

Republic of the Philippines

Preparatory Study on BoP Business on
Recycled Watt-hour Meter Operation and
Maintenance

Final Report (Summary)

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Executive Summary

In this survey, we have examined the possibilities of a business deployment which consists of two pillars; “meter sales business” and “meter maintenance business”. In the former, second-hand Japanese meters, which would be in surplus after Smart Meters becomes popular in Japan, are to be reused after maintenance is conducted in the Philippines. In the latter, meters that are now used and disposed of in the Philippines will be reused after maintenance in the Philippines.

An essential point of the latter “meter maintenance business” is whether the maintenance method that is known in Japan can be applied to the mechanical meters used in the Philippines. The survey revealed that most of the meters in the Philippines contain some defects, include many different manufacturers and types, and have different machinery from what is popular in Japan. Therefore, we came to a conclusion that there is little possibility that the Japanese way of maintenance can be implemented to the meters in the Philippines.

In respect of “meter sales business”, it is confirmed that there is no technical problem to utilize Japanese manufactured meters in the Philippines, and that BoPs (differently-abled persons) are capable of acquiring skills in maintenance with continuous educations and trainings. Although the business can be profitable with sales of a certain amount of meters, the problem is to secure the amount and the sustainability of the business.

It would be necessary to sell over 50,000 meters every year in order to break even. There are 119 Electric Cooperatives (EC) who would be sales distribution points, scattered all over the country, but it would require great effort and expenses to talk business with and to get contracts through tenders with each of the ECs. National Electrification Administration (NEA) was the distributor of meters to ECs in the past, but each EC now procures the meters by bidding themselves. The required meters for an ongoing Rural Electrification Program are individually obtained by the ECs as well.

In the seminar held by NEA in July 2014, where 12 ECs attended, although they highly appreciated the quality and reliability of Japanese manufactured second-hand meters, inquiries were made only on 3,000 meters (1,000 each from 3ECs). One of their concerns was the durability of the meters. This could be overcome only by actual achievements and performance in the Philippines and gaining credit. At any rate, what is important is to convince them the superiority of the Japanese second-hand meters. Promoting them with time and money, however, can be risky. In order to hedge this risk, it is desirable for the Philippines government to make changes to the procurement system to include special case for this kind of project so that NEA can make a lump-sum purchase on behalf of the ECs. The possibility of business deployment goes much higher in a system where NEA certifies the specification of the meters, makes lump-sum purchases and distributes them to the ECs. In addition, while 50,000 sales are required if a Japanese company operates the business, only 25,000 sales are required if a Filipino company operates it.

The problem of sustainability lies in the fact that the number of exportable meters is limited up to 1 million units. It is anticipated that the number of good-condition meters will decrease to 70% of the total number of surplus meters. Besides, since replacement parts are taken from the surplus meters during the maintenance process just before the shipping inside the Philippines, yield rate would remain at 70%. Therefore, actual numbers of distributable meters drops as much as 50% to 500,000 units, and thus the sustainable duration would be around 10 years.

Finally, we will make a proposal of streamlining the meter maintenance business to the Philippines government. Meter maintenance in the Philippines has never been efficient, because all of the meters come from overseas, not having indigenous manufacturing or maintenance knowledge, thus there has been no technological innovation or price competition. From the broad view of the meter business, we will question the present shape of meter maintenance, and make recommendations for the restructuring of the present method of meter maintenance in terms of streamlining.

In the present circumstance of the Philippines, each EC sets up their meter shop individually, with a few engineers doing inefficient operation of testing, repairing and calibration manually with small testing devices. In order to improve the efficiency, we would offer to establish meter shops which bundle neighbouring ECs and to introduce automated testing apparatuses capable of refurbishing a large number of meters at once. In a questionnaire we circulated, about half of the responded twelve (12) ECs answered that they would consider adoption, if a better maintenance service was provided.

Since it is possible for third-party bodies, other than the ECs, to open a meter shop, there is room to consider a future opportunity that a Japanese company could run a business with utilizing Japanese foremost maintenance technology, bundling the ECs' inefficient meter maintenance methods.

1. Outline of Survey

1.1 Background and Objective of Survey

The objective of this survey is to contribute to the following points with utilizing intellectual properties of the proposers; Shikoku Electric Power and Shikoku Instrumentation, and achievements and networks of NPO International Children's Action Network (ICAN) in the Philippines.

- To enhance management soundness of the ECs and to reduce electric power loss in the Philippines.
- To BoP acquire skills and know-how and gain opportunities to generate income.

This survey examines the possibility of long term use of watt-hour meters in the Philippines, where the meters are low quality and single-use, by recycling them as it is common in Japan. If this recycling business is widely spread, it is expected to contribute to qualitative improvement of watt-hour meters, reduction in initial capital investments, and in the long run, decrease in the power distribution loss rate.

In recent years, the introduction of Smart Meters has been progressing in Japan. Every mechanical meter now being used will be sequentially replaced by Smart Meters and eventually abandoned.

This business model is expected to have the following effects.

- Moderation of investment for brand-new meters and reduction of industrial waste, by recycling decrepit meters in the Philippines.
- Moderation of investment for brand-new meters and reduction of industrial waste, by recycling surplus meters in Japan.
- Decrease in power distribution loss by appropriate management of meters.
- Development of BoP business and promotion for employment, by introducing Japanese meter maintenance technology.

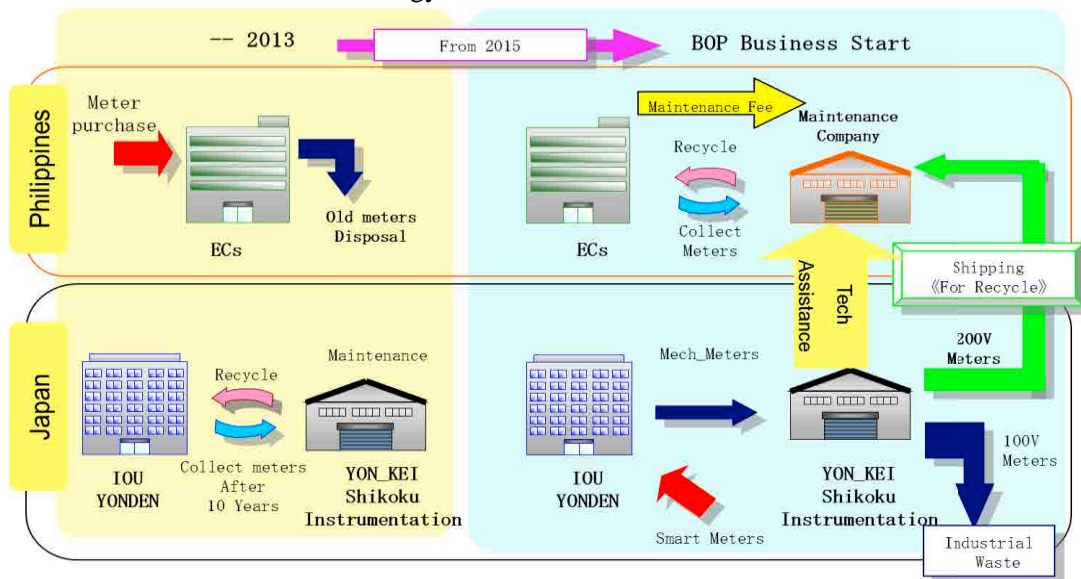


Figure 1 Project Concept

1.2 Survey Area and Business Deployment Area

The map below shows the distribution loss rate of each EC. Having discussed with the NEA and taking future business deployment into consideration, this project focuses on Batangas area and set Batangas Distribution 2 (BTELEC2), which supplies electricity around Lipa, as a model EC. Geographically, it is an important point for traffic of the south part of Luzon and Visayas. We have recycled meters in Batangas and made researches identifying possible distribution points of ECs along through the peninsula, that are, Camarines, Albay, Sorsogon, Samar and Leyte. We have continued our researches by crossing the strait to Mindoro Island, Marinduque Island and Panai Island to promote recycled meters in these islands.

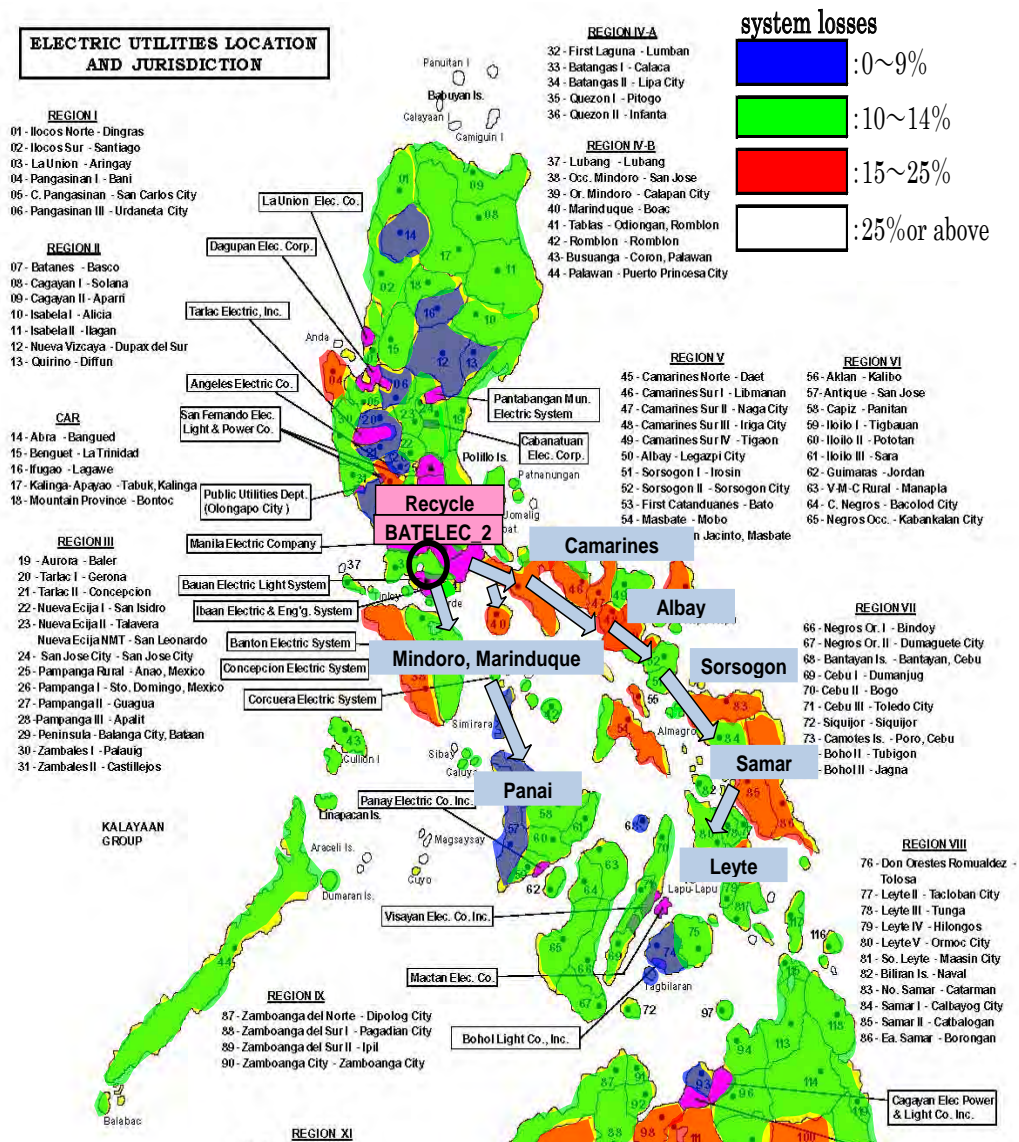


Figure 2 Distribution Loss Rate of Each EC

2. Business Model

2.1 Envisaged Business Model

Envisaged business models are as follows.

1. Meter Sales Business

Since the meters that will be replaced in Japan will have been used for 10 years maximum, maintenances needs to be conducted prior to be used in the Philippines. A local company which would be incorporated to operate the business will give training programs of meter maintenance to a BoP organization, in cooperation with some NGOs. The skilled and organised BoP will do the maintenance of the surplus meters imported from Japan.

In the first year, the planned sales to the ECs are 5,000 meters at the unit price of 400 pesos. In the second and third year, it is planned to increase by additional 5,000 units annually.

In Shikoku area, there are estimated 180,000 meters that can be reused in the Philippines, and as these would be replaced by Smart Meters within next ten years, it would be possible to secure the availability and sustain the meter sales business for at least ten years. Additionally, 60Hz meters would be also available from Kansai, Kyushu and Chugoku area if necessary.

2. Meter Maintenance Business

In parallel with the sales business, the company would operate the maintenance of defected meters which ECs retrieve. In the first year, maintenance of 5,000 units would be conducted at a unit price of 400 pesos and delivered to the ECs, and an additional 5,000 units per year from the second to fifth year is anticipated. This meter maintenance business could be expanded by conducting well-designed training, in accordance with possible models of meters.

2.2 Outcome of Survey

2.2.1 Outcome 1. Survey on System

1. System about Meter Maintenance

According to the “Rules and Procedures for the Test and Maintenance of Electric Meters of Distribution Utilities”, which is relevant to this business, it is necessary to acquire the Energy Regulatory Commission (ERC)’s approval as a third party body meter shop, in order to start maintenance of the aimed meters of this project in the Philippines. In order to obtain the approval, it is required to make an application to the ERC with a business permit from the Mayor of these locations and some other particular requirements.

These requirements seem to be a simple task, but there is another condition that the manager of the third party must possess the national qualification of a electrical engineer and have sufficient experience in meter maintenance, also the workers engaged need to have work (or training) experience of more than one year. Since the national qualification mandate for the manager is unique to the Philippines, a qualified person should be employed on-site as a manager, also, human resources of experienced workers should be secured.

2. System about Type Approval of Surplus Meters

It is required to obtain written approval from the ERC to use Japanese surplus meters as revenue meters in the Philippines. The application procedures of Initial approval and re-approval are thoroughly regulated in the “Rules Governing the Type Approval of Meter Products to be used in Revenue Metering by Distribution Utilities and Redistributors”.

The meters that would be used in this project fall under re-approval category, and we actually have made an application of some of those meters, as per the regulation. The application has passed the screening (includes some tests) and as we researched, we have confirmed that an approval is to be valid when a letter which tells that the intended usage of the meter in question is a revenue meter inside the Philippines is submitted from the NEA to the ERC. Since this part of the procedure takes place between the concerned organizations in the Philippines, the challenge of bringing in meters from Japan to the Philippines was practically solved.

2.2.2 Outcome 2. Survey on Technical Matters

1. Meter Sales Business

One of the technical challenges for utilizing Japanese surplus meters in the Philippines would be the voltage difference. In concrete, while the supplied voltage in the Philippines is 240V, the rated voltage of the Japanese meters is 200V.

This discrepancy of voltage would cause burnouts or over-heat and errors of the meters by applying higher voltage than the rated voltage of the meters.

Firstly, as a research on the overvoltage, we have conducted a test of voltage margin of the surplus meters' voltage coil as well as a continuous current test on actual sites.

The continuous current test was taken place in cooperation with 3 ECs (PELOC2, ORMECO, BATELEC2) in their properties, and we have obtained the outcome that the meters work continuously without any problem such as a burnout in every occasion.

In regard to the voltage margin testing, we have picked up 6 types out of the surplus meters, and looked into the correlation of the applied voltage and the current consumption and the temperature rise. As a result, there was no abnormal increase in current consumption or temperature under the applied voltage of 300V, which is 1.25 times higher than the supplied voltage in the Philippines.

Secondly, with respect to the meter error, the surplus meters have adjusting devices such as a heavy load adjusting device, a light load adjusting device and a phase adjusting device so that they are adjustable by setting the test environments and these devices in accordance with the actual environment of the usage.

We have confirmed that those meters could be compliant to the standards of the Philippines, by setting the test environments of 240V and readjusting the devices during the maintenance process.

Although the outcome of these verification tests of voltage discrepancy shows that using Japanese surplus meters with 240V would cause no problem, a problem on the business deployment still remains in liability since the responsibility that relates to the actual usage lies on the local maintenance entity.

2. Meter Maintenance Business

The important point regarding the possibility of recycling mechanical meters that are abandoned in the Philippines is whether the maintenance method used in Japan would be applicable in the Philippines.

While the main contents of the maintenance are the disassembling and cleaning, the replacement of defected parts to new ones and the adjustment of the margin of error, it would not be possible to repair the break-down meters in the maintenance.

Through our research to PELCO2, ORMECO and BATELEC2 of the contents of the disposals, it was revealed that, in spite of the variety of the manufacturers and the types they contain, there are few meters which have the same machinery as those distributed in Japan and most of them have some sort of defect.

While parts replacement would be needed in case of a break-down of the components, it is indispensable to obtain brand-new or good-condition identical parts in order to remain as an identical type.

In conclusion, it is not possible to apply the Japanese maintenance methods to the meters in the Philippines as they are.

2.2.3 Outcome 3. Survey on Market

While the electric meters are widely used in urban areas, it is assumed that there are markets in provincial cities where we have conducted the survey since about half of the meters used there are mechanical meters.

Despite the fact that many of the meters in the Philippines have larger current capacity, there would be demands for Japanese meters, whose current capacities are mainly 30A, since there are a certain number of meters whose current capacities are 30A or less. In addition, there would be no difficulty in wiring work because the wire connection type of the meters in the Philippines is bottom-entry, which is the same as that in Japan.

Although we are convinced that there are sufficient markets in the provincial cities, it would be necessary to make considerable efforts of promotion to impress the ECs of the merit of Japanese meters. It would be possible to secure an efficient sales channel if the NEA made a lump-sum purchase and distributed to the ECs, but in the present system the procurements are made by the ECs individually.

Therefore, it is significantly difficult to assure the sales amount which enables sustainable business through talking business with the individual ECs and their tenders.

According to the interviews we have made directly to the NEA and its regulatory administration of the ERC, they do not handle the data in relation to the ECs' meters. We,

therefore, have conducted a questionnaire survey to ECs all over the country, and held a seminar with the ECs who were interested in this project.

The below are the profiles of the questionnaire and the interviews.

(1) Types of Presently Used Meters

About 20% is mechanical meters. The life duration is 3-5 years, and the lowest purchase price is 600 pesos.

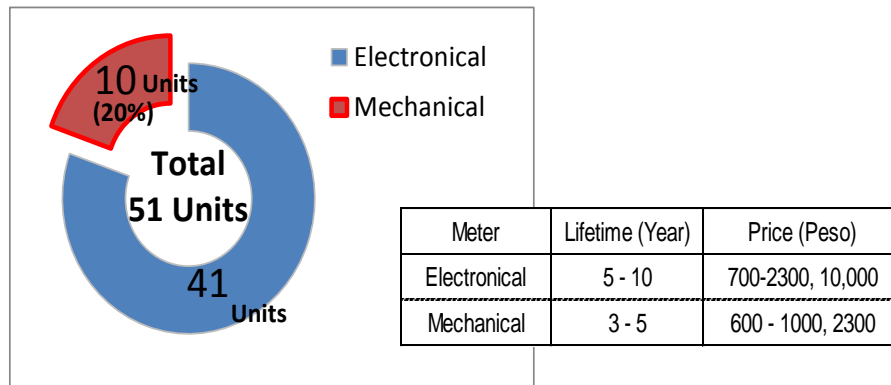


Figure 3 Types of Presently Used Meters

(2) Types of Planned Meters to be Installed in the Future

There are twenty five (25) various kinds of meters, with only one being mechanical. This shows that most of the ECs are planning to introduce electrical meters in the future. The electrical meter is expected to have a similar life expectancy and price as the present units. The mechanical meters are expected to have a life expectancy of ten (10) years, which equals to twice the life span of the present units, at the same low price.

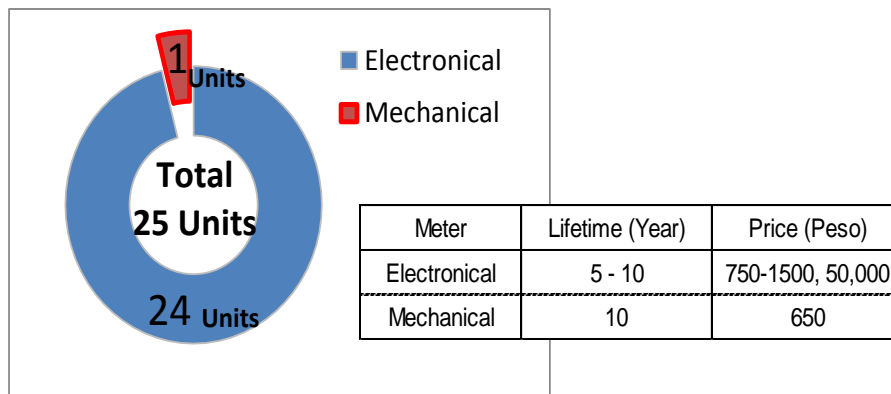


Figure 4 Types of Planned Meters to be Installed in the Future

(3) Interest in Japanese Surplus Meters

It shows their strong interest in the outcome of this survey, with the ten (10) ECs answering that they have very high interest.

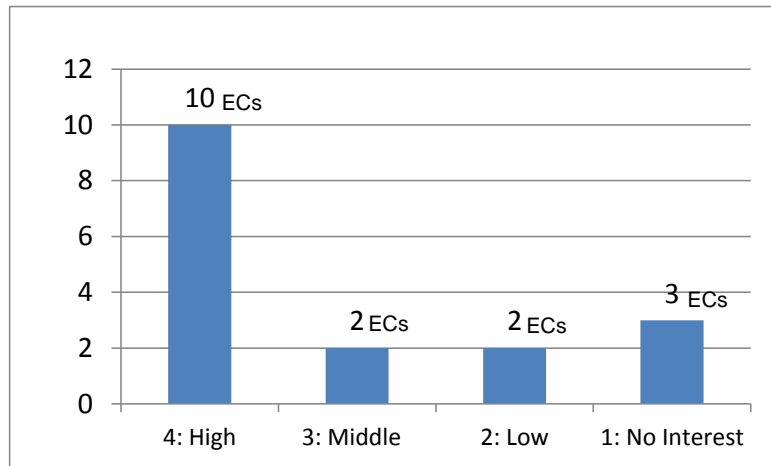


Figure 5 Interest in Japanese Surplus Meters

(4) Expected Purchase Price of Japanese Surplus Meters

Although it is less expensive than the present lowest purchase price of six hundred (600) pesos, the most common answer was that a price of more than five hundred (500) pesos is acceptable. This reveals their high expectation for Japanese surplus meters.

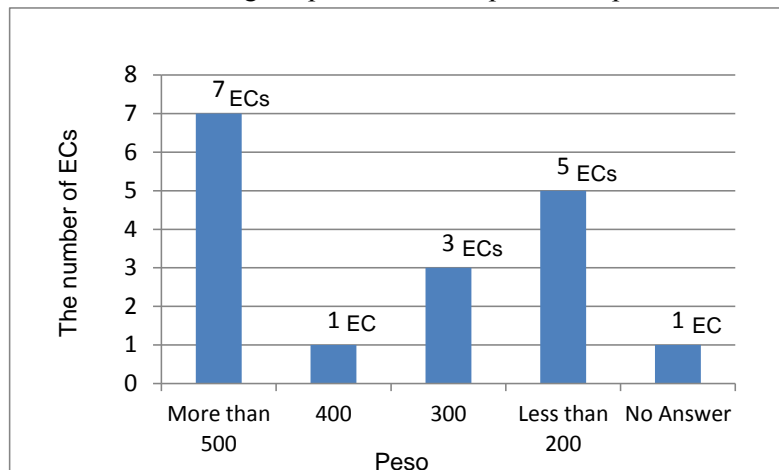


Figure 6 Expected Purchase Price of Japanese Surplus Meters

(5) Expected Amount of Purchase

The most common answer was “Small Part”. In spite of high expectation for the second hand Japanese meters, the result reveals that they feel anxious whether the meters actually work, thus they may want to test them in actual environments with a small quantity of the purchase.

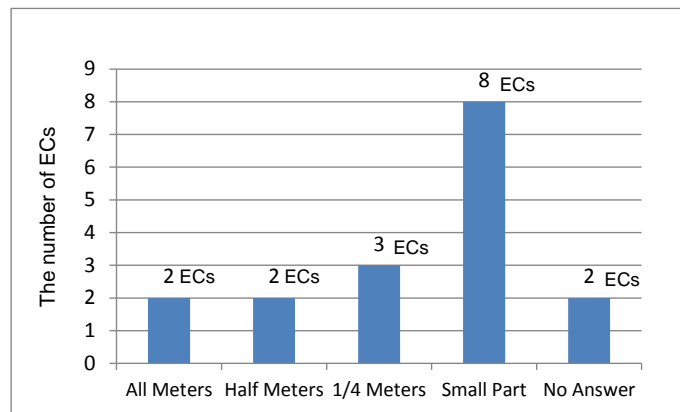


Figure 7 Expected Amount of Purchase

The outcome of the questionnaire (1)-(5) demonstrates the followings.

- The main trend is to replace mechanical meters to electric ones.
- The expectation for the quality of Japanese surplus meters is strong, even if they are second hand.
- Although it is less expensive than the lowest purchase price of the present mechanical meters, many of the ECs consider that the price of more than five hundred (500) pesos is acceptable.
- Many of the ECs are considering to have a trial period by purchasing only a few meters because they are not fully convinced whether they are actually usable.

3. Summary of Survey Outcome

3.1 Survey Outcome

3.1.1 Findings and Advisability

One of the conclusions of this survey is that the “meter sales business”, where the surplus meters which would be available after Smart Meters diffusion in Japan, will be exported to, have maintenance conducted on them and reused in the Philippines, could be profitable, if there is a certain amount of demand in the Philippines. We have confirmed through the on-site tests that there would be no problem in the compatibility of Japanese meters to the different rated voltage of the Philippines, and also verified that the technological transfer of the meter maintenance to the BoPs would be well achievable.

In relation to the “meter maintenance business”, it was determined that the maintenance process cannot be applied that the meters that currently being used in the Philippines as these would have to be disposed of, because of the fact they cannot be restored.

Regarding the “meter sales business”, we have considered both cases where a Japanese company operates the business (initial model) and where a locally-incorporated company operates the business (alternative model), but there are still problems for conducting the business.

3.1.2 Bias of Advisability (Initial Model)

The meter sales business is the only profitable option, since reusing the disposed meters (meter maintenance business) is infeasible. The operating body must be a Japanese company in this initial case.

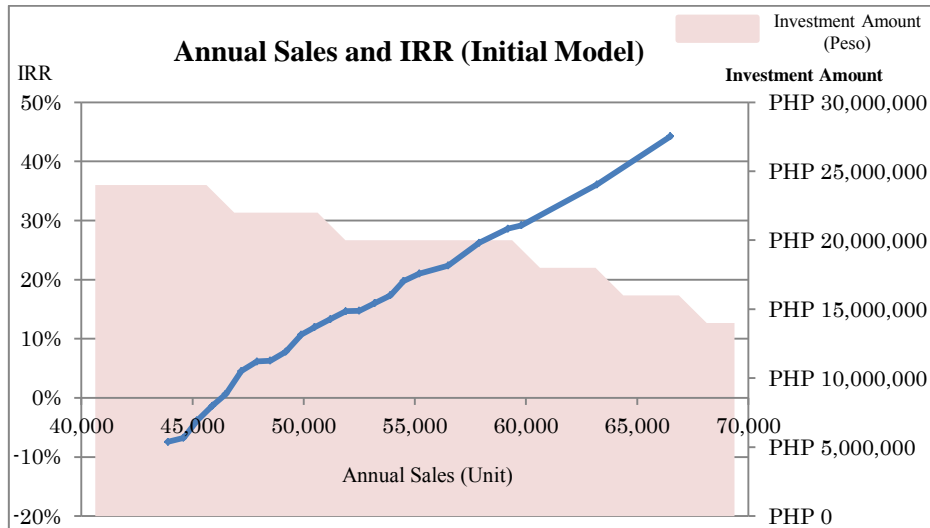


Figure 8 Annual Sales and IRR (Initial Model)

Taking the meter sales business as the only business model, there are two situations that arise:

- Securing a certain amount of sales
 In case of expecting more than the 10% of the IRR, an expected sale of 50,000 meters would be necessary. The anticipated annual sales with the promotions we have made throughout this survey would be far less than this goal, about 10,000 units at the most. Besides, there is a trend of replacing mechanical meters to electric meters.
- Business Sustainability
 Since the number of exporting surplus meters is limited, the stock would be in short supply at some stage. Since it is very difficult to avoid this shortage, this model should not be considered.

(Alternative Model)

The operating body in this case should be a local corporation.

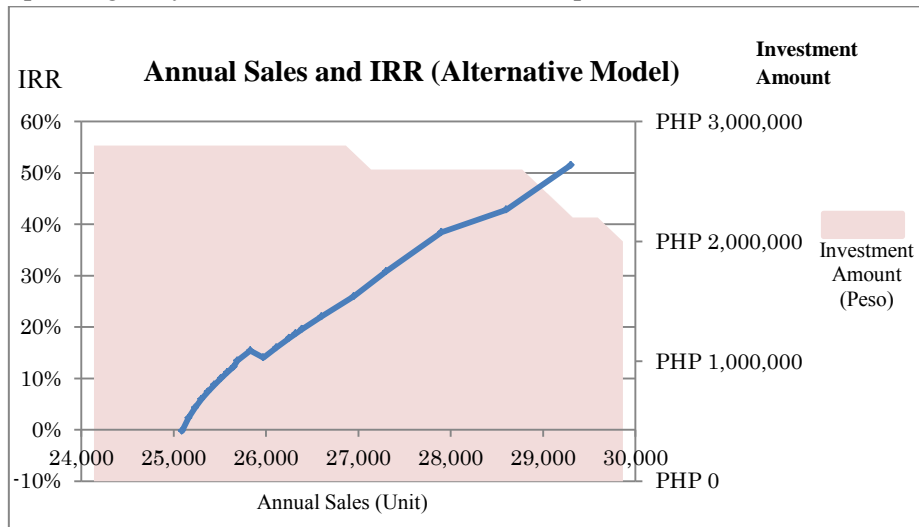


Figure 9 Annual Sales and IRR (Alternative Model)

The required number of annual sales would be more than twenty five thousand (25,000) units, in order to secure the IRR of more than 10%. Despite the fact that the required number of the meters is about half of the initial model and the possibilities are enhanced, the anticipated sales is still insufficient to be profitable.

In terms of the sustainability of the business, the purchase would be about half of that of the initial model, and thus the possible sustainable duration would be extended. We, however, have come to the conclusion, considering the fact that the number of the meters would be in short at some stage, that the difficulty cannot be overcome.

(End of the Report)