Public Workshop on Submetering and Telematics

California Public Utilities Commission, Energy Division

Shiva Ourang, Utility Engineer

April 15, 2025 - 10:00 AM – 4:00 PM Pacific Time

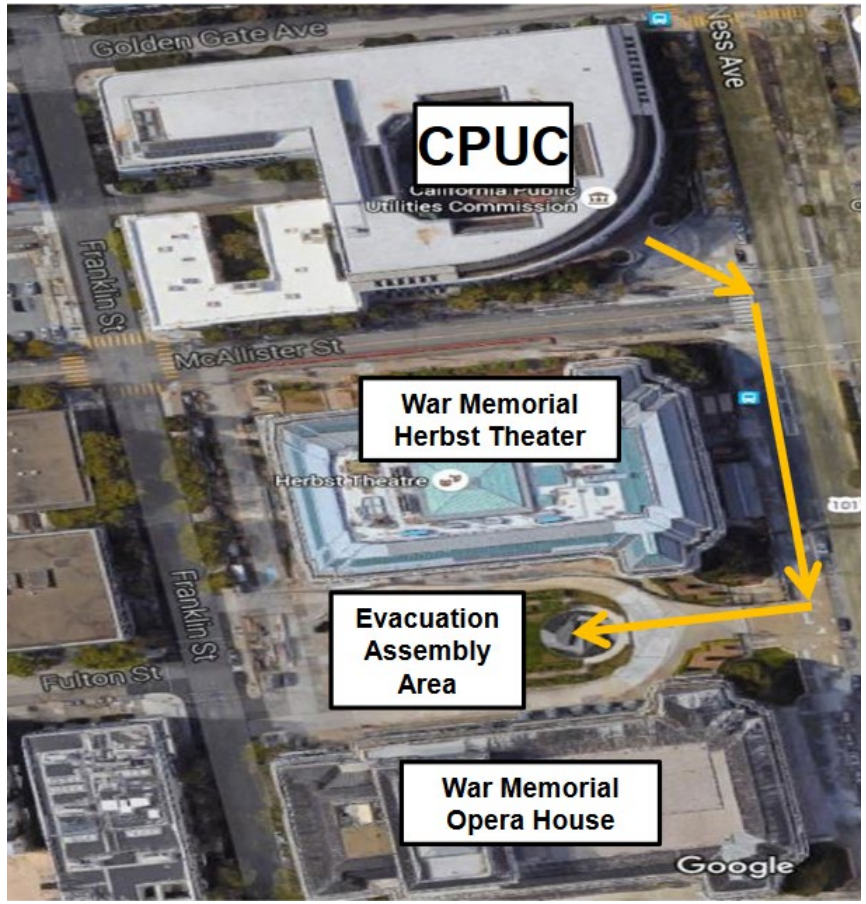
California Public Utilities Commission

California Public
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Welcome!

Safety Instruction.

- In case of an Emergency
  - Staff will call 911
  - To evacuate, proceed out of 1 of 4 exits to Civic Center Plaza
    - Exit toward Van Ness / McAllister
    - Walk past City Hall
- Bathrooms & water fountain across the Lobby.



Workshop Reason and Goals

Reason of this workshop

Under Decision 22-08-024, CPUC staff must host a public workshop within 24 months to **review the PEV Submetering Protocol and assess the need for updates.**

Workshop Goals

1. Gain a clear understanding of IOUs' updates and challenges in **implementing the submetering protocol** and foster collaborative solutions in discussion panel.
2. Explore OEMs' **telematics efforts, updates, and challenges**, and market opportunities.

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Opening Remarks

Workshop Agenda

Welcome and Safety	10:00-10:10
Opening Remarks	10:10-10:15
Introduction to Decision 22-08-024 & Resolution E-5274 – CPUC Perspectives	10:15-10:30
Panel 1: Submetering Protocol – Utility Perspectives	10:30-11:30
Break	11:30-11:45
Panel 2: Submetering Protocol – MDMAs Perspectives	11:45-12:45
Lunch Break	12:45-1:45
Panel 3: OEM Presentation on Vehicle Telematics	1:45-2:45
Break	2:45-3:00
Panel 4: Fostering Collaborative Solutions & Closing	3:00-4:00

California Public
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Introduction to Decision 22-08-024 & Resolution E-5274 – CPUC Perspectives

Background: Decision 22-08-024 and IOU Implementation Efforts

D.22-08-024 was published in August 2022, ordering that the IOUs must submit Advice Letters which include Implementation Plans for their submeter programs

Decision 22-08-024
August 2022

This decision aims to facilitate the expansion of EV adoption in California by allowing IOU customers to measure and bill EV charging separately from primary utility services, promoting vehicle-grid integration

- **Implementation:** Required IOUs to document submetering protocol detailing plans for how they will implement submetering for all customers with EVs.
- **Automatic Billing:** Ruled that utilities should begin accepting submetering applications and perform billing reconciliations for customers while upgrading their billing systems. The goal is to have widespread automated billing for submetering services. The IOUs are to begin system upgrades to work towards full automation.
- **Timeline:** Ruled that there is a 24-month timeline to incorporate submetering, but excluded automatic billing
- **Communication Protocol:** By July 1, 2023, the utilities must implement EVSE communications protocols for all ratepayer funding or utility administered programs

IOU Advice Letters and Implementation Plans
December 2022

The IOU Advice Letters outline plans for Pre-Enrollment, Meter Data Management Agent (MDMA) onboarding, Customer Enrollment, Outreach, and Automated Billing Upgrades.

Source: D.22-08-024

Background: Resolution E-5274 and Current Updates

After Advice Letter approval, Resolution E-5274 ordered that IOUs modify plans to prioritize automated billing and continue progress on MDMA enrollment

Advice Letters Approved
June 2023

Resolution E-5274
June 2023

Current Status
2025

Orders out of the ruling:

- IOU advice letters were approved with modifications
- IOUs must have standard data transfer and monthly data transfer protocols to align with billing cycles
- IOUs must begin the data automation process and develop a partial solution within 18-24 months
- PG&E and SCE must remove enrollment caps
- IOUs must clarify that EVSPs and MDMAs can limit participation to customer groups they specify in serving
- PG&E and SCE must update tariff language as specified

Order #	Ruling	IOU Status
2 & 3	Standardize data transfer (data transfer intervals must be filled with a numerical value; MDMAs must transfer data on a monthly basis)	Completed for PG&E, awaiting update from SCE and SDG&E
4 & 5	IOUs must immediately begin working on billing automation and/or must notify CPUC if they are unable to complete billing automation	On pause, Waiting for MDMA approval
6	Eliminate participation caps on enrollment	**Completed, confirmed by CPUC**
7	IOUs must clarify with MDMAs that they may be limited to serving customers bases that each MDMA/EVSP specializes in serving	Waiting on CPUC confirmation
9	PG&E and SDG&E must file Advice Letters to modify the tariff language to be consistent with the tariff language ordered in D. 22-08-024	**Completed, reference ALs 4268-E and 7019-E**

Sources: D.22-08-024; Advice Letter 6778-E; Advice Letter 4114-E; R. E-5274; Advice Letter 4913-E; Advice Letter 4069-E; Advice Letter 6697-E; Advice Letter 4861-E; NEM Workshop Report

MDMA Role and Enrollment Process

MDMAs collect and process meter data for the IOU and must go through an IOU enrollment process before customers can receive MDMA services.

Customer

MDMA

- Collect and process meter data
- Detects anomalies
- Supports billing accuracy
- Sends recorded data to IOU each month

IOU

- Receives and validates data
- Performs bill calculations
  (+) Primary meter recorded usage
  (-) Submeter recorded usage

MDMA Enrollment Process

1. Request IOU Application
2. Provide submeter device (external & EVSE embedded)
3. Certify submeter for accuracy
4. Demonstrate submeter accuracy and IOU cybersecurity requirements via a test file transfer
5. Provide documentation of personnel requirements, e.g., training compliance, subcontractor policies
6. IOU adds MDMA to approval list and prepares for customer enrollment

Creating Customer Value through Submetering

SDG&E and PG&E offer PEV submetering to allow customers to enroll in EV TOU Rates separate from their main meter rate. SCE uses submetering to credit the cost of the secondary meter but allows any customer with an EV to access the same TOU rate.

	SCE		PG&E		SDG&E	
Standard $/kW	Tier 1 Up to 100% of baseline $0.32	Tier 2 Over 100% of baseline $0.42	Below Allocation Baseline / Above Allocation		Tier 1 Up to 130% of baseline $0.407	Tier 2 Over 130% of baseline $0.512
			Summer Off Peak - $0.40 / $0.50 On Peak - $0.52 / $0.63	Winter Off Peak - $0.37 / $0.47 On Peak - $0.40 / $0.50		
EV TOU $/kW	Summer Off Peak - $0.26 On Peak - $0.56 / $0.38 (weekends)	Winter Off Peak - $0.24 Super Off Peak - $0.24 Mid-Peak - $0.53	Summer Off Peak - $0.37 On Peak - $0.73 Partial Peak - $0.48	Winter Off Peak - $0.34 On Peak - $0.54 Partial Peak - $0.41	Off Peak - $0.45 On Peak - $0.499 Super Off-Peak - $0.248	
Estimated Savings $/kW	**Up to $0.16 during off peak charging in Summer** **Up to $0.18 during off peak charging in winter**		**Up to $0.13 during off peak charging in summer** **Up to $0.13 during off peak charging in winter**		**Up to $0.062 off during off peak charging** **Up to $0.264 off during super off-peak charging**	
Submetering Component	EV TOU rate is available to any residential customer with an EV. Customers who have or install a second meter at their household for charging their EV will qualify for a monthly "EV Meter Credit" on their bill to offset basic charges associated with that second meter.		EV-B separates vehicle's electricity costs from those of the customer's home and involves the installation of a second meter.		EV-TOU requires a separate meter installation to track customer's EV electricity use independently from their Standard (DR) household plan.	

Sources: PG&E Electric Vehicles (EV) Rate Plans; SCE Rate Options for Clean Energy Technology; Electric Vehicle Pricing Plans | San Diego Gas & Electric

PG&E Progress and Updates

Orders from D. 22-08-024 and R. E-5274	Complete
File a Tier 1 advice letter within 30 days D. 22-08-024 to establish a memorandum account	✓
File a Tier 2 advice letter within 120 days of issuance of this decision updating their respective electric rules	✓
Begin accepting plug-in electric vehicle submetering applications and performing billing reconciliation for PEV submetered customers, while upgrading system	
Jointly host a public workshop to explore potential pathways to allow net energy metering (NEM) customers to use the adopted Plug-in Electric Vehicle Submeter Protocol.	✓
Jointly host a public workshop to explore issues associated with incorporating vehicle telematics into the Plug-in Electric Vehicle Submetering Protocol.	✓
Standardize data transfer	✓
Notify CPUC if they are unable to complete billing automation by Dec 31, 2024	
Eliminate participation caps on enrollment	✓
Clarify with MDMAs that they limit customers bases that each MDMA/EVSP specializes in serving	✓
Modify the tariff language to be consistent with the tariff language ordered in D. 22-08-024	✓

2025
Awaiting Updates

PG&E proposed the following:

- **Q4 2023**: PG&E targets starting updates to IT systems to support automated billing
- **Q4 2024**: Targeted completion of automated submeter billing
- **Q1-Q2 2025:** Ready to support customer enrollment

MDMA Enrollment Progress:

- 2 approved MDMAs

Sources: D.22-08-024; R. E-5274; Advice Letter 6778-E; Advice Letter 6697-E; PG&E Advice Letter 7019-E; PG&E MDMA Registration Agreement

SCE Progress on D. 22-08-024 and R. E-5274

Orders from D. 22-08-024 and R. E-5274	Complete
File a Tier 1 advice letter within 30 days D. 22-08-024 to establish a memorandum account	✓
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Jointly host a public workshop to explore issues associated with incorporating vehicle telematics into the Plug-in Electric Vehicle Submetering Protocol.	✓
Standardize data transfer	✓
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Eliminate participation caps on enrollment	✓
Clarify with MDMAs that they limit customers bases that each MDMA/EVSP specializes in serving	
Modify the tariff language to be consistent with the tariff language ordered in D. 22-08-024	✓

Sources: D.22-08-024; R. E-5274; Advice Letter 4913-E; Advice Letter 4861-E; SCE MDMA Qualification Package

SDG&E Progress on D. 22-08-024 and R. E-5274

Orders from D. 22-08-024 and R. E-5274	Complete
File a Tier 1 advice letter within 30 days D. 22-08-024 to establish a memorandum account	✓
File a Tier 2 advice letter within 120 days of issuance of this decision updating their respective electric rules	✓
Begin accepting plug-in electric vehicle submetering applications and performing billing reconciliation for PEV submetered customers, while upgrading system	
Jointly host a public workshop to explore potential pathways to allow net energy metering (NEM) customers to use the adopted Plug-in Electric Vehicle Submeter Protocol.	✓
Jointly host a public workshop to explore issues associated with incorporating vehicle telematics into the Plug-in Electric Vehicle Submetering Protocol.	✓
Standardize data transfer	✓
Notify CPUC if they are unable to complete billing automation by Dec 31, 2024	
Clarify with MDMAs that they limit customers bases that each MDMA/EVSP specializes in serving	
Modify the tariff language to be consistent with the tariff language ordered in D. 22-08-024	✓

Sources: D.22-08-024; R. E-5274; Advice Letter 4114-E; Advice Letter 4069-E; SDG&E Advice Letter 4268-E

SDG&E Progress and Updates

2024 → 2025

Stakeholder Update

SDG&E provided a stakeholder update on progress made against R. E-5274:

- **July 2023**: SDG&E submitted AL 4268-E that proposed tariff changes
- **April 2024**: Phase 1 of their Implementation Plan was complete, developing a "Minimum Viable Product" that works towards automated billing
- **April 2025**: estimated Phase 2 completion for the Implementation Plan which seeks to refine automated billing to ensure efficiency and handling complex billing scenarios

Awaiting Updates

SDG&E proposed the following:

- SDG&E begins Phase 2, focusing on refining their automation solution to handle complex submetering scenarios.

MDMA Enrollment Progress:

- No approved MDMAs published on website

Sources: Advice Letter 4114-E; Advice Letter 4069-E; SDG&E Advice Letter 4268-E

California Public Utilities Commission

Panel 1: Submetering Protocol – Utility Perspectives

Introductions



Shiva Ourang

Utility Engineer with CPUC

Facilitator



Benjamin Mothershead

Senior Manager, Vehicle-Grid Integration

PG&E



Aaron Dyer

Senior Manager

SCE



James McCloskey

Senior Project Manager

SDG&E

EV Submetering Update

April 15, 2025

Ben Mothershead
Senior Manager, Vehicle-Grid Integration | Clean Energy Transportation

INTERNAL

PG&E's Decarbonization Goals

We aim to support 3M EVs & 550 MW of flexible load by 2030

- EVs are fundamental to decarbonizing our energy system while creating value for all customers
- EVs can and are helping reduce rates for all customers by increasing utilization and harnessing their flexible load; EVs have already contributed $2.2B more than associated cost in past 10 years[1]
- EV Submetering could help enable strategies to further PG&E's decarbonization efforts



1. Electric Vehicles are Driving Down Rates for all Customers. Synapse study, May 2024.

Implementation Update and Billing Modernization Timeline

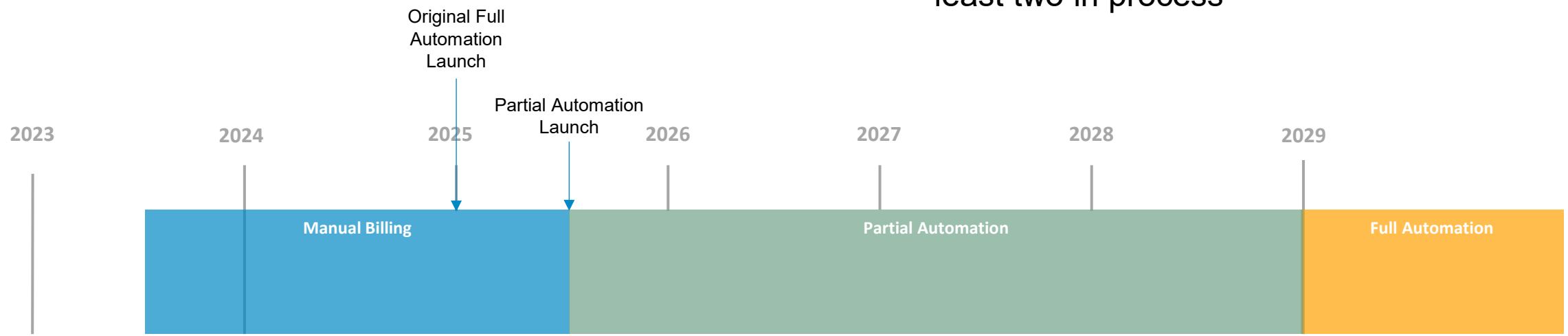
Full Automation of Submetering will be delayed until ~2029 in the current scenario, pending availability of other options. We are building Partial Automation in the interim to significantly reduce implementation costs and will evaluate progress shortly after launch.

Billing Modernization Initiative's impact: a revised plan

- 1st - Manual billing
- 2nd - Partial Automation via bill derivation enhancements w/ some manual billing
- 3rd - Full Automation by 2029 (enrollment, data validation, billing, unenrollment)

Status of MDMAs and customers:

- PG&E is ready to accept customers
- Two MDMAs approved as of April 2025, GridTractor & Applied Systems Engineering, serving commercial customers
- Zero customers enrolled as of April 15 but at least two in process



Where we want to go with Submetering

EV Submetering could lay groundwork for innovation

- Pilots showed that Submetering can drive both **load-shaping** and **high customer satisfaction** rates: 46% shifted to off-peak charging & 91% of customers were “extremely or somewhat satisfied” after 12-month pilot[1]
- PG&E sees Submetering as an important building block for offering innovative products & rates that meet customers’ and utilities’ evolving needs
- **Submetering can support future applications of distributed EV storage** by providing important load and energy measurements
- Opportunities exist to ensure that customers and MDMAs see value in Submetering

1. *California Statewide PEV Submetering Pilot – Phase 2 Report.* Nexant, December 2018.

What we've noticed / Ideas for progress

Observations	Recommendations
1. Limited engagement from MDMAs	• Understand MDMAs' lack of interest (especially in resi. customers), cost structure, barriers to entry
2. Current EVSMP[1] requires high upfront costs for metering[2]	• Determine if EVSMP is too inflexible to lower-cost & emerging solutions
3. Customer participation is predicated on an MDMA	• Explore alternatives to MDMAs to expand pathways for customer enrollment
4. Prospective & past customers want bill savings	• Investigate to what extent Submetering could reduce costs for utilities and customers alike
5. Wiring & metering needs are varied	• Understand the common installation scenarios for customers, determine ways to meet their needs

1. Electric Vehicle Submetering Protocol 2. hardware, integration/setup fees, installation costs, maintenance, replacement cost of existing charger, device certification, etc.

Thank You

Ben Mothershead
Senior Manager, Vehicle-Grid Integration | Clean Energy Transportation
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EV Submetering Protocol

April 15, 2025

Aaron R. Dyer, PE, PMP
Senior Manager, Program Design & Development
Customer Solutions

Current Status – Overview of SCE's EV Submetering Protocol

Submeter Equip Approval

- New "Submeter" Approved Product List (APL) available at www.sce.com/apl

MDMA Qualification

- 1st Approved MDMA: **GridTractor** - Submitted 5/31/2024
- 2nd in Pipeline for approval: **FlipTurn** - Submitted 10/31/2024
- 3rd in Pipeline for approval: **SWTCH** - Submitted 1/23/2025

Customer Enrollment

- **Approved MDMAs are responsible for completing enrollment applications** & returning to SCE.
- Submeter customer participants will be responsible for any MDMA related charges. MDMA business model & pricing is currently unknown, but completely discretionary

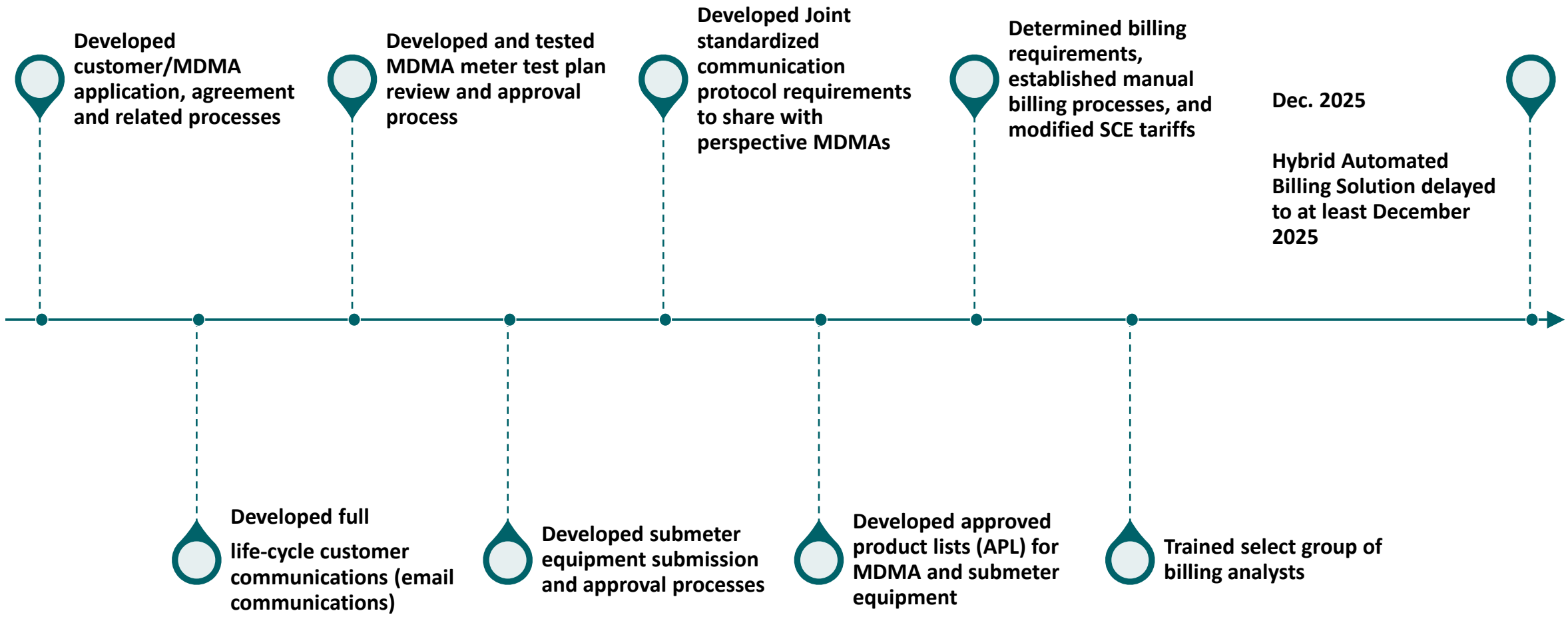
Customer Interest

- As of April 15, 2025, SCE is still awaiting its first customer application.
- To enroll, customers must partner with an approved MDMA.
- The value proposition for the customer must intersect with the value proposition for the MDMA.

Manual Billing Readiness

- **READY** to receive and process applications and to implement the billing process

Key Milestones – Program Implementation (July 2023 to Date)



Budget Overview of SCE's EV Submetering

Resolution E-5274 approved $7.5M for program expenditures

2023-2025 Non-Billing System Estimated Costs	2023	2024	2025	Total
Submeter & MDMA Approval Management	140,000	140,000	140,000	420,000
Project Manager	200,000	200,000	200,000	600,000
Manual Billing	1,180,000	1,160,000	1,160,000	3,500,000
Application Processing & Training	100,000	60,000	60,000	220,000
Non-Billing System Total	**1,620,000**	**1,560,000**	**1,560,000**	**4,740,000**



2023-2029 Billing System Estimated Costs	2023	2024	2025	2026	2027	2028	2029	Total
Required System Modifications	600,000	400,000	-	-	-	-	-	1,000,000
Hybrid Automation	200,000	800,000	200,000	-	-	-	-	1,200,000
Full Automation	-	-	-	1,020,000	2,660,000	1,440,000	160,000	5,280,000
Future Integration of NEM & Telematics	**Unknown[1]**							
Billing System Total	**800,000**	**1,200,000**	**200,000**	**1,020,000**	**2,660,000**	**1,440,000**	**160,000**	**7,480,000**

1 – SCE anticipates additional integration costs if the Commission authorizes NEM customers to participate in submetering and permits the use of telematics

Outreach and Marketing

- **Building Customer Awareness**
  - Created a publicly available program fact sheet on SCE.com
  - Contacted interested customers to facilitate MDMA program enrollment after approval of SCE's first participating MDMA.
- **Participation Recruitment**
  - Continuously provide program-related information to non-residential customers through routine business customer engagements.
  - Proactively engaged EVSE suppliers to encourage participation in the program.
  - Proactively engages SCE's Charge Ready Network Service Providers and other potential MDMAs to solicit participation in MDMA role.

Challenges and Barriers

Low Customer Demand/Participation

- **Stringent program requirements** - Customers must purchase and install IOU approved submeters and will likely be required to pay MDMAs for required data services.
- **Costs do not outweigh the benefits** - Potential savings achieved by leveraging EV friendly Submeter rate plans might not exceed participation costs.
- **Inability to test manual billing system** – lack of participation to-date means that SCE will need to retrain its billing staff

MDMA Approval Process / Collaboration with MDMA Candidates

- Challenges with timely communication and responses to questions during the MDMA approval processes.
- Only three MDMA applications received to date and has approved one application. Other two still in approval process. No MDMA applicant drop-offs to date.

MCOR Customer Enrollment

- SCE's manual billing process ready to support MCOR customers but SCE has not received any customer applications to date.
- MCOR participation challenges still unknown as MCOR was not tested in Phase 1 or Phase 2 of Submeter Pilots

Strategies for Enhancing Customer Engagement and Program Participation

- **Strengthening Training for Manual Billing Support**
  - Increase internal training efforts to support ongoing manual billing processes
- **Identifying and Addressing Root Causes of Low Customer Interest**
  - Track approved MDMA progress for acquiring customers and share best practices.
  - Ensure program information and potential benefits are easily accessible to customers, empowering them to make informed decisions based on installation costs and MDMA service fees.

Appendix

Submeter Billing for EV Charging Equipment

1. Enrolling customer needs to partner with an approved Meter Data Management Agent (MDMA)
2. Customer installs qualifying submeter equipment
3. MDMA reads and verifies submeter data and sends to SCE for billing purposes
4. SCE receives and also validates submeter data and performs subtractive billing / bill generation



SCE primary meter upstream of the EV charging equipment



OR



Submeter Equipment

Customer or 3rd Party Owned

MDMA sends recorded usage data each month

SCE Performs Bill Calculations

(+) Primary Meter Recorded Usage
(-) Submeter Recorded Usage



Modifies Primary Account Holder Bill

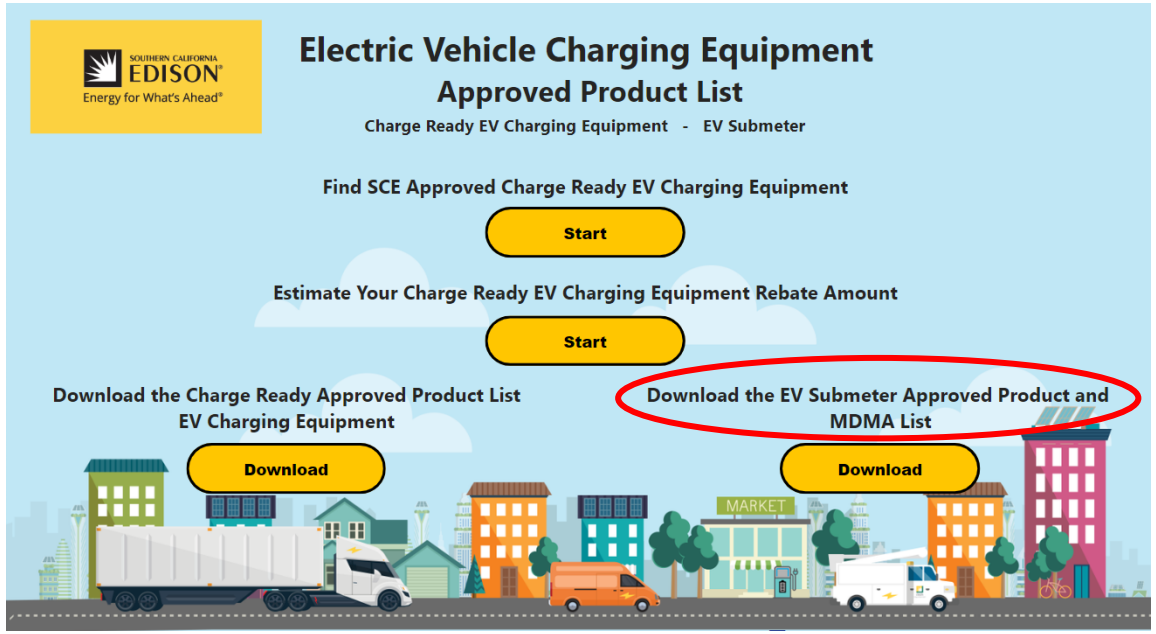


Creates NEW Submeter Bill

Images for illustration purposes only

Approved Submeter Equipment

www.sce.com/apl



SCE EVSE Embedded Submeters - Approved Product List

All Submeter's require a Meter Data Management Agent (MDMA)

EVSE Manufacturer	Approved EVSE Model Numbers	Equipment Output (kW)	AC or DC	Charger Type	CTEP Certification	Notes
Loop						
Loop	Flex	7.68	AC	L2	Y	
Loop	Flex Light	7.68	AC	L2	Y	
Loop	Fleet	19.2	AC	L2	Y	
Zerova						
Zerova	AX48	11	AC	L2	Y	
Zerova	AX80	19.2	AC	L2	Y	
Zerova	DS60	60	DC	DCFC	Y	
Zerova	DS90	90	DC	DCFC	Y	
Zerova	DS120	120	DC	DCFC	Y	
Zerova	DS150	150	DC		Y	

Embedded SubMeters | External SubMeters | SCE's Approved MDMA's

SCE External (Non-EVSE Embedded) Submeters - Approved Product List

All Submeter's require a Meter Data Management Agent (MDMA)

Submeter Make	Approved Submeter Model Numbers	Notes
Aclara	I-210+C	PG&E Revenue Grade Meter
Aclara	KV2C-HV	PG&E Revenue Grade Meter
Aclara	KV2CE	PG&E Revenue Grade Meter
Aclara	KV2C-H	PG&E Revenue Grade Meter
Aclara	I-210+	PG&E Revenue Grade Meter
Aclara	KV2C+	PG&E / SDG&E Revenue Grade Meter
Aclara	KV2C-M	PG&E Revenue Grade Meter
Aclara	KV2C	PG&E / SDG&E Revenue Grade Meter
CIMCON	SMARTPOLE Meter	PG&E Revenue Grade Meter
Honeywell	A4R-DSH	PG&E Revenue Grade Meter
Honeywell	A4R	PG&E Revenue Grade Meter
Honeywell	A4CI-H	PG&E Revenue Grade Meter
Honeywell	A4R-H	PG&E Revenue Grade Meter

Embedded SubMeters | External SubMeters | SCE's Approved MDMA's

SCE Resources

- MDMA Applications requests: SCESubmeteringAPL@sce.com
- Submeter Equipment Qualification Package / Approvals: SCESubmeteringAPL@sce.com
- List of currently Approved Submeter Equipment: www.sce.com/apl
- List of currently Approved MDMAs: www.sce.com/apl
- Submeter Billing Program Fact Sheet: [SCE.com] https://www.sce.com/factsheet/EV_Charging%E2%80%93Submeter_Billing_Option_Information_Sheet
- Customer Enrollment Application related questions [CSOD]: EVSubmetering@sce.com

Energy Innovation
Clean Transportation

EV Submetering Protocol

April 15, 2025

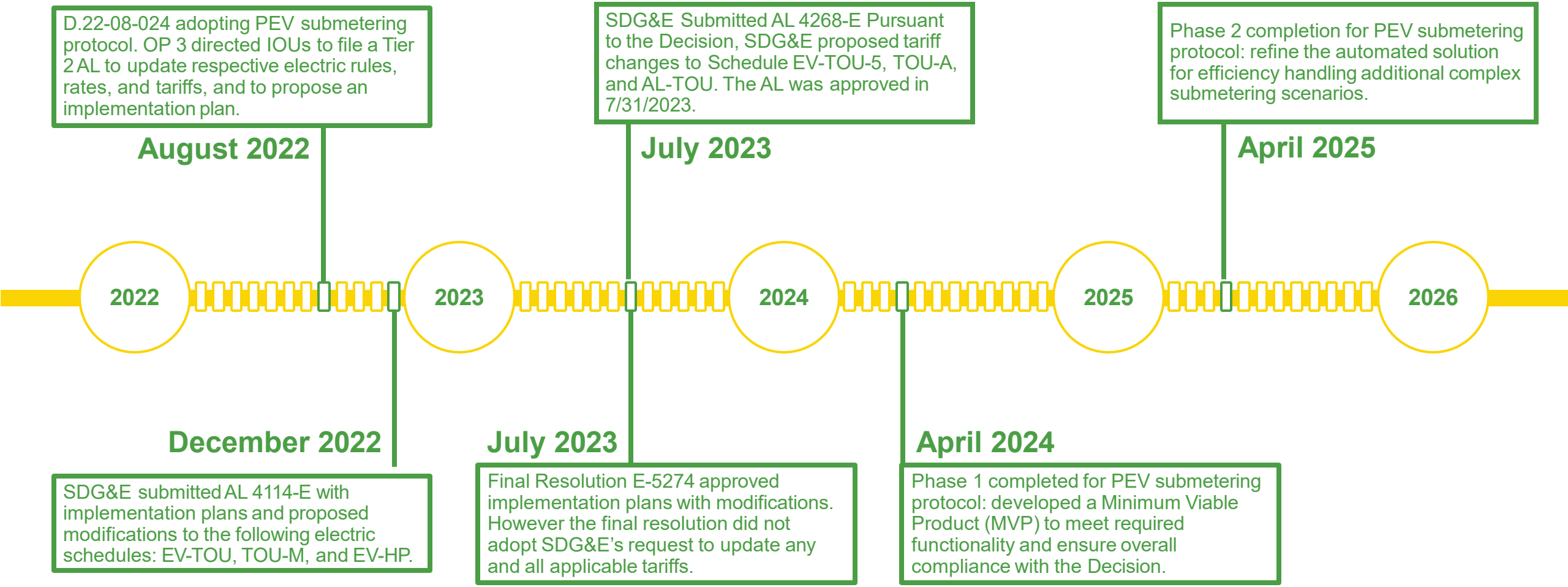
James McCloskey

Clean Transportation

Senior Project Manager



MILESTONE TIMELINE



BUDGET OVERVIEW

Proposed Budget in AL 4114-E	2023	2024	2025	TOTALS
Program Management	$250,000	$200,000	$175,000	**$625,000**
Manual Billing	$500,000	$170,000	$50,000	**$720,000**
Phase 1 - MVP Implementation	$2,500,000	-	-	**$2,500,000**
Phase 2 – Refinement	$500,000	$1,500,000	-	**$2,000,000**
ME&O	$100,000	$75,000	$50,000	**$225,000**
Future Integration of NEM and Telematics	TBD	TBD	TBD	-
TOTALS	**$3,850,000**	**$1,945,000**	**$275,000**	**$6,070,000**

The project concluded with expenditures of approximately $5.4 million (with AFUDC, based on March and April forecasts).

Minimal budget was allocated to ME&O activities due to the lack of participating MDMA vendors.



BILLING SYSTEM UPGRADES

Enhancements Outlined in AL 4114E

	Completed
An EVSP MDMA **onboarding and verification** process.	✓
A secure data integration process for the MDMAs to send **enrollment and unenrollment** information.	✓
A secure data integration process for the MDMAs to send **customer usage data**.	✓
A process to **validate and ingest** customer enrollment/unenrollment and usage data.	✓
A new **subtractive billing calculation** process, to support billing both the customer's EV charging and non-EV charging load.	✓
Changes to the customer bill to accurately present charges for both the customer's EV charging and non-EV charging load.	✓
Updates to SDG&E's Cloud for Customer (C4C) system to **identify that the customer is participating in submetering** for internal SDG&E Customer Contact Center employees, allowing them to better serve the customer and respond to inquiries.	✓
Updates to SDG&E's My Energy Center allowing for customers who self-serve to **view EV charging and non-EV charging usage**.	✓
Updates to SDG&E's reporting systems to **capture and display submetering information**.	✓
Additional changes to ensure submetering **indicators and data are accurately being stored and displayed** within its systems.	✓

IT PROJECT UPDATE



BILLING SYSTEM

SDG&E implemented its billing system in alignment with the approved implementation plan, future enhancements to be prioritized as needed.

Enhancements include automated customer enrollment, secure data transfer processes with MDMAs, billing system modifications to support subtractive billing, and customer access to submetering details via SDG&E's My Energy Center.



MILESTONES

SDG&E met all milestones outlined in E-5274 for implementing an automated billing system and followed standard IT project management practices for continuity of operations and knowledge retention.

These practices will support the long-term sustainability of the submetering program and allow new subject matter experts to maintain and improve the program as needed.

BILLING SYSTEM CUSTOMER SCALABILITY



ENROLLMENTS

SDG&E has implemented automated billing and enrollment solutions for Single Customer of Record (SCOR) customers, while Multiple Customer of Record (MCOR) customers will require manual enrollment.

SDG&E's system is designed to support both SCOR customers and MCOR submetering customers efficiently.



BILLING

SDG&E completed its automated billing solution and is ready to provide submetering billing services once a participating MDMA vendor is secured.

Coordination with MDMA partners is essential for accurate data exchange, but manual billing support has not been required due to the absence of participating MDMAs.

There is no utility-managed physical validation process for third-party meters. SDG&E will not inspect customer-owned meters, incorrect customer-side enrollments could impact billing accuracy.

OUTREACH AND MARKETING



CUSTOMER AWARENESS EFFORTS

With no participating MDMA vendors currently enrolled, SDG&E has developed a submetering webpage and an informational fact sheet to provide foundational resources and support future outreach.

Our customer contact center specialists are trained to address submetering inquiries. An EV charging submeter billing fact sheet is available online, featuring key details on installation, benefits, eligibility, enrollment, and the approved product list.

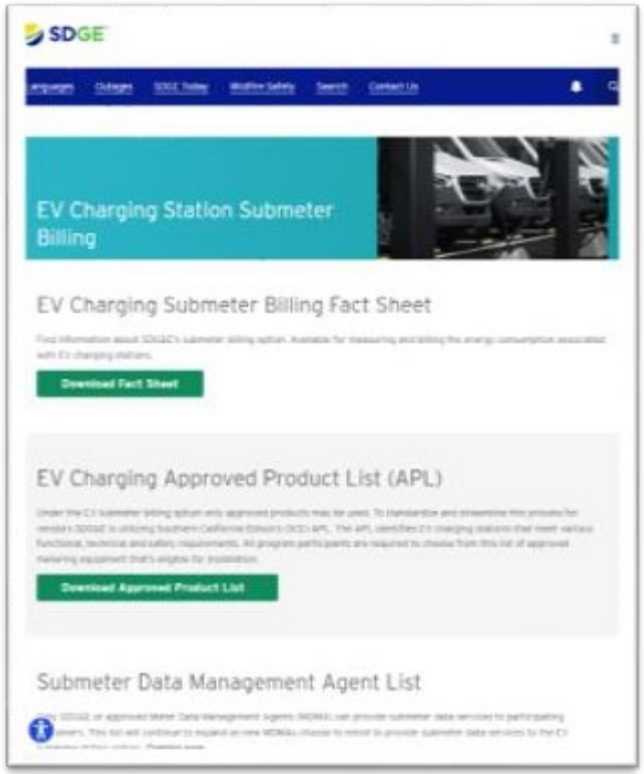


ADDRESSING CUSTOMER DEMAND

Customer interest in submetering exists; however, participation has been limited due to the lack of enrolled MDMAs, preventing interested customers from joining the program.

Alternative market solutions, like establishing the main meter customer as site host with an EVSP, provide greater flexibility by allowing control over charger access, pricing, and revenue collection—potentially reducing the demand for submetering solutions.

MARKETING AND EDUCATION CONTENT







Visit **SDGE.com/LOVELECTRIC** for more information.

MULTIPLE CUSTOMERS OF RECORD



BARRIERS FOR MCOR CUSTOMERS

SDG&E has not yet enrolled any Multiple Customer of Record (MCOR) customers due to a lack of participating MDMAs. While discussions have taken place with multiple prospective MDMAs, none have completed the necessary data integrations required for implementing subtractive billing for both SCOR and MCOR scenarios.



MCOR CHALLENGES

The MCOR scenario was not implemented in previous pilots, leaving no standardized process for handling move-ins/move-outs, managing enrollments, or determining responsibility for billing issues when multiple customers share a single main meter.

The move-in/out process for MCOR will remain manual, requiring staff to handle enrollments for submetering. Exceptions or disputes will be manual if errors occur.

MDMA PARTICIPATION

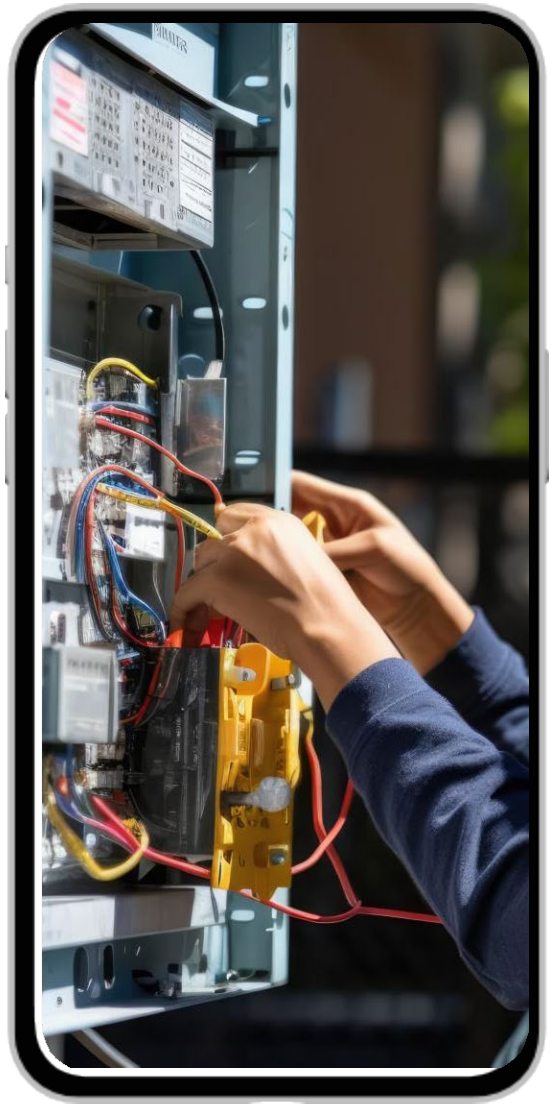
SDG&E identified two key challenges with MDMA participation:

1. MDMAs **require internal support and a strong business case** to justify their investment.
2. The **current monthly data transfer protocol poses a risk** to billing accuracy if missed; increased daily transfer frequency with redundancy could enhance reliability.

SDG&E had no Submeter device certification challenges because SCE is managing this process.

The MDMA approval process, including collaboration with MDMA candidates, has been slow.

Despite meetings with multiple MDMA vendors, none have yet opted to complete data integrations to become established MDMA partners.





Thank you for your time.



California Public
Utilities Commission

Break: 11:30-11:45

Workshop Agenda

Welcome and Safety	10:00-10:05
Opening Remarks	10:05-10:15
Introduction to Decision 22-08-024 & Resolution E-5274 – CPUC Perspectives	10:15-10:30
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Break	2:45-3:00
Panel 4: Fostering Collaborative Solutions & Closing	3:00-4:00

California Public Utilities Commission

Panel 2: Submetering Protocol – MDMAs Perspectives

Panelists



Shiva Ourang

Utility Engineer with CPUC

Facilitator



David Meyers

Founder/CEO

Gridtractor



Zachary Lee

Director – Research and Development

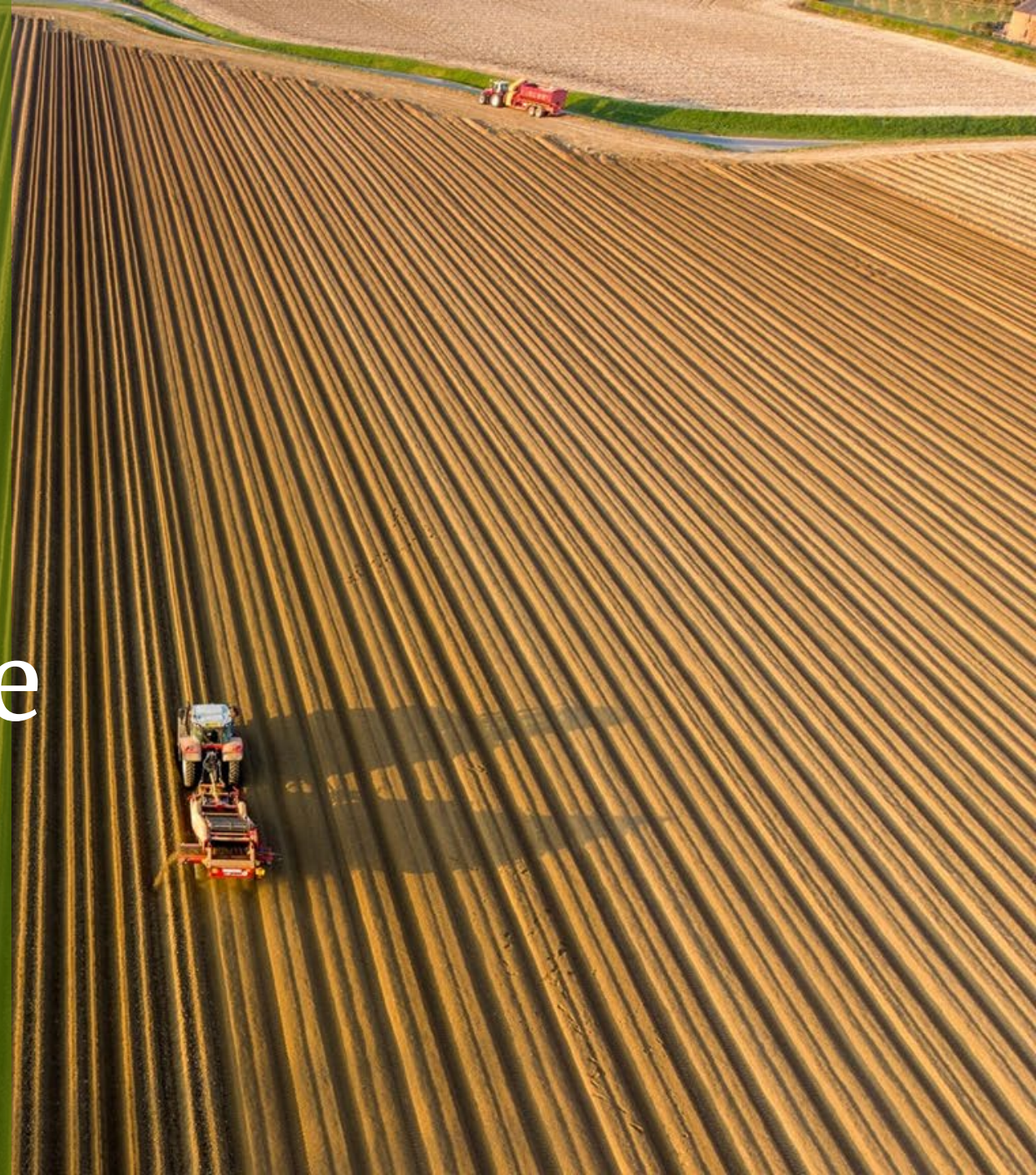
Powerflex

GRIDTRACTOR

Submetering and Telematics Workshop

MDMA Perspective

David Meyers
CEO



PLATFORM

Market-to-Farm

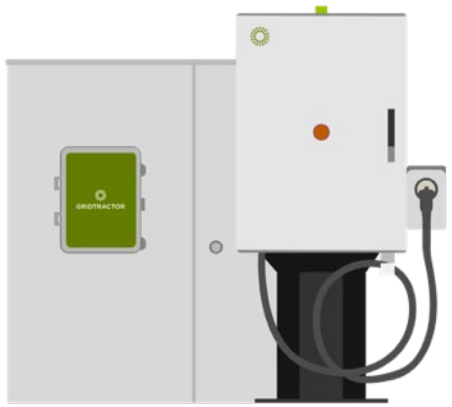


GRIDTRACTOR

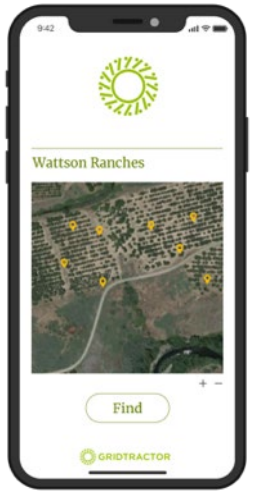
Product Offering



>Plan



>Charge



>Operate



>Monetize

GRIDTRACTOR

REDWDS Use Case for Submetering





GRIDTRACTOR

MDMA Approval Process For Submetering

- 1 year from first inquiry
- Lack of clarity, e.g. between two IOUs
- Questions about the decision often met with referring back to the decision
- Now that the process is complete, the path for enrollment of customers is clearer and communication is better

GRIDTRACTOR

Submetering Device Certification

- For several months, there was a lack of clarity on certification of external submeters (e.g. the forms had questions that only applied to embedded submeters)
- Provided what seemed to be the same information more than once without any clarification on what was missing
- There was not confirmation of submittals or clear feedback
- **The second certification went faster than the first (much)**
- Gap between submeter and MDMA requirements
  - Voltage measurements
  - “Power Outage”
  - OCPP access

GRIDTRACTOR

MDMA Business Model

- The CPUC/IOU model is “copy/paste” of utility metering, which is not the same as commercial submetering or EVSE submetering
  - What’s an MSP?!
  - Where’s a power outage?
  - What if the meter passes the test but the data availability doesn’t?
  - Why is a site visit needed?
- As currently specified, the model will work well for large, multi-EVSE deployments; residential and small commercial do not pencil out
- Even for larger deployments, it is not clear that the business model is attractive
  - Cost to serve…how much manual intervention is required?
  - Meter reliability and data quality?
  - Volume?
  - Meter sampling requirements?
  - Validation may pop a lot of flags

GRIDTRACTOR

Collaboration with other entities

- **NEM exclusion is a big deal, unnecessary and based on incorrect information**
  - Proactive energy managers likely to be early adopters of EVs are often who were early adopters of other energy technologies, e.g. solar!
  - Submetering was initially a way to address NEM exclusions/delays in dynamic pricing so now those customers are "double excluded"
  - IOUs and CPUC have received detailed explanations addressing these issues and have not acted to address the issue – "shell game"
- Charging system implementers and energy management providers are good channels as they are likely to identify the need/opportunity first but may not see enough value in becoming MDMAs themselves

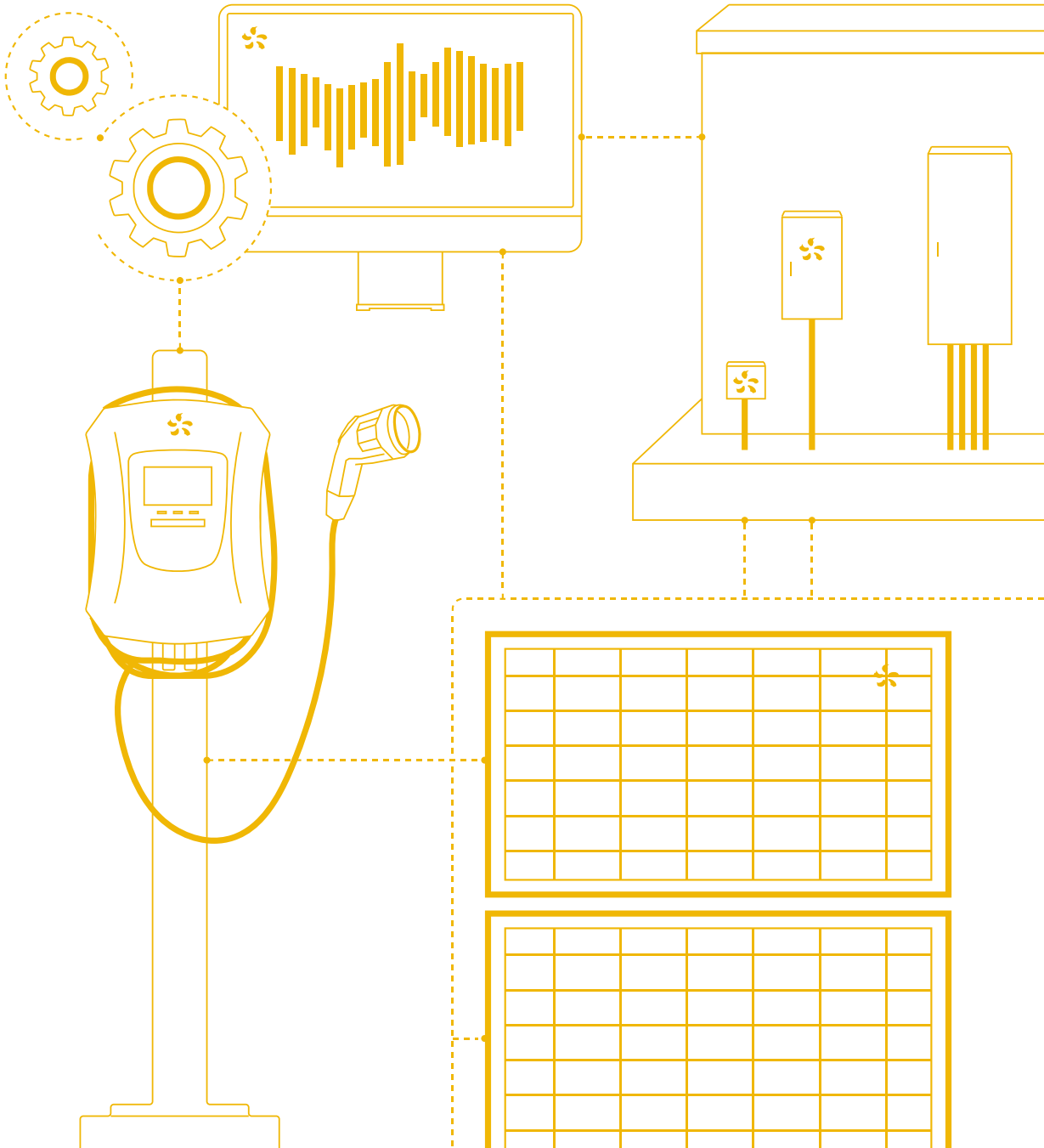
GRIDTRACTOR

Discussion

powerflex
EDF Renewables

Perspectives on Submetering

Zach Lee
Director of Research and Development



Who is PowerFlex?

32,000+

Managed EV Charging Stations

450+ MW

Commercial Solar

40+ MWh

Commercial Storage



LAX – California – 1,200+ EVSEs



Amazon – California – 3.8 MW



San Diego Zoo – California – 1 MW / 4 MWh

powerflex
EDF Renewables

Why our customers want submetering

Benefits of Dedicated EV Service

- Reduce electricity costs
- Control demand charge risk
- Fairly allocate costs between tenants or departments
- Segregating flexible load from inflexible load

Without the Downsides

- Long timelines
- Higher infrastructure costs
- No metering flexibility

powerflex
EDF Renewables

Our Journey to becoming an MDMA

- Early stages of becoming an MDMA
- Assessing submetering value with early customers
- Portfolio analysis to determine market scope
- Applied for CEC EPIC funding to develop a flexible MDMA platform
- Exploring partnerships with other MDMAs



powerflex
EDF Renewables

Challenge: Timeline and Process Uncertainty

- Need clear testing protocols and timelines.
- Uncertainty in the process for certifying, testing and operating systems based on embedded submeters.
- Uncertainty on the process for some IOUs.



Challenge: Submetering for NEM Sites

- Currently, the CPUC decision disallows submetering for NEM tariffs customers
- We see high demand for submetering from sites with solar
- Solar + daytime EV charging is ideal and should be encouraged

- **Recommendation:** Create a technical working group of utilities and MDMAs to find a fair way to submeter sites on NEM tariffs



powerflex
EDF Renewables

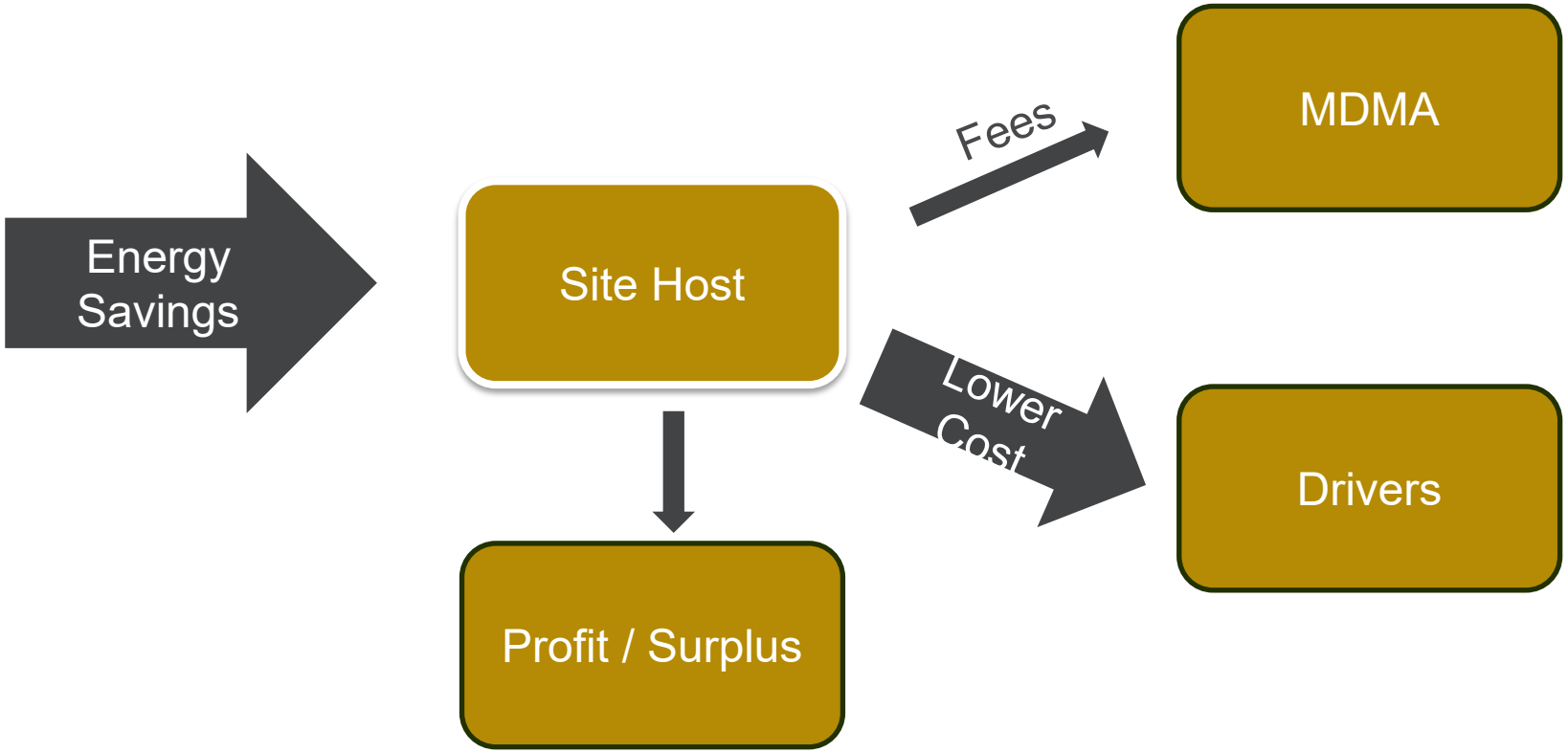
Business Model

- Expect significant cost savings from submetering:
  - ~$72k / year (65% savings) for workplace
  - ~$55k / year (55% savings) for fleet

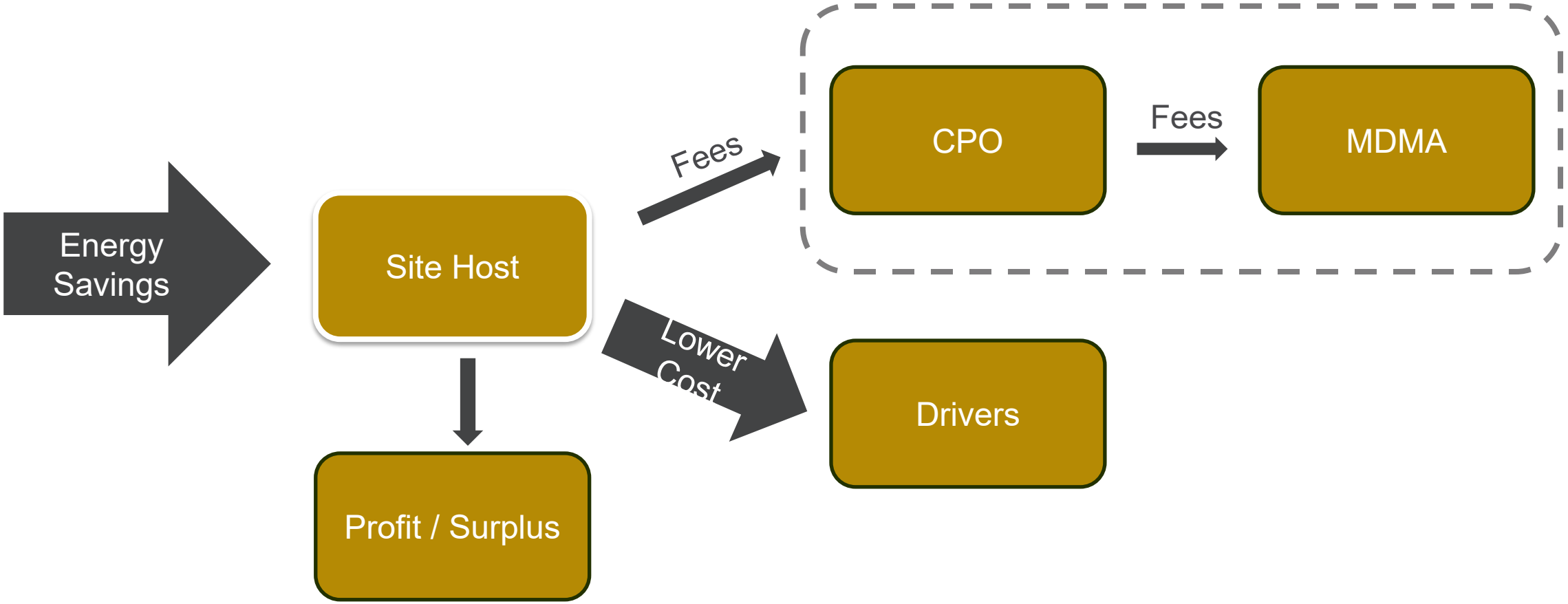
- **Key Questions:**
  - How should we allocate savings between site hosts, CPOs, MDMAs, and drivers?
  - What are the ongoing costs of operating an MDMA?
  - Are there additional revenue streams enabled by submetering?



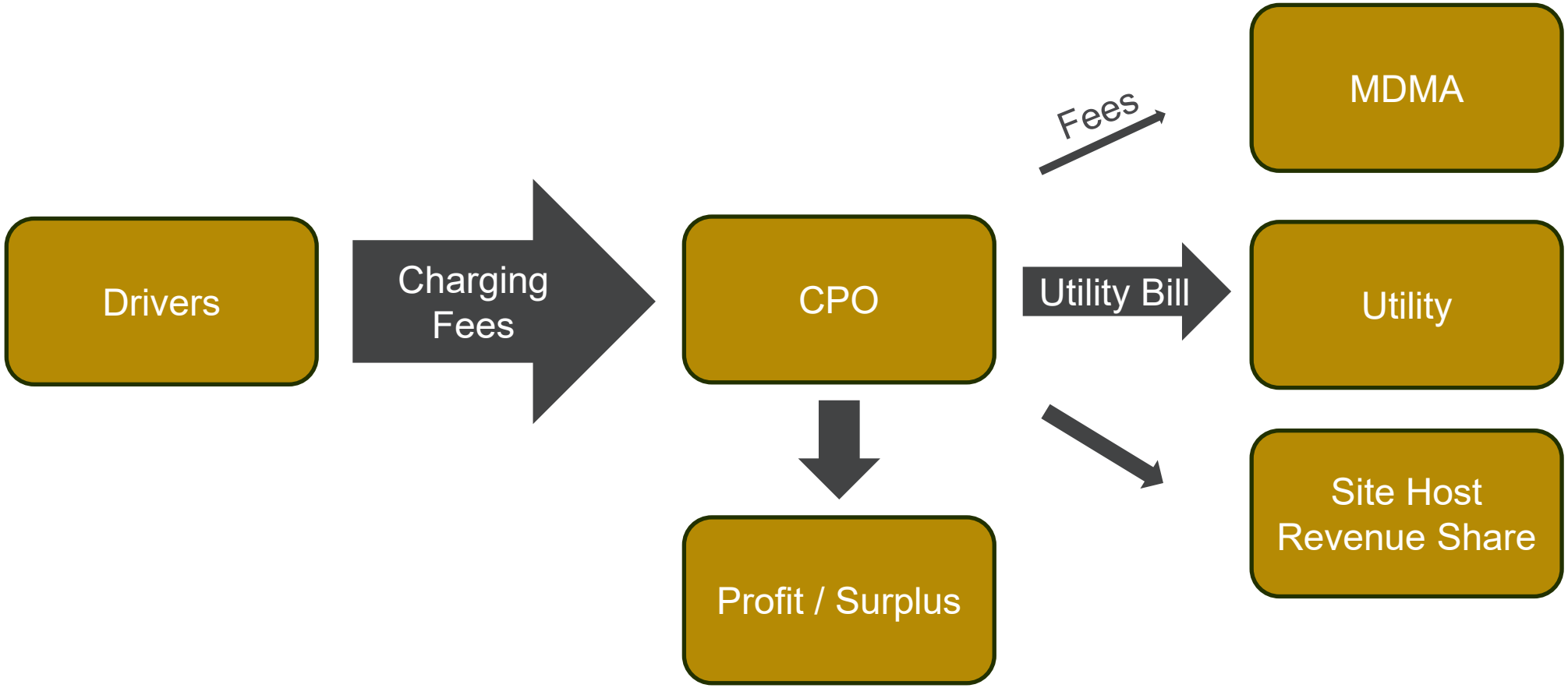
Basic Direct Fee



Bundled with CPO



CPO Direct Bill



Collaborations

- We have several customers who are very excited about submetering.
  - Reduce energy costs
  - Reduce uncertainty caused by demand charges
  - Fairly divide energy costs between departments, tenants, etc.
- Segments include:
  - Fleets
  - Commercial Real Estate
  - Governments
  - Mixed Use Facilities
  - Schools / Universities
  - Multi-unit dwellings
- Exploring partnerships with MDMA providers to get customers access to submetering

Final Thoughts

- Submetering can significantly reduce the costs of ownership for electric vehicles helping us meet our ZEV goals.
- Submetering rules should be compatible with other programs and technologies, e.g., solar, storage, flexible interconnection programs, DR programs, hourly flex pricing, etc.
- We should seek to minimize the administrative burden on MDMAs so they can pass savings on to site hosts and drivers.



Thank you!

Zach Lee

Director of Research and Development

zach.lee@powerflex.com

powerflex.com

(888) 888-8888

Street

City, State Zip

powerflex
EDF Renewables

California Public
Utilities Commission

Lunch Break : 12:45-1:45PM

Workshop Agenda

Welcome and Safety	10:00-10:05
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California Public
Utilities Commission

Panel 3: Presentation on Vehicle Telematics

Panelists



Shiva Ourang

Utility Engineer with CPUC

Facilitator



Mathias Bell

VP of Market Development

Weavegrid



Zach Woogan

Executive Director

VGIC



Nancy Ryan

Partner

Alliance for Automotive Innovation

WeaveGrid

Public Workshop on Submetering and Telematics

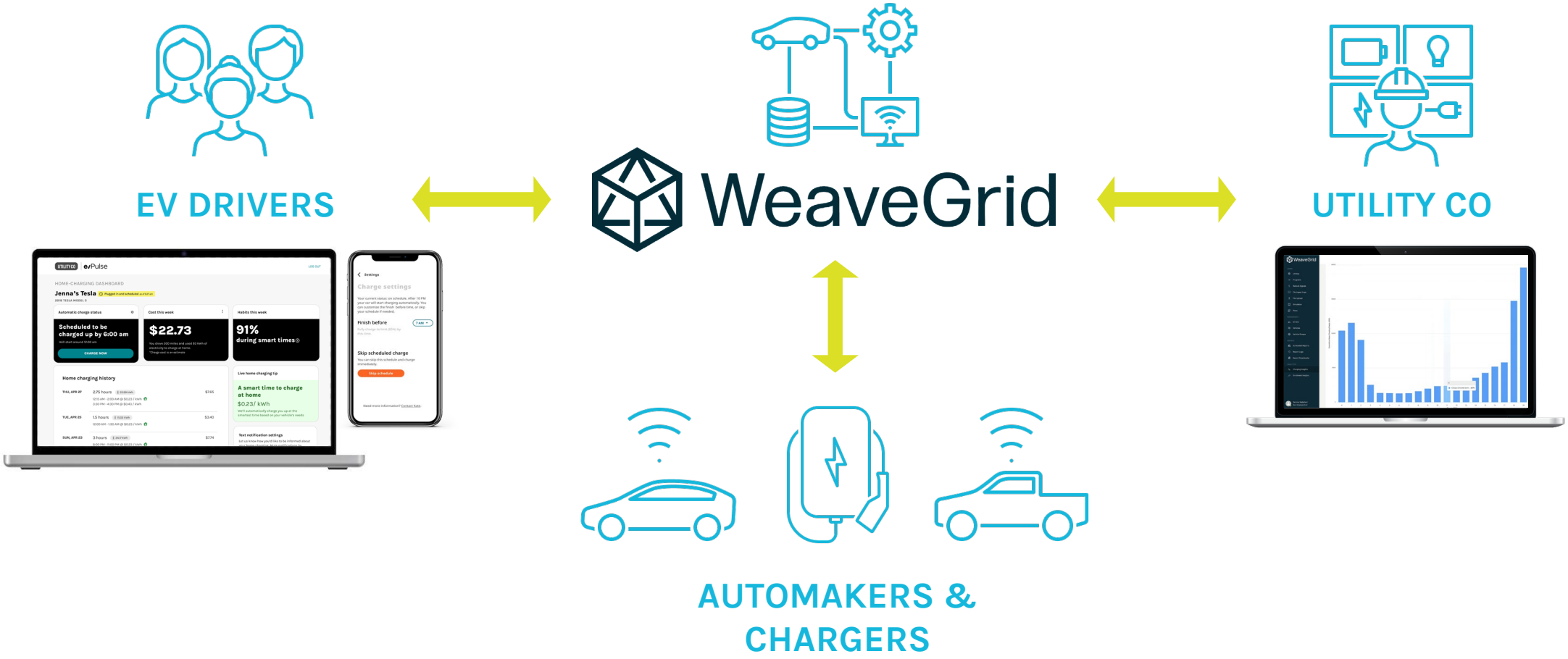
Mathias Bell

April 2025

WeaveGrid

OUR APPROACH

WeaveGrid builds software that helps integrate EVs and the electric grid



WeaveGrid's Position

Telematics can enable a range of use cases that support affordable, reliable, and resilient charging

Not all telematics are created equal. Screen scraping raises concerns around data security, reliability, and long-term viability. Direct, authorized integrations offer a more scalable path.

Authorized integrations are improving. OEMs are refining data specifications and equipment to better support submetering programs.

Well-suited for load management. Direct, authorized telematics data is highly capable for load management programs. Submetering depends on the OEM make/model.

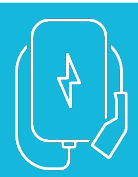


WeaveGrid

Telematics– what's great about them



- **Improved access**
  No additional hardware required
- **Expanded data insights**
  Leverages state of charge data
- **Enhanced flexibility**
  Not tied to fixed locations.

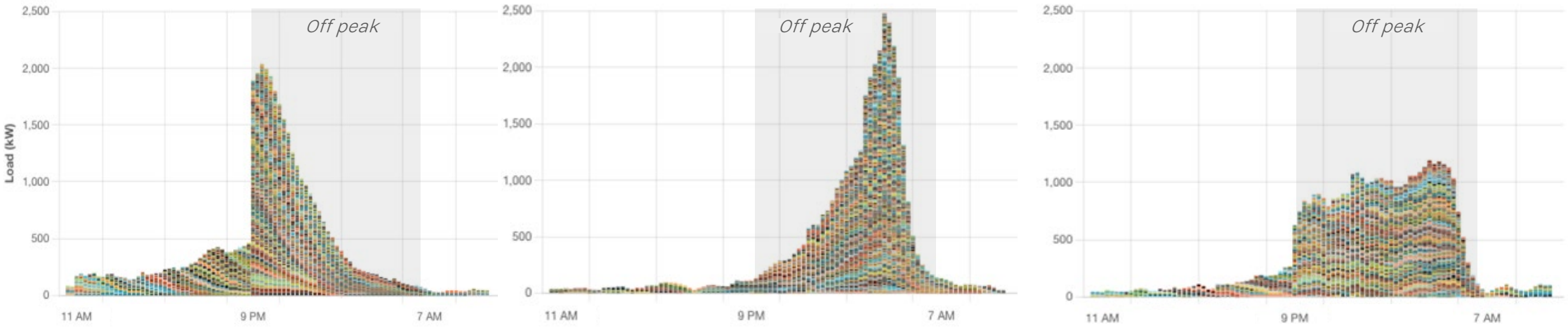


Telematics complement EVSEs:

Together, they improve participation and coverage

WeaveGrid

Grid Value from Telematics: Use Cases in Utility Programs



1. TOU Rates & Traditional DR

Shift charging to off-peak time periods and curtail charging during peak times

2. Dynamic Rates

Shift charging to low-cost hours based on dynamic pricing signals

3. Distribution Optimization

Optimize charging to protect assets by grouping vehicles to simulate distribution asset capacity per type (e.g., feeder)

**Graphics are visual representations of home charging with each color indicating a unique vehicle.*

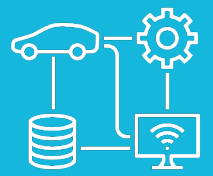
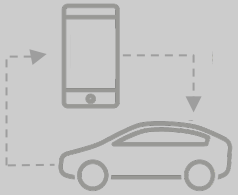
WeaveGrid

Telematics are not created equal

Unauthorized	Authorized by OEMs	
Screen Scraping (reverse engineering APIs)	**Documented, Commercially Available APIs**	**Custom, Partner Integrations**
Seeks to leverage data, communications, controls of customer mobile app via driver credentials	*OEM provides commercial API for energy and managed charging use cases.*	*OEM and platform work together to build customer experiences, data specs and controls to serve energy and managed charging use cases*

WeaveGrid

Why the Type of Integrations Matter: Quality, Reliability, and Security

Direct Authorized Integrations & Partnerships	 **Customer** Authorizes permissions for platform to access data and controls	 **Platform** Leverages custom integrations and/or APIs with OEM to enable communications	 **OEM** Maintains visibility and control over access, ensuring security and trust while supporting marketing and enrollment
Screen Scraping, Reverse Engineering, and Non-licensed Pathways	 **Customer** Shares OEM app credentials with third party	 **Third Party App** Logs into OEM app on behalf of customer to "scrape" *limited* data and controls	 **OEM** Lacks transparency on who has access to their customers' data and controls

Improving Telematics for Submetering

Approaches vary by OEM and make model:



Improving data specifications, leveraging state of charge and data from vehicle CAN bus



Adding vehicle-side monitoring, sensor equipment (i.e., measure current) to increase accuracy

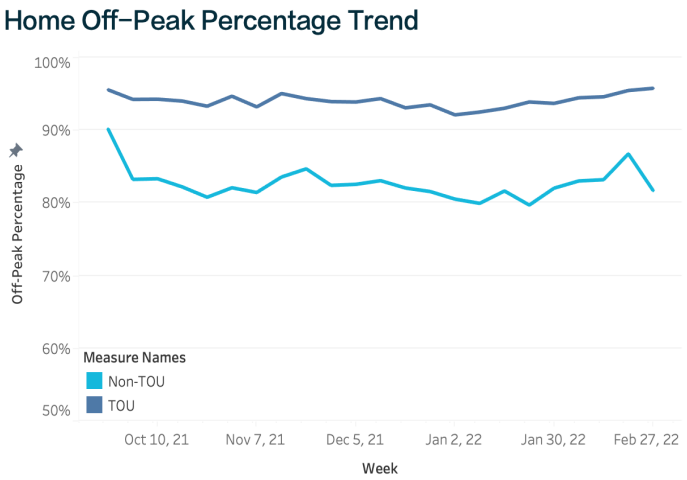


Establishing validation protocols and data standards to ensure consistency

WeaveGrid

REAL WORLD DEPLOYMENTS

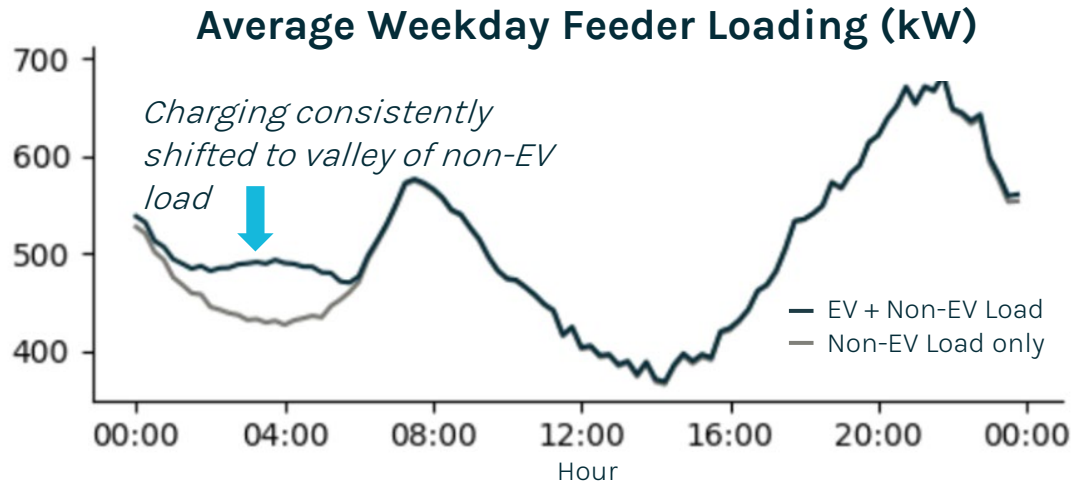
Case Studies Using Telematics



EV-only Time-Varying Rates

- Used a Maryland PSC waiver to enable telematics for submetering
- For participating customers, more than 97% of charging occurs off-peak

bge℠
AN EXELON COMPANY



Distribution Orchestration

- Incorporate **non-EV load** forecasts for assets to enable EV load shifting away from asset peak and significantly increase grid value
- Up to **100% decrease in EV charging coincident with asset peak,** reducing risk of asset overloading

Portland General Electric

WeaveGrid

Next Steps

Recommendation: CPUC should encourage and enable telematics as a viable submetering pathway and for load management

- Support performance based pilots to validate the accuracy and reliability of telematics-derived data under real-world conditions for submetering
- Continue to convene a technical working group with utilities, OEMS, and platform providers to develop data definitions and verification protocols for submetering
- Utilize telematics in load management programs

Telematics can support use cases to meet affordability and reliability goals



WeaveGrid

WeaveGrid

Mathias Bell
mathias.bell@weavegrid.com

Amanda Myers Wisser
amanda.myers@weavegrid.com

Thank You!

WeaveGrid

VGIC
VEHICLE-GRID INTEGRATION COUNCIL



Telematics-Based Managed Charging

Zach Woogen, Executive Director, VGIC
April 15, 2025

VGIC MEMBERS / 2025

LEADERSHIP CIRCLE

Fermata Energy
Ford
gm
HONDA
NISSAN GROUP OF NORTH AMERICA

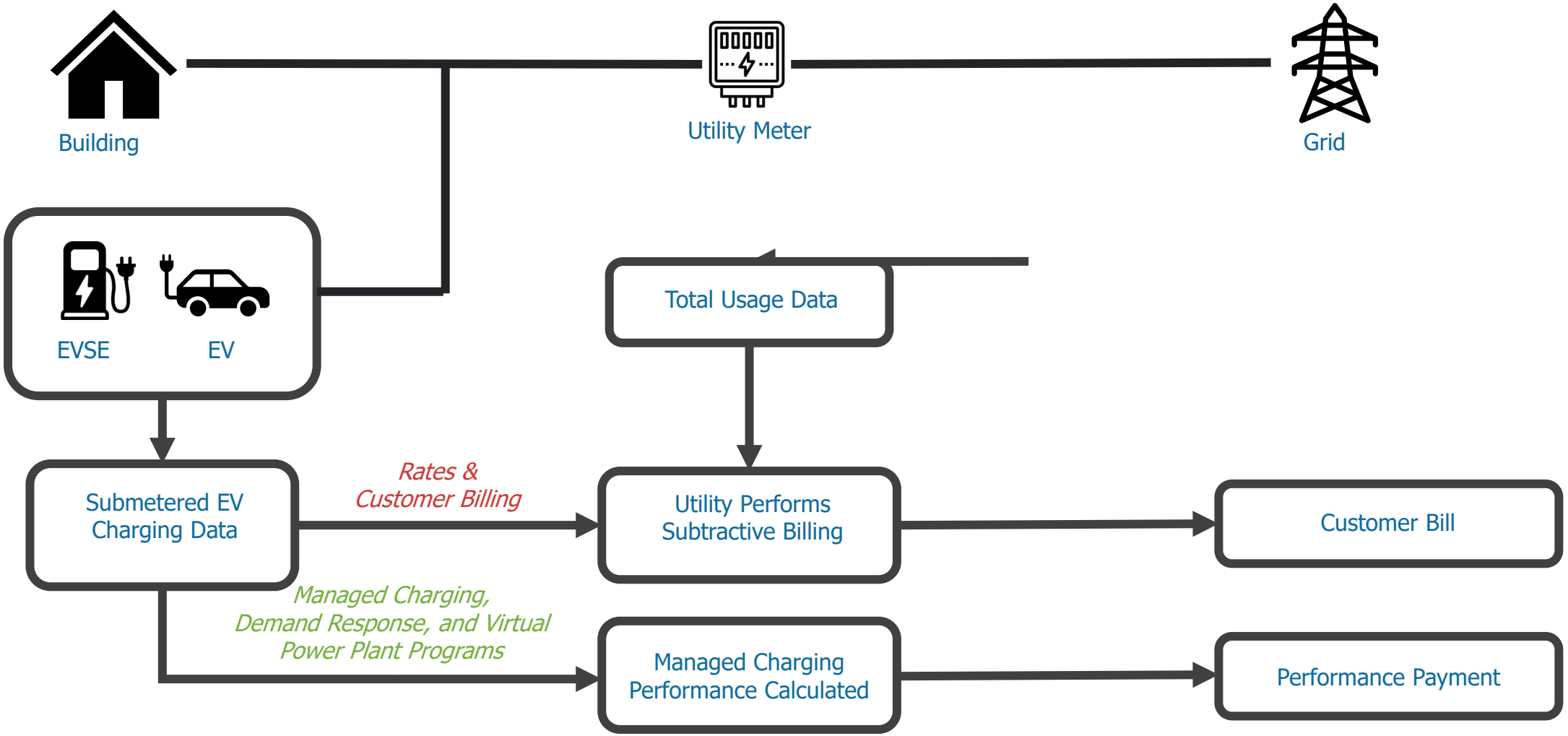
GENERAL MEMBERS

BIDIRECTIONAL ENERGY
BORGWARNER
ChargeScape
dcbel
EATON Powering Business Worldwide
emporía
EnergyHub
ev.energy
GridBeyond
GRAVITY
Gridwiz
HYUNDAI CRADLE
Innovation Core SEI
KALUZA
Landis Gyr+
LG Innotek
ORANGE
STELLANTIS
SUNRUN
TESLA
THE MOBILITY HOUSE
TOYOTA
WeaveGrid

ASSOCIATE MEMBERS

CPA CLEAN POWER ALLIANCE
HOLY CROSS ENERGY ESTABLISHED 1939
LA DWP Los Angeles Department of Water & Power
SMUD

EVSE/telematics submetering applications



Why is submetering important?

- With submetering, EV customers can:
  - More easily enroll and measure performance for managed charging, demand response programs, and/or virtual power plant programs (e.g., Demand Side Grid Support).
  - Participate in compelling EV-specific charging (and discharging) rates without installing a separate utility meter.
- Enabling these VGI applications will:
  - Promote efficient use of the grid and savings for all ratepayers.
  - Lower charging costs and enhance the value proposition for new EV owners.
- **Possible Pathways**
  - Networked EVSE
  - Vehicle telematics

Telematics-based submetering effectiveness

- In 2024, EPRI conducted testing of a limited number of EVSE and telematics systems to support New York Public Service Commission's inquiry into submetering
  - Full report "*Methodology for Testing the Accuracy of Data Collected from Managed Charging Enabling Technologies*" available at https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b70B1E691-0000-C92C-882F-08E29400DA77%7d
- Fundamental purpose was not to test equipment, but rather *develop a testing protocol* for these technologies

Telematics-based submetering effectiveness

- Key takeaways:
  - A. Given today's telematics capabilities were not *purpose-built* for grid-facing purposes, equipment offers varying degrees of accuracy.
  - B. It is clearly feasible to correct for inaccuracies and accomplish relatively *ider* tried… and succeede

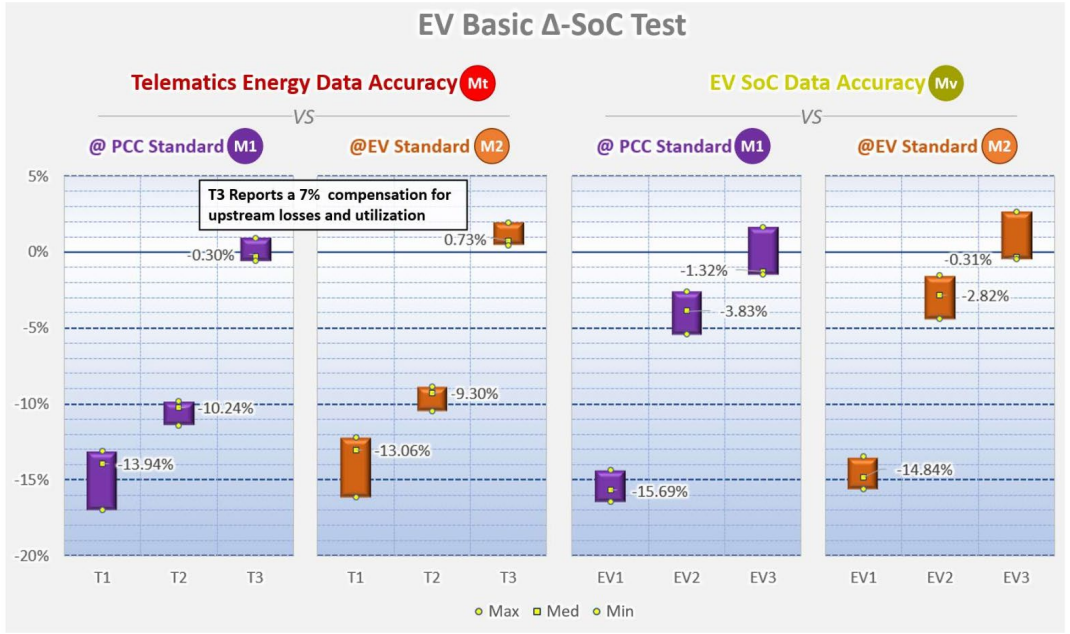


Figure 7-2
Telematics Energy Data Accuracy vs. EV SoC Data Accuracy.

Telematics-based submetering applications in California

- **Currently accepted and used by utilities: Telematics for DR/Managed Charging Programs**
  - Currently accepted and used by CA IOUs, for example:
    - PG&E Charge Manager
    - PG&E BMW ChargeForward
    - PG&E evPulse
- **Near-Term Opportunity: Expand EV participation in DR and managed charging programs by enabling enrollment and participation via telematics**
  - E.g., ELRP Subgroup A.5
  - Applies consistent treatment of the telematics pathway across all DR/managed charging/VPP non-rate programs
- **Long-Term Opportunity: Telematics for Customer Billing**
  - Goal: Expand EV TOU/dynamic rate participation by enabling submetering via vehicle telematics.
    - E.g., PG&E EV2, SCE TOU-D, SDG&E EV-TOU and EV-TOU-5 per CPUC Res E-5274

"Quick Win" - Expanding telematics to DR and managed charging programs

History of EVSE submetering in programs (e.g., ELRP):

Dec 2021: EVSE Submetering Permitted in ELRP

Ad hoc approach used initially, with direction that CPUC-adopted protocol be used "if and when adopted"

Aug 2022: EVSE Submetering Protocol Adopted

CPUC-adopted protocol to now be used in ELRP

Recommended pathway for telematics-based submetering in programs (e.g., ELRP):

~2025: Telematics-based Submetering Permitted in ELRP

Ad hoc approach used initially, with direction that CPUC-adopted protocol be used "if and when adopted"

~2026: Telematics-based Submetering Protocol Adopted

CPUC-adopted protocol to be used in ELRP and other programs that leverage EVs (managed charging VPP programs, other DR programs)

Long-term telematics-based **customer billing**

Proposed elements for long-term telematics standard for rates and billing:

1. **Accuracy standard:** VGIC proposes using the NIST Handbook 44 1% lab / 2% field accuracy adopted in the existing PEV Submetering Protocol per D.22-08-024.
   A. **Under-reporting accuracy:** EV on-board metering will never be exactly the same as the measurement at the utility meter due to losses (EVSE loss, home wiring loss, etc.)

      Potential solution: Can utilize a scaling factor that accounts for losses (e.g., calculated from EPRI NY testing data).

   B. **Data reading accuracy:** Accuracy of the EV on-board metering at the measurement point.

      Potential solution: On-board meter accuracy, meter precision, and data reporting to improve to achieve the desired NIST Handbook 44 1% lab / 2% field accuracy standard

Long-term telematics-based **customer billing**

Proposed elements for long-term telematics standard for rates and billing:

3. **Geotagging/geofencing:** How can the OEM/telematics provider/utility determine whether the customer is charging at "home base" or elsewhere, and bill the customer accordingly?
    - **Potential solution:** Leverage CARB's Low Carbon Fuel Standard geotagging methodology, where charging within 110 meters of a home is attributed to that home account, and any charging within 220 meters of a non-residential site is associated with that non-residential site.

Summary of VGIC Recommendations

VGIC recommends the following actions be taken by the CPUC and stakeholders:

- **2025: Clarify via ED-led Resolution that telematics participation should be permitted across all non-rate opportunities (currently permitted in some, but not others).**
  - Unlocks telematics in programs such as ELRP and any new utility-administered demand response, managed charging, or virtual power plant programs
- 2026: Adopt a telematics submetering protocol that can be used broadly for all CPUC-jurisdictional programs and rates, including customer billing.
  - For example, can utilize a 1%/2% NIST HB 44 accuracy standard with a standard scalar to address under-reporting challenge. This scalar could be based on EPRI's testing, or another methodology.
- Adopt broader changes to PEV submetering protocol per today's workshop. E.g.:
  - Onerous field testing requirements
  - Flat file transfers vs API

Thank you!

Vehicle-Grid Integration Council (VGIC) is a national 501(c)(6) membership-based trade association committed to advancing the role of flexible electric vehicle charging and discharging through policy development, education, outreach, and research.

VGIC VEHICLE GRID INTEGRATION COUNCIL

vgicouncil.org

ALLIANCE FOR AUTOMOTIVE INNOVATION

CPUC Submetering and Telematics Workshop

April 15, 2025

Outline of Presentation

- **About the Alliance for Automotive Innovation (Auto Innovators)**
- **Auto Innovators' VGI White paper**
  - Context
  - Relevant recommendations
- **Auto Innovators' Utility-OEM Forums**
  - Focus areas
  - Key themes that emerged from the discussions



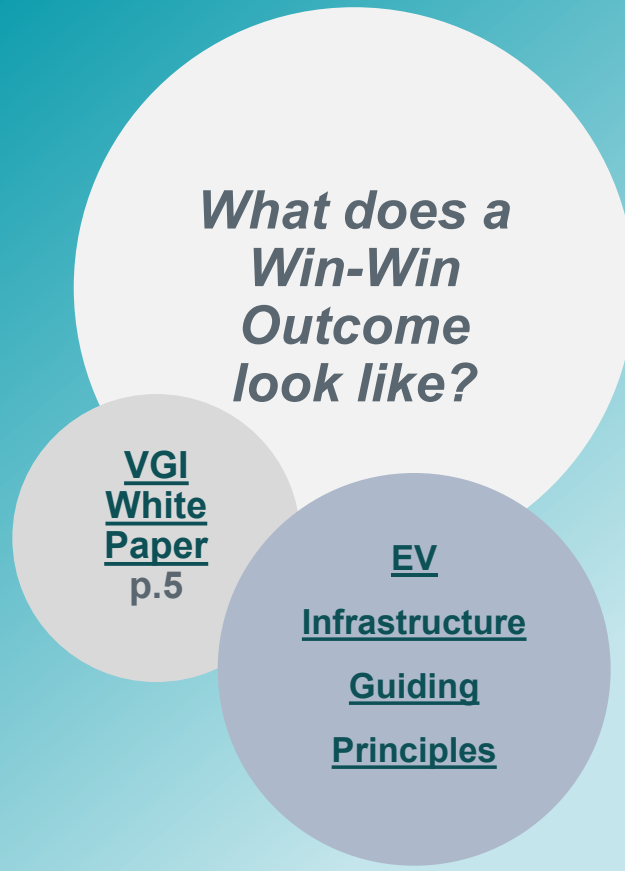
About Auto Innovators

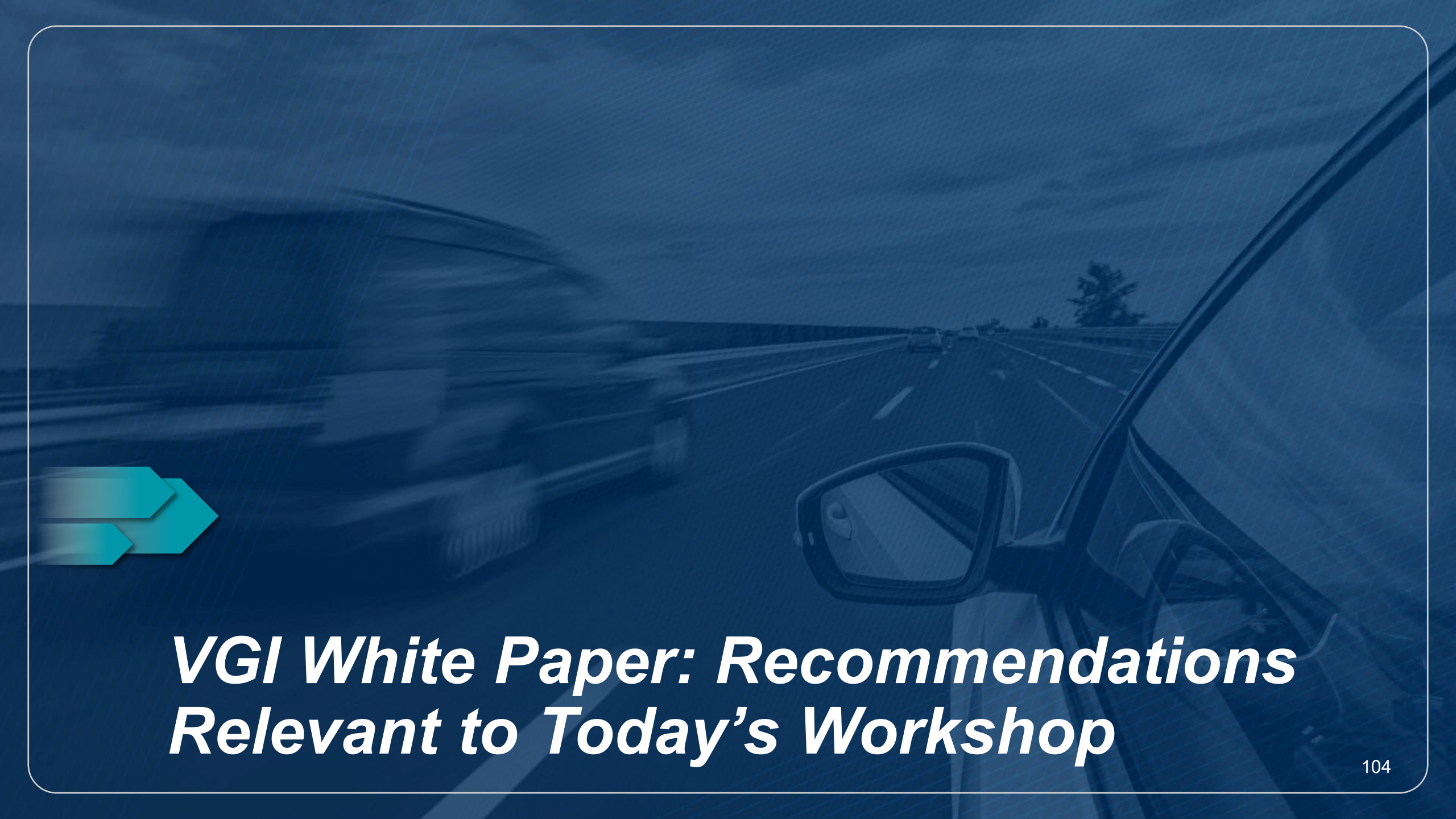

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The Alliance for Automotive Innovation (Auto Innovators) is committed to making electrified transportation a success for all EV drivers and for all utility customers.

- **For EV drivers:** *success means no compromise mobility, enabled by convenient, reliable, and affordable charging that is coupled with opportunities to save on charging costs through EV-enabled grid services.*

- **For utility customers:** *success means that utilities serve EV charging load in a cost-effective manner that delivers economic and environmental benefits to all utility customers, supports utilities' efforts to modernize their systems, and takes advantage of technological advancements in the latest generation of EVs to enhance grid reliability and resilience.*





VGI White Paper: Recommendations Relevant to Today's Workshop

Recommendations from VGI White Paper Relevant to Today's Workshop:

Telematics & Submetering:

- EV rates and DR programs should include options for EV drivers to participate by leveraging vehicle telematics to manage EV charging energy use. Utilities and regulators should draw upon the experiences of utilities across the country that have piloted telematics-based charge management to implement a variety of rates and programs.
- Utilities should move expeditiously to validate the accuracy of telematics data for calculating billing determinants, and demonstrations and pilots should be designed to support robust analysis that can be extrapolated to other utilities' service territories.
- Utilities and regulators involved in developing mobile submetering standards should coordinate development of mobile submetering standards to avoid duplicative efforts and hasten development of a single approach that can be adopted nationwide.

Rates & Managed Charging:

- Utilities should make optional TOU rates universally available to all EV drivers and structure programs to ensure that suitable enabling technologies, such as timers and smartphone apps, are available to all participants.
- Utilities should make both whole-house and EV-only TOU rates available to their customers.
- Utilities should develop dynamic EV charging rates and include EVs in Demand Response (DR) programs. These opportunities should be available to all EV drivers on an opt-in basis.
- EV tariff and DR program rules should permit revenue stacking for multiple types of grid services that are mutually exclusive.
- Utilities should partner with automakers to develop and implement marketing, education, and outreach to EV drivers about opportunities to provide valuable grid services and lower their electricity bills by participating in EV rates and DR programs



National Perspective: 2025 Utility-OEM Forums

Auto Innovators' Utility-OEM forums

- In January – February 2025 Auto Innovators collaborated with EEI, APPA and NRECA to convene three virtual meetings with a cross-section of publicly- and investor-owned utilities
  - Auto Innovators sought…
    - Feedback on the recommendations in its 2024 VGI White Paper
    - Lessons learned from pilots and programs to date
    - Utilities' perspectives on opportunities for and challenges to realizing greater implementation of VGI rates, programs and technologies
  - Participants identified areas for further collaboration
  - These will be addressed during 2025 in in-person workshops
- Forum focus areas
  - Rates and Managed Charging for EVs
  - Standards and Technology: Telematics and V2X
  - Scaling up from Pilots to Programs
- Next step: In person workshops

* EV rates and managed charging

Relevant Themes from Auto Innovators' Utility-OEM Forums

- OEMs and utilities are both concerned about affordability, although they view it through different lenses. Smart Charging* is a key strategy to unlock value for both drivers and utility customers.
- Even though utilities are highly diverse, it is useful to share best practices, collaborate on replicating successful rates and programs, and identify strategies to address shared challenges.
- Harnessing the capabilities of vehicle telematics may reduce the cost of implementing smart charging, but many challenges must be overcome to realize the potential of this technology.
- Simple, easy to use customer interfaces coupled with increased driver education could boost both enrollment and price responsiveness. Utilities, OEMs, and Dealers need to work together to improve marketing and customer education about Smart Charging.
- Utilities and OEMs have both seen strong price responsiveness in Smart Charging pilots, but designing and deploying EV rates and managed charging programs is a complex, utility-specific undertaking.
- Utilities need local, real-world data to design and gain regulatory approval of new EV rates and managed charging programs, which is why many utilities seem to be undertaking similar pilots.

* EV rates and managed charging

Summary of Relevant Conclusions from Utility-OEM Forums

- **OEMS and some (mostly larger, investor owned) utilities see activating telematics as the key to fully leveraging the value of EVs as grid resources and maximizing the value proposition for drivers (and prospective purchasers).**
- **Accuracy of telematics data is a particularly thorny issue, but additional improvements to the technology are needed to meter *and* manage charging load. Near-term workarounds are a possibility.**
- **Possible areas of collaboration on telematics-based submetering:**
  - Work with utilities to agree on a minimum data set, accuracy standard and testing protocols, and reporting format for telematics data to use for managed charging, billing, export compensation, etc.
  - Start with the basics. What is good enough for charge management versus submetering charging load, programs versus rate compensation? What are the base "must haves" versus the "nice to haves" etc.
  - Develop a tiered approach to telematics-based submetering that requires different levels of accuracy depending on the data needed to calculate bills and/or incentives.
  - Explore with regulators using telematics as a third-party pathway to submetering
  - Revisit pilot programs and reports to address challenges that can be elevated to further discussion.
- **Identify the organization that can take results from these discussions to the next level– e.g. develop standards, promulgate best practices, etc…**

Resources

- The Alliance for Automotive Innovation (Auto Innovators)
- Auto Innovators Guiding Principles for EV Charging Infrastructure
- Auto Innovators' VGI White Paper



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Break: 2:45-3:00 PM

Workshop Agenda

Welcome and Safety	10:00-10:05
Opening Remarks	10:05-10:15
Introduction to Decision 22-08-024 & Resolution E-5274 – CPUC Perspectives	10:15-10:30
Panel 1: Submetering Protocol – Utility Perspectives	10:30-11:30
Break	11:30-11:45
Panel 2: Submetering Protocol – MDMAs Perspectives	11:45-12:45
Lunch Break	12:45-1:45
Panel 3: OEM Presentation on Vehicle Telematics	1:45-2:45
Break	2:45-3:00
Panel 4: Fostering Collaborative Solutions & Closing	**3:00-4:00**

California Public Utilities Commission

Panel 4: Fostering Collaborative Solutions & Closing

Identified Challenges: Submetering

Process	CPUC Recognized Challenge
Data Transfer, Data Quality and Standards	Utilities and MDMA may not follow the ESPI data format, the utility selected the California Metering Exchange Protocol for the interoperability instead of ESPI.
	Compliance with ESPI data format requirements.
Cybersecurity and Communication protocol	R.18-12-006 Chapter B. Submeter Data Communications contains requirements for communication security and components including Advanced Encryption Standard (AES), Transport Layer Security (TLS), National Security Agency Suite B. Notably, SFTP is not a named solution and does not use TLS.
Certification & Costs	Certifying submeters every year is contrary to CTEP requirements (10 years for sealed devices)
	Large number of potential meters; audit periods are not aligned to CTEP requirements; meter selection for audits is not well-defined, potentially raising costs.

Outstanding Questions: Submetering

1- Based on what you've heard today—or your own experience—how can IOUs improve the MDMA approval process?

2- How can other entities and stakeholders in the process support potential MDMA candidates in navigating and overcoming these barriers?

3- How is the industry aligning with required standards for submeter devices including accuracy, communication, and annual testing? Do you think these requirements are necessary or need any updates?

4- From your perspective, how valuable is submetering for customers? What opportunities—or limitations—do you see in how it's currently being offered?

Identified Challenges: Telematics

Process	CPUC Recognized Challenge
Data Management	Data type necessary for telematics supporting charging and billing are not standardized between OEMs and do not provide a common data model for transfer of billing information
Data Accuracy	Charging time, charging conditions and energy losses from source to sink can impact accuracy of energy reporting.
Data Integration and Reliability	OEM approach may not align with individual utility requirements.
Data Integration and Reliability	OEM processes do not support 3rd party certification methods; they self-certify to reduce cost

Outstanding Questions: Telematics

1-How can the telematics industry resolve the concerns around self-certification process and data accuracy?

2- What is your thoughts on privacy concern with third party having access to EV telematics information?

Next Steps

- **CPUC**: In accordance with **Decision 22-08-024**, the Energy Division may propose periodic updates to the **PEV Submetering Protocol** through a resolution for Commission consideration.

- **IOUs**: Each IOU is expected to submit a **summary report of this workshop** and provide written responses to the **outstanding questions** discussed during Panel 4.

- **Stakeholders**: The CPUC encourages **MDMAs, OEMs, EVSPs**, and other relevant stakeholders—particularly those working on telematics or MDMA implementation—to also submit written feedback and responses to the outstanding questions

California Public
Utilities Commission

Thank You for You Presence and Attention!

For more information, please contact with:
shiva.ourang@cpuc.ca.gov