E4T Microgrid Project @ TU Campus

Coordinating Department: Department of Energy

The E4T Microgrid Project is an international R&D initiative led by Pamoja Cleantech AB, in collaboration with Modio AB, KTH University (Sweden) & Tezpur University (TU) and implemented at TU campus. The project is being funded by the Swedish Energy Agency, Sweden with the goal to develop, implement, and demonstrate a poly-generation microgrid platform to increase the availability and utilization of renewable energy at TU campus and in order to reduce the dependency on fossil fuels.

The project shall serve as a state-of-the-art teaching and training facility for academia and industry together. The E4T microgrid concept at TU integrates following components over two phases: **Phase 1** (2021-2022) – 100kW/84,5kWh Li-Ion Battery Energy Storage, 12 smart air conditioning controllers, 36 automatic hostel room controllers; **Phase 2** (2022-2023) – 140kVA gasification bioenergy plant, biomass and biochar storage and processing facility, >500 smart air conditioning controllers.

Phase 1 Implementation (in Progress):

1. **Battery Energy Storage System – 100kW/84,5kWh – Li-Ion Technology**

The BESS system is being installed at the low voltage panel inside the adjacent Substation 2. The system stores excess solar energy produced in the day and/or energy from the grid and enables the building to use this energy as a replacement for diesel energy during times of grid outages. Further, the part of the Human and Social Sciences Department Building (HSSB) is connected directly to the BESS as designated load. With this configuration, HSSB can be supplied with fully autonomously electricity during grid outages.

2. **Smart Air Conditioning Control at Humanities and Social Sciences (HSS) Building**

Based on the principles of Demand Side Management (DSM), 12 numbers of selected AC units in the HSS building shall be equipped with smart control units from Modio AB (Sweden). These units have the autonomous capability to schedule air conditioning operation or switch off or lower the cooling load based on various factors including source of energy and marginal cost, availability and

number of persons in a room, internal and external temperature & humidity conditions etc. The control logic is run on a cloud server and data can be visualized and studied at any given time frame. The system optimizes both the operational cost and energy efficiency by reducing energy consumption by the higher power consuming part of any building i.e., Heating Ventilation and Air conditioning System (HVAC)

3. Automatic Hostel Room Control at Patkai Mens Hostel

As part of this project, a selected 36 rooms in Patkai Hostel are equipped with no-voltage release switches (NVR) which can automatically open an electrical circuit once voltage drops to zero at the supply side. In the corridor, a smart contactor is connected. The system aligns availability of students based on their schedules and automatically switches off the electrical loads in the student rooms during class hours or other non-availability periods. This is intended to reduce energy losses in the hostel due to unattended appliances. The individual rooms can re-establish the power supply at any time by manually clicking the NVR switch next to the door.

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