

## **Increasing policy makers' awareness and public acceptance**

### **1. Introduction**

Geothermal energy is a versatile renewable energy source and among the cleanest of the commercially viable technologies available today, with many advantages in comparison to other renewable energy sources. A lot of literature is available supporting this fact. Despite that, solar, wind and biomass are accepted more as new scientific achievements offering many benefits to society, and are perceived as more friendly to the environment.

In addition, these renewable energy sources exhibit quicker development rates during recent years than geothermal energy. An important reason is that many geothermal projects face strong opposition from politicians, neighbouring communities or environmental pressure groups. Other renewable energy sources have also faced opposition from local communities but not as strong as the geothermal energy projects. This fact has led to a global tendency for successful geothermal companies to develop their own policy and social responsibility.

The aim of this paper is to analyze the reasons for weak social acceptance of geothermal development, identify possible solutions for changing the situation, highlight the need of a strategy and examine the policy that should be followed in order to overcome this problem. In detail, this paper examines why this is the case, what mistakes have been made in geothermal energy promotion up to now, how can the present situation change and enable better conditions for further and faster geothermal development, and try to identify the positive and negative case histories.

### **2. Current situation - Reasons for weak social acceptance of some geothermal projects**

#### **2.1. The initial development**

The initial phase of a geothermal project, includes well drilling and testing, sometimes close to residential property, using bulky and noisy equipment not familiar to local people, who are not involved in the project. Any steam or hot water delivered to the surface, causes local environmental impact in terms of smell, scale and corrosion, and sometimes unregulated flow of water through people property.

Despite the fact that scientists try to ease worries of local community, local people are afraid that the balance of the underground water will be disturbed due to large artificial flow. This water balance is important to local community for many reasons, such as fresh water supply and crop irrigation. They are also afraid that emptying the underground water reservoirs may trigger additional earthquakes.

After the completion of the geothermal plant, local people and politicians have, in front of their eyes, a system of irregularly located boreholes and surface equipment and pipelines passing through their properties, something totally unfamiliar to them. Therefore, in the initial phase of development the benefits of the abundant and low cost energy supply are not yet obvious, but appear to be outweighed by the negative changes to the surroundings.

Some problems during early development came from the fairly bad experiences in other fields or countries where bad practices paid no attention to environmental and social

protection issues. Nowadays, when the regulatory frame around the world is more strict and technology more advanced, the main problem is to convince local people that the developer will pay special attention to environmental and social aspects.

## **2.2. The environmental impact**

Taking into account that people usually do not have a clear understanding of what types of impact are coming with the introduction of this new to local community energy source, there is primarily no resistance during the initial phases of development, i.e. exploration, investigation, and project design phases. The differing opinions of local people depend on several local factors, including socio-economic conditions, cultural background, and individual or group interests.

When news spread about the possibility of having a geothermal project initiated in a given area, many residents eulogize natural heat with terms like clean, cheap, friendly, benign, green, and sustainable; thus creating a favourable climate for the implementation of the project. However, individual and collective attitudes towards geothermal development usually change with time as the project reaches the drilling stage, and works begin for plant construction.

Moreover, reaction often grows against landscape modifications and alteration of natural features of cultural or religious interest, caused by civil and industrial works and by changes in the use of public areas resulting from project activities.

For all the above reasons, opposition by residents in the project area often increases as the project proceeds, especially in areas with resources suitable for geothermal power generation. Thus, the number of people who label geothermal energy with terms such as costly, polluting, and dangerous for people's health also increases. Furthermore, in areas with different energy options, opposition to geothermal development can be used as reinforcement by parties interested to foster the use of energy sources other than natural heat.

Normally, the geothermal development cause several changes or modifications to the surrounding area that could be positive or negative. The positive effects are improvement of local infrastructure such as roads, water supply, electricity, communications, etc., increase of local employment, general commerce and in general the social and economic development of the surrounding area. The best way to implement geothermal development is to reach a perfect balance between the positive and negative aspects without affecting the economic feasibility of the project.

## **2.3. The public acceptance**

Sometimes geothermal energy projects, both for electricity generation or direct heat applications, result in changes to the social environment and this is why public acceptance is in question. For example:

- Building a large industrial plant for electricity production with complicated infrastructure. New people with higher living standards and different ways of life move into the area. Young locals leave the traditional local economy and way of life by getting these better paying jobs.

- Introduction of new and different economic sectors, based on low-energy costs from the use of the new energy source. Often this creates strong competition to existing traditional sectors such as greenhouses or aquaculture. Joint venture projects are a possible alternative to improve this development.
- New buildings and houses appear in the traditional environment, resulting in changes to existing property values.
- Feasible economic benefits are coming, but only for a limited number of people.

On the other hand, usually, better life infrastructure and organization comes with the new project, i.e. better road connections, potable water supply, better management of the effluent water, better supply to the local market with everyday goods, etc. The type of social acceptance in a local community depends on the level of culture and existing economy, but also on the organization of the initial approach to development of the new economy sector.

#### **2.4. The political acceptance**

Political acceptance is very important because real geothermal development cannot begin without strong State support due to the high risk and capital cost involved. However, this is one of the weak points of the public treatment of geothermal energy, due to the following reasons:

- Development of a geothermal project lasts for a long time, as production of energy may start after 10 or more years from the beginning of activities. That may be a too long period for local politicians needing short term results, and even for the State having on hand other short term and less capital intensive possibilities.
- Technologies mostly use products and equipment designed for other uses, so essentially there does not exist a local geothermal industry needing political support for its existence and further development, except for geothermal heat pumps where the development is fastest.
- There is no widely accepted strategy for scientific and commercial promotion of the “new” energy resource. It is understood as important only in a few (rich) countries of higher cultural levels and good State organization, where long term planning has higher priority than short term solutions.

In EU member states and other countries where oil or gas resources are rare, it is more easy to convince politicians to support geothermal development, because geothermal energy is indigenous and relatively less expensive than oil or natural gas.

Commencement of field exploitation may take a long time, mainly due to the need of concession permits and the time to do the drilling and testing of the wells. We are confident that geothermal development needs at least three years to complete initial phases and start exploitation.

#### **2.5. The complex technology**

Due to the high temperature involved, the corrosive and scaling tendency of the fluid, and the depth of the resources, geothermal technology is more complex than the one used in the petroleum extraction industry. Specialized contractors are necessary, who have the necessary know-how for the exploitation of geothermal resources, know-how which is not available to local works contractors, consultants and engineers. This is one of the reasons for weak social acceptance of geothermal energy. In addition, exploitation methodology and

installations is site specific and tailor made for each geothermal field, fact that allows very limited room for standardizing geothermal technology, materials and equipment, leading to the absence of support from local industry.

### **3. Possible solutions for changing the situation**

The different aspects which affect the social acceptability of geothermal development from the local communities can be effectively overcome by taking action as follows:

- *Initial development.* Public relations policy should start from the very beginning of a geothermal project, by educating local community on the benefits of an abundant local energy supply, establishing partnership schemes with local community and spreading honest information in an understandable way, accommodated to local cultural level.
- *Environmental impact.* Large scale geothermal development has its impact to local environment. This impact to local environment can contribute positively or negatively to local public opinion, depending on the quality of project management practices, quality of project design, organization of work during construction and completion, and quality of operations. General positive opinion can be reached when most of the elements are done in a proper way.
- *Social acceptance.* As changes to local life and habits due to geothermal development grow more and more, it becomes more difficult to get fast social acceptance – even if project results and favourable benefits to the community are evident. Sometimes, it may be better to start with small scale development to make local people acquainted to the presence and benefits of a new energy source, than proceed directly to completion of large scale projects. However, if the geothermal contractor takes the responsibility to resolve some urgent needs of the community in parallel or, even better, as a part of the project completion, then the chances to accelerate the process of public acceptance are much better. Increasing local development will also contribute towards this direction.
- *Political acceptance.* Political support to geothermal development is important in order to get public acceptance and to obtain the necessary State financial support to the initial development phase.
- *Technologies for geothermal energy application.* Close collaboration with local population providing honest answers to their questions and concerns, accompanied by educational activities to the general public and to schools seem to be a good practice towards spreading understanding of the technology to local population.

In addition, social acceptability is one of the most important parts of geothermal development in a specific environment and should be taken into account. In order to attain social acceptability, project activities should not result in drastic changes to local conditions, and the affected sectors should be able to see some advantages resulting from the project. Social acceptability of a profit oriented project is the condition upon which the technical and economic objectives of the project are pursued in due time and with the consensus of local communities, which can be gained by acting in consonance with the dynamic conditions of local environment, and in respect of people's health, welfare, and culture. It is not possible to complete a successful project if initially not identifying the elements of local environment, which can influence its social acceptance and not designing honest organizational, technical, economic, and other solutions in order to prevent the development of negative opinions.

When starting a geothermal project, careless practices may result in initial negative impressions to develop quickly, and the re-establishment of good image may need large

investments in effort and time. Proper technical/technological and organizational solutions should be applied in all phases of project development, (exploration, planning, design, implementation, technical acceptance, trial work, operation and maintenance). Furthermore, before the commencement of project works, all elements of social acceptance within local environment should be identified, and honest solutions should be provided, in order to prevent the appearance of negative opinions, accompanied with a plan to communicate the benefits.

Education programs can be really helpful in order to improve the image of geothermal energy and its acceptance by children and local communities in general. Education material of suitable style should be prepared for students and teachers. Programs with this kind of material referring to groundwater quality and quantity protection, introducing the concept of sustainable use can also be introduced.

Geothermal regulation should also be taken into account. It is apparent that the present lack of regulation for geothermal energy exploitation over most of the EU is inhibiting effective exploitation of this underutilized resource. The process is planned to outline and encourage investment in geothermal energy by private and public sector partnerships. Furthermore, lack of clarity or improper regulation can also impose a barrier to geothermal development.

Measures that have been effectively applied resulting in successful geothermal development have included the following:

- Enforcing legislation separating geothermal resources from the mining code
- Demonstration of very small scale geothermal pilot power plants (a few kWe)
- Providing strong incentives to investors
- Communicating positive impact of geothermal development through independent experts
- Educating local society and company staff
- Communicating best practices by inviting local journalists to foreign geothermal power plants

#### **4. Conclusions**

Geothermal companies and governments committed to geothermal development have developed policy and social responsibility associated to geothermal projects. They have adopted practices in order to prevent the evolution of bad image and social opposition, which appears whenever geothermal projects do not meet the expectations for clean and environmental friendly energy supply which improves local employment and living conditions. These policies and practices, should be considered as positive examples for all the geothermal community, so that geothermal energy will attain more quickly the development it deserves.