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Bidirectional EV Working Group

Meeting #1: Kickoff & Framing

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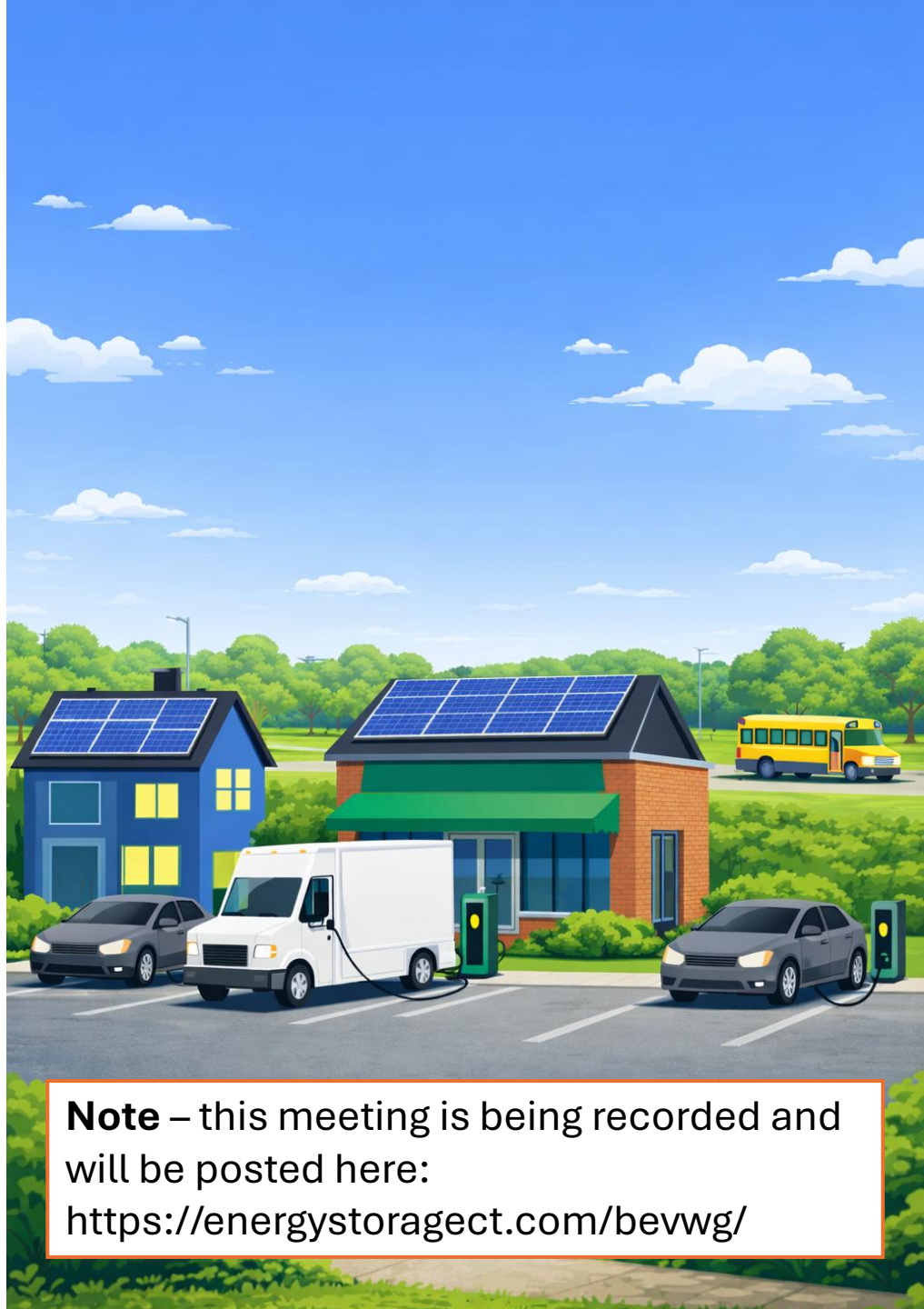
March 6th, 2026



Note – this meeting is being recorded and will be posted here: https://energystoragect.com/bevwg/

Meeting Agenda

1. Welcome & Overview
2. Authority Charge & Timeline
3. Logistics, Charter & Participation
4. Overview of the ESS Program
5. Vehicle Grid Integration (VGI): Definitions & Framing
6. Overview of IES Pilots & Initial Learnings
7. Bidirectional EV Working Group Scope vs. Interconnection Working Group scope
8. Topics for Subsequent Meetings
9. Wrap-Up & Next Steps

Meeting Overview

Welcome!

Objectives

- Align on the Working Group's purpose, scope, and constraints
- Establish common terminology and a shared understanding of the Connecticut program landscape
- Set expectations for participation and the process ahead

Meeting Logistics

- Running as a Teams meeting – everyone can unmute themselves, but please remain on mute when not speaking!
- Pause for discussion at the end of each section – use hands or unmute for clarifying questions, corrections during presentations
- Encouraged to turn on cameras (but recognize 9:00 AM ET is not ideal for all…)

Welcome to the CT Bidirectional EV Working Group — Meeting #1

Note – this meeting is being recorded and will be posted here: https://energystoragect.com/bevwg/

Authority Charge & Timeline

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PURA Has Directed Connecticut to Act on Bidirectional EVs

- In its December 17, 2025 Final Decision (Docket No. 25-08-05), PURA determined that bidirectional EVs offer "significant benefits" — but that several important issues must be resolved before EVs can be integrated into the ESS Program
- PURA directed the Program Administrators to convene this Working Group by **March 1, 2026**
- The Working Group must submit a Bidirectional EV Report by **August 1, 2026**

> *"The Authority finds that bidirectional EVs offer significant benefits to the grid and to participating customers."*
> — PURA Final Decision, Docket No. 25-08-05

Source: Connecticut PURA, Final Decision, Docket No. 25-08-05 (December 17, 2025).
Available at: https://www.dpuc.state.ct.us/dockcurr.nsf/4b3c728dd1c0d642852586db0069aa70/b1de90d5e52b43d185258d630056a8bf/$FILE/250805-121725.pdf

Table Stakes: What the Report Must Address

Five Directives from PURA

1

Cross-Program Coordination

Framework for interaction between the ESS Program and other managed charging programs in Connecticut

2

Technical Requirements

EV-specific technical standards, including data and telemetry requirements

3

Program Terms & Conditions

Enrollment eligibility, contract provisions, and performance measurement

4

Incentive Structure

Economic analysis and recommended incentive levels*

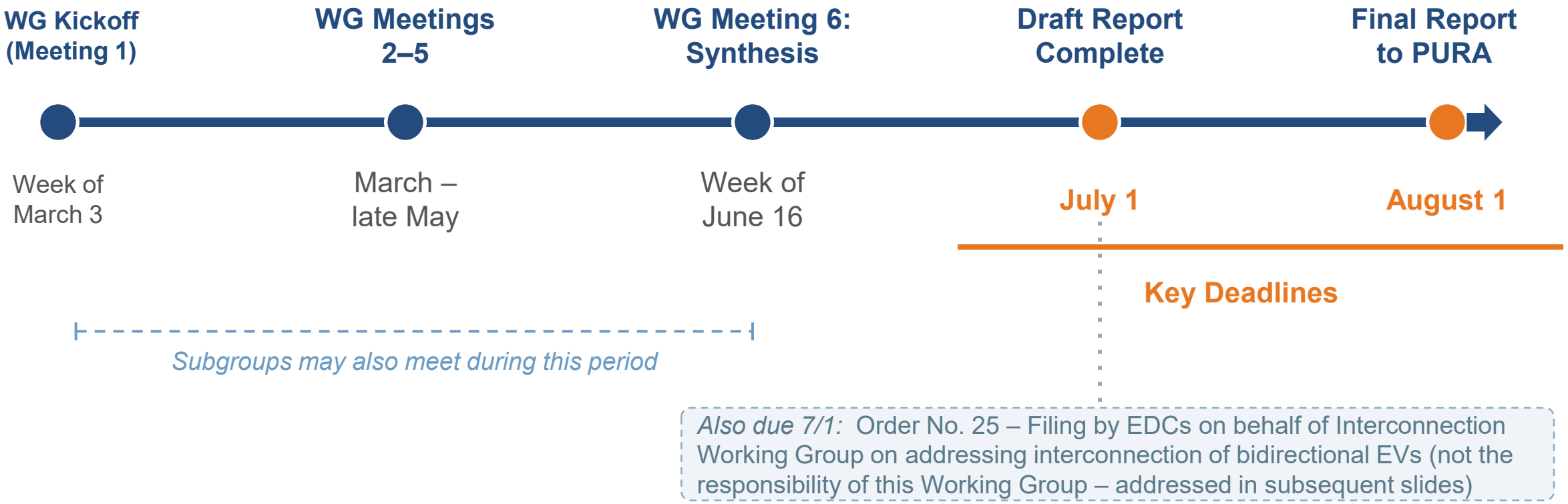
5

Light-Duty vs. Med/Heavy-Duty

Whether and how to differentiate program parameters by vehicle class

**Note: as the ESS Evaluation, Measurement, & Verification Consultant, CES will also support consideration of incentive levels and impact on ESS benefit cost analysis*

Our Path to August 1st



Logistics, WG Charter, and Participation

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The Charter Sets Our Guardrails

The Charter defines the Working Group's scope, process, and expectations — it is a **living document** and may be updated by the Program Administrators.

In-Scope

- ►Five PURA directives
- ►Recommendations for integrating bidirectional EVs into the ESS Program
- ►Other considerations relevant to the points above

Out-of-Scope

- Technical interconnection standards (addressed by the separate Interconnection Working Group)
- Policy recommendations outside ESS Program integration (e.g., those related to net metering, Residential Renewable Energy Solutions (RRES), Non-Residential Renewable Energy Solutions (NRES) and their successors, etc.)

Meeting Ground Rules

- Be **Prepared**
- Be **Present**
- Be **Focused**
- Be **Respectful**
- Be **Timely**
- Be **Solutions-Oriented**
- Be **Transparent**

Who's in the Room — and How Decisions Get Made

Members, Participants, and Voting

Working Group Members

- ▶ PURA-designated organizations
- ▶ Expected to attend all ~6 meetings
- ▶ Review materials in advance
- ▶ Engage actively in consensus-building
- ▶ **Have voting rights**

Additional Participants

- – May attend and contribute to discussions
- – **Do not vote** on recommendations
- – Can participate as a non-voting distribution list member

Consensus Process

- ▶ Members will vote on specific recommendations and positions developed throughout the process
- ▶ CES will draft positions based on working group input for members to review and vote on
- ▶ Where unanimous support is not reached, alternative perspectives will be documented in the final report

Staying Connected & Finding Materials

Everything Lives on the Working Group Website

All meeting recordings, summaries, and materials will be posted to the Working Group page:

energystoragect.com/bevwg

- Meeting agendas and materials distributed **in advance**; required pre-reading will be identified
- Meeting summaries shared following each meeting

Questions between meetings? Contact CES at **stephan.wollenburg@ces-ltd.com** and **madeline.frierson@ces-ltd.com**

Overview of the Energy Storage Solutions Program

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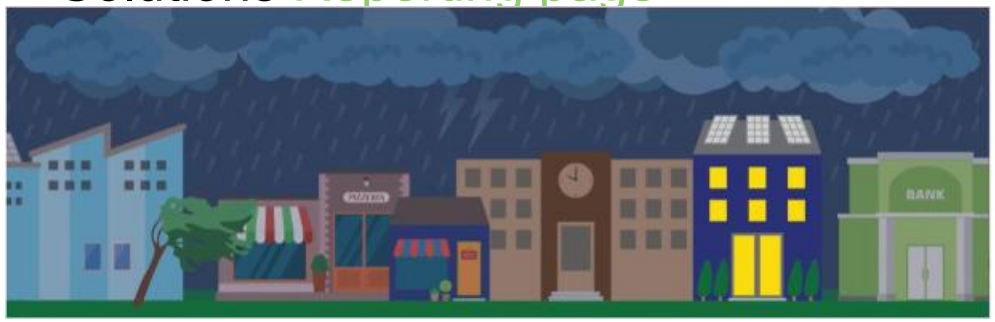
Energy Storage Solutions Overview

Energy Storage Solutions

- 9-year Program – Goal of **580 MW** behind-the-meter storage for residential and Commercial + Industrial (“C&I”) end-use customers. **150MW** for residential and **430 MW** for C&I

- Program is overseen by Public Utility Regulatory Authority (“PURA”), paid for by electric ratepayers, and administered by Connecticut Green Bank, Eversource and United Illuminating (“UI”)

- Current capacity and other metrics for the Program located on the Energy Storage Solutions Reporting page



Construct 5 Program Description

Program Element	Design Item	Summer	Winter
Construct 5 – Active Dispatch	Enrollment and Performance Incentives	Varies by customer type, grid-edge eligibility, and building type. See "Section 6: Program Dispatch and Incentive Structure" for additional details.	
	Events per Season	30-60	1-10
	Months	June through September	November through March
	Event Duration	1 to 3 Hours	1 to 3 Hours
	Anticipated Dispatch Window	12 PM to 9 PM (All Days)	12 PM to 9 PM (All Days)
	Reserve Capacity	OEM minimum recommended capacity	

Performance Incentives

Rates for New Customers starting 4/1/26:

Customer Class	Years 1 – 5	Years 6 – 10
Small or Medium C&I	$325/kW	$175/kW
Large C&I	$275/kW	$175/kW
Standard Residential	$300/kW	
Underserved Residential*	$450/kW	
Low-Income Residential*	$550/kW	

*Applies based on Customer Class at the time of application. Performance incentives are based on average kW-AC contribution during the season, determined by actual system performance during events as indicated by inverter data, not nameplate capacity.

Customer Class	Small C&I	Medium C&I	Large C&I
Annual Peak Demand	*<200 kW*	*200-500 kW*	*>500 kW*

Enrollment Incentive Rates

Customer Category	Enrollment Incentive Rate*
Residential (Non-Grid Edge)	$30/kWh
Residential (Grid Edge)	$130/kWh
Commercial (Non-Priority)	N/A
Commercial (Priority)	$10/kWh

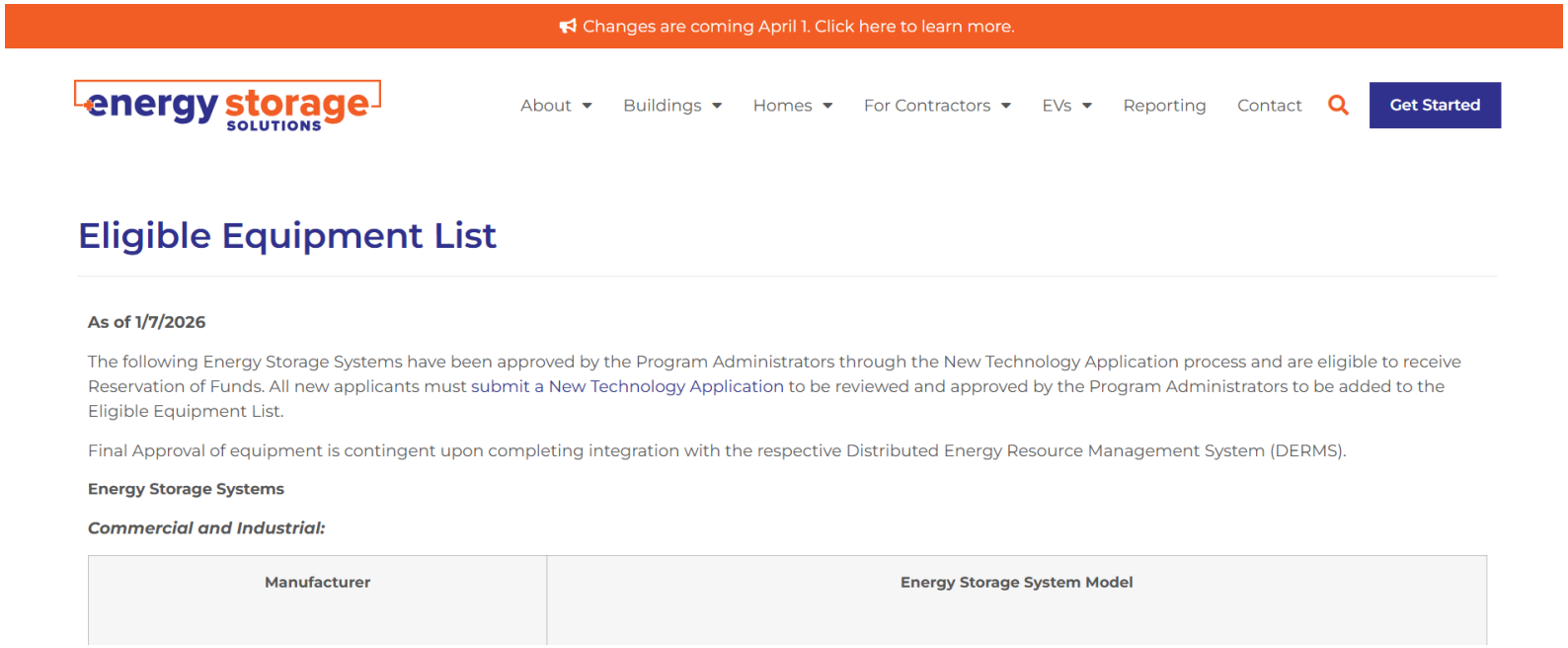
*Enrollment incentives are defined based on rated energy capacity (kWh)

Construct 5 Program Elements

Customer Description	Active Dispatch
Residential Customers (standard and grid-edge)	• May receive Enrollment Incentives where applicable • Will receive Performance Incentives • As a pay-for-performance program, participation in Active events is optional
Commercial Customers (non-Priority)	• Will not receive Enrollment Incentives • Will receive Performance Incentives • As a pay-for-performance program, participation in Active events is optional
Commercial Priority Customers	• May receive Enrollment Incentives where applicable • Will receive Performance Incentives • As a pay-for-performance program, participation in Active events is optional

Approved Technology

- Eligible Equipment must have an approved New Technology Application
- Eligible Equipment is made available on the Energy Storage Solutions website



Appendix

Distributed Energy Resource Management ("DERMS")

- All BESS must be visible in the DERMS platform(s). Contractor and customer must register the Battery Energy Storage System ("BESS") through the battery inverter Original Equipment Manufacturer ("OEM")'s Process
- Best if completed at time of commissioning when system receives Permission to Operate ("PTO")
- Contact battery inverter's Original Equipment Manufacturer ("OEM") for support as each OEM has a different process

DERMS Platform	Utility / Customer Segment
EnergyHub	Eversource – Residential
Uplight	United Illuminating – Residential
Uplight	United Illuminating – C&I
Uplight	Eversource – C&I

Vehicle Grid Integration (VGI): Definitions and Framing

The Bidirectional Charging Landscape

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V2G: *Vehicle-to-Grid*

EV exports power back to the electric grid which enables participation in utility programs, demand response, and wholesale markets. Requires bidirectional charger and grid interconnection.

Example: EV exports to the grid and is compensated through a utility program.

V2H: *Vehicle-to-Home*

EV powers a customer's home, typically as backup during an outage. Energy does not flow back to the grid. Requires a bidirectional charger and ability to prevent export to grid. May reduce interconnection complexities.

Example: EV provides backup power to a residential house during a grid outage.

V2B: *Vehicle-to-Building*

EV powers a commercial or multi-unit building. Similar to V2H but at a larger scale. Can support demand charge management for commercial customers.

Example: Commercial vehicle fleet interconnected and helps manage electric charges at a warehouse.

V2X: *Vehicle-to-Everything*

Umbrella term encompassing all forms of energy transfer from EV to any load or grid asset (includes V2G, V2H, V2B). Used broadly in policy and technical contexts.

Example: Program framework designed to accommodate all export use cases (V2X).

V2L: *Vehicle-to-Load* – EV powers external devices directly (e.g., tools, appliances) without grid interconnection

Exporting vs. Non-Exporting

One of the most important distinctions is whether a system is **export-capable** or not.

	Export-Capable	Non-Export	Managed Charging
Definition	Energy flows from the EV battery back through the meter to the grid or building loads	EV battery system cannot send energy to the grid and can support on-site loads only	Changing charging timing/behavior to benefit the grid through scheduling or dispatch.
Examples	V2G	V2H, V2B, managed/smart charging, demand response load curtailment	CT's EV Charging Program
Interconnection	Requires utility interconnection agreement	Generally simpler interconnection path	No interconnection agreement required
ESS Program Relevance	Primary focus of this Working Group (how to incorporate export-capable EVs into ESS)	Already addressed (in part) through managed charging programs. May interact with ESS eligibility.	Consideration of overlap with ESS, EV export
Charge Requirements	Requires bidirectional charger	Requires bidirectional charger	No bidirectional charger required; utility managed charging programs require qualified EVSE or telematics connection

Note for this Working Group: This Working **Group's primary focus is export-capable and non-export integration into the ESS program**, as managed charging options are addressed through existing programs. Interactions between the two programs will be discussed in future meetings.

Terminology

As a Working Group, we need to align on a common set of terms to be used consistently across all meetings and in the final report.

Proposed Working Definitions (and acronyms for reference)

- **Bidirectional EV WG:** Bidirectional EV Working Group.
- **IXWG:** Interconnection Working Group.
- **VGI (Vehicle Grid Integration):** Broad term for technologies, programs, and frameworks that enable coordination between electric vehicles and the electric grid.
- **Bidirectional EV:** An EV capable of exporting energy (V2G, V2H, or V2B) via a bidirectional charger.
- **V2X:** Umbrella term used when referring to all export-capable applications collectively.
- **Export-capable:** A system (vehicle + charger) capable of sending energy back to the grid.
- **Non-Export:** A system that discharges only to on-site loads (V2H, V2B) or manages charge timing only (V1G/managed charging).
- **Managed Charging:** The control (through charging or active control) of when and how fast an EV charges without any reverse power flow (i.e., no V2H, V2B, or V2G)
- **DERMS (Distributed Energy Resource Management System):** The utility platform used to monitor and dispatch distributed resources like EVs and batteries.

Discussion Question: *Are there terms or framings that the group wants to flag or revisit?*

Overview of IES Pilots and Initial Learnings

Innovative Energy Solutions (IES) Participants

The Connecticut IES Program is a statewide regulatory program with budgets up to $5 million per project over 12-18 months, designed to pilot and scale innovative grid solutions. Projects demonstrating cost-effectiveness and benefits can be deployed at scale in Connecticut.

There are **three** ongoing IES pilots that are directly relevant to V2X and bidirectional electric vehicle systems.

Participant & Project Type	Partners	Cycle / Status	Description
GridEdge Networks *EV School Bus V2G Electric*	UI / ACES (School bus operator)	Cycle 1 / Complete	Integration of EV school bus fleet with the grid to enable Vehicle-to-Grid (V2G) capabilities
Bidirectional Energy *V2X Residential Pilot*	Eversource / UI	Cycle 2 / In-Progress	Residential V2X pilot targeting up to 63 homes using the Wallbox Quasar 2 bidirectional charger with Kia EV9 owners
RoundTrip EV Solutions *MHD Fleet Charing – Electric Refuse Trucks*	Eversource / City of Stamford / CT DEEP	Cycle 2 / In-Progress	Public-private-partnership (PPP) model to electrify medium-to-heavy refuse trucks

Key Findings and Anticipated Learnings

Through the IES Pilots, there have been several important lessons learned:

Technical Readiness

- ***GridEdge:*** Difficulty with V2G charger interface. The existing ACES school bus used an obsolete standard, rendering it V2G-incapable. Multiple loaner buses were tested before a compatible vehicle (BYD/RIDE) was found. Each charger-bus pair required specialized software integration (Challenge #2 in Final Report).
- ***Bidirectional Energy:*** Kia EV9 requires a specific OTA software update to enable bidirectional export which has been delayed since August 2025 due to a software bug originating in Kia South Korea.

Solar Co-location

- ***GridEdge:*** Co-located solar PV at the ACES site created a tariff conflict as V2G export would have affected the site's Class I renewable energy classification. Resolution required limiting V2G to on-site load only (V2L). A dedicated meter was installed to enforce this limit (Challenge #1 in Final Report).
- ***Bidirectional Energy:*** Eversource identified a potential need for a Net Generation Output Meter (NGOM) for customers with existing solar. Requirement was not anticipated in initial customer quotes and is still being clarified.

Market & Deployment Readiness

- ***GridEdge:*** Did not recommend scaling this pilot statewide; future of pilot under active discussion in IES docket. Recommended other pilots, e.g., pilot focused on Brandford School District, given V2G capability of BYD/RIDE vehicles operated by ZUM.
- ***Bidirectional Energy:*** Only ~200 Kia EV9s registered statewide, so the addressable market is extremely limited today.

Relevance to Working Group Discussions

IES Pilot Finding	Bidirectional EV WG Question
GridEdge found that each charger-bus pair required specialized integration. ISO 15118-20 adoption is still 2-3 years away.	Should ESS program eligibility require specific certifications? How do we write requirements that accommodate an evolving standards landscape without locking out early participants?
GridEdge recommends PURA create a predictable V2G compensation mechanism for fleet operators	Does the ESS Construct 5 align with encourage V2G market development while providing ratepayer value?
GridEdge's interconnection process required navigating solar/V2G metering conflicts, a utility witness test, and a custom non-export configuration. Bidirectional Energy is still working through PowerClerk and NGOM requirements with Eversource.	In coordination with IXWG: How do we align ESS program eligibility with IXWG interconnection requirements?
Both pilots encountered complications when V2G was co-located with solar PV.	What is the right venue (docket, working group) to address issues of compatibility of ESS with co-located renewable generation?

Discussion Question: *What questions do participants have about the pilots?*

EV Working Group Scope vs. Interconnection Working Group Scope

EV WG Scope vs. Interconnection WG Scope

The Bidirectional EV WG and the Interconnection Working Group (IXWG) are pursuing parallel but closely related workstreams. The Bidirectional EV WG Facilitator will attend all IXWG meetings to ensure coordination between the groups.

Bidirectional EV WG	Interconnection WG

• ESS program integration framework
• Cross-program coordination (managed charging + ESS)
• Program terms, eligibility, and enrollment incentives
• LD v. MHD differentiation
• Report due to PURA: August 1st, 2026
	• Technical interconnection standards & process
	• Examples of specific topics include:
	  • Flexible interconnection
	  • Standards for studying energy storage
	  • Updates to meter procurement and payment process

Potential areas of overlap:

- EV metering and communication requirements
- Equipment certification
- ESS eligibility requirements and coordination with interconnection process

Regulatory Mandates

Two orders from PURA docket 25-08-05, Order 20 and Order 25, are driving these parallel workstreams.

Order 20 (Bidirectional EV WG)	Order 25 (IXWG)
• **Order summary:** *Convene a Bidirectional EV Working Group to develop recommendations for incorporating bidirectional EVs into Connecticut's ESS Program. Report must address PURA's five directives covering cross-program coordination, technical requirements, program terms, incentive structure, and LD vs. MHD differentiation* • Final report filed to PURA by August 1st, 2026 • Intention is to incorporate conclusions from Order 25 into Order 20 report.	• **Order language:** *No later than July 1, 2026, the EDCs, on behalf of the Interconnection Working Group, shall file a recommended process for interconnecting bidirectional EVs. This filing shall include proposed redlined and clean revisions to the EDCs' Interconnection Guidelines, along with a description of any necessary modifications to the PowerClerk system.* • Final report filed to PURA by July 1st, 2026

Discussion Question: *What key areas of overlap do participants envision between the two groups?*

Topics for Subsequent Meetings

Future Topics - Draft

Meeting	Theme	Key Questions & Focus Areas
2	**Bidirectional EV Technology Requirements by Vehicle Class**	• Technical characteristics of bidirectional EVs by vehicle class; ESS participation readiness. • Vehicle, charger, and site-level requirements for bidirectional operation. • Integration of IES pilot early lessons. • Potential for phased inclusion of bidirectional EVs into ESS by vehicle class
3	**Technical Integration of Bidirectional EVs into ESS**	• How ESS technical requirements must adapt for bidirectional EVs; data, telemetry, and verification needs. • DERMS capabilities, constraints, and potential workarounds. • Privacy, cybersecurity, and data access considerations.
4	**Cross-Program Participation**	• Overlap between ESS Program and other state EV programs, particularly managed charging. • Distinguishing load reduction vs. energy discharge across programs. • Considerations across programs to avoid double-counting. • Identification of relevant tariffs (enabling and/or potential conflicts)
5	**Bidirectional EV Incentives**	• Appropriate incentive structure for bidirectional EV participation in ESS. • Upfront versus performance-based incentives. • Incentives tied to EVSE, vehicles, or integrated systems.
6	**Draft Recommendations Review**	• Present draft findings; identify consensus vs. minority views; confirm alignment with PURA's five directives. • Document consensus positions and non-consensus items. • Alignment with Interconnection Working Group recommendations.

Discussion Question: *Are there topics missing, missequenced, or that should be prioritized?* ***Any potential topic areas for subgroups?*** *Areas of anticipated disagreement that should be prioritized?*

Future Topics

Meeting	Topic	Date
1	Kickoff & Framing	Friday, March 6th: 9:00-10:30AM ET
2	Bidirectional EV Technology Requirements by Vehicle Class	Tuesday, March 31st: 9:00-10:30AM ET
3	Technical Integration of Bidirectional EVs into ESS	Thursday, April 16th: 9:00-10:30AM ET
4	Cross-Program Participation	Thursday, May 7th: 9:00-10:30AM ET
5	Bidirectional EV Incentives	Friday, May 29th: 9:00-10:30AM ET
6	Draft Recommendations Review	Friday, June 12th: 9:00-11:30AM ET

Wrap-Up & Next Steps

Next Steps

- Meeting notes will be distributed, and meeting recording will be posted at https://energystoragect.com/bevwg/
- **All Members must confirm intention to participate by Wednesday, March 11th1**, if they have not done so already
- Share any comments and thoughts on today's discussion questions with **WG Facilitators by Friday, March 12th**
- Discussion questions:
  - *Are there terms or framings that the group wants to flag or revisit?*
  - *What questions do participants have about the pilots?*
  - *What key areas of overlap do participants envision between the two groups?*
  - *Are there topics missing, missequenced, or that should be prioritized?*
  - *Any potential topic areas for subgroups?*
  - *Areas of anticipated disagreement that should be prioritized?*