Public Information in the U.S. Geothermal Industry: The Challenge of the Early Years

An Unofficial History, Part I

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Most of the quotes in this article were obtained from our geothermal colleagues at various GRC Annual Meetings between 1989 and 1997. Company, agency and other affiliations and titles are noted as of the time a statement was made. If there are any particular quotes about which you'd like more information, please contact one of the authors.

Foreword

by Marilyn Nemzer

It was a revelation when I first learned of geothermal energy over 30 years ago. My husband Ken had helped a legal client, Charles Condy, to found an energy company (later CalEnergy) that would develop and sell electricity from geothermal power plants. ***Geo-what?*** Uh oh. I sure had a lot to learn!

In 1988, one of our children brought home his fourth-grade book about California. I read with him all about the Golden State's "valuable natural resources." Oops … where was geothermal? Not there. Not under "water resources" either. Not anywhere. The natural question for me, a teacher, was: So where do people learn about geothermal energy? As I researched the question, I learned—rather sadly—the answer: pretty much nowhere. The wind and solar industries were way ahead of us in getting the word out to the general public. If geothermal was ever to become a household word, we sure had a lot of catching up to do.

Thus was born the Geothermal Education Office (GEO), a nonprofit organization I founded in 1989.

Over the years, working together with Anna Carter, science teacher Deborah Page, and with many generous industry volunteers (standouts: Marshall Reed, Gordon Bloomquist, Marcelo Lippmann, Mike Wright, Charlene Wardlow, Susan Hodgson, John Lund, Dave Anderson, Joel Renner, Tom Flynn, Alfred Truesdell, Ken Nemzer), we developed popular geothermal education publications, presentations and programs for elementary and high school students and public information materials for use by industry, agencies, the media, and others.

But we were not alone. A lot of people in the geothermal industry were making similar efforts. In 1997 Anna Carter and I decided to chronicle those efforts but the draft was set aside for other projects and is taken up again here. This article is a result of that work.

The authors hope that these recollections of times past will help our readers fully appreciate the mostly positive relationships we have today with environmental groups, legislators and agencies; 'twas not always so. And we hope, too, that others will write interesting historical notes for the *GRC Bulletin* so stories of the colorful history of the U.S. geothermal industry will not be lost.

Introduction

"I find that very few people know what geothermal energy is. Solar still gets funded at a fairly reasonable level, not because it puts out any great volume of power compared to geothermal or that it has a brighter future, but because it has a very good image with the general public. I can say categorically that geothermal energy has no image. Most people have never heard of it."
- Ted Mock, DOE, early Geothermal Program Manager

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As our community has built the industry we have worked hard to be understood.

In the early days, the focus of this fledgling industry was on survival. Educational efforts were focused on geothermists sharing information on geothermal technology with other geothermists. In time, we reached out to other groups: legislators and administrators who would provide infrastructure for our work, neighbors who would be affected by our work, voters and opinion-makers who would provide our projects with support—or with impediments.

We were innovators, introducing an energy industry that was already known in Italy, but new to the U.S. The public had no inkling of those early achievements. Energy issues were not the stuff of front-page headlines, and the outreach and educational opportunities offered by the Internet age were yet to come.

The Challenge of The Early Days

Keeping the Industry Alive

When geothermal development began in the U.S. at The Geysers in the 1960s and 1970s, developers had to educate investors, the financial community, utilities, legislators, local and state energy and regulatory agencies, county supervisors and assessors, non-governmental organizations, voters—everyone—about all aspects of geothermal energy. Most importantly, they had to convince utilities to buy the steam to generate power. (At that time, only utilities could build power plants.)

These education efforts did not have the benefit of a domestic history, printed or otherwise—no reservoir performance to tout, no U.S. plant operating experience from which to draw. They didn't even have a legal definition of geothermal energy.

The Beginnings of Education: Technology Transfer

The need to organize the sharing of technical information within the industry became apparent early on. In 1970, Dave Anderson, a geologist working at the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR), organized a workshop on geothermal energy that was attended by about 150 members of industry, service companies and regulators. On the heels of this workshop came publication of the first edition of DOGGR's *Geothermal Hot Line*. The first announcement was that:

"The long-awaited federal 'Geothermal Steam Act' was officially signed into law by President Nixon on December 24, 1970. The Act provided a leasing process for making federal lands available for exploration and development and directed the U.S. Geological Survey to study and classify all potentially productive geothermal lands."

In 1972—with seed funding donated by Joe Aidlin (Vice President and General Counsel of Magma Power)—our fledgling industry founded the Geothermal Resources Council (GRC), with Dave Anderson as its first Executive Director. That same year, the GRC held its first Annual Meeting in El Centro, Imperial Valley, California, and in November of 1972, the flagship publication of the GRC—the *Geothermal Resources Council Bulletin*—was born.

Organized geothermal education in the U.S. thus had its beginnings. The GRC, with various
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federal, state and local agencies, universities, government labs, and geothermal developers, set about making technical and semi-technical information available—primarily for the benefit of geothermal stakeholders. These entities, along with the geothermal science journals that emerged, did an excellent job of technology transfer. (An early standout was the Oregon Institute of Technology's GeoHeat Center, a major source of national and international data and technical information on geothermal direct uses, founded in 1975.)

The development of non-technical or semi-technical materials and programs for the general public would not be undertaken in an organized way until years later.

Educating Legislators

The U.S. geothermal industry quickly recognized the need for more favorable laws at all levels of government. Geothermal players supported the Public Utility Regulatory Policies Act of 1978 (PURPA), mandating the purchase of electricity by utilities from non-utility producers—creating a market for Independent Power Producers (IPPs) and promoting public funding for research. Geothermal industry leaders like Joe Aidlin, Carel Otte (Vice President of UNOCAL), and Domenic Falcone (former Geothermal Resources International senior executive) were active in legislative matters in the 1970s.

GRC/GRA: Until the mid-1980s, legislative efforts among the companies were somewhat loosely coordinated. The challenge of educating legislators gained new life at the GRC Annual Meeting of 1985, in Kona, Hawaii. Starting with a meeting led by Carel Otte, Kenneth Nemzer (California Energy Company) and Ben Yamagata (attorney, Van Ness and Feldman), momentum gathered to better plan and fund campaigns for legislative action in matters that included taxation and regulation. The Geothermal Resources Association (GRA) was formed, with Nemzer as its first President, and achieved notable success in gaining and retaining favorable treatment for geothermal, all during a time when other industries were losing benefits.

NGA/GEA: The National Geothermal Association (NGA) was formed in 1986. In contrast to the GRA, which had been organized and funded exclusively by the large geothermal developers, the NGA included geothermal suppliers, support companies and consultants as well as developers. The NGA promoted trade and also served an outreach function. By 1997 the functions of both the GRA and NGA had been assumed by the recently incorporated Geothermal Energy Association (GEA). Karl Gawell was brought in as its first long-term executive director.

Educating Others: The As-Needed, Targeted Audience Approach

"Sharpshooting is where you get the most bang for your buck." -*Domenic Falcone*

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On the non-technical horizon, the industry philosophy was "educate as needed." The concept of general public information was not rejected; its need was simply not an affordable priority. Information dissemination required staff time to develop fact sheets, make presentations, cultivate relationships with science editors and write press releases. Education of the general public was too expensive an undertaking and just didn't get to the table. Energy issues were not yet making headlines nor seen on television documentaries. Peaking oil and climate change were not on the public's radar—and federal energy policy was focused on nuclear and fossil fuels.

In the 1970s, '80s—and even into the '90s—a few people learned about geothermal energy because they lived near places where geothermal leasing, drilling or power plant projects were proposed. Local communities learned about geothermal energy through public hearings held by permitting agencies or through developers' presentations. Sometimes a local college would provide a forum for discussion of a specific project.

With enactment of the National Environmental Policy Act of 1969 (NEPA) for projects on U.S.
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federal lands, and the California Environmental Quality Act of 1970 (CEQA), first impressions of the impacts of geothermal power generation most often came from a two-inch thick, highly technical, Environmental Impact Statement (EIS) including "worst case scenarios." (Note, for comparison, that projects to clear-cut thousands of acres of timber were approved with 1/4-inch thick Environmental Assessments [EAs].)

The public had no context for understanding the advantages of a geothermal plant or the impacts of a coal or natural gas plant. There were no equivalent EISs covering all phases and offsite impacts of those projects. Fossil fuel and nuclear plants could be sited at more desirable (less controversial) locations and were rarely on federal lands, so—unless federal funding was used for them—no EISs or EAs were prepared. Geothermal projects, however, were highly scrutinized. Mistakes and early practices (arising from inexperience), hydrogen sulfide issues in The Geysers and subsidence concerns in the Imperial Valley were generalized to every geothermal project proposed.

> "There was a lot of misperception—especially in the 70s, but also a lack of understanding of what role the government had. I spent a lot of time before the Sonoma County and Lake County Planning Commissions and Boards of Supervisors, just telling people what regulatory authority we (DOGGR) had and what we were doing and that geothermal wells were safer than oil and gas wells." - *Marshall Reed, U.S. DOE*

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Marshall Reed's experience was repeated again and again by others. In addition to Dave Anderson's outreach work through the GRC, many individuals from industry and regulatory agencies spent years preparing fact sheets and attending public hearings explaining the technology behind geothermal projects. Permitting agencies also had a steep learning curve, having to become familiar with the impacts of geothermal projects, define the boundaries of their regulatory authority and implement NEPA or CEQA. Educating the public and reassuring them that the agency standards would protect them became a new priority. Yet most people remained unaware of the clean, renewable energy in their backyard.

> "Even though on clear cold days you can see the vapor plumes from Santa Rosa, no one knew that they had the biggest geothermal resource in the world up there. ... I was here in the 1970s talking to Rotary, Kiwanis, county meetings, the Boards of Supervisors, etc." - *Lou Capuano, Jr., Thermasource*

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> "Most people didn't understand… I can remember when the Santa Rosa Garden Club used to come up and had no idea what they were coming to see." - *Dean Cooley, PG&E*

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> "Starting back in the 1970s about three of us from the Deschutes National Forest and the BLM created a library of geothermal information, attended GRC meetings and educated ourselves. Then we became a resource to the other Forest staff and went around giving talks on geothermal to the other forest districts. . . .then we organized classes at the community college and other events open to the public and gave presentations to community groups. We did this for years and years." - *Larry Chitwood, Deschutes National Forest*

Dealing With Opposition

Despite these early efforts there remained a vacuum in public and media understanding of geothermal and its advantages compared to other energy sources. At that time, federal and state energy agencies assiduously avoided critically needed comparisons of the environmental and economic impacts of the various energy sources. This dearth of relevant information opened the door for opponents to orchestrate delays in geothermal development. Groups would oppose projects from their national offices, even when local members were supportive.

The agencies and the developers were hit
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with: (1) lawsuits by the Sierra Club opposing geothermal leasing on federal lands in Oregon; (2) a lawsuit by the National Wildlife Federation opposing development projects on certain types of federal lands, which targeted coal mining but inadvertently almost killed the funding for the Coso geothermal project in California; (3) a media campaign by the Rainforest Action Network that created international opposition to geothermal development in Hawaii; 4) a scare campaign by an Oregon interest group opposing exploration on U.S. Forest Service lands—well outside the boundary of Crater Lake National Park—suggesting that geothermal plants would surround the lake's rim (in the park); newspaper headlines read "Imagine Crater Lake With No Water"; 5) over a year's delay in obtaining a drilling permit due to rules applicable to the geothermal industry that did not apply to the oil and gas or other resource industries for the same activities; 6) over a year's delay in permitting of a project at The Geysers, because the cliffs near a project location "might" provide habitat for the Peregrine falcon, though none had ever been observed there; and 7) opposition to the expansion of the geothermal project at Mammoth Lakes, California, by both the California Department of Fish and Game and the U.S. Geological Survey. (And though their positions shifted to the positive, and early concerns proved unfounded, negative papers on the subject remain in the literature.) Every geothermal company of the time has its own permitting horror stories.

The industry and the regulators became increasingly beleaguered and demoralized by misinformation and negative press about geothermal.

"I've been working in Hawaii and the press seems to be filled with a mixture of partial information and the strangest misconceptions." - *Bill D'Olier, Consultant*

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Facing Facts

"All too often . . . we remain talking to one another and failing to communicate with the wider public." - *John Garnish, Consultant*

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"In retrospect, we did many things correctly. However, our strategy had one major flaw: We failed to include the proper media people in our information efforts." - *Joe LaFleur, CalEnergy*

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It was evident that the U.S. geothermal industry had been naive about the need to educate the public and the media and was not well prepared to promote the benefits and advantages of geothermal energy projects,

The geothermal industry met opposition by local citizens or by organized environmental groups with incredulity, defensiveness, frustration and resentment. We knew that geothermal energy was one of the answers to environmental problems caused by fossil fuels and considered ourselves the real environmentalists. The lack of full inclusion of geothermal (and, in fact, of all renewables) in national energy policy was hard to fathom. We were the good guys in the white hats and we were either being ignored or maligned. We hadn't created solid alliances with other renewable energy organizations or environmental groups and we hadn't brought the public along with us.

"Don't get out too far ahead of the troops, they'll shoot you." - *Bill Tipton, CalEnergy*

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In those early years geothermal developers did not share information easily. The oil industry origins of many participants contributed to a culture of wildcatting individualism and competitive secrecy. They bristled at the introduction of new regulatory constraints. And the industry did not always rally behind the developers of controversial projects. Appropriate responses came too late. The need for more cooperation and organization became critical.

"The industry could have been a lot more open and outgoing with the public. It took years before we were willing to take the Board of Supervisors and the State Energy Commission on field trips to The Geysers. We could have been more open and run bus loads through earlier. It is fundamental to education to see, to touch, to expose the senses . . . same problem in the Pacific Northwest. People knew nothing except what they were able to read—and they were reading horror stories. Once you've seen one, it's a lot easier to accept a geothermal plant than a clear-cut forest." - *Marshall Reed, U.S. DOE*

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"The reality was that we didn't have a credible way of saying geothermal was good. We couldn't tell people what the impact of a power plant would be; we didn't have access to operating engineers. Early on you had a bunch of guys looking for reservoirs; we were exploration companies. We used to tell people to go a GRC meeting. A couple of environmental groups did." - *Dick Benoit, Oxbow*

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That the geothermal industry had failed to adequately invest in outreach and engagement with the public was quintessentially illustrated at the 1990 GRC Annual Meeting in Hawaii.

The meeting was picketed by a flotilla of protestors opposed to the geothermal power plant project at Puna on the Big Island. Upon being alerted to the picketing, the GRC's official response was to beef up security, refuse the request of representatives of the protest group to attend the meeting without payment of the registration fee and ignore the picketers.

Though many individuals did attend an evening open house hosted by the protestors, the industry as a whole had not committed to a proactive effort to open its doors to a dialogue. They were entrenched, despite the urging of individual developers and agency staff members and that of environmental and NEPA/CEQA consulting firms regularly engaged by developers.

Ironically, the GRC had public information specialists and mediators right there—scheduled to speak at the Annual Meeting's first technical session on Public Information and Outreach.

"Not only do we need the public education effort . . . we . . . need, based on our experiences in Oregon and Hawaii, to educate ourselves to local sensitivities. If both parties know where each other is coming from they will be better able to come to compromise." - *Bob Fujimoto, U.S. Forest Service*

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How has the U.S. geothermal industry improved on its public image since the early 1990s?

Stay tuned for *Public Information in the U.S. Geothermal Industry: The Challenge of the Early Years: An Unofficial History, Part 2*, coming up in the next *GRC Bulletin*.

The views expressed in this article are those of the authors and do not necessarily represent the views of, and should not be attributed to, the Geothermal Resources Council or the *GRC Bulletin*.

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Foreword

In Part 1 of this article, which appeared in the last *GRC Bulletin* (Vol.42, No. 4, July/August 2013), the authors took readers through public information challenges of the 1960s, 70s and 80s. We recalled growth and adversity – even times with a near-siege atmosphere. Part 1 concluded – no surprise – that the geothermal industry had failed to invest adequately in geothermal education, outreach and public engagement.

Recognizing the Need for Broader Public Information Efforts

Until 1990 – with a few notable exceptions (discussed below) – there was little generic non-technical information about geothermal energy available for dissemination to the general public. There was an acute need for non-company and non-project-related user-friendly geothermal education materials and for a sustained outreach program. Lack of public understanding of geothermal energy was impeding industry progress.

"The public view of geothermal—or renewables in general—affects our ability to market." -*Bill Woods, Calpine*

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"When discussing energy, it is often painfully obvious that geothermal is one of the nation's best kept secrets." -*Gordon Bloomquist, Washington State Energy Office*

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"I've been frustrated because we are trying to do all things ourselves. We respond to the congress, the media, the general public, and to the Sierra Club. And the materials and tools have not been there. We've had to generate things over and over again ourselves. Something needs to be done in that respect." -*Sally Collins, Deschutes National Forest*

Starting from Zero

Educating the public about geothermal energy meant starting from zero. Even as late as the 1990s, most people did not have an energy frame of reference. Large central-station power plants fueled by coal were the primary source of electricity in the

U.S. and climate change was not yet in the public lexicon. The public remained complacent.[1]

> "Energy is not a big issue for people. People are not particularly interested in energy." *-Tom Hinrichs, Magma Power Company*
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> "On energy related issues, only 32% of teachers and high school seniors correctly choose wind as the renewable energy source among wind, natural gas, and coal; only 19% know that petroleum supplies most of the nation's energy; and only 16% know that coal is used to produce electricity." *-1991 National Energy Strategy, Powerful Ideas for America*

No public school courses were required that helped produce energy literate citizens.[2] Few people knew where their electricity came from and even fewer knew that we were burning dirty fuels to make steam to run turbines to generate electricity.

How could we expect people to understand the value of natural steam, when they did not understand that dirty, nonrenewable fuels were being burned to manufacture steam for electricity? We had a big job ahead of us.

We really did have to start from zero: What is a turbine? How does it work? What energy sources are used to make electricity? What are the impacts of burning fossil fuels? What is renewable energy? What is geothermal energy? What are the environmental consequences of energy choices?

Even our legislators would have been hard pressed to answer these questions.

Taking on the Task: The Early '90s

> "In the beginning days of the industry we faced . . . numerous and new problems and opportunities. We met them – sometimes with admirable ingenuity. Today we are confronted with new and different problems and opportunities, and we should meet them in the same forthright and open manner as we did then. We owe no less to our own country and to the various communities in the world where geothermal resources exist in abundance. There is no reason why this cannot be done except unwillingness to reason or to communicate." *-Joe Aidlin, former Vice President and General Counsel, Magma Power*

Highlights of Earliest Public Information and Outreach Materials and Programs

1988 through 1991 were banner years for industry collaboration and the creation of geothermal public information materials.

California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR): With the 1988 publication, *Geothermal California* by the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR), we were off to the races. Authored by Susan Hodgson, this geothermal energy primer, known as "the comic book," was widely distributed and appreciated by both the young and "the old." For years, an introductory geothermal class at Stanford read the publication on the first day. *Geothermal California* covered the basics with simplicity and, at the same time, technical accuracy. There were other individual efforts, but this one is the most recognized and widely adopted kick-starter toward public geothermal enlightenment.

Geothermal Education Office (GEO): In 1989, recognizing the lack of geothermal education materials in our nation's schools, Marilyn Nemzer

[1] Climate data and warnings appeared as early as the 1950s and '60s. The Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 and its first report was published in 1990. The U.S. Department of Energy did not acknowledge climate change until well into the first decade of the 21st century. It is illustrative of their position that DOE once asked GEO to remove references to climate change in its 1998 video on geothermal energy.

[2] Even today, in most states, the only required class covering renewable energy is a short segment of the sixth grade curriculum and an even shorter bit in the eighth grade. At the high school level, renewable energy is studied in some elective classes, but not much in required classes. Nor have social-political-international renewable energy issues been given appropriate focus in public school social studies classes.

founded the nonprofit Geothermal Education Office (GEO), with seed support from California Energy Company (now CalEnergy). GEO's founding mission (later expanded) was to develop and disseminate curricula for K-12 students. With Anna Carter (who had learned from the ground up at CalEnergy) and science teacher Deborah Page, GEO began with publications and programs for schools. The first curricular supplement won recognition from the Smithsonian Institute and other GEO publications were commended by the National Science Teachers Association. Easy-to-understand information about geothermal energy was finding its way into nationwide energy education programs and into the classrooms of motivated teachers.

Early in the '90s, GEO recognized a growing industry need for presentation tools for geothermal speakers from industry and agencies. GEO's "find a need and fill it" approach led to the publication of a variety of brochures, fact sheets, graphics, slides, videos, and curricular materials which were ultimately translated into several languages and are still in use around the world today by geothermal stakeholders, textbook publishers, students, and the media.

Crucial to the accuracy and credibility of GEO's materials were the hundreds of hours of volunteer time given by members of the geothermal industry to share information and review drafts.

Geothermal Resources Council: In October 1989, at the GRC Annual Meeting in Santa Rosa, California, Susan Hodgson and Anna Carter convened a Public Information Forum to discuss public information activities within the GRC. About 60 people attended this spontaneous meeting, word of which was spread person-to-person. (Many quotes from that meeting are included in both parts of this article.) In response to the wholehearted agreement that there was a need for more organized public information activities, the GRC later formed the *Ad Hoc* Public Information Committee, which subsequently became the Public Outreach Committee, a standing committee of the GRC. (The work of this committee has been sporadic, as it has relied almost exclusively on the volunteer efforts of GRC board members.)

Then, in 1990, Hodgson and Carter organized the GRC's first Special Session on Public Information at the Annual Meeting in Hawaii. For a time, Public Information sessions became a regular feature at GRC Annual Meetings.

Promotion of Geothermal Advocacy and Outreach

In 1990-91 Phillip (Mike) Wright, of the University of Utah's Energy & Geoscience Institute, wrote two foundational papers: *Developing Advocacy for Geothermal Energy in the United States and Advocacy for Geothermal Energy: a Critical Need*, in which he succinctly states:

> "We need an organized, sustained effort to provide information and education to all segments of our society... Elected and appointed government officials see that there is no geothermal constituency... Environmental groups are not generally supportive and some are even combative... wide-based advocacy must be developed. We have failed to develop and communicate factual data about geothermal energy and... we have not spread our excitement and conviction. The result is lack of public awareness in all segments of our society, which leads to misperceptions and/or the absence of a rational basis to support geothermal energy."

In 1991 the GRC and the NGA held three workshops on public policy issues. These included topics such as "Public Awareness and How it Affects Energy Development," "Public Outreach Issues" and "Special-Interest Group Issues – Including the Environmental Community and Energy Advocacy Groups." The outcome of these newly collaborative efforts included:

Identification of impediments: "Geothermal energy is not recognized as a viable option by the public, the media, the technical community, the environmental community or by our government leaders."

Development of Policy: "The geothermal community supports a proactive and reactive education and outreach program for the purpose of bringing a much higher level of awareness of the

advantages and potential of geothermal energy to all sectors of the American and world population."

Agreement on Strategy: "Identify and prioritize with specificity target audiences for outreach material, and develop and communicate tailored messages for them."

Sadly, the geothermal industry was not able to coordinate or finance a unified effort to implement a strong public information and outreach program as envisioned by Wright and by the hopeful group of us who wanted so much to see it happen.

Moving Into the '90s

Despite the lack of an organized effort, it had become clear that we could not wait for the world to come to us to learn about geothermal energy. We had to move ourselves into the public eye.

"It's hard to convince someone that you are not something. It's much easier to convince someone you *are* something. That's why you need to be proactive rather than reactive." -*Susan Hodgson, DOGGR*

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"The industry must create its own political heat through a strong public awareness campaign . . . We have to do everything we can during the next five to ten years . . . to place geothermal energy in the minds of as many persons as possible and to maintain this image over this duration. Otherwise, when the time comes to develop this resource we'll suddenly be faced with an even more urgent need for public advocacy, and we'll lose valuable development time in the process.

. . . [S]peak up by contacting local news media, addressing community groups, writing newspaper guest editorials, and volunteering to speak in college and high school classrooms." -*Dave Anderson, GRC*

And there was no dearth of enthusiasm and advice on the subject:

"Because fact contaminated with disinformation is a quicksand, and because every outrageous disinformation will attract followers, disinformation always must be fought, whatever the effort." -*Jim Koenig, GeothermEx*

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"Make yourself available to any organization that will hear you. Eventually people will get on board. When you educate personally, you build name and face recognition, you build trust. I'm cautiously apprehensive about the future of the industry in the U.S., but I will always be involved. If you want to make a difference you have to be involved." -*Lou Capuano, Thermasource*

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"One thing that's been pretty amazing from our standpoint is that . . . when we need help in terms of seminars and community college classes on geothermal there are people out there ready to do it."
-*Sally Collins, Deschutes National Forest*

Early Points of Light

Beginning in the early '80s and throughout the '90s, many individuals and organizations – some on their own, some through collaborations – made worthy efforts to reach the public with the geothermal story.

Notable Early Efforts by Companies

CalEnergy was an early standout. In 1989 the company sponsored an energy contest in the San Francisco public schools offering a contribution to the winning student's college education. In 1990, with major environmental groups, CalEnergy co-founded the Center for Energy Efficiency and Renewable Technologies (CEERT).

Unocal's company brochures were especially friendly, including big, colorful, easy-to-read sections explaining geothermal energy.

Ormat staff presented at national conferences, where they were usually the only geothermal representatives.

Power plant operators of many companies were glad to arrange for power plant field trips for the public and began to reach out into their own local schools and communities.

Notable Early Efforts by Organizations

GeoHeat Center (GHC) at the Oregon Institute of Technology. By the early 80s, under
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the direction of Paul Lienau and, later, John Lund, GHC gained international recognition as the go-to place to obtain introductory, semi-technical and engineering advice on geothermal direct uses.

Geysers Geothermal Association (GGA). Formed in 1983, one of the GGA's founding objectives was to actively promote the geothermal industry to the public. One of the earliest things the group did was to organize a GGA Speaker's Bureau to explain the many benefits of geothermal energy to service organizations and classrooms. By 1986 the GGA had implemented a generous scholarship program (which continues today) for local students.

Geothermal Education Office (GEO) was first to focus on pro-active outreach. In 1990 GEO began its 15-year history of participation in meetings of science educators, energy and environmental groups, utilities and legislators. GEO organized workshops for teachers, collaborated with energy, water and environmental education programs, sat on related boards, arranged for speakers at schools and service clubs and networked proactively with the greater renewable energy industry. GEO responded to hundreds of questions submitted by students and the public, and started what later became a premier geothermal education website.

Geothermal Resources Council (GRC), was very supportive of public information outreach efforts. As is noted elsewhere, GRC members selflessly spent many hours reviewing drafts to help GEO staff with development of educational materials. Dave Anderson, GRC's Executive Director at the time, happily shared facts and discussed ideas for GEO publications and he was always glad to answer questions about geothermal from students, teachers and the general public. Beginning in the very early '90s, the GRC hosted GEO's teacher workshops at Annual Meetings, where the venue offered welcome opportunities for GRC members to connect with local educators eager to learn about geothermal.

International Geothermal Association (IGA). Beginning in the late '80s, the IGA contributed unique information useful to those of us who needed data for our own materials. One of its earliest contributions was a compilation of locations for all geothermal power plants in the world by longitude and latitude.

Geothermal Program Office of U.S. Department of Energy (DOE). As early as 1989, DOE began sponsoring some excellent education programs, among which were GEO, OIT, GRC and, later, the Geo-Powering the West program, which, importantly, included funding for the Western Area Power Administration's (WAPA) outreach to utilities.

Geothermal Energy Association (GEA). The GEA, formed in the mid '90s, took on new life in 1997 when Karl Gawell became its Executive Director. Gawell began working to expand positive media coverage of geothermal energy, educating legislators and collaborating with other renewable energy organizations; addressing industry needs identified in those Public Policy workshops of 1991.

Notable Early Efforts by Individuals

Deserving special mention are a few dedicated individuals who pioneered some very solid and lasting geothermal public information pieces in the early1990s:

Mike Wright and Jeff Hulen created what came to be known as "the red brochure," or "Mike's brochure": ***Clean Sustainable Energy for the Benefit of Humanity and the Environment***, published by Energy and Geoscience Institute, University of Utah. This 8-page brochure was perfect for legislators, investors and older students.

Wendell ("Duff") Duffield and John Sass of the U.S. Geological Survey came out with ***Tapping the Earth's Natural Heat***, a 63-page "circular." This was written at a level suitable for the general public and, like "the red brochure," was another much-used handout. Due to popular demand it was reprinted in 1997, and later republished as ***Geothermal Energy—Clean Power From the Earth's Heat*** (Circular 1249). (Said Duffield: "The style and level of writing was deliberately aimed for a general readership, rather than just our pointy-headed research colleagues.")

Susan Hodgson, in addition to "the comic book," authored and edited several items that advanced geothermal public information. Unique was a 1990 summary of nontechnical worldwide geothermal public information; another was a 1999 GRC-IGA publication, ***Stories from a Heated Earth***, co-edited with John Lund and Raffaele Cataldi.

The Late 1990s

By the last half of the 1990s, environmental issues related to energy production were in wider focus: newspapers had more environmental themes and renewables were getting more recognition as a partial solution, though geothermal's role still was rarely acknowledged.

Though inroads had definitely been made, the industry remained daunted by the prospect of educating the general public. At the opening session of the 1996 GRC Annual Meeting in Portland, Lou Capuano questioned the ability of the geothermal industry to educate the U.S. public, considering that "the public is so large and the geothermal industry is not only small, but is struggling to educate even the members of Congress." That was a widely held industry concern, as was the lack of inclusion of geothermal in the public literature on renewables; particularly galling in light of the fact that it was producing more kilowatts of power in the U.S. than any other renewable energy except large hydropower.

"This editorial is written to explain my frustration with the lack of geothermal coverage in alternate energy articles published in the United States and abroad. ...wind, solar, tidal, etc. are touted as solutions to the fossil fuel problem and as saviors in terms of air pollution, depletion of resources and greenhouse warming. Most often geothermal energy is given only passing or no mention." -*John Lund, OIT GeoHeat Center*

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"There is a glaring omission in public education. I have hosted I don't know how many crews videotaping; PBS, local networks, etc. There has never been a PBS program on geothermal. After a nine-hour field tour and two full hours of taping these very photogenic facilities, they put about 18 seconds in their presentation of renewable resources. I was incredulous!" -*Frank Monastero, China Lake Naval Weapons Center*

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"The Worldwatch Institute just published *Paying the Piper, Subsidies, Politics and the Environment*. It contains a table listing the various sources of power. It is absolutely appalling that with the number of megawatts of geothermal online that it is completely ignored. How can you get geothermal on the radar screen? It is not happening; it is getting worse instead of better." -*Laurie McClenahan-Heiter, MHA Associates*

As is so clearly expressed, it was a frustrating time for the geothermal industry. By the end of the 20th century, geothermal curriculum material was available to teachers (though dissemination was still a difficult and expensive hard-copy effort). Presentation materials were available for stakeholder use in educating the public. More of us than ever were attending renewable energy meetings and reaching out to new and ever-larger groups, including utilities. But it was not yet apparent that those seeds were bearing fruit.

Polls of the U.S. citizenry were revealing a clear-cut preference for renewable energy, but that preference was not reflected in federal energy policy. Though the tide was turning, more and more states were adopting renewable portfolio standards. The reality was that the geothermal industry was in a 15-year slump. U.S. natural gas prices were low (similar to today). The power industry had turned almost exclusively to combined cycle natural gas plants, It took several spikes in natural gas prices to refocus America on renewables. In the interim, the very survival of the U.S. geothermal industry came into question as more and more geothermal experts sought employment in other industries or overseas.

In the next *GRC Bulletin*, the authors will conclude ***Public Information in the U.S. Geothermal Industry: The Challenge of the Early Years: An Unofficial History***, with a discussion of geothermal public information in the 21st century. ■

The views expressed in this article are those of the authors and do not necessarily represent the views of, and should not be attributed to, the Geothermal Resources Council or the *GRC Bulletin*.

Public Information in the U.S. Geothermal Industry: The Challenge of the Early Years

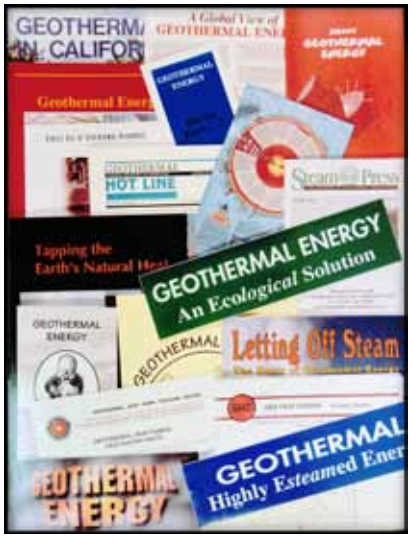
An Unofficial History, Part 3

by Anna K. Carter, Principal, Geothermal Support Services;
Marilyn Nemzer, Executive Director, Geothermal Education Office; and
Kenneth P. Nemzer, Former General Counsel, California Energy Company & Former President,
Geothermal Resources Association

Foreword

In Part 1 of this article, which appeared in the *GRC Bulletin* (Vol.42, No. 4, July/August 2013), the authors took readers through geothermal public information challenges of the 1960s, 70s and 80s, recalling growth and adversity—even times with a near-siege atmosphere. Part 1 concluded that the industry had failed to invest adequately in geothermal education, outreach and public engagement.

In Part 2 (*GRC Bulletin*, Vol. 42, No. 5, September/October 2013), the authors highlighted notable geothermal outreach and public information efforts that took place throughout the 1990s by dedicated individuals, companies and organizations. However, Part 2 ends on a discouraging note: the '90s were a frustrating time for the geothermal industry, which found itself in a 15-year slump. Though educational and public outreach seeds had been sown, the fruits of those efforts were not yet apparent. Natural gas prices in the U.S. were low, and the power industry had turned almost exclusively to combined cycle natural gas plants. "The very survival of the U.S. geothermal industry was brought into question as more and more geothermal experts sought employment in other industries or overseas."



Sampling of geothermal education materials developed in the 1990s by Geothermal Education Office; Geothermal Resources Council; Geothermal Energy Association; California Department of Conservation, Division of Oil, Gas and Geothermal Resources; University of Utah, Energy & Geoscience Institute; Oregon Institute of Technology, GeoHeat Center; U.S. Geological Survey. Note that these do not reflect the expanded materials available today.

Geothermal Public Information in the 21st Century

> "The potential for the future is great—provided we're willing to work together until enough people begin to see the light."
> *- Darcel Hulse, Unocal*

From 1997—the year this article was first drafted—to the present day, the national climate for geothermal energy development has improved. Presidents and governors now use the word "geothermal." Most legislators now recognize geothermal as part of the family of renewable energy resources. And people who, beginning in the '90s, may have learned about geothermal energy in school from Geothermal Education Office (GEO) curricular materials are now voters.

Geothermal industry stakeholders have placed more focus on public perceptions of geothermal energy. Developers and operators have built

user-friendly visitor centers, opening their doors ever wider for classroom and public field trips and are supporting more geothermal education in their local schools, community colleges and universities. Geothermal energy organizations, universities and national labs, and many major utilities and small co-ops have shared in the efforts to provide energy education materials for schools and the general public.

The GEO, Geothermal Resources Council (GRC), Geothermal Energy Association (GEA), Department of Energy (DOE), and others have reached out to students and have helped support geothermal seminars and summer schools in colleges and universities. The GRC now provides student scholarships and encourages students to attend our geothermal meetings. The Geysers Geothermal Association has been awarding scholarships for over 25 years. The Oregon Institute of Technology (OIT), Stanford University, Southern Methodist University (SMU), University of Nevada, Reno (UNR), University of California at Davis and other educational institutions have growing student programs in geothermal energy. The GRC has periodically offered environmental, utility, renewable energy or tribal representatives free attendance at its annual meetings. Both the GRC and GEA have developed important collaborations with national environmental and renewable energy groups around the U.S. And, over the last few years, GEA media events have brought significantly more visibility of geothermal energy to the public.

Individuals in the geothermal industry are still out there giving talks and presenting at GRC Annual Meetings, at energy and environmental conferences, in their local communities, in classrooms and in university seminars. And it was during this last decade that GEO's staff published the landmark *Energy for Keeps: Electricity from Renewable Energy*—the first book written for students and the general public that placed

Public Outreach at the Community Level

"I don't think there is any substitute for one-on-one conversations."
– Laurie McClenahan Hietter, MHA Environmental

One of the most effective means of alleviating public fears of geothermal exploration and development projects has been the early formation of local committees and working groups to address particular issues or projects. Typical participants include developers, land management and permitting agencies, utilities and co-ops, geothermal consultants, the U.S. Geological Survey, interested local citizens or citizen organizations, and recreational and environmental organizations.

Regular meetings offer opportunities to raise issues, be heard, share information, express needs, hear from industry or third party experts on subjects of interest, build consensus and formulate compromise. While such local approaches are not "public education" in the broader sense of national outreach programs, they are all-important in establishing and maintaining the relationships, trust and goodwill necessary for successful permitting of specific geothermal projects. In geothermal fields with more than one operator, these committees or working groups also offer opportunities to find areas of cooperation and develop agreements for shared funding of mitigation and monitoring.

An early example is the Geothermal Research Information and Planning Services (GRIPS) Commission, a 4-county joint powers agency convened in the '70s to address development of The Geysers. The Geysers Geothermal Association (GGA), an industry group, followed—along with *ad hoc* committees formed to collaboratively address ongoing issues such as air quality monitoring and seismicity.

Others include the Long Valley Hydrologic Advisory Committee (for the Mammoth Lakes projects), and the Newberry Citizens Committee (which ultimately created the Newberry National Volcanic Monument in Oregon, resolving boundary and other issues related to leasing of federal lands outside the caldera). Geothermal working groups also have operated, or are operating, in Idaho, New Mexico, Utah, Washington, Oregon, and Colorado. Some of these groups were first created through DOE's GeoPowering the West Program (also now defunded), working with state agencies.

Early on, the GRC provided opportunities for regions to informally affiliate their organizations with the GRC. GRC Sections were organized in the San Francisco Bay Area and the Imperial Valley of California, in Nevada, and in the Pacific Northwest. The Pacific Northwest Section is the only GRC section currently active. Today the California Geothermal Energy Collaborative and the Nevada Geothermal Council also provide opportunities for collaboration in those states.

geothermal solidly within the family of renewables.

Additionally, the Internet has made it easy for us to share information and ideas and for interested folks to find out what they want to know. Students, teachers, legislators, investors and anyone else can now learn about geothermal energy with just the click of a button.

And yet . . .

. . . at nearly every geothermal, renewable energy, and environmental meeting, geothermal stakeholders still identify education of the public as a primary need.

Maintaining Public Education Momentum

Although not all geothermal education and outreach programs in the United States have depended on DOE dollars, the major multi-year and sustained education and outreach programs have heavily relied on government grants. Sadly, over the last decade, that DOE funding has been phased out.

The National Geothermal Collaborative (NGC), funded by DOE to facilitate dialogue among key stakeholders and to provide outreach tools to the geothermal industry, is no longer funded and its products are no longer available online. DOE funding of the Western Area Power Authority (WAPA) for its important geothermal education program for utilities and co-ops ended in 2008. The OIT GeoHeat Center funding for information dissemination about geothermal direct and lower-temperature uses ceased this year. GEO has not received DOE funding since 2004 and, after maintaining some operations voluntarily, is seeking to pass its materials and updating of its curricula and website on to the next generation of geothermists. These are just a few examples.

Over the years there has been sporadic supplemental funding for these and other programs through state agencies, larger utilities, the GRC and other sources, but these supplemental dollars have not covered continuing education and outreach operations.[1]

It is true that most geothermal entities and stakeholders include important educational information about geothermal on their websites, making it available to anyone who is actively looking for it.[2] But websites do not represent pro-active outreach. And most do not prepare students (future voters) for energy decisions or for understanding of the economic and environmental impacts of those decisions. Energy literacy (as the authors have previously discussed) is being overlooked in our schools.

It is also true, as noted elsewhere in this article, that many geothermal-related agencies, companies and individuals—many of our readers—are, as in earlier decades, working hard to educate a wide variety of audiences, both locally and nationally. The importance of these voluntary efforts cannot be overstated: with the loss of most of our large organized outreach programs, your volunteer efforts have become more important than ever.

But critical geothermal educational centers that have had public outreach as their primary or secondary focus are being lost.

This raises a question for discussion by the geothermal community. Do we still believe that educating students and the public is important to the future of the U.S. geothermal industry? If so, who is responsible for which educational and outreach functions and how are they to be funded?

Conclusion

Great strides were made by early visionaries who, through sometimes hard-won battles, moved the geothermal industry forward. Early work in the arena of public information and outreach contributed to that forward movement but the need for continued outreach and advocacy remains, especially in schools and to the national general public.

The industry is still working hard to be understood. Should we weary of the effort, it might help to remember these words:

> "We . . . have had an opportunity to build an industry that offers so much public good. We have had an opportunity that rarely comes to man or woman, whether in commerce, industry, government, education or other profession or public service."
> *- Joe Aidlin*

Following Our Own Advice: Lessons Learned

Some of the hard-learned lessons of the early years of geothermal advocacy in the United States bear noting—lest we repeat the mistakes that taught the painful lessons.

- Anticipate that your projects will require some community outreach (potentially including prolonged service on a committee) and budget for staff time, travel and materials.
- Strive to make public information and project advocacy efforts pro-active, sustained and positive, not defensive and re-active.
- Get professional help crafting effective messages if needed (and it is likely needed).
- Share information and expertise.
- Develop widely usable generic materials. Don't keep reinventing the wheel, but do maintain accuracy.
- Become familiar with the materials available from the various sources for your public information efforts.*
- Develop fact sheets about your projects.
- Communicate early and often with agencies, media and community leaders.
- Keep media folks informed and armed with facts.
- Write letters to editors, including environmental, science and business editors. Offer to be a resource should they have questions.
- Be credible and develop trust.
- Provide information on the economic benefits of your project to the community—but don't oversell. Be careful of wishful thinking.
- Respond to misinformation wherever you find it.
- Form alliances with like-minded organizations on issues of mutual concern.
- Host field trips; give talks in the schools, colleges and in your community.
- Donate curricular and other materials to schools.
- Develop a list of experts skilled at conveying information about their subject to the public. Don't hesitate to inquire of GRC, GEA and members of the industry to help you identify potential speakers to participate in your events.
- Be inclusive. Invite members of environmental organizations to participate in your events, to perhaps address your group and to express their concerns—then follow up.
- Take advantage of opportunities, such as annual meetings or workshops and seminars where geothermal experts are gathered, to offer free presentations to the public. Offer courses such as Geothermal 101 or geothermal teacher workshops.
- Maintain a GRC exhibit and materials appropriate for national and regional utility, energy, environmental and teacher conferences (you can be sure other resource exhibits will be there and the absence of geothermal representation leaves a vacuum).
- Take advantage of broadly knowledgeable geothermal industry volunteers to staff exhibits.
- Monitor the development of curriculum standards and textbooks by states. As curricular requirements evolve, so should our industry's development of educational materials, so that teachers will be motivated to use them.

*Note that this is primarily historical in nature and the authors have not attempted to recite a list of currently available outreach materials.

[1] In 2011, the California Geothermal Energy Collaborative (CGEC) and the California Energy Commission (CEC) funded an update of a paper, available on the UC Davis publications website in draft: *Geothermal Education and Outreach Guide* (cgec.geology.ucdavis.edu/publications/Outreach%20Guide_Revised_Draft.pdf). That guide, and the CEC-funded *California Geothermal Permitting Guide* (www.energy.ca.gov/2007publications/CEC-500-2007-027/CEC-500-2007-027.PDF), are recommended for developers and agencies in every state to facilitate outreach with respect to project permitting. These are excellent materials for stakeholder use but do not address outreach educational programs in schools and for the national public.

[2] As the result of a recent collaboration of DOE, state agencies, the GRC and national labs, geothermal technical papers from the *GRC Library* (www.geothermal-library.org) and government sites are being converted to electronic files for internet access on the National Geothermal Data System (NGDS) website (geothermaldata.org). Another important recently developed tool is the DOE supported "Geothermal Regulatory Roadmap" (GRR), which details the complicated (and sometimes overlapping) regulations and permitting requirements for geothermal projects. The GRR is part of an "Open EI," Wikipedia-style geothermal data-sharing website (en.openei.org). ■

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