GRID BLOCK

# Resilient Vehicle Charging Platform

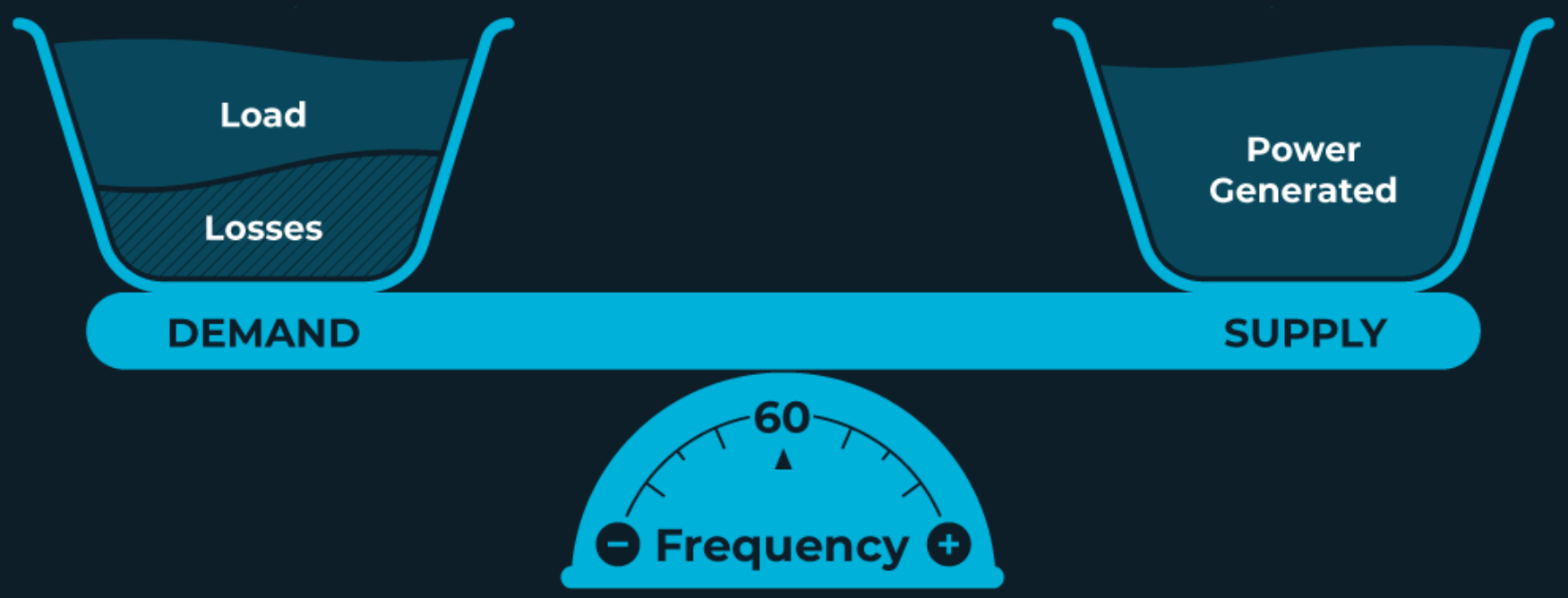
ENDEAVOUR

# Endeavour is developing an integrated stack of sustainable infrastructure technologies

ENDEAVOUR

| Data Center Solutions | EV Charging & Microgrids | Distributed Power | Waste-to-Fuel Solutions | Cooling Systems | Water Solutions | Monitoring Solutions |
|---|---|---|---|---|---|---|
| edged | GRID BLOCK | TurboCell | PACT | ThermalWorks | VOLTEK | Gamma |

# All Grid Experts Agree On One Thing: a New Approach is Needed to Deliver Charging at Scale

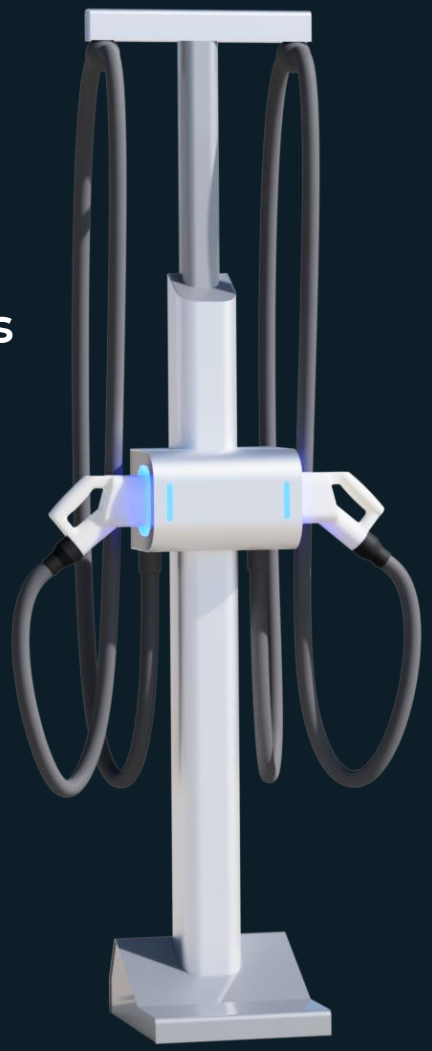


# The Solution

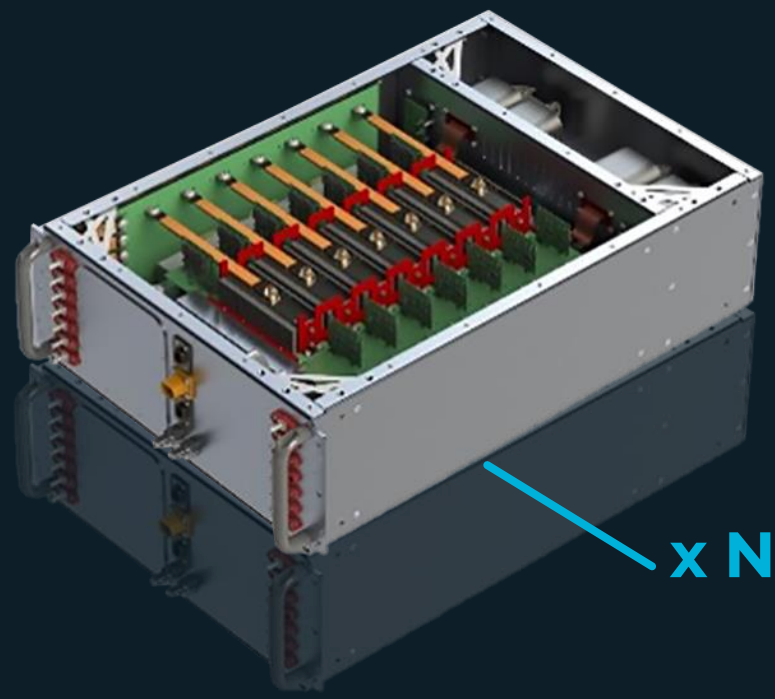
GRID BLOCK

## A modular platform for fast EV charging and flexible microgrids

- Deploy faster, with more capacity
- Lower cost (near- and long-term)
- Greater resilience
- Future-proof flexibility
- Scale to support advanced vehicles and full campus microgrids
- Grid Agnostic



# Patented GridBlock Energy Router Technology

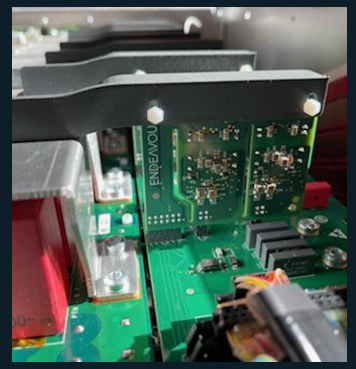


**x N** **Energy router module**

Modular design scales rapidly. Systems can be connected without customization.

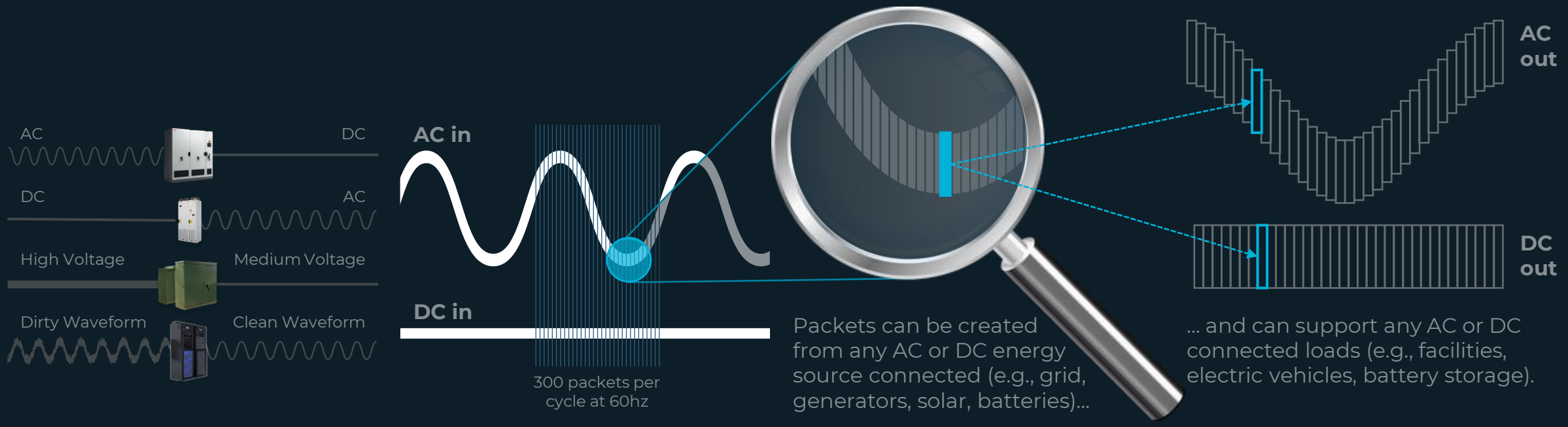
## Technological Advantage

- **Flexible topology -** Bidirectional AC or DC at each port
- **Adjust number of ports** by adding/removing legs at minimal incremental cost
- **No switching loss penalty** in adding ports
- **Fast and dynamic -** packetizes and distributes energy to ports every 55us switching cycle
- **Scalable and modular -** Multiple converter units can be parallel without circulating currents
- **Fully protected -** benign failure mode



80 kW energy router module (36” x 10” x 24”)

# How the GridBlock energy router works

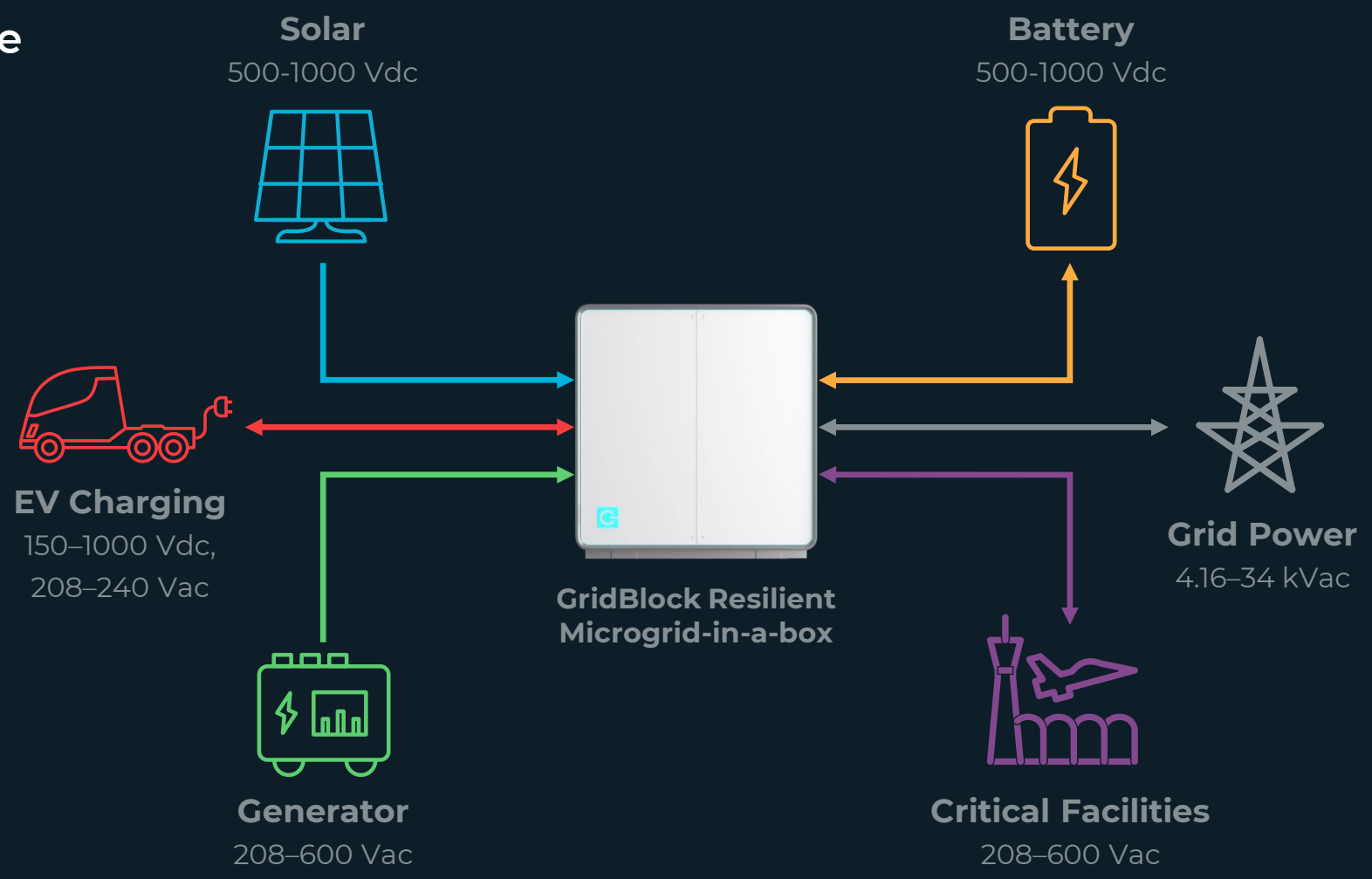


# GridBlock Multi Function Microgrid

## Resilient Charging Infrastructure

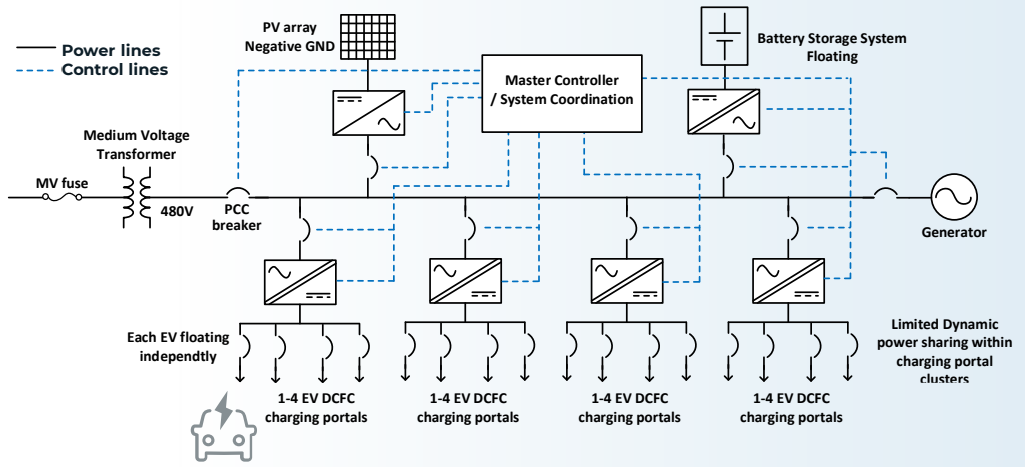
The same GridBlock Energy Router that provides EV charging support can also create **resilient microgrids** and integrate distributed energy resources (backup generation, PV, battery storage) enabling site wide advanced load management and grid services.

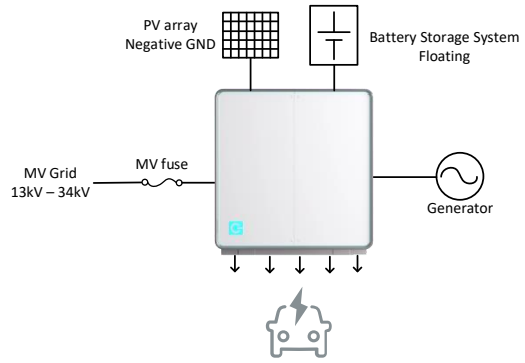
- **Microgrid-in-a-box** for EV charging, expandable to full base microgrid
- **Enables peak shaving** with PV and battery storage
- **Provides resilient charging** in case of power outage
- **Integrates with backup generation** at critical facilities
- **Plug and play solar** support for on-site green electricity generation



# COMPARISON

## DC fast charging, solar and battery storage systems




### Conventional approach

- Requires one dedicated power converter per connection port
- Complex system coordination through master controller
- Complex and expensive protection scheme – with coordination
- Poor scalability, no flexibility
- Multiple equipment vendors, sensitive to product changes
- Complex commissioning and servicing, large footprint

### GridBlock – System in a box

- One integrated system replaces (6) power converters
- Seamless integration of all sources and loads
- Direct connection to the MV Grid
- Full protection incl., eliminates expensive protection gears
- Simple commissioning and rapid servicing
- Standardized hardware across all deployments
- Flexible and scalable; parallel connection of multiple units
- Maximum infrastructure utilization through routing technology
- No overbuild required

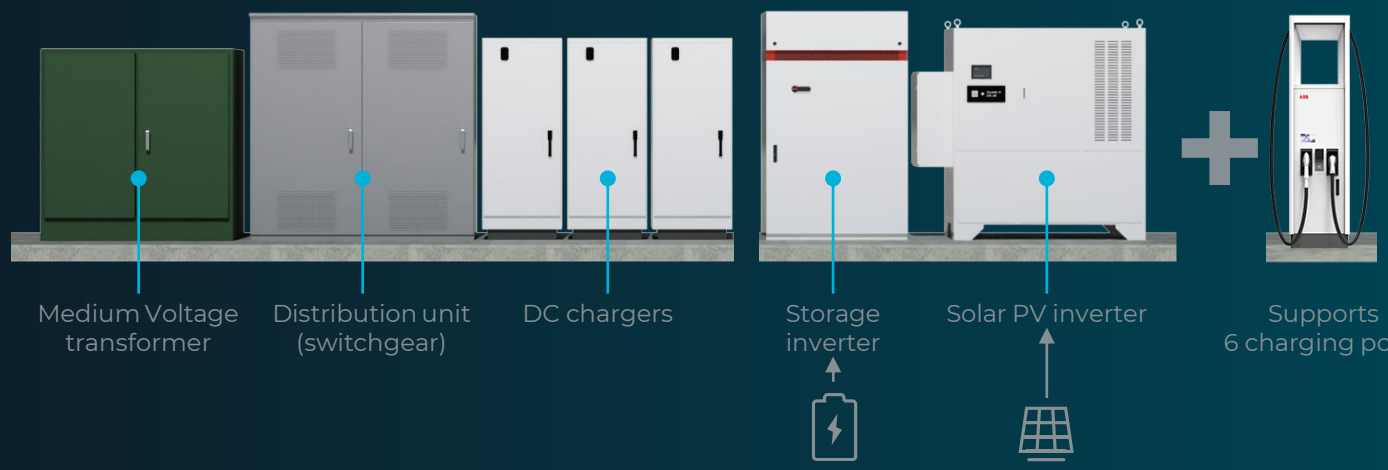
# Simplified, lean infrastructure

The **GridBlock Charging** platform simplifies design and deployment, replacing multiple components with a multi-functional, modular system.

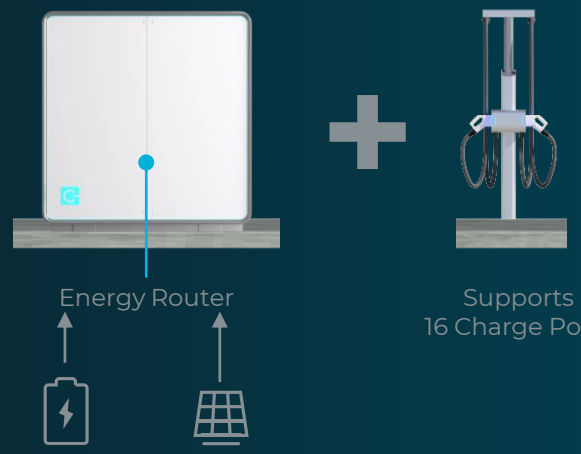
**The GridBlock system:**
❶ Energy Router ❷ Charge Port
No additional equipment required.

**Traditional equipment** needed to support 500kW of DC fast charging

**Additional inverters** are needed for PV & storage integration




**GridBlock Energy Router** supports 500kW fast charging with up to 16 DCFC ports per unit **and** provisions for PV and storage connection

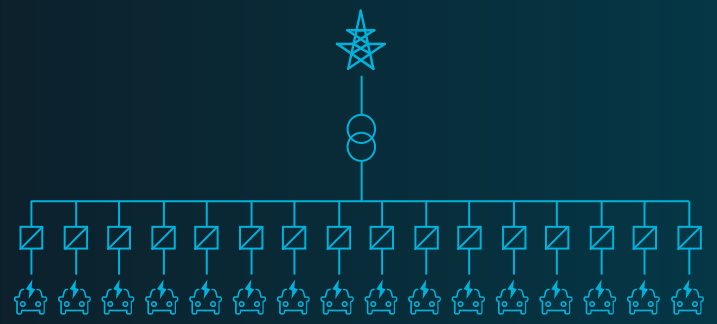



**30%-50% lower cost per kWh**

# Simplified, lean infrastructure

**Traditional configuration: one-to-one**

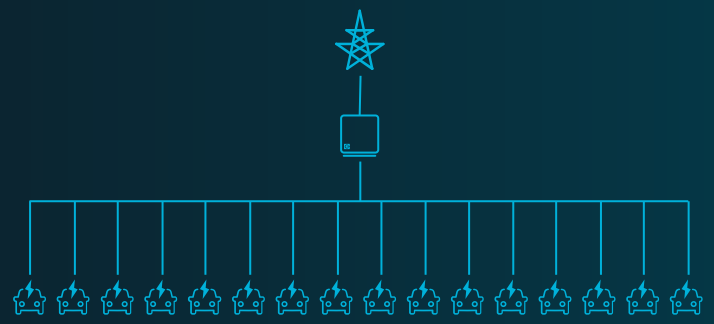
Back-end inverters are close-coupled to individual charging ports.



- **More Equipment**
- **More $$$**
- **Less flexibility**
- **Low utilization**

**GridBlock configuration: one-to-many**

Energy Router manages multiple charging ports. Solar and storage inverters are built in.

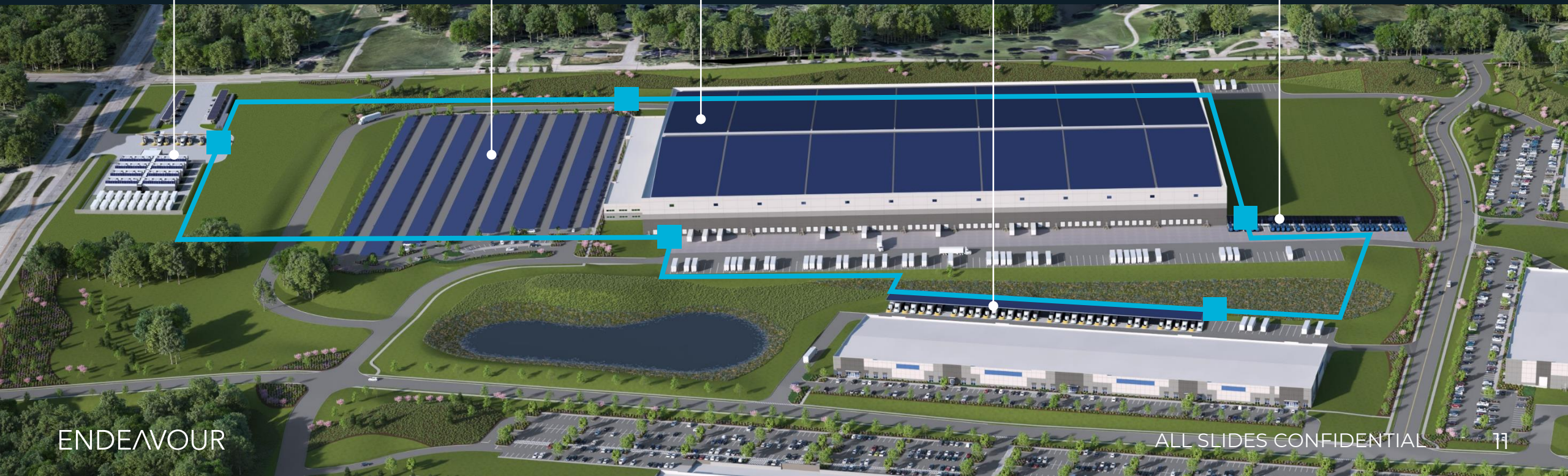


16 Charge Ports supported with scheduling; 4 Charge Ports simultaneously

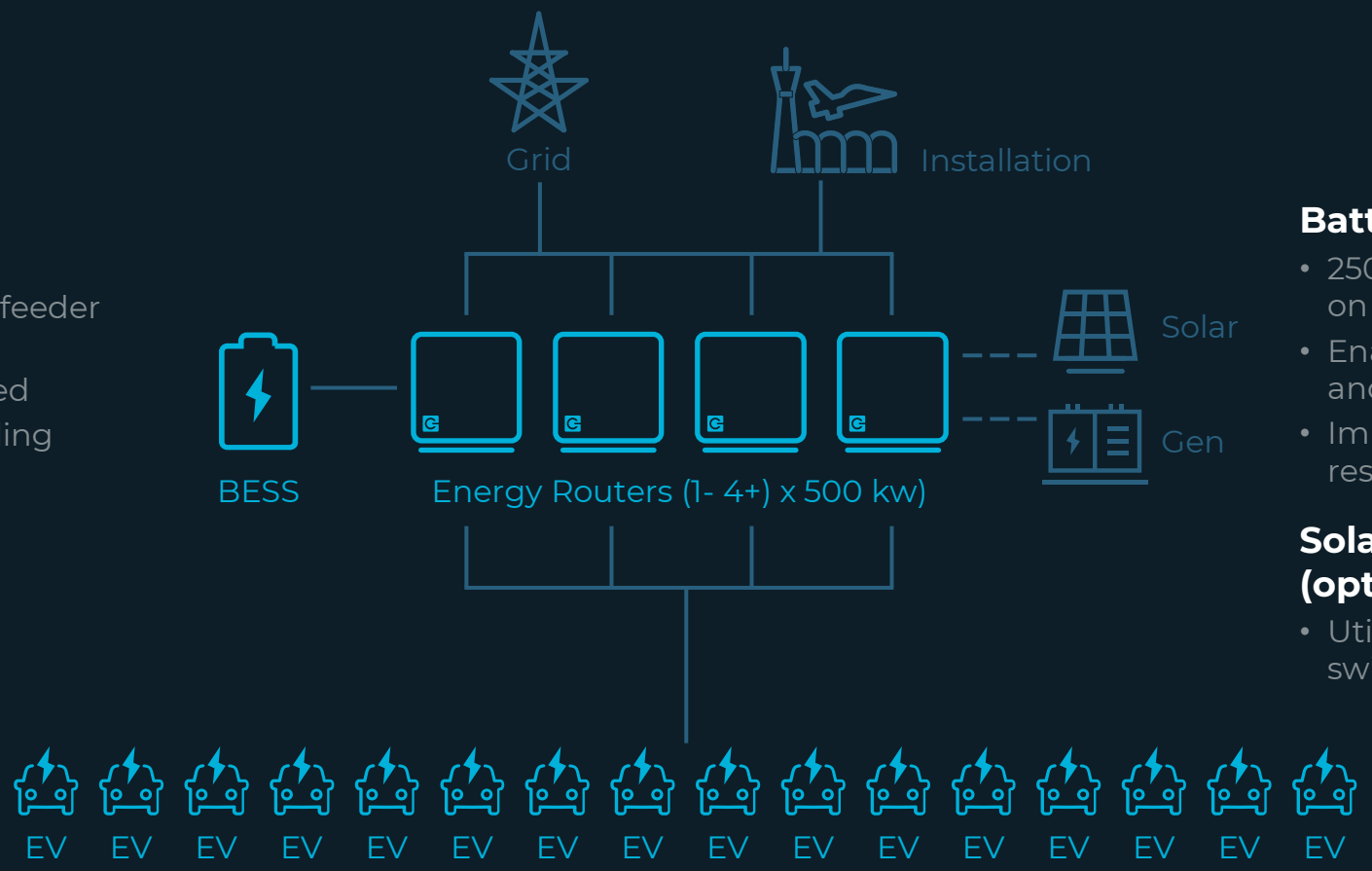
- **Less Equipment**
- **Less $$$**
- **More flexibility**
- **High utilization**

# Facility-level implementation

GridBlock powers the entire facility with solar and clean energy sources, forming a **campus microgrid** to protect critical loads. The same hardware supports DCFC for delivery fleet, semi-trucks and passenger vehicles.



# Typical Installation




### 4 Energy Routers

- Support 500 kW each (total feeder power target 500 kW-1 MW)
- Microgrid protection included
- Load balancing and scheduling included
- Direct Medium Voltage grid connection (no transformer needed)

### 16 Charge Ports

- Omni-level charging (0-500 kW) on all Ports
- Simultaneous charging on all Ports
- Expandable to 48 Ports with same infrastructure

### Battery Storage

- 250 kWh-1 MWh (depending on available space)
- Enables resilient charging and peak shaving
- Improves overall campus resilience at no additional cost

### Solar and Generator (option)

- Utilize existing backend (no switchgear or inverters needed)