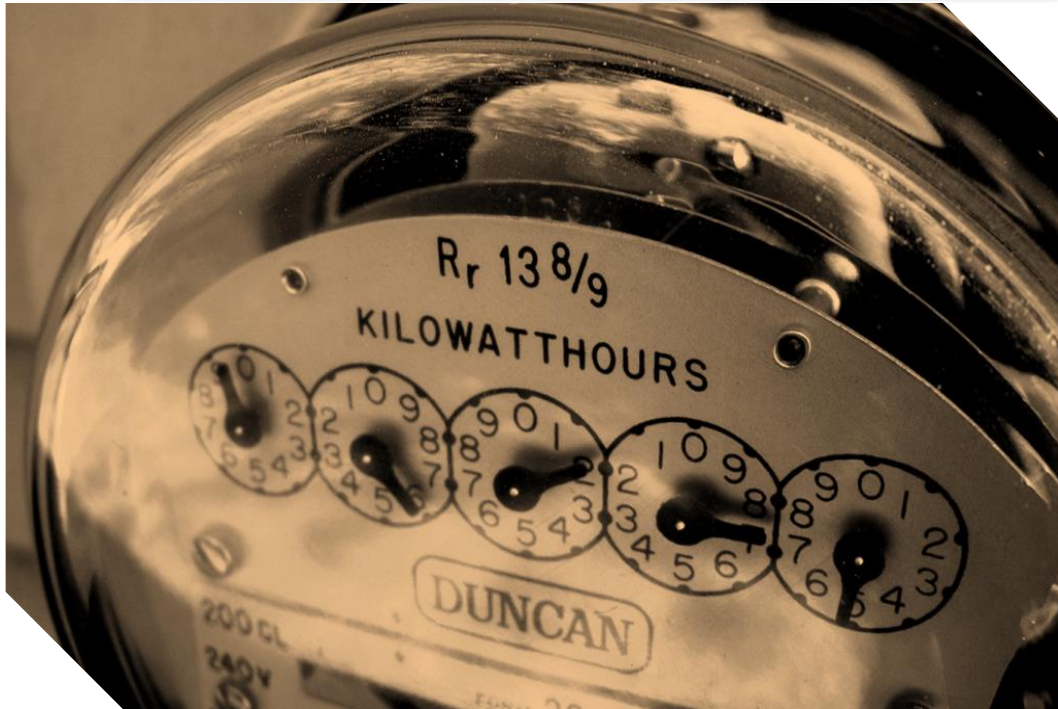




# Technology Overview

Trudie Wang  
VP of Product

Nov 1st, 2022



“Our mission is to **transform the energy industry from the ground up** using DERs and microgrids as the pillars of a clean, resilient, and equitable grid.

By **orchestrating fleets of DERs with embodied intelligence** and emergent behavior, we redefine how electricity is generated, stored, used, and valued.”



# A Rigid and Complicated System



## Traditional Solutions



### Centralized Control

Single central device monitors, controls and optimizes all the DERs for both local objectives and system-level goals.

- Customized / rules-based
- Single points of vulnerability
- High integration costs
- Hard to scale or modify

## Common Challenges

### Non-Standardized Ecosystem

Wide range of technologies, vendors and protocols forces many systems to rely on customized solutions.

### Complex Systems

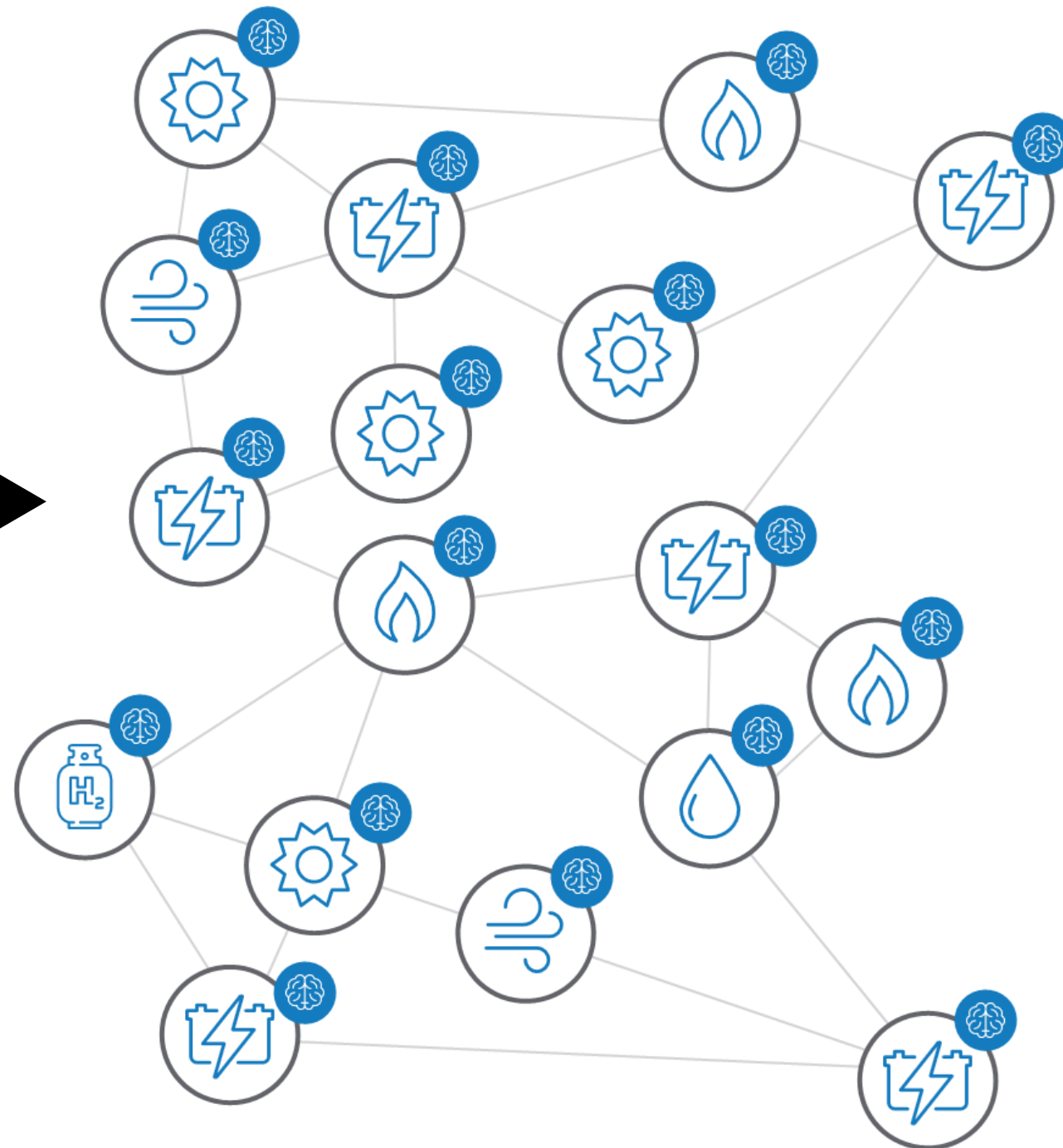
Aggregated DERs need to achieve numerous objectives simultaneously, resulting in a challenging engineering problem.

### Dynamic Environment

Sites and market requirements can change, and that requires costly re-engineering of the control system.



# A Distributed and Intelligent Approach



## Distributed Control

Add intelligence to each DER to control and optimize for both local objectives and system-level goals.

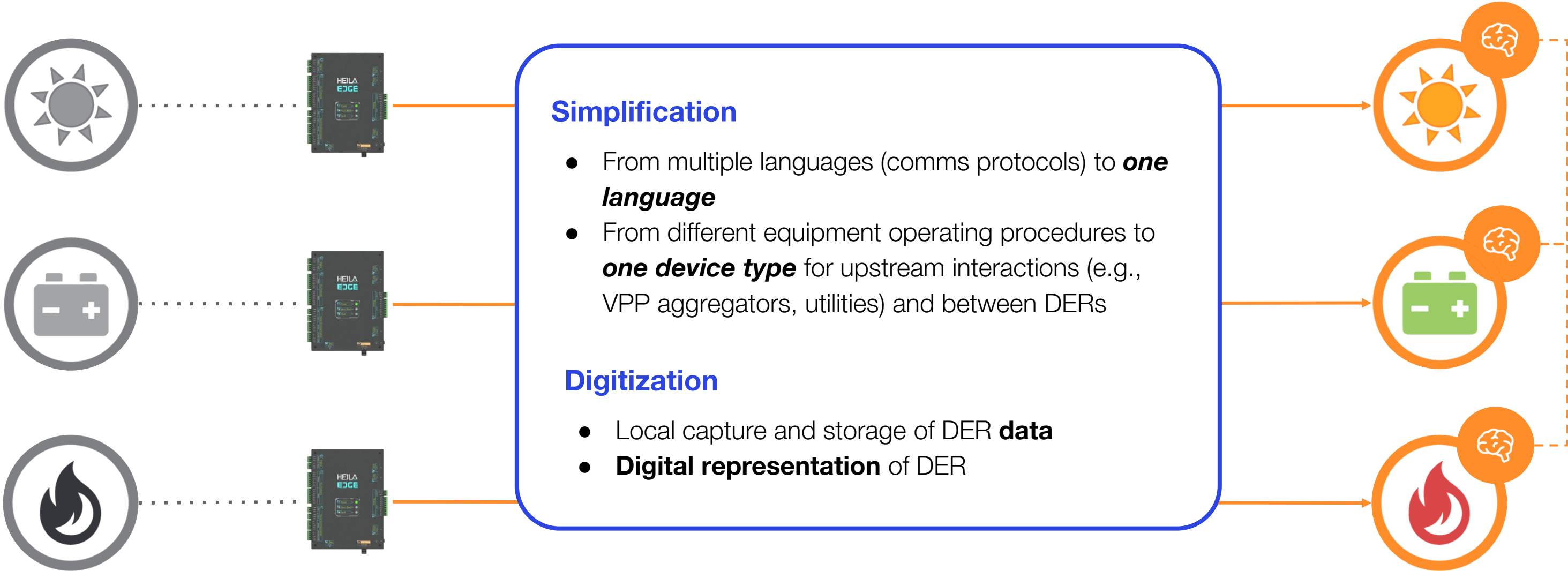
- Dynamic, real-time response
- No single point of failure
- Self-Healing
- Fully scalable

# Each DER is Made a Controllable and Intelligent Building Block

**Heila Edge** establishes a link with each DER via local communications protocol...

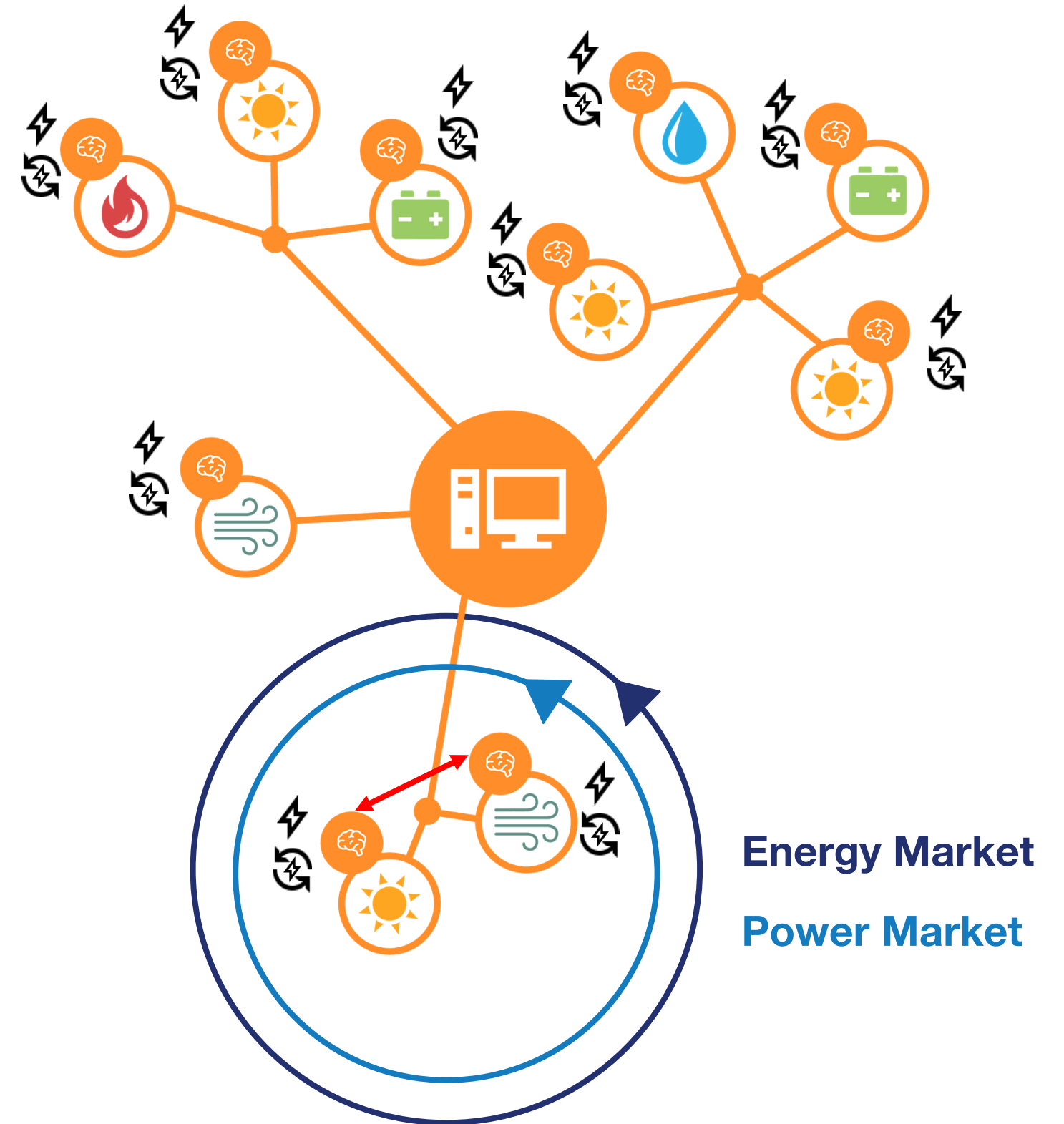
...and transforms each DER into a standardized, controllable, and intelligent **building block**.

Heila building blocks can be combined with each other, replaced, or reconfigured.

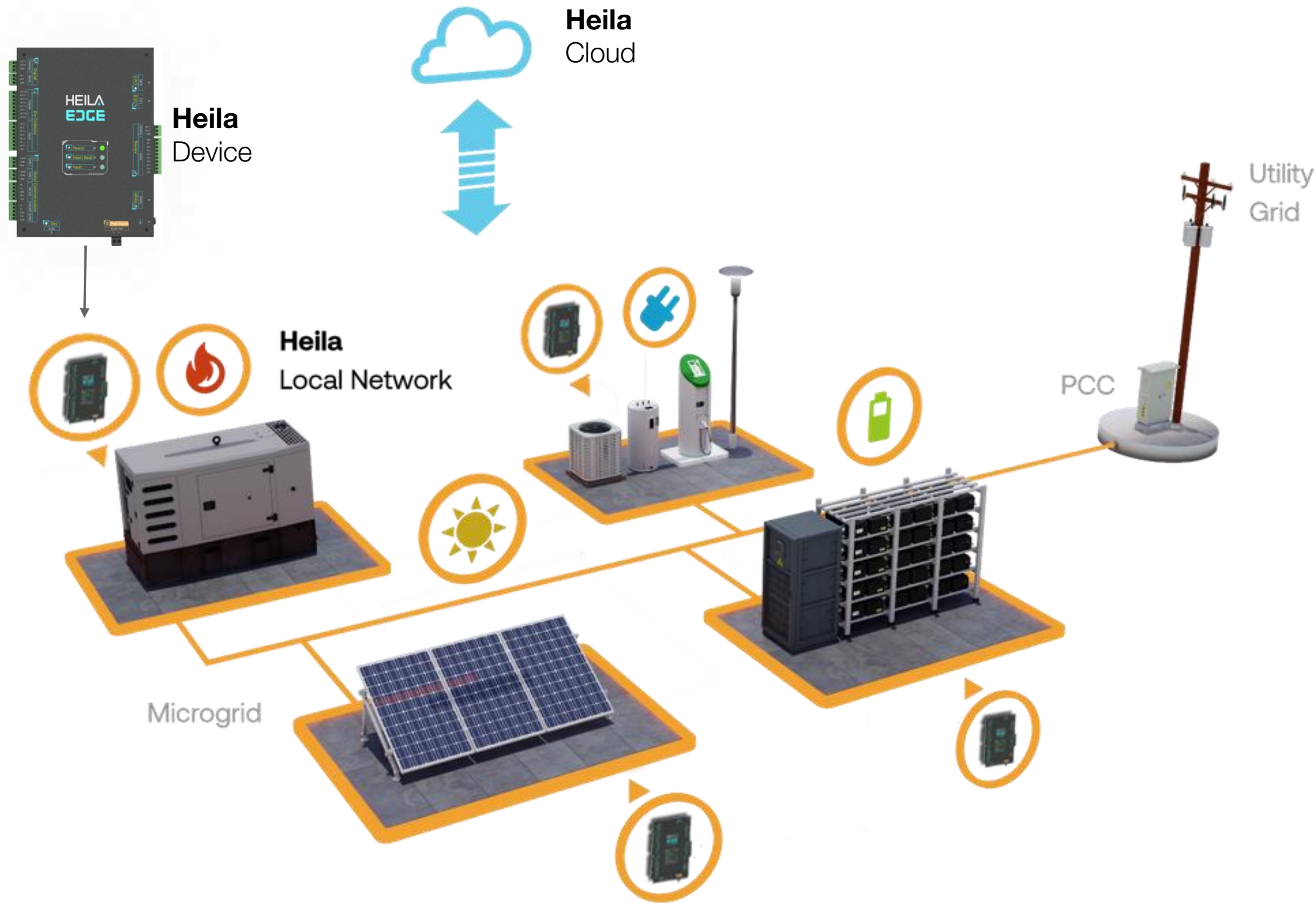


# DER-level Decisions Drive Transactions

- 1 Each DER tells the other DERs how much of each commodity it seeks to supply or take, and at what price
- 2 DERs achieve consensus, resulting in a schedule for DER energy import or export.
- 2 The power market runs on a second by second basis to maintain the optimal course through the energy market schedule.
- 3 The outputs from the algorithms running these virtual markets define the desired DER states for feedback control loops.



# An End-to-End Platform



## Challenges Resolved

- Fully Agnostic**  
Aggregates DERs, regardless of technology or vendor. Agnostic to use case or architecture.
- Automated and Robust Operations**  
Operates and optimizes DERs autonomously, hiding the complexities of the DERs and relying on localized decision-making.
- Flexible, Scalable and Future-proof**  
Distributed approach is more computationally efficient and enables seamless integration of legacy/new equipment and value streams over time.



# Flexibility across Energy Systems



## Microgrids

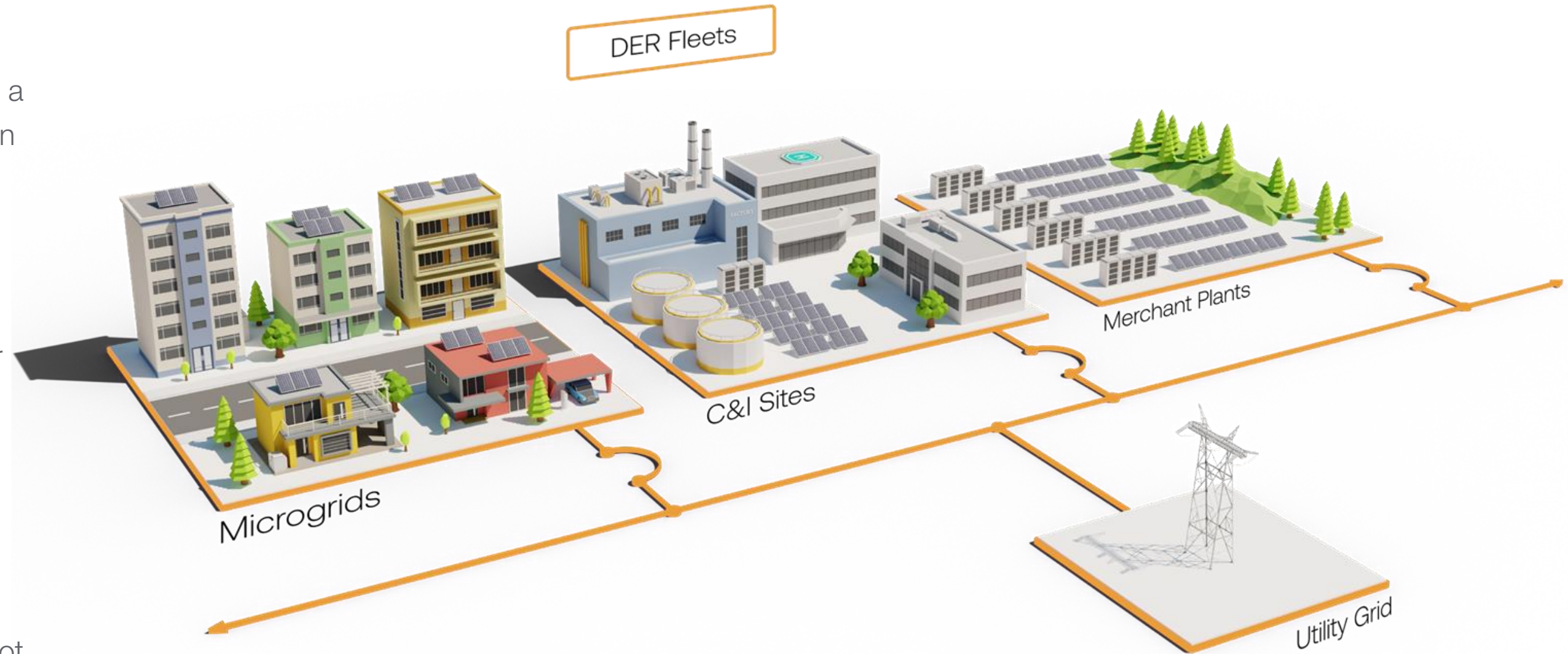
A group of interconnected loads and DERs that acts as a single controllable entity with respect to the grid and can operate both grid-connected or islanded.

## C&I Sites

A zoned area for commercial or industrial businesses or manufacturing, where electricity impacts the site's productivity and income.

## Merchant Plants

A non-utility or independent power plant designed for competitive wholesale power marketplaces that does not have upfront, long-term power purchase agreements to cover their output.





# Case Studies

## BTM Microgrids



**Customer:** Stone Edge Farm  
**Location:** California  
**Type:** Microgrid (BTM)  
**Load:** Commercial Vineyard



**Customer:** Holy Cross Energy  
**Location:** Colorado  
**Type:** Microgrid (BTM)  
**Load:** Housing Development



**Customer:** Emera Technologies  
**Location:** New Mexico  
**Type:** Microgrid (BTM)  
**Load:** Air Force Base

## S+S Plant



**Customer:** Yaskawa Solectria  
**Location:** Massachusetts  
**Type:** Solar + Storage Plant  
**Load:** NA

## FTM Microgrids



**Customer:** AEP  
**Location:** Louisiana  
**Type:** Microgrid (FTM)  
**Load:** Existing Housing



**Customer:** Emera Technologies  
**Location:** Florida (TECO)  
**Type:** Microgrid (FTM)  
**Load:** Housing Development

## C&I Sites



**Customer:** Rialto WWTP  
**Location:** California  
**Type:** C&I Site  
**Load:** Wastewater Treatment Plant



**Customer:** CED  
**Location:** Tennessee  
**Type:** C&I Site  
**Load:** Commercial Site (1 of 3)