**Optimization Project Requirements**

**Requirements goals:**

* Optimize heat production for a district heating utility.
* Heat availability for all buildings in the district heating network.
* Produce heat at the lowest costs.
* APIs should be implemented for communication between modules.

**Our Components or Modules:**

1. **Asset Manager (AM)**
2. **Source Data Manager (SDM)**
3. **Result Data Manager (RDM)**
4. **Optimizer (OPT)**
5. **Data Visualization (DV)**

**Scenarios for iteration:**

- Scenario 1: Single heating area with one gas boiler and one oil boiler.

- Scenario 2: Single heating area with one gas boiler, one oil boiler, one gas motor, and one electric boiler.

**Different measurement time:**

* Winter period: high levels of production.
* Summer period: low levels of production.

**Data Management of Modules:**

**Asset Manager (AM):** manage static system information:

Name of the heating grid.

Image of the heating grid.

Production units.

**Source Data Manager (SDM):** manage dynamic information:

like heat demand time series and electricity price time series.

**Result Data Manager (RDM)**: store optimization results

1. Heat production
2. Electricity production
3. Electricity consumption
4. Expenses
5. Profit
6. CO2 emissions.

**Optimizer (OPT)**

Produce and availability heat in favorable cost.

produce electricity when a market price is high.

**Data Visualization (DV)**: visualize results:

1. Heat demand.
2. Electricity prices.
3. Production metrics.

Our project involves multiple layers of requirements ranging from functional to non-functional.

**Functional Requirements:**

1. Data import and export functionalities for market conditions and optimization results.
2. User interface for selecting boiler types and viewing optimization results.
3. Optimization algorithm to recommend the best heating solutions based on imported data.

**Non-Functional Requirements:**

1. Performance: The system should handle large datasets efficiently.
2. Usability: The user interface must be intuitive for both technical and non-technical users.
3. Reliability: The optimization results must be accurate and dependable.