Concept for Resource Consumption and Emission Monitoring System

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Part 1

- Secondary Research
- Insights
- Big Picture
- Product Requirements

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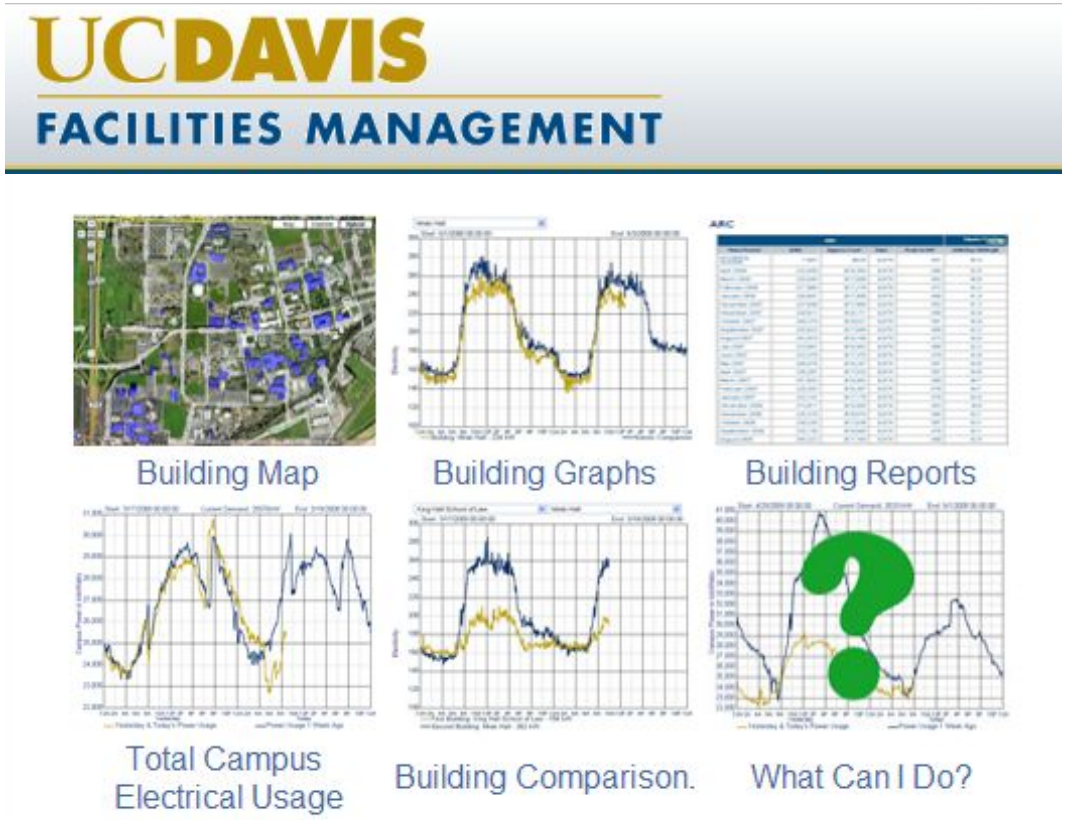
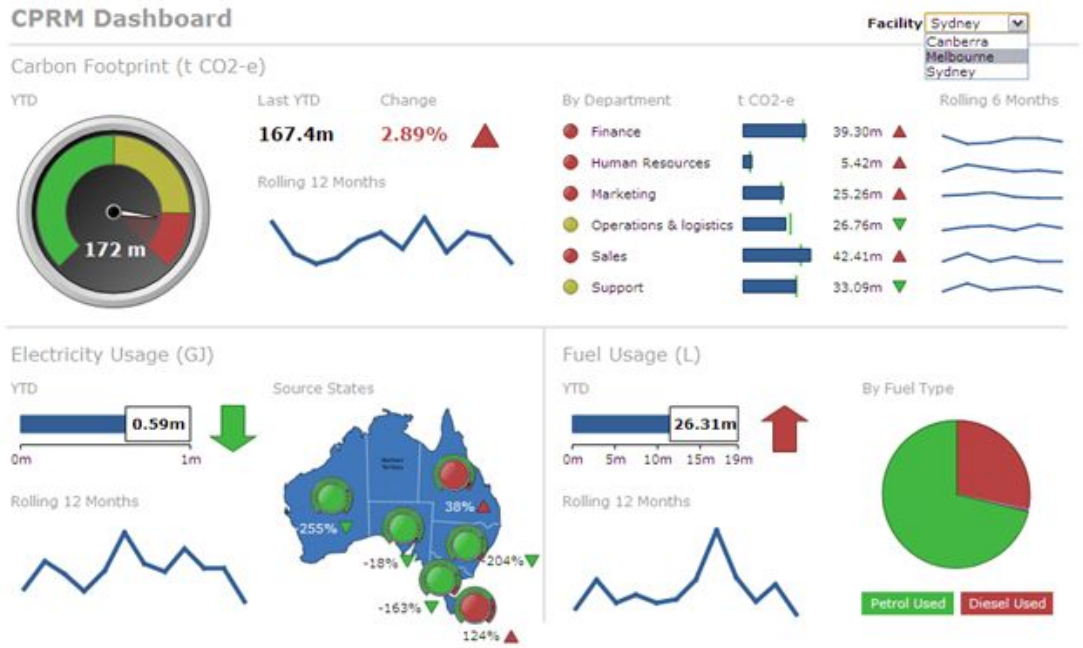
Electricity consumption dashboard



Name	Key Takeaways
• US Davis – Facility management	• Selection of buildings in a zone plotted over Google maps • Electricity consumption monitored over 48 hours • Time based (variable units –day , week, month) report generated • Suggestion on action based on deviation from recommended range
• University of Minnesota	• Selection of buildings, along with color codes showing the energy usage • Displays real time energy data • Provides monthly comparative data between buildings
• eMetric: Office Energy Monitor	• Monitors energy consumption wirelessly • Set timers and or turn-off electronics based on energy usage • develop a culture of responsible consumption – enhanced occupant involvement

Carbon Emission Dashboard



Corporate Carbon Footprint

- current, oil, gas
- transports
- business trips
- commuter trips
- waste

Product Carbon Footprint

- crude material
- procurement
- production
- distribution
- consumption

Transport Carbon Footprint

- road
- rail
- sea
- inland waterway
- air

Real Estate Carbon Footprint

- current
- oil, gas
- paper
- water
- waste

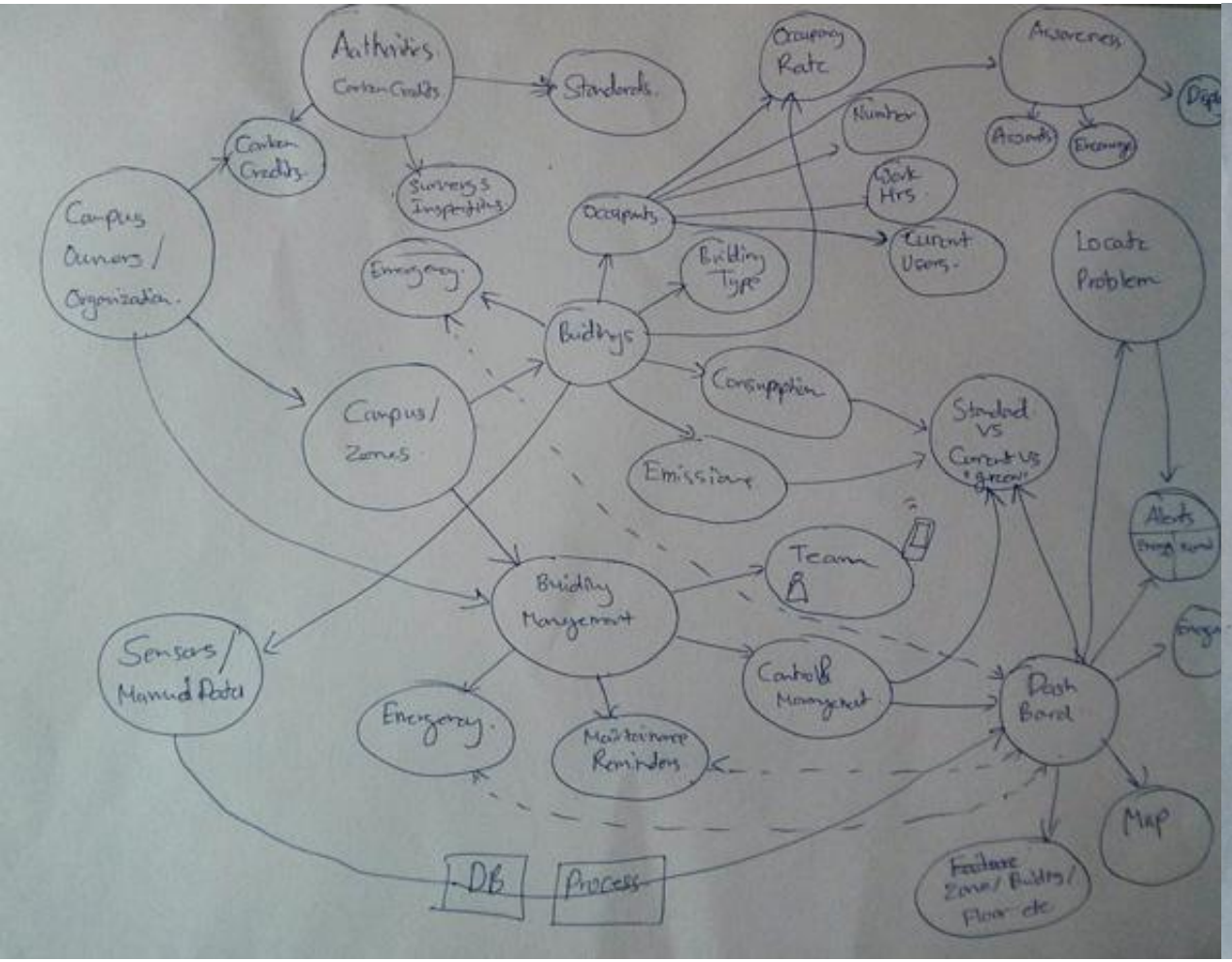
Name	Key Takeaways
CPRM dashboard	Calculation - based on comprehensive guidelines such as DIN EN 16258, the GHG* Protocol, etc.
Kat logistics	Simulations and what-if scenarios
	Reporting of Results and recommendation for action

Environmental dashboard

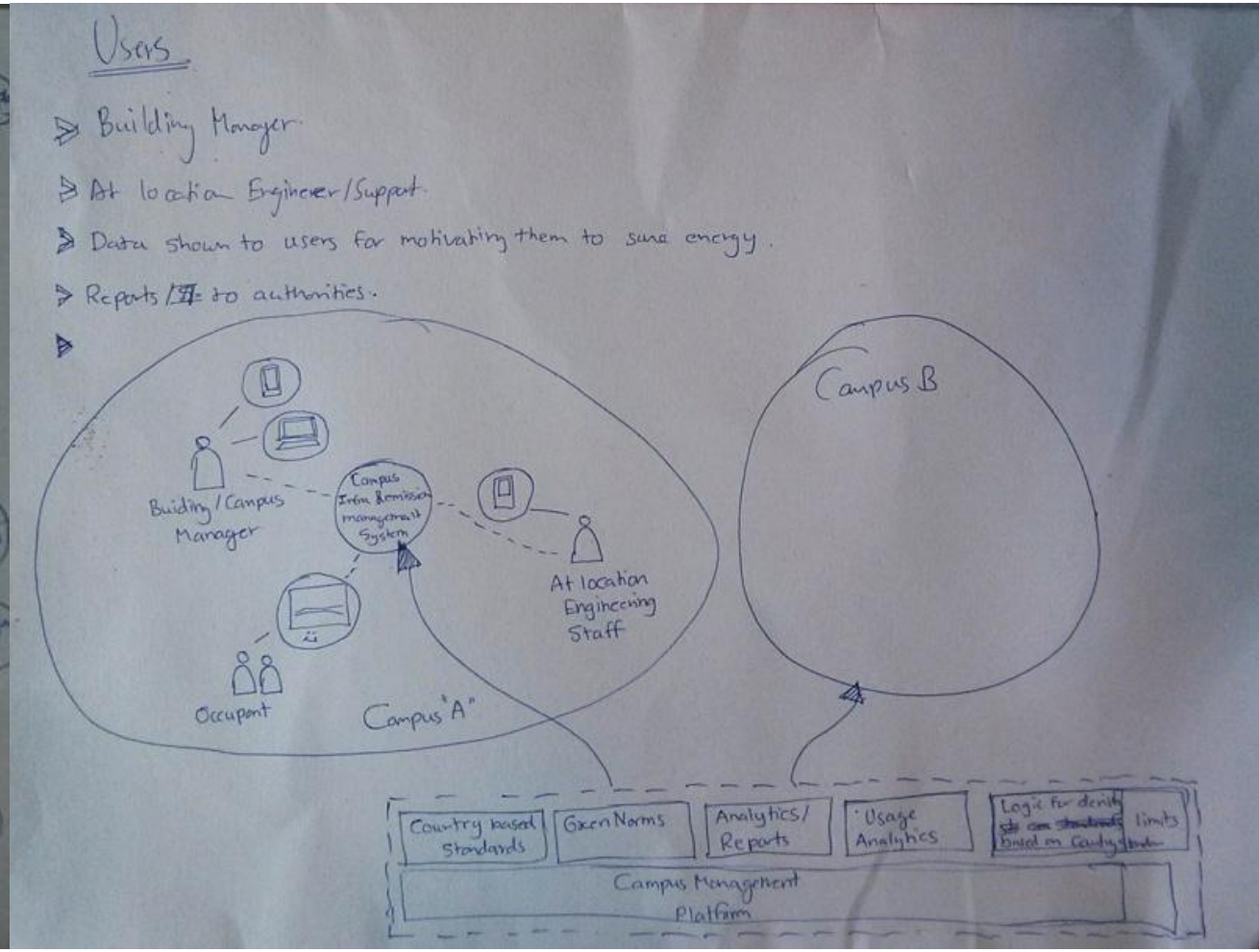
Name	Key Takeaways
EnviroSys Solutions	Spatial capabilities: integrated with the major commercial GIS packages
	operates by polling, auto loading and validating data
	platform to collate, analyses, present and report environmental based information
	Auditing & Compliance, automatic notification of exceedances and missing data

Big Picture

Understanding Scope, entities and relationships



a. Ecosystem Map



b. Affinity Diagram

Insights

- Existing standards and regulations govern the alert mechanism feature of the product
- Involvement of various key stakeholders in corresponding steps
- Trends indicate inclusion of occupant involvement in ticketing systems
- Predictive analysis in reports and recommendations
- Quick access required to actionable items like issue identification, remedy allocation etc.
- Data needs to be interpreted from multiple sources/sensors
- GIS based integration for exact location support

Feature Requirements

Scope and Functionality

Introduction

This system aims at providing real time picture of – resource consumption and carbon emission to the building infrastructure managers.
This aids in identifying any faulty operation (under/over consumption/emission) taking place in the premise.

The system should be able to

1. Generate reports of resource consumption ((Electricity & water) and emission (Carbon & waste) Roadmap includes calculation of Carbon Credit Points on a time dimension (weekly/monthly/yearly)
2. Support existing building management systems and exchange information with easy to use APIs
3. Read and process the data from different sources like sensors (types/manufacturers), CSV Files, feeds in run time
4. Set trigger points for alerts based on different levels of consumption and emission
5. Set priority of different sources based on type, and nature of impact
6. Calculate carbon footprint & carbon credits based on consumption standards guidelines and regulations (ex. GHG)
7. Register users under an organization with different roles & permissions
8. Locate user on Google map and should be able to find nearby sources
9. Locate and navigate to a particular source using Google Map
10. Send Alerts & Notifications to users by SMS/App Notifications/Email
11. Map multiple data sources to different Types of consumption or emission points in a building campus. Also plot it on layout plan, different floors and service cores on building plan during system installation process
12. Store data in form which can be reported based on different metrics and dimensions.
13. Store issue related data

Part 2

- Use Cases
- System Flow
- Info Architecture
- Wireframes

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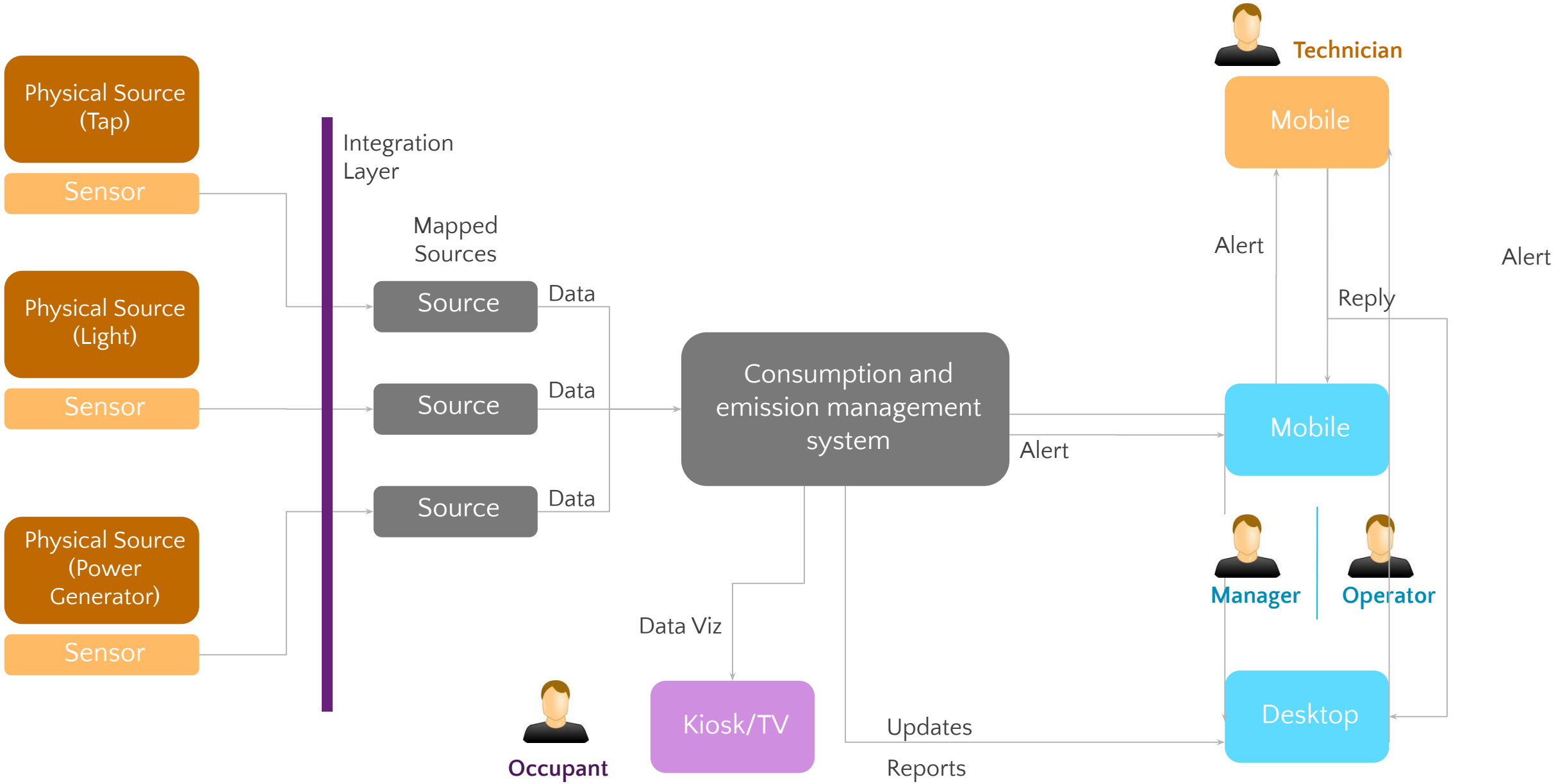
Use Cases

Users and Use Cases

System Engineer	Building Manager	Operator	Technician	Occupant
Adding consumption/emission source with type, location ,Data connectors, impact level, data update frequency through an interface	Viewing dashboard to check if consumption and emission level are within normal usage limits for assigned Zone	Viewing dashboard to check if consumption and emission level are within normal range for assigned Zone	View update on the malfunctioning source	View the energy consumption and emission data
Testing the installations based on correct data input from different s connectors	View inactive sources/ deviations in range and set the priority level		Reply to the update with Accept/Busy	Submit Suggestions for Green environment
Setup the trigger points for different sources based on usage		Check if the system has allocated the task to operator	Reply when issue is fixed at particular source	
Training and handover to Building Manager and Operators		Receive notification on Task allocation to technician and when technician replies	Estimate time for fixing the issue	
		Assign Operator Manually to the specific source	Assign technician to a particular task, and supervise the work	
		Call operator working on particular source	View nearby issues which (s)he can resolve	
		Generate reports and suggest improvements based on historic data of consumption and emission		
		Create report of issues and time taken to fix those issues		

System Flow

Data and Alert Flow



Info Architecture

Desktop Web Application

Login

Live Dashboard

Map View
View
- All
- All Issues
- Electricity related
- Plumbing related
- Generator
- Waste
- Technicians
- Electrician
- Plumber
- HVAC Expert
- Ongoing Tasks

List View
View
- All Issues
- Electricity related
- Plumbing related
- Generator
- Waste
- Operators
- Ongoing Tasks

Reports (Permission Based)

View Reports
View
- Workflow
- Maintenance
- Consumption
- Emission
- Carbon Footprint
- Carbon Credits

Export Reports

Generate Reports
- Select Metric
- Select X Dimension
- Select Y Dimension
- Select Frequency

Suggestion

Sources

Sources
View By
- *Type*
- Location
- Priority
- Inactive

Filter by
- *None*
- Type
- Location
- Priority
- Inactive

Export Data

Maintenance
- This week
- This month
- This quarter

Operators and Technicians

Operators (Permission Based)
View By
- *Name*
- Location
- Timings

Technicians (Permission Based)
View By
- *Name*
- Expertise
- Location
- Timings

Account

Logout
Manage User
- Add
- Edit Permission
- Delete

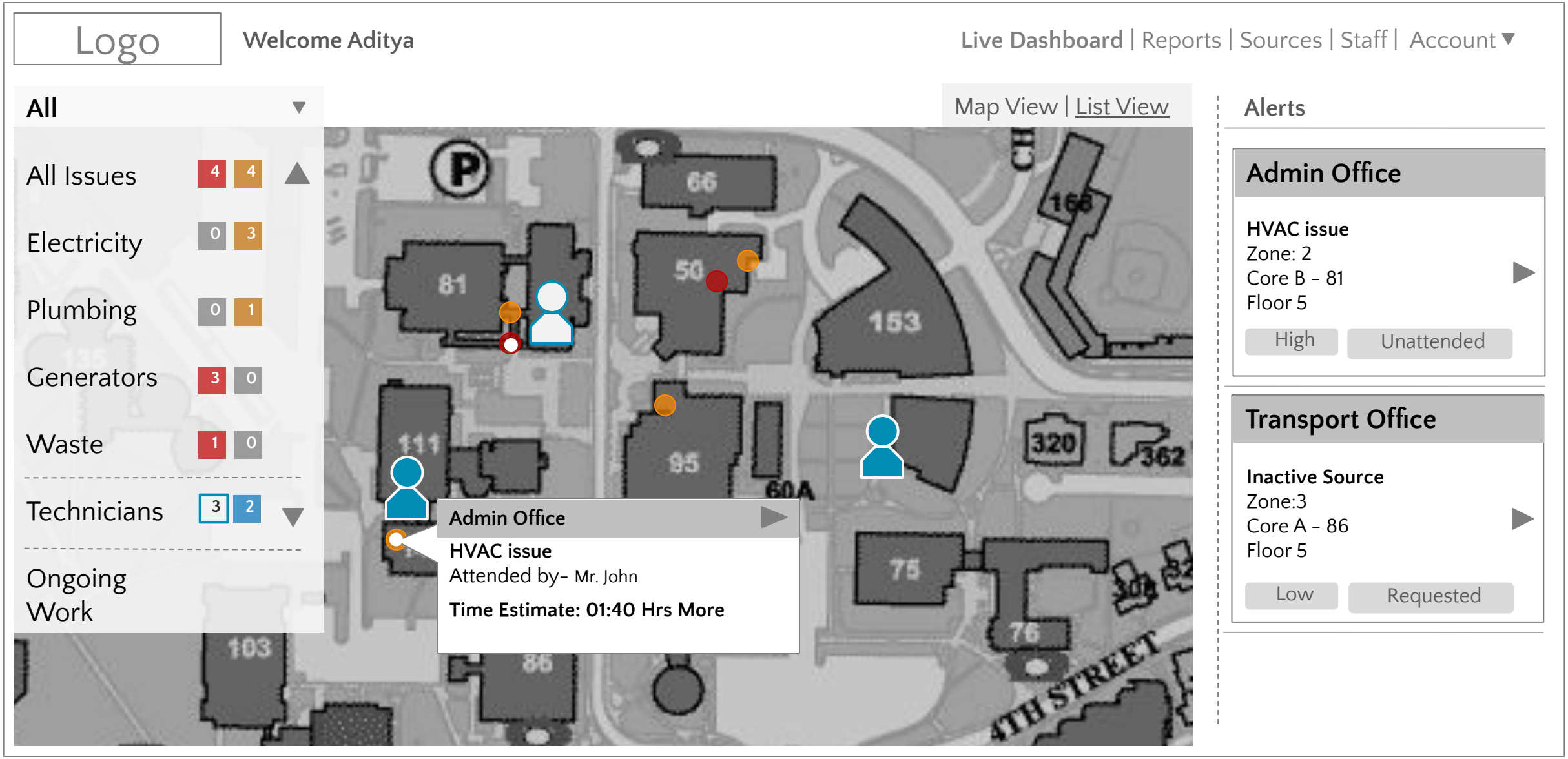
Settings (Permission Based)
- Add Source
- Modify Map
- Edit Source
- Delete Source

Alerts (Persistent)

Unattended
Postponed
Delayed

Wire Frame

Desktop Web Application – Live Dashboard



Wire Frame

Desktop Web Application – Alert Detail

Logo

Welcome Aditya

Live Dashboard | Reports | Sources | Staff | Account

All

All Issues 4 4

Electricity 0 3

Plumbing 0 1

Generators 3 0

Waste 1 0

Operators 3 2

Ongoing Work

HVAC Issue, Source ID: B81F3C2H12

X

Details:
Consumption: **More than 500% in 1Hr**

Status: **Unattended**
Time: 20 Mins Ago | 09:45 AM SAT 09/12/13
Alert ID: ACPK123

Assign Technician >

Name	Status	Distance	Action
John D. (H.V.A.C. Expert)	Requested | 10Min Ago	0.5 KM	Cancel Request
Smith B. (Electrician)	Available	1.0 KM	Assign
Jason D. (H.V.A.C. Expert)	Busy	1.5 KM	Assign

in Office

issue

Unattended

sport Office

Source

Unattended

Wire Frame

Desktop Web Application – Alert Detail

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All

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Name	Status	Distance	Action
John D. (H.V.A.C. Expert)	Assigned | 1 Min Ago	0.5 KM	Cancel Request
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Jason D. (H.V.A.C. Expert)	Busy	1.5 KM	Assign

in Office

issue

Unattended

sport Office

Source

Unattended

Wire Frame

Android Mobile Application for Technician – Alerts

Welcome
Aditya

Requests | Tasks | Nearby Issues

Admin Office

HVAC issue
Zone: 2, Core B – 81, Floor 5

By: D. Andrew

High | Unattended

Meeting Room 56

HVAC issue
Zone: 2, Core B – 81, Floor 6

By: D. Andrew

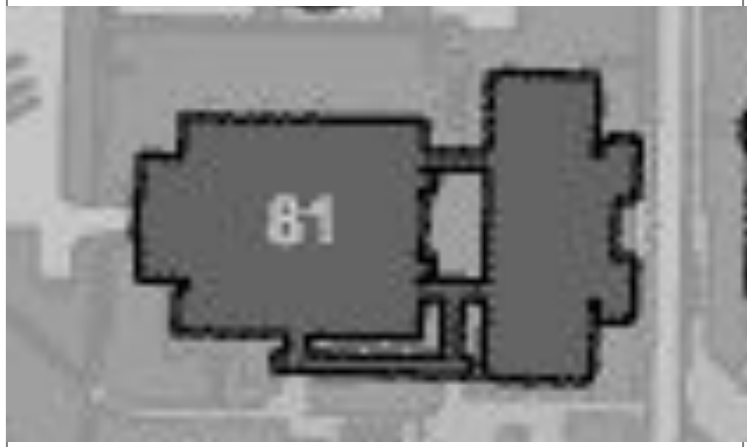
Low | Unattended

Meeting Room 11

HVAC issue
Zone: 2, Core B – 81, Floor 6

Request | Accept | X

HVAC Issue
Source ID: B81F3C2H12
High



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Status: **Unattended**

Time: 20 Mins Ago | 09:45 AM SAT 09/12/13
Alert ID: ACPK123

Request by : D. Andrew

Welcome
Aditya

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HVAC issue
Zone: 2, Core B – 81, Floor 5

By: D. Andrew

High | Unattended

Meeting Room 11

HVAC issue
Zone: 2, Core B – 81, Floor 6

By: D. Andrew

Low | Unattended

1 Request Deleted | Undo