2022 SWEEP REGIONAL WORKSHOP

NOVEMBER 30TH – DECEMBER 2ND

WELCOME!

Elise Jones
Executive Director

Day 1 Agenda

9:00 a.m.-9:05 a.m.	**Welcome & Introductions – Elise Jones, Executive Director, SWEEP** *Located in Moon Room (Floor 53)*
9:05 a.m.-9:40 a.m.	**Director's Roundtable: Major Trends in Energy Efficiency Economy-Wide** *Moderator: Elise Jones, Executive Director, SWEEP*
9:40 a.m.-10:00 a.m.	**Preparing for Impact: Energy Efficiency Funding in the Inflation Reduction Act** *Presented By: Kara Saul Rinaldi, AnnDyl Policy Group*
10:00 a.m.- 10:30 a.m.	**SWEEP Allies Snapshot** *Led By: Nissa Erickson, Federal Funding Implementation Coordinator, SWEEP*
10:30 a.m.-10:50 a.m.	**Networking Break**
10:50 a.m.-12:00 p.m.	**Panel Session #1: Breaking Down Silos - Ensuring Benefits of Federal Stimulus Opportunities Flow Through Implementation** *Moderator: Caryn Potter, Arizona Representative, SWEEP*

Day 1 Agenda – CONT'D

12:00 p.m.-1:45 p.m.	**Lunch & Networking:** *Located in NOVE Room (Floor 51)*
1:45 p.m.-2:30 p.m.	**SWEEP Allies Snapshot:** *Located in Moon Room (Floor 53)* *Led By: Nissa Erickson, Federal Funding Implementation Coordinator, SWEEP*
2:30 p.m.-3:30 p.m.	**Panel Session #2: Scaling Grid Infrastructure to Support Transportation and Building Electrification** *Moderator: Travis Madsen, Transportation Program Director, SWEEP*
3:30 p.m.-3:45 p.m.	**Networking Break**
3:45 p.m.-5:00 p.m.	**Panel Session #3: Targeting and Recruiting for Equity Programs** *Moderator: Tammy Fiebelkorn, New Mexico Representative, SWEEP*
5:30 p.m.-7:00 p.m.	**Hors D'oeuvres & Networking & Cash Bar** *Located in View Room (Floor 52)*

Logistics

- Thursday and Friday's General sessions are in the MOON Room (53rd Floor)
- Thursday's lunch is located in the NOVE Room (51st Floor)
- Thursday's reception is located in the VIEW Room (52nd Floor)
- Friday's Breakfast is located in the NOVE Room (51st Floor)
- Wifi available in hotel rooms and in public spaces

Director's Roundtable: Major Trends in Energy Efficiency Economy-Wide

Justin Brant
Utility Program Director

Travis Madsen
Transportation Program Director

Neil Kolwey
Industrial Program Director

Jim Meyers
Buildings Program Director

Preparing for Impact: Energy Efficiency Funding in the Inflation Reduction Act

Kara Saul Rinaldi
President & CEO
AnnDyl Policy Group

Preparing for Impact:

Energy Efficiency Funding in the Inflation Reduction Act

December 1, 2022

Kara Saul Rinaldi
President & CEO, AnnDyl Policy Group

Inflation Reduction Act (IRA): Big Picture

- Signed into law on **August 16.**
- Nearly **$370 billion** in support of clean energy and energy efficiency.
- President Biden held an event at the White House on September 13 touting IRA.
- Implementation is just getting started…

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IRA Overview – Key Programs

Program	Funding	Timeline
Home Energy Performance-Based, Whole-House Rebates (HOMES)	$4.3B	Available through 2031
State-Based Home Energy Efficiency Contractor Training Grants	$200M	Available through 2031
High-Efficiency Electric Home Rebate Program	$4.5B	Available through 2031
25C Energy Efficient Home Improvement Tax Credit	CBO Estimate: $12.4 billion over 10 years	Available through 2032
45L New Energy Efficient Home Tax Credit	CBO Estimate: $2 billion over 10 years	Available through 2032
179D Energy Efficient Commercial Buildings Deduction	CBO Estimate: $362M over 10 years	Available permanently (no sunset)

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IRA: Home Energy Performance-Based, Whole-House Rebates (HOMES)

- IRA provides **$4.3 billion in formula funding for state energy offices to set up HOMES rebate programs.**
- Provides direct rebates for home energy efficiency retrofits.
  - **Modeled $2,000 for 20%** savings, **$4,000 for 35%** savings.
  - **Measured** energy savings of **at least 15% portfolio**, based on Average State House 20% energy savings.
  - Capped at 50% of project cost for market-rate (over 80% AMI).
- Rebates **double** for low- and moderate-income households (**up to $8,000**, capped at 80% of project cost).
- Includes a "prohibition of combining rebates" provision to prevent double-dipping with other federal grants or rebates, including the High-Efficiency Electric Home Rebate Program - **for the same measure.**
  - IRA does not include any provision prohibiting stacking federal rebates with state rebates, nor does it prohibit stacking rebates with energy efficiency tax credits like 25C.

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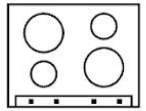
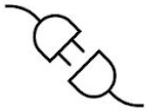
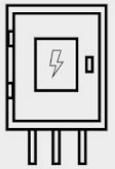
IRA: High-Efficiency Electric Home Rebate Program (HEEHR)

- IRA provides **$4.5 billion** in grants to state energy offices for the **High-Efficiency Electric Home Rebate Program (HEEHR).**
- LMI households are eligible for rebates **up to a total of $14,000** for electric systems/appliances.
- Includes a "prohibition of combining rebates" section to prevent double-dipping with HOMES.

	Appliance	Rebate Amount (Maximum)
	Heat Pump (for space heating and cooling)	$8,000
	Electric Stove, Cooktop, Range, or Oven, or Clothes Dryer	$840
	Heat Pump Water Heater	$1,750
	Electric Wiring	$2,500
	Electric Load Service Center (Breaker Box)	$4,000
	Insulation, Air Sealing, and Ventilation	$1,600

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IRA – Implementation Timeline for Rebates

- **Note: two year deadline for States to secure funds.**

DOE Releases RFI for Public Input	DOE Releases Guidance to State Energy Offices	State Energy Offices Apply for DOE Funding	State Energy Offices Receive Funds and Set Up Programs	Program Funds Flow to Consumers and Contractors
• DOE will release a Request for Information (RFI) for public input in early 2023.	• Guidance from DOE will provide more detail on how State Energy Offices (SEOs) can apply for funding and what rebate and training programs should look like.	• State Energy Offices submit applications for funding to DOE, relying on agency guidelines.	• Funding for rebate programs is distributed to SEOs via formula, weighted by population and state energy consumption. • SEOs set up their state rebate programs.	• Rebates drive consumer demand for residential energy efficiency and electrification. Consumer interest drives demand for home performance contractors and electrification.

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IRA: HOMES and HEEHR Funding Allocations

- On November 2, DOE announced **state-by-state funding allocations** for state HOMES and HEEHR rebate programs, and announced a Request for Information (RFI) on these programs will be released early next year.
- States **will still need to apply for funding - and receive approval** from DOE on their rebate program plans.

Colorado
HOMES: $70.4M
HEEHR: $69.9M

Arizona
HOMES: $76.8M
HEEHR: $76.4M

New Mexico
HOMES: $44M
HEEHR: $43.7M

Wyoming
HOMES: $34.7M
HEEHR: $34.5M

Utah
HOMES: $50.7M
HEEHR: $50.4M

Nevada
HOMES: $48.2M
HEEHR: $47.9M

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IRA: State-Based Home Energy Efficiency Contractor Training Grants

- IRA provides **$200 million for State-Based Home Energy Efficiency Contractor Training Grants.**
  - Grants to states through the State Energy Program to **support energy efficiency and electrification contractor training.**
- Specifications will be left up to DOE in implementation.

Implementation Update

- DOE is planning to announce an upcoming roundtable with labor, businesses, and other key stakeholders to get input on program design for these grants (and other workforce development funding contained in IIJA).

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Contractor Survey on HOMES, HEEHR, and Training Grants

- Contractor survey input will be compiled and shared with DOE and State Energy Offices to help contractors have a voice during implementation.
- Distributed by the Building Performance Association, E4TheFuture, Pearl Certification, and others.
- Sharing personal information is **optional**.
- Responses will **only be shared in an anonymized/aggregated format** to protect confidentiality.

SurveyMonkey.com/r/HOMESContractorSurvey

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IRA: Tax Credits

- IRA extends and expands energy efficiency tax credits including:
  - **Section 25C Energy Efficient Home Improvement Tax Credit** through September 2032.
  - **The Section 45L New Energy Efficient Home Tax Credit** through September 2032.
  - **The 179D Energy Efficient Commercial Building Deduction Tax Credit** (no sunset date - permanent).

Implementation Update

- On November 4, the Building Performance Association **submitted joint responses** to IRS notices **Request for Comments on Incentive Provisions for Improving the Energy Efficiency of Residential and Commercial Buildings** in the Inflation Reduction Act.

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Thank you!

Kara Saul Rinaldi
President & CEO
AnnDyl Policy Group
kara@anndyl.com

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Allies Snapshots

Group14 Engineering
Franklin Energy
Daikin Comfort Technologies
Proctor Engineering Group

Group14 Engineering, PBC

WOMEN OWNED™

Just.SM

30 Years in business

60 Staff members

- **16** Professional Engineers
- **24** LEED A.P.s
- **7** Certified Commissioning Professionals (CCP)
- **6** SkySpark Certified Professionals (SkySpark CP)
- **9** Certified Energy Managers (CEM)

customer journey map

EV MAKE READY - RESIDENTIAL JOURNEY MAP

"**This helps me look like a hero.** This is all straightforward. If someone hasn't done this before, this would help them know what to expect and put their minds at ease."

-Director of Facilities, user testing

"EV programs are part of an emerging, nascent market, and customer needs are still changing. **We need to have some flexibility in program implementation.**"

– Rishi Sondhi at National Grid

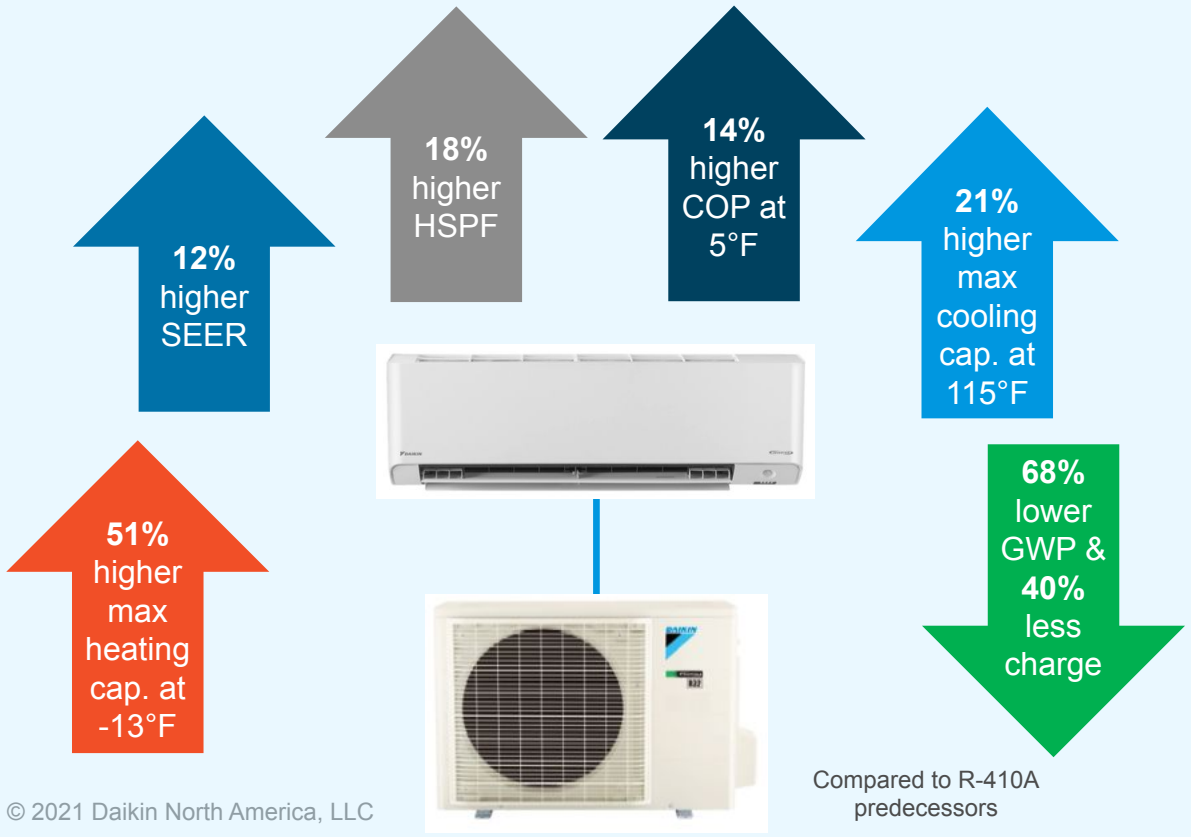
FRANKLIN ENERGY™

Daikin Innovations

ATMOSHPERA: Next-gen, Low-GWP Refrigerant

Daikin *Atmosphera* with R-32 Refrigerant:

- **Proven** – R-32 is installed in over 160 million units from 40 manufacturers
- **Efficient** – higher SEER, HSPF, COP and heating & cooling capacities
- **Responsible** – 68% lower GWP and up to 40% less refrigerant charge
- **Available** – already used widely in common household appliances like room ACs, and now **Daikin *ATMOSHPERA***



VRV: Heating/Cooling, When/Where It's Needed

Daikin *VRV* with Heat Recovery:

- **Energy Savings** – only heat or cool the spaces where it is needed and move heat from areas calling for cooling to areas calling for heating
- **Comfort** – simultaneous heating and cooling on the same system with continuous operation during defrost provides continuous comfort
- **Flexible & Easy Installation** – zoning with refrigerant is not only more efficient, it also makes it much easier to get comfort where it is needed
- **Performance** – **Daikin *VRV*** provides continuous all-electric heating down to -13ºF, with dual fuel functionality for more extreme climates, and full-capacity cooling up to 122ºF

Western Cooling Control™

- Proven technology, US manufactured, UL listed
- More than 110,000 installed in AZ, NV, CO, NM, & CA
- Average CEC field monitored cooling savings of 16%
- Multiple NV Energy ADM Associates billing impact evaluations found savings up to 18%, averaging 10% - 12%
- Currently in APS, TEP, UES, PG&E, SCE, SDG&E, & LADWP
- Most cost effective measure in TEP's Efficient Home & Multifamily programs
- Wholesale cost approximately $45.00
- Less than 15 minutes to install and test

NETWORKING BREAK

10:30 AM – 10:50 AM

Panel Session #1: Breaking Down Silos – Ensuring Benefits of Federal Stimulus Opportunities Flow Through Implementation

Steve Dunn
Department of Energy, Office of State and Community Energy Programs (SCEP)

Richard Ezike
Joint Office of Energy and Transportation

Will Toor
Colorado Energy Office

U.S. DEPARTMENT OF ENERGY

DOE Funding Opportunities: States and Communities

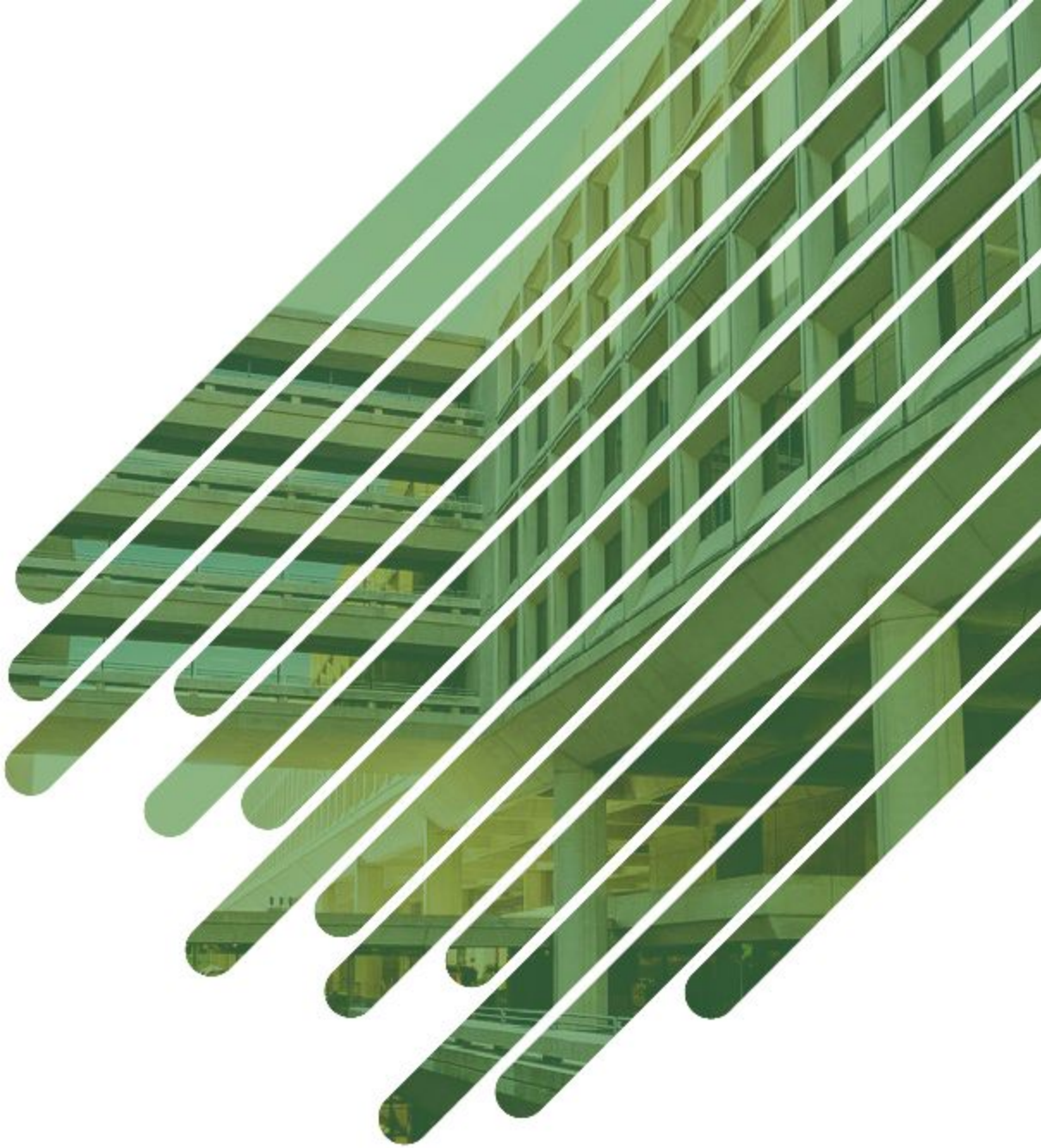
SWEEP 2022 Regional Workshop

Las Vegas, Nevada

December 1, 2022

SCEP

STATE & COMMUNITY ENERGY PROGRAMS



Biden-Harris Administration Priorities

- The Administration knows there is **no greater challenge** facing our nation and our planet than climate change.
- We can turn the threat of climate change into an **opportunity** to:
  - Revitalize the U.S. energy and manufacturing sectors.
  - Create millions of high-quality, good paying jobs throughout the country.
  - Address historic environmental injustices and inequities.
- DOE is working to advance these goals and help the U.S. build a **100% clean energy economy** and reach **net-zero emissions** no later than 2050.

Office of State and Community Energy Programs (SCEP)

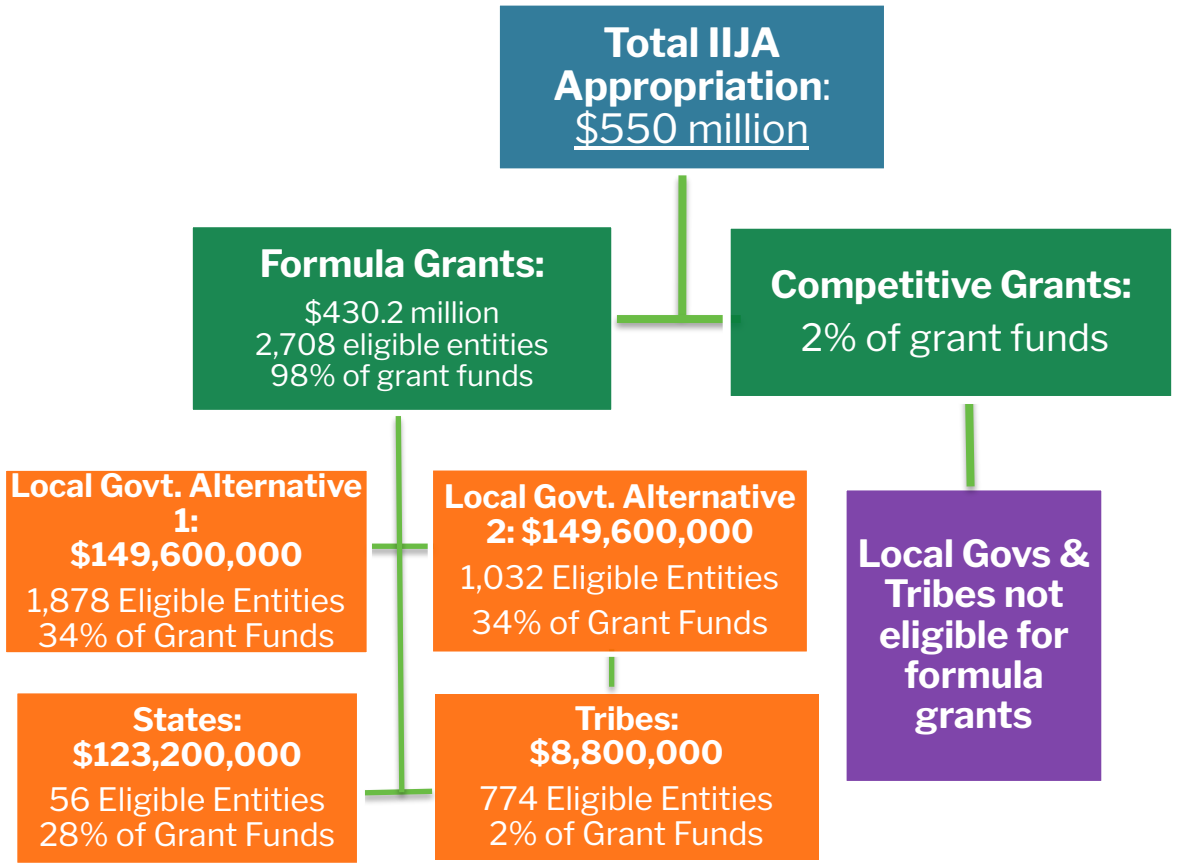
Mission Statement: To significantly accelerate the deployment of clean energy (e. g. , energy efficiency and renewable energy) technologies and practices through place-based strategies involving state, local, and Tribal governments, community orgs, academia, and business stakeholders that catalyze community economic development, create high-quality jobs, and improve the lives of Americans.


SCEP
STATE & COMMUNITY ENERGY PROGRAMS


Guiding Vision: SCEP wants to be the bridge that connects the federal government to community serving institutions. We manage the main community-facing funding and technical assistance programs for DOE. We serve as the common touch point and the navigator through DOE and other applicable programs across the Federal Government. If done right, everyone should know a person or be served by a local institution who has interacted with and been positively impacted by DOE programs.

EECBG Program Distribution and Eligible Uses of Funds

Distribution of Funding to Eligible Entities*



*Distribution does not reflect $110M set aside for DOE to deliver an effective and efficient program and to provide technical assistance to eligible entities before distributing remaining funds to eligible entities.

Eligible Uses of Funds

1. Strategy Development
2. Technical Consultant Services
3. Building Energy Audits
4. Financial Incentive Programs
5. Energy Efficiency Retrofits
6. Energy Efficiency and Conservation Programs for Buildings and Facilities
7. Development and Implementation of Transportation Programs
8. Building Codes and Inspections
9. Energy Distribution Technologies for Energy Efficiency
10. Material Conservation Programs
11. Reduction and Capture of Methane and Greenhouse Gases
12. Traffic Signals and Street Lighting
13. Renewable Energy Technologies on Government Buildings
14. Programs for Financing, Purchasing, and Installing Energy Efficiency, Renewable Energy, and Zero-Emission Transportation (and associated infrastructure) Measures
15. Any Other Appropriate Activity

New activity added by IIJA

EECBG Program Formula Allocations, Southwest Region

State	State Governments	Local Governments	Local Governments (#)	Tribes	Tribes (#)	Total
AZ	$2,068,370	$ 7,477,040	38	$ 295,562	20	$9,840,972
CO	$2,075,409	$ 5,624,564	32	$ 22,260	2	$7,722,233
NM	$1,767,142	$ 2,197,957	20	$ 252,692	21	$4,217,791
NV	$1,758,248	$ 3,544,196	20	$ 10,271	1	$5,312,714
UT	$1,811,731	$ 4,328,829	39	$ 41,045	4	$6,181,604
WY	$1,617,081	$ 1,607,921	20	$ 27,570	2	$3,252,571
Total	**$11,097,981**	**$24,780,505**	**169**	**$649,400**	**50**	**$36,527,887**

EECBG Formula Quick Facts: Southwest Region

- **6 States** ($11.1 M)
- **169 Local Gov'ts** ($25M)
- **50 Indian Tribes** ($650k)
- **$36.5 million** total funding

Average Award Amounts:

- States: **$1.8M**
- Local Gov'ts: **$147,000**
- Tribes: **$14,400**

Notes:
States are required to sub-grant at least 60% of funds to formula-ineligible local governments.
For additional information, including allocations to individual States, Local Governments and Tribes, visit:
https://www.energy.gov/clean-energy-infrastructure/energy-efficiency-and-conservation-block-grant-program

New Community Energy Programs

Program Name	FY22 Funding Appropriation[1]	FY23 HEWD Bill[2]	Eligible Entities	Description
Local Government Energy Program	**$10 million** "Local Government Clean Energy Workforce Program"	**$25 million** "Local Government Energy Program"	**local governments** and Tribal Nations, with a **focus on energy communities and disadvantaged or small-to-medium jurisdictions**	Competitive awards, on-site capacity, peer exchanges, and technical assistance to support transformative clean energy programs
Energy Future Grants*	**$20 million**	**$102 million**	Community-led projects in partnership with state, local, Tribal entities	Financial and technical assistance to support community energy needs

To receive local government updates, subscribe to the *State and Local Spotlight* newsletter:
www.energy.gov/eere/slsc/listings/state-and-local-spotlight-newsletters

[1] 117th Congress. Senate Report Number 117-36. "Energy and Water Development Appropriations Bill, 2022." August 4, 2021. p. 90.
[2] 117th Congress. House Report. "Energy and Water Development Appropriations Bill, 2023." July 20, 2022.
* 117th Congress. Joint Explanatory Statement. March 2022. p. 47

BIL / IRA Funding: Building Energy Codes

- Building Energy Codes
  - Building Codes Implementation for Efficiency and Resilience (BIL, Sec. 40511)
    - $225 million in competitive grant to enable sustained, cost-effective implementation of updated building energy codes to save customers money on their energy bills
      - FOA closed October 19, 2022
  - Assistance for Latest and Zero Building Energy Code Adoption (IRA, Sec. 50131)
    - **$330 million** for grants to states adopt residential building energy codes that meet or exceed the 2021 International Energy Conservation Code (IECC) or building energy codes that meet or exceed ANSI/ASHRAE/IES Standard 90.1–2019, or to fund code compliance plans
    - **$670 million** for grants to states and local governments to adopt zero energy codes that meet or exceed zero energy provisions in the 2021 IECC (or ensure full code compliance)
    - Funding to remain available through Sept. 2029
  - For more details, see ICC Annual Meeting presentation, Sept 13, 2022

BIL / IRA Funding: Workforce Development

- **STATE-BASED HOME ENERGY EFFICIENCY CONTRACTOR TRAINING GRANTS**
  - Provides $200 million for grants to states under the State Energy Program to train and educate contractors involved in the installation of home energy efficiency and electrification improvements, including improvements eligible for rebates under the HOMES rebate program
- **ENERGY AUDITOR TRAINING PROGRAM**
  - Provides $40 million for grants to eligible States to train individuals to conduct energy audits or surveys of commercial and residential buildings to build the clean energy workforce, save customers money on their energy bills, and reduce pollution from building energy use.
- **CAREER SKILLS TRAINING PROGRAM**
  - Provides $10 million in grants to pay the Federal share of career skills training programs under which students concurrently receive classroom instruction and on-the-job training for the purpose of obtaining an industry-related certification to install energy efficient building technologies

For additional information on DOE workforce development programs and resources, see:
DOE Workforce Development | Better Buildings Workforce Development Portal |NREL Workforce Development

Stay Connected with the EECBG Program

Watch for EECBG Program updates, coming in early 2023:

- https://www.energy.gov/clean-energy-infrastructure/energy-efficiency-and-conservation-block-grant-program

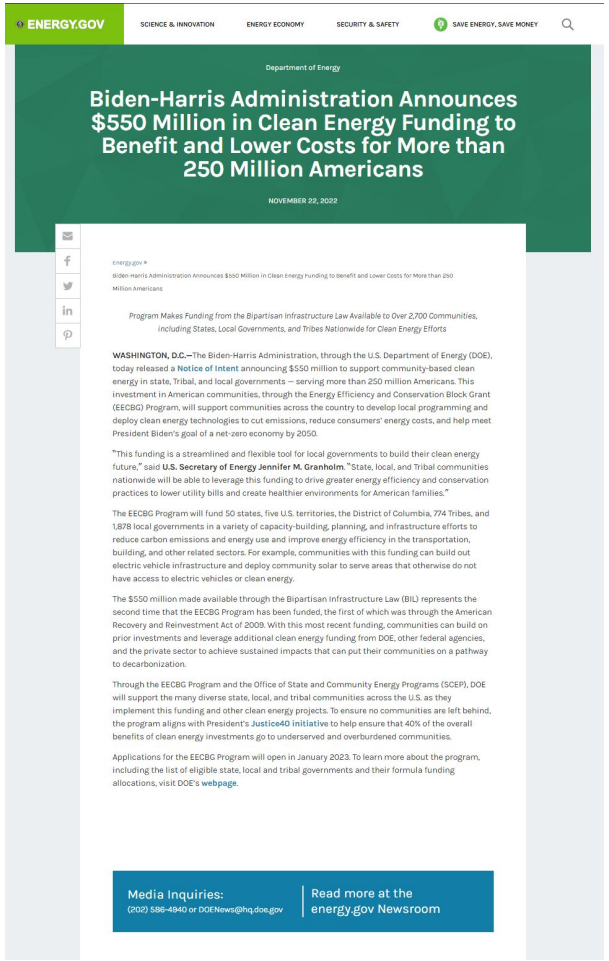
  Notice of Intent with **formula allocations** published in EERE Exchange (11/21)
  - Financial Opportunities: Funding Opportunity Exchange (energy.gov)
  - EECBG Program Optional Information Collection Form for Eligible Entities
  - Allocation formulas published in the Federal Register in June 2022
    - Notice of Availability: https://www.federalregister.gov/d/2022-13859
  - Information on program design and implementation
  - Allocation amounts for eligible entities (state, local, tribal)
  - Funding opportunity for formula awards
  - Competitive EECBG Program information

Find Additional IIJA Program Updates:

- https://www.energy.gov/bil/bipartisan-infrastructure-law-homepage

Contact the EECBG Program Team or DOE's Regional Specialists:

- eecbg@hq.doe.gov
- DL-RegionalSpecialists@hq.doe.gov



Biden-Harris Administration Announces $550 Million in Clean Energy Funding to Benefit and Lower Costs for More than 250 Million Americans | Department of Energy

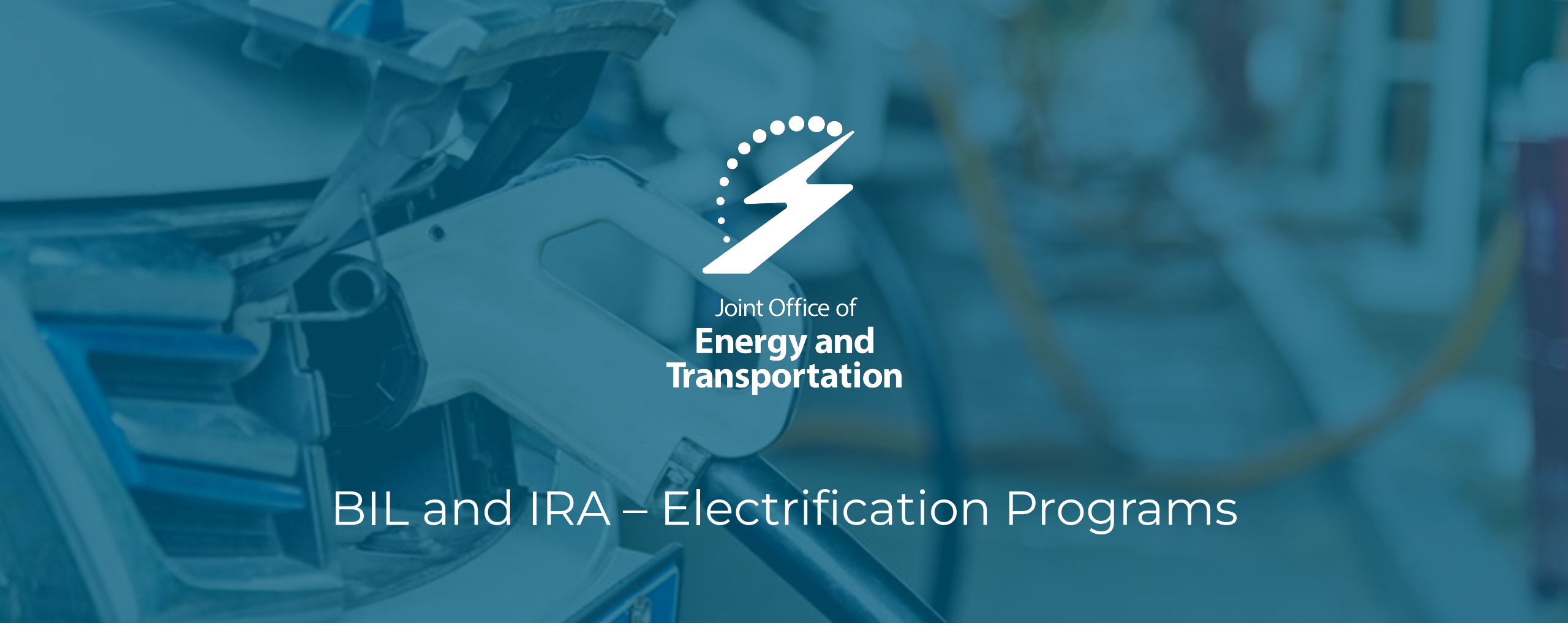
Disclaimer

NPRM: DOT Ex Parte Communications Procedures – available at Guidance on Ex Parte Communications | US Department of Transportation

Any issues discussed today related to FHWA's National Electric Vehicle Infrastructure Formula Program rulemaking are subject to DOT's ex parte guidelines. Under those guidelines:

1) DOT is the receiver of information:
- DOT personnel can listen, ask clarifying questions, and answer factual questions about public documents
- DOT personnel cannot negotiate or provide any substantive, non-public information

2) DOT dockets information for transparency:
- DOT will docket information or memoranda memorializing communications as soon as possible. DOT's intent is to ensure notice of any ex parte meetings and an opportunity to comment on any information submitted during an ex parte meeting.



Joint Office of
Energy and
Transportation

BIL and IRA – Electrification Programs

December 1, 2022
Richard Ezike
SWEEP Regional Utility Workshop

driveelectric.gov

Joint Office of Energy and Transportation

Established in the Bipartisan Infrastructure Law to address areas of joint interest to the Departments of Energy and Transportation

$300M

in FY22 funds to DOT
with transfer authority to DOE

9

major areas of emphasis

Areas of emphasis summary

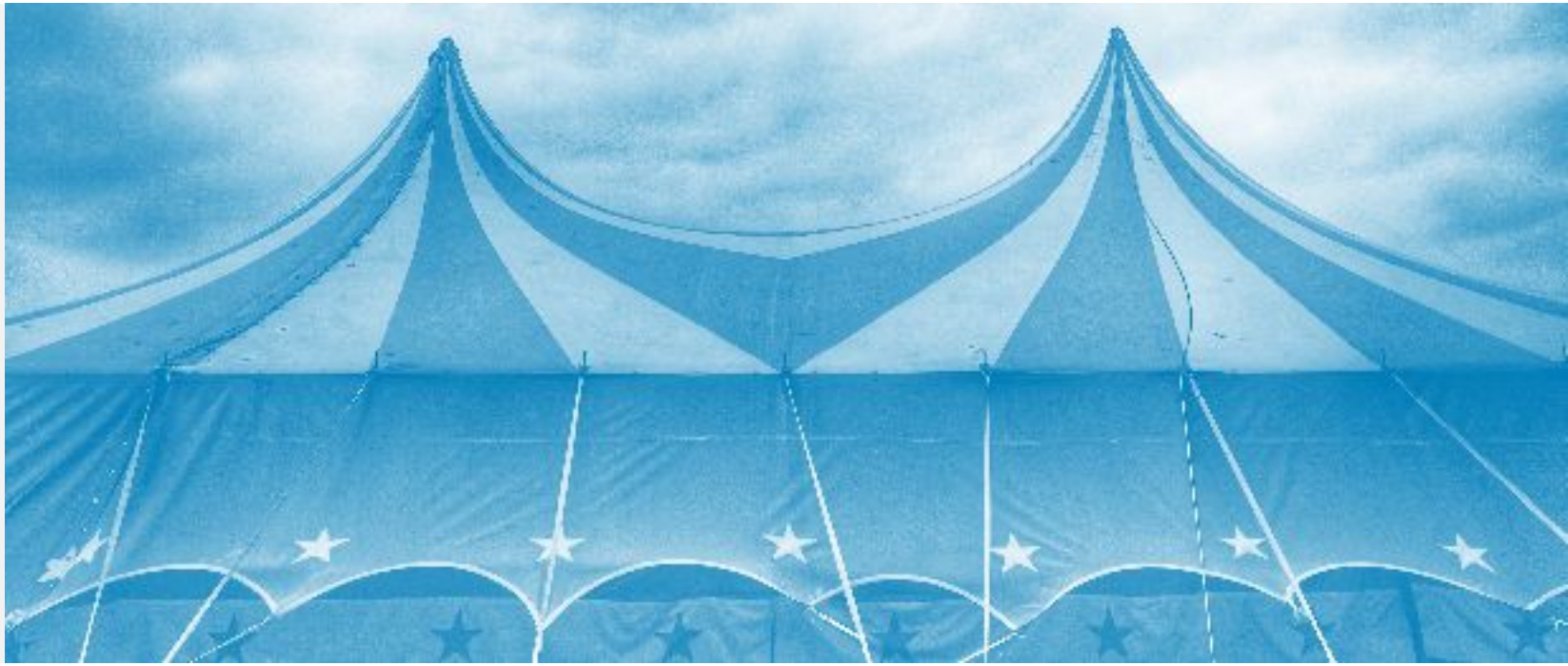
1) technical assistance of vehicle charging
2) data sharing
3) performance of a national and regionalized study vehicle charging
4) training and certification programs
5) a program to promote renewable energy generation, storage, and grid integration
6) transmission pilots in the rights-of-way
7) research, strategies, and actions to mitigate the effects of climate change
8) development of a streamlined utility accommodations policy for transmission in the transportation right-of-way
9) any other issues that the Secretary of Transportation and the Secretary of Energy identify as issues of joint interest

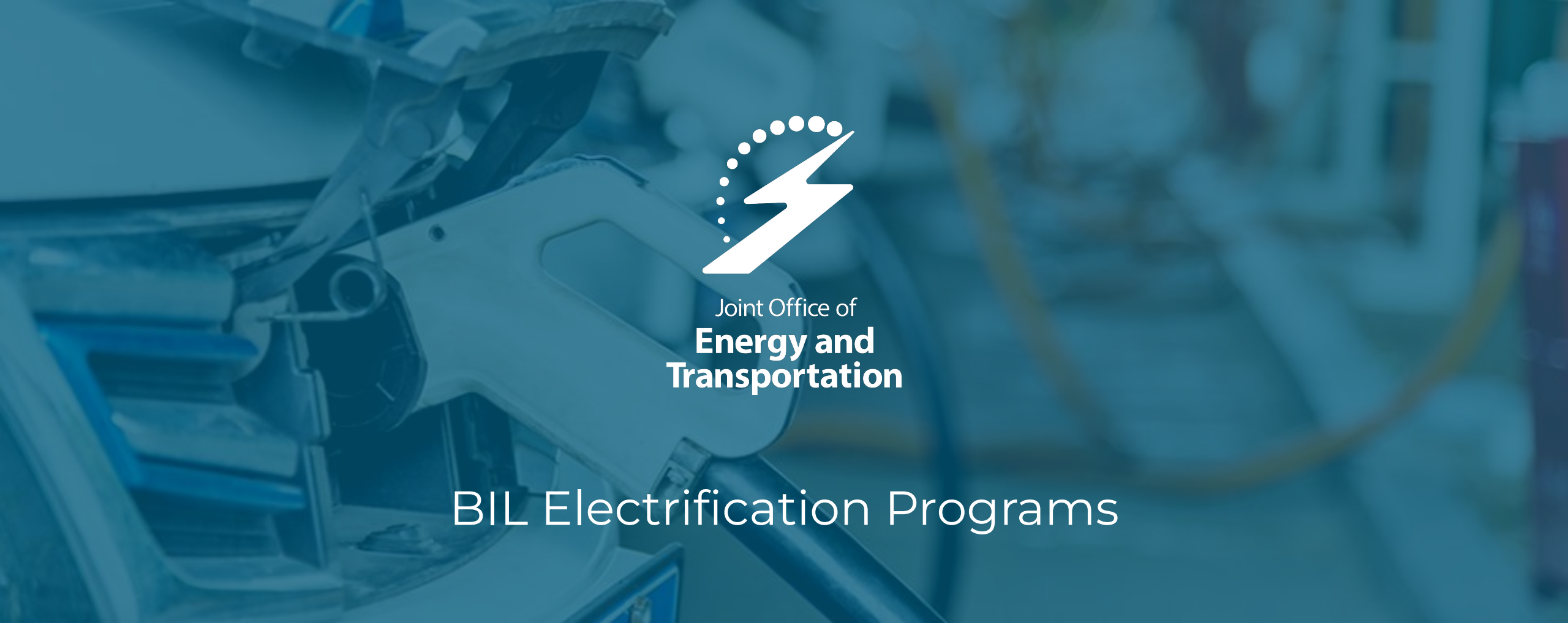
Joint Office Technical Assistance Principles

Respectful collaboration with the electric charging experts that have preceded the Joint Office to accomplish our shared vision:

A future where everyone can ride and drive electric

- In our goal to build a reliable, convenient, equitable national network, Technical Assistance will
  - Dive into the hard challenges alongside states and our partners in order to create something revolutionary.
  - Help states getting started build on the successes and learn from the challenges of states with more mature networks.
  - Utilize the people, programs, and relationships that came before us and enable future charging experts.





Joint Office of
Energy and
Transportation

BIL Electrification Programs

December 1, 2022
Richard Ezike
SWEEP Regional Utility Workshop

driveelectric.gov

BIL Transportation Electrification Programs

National Electric Vehicle Infrastructure (NEVI) Formula Program (U.S. DOT)
$5 billion for states to build a national electric vehicle (EV) charging network along corridors

Charging & Fueling Infrastructure Discretionary Grant Program (U.S. DOT)
$2.5 billion in community grants for EV charging, as well as hydrogen, natural gas, and propane fueling infrastructure

Low-No Emissions Grants Program for Transit (U.S. DOT)
$5.6 billion in support of low- and no-emission transit bus deployments

Clean School Bus Program (U.S. Environmental Protection Agency [EPA])
$5 billion in support of electric school bus deployments

NEVI Formula Program—Guidance

- **EV charging infrastructure:**
  - Installed **every 50 miles** along the state's portions of the interstate highway system **within 1 travel mile of the interstate**, unless a discretionary exception has been granted
  - Includes **at least four 150kW DC fast chargers with Combined Charging System (CCS) ports** capable of simultaneously charging four EVs
  - Has minimum station power capability **at or above 600kW and supports at least 150kW per port simultaneously across four ports for charging**
- **Requires approved state EV deployment plan**

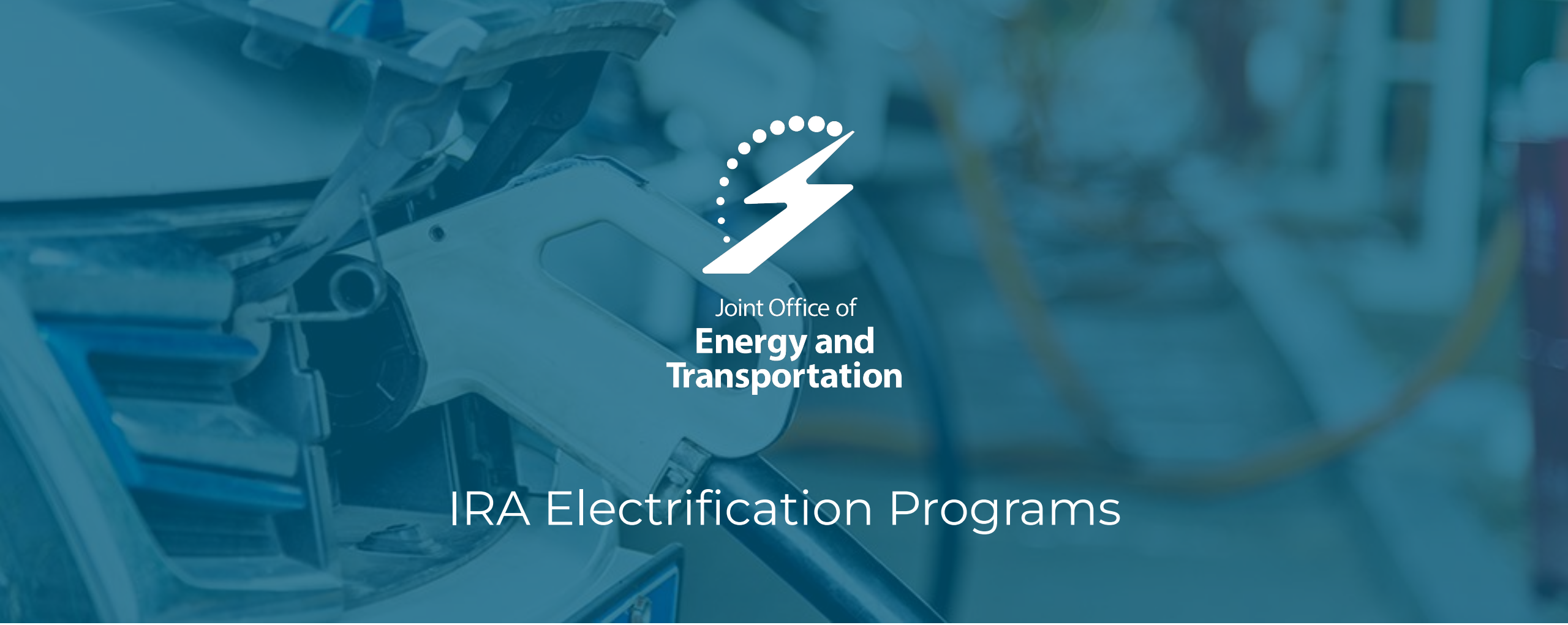
Critical Activities Covered by NEVI Funding

- **Community outreach and participation**
- **Data sharing** about EV charging infrastructure to ensure the long-term success of investments
- **Mapping and analysis activities,** including **identifying disadvantaged communities**
- **Workforce development activities** that are directly related to the charging of an electric vehicle.
- Updating existing EV charging stations to meet **Americans with Disabilities Act (ADA)** requirements

NEVI 90-day program guidance: *https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/90d_nevi_formula_program_guidance.pdf*
NEVI FAQs: *https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/resources/nevi_program_faqs.pdf*

Charging and Fueling Infrastructure Discretionary Grant Program

- For **EV charging, hydrogen, propane, and natural gas fueling infrastructure**
- Divided into two distinct **$1.25 billion grant programs** to support EV charger deployment
  - **Corridor Charging Grant Program**. This program will strategically deploy publicly accessible EV charging infrastructure and hydrogen, propane, and natural gas fueling infrastructure along designated **Alternative Fuel Corridors**
  - **Community Charging Grant Program**. This program will strategically deploy publicly accessible EV charging infrastructure and hydrogen, propane, and natural gas fueling infrastructure in **communities**



Joint Office of
Energy and Transportation

IRA Electrification Programs

December 1, 2022
Richard Ezike
SWEEP Regional Utility Workshop

driveelectric.gov

IRA Transportation Electrification Programs*

Light Duty EV Tax Credit
Credit of $7,500 extended to 2032 (includes provisions for an MSRP cap, income cap, assembly and sourcing requirements, and credit transfer to point-of-sale option

Used EV Tax Credit
Credits of up to $4,000 or 30 percent of sales price, whichever is lower (sales price must be less than $25,000 and vehicles must be at least 2 years old – also has income requirements)

Commercial EV Tax Credit
Credit can be up to 30 percent of the sale price

EV Charging Equipment Tax Credit
Extended through 2032 (30 percent, up to $1,000 for individual and residential; 6 percent with a maximum credit of $100,000 for commercial and equipment must be placed in a low-income community or non-urban area

USPS Fleet Electrification
$3 billion allocated for electrification of the Postal Service fleet

Electrification of Heavy-Duty Vehicles
$1 billion allocated for replacement of Class 6/7 heavy-duty vehicles with electric vehicles (rebates can cover 100 percent of costs)

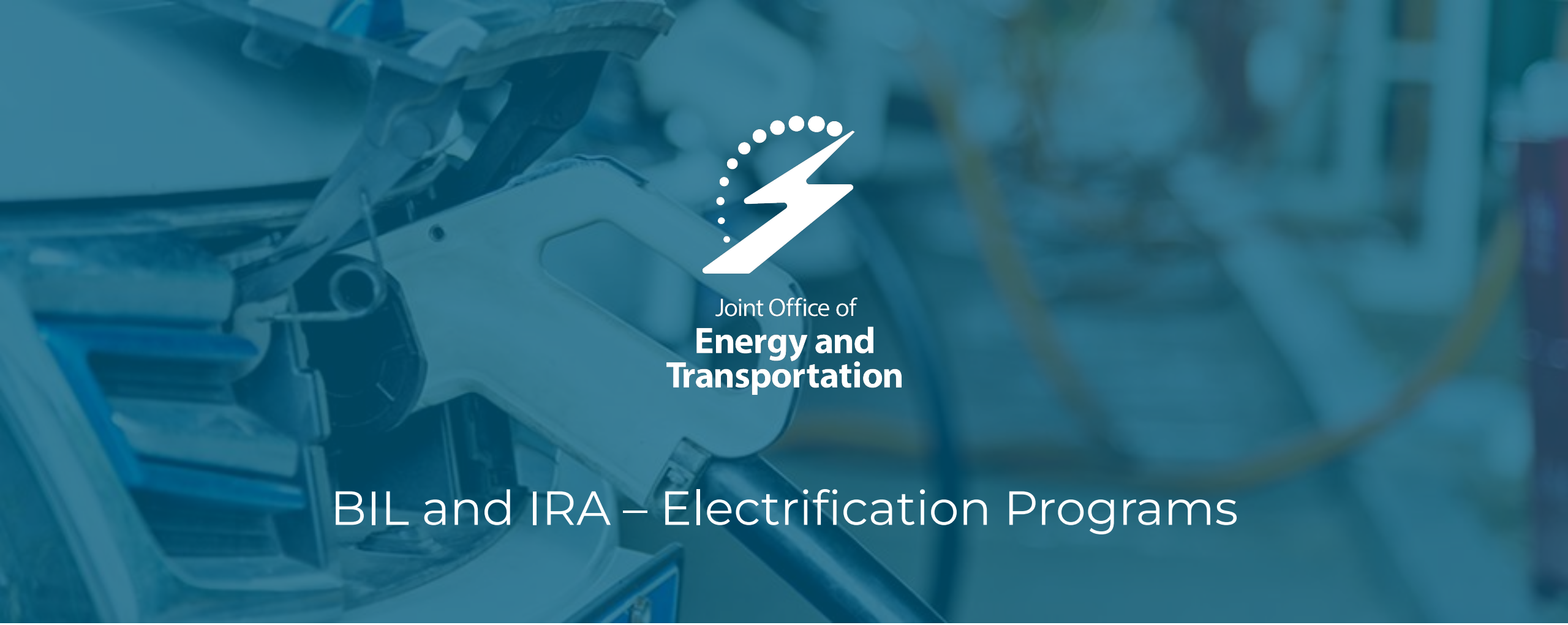
*https://www.electrificationcoalition.org/work/federal-ev-policy/inflation-reduction-act/

DriveElectric.gov

Website connects stakeholders to technical assistance resources, including:

- NEVI guidance, proposed rulemaking and FAQs
- State plan template
- Technical assistance concierge
- Supporting data and tools

State plans are listed here at https://driveelectric.gov/state-plans/



Joint Office of
Energy and
Transportation

BIL and IRA – Electrification Programs

December 1, 2022
Richard Ezike
SWEEP Regional Utility Workshop

driveelectric.gov

Colorado's approach to IRA implementation

December 2022

COLORADO
Energy Office

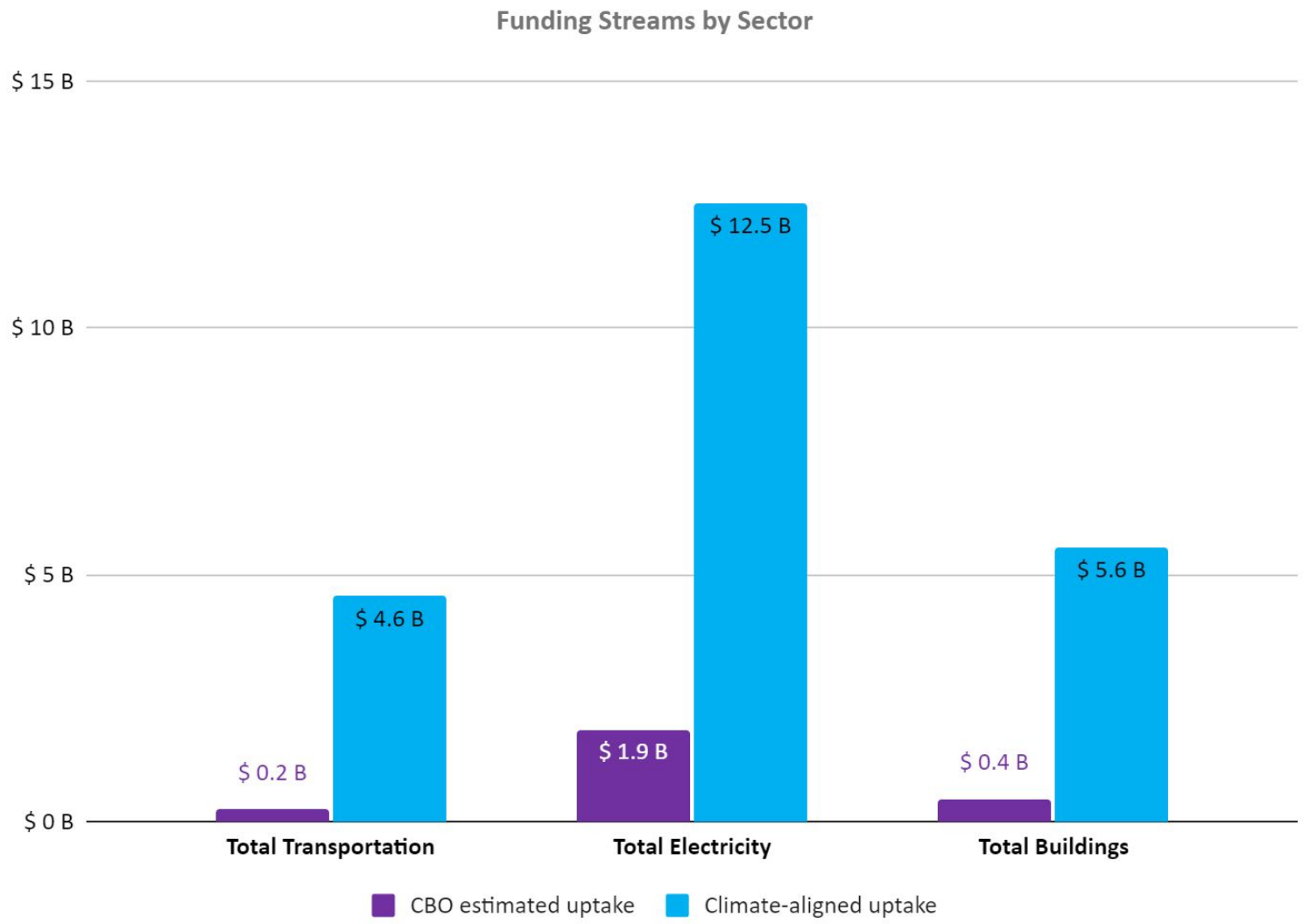
IRA - What We Know So Far:

- Billions of dollars of federal investment in Colorado— how much depends on enabling Coloradans to take advantage of available incentives.
- Many of the IRA provisions are uncapped, and several others will be distributed on a first-come, first-served or competitive basis.
- Some programs will run through the Energy Office, some funding likely to go to CDPHE. Many programs are direct to consumer/industry, but can help enable/encourage participation.
- DOE, EPA, IRS all working to release draft guidance, solicit feedback on program design

IRA Funded Programs that CEO will set up

Title	Description	CO Amount	Timeline
High Efficiency Electric Home Rebate Program	Rebates on efficient electric appliances to low and middle income families ($4000 for middle income, $8000 for households earning less than 80% AMI)	$70.3M	Have two years to set up a program, CEO awaiting DOE guidance
Home Energy Performance-Based, Whole Home Rebates (HOMES)	Rebate programs for electric home appliances for low- and middle-income recipients (less than 150% the area median income)	$69.9M	Have two years to set up a program, CEO awaiting DOE guidance
Home Energy Efficiency Contractor Training Grants	Training for contractors involved in installation of home energy efficiency and electrification improvements	TBD ($200M nationally)	Have two years to set up a program, CEO awaiting DOE guidance

Tax Credits: Uncapped! Need to take advantage



Key themes

- State policy will play an important role in driving uptake
- Federal agencies should, where possible, provide formula funding to states to allow rapid deployment that reflects local needs - such as EPA GHG reduction and climate pollution grants
- State/local agencies should maximize uptake of direct pay tax credits - such as the big opportunity with commercial vehicle tax credits
- State policy can layer state grants and tax incentives and utility programs with federal to achieve tipping points - example of building electrification
- Mesh with state regulations - eg, as CO adopts Advanced Clean Trucks rule, federal tax credits support adoption, adoption supports tax credit uptake, or clean heat plan requirements support heat pump uptake
- State regulators should assure utility ERPs reflect post IRA economic realities - faster decarbonization

Will Toor
Executive Director,
Colorado Energy Office

energyoffice.colorado.gov
@COEnergyOffice

COLORADO
Energy Office

Allies Snapshots

ChargePoint

Pearl Certification

Michaels Energy

Power TakeOff

Oracle/Opower

ICAST

Evergreen Consulting Group

Deployed Infrastructure + Managed Charging = Health Grid

200,000+ activated ports | **15,000+** activated DC ports

Over 355,000 ports through roaming reach

A leader in North America all-purpose charging

+ Operating across verticals
+ Integrated into where people live, work, play

Operating in 16 European markets

+ Support in 9 languages
+ Partnerships with energy retailers and leasing solution providers

Ports as of July 31, 2022. “Activated” ports are installed and activated on our network.

Helping homeowners be safer and more comfortable in their homes

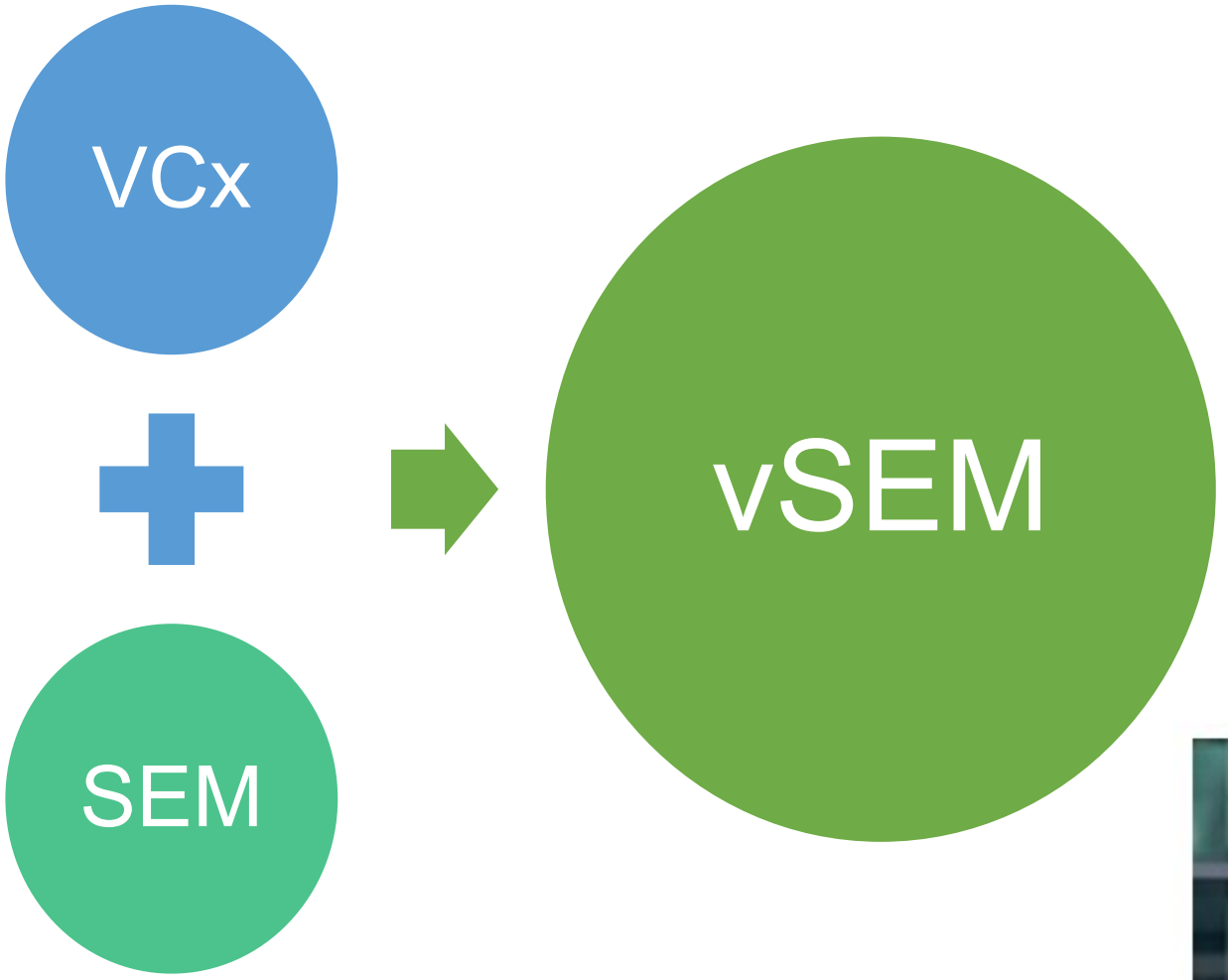
Learn more:
www.pearlcertification.com/p3

Michaels Energy

- Veteran-Owned Small Business
- Established in 1984
- Energy Consulting
- **Our Purpose**: Minimize Waste, Maximize Value
- **Our Values**: Proactive & Responsive Service, Collaborative Partnerships, Intuitive Analysis, & Fanatical Execution

Virtual Strategic Energy Management

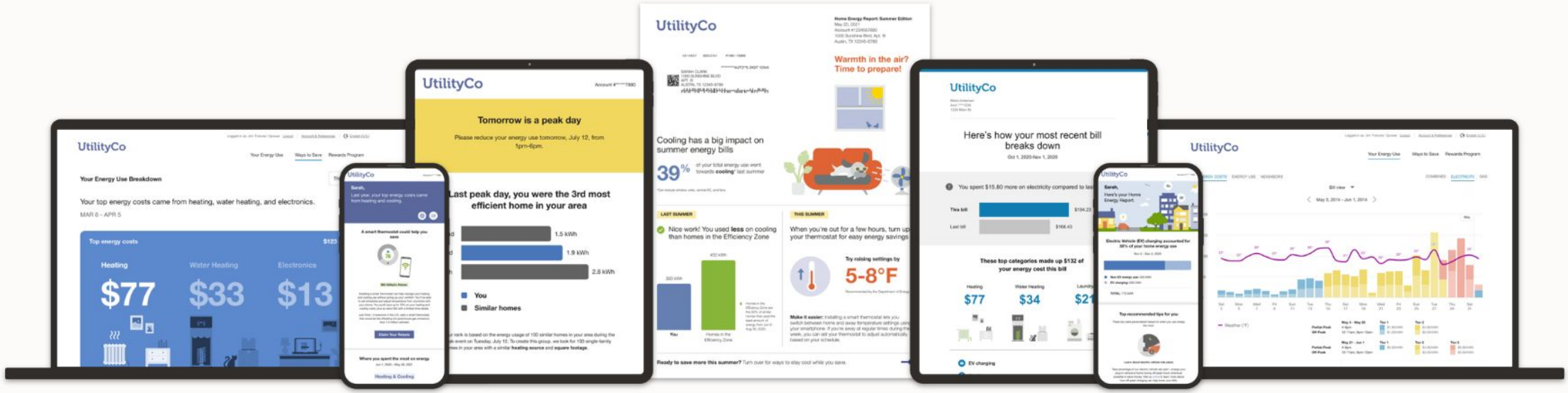
by Power TakeOff



Clark Korbisch
Power TakeOff
VP Business Development

Clark.Korbisch@PowerTakeOff.com
(770) 778-1270
www.linkedin.com/in/clarkkorbisch

Opower delivers decarbonization results and customer lifetime value



33TWh

Energy Efficiency

418MW

Lower Peak Demand

up to **2X**

Faster Product & Program Adoption

162M

yearly views

Digital Self-Service

up to **95%**

Satisfied Customers

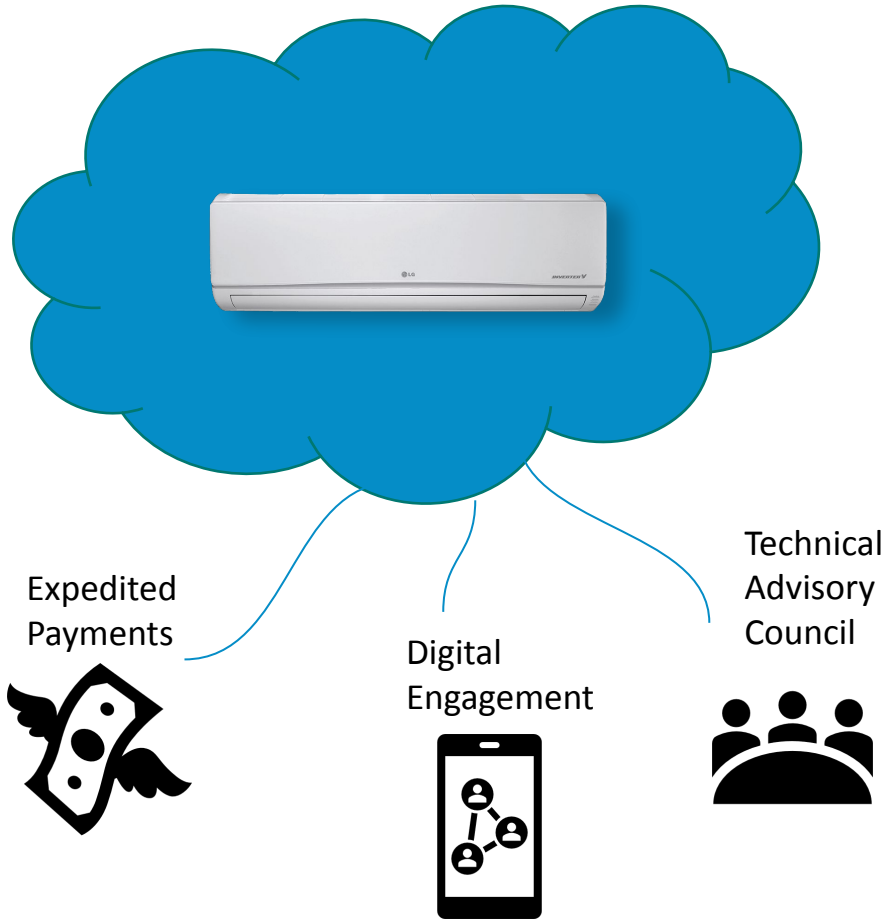
Customer Centric

Beyond DSM

Multifamily Customer

ICAST

- Cold Climate Heat Pump Water Heater Utility Program
  - Contractor SPIF with Customer Incentive
  - Expedited Payments via Major Banking Institution
- [Five Reasons to Choose a HPWH Video]
- Heat Pump Technical Advisory Council



Questions? Email Lizzy.Safranski@evergreen-efficiency.com

Panel Session #2: Scaling Grid Infrastructure to Support Transportation and Building Electrification

Noelani Derrickson
Tesla

Sue Reilly
Group14 Engineering

Tony Perez
Arizona Public Service

Scaling Grid Infrastructure for EVs

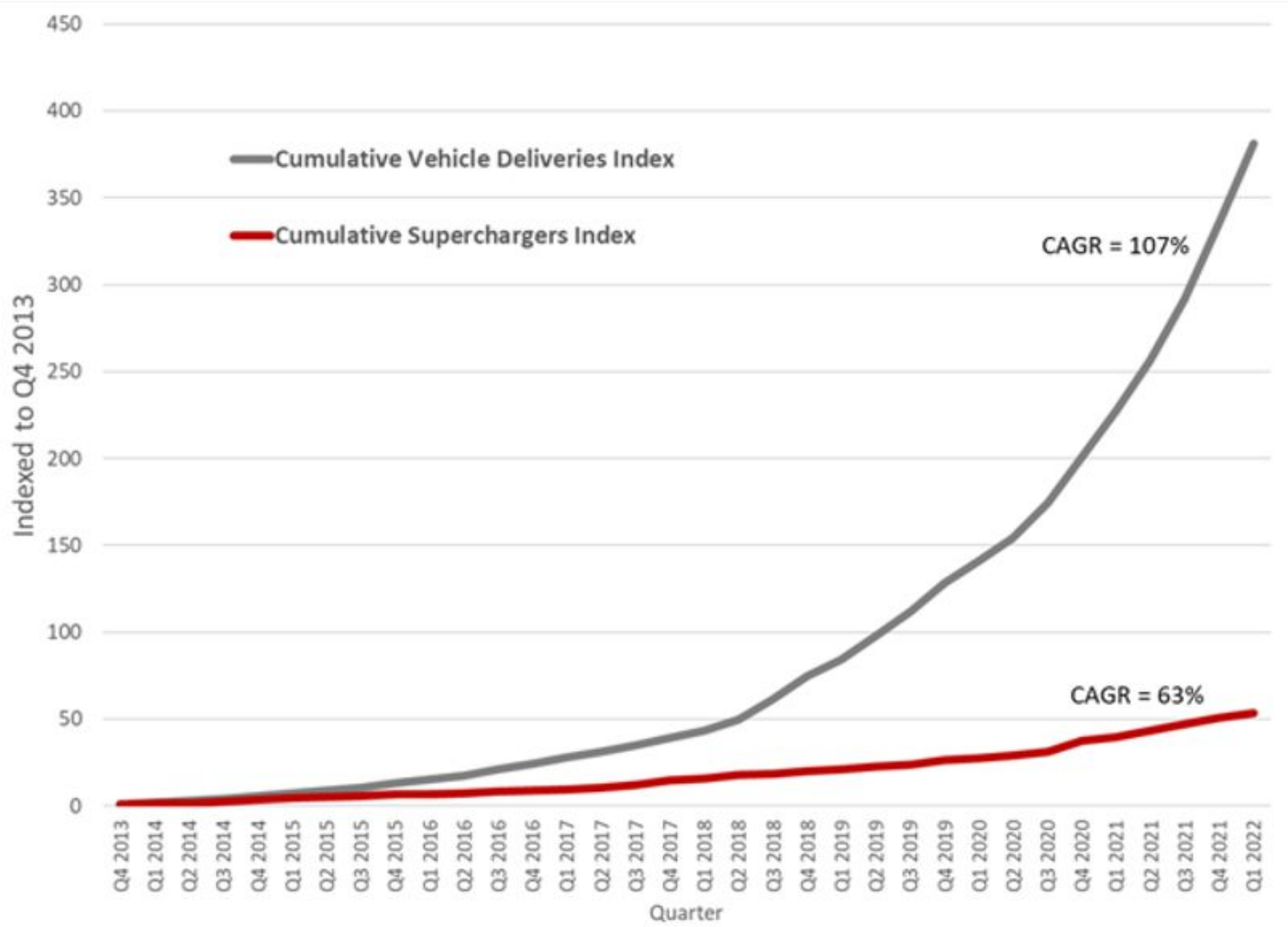
December 2022

Our Mission

ACCELERATE THE WORLD'S TRANSITION TO SUSTAINABLE ENERGY

Electric Vehicle Demand

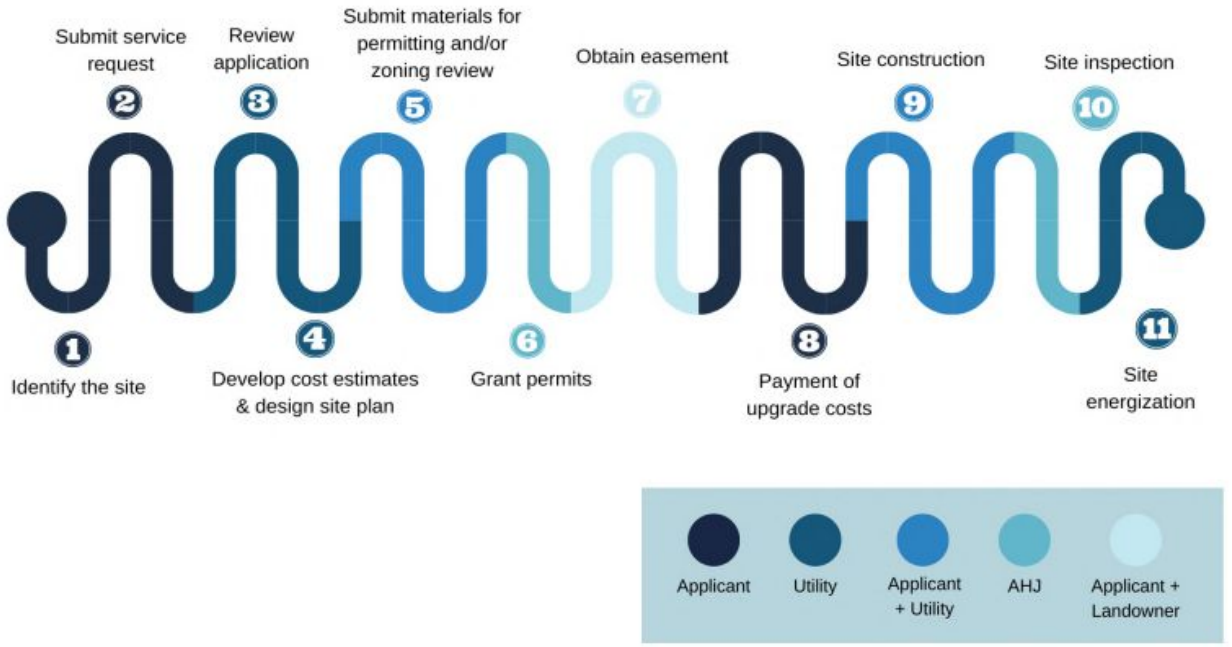
Vehicle Adoption Outpaces Charging Installations



Key Challenge:
Complex and lengthy utility new service energization process for EVCS

Solutions:

- ✔ Streamlined EV charging station service connection process
- ✔ Designated responsible parties
- ✔ Maximum timeline set for ~ 6 months
- ✔ Dedicated EV team with training

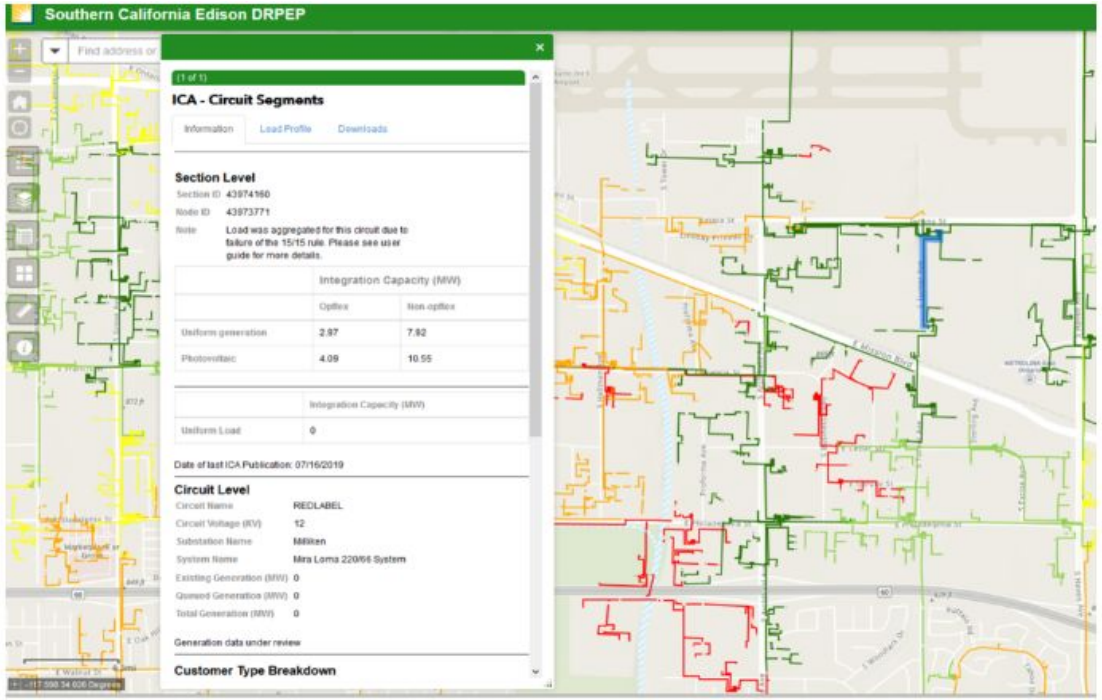


Source: IREC 2022

Key Challenge:
Limited distribution grid information and mapping transparency

Solutions:

- ✔ Release up-to-date, dynamic utility distribution and capacity maps
- ✔ Update maps regularly and improve circuit-level detail
- ✔ Provide pre-application review and feedback on location impacts



Source: IREC 2019

Scaling Grid Infrastructure to Support Building Electrification

Sue Reilly, P.E., LEED AP
Energy Services Director
sreilly@group14eng.com
720-221-1073

group14eng.com

Group14 Overview

Transforming the built environment to realize a more resilient future.

1000+ Completed Energy Models

300+ LEED Certified Projects

600+ Buildings Commissioned

9M+ Sq. Feet of Building Area Monitored

Our Core Services:

Energy

At Group14 we inspire better buildings that are smarter, healthier, and more cost-efficient through innovative energy solutions.

- Energy Modeling & Consulting
- Energy Audits
- BAS Upgrade Design
- Measurement & Verification

Sustainability

Our sustainability solutions decrease environmental footprint, maximize savings, and enhance occupant wellbeing.

- Green Building Certification
- Corporate Social Responsibility Assessment
- Life-Cycle Assessment
- Social Impact & Health

Commissioning

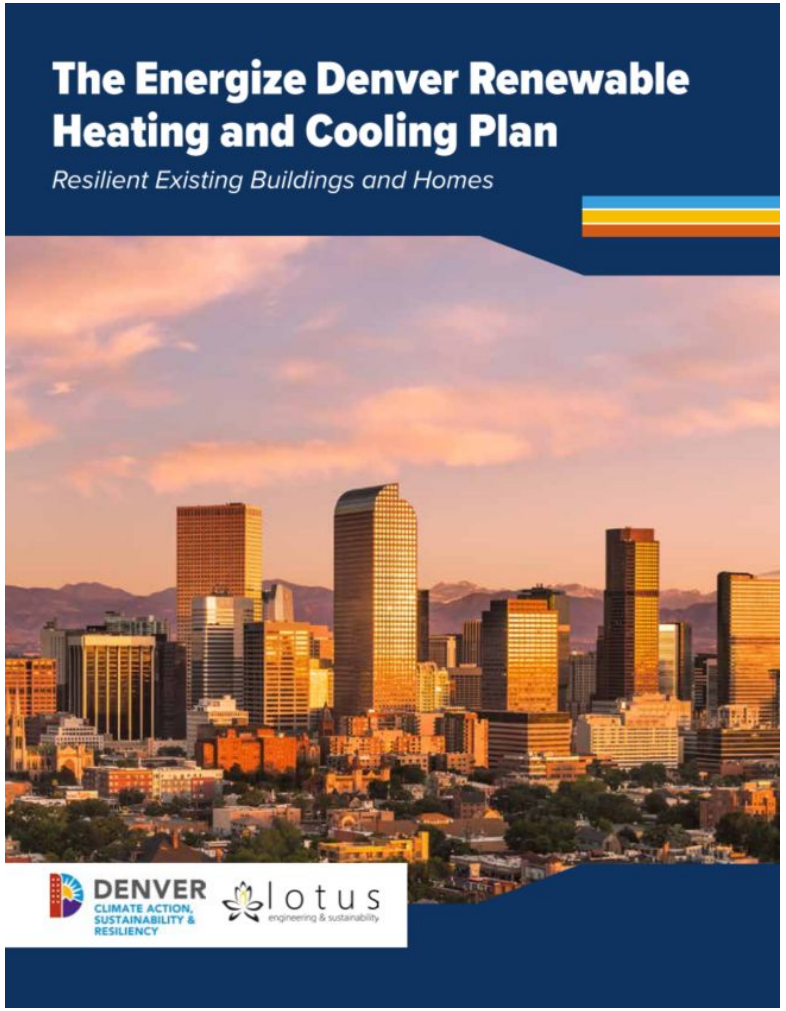
We help building owners protect and grow their investments by ensuring that all building systems are installed and operating properly.

- MEP & Special Systems Commissioning
- Retro-commissioning
- Monitoring Based Commissioning (SkySpark)
- Enclosure Commissioning

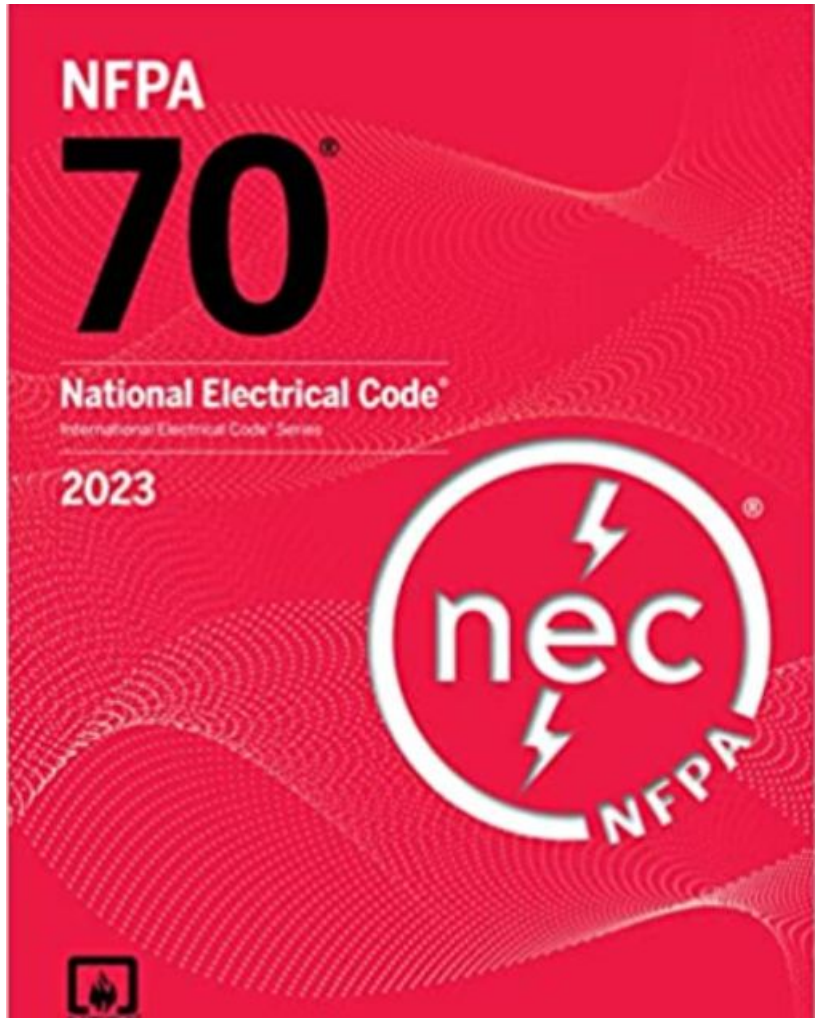
Electrification Studies

- Big grid impacts come from electric resistance for peak space heating loads or using electric heat for DHW when 100% natural gas had been used.
- At 50% of electrification of the whole building stock, peak is still in the summer.
- Focused heavily on "partial electrification" of the existing building stock where natural gas remains to meet peak heating loads.

https://www.denvergov.org/files/assets/public/climate-action/documents/hpbh/renewable-hampc/denver-renewable-heating-and-cooling-plan_june-2021.pdf



Building Codes



LOAD CALCULATIONS

National Electric Code (2020)

- Deemed wattages or volt amps are conservative
  - e.g. lighting is about double energy code allowances
  - Adjusted by demand factors
- Often overestimates peak electrical load

- ALTERNATIVE: Load Study Methods (for existing loads)
  - 30-day electrical load monitoring
  - 1 year's worth of utility bills based on peak-demand meter with 15-min interval data
  - Apply 125% safety factor

Could this approach be used for new buildings?

NEC 2020 (2023) Recognizing Energy Efficiency

220.42 Lighting Load for Non-Dwelling Occupancies

(B) Energy Code.
Where the building is designed and constructed to comply with an energy code adopted by the local authority**, the lighting load shall be permitted to be calculated using the unit values specified in the energy code where the following conditions are met**:

- power monitoring system, no demand factors, 125% of calculated load….

N 220.70 Energy Management Systems (EMSs).

If an energy management system (EMS) is used to limit the current to a feeder or service in accordance with 750.30, a single value equal to the maximum ampere setpoint of the EMS shall be permitted to be used in load calculations for the feeder or service.

The setpoint value of the EMS shall be considered a continuous load for the purposes of load calculations.

Sizing Electrical Systems

ENERGY EFFICIENCY IN MULTIFAMILY

Natural Gas Fueled Furnace Indoor Air Handler

	Existing	Proposed	Capacity & Infrastructure Savings
Cooling Efficiency (SEER)	13.0	16.0	-
Heating Efficiency	80%	320%	-
Cooling Capacity (Btu/hr)	36,000	35,800	-
Heating Capacity (Btu/hr)	32,000	36,000	-
Watts (VA)	5,610	3,720	+1,890
Breaker Size	• 240V 30 Amp Breaker (Outdoor Unit) • 120V 15 Amp Breaker (Indoor Unit)	240V 20 Amp	+120V 25 Amp

Figure 29. 1.5 to 3 Ton Split AC Replaced with Heat Pump

If have 100-unit building, would save 189,000 VA

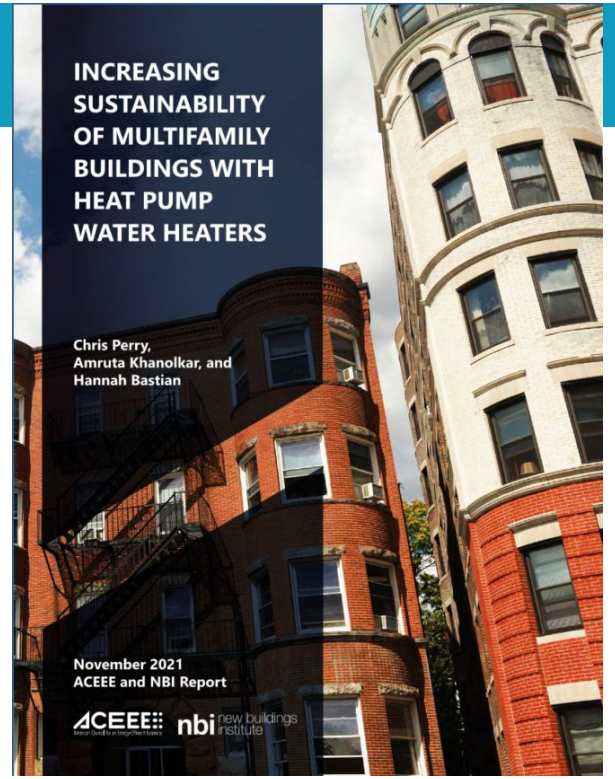
https://www.stopwaste.org/sites/default/files/MF%20Electrification%20Readiness%20Report_FINAL.pdf

Multifamily Water Heating

In NEC, demand factors apply to individual storage water heaters, but not central hot water systems. Results in larger service size for central hot water.

Central systems are easier to retrofit in future when technology matures.

Denver is requiring demand response controls on all electric-resistance storage water heaters (in 2024, can't install these).



Large Heat Pumps for Hydronic Heating

Ron Domitrovic
Program Manager

October 26, 2022

www.epri.com

What Did I Miss?

- Energy Recovery
- Energy Storage
- Utility Rates

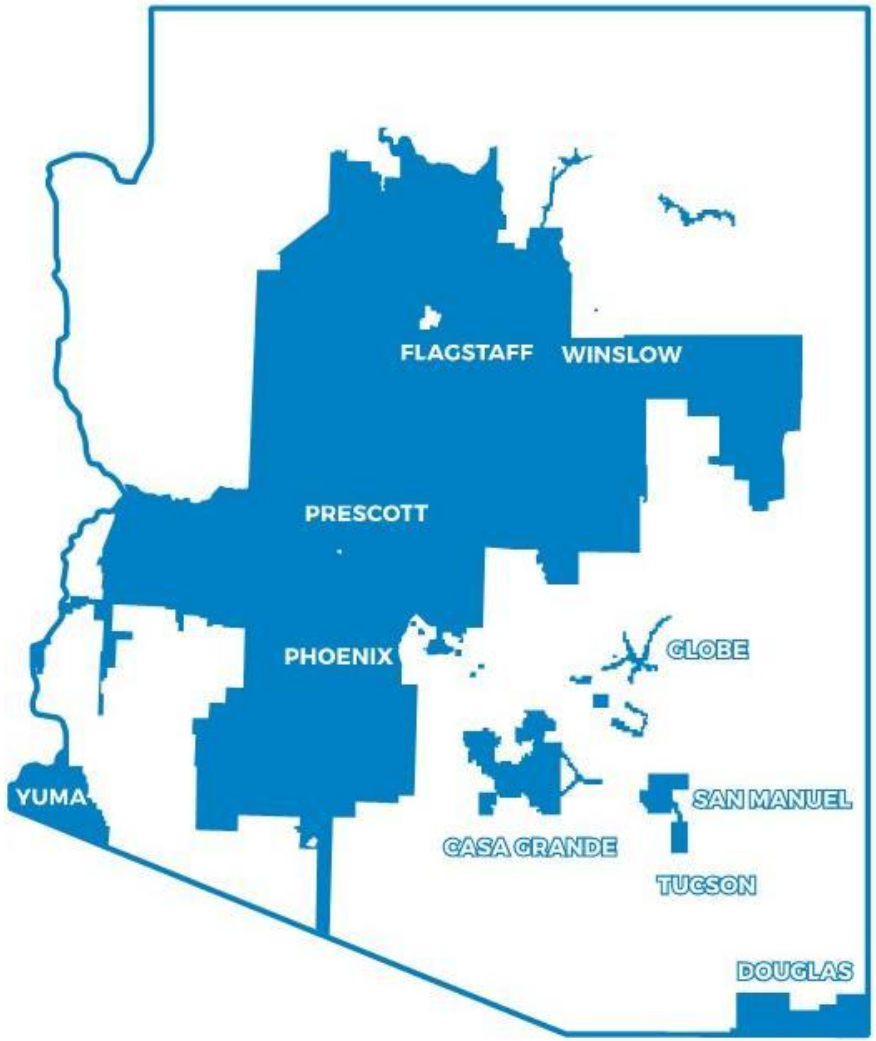
Group 14 ENGINEERING

Scaling Grid Infrastructure to Support Transportation and Building Electrification

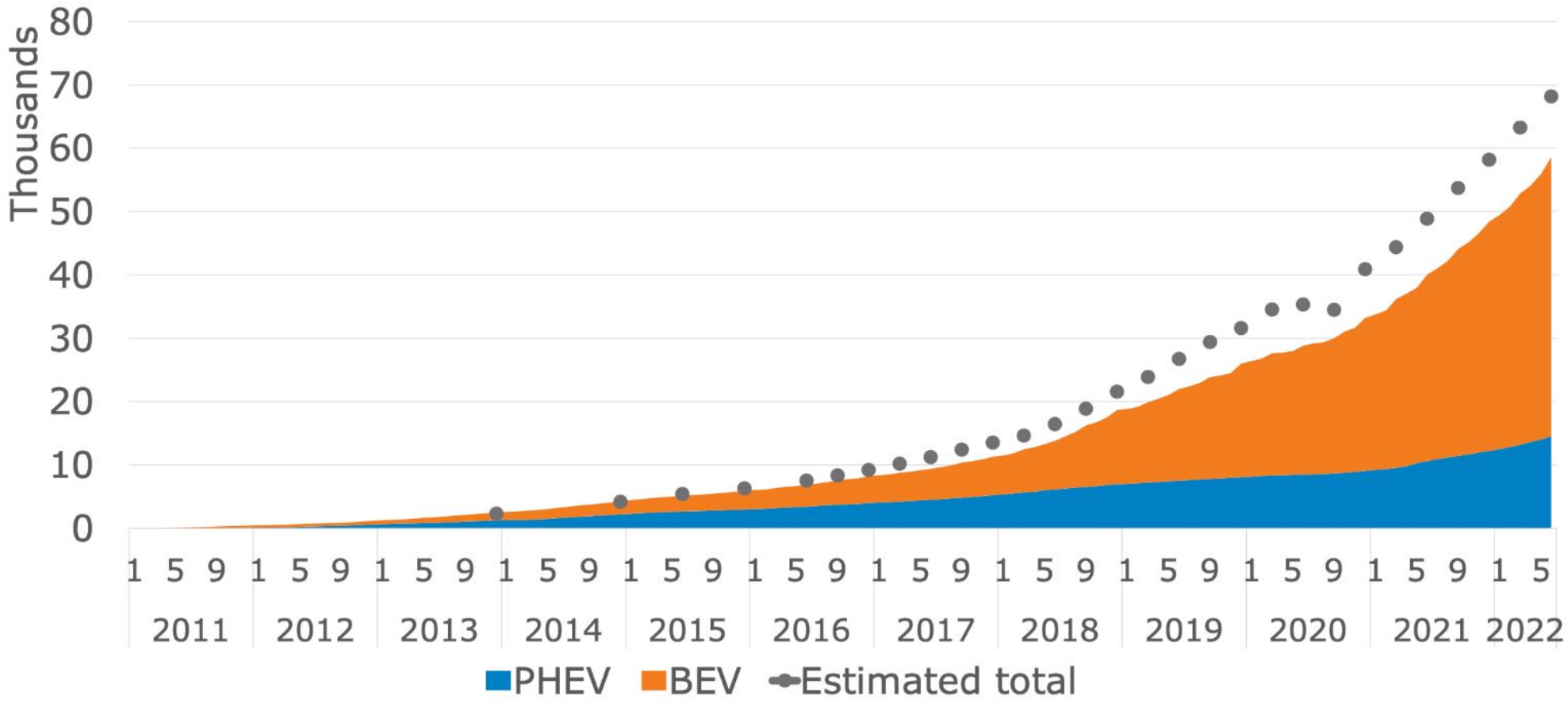
Tony Perez, Customer to Grid Solutions, Arizona Public Service

About APS

- Serving Arizona since 1886
- Investor-owned public service company, regulated by ACC
- 34,646 square mile service territory, operating in 11 counties
- Serving nearly 1.3 million homes and businesses
- Goal to deliver 100% clean, carbon free electricity by 2050



Arizona Light-Duty EV Adoption



Source: Electric Power Research Institute, June 2022

Automaker, Light-Duty Vehicle Sale Outlook

2022

Mercedes – 10 EV models introduced (2022)

Rivian – Began delivery of first all-electric truck (2022)

2025

Volvo – 50% global sales electric (2025)

Toyota – 60 EV models available (2025)

Audi – 30 EV models available (2025)

BMW – 15-25% global sales electric (2025)

Jaguar – 100% electric (2025)

2030

Ford – 40-50% global vehicle volume electric (2030)

Mazda – EV version of every car lineup (2030)

VW – Expect 50% sales EV (2030)

U.K. – Ban on sale of new gasoline powered vehicles expected to take effect (2030)

U.S. – Biden EO targets 50% new sales electric (2030)

2035

Subaru – EV version of every car in lineup (2035)

GM – Eliminate diesel and gas powertrain from light-duty lineup (2035)

CA, NY – Ban on sale of new gasoline powered vehicles expected to take effect (2035)

WA – Proposed ban on sale of new gasoline powered vehicles (2035)

EU – Proposed ban on sale of new gasoline powered vehicles (2035)

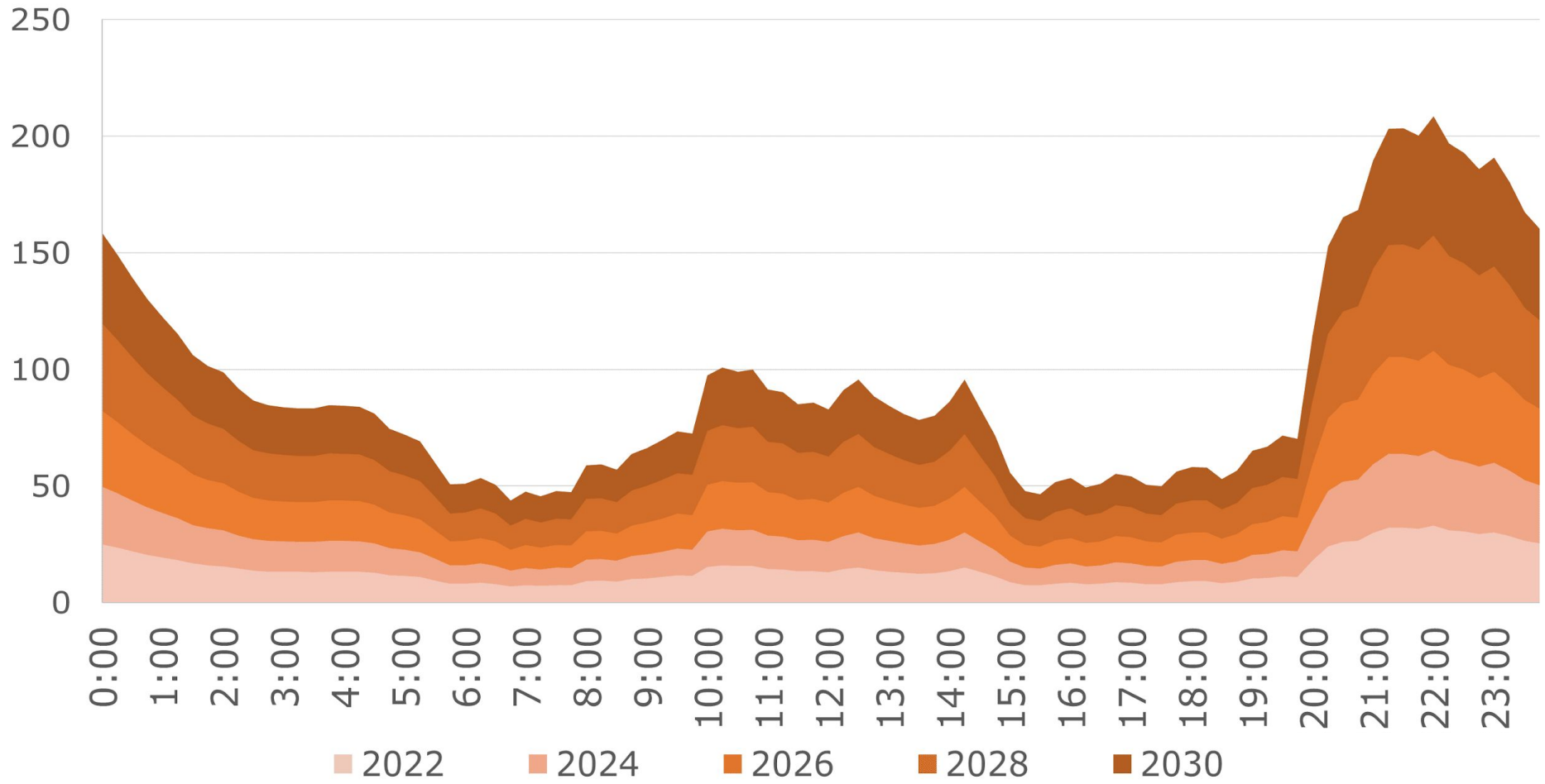
2040+

Honda – 100% EV or FCV (2040)

Mazda, Mitsubishi, Nissan – net-zero carbon emissions (2050)

Source: Car and Driver, 2021; Reuters, 2021

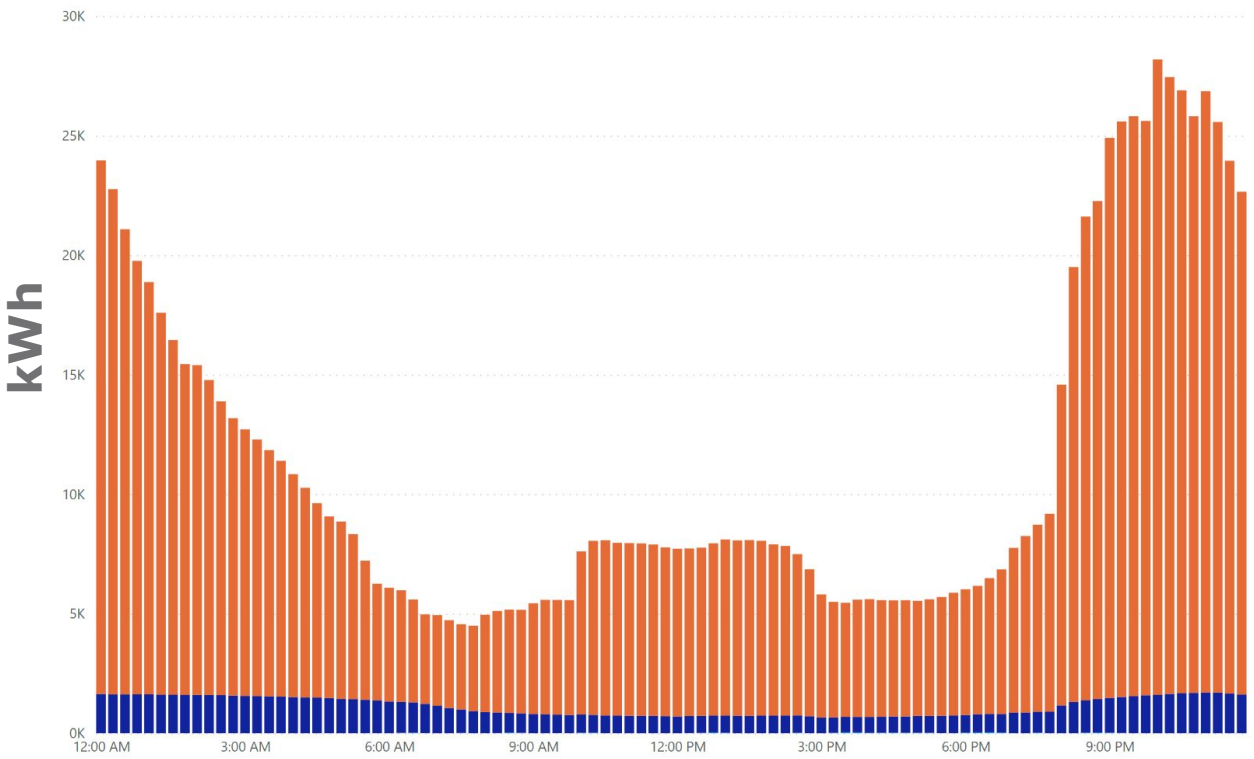
Average Weekday EV Load Projection (MW)



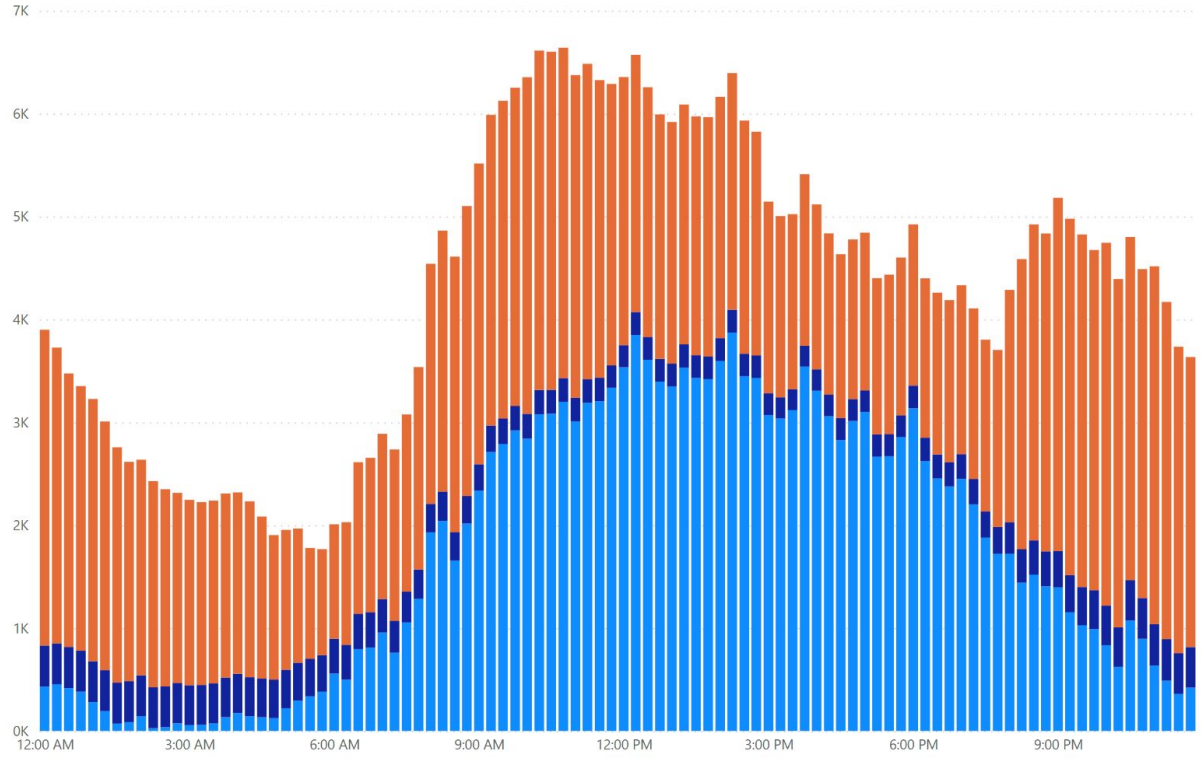
Source: Electric Power Research Institute, 2022; APS Smartcharge Program, 2022

Managing EV Load

Home, 72% of EV charging



Away, 28% of EV charging

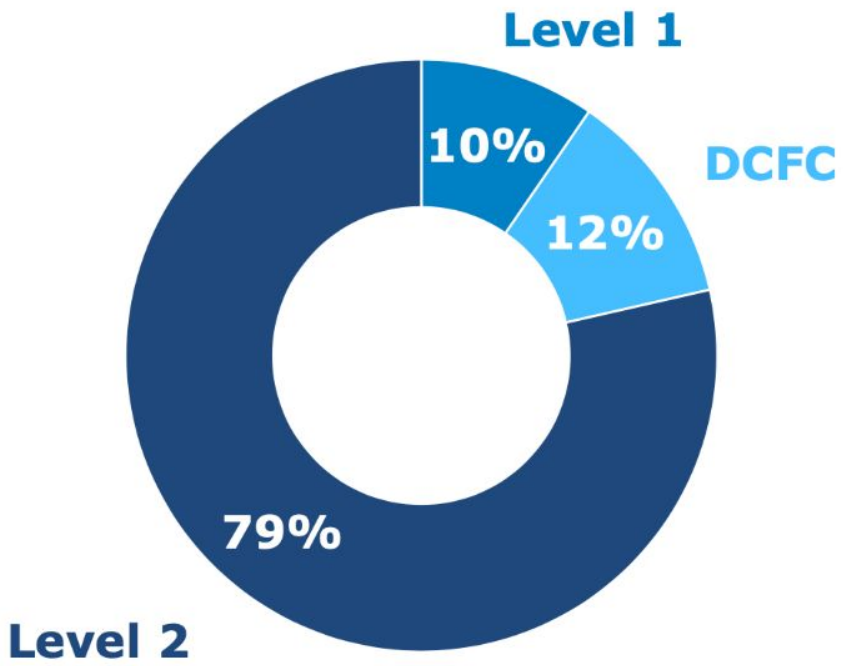


L2 L1 DCFC

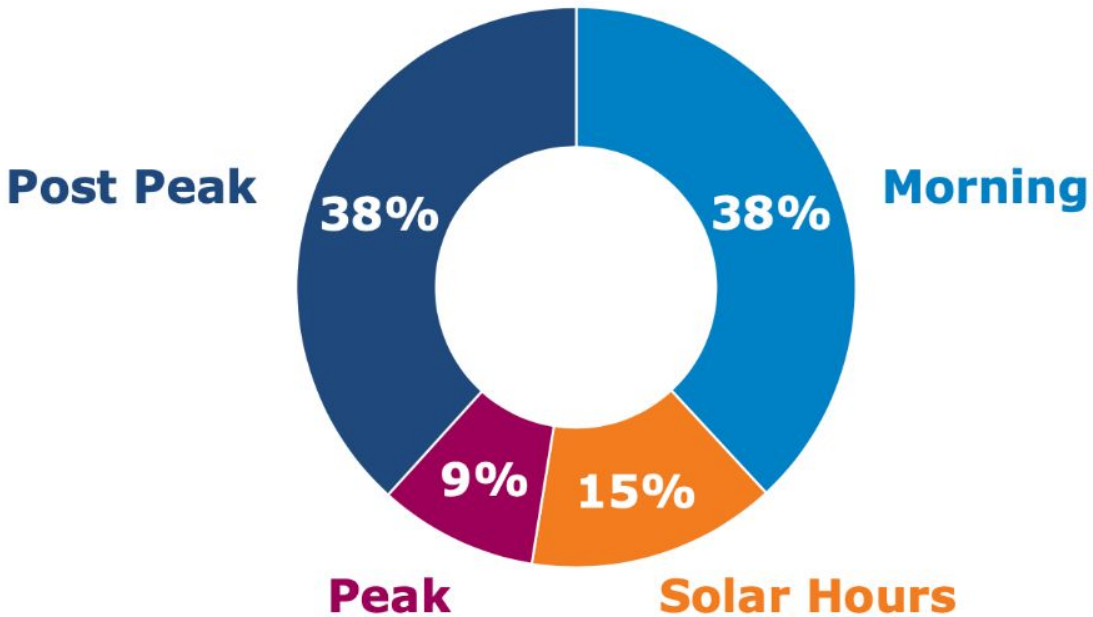
Source: APS Smartcharge Program

Managing EV Load

Energy by Charging Type



Energy by Time Period



Source: APS SmartCharge Program, 2022

Grid Planning

Understanding impacts to our grid…

- An EV adds approximately 20% more energy to residential household
- Load forecasting and resource planning
- Distribution system impacts from EVs (where and how they charge)
- Plan and budget for system upgrades

Customer EV Program Overview

Strategic Focus Area	Proposed 2023 Program Portfolio
Support Fleet Electrification	•Fleet Advisory Services •Take Charge AZ •Commercial Make-Ready
Enhance Grid Reliability Through Managed Charging	•Active Managed Charging •APS SmartCharge •Residential EV Charger Rebate
Broad Based Education & Outreach	• Fleet Marketplace • Cars Marketplace • Chargeway • EV Ride & Drives
Expand Charging Infrastructure	•Take Charge AZ •Commercial Make-Ready •Residential EV Charger Rebate

Education, Outreach, and Equity

- Increase customer EV education and awareness while removing EV charging knowledge gaps
- Understand customer expectations and position utility as enabler of technology
- Ensure benefits of electrification are shared by all, including the implementation of equitable programs

THANK YOU.

Scaling Grid Infrastructure to Support Transportation and Building Electrification

Tony Perez, Customer to Grid Solutions, Arizona Public Service

Panel Session #3: Target and Recruiting for Equity Programs

Patricia Rodriguez
NV Energy

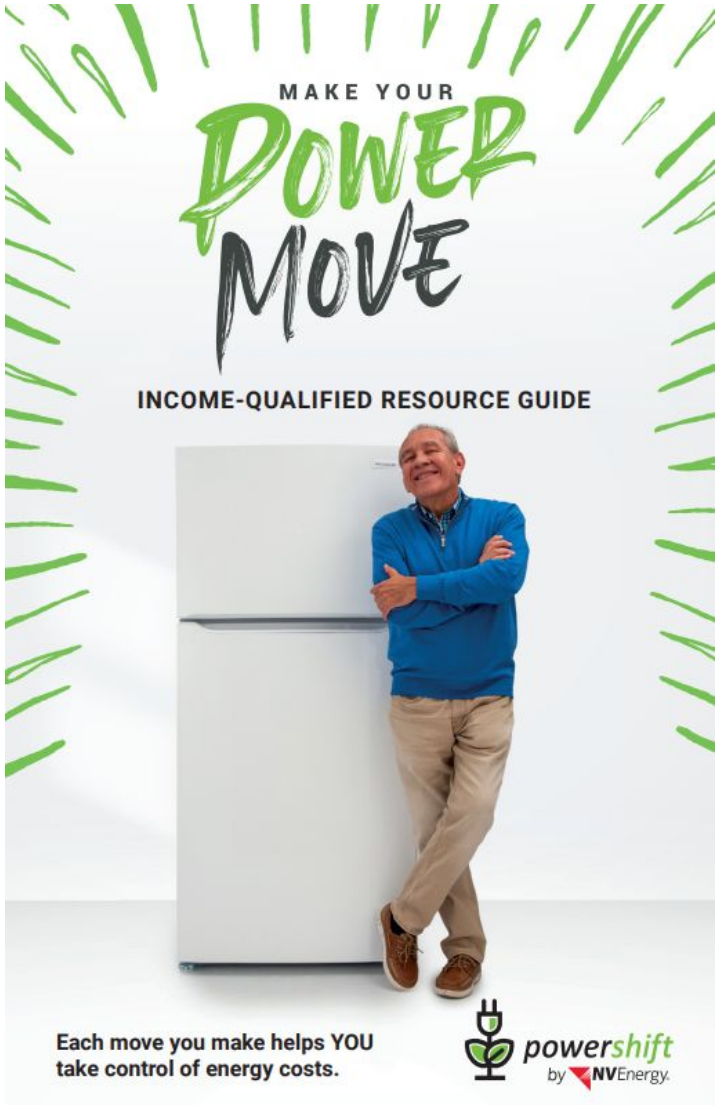
Dr. Mary House
Caring, Helping & Restoring Lives (CHR)

Luke IIderton
Energy Outreach Colorado

Ona Porter
Prosperity Works

NV Energy's Income-Qualified Customer Programs Overview

Patricia Rodriguez
Director, Demand Side Management, Clean Energy, Electrification
SWEEP Workshop
December 1, 2022

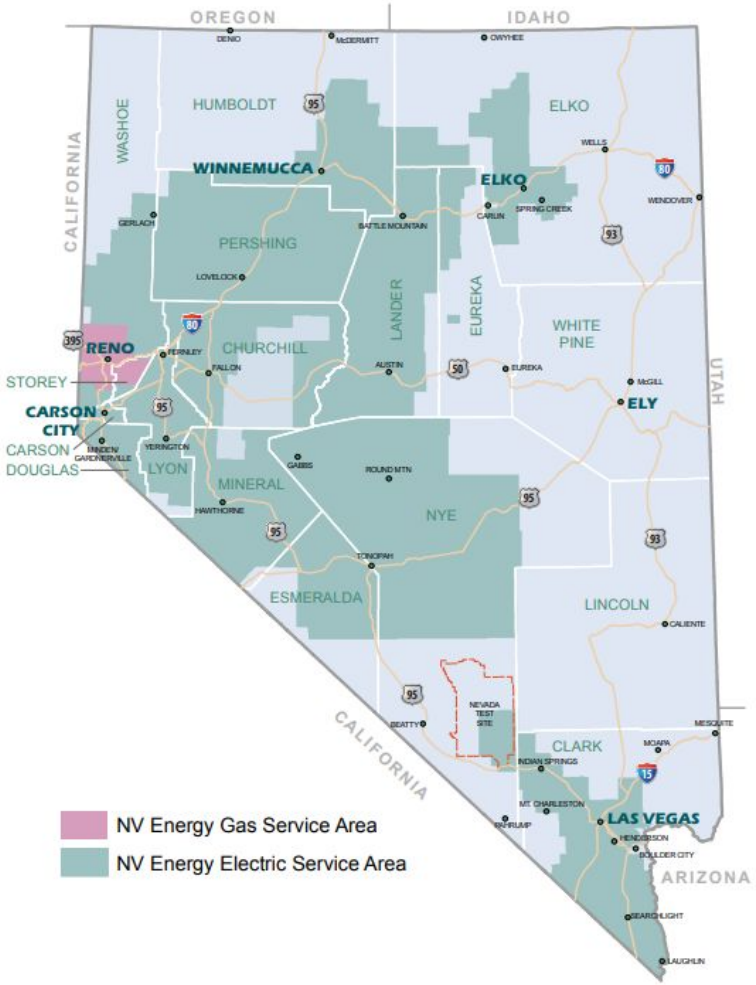


About NV Energy

- NV Energy provides safe, reliable and affordable energy to more than **1.5 million customers**.

- NV Energy has 57 **utility-scale geothermal, solar, solar plus storage, wind and hydro projects** both in service and under development to serve customers.

- NV Energy has numerous PowerShift program offerings that help customers **save energy, save money, and supports clean energy initiatives that sets the foundation for a sustainable energy future for generations** to come.
  - Many programs provide higher incentives or are specifically offered to customers who are income-qualified.



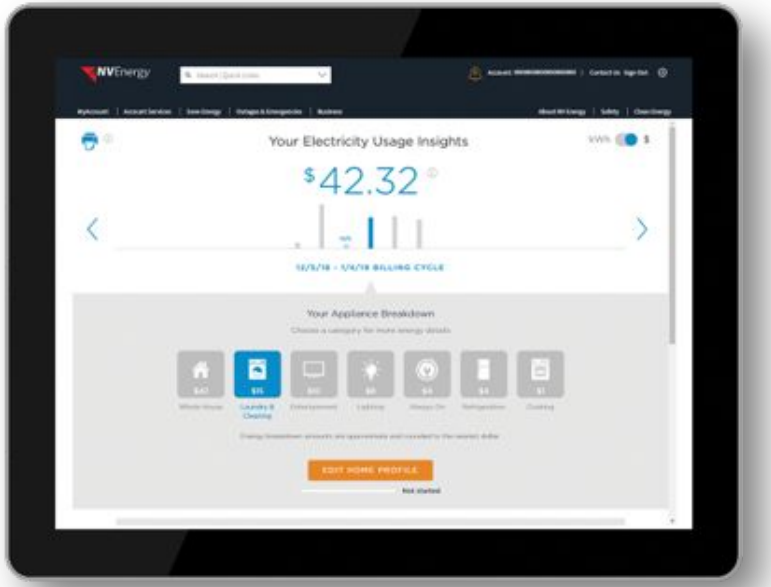
Income- Qualified Energy Efficiency & Demand Side Management Programs

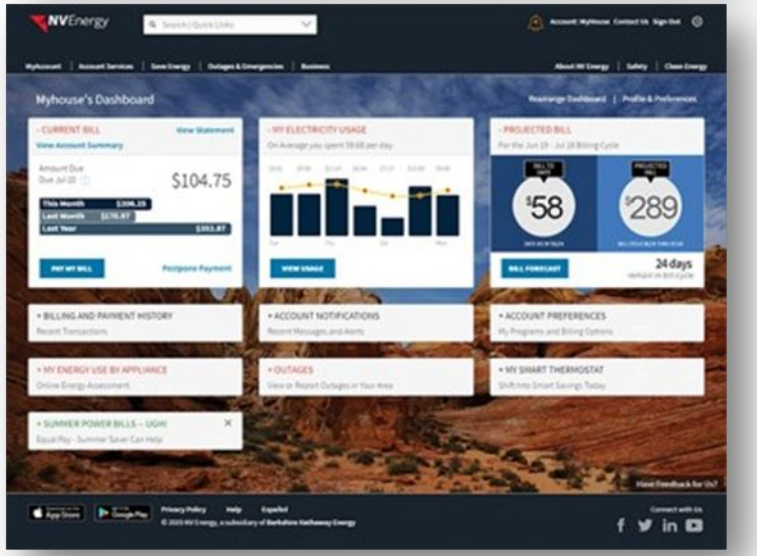
Residential Products & Services:

- Energy Education and Outreach
- Energy Assessments (in-home and online assessments)
- PowerShift Bundle (includes smart thermostat, in-home energy assessment, and direct installation of energy efficient measures)
- Home Energy Reports
- Home Energy Saver (residential appliances and air conditioning discounts)
- Residential Qualified Appliance Replacement Program

Business Products & Services:

- Energy Smart Schools





Energy Assessments: In-Home & Online

In-Home Energy Assessments

In-home energy assessments are intended to educate and inform customers about their energy usage and learn what they can do to reduce their consumption.

Online Energy Assessments

Online assessments are available to customers for free via their NV Energy MyAccount dashboard. Customer benefits include:

- Personalized disaggregated usage data,
- Customized tips on how to be more energy efficient,
- Comparison of energy usage to similar and nearby homes, and
- Recommendations to other energy efficient programs offered

Home Energy Saver

NV Energy partners with local businesses to offer our customers discounts on qualifying high-efficiency air conditioning units and heat pumps. The discount is applied directly to the purchase.

- Customers can choose from a list of participating air conditioning contractors for air conditioners.
- Savings vary depending on the product, SEER Rating and income qualification.

Retails partners such as Lowes, Home Depot, RC Willey, Nationwide (online) and Dollar Tree offer instant discounts on energy efficient appliances.

- Washers, Electric Clothes Dryers, Refrigerators and Freezers will soon be available at Lowes, Home Depot and RC Willey
- Advanced Power Strips available at Dollar Tree

Qualified Appliance Replacement - QAR

- Launched in August 2020, the program helps income- qualified customers upgrade to energy star appliances along with energy efficient products.
- The cost and installation of appliances are free of charge along with the energy efficient products.
- All removed appliances are disposed and recycled through the EPA's Responsible Appliance Disposal Program.
- The program offers the following appliances and direct installation items as an incentive to income-qualified customers:
  - Refrigerators
  - Electric Dryers
  - Energy Star LED light bulbs
  - Advanced Energy Saving Power Strips

Qualified Appliance Replacement - QAR

The program also utilizes partnerships with community services to qualify customers instantly allowing for the customer to apply with a shorter application.

Eligible Public Assistance Programs

- Asian Community Resource Center
- Boys and Girls Club Family Resource Center
- Community Services Agency Weatherization Program
- Community Services of Nevada (CSN)
- East Valley Family Service
- HopeLink
- Las Vegas Urban League
- Nevada Rural Housing Authority
- Project REACH (Southern Nevada Energy Assistance Program)
- Southern Nevada Regional Housing Authority
- Three Square
- Nevada Division of Welfare and Supportive Services - Energy Assistance Program
- CARE Chest
- Supportive Services for Veteran Families (SSVF)
- U.S. Department of Housing and Urban Development-VA Supportive Housing (VA-HUD-VASH)
- WCSD Family Resource Centers

Income Eligibility Requirements:

Household Size	Maximum Annual Gross Income
1	$ 25,750
2	$ 34,840
3	$ 43,920
4	$ 53,000
5	$ 62,080
6	$ 71,160
7	$ 80,240
8	$ 89,320
Each Additional	$ 9,080

Future of Transportation Electrification

- Economic Recovery Transportation Electrification Plan (ERTEP)
  - NV Energy will invest ~$100 million to expand availability of electric vehicle (EV) charging station access
  - Goal is to strategically place charging stations across the state, while prioritizing historically underserved communities
- Transportation Electrification Plan (TEP)
  - On September 1, 2022, NV Energy proposed a new suite of residential and commercial EV charging station programs to be reviewed by the Public Utilities Commission of Nevada.

Our Renewable Energy Commitment

We are committed to increasing our use of clean energy resources and reducing our carbon footprint as we work toward our goal of serving customers with **100% renewable energy**.

powershift by NVEnergy

https://chrinc.net/

Dr. Mary L. House
CEO

CHR, Inc (Caring, Helping Restoring Lives), a Faith-based 501(c)(3) non-profit corporation was founded in May 1996 by Clinton & Mary L. House. The purpose of establishing this company is for the caring, helping, and restoring of lives to the under and unemployed, as well as, the victims of domestic & sexual violence who are challenged with poor credit, homelessness, minimal job skills, education, and the confidence to break these barriers.

In 2017, CHR partnered with the Clean Energy Initiative to provide information on renewable energy that will lead to healthier lives. We have been able to provide education on the benefits of driving an electric car, benefits of cooking on an induction cooktop and ways to create a greener and healthier home.

CHR inc.
CARING HELPING & RESTORING LIVES
a faith-based community non-profit corporation

Mission Statement:

To bring hope, help, and healing to victims of domestic and sexual violence through the love of Christ, counseling, education, services; and to provide education and empowerment workshops (to include, but is not limited to, domestic violence and clean energy initiatives). Individuals participating in our program receive combined and continual economic empowerment, mental health resources, motivational workshops, and advocacy to help them maintain healthy, nurturing, and violence-free lifestyles. Our mission is also to provide information and resources regarding clean energy, developing a healthy home environment and social services.

CHR inc.
CARING HELPING & RESTORING LIVES
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We have been able to:

- Create an informed and engaged community of advocates in support of clean energy solutions in Nevada, with a focus on environmental justice, reducing air pollution, and expanding access to electric transportation and renewable energy technologies.

- Educate the African American community, candidates, and decision makers about environmental justice and the rising socio-economic costs associated with fossil fuels, including health and climate impacts. Highlight the economic and health benefits of clean energy, clean transportation, and healthy homes and buildings.

- Develop organizational leadership and membership to become effective spokespeople and advocates on clean energy and climate solutions.

CHR inc.
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ENERGY OUTREACH COLORADO

Together We Power Stability

APPROACH TO ENERGY AFFORDABILITY

EOC is focused on energy supportive services that lead to stability

Vision

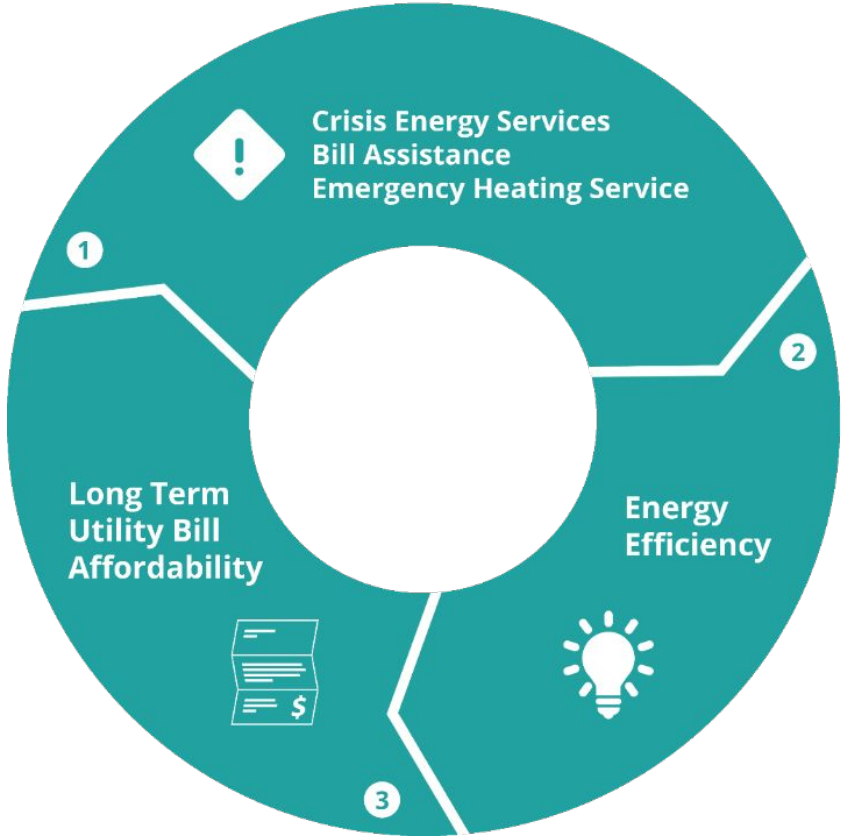
All Coloradans can afford their energy needs.

Strategic Foundation

SUPPORT ▶ Bill Assistance, Furnace Repair - Short Term

STABILIZE ▶ Energy Efficiency, Behavior Change - Mid Term

SUSTAIN ▶ Renewable Subscriptions, Advocacy - Long Term



PARTNERING WITH COMMUNITY ORGS

Community-based organizations know what's needed

- Energy prices continue to rise
- Conservation has limited returns
- Agency partners have limited capacity for outreach
- Prioritize participant stability
- Focus on participant journey through assistance
- Direct interaction with participants makes programs and education stronger

IQ CUSTOMER OUTREACH TOOLS

Texting platform has been a critical tool for engagement

- Utilized text platform to refer participants to other programs
- Moved from automated texts to peer-to-peer texting
- Higher response rates on SMS vs any other direct communication – approx. 25% response rate
- Adds capacity to busy CBO staff
- Huge benefit to addressing utility bill literacy issues

TARGET IQ CUSTOMERS WITH A PLAN

Utilities and implementers should be presenting solutions

Income qualified (IQ) customer program referrals-suite of solutions for the problem

Must prioritize stability before asking IQ customers to be engaged in education

Consistent communication with IQ customers builds trust

IQ customer feedback makes education and outreach efforts stronger

OTHER TECHNIQUES USED IN COLORADO

EOC has been testing new consumer research language

- Directly engage with high use customers and support their access to weatherization or solar programs
- Combine energy supportive services with other social services-LEDs and program applications in food bank bags, back to school events, start of summer events, presence at bill payment centers or rental assistance
- Move away from industry terms-electrification is perceived negatively, pollution-free homes or healthy electric homes had the highest positive response rates
- Partner with high school science and vocational programs
- Address safe and abundant natural gas perceptions from customers

Capital Stacking
Deploying Energy Efficiency to Those Most in Need and Hardest to Reach

Key Principles:

- Remove Barriers
- Create Pathways
- Deploy ALL Available Free Resources
- Add contract and grant investments

Prosperity Works Energy Work & Advocacy

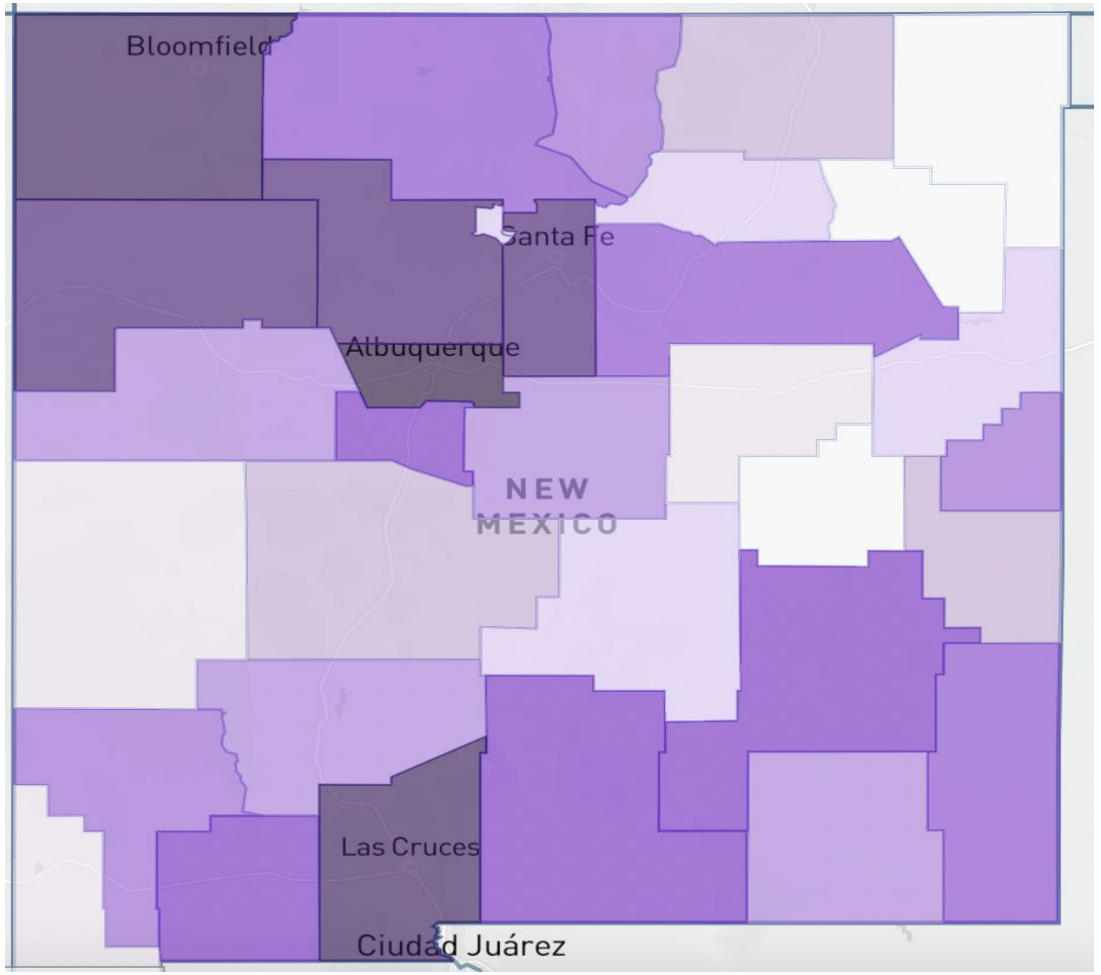
PROSPERITY WORKS
Powering Social and Economic Opportunity

- Energy efficiency upgrades in South Valley and International District – 600 homes
- Deeper investment in International District $8,000 per home
- Represent low-income people at PRC
- Supporting community solar implementation

Why should we care?

PROSPERITY WORKS
Powering Social and Economic Opportunity

- The ENERGY BURDEN for low income families is up to 30% of their annual income vs. 2-3%.
- Food, medicine and medical care sacrificed to pay for the essential commodity of energy.
- We can't reach our carbon reduction goals w/o serving the LI community



What this looks like for families?

PROSPERITY WORKS
Powering Social and Economic Opportunity

Electric panel upgrade

Energy Star Roofs

Duct Sealing

Programmable thermostats

Water heater insulation

Water heater

Community Solar

Insulation

Low income rates

Low flush toilets

Windows & Doors

Shower & faucet aerators

Lightbulbs

Low flush toilets

HVAC

Carbon Monoxide detector

Refrigerator

CEED – Community Energy Efficiency Development

PROSPERITY WORKS
Powering Social and Economic Opportunity

- 10 million allocated
- Municipalities and tribes can apply with a community partner
- Project based on your needs
- Town of Bernalillo – declaring its intention

CLEAN ENERGY COMMUNITY BY 2030

Welcome – Day 2

9:00 A.M. – 12:00 P.M.

Located in Moon Room (Floor 53)

Day 2 Agenda

9:00 a.m.-10:15 a.m.	**Panel Session #4: The Grid of Tomorrow–Grid Flexibility, Energy Storage, & Energy Efficiency Measure Load Shaving** *Moderator: Michael Kenney, Senior Utility Program Manager, SWEEP*
10:15 a.m. – 10:30 a.m.	**SWEEP Allies Snapshot** *Led By: Nissa Erickson, Federal Funding Implementation Coordinator, SWEEP*
10:15 a.m. – 10:45 a.m.	**Networking Break**
10:45 a.m. – 11:45 a.m.	**Panel Session #5: Challenges in Meeting Energy Savings Goals** *Moderator: Angie Dykema, Nevada Representative, SWEEP*
11:45 a.m. – 12:00 p.m.	**Concluding Remarks – Elise Jones, Executive Director, SWEEP**

Panel Session #4: The Grid of Tomorrow–Grid Flexibility, Energy Storage, & Energy Efficiency Measure Load Shaving

John Phelan
Fort Collins Utilities

Hilary Polis
Opinion Dynamics

Brett Bishop
Franklin Energy

Fort Collins Utilities Grid Flexibility

Presented by:

John Phelan, PE

Energy Services Manager and Policy Advisor

SWEEP Annual Workshop

December 2, 2022

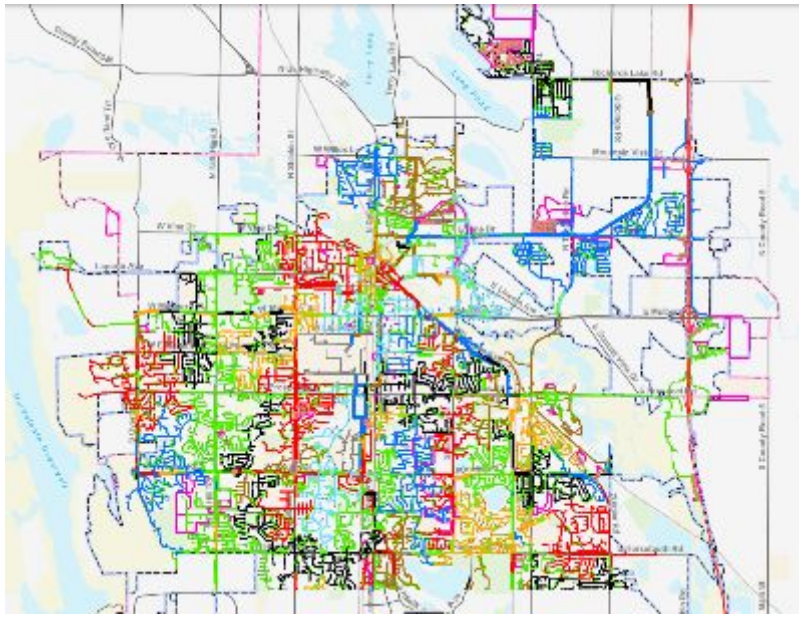
City of Fort Collins

- Population 180,000
- Municipal Electric Utility
  - 2000 miles of distribution lines
  - 55 square miles
  - 320+ MW peak
- **Time-Of-Day pricing for all residential**
- **Reliability 99.9965%**
- Climate Action Plan Goals
  - 20% reduction by 2020 (**actual 24%**)
  - **50% reduction by 2026**
  - 80% reduction by 2030
  - Carbon neutral by 2050
- Home to
  - Colorado State University
  - High tech & beer industries

OUR CLIMATE FUTURE

- Technology and Systems
  - AMI since 2003, starting refresh of backhaul communications
  - DERMS – Itron Intellisource
  - ADMS – system topology/mapping/outage management
  - “BERTHA” – integrated property, customer and programs data tool
  - PowerClerk solar software
  - Distribution system modeling
    - Milsoft (EDAR export source)
    - Open DSS (EPRI tool run by CSU)
- Standards
  - Over 99+% underground, looped system
  - Design for 2x substation capacity
  - Electric capacity fee for new construction
  - 2022 updated DER interconnection standards
  - 2021 building code with amendments (EV infrastructure)

Joining energy imbalance market in 2023 and regional electricity market in 2025



- Equipment/Interfaces
  - Wi-Fi thermostats
    - Direct Install and BYOT
  - Standard Electric water heaters
  - Grid Interactive Water Heater
    - CTA-2045
  - Electric Vehicles (2023)
  - OpenADR
    - Commercial & Industrial
  - IEEE 203.5 (2023)
    - Solar and battery inverters
- About 3,500 homes and 7 large commercial
- Effective capacity of -1.8/+2.4 MW
- Current functions
  - Peak savings
  - Time of Day load shifting
  - Solar noon consumption



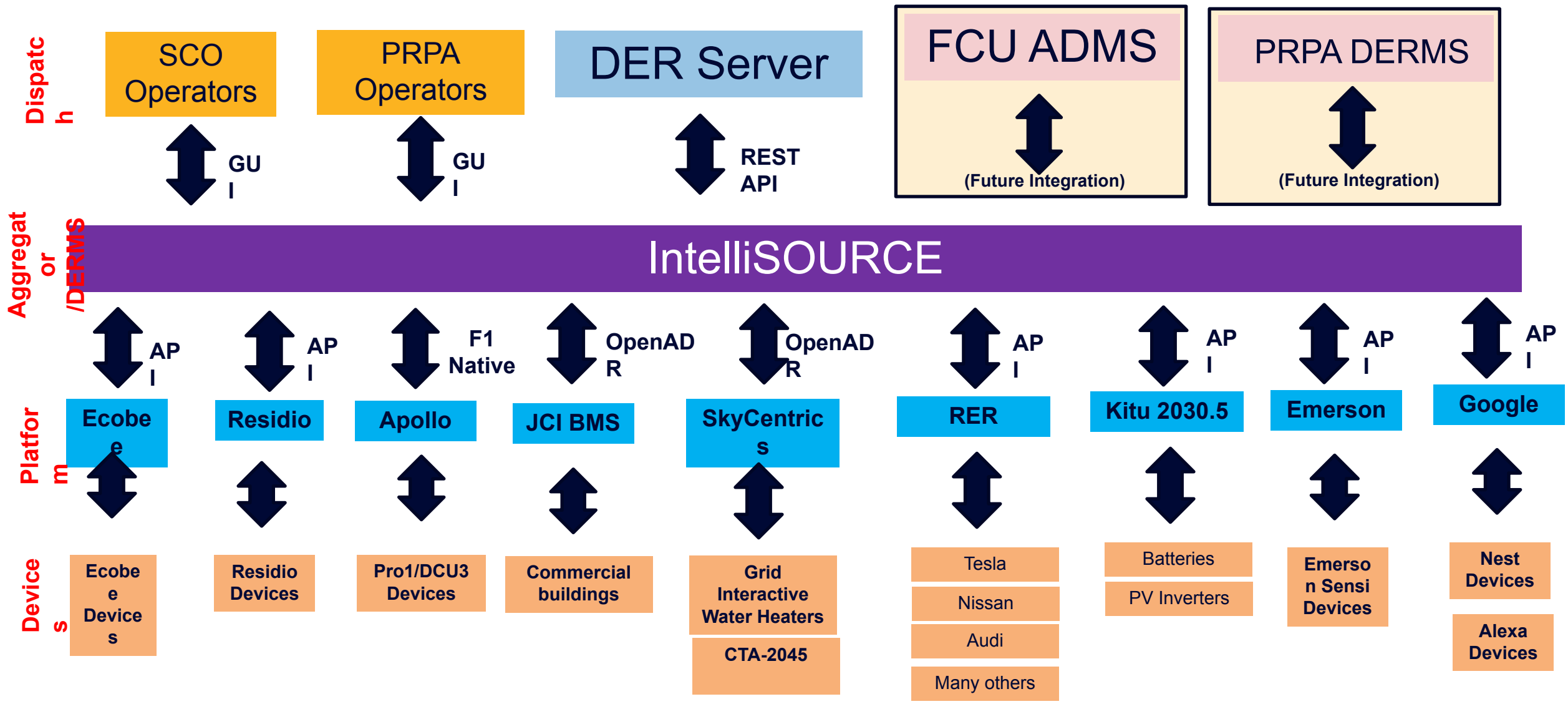




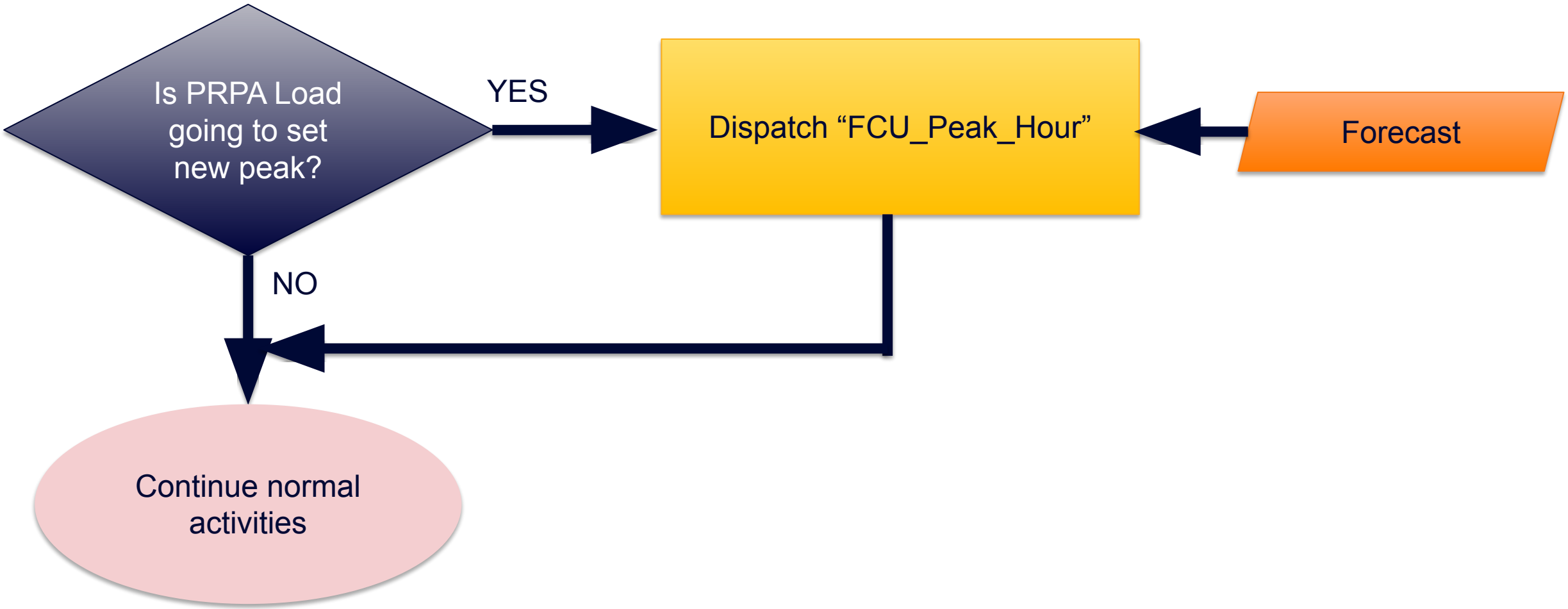

~ 3,000 solar systems (30 MW) and 200 batteries (2 MW)

- Orders of magnitude increased **complexity**
  - Control scenarios
  - Forecasting
  - Communications
  - Validation
- Ridiculously increased activity levels
- Commitment to using standards wherever possible
- New challenges
  - Dynamic distribution system “capacity”
  - Systems for operator and crew DER visibility
  - Shift from single to many use cases for any device
  - Undersanding the net effect of fleets of devices
  - Roadmap acceleration
  - Maintenance of DER assets
  - Uncertain economic and system values

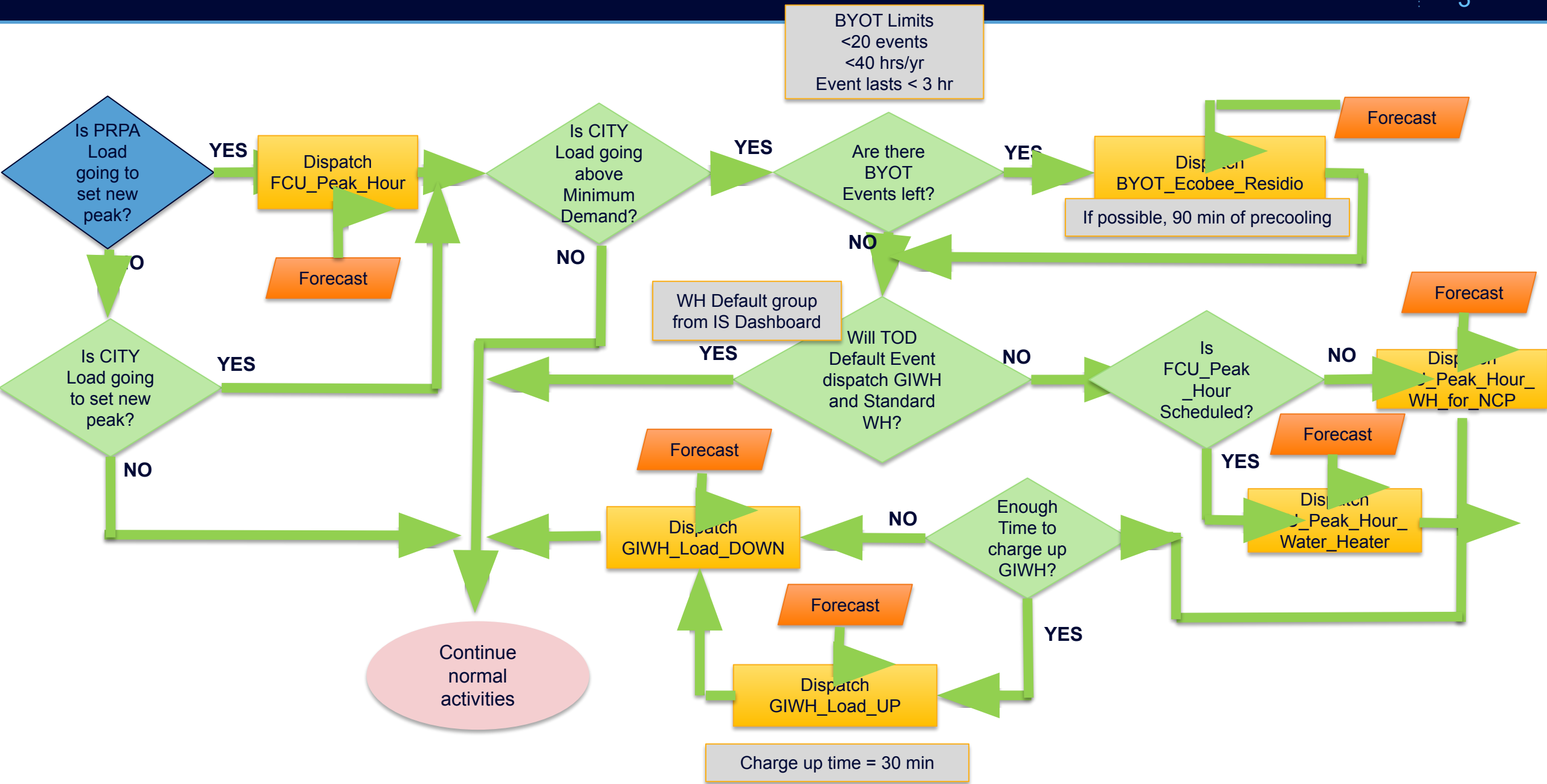
Result: Investing in capabilities and systems before capacity

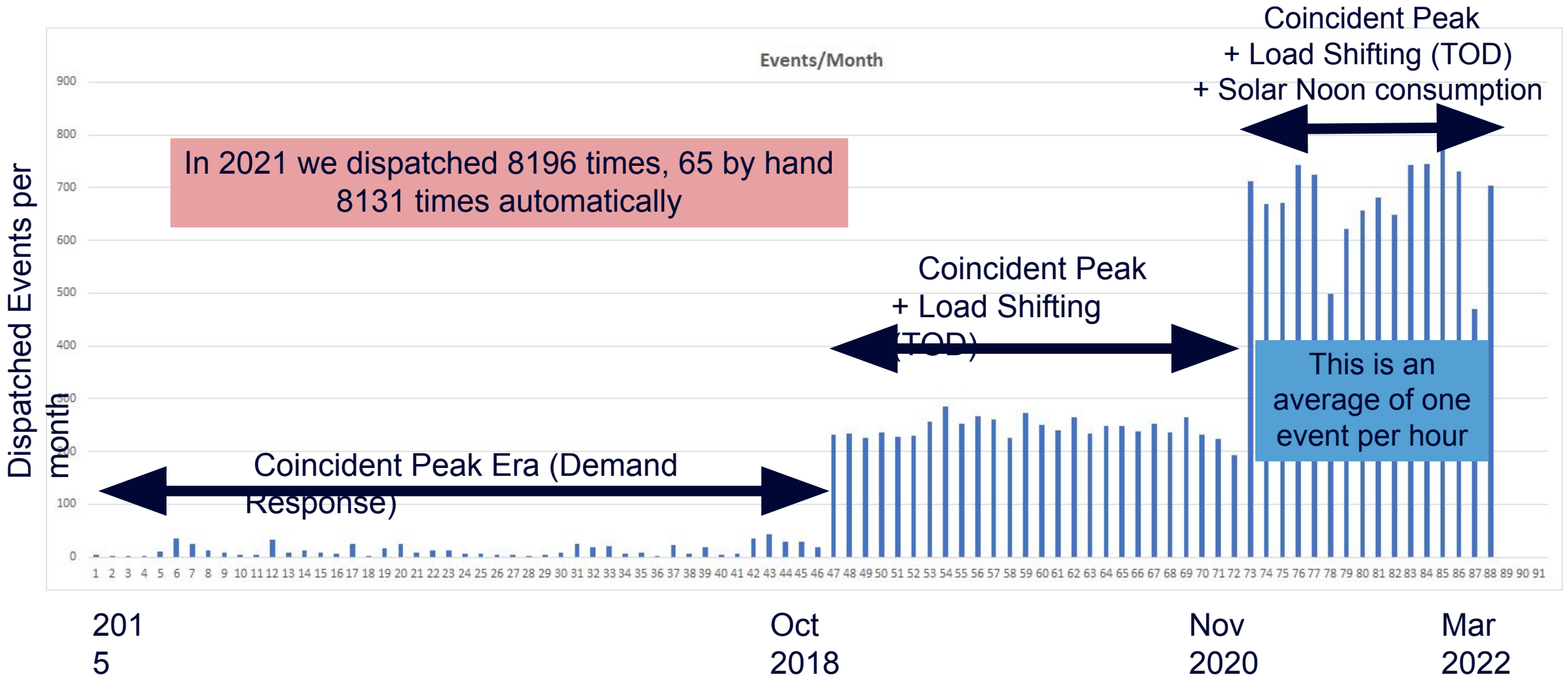

Dispatch
SCO Operators
PRPA Operators
DER Server
FCU ADMS
(Future Integration)
PRPA DERMS
(Future Integration)
GUI
GUI
REST API
Aggregator /DERMS
IntelliSOURCE
Platform
API
API
F1 Native
OpenADR
OpenADR
API
API
API
Ecobee
Residio
Apollo
JCI BMS
SkyCentrics
RER
Kitu 2030.5
Emerson
Google
Devices
Ecobee Devices
Residio Devices
Pro1/DCU3 Devices
Commercial buildings
Grid Interactive Water Heaters
CTA-2045
Tesla
Nissan
Audi
Many others
Batteries
PV Inverters
Emerson Sensi Devices
Nest Devices
Alexa Devices

"Old" Dispatch Decision Flowchart

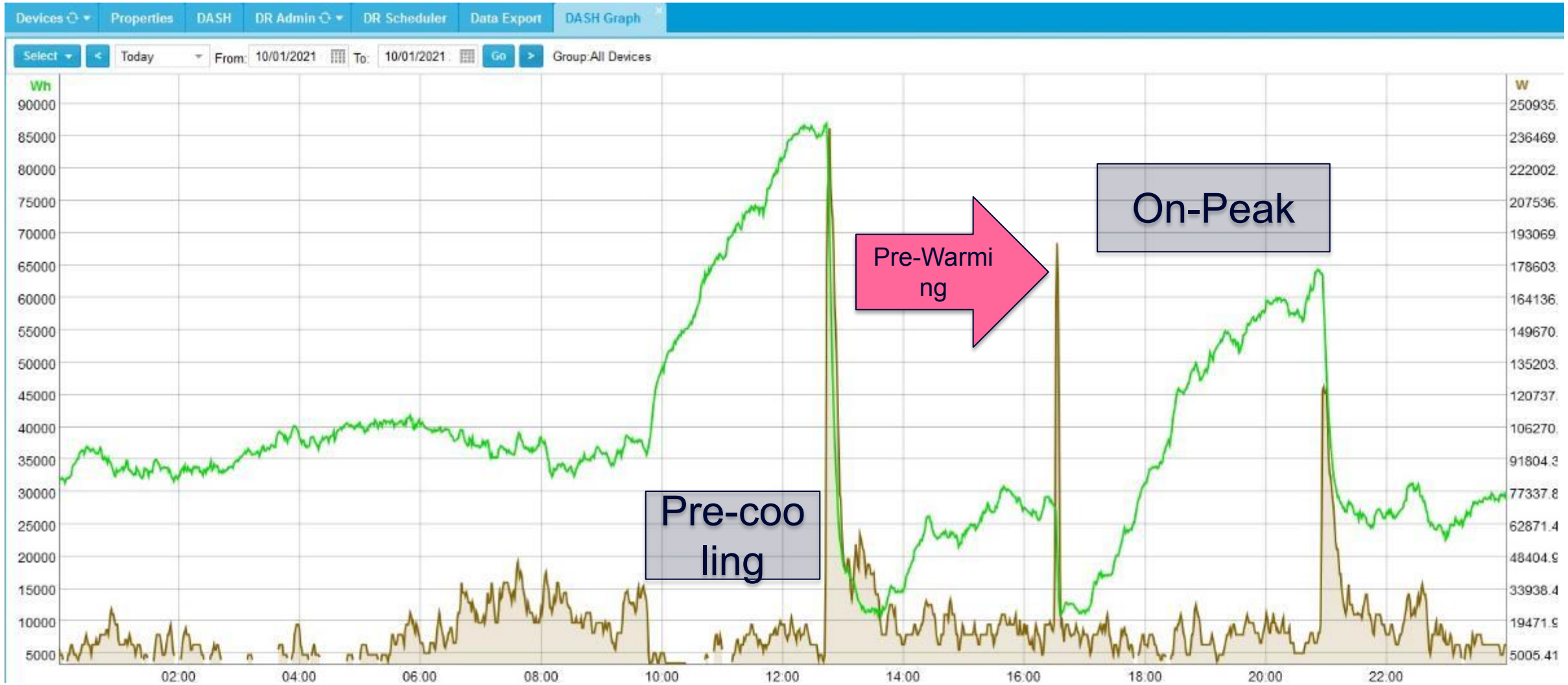


"New" Dispatch Decision Flowchart

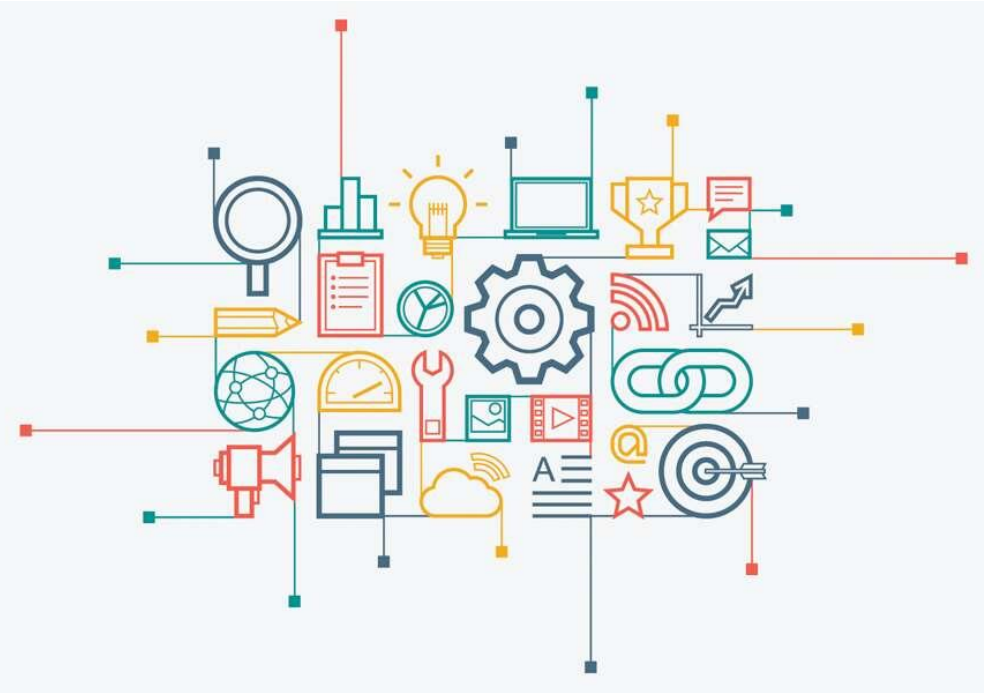



Coincident Peak
+ Load Shifting (TOD)
+ Solar Noon consumption
Events/Month
Dispatched Events per month
In 2021 we dispatched 8196 times, 65 by hand
8131 times automatically
Coincident Peak
+ Load Shifting
(TOD)
This is an average of one event per hour
Coincident Peak Era (Demand Response)
201
5
Oct
2018
Nov
2020
Mar
2022

Solar noon and time-of-day operation (with pre-cooling and pre-warming)



- Upstream connectivity
  - Fort Collins DERMS to ADMS
  - Fort Collins DERMS to Platte River DERMS
  - Platte River DERMS to ISO/RTO market
- Peer connectivity
  - AMI/MDMS, GIS, asset management, work orders, etc
  - Real-time data processing
- Downstream connectivity
  - DER assets
  - Metering

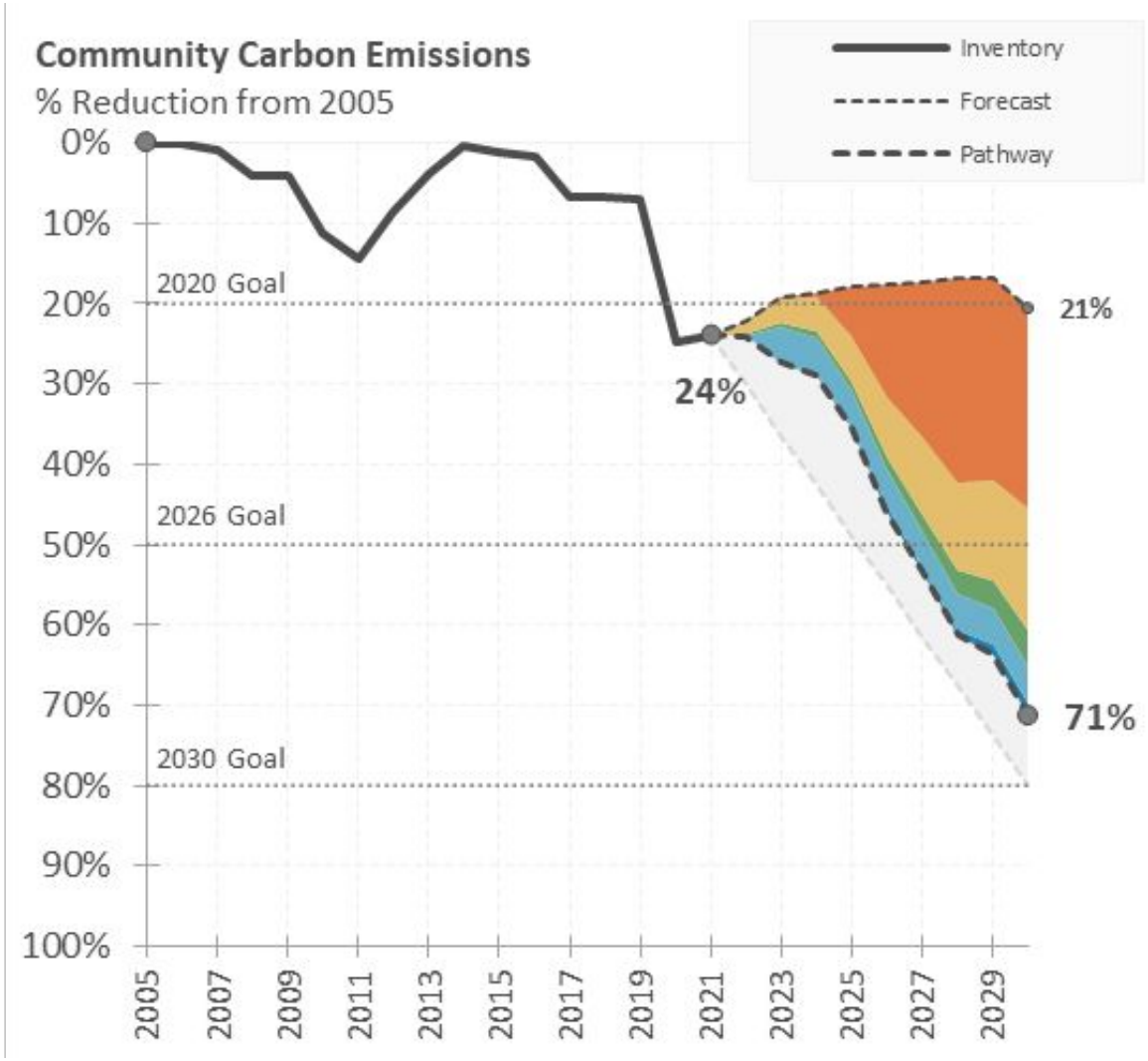


Capabilities

- Centralized control
  - Curves
  - Setpoints
  - Events
  - Telemetry
  - Topology
- Edge control
  (distributed intelligence)
  - Situational awareness
  - Low latency
  - Fast response

Protocols: OEM API – Direct load control – OCPP – Modbus – IEEE 2030.5

Community Emissions Pathways to 2030



Pathways	2030
Electricity	25.0%
Buildings	15.1%
Transportation	4.6%
Industry	4.5%
Waste	1.7%
Land Use	0.1%
Undetermined to Goal	9%

Last ~10% requires additional community leadership action

THANK YOU!

For Questions or Comments, Please Contact:

John Phelan

jphelan@fcgov.com

City of Fort Collins

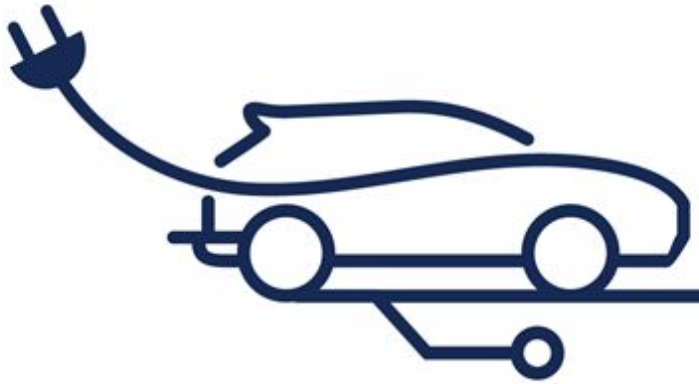
Opinion Dynamics

ELECTRIC VEHICLES AS A LOAD MANAGEMENT RESOURCE

PG&E EV ADR Study Case Study

SWEEP Fall Workshop

December 2, 2022



GATHER & SELECT

- Identify viable EV ADR charging control technologies and their providers
- Vet EV ADR charging control technology providers and select three providers for participation in technology field test
- Gather information about similar EV ADR programs and field tests to inform the study design

Methods: Literature Review, Industry Expert Interviews, EV Control Technology Screening, Vendor interviews

TEST

- Recruit 212 study participants
- Test EV ADR controls technologies through a field test comprised of 10 DR events
- Assess load impacts for each DR event
- Understand customer experience with field test

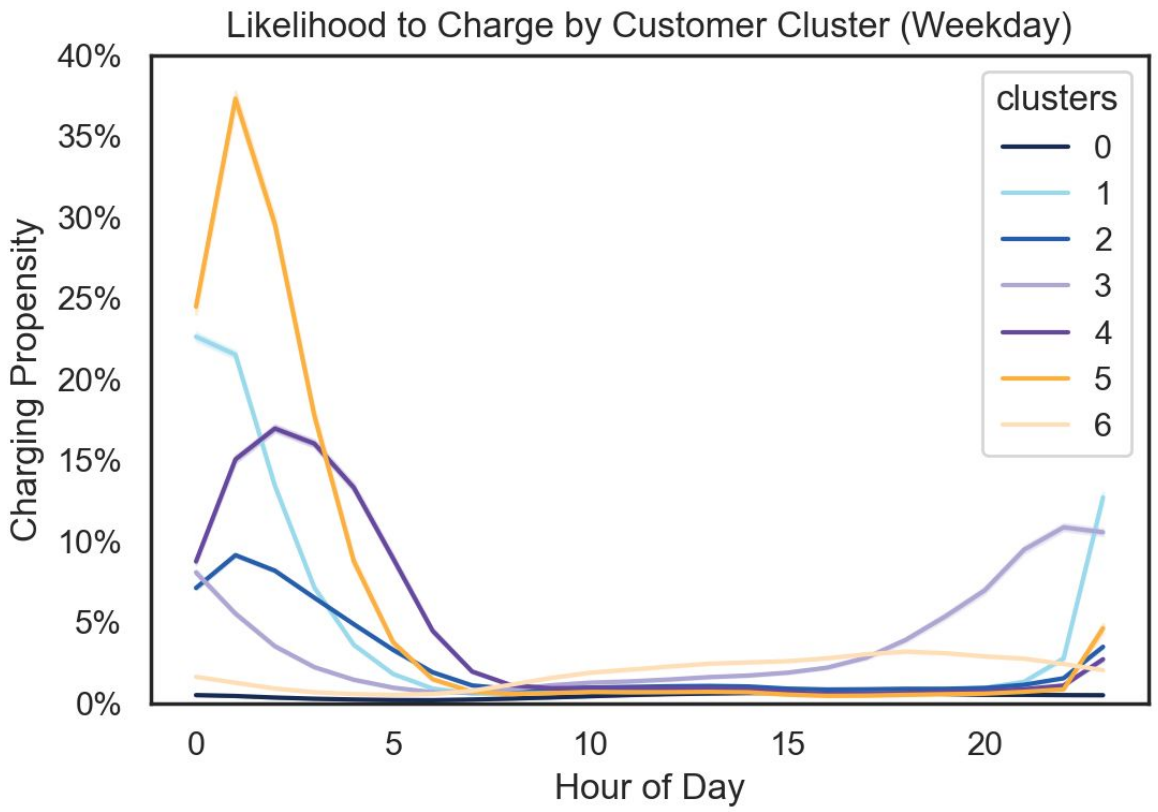
Methods: Customer Recruitment Survey, EV Controls Field Test, Load Impact Analysis, Participant Close-out Interviews

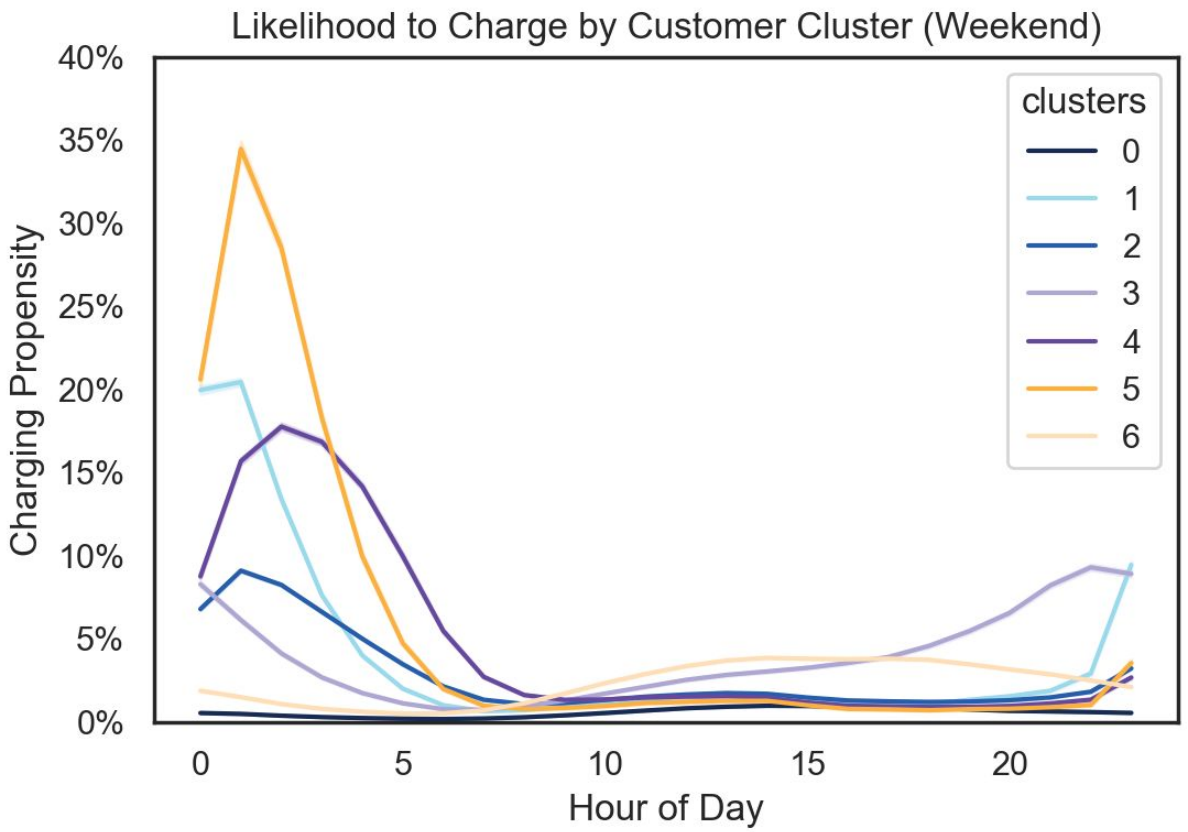
SCALE

- Investigate customer incentive preferences for upgrading to a smart L2 charger and participating in an EV DR program
- Characterize the EV DR resource potential in PG&E service territory via EV load disaggregation and clustering analysis of charging behaviors
- Identify key considerations and best practices to inform potential future program designs

Methods: Incentive Preference Conjoint Survey, Load Disaggregation and Clustering Analysis

Clustering analysis identified 7 common EV charging patterns





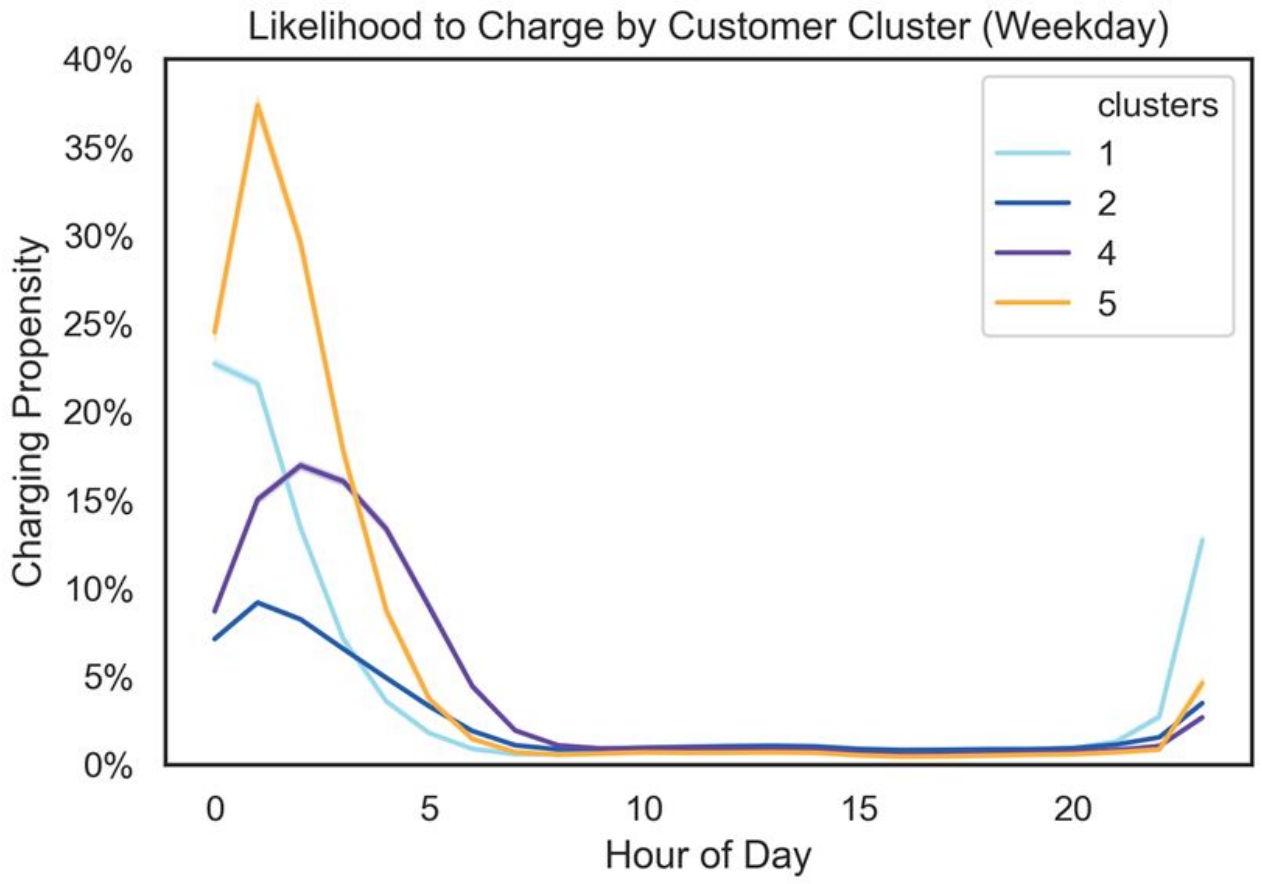
28% of EV owners are “overnight chargers,” which could be targeted to mitigate distribution system impacts in areas with high EV adoption

Overnight Chargers

(Clusters 1,2,4 and 5)
28% of Customers

More likely to:

- Be on an EV rate
- Program their charger to charge at specific times
- Own a BEV
- Own a smart level 2 charger

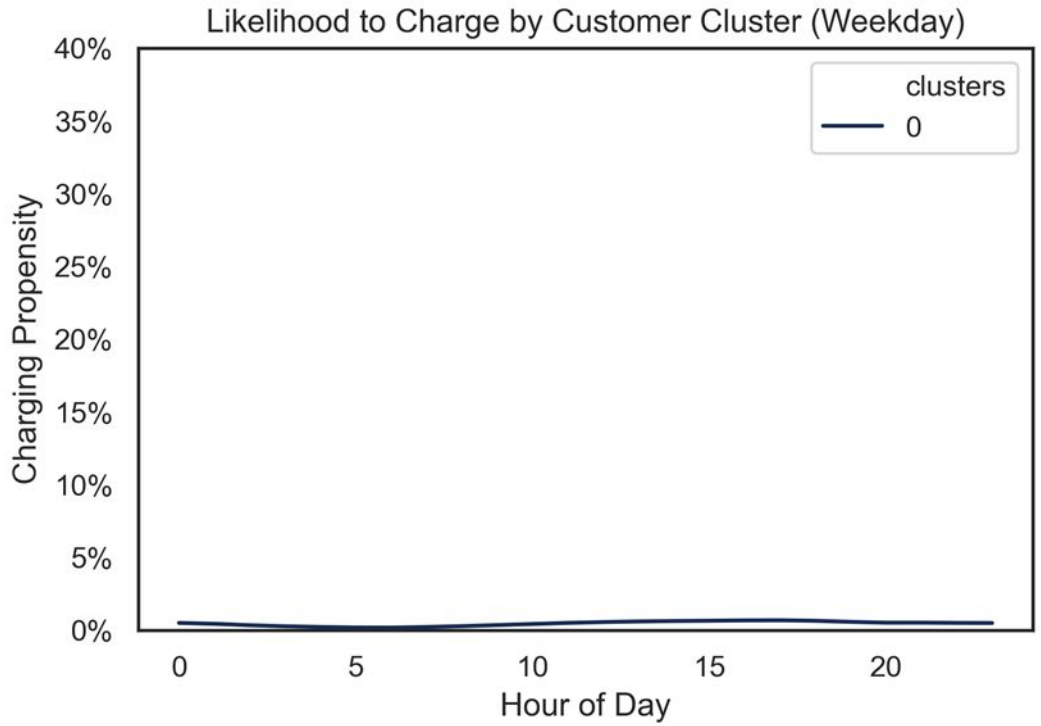


50% of EV owners are “variable and low-level chargers”

Variable and Low-Level Chargers

(Cluster 0)
50% of Customers

- Less likely to:
  - Be on an EV rate
  - Program their charger to charge at specific times
  - Own a battery electric vehicle
- Highest incidence of Level 1 chargers
- Lowest average demand when charging

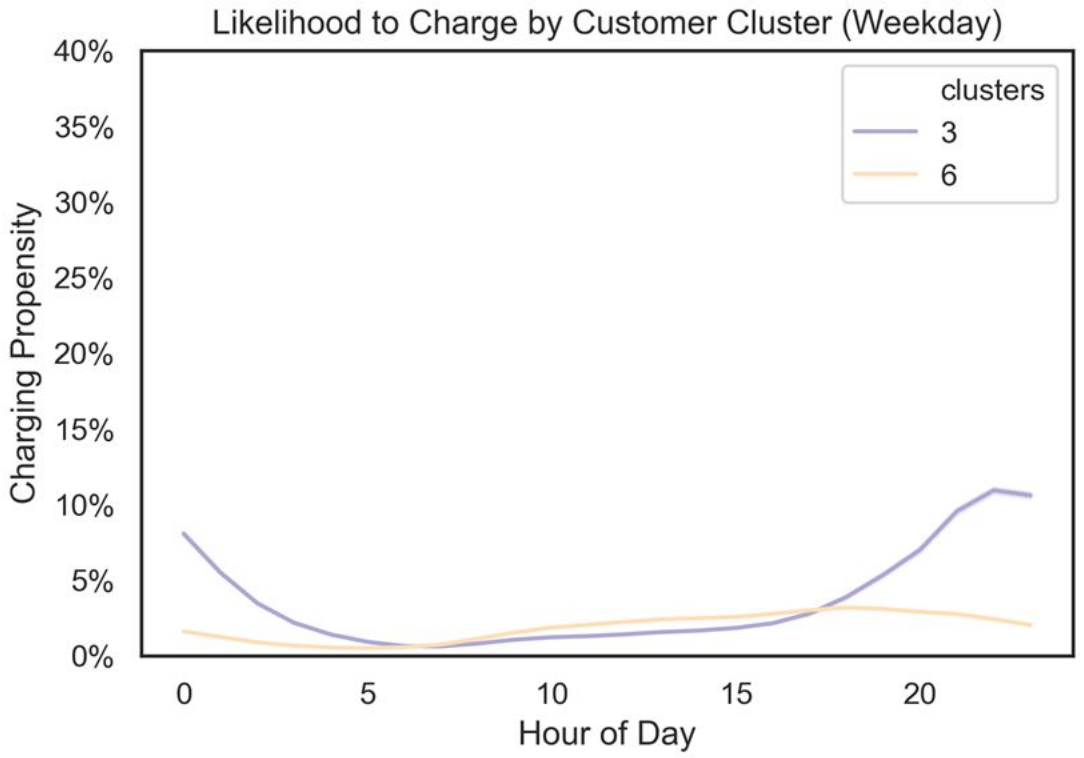


20% of EV owners are “peak period chargers” and would be good targets DR efforts designed to curtail consumption during PG&E’s peak period

Peak Period Chargers

(Clusters 3 and 6)
20% of Customers

- Less likely to:
  - Be on EV rate
  - Program their charger to charge at specific times
- Group 3 has the highest likelihood of owning a BEV
- Group 6 has a lower likelihood of owning a BEV and a higher likelihood of owning a Level 1 charger



Key insights to inform the path forward for leveraging EVs as a load management resource

- Targeting customer enrollment for managed charging programs based on their EV charging load shapes can help maximize load shift opportunities
- We need a better framework for measuring load impacts from managed charging programs
- It is imperative to consider the interaction between EV TOU rates and event-based EV load management programs
- There are opportunities to design programs that encourage EV owners to charge when renewable resources are most abundant

A link to the full study report is publicly available at: https://www.calmac.org/publications/PGE-EV-ADR-Study-Report_FINALV2.pdf

Opinion Dynamics

Appendix

Background on PG&E EV ADR Study

366,000+ EVs were registered in PG&E service territory (as of July of 2021)

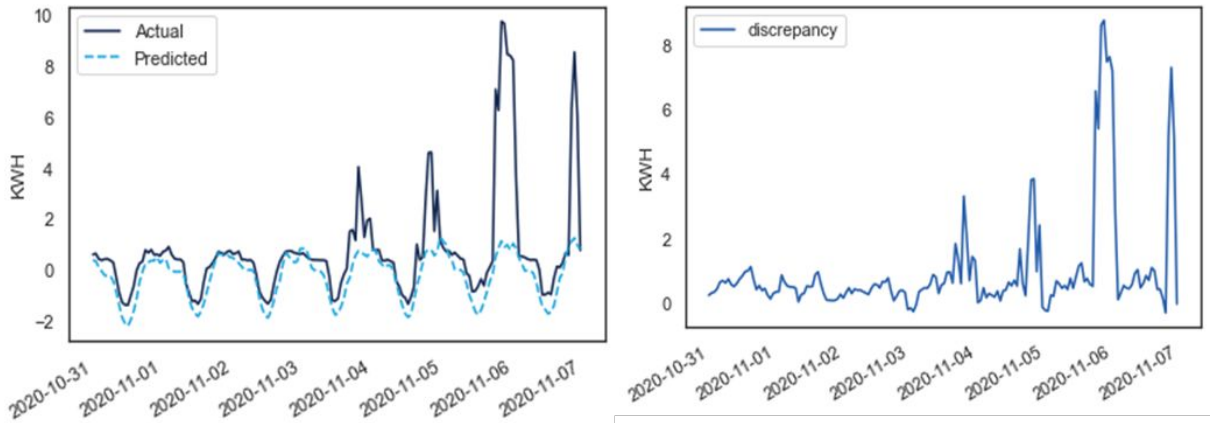
California Air Resources Board (CARB) estimates there will be 8 million electric vehicles registered in California by 2030

EV owners in PG&E service territory represent 20% of all EVs owners in the US

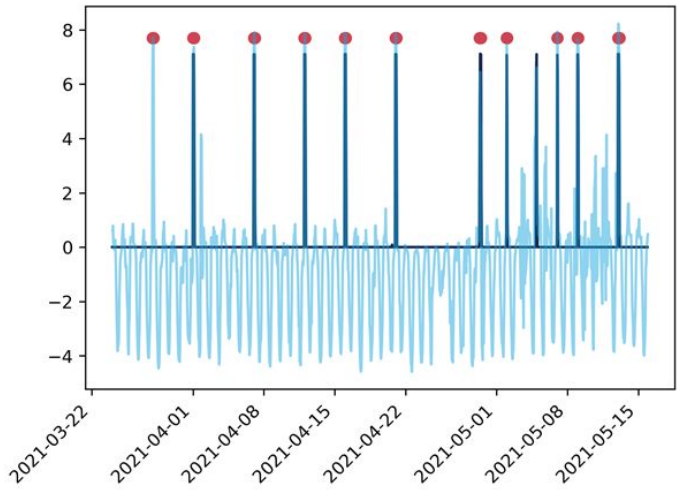
- In 2019, Opinion Dynamics completed a study for PG&E and found that EV charging controls would be a good fit for the Automated Demand Response (ADR Program)
- Prior to integration into the residential ADR program, PG&E was interested in testing EV charging controls, evaluating DR potential, and identifying appropriate incentive levels for participation
- From 2020-2021 Opinion Dynamics worked with PG&E to complete a second study that assessed opportunities to offer EV charging control technology through the ADR program

Load disaggregation effectively isolated the EV charging load curves from home usage

1. Processed whole home AMI data for 70,000 EV owners
2. Modeled household energy consumption pre and post EV adoption to disaggregate EV charging from other home end uses
3. Validated charging signals by comparing load disaggregation results to actual EV charging data from the field test participants

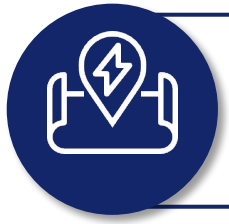


Actual and Predicted Load of Example Customer



Disaggregated EV Charging Signals for Example Customer

We extrapolated results to reflect resource potential of 366,000 PG&E EV owners under realistic scenarios

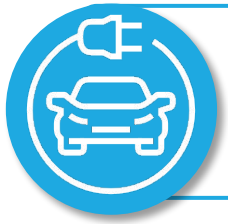


Average Per Customer EV Resource Potential

Calculated expected demand based on propensity to charge and average charging peak height

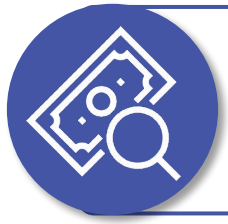
Expected Event Performance Adjustment

Applied participant-level realization rate based on DR performance from the technology field test conducted July-October 2021



Scaling to 366,000 EV Owners in PG&E Service Territory

Leveraged known characteristics of the population of PG&E EV owners to scale results from 71,000 customers in the analysis to the entire population of 366,000 PG&E EV owners



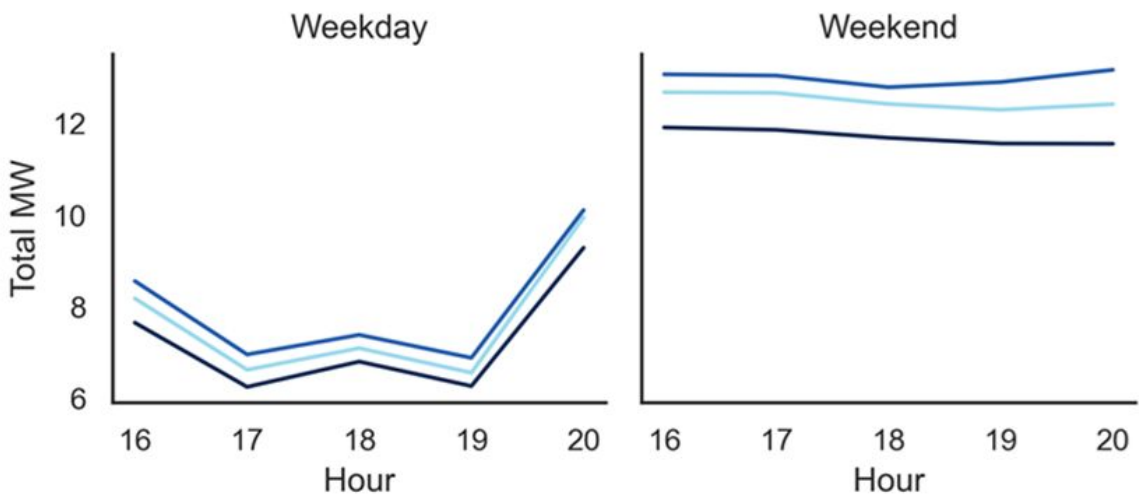
Expected Participation Adjustment

Our survey of existing EV owners revealed an incentive of $50 for EV DR program participation would yield a 45% peak period participation rate, and 29% overnight participation rate. We applied the participation rate to produce the final resource potential estimate

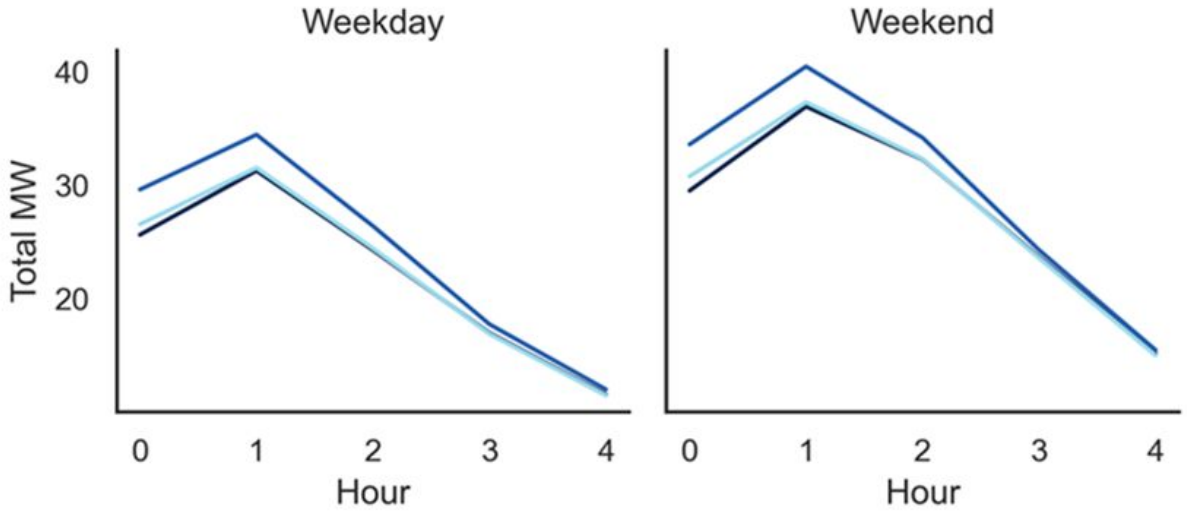
Final Resource Potential Estimate

The PG&E EV DR resource potential for 366,000 PG&E EV owners is 9 to 13 MW during the evening peak period (4pm to 9pm) and 31 to 40 MW overnight (12am to 5am)

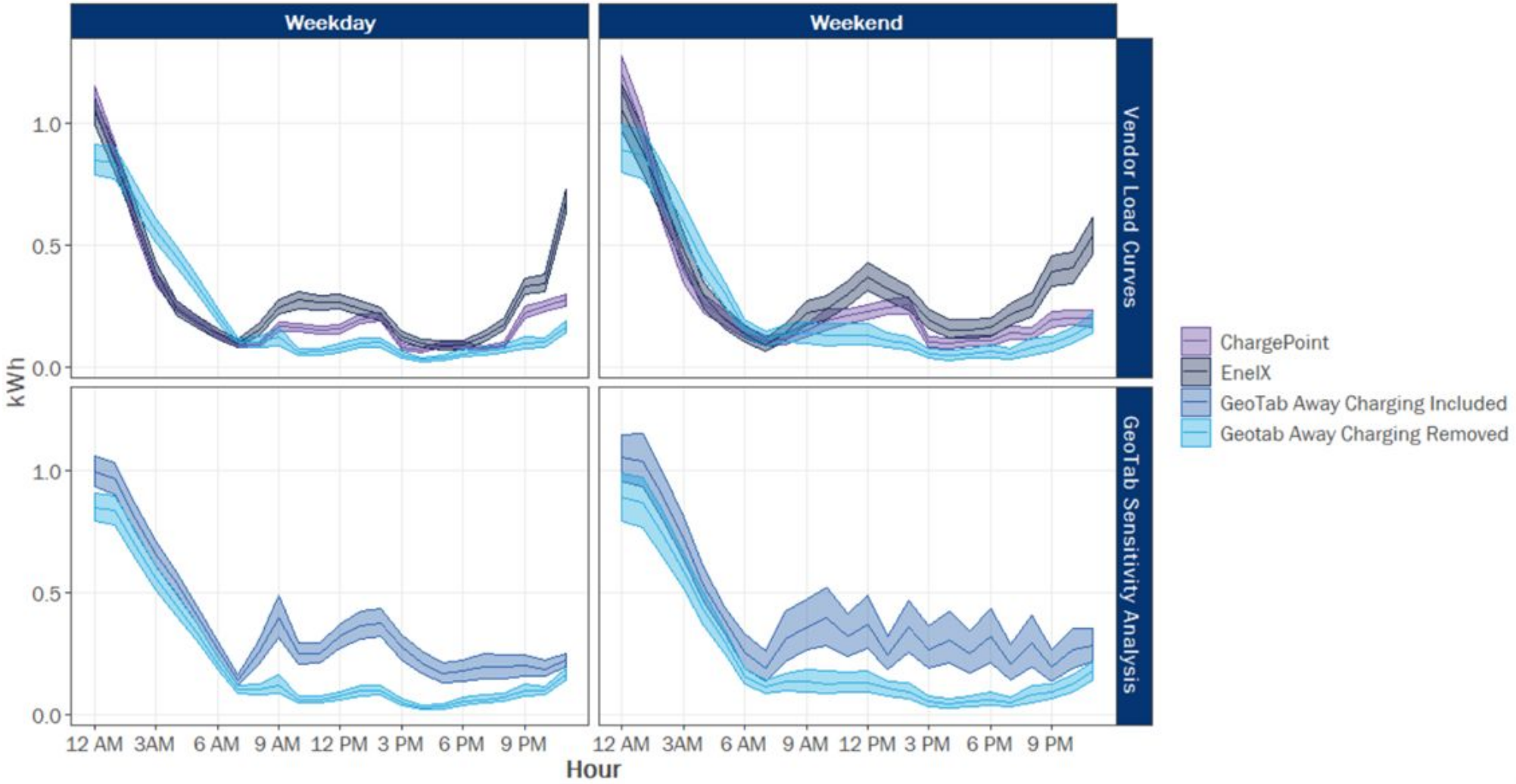
Resource Potential at $50 Enrollment Incentive for Resource Adequacy Window



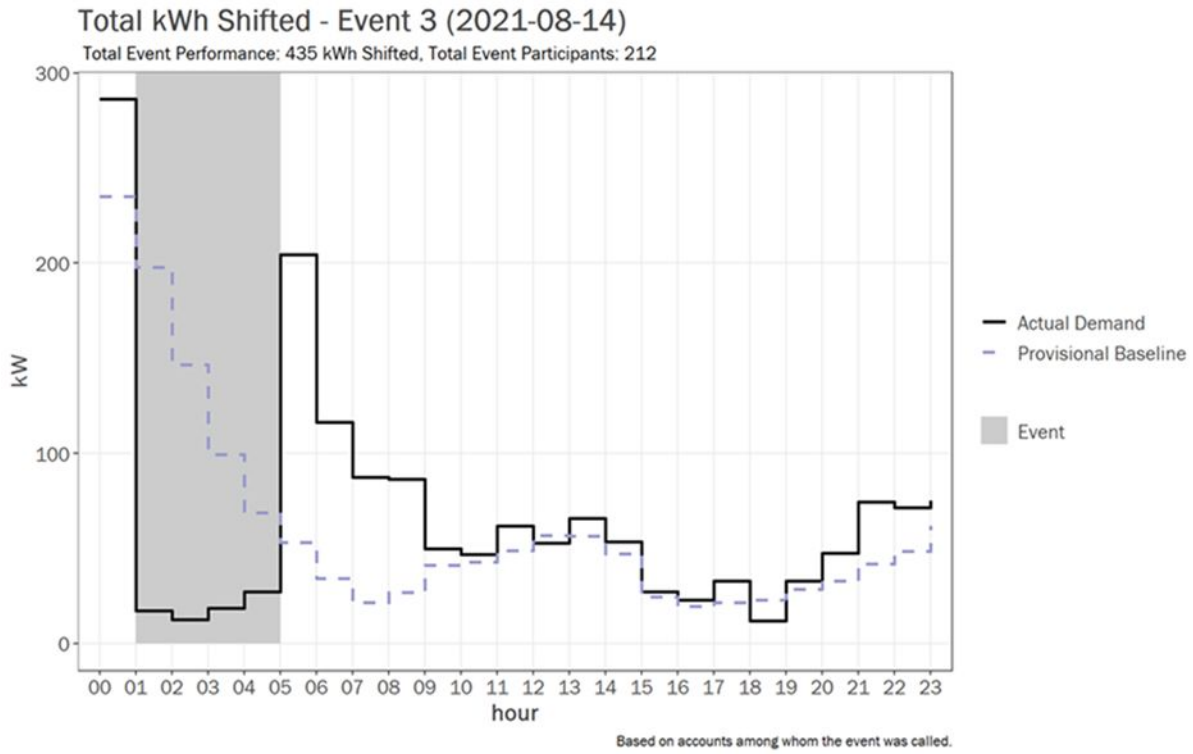
Resource Potential at $50 Enrollment Incentive for Overnight Period

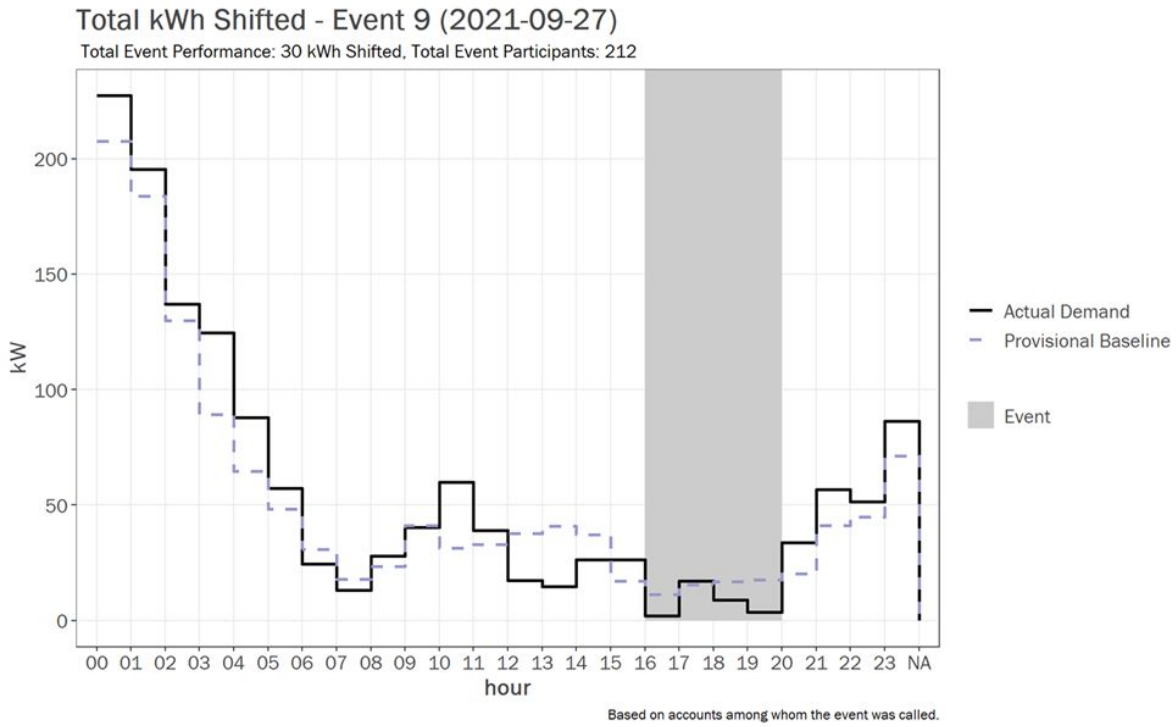


Field Test Participants' Average EV Charging Load Curves (April-October 2021)



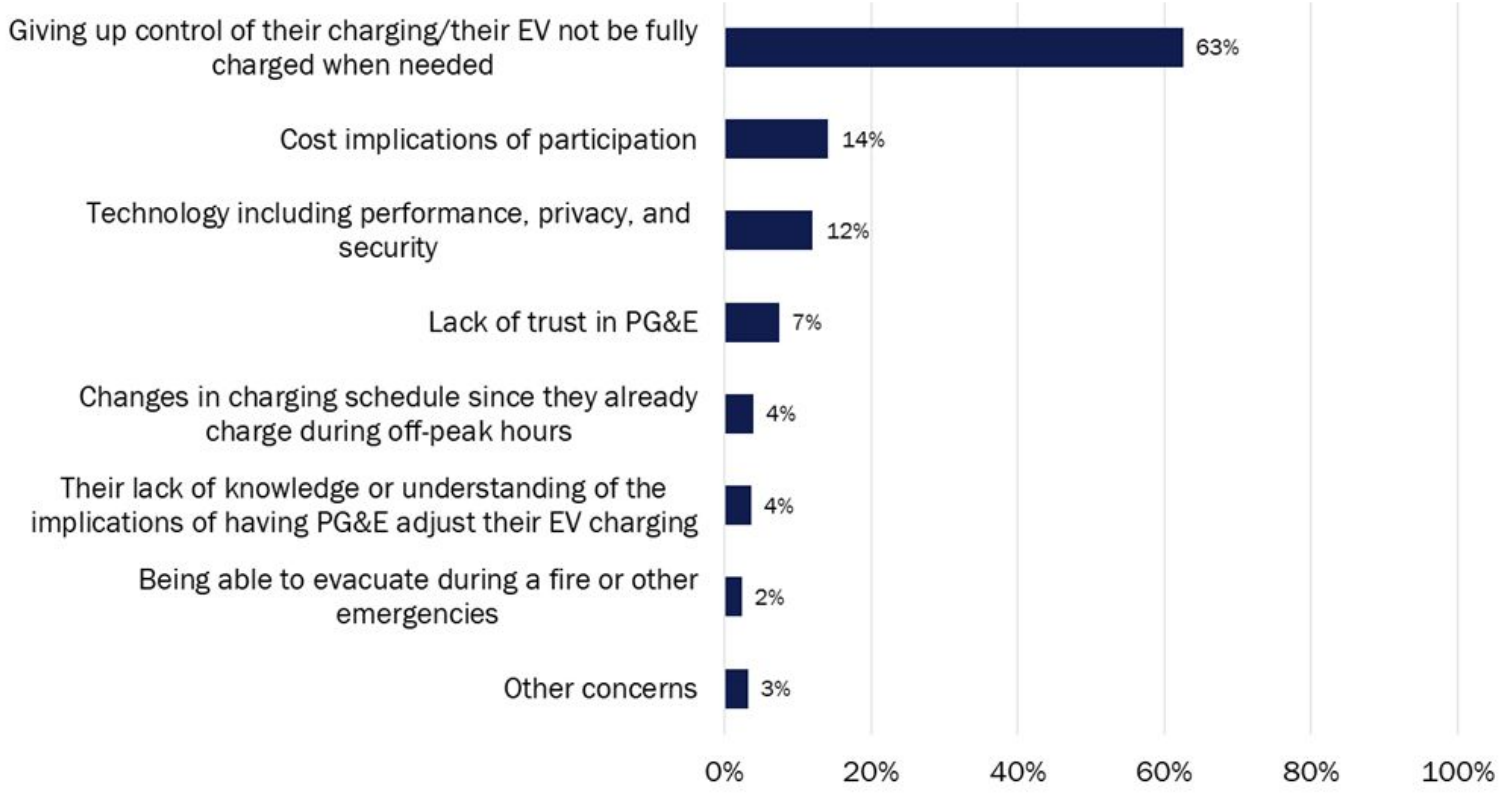
EV charging control technologies responded to simulated DR events; more load is available to shift during overnight periods





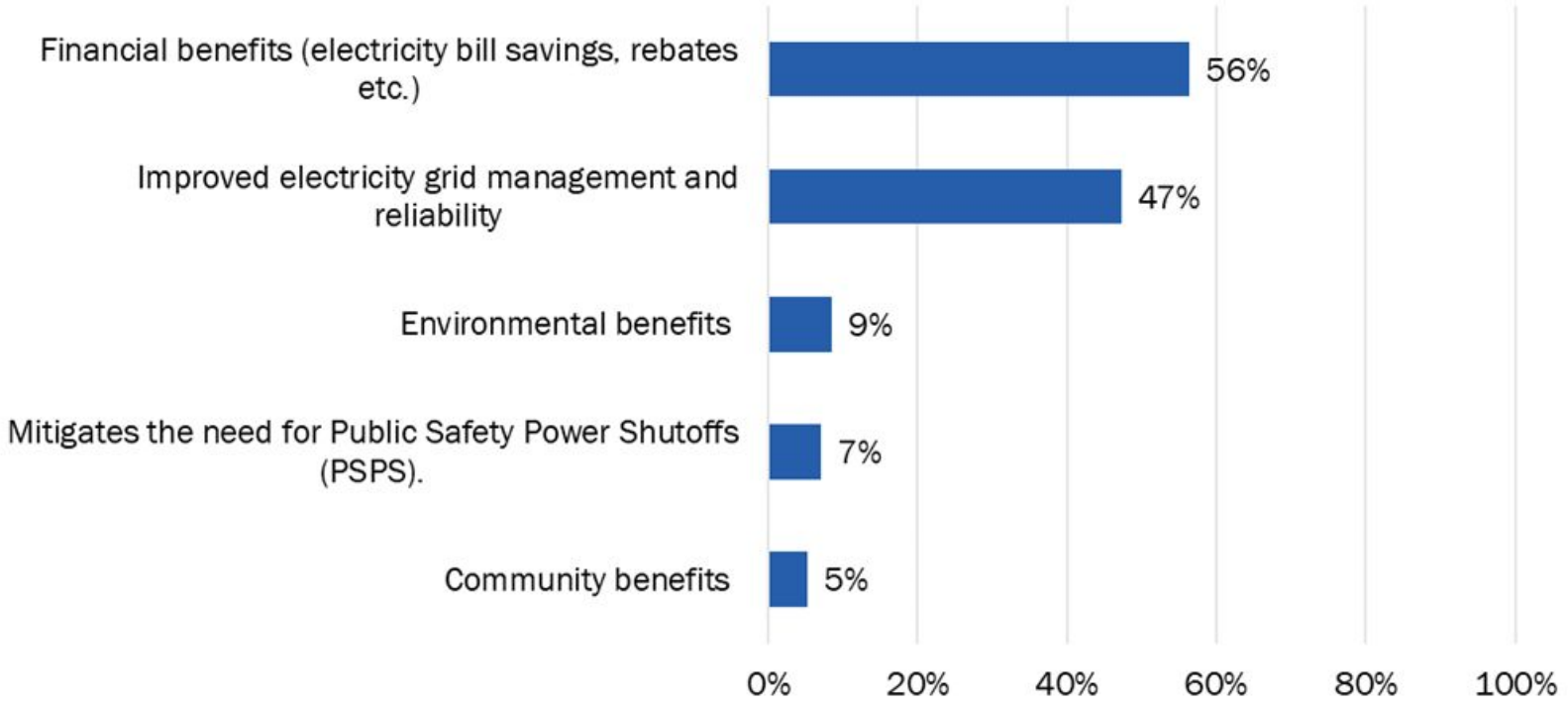
EV Owners' Managed Charging Concerns

PG&E EV Owners' Concerns about Allowing PG&E to Adjust their Charging (unprompted) (n=1,235)



EV Owners' Perceptions of Managed Charging Benefits

EV Owners' Perception of Benefits Associated with Allowing PG&E to Adjust their Charging (Unprompted) (n=1,066)



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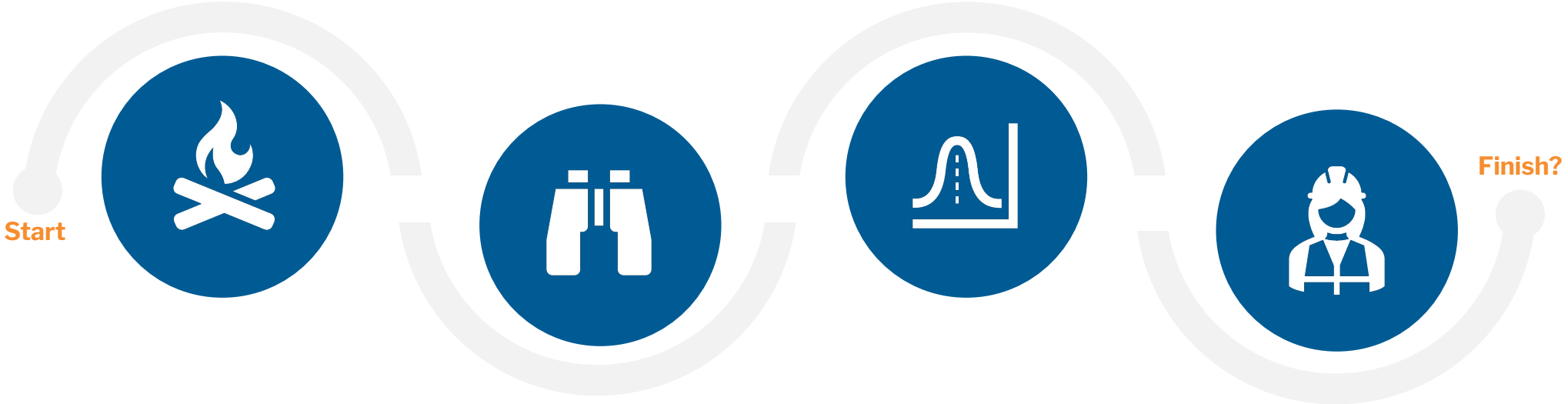
REMOTE GRID RESILIENCY

Modeling Efficiency Impacts *with* Predicted Loads and the Impacts of Behavior

Topics of Discussion



About the Project

Predicting Results

Solving for the Mean

Measures & Installation

FRANKLIN ENERGY™

About the Project

Wildfire Resiliency

The main objective of the Remote Grid is safety.

- **Reduce wildfire risk by removing overhead powerlines.**
- **Desire to avoid fossil fuel back-up power.**
- **The site is all-electric.**
- **Winter Peaking.**
- **1940's Construction.**
- **The usage case, intermittent occupancy.**

FRANKLIN ENERGY™

Efficiency **& LOAD**

Predicting the future is super simple. Right?

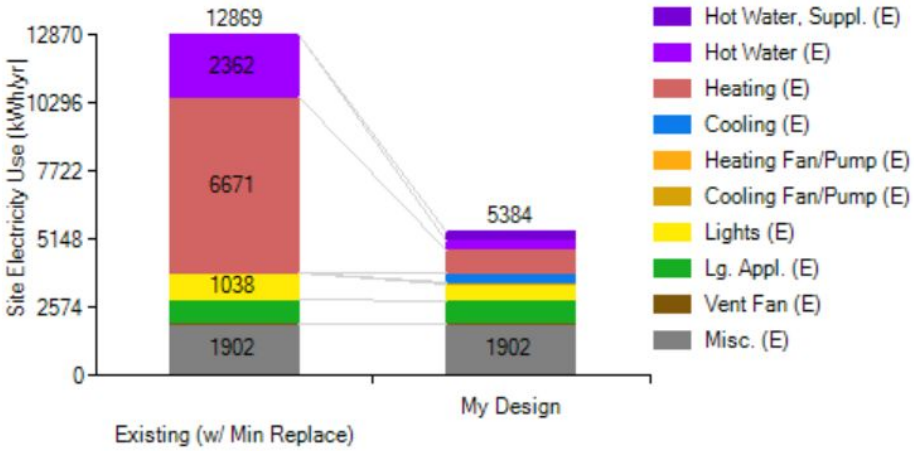
Franklin Energy utilized the BEopt frontend to DOE's Energy Plus simulation engine to forecast total energy and demand reductions.

PG&E's team utilized Homer Pro to predict solar and storage sizing.

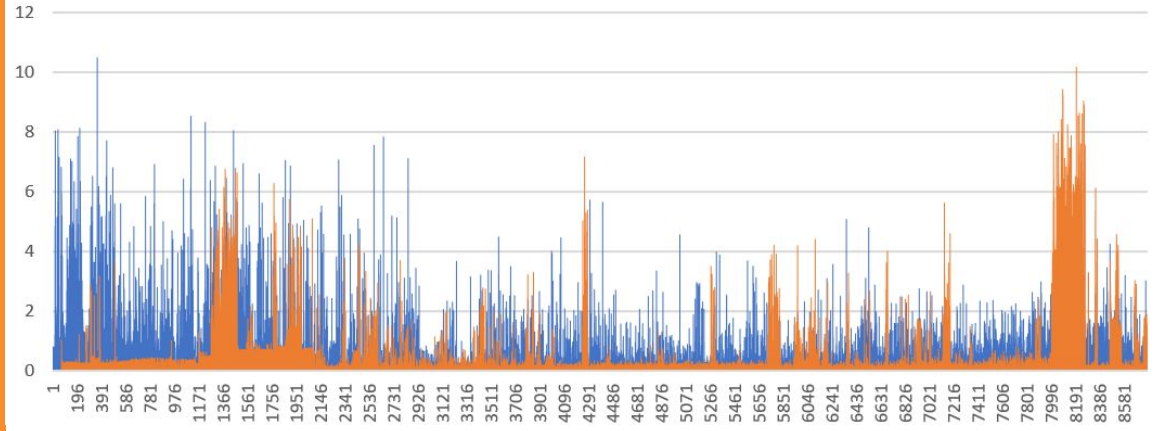
- **Efficiency modeling software over predicts baseline usage, post-retrofit usage is more reliable, especially when baseline is calibrated to observed consumption.**
- **It was estimated cost effective to reduce usage with Efficiency.**
- **Passive measures enhance resiliency and overall experiance.**

BEopt
Building Energy Optimization
with Hour-by-Hour Simulations
NREL
National Renewable Energy Laboratory
15013 Denver West Parkway
Golden, CO 80401
www.nrel.gov
Loading Test w 2 Buildings V2 Case 3.BEopt...

HOMER Pro
STANDALONE MICROGRIDS



Remember to Update ***Weather Files***



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Solving for the **Mean**

& Finding Agreement

We began calibration focused on peak periods and calibrated to match modeled to observed peaks.

Due to intermittent occupancy and behavior, we found much better agreement when we calibrated to monthly averages.

Spikes in demand then followed closely in magnitude as well.

		V2						
		5 Year Highest	V3	Discrep		5 Year Highest	V2	Discrep
Max Hourly Consumption	Jan	[redacted]	10.675	20%	Max Monthly Average	[redacted]	3.65	25%
	Feb		10.59	12%			2.91	10%
	Mar		9.24913	-10%			2.33	-13%
	Oct		5.90171	5%			1.38	33%
	Nov		10.5015	10%			2.50	-7%
	Dec		10.9225	9%			3.50	21%
		V3						
		5 Year Highest	V3	Discrep		5 Year Highest	V3	Discrep
Max Hourly Consumption	Jan	[redacted]	10.6	19%	Max Monthly Average	[redacted]	2.70	-1%
	Feb		6.7	-38%			2.06	-27%
	Mar		8.0	-28%			1.97	-33%
	Oct		5.5	-2%			1.17	22%
	Nov		9.3	-2%			1.99	-34%
	Dec		7.3	-35%			2.64	-5%

Efficiency **Construction**

Old Meets New

The Heat Pump Technologies *REQUIRED* efficiency measures to perform as desired.

- Thermal loss through the building shell
  - Air seal and insulate the ceiling and subfloor
- Mini split space conditioning
- Heat pump water heating
- Induction cooking, LED retrofits, and pipe insulation

Usage Type	Existing Equipment	Post Retrofit	Demand Reduction
Space Heating	4,500 W	< 1000 W	-3,500 W
Water Heating	4,500 W	< 600 W	-3,900 W
Using Two Range Top Burners*	2400 W @ 65% efficiency	2,400 W @ 90% efficiency	-600 W
**efficiency results in lower settings & watt draw*		**Reduction****	**- 8,000 W**
***Assumes highest cook setting*			

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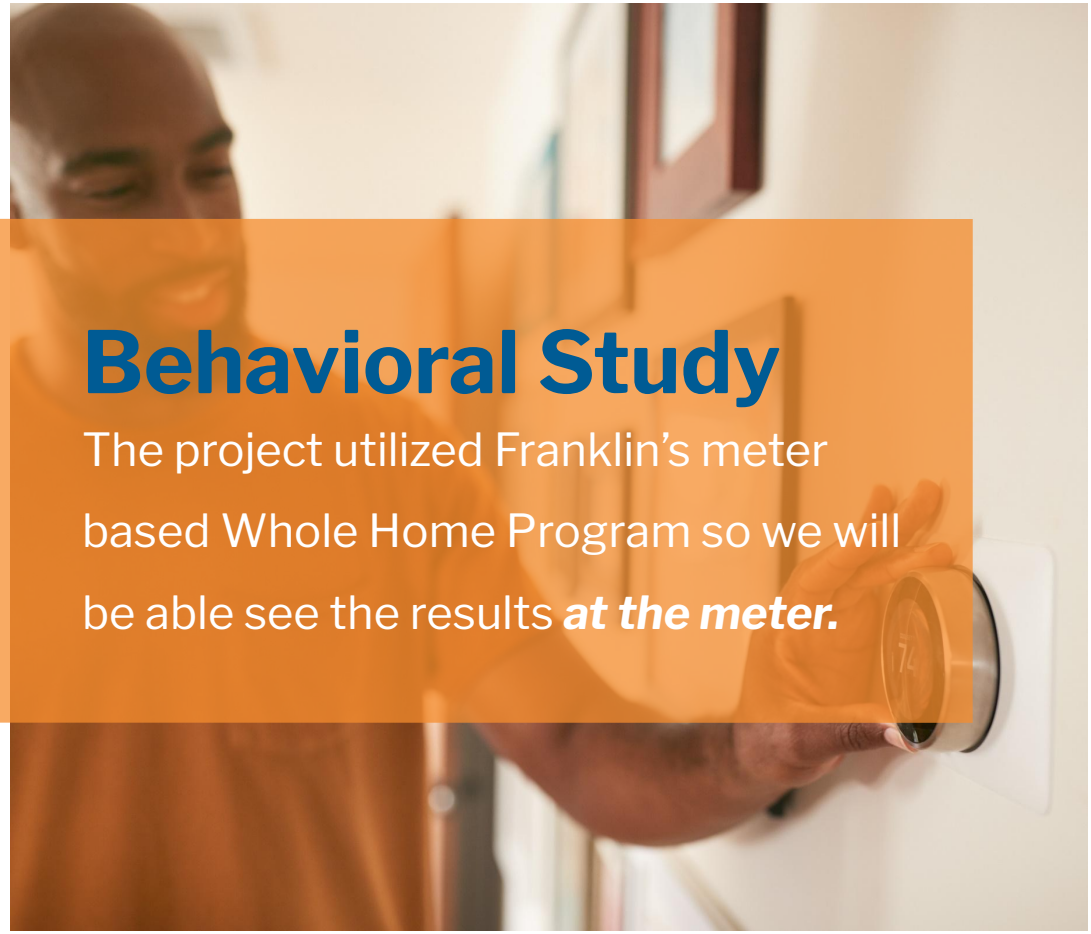


Behavioral Study

The project utilized Franklin's meter based Whole Home Program so we will be able see the results ***at the meter.***

Calibrate, Learn, & then Calibrate Some More

We saw that different people used the space in different ways before the retrofit, we will likewise see how people use the updated systems.

These learnings will enhance our understanding of modeling software, the effects of behavior, and how to predict measure impacts at a population level.

FRANKLIN ENERGY™

THANK YOU.

FRANKLIN ENERGY™

Allies Snapshots

Opinion Dynamics
Trane Technologies
Bernhard
Recurve

Xcel Transportation Electrification Plan

1st Transportation Electrification Plan (2021-2023, $110M) includes 6 portfolios and a focus on equity

- Residential
- Multifamily housing
- Commercial
- Advisory services
- EV Purchase and Lease Rebates
- Partnerships, Research and Innovation

Xcel Transportation Electrification Plan Evaluation

Embedded evaluation focused on program performance feedback and delivering insights to inform future TEPs and EV market needs

Customer Research

Objective: Deliver insights to inform program improvements for current and future TEP cycles

KPI Measurement and Reporting

Objective: Provide updates on evaluation results, performance across metrics, and insight into program changes and new program opportunities

Variable Speed. We created it, then perfected it.

- 33 years of VS experience
- Widest turndown
- Benefits
  - ✔ Advanced temperature control
  - ✔ Lower humidity
  - ✔ Reduced sound
  - ✔ Enhanced filtration
- Right choice for electrification

TRANE® LINK

CEE Integrated Home Special Recognition

Benefits

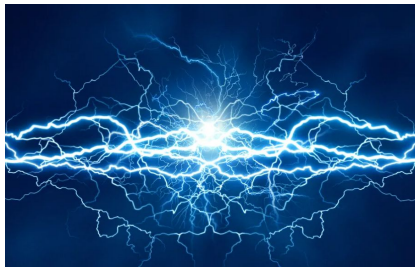
- ✔ System ID and Set Up
- ✔ Self Verification
- ✔ Smart Charge
- ✔ Live Sensor Readings
- ✔ Flexible Test Modes
- ✔ Bluetooth to smart phone
- ✔ System Alerts: Real Time & History
- ✔ Remote Diagnosis

Climate Leadership

2030 Sustainability Commitments Gigaton Challenge

Electrification

- The right system for the climate zone
  - ✔ Full electric
  - ✔ Dual Fuel Hybrid system
- Help needed to accomplish



Cold Climate Heat Pumps

Exceeded DOE CCHP Challenge Goals

- 100% capacity at 5° F
- Operates down to -20° F
- Field trial in Idaho

LEVERAGING TECHNOLOGY TO BUILD BETTER IDEAS.

10 years of experience

2,300+ employees across the U.S.

offices in **14** states

Engineering

- Audits
- Recommissioning
- Turnkey Energy Efficiency
- Monitoring-based Cx
- Commissioning
- Gas to Electric Engineering
- Sequences of Operation
- Carbon Reduction
- Net zero

Energy-as-a-Service

- Funding
- Off Balance Sheet Assets
- Maximize tax benefit

Bernhard.com

Bernhard

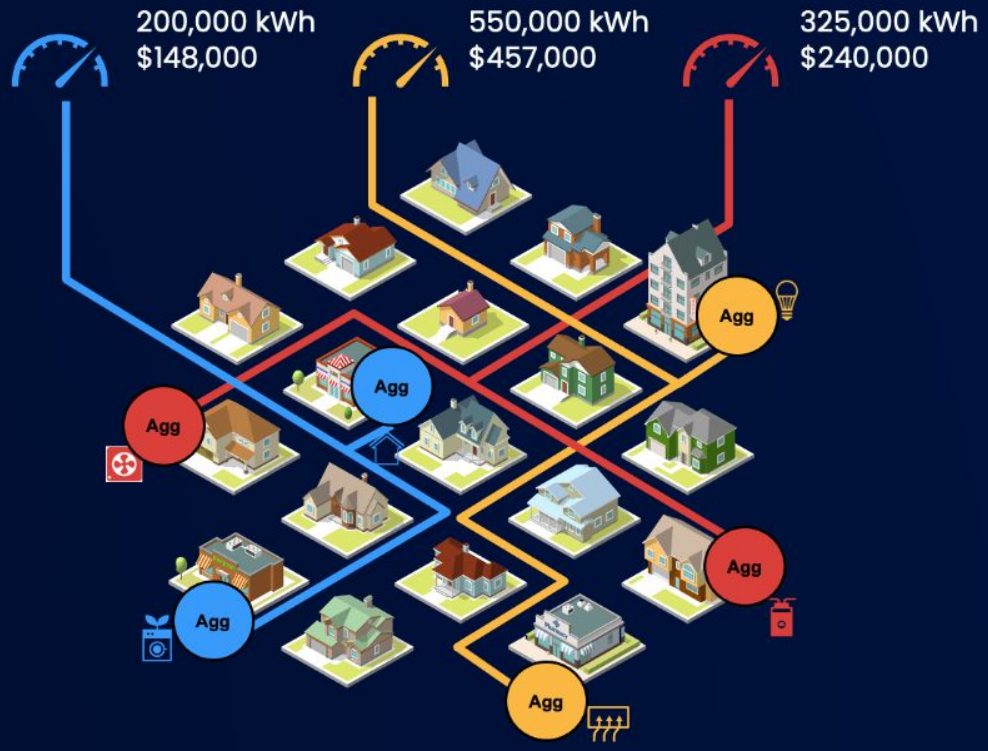
VISION

To be the leading Energy-as-a-Service provider in North America through delivery of excellent, high value service and innovative solutions for our clients.

Who is Recurve?

1. Recurve provides analytics and M&V for demand flexibility

2. Recurve is the platform for virtual power plants



RECURVE

Networking Break

10:15 A.M. - 10:45 A.M.

Panel Session #5: Challenges in Meeting Energy Savings Goals

Rohini Srivastava
American Council for an Energy Efficiency Economy (ACEEE)

Matt Baker
Daikin Comfort Technologies

Alaric Babej
Public Service Company of New Mexico

December 2022

Training the Workforce for Buildings of the Future

Rohini Srivastava, PhD, LEED AP BD+C
Senior Researcher
Buildings Program

ACEEE
American Council for an Energy-Efficient Economy

About Us

The American Council for an Energy-Efficient Economy is a nonprofit 501(c)(3) founded in 1980. We act as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors.

Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

Our work is made possible by foundation funding, contracts, government grants, and conference revenue.

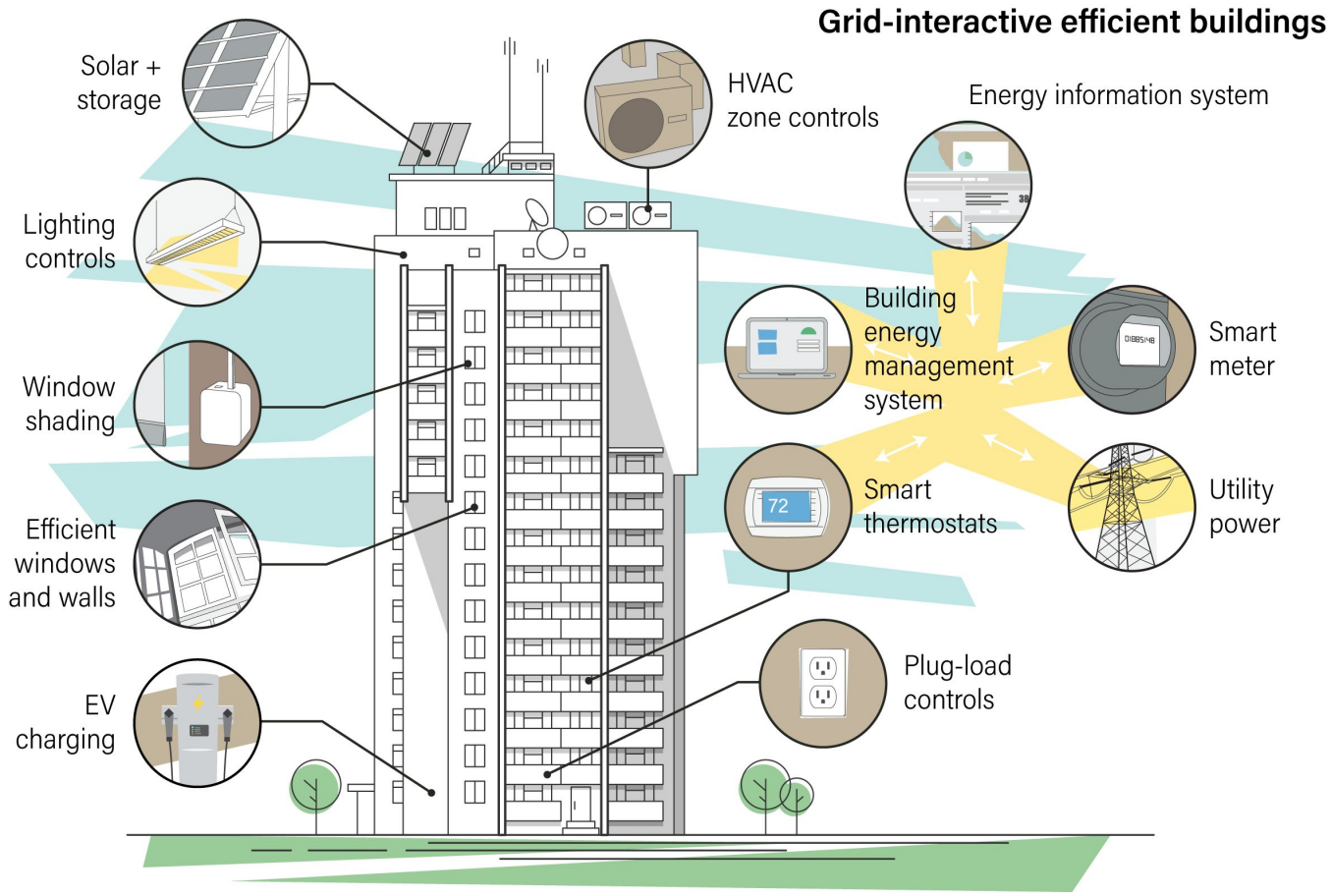
aceee.org @ACEEEdc

INTRODUCTION:

More efficient
- Higher performance,
- Better indoor air quality, and
- Reduced carbon emissions

More technologically advanced
- Integrated systems
- Solar, energy storage, and vehicle charging
- More sensors & controls
- Cybersecurity systems

More intelligent
- Expanded automation
- Responsive to occupant needs
- Reliance on advanced analytics



aceee.org/white-paper/gebs-103019

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More sophisticated technologies, greater systems integration, expanded automation, and advanced data analytics place new skill and knowledge demands on professionals who design, construct, and serve them.

EXISTING ENERGY EFFICIENCY WORKFORCE CHALLENGES:

Aging and retiring professionals

- 50% of the current energy utility workforce will retire in next 10 years
- Average age of workers in the industry is 50 years

Low/negative perception

- Lack of identity within building workforce
- Low interest and awareness of careers among young people

Less diverse than the national workforce

- 50% fewer black workers, 20% fewer Hispanic workers
- 90% fewer women compared to national workforce

Confusing career pathways

- 80-90% efficiency employers cite hiring difficulties
- Industry credentials are fragmented and nontransparent

Lacks skills for quality installations

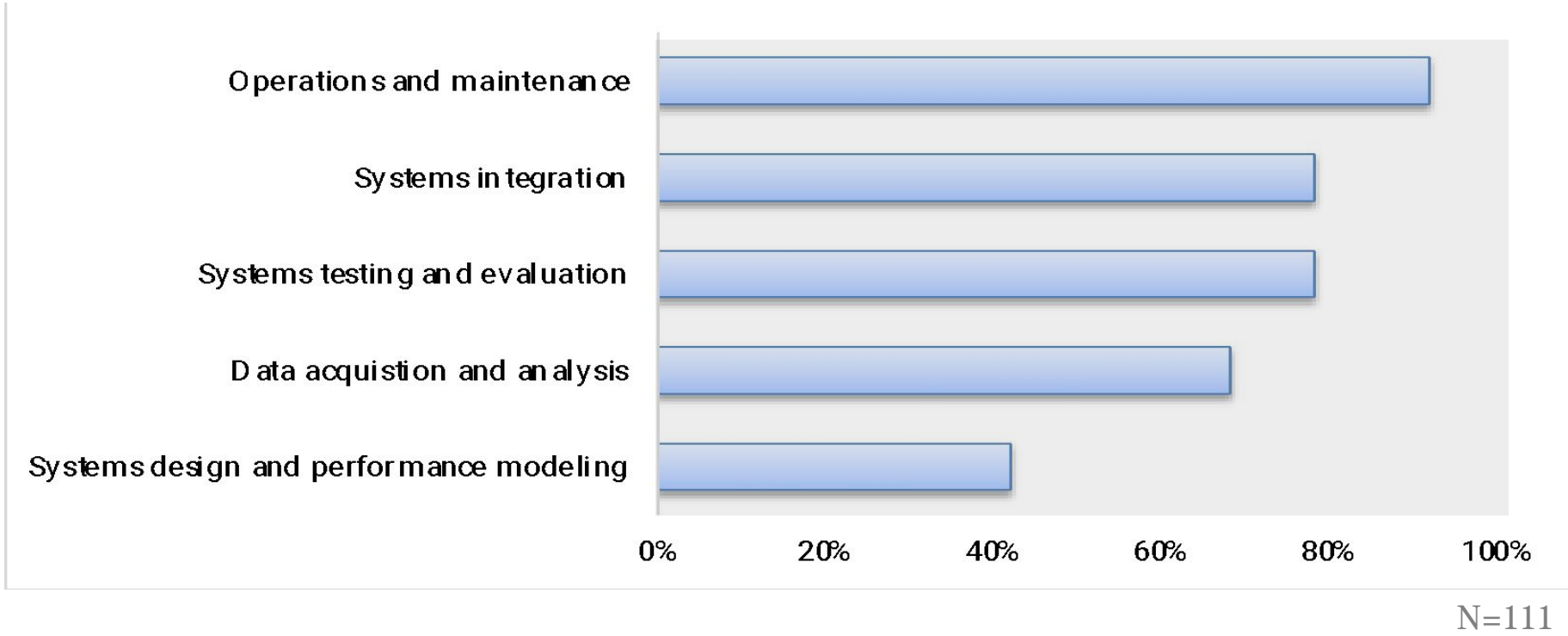
- Limited adoption of digital tools to modernize processes
- Sustainability & building science content is often ad hoc, not standardized

Skill deficiencies prevent buildings from delivering on their promise

SKILLS DEVELOPMENT:

Workforce needs training in five key technical skills to perform effectively

Operations and maintenance, systems integration, and evaluation were cited as the most essential skills.

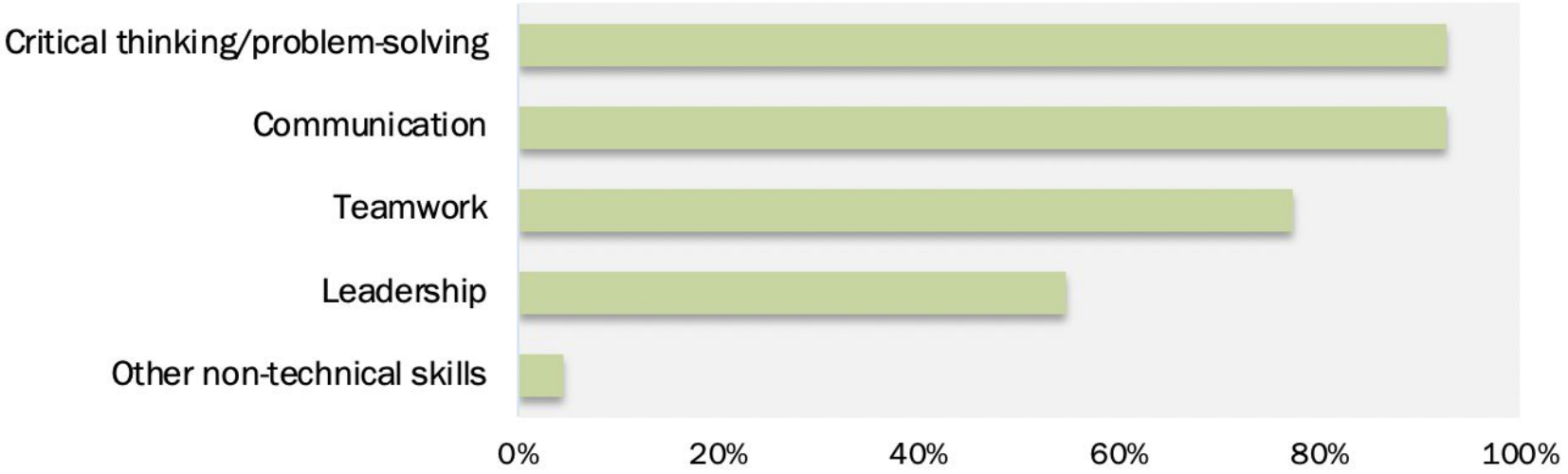


N=111

SKILLS DEVELOPMENT:

Workforce also needs training in nontechnical skills to perform effectively

Critical thinking, communication, and teamwork were cited as the most essential nontechnical skills.



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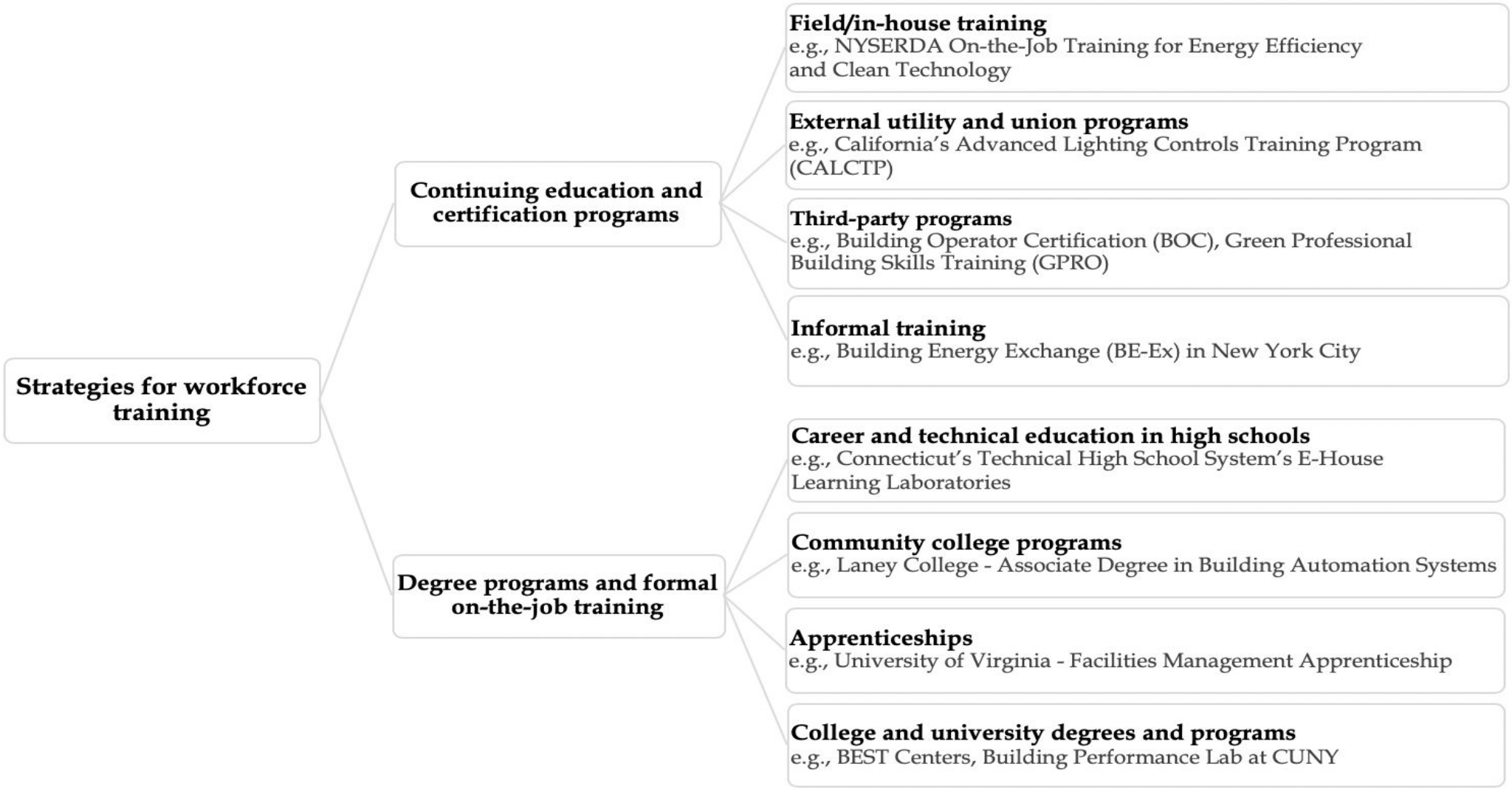
APPROACHES TO WORKFORCE TRAINING:



APPROACHES TO WORKFORCE TRAINING:

Continuing education courses, seminars, and certifications can meet the need for highly specialized training

Several utilities, labor unions, and other parties offer programs that can meet the need for highly specialized training in areas such as cybersecurity and systems programming and integration.

Program type	Skills category					Learning approaches		
	Operations and maintenance	Systems integration	Systems testing and evaluation	Data acquisition and analysis	Systems design and modeling	Classroom instruction	Hands-on learning	Practical/field training
Field or in-house training								
NYSERDA On-the-Job Training	•	•				•	•	•
Rheem Innovation and Learning Centers	•					•	•	•
External workforce programs								
PG&E Energy Centers	•				•	•	•	
Pepco Energy Savings for Business	•		•			•		•
CALCTP program	•	•	•			•	•	
DCSEU workforce training program*	•	•				•	•	•
IBEW-NJACT joint BAS program	•	•				•	•	•
SEIU Local 32BJ Green Supers Program	•					•		•
AEE's Certified Energy Auditor program			•	•		•	•	
BOMI-HP Designation program	•					•		
Urban Green Crushing the Code training					•	•		
Third-party programs								
BOC certification	•	•	•			•	•	•
Dollars to $ense workshops	•	•	•			•	•	
Urban Green Council GPRO training	•					•	•	•
Informal training opportunities								
Building Energy Exchange, New York City	•	•			•	•	•	
BOMA, IFMA, and AESP conferences	•			•	•	•	•	

* Includes soft skills training

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APPROACHES TO WORKFORCE TRAINING:

Career training programs help develop skills from the ground up and address needs in new areas

Program type	Skills category					Learning approaches		
	Operations and maintenance	Systems integration	Systems testing and evaluation	Data acquisition and analysis	Systems design and modeling	Classroom instruction	Hands-on learning	Practical/field training
Career and technical education for high school students								
E-House learning laboratories	•	•		•	•	•	•	•
Apprenticeship programs								
UVA Facilities Management program	•					•	•	•
IUOE Stationary Engineers program	•	•				•	•	•
Community college programs								
Laney College* A.S. degree and certificate in building automation systems	•	•	•		•	•	•	•
Valencia College A.S. degree in energy management and controls technology	•	•	•		•	•	•	•
University degree and programs								
Cal Poly mechanical engineering program	•	•			•	•	•	
CUNY Building Performance Lab	•	•	•	•		•	•	

* **Includes soft skills training**

Programs such as apprenticeships and those offered in community colleges and universities can help develop building performance skills and address needs in fields such as data analytics and systems measurement and verification

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American Council for an Energy-Efficient Economy

RECOMMENDATIONS:

Following actions can help develop the necessary workforce

- Forge partnerships with state agencies and skills training providers
- Engage underrepresented groups with training and internship programs
- Integrate and coordinate training efforts and share best practices, clearinghouse of curricula, and certifications to reduce confusion and avoid duplication.
- Focus on supplier diversity ad inclusive procurement
- Reach out to high school students to increase their awareness of opportunities.

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Resources

ACEEE, *Training the Workforce for High-Performance Buildings: Enhancing Skills for Operations and Maintenance:* www.aceee.org/research-report/b2003

ACEEE, *Expanding Opportunity through Energy Efficiency Jobs: Strategies to Ensure a More Resilient, Diverse Workforce*: www.aceee.org/research-report/u2010

MEEA, *Winning Contracts and Developing Skills: Supplier Diversity and Workforce Development*: www.mwalliance.org/sites/default/files/meea-research/supplier-diversity-sept2018.pdf?current=/taxonomy/term/11.

For additional inquiries, contact Rohini Srivastava
rsrivastava@aceee.org

Supply Chain Constraints & Challenges in Meeting Program Savings Goals

Matt Baker

Manager, Electrification, Utility and Government Programs

DAIKIN
AIR INTELLIGENCE

HVAC Supply Chain Constraints

Problems are seemingly limitless…

Transportation

- It started with **backups** in the **ports** preventing products from even getting unloaded
- It grew to a **lack of drivers** to operate the trucks to carry product down the road
- Now we are facing a **shortage of chasses** to carry the containers

Procurement

- Lead times are a bit like chasing a **moving target** or trying to read the tea leaves
- Inventory management practices change on a near-**daily basis** depending on the latest shifts in availability
- Need to anticipate what will be in short supply versus consistently available and then **manage inventory** accordingly

Manufacturing

- During early days of Covid we saw 12-15% daily **absenteeism**
- Seasonal manufacturing (summertime ramp up) had to be **scaled back** in order to just maintain production
- Changing political environment, efficiency standards and industry standards mean that **product lineups** need to be adjusted or even reengineered

DAIKIN AIR INTELLIGENCE

HVAC Supply Chain Constraints

…but things are improving

Transportation

- Ports are catching up (even LA!)
- Trucking is slowly returning to pre-pandemic availability
- It now takes half the time to get goods out of port

Procurement

- Items with 5-month lead times area now readily available
- Suppliers returning to 2 weeks of inventory instead of 20
- Sourcing strategies now include multiple vendors for many items

Manufacturing

- Increasing existing manufacturing capacity and adding new facility in 2023
- Bulk of the DOE changes have been rolled out
- Currently sitting on our highest logistics inventory ever

HVAC Supply Chain Constraints

Looking forward…

- We need to revisit how programs are designed and how success is measured
  - Metrics like EER are leveraged for short-term savings wins, but are creating a load base of fixed-capacity equipment that will last for 10-20 years
  - Many programs are still offering incentives for lower efficiency air conditioners and furnaces
  - The best performing equipment that meets the most stringent program requirements can cost 2-3 times as much as very similar equipment with slightly lower performance metrics
- We need to collaborate on the solutions
  - Supply chain issues vary widely based on type of equipment, and program changes can cause issues that ripple throughout the manufacturing lineup. Utilities need to engage with manufacturers to ensure success
  - Complicated or differing participation requirements across territories discourage participation for all parties
  - With federal funding coming online next year, broad dialog is needed to ensure successful program designs
  - Incentives are powerful levers, and we need to use them carefully so as not to leave low income/ disadvantaged customers behind

DAIKIN
AIR INTELLIGENCE

Getting to Goal:
Challenges and Opportunities

ALARIC J. BABEJ

PNM®

PNM: PROUDLY SERVING NEW MEXICANS FOR OVER 100 YEARS

- Public Service Company of New Mexico
  - Founded in 1917 as Albuquerque Gas and Electric Company
  - 530,000 customers in 40 communities
  - Over 15,000 miles of transmission and distribution lines
  - 2,701 MW of generation capacity

PNM EE PORTFOLIO

SOLUTIONS ACROSS MULTIPLE CUSTOMER SEGMENTS

- Programs broadly fall in either Residential or Business categories

- Common approaches:
  - Rebates
  - Point-of-sale discounts
  - Behavioral
  - Demand Response

- Approximate 50/50 split in energy savings targets between Residential and Business programs

Residential

- Residential Products
- Refrigerator Recycling
- Home Energy Checkup
- Cooling
- Home Weatherization
- PNM HomeWorks
- Easy Savings Kits
- Home Energy Reports
- PNM Power Saver
- New Home Construction

Business

- New Construction
- Retrofit Rebates
- Refrigerator Recycling
- QuickSaver
- Building Tune-Up
- Multi-family Improvements
- Advanced A/C Tune-Up
- Building Operator Certification
- PNM Peak Saver
- Strategic Energy Management

PNM ENERGY EFFICIENCY

MARKET CHALLENGES

POST-COVID INDUSTRY CONDITIONS

MARKET CHALLENGES

POST-COVID INDUSTRY CONDITIONS

MARKET CHALLENGES

POST-COVID INDUSTRY CONDITIONS

MARKET CHALLENGES

POST-COVID INDUSTRY CONDITIONS

MARKET CHALLENGES

POST-COVID INDUSTRY CONDITIONS

RESIDENTIAL PROGRAM CHALLENGES

Customer Awareness:

- 44% of residential customers aware of energy efficiency programs
- www.CheckWithPNM.com
- Cross-promotion and journey mapping

Digital Resistance:

- Customers not motivated by digital communications – digital fatigue?
- Online portals too long to develop and difficult to navigate

Contractor Geography:

- Lack of desire to participate by contractors across complete utility service area

Changing Behavior:

- Home comfort a challenge and opportunity

BUSINESS PROGRAM CHALLENGES

Market Forces:

- Supply chain bottlenecks
- Inflation increased project costs

Workforce Constraints:

- Facility staff lacks time to engage
- Lack of qualified contractors willing to travel to remote service territory

Design Constraints:

- Cost effectiveness can limit opportunity for projects with changing market conditions

Reaching New Customers:

- Pipeline of projects no longer provides ample flexibility across project years
- New market segment targeting needs additional build out

LOOKING AHEAD

ADDRESSING A CHANGING LANDSCAPE

Marketing Campaigns

- Change marketing tactics to highlight full portfolio
- Marketing budget crucial to reach customers

New Customer Segments

- Indoor agriculture offers a huge opportunity for both education and savings
- LTOs are proven to engage additional participation

Setting Expectations for Next Gen Programs

- Successful market transformation limits potential for future savings to reach historic levels
- Changing standards (e.g. EISA) effect baseline
- Grid modernization and new technology impacts
- Energy equity and other factors outside UCT


PNM

Concluding Remarks

Elise Jones
Executive Director

THANK YOU!