**Smart Load Environment**

**Description**

The smart load environment (SLE) is a custom-built multi-agent reinforcement learning scenario that is built to be compatible with the Multi-Agent Particle Environment (MPE) and the Multi-Agent Deep Deterministic Policy Gradient (MADDPG). This scenario aims to simulate an area that consists of multiple energy consuming entities in an area by defining them as their own reinforcement learning agents in order to optimize the energy demand of the entire area.

**Motivation**

The motivation behind the SLE is to experiment with novel approaches to load optimization in order to test whether Multi-Agent Reinforcement Learning (MARL) could aid in optimizing entire areas of energy consumption.

**Dependencies**

The environment is programmed in Python3, and to begin working with the environment additional libraries must be installed:

* gym (0.10.5)
* MPE (<https://github.com/openai/multiagent-particle-envs>)
* MADDPG (<https://github.com/starry-sky6688/MADDPG>)

**Design**

Currently, the SLE focuses on two main entities, the Smart Building (SB) and Charging Station (CS).

**Smart Building**

For the smart building, the agent has the option of altering how much energy the building consumes (up to a minimum). However, as the building consumes less energy the quality of life in the building decreases as well. The design for this only limits the energy that the building can consume, not where the energy gets distributed once it gets there.

**Charging Station**