



Assessing Data Needs for Building Decarbonization

Staff Workshop

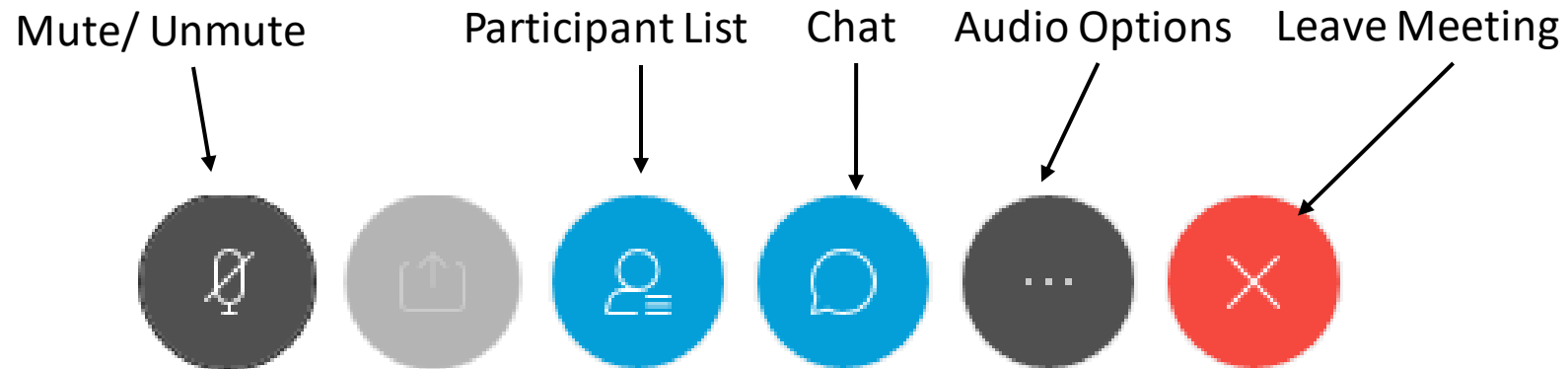
June 17, 2020

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Workshop Logistics

- Today's presentations (.pdf) available on WebEx link under “Event Material” type password “!Energy1” into the box and click “View Info”
- Please submit questions in the Chat box; specify panelist
- Questions will be read aloud by staff but you will be unmuted to respond to the answer. (Reminder: Mute back!)





Agenda

10:00-10:10 am	Welcome; <i>WebEx logistics</i>
10:10-10:30 am	CPUC Staff Presentation: <i>Assessing Data Needs for Building Decarbonization</i>
10:30-10:40 am	Discussion/ Q&A
10:40-11:00 am	Gridworks; Katie Wu: <i>Framing Data Needs and Use Cases for Building Decarbonization</i>
<i>S t r e t c h B r e a k</i>	
11:05-11:25 am	Environmental Defense Fund; Michael Colvin: <i>Natural Gas Infrastructure Data needs in the BUILD and TECH programs</i>
11:25-~11:45 am	Discussion/ Q&A
<i>L u n c h B r e a k</i>	



Agenda

1:00 -1:15 pm	PG&E Presentation: Processes for Gas System Expansion
1:15-1:30 pm	Southwest Gas: <i>Role of Data in Building Decarbonization</i>
1:30-1:50 pm	Discussion/ Q&A's
<i>B r e a k</i>	
2:00-2:15 pm	SDG&E: <i>Building Decarbonization-Related Data</i>
2:15-2:30 pm	SoCalGas: <i>SoCalGas' Vision on Decarbonization & Related Data</i>
2:30-2:50 pm	Discussion/ Q&A's
<i>S t r e t c h B r e a k</i>	
2:55- 3:10 PM	SCE: <i>Building Decarbonization; Vision and Role of Data</i>
3:10-3:20 pm	Discussion/ Q&A's
3:20 -3:30 pm	CPUC Staff: <i>Next Steps</i>
3:30-3:45 pm	Discussion/ Final Q&A's/ Wrap Up



General Purpose

Identify Data Needs for Building Decarbonization

SB 1477 Pilots Decision (D).20-03-027; Ordering Para 25:

- Requires IOUs to release certain data by September 1 of each year
- Data requirements (details, format..) to be determined through [this] staff workshop
- CPUC may revise data requirements annually; must publish by July 1 every year
- CPUC determines the confidentiality designations
- Stakeholders + CPUC determine how best to collect any necessary, not readily available data
- CPUC may require IOUs to initiate data collection through their existing processes



Workshop Goals

Identify Data Needs for Building Decarbonization

Short-term:

For BUILD and
TECH programs



Image Source: Adobemagazine.com

Long-term:

For scaling pilots
and strategic
planning



Expected Outcomes

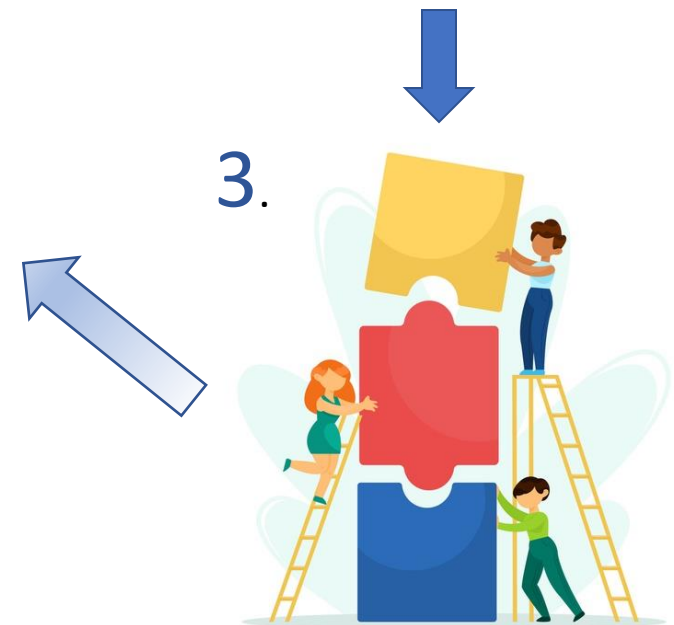
1. Kickoff a vision for identifying, collecting and disseminating all feasible and necessary data
2. Create a shortlist of immediate-need IOU data
3. Create a framework and process for developing Item 1 and future iterations of Item 2.




Image Source: clipart-library.com



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Data Coordination with other Proceedings

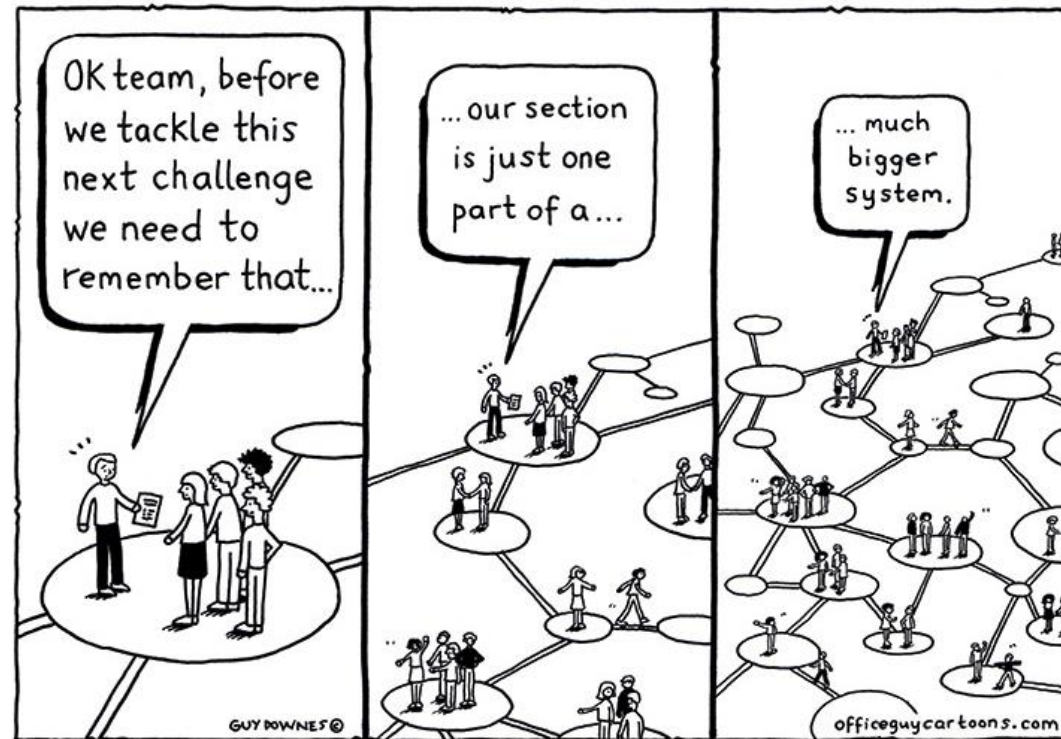


Image Source: officeguycartoons.com



Proceedings with Inter-related Data needs

- Long-Term Gas Proceeding
 - Tackles reliability standards, stranded assets, fair cost shifts and strategic transitions
- Gas Safety and Reliability Branch
 - Investigates deteriorating gas infrastructure and assesses risk
- Aliso Canyon Leak Investigation
 - Examines long-term viability of Aliso Canyon NG storage facility
- Integrated Resource Planning Proceeding
 - Considers data from all electric procurement policies and programs



Proceedings with Inter-related Data needs

- Integrated Distributed Energy Resources Proceeding
 - Quantifies contribution of DERs for Integrated Resource Planning
- General Rate Case Proceedings
 - Approves infrastructure maintenance and developments costs and rates
- Ratepayer + Non-ratepayer-funded Programs and Proceedings
 - SGIP, EE, LI/ ESA, AQMD, SJV Pilots, SOMAH, EPIC, others
- CEC-CPUC AB 3232 Building Decarbonization Assessment
 - By Jan 1, 2021, evaluate GHG reduction potential for residential and commercial buildings through 2030.
- CEC Title 20 Data Regulations
 - IOU data submitted to CEC for energy forecasts, setting state energy policy

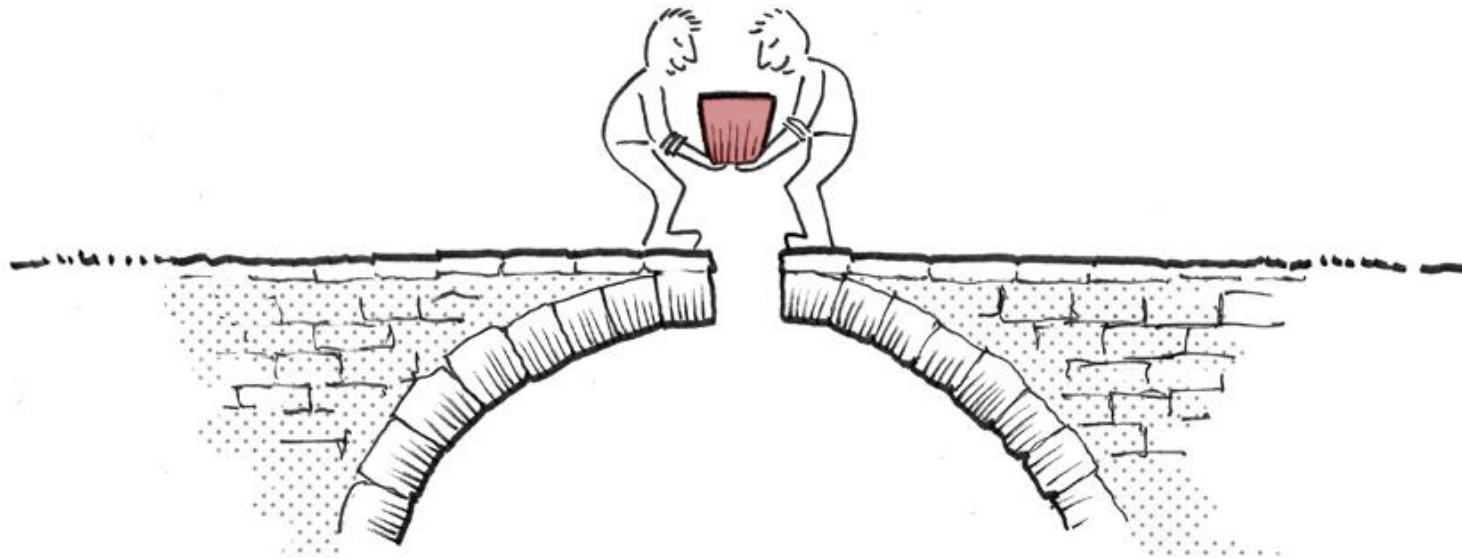


Image Source: southmountain.com

Energy Division, Gas Policy and Reliability Section: Christina Ly

Safety and Enforcement Division, Gas Safety and Reliability Branch: Matt Epuna



CPUC R.20-01-007 Long-Term Gas Planning OIR

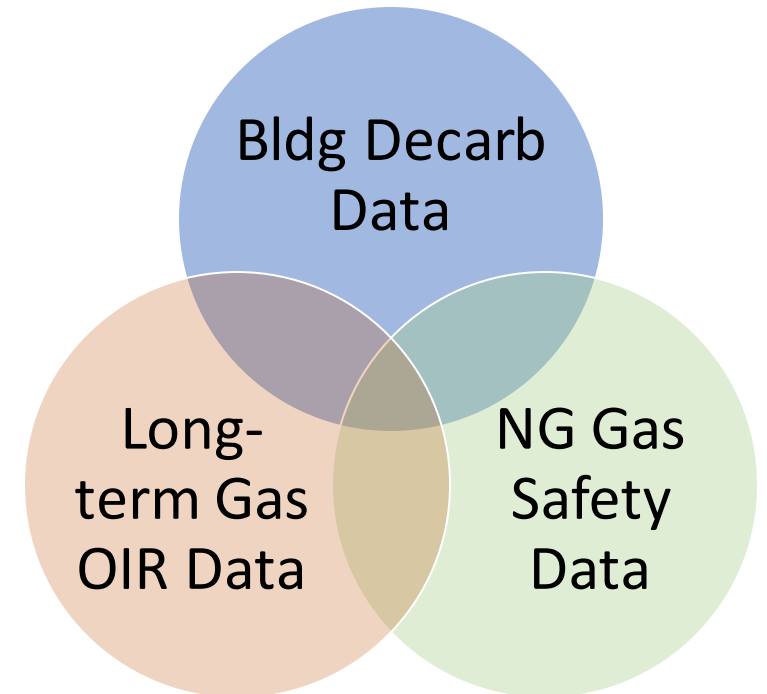
- OIR Issued January 27, 2020
 - Three tracks to the proceeding.
 - Track 1A and 1B currently underway.
- Track 2: Long-Term Natural Gas Policy and Planning
 - Pre-Hearing Conference June 2021
 - Some topics:
 - How much gas infrastructure is needed to ensure reliable gas service through 2030, 2030-2040, and beyond?
 - What type of data should be collected to forecast the expected decline in demand for each customer class on the gas utilities' backbone, transmission, and distribution systems during each time horizon?
 - Should we establish parameters to determine when aging infrastructure should be replaced?



CPUC R.20-01-007 Long-Term Gas Planning OIR

Shared Goal: Planned curtailment of NG distribution networks where cost-effective

- Coordinate data needs with related proceedings
 - Avoid duplicative efforts
- Identify preliminary overlapping data needs through today's workshop
- Collect additional data if necessary ahead of Track 2 through Gas OIR.
 - Recognize incremental data points for the OIR





CPUC R.20-01-007 Long-Term Gas Planning OIR

GSRB Introduction

- CPUC enforces the Federal Natural Gas Pipeline Safety Regulations on all investor-owned entities that operate intrastate gas pipelines, natural gas storage fields and Municipalities that operate gas services in CA through the Certifications and Agreements with the Pipeline and Hazardous Materials Safety Administration under 49 U.S.C. §§ 60105-60106
- Gas Safety and Reliability Branch (GSRB) has safety regulatory jurisdiction over 150,000 miles of investor-owned natural gas pipelines in addition to Municipalities and Master-metered distribution systems.
- GSRB conducts investigations of reportable gas incidents.
- GSRB conducts on-site inspections of construction projects, inspections of operation & maintenance activities and other gas safety related activities.



CPUC R.20-01-007 Long-Term Gas Planning OIR

GSRB is in the Process of Acquiring a GIS

- GSRB will be requesting gas pipeline GIS mapping information from IOUs and PHMSA to build a comprehensive pipeline GIS to enhance its pipeline safety awareness and support its inspections and incident investigations.
- GSRB envision sharing some of the GIS data with Energy Division
- GSRB has a standing data requests for all planned construction activities from the three major IOUs.
- GSRB occasionally collect data on issues like vintage plastic Aldyl A pipe material replacement and etc
- GSRB plan to collect GIS mapping information during incident investigation and inspections to enable GSRB to conduct a well-informed investigation and a comprehensive risk-based field inspections that includes pipeline record integrity verification.



CPUC R.20-01-007 Long-Term Gas Planning OIR

GSRB Confidentiality Guidelines

- GSRB is very cognizant of the security sensitivity of some of the data contained in the IOUs gas pipeline GIS
- GSRB is will observe the requirements of the PU Code Section 583 and CPUC General Order 66-D
- GSRB will observe the requirements of Physical facility, Cyber-Security and Critical Energy Infrastructure Information (CEII) as defined by the regulations of the Federal Energy Regulatory Commission at 18 C.F.R. § 388.113



Rules Governing IOU Data Confidentiality

- Protect Citizen's right to privacy; *CA Constitution Art. I. Sec 1.*
- Principles: Fair Information Practice Principles
 1. Transparency
 2. Individual Participation
 3. Purpose Specification
 4. Data Minimization
 5. Use Limitation
 6. Data Quality & Integrity
 7. Data Security
 8. Accountability & Auditing



Rules Governing IOU Data Confidentiality

1. Transparency

- CA Business and Professions Code Section 22575 –**Requires online posting of a privacy and third party access policies** of California businesses, including California energy utilities

2. Individual Participation

- CA Civil Code Section 1633.1 et seq. –**Authorizing the use of electronic transactions / signatures** to satisfy laws requiring records to be in writing
- CPUC Decision (D) 90-12-121; 39 CPUC 2d 173 (1990) –CPUC policies in “Customer List OII”(I.90-01-033) restricting access by third parties to confidential customer information possessed by utilities **unless the customer provides written permission** and prohibiting access by law enforcement except pursuant to legal process (i.e., warrant or subpoena); directing the IOUs to notify the CPUC in writing ninety days prior to any contemplated change in policies regarding release or use of customer information

3. Purpose Specification

- CPUC Decision No. 00-07-020, 7 CPUC 3d 380, 422-425 –Extends customer data to IOU third party contractors

4. Data Minimization

- CA Public Utilities Code Section 6354(e) –Energy utilities must report to municipalities the names and addresses of customers who transport gas or electricity, for purposes of enforcing taxes and fees. Municipalities shall not disclose such customer information to third parties



Rules Governing IOU Data Confidentiality

5. Use Limitation

- CA Public Utilities Code Section 583 –Prohibits disclosure of confidential information provided to the CPUC **unless ordered released by the CPUC**

6. Data Quality & Integrity

7. Data Security

- SB 1476, Public Utilities Code Section 8380 (d)

6. Accountability & Auditing

- CA Public Utilities Code Section 581-584- Requires utilities to furnish any reports [or data] required by CPUC to keep itself informed.



Rules Governing IOU Data Confidentiality

D.06.06-066: Electric Procurement Data Confidentiality

- Identifies 13 categories of IOU Data
- Deems certain data to be public after 1 year
 - E.g. Historical Peak Demand by Customer Class
- Near-term forecasts receive greater protection than longer-term forecasts
- Establishes that confidentiality of data depends on context



Rules Governing IOU Data Confidentiality

D.14-05-016: Access to Energy Use Data

- Defines users and levels of access; state energy agencies, local governments, research institutions, public
- Sets aggregation rules by user
- Sets a framework for direct access through IOU
- Subsequent decision D.18-05-041 requires SCE to establish a statewide energy data access tool with proportional allocation from other IOUs (up to \$2 million)



Misalignment with recent laws

- AB 802 (Williams, Statutes of 2015) changes the aggregation thresholds for nonresidential and residential customers
- Allows building owners access to renter's energy use data, if aggregated
- Requires public disclosure of annual energy use data for certain large multifamily properties
- CEC sets regulations for public disclosure



Customer right to disclosure

D.20-03-027 , Conclusion of Law #30:

It is reasonable to provide IOU customers the option of voluntary public donation of their energy use data rather than assume that every customer is unwilling to share their individual energy use data for public interest decarbonization-related research.



Proposed Data Categories

- 1) Data available or possible **through IOUs**
- 2) Data obtainable through **other known sources**
- 3) Data **not currently available**- would require ground research, new studies



IOU-related Data

Categories of data that IOUs have, or can collect

I. Physical characteristics:

- 1) **Behind-the-meter data:** E.g. building characteristics data, age of program-incented appliance, presence of solar PV/ EV, locational attributes
- 2) **In-front-of-the-meter data:** E.g. Service line size, feeder capacity, age, material characteristics of natural gas pipeline, locational attributes

II. Energy Data:

- 1) **Usage data:** E.g. customer billing data, hourly load profiles (program-incented appliances)
- 2) **Generation and Distribution data:** E.g. Service line size, feeder capacity, age, material characteristics of natural gas pipeline; transmission and distribution level, locational attributes



IOU-related Data

Categories of data that IOUs have, or can collect

III. Rates data:

- 1) **About the rates:** E.g. hourly rates by customer class, baselines, tiers, rate forecasts
- 2) **About the customer, derived from rates:** E.g. number of customers on certain rate, equity need, primary heating source

IV. Customer characteristic data:

E.g. Household size, responsiveness to programs, other self-reported customer data collected through programs



External Data

- Housing and Community Development, Planning Commissions
 - Planned developments
- US Census Bureau
- County Assessors
 - Square footage
- Needed but unavailable
 - E.g. Locations of equipment that are at end of useful life



Proposed Framework for Needs Refinement

- Establish a Stakeholder Data Working Group
- The Working Group would identify:
 - Data needs
 - End Users and Use Cases
 - Data Sources
 - Categories
 - Format
 - Funding sources, research organizations, overlapping work
 - Dissemination methods
 - Statutory and regulatory limitations, refinements needed
- Workshop/ publish working group findings; refine data needs
- Annual resolution, if needed



Discussion



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Framing Data Needs and Use Cases for Building Decarbonization

CPUC Workshop on Building Decarbonization Data Submittals

June 17, 2020

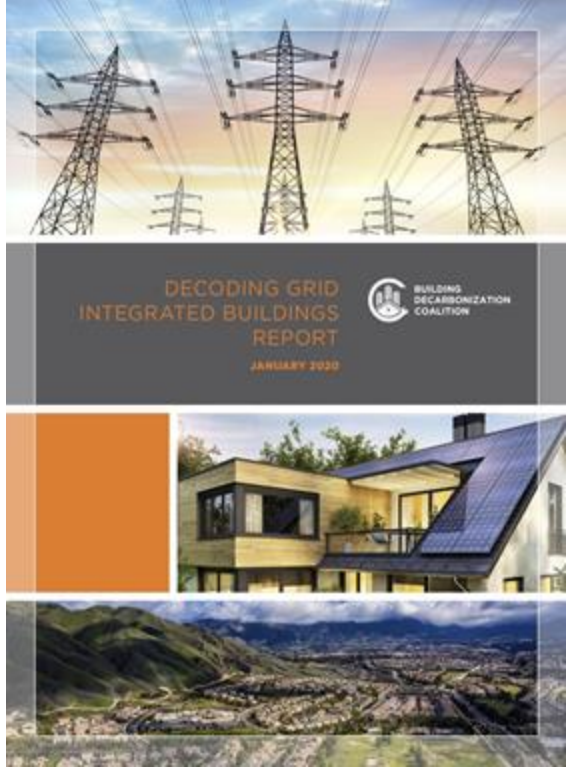
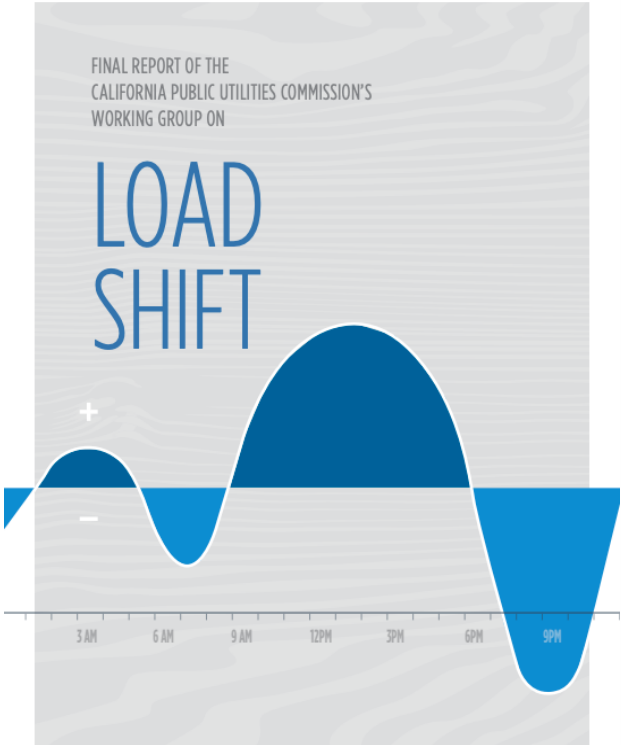
Presented by Katie Wu



GRIDWORKS

Gridworks' Mission

To convene, educate, and empower stakeholders working to decarbonize electricity grids



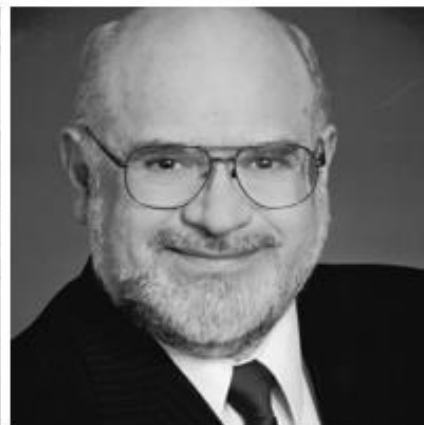
The Gridworks Team



Matthew Tisdale
Executive Director



Katie Wu
Director



Mike Florio
Senior Fellow



Eric Martinot
Senior Fellow



Arthur Haubenstock
Senior Fellow



Ronny Sandoval
Fellow



Deborah Shields
*Operations and
Communications Director*



Paul "Mac" Roche
Project Manager



Hector Tavera
Distribution Grid Analyst



Rehana Aziz
Project Manager

Overview

Barriers to building decarbonization

Roles for data

Costs and benefits of data

Clean energy data tracking at the CPUC

Relating equity, data, and decarbonization

Community-based metrics options

Barriers to Building Decarbonization



LOW PERCEIVED CUSTOMER VALUE

Customers do not see a clear value proposition. Contributing factors include:

- Lack of incentives encouraging customer adoption
- Lack of financing solutions to help customers manage up-front costs
- Lack of coordination with existing building weatherization support programs
- Lack of paths to market for electric load shift enabled by heat pumps
- Lack of customer bill savings in some utility service territories at current electric and gas rates
- Lack of markets to monetize grid and climate values

LOW PERCEIVED CONTRACTOR AND BUILDER VALUE

Like customers, contractors and builders do not see a clear value proposition. Contributing factors include:

- Lack of incentives encouraging builders to construct carbon-free structures
- Lack of training for builders and contractors
- Lack of recognition for builders and contractors promoting building decarbonization
- Lack of coordination and support for local government permitting offices
- Lack of adequate measurement and valuation of GHG emissions
- Lack of consumer demand

Data Informs All Program Stages



Recognize the Data Reporting Costs

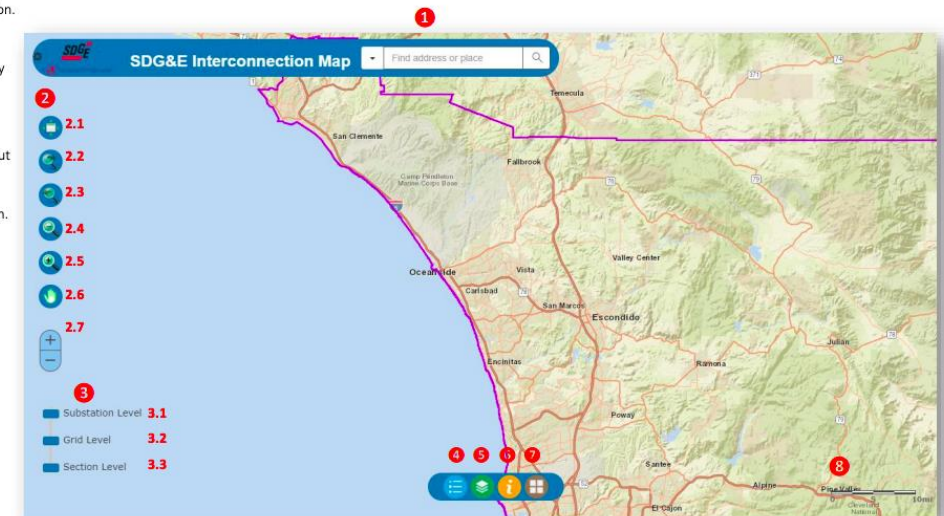
- Data collection, processing, formatting, and reporting are generally part of programmatic administrative costs
- Data storage and maintenance also has a cost

SDG&E Interactive Map and Integration Capacity Analysis (ICA) User Guide

Interactive Map

Map Navigation and Zoom

- 1 Search Bar
Type an address, city, place, substation or circuit to zoom into that location.
- 2 Zoom tools
 - 2.1 Zoom extent – zooms out to default elevation, service territory
 - 2.2 Next zoom- takes you one forward zoom level
 - 2.3 Previous zoom – takes you one back zoom level
 - 2.4 Zoom out- draw a rectangle on an area on the map to zoom out
 - 2.5 Zoom in- draw a rectangle on an area on the map to zoom in
 - 2.6 Panning – Click and drag on the map to move the map location.
 - 2.7 Zoom in and zoom out buttons
(or use the mouse wheel to zoom in and out)
- 3 Specific Zoom level layer
 - 3.1 Substation Level – zooms to an elevation to display layer
 - 3.2 Grid Level – zooms to an elevation to display layer
 - 3.3 Section Level – zooms to an elevation to display layer
- 4 Legend – click to displays the values of the selected layer
- 5 Layer List – click to select the desire layer to view
- 6 Information & User Guide
- 7 Base Map Gallery
- 8 Elevation map display

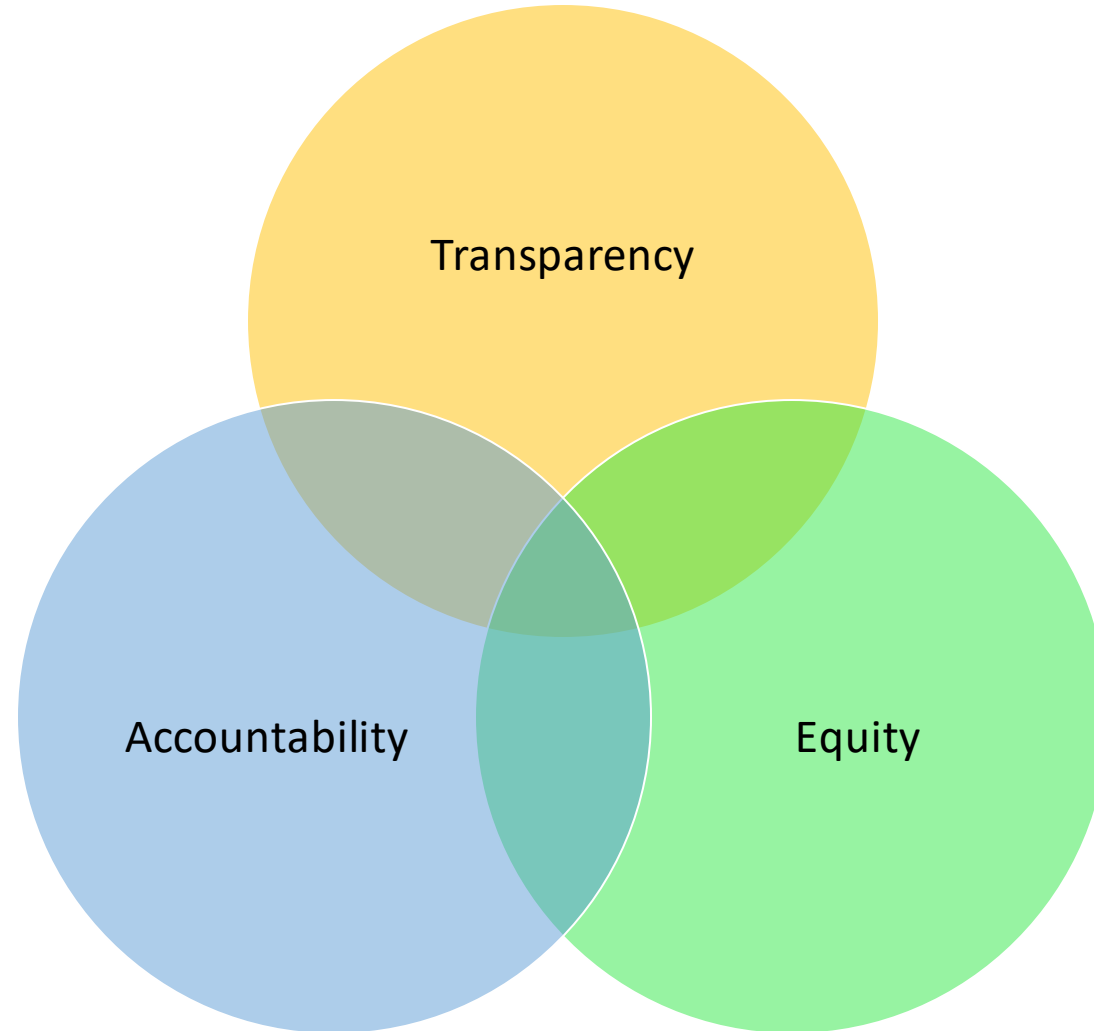


Simplicity Helps Reduce Costs

Cost Item	2018 Total Expenditures	2019 Expenditures ⁽¹⁾												Year-to Date 2019 Expenditures	Program-to-Date Total Expenditures 2018-2022
		January ⁽²⁾	February	March	April	May	June	July	August	September	October	November	December		
Category 1: Reliability Programs															
Agricultural Pumping Interruptible (API)	\$11,053	(\$41)	\$6	\$195	(\$20)	\$2	(\$2)	\$3	(\$43)	(\$5)	(\$2)			\$92	\$11,146
Base Interruptible Program (BIP)	\$7,197	(\$65)	\$9	\$184	(\$32)	\$3	(\$3)	\$4	(\$66)	\$2,360	(\$486)			\$1,909	\$9,105
Optional Binding Mandatory Curtailment (OBMC)	(\$9)	\$0	\$0	\$7	\$0	\$0	\$0	\$0	\$0	\$0	\$0			\$6	(\$9)
Rotating Outages (RO)	\$6	(\$11)	\$2	\$13	(\$5)	\$1	(\$1)	\$1	\$113	(\$1)	(\$0)			\$11	\$116
Scheduled Load Reduction Program (SLRP)	(\$7)	\$0	\$0	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$0			\$1	(\$6)
Category 1 Total	\$18,241	(\$117)	\$17	\$400	(\$57)	\$6	(\$6)	\$7	\$3	\$2,354	(\$488)	\$0	\$0	\$2,119	\$20,359
Category 2: Price Responsive Programs															
AC Cycling - Summer Discount Plan (SDP)	\$204,019	\$2,206	\$3,383	\$766	\$432	\$453	\$1,352	\$2,432	(\$1,807)	\$86	\$248			\$9,551	\$213,570
Capacity Bidding Program (CBP)	\$363	\$11,789	\$3	(\$11,695)	(\$9)	\$1	(\$1)	\$1	(\$18)	(\$2)	(\$1)			\$67	\$430
Demand Bidding Program (DBP)	\$1,257	(\$40)	\$6	\$3	(\$20)	\$2	(\$2)	\$3	(\$41)	(\$5)	(\$2)			(\$96)	\$1,161
Save Power Day (SPD/PTR)	\$237,450	\$2,139	\$1,500	\$2,445	(\$65)	\$6	(\$6)	\$8	(\$130)	(\$15)	(\$6)		(\$6)	\$5,871	\$243,321
Category 2 Total	\$443,089	\$16,093	\$4,892	(\$8,482)	\$339	\$462	\$1,344	\$2,444	(\$1,997)	\$64	\$239	(\$6)	\$0	\$15,993	\$458,482
Category 3: DR Provider/Aggregated Managed Programs ⁽³⁾⁽⁴⁾															
AMP Contracts/DR Contracts (AMP)	\$14	\$3	\$1	(\$8,698)	\$0	\$0	\$0	\$0	(\$24)	\$0	\$0			(\$8,718)	(\$8,704)
Category 3 Total	\$14	\$3	\$1	(\$8,698)	\$0	\$0	\$0	\$0	(\$24)	\$0	\$0	\$0	\$0	(\$8,718)	(\$8,704)
Category 4: Emerging & Enabling Technologies															
Auto DR / Technology Incentives (AutoDR-TI)	(\$407,410)	(\$1,153)	\$13,089	(\$36,981)	(\$566)	\$31,274	(\$57)	\$73	(\$1,187)	\$61,286	(\$6,178)			\$99,599	(\$347,810)
Emerging Markets & Technologies	\$2,325,254	\$154,989	\$154,505	\$40,680	(\$64,437)	\$61,251	\$42,473	(\$21,558)	\$49,364	\$74,644	\$32,938			\$524,849	\$2,850,103
Category 4 Total	\$1,917,844	\$153,836	\$167,594	\$3,699	(\$65,003)	\$92,524	\$42,416	(\$21,485)	\$48,177	\$135,930	\$26,760	\$0	\$0	\$584,448	\$2,502,292
Category 5: Pilots															
Over Generation Pilot Program	\$376,622	\$0	(\$110,572)	\$118	\$0	\$0	\$4,950	\$261,353	\$74,652	\$67,612	\$63,929			\$362,042	\$738,664
Category 5 Total	\$376,622	\$0	(\$110,572)	\$118	\$0	\$0	\$4,950	\$261,353	\$74,652	\$67,612	\$63,929	\$0	\$0	\$362,042	\$738,664
Category 6: Evaluation, Measurement and Verification															
DR Research Studies (CPUC)	\$62,370	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$200,000	\$0			\$200,000	\$262,370
Measurement and Evaluation	\$494,350	(\$12)	(\$46)	(\$142,266)	\$98,568	\$224	\$16	(\$688)	\$237	(\$20)	\$162			(\$43,825)	\$450,525
Category 6 Total	\$556,721	(\$12)	(\$46)	(\$142,266)	\$98,568	\$224	\$16	(\$688)	\$237	\$199,980	\$162	\$0	\$0	\$156,175	\$712,895
Category 7: Marketing, Education & Outreach ⁽⁴⁾															
Other Local Marketing	(\$15,569)	\$0	\$0	\$6,139	\$0	(\$8,297)	(\$1,721)	\$0	\$3,443	\$0	\$1,700			\$1,262	(\$14,306)
Category 7 Total	(\$15,569)	\$0	\$0	\$6,139	\$0	(\$8,297)	(\$1,721)	\$0	\$3,443	\$0	\$1,700	\$0	\$0	\$1,262	(\$14,306)
Category 8: DR System Support Activities															
DR Systems & Technology (S&T)	\$6,637	(\$500)	(\$133)	\$554	(\$177)	\$43	\$327	(\$238)	(\$408)	(\$57)	(\$22)			(\$611)	\$6,027
DR Rule 24	\$727,391	\$26,126	\$27,426	(\$340,221)	\$22,083	\$22,210	\$21,095	\$43,954	\$39,171	\$22,501	\$27,840			(\$87,815)	\$639,576
Category 8 Total	\$734,028	\$25,626	\$27,293	(\$339,667)	\$21,906	\$22,253	\$21,422	\$43,716	\$38,763	\$22,444	\$27,818	\$0	\$0	(\$88,425)	\$645,603
Category 9: Integrated Programs and Activities (Including Technical Assistance)															
Commercial New Construction	(\$25,725)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$10)	\$0	\$0			(\$10)	(\$25,735)
DR Energy Leadership Partnership (ELP)	\$128	(\$37)	\$5	\$2	(\$17)	\$2	(\$2)	\$2	(\$21)	(\$4)	(\$2)			(\$73)	\$56
DR Institutional Partnership	\$143	(\$28)	\$3	\$1	(\$13)	\$1	(\$1)	\$2	(\$16)	(\$3)	(\$1)			(\$56)	\$87
DR Technology Resource Incubator Program (TRID)	(\$169)	(\$10)	\$0	\$0	(\$5)	\$0	(\$0)	\$1	(\$6)	(\$1)	(\$0)			(\$20)	(\$189)
IDSM Continuous Energy Improvement	(\$70)	(\$11)	\$1	\$0	(\$5)	\$1	(\$1)	\$1	(\$6)	(\$1)	(\$0)			(\$22)	(\$92)
IDSM Food Processing Pilot	(\$6)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			\$0	(\$6)
Integrated DSM Marketing	\$916	(\$126)	\$16	\$93	(\$59)	\$6	\$60	(\$881)	(\$73)	\$3,210	\$9,027			\$11,272	\$12,188
Residential New Construction Pilot	(\$39)	(\$6)	\$1	\$0	(\$3)	\$0	(\$0)	\$0	(\$4)	(\$1)	(\$0)			(\$12)	(\$51)
Statewide IDSM	(\$11,243)	\$0	\$30,896	\$0	(\$30,896)	\$0	\$0	\$29,272	(\$29,272)	\$0	\$29,186			\$29,186	(\$82,057)
Technical Assistance (TA)	(\$1,104)	(\$50)	\$7	\$700	(\$25)	\$2	(\$2)	\$3	(\$52)	(\$6)	(\$2)			\$576	(\$528)
Third Party Programs	(\$1,304)	(\$83)	\$12	\$1,159	(\$41)	\$4	(\$4)	\$5	(\$86)	(\$10)	(\$4)			\$952	(\$352)
Workforce Education & Training Smart Students (SmartStudents)	(\$553)	(\$43)	\$6	\$121	(\$20)	\$2	(\$2)	\$3	(\$42)	(\$5)	(\$2)			\$21	(\$532)
Category 9 Total	(\$139,025)	(\$392)	\$30,948	\$2,077	(\$31,084)	\$18	\$48	\$28,407	(\$25,587)	\$3,179	\$38,201	\$0	\$0	\$41,814	(\$97,210)

But there is a tradeoff with ease of interpretation and usability

Data Benefits Represent Values



Examples of CPUC Data Tracking



Examples of CPUC Data Tracking



California Distributed
Generation Statistics



NEM Solar PV

California Solar Initiative

Low-Income Solar PV

Rule 21

SOMAH

Summary: These statistics and charts are created from completed incentive applications from the Single-family Affordable Solar Homes (SASH) programs, the Multifamily Affordable Solar Housing (MASH) programs and the Disadvantaged Communities - Single-family Solar Homes (DAC-SASH) program.

Data Type: Incentive Applications

Utilities: PG&E, SCE and SDG&E

Technology: Solar PV

Data Source: [Low-Income Solar PV Data Set](#)

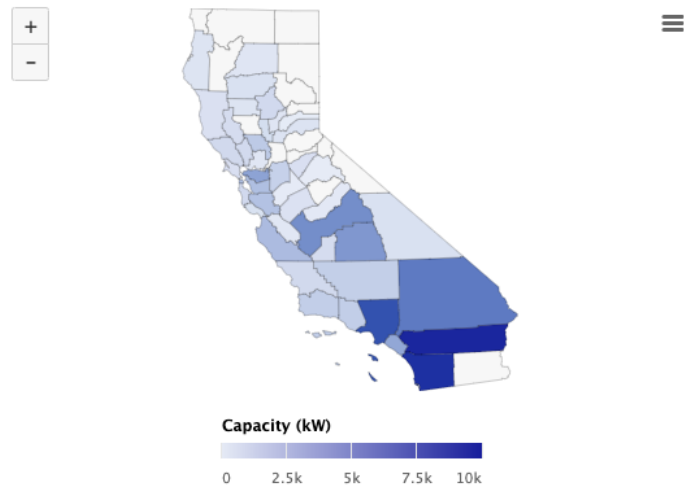
Data View: All IOUs

Data Type: Capacity Projects Incentives

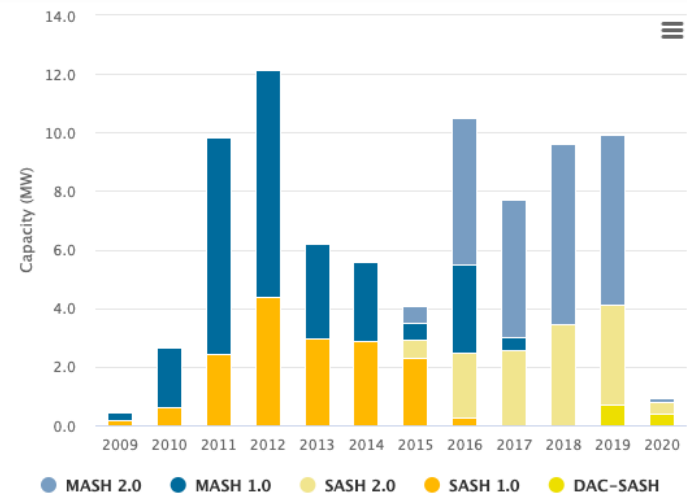
Program: All

Time Series: All Years

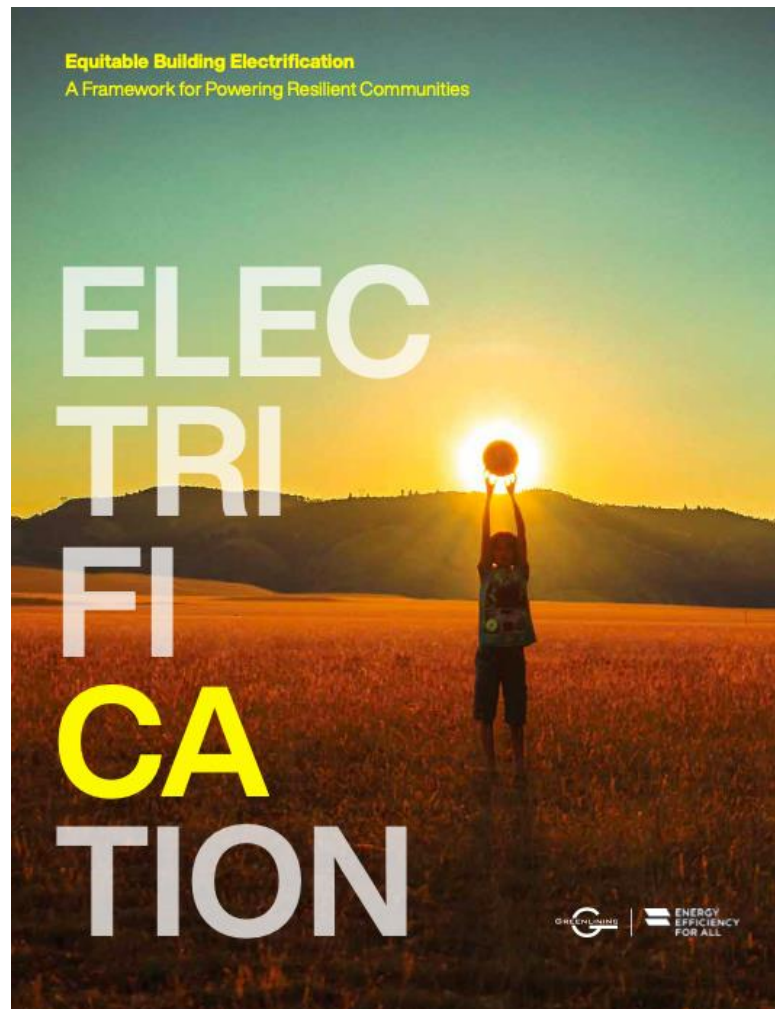
Territory and Location¹



Capacity²

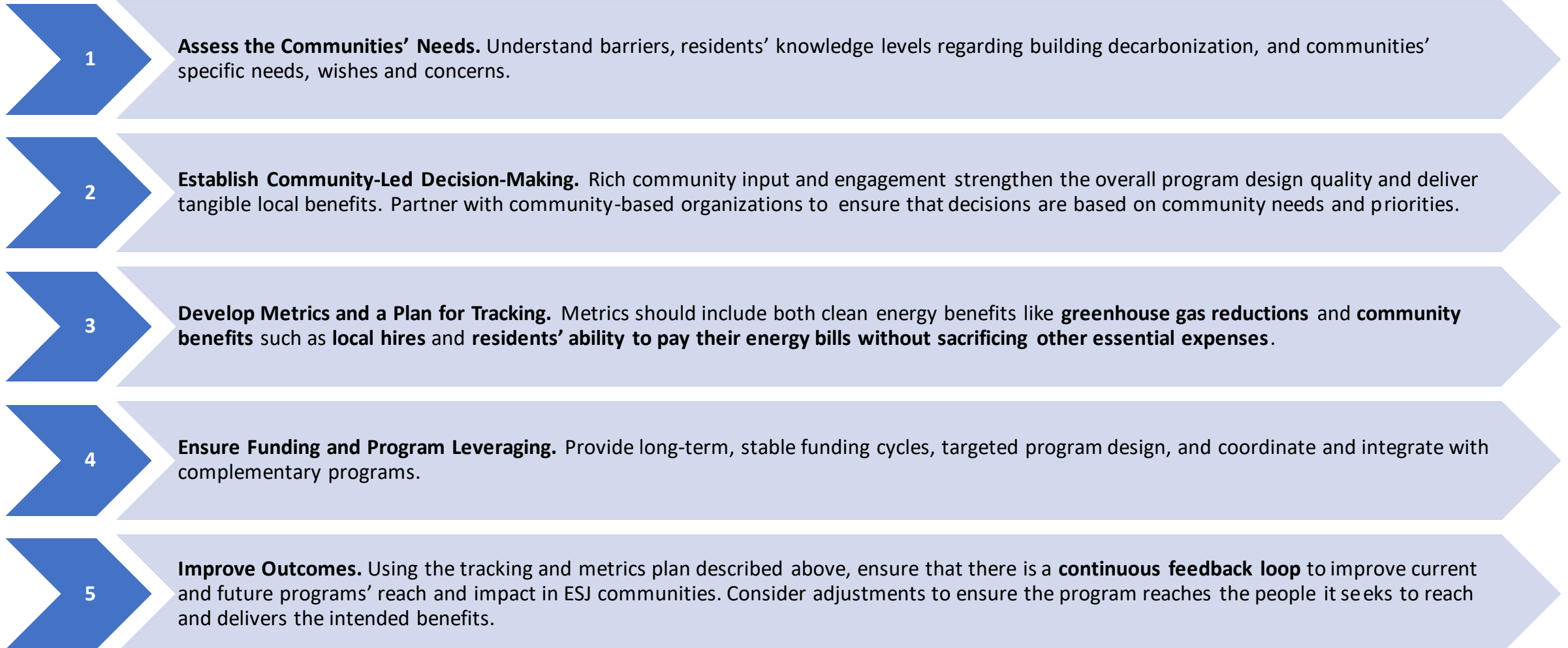


Equitable Electrification Framework



- 2019 Greenlining and Energy Efficiency for All publication
- “...an equitable transition will respect people’s and communities’ right to self-determination and will seek to build trust among communities that may view clean energy as a false choice that is forced upon them without consideration of their wishes and needs.”

Summary of Five-Step Framework



Community-based Metrics Options

Measuring Community Resilience

- Resilience can be measured across several different metrics
- Program administrators should consult with communities on resilience-related goals to identify the necessary metrics

Table 1. Local energy resilience dimensions and indicators

Local energy resilience dimension	Indicator	Potential hazard	Energy efficiency solution that reduces vulnerability or increases capacity to cope
Energy infrastructure and reliability	Improvements in community-wide energy efficiency	Disruptions and outages	Reduce demand through efficiency
Transportation connectivity	Availability of, and access to, multiple transportation modes	Service disruptions to transportation modes	Location efficiency; multimodal transportation system
Distributed generation	Number of critical facilities served by efficient distributed energy	Loss of power at critical loads	Combined heat and power (CHP)
Thermal building performance	Building code stringency and compliance	Inability to shelter in place safely	Well-insulated buildings that maintain temperature
Urban heat island effect	Temperature gradient between urban area and surrounding rural areas	Stress on electric system	Energy efficiency to reduce system peak
Climate change	Levels of community-wide GHG emissions	Varied (climate change acts as a risk multiplier)	Reduce GHG emissions through efficiency measures
Particulate matter pollution	Levels of particulate pollutants	Chronic health issues	Reduce local pollution through efficiency measures
Energy burden	Proportion of household income spent on energy bills (especially for low-income households)	Inability to prepare for the unexpected (due to high burden)	Lower bills through energy efficiency
Energy bill stability	None	Inability to prepare for the unplanned (due to unexpected bill swings)	Reduce exposure to swings through energy efficiency

Source: Ribeiro and Bailey, 2017

Measuring Workforce Impacts

- “To ensure local business engagement, job creation, and career pathways for local residents, programs can measure who accessed contracting, employment and workforce development opportunities in low-income communities”
- Number of jobs created, participation in new apprenticeship and training programs, and number of local hires should be tracked

Workforce Development	Contracts or jobs to locally-owned, minority-owned, women-owned, and small businesses (# and/or %)
	Number of jobs created (# by job type)
	Participation of low-income residents in the energy efficiency and renewable energy workforce (# of local workers trained and # placed into energy efficiency and renewable energy jobs)

Measuring Energy Burden

- Look beyond bill impacts – Build from the CEC’s bill impact tool to track and mitigate energy burden
- Proxy data and/or averages of census tract-level data may be appropriate in some cases

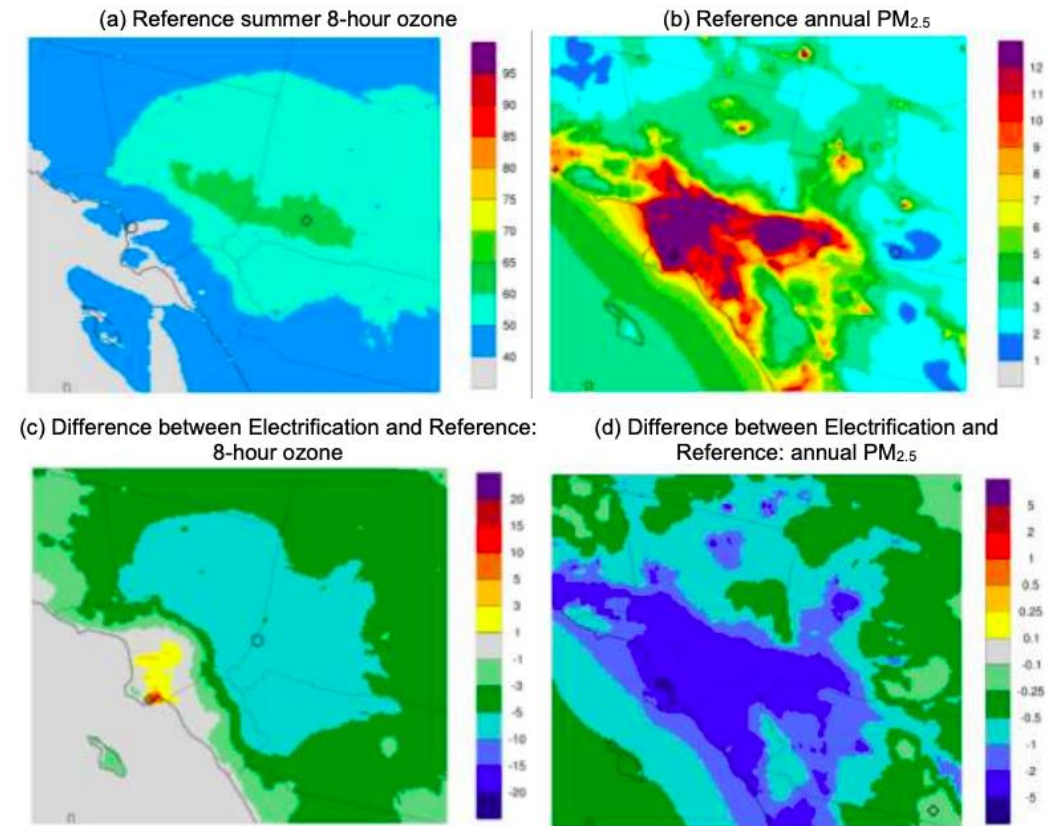
Table 23: Measures of Energy and Household Burden

Measure	What it Measures	Calculation Method	Meaning of Categories
Energy burden	Actual home energy costs as a percentage of household income	<u>Household Energy Bill</u> Self-Reported Gross Household Income	<ul style="list-style-type: none"> • High: 6.3 percent or higher • Medium: 3.9 to 6.3 percent • Low: 1.0 to 3.9 percent • Very low: energy burden < 1.0%²⁹
Modified energy burden	Actual home energy costs plus valuation of medical, housing, and food stamp assistance as a percentage of self-reported gross household income	<u>Household Energy Bill</u> Self-Reported Gross Household Income + Valuation of Non-Cash Assistance	Same breakpoints as for energy burden
Energy insecurity	Household challenges regarding affordability of energy bills and monthly trade-offs between meeting energy needs and bill payments	Points allocated based on responses to survey questions about: <ul style="list-style-type: none"> • Difficulty household faces in paying energy bill (C5) • Household disposition to and motivation for saving energy (A19) • Equipment-related inability to keep home temperature comfortable 	Primary assignment based on challenges paying energy bill (with adjustments based on other inputs): <ul style="list-style-type: none"> • High: Constantly struggle (or usually struggle with high degree of energy saving practices) • Medium: Usually struggle • Low: Sometimes struggle • None: Never struggle and few energy practices motivated by

Measuring Health Impacts

- Maps visualizing regional criteria air pollution impacts may be well-suited for longer-term analysis horizons
- Partnerships are key! For communities with high asthma rates, Marin Clean Energy and Green & Healthy Homes Initiative provide an example of a partnership to offer health and energy services to improve indoor air quality and reduce in-home asthma triggers

Figure 25: Summer Maximum Daily Average 8-hour-Ozone (ppb) and Annual PM_{2.5} (µg/m³) for Different Scenarios in South Coast Basin



Reference scenario (a and b) and difference between Electrification scenario and Reference scenario (c and d) in South Coast Basin.

Takeaways



To promote transparency

Make data easy to access and visualize



To stay accountable

Track metrics specific to targeted programmatic outcomes



To promote equity

Include community-based metrics such as local jobs, energy burden, and health effects

Thank You!

Contact:

Gridworks: <https://gridworks.org/>; info@gridworks.org

Katie Wu: katiewu@gridworks.org



GRIDWORKS

Resources

- Low Income Needs Assessment Studies: <https://www.cpuc.ca.gov/iqap/>
- *Issue Brief: Using Data to Set Priorities and Track Success of Low-Income Energy Programs* (US Dept. of Energy):
https://betterbuildingsolutioncenter.energy.gov/sites/default/files/IB_Using%20Data%20to%20Set%20Priorities_Final.pdf
- *Indicators for Local Energy Resilience* (Ribeiro and Bailey, 2017):
<https://www.aceee.org/sites/default/files/resilience-indicators-0817.pdf>
- *Air Quality Implications of an Energy Scenario for California Using High Levels of Electrification* (Alexander, M. et al, 2019): <https://ww2.energy.ca.gov/2019publications/CEC-500-2019-049/CEC-500-2019-049.pdf>
- *Equitable Electrification Framework* (Greenlining and Energy Efficiency for All, 2019):
<https://greenlining.org/publications/reports/2019/equitable-building-electrification-a-framework-for-powering-resilient-communities/>



Stretch Break



Image Source: Google Images

Natural Gas Infrastructure Data needs in the BUILD and TECH programs

Michael Colvin

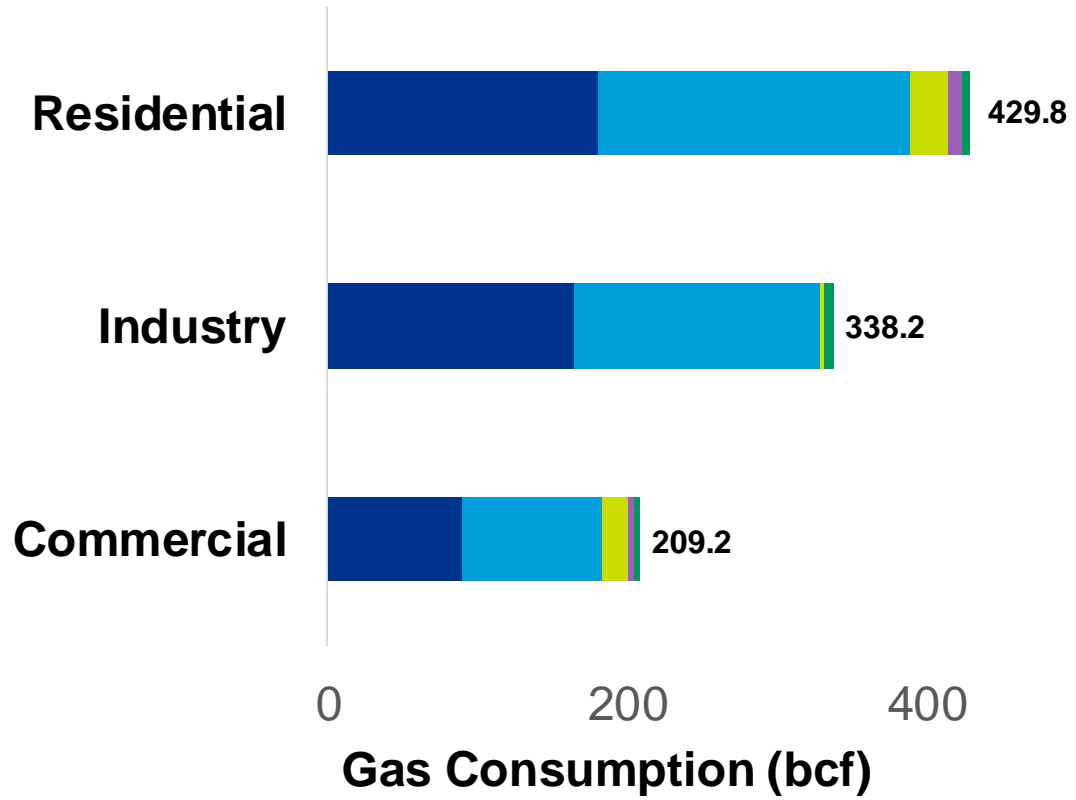
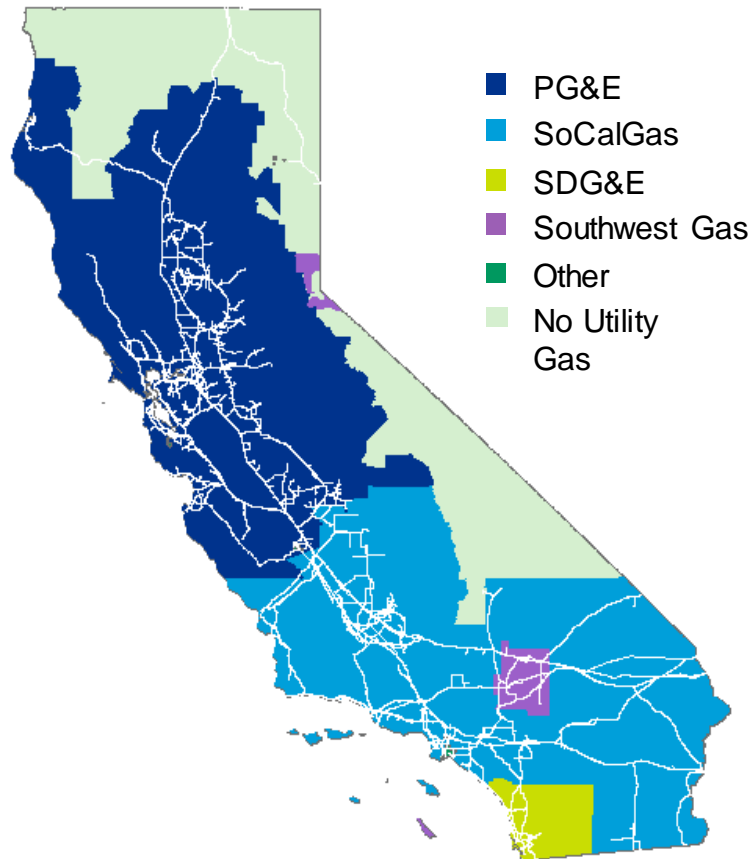
Director, Regulatory and Legislative Affairs

California Energy Program


June 17, 2020



CA Gas System



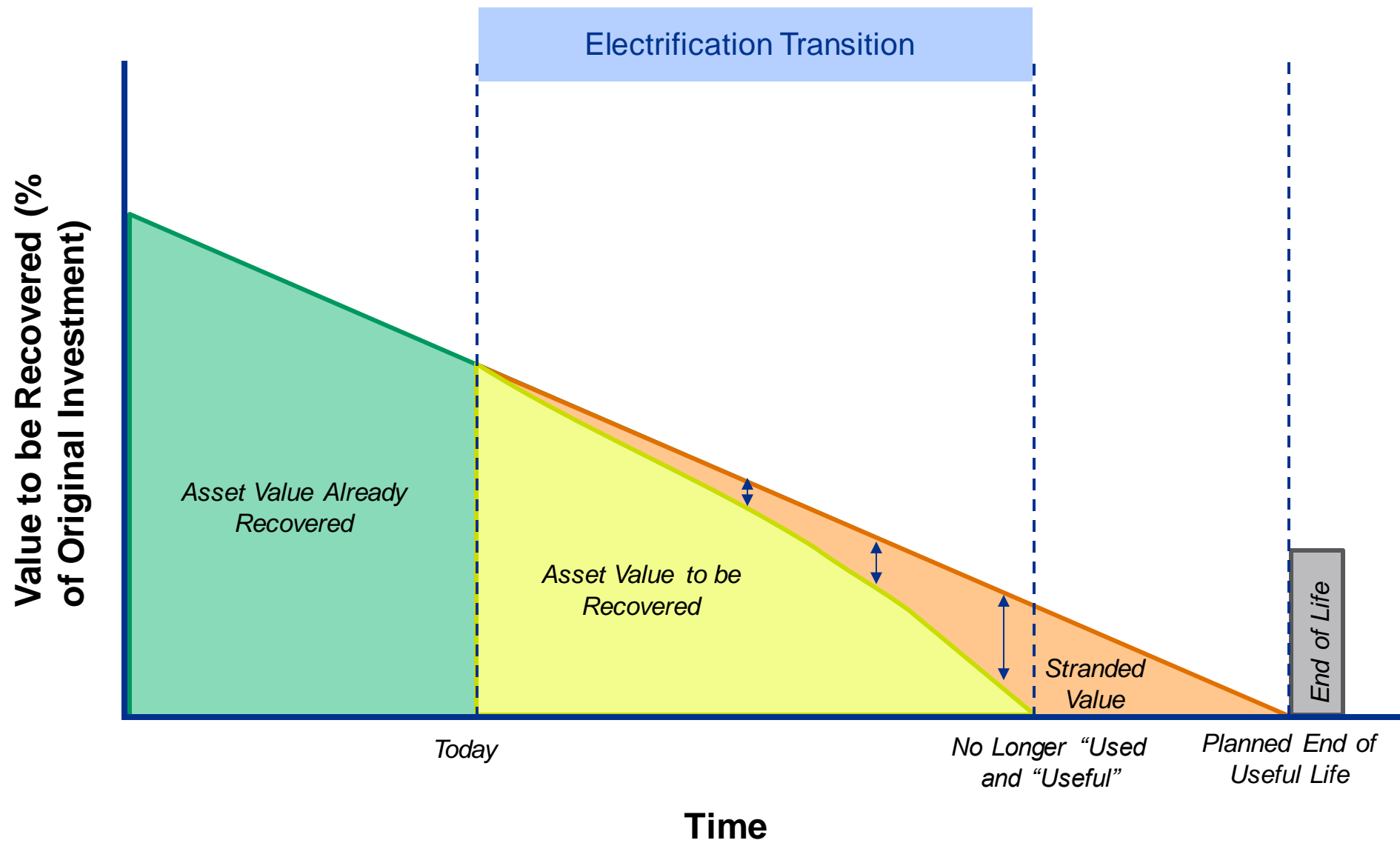
Data Rationale

- Gas Data is useful for *both* TECH (existing buildings) and BUILD (new construction)
 - We can use the information to help target and strategically offer programs
 - Gathering data should be informative to our policy objectives. If we are clear on the objectives, the data needs become easier when grounded on the goals
- 

Goals

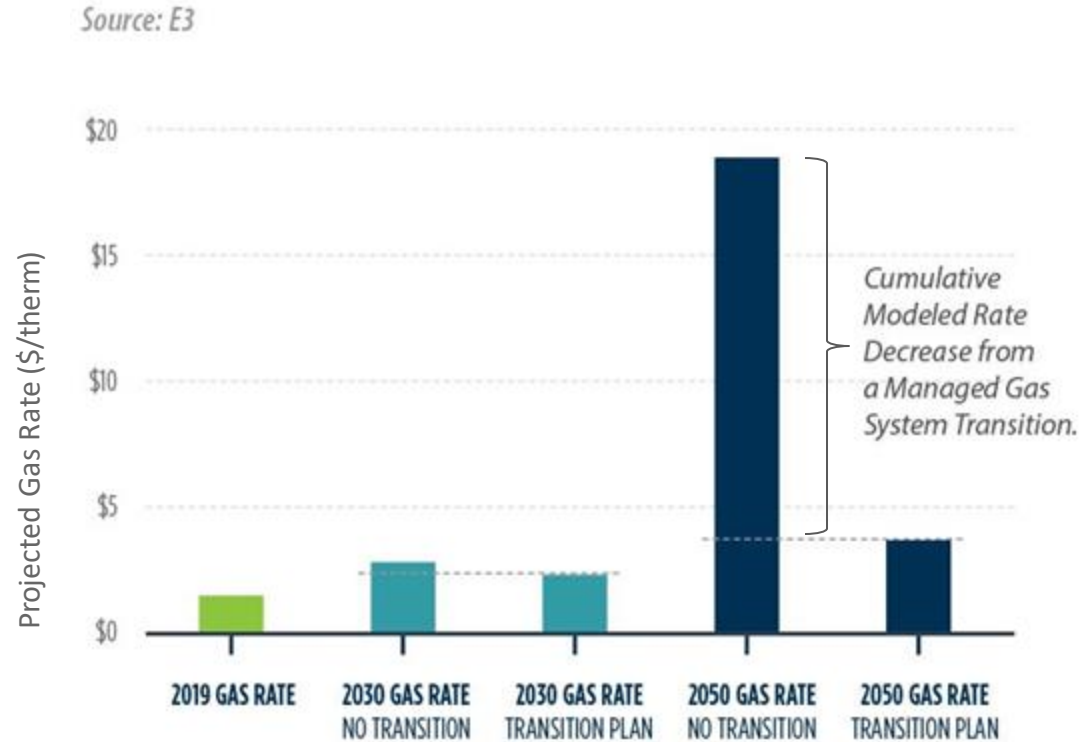
- Minimize customer cost
 - Strategic retirement of existing infrastructure
 - Displacement of new investments
 - Strong intergenerational and other equity considerations about cost
 - What is the remaining book value?
- Accelerate decarbonization of the pipe
 - Think about leak repair, configuration of compressor stations, etc.

Overview of Stranded Value



INITIATING A LONG-TERM GAS TRANSITION PLAN IS IMPERATIVE

Without a managed gas transition, projected gas rates in 2050 are 5x more than they could be with a managed transition plan



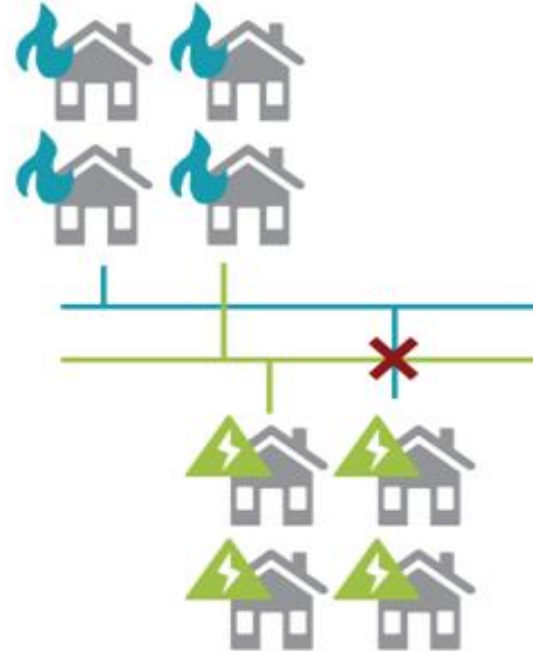
Targeting TECH Deployment

Source: E3

UNTARGETED ELECTRIFICATION
(No retirements)



TARGETED ELECTRIFICATION
(Targeted retirements)




Mixed fuel house
(Natural gas and electric)



All electric house

New Investments

- Why are there new pipeline investments?
 - Can we target pressure changes?
 - Can we defer new connections?
 - How do we start thinking about “non pipeline alternatives?”
- 

Thoughts on Maps

- Mapping is a data visualization tool
- NO false precision - do not need any information that will infringe on customer privacy
- Where are there major leaks
- Where will there be major demand regardless of residential buildings
- What if scenarios – what if an entire jurisdiction acted locally – impact on the rest of the system



Michael Colvin

mcolvin@edf.org **(415) 293-6122**



Assessing Data Needs for Building Decarbonization

Lunch Break

Please return at 1:00 PM PST

Gas System Expansion and Retirement: *What Role for Data?*

Building Decarbonization OIR Data Workshop
June 17, 2020





Presentation Overview

Agenda

Expanding the gas system: *why and how is service extended to new locations?*

Retiring existing gas facilities: *what role can data play in targeted electrification?*

**Objectives
and
Example
Activities**

Enhance understanding of customer perspectives

- Robust study on customer perceptions of gas and electricity
- San Joaquin Valley Disadvantaged Communities Pilots

Support all-electric new construction

- Technical advice and public letters of support to cities developing Reach Codes
- Request to incorporate avoided gas install in cost-effectiveness calculation for Energy Efficiency new construction programs

Promote all-electric rebuild

- Provide incentives for efficient, all-electric rebuilds through Advanced Energy Rebuild (AER) program
- Explore potential to avoid gas infrastructure install in target locations with Zonal Electrification Pilot

Pursue electrification as alternative to planned gas spend

- Incorporate electrification into gas planning and operation
- Offer to convert customers to all-electric when possible

Explore potential for electrification to reduce future spend

- Internal assessment of available data to streamline engineering review of potential alternatives

Key Takeaways: Expanding the Gas System

1

PG&E only extends new gas service in response to a requesting customer. PG&E may not refuse to extend service if the request meets CPUC-governed requirements.

2

PG&E becomes aware of requests for new gas service once the customer submits an application to Service Planning. Usually, this occurs when a property owner has completed plans and received construction permits.

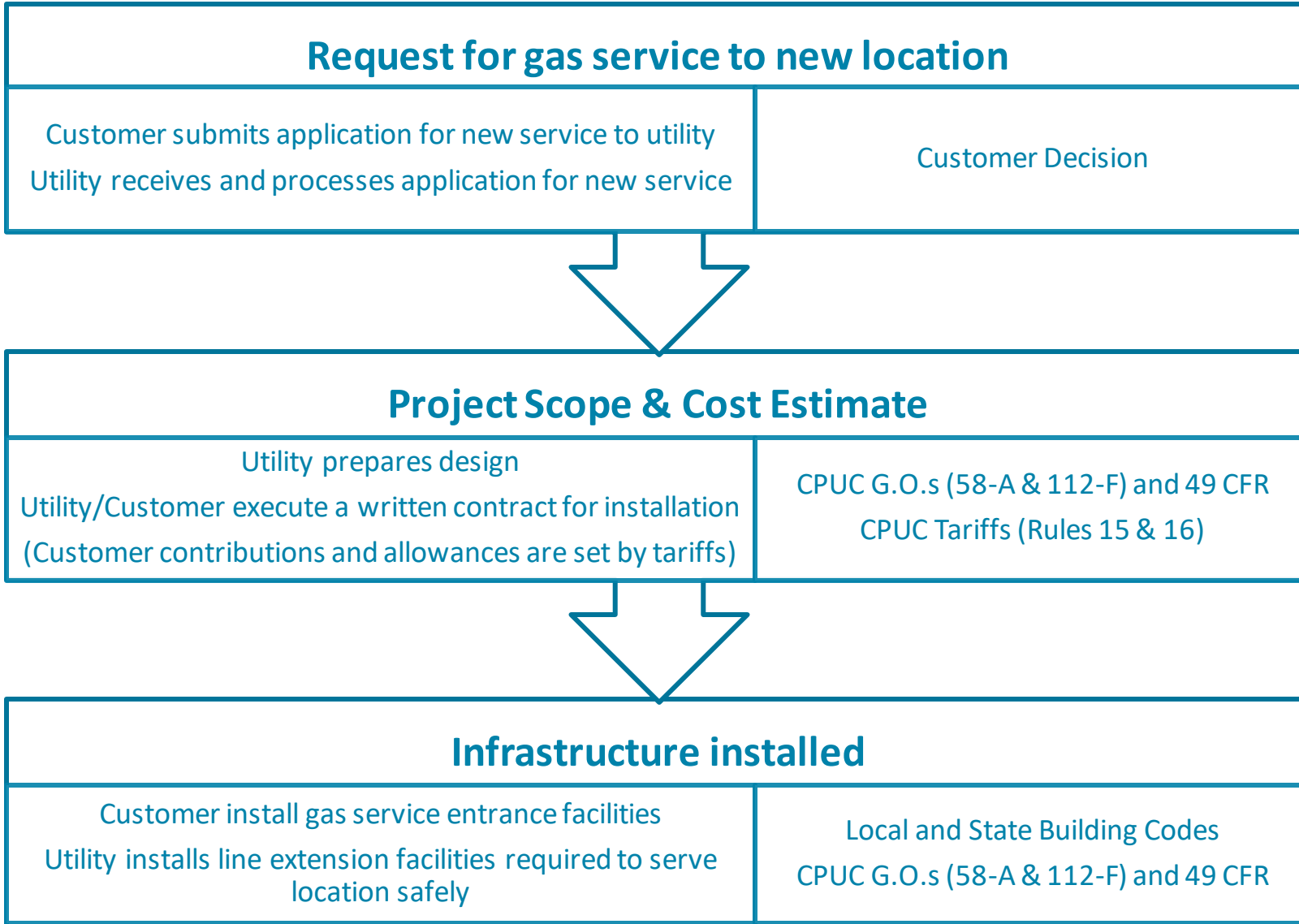
New Business Program

- New Business budget forecasts are based on projected new meter sets
- Meter set projections are based on an economic model that uses building permit and employment indicators
- Forecasts are made at the system level, not regionally or location-specific

New Business Projects

- Distribution and Service line extensions are only installed at customer requests
- Distribution line extensions are not built in the absence of customer projects

Establishing New Gas Services



Gas is only installed in response to customer requests.

Gas service is established if a customer complies with Utility tariffs and rules, which are authorized by the CPUC.

Gas Rule 15 – Gas Main Extensions

- Describes the requirements for extending Distribution Mains to supply three or more Permanent Services with gas loads
- Describes Applicant and Utility responsibilities
- Describes Contributions or Advances required by an applicant to receive utility service
- Sets the methodology for calculating allowances from bona-fide loads
 - Allowances and discounts set forth by the Commission and are recovered from ratepayers
 - CPUC authorization is needed for any substantial changes

Gas Rule 16 – Gas Service Extensions

- Describes the requirements to install service facilities that extend from the Distribution Main to the Service Delivery Point, and the service related equipment required of the customer
- Describes Applicant and Utility responsibilities
- Identifies facilities that are subject to allowances

Terminating Gas Service

- Once new service has been established, PG&E is required to continue serving the property, even if load decreases.
- Distribution Line Extension contracts have a term of 10 years, which commences on the date the PG&E facilities are installed and first ready to supply service.
- If a customer requests for gas service facilities to be removed, there are costs and crew time associated with stopping service.
 - PG&E removes service facilities at no charge to the customer if the 10-year contract term has expired.
 - PG&E will collect estimated costs to remove gas facilities if requested by the customer prior to the termination of the 10-year agreement.

Distribution and Service Extensions are permanent in nature, as recognized by Rules 15 & 16.

The Utility must continue maintaining infrastructure to ensure safe and reliable service, unless and until a property owner indicates in writing that they are requesting to terminate gas service.

Key Takeaways: Electrification and existing gas system

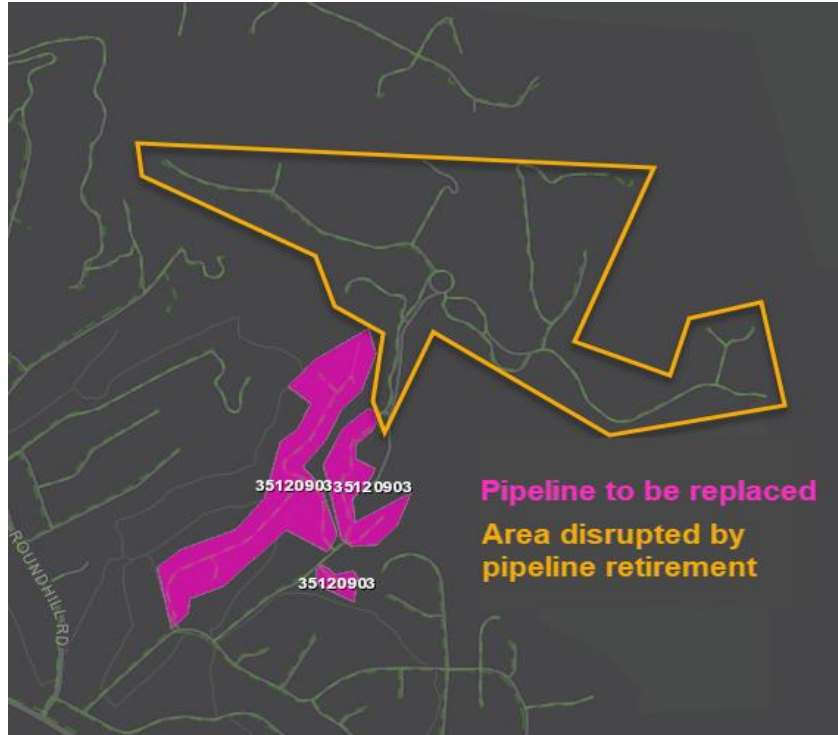
3

PG&E data and maps help planning engineers scope options to achieve necessary outcomes. Few electrification opportunities can be identified or evaluated without planning expertise and some manual analysis.

4

In the process of pursuing electrification alternatives to planned gas projects on dozens of occasions, PG&E has learned that the most significant barriers to success are customer consensus, cost, and availability of funds.

Future Aldyl-A replacement identified.



Some data layers suggest future gas spend, for example:

- Aldyl-A pipeline
- High Pressure Regulators
- Rate case commitment programs
- Integrity-driven work

Engineering review reveals broader impact to customers.

On their own, data layers provide an incomplete picture of electrification opportunity.

Detailed engineering review is required to determine, for example:

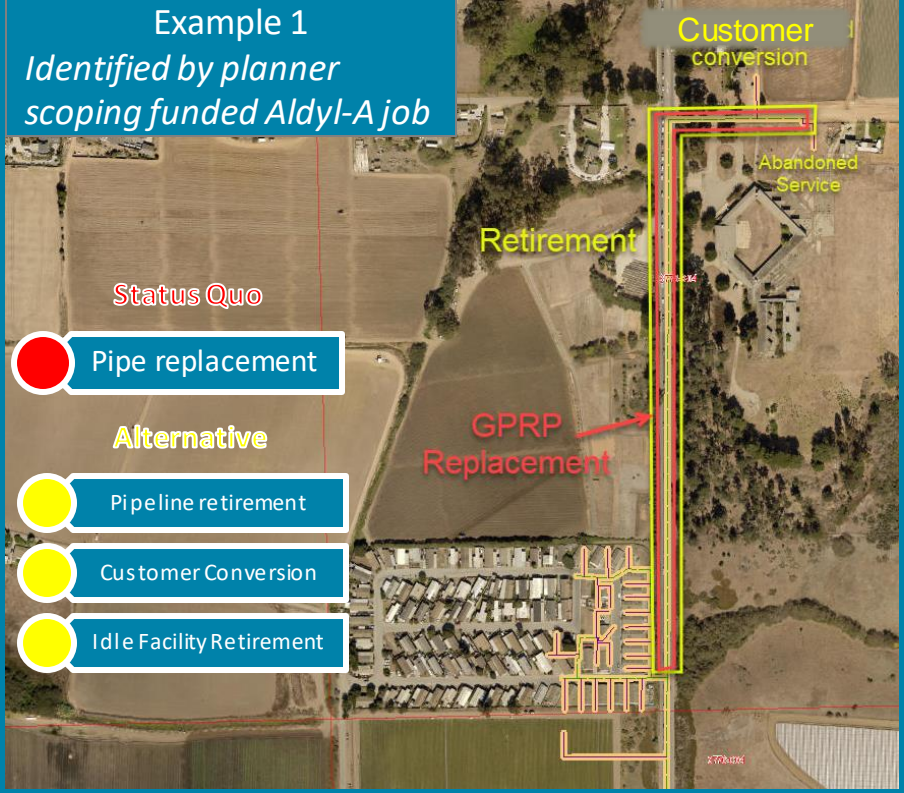
- Which facilities (and buildings) involved in mitigating identified risk
- Hydraulic feasibility of electrification alternative
- Cost of available options
- Changes to site conditions of non-utility assets
- Potential to alter configuration to reduce number of customers impacted by retirement

Example- Electrification to avoid pipeline replacement

Electrification conversion costs are driven by customer density and pipeline retirement costs, which are dependent on unique geographic considerations and require a fair amount of engineering design to assess.

Example 1

Status Quo	Costs
Pipeline Replacement	\$1.2M
TOTAL	\$1.2M
Alternative	Costs
Pipeline Retirement	\$20K
Customer Conversion	\$130K
(2) Idle Service Retirement	\$6K
TOTAL	\$156K



Example 2 Identified by searching map for Aldyl-A



Example 2

Status Quo (North Side)	Costs	Electrification (North Side)	Costs
Replacement	\$412K	Service Deactivation (17)	\$46k
		Customer Conversion (17)	\$595k
		Retirement	\$7K
TOTAL	\$412k	TOTAL	\$648K

Key barriers: electrification as alternative to gas spend

Most significant barriers:

100% of property owners in target zone must agree to terminate gas service

Consensus



Cost of electrification (e.g., conversion, pipeline decommissioning) must be equal to or lower than the cost of the gas project

Cost



Most rate case funding is not flexible; electrification must be covered by available expense dollars.

Funding



In PG&E's experience, the primary obstacles to replacing gas system spend with targeted electrification occur *after* a target location has been identified.

Data has limited role in successful implementation.

Key Takeaways

1

PG&E only extends new gas service in response to property owner request. PG&E may not refuse to extend service if the request meets CPUC-governed requirements.

2

PG&E becomes aware of requests for new gas service once the property owner submits an application to Service Planning. Usually, this occurs when a property owner has completed plans and received permits.

3

PG&E data and maps help planning engineers scope options to achieve necessary outcomes. Few electrification opportunities can be identified or evaluated without planning expertise and some manual analysis.

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In the process of pursuing electrification alternatives to planned gas projects on dozens of occasions, PG&E has learned that the most significant barriers to success are customer consensus, cost, and availability of funds.

Thank you!





SOUTHWEST GAS

Decarbonization Vision and Pilots Data

June 17, 2020

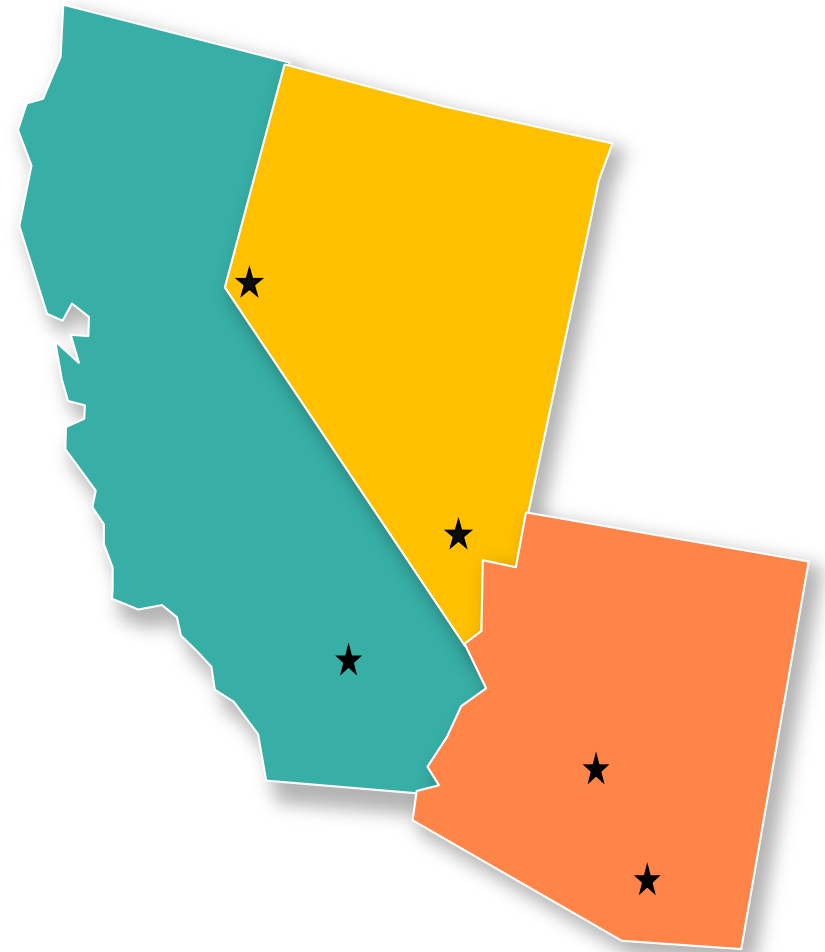
James Stein, Energy Solutions Manager



SOUTHWEST GAS

NATURAL GAS OPERATIONS

- **2 Million total** customers across Arizona, California, and Nevada
- Serving **200,000 California** customers in portions of San Bernardino, Placer, El Dorado, and Nevada counties
- **5 Operating Divisions** across the 3 states



SUSTAINABLE BUSINESS PRACTICES

By 2025
20%
REDUCTION IN
GHG
EMISSIONS

From fleet and facilities

- ✓ LED lighting
- ✓ Energy efficient windows and coverings
- ✓ Computerized HVAC
- ✓ Solar canopies
- ✓ Energy Star® rated bill management system
- ✓ Replace percentage of fleet annually
- ✓ Add CNG and alternative fuel vehicles
- ✓ CNG fueling stations



SOUTHWEST GAS' DECARBONIZATION VISION

- **Renewable Natural Gas (RNG)** - 1% of its forecasted retail sales portfolio from RNG by 2025, 2% by 2030, and 3% by 2035.
- **Compressed Natural Gas (CNG) & Hydrogen** – Utilization of CNG to displace diesel fuel and hydrogen blending into pipelines to reduce GHG emissions.
- **Energy Efficiency & Renewable Energy Rebates** – Energy efficiency & renewable energy rebates decrease natural gas usage and GHG emissions.



RENEWABLE NATURAL GAS (RNG)

California Pathways to RNG

90%

of Southwest Gas customers see RNG as environmentally friendly.

RNG's Potential

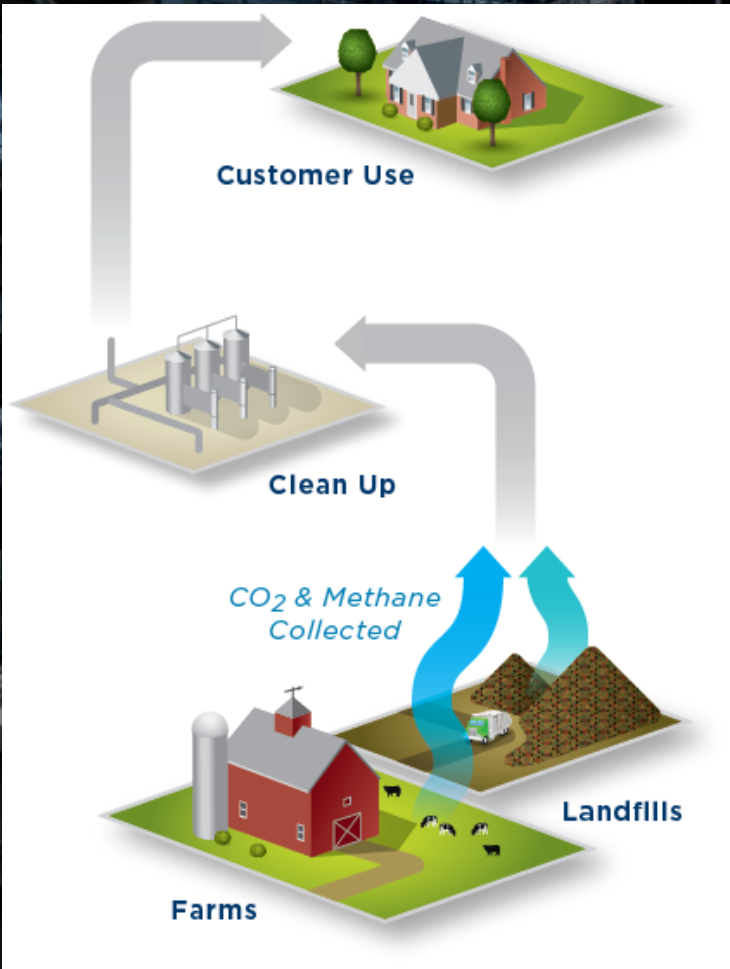
“Adding 25% RNG into the existing natural gas system and delivering it to heat homes directly (versus using it to generate electricity), the region can achieve its climate goals without a substantial build out of new power plants.”

- Northwest Natural & Energy and Environmental Economics (E3: Natural Gas Is Key to Reaching Northwest Emission Reduction Goals)

- Rule 22 – Rules for an RNG producer to interconnect with natural gas distribution systems
- Joint Utility Interconnection Tariff Rule
- Joint Utility Renewable Gas Interconnection & Operating Agreement (RGIOA)

“The research indicates that RNG delivered to residential and commercial buildings could reach similar GHG emissions reduction targets in 2030 as appliance electrification.”

- SoCalGas: Analysis of the role of Gas for a Low-Carbon California Future by Navigant



COMPRESSED NATURAL GAS (CNG)



CNG helped reduce greenhouse gas emissions by **displacing 23 million gallons of diesel fuel** from customer fleets in 2019. That's equivalent to **14,500 cars off the road.**

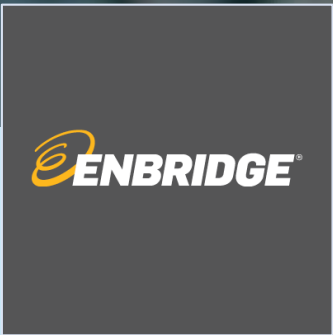
One vehicle represents the reduction of GHG emissions equivalent to 500 passenger vehicles.



BEYOND RNG - HYDROGEN

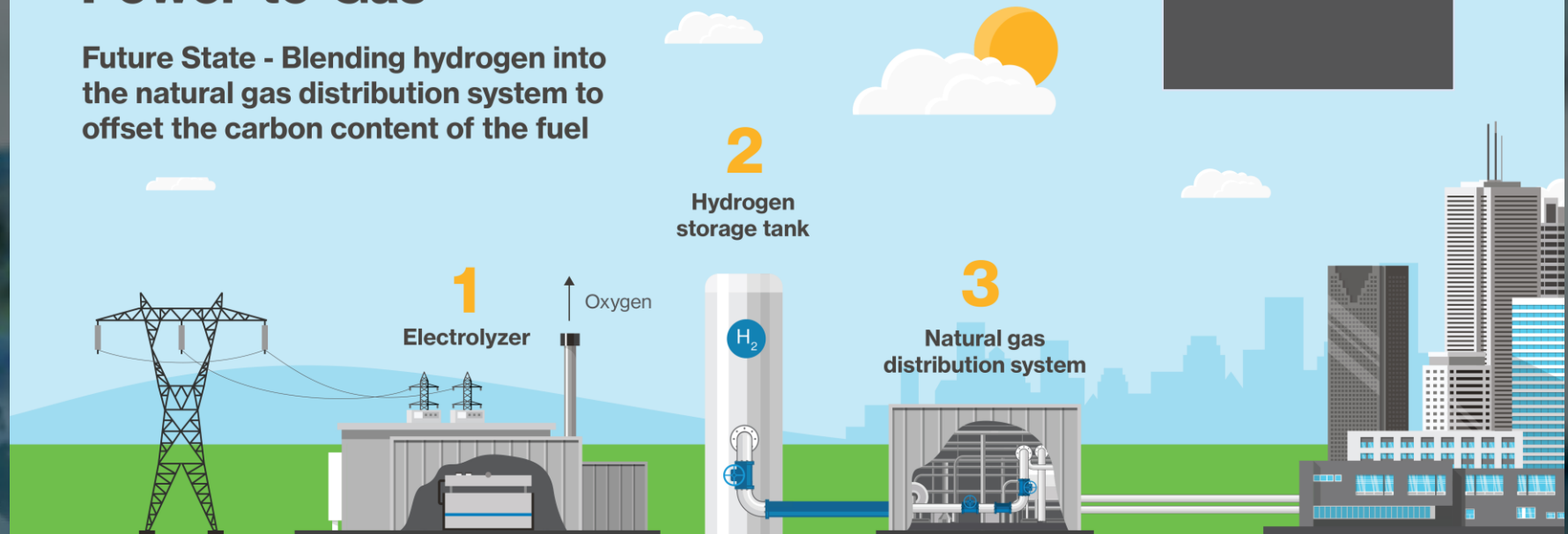
Hydrogen is a great partner for wind, photovoltaics and Bloom's hydrogen fuel cell.

Renewable hydrogen is pathway for preserving existing gas infrastructure while also reducing GHG emissions



Power-to-Gas

Future State - Blending hydrogen into the natural gas distribution system to offset the carbon content of the fuel



- 1** Since electricity can't be stored, when there is a surplus, the electrolyzer takes electricity and uses it to split water into hydrogen and oxygen, while balancing the power grid at the same time.
- 2** The hydrogen that is produced is then stored.
- 3** Instead of converting the hydrogen back into electricity, the hydrogen may be blended into the natural gas distribution system at a pre-determined percentage, to reduce the carbon content of the gas.
- 4** A lower carbon gas is delivered to customers.

EFFICIENCY DRIVES SAVINGS & EMISSIONS REDUCTIONS



Increasing the energy efficiency of homes and businesses reduces demand for natural resources thereby lowering bills and decreasing emissions.

Rebates	Conservation and Energy Efficiency Plan	Proposed Conservation and Energy Efficiency Plan (TY 2021 GRC)
Homeowners	Nat. Gas Tankless Water Heater Nat. Gas Furnace Low Flow Showerhead	Nat. Gas Tankless Water Heater Nat. Gas Furnace Nat. Gas Fireplace Smart Thermostat Solar Water Heating Residential Equipment Direct-Install
Businesses	Conveyor Oven Combination Oven Convection Oven Nat. Gas Furnace Fryer Griddle Nat. Gas Tankless Water Heater Low Flow Showerhead Boiler Equipment	Conveyor Oven Combination Oven Convection Oven Nat. Gas Furnace (Condensing) Fryer Griddle Nat. Gas Water Heater (tankless & storage) Low Flow Showerhead Boiler Equipment Energy Audit Faucet Pre-Rinse Spray Valve Broiler Equipment Solar Water Heating
Builder		New Homes Rebates Solar Water Heating



DATA AND PLANNING FOR THE BUILD AND TECH PROGRAMS

- **Planning** – Builders and developers lead the way in planning for natural gas inclusion in homes.
- **Natural Gas Inclusion** – Once determined home will include natural gas, Southwest Gas assists customers through engineering and installation steps.
- **Customer Experience** – Strong focus on customer experience during natural gas expansion and promoting energy efficiency.



NATURAL GAS EXPANSION

Key Players

- HVAC and Plumbing Contractors
 - They install the internal piping in the buildings that SWG will energize thru the gas meter
- Municipalities and Permitting Agencies
 - They approve SWG plans and design prior to installation
 - Approve street cut and traffic control plans
- Builders / Developers
 - They elect what type of gas will be installed to their project





Thank you!



SOUTHWEST GAS



SOUTHWEST GAS



Stretch Break

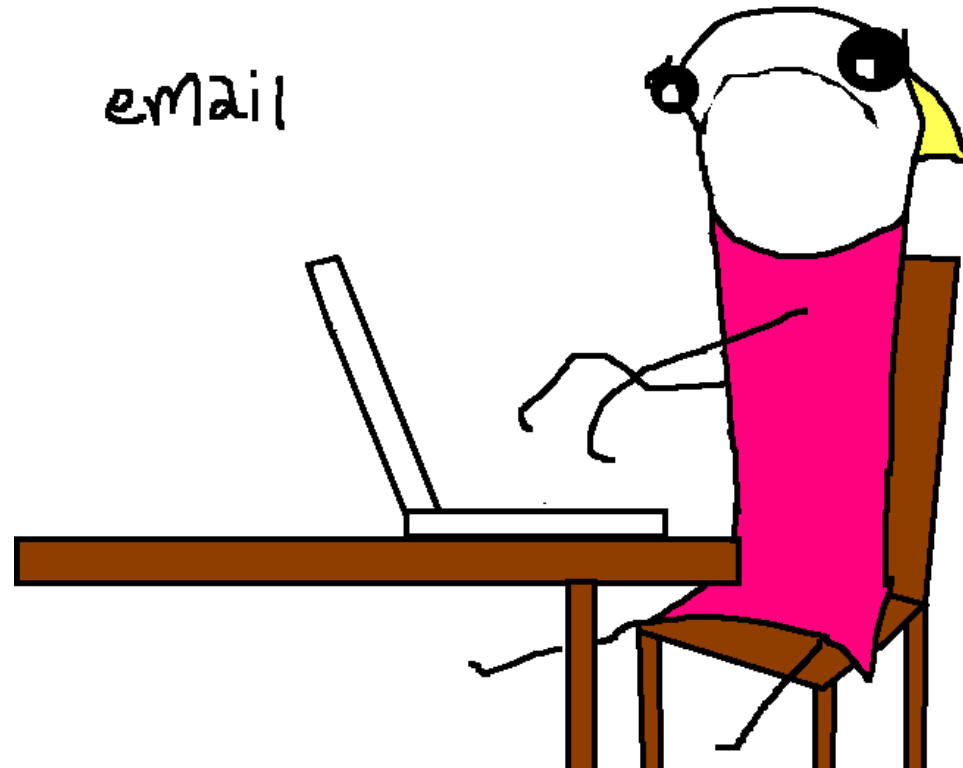


Image Source: <http://hyperboleandahalf.blogspot.com/2010/06/this-is-why-ill-never-be-adult.html>

SDG&E Building Decarbonization & Related Data

Doug White, Customer Programs Policy & Strategy Manager



CPUC data workshop presentation

June 17, 2020

SDG&E Overview

- SDG&E provides energy service to 3.6 million people through 1.4 million electric meters and ~870,000 natural gas meters.
- Its service territory spans 4,100 square miles.
- SDG&E is a dual fuel utility that supports customer choice and flexibility in how they power their lives.
- Approximately 45% of the electricity that powers our region's homes and businesses comes from renewable sources.
- SDG&E employs 4,000+ people as a subsidiary of parent company Sempra Energy.



SDG&E's Commitment to Sustainability

SDG&E's approach to sustainability means we're reducing our carbon footprint, fostering energy innovation and conservation, and encouraging our employees and the communities we serve to take daily action to ensure a sustainable energy future.



SDG&E's Examples of Sustainability Efforts



Clean Energy

Around 45 percent of the electricity that powers the region's homes and businesses comes from renewable sources, such as solar and wind.



Clean Transportation

Expanding EV charging in multifamily complexes and workplaces infrastructure and launching pilots to install charging stations at the Port of SD and SD International Airport.



A Clean Energy Option

Residential customers have the choice to be green by committing up to 100 percent of their energy use from renewable sources through the EcoChoice program.



SDG&E's GHG Reduction Efforts



Greenhouse Gas Emissions

Member of CA Climate Action Registry since 2003 with third party verification.

In 2017, reduced direct GHG emissions of approx. 1.6 million metric tons of CO₂e and 0.2 million of indirect GHG emissions.



Energy Efficiency

Over the last 10 years, SDG&E EE programs have resulted in a reduction of approximately 294,000 metric tons of CO₂, the equivalent of removing approximately 588,000 cars from the road.



Energy Efficiency Programs

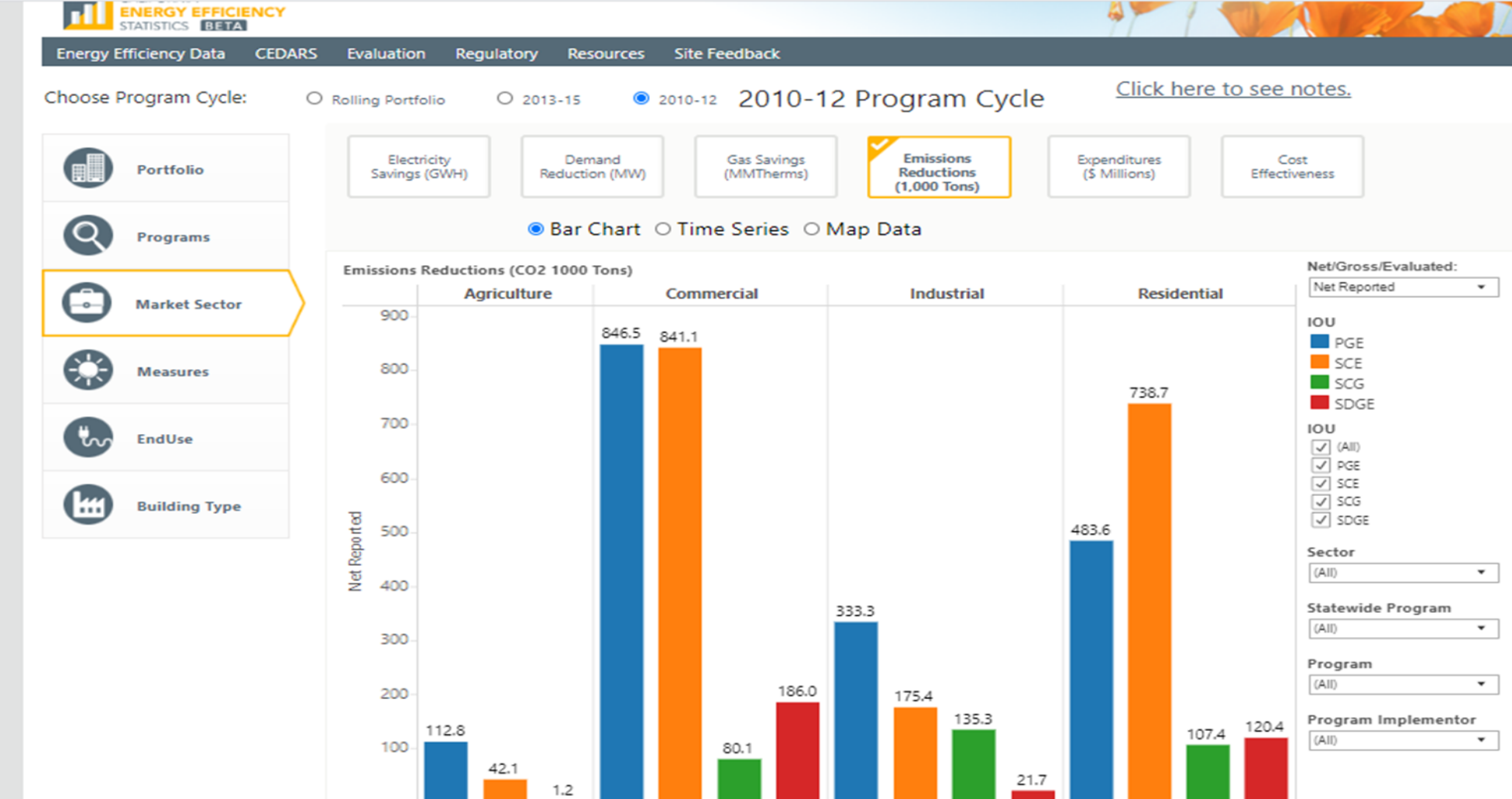
Data Availability

Data Availability


- Energy Efficiency Programs
 - Program data available from these programs are available through CPUC's CEDARS and EESTATS.
 - Statewide deployment of a database tool and website to be referred to as California's Analysis Tool for Locational Energy Assessment ("CATALENA") that will cross-link with other information systems to produce energy use profiles that support targeted, effective EE strategies and programs, performance over time, and reliable analysis and reporting.



EESTATS Data Availability



CEDARS Data Availability



Programs Monthly Reports Budget Filings Quarterly Claims **Data** Register Log

Please select the desired report type from these three options: **Summary** Record-level User-defined

The Summary Reports page provides Program-level reports by year combining data across the CEDARS Filing, Claim, and Monthly Report Modules.
Filtering allows users to select only the desired data needed for analysis.

Year Selector

- 2016 ⓘ
- 2017
- 2018
- 2019
- 2020

Data Sets

- Filings ⓘ
- Monthly Reports ⓘ
- Claims ⓘ

Sorting

1. No custom sorting applied (using default sorting).

[Modify](#)

Filtering

1. No filter applied.

[Modify](#)

Summary Data

[Data Dictionaries](#) ▾

No data selected. Please select at least one Year Selector and at least one Data Set.

Other Program Incremental Data Collection Efforts

- Emerging Technologies Program (ETP) pilots to study potential new EE measures. Examples of data and intelligence collected:
 - ZNE enabling technologies, Building energy profiles, Technical and market potential, Cost and savings estimates, customer feedback.
 - Information collected is customer-specific and limited due to the number of projects and technologies evaluated.
- Codes & Standards CASE (Codes and Standards Enhancement) studies and Reach Code Cost Effectiveness studies. Data collected:
 - Appliance and building data simulations in CEC's Title 24 energy modeling software.
 - These simulations include energy savings estimates, cost-effectiveness analyses, market assessments, economic analyses, material and water use impacts.



Other Program Incremental Data Collection Efforts (Cont'd)

- CEC's Electric Program Investment Charge (EPIC) in Partnership with EPRI Grant Projects
 - Group 1: Low carbon space conditioning (Applied Research)
 - Energy performance (COP) of the NH₃/CO₂ unit for cooling and heating applications as a function of operating conditions to establish baseline.
 - Heat transfer data for supercritical CO₂ in the heating condensing coils.
 - Loss of refrigerants data.
 - Maintenance needs in comparison to conventional refrigerant cycles and reliability of individual components.
 - Installation costs compared to conventional installations.
 - Data on where the exergy destruction to improvement to future versions of the machine.
 - Group 2A: Low carbon water heating (Applied Research)
 - Data on community scale water heating and overall electric and gas energy use for up to 5 multifamily communities.
 - Monitoring performance: gas usage of boiler, water usage at the central recirculation loop, temperature of water in recirculation loop storage tank, electricity usage of the HPWH, recirculation pump energy use, and OnDemand controls operations.



Data Collection Challenges

Other items for consideration regarding data collection:

- SDG&E's approach is from a customer-level perspective
- Expense of securing the data
- Level of detail of customer-level data could be proprietary
- Difficult to share unless aggregated
- Timeframe for data collection and monitoring to assess trend and performance information



Collaboration Opportunities

- Statewide Administration
 - Lead IOU for Plug Load & Appliance and HVAC
- Best practice sharing and coordination with eventual TECH Administrator



Comments or Questions

Thank you!

Doug White

Customer Programs Policy & Strategy Manager

San Diego Gas & Electric

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Vision on Decarbonization & Related Data

Deanna Haines, Director Environmental Policy

June 17, 2020



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Agenda

- SoCalGas' Decarbonization Vision
 - Deanna Haines, Director, Policy & Environmental Strategy
- Decarbonization Programs/Technologies & Lessons Learned
 - Darren Hanway, Energy Programs & Strategy Manager
- Gas System Data and Planning
 - Devin Zornizer, Director, Gas Engineering

Our Vision

To become the cleanest gas utility in North America, delivering affordable and increasingly renewable energy to our customers

Stepping up our commitment to **reduce emissions**

Our **Vision**

To become the
cleanest gas
utility in North
America

Our **Commitments**

2022 5% RNG being delivered
on our system.

2030 20% RNG being delivered
on our system.

Important technologies to include in the clean energy mix



Reduce waste

Prevent emissions from going into the air by using waste from our food, sewers and dairy farms to create **renewable natural gas (RNG)**.



Use existing infrastructure

Use **Power-to-Gas (P2G)** to convert excess solar and wind energy into renewable gases that can be stored in our existing pipeline system and solve long-term storage challenges. (e.g. NREL developed Electrochaea)



Capture and use carbon

Use **carbon capture utilization & sequestration (CCUS)** to capture carbon dioxide (CO₂) to create negative emission pathways from biomass waste conversion, (e.g. forest wastes to mitigate wildfires) and/or carbon products.

A dark blue silhouette of the state of California is positioned on the left side of the page, partially overlapping the main text area.

Dr. Moniz Energy Futures Initiative Report

Optionality, Flexibility & Innovation:
Pathways for Deep Decarbonization in California

| June 2019

California can
meet its 2030 and
2045 targets, but
it will require

a range of
clean energy
pathways across
all sectors

Innovation is necessary

There is no clear path to achieving goals the 2045 climate goals. Success will depend on **innovation including clean energy technologies that cut across sectors**



**Optionality
Flexibility
Innovation**

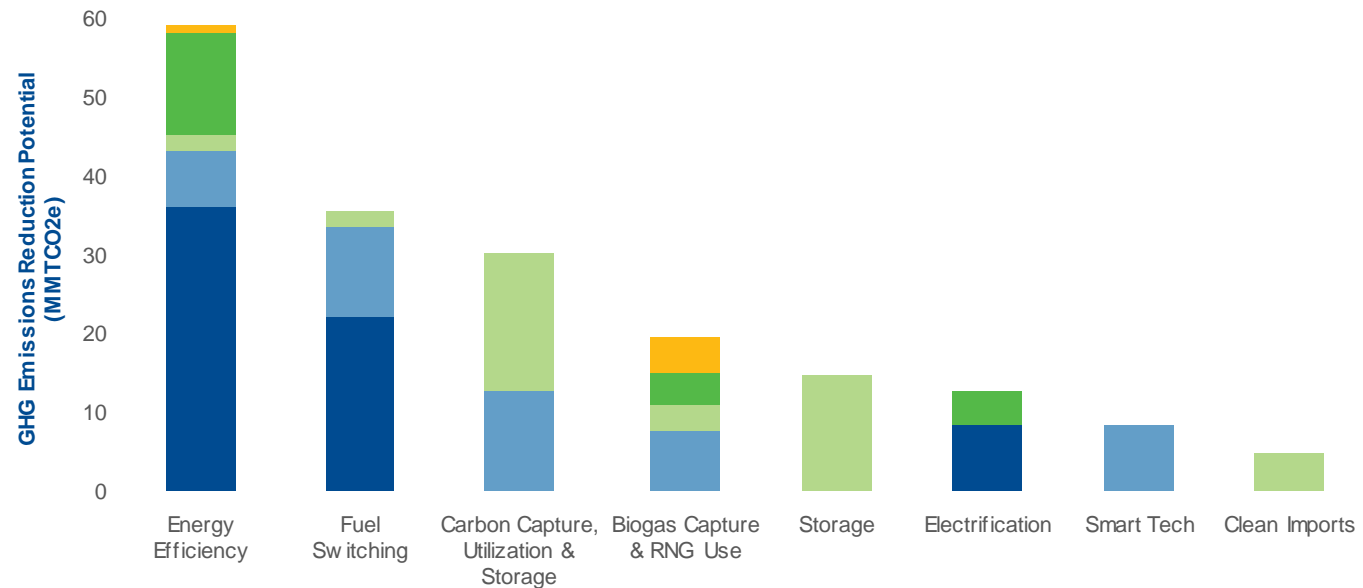
Meeting goals while managing costs requires focus and commitment to technology.

Avoid unintended consequences of actions in one sector on the others.

A broader approach to emissions reductions yields better, more cost effective results

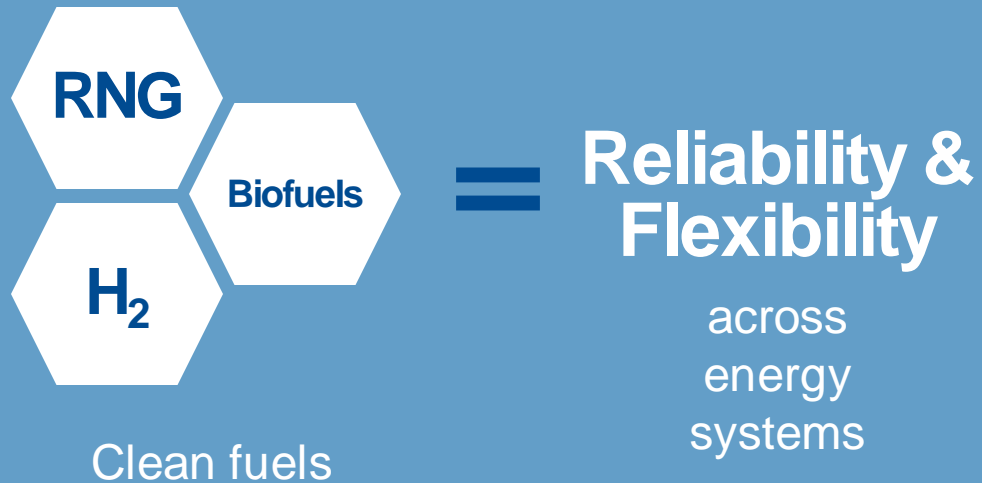
Emissions Reduction Potential for Meeting the 2030 Targets by Cross-Cutting Technologies

- Transportation
- Industry
- Electricity
- Buildings
- Agriculture



Source: Energy Futures Initiative

Clean fuels provide critical options



- » Durable, storable, and easily transportable fuels fundamental
- » **to meeting diverse social, economic and stakeholder needs across sectors.**

Seasonal storage technologies are critical

Power-to-Gas creates seasonal storage which is critical to reaching 2045 goals

Advances in energy storage are key to increasing the role of intermittent energy sources

1:00

BATTERIES
store energy for
HOURS



RENEWABLE METHANE from P2G
can be stored for
MONTHS

Source: Google Images

Existing infrastructure is an accelerator

Repurposing thousands of miles of highly engineered existing infrastructure

+

Technological expertise

+

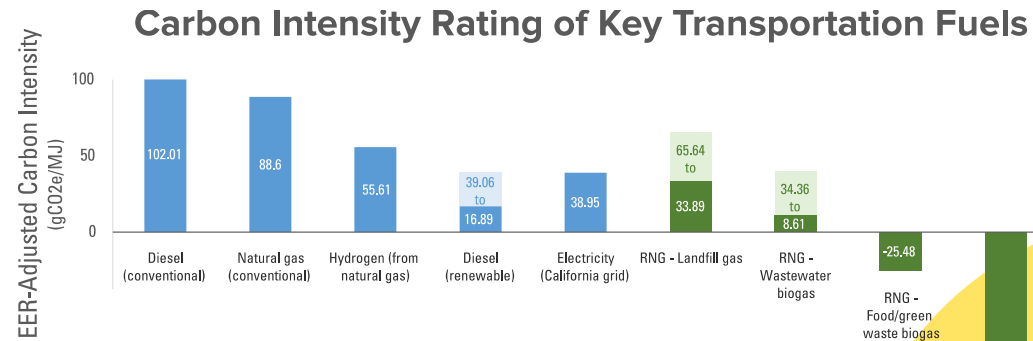
More than 100,000 people

=

Enables, accelerates and improves performance of the transition to a deeply decarbonized economy

Reaching 2045 will require carbon negative solutions

- » To become carbon neutral by 2045, California must find carbon negative solutions – solutions that take carbon out of the air.



Today, renewable natural gas is one of the only fuels that can be carbon negative.

Source: http://www.arb.ca.gov/fuels/lcfs/fuel_pathways/pathwaytable.htm, CARB, February 2017. Adjusted for Heavy-Duty Truck Applications

Lawrence Livermore National Labs:

- 1) Capture & Store Carbon through natural & working lands
- 2) Convert waste biomass to fuels & store CO₂
- 3) Implement Direct Air Capture & CO₂ storage

All of California can participate in gathering the biomass needed for negative emissions

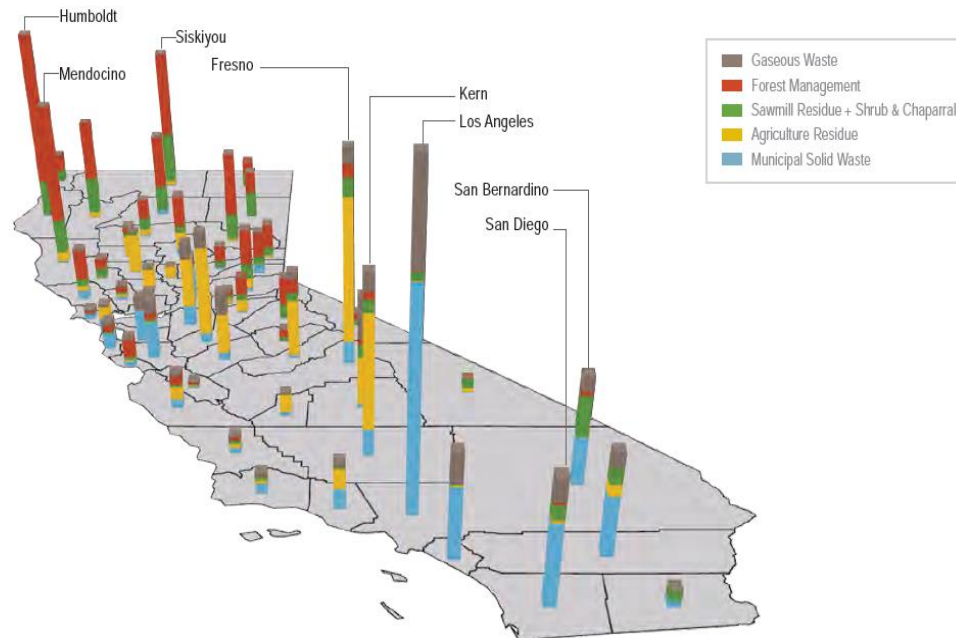


Figure ES-3. All of California can participate in collecting the biomass needed for negative emissions. Our study assumed contributions across counties and resource types. In sum, 56 million bone-dry tons of waste biomass will be available in 2045, at a typical carbon content of 50%. Gaseous waste comes from landfills and anaerobic digesters. Forest management refers to residue produced from forest management treatments like mechanical thinning for fire control. Sawmill residue refers to the residue produced at the sawmill facilities. Shrub & chaparral refers to mostly shrubby evergreen plants located in semi-arid desert region of California. Agriculture residue includes orchard & vineyard residues, field residues, row residues, row culls, almond hulls, almond shells, walnut shells, rice hulls and cotton gin trash. Municipal solid waste includes paper, cardboard, green waste and other organics.

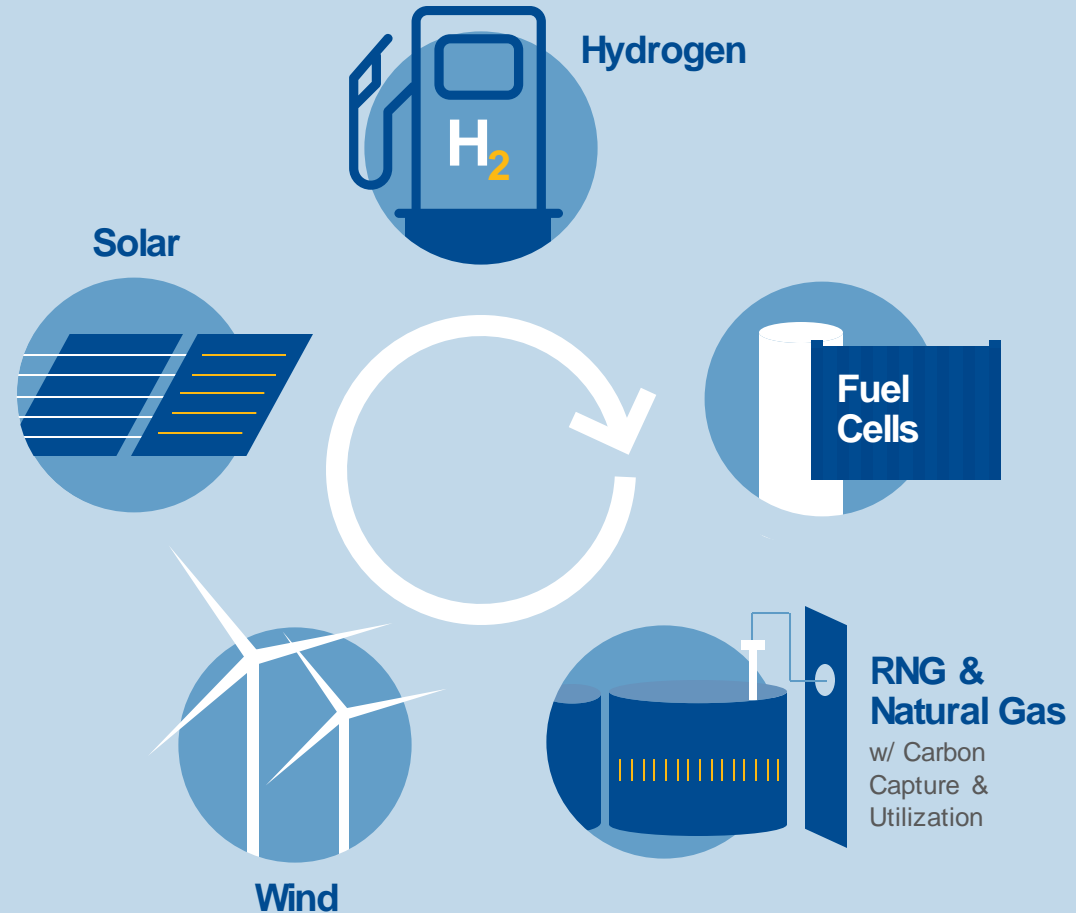
GETTING TO NEUTRAL

OPTIONS FOR NEGATIVE
CARBON EMISSIONS IN
CALIFORNIA

Our vision for what's possible

With an integrated approach

we can achieve our goals and preserve choice, while minimizing disruption and cost



Decarbonization Programs/Technologies & Lessons Learned

Darren Hanway, Energy Programs & Strategy Manager



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Building Decarbonization Technologies-Fuel Cells

Resilient Power Supply

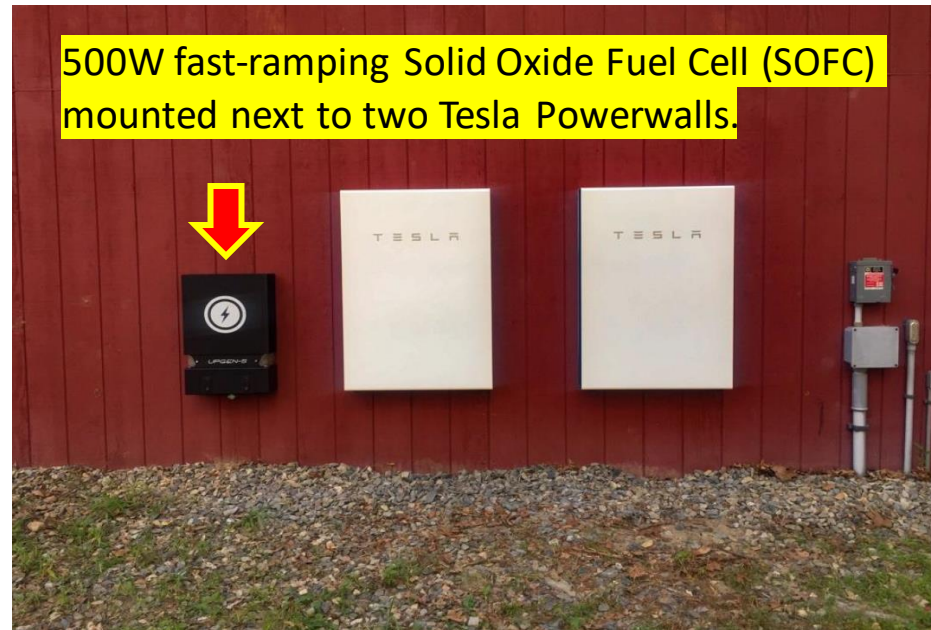
- Generates electricity during PSPS events/power outages
- Works in all weather conditions
- Not impacted by smoke filled skies

Lower CO₂ emissions than CA Grid when fueled with RNG or Hydrogen

- Lower emissions than back-up diesel/gasoline generators
- Similar emissions to current CA Grid when fueled w/Natural Gas

Can Optimize for carbon capture, utilization, and sequestration (CCUS) applications

Supports Microgrid/Distributed Generation that can avoid costly T&D Upgrades



Building Decarbonization Technologies- Gas Heat Pumps (CEC Partnership)

Key Benefits:

Plug-N-Play –can easily replace current gas equipment without extensive retrofits which supports **quick GHG reductions**

- **High energy efficiency** (less fuel use plus higher efficiency of gas grid)
- **Can avoid ozone depleting/high GWP refrigerants** (e.g. HFCs) creating further savings (see partnership w/CEC Restaurant Pilot link below)
- **Renewable Natural Gas will further reduce GHGs** on top of efficiency gains



Lessons Learned - Program Design

- » **SoCalGas helps customers better optimize their energy use:**
 - Energy Efficiency, Energy Savings Assistance, CARE, Self Generation Incentive Program, Solar Thermal, San Joaquin Valley Pilot, etc.
- » **Develop overarching guiding principles:**
 - Implement customer-centric solutions
 - **Cost-effective** program delivery
 - Advancement of efficient technologies
- » **Strategies for Success:**
 - **Aligned with customer expectations**
 - California is diverse, geographic, demographic, social, and economic considerations
 - **Intelligent outreach** using available market data
 - Data Used – SGIP availability maps, AMI data, RASS/CLASS, low-income information, EM&V studies.
 - **Community meetings**
 - **Preconceived disposition or affinity to gas or electric**
 - **Identify Partners to leverage**

Gas System Data and Planning

Devin Zornizer, Director, Gas Engineering



Gas System Planning & Data

» SoCalGas Pipeline System Maps

- SoCalGas designates pipeline engineering and operational data confidential per guidance provided by PHMSA and current laws established to protect critical energy infrastructure (CEII). Regulations and guidance established seek to protect critical infrastructure information from public disclosure for national security reasons.
- Sensitive critical energy infrastructure information, if made publicly available, could present a risk to the security of California's critical energy infrastructure.

Public Pipeline Mapping Information

NPMS NATIONAL PIPELINE MAPPING SYSTEM

Search

GOVERNMENT OFFICIAL **PIPELINE OPERATOR** **GENERAL PUBLIC** **FIRST-TIME VISITOR**

PIMMA USER LOGIN
PASSWORD PROTECTED VIEWER RESTRICTED TO GOVERNMENT OFFICIALS AND PIPELINE OPERATORS

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PHMSA Pipeline and Hazardous Materials Safety Administration
The National Pipeline Mapping System contains information about hazardous liquid and gas transmission pipelines under the jurisdiction of US DOT PHMSA

811 Know what's below. Call before you dig. U.S. Department of Transportation

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Natural Gas Pipeline Map

View our gas transmission and high pressure distribution pipeline interactive map.

SoCalGas is providing this map as a courtesy and for general information purposes only. SoCalGas does not represent that the information contained herein is accurate for any particular purpose, and therefore disclaims all warranties, expressed or implied, including the warranty of fitness for a particular purpose. Independent verification from experts should be obtained prior to any specific use. Recipient accepts full responsibility for any consequences associated with use of this information.

Pipelines may be located anywhere, including under streets and sidewalks, and on private property. This map shows the general locations of SoCalGas owned or operated Gas Transmission Pipelines and High Pressure (greater than 60 pounds per square inch) Gas Distribution Mains. Lower pressure distribution mains and smaller service lines connected to the gas meters at homes and businesses are not shown.

To locate Gas Transmission or Hazardous Liquid Pipelines operated by companies other than SoCalGas, please visit the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration website.

Report a Gas Leak
If you suspect a gas leak or pipe damage, evacuate the area and call us from a safe location.
1-800-427-2200

View the Map **SoCalGas**
Search for pipeline information by county.

Select County <http://www.socalgas.com>

- Fresno
- Imperial
- Kern
- Kings
- Los Angeles
- Orange
- Riverside
- San Bernardino
- San Luis Obispo
- Santa Barbara
- Tulare
- Ventura

National Pipeline Mapping System (NPMS)
<https://www.npms.phmsa.dot.gov/>

National Association of State Fire Marshal's

<http://www.pipelineemergencies.com/>

Pipeline Association for Public Awareness

<http://www.pipelineawareness.org/>

Gas System Planning & Data

» Line extension maps:

- This would be a lagging indicator - Our GIS system is updated to reflect changes to our pipeline system after construction is completed. However it doesn't reflect why a replacement or new pipe installation was performed.
- SoCalGas believes that local building permit offices would be a better source of more recently updated public data

» Housing units by zip code:

- SoCalGas does not track this information as requested, but do have meters by zip code that is already publicly available
- SoCalGas believes that obtaining permitting information directly from the Cities or through organizations such as SCAG (Southern California Association of Governments) might be a better source for housing unit building permits.

Data Considerations

- » Consider and assess system-wide, holistic impacts from building decarbonization
 - Gas infrastructure has important reliability and resiliency system impacts to consider
- » Evaluate broad building decarbonization options
 - e.g. energy efficiency, DERs, renewable gas, fuel switching
 - Climate zones, neighborhood age, etc. can influence optimal approach
- » Gather cost effectiveness data of decarbonization options
 - e.g. rate and bill impacts, appliance and infrastructure update potential and alternatives

Thank You

Any Questions?



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Stretch Break



Image Source: iamthinks.blogspot.com

SCE's Building Decarbonization Vision and Electric System Planning 101

Matthew Horwitz

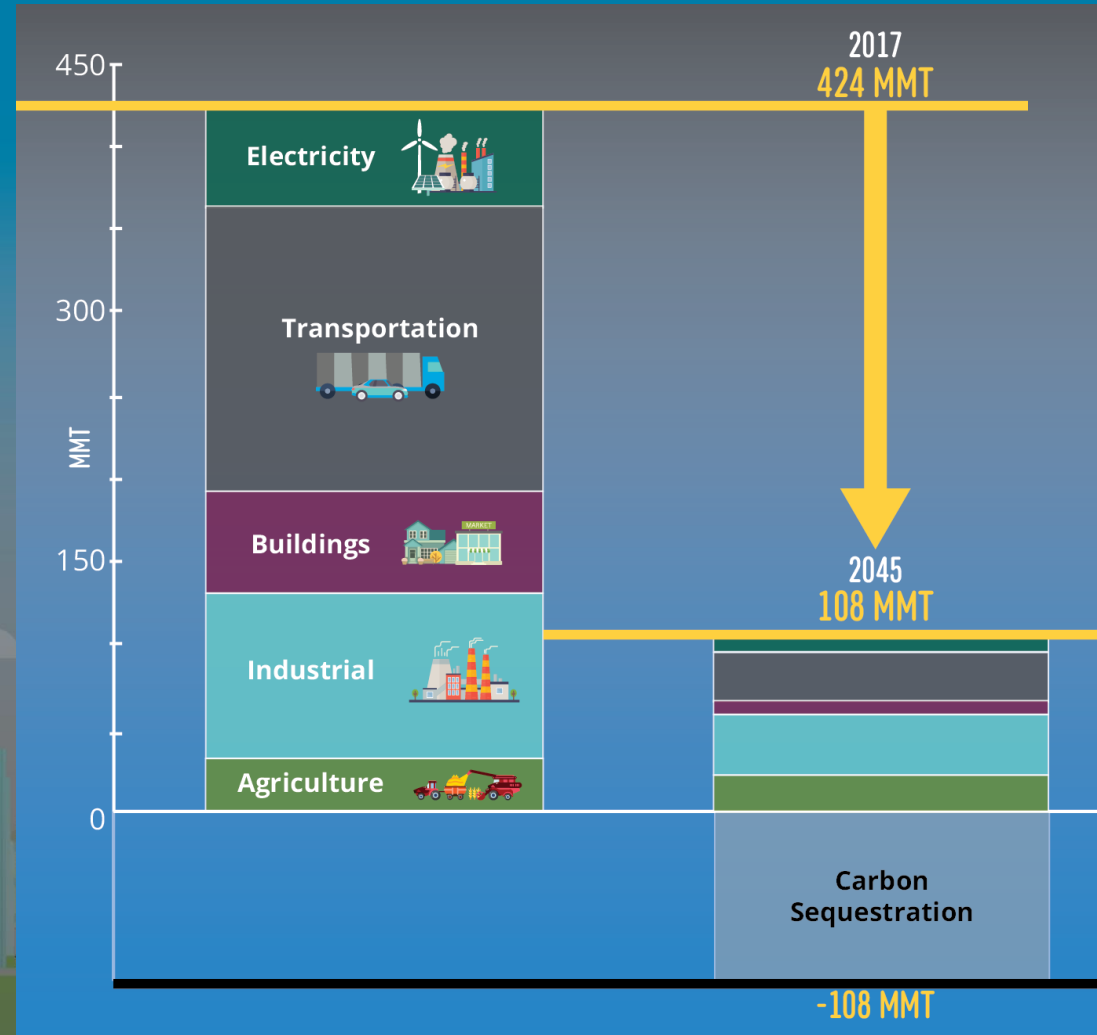
June 19, 2020



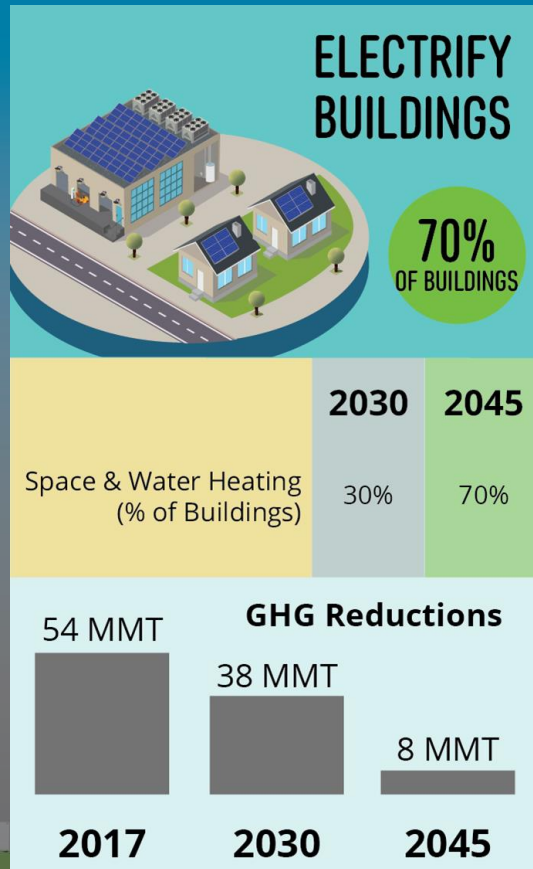
In Pathway 2045, economy-wide decarbonization is achieved through:

- Deep decarbonization of the **electric sector**
- Significant electrification of **transportation** and **buildings** coupled with advanced **energy efficiency**
- Use of **low-carbon fuels** for hard-to-electrify applications such as **industrial** and **heavy-duty transportation**.

The remaining carbon is sequestered, either biologically or physically, to reach carbon neutrality.



Building Electrification in Pathway 2045



- SCE’s view on most feasible and cost-effective path for California to reach carbon neutrality by 2045
 - Aligns with the CEC’s Deep Decarbonization study’s “High Electrification” scenario*
- CEC’s Deep Decarbonization study validated cost effectiveness of its High Electrification scenario, allocating limited biomethane supply to hard-to-electrify applications**
- Building Electrification will contribute to a better utilization (higher load factor) of the grid***
- Prioritized customer value to identify opportunities

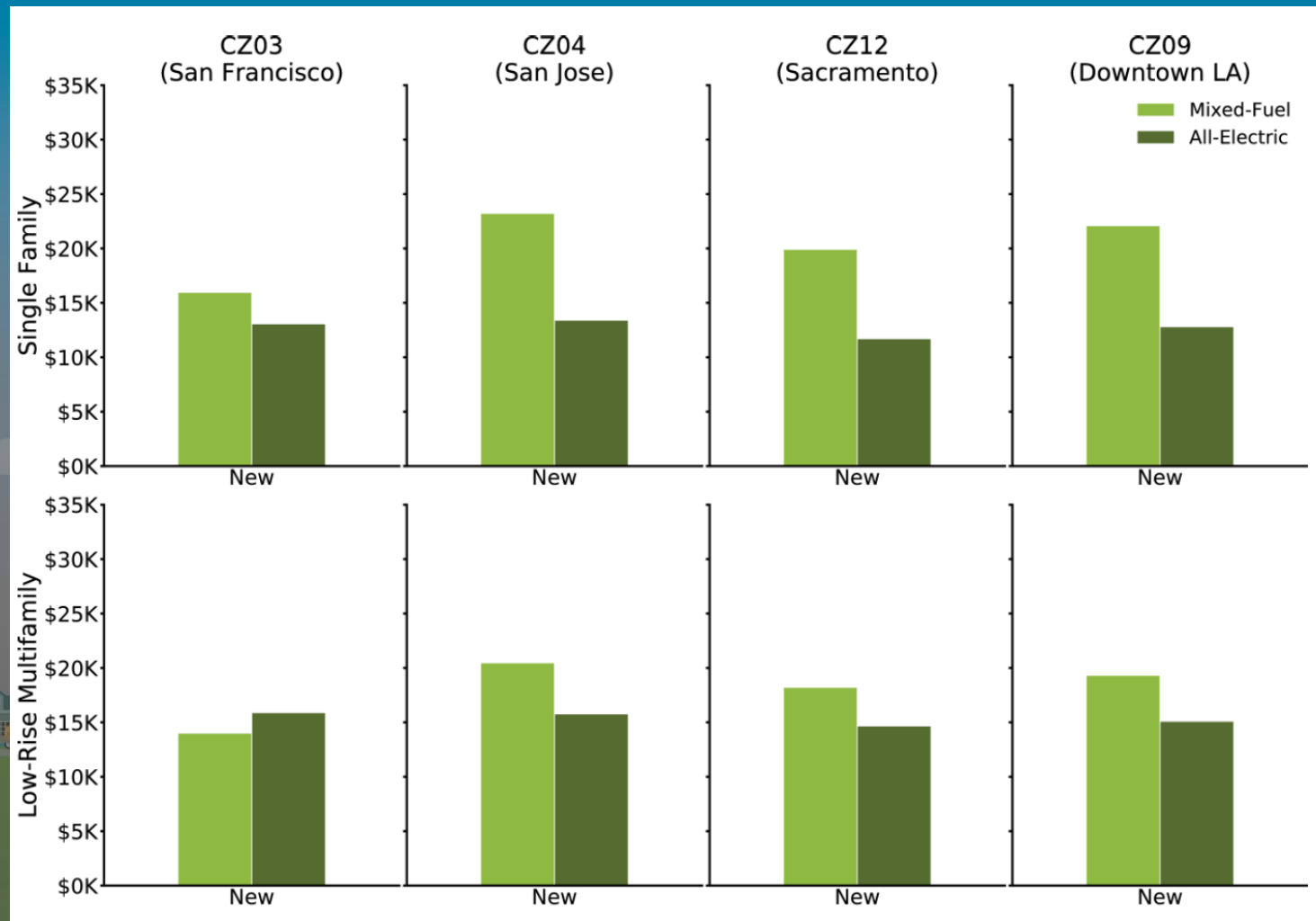
*Ma hone, Amber. Results from the California PATHWAYS Model. California Energy Commission. Publication Number: CEC-500-2018-012

** Ma hone, Amber. 2020. The Challenge of Retail Gas in California’s Low Carbon Future. AIA Course Number E00179

***Ma hone, Amber, Charles Li, Zack Subin, Michael Sontag, Gabe Mantegna, Alexis Karolides, Alea German, Peter Morris. 2019. Residential Building Electrification in California: Consumer Economies, Greenhouse Gases and Grid Impacts.

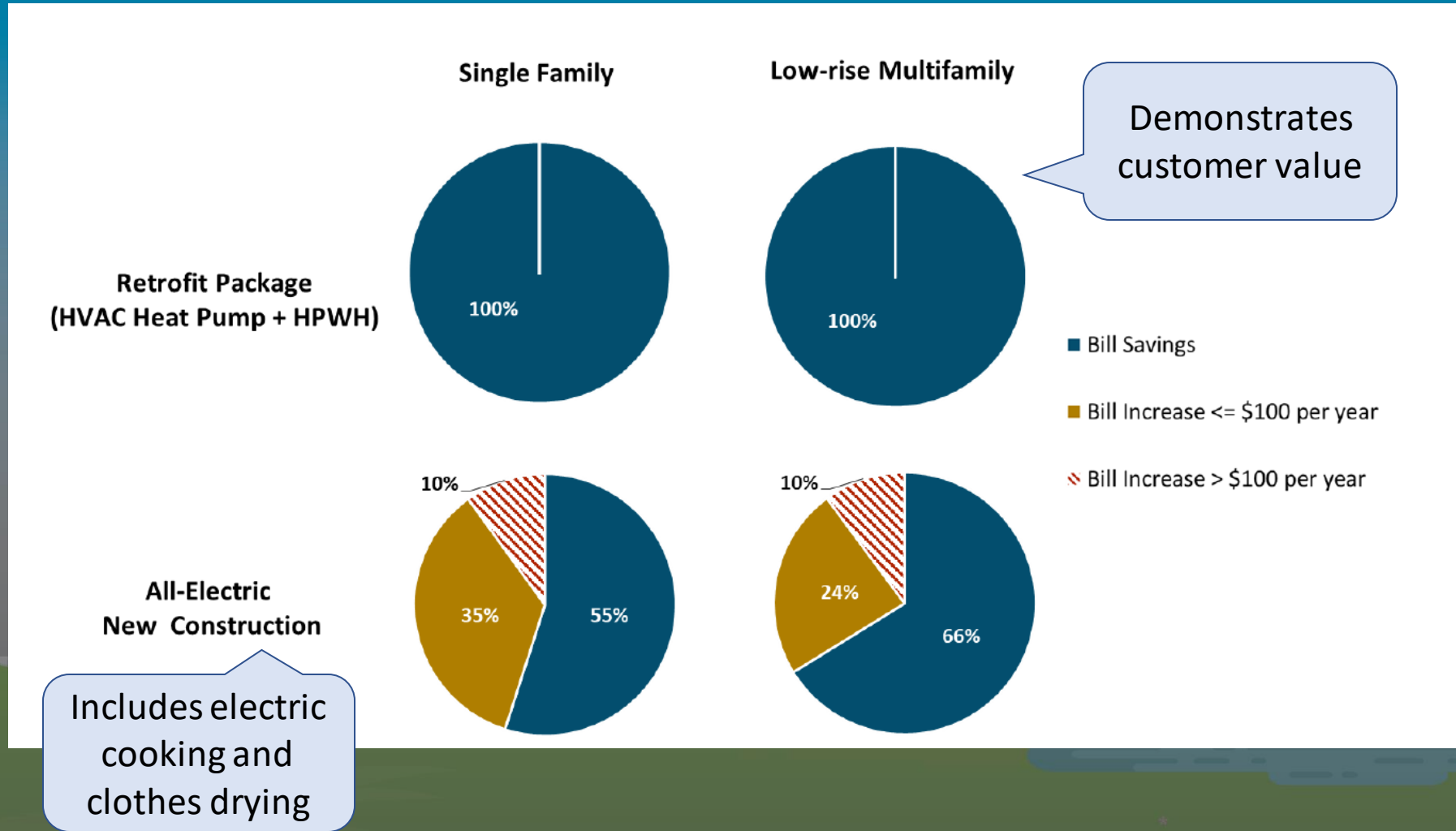
All-Electric Residential New Construction is generally cheaper than Mixed-Fuel

Capital costs per unit of all appliances (HVAC, water heater, stove, and clothes dryer) and infrastructure (including gas connection costs) for new construction

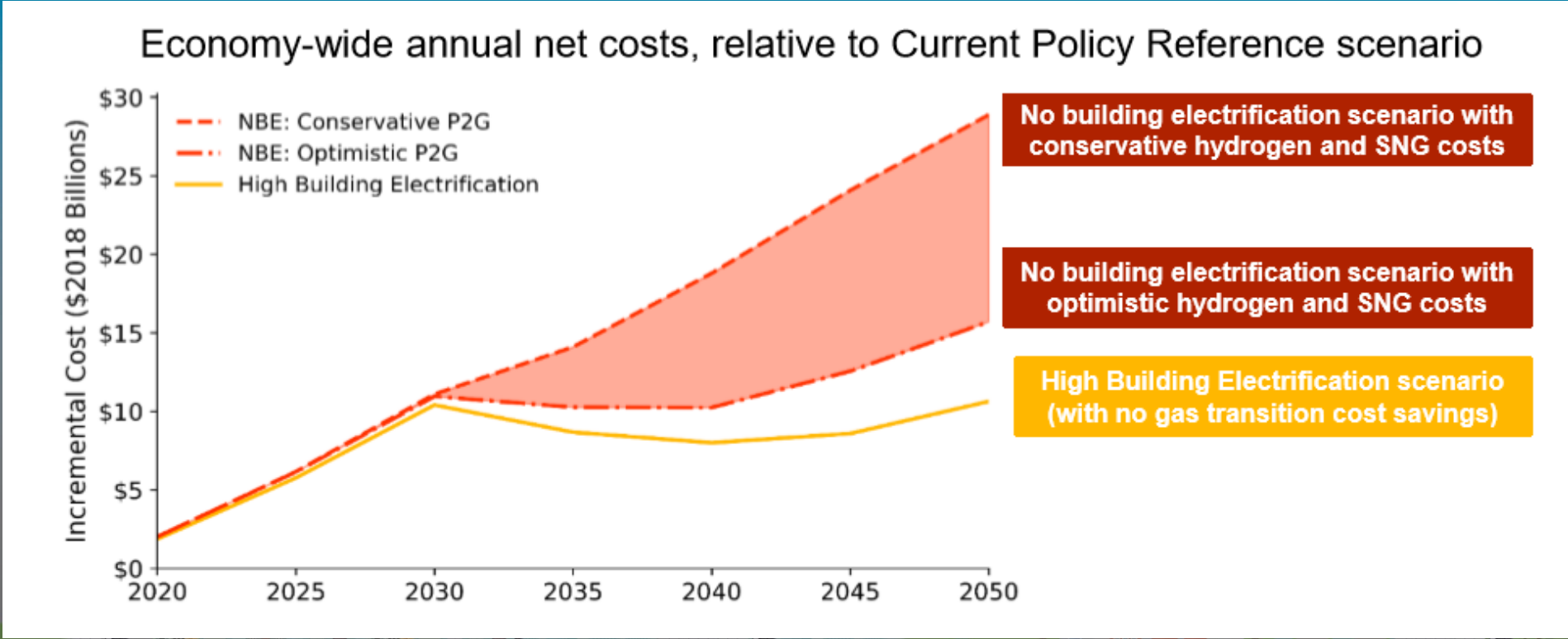


Bill Savings from BE for households across CA

Capital costs per unit of all appliances (HVAC, water heater, stove, and clothes dryer) and infrastructure (including gas connection costs) for new construction



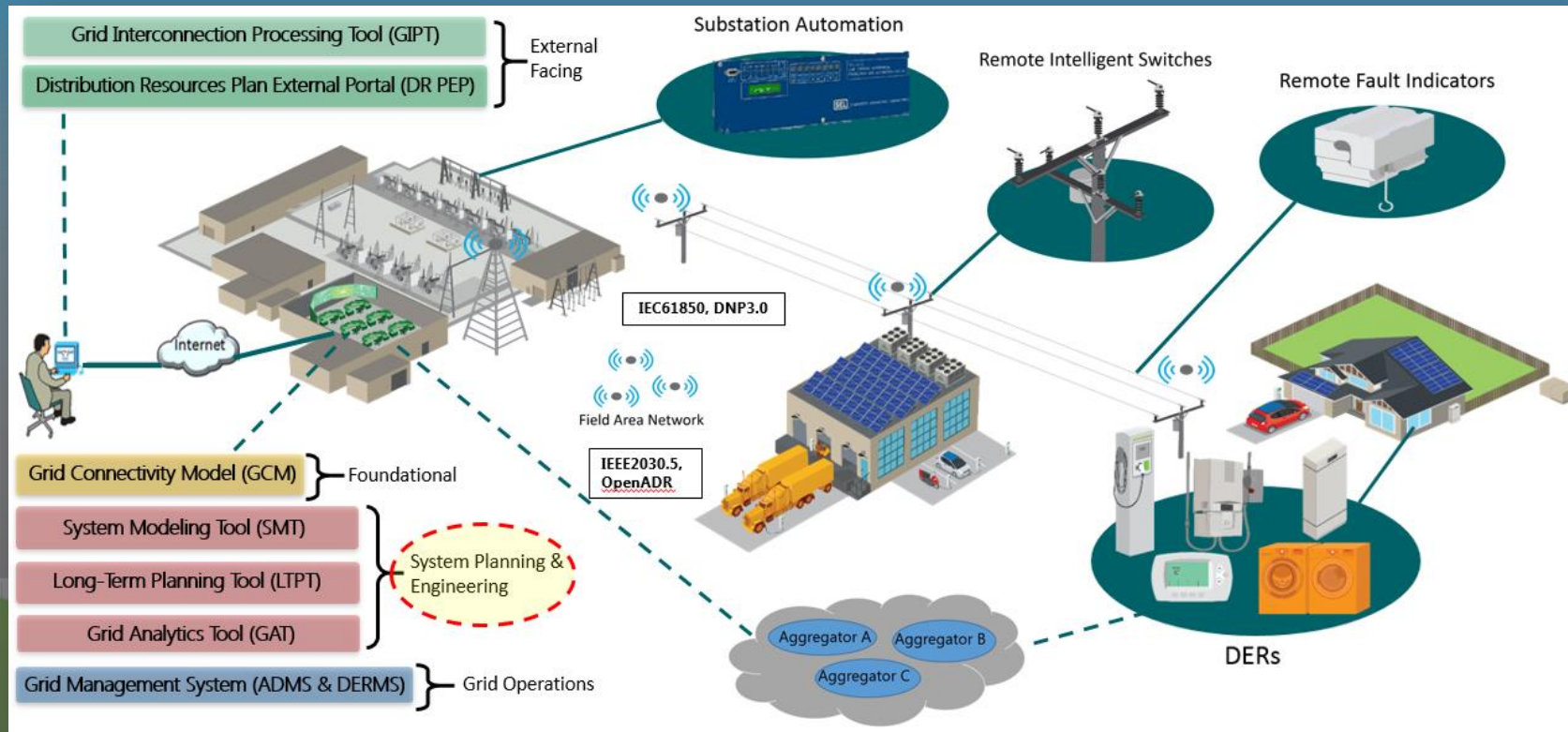
Societal Cost of Building Electrification Scenarios



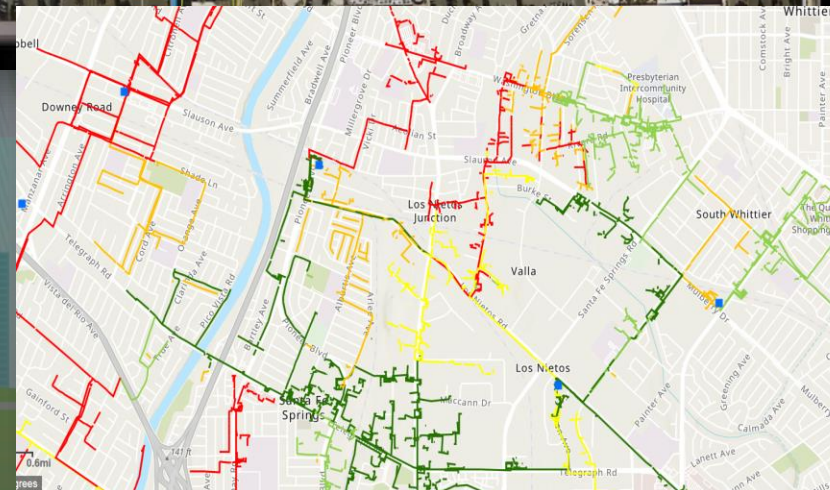
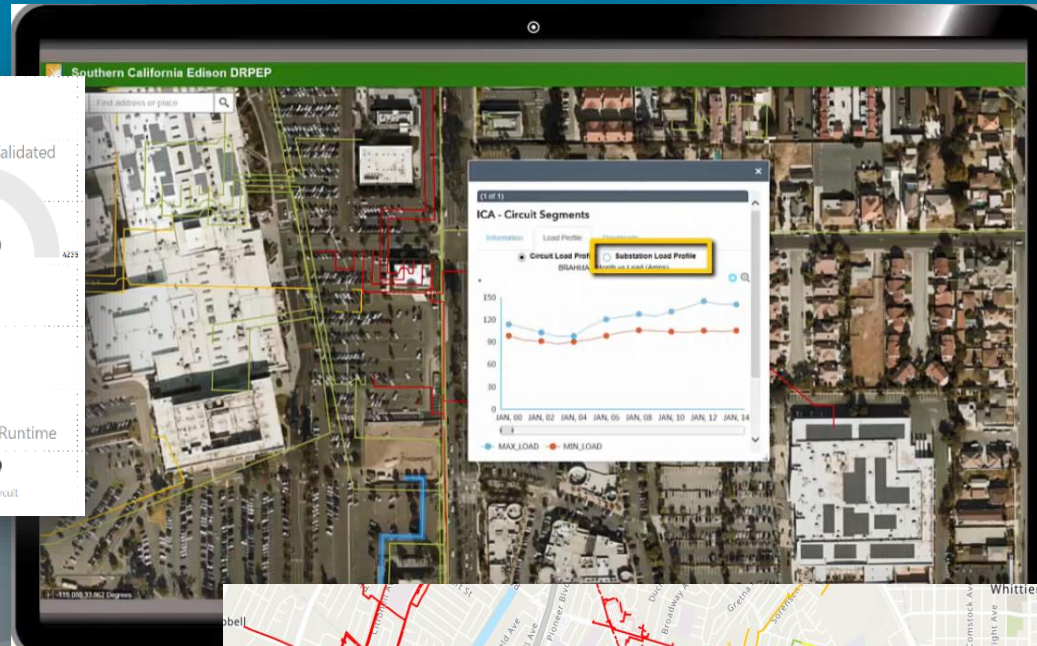
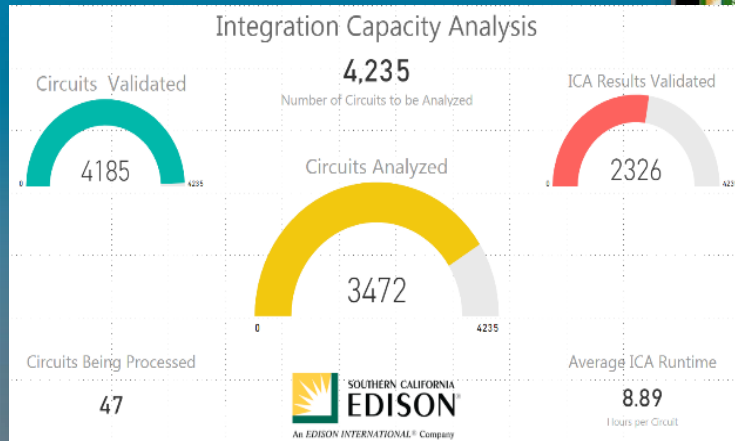
Electric System Planning 101



Electric System Planning for Integrating DERs



DERs Customer Engagement Portal



- Improve customer interaction by providing public web access to grid data regarding circuit, substation, sub-transmission, and transmission interconnection capacities.
- Customers leverage portal to plan DER generation at optimal/cost effective locations.

Electric Distribution Line Extensions

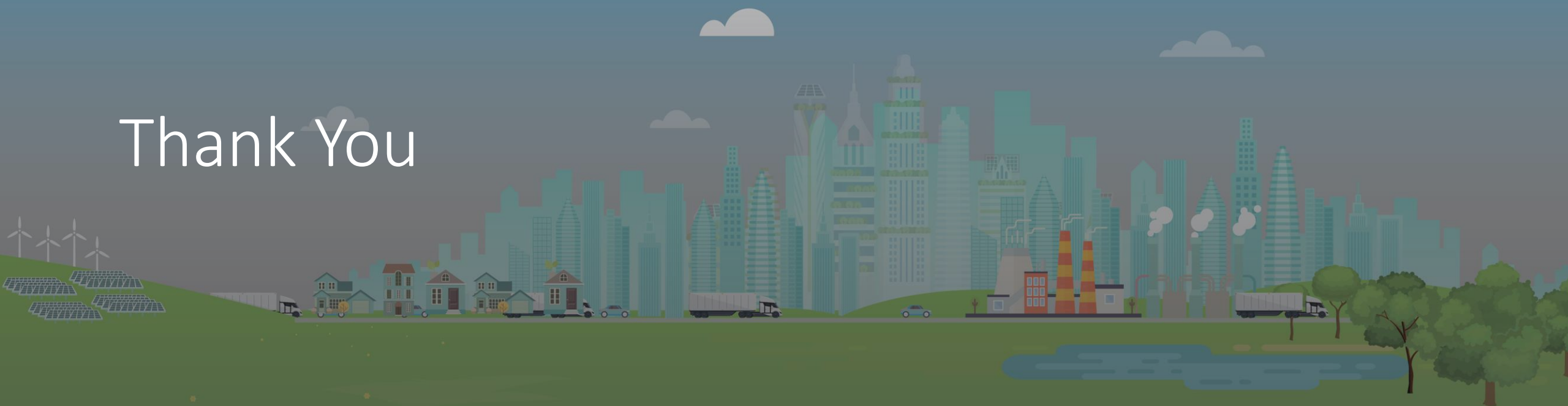
- Line extensions are “hook-ups” to new customers that may include conductors, transformers, meters
- Applicants charged for IOU-estimated cost of the line extension, minus “allowances”
- “Allowances” are based on expected “net revenues” (based upon energy use)



Governed by:

- Rule 15 Distribution Line Extensions
- Rule 16 Service Extensions

Thank You





Post-Workshop; Next Steps

Collect Stakeholder Feedback for Desired Data



Image Source: depositphotos.com

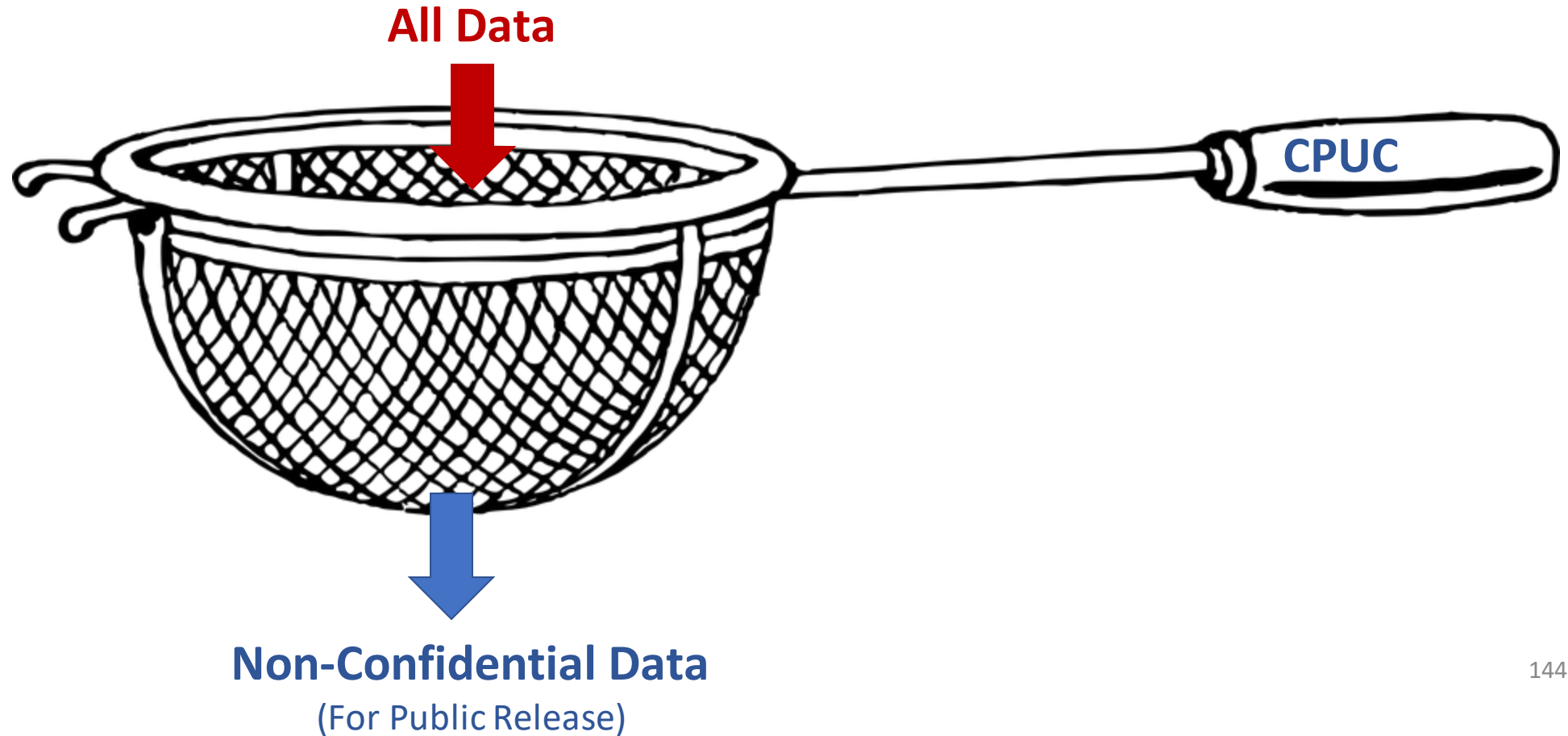
To submit your comments:

- Please use data categories
- Explain end user/ use case
- By July 1, 2020.



Post-Workshop; Next Steps

CPUC Identifies Confidential and non-Confidential Data





Post-Workshop; Next Steps

CPUC publishes Resolution

- Your feedback to workshop shapes CPUC draft resolution
- CPUC releases draft resolution; 20-day comment period
- Final resolution goes to Commission vote; 2020 data requirements



Proposed Timeline

This year:

- By July 1, 2020: Initial input from stakeholders
- September: Release Draft Resolution
- November: Final Resolution; Commission vote
- CPUC staff + IOUs seek time extension from CPUC Executive Director

Future years:

- November 2020: Kickoff data working group
- Q1 : CPUC share/workshop working group findings
- April: Draft Resolution
- June: Final resolution



Final Discussion/Questions

