CLOE Doctoral Program

Electrification and Digitalization of Remote Regions

Presented by: Muhammad Asim Amin
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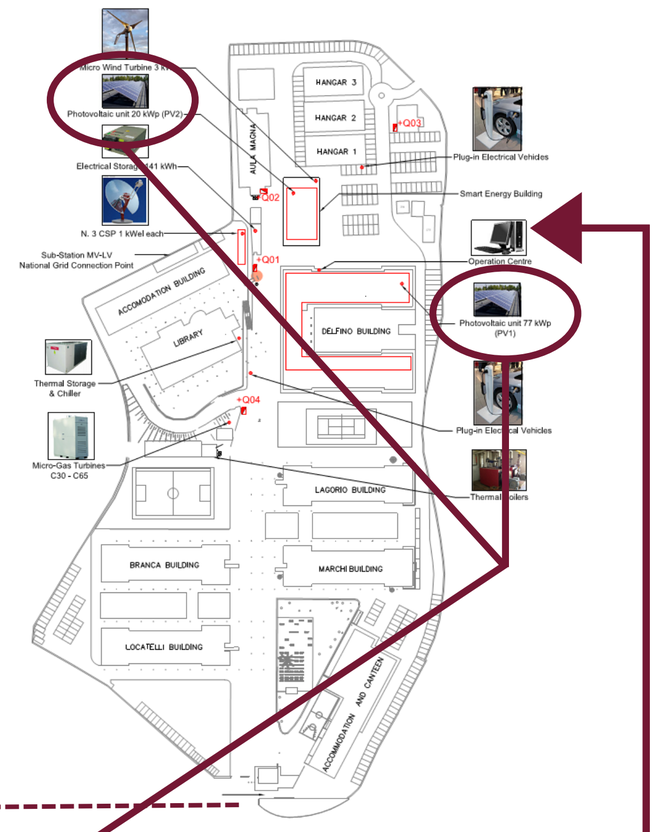
Energy Management System (EMS)

Smart Polygeneration Microgrid – SAVONA Campus Test Case



Reduce Campus Supply Cost.
Intelligent Microgrid structure to **Minimize** the **CO2 Emission**.

Energy Communities

Can achieve **Cost Saving** through **Self Consumption**.
Avoid grid expansion costs.
Reduce transmission network fees.

Optimize the use of existing grid.
Avoid Grid Expansion.
Integrate more Renewable Energy Resources.

Local Ownership and control energy system

Facilitate the **Digital Transformation** in energy management

1 Paper Under Review

Photovoltaic Power Forecasting

Overcome Intermittent Nature by Forecasting

Nowcasting / **Hour Ahead Forecasting** for Planning Energy Usage

Seasonal and Trend Decomposition (STL) of the meteorological variables

Validation through **Reduced Features** for analysis to **Mimic Real Scenarios.**

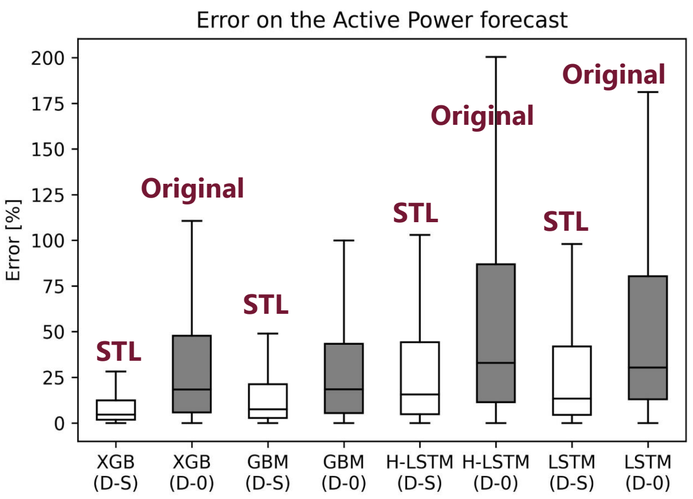
2 Papers Accepted for Publications

Machine Learning

Provides **Actionable Insights**, and **Enable Informed Decisions**

Utilized for the predictive analysis to balance the **Supply and Demand**

Allocates Resources Efficiently by predicting and managing peak usage time.



Photovoltaic Power Forecasting Results Comparison

Energy Trading

Consumer can participate in energy management, aided by smart technologies

Decision optimized through **Localized Control**

Direct energy transaction between producer in **P2P**

Focus on **Local Energy Exchange** within Community or Neighbour

Enables **Innovative Trading model**, and highly flexible.

Enhance Grid Resilience, reduce the risk of blackout.

Encourage the adoption and integration of Renewable Energy Resources

Future Goals

Secondment Period: Photovoltaic and storage system in Microgrid's (University of Nis, Serbia).

Implementation of Energy Trading Platform Through **Innovative Trading Model using Machine Learning.**

Further **Enhance the PV Forecasting** model, by integrating more metrological variables.

Extend the model of current EMS system at SAVONA CAMPUS Microgrid.

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