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Geothermal Energy Development as a Medium Towards Total Community Development: The Philippine Example

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ABSTRACT

Philippine geothermal projects have evolved into total community development efforts over the years. This is in large part attributed to the *in situ* development and sustainable management of the geothermal resource. Alongside the application of resource-sustaining geothermal technologies, the government-owned Philippine National Oil Company – Energy Development Corporation (PNOC-EDC) also considers the social aspect of sustainability by adopting the integrated social forestry (ISF) scheme which would later set the pace for the company's other community development initiatives. With ISF, the company was able to effectively mobilize the upland communities, create livelihood opportunities and inculcate positive values among them to work collectively towards attaining self-reliance. Meanwhile, the parallel corporate citizenship efforts have served as yardsticks for social desirability of many development projects in the country. With these experiences, PNOC-EDC has demonstrated that geothermal projects can be an impetus in bringing about countryside development.

1. INTRODUCTION

Harnessing geothermal energy for power generation has been known to introduce a multitude of benefits to areas where such projects are present. In large part, this is attributable to the *in situ* characteristic of geothermal which requires that the development and management of the resource and the subsequent ancillary activities be localized. The capability of geothermal to provide direct economic values and ecosystem services was also explained by De Jesus (1996), stating that to be sustainable, geothermal development must be able to maintain the productive and renewable capacity of the resource to ensure continuous use.

In the Philippines, the sustainability of the geothermal resource is a foremost concern and it is for this reason that the government-owned Philippine National Oil Company – Energy Development Corporation (PNOC-EDC) has instituted schemes that would ensure the optimized and sustained operation of its geothermal projects. Alongside the application of resource-sustaining technologies such as full reinjection, PNOC-EDC also considers the social aspect of sustainability by adopting the integrated social forestry (ISF) approach which would later set the pace for the company's other community development initiatives.

2. INTEGRATED SOCIAL FORESTRY

In 1987 or four years after it successfully commissioned its first two geothermal production fields, PNOC-EDC was awarded the management of three geothermal watershed reservations located in the islands of Leyte, Negros and Luzon. A fourth reservation was granted in 1992 in Mindanao island bringing the total area to 266,326 hectares (See Table 1). These watershed reservations are typical of Philippine forests that are commonly degraded by illegal logging and slash-and-burn farming for livelihood.

Table 1. Geothermal Reservations Managed by PNOC-EDC

Geothermal Reservation	Area (in hectares)
Palinpinon (Negros Island)	133,000
Tongonan (Leyte Island)	107,625
Bacon-Manito (Luzon Island)	25,000
Mt. Apo (Mindanao Island)	701
Total	**266,326**

The company was hard-pressed to solve this concern because geothermal being a water-based energy source is inherently dependent on the state of health of forests. Geothermal in the Philippines is known to come from meteoric water stored for thousands of years in deep geothermal reservoirs. Healthy forests keep the rainwater from running off the land by allowing it to infiltrate the ground to reach these geothermal reservoirs (PNOC-EDC and New Zealand, 2001). The company thus became aware of its responsibility to protect the forests around its project sites which are the ultimate source of geothermal power.

PNOC-EDC recognized that survival was the real issue behind the continued degradation of forest areas, especially in its geothermal reservations. Socioeconomic problems prompt forest dwellers to resort to activities that are detrimental to the forests. The company also figured that a punitive approach would not put an end to the problem. To address this issue, the company turned to integrated social forestry with the end in view of reconciling the conflicting interests of forest dwellers and the development of geothermal resources.

ISF essentially combines watershed management and community development by engaging forest occupants within the geothermal reservation areas in the overall management of forest areas (De Jesus and Nieva, 2003). It is argued that these people are the major determinants of the watershed status and can assist in the protection of the existing forest cover since they are permanently present in these areas.

The program's primary objective is to enhance the socioeconomic circumstances of the people living in and dependent upon geothermal reservation lands for their livelihood. In recognition of their needs and expectations, these people are not ejected from the reservations but are, instead, managed in place and tapped to become partners in forest management. This objective is being achieved through appropriate land use management systems, security of tenure, and forest conservation value appreciation, among others (Elman, 1995).

2.1 Components and Development Approach

PNOC-EDC's ISF program has three components: social development, ecological enhancement and economic improvement.

Social development involves community organizing through social education and rapport establishment to gain the settlers' support for watershed conservation. The communities are organized into farmers associations and linked with relevant government and private institutions. The associations are then made to undergo social preparation through seminars and training programs on self-awareness, value formation, leadership and team building, among others. Later, members go through other management skills training which include simplified bookkeeping and auditing procedures, parliamentary procedures, and organizational record keeping (Nieva, 2002). All organized farmer-beneficiaries are registered with the Bureau of Rural Workers of the Philippine Department of Labor and Employment as farmer associations with their own set of constitution and by-laws. The company's extension workers meet regularly with the associations to monitor their progress.

Ecological enhancement involves forest rehabilitation through reforestation, agroforestry and non-wood-based livelihood modules as primary economic activities, including technology transfer for these livelihood modules. The associations are trained on seedling production, tree planting, soil erosion control, and forest protection. They are then awarded plantation and harvest contracts where members are paid daily wages for services rendered as nursery and plantation workers (Elman, 1995).

Economic improvement, on the other hand, involves the setting up of sustainable alternative livelihood projects through a self-financing scheme from organizational savings mobilization program. The associations are encouraged to save 10% of their wages as their capital build-up (CBU) fund for other livelihood projects. With this and the knowledge and skills they acquired on micro-enterprise development, the associations are empowered to branch out to other projects such as apiculture, cutflower production, handicraft-making, livestock raising, and vegetable gardening, among others. These projects do not only generate more income for the members but also promote and strengthen the camaraderie among themselves (PNOC-EDC and New Zealand, 2001; Elman, 1995).

2.2 Pilot-Testing

PNOC-EDC first experimented with the slash-and-burn farmers of the Baslay community in Negros Oriental province beginning 1985. Convinced of its feasibility, the New Zealand government offered to co-finance the ISF program with the company for a five-year period from 1989 to 1994. For the said period, New Zealand extended NZ$250,000 (US$153,025 at NZ$1.63:US$1 exchange rate) while PNOC-EDC put in a counterpart funding of PhP4 million (US$71,429 at PhP56:US$1 exchange rate). Four pilot communities were chosen: Baslay and Bediao in the Municipality of Dauin, Negros Oriental province; Tongonan in Ormoc City, Leyte province; and Azupre in Tublijon, Sorsogon province. These communities are all catchment areas of PNOC-EDC's geothermal projects located in the islands of Negros, Leyte and Luzon.

The communities were subsequently organized into farmers associations, namely: the Baslay Farmers Association; the *Kapunungang Mag-uuma sa Bediao* (Bediao Farmers Association); the Tongonan Farmers Association; and the Tublijon Farmers Association, Inc. Each of these associations had been issued land tenure contracts for 25 years under the Community Forest Stewardship Agreement (CFSA) scheme of the government covering the development area of the geothermal projects. The contract—which is renewable for another 25 years—entitles them to exclusive ownership of the harvest from the plantations, as well as the maintenance and protection of the area. By virtue of the CFSA, the Tongonan Farmers Association was granted stewardship rights on 1,000 hectares of rattan plantation, while Baslay, Bediao and Tublijon were awarded stewardship rights on 155.3, 66.8, and 20 hectares of agroforestry plantations, respectively (Nieva, 2002).

2.3 Replication and Expansion

PNOC-EDC initially had difficulty convincing the communities and gaining their respect and cooperation, but these challenges were eventually hurdled. What began as an experiment in social forestry has evolved into a total community development program. The Tongonan Farmers Association in Leyte, for instance, has become a rattan producers cooperative, consumers cooperative, marketing cooperative, savings and loan association, women's league, and youth club. Table 2 lists the various livelihood projects that are currently being implemented by the four pilot associations.

Table 2. Livelihood Projects Implemented By the Four Pilot ISF Communities

Name of Community/ Farmers Association	Livelihood Projects Implemented
Tongonan	Agroforestry; consumer store; carabao raising; money lending; rice, black pepper and abaca production; abaca stripping machine; land master operation; film showing; lot mortgage
Baslay	Agroforestry; copra production; abaca weaving; savings and loan; consumer store; apiculture; cottage rental, lot mortgage
Bediao	Agroforestry; cutflower production; apiculture; cattle fattening; lot mortgage; savings and loan; shares of stocks
Tublijon	Agroforestry; reforestation; savings and loan; consumer store; apiculture, handicraft making; labor contracting; multi-purpose center; money lending; merchandising; swine and carabao dispersal; soft broom making; abaca plantation; lot mortgage

From four pilot projects, the ISF program has been replicated in 79 other forest communities in a span of 15 years. There are now 83 farmers associations around the company's five operating geothermal projects implementing close to 500 livelihood modules (See Table 3). This rapid replication plus the steadily increasing membership of the associations are solid proofs that the communities are convinced of the program's benefits.

Table 3. Status of Integrated Social Forestry Program (As of December 2003)

Geothermal Project/Reservation	No. of Farmers Associations Organized	Total Membership	Total No. of Livelihood Projects	Total Accumulated Net Worth*
Leyte	23	1,191	105	PhP10,725,728 ($195,013.24)
Southern Negros	17	745	224	PhP7,297,594 ($132,683.53)
Bacon-Manito	15	729	93	PhP5,672,896 ($103,143.56)
Mindanao	24	913	63	PhP3,726,697 ($67,758.13)
Northern Negros**	4	132	9	PhP522,000 ($ 9,490.90)
Total	**83**	**3,710**	**494**	**PhP2,7944,915 ($508,089.36)**

* Since inception of ISF program; converted to US dollars at exchange rate of PhP55 to $1
** Under development

ISF has brought significant changes in its beneficiaries as mirrored in their improved economic status and positive attitude towards themselves, the community and the environment. Likewise, they have appreciated and imbibed the value of volunteerism, industry and self-reliance (De Jesus and Nieva, 2003). Equally significant is the fact that illegal logging and slash-and-burn farming incidences have dropped considerably because the forest settlers themselves apprehend the violators. Verily, the farmers associations have become "social fences" around the watershed areas.

3. CORPORATE CITIZENSHIP

Accordingly, ISF became a vehicle for translating the company's other corporate citizenship efforts where the returns include better lives for the communities and enduring linkages with the other stakeholders. These include benefits funds extended to local government units (LGUs) and host communities, as well as community relations (comrel) initiatives designed to uplift the well being of communities and assist them to develop their self-reliance, unity and self-pride.

3.1 Geothermal Royalty

In compliance with the Philippine Local Government Code, PNOC-EDC remits 40 percent of its profit net of tax to the LGUs (composed of *barangays* or villages, municipality/ies, province/s and region which host the company's geothermal facilities). This represents the royalty payment for the use of the geothermal resource in the area. As specified by the Code, 40 percent of this amount is earmarked for electric power rate subsidies and for development projects for host communities. To date, PNOC-EDC has paid royalties amounting to PhP1.25 billion (about US$22.7 million) to all concerned LGUs since the Code was promulgated in 1992. Table 4 summarizes the royalties paid by PNOC-EDC for each geothermal project from 1992 up to 2004.

Table 4. Benefits Funds Remitted to Host LGUs From 1992 to 2004

Project	Amount* (in '000)
Leyte	PhP293,361 ($5,333.84)
Southern Negros	PhP712,150 ($12,948.18)
Bacon-Manito	PhP187,898 ($3,416.33)
Mindanao	PhP52,678 ($957.78)
Total	**PhP1,246,087 ($22,656.13)**

* Converted to US dollars at exchange rate of PhP55 to $1

3.2 Energy Regulations 1-94

On top of royalty payments, PNOC-EDC also sets aside an equivalent of one centavo per kilowatt-hour of generated steam to a development fund in accordance with Energy Regulations (ER) 1 - 94 of the Department of Energy (DOE) Law. This fund is used for missionary electrification, livelihood development, and reforestation, watershed management, health and environment enhancement (RWMHEE). Details of the remittances to this fund are shown in Table 5.

Table 5. Benefits Funds Remitted under ER 1-94 From 1984 to 2004

Project	Amount* (in '000)
Leyte	PhP400,716 ($7,285.74)
Southern Negros	PhP592,534 ($10,773.35)
Bacon-Manito	PhP152,737 ($2,777.04)
Mindanao	PhP55,528 ($1,009.60)
Total	**PhP1,201,515 ($21,845.73)**

* Converted to US dollars at exchange rate of PhP55 to $1

3.3 Community Relations

Apart from the ISF and the mandated benefits funds, the company also pursues community relations projects specifically focused on livelihood, education, health and sanitation, and infrastructure. Among others, these include educational support in terms of scholarships, books, classrooms, and facilities; health enhancement in terms of medicines and medical/dental services; livelihood assistance in terms of skills training as well as preference in employment and in procurement of local supplies and services; socials and sports; and infrastructure development in terms of construction of roads, bridges, markets, and multi-purpose halls.

Rural electrification is the newest addition to the company's socially responsive initiatives. PNOC-EDC was the first energy company to respond when the DOE called for support for its Expanded Rural Electrification Program in 1999. As of end-2004, PNOC-EDC has already energized 662 villages in 12 provinces. This effort has gradually turned the host provinces into attractive investment areas. Residents, meanwhile, have become the primary beneficiaries of the provinces' booming economy as manifested by modern infrastructure and facilities, as well as job and livelihood opportunities that have emerged.

4. CONCLUSION

As a company whose business is nature-based, it is a matter of survival that PNOC-EDC has been able to harmonize its needs and aspirations with those of its host communities.

Through the ISF program, PNOC-EDC was able to effectively mobilize the upland communities and create livelihood opportunities. Likewise, the program has enabled these communities to gain experiences from their active involvement in the national effort to conserve natural resources. It also helped inculcate positive values among

forest occupants to work collectively towards becoming self-reliant. Meanwhile, the parallel corporate citizenship efforts have served as yardsticks for social desirability of many development projects in the country, not to mention that these have also molded the communities to become active partners in nation building.

Accordingly, these efforts have not gone unnoticed as awards and recognition from private sector entities, the academe, government agencies, non-government organizations, and the international community have poured in. Most notable is the 1st Excellence in Ecology and Economy Award from the Philippine Chamber of Commerce and Industry which was given to PNOC-EDC in November 2003 for demonstrating innovative and outstanding environmental responsibility as part of its management's sustainable development strategy. The farmers associations and host LGUs would also have their share of these commendations.

PNOC-EDC's experience only proves that geothermal projects can be an impetus in bringing about countryside development. Today, PNOC-EDC has amassed close to 30 years of geothermal experience and boasts of a combined installed geothermal capacity of 1,148 megawatts in the Philippines. A substantial part of this success can be ascribed to the aforementioned community development programs which have effectively balanced the conflicting interests of host communities and geothermal energy development.

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