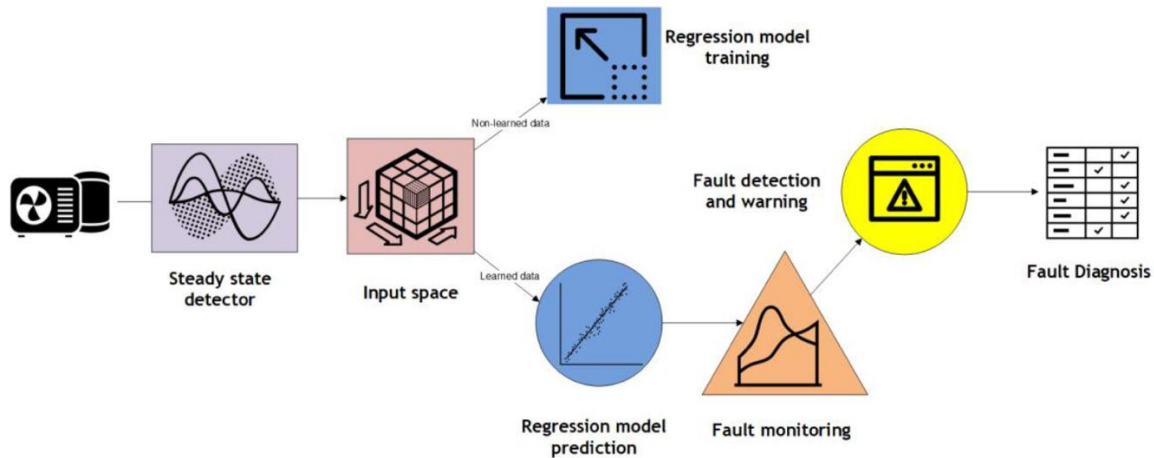


Smart Energy Management and Fault Detection tools

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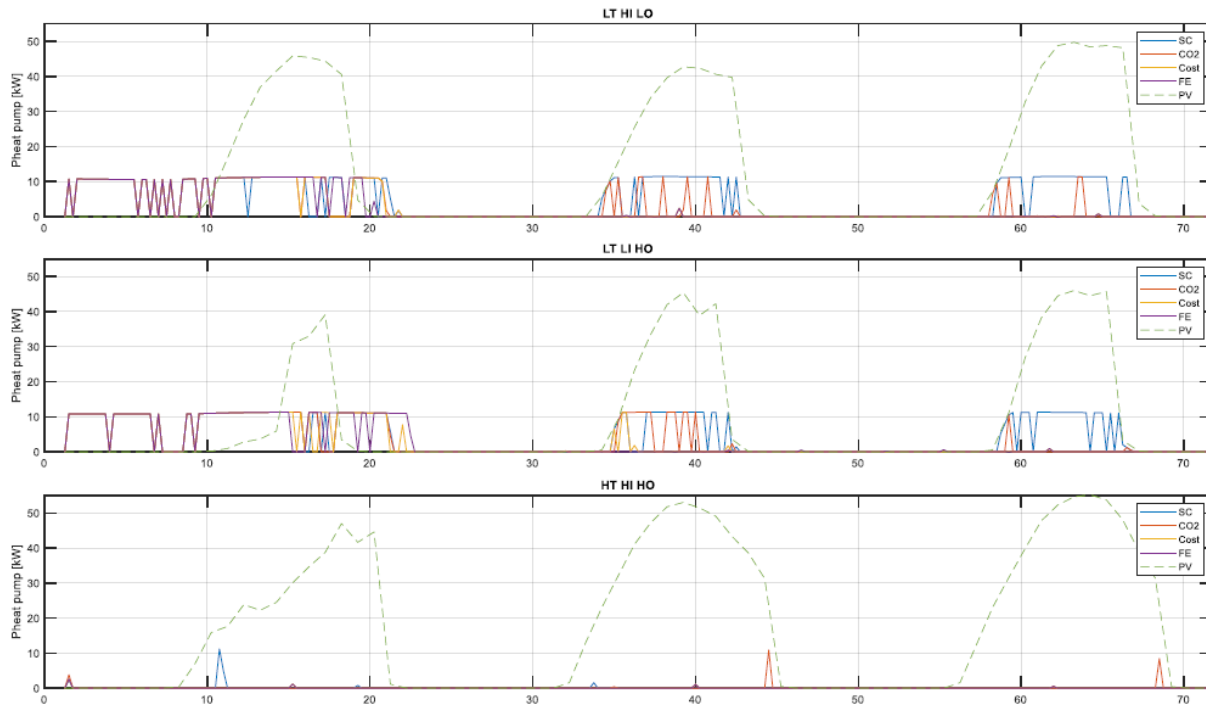
Self-detecting algorithms have been developed by IREC through their Fault Detection (FD) tool, which uses data-driven techniques to unlock the full potential of heat pumps and enhance a building's energy potential for heating and cooling purposes. Maintaining equipment performance is crucial since faults can negatively affect the optimal operation and reduce energy efficiency. Therefore, FD techniques are developed for heat pump (HP) and air handling unit (AHU) systems, with a specific focus on PLURAL components such as heat pumps used in eWHC, SmartWall, and eAHC (external Air Heating and Cooling).



Software scheme of the FDD.

In addition to FD, IREC has also developed a set of Smart Energy Management (SEM) building control algorithms that can improve energy flexibility, reduce costs, and revolutionize the way buildings consume energy. These algorithms have been designed to be included in the control toolbox of the PLURAL solutions. The primary objective of SEM is to find the optimal strategy in terms of different optimization criteria, including electricity cost savings, reduced CO₂ emissions, and system performance under market conditions. The algorithms also take into account the forecast of heating, cooling, electricity demand, and renewable (RE) generation.





Comparison of HP operation for 3 scenarios and 4 optimization criteria.

The SEM algorithms developed by IREC include simplified models of all the devices present in the facilities, such as heat pumps, thermal storages, building thermal and electrical consumption, among others. By using these algorithms, building managers can gain insights into their energy consumption patterns, optimize their energy usage, and achieve significant energy savings.

For more information visit the PLURAL website www.plural-renovation.eu.

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