

EDC's Reforestation Initiatives in Mt. Apo

Marianne J. Paje, Jose Arnel S. Alvarez, Ronaldo S. Guangco and Erlito P. del Rosario

Energy Development Corporation, Energy Center, Merritt Road, Fort Bonifacio, Taguig City, Metro Manila, Philippines

mjpaje@energy.com.ph, jasalvarez@yahoo.com, guangco.rs@energy.com.ph, delrosario@yahoo.com

Keywords: reforestation, geothermal development, Mount Apo Natural Park, sustainable development

ABSTRACT

The establishment of a model geothermal project at the northwestern flank of Mt. Apo National Park in the early 1990s was perhaps one of the most challenging undertaking of the Energy Development Corporation (EDC). Issues on the area's status as a natural park, loss of biodiversity, as well as the plight of indigenous peoples were raised against the project at the start of its development. In an effort to address these issues, the company employed the most tangible environmental program, which is reforestation.

After identifying more than a hundred hectare of open grassland found several meters from the peak of Mt. Apo, the company organized the tribal communities around its project area, forming these into peoples' organizations. These were then tapped in the different phases of the reforestation project such as seedling production, establishment, maintenance and protection, which provided them alternative livelihood opportunities. EDC staff, together with the indigenous peoples, joined hands in restoring the southwestern side of the mountain, braving extreme hot weather during dry season and even frost during the colder months. The company has now reforested 700 hectares of open grassland now fully planted with more than 1,000,000 seedlings of indigenous forest species commonly known as tinikaran (*Leptospermum flavescens*). After more than a decade, some of the trees are now 7-foot tall and are starting to have a close canopy. Wildlife like birds and wild boars were observed to be returning to the once barren area. Through this project, upland communities were lured away from doing destructive forest activities such as slash-and-burn farming, timber poaching and forest products gathering, and eventually became partners of the company in protecting Mt. Apo's forests. Lately, the company has tied up with the local government units (LGU) in restoring other portions of the mountain. Definitely, the company's program to reforest denuded portions of the country's highest mountain is now recognized by local agencies, Non-Government Organizations (NGOs), and the LGUs as an effective environmental measure, after its flagship reforestation project proved that indeed geothermal development could harmoniously co-exist with the environment.

1. INTRODUCTION

Mt. Apo, the home and the burial site of Lumad's Apo Sandawa, is the Philippines highest peak with an elevation of 2,934 meters above sea level (DENR, 1992). Proclaimed as a national park in 1936, it has an original area of 76,000 hectares and falls under the jurisdiction of 5 municipalities and 2 cities in Southern Philippines (Magpet, Makilala and Kidapawan City in Cotabato Province; Bansalan, Digos and Sta. Cruz in Davao del Sur; and Davao City). Several proclamations have been issued altering its coverage but it was eventually declared as a natural park on September 26, 1997 (PAMB, 2000). Being a natural park, Mt. Apo also

flaunts one of the highly diverse ecosystems in the country hosting a wide range of plant and animal species (DENR, 1992).

Because of the above-premise, some groups were alarmed when the Energy Development Corporation (EDC), then a Government-owned and Controlled Corporation (GOCC) started the development of geothermal project at the northwestern flank of Mt. Apo and signified their opposition towards the project. The status of the as a national park, the destruction of forest cover along with other related issues such as loss of wildlife habitats and the plight of indigenous peoples were raised. However, EDC for years, have been managing 266,326 hectares of geothermal reservations in other parts of the country such as in Leyte and Negros Oriental (Visayas) and in Sorsogon (Southern Luzon). The company employed watershed management strategies such as enforcement of forestry laws and regulations within these reservations, reforestation in grasslands and open areas, and organization of upland communities within the area who were then tapped as partners in forest protection and development. Such scheme successfully enhanced not only the watershed areas of the geothermal reservations but the lives of the communities as well. It is for this reason that EDC was encouraged to show that geothermal and forest can co-exist.

2. ADDRESSING THE ISSUES AGAINST THE GEOTHERMAL PROJECT

Several papers have been written on how the company addressed the conflict brought about by the entry of the company in the area during the early stage of development of its geothermal project. E.C. Lee in her paper, Understanding Public Opposition to Development Projects: The Mt. Apo Case (2000), presented an account on how the company handled concerns in what is considered, as one of the most controversial development projects in the Philippines. The company was non-selective, direct and factual in dealing with the various groups or individuals opposing the project regardless of their location, affiliation, age, sex, etc, where each received individual replies to the letters they sent to the company (Lee, 2000). Meetings and public consultations were also held to directly deal with them and other stakeholders.

These efforts of the company, coupled with the immediate need of the government to augment the increasing energy demand in the country, paved the way for the issuance of an Environmental Compliance Certificate (ECC) for the project on January 14, 1992 after almost three years of thorough review and public consultations. As this was a government priority project, then President Corazon Aquino issued Proclamation No. 853 segregating 701 hectares area from the Mt. Apo National Park and allocated it as a geothermal reservation.

3. PROJECT INCEPTION

Before the company started geothermal development activities in the area, an occupancy survey was conducted in

March 1992, which revealed that about 95.5 hectares of the 701-ha reservation have already been cleared up for occupancy and/or *kaingin* (slash-and-burn farming) (PNOC EDC, 1992). The rest of the reservation was either primary or secondary forest stands. Committed to protect the remaining forest cover, EDC limited its land clearings to facilities that are area/resource-specific such as geothermal production wells. Other facilities such as power plants, staff house, logistics office were located in former *kaingin* farms so as to reduce disturbance to vegetation. Although 112 hectares have been permitted for development, only 62 hectares, or roughly nine percent (9 %) of the reservation were utilized to house all the needed structures and support facilities.

True to its commitment to rehabilitate the watersheds around its geothermal work site, the company launched its most valuable project in the area, the reforestation of Mt. Apo. This project also forms part of the commitment of the company to the DENR and other government agencies as well as non-government organizations during the various dialogues held for the project's social acceptability. Since more than 80 percent of the reservation is already forested, EDC scouted for open areas adjacent to the project for its reforestation project.

A reconnaissance survey showed that the southwestern flank of Mt. Apo, an area between the summit and geothermal reservation's Corner Three (3) is an open/grassland, the original vegetative cover of which was destroyed by a forest fire in 1983. This area was chosen to be the site of the company's reforestation project in Mt. Apo.

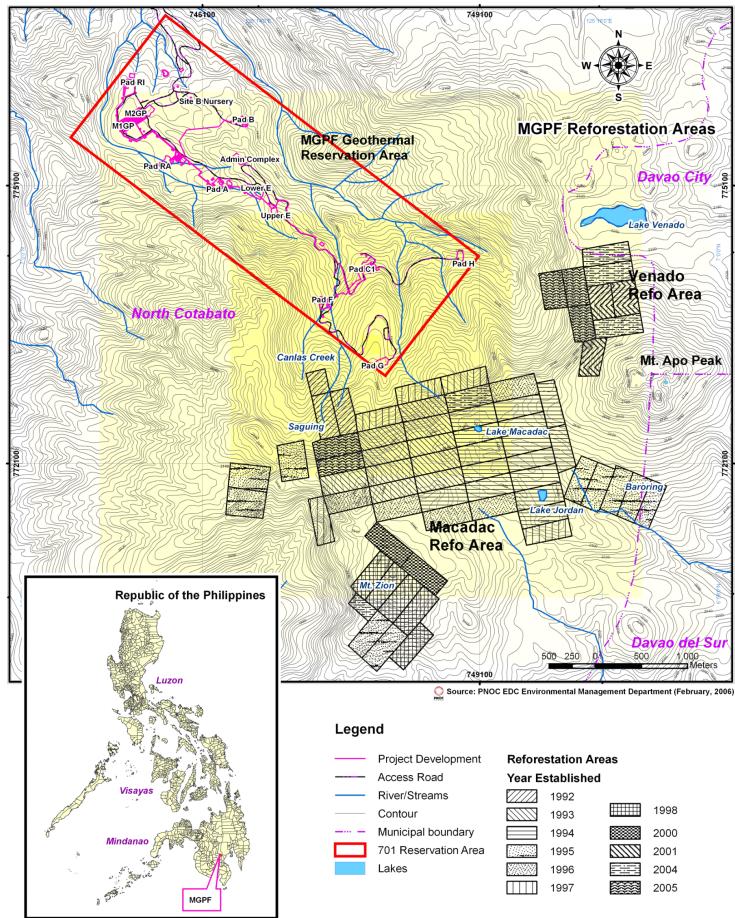


Figure 1: Map of EDC;s reforestation project with respect to the geothermal reservation and Mt. Apo peak.

4. PROJECT DEVELOPMENT

EDC started the restoration activities in the later part of 1992 at the headwaters of Canlas River, some 250 meters away from the reservation's southwestern corner (Figure 1). Around 50,000 seedlings of indigenous species were planted in a 25-hectare grassland dominated by *bugang* (*Saccharum spontaneum*).

As one of its watershed management strategies, the company organized the upland communities around the geothermal reservation into farmers' associations to become partners in protecting Mt. Apo. Members of these associations were then tapped in almost all aspects of the reforestation project from seedling production, establishment, maintenance as well as in the protection of the plantation. Foresters and forest guards of the company together with the farmer-members endured the seemingly impenetrable thick vegetation of grasses and cleared strips of land within the target restoration area, wherein seedlings were outplanted. A two-meter wide strip of grasses were left in between to serve as protection and at the same time as nurse vegetation to the outplanted seedlings.

The following years saw the reforestation of the nearby barren areas, which includes grassland around Lake Maag, Lake Jordan, Saguing, Baroring and Mt. Zion (Figure 1). Mt. Apo is considered as one of the sites in the country with high level of endemism, thus only indigenous forest tree species such as Timikaran (*Leptospermum flavescens*), Kalingag (*Cinnamomum mercadoi*), Kiramdam (*Dacrycarpus imbricatus*) and Philippine Cedar were used in this endeavor.

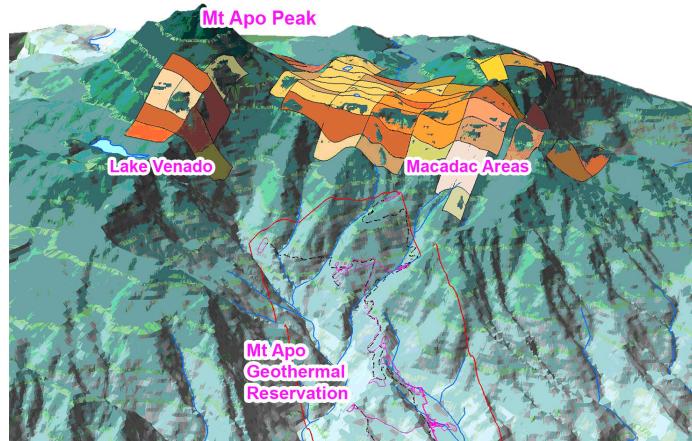


Figure 2: A Three-dimensional figure showing extent of EDC's reforestation project near the Philippine's highest summit and the 701-ha geothermal reservation.

Satellite nurseries were also established around the reforestation project. The two lakes, Maag and Jordan found within the vicinities of the reforestation site, served as water source critical in seedling production, thus played an important role in this undertaking. Wildlings, barely two-inch high were carefully collected from the nearby forests and potted in the satellite nurseries. These are then reared for six months to one year until they reached a height of at least 6 inches or more, and are ready to be planted on the field. Planting is at the onset of rainy season or during May to August, which are the雨iest months in the area. To ensure survival of the outplanted seedlings, maintenance activities were conducted every six (6) months to remove the competing vegetation. Fertilizers were also applied to hasten the growth of the seedlings. However, due to relatively extreme weather and poor soil condition, seedlings were observed to be slow growing, where an average increment is recorded at only eight to ten inches a year. Nevertheless, EDC patiently maintained these plantations, and attempted to expand every year. Before the start of year 2000, Maag area was almost fully restored where reforestation totals to 545 hectares. EDC then extended its restoration works to Lake Venado, found at the northern side of the summit (Figure 2). As the project earns recognition from different sectors, adjacent LGUs like Bansalan and Sta. Cruz both from Davao del Sur requested that similar undertaking be done in their respective areas. Thus in 2001, EDC started the reforestation at said areas this time using dipterocarp species such as White and Red Lauan (*Shorea contorta* and *S. negrosensis*, respectively), two of the more important premium forest species found in the locality.

To date, reforestation efforts of the company totals to 715 hectares (Table 1). From 1992 to present, EDC has spent more or less US\$ 1.27 million for this endeavor. This figure includes establishment cost, maintenance cost, support facilities such as bunkhouse, lookout towers, firebreaks, as well as fire fighting tools and equipment. The estimate however, does not include administrative and management costs.

5. CHALLENGES ENCOUNTERED

Ascent to Mt. Apo has been one of the ultimate goals of local mountaineers not only because of its distinction as the Philippines highest peak, but also of its rugged terrain that brings extreme adventure to most climbers. This was also among the first challenge EDC had to conquer during the

early stage of the project when its personnel started conducting perimeter survey of the targeted site. Members of the survey team oftentimes fell into gullies concealed by thick *bugang*, which were three times higher than an average human being, thus adding up to the obstacle. After the original vegetation of the mountain was totally burned in 1983, no attempts have been done to restore the area. The site was exposed, degraded and for a long time supported only a grassland vegetation. This posed another challenge, as competing vegetation grow much faster and outgrows the outplanted seedlings in so short of time. Thus, EDC has to undertake brushing activities regularly.

Considering its high elevation, which starts at 2,200 meters above sea level, the area experiences extreme weather conditions. It is very cold and even frost during the colder months while it becomes arid during summer. This poses another difficulty to the project implementers, as this contributed to the slow growth of the seedlings, and sometimes led to mortality. The occurrence of frost from time to time also resulted to death of young seedlings causing blisters to its delicate shoots. The area would become extremely dry if no rain falls within a five-day period, much more if prolonged drought hits the region. The staff fears the occurrence of El Nino as such phenomenon triggered a major forest fire in 1998. The fire ignited at a grassland and eventually extended to the nearby reforestation area. Since the vegetation has already been dried up, the fire spread out easily, where about 65 hectares of the reforestation project were totally burned including 18 hectares of secondary forest. Burned area however was completely restored after the drought the following year.

6. ROLE OF COMMUNITIES

The project, described as the most ambitious reforestation effort in the country (Kennedy, 1995), would not have been successful without the support of the members of the 24 PNOC EDC-assisted farmers associations. These are the communities around the 701-hectare geothermal reservation, who were previously tilling the mountains for their subsistence. The company organized these communities, provided them with various trainings, as well as alternative livelihood opportunities aimed at improving their socio-economic conditions and for them to gain self-reliance. They played major role in the Mt. Apo reforestation project. Armed only with *lagaraao* (scythe) and *bucag* (large rattan baskets), these groups of people painstakingly took the laborious job of brushing the thickly-

vegetated grassland, dug holes of intertwined roots, hauled and outplanted the delicate seedlings. The farmers literally put their blood and sweat for this project. The communities' great concern towards the project has also been proven when a major forest fire struck the plantation. During this time, these people were the ones who helped the company personnel in putting out the fire. They were the first ones who responded to EDC's call for assistance. About 200 tribesmen assisted the company foresters and engineers in saving the forests during the summer months.

Working in the mountain allowed them to earn additional income that would support their day-to-day subsistence. The associations where they belong to were the entities engaged by the company for this undertaking. Through these contracts, these associations were able to accumulate adequate amount to finance other alternative livelihood projects. Ten percent (10%) of their contract amount is being set aside as their Capital Build Up (CBU) fund. To-date, the 24 associations have combined CBU of US\$ 98,273 which they now use to finance livelihood projects such as banana plantation, consumer store, *tahiti* (tiger grass) production, broommaking, cutflower production, abaca plantation and money-lending, among others. As such, these communities were lured away from doing destructive forest activities such as kaingin-making, timber poaching and forest products gathering, and eventually became partners in protecting Mt. Apo's forests.

7. CURRENT STATUS

After more than a decade since PNOC EDC took the challenge of restoring the barren portions of the majestic mountain, some of the planted trees have now attained height of more than seven meters and some areas have a close canopy (Figure 3). Further, some of these trees have started to bear flowers and fruits, thus are now source of some planting materials. It has also been observed that a variety of bird species are now starting to flock around the vicinity. Nestings of birds were found on the planted tinikaran seedlings (Figure 4) while droppings of wild boar, as well as traces of deer are regularly observed during patrols of the forest guards manning the area. Likewise, several endemic species such as Apo Sunbird (*Aethopyga boltoni maiindangensis*) and Mountain Shrike (*Lanius validirostris hachisuka*) were spotted in the area during the wildlife inventory conducted by the company in 1997. The site has also been one of the favorite route of media, dignitaries and other VIPs, when they ascent to the peak. Visitors are awed by the expanse of the project and EDC has always been commended by everyone who sets foot on this 715-hectare protection forest. This project also serves as climate change adaptation measure as its is estimated to sequester more or less 10,000 tons of carbon dioxide annually.



Figure 3: Portion of 1994 reforestation project with Tinikaran, which is starting to have a close canopy, while on the foreground is the scenic Lake Maag.



Figure 4: Some of the bird species seen nesting on one of the planted Tinikaran.



Figure 5: A panoramic view of Mt. Apo peak and EDC's reforestation project, considered as the highest reforestation effort in the Philippines at 2200-2560 meters above sea level.

Located a few meters away from the country's highest summit, the project is regarded as the highest reforestation effort in the country (Figure 5). With nearly 2,000,000 seedlings already planted, majority of which are already full-grown, this flagship project of PNOC EDC is expected to bring back the grandeur Mt. Apo has been known for.

8. CONCLUDING REMARKS

It is understandable that any development project if to be introduced in critical areas would be confronted with issues and negative perceptions by concerned groups especially now that the world have growing awareness on degrading environment. EDC was not an exemption as it went through long ordeal before it was able to gain social acceptability from various stakeholders. The company worked double time addressing the concerns.

Minimal disturbance on the vegetation was observed. Mt. Apo's forest cover was even enhanced, and now serves as home to various bird species. Lives of the upland communities were in a way improved through the provision of alternative livelihood, and are now staunch supporters of the geothermal project. The reforestation project has served its purpose. The company recognizes that its strength comes directly from the earth, thus it needs to do something in return, thus this valuable project. Mt. Apo Reforestation project is a living testimony that PNOC EDC is committed to protect and maintain a sound environment in its entire energy project. It is a solid proof that indeed geothermal development could co-exist in harmony with nature.

REFERENCES

Verma, A., and Pruess, K.: Enhancement of Steam Phase Relative Permeability Due to Phase Transformation

Effects in Porous Media, *Proceedings*, 11th Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, CA (1986).

Canuday,re J.F.: Encroachment in Mt. Apo Threatens Ecosystem, MindaNews, Vol. 1, No. 7, (June 2002) WebPages at <http://www.mindanews.com/2002/06/3rd/arn1apo.html>

DENR Protected Area and Wildlife Bureau (DENR PAWB): Mt. Apo Natural Park Management Plans and Boundary Delineation and Land Use Report, 181pp (1992).

IUCN: The IUCN Red List of Threatened Species, (1994) WebPages at http://www.redlist.org/info/categories_criteria1994.html

Kennedy, R.S., Magsalay P.M. and Salvador D.I.: Assessment of the Effects of Construction and Operation of the Geothermal Power Plant and Steamfields in the Mt. Apo Geothermal Reserve on the Philippine Eagle and Biodiversity, Oxbow Power Corporation, (1995).

Lee, E.C.: Understanding Public Opposition to Development Projects: The Mt. Apo Case (An Update), *Proceedings*, World Geothermal Conference Kazuno, Japan (2000).

PNOC EDC: Mindanao 1 Relocation Program (1992).

PNOC-Energy Companies Corporate Policy Manual.

PNOC EDC: Terrestrial Fauna Assessment of Mt. Apo Geothermal Reservation, 60pp (1997).