**Scope of Work**

**Demonstrating Battery Energy Storage System in the Commercial and Industrial Sector**

## BACKGROUND

As Vietnam experiences steep increases in energy demand and rising air pollution challenges, there is growing recognition that cleaner, more reliable sources of energy are needed and greater capital investment is necessary. USAID Vietnam Urban Energy Security project works closely with target cities (Da Nang and Ho Chi Minh City - HCMC) to improve enabling frameworks, mobilize investment, and increase the adoption of innovative solutions for advanced, distributed energy.

The overall goal of the project is "advanced, distributed energy solutions deployed to improve urban energy resilience and energy security" in Vietnam. At its completion, USAID Vietnam Urban Energy Security must achieve the following high-level expected results:

1. At least 400 megawatts (MW) of advanced, distributed energy systems deployed in the selected cities.
2. At least $600 million in public and private investment mobilized for advanced, distributed urban energy systems.
3. At least 20 innovative solutions to address urban energy and environment issues demonstrated and/or commercialized.

In recent years, electricity demand in Vietnam has been increasing at an annual rate of around 10% while electricity demand in the industrial sector has been growing at 11%, and the commercial sector at 12%[1]. With 54% of overall electricity consumption by the industrial sector and 6% by the commercial sector, the Commercial and Industrial (C&I) sector represent the largest energy consumer in Vietnam.

To promote implementation of the energy efficiency and conservation (EE&C) law, in 2019 the Government of Vietnam (GVN) approved the Vietnam National Energy Efficiency Plan 2019 – 2030 (VNEEP3). VNEEP3 proposes a range of ambitions, including a reduction in consumption by intensive energy consuming sector; the establishment and piloting of an Energy Efficiency Fund; a demonstration of financing mobilization, the certification of Energy Efficient solutions; operationalizing the energy service company (ESCO) model; promoting the adoption of energy efficiency solutions in the industrial sector; increasing awareness of energy issues and capacity building. In response to VNEEP3, cities including Da Nang have developed their own Energy Efficiency Action Plans (EEAP) with defined activities and energy efficiency targets.

Based on a technical review, the USAID Vietnam Urban Energy Security (the Project) Technical team has identified number of innovative solutions that could potentially contribute to achieving energy efficiency targets if scaled in Vietnam.

One such innovation is the Battery Energy Storage System (BESS). This innovation allows changes to the way energy is generated and consumed through three significant trends: (i) increasingly affordable distributed power technologies; (ii) decarbonization of the electricity network through more renewable energy sources; and (iii) the emergence of digital technologies.

Battery energy storage systems are rechargeable battery systems that store energy from solar arrays or the electric grid and provide that energy to a home or business. Because they contain advanced technology that regular batteries do not, they can easily perform certain tasks that used to be difficult or impossible, such as peak shaving and load shifting.

[1] Vietnam Annual Energy Report, MoIT, 2019

During daylight, the battery storage system is charged by clean electricity generated by solar or from the electric grid. Intelligent battery software uses algorithms to coordinate solar production, usage history, utility rate structures, and weather patterns to optimize when the stored energy is used. Energy is discharged from the battery storage system during times of high usage, reducing or eliminating costly demand charges. Battery energy storage systems have a wide range of applications, with commercial applications these include peak shaving, load shifting and emergency backup.

In Vietnam, installed capacity of solar power generation currently accounts for 16,500 MW, nearly 25% of the total installed capacity of the national power system. Recently, congestion has appeared in the middle of the day from 10:00 am to 2:00 pm when solar radiation is highest. This presents a very good opportunity to expand BESS projects in the Vietnamese market through offering a range of options, from small systems all the way up to semi-integrated and fully integrated systems.

So far, the BESS technology has not been deployed at a scale larger than the household in Vietnam. The most recent development in relation to this technology in Vietnam is a feasibility study funded by the Asian Development Bank (ADB) on design of BESS to serve the grid operation and its inclusion to the EVN's grid codes. Given the prospect that the cost of this technology is progressively reducing, and there is greater market readiness for BESS, the Project seeks a service provider to demonstrate this innovation at a suitable location that meets appropriate specifications within the Commercial and/or Industrial (C&I) sector, in either Da Nang or HCMC, preferably the former.

## OBJECTIVES

The objective is to demonstrate the BESS, to document achievements and challenges and to share findings. The solution will be demonstrated in one location, in either Da Nang or HCMC, preferably the former, with appropriate specifications in a city, and that is representative of other potential sites.

The demonstration of the BESS aims to:

- show that the demonstration site can reliably use energy from the BESS during peak hours, and therefore alleviate stress on the local electricity grid;
- demonstrate that the BESS can provide a reliable, emergency backup service;
- reduce the need for electricity from the grid during peak hours and therefore save costs for the electricity customer;
- Outline the steps involved for suppliers, detailing the challenges and how to overcome them.

The implementation process, lessons, achievements and challenges will be documented through 1) an independent Monitoring, Evaluation and Learning service provider, as well as 2) progress and final reports prepared by the supplier.

The supplier will work with the Project team to share findings with appropriate stakeholders, including local authorities and potential customers. If the innovation is deemed to be appropriate for scaling and commercialization, then Project staff will lead this through a separate process.

## ANTICIPATED ACTIVITIES

The selected firm will carry out the following activities:

- Through desk research, on-site data collection and analysis, develop a list (minimum three) of appropriate facilities in which the solution could be applicable. Findings will be presented in a report format.

- Select one site in either Da Nang or HCMC, preferably the former, where the solution will be demonstrated and agree on terms and conditions with the owner of the site. The site selection decision should:
    - be representative of other locations that are likely to benefit from the solution in the future;
    - be capable of achieving the following through the demonstration: Grid support during peak hour and energy and/or cost savings due to using BESS at the facility;
- Develop a technical proposal with cost/benefit analysis toward ESCO/ leasing BESS to customer or Self-invest/owned BESS;
- Commissioning the solution with the beneficiary.
- Document lessons and results, including successes and challenges.
- Monitor and report against a set of key performance indicators related to energy savings (indicators to be agreed in a Monitoring & Evaluation plan with the Project).
- Support the Project to share the findings of the demonstration with relevant stakeholders through a limited number of workshops and exchange visits. Stakeholders are likely to include GVN and local government representatives, potential customers of the technology, Vietnam Energy Efficiency Program (VNEEP) and Departments of Industry and Trade (DOITs) from Da Nang and HCMC.
- On an as-needed basis, provide inputs to the preparation of communications materials developed by the Project team.

## TARGET BENEFICIARIES

The demonstration aims to directly benefit C&I facilities operating that have rooftop solar systems installed and that are willing to save electricity during the peak hours.

If proven to be a viable solution for scaling/ commercialization, then the target cities will benefit: adopters in the C&I sector will achieve greater energy efficiency and will contribute to achieving City EEAP targets.

## EXPECTED TIMELINE AND DELIVERABLES

Implementation is expected to start in August 2021, for a maximum period of up to six months. The offeror should propose a timeline and sequence of activities that aligns with the proposed technical approach. Deliverables will include:

- A report documenting the results/ analysis of survey findings (related to identification of potential demonstration sites);
- A clear agreement, detailing the terms and conditions with the owner of the demonstration site.
- Installed and operational BESS in one appropriate location;
- Bi-monthly narrative and financial progress reports as per an agreed template and in English (number and timing of reports to be agreed with the Project);
- Completion report documenting activities, successes, lessons as per an agreed template, and in English;
- A guide / manual (in English and Vietnamese) aimed at distributors wishing to promote the technology in the future. This manual will detail the steps involved, the challenges and ways to resolve these challenges (based on experience with the demonstration). The expected audiences of the manual are policy makers, utilities, and C&I electricity customers.