

SUMMARY OF CONSULTATIONS IN BORACAY ISLAND (14–15 August 2011)

I. Boracay General Information

1. Boracay is an island located at the Northwestern tip of Panay Island that belongs to the Malay municipality, province of Aklan found in Region VI. Having Boracay Island, the prime tourist destination in the Philippines, the municipality is obviously the tourism capital of the Province of Aklan. It is 76 kilometers away from Kalibo, the Capital town.

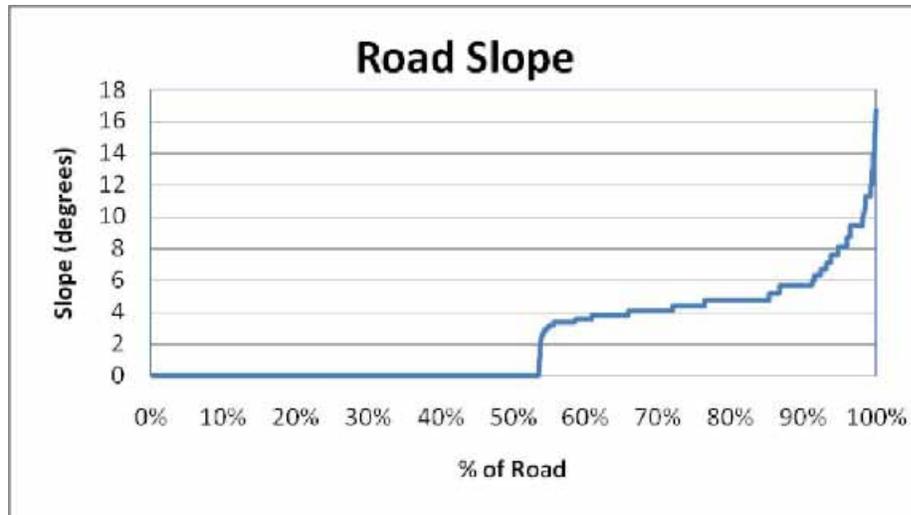
2. Population: 21,803 (projected 2010)
Land Area: 1,002 hectares
Population Density: 2,176 persons/sq km (projected 200)
Population Growth: 6.15%

3. About 60% of land area of Malay is classified as hilly to mountainous which are irregularly shaped and with elevation of less than 600 meter. In Boracay Island, about two-thirds of the total land area falls between 8.16 percent slope. Lowland and gently sloping areas are found near the shoreline.



4. **Road Conditions.** Boracay Island has a road network of around 18 kilometres with 1.2km of dirt road while the rest are concreted. Low lying roads have large puddles and uneven pavement. A few section of the road are narrow and can hardly accommodate bidirectional traffic. There is a sharp corner and a narrow street because the private land owner refuses to provide the right of way for public traffic.

5. The road gradients were measured and have a maximum of 16.7 degrees on the hilly portions of the northeastern and southern parts of the island while half of the roads are flat. There are areas that the tricycles have to slow down going downhill to avoid rolling over. The local body fabricator also suggested minimizing load overhang at the rear to prevent rolling backwards in climbing steep slopes.



6. **Transportation.** Land transportation are being provided for by L-300 van, aircon/non-aircon buses, jeepneys & tricycles.

7. Water transportation are being provided for by pumpboats, sailboats and a shipping line

for Manila–Caticlan and vice versa. Small (50 seater) planes and other smaller aircrafts are being used for air transportation from Manila–Caticlan and vice versa.

II. Tricycle Profile

8. There are 507 tricycles in Boracay managed by the Boracay Land Transportation Multipurpose Cooperative (BLTMPC). This serves as the main means of transportation in the island aside from the vans, multi cabs and motor cycles. The regular route taken by the tricycles is to ferry passengers; mostly tourist, from the ferry terminal to their designated hotel or working area. There are two ferry terminals in the island but either route takes an average of 3.5 kilometers. The usual fare charge by the tricycles is P75 to P100 per trip or P20 per passenger for an average of 10 passengers per trip. The average fuel consumption of the tricycles is 6 liters of gasoline per day at a relatively higher pump price of P64 per liter. The drivers get an average of P700 net income daily. Around 40% of the tricycles are owned by the drivers. A tricycle is shared by two to three drivers that take shifts in a day.

9. The tricycles here are designed to carry a maximum of nine passengers. Three passengers are seated in front, four passengers at the back, and two passengers behind the driver. Languages are carried on the roof. Often, the tricycle carries only two passengers.



10. Most of the tricycles are assembled in the capital town of Kalibo and ferried to Boracay Island. There are local tin shops in the island that can assemble the body of the tricycles but limited to basic tools and supply of materials. These shops mostly do body repairs than manufacturing. A shop takes an average of two weeks to assemble a body with galvanized metal sheets. It takes them a month to work on a body using stainless steel.



11. Due to the corrosive environment in the island and passengers that are wet with sea water from the beach the metal body of the tricycle easily rusts and wears out quickly. The tricycle body undergo annual repairs or sooner when necessary. Some tricycles use stainless steel bodies that last longer but costs twice than the regular galvanized body.

III. Proposed e-Trikes in Boracay

A Macro Considerations

12. **Interest and commitment of local government.** The local government has demonstrated great interest and commitment to participate in the Project. In fact, the concept of electric vehicle is not entirely new in Boracay and in Malay. There are some resorts owning units and some initiatives have already been undertaken to test electric vehicle in the area. With the necessary technical support, the LGU is interested to adopt more units and even indicated to operate at least 20 units using their own funds.

13. **Willingness to pass laws and guidelines to ban gasoline tricycles.** In our assessment of the LGU willingness, banning gasoline tricycles would be too early at this stage. The phase-out approach needs to be planned very carefully as there would definitely be some resistance from the existing owners of the tricycles. However, the LGU can start to think of not opening new franchises for non-electric type tricycles.

14. **Availability of “Champion Leaders” in the organizations.** The Municipal Mayor and some members of the Sanguaniang Bayan showed potential to be the “Champion Leaders” to push for the adoption of electric tricycles in the area. During the consultation, the LGU leaders indicated their support for the project.

15. **Organized tricycle group.** The tricycle group in both the main island (Malay) and Boracay are very organized. Specifically, the Boracay Land Transport and Multi-Purpose Cooperative (BLTMPC) is an organized cooperative operating in Boracay. BLTMPC was registered with the Security and Exchange Commission (SEC) on 2 October 1996 to assist, facilitate and provide public land transportation to all residents and visitors within the Island of Boracay. Presently, the cooperative is operating 37 multicabs, 5 EPVs, 6 Hi-Ace Vans, and 2 Avanza including membership of the 500 plus tricycles operating within the island.

16. **Interest from the owners of tricycles.** The reactions of tricycle owners are mixed. There are some who expressed apprehension that they can be put out of business with the

implementation of the electric tricycle in the area and there are some who have indicated support and interest.

B. System Considerations

17. Sufficient electricity available for charging. At present, the supply of power in the Visayas grid remains tight and with the coming-in of the committed capacities, supply situation in the region is expected to normalize within the short-term. With the installation of the 69 kW submarine transmission line from the Municipality of Navaz, the power situation in Boracay has also significantly improved. Presently, a 30 MVA substation is located within the island servicing three feeder lines including the line going to the Malay town proper. At present, the peak demand of the substation during peak seasons only stands at 15 MW indicating that the proposed e-Trikes Project will not significantly affect the power situation in the area.

18. Partners interested in charging infrastructure (is it needed?). There are some institutions that can be considered for the charging infrastructures. These are: (1) AKELCO, the distribution utility servicing the island, (2) some resort owners/operators, (3) some mall owners/operators, (4) BLTMPC, (5) LGUs both provincial and municipal. Specifically, it was learned during the visit that the provincial LGUs owns and operates the pier/terminal where most tricycles queue to get passengers.

19. Driver's willingness to change. The reactions of the driver are also mixed. Most of them wanted to try an e-Trike unit first. They also mentioned that the e-Trikes should have sufficient battery capacity or fast charging capability to run for 24 hours. It was learned that up to 3 drivers share each tricycles in the area.

20. Is flooding and high terrain a concern? Flooding is not a problem in both main and Boracay island. However, the e-Trikes that will be deployed in the area must be designed to have sufficient torque to handle some stiff terrain. In Boracay Island, about two-thirds of the total land area falls between 8 – 16 percent slope. Lowland and gently sloping areas are found near the shoreline.

C. e-Trikes Design Considerations

21. In designing the e-Trikes that will be used in Boracay, the following issues have to be considered:

22. **Passenger capacity and luggage carrier.** The tricycles in Boracay are designed to have a maximum of 9 passengers but often only carry 5 passengers with the luggage mounted on top. The recommended passenger capacity will be 6 with a luggage carrier at the back instead of the top.

23. **Stability.** The e-Trikes should have low center of gravity to maintain its balance on steep slopes and inclined roads. However, it has to have enough ground clearance for unpaved roads and deep puddles. This can be complemented with shock absorbers to add to the comfort of the passengers.

24. **Corrosion.** Stainless steel was used as an alternative to galvanized metal sheets as the material for the body to withstand corrosion. This makes the tricycle more expensive, heavy and difficult to repair in case of dents and scratches. Fiber glass or injection mold plastic body will be

ideal for this condition because of their resistance to corrosion and ease of repair but local capacity and supply of materials need to be introduced in the island.

25. **Range.** The usual trip taken by the tricycles is 3.5km or 7km per round trip before they make another trip after waiting for a while in the terminal. Special trips to the other side of the island can take 7km or 14km round trip. An average of 6 liters of gasoline is consumed by the tricycle throughout the day with extended service at night. The 3kWh battery used in Mandaluyong can travel for 30km to 40km under the road condition in Boracay. This capacity should be enough if charging is made available while the e-Trikes is waiting for its next set of passengers.

26. **Power.** Basing on the Mandaluyong e-Trikes model with 3kW motor, the minimum requirement for the Boracay model should be 3kW with 6 passengers. The e-Trikes may only carry 4 passengers in steeper roads and a larger motor can accommodate 6 passengers on the same road.

27. **Charging stations.** There is enough electric capacity and reliability to operate charging stations in Boracay Island. The BLTMPC recommended 13 charging stations all over the island. These stations are waiting areas and the usual destinations of the passengers. If onboard chargers are used that can be safely plugged to an AC outlet with basic metering and protection, these charging stations can be easily be established and operated by the BLTMPC. Using a slow charger for 4 to 6 hours limits the operating hours of the e-Trikes especially with the heavy traffic in Boracay during peak season. Using the fast chargers with an hour of charging time or less provides the opportunity for drivers to maximize the utilization of the e-Trikes and generate more income. The 13 charging stations can be reduced to a fewer number to make them financially viable. The BLTMPC will be the best to assign the most critical locations that the chargers should be installed.

28. The suggested locations are:

1. Cagban (port)
2. Station III
3. Tropics
4. E-Mall
5. D Talipapa
6. D Mall
7. Station I
8. Pinaungon
9. Fairways
10. Boracay Teraces
11. Din-iwid
12. Yapak
13. Puka Beach



29. Exterior and seating capacity
 - Will flood and high terrain be an issue for the design—Flooding is not an issue. Terrain and corrosion are an issue to design.
 - Size of wheels, boot space and number of seats?
 - LED lamps
 - Any safety issues.
 - How to rust-proof the design? Aluminum and fiber glass body?
 - Is there a Roadworthy test?
 - What will be the minimum technical design?
30. Interior
 - LCD screens for tourist information
 - Visitors book could be added in each e-Trikes
31. Project design parameters
 - What are the actual number to tricycles? 507 units
 - How many will be replaced through how many phases?
 - How will the old tricycles be disposed?
 - How will the tricycle driver be selected for different phases?
 - Need a list of all drivers? Licensed or unlicensed--all will be covered
 - We may need a survey to establish driver's social profile
32. Components and cost
 - Could the e-Trikes be charged at home safely? Yes. This would be preferred by the drivers. However, the claims that some drivers do not have the proper parking area and therefore are not properly parking their units at night needs to be verified.
 - Will there be after hours use of e-Trikes—public lighting. None. Boracay is well lighted.
 - Will there be a need for awareness campaign. Yes.
 - Any solar charging? Advertisement and other revenue. There are potential for advertising revenue. Some tricycles are already benefiting from advertising income.

D. Local Business and Technical Competency

- (i) Are local businesses interested? Yes, there are some who are interested.
- (ii) What are options for charging? Home? Will existing gasoline stations or electric cooperative be interested in charging station business? According to the drivers, the e-Trikes must have fast charging capability or sufficient battery capacity to operate for 24 hours. Hence, charging station capable of fast charging is preferred. AKELCO can be a partner in the charging infrastructures. However, BLTMPC may be in the best position to operate the charging stations including the collection of fees, assigning a dedicated technician, etc.
- (iii) What are options for battery leasing service? Any interested parties? None was identified during the visit. For some resort who are operating an electric vehicle, their batteries are sourced directly from companies or agents coming from Manila.

- (iv) Will there be at least five/ six local manufacturer and assembler? Manufacturing of tricycle is a backyard industry in the area. In Boracay, there are at least 3-6 persons involve in the fabrication and repair of tricycle/sidecar. There are more fabricators located in Kalibo, the capital town of the Province.
- (v) What are existing “boundary payments”? For Boracay, the mechanism is more of an “income sharing”. Driver and owner split the income after deducting the gas expenses and 10-15% of the income as maintenance expense. On the average, drivers reports P1,000 to P1,500 gross daily income.
- (vi) Will 100 Peso a day be enough for leasing of e-Trikes body and battery? Given the daily income of the driver and existing sharing income arrangement, drivers can pay more than P100.
- (vii) Will the drivers need training? What are the options for training? Yes, drivers need training on the operation of e-Trikes. This can be done during project implementation.
- (viii) Will local Land Bank or DBP be interested in the leasing business? DBP and Land Bank has separate leasing companies. Currently, they do not have local presence. However, initial talks with DBP Leasing indicated that they are very interested in the leasing operation of the e-Trikes.