



HVAC IntelliCare POC

V 1.0

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Project Overview

SDI will design and develop a Proof of Concept (POC) for a monitoring and reporting system for HVAC units. This system will collect data & generate a report on energy usage, mechanical performance, environmental condition to monitor & help optimize system efficiency.

Goals

1. Energy Efficiency: Monitor electrical usage and identify opportunities for energy savings.
2. System Health: Track mechanical performance to prevent breakdowns and extend system life.
3. Indoor Air Quality: Ensure air quality remains safe and comfortable.
4. Proactive Maintenance: Track early signs of wear or inefficiency, allowing for timely maintenance.



Functional Requirements

Mobile apps (iOS & Android)

SDI will design & develop mobile apps for both iOS & Android.

Client can choose the monitoring services from the following list to implement in the POC. SDI can evaluate the feasibility of each service and implement it if possible. Each option provides insights into specific HVAC performance areas.

- Electrical Use Monitoring
 - Monitor & Report HVAC energy consumption in kilowatt-hours (kWh).
- Amp Draw on Motors
 - Monitor & Report current drawn by blower and compressor motors.
- Refrigerant Pressure Monitoring
 - Monitor & Report refrigerant pressure to ensure optimal cooling performance.
- Static Pressure Monitoring
 - Monitor & Report ductwork pressure to assess airflow and detect blockages.
- Air Quality Monitoring
 - Monitor & Report particles, allergens, VOCs, and humidity for safe indoor air quality.
- Carbon Monoxide (CO) Detection
 - Monitor & Report carbon monoxide levels to prevent safety hazards.



- Air Temperature Monitoring
 - Monitor & Report ambient and output air temperatures for consistent performance.
- Humidity Level Monitoring
 - Monitor & Report indoor humidity to maintain comfort and avoid excessive moisture or dryness.
- Vibration Monitoring
 - Monitor & Report vibrations in compressors and blowers to identify imbalances or wear.
- Filter Condition Monitoring
 - Monitor & Report air filters to maintain airflow and prevent clogging.
- Fan and Motor Speed Monitoring
 - Monitor & Report fan and motor speeds are within optimal ranges.
- Compressor Cycling and Runtime Monitoring
 - Monitor & Report compressor cycling and runtime to detect issues like short cycling.
- Outdoor Temperature and Humidity Monitoring
 - Monitor & Report external temperature and humidity for efficiency.
- Duct Leakage Detection
 - Monitor & Report air leaks in ductwork to improve airflow efficiency.
- Occupancy Monitoring
 - Monitor & Report heating, cooling, and ventilation based on occupancy levels.
- Evaporator and Condenser Coil Condition Monitoring



- Monitor & Report buildup on coils to maintain efficiency.
- Power Quality (Voltage and Frequency) Monitoring
 - Monitor & Report power fluctuations to prevent operational issues.

Reporting Requirements

- Dashboard: Visual dashboard displaying real-time sensor data.
- Report Generation: Detailed summary on the data received from the sensor data.

Technical Requirements

1. Sensor Integration
 - The client will handle the purchase and installation of IoT sensors and devices (e.g., CTs, amp meters, pressure transducers, temperature sensors). SDI will help in research and provide recommendations for suitable devices to ensure compatibility with the monitoring system.
2. Data Storage: Centralized database for collecting and storing historical sensor data.
3. User Interface: Mobile app for real-time monitoring and reporting.



Investment details

Task	Timeline	Cost
Programming services - 6 sensors	3 months	\$30000
Additional 4 Sensors (Optional)	1 month	\$12850

SDI will recommend the sensors and base station based on its research once the project starts. Client can then acquire them and provide them to SDI for SDI to continue and complete the POC.

Regards,

For Software Developers, Inc

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