LOAD BALANCING
STRATEGIES FOR EVSE

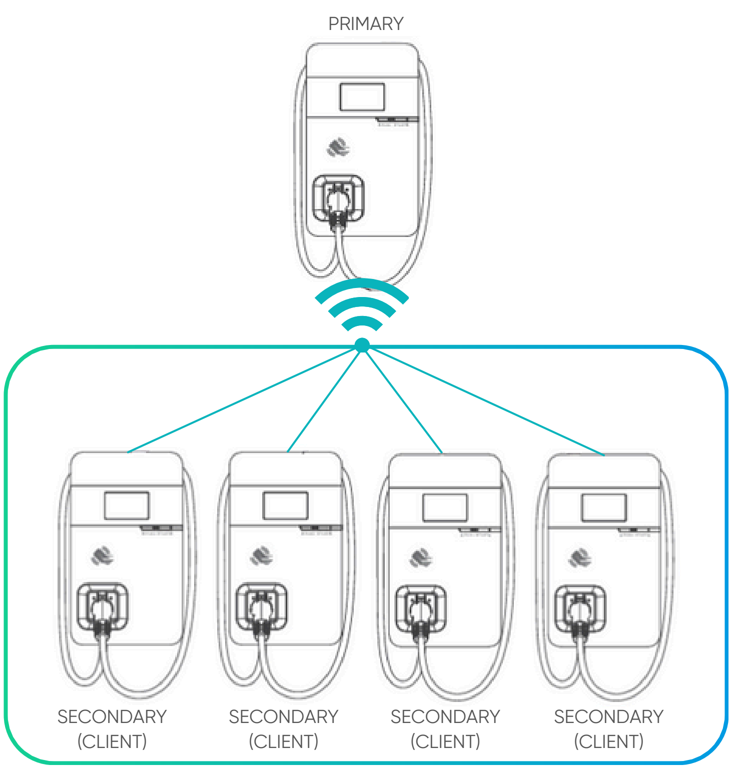
Load Balancing Strategies for EVSE

As electric vehicle (EV) charging expands across multi-unit residential buildings, commercial properties, and fleet depots, managing limited electrical capacity is becoming a top priority. Without effective load balancing, large-scale EVSE deployments risk overloading infrastructure, potentially triggering expensive service upgrades or limiting charging availability.

Load balancing — whether handled locally by the chargers themselves (offline) or managed through centralized cloud-based software (online) — enables multiple EV chargers to share available power efficiently. This ensures charging demand stays within the site's electrical capacity while optimizing performance across stations. There are four key types of load balancing used in EV charging systems: circuit-level, panel-level, multi-level, and dynamic load balancing. Let's explore what each type means and when to apply it.

Offline Load Balancing

Electric Avenue's Watti Pro charging stations support offline load balancing for up to five units on a shared circuit—one configured as the primary station, and up to four secondary stations. This mode does not require network connectivity or external software, making it ideal for installations where simple, reliable power sharing is needed without additional infrastructure.



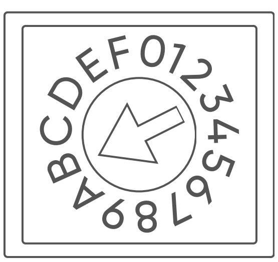
Offline Load Balancing

HOW IT WORKS

- Primary Station Setup: The primary station is configured to represent the total available circuit capacity by setting its internal rotary switch to the desired maximum output amperage. For example, if the circuit breaker supports 60A, the rotary switch on the primary unit should be set to 48A. The factory default is 48A if no changes are made. See the settings chart, below.
- Secondary Station Setup: Each secondary station is placed in Secondary Mode by setting its rotary switch to the 'F' position. This identifies the station as a follower in the load balancing group.
- Once configured, the stations automatically share the available amperage set by the primary unit, distributing power dynamically among all connected chargers based on vehicle demand and charger availability.

KEY BENEFITS

- No Networking Required: Ideal for deployments where WiFi or Ethernet is unavailable or unreliable.
- Simple Configuration: Quick setup using rotary switches with no software interface needed.
- Smart Power Sharing: Maintains total load within breaker limits while allowing all stations to charge simultaneously when possible.



Rotary Switch Settings: Watti Pro 48A / 80A								
Rotary Switch Number	0	1	2	3	4	5	6	7
Maximum Output Current	Test Mode	6A	8A	10A	13A	16A	20A	25A
Rotary Switch Number	8	9	A	B	C	D	E	F
Maximum Output Current	30A	32A	40A	48A	Invalid	Invalid	80A*	Secondary Mode

On 48A models, 48A (B) is set as the default. On 80A models, 80A (E) is set as the default.

**80A option is only available on supported models.*

Cloud Based Load Balancing

While basic load sharing can be handled offline between a small number of chargers, cloud-based load balancing enables advanced control, greater scalability, and more efficient energy use — especially important in commercial, fleet, and multi-unit residential settings where power demands are higher and user needs are more complex.

With Electric Avenue's Enterprise Software, site operators can manage large charger networks, adapt to evolving usage patterns, and integrate EV charging into broader energy management systems. Cloud-based load balancing allows for remote configuration, real-time monitoring, user prioritization, and dynamic power allocation across sites.

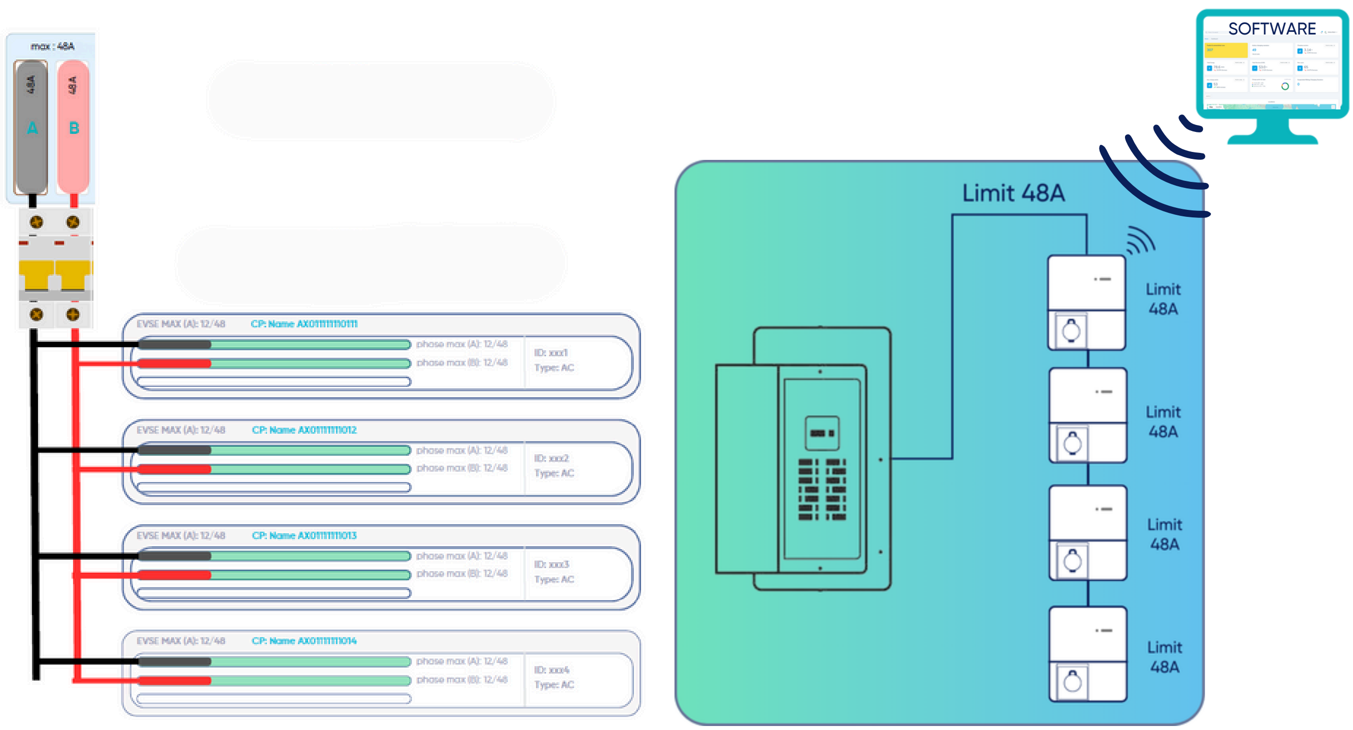
And here's the best part for installers: you don't have to configure the software. Once the chargers are installed and brought online, our team programs the load balancing setup based on the circuit information you provide. This hands-off approach lets electricians and contractors focus on installing hardware and ensuring connectivity — while we handle the rest remotely. Many of our partners say this saves valuable time onsite and simplifies the entire installation process.

There are four main types of online load balancing — circuit-level, panel-level, multi-level and dynamic load balancing. Let's dive into the different types and how they work.

CIRCUIT-LEVEL LOAD BALANCING

Multiple EV chargers are connected to a single branch circuit (e.g., 60A), with a load cap (e.g., 48A) enforced across all devices. Chargers dynamically throttle based on real-time usage so the total current draw never exceeds the breaker limit. This setup reduces panel space requirements.

In this example, four EV charging stations are sharing the same breaker. When one vehicle plugs in, it will provide full power (up to 48A). When a second vehicle plugs in, the power will be shared equally, 24A and 24A, and continues to be split amongst the number of vehicles charging concurrently.

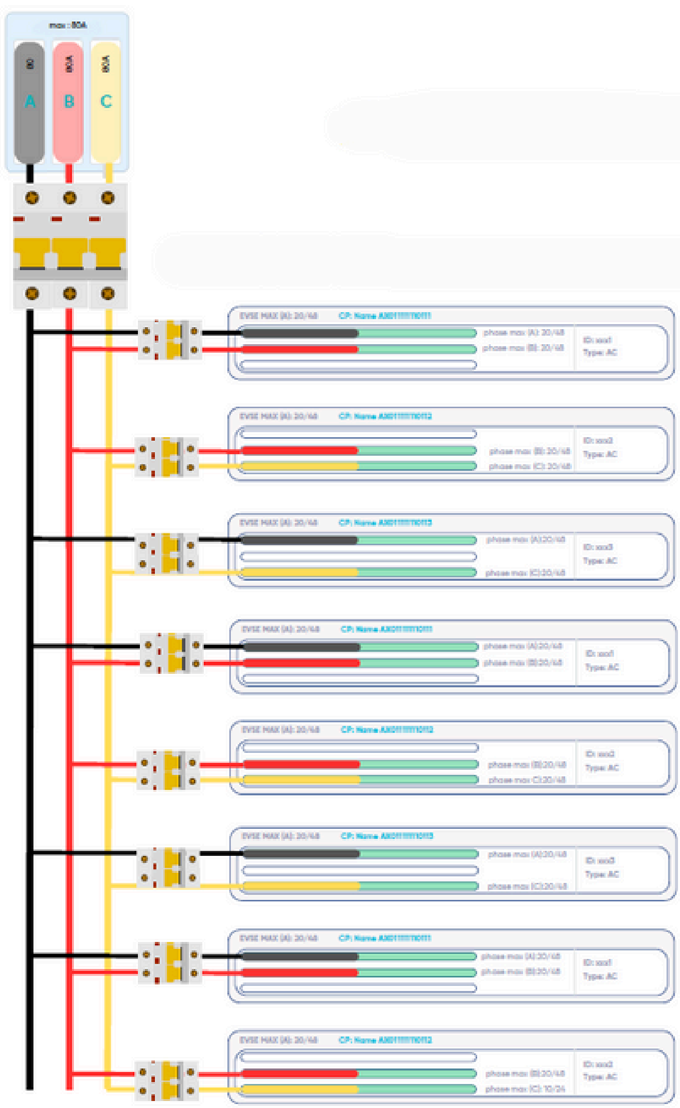


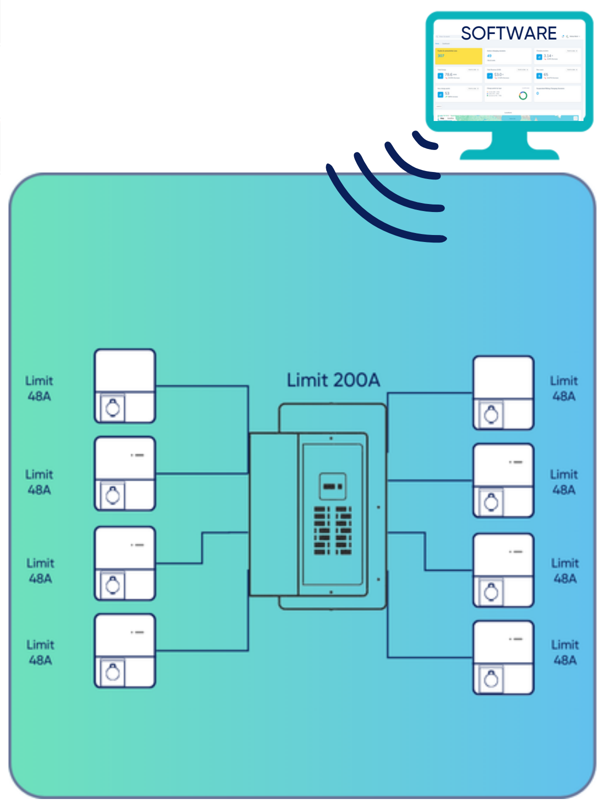
PANEL-LEVEL LOAD BALANCING

Each charger is on its own branch circuit, but the cumulative load of the panel is managed against the panel's main breaker (e.g., 200A). The system adjusts individual charger output to ensure total panel draw remains within capacity. This enables over-loading of panels without upgrades, while maintaining CEC compliance.

In this example, eight EV chargers are on individiual breakers, sharing a 3-phase panel with a 200A limit. When one vehicle plugs in, it can receive full power (up to 48A). As additional vehicles connect, the total charging load is dynamically distributed to ensure the combined draw does not exceed the 200A panel limit.

In this example, if all 8 stations are in use, each charger may be limited to approximately 25A to stay within the panel's capacity, protecting the main breaker.



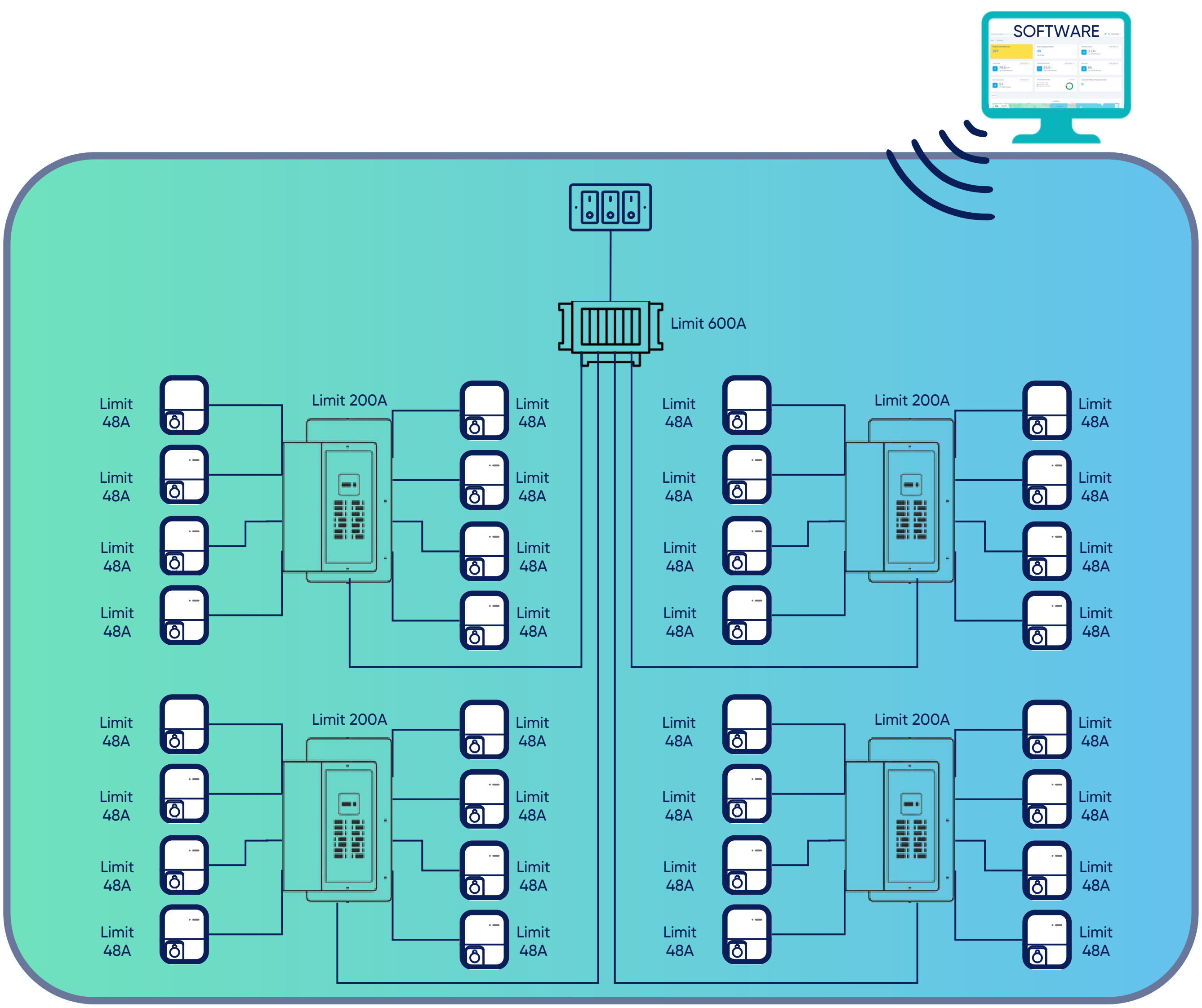


MULTI-LEVEL LOAD BALANCING

This approach applies simultaneous load caps at multiple points in the electrical hierarchy—e.g., per-panel (child) and per-transformer or service entry (parent). Load balancing decisions consider both panel constraints and the shared upstream infrastructure. Ideal for larger buildings with multiple subpanels feeding EVSE.

In this example, there are four circuits, each with three 48A charging stations, feeding into a 3-phase panel with a limit of 200A. When one vehicle plugs in, it can receive full power (up to 48A if available). As more vehicles connect, power is first balanced within each circuit and then across the entire panel to ensure the total draw does not exceed the 200A panel limit.

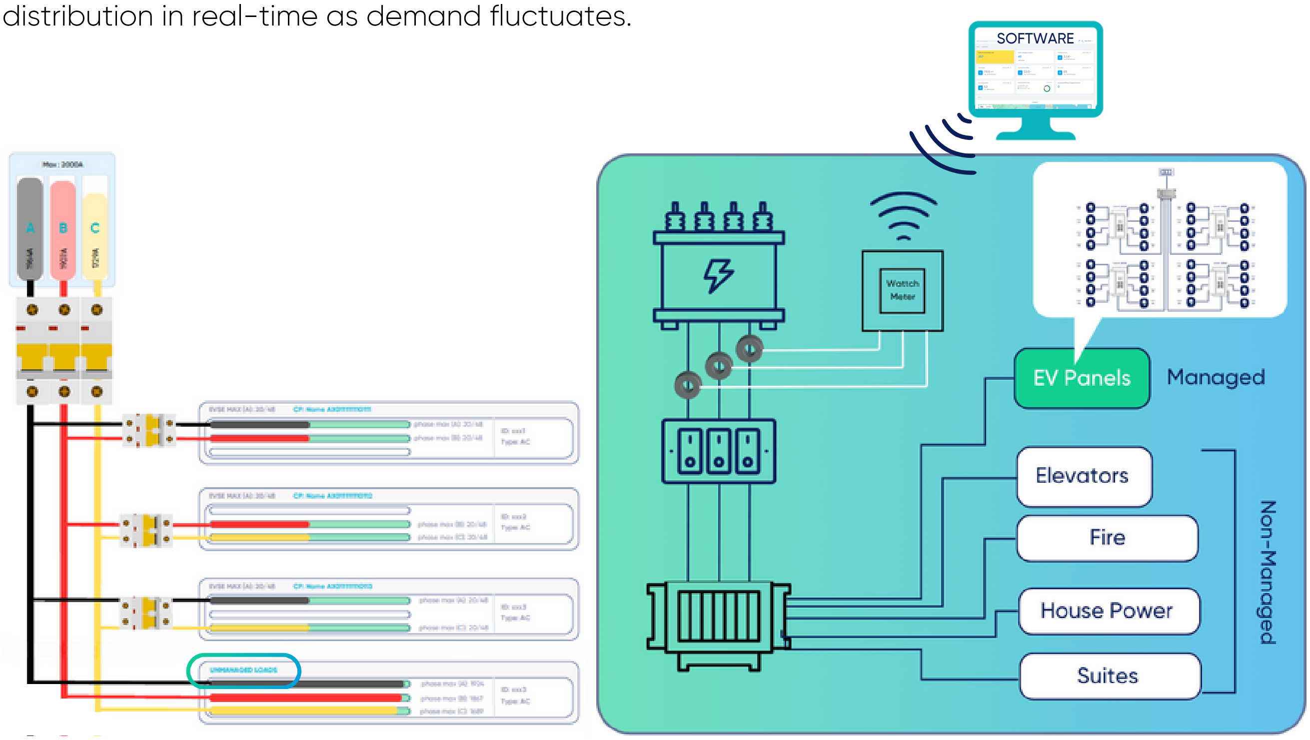
In this example, if all 12 chargers are in use, each circuit's available power is dynamically allocated, and individual charger output may be reduced to approximately 16A to stay within the panel's capacity.

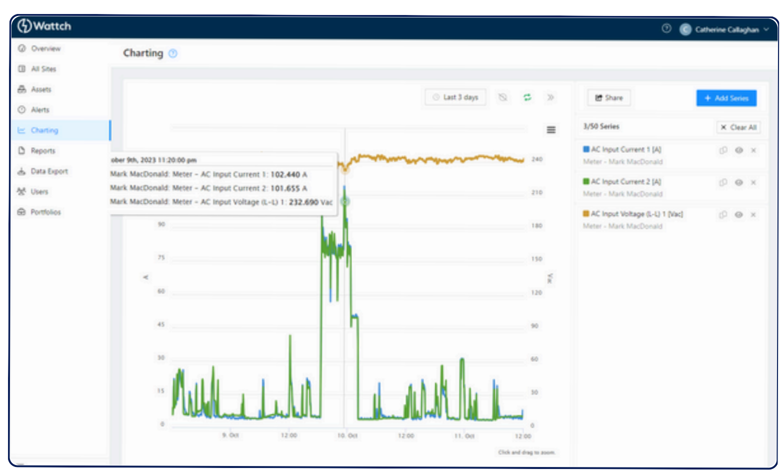


DYNAMIC LOAD BALANCING

A whole-building energy monitoring system (with CTs installed at the main switchboard or transformer secondary) dynamically adjusts EVSE output based on total building load. Chargers are throttled or ramped in real-time to fit within available headroom. When implemented, this strategy allows EV charging loads to be zero-rated in service calculations per CEC, enabling large-scale deployments without increasing service size.

This example uses Electric Avenue's Wattch CT monitoring kit, paired with Electric Avenue's Enterprise Plus software, to enable real-time dynamic load management. CTs are installed on the main utility feed to measure total building energy consumption and monitor electrical loads across all circuits and equipment. This setup allows the system to dynamically adjust power distribution in real-time as demand fluctuates.



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