Electric School Bus INITIATIVE

ELECTRIC SCHOOL BUS INITIATIVE UTILITY WORKING GROUP

UWG 9TH CONVENING | September 26th, 2024

IMAGE CREDIT: GILBERT ROSAS

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MEETING GOALS

- Launch a collaborative working group aimed at influencing, supporting and driving the equitable transition to ESBs
- Learn about various ESB-related activities, issues and ideas particularly as they pertain to electric utility interactions, requirements and programs.
- Collectively identify key ESB topics to explore in subsequent meetings and the related resources and support required

WE KINDLY ASK…

- Please rename your ZOOM title with your name and organization
- Please mute yourself during presentations and when not talking
- Please put your questions in the chat box
- Please participate in the surveys to help inform the topics and provide feedback on the value of the materials being presented
- Please be respectful of the meeting participants and the space allowed for input
- The meeting will be recorded and made available to all participants

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AGENDA

Welcome (Goals, Requests and Agenda)
Important News and Updates • ESBI Updates • Equity Update • V2G Insight Article • Pre-Panel Survey
Presentations • Automated Load Management • Flexible Interconnection • On-Site Generation/Storage • Energy Efficiency Improvements
Panel Discussion + Q&A
Wrap-Up • Post-Panel Survey

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ESBI UPDATES

RESOURCES AND INFORMATION

- NEW ROUND OF CSBP FUNDING ~$956M, up to 50 ESBs per award. Visit the CSBP Website
- Good article on school bus electrification: Electric school buses are the future we deserve
- Director's Note: Let's take an electric ride back to school! (ortto.app)
- Come see us at these events:
  - Forth Roadmap 9/24-9/26
  - New York Climate Week 9/22-9/29
  - USGBC Hawaii Building Transformation Forum: Equity in the Built Environment + TRUE Workshop 10/3
  - NAPT Annual Conference & Trade Show 10/4-10/8
  - VGIC EVOLVE: Accelerating VGI 10/9
  - ESB3-NY Clean Transportation Prizes Program Interim Conference 10/7-10/9
  - 55th Annual NIEA Convention & Trade Show 10/9-10/12
  - V2G Business, Policy & Technology Forum 10/22-10/24

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EQUITY UPDATES

DOE Community Benefit Plans

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DOE COMMUNITY BENEFIT PLANS

- For nearly all BIL and IRA funding opportunity announcements and loan applications.
- Aim to increase
  - Participation of affected communities
  - Effective communication with communities
  - Accountability to workers and communities
  - Effective delivery of benefits to communities
- Aim to decrease
  - Project risks, delays due to community opposition
  - Health and safety risks to workers
- 20% of overall proposal score
- SMART milestones and reporting to track progress
- Templates for CBP, Reporting, and Outcomes

4 Key Principles and CBP Sections

About Community Benefits Plans | Department of Energy

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V2G INSIGHTS ARTICLE

VEHICLE-TO-GRID

- Interviewed utilities and school bus operators
- New programs in new states
- Documenting vehicles, chargers, and other pertinent information for each program
- Please reach out if you know of or are participating in a program and we haven't spoken with you
- Look for the article on our site in the coming month

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TODAY'S PANELISTS

Sam Hill-Cristol
Manager – Strategy & Business Development,
The Mobility House

Cole Jermyn
Attorney, Energy Transition,
Environmental Defense Fund (EDF)

Casey Horan
Attorney, Zero-Emission Transportation,
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Presenter not included due to permission not received

Whitney Kopanko
Director of Marketing & School Bus Sales,
Sonny Merryman

Mike Rowand
Senior Advisor
ERPI

Gregg Kresge
Senior Manager
WRI, ESBI

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AUTOMATED LOAD MANAGEMENT PRESENTATION

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PRESENTER

Sam Hill-Cristol

Manager – Strategy & Business Development,

The Mobility House

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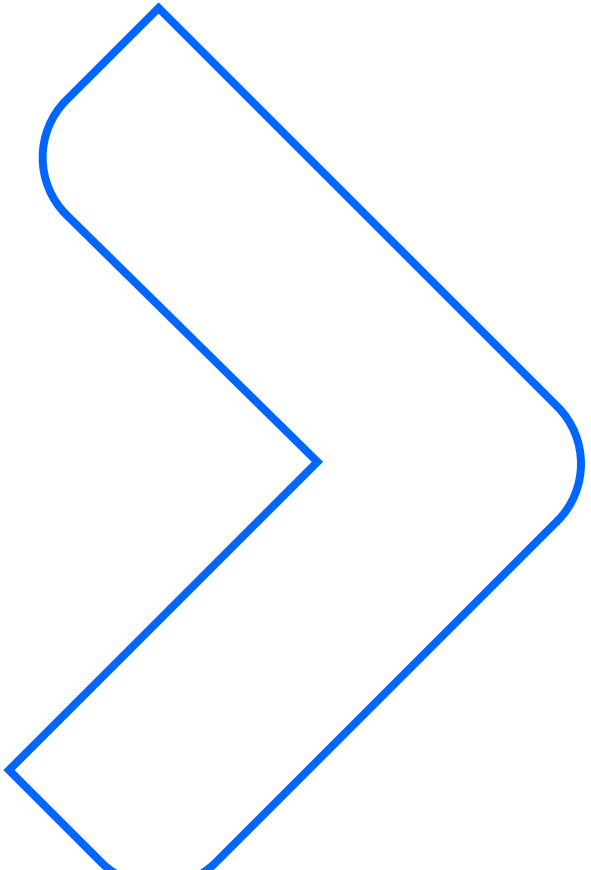
THE MOBILITY HOUSE

Automated Load Management

Technical Background & Case Studies

THE MOBILITY HOUSE

Company & Product Summary



Leading the world in fleet electrification since 2009

Over 1700+
Charging depots assisted by
the Mobility House

More than 320+
Mobility House employees working to
achieve a net-zero future

Operating globally
From offices in Belmont, CA in Silicon Valley,
Zürich, Switzerland, and Munich, Germany

The Most Experienced Fleet Charging Company Worldwide

THE MOBILITY HOUSE

Consulting & Solutions

Professional services from charging expert Consulting to complete Turnkey Solutions.

180+ Fleets

Helped by the The Mobility House

Smart Charging

ChargePilot - The world's leading EV charging and management platform designed just for fleets

1700+ EV Fleets

That trust The Mobility House

Stationary Storage

Largest developer of stationary storage solutions using EV batteries in the EU.

100+ MW

Capacity installed or under construction

Vehicle-Grid Integration

EV Aggregation Platform for monetization of EV battery flexibility & energy markets

10+

Value generating energy and grid services enabled

What is it?

“Automated Load Management (ALM) is the use of software or other behind-the-meter technologies to strategically share charging capacity across multiple charging ports at the same charging site, helping safely connect multiple charging ports whose total nameplate load would otherwise exceed the rated capacity of the customer connection. By using ALM, customers can avoid or defer the need to upgrade certain distribution system infrastructure to accommodate the new EV charging load.”

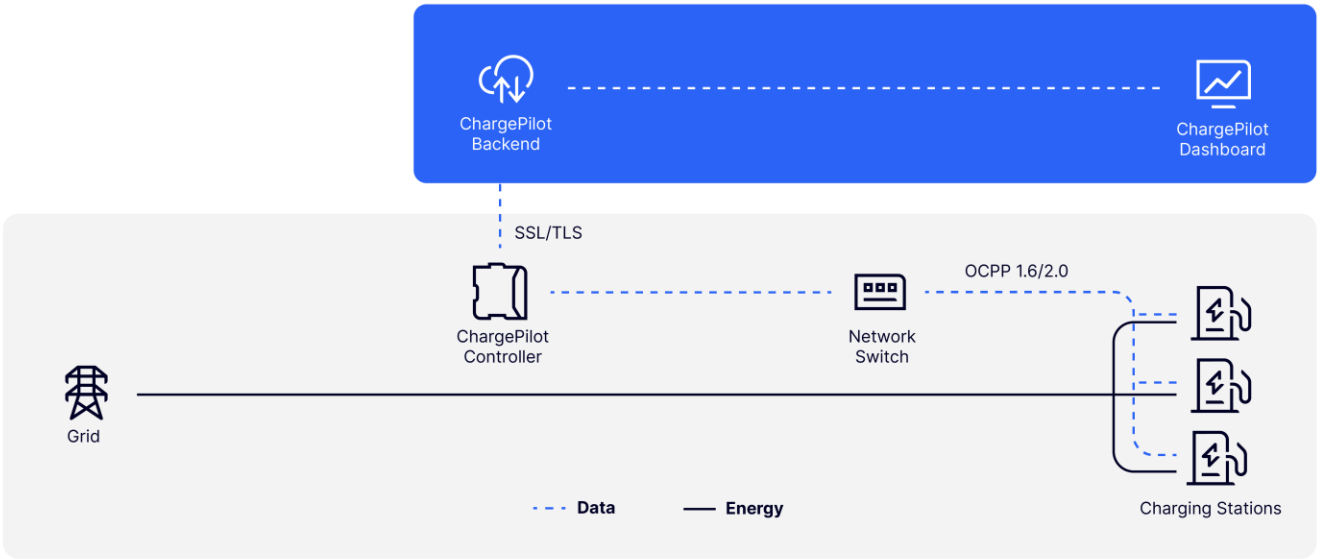
- Definition from the Vehicle-Grid Integration Council (VGIC)

What is it not?

ALM is not:

- Traditional power sharing
- Uniform de-rating of charging stations

ALM is Provided by Charging Management System (CMS)



Bringing it All Together

ALM regulates the amount of power below a safe limit

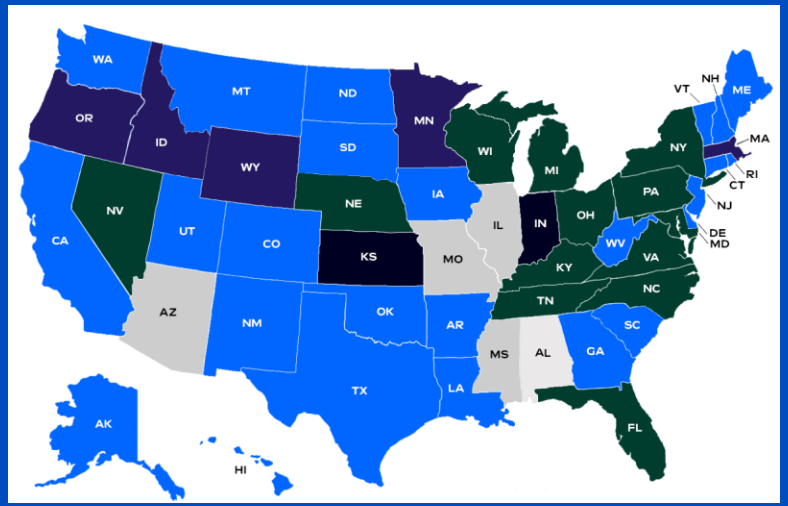
Industry leading CMS providing ALM factor in fleet schedules and include an on-site controller to maximize reliability

Changes the sizing requirements of equipment under NEC 625.42, effecting site design & permitting

Helps install EV sites by avoiding, reducing or delaying the need for a grid upgrade

National Electric Code

Who & Where



2023 NEC® - 5

2020 NEC® - 26

2017 NEC® - 12

2014 NEC® - 1

2008 NEC® - 2

County/Municipality NEC ® regulations only - 4

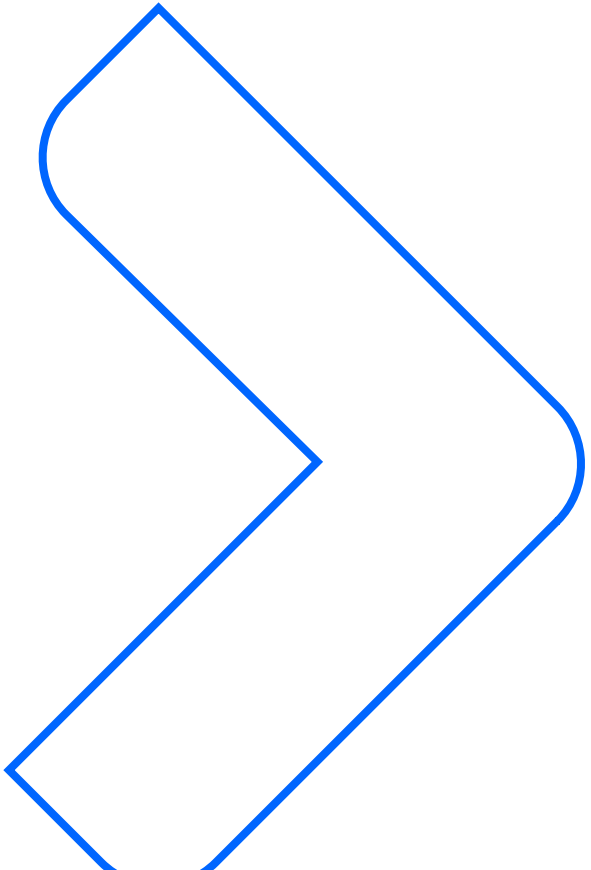
When

NEC Version & Terminology	
ALM	EMS
2014	2023
2017	
2020	

How

Contact your local Authority Having Jurisdiction and Utility

Project Examples



New York City Schools Bus Umbrella Services

14 Buses	14 x 19.2 kW	No Derating	80 kW
Supported with Charging	Chargers	Individual Chargers	Utility Transformer Limit

Challenge

ChargePilot manages the cumulative load for this site without derating individual chargers, demonstrating true smart charging.

269 kW of chargers

80 kW of available capacity

Location
New York, New York City, NY

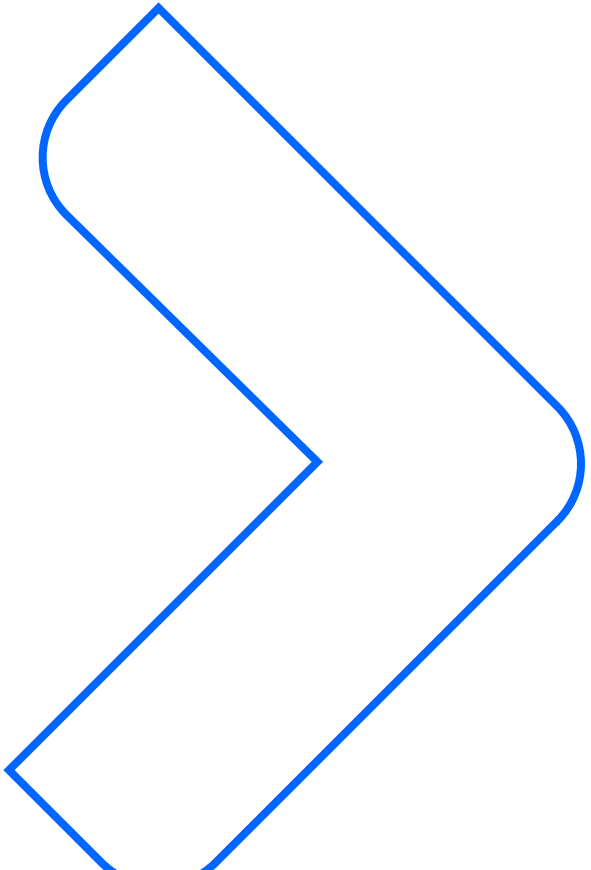
Charging Stations
14 additional single-port 19.2 kW Epic chargers serving 14 additional Microbird buses

Energy Management
ChargePilot

Modules
Plus

Performance of TMH
Load Management (ALM) | Monitoring | Operation incl. Service

How can ALM be used by utilities?



Fast & Flexible Interconnection (FIX) Program leverages ALM to improve a utility's ability to serve customers

- This programmatic approach to address distribution constraints, designed by TMH and Itron, enables utilities to incorporate ALM technology into their current energization processes and grid planning
- Any fleet customer requiring an upgrade to meet a load request is offered the option to participate in FIX, and program provides modeling of both grid infrastructure limits and fleet mobility needs to determine that power limitation will not compromise operations
- Multiple levels of technical complexity can be offered to accommodate varying levels of grid visualization and control by utilities
- Advanced versions of the program feature a "flexible connections" option, which enables infrastructure deferral benefits to be realized farther up the utility's distribution system (feeder lines, transformers, substations, etc)

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FLEXIBLE INTERCONNECTION PRESENTATION

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PRESENTERS

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Casey Horan

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FLEXIBLE INTERCONNECTION

Speeding Energization & Sustainably Scaling Electric Load

Casey Horan & Cole Jermyn
Attorneys for Environmental Defense Fund

Environmental Defense Fund

What is Flexible Interconnection?

- A range of options for connecting load-only resources to the distribution grid using power controls to limit grid impacts.
- *Example*: Connecting a customer's EV chargers with a set upper limit to how much electricity a customer can pull at one time to stay within a feeder's capacity.

Environmental Defense Fund

Why Flexible Interconnection?

- Faster Interconnection
- Bridge-to-Wires
- Right-Sizing Grid Infrastructure

LOAD CONTROL MANAGEMENT SYSTEMS (LCMS)

- Informs Structure of Flexible Interconnection
- Spectrum of Low Tech to High Tech Options
- Factors
  - Operational Sophistication
  - Expanded Capabilities
  - Customer Flexibility
  - Cost/Installation
  - Legal/Reg Standards
  - Current Availability

Considerations for Different Flexible Interconnection Scenarios

- Structure
  - Static vs. Dynamic
- Communication
  - Autonomous vs. Communications-based
- Enforcement
  - Hard Cap vs. Soft Cap

Structure: Static v. Dynamic

- *How frequently should the utility change the customer's maximum allowable demand?*

Communication: Autonomous vs. Communications-based

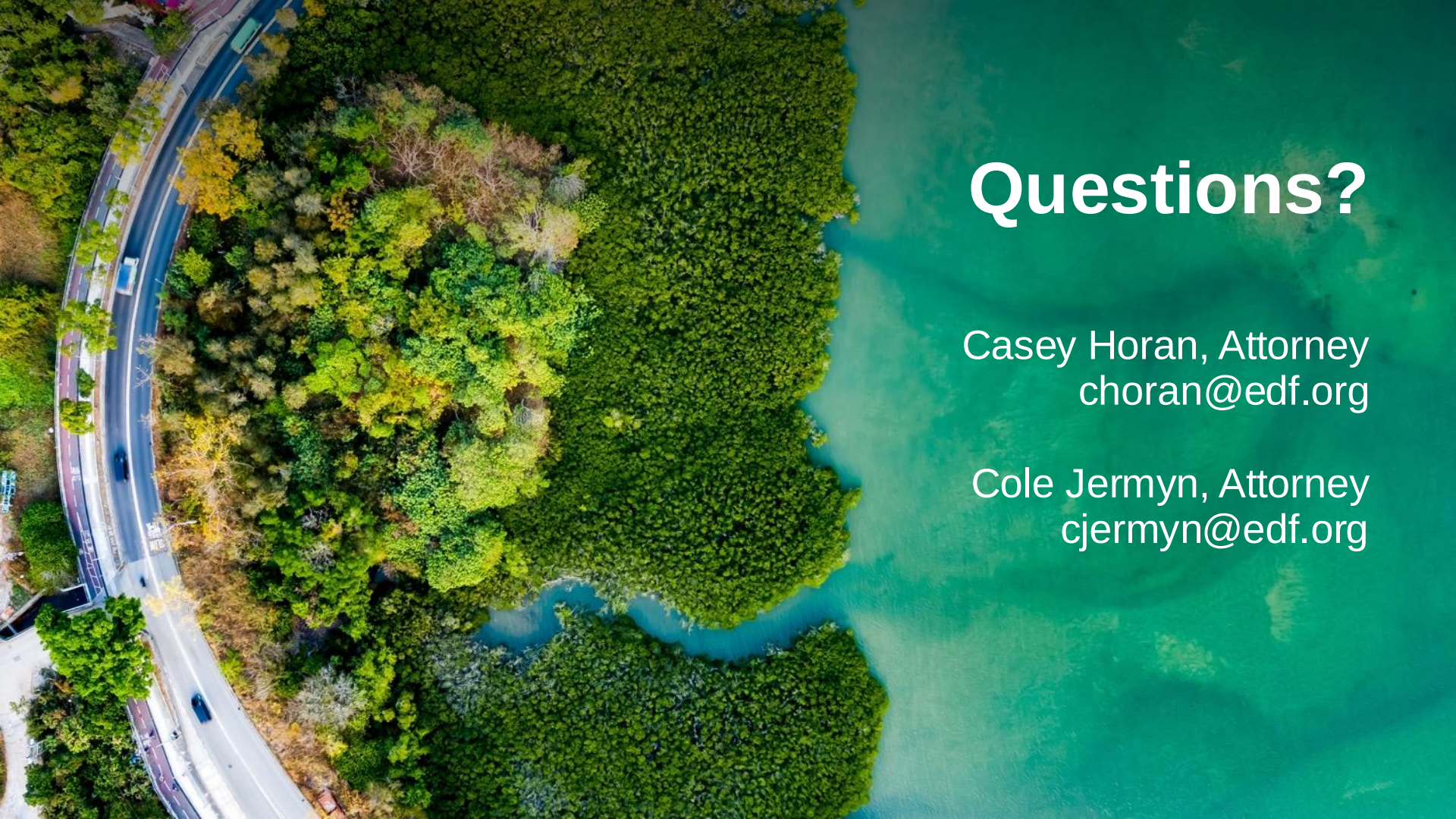
- *How should the utility communicate signals pertaining to the customer's maximum allowable demand?*

Enforcement: Hard Cap v. Soft Cap

- *What mechanism(s) should the utility use to ensure the customer does not exceed the maximum allowable demand?*

Examples

1	2	3	4
Static Hard cap Autonomous	Dynamic Soft Cap Autonomous	Semi-Static Hard Cap Communications-based	Dynamic Hard Cap Communications-based
500 kW charging limit always, customer cannot exceed limit or LCMS curtails charging. Customer-side hardware is configured to automatically limit the customer's energy usage by shutting off when the limit is reached.	500 kw charging limit during the day, during evenings the limit increases to 700 kW. Customer can exceed limit subject to additional fee. LCMS is pre-set to adjust limit from day to night.	500 kW during summer, raised to 700 kW during winter, repeating limits until grid upgrades are complete. Utility can also call "events" with further restrictions and compensate customers for additional limits.	Upper load limit varies between 500-700 kW depending on grid conditions. Utility sends signals to customer on day-ahead schedule communicating changing limits to LCMS. Customer can manage their load under the cap or hardware will limit power.



Questions?

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ON-SITE GENERATION/STORAGE PRESENTATION

Slides are not included due to permission not received from the presenter.

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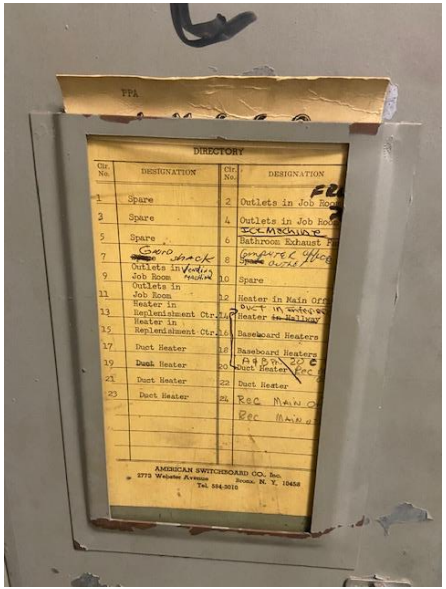
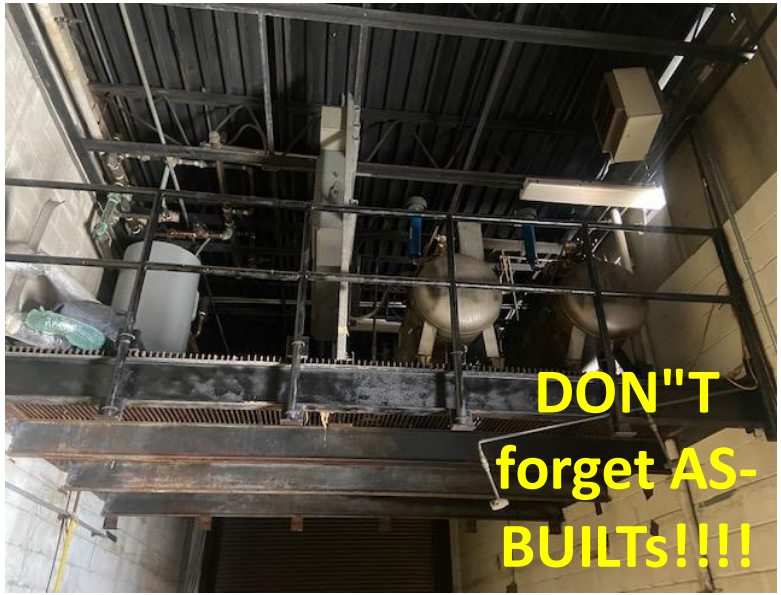
ENERGY EFFICIENCY IMPROVEMENTS

THE BEST KWH IS THE ONE YOU DON'T USE!!!

- I spy with my little eye...





TIP: Look high and low for old or defunct equipment and ask: Are breaker/panel boxes updated? Is there a lower cost but more efficient alternative? Can you automate for less waste (e.g. light switches)

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PANEL DISCUSSION

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THANK YOU

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