



Application report OBEM-alphaTeam

Skyline talent program
Coding battle

Team:

Amer Mujalo

Kerim Imamovic

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Safet Comor

Datum: 28.02.2025

Project Report

Use-Cases

Unit-Level Energy Monitoring:

Building managers and residents need to track energy consumption for individual units/apartments to identify high-usage areas and encourage energy-saving practices.

Peak Energy Demand Management:

Building administrators want to monitor and manage energy demand during peak hours to avoid excessive costs and strain on local grids.

Anomaly Detection in Energy Use:

Maintenance teams require alerts for abnormal energy usage patterns (e.g., sudden spikes due to faulty appliances or devices left running) to investigate and resolve issues quickly.

Energy Cost Allocation:

Property managers need tools to fairly allocate energy costs to each unit/apartment based on actual usage, ensuring transparency and accountability.

Sustainability Monitoring:

Sustainability teams require insights into the building's overall carbon footprint and recommendations for energy-saving initiatives (e.g., smart thermostats, better insulation).

Overview of changes and improvements

This document contains a detailed overview of all commits from February 24nd to February 28th, 2025, including new functionality implementations, code refactoring, and system optimizations.

24. februar 2025.



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1. **Initial commit** (First commit, setting up the basic project structure)
 2. **initial spark [Amer]** (Initial project setup, probably adding fundamental files)
 3. **Create .gitignore** (Adding a `.gitignore` file to exclude unnecessary files from the repository)
 4. **Added Building Model** (Adding a model for building objects in the project)
 5. **added preset json parser classes** (Adding classes for parsing JSON data)
 6. **added API services** (Adding API services to enable communication between frontend and backend)
 7. **added frontend for simulating .get** (Adding frontend functionality to simulate HTTP GET requests)
 8. **added Acomponent class for Composite Pattern** (Adding the `Acomponent` class as part of the Composite design pattern)
 9. **Update component.cs** (Updating the `component.cs` file, likely fixing bugs or improving logic)
 10. **ispravka gita** (Fixing some Git-related issues)
 11. **Amer added trending in UI** (Adding trending functionality in the user interface)
 12. **added TrendingInfo.cs for parsing from json in instance** (Adding the `TrendingInfo.cs` class for parsing data from JSON into an instance)
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- 13. **Dodavanje model klasa** *(Adding various model classes to the application)*
 - 14. **Device model added** *(Adding a device model to the application)*
 - 15. **BuildingObject class added** *(Adding the `BuildingObject` class for handling building objects)*
 - 16. **get trending by id** *(Implementing functionality to fetch trending items based on ID)*
 - 17. **Updated model classes** *(Updating model classes, probably adding new fields or improving structure)*
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- 18. **device return** *(Restoring device-related data in the application, probably a rollback)*
 - 19. **device fix** *(Fixing issues related to devices in the application)*
 - 20. **refactor** *(Refactoring code – improving structure and efficiency without changing functionality)*
 - 21. **random fix** *(Random bug fix, likely a minor issue resolution)*
 - 22. **fixfix** *(Another bug fix, possibly correcting a mistake in the previous commit)*
 - 23. **api service update** *(Updating API services multiple times – improving data handling and frontend-backend communication)*
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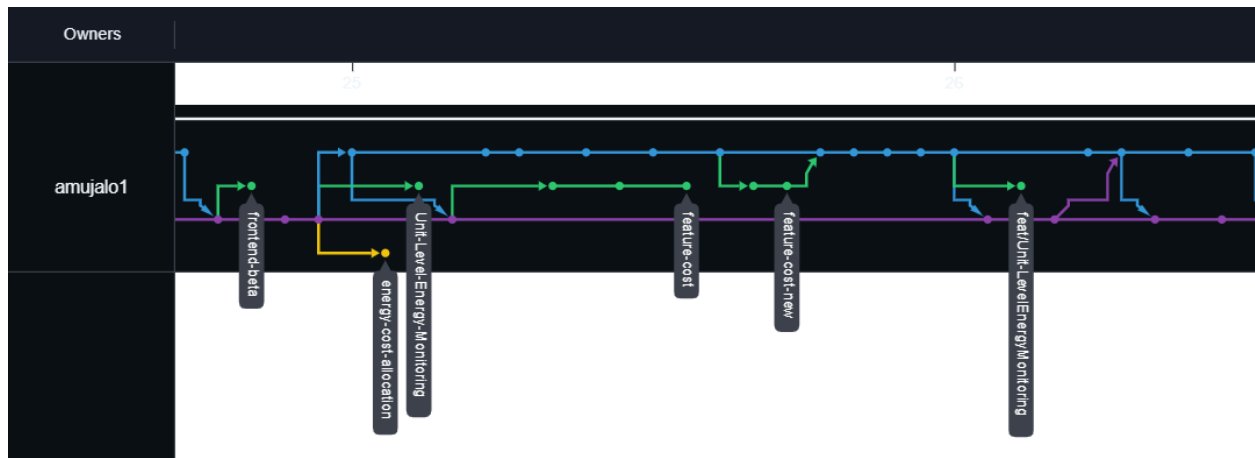
AnesCenanovic

- 24. **Update git ignore** *(Updating the `.gitignore` file, probably adding new rules for file exclusions)*
 - 25. **Updated model classes** *(Updating model classes, adding or fixing data structures)*
 - 26. **Update component.cs** *(Updating the `component.cs` file, likely optimizing or fixing bugs)*
 - 27. **Merge branch 'develop'** *(Merged the `develop` branch multiple times to synchronize code among team members)*
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Merge Commits

- 28. **Merge branch 'develop' of <https://github.com/amujalo1/OBEM-alphaTeam> into develop** *(Multiple merges of the `develop` branch to ensure code synchronization among team members)*

25. februar 2025.



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1. **Redo of main building UI** (*Redesigning the main building user interface*)
2. **Populisanje apartmana za jedan sprat (trenutno bugged)** (*Populating apartments for one floor, currently bugged*)
3. **Izrada filtiranja po kosturima** (*Creating filtering functionality based on building structures*)
4. **Kostur Zgrada UI-a** (*Creating the initial UI skeleton for buildings*)

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5. **made UI better** (*Improving the user interface design and functionality*)
6. **fix top bar** (*Fixing issues with the top navigation bar in the UI*)
7. **fixed apartman view** (*Fixing the apartment view display or logic*)
8. **fixButton** (*Fixing issues related to button functionality or appearance*)
9. **edded initial UnitEnergyMonitoring model** (*Adding the initial model for unit-level energy monitoring*)

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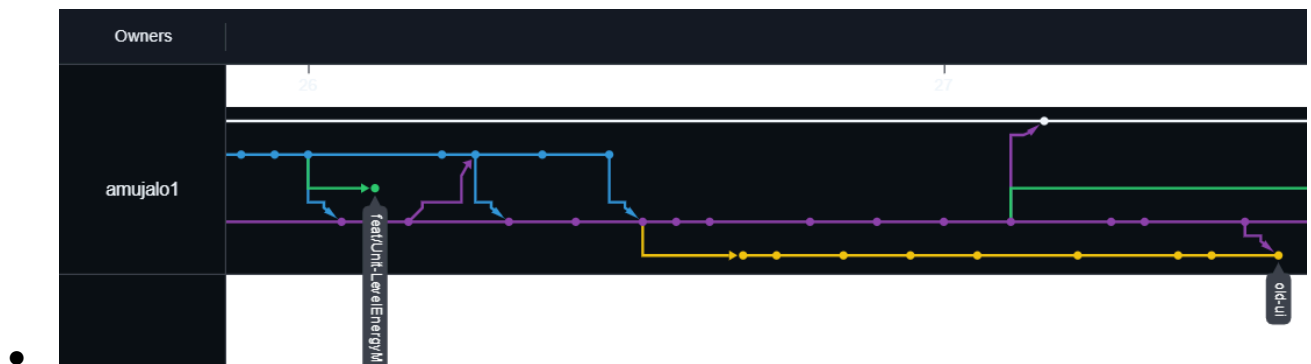
10. **Merge pull request #3 from amujalo1/feature-cost-new** (*Merging the `feature-cost-new` branch, implementing cost-related features*)

11. **energy cost implemented** (*Implementing the functionality for energy cost calculation or tracking*)
 12. **late commit** (*Committing changes later than planned, possibly a delayed update or fix*)
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Merge Commits

13. **Merge pull request #1 from amujalo1/feat/Unit-LevelEnergyMonitoring**
(*Merging the `feat/Unit-LevelEnergyMonitoring` branch, integrating energy monitoring functionality into the project*)
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26. februar 2025.



AnesCenanovic

1. **Izmjena UI** (*UI modification/update*)
 2. **Bugfix: Filtracija po apartmentima radi pravilno** (*Bugfix: Filtering by apartments now works correctly*)
 3. **Izmjena UI** (*UI modification/update - second instance*)
 4. **Izmjena apartment buttona da budu u redu sa floor buttonima** (*Adjusting apartment buttons to align correctly with floor buttons*)
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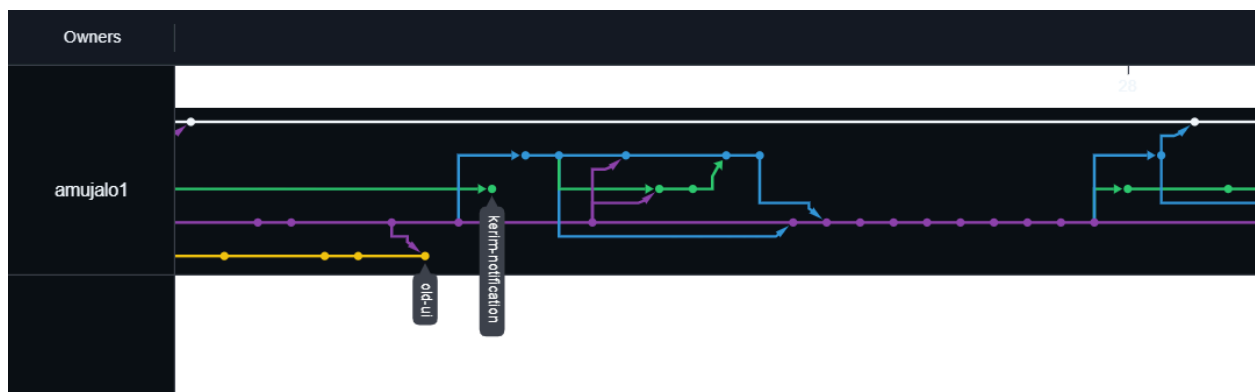
5. **added topBar notifications button and datetime** (*Added a notifications button and date-time display in the top bar*)

6. **amujalo1 edded kerim-graph kerims work** (Added Kerim's graph and work to the project)
 7. **added functionality to anomaly tab** (Implemented additional functionality for the anomaly tab)
 8. **added max consumption energy kW** (Added maximum energy consumption (kW) tracking feature)
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9. **Merge pull request #6 from amujalo1/old-ui** (Merging the `old-ui` branch into the main project)
 10. **logo CO2 and cost** (Added a CO2 and cost logo to the UI)
 11. **Merge pull request #5 from amujalo1/old-ui** (Another merge of the `old-ui` branch, possibly resolving conflicts or adding updates)
 12. **cache fix** (Fixed caching issues in the application)
 13. **coost and CO2 added to ui** (Added cost and CO2 tracking features to the UI)
 14. **Merge pull request #4 from amujalo1/feat/Unit-LevelEnergyMonitoring** (Merged the `feat/Unit-LevelEnergyMonitoring` branch into the main project, integrating energy monitoring features)
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27. februar 2025.



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1. **apartment info** (Added or updated apartment information in the UI)
2. **Removed unnecessary files** (Cleaned up the project by removing redundant files)

3. **current power and page info** (*Displayed current power usage and relevant page information*)
 4. **cost and CO2 last 24h** (*Implemented tracking of cost and CO2 emissions for the last 24 hours*)
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5. **added PiChart** (*Integrated a pie chart visualization into the UI*)
 6. **fix group2 when only floor selected** (*Fixed a bug related to Group 2 when only a floor is selected*)
 7. **added better plotting in UnitDetails** (*Improved the plotting functionality within the UnitDetails section*)
 8. **add login functionality** (*Implemented login functionality for user authentication*)
 9. **Merge branch 'develop'** (*Merged updates from the `develop` branch into the main project*)
 10. **added notifications cs and xaml** (*Added notifications logic and UI elements in C# and XAML*)
 11. **fix UI for apartment view** (*Fixed layout issues in the apartment view*)
 12. **fixed UI in MainWindow** (*Resolved UI alignment issues in the MainWindow*)
 13. **added another view of graph** (*Introduced an alternative graph visualization*)
 14. **added graph functionality in top bar as a page and as a button on anomalies** (*Integrated graph functionality into the top bar and added a button in the anomalies section*)
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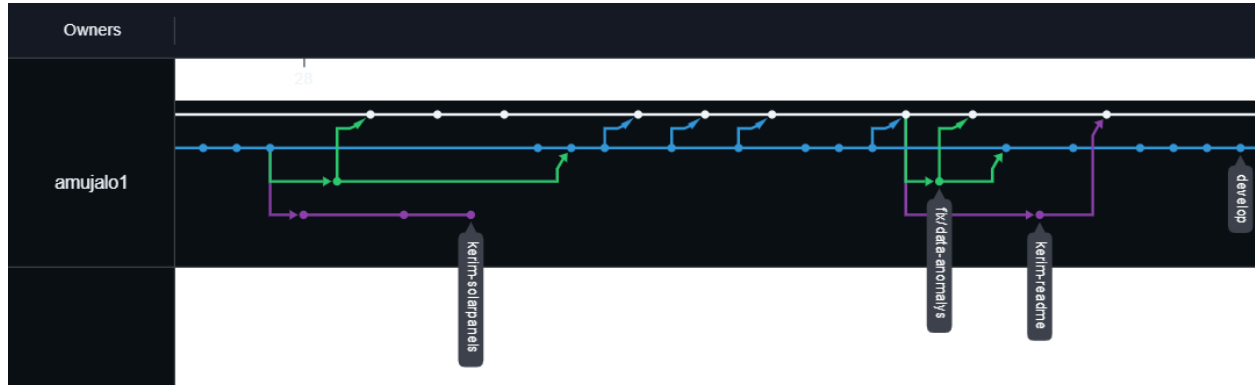
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15. **Bugfix za nivo button** (*Fixed a bug related to the level selection button*)
 16. **Rearrange UI - pomjeranje details panela ulijevo** (*Rearranged the UI by shifting the details panel to the left*)
 17. **Izmjena UI** (*Updated UI elements*)
 18. **Izmjena UnitDetails UI na vertikalni prikaz** (*Modified the UnitDetails UI to a vertical layout*)
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19. **Merge branch 'develop'** (*Merged changes from the `develop` branch into the project*)
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28. februar 2025.



amujalo1

1. **Merge pull request #17 from amujalo1/develop** (Merged changes from *develop* branch, with a humorous remark about scomor55 trying to steal the pull request 😊)
2. **fix Water Consumption for anomaly's erased** (Fixed an issue related to water consumption tracking in anomalies)
3. **fix reduced refresh time** (Optimized the refresh time for better performance)
4. **added more information in anomalies table** (Enhanced the anomalies table with additional details)
5. **fixed anomalies and added better UI** (Resolved issues in anomalies handling and improved the UI)
6. **added notification feature / Last24HoursEnergy** (Implemented a notification system for energy consumption in the last 24 hours)
7. **Update README.md** (Updated the README file with new information)
8. **small UI fixes** (Minor UI adjustments for better user experience)

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9. **removed API tester tab from UI** (Removed the API tester tab from the user interface)
10. **Bugfix: level label & Unit UI Changes** (Fixed an issue with level labeling and adjusted the Unit UI layout)

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11. **more tests added** (Expanded the test suite for better code validation)
12. **test initial** (Initial test setup added to the project)
13. **tests init** (Initialized additional test cases)

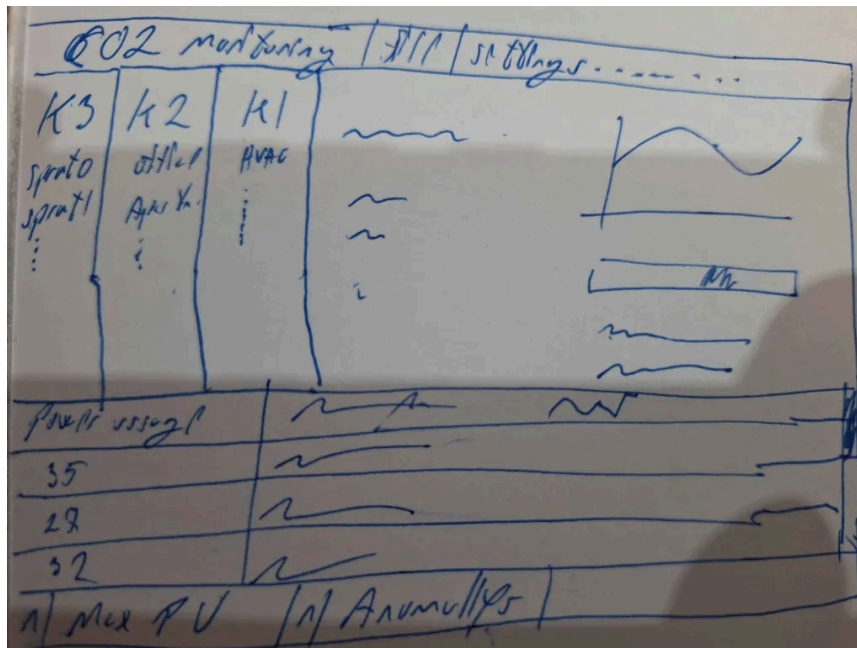
14. **preferred button added** (Introduced a "preferred" button in the UI)
 15. **cost and CO2 refactor v2** (Refactored cost and CO2 tracking logic - second version)
 16. **cost and CO2 refactor** (Initial refactor of cost and CO2 tracking logic)
 17. **cost and CO2 refactoring** (Continued improvements on cost and CO2 calculations)
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18. **Merge pull request #16 from amujalo1/kerim-readme** (Merged updates related to the README file)
 19. **README.md file updated** (Further refinements to the README document)
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Class Diagrams

1. Demo UI V1



2. Demo UI V2

3. Demo UI V3

h UI-V3

13:25 26.02.2025

User1

Logo

"Moćer ovdje"
apertura
ili ovdje

Floor 2

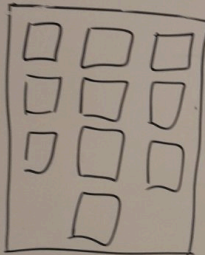
Floor 1

Floor 0

Floor -1

General

Outside



* not fully implemented
Clima: HVAC is On: 1
23°C Show Graph

Menu

CO2

Energy Cost

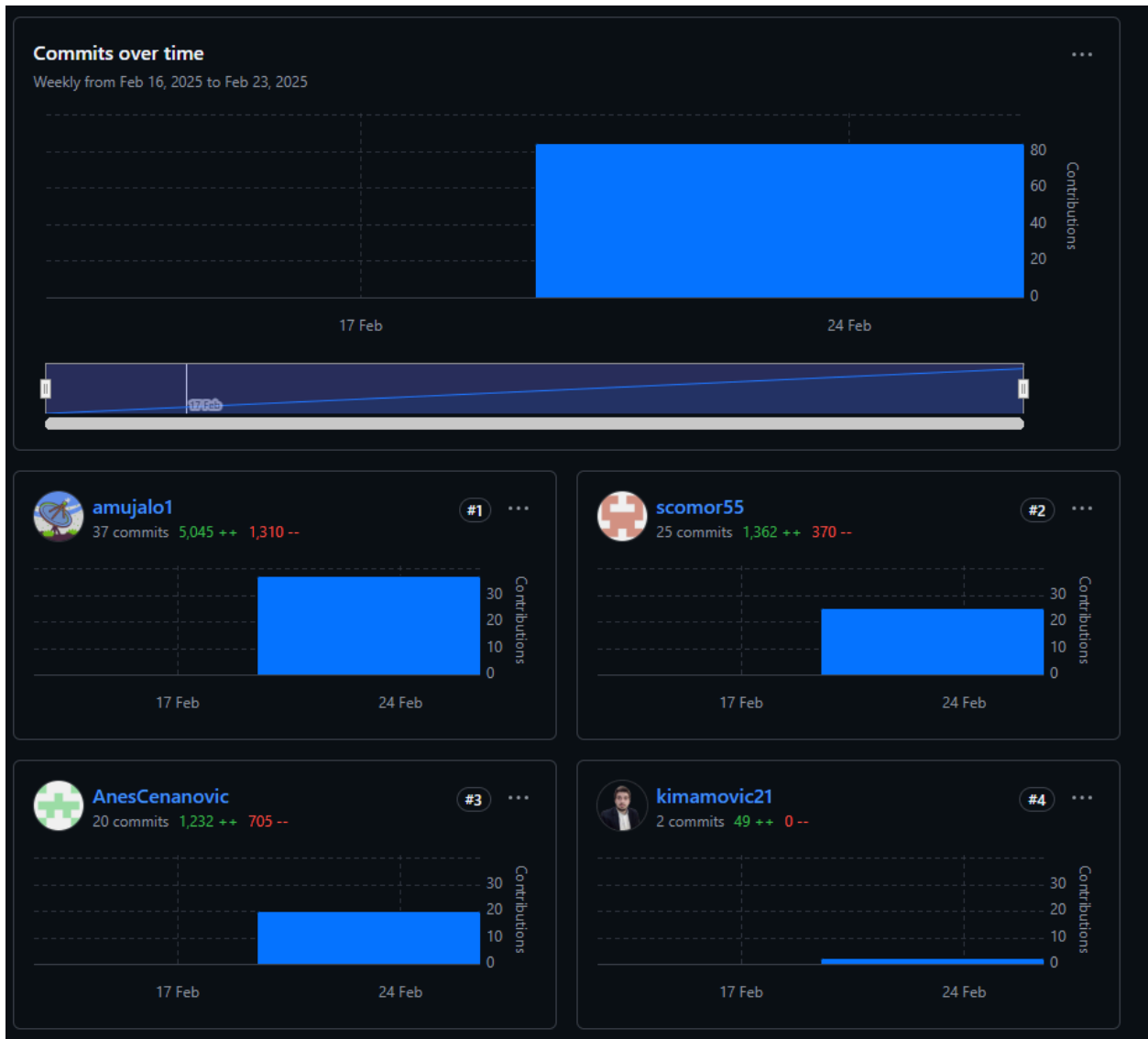
Max Con 0 Annulus 0

9

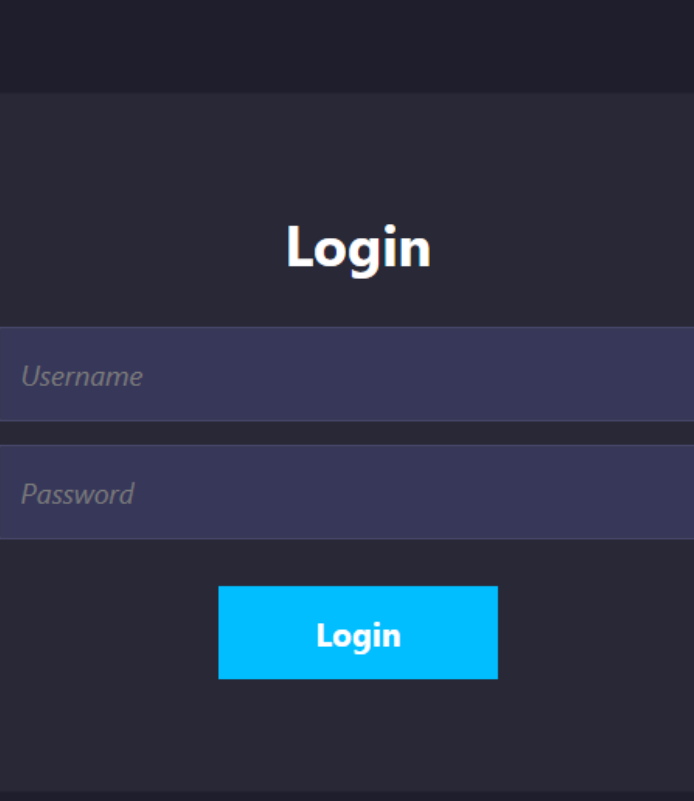
Valve
0.5

for ...

Contributions per week to main, excluding merge commits



Pages:



Login

Username

Password

Login

Username: admin, password : 1234

Notifications	Unit Energy Monitoring	Open Energy Cost View	Open Graph Page	LogOut	28.02.2025 12:11:32
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Apartments with the highest consumption		Devices with anomalies	
Group1	Group3	TotalConsumption	DeviceNames
Office D	Floor 2	41	Electricity
General	Outside	38	Solar Panels, Solar Panels, Solar Panels, Lighting System
Office B	Floor 0	20	Electricity
Office C	Floor 0	20	Electricity
Apartment 3	Floor 0	18	Electricity
Apartment 1	Floor 0	17	Electricity
Apartment 2	Floor 0	17	Electricity
Apartment 5	Floor 1	17	Electricity
Office E	Floor 0	15	Electricity, Lighting System
Elevator B	Monitoring	9	Electricity
Office A	Floor 0	6	Electricity
Elevator A	Monitoring	5	Electricity
Apartment 6	Floor 1	4	Electricity
Car Park	Floor -1	3	Electricity, Electricity, Lighting System
Apartment 4	Floor 1	2	Electricity

NotificationsUnit Energy MonitoringOpen Energy Cost ViewOpen Graph PageLogOut28.02.2025 12:12:42

Apartments with the highest consumptionDevices with anomalies

ID	Name	Group 1	Group 2	Group 3	Deviation Size	Value	Date	Severity	Graph
505/31	Real-time Energy Usage	Office D	Electricity	Floor 2	14.4137724137931	62.383	2/28/2025 4:12:24 AM	Alert	Prikaži graf
505/4	Real-time Energy Usage	Apartment 3	Electricity	Floor 0	10.9432596896552	27.13508	2/28/2025 9:35:00 AM	Alert	Prikaži graf
505/47	Lighting Power Consumption	Office E	Lighting System	Floor 0	10	0	2/27/2025 4:55:07 PM	Warning	Prikaži graf
505/29	Real-time Energy Usage	Office B	Electricity	Floor 0	7.20736551724139	31.192	2/28/2025 4:12:24 AM	Warning	Prikaži graf
505/30	Real-time Energy Usage	Office C	Electricity	Floor 0	7.16910344827587	31.192	2/28/2025 4:17:31 AM	Warning	Prikaži graf
505/28	Real-time Energy Usage	Office A	Electricity	Floor 0	7.16910344827586	16.792	2/28/2025 4:17:34 AM	Warning	Prikaži graf
505/19	Car Park Occupancy	Car Park	Generic	Floor -1	4.91971428571429	0.115	2/28/2025 3:12:13 AM	Normal	Prikaži graf
505/7	Real-time Energy Usage	Apartment 6	Electricity	Floor 1	3.32069366782007	9.77362	2/28/2025 9:35:00 AM	Normal	Prikaži graf
505/2	Real-time Energy Usage	Apartment 1	Electricity	Floor 0	3.31677830449829	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf
505/6	Real-time Energy Usage	Apartment 5	Electricity	Floor 1	3.31677830449829	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf
505/3	Real-time Energy Usage	Apartment 2	Electricity	Floor 0	3.31677830449829	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf
505/15	Phase 2	General	Electricity	Monitoring	3.00242068965531	232.996	2/28/2025 4:12:24 AM	Normal	Prikaži graf
505/44	Array 3 Production	General	Solar Panels	Outside	2.44615384615385	5.858	2/28/2025 5:58:35 AM	Normal	Prikaži graf
505/43	Array 2 Production	General	Solar Panels	Outside	2.44615384615384	10.358	2/28/2025 5:46:11 AM	Normal	Prikaži graf

Notifications page:

NotificationsUnit Energy MonitoringOpen Energy Cost ViewOpen Graph PageLogOut28.02.2025 12:13:54

Notifications

Solar Panel Devices

Device ID: 42
Numeric Value: 13 Power (kW)

Open Last 24 Hours Production

Device ID: 43
Numeric Value: 14 Power (kW)

Open Last 24 Hours Production

Device ID: 44
Numeric Value: 9 Power (kW)

Apartments with the highest consumptionDevices with anomalies

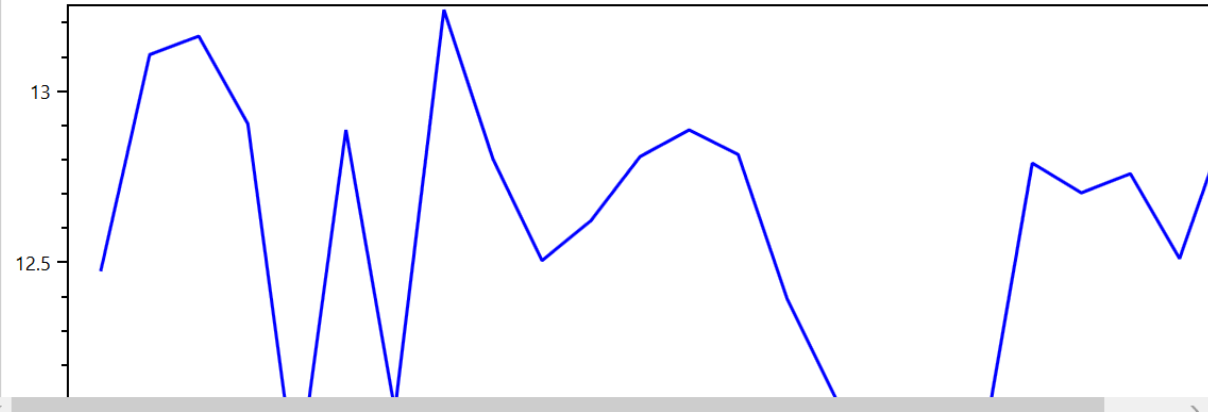
Energy Monitoring for Last 24 Hours

Load Data

Min: 0.00 kWh at 24.02.2025 16:11 (16 h)
Max: 15.32 kWh at 24.02.2025 15:42 (15 h)
Average: 11.93 kWh

Name: Array 1 Production
Unit: Power (kW)
Is On: True
Update Interval: 3600

Energy Monitoring (Last 24 Hours)



Devices Turned Off

Real-time Energy Usage

Device ID: 46
Numeric Value: 0 Power (kW)

Devices with Peak Consumption

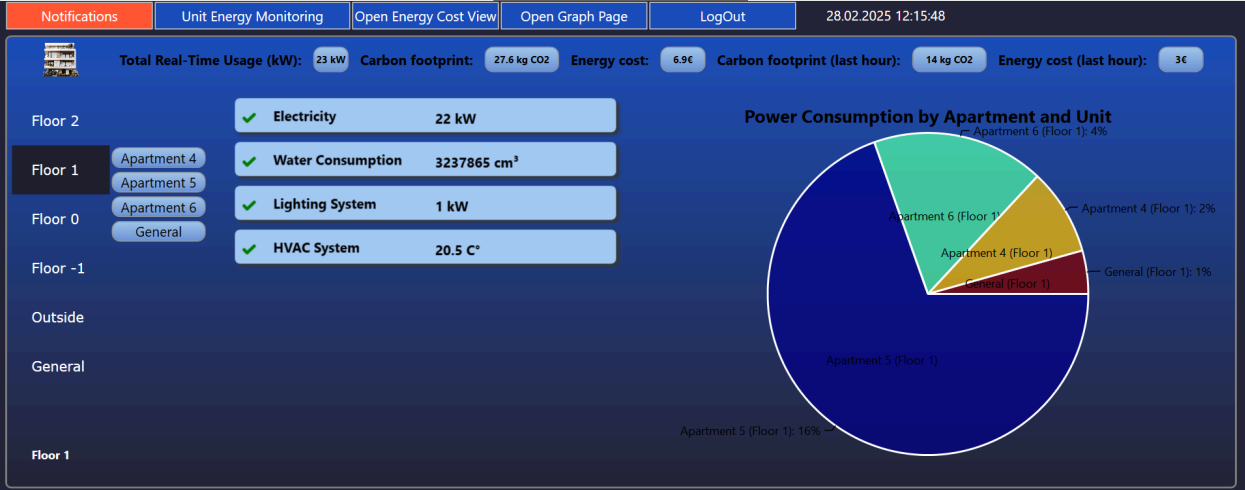
Device ID: 14
Numeric Value: 216 Voltage (V)
Upper Bound: 235

Device ID: 41
Numeric Value: 19 Temperature (C°)
Upper Bound: 22

Device ID: 47
Numeric Value: 15 Power (kW)
Upper Bound: 10

Devices Exceeding Threshold

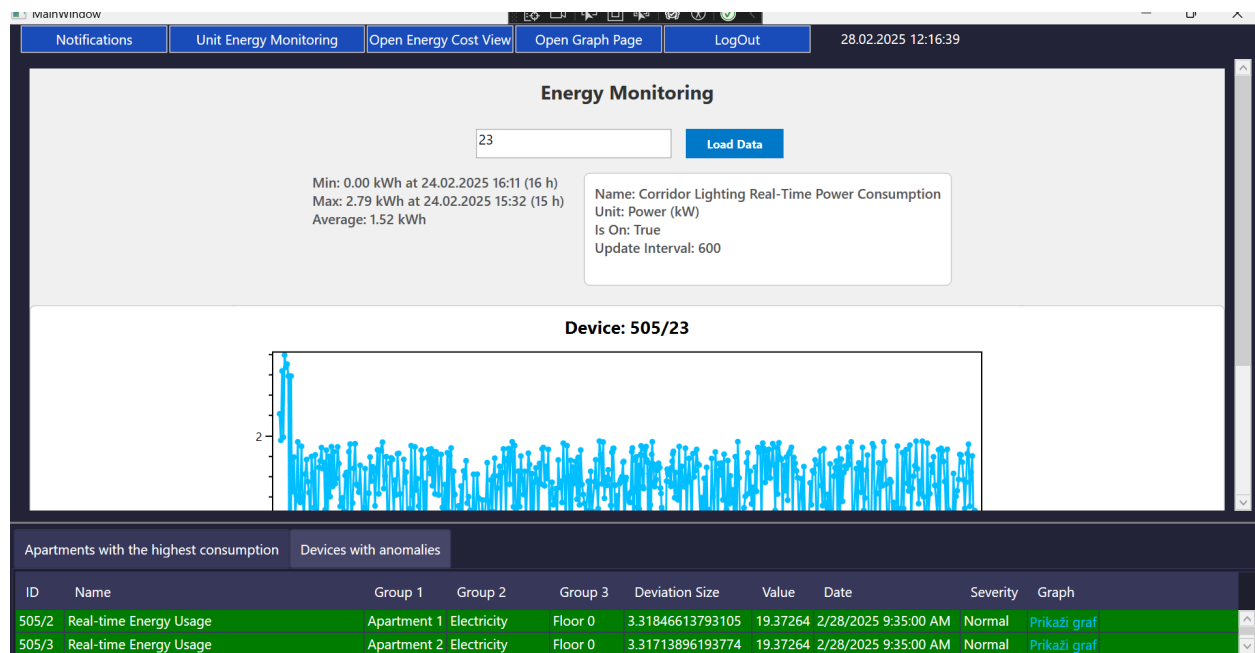
Device ID: 47
Numeric Value: 15 Power (kW)
Upper Bound: 10



Apartments with the highest consumption										Devices with anomalies									
ID	Name	Group 1	Group 2	Group 3	Deviation Size	Value	Date	Severity	Graph	ID	Name	Group 1	Group 2	Group 3	Deviation Size	Value	Date	Severity	Graph
505/2	Real-time Energy Usage	Apartment 1	Electricity	Floor 0	3.31810672413795	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf	505/2	Real-time Energy Usage	Apartment 1	Electricity	Floor 0	3.31810672413795	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf
505/3	Real-time Energy Usage	Apartment 2	Electricity	Floor 0	3.31942601374573	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf	505/3	Real-time Energy Usage	Apartment 2	Electricity	Floor 0	3.31942601374573	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf



Apartments with the highest consumption										Devices with anomalies									
ID	Name	Group 1	Group 2	Group 3	Deviation Size	Value	Date	Severity	Graph	ID	Name	Group 1	Group 2	Group 3	Deviation Size	Value	Date	Severity	Graph
505/2	Real-time Energy Usage	Apartment 1	Electricity	Floor 0	3.31942601374573	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf	505/2	Real-time Energy Usage	Apartment 1	Electricity	Floor 0	3.31942601374573	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf
505/3	Real-time Energy Usage	Apartment 2	Electricity	Floor 0	3.31810672413795	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf	505/3	Real-time Energy Usage	Apartment 2	Electricity	Floor 0	3.31810672413795	19.37264	2/28/2025 9:35:00 AM	Normal	Prikaži graf



Conclusion

Over the course of this development period, significant improvements and refinements were made across various aspects of the project. The team focused on implementing new functionalities, enhancing the user interface, optimizing backend processes, and refining system performance. Key updates included the introduction of energy monitoring, anomaly tracking, cost and CO2 calculations, improved data visualization, and enhanced user experience through UI adjustments.

Additionally, several bug fixes and code refactoring efforts contributed to the overall stability and maintainability of the project. The integration of notifications, login functionality, and refined graph visualizations further strengthened the system's usability.

Through continuous collaboration and iterative improvements, the team successfully advanced the project, ensuring a more robust and efficient application. Moving forward, further enhancements and optimizations will continue to refine the system, aligning it with project goals and user needs.