

**"Project Formulation Survey" under
the Governmental Commission on
the Projects for ODA Overseas
Economic Cooperation in FY2012"**

Summary Report

The Philippines and Indonesia

**Research on the Promulgation of
Solar-Diesel Hybrid Solution (Mixture of
Solar and Diesel Power)**

March, 2013

**UYENO Green Solutions Ltd. &
Industrial Marketing Consultants Co., Ltd.**

This report is a summary of a project formulation survey conducted by the contractor, under the Governmental Commission on the Project for ODA Overseas Economic Cooperation, commissioned by the Ministry of Foreign Affairs of Japan in Fiscal Year 2012. It does not necessarily represent the official views of the Ministry of Foreign Affairs of Japan.

I. Description of the current situation and development needs of the concerned development issues in the surveyed countries.

Among developing nations including the Philippines and Indonesia, while continuous national economic growth has been observed, differences in quality of life are present and continue to widen. One such visible disparity is the lack of progression in improving rural electrification. The Philippine economy has grown at an average 5% annually for the past decade, a significant improvement upon the country's rate of growth 20 years ago. On the other hand, poverty remains a serious issue with indications that approximately 25% of the population falls below the poverty line, with limited change to this number over the past decade of growth.

Although the power industry was restructured in 2001 into the three major sectors: generation, distribution, and supply in an attempt to rationalize the service, there yet remain differences in availability of coverage between urban, mountainous and isolated island areas.

While solving the matter of power deficiencies in rural areas has been categorized as a high priority issue for the country, the government has also been addressing the current challenge of rapidly increasing demand for power due to population growth.

In Indonesia, with rich national resources and with a high rate of investments, the country has reported a strong rate of economic growth, an average of 6%. However, simultaneous to this fast development, there has been a lull of investing in the upgrading of infrastructure.

In the power industry, whereas there has been a movement toward privatizations of power corporations, the national power corporation still has a strong influence on the industry. With this and the corporation's financial struggles, rural electrification is not progressing as expected. Also, structural change from the financial support of the government to subsidies on costs of electricity rate has also made the management of the national power corporation challenging.

In addition, with regard to these issues, the Photovoltaic (PV) system has been recommended from a variety of organizations such as the department of energy, local governmental unit (LGU) and the national power corporation. The reality that they are determining respective standards of usages of the systems is also delaying the well-established and maintained solar systems.

II. Possible application of the SME's products and technologies, and prospects for further business development

Understanding the abovementioned circumstances, our proposals for a solar-diesel hybrid system is the most efficient mixed-energy system. This is achieved by centralizing main devices including the solar modules and off-grid inverter, while maximizing existing batteries and other equipment. Particularly, our goal for this system is for consumers in isolated islands and remote areas in the developing country to minimize their usage of diesel, which would be expected to be more expensive in the long-term. Also, by supplying power to remote communities in the areas and/or at a high electricity rate, the system can ensure providing stable and less expensive power to consumers.

What we propose to provide as a solar-diesel system is not only the sales of the hardware, but also optimum designing, foundation, maintenance, operation, monitoring and management of the system by providing technical support, as “the power solution as a package”.

In terms of its size and location, the PV system has a high flexibility to correspond to a variety of demands. Also, the system improves cost efficiency, and last but not least, it performs well environmentally. That said, unfortunately, due to inefficient installation, lack of maintenance, poor operation of system (including overlooking alarms), we have witnessed from some of the existing systems that they are not performing at the most efficient level. We believe that many of these issues are due to lack of support on the software side. It is noteworthy that at our site survey, we were able to study these issues and make a root cause analysis together with nongovernmental organizations (NGO) and governmental organizations. We strongly believe that, based on this feedback, we can design locally adaptive systems in order to electrify the areas.

III. Expected development impact and effect on business development of proposing SMEs in the surveyed countries through proposed ODA projects

We trust that our solar-diesel hybrid system could correspond well to the challenges that the newly developing countries are facing today. Foremost, there is a high demand for rural electrification in the Philippines and Indonesia, which have numerous isolated islands. Secondly, we are able to respond to the growing demand for power, shifting from the current energy, sourced by diesel and coal, to renewable energies, and shifting from fuels whose cost has been increasing.

While the government has set a goal of electrifying all areas in the Philippines by 2020, due to the massive number of isolated islands, it is practically difficult to connect the existing power distribution lines there. In terms of costing and time consuming, the current power generating method will truly not achieve the target. However, by implementing the solar-diesel hybrid system, power may be supplied efficiently.

Also, in Indonesia, there are still lots of remote areas where there is no power supply. Dealing with this issue, a water power generation (micro-hydro) system has been relatively focused on solving the situation. However, while the water power generation system has a geographical restriction for installations, the solar-diesel hybrid system, which has flexible design of setup to adjust to various requirements, has been receiving attention.

In addition, by establishing a strong relationship with a local partner to provide business to local communities, explaining details of installing the system, setting up an operation team, designing a maintenance system, and offering monitoring methods, we set our goal to maximize the performance and life of the system to contribute to the quality of life of the poor.

IV. Proposals for formulating ODA projects

To promote our Solar Hybrid systems through the ODA scheme, it is necessary to accomplish both the rural electrification in the short term, and support the sustainable supply of electricity in the long term. In addition, we would utilize the first project as a pilot site, where we periodically invite and educate people such as the municipal staff, local citizens, local workers and local companies which need cheaper electricity. By doing this, such skills as know-how of operation and maintenance of the system are expected to be transferred to the locals. As a part of marketing activities, we plan to work together with NGO/NPOs to demonstrate and explain the system. At this point, the important matter is not installing a large scale system but making it appropriately sized and operating smoothly in the long run. Furthermore, it is important to make them feel that the system is owned by them, and that they can proactively interact and cherish the system. It is not easy to raise awareness and consciousness of the system, this has to be accomplished by making an autonomous organization, and supporting them. In this regard, this project cannot be successful without soft skills such as operations, maintenance and designing.

This system primarily supplies less expensive electricity for people in un-electrified areas and places where there are high rates. However, this will even help to improve quality of life, reduce criminal offences, and stimulate the economy, leading to reduction in the disparity between rich and poor.

In the business aspect, due to the geographic reason, it is difficult to connect to the national power grid in the islands, and diesel engines are promoted around those areas which makes solar-diesel hybrid more competitive. Thus, there are many companies which are interested in our system. We can utilize a pilot system fully for promotion. Especially in the Philippines, due to the expensive price of electricity, this will be attractive for private companies.

Primarily, private utility companies, electricity authorities and local governments are responsible for electrifying their areas. Therefore, it will be good for them to work together in order to electrify the whole area through utilizing the potential application of ODA.

Through this research, we have found potential projects, which can be funded by ODA.

The Philippines:

One of the un-electrified barangays in Palawan can be the pilot site for an around 30kW system, with partnership with local government unit and local NGO. It costs around 35 million JPY, and has around 1,000 beneficiaries. This project includes not only the system itself but also intangible skills and know-how, such as system design, installation, operation, maintenance and monitoring by teaching local staff.

Indonesia:

Partnering with an NGO, which has much experience in micro hydro power plants, we are trying to introduce the solar diesel hybrid system in the islands of Indonesia. Most of the solar system projects have failed to show their highest performance in Indonesia, so solar systems have won relatively low confidence in the country. Therefore, it will be good to start small projects with NGOs who can probably learn intangible skills quickly based on their former experience.

Project Formulation Survey – The Philippines, Indonesia Research on the promulgation of Solar-Diesel Hybrid Solution (Mixture of Solar and Diesel Power) for developing countries and Pacific islands

SMEs and Counterpart Organization

- Name of SME : UYENO Green Solutions Ltd. & Industrial Marketing Consultants Co., Ltd
- Location of SME : 46 Yamashita-cho, Naka-ku, Yokohama-shi, Kanagawa-ken
- Survey Site ▪ Counterpart Organization : The Philippines & Indonesia, Local Government Units & NGOs/NPOs

Concerned Development Issues

The Philippines

- Difficulties to expand distribution networks
- Lack of Electrification in Rural Areas
- High Cost of Diesel Power Supply

Indonesia

- Too cheap electricity price to cover costs
- Lack of Electrification in Rural Areas
- High Cost of Diesel Power Supply

Products and Technologies of SMEs

Solar Diesel Hybrid Solutions

- Solar Generated Energy as primary supply
- Optimization of mixed energy sources
- Support for Intangible Skills
 - Designing of System
 - Maintenance, Operation
 - Monitoring, Repairing

Proposed ODA Projects and Expected Impact

- Solar Diesel Hybrid System Supply with medium-long term support for intangible skills in the Philippines
- Application of Solar Hybrid system to the existing diesel power generation in remote islands of Indonesia
- Giving a higher quality of life with electricity to rural areas of approximately 1,000 population

Future Business Development of SMEs

- With the pilot site, demonstration of system and its operation & maintenance
- Consulting and Sharing information of intangible skills for Solar Hybrid Solutions

