

**Expression of Interest for proposal for optimisation options for the Heat Pump based Space Heating solutions.**

# Introduction

Energy Efficiency Services Limited (EESL) has been implementing the world’s largest energy efficiency portfolio across sectors like lighting, buildings, industry electric mobility, smart metering, agriculture, etc. at an enormous scale. EESL’s energy efficiency solutions have saved India over 47 billion kWh energy annually, while reducing 36.5 million tons of carbon emission. These interventions have so far avoided 12 GW of Generation Capacity in the market. EESL and her subsidiary CESL focus on solution-driven innovations to provide public value at scale and operates with the intent of creating and opening markets which have the capacity to exist but have not been able to take-off due to various constraints, a few examples being LED Bulbs, Street lights, Smart meters, Feeder level solarization, and Electric busses.

# Project Background

EESL is planning to implement energy efficiency programs in UT of Ladakh to make the Union Territory a carbon neutral region. Under this program EESL is going to provide the Heat pump-based energy efficient space heating solution to the UT administration. Considering the climatic conditions and requirement of space heating following two options are being proposed:

1. **Air based Heat Pump:**

Heat pump-based energy efficient space heating solutions in small public buildings (like- offices, schools) (with 8 hrs operations and minimum temperature range in -15 deg C to +10 Deg C. Heat pump shall provide suitable space heating solution down to -15 deg C outside ambient temperature conditions and inside comfort conditions as per BIS/ ASHRAE or equivalent reference standard.

1. **Water based Heat Pump:**

Heat pump-based energy efficient space heating solutions in medium size public buildings (like- Hostels, guest houses, hospital buildings) (centralized system with 24 hrs operations and Temperature range -30 deg C to +10 Deg C). Heat pump shall provide suitable space heating solution down to -30 deg C outside ambient temperature conditions and inside comfort conditions as per BIS/ ASHRAE or equivalent reference standard.

EESL is planning to conduct pilot demonstration for both types of heat pump-based space heating solutions to show case performance as well as the energy saving potential. Subsequently, EESL will go for the upscaling of the same.

# Intended beneficiaries

Intended beneficiaries are Government Offices, Schools, Hostels, hospitals and other organizations having offices located in cold regions of India such as under the Union Territory of Ladakh.

# This EOI

Through this EOI, EESL intends to seek proposals from optimization solution providers in these heat pump based space heating solution for (i) **optimized insulation options for space heating solutions covering standard insulations and customized & localized insultations** (ii) **integration of hot water storage system covering solar based space heating solutions** (iii) public consultations for assessing of optimization options in space heating solutions for cold regions and also for fine tuning the broad based Technical specifications of the proposed solutions as described in this EOI. The interested parties are expected to submit their proposals in details.

The aim of the project is to demonstrate at scale the replicability of such technology solutions for space heating.

# Proposed BoQ for Pilot demonstration

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| **S. No.** | **Details** | **Area of the Room** **(Sq. Feet)** | **Estimated Heat Load (kW)** | **Type of Unit** | **Proposed Heat Pump Capacity (kW)** | **Units for pilot demonstration****(No.)** |
| 1 | Public building | 180 | 3.08 | Direct Exchange (DX type) Air based Heating System | 4.6 | 1 |
| 2 | Public building | 180 | 3.08 | 4.6 | 1 |
| 3 | Public building | 168 | 2.87 | 4.6 | 1 |
| 4 | Hostel building | 2500(@500 Sq. feet x 5 rooms) | 87.16 | Water based space Heating solutions | 32 | 3 |
| 5 | Hostel building | 900 | 31.38 | 32 | 1 |
| 6 | Residential building | 850 | 29.63 | 32 | 1 |

# Technical Specifications of proposed Oprimisation option for ENERGY EFFICIENT space heat SOLUTIONS

1. **Insulation solutions (for walls and roofs)**

EESL aims to identify vendors who can provide effective insulation solutions that are ECBC compliant and can be implemented in Ladakh to provide comfortable indoor spaces in extreme weather conditions.

**Scope of Work:**

The pilot projects require retrofitting existing envelopes with insulation solutions for indoor or outdoor applications on walls and roofs. The solutions should be able to effectively regulate the temperature in these spaces and keep the indoor spaces warm.

The insulation solutions should be made of high-quality, durable materials that are fire-resistant. We prefer the use of less logistic costs including local and eco-friendly products for insulation. The solutions should be easy to install in a short time and maintain insulation properties for longer period. The specifications required for insulation solutions will be shared with interested parties in due course.

1. **Integration of a hot water storage system covering solar based space heating solutions**

EESL invites parties with experience and expertise in providing solar-based space heating solutions to submit proposals for the installation of such systems in the region of Ladakh. The project aims to promote clean and renewable energy sources that can help to meet the hot water demand and reduce the carbon footprint of the region.

**Scope of the work:**

The proposed solutions should include the following:

* **Solar Panels:** High-quality solar panels that can efficiently convert sunlight into electrical energy.
* **Hot Water Storage Tanks:** Large-capacity hot water storage tanks that can store the excess energy generated by solar panels during the day and use it for space heating at night.
* **Heating Systems:** Efficient and reliable heating systems that can use stored hot water to provide space heating to homes and buildings in the region.

The proposed solutions should be designed to meet the specific heating requirements of the region by considering the harsh winter conditions and limited daylight hours.

1. **Energy-efficient windows**

EESL is looking for service providers that have a proven track record in providing energy-efficient fenestration solutions for residential and institutional buildings. We welcome high-quality and innovative solutions that will help us reduce heat loss and improve the thermal comfort of the buildings under this pilot project. The vendor should have experience working with similar buildings and should have the necessary technical expertise to design, supply, and install the solutions. Prior experience working in a cold climate is preferable.

**Scope of Work:**

Supply and installation of energy-efficient fenestration solutions for retrofitting existing windows in the buildings. The solutions should be designed to reduce heat loss in the extreme conditions of Ladakh while also providing adequate daylighting and visual comfort for the building occupants.

The scope of work also includes the following (depending on a case-to-case basis).

* Survey of buildings to identify areas of heat loss and gain.
* Installation of energy-efficient measures such as insulation, sealing, and weatherstripping.
* Installation of window accessories such as blinds, shutters, and curtains.
* Project management and supervision

The solutions should comply with all relevant standards for energy efficiency and environmental sustainability. They should also be durable, easy to maintain, and compatible with weather conditions. Applications like dual glazing units, flexible control accessories such as blinds, or efficient curtains can also be implemented for energy efficiency.

1. **Optimized control solutions**

Proposals are invited for developing building management systems (BMS) to optimize control solutions. The control solutions should enable real-time monitoring, analysis, and control of all crucial parameters like energy use patterns, CO2 levels, internal and external temperatures along with humidity. Additionally, the applications should be user-friendly, intuitive, and easy to use.

**Scope of Work:**

Supply and installation of intelligent BMS solutions to monitor and control the space heating solutions in the buildings.

The following are key requirements for building management systems:

* Real-time monitoring of all building systems
* Customizable dashboards and reports for real-time analysis and control
* Integration with existing building systems
* Mobile compatibility for on-the-go monitoring and control.
* Control for optimisations of operations and energy consumptions of heating components

All the proposals should include a detailed description of suitable solutions, including cost estimates, timelines, and technical specifications. The proposals will be evaluated based on their technical merit, cost-effectiveness, and sustainability. Prior experience working in similar climatic conditions would be prioritized.

# Response to this EOI

Manufacturers/ technology solution providers of solar based space heating/ energy efficient insulations/ windows, Optimization/ Customized technology solution providers, Start-ups, optimization designers, International Organizations and other Stakeholders may submit this expression of interest along with concrete proposals on email gshankar@eesl.co.in; nkjha@eesl.co.in by May 17th, 2023.

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