City of Oakland

Proposal - BetterFleet™ Manage as Part of the CEC REDWDS Research Grant Program

DRAFT

BetterFleet

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September 12, 2024

Dear Richard,

BetterFleet, a leading software company focused on helping fleets transition to zero-emission vehicle alternatives, has been awarded a California Energy Commission (CEC) grant. The City of Oakland provided a letter of support for the grant application and during the proposal preparation, various projects and participation were discussed. We thank the City for its continued support and we are excited to work with the City of Oakland (referred to as the City or Oakland) on this research grant.

This grant program called REDWDS (Responsive, Easy Charging Products with Dynamic Signals) aims to test the ability of fleets throughout California with electric vehicles (EVs) to flex their EV charging to provide resilience to the California grid, while aiming to lower energy bills for fleet owners.

This proposal provides a summary of the following:

- Grant background
- the City scope of REDWDS participation and project
- Grant funding for the research project
- Quote for the services – note that no cost is expected for the City, and this information is shown to demonstrate how the funding amount was derived
- Implementation plan
- Information about BetterFleet Manage, our advanced charge management system provided as part of the grant to enable participation in the California energy market

Attachments to this document include:

- Collaboration Agreement, which provides the terms and conditions for a data sharing agreement as part of the grant
- Software License Agreement

All funding is provided by the CEC under the REDWDS Program.

We thank you for your participation in this exciting project that will help propel the California EV and energy markets forward.

About BetterFleet

BetterFleet is a world-leading platform for fleet transition planning and management for complex (mixed) fleets. We have serviced over 200 fleets globally. Our significant internal software team has built a state-of-the-art charge management system, fine-tuned for transit operations through five years of research and development collaborations and grants.

The business was founded in 2016 in Australia with a mission to decarbonize transport. The company grew primarily organically through major contract success and major R&D grants, entering the United States, Canada and Europe rapidly. The business is still 45% employee owned and operated with 100% of funding coming from impact investors, most recently Aligned Climate Capital, New York based impact investment company. Our directors include Jordan Ramer (former CEO and Founder of EV connect), Jamie Rubin (former COO of State of New York), and Brendan Bell (former director of strategy at the Department of Energy).

Our values permeate every aspect of our operations and many customers point to our transparency and honesty as the thing they value most from dealing with us.

Clear & Transparent
We always call it like it is. We are honest to our customers and to each other. When putting forward documents, code or information of any sort we do not embellish, we get to the point and provide clear methodical answers to questions.

Eco Active
We are driven to impove the state of the environment in which we live. We are bound by a joint commitment to this goal and we are passionate about finding ways to achieve it in our projects and product.

Transformative
We strive to transform the industries we are in. We learn fast so we can come up with solutions that push beyond incremental change and deliver customer-focused solutions that deliver multiple improvements to our customers and communities.

Empathy for customers and each other
We put ourselves in the shoes of our customers when we deliver projects and products. We try to truly understand their problems so we can offer solutions that make a real difference in their business and personal lives.

We were also established as a research & development (R&D) focused entity with all additional capital and profits going into funding our significant R&D efforts and collaborations in the Charge Management domain. Most notably and recently we were awarded a grant of up to $25M from the California Energy Commission to fund research and development in advanced charging for fleets.

CEC REDWDS – Grant Background

California energy utilities employ a range of signal-based strategies to enable and incentivize widespread customer load shift in response to electric grid conditions, including demand response, other event-based signals, and energy billing rates. To realize load shift, customers and their devices must be able to easily access and respond to these dynamic grid signals. The Grant, awarded to EVenergi LLC (dba BetterFleet), will support the development and deployment of EV charging products that help customers respond to dynamic electric grid signals while ensuring that customer charging and mobility needs are met.

The goal of this Grant is to develop and deploy products that enable EV charging load flexibility, which supports transportation electrification, grid decarbonization, and electric system reliability.

BetterFleet is partnering with the City to deploy its software on new and existing EV Charging Stations at a City yard facility to collect data in order to identify the feasibility of the City's fleet and operations to respond to dynamic grid signals. This data collection effort will help understand whether flexible charging mechanisms are possible that will help the City reduce energy costs while providing the California grid with resilience. As such, with expressed consent from the City, BetterFleet through its BetterFleet Manage charge management software (CMS) will also control EV Charging Stations to test a variety of demand-response signals and dynamic rates **but in no event shall such testing interfere with the City's ability to fully charge its fleet** in a timely manner or interfere with the City's fleet operations.

The diagram below outlines the key commitments for the project.

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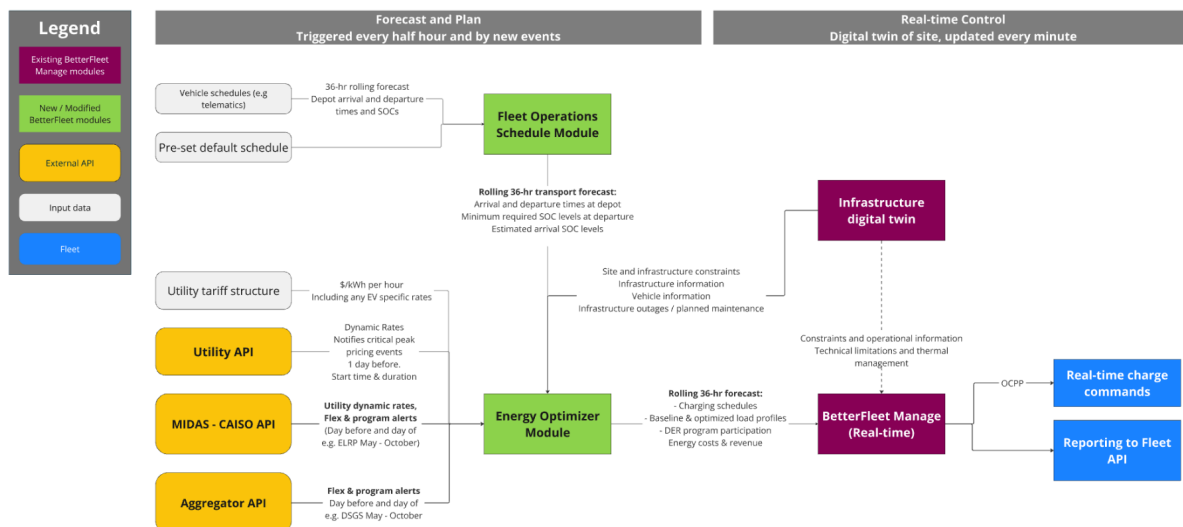
Scope of REDWDS Participation and Project

As outlined in the attached Collaboration Agreement - Schedule 1, the scope of the REDWDS project with the City is as follows:

Project Location

7101 Edgewater Dr.
Oakland, CA 94621

Site Electric Utility Provider

Pacific Gas & Electric (PG&E)
Community Choice Aggregator: Ava

Background on the Site

Based on BetterFleet's site visit in July 2024, we note the following key observations:

- 2 L2 ChargePoint chargers are active and operational for fleet and personal use under the ChargePoint CMS.
- 1 Existing non-operational 20-kW DCFC.

Implementation scope

Charge management	A full charge management system including ● Charger Monitoring and Static Load Management ● Depot Load Management ● Advanced Energy Management ● New modules to respond to grid-generated demand-response signals and dynamic rates, as applicable
Hardware - IoT	1 IoT device to enable load management across the site and chargers
Hardware - Power Meters	3 Power meters will be installed to accurately measure the site consumption against the charger consumption to evaluate available site capacity and be able to gather detailed information for reporting and load managing purposes.
Hardware - EVSE to be installed and integrated	1 new DCFC (ABB Terra 54UL) 2 new L2 (ABB Terra Wallbox)
Planning/Modeling	BetterFleet will model the fleet operations at Weymouth to understand the availability to shift EV charging loads and participate in demand-response signals and dynamic rates.
Integration - Telematics	Ideally we will implement a live feed from the telematics to capture

	real-time vehicle operations and positional data.
Integration - EVSE not directly funded by REDWDS grant	BetterFleet Manage will control the following existing EVSEs: ● 2 ChargePoint L2 Chargers

Project Funding

As a participant in the CEC REDWDS Grant program and BetterFleet partner, we are pleased to provide the following funding to the City, as also outlined in Collaboration Agreement – Schedule 1.

Software Funding	Amount
CEC REDWDS BetterFleet Manage CMS - Credit applied for two years from deployment date	$(8,140)
Total Software Cost - To be paid by the City of Oakland	**$0**

Hardware Funding	Amount
Total hardware and installation cost estimate	$111,017
Assumed federal tax credit (30C Tax Credit) provided to BetterFleet (30% of project cost)*	$(29,600)
Assumed LCFS credits generated and refunded by BetterFleet*	$(12,000)
Remainder covered by CEC REDWDS[†]	$(69,417)
Total Hardware Cost - To be paid by the City of Oakland	**$0**

These estimates are based on assumed amounts and compliance with terms and conditions of respective programs. BetterFleet and Riverside will collaborate to apply for these refunds/rebates to help fund the project. Any refunds, rebates, or credits from these programs will be paid wholly to BetterFleet to offset the costs of the hardware.

[†] The CEC REDWDS funding will be used to cover hardware costs upfront with the understanding that other sources−federal tax credits and LCFS credits−will be leveraged to reduce the overall grant contribution.

Total Funding Provided by CEC REDWDS	Amount
Not to exceed amount	**$119,157**

Project Capital Costs Funded by the Grant

The following table outlines the capital project costs that will be covered by the REDWDS Grant funding.

	Number of	Cost per unit	Total cost
Chargers	1 DCFC (ABB Terra 54UL) 2 L2 (ABB Terra Wallbox)	-	$34,704
Civil works	1	$41,770	$41,770
Electrical works	1	$22,193	$22,193
IoT device	1	$8,000	$8,000
Power Meters	3	$950	$2,850
Sustainable Fleet Solution Services	10 hours of project management oversight of CMS implementation	$150	$1,500

Project Operating Costs Funded by the Grant

The operating costs of the project will include the licensing of BetterFleet Manage software for a total of 42 dispenser ports.

	Number	Cost per unit p.a	Total cost p.a	Total project cost
CMS Licensing costs	3 new EVSE dispensers 2 existing EVSE dispensers **Total of 5 dispensers**	$550	$2,750	$5,500
IoT - SIM Cards	2	$660	$1,320	$2,640

Project Operating Costs After the Conclusion of the Grant Project

At the expiration of the grant participation in Phase 1, the City will remain the owner of the EVSE installed as part of the grant and may elect to:

- Continue using BetterFleet Manage as a paid subscription to be negotiated at that time (costs outlined below), or;
- Participate in Phase 2, if funded by the CEC. In Phase 2, we will discuss any costs or subsidies or potential for additional EVSE funding at that time, or;
- Discontinue using BetterFleet Manage. BetterFleet will assist with transitioning any hardware to a provider of the City's choosing.

	Number	Cost per unit p.a	Total cost p.a
CMS Licensing costs	5 dispensers	$550	$2,750
IoT - SIM Cards	2	$660	$1,320
Charger Maintenance Costs	1 DCFC	TBD	TBD

Overview of Grant Funded Infrastructure/Hardware

The following EVSE hardware will be funded for the Grant project.

Recommended Hardware	
Vendor Name	Momentum Electric
Key specifications	150 kW minimum, 2-4 Dispensers
Reason for selection	ABB Terra 54 UL, ABB Terra Wallbox Warranty – 2 Year Manufacturer Warranty
Installation	Conducted by Momentum Electric. As required by the Grant, installers must be EVITP certified and conform to prevailing wage rates.

ABB

Implementation plan

The following is a high-level overview of the process of collaboration in the research grant.

	Scope item	the City Role	BetterFleet Deliverables
1	Preparatory meetings	Attendance and information	Summary; follow-up questions
2	Site visits	Site access and site data	Site reports
3	Utility engagement	Provide account manager contact info	Set up meetings, review REDWDS scope, discuss enrollment in demand-response programs and/or dynamic rates
4	Complete collaboration agreement	Review, redline, and execute	Revise and execute
5	Formal project kickoff	Attend meeting	Summary notes; kickoff presentation
6	Data collection phase	Review and fulfill RFI	Prepare RFI, review data
7	Planning phase - energy modeling	Review results of modeling	Energy modeling slide deck with takeaways for flex EV charging opportunities
8	Hardware and Energy Management System- delivery phase	Site Access	Installation
9	Integration, configuration, testing and trianing	Assistance with telematics API where available and with third party charging vendors' API	The live operational system, testing, configuration and training delivered
9	Monitoring phase	Provide authorization and access to energy bills	Delivery reports
10	Project wrap-up and reporting	Feedback on program	Write all reports

Onsite works and commissioning

The following diagram is an overview of the process of installing and commissioning the EVSE and CMS.
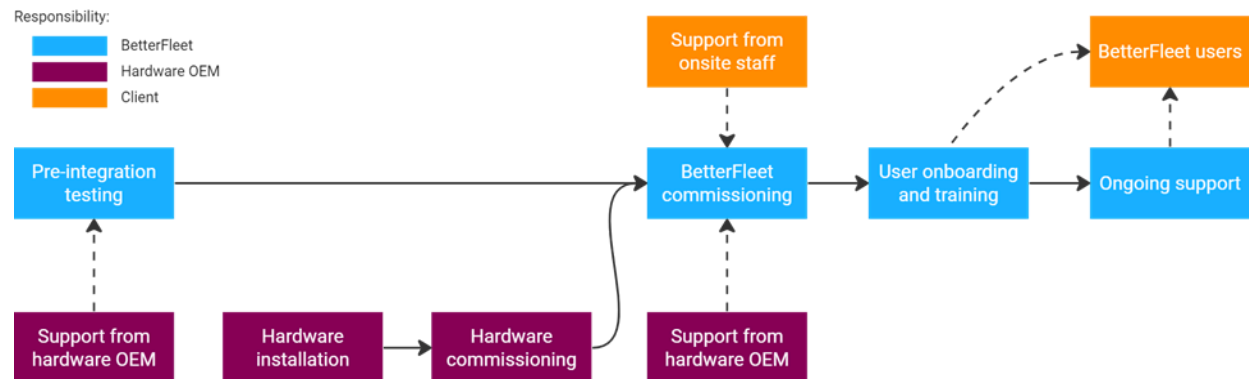
Charging Hardware Installation

Momentum Electric, a local installer, will perform the installation at the City of Oakland facility due to their strong local presence and extensive experience in handling commercial electrical projects. Their familiarity with the region, coupled with a proven track record of successfully completing complex installations, makes them a reliable partner for this job. Engaging a local contractor not only ensures prompt service and support but also aligns with our goal of supporting local entities in the Oakland community.

Installation (IoT), Integration and cutover plan

An IoT Hub will be constructed and certified by BetterFleet. Power meters will be supplied by BetterFleet for Momemtum electricians to install at the identified locations to accurately monitor site and charger energy consumption. Integrations will be confirmed between all OEMs and BetterFleet. IoT Hub will be commissioned and chargers could begin to migrate to BetterFleet from other CMS systems. We would align and attend meetings either virtually or in person with the OEM engineering representative to support the cutover process.

Software configuration, testing, and training

Once installed, BetterFleet will provide support loading vehicle data and establishing core configuration of load management. If telematics integration is available, our customer success team will also facilitate the connection to vehicles.

Testing and training will then be conducted to ensure that the City staff are satisfied with the functionality and comfortable with using the key features.

BetterFleet Platform Overview

BetterFleet is a globally leading planning and charge management platform (CMP) that has been designed from the ground up for fleets. We have partnered with multiple operators to truly understand the intricacies and complexities of operating a fleet and developed an end-to-end solution that makes the adoption and operation of electric vehicles much easier.

From our time in the industry, we are acutely aware that plans change in an instant. When they do, you need to be able to react quickly. Our easy to use interface also allows non-technical users to understand operations at a high level, while also providing an in-depth, technical analysis to those who need it. As outlined below, our tool is able to complete route and depot emulation with a high level of accuracy, displaying successful and unsuccessful modeling attempts under various scenarios.
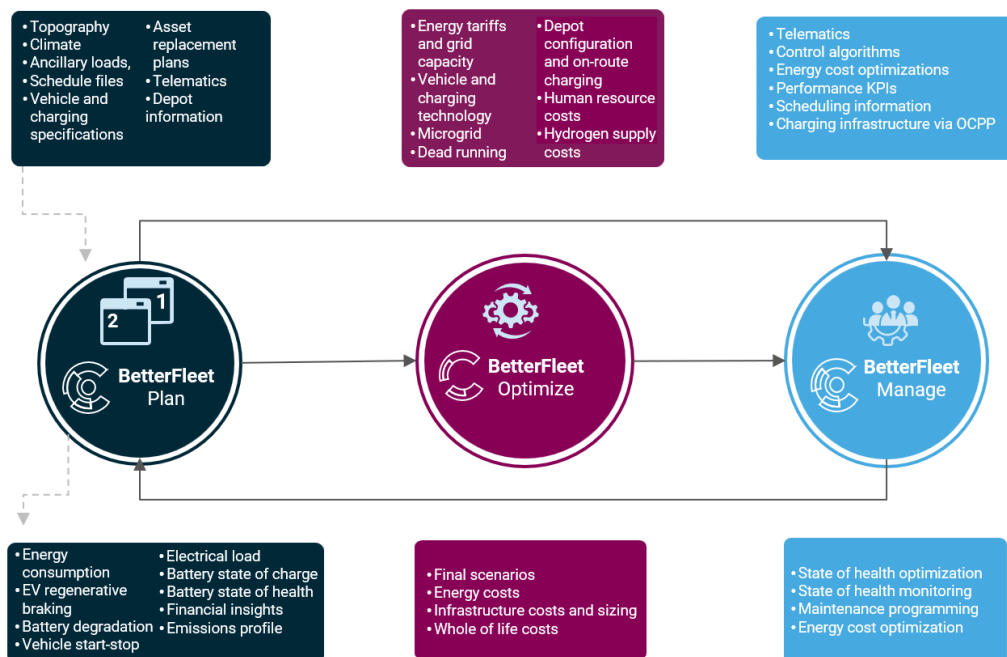
BetterFleet Manage
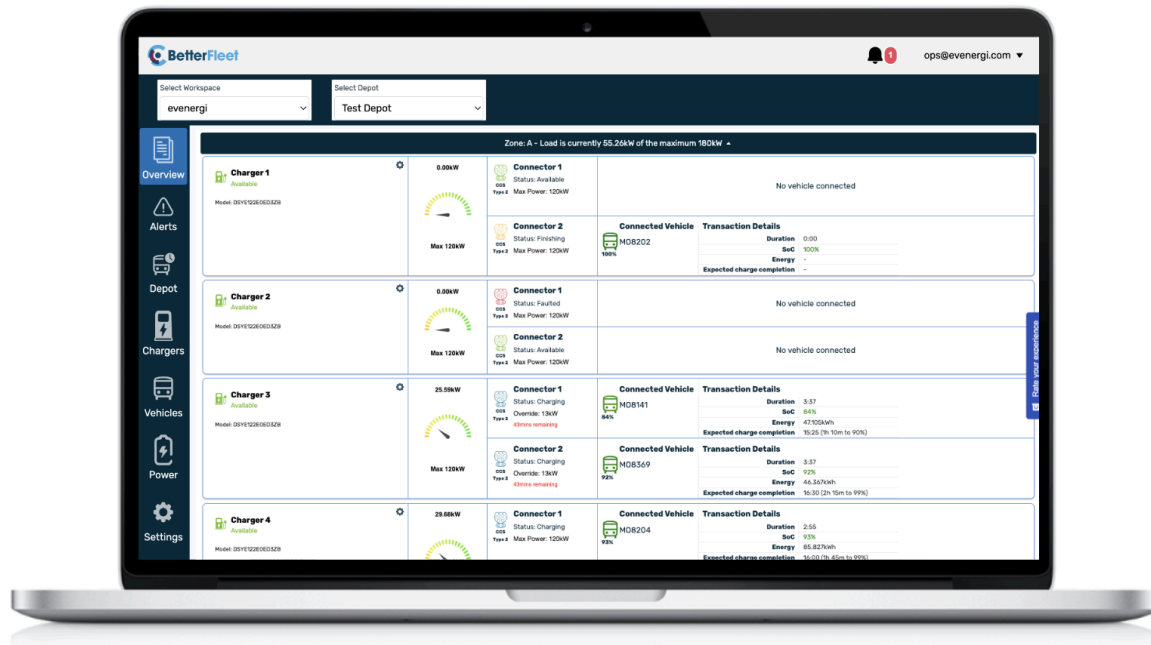
BetterFleet Manage is a system-wide load and charge management control system. Designed from the ground up to streamline vehicle operations and dynamically monitor site loads through smart metering and adjust charger outputs in real time. This ensures not only your vehicles are always charged, but your depot operations can continue unhindered by site capacity constraints. Below is a summary of some of the many features of the BetterFleet Manage control system:

- **Charge monitoring and reporting:** Vehicle and charger level monitoring of charging events (state of charge (SOC), kilowatt-hours (kWh) delivered, plug in/out time, session start/stop time, odometer, etc). With an easy to use .CSV download, you will be able to fulfil all reporting needs easily.

- **Smart charging:** Static and dynamic load management, to remain within infrastructure limits, energy cost optimization and hourly charging limits.

- **Telematics integration:** When paired with compatible devices, BetterFleet Manage allows users to view vehicle status either en-route or in depot. Identify vehicles with low state-of-charge that are not currently plugged in and prevent unnecessary downtime and ensure vehicles are ready for operations when needed.

- **Easy-to-use interface:** We have a heavy focus on user experience, we have designed BetterFleet™ Manage to be able to be used by 'non-technical' members of the team seamlessly.

- **Seamless integration:** We have an entire team on stand-by dedicated to a successful integration between charger, vehicle and software. This ensures a smooth rollout and minimal disruptions to your operations. Having already completed integration testing with many of the major brands in North America and the world, we are confident that we will be able to get you up and running in no time.

- **Operational dashboard:** We have received feedback from our clients that the BetterFleet dashboard has provided them with much needed visibility on day-to-day operations when compared to the OEM charge management solution. We are committed to furthering the functionality of BetterFleet and actively seek out feedback from our clients to further develop our roadmap.

With live access to charger status, charging sessions, vehicle energy usage, depot operations and vehicle location, BetterFleet Manage removes the need to have multiple screens and interfaces, simplifying the entire operational process. With telematics integration, this software operates with live data to make charging decisions and manage depot movements in an electrified setting.

For more details on BetterFleet Manage, please see [Appendix A: BetterFleet Manage](#)

About the BetterFleet Software

BetterFleet Manage Feature Stack

BetterFleet Manage aligns with the City's and the CEC's requirements. The table below demonstrates the functionality of each module.

Features	Charger Monitoring and Static Load Management	Depot Load Management	Advanced Energy Management	Vehicle Management (per vehicle)	Advanced Depot Orchestration
Charger monitoring	■	■	■		
Remote reset of chargers	■	■	■		
Alert system for chargers	■	■	■		
Static load management (set depot level load limits for different times of day or days of the week)	■	■	■		
Autocharge for DC chargers (identify vehicles by MAC address)	■	■	■		
Charger warranty management	■	■	■		
Charger incident management (advanced alerting)	■	■	■		
Depot level load control of one incoming grid supply (includes fail safe modes)		■	■		
Charger level control including manual overrides (distribute available capacity evenly across connected vehicles)		■	■		
Third party ancillary load monitoring and management (e.g bus wash load or similar)			■		
Plug level control (FIFO, sequential, and remote start/stop)			■		
Demand response program capabilities			■		
Microgrid integration (Send charger flexibility information to microgrid controller)			■		
Vehicle location visibility					
Vehicle management					
Battery warranty (target SOC, battery use reports)					
Vehicle pre-conditioning					
Emulation mode (test changes before deployed)					
Estimated time to charge based on AI digital twin					
Range remaining based on AI digital twin					
Dispatch schedule optimization					
Parking optimization					
Integrated planning modules for depot transitioning over time					

Proposed Solution for the City as Part of REDWDS

Based on the grant requirements, we propose the following modules of BetterFleet Manage:

Charger Monitoring	Depot Dynamic Load Management	Advanced Energy Management	Vehicle Management	Advanced Depot Orchestration
☑	☑	☑		

This would enable the City to comply with key REDWDS requirements such as:

- Core charger management and monitoring features

- Load management of charger/electric bus load and also other local onsite electrical metered load (i.e. offices, washing facilities, training facilities).

- Manage vehicle via telematics integration for key operational performance data (i.e. live SoC, SoH, Odometer Readings, Efficiency, etc.)

- Participation in energy market signals. These modules will be developed and tested as part of the CEC REDWDS grant program.

Appendix A: BetterFleet Manage

Below is an overview of the BetterFleet Manage charge management system.

Power

With an easy to navigate interface, you can view your overall electricity consumption and the status of each charger in real time, observing key information such as current output per zone and per charger.

Vehicle Dispatch and Parking Integration With Charge Management

BetterFleet Manage stands apart from other charge management platforms by offering real-time tracking and reporting capabilities for vehicles, as well as chargers. With our platform, you have access to a centralized dashboard that provides a comprehensive overview of your operations.

This functionality is made possible through seamless integration with vehicle telematics systems and via OCPP. By leveraging this integration, users can monitor crucial vehicle metrics such as state-of-charge for vehicles parked at depots and en-route, and their location while on the move. Users can easily identify vehicles with low state-of-charge that are not currently plugged in, preventing unnecessary downtime and ensuring vehicles are ready for operations when needed. Additionally, customizable alert parameters ensure that users stay informed about important events or conditions affecting their fleet.

Vehicles

As mentioned above, BetterFleet Manage is able to display up-to-date vehicle information either via the charger or via telematics. An example is shown below of a list of all transactions in chronological order, or view a summary per vehicle/charger. This visibility will allow managers to see charge time, energy (kWh) delivered, number of charge events, and SoC reporting. BetterFleet has been able to connect databases from unrelated systems to provide unparalleled visibility on vehicle and charger operations.

Alerts

See all systems alerts in real time allowing for rapid and proactive response to charger or vehicle faults. BetterFleet is able to provide frontline support with Operations and Maintenance on chargers through our O&M services. You are also able to nominate subscribers for email and sms notifications based on alert type. This will ensure operations can run efficiently and visibility can be maintained on critical incidents at all times.

Chargers and Site Capacity

A summary of all chargers can be conveniently seen on a single screen, showing current charge status, active faults, vehicles connected, and much more. Simply "view" a specific charger for access to transaction summaries and the ability to hard/soft reset, and start/stop charging with the click of a button. This view also provides an overview of the current total site demand. The ability to access individual chargers can be completed here, with the ability to increase, decrease, start or stop charging and soft reset can be actioned on all plugs through this page.

Depot Overview and Load Management

Load management can be configured in the system at a site or at different points downstream from the site level.

BetterFleet's load management architecture is structured in terms of function and system of influence. Functions that BetterFleet is capable of are defined as follows.

Static Load Management	Dynamic Load Management	Fleet Integrated Load Management
Ability to set limits, either fixed or time scheduled.	Site power monitors are used to determine available capacity in real-time. Charging power is dynamically regulated to remain within capacity.	Integration with scheduling and dispatch systems enables forward-looking charging decisions to be made.

Any of the above algorithms can be set to control systems of influence. This can be the entire site, a single charger or socket, or a group of chargers. BetterFleet can perform dynamic load management at site level, while at the same time limiting a specific socket to a static limit.
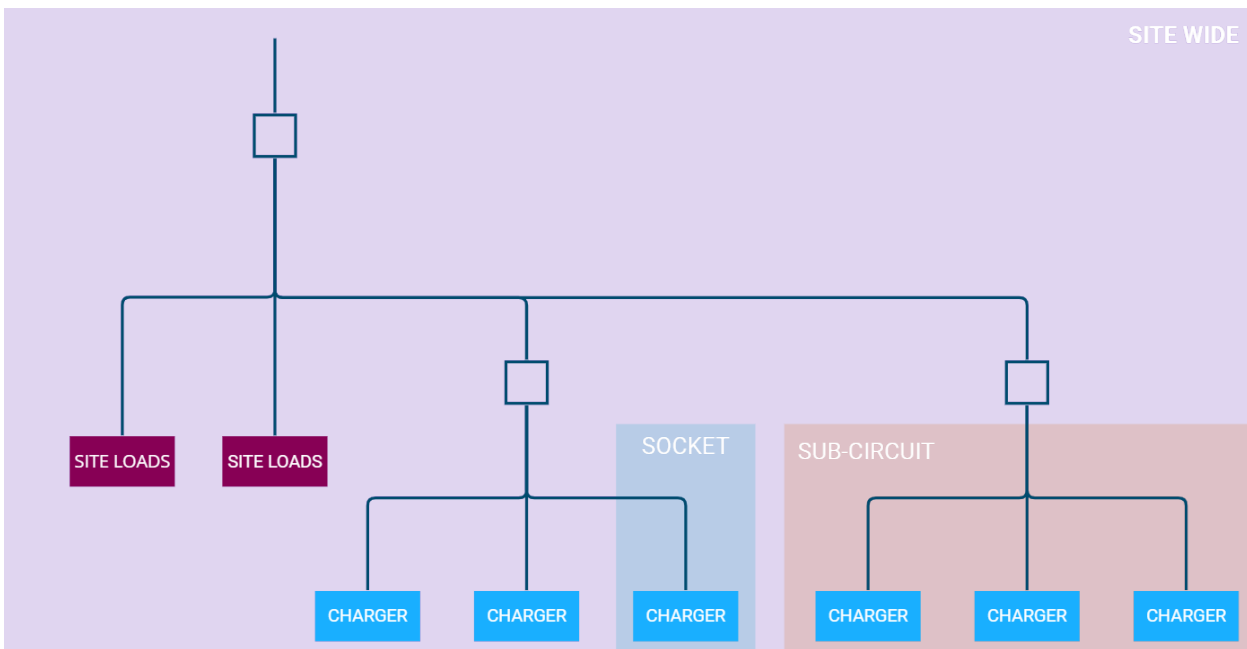
An example of our configurable load management interfaces is provided below:
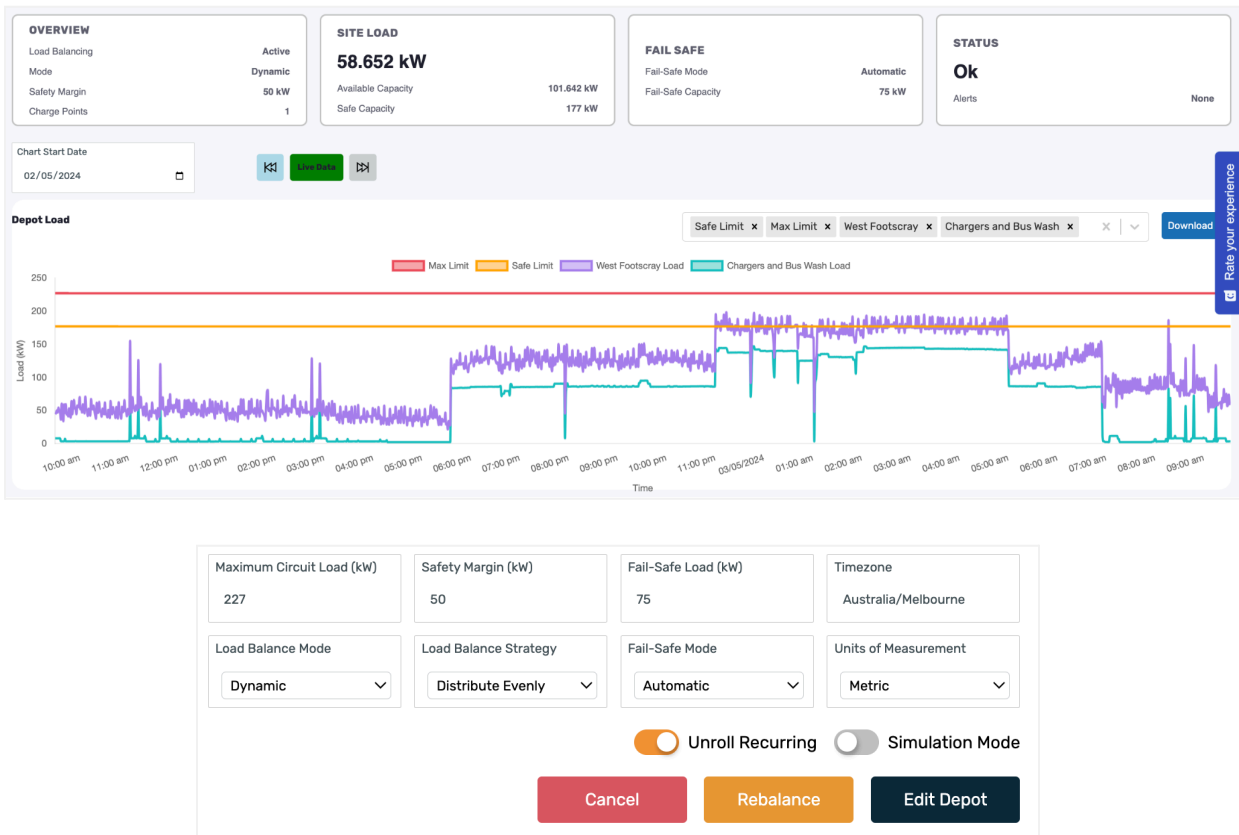
BetterFleet Manage simplifies the process of charging electric vehicles by automatically adjusting the power usage of each charger. BetterFleet IoT Hubs are used to collect data from site power meters and transmit it to the cloud, where the system leverages the integrity and reliability of AWS systems to perform critical calculations and decisions. A BetterFleet IoT Hub is typically required for every two power meters. With onsite deployment of the BetterFleet IoT Hub, BetterFleet Manage is able to dynamically control the rate of charge in accordance with the available onsite capacity. As site-specific systems turn on/off, your chargers will react and avoid blowing fuses. This will allow you to maximize the available charging potential onsite without needing to upgrade infrastructure to account for the infrequent "worst case" scenario. Prior to live deployment, the Dynamic Load Management can be deployed in 'shadow' mode, which will give you the ability to see system-made charging decisions prior to live deployment.

With this system, users can also avoid charging during times when electricity prices are highest. This not only saves money but also reduces the strain on the power grid, potentially eliminating the need for costly upgrades. Moreover, BetterFleet Manage can intelligently coordinate with renewable energy sources, like solar panels, to charge vehicles inline with renewable energy generation.

Data Collection and Reporting

BetterFleet Manage is built on the principles of granular data collection and open data access. To provide insights required to achieve operational, financial and environmental excellence, data must be collected from multiple sources. This includes vehicles, chargers, meters, scheduling systems and local decentralized energy resources. BetterFleet is vendor-agnostic and collects data from multiple different telematics systems, chargers, scheduling systems and meters globally.

Our reporting methodology is centered around delivering the highest business benefit for our users in the most convenient manner. In some cases that is within our system, and in others it is delivering data to other third party systems. From a reporting perspective, this led to a reporting architecture around:

- Vehicle efficiency
- Charger performance, usage, and issues
- Energy efficiency across the system
- Environmental sustainability metrics
- Transition progress
- Dispatch efficiency and issues
- Battery condition
- Detailed trend reports and trends about transactions
- Corrupted transactions and maintenance

Data is available as an Excel export (.csv) and API call. In addition to operational reporting, we implement data collection and storage to enable machine learning as significant volumes of data are collected to start to implement predictive optimizations in planning and management.
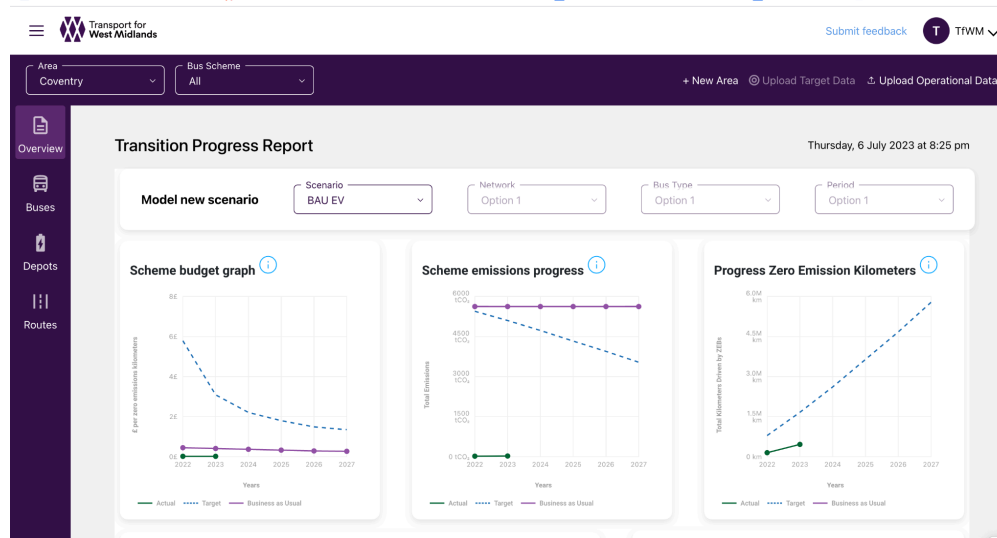
System Support

As with any software platform, there are two key issue types that can occur. Firstly there can be an outage of the actual platform, and secondly there may be a bug experienced by users. For both issues, BetterFleet provides access to our support portal (https://support.betterfleet.com/) and a local account manager for more immediate issues.

BetterFleet has the following uptime targets:

Service	Uptime target	Measurement
BetterFleet Plan	95%	MTTR
BetterFleet Manage	99%	MTTR

The following is the target response and resolution times for the platform.

Severity Level	Description	Target Response	Target Resolution*
1. Outage	SaaS server down	Immediate	3 hours
2. Critical	System malfunction with operational impact	Within 4 hours	2 days
3. Urgent	System malfunction without operational impact	Within 2 days	7 days
4. Important	Service performance issue reducing timeliness of system use	Within 3 days	Within 9 days

System Architecture

While many charge management systems were designed as energy management systems, the BetterFleet platform is the product of over five years of R&D into the more complex problems that fleet operators experience in the transition to zero-emission alternatives.

At the core of our R&D is a framework we refer to as a digital twin. This digital twin technology is at the core of a multi-physics architecture that has been designed to incorporate all related elements from vehicles, batteries, to chargers, to properties and the physics of weather, topology, driver styles, and over 100 other elements.
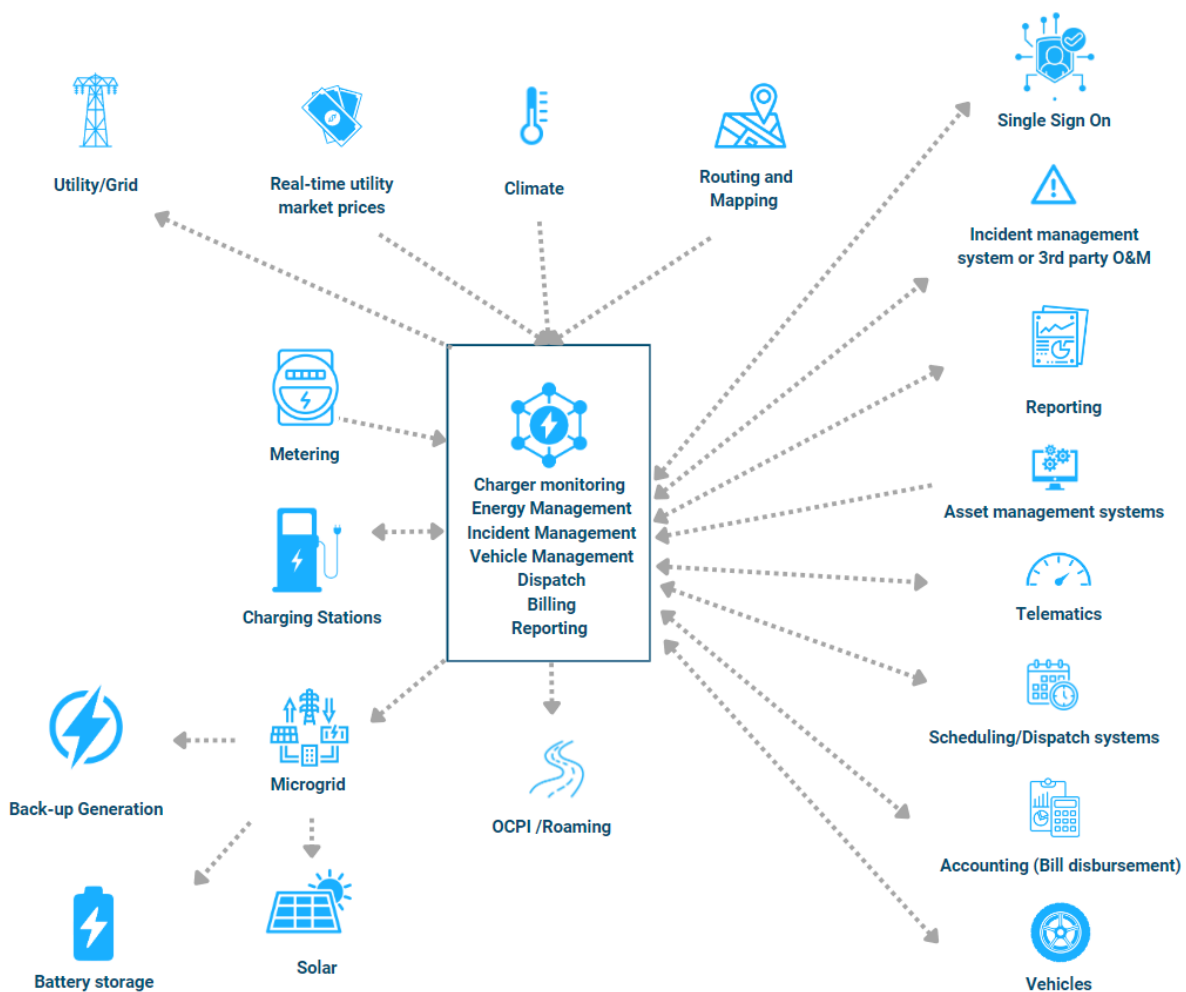
Technical Environment

Much of the above architecture is focused on the algorithms that power the system, but in addition to this, we use state-of-the-art architectures to deliver user interfaces and data transfer as outlined below.

We utilize a unique, balanced approach to service architecture, which combines the adaptability of microservices with the simplicity of monolithic structures. This allows us to rapidly and reliably implement new features, ensuring our product evolves with your business needs.

Using containerized deployment, we ensure our service is portable, efficient, and consistently reliable across environments. Our use of Amazon CloudFront ensures quick and secure delivery of content globally, resulting in a seamless user experience.

BetterFleet is designed with an API-first approach, which guarantees easy integration with your existing systems and opens up possibilities for future enhancements.
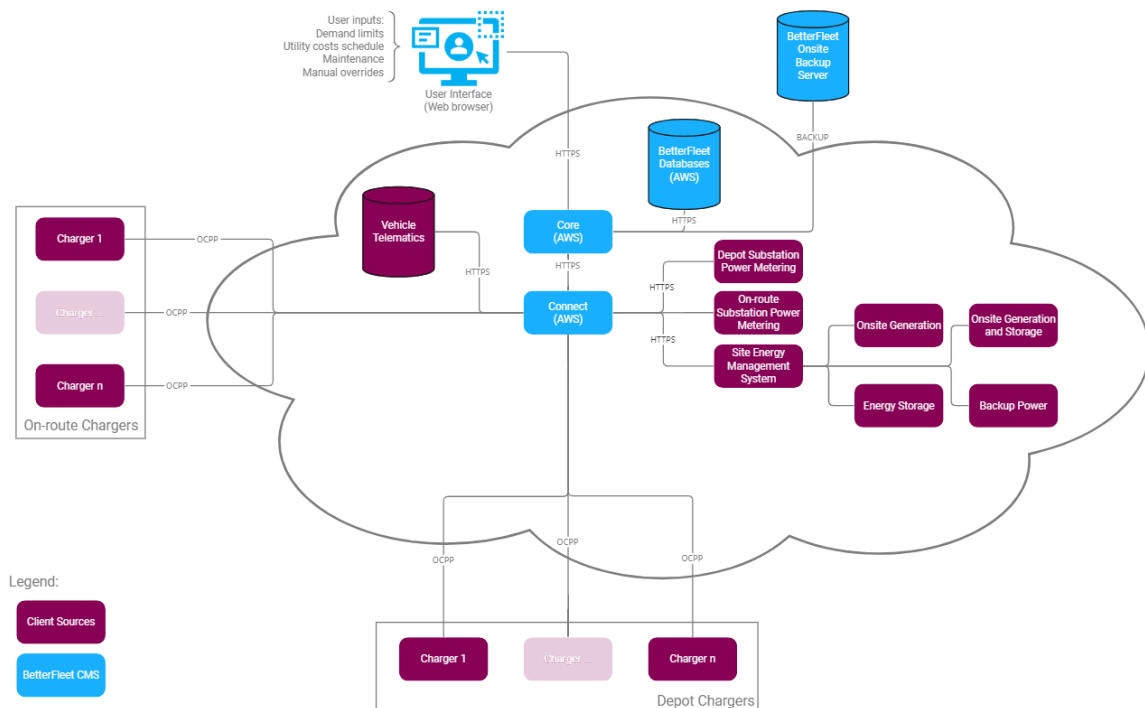
System Security

As part of our commitment to operational excellence and security, we have achieved SOC2 compliance through a full policy and process audit.

This certification implements the highest standards for the service areas of security, availability, processing integrity, confidentiality, and privacy and is highly aligned with the policy and process requirements for Quality, Environmental and Safety Management.

We have detailed security policies and protocols that we can provide on request and every level of our platform has been hardened through penetration testing.

We use TLS encryption for connections for data transfer between site infrastructure and our cloud and all data at rest is also encrypted.

User access control is granular down to sites and system functions.

Open API Architecture

In a fast moving environment, it is critical that the operator selects systems that are open, and that features and data can be exposed and used by other systems. BetterFleet promotes an open architecture which enables customers to determine where they feel they should drive user interfaces and functionality. For example, if it makes sense for an in-vehicle device to display information from the CMP, then open APIs makes that a simpler process. If the operator needs data to flow to another management reporting system, this needs to be enabled in a seamless way that does not require human intervention.

We implement the OpenAPI Specification by default through an open source component called FastAPI, or using GraphQL. Both provide ways of documenting the APIs. However, access to most APIs is secure, and requires authentication either with OAuth or an API key.

Standards Compliance

BetterFleet has been designed to comply with all current and emerging standards. This ensures that the architecture will scale to support future integrations and functionality. The following is an overview of the key current standards compliances.

Standard	Priority	Purpose	Status
OCPP 1.6J	Essential	Communication between CMP and charger, including authorization, charger control, charge management and smart charging.	Supported
OCPP 2.0.1	High	Newer version of OCPP including improved support for device monitoring, security, smart charging and ISO 15118 (plug-and-charge and smart charging requirements from the EV).	Supported
VDV 261	High	Vehicle pre-conditioning	Supported
VDV 463	High	Interface between the CMP and upstream systems such as Scheduling or Depot Management Systems.	Supported
ISO 15118	Mid	Communication between the vehicle and the charging station for a range of purposes including bidirectional charging, wireless charging, plug and charge, remote load profiles.	Partially supported
IEC 61851	Low	Defines rules and procedures for controlling the charging process, exchanging data between vehicles and chargers and supports interoperability between different manufacturers.	Not relevant
IEC 60870-5-104	Mid	Defines a set of rules and procedures for exchanging data between different devices in electrical power systems. The protocol allows devices such as control centers, substations, and remote terminal units (RTUs), to communicate with each other effectively and reliably. It enables the exchange of information related to monitoring, control, and protection of electrical power systems. IEC 60870-5-104 is particularly useful in the context of supervisory control and data acquisition (SCADA) systems.	Partially supported

Onsite Hardware

If required for site operations, electricity meters, along with the BetterFleet IoT hub are required to be installed by the electrical contractor. This equipment is compact and easy to install. An outline of required hardware has been included in our pricing and an installation diagram can be found below.
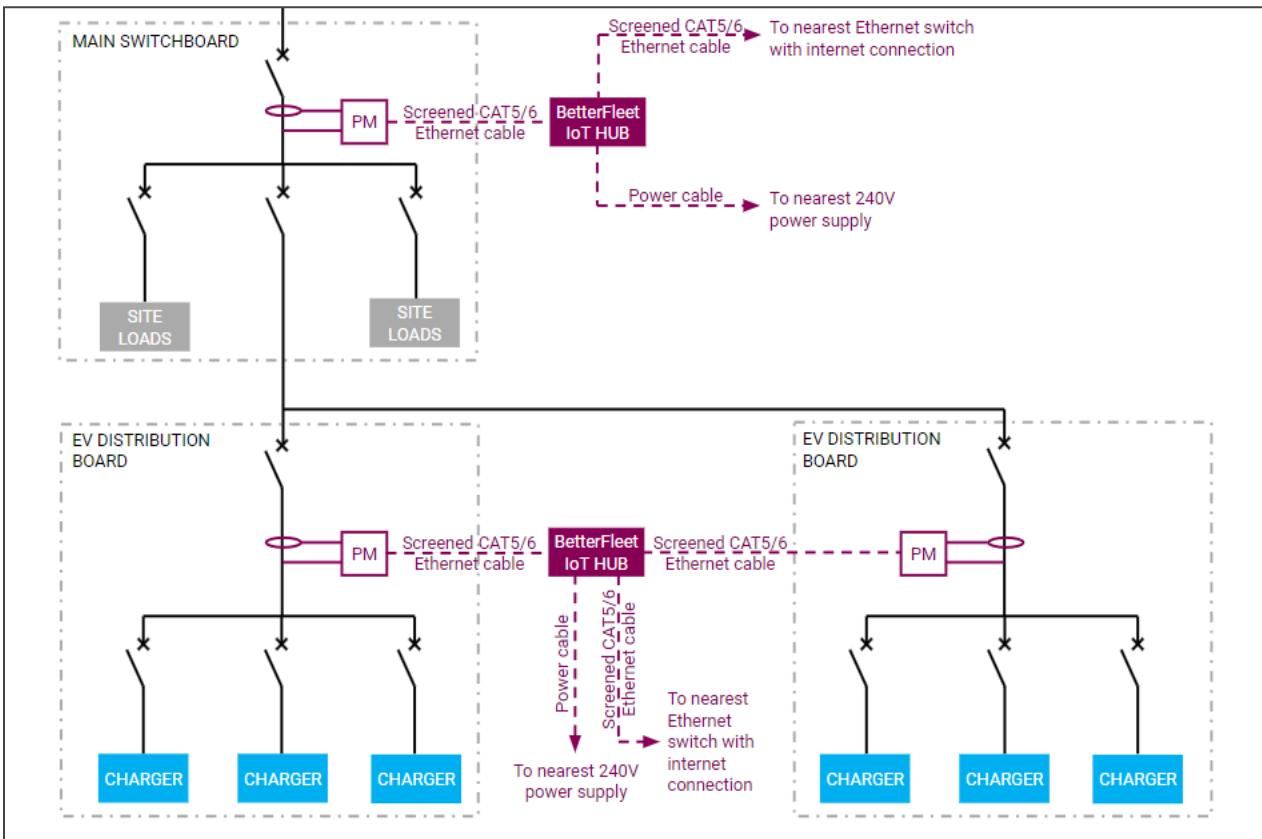
Notes:
1) This is a typical design, to be used for the purposes of informing site specific detailed designs. Actual configuration may vary from site to site.
2) Power meters, associated CTs and BetterFleet IoT Hubs are supplied by BetterFleet. Installation (including cabling) typically done by others.
3) CTs for power meters are simple to install, clip-on Rogowski coils. Standard coil length is 450mm, other sizes can be quoted.
4) One BetterFleet IoT Hub is required for every two power meters.
5) Each BetterFleet IoT Hub is a wall-mounted steel enclosure measuring 300H x 300W x 210D (mm).
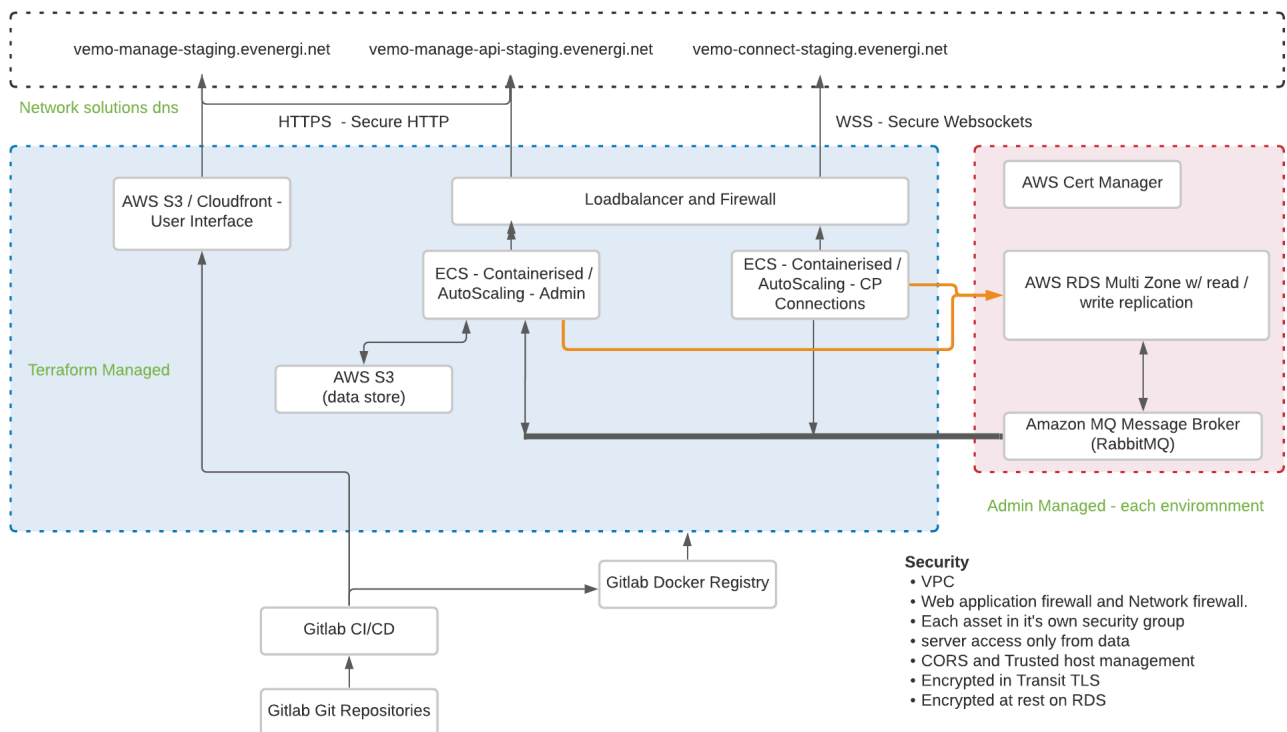
Hosting and System Availability

BetterFleet Manage is a Software-as-a-Service (SaaS) platform, which runs in a web browser and requires no client software installation. All BetterFleet Manage servers are hosted locally and are accessible via the cloud.

In a Cloud-based environment, the BetterFleet Manage services and databases are hosted on the Amazon Web Services (AWS) platform. Communication between the different services and databases is via Hypertext Transfer Protocol Secure (HTTPS).

BetterFleet Manage uses Open Charge Point Protocol (OCPP) 1.6j to control and communicate with chargers, and Message Queuing Telemetry Transport (MQTT) to communicate with other local Internet of Things (IoT) devices. In the event of a network outage the chargers would operate in a safe state, limiting power output to safe limits until communications is restored.

The high availability of the system is guaranteed due to the robust nature of the AWS infrastructure, with data and services being replicated driving significant redundancy. In addition, fail-over is provided by installing local controllers that can operate even if the connection to the cloud is compromised.

The diagram below describes the BetterFleet system architecture in Cloud and on-premise environments. This below diagram represents the Cloud-based solution where components in blue are part of the BetterFleet system. The microservices approach ensures unlimited scalability, transaction speed and security.

vemo-manage-staging.evenergi.net   vemo-manage-api-staging.evenergi.net   vemo-connect-staging.evenergi.net

Network solutions dns

HTTPS - Secure HTTP   WSS - Secure Websockets

AWS S3 / Cloudfront - User Interface

Loadbalancer and Firewall

AWS Cert Manager

ECS - Containerised / AutoScaling - Admin

ECS - Containerised / AutoScaling - CP Connections

AWS RDS Multi Zone w/ read / write replication

Terraform Managed

AWS S3 (data store)

Amazon MQ Message Broker (RabbitMQ)

Admin Managed - each enviromnment

Gitlab Docker Registry

Security
- VPC
- Web application firewall and Network firewall.
- Each asset in it's own security group
- server access only from data
- CORS and Trusted host management
- Encrypted in Transit TLS
- Encrypted at rest on RDS

Gitlab CI/CD

Gitlab Git Repositories

Hardware Integrations

The BetterFleet platform is truly hardware agnostic and has been integrated with most popular providers in the market today. Our team is in continual conversations with suppliers globally and conducting pre-integration testing to ensure that when we connect to your chosen hardware, most issues have already been resolved and if you choose to change supplier down the track, we will be ready. Some of the chargers we have integrated with are listed below, with this list growing almost weekly.

Being a central system for EV and charger management, BetterFleet interfaces with onboard telematics, scheduling, site metering and energy generation and storage.