
Chula Vista New Building Decarbonization

— Sustainability Commission —

5/8/23

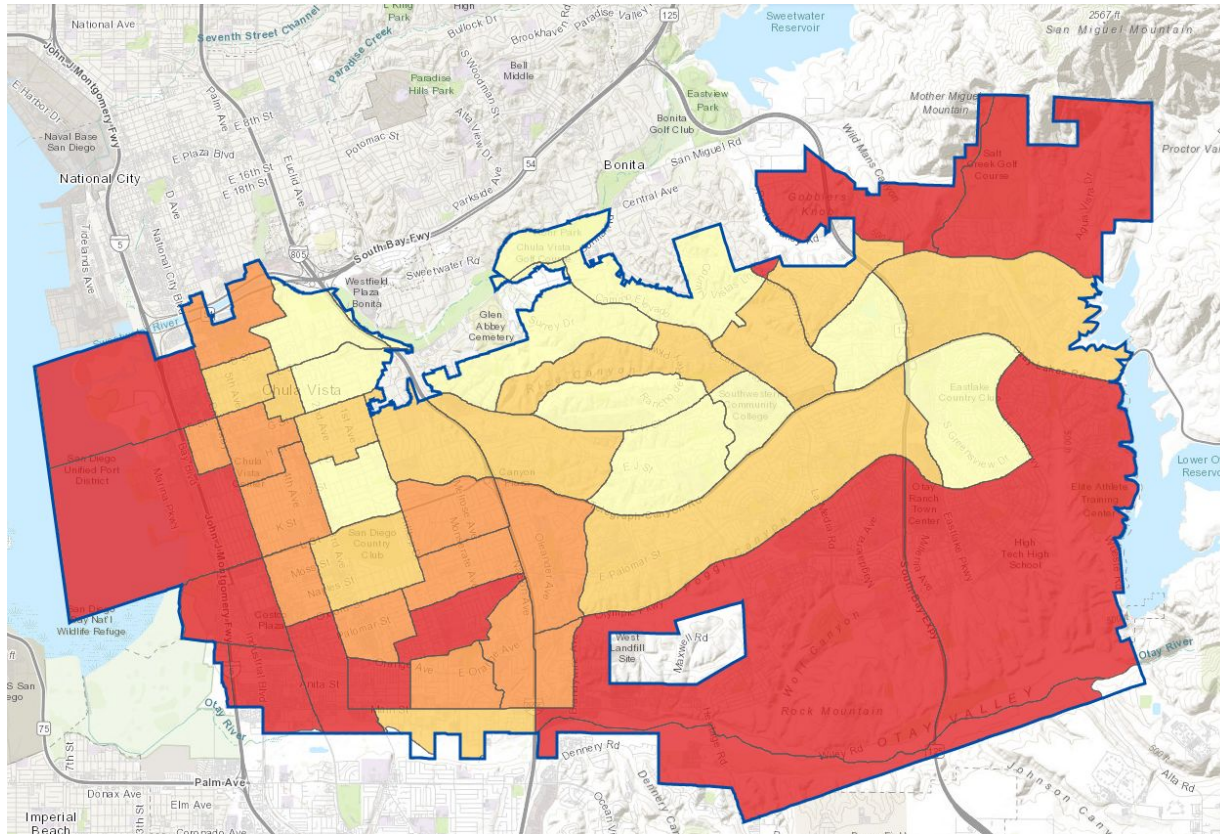
Agenda

- Climate impact
- Background
- Potential recommendations
- Next steps

Google Shared Resource Document:

<https://docs.google.com/document/d/1YwBY8XdKBeBrkLIXnEIDXNaUX2hSKy1miYT6uI dp04M/edit?usp=sharing>

Climate Change Impacts



Tree Cover Layer of CV Climate Equity Index at www.chulavistaca.gov/sustainability

Climate Change Impacts

The San Diego Union-Tribune

Padres Podcasts Things to do Crossword Sign up for news a

SOUTH COUNTY

Chula Vista declares climate emergency



At the Olay Compost Facility, organic waste goes through a grinder that produces a fine mulch which is then covered, watered, and pumped with oxygen to speed up decomposition. (Jarrod Valliere / The San Diego Union-Tribune)

RACE TO ZERO

Climate Emergency Declaration at
www.chulavistaca.gov/departments/clean/conservation/climate-action-plan

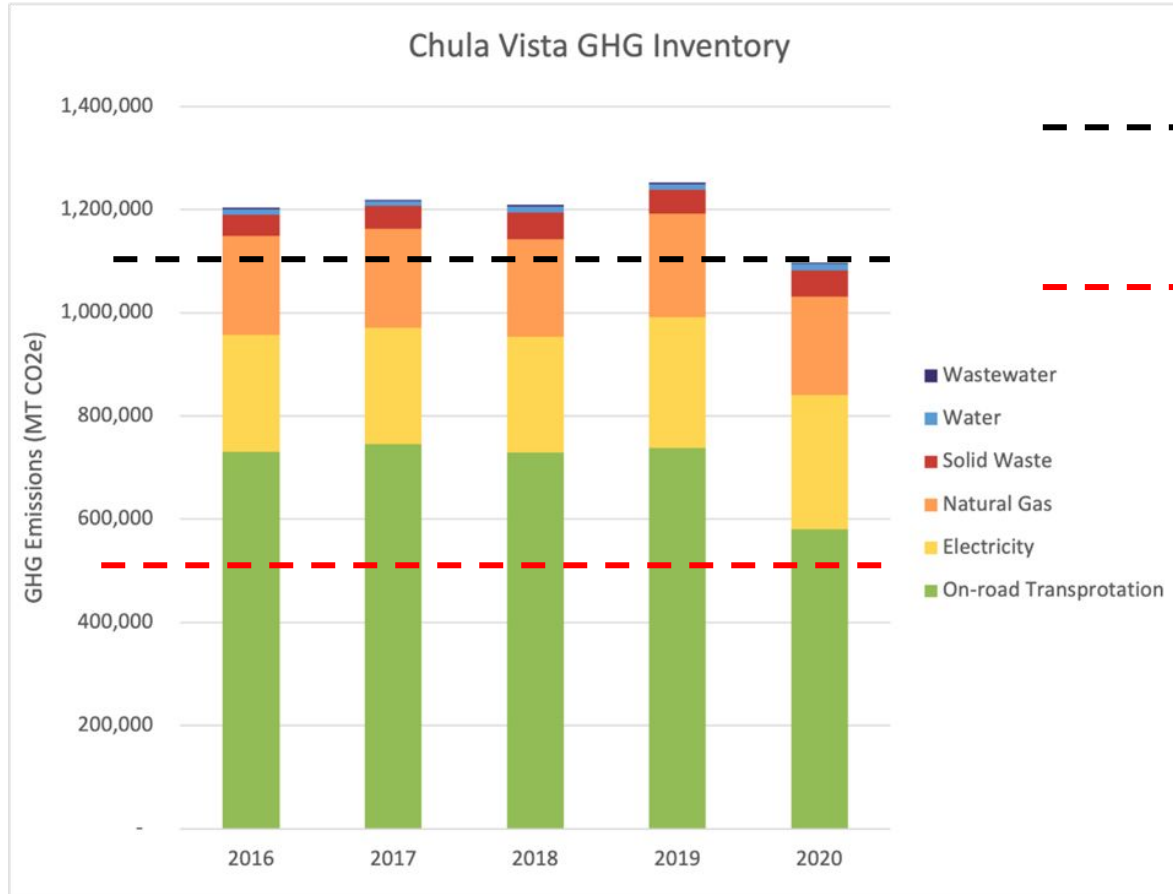
Decarbonization =

- * For building use, not including embedded carbon in building materials



Carbon free electricity (electrification)
Bio or renewable gases

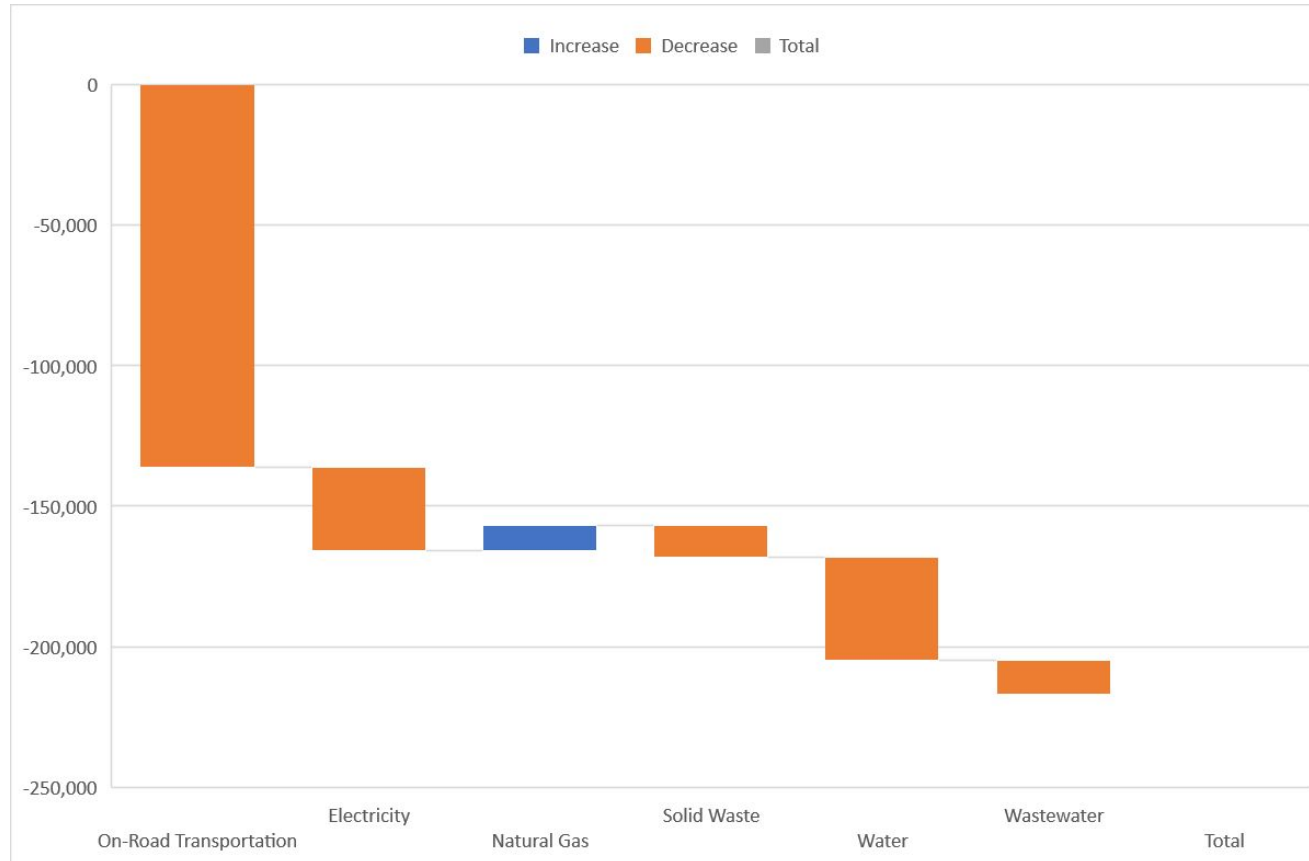
2020 Greenhouse Gas Inventory



15% below 2005 by
2020 (1,118,000)

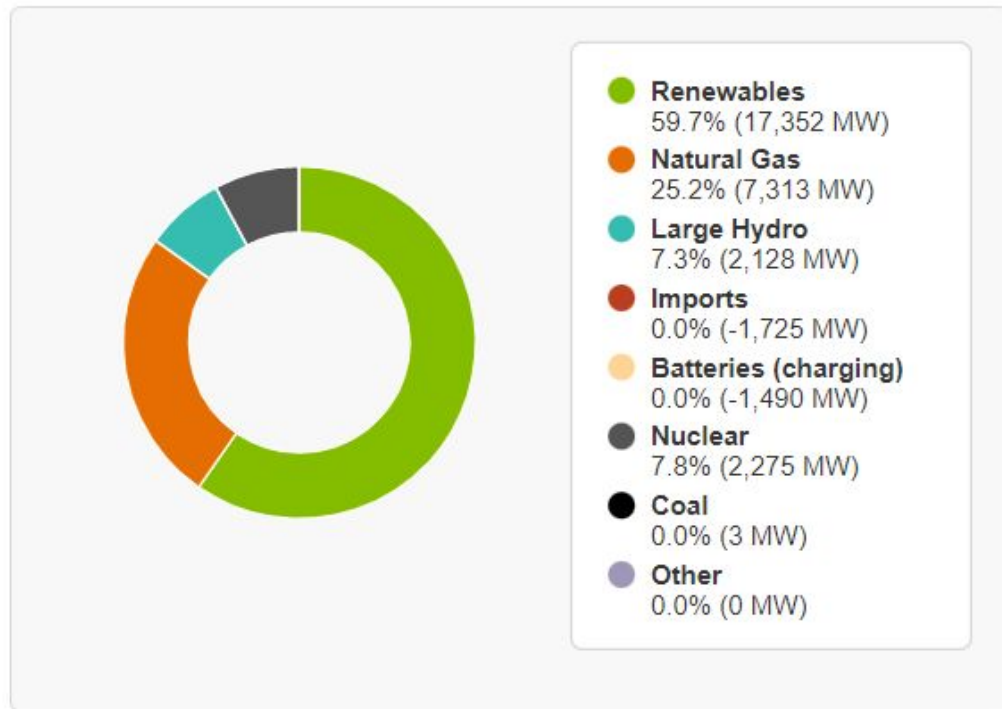
57% below 2018 by
2030
(493,000)

GHG Emission Change by Sector (2005 - 2020)

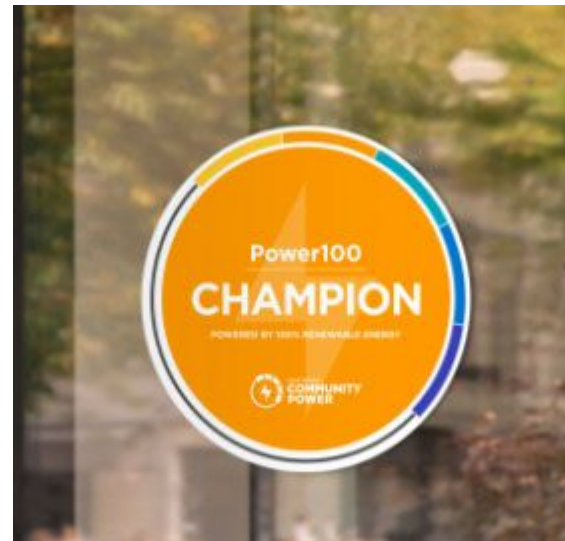


Why Electrify

Current supply

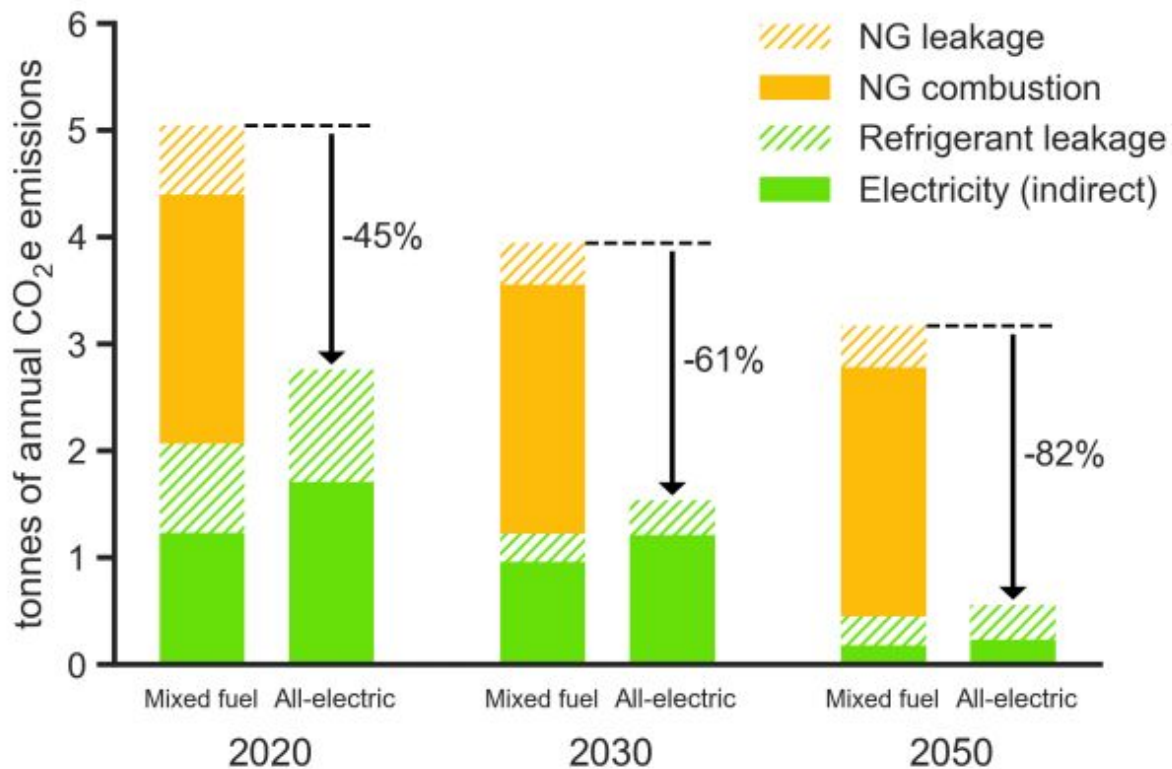


San Diego Community Power goal for 100% renewable energy by 2035



From California ISO at <https://www.caiso.com/todaysoutlook/>

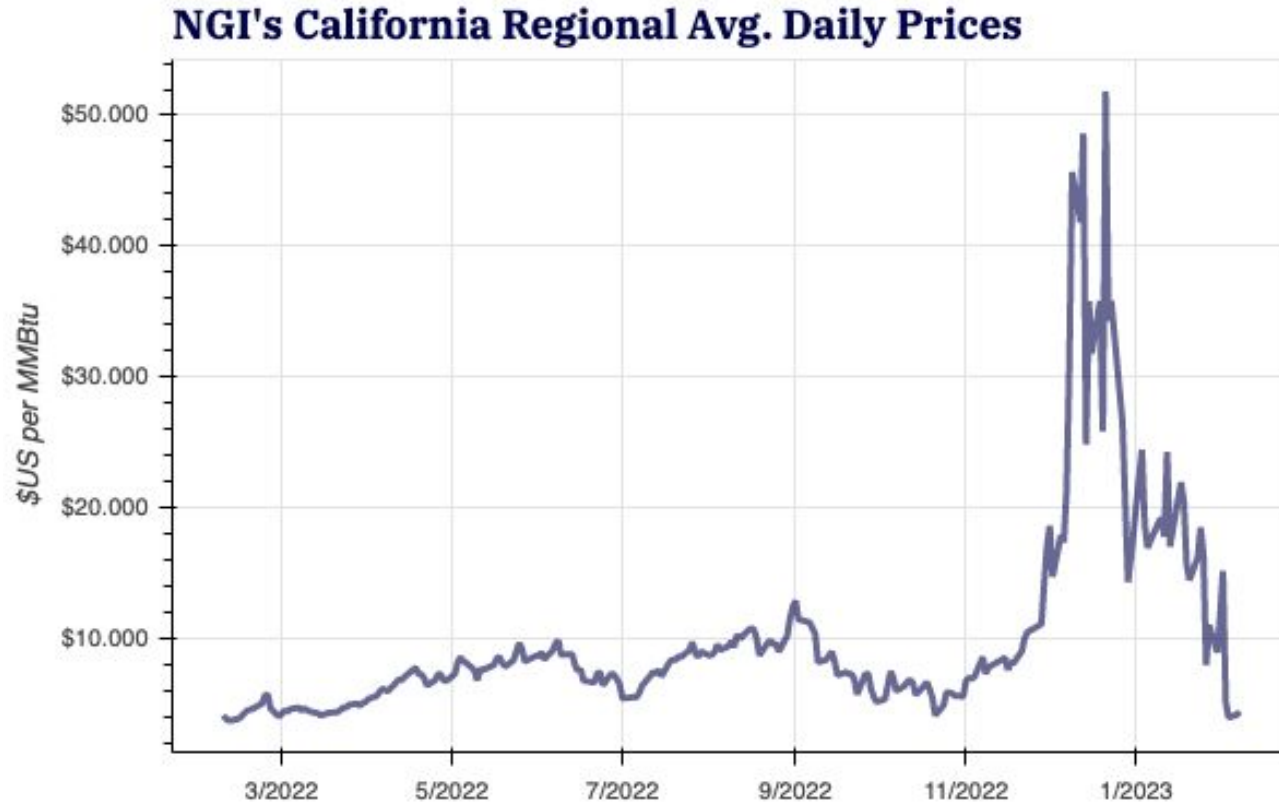
Why Electrify



Why Electrify



Why Electrify - Energy Independence



Why Electrify - Reduce Future Costs

Building electrification could be part of the solution



Gas system costs can be reduced by avoiding spend that would otherwise take place.

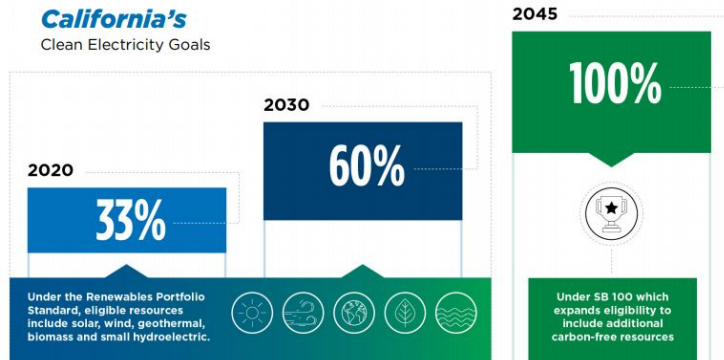
- **All-electric new construction** that avoids installation of new gas facilities
- **Targeted/ “zonal” retrofits** that reduce or eliminate planned, funded gas work

Electrification must avoid spend and result in lower revenue requirement

- If spend remains the same--even if directed to electrification--burden falls to remaining customers
- Repurposing funds without reducing costs may create fairness concerns

State Action

- Eliminate gas line extension allowances, effective - average of \$3,300 per home
- Incentives - Energy-Smart Homes & Tech Clean CA
- Contractor Network - [The Switch is On](#)
- SB 100 - 100% clean electricity 2045
- 2035 zero emission appliance standard (2027 for Bay Area)



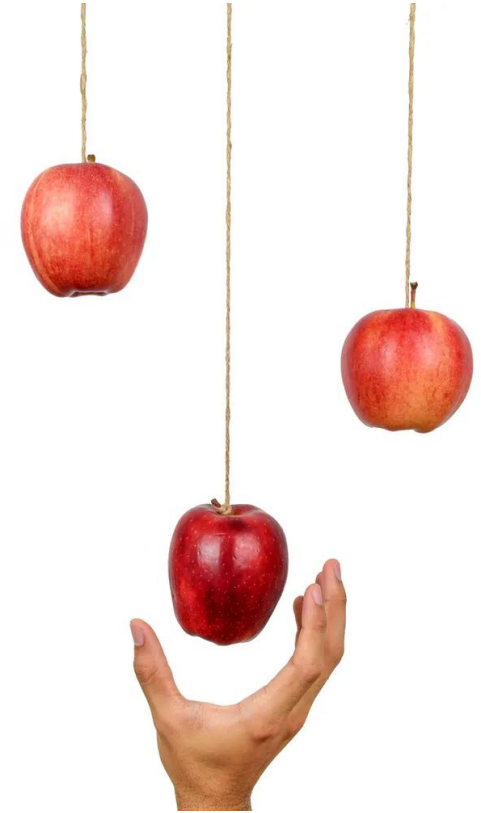
Other Jurisdictions Taking Action

All Electric Ordinances

- 89 Local governments in 9 states
- 70 local governments in California
 - Encinitas and Solana Beach have adopted electrification requirements
 - City of San Diego has proposed a draft ordinance
 - Called out in County's Regional Decarbonization Framework
 - Most affordable housing

State Code

- All Electric Ready
- Solar and battery on commercial buildings
- Requires heat pump water heater in homes
- Increased gas stove venting



Potential Code Options

	Efficiency	Electric - Preferred	Electric Only		Electric Only Plus Efficiency
			Natural Gas Moratorium	Electric Only	
Mechanism	Energy Code	Energy Code	Jurisdictional authority (Health and Safety)	CALGreen	Jurisdictional authority or CALGreen plus Energy Code
Requirements	All new construction exceeds minimum energy code	Only mixed fuel buildings exceed minimum energy code	No new gas infrastructure (hookups or piping)	All new construction is electric only	All new construction is electric only AND exceeds minimum energy
Considerations	Simplicity Preserves choice Specific measures	Preserved choice Lower GHG savings	Longest lasting, legal risk	Must be renewed, no CEC approval	Biggest impact Must be renewed

Building Decarbonization Working Group

- 23 Members
 - Utility, builders, non-profits, trade associations, Sustainability Commissioner, unions
 - Not all members voted
- 11 meetings and a public forum over a year
- Reviewed a wide range of presentations and potential decarbonization options



Draft Working Group Recommendation

Require most new construction including single family, multi family, medium office, retail, quick service restaurant to be all electric and include applicable energy efficiency and load flexibility

- Do not include hotels, multifamily buildings above 3 stories or restaurant cooking because of on-bill impacts
- Include load flexibility for medium office and quick service restaurant
- No additional PV requirement, but larger system would offset some on-bill impacts



Heat Pump Water Heater



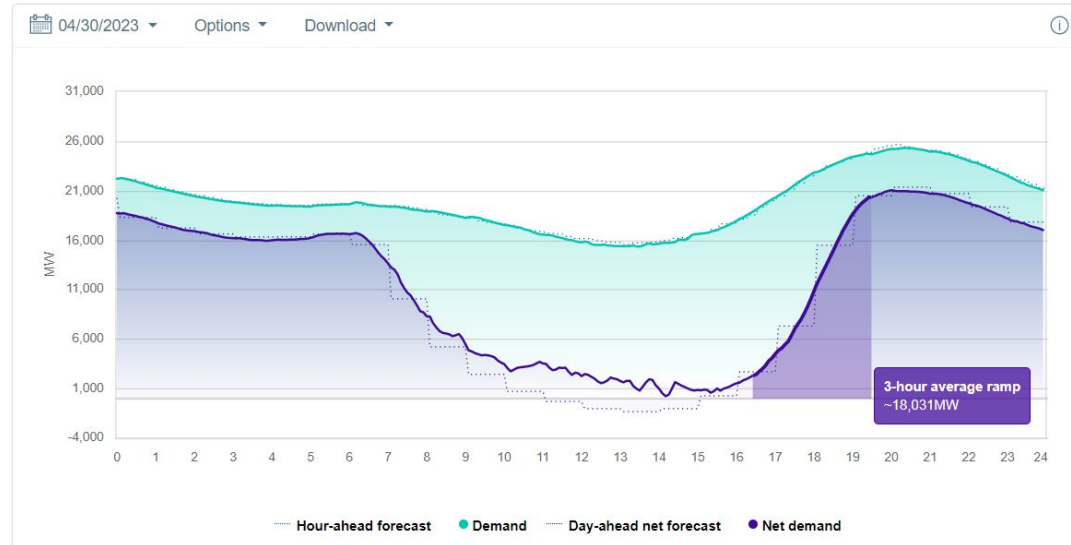
Heat Pump Heating & AC



Induction Cooking

Cost Efficiency - Terms

- Net Energy Metering (NEM): A practice in which utilities credit you for the excess electricity generated by your solar panels. For more information on NEM 3.0: <https://news.energysage.com/net-metering-3-0>
- On-bill: a customer-based approach to evaluating cost-effectiveness that shows the bill impacts of estimated energy use over the useful life of the measure/package studied.
- Time Dependent Valuation: a different value depending on which hours of the year the savings occur, to better reflect the actual costs of energy to consumers, to the utility system and to society. Used for state minimum building codes



Electrification Impacts - Single Family

Climate zone 7

Measure & Packages

Explore the impact, cost-effectiveness, and compliance margins for the studied packages.

Cost-Effectiveness

On-Bill
≥ 1.0 is cost effective

TDV
≥ 1.0 is cost effective

Per Home Results

Compliance Margin
(EDR2eff)

Incremental Cost

Annual Bill Savings
(on-bill)

Measure & Packages	On-Bill	TDV	Compliance Margin (EDR2eff)	Incremental Cost	Annual Bill Savings (on-bill)
Electrification + EE + PV + Battery	1.0	1.5	MAX 9.9	\$4,928	\$450
Electrification + EE + PV	13.2	7.2	7.0	-\$516	\$450
Electrification + EE	0.4	6.2	7.0	-\$4,201	-\$390
Electrification + Basic EE	0.5	3.1	2.3	-\$5,288	-\$456

Climate zone 10

*Solar analysis is under NEM 2.0

Electrification + EE + PV + Battery	1.0	1.7	MAX 10.1	\$5,516	\$495
Electrification + EE + PV	8.4	5.5	4.7	\$24	\$495
Electrification + EE	0.3	∞	4.7	-\$3,944	-\$553
Electrification + Basic EE	0.3	3.5	1.2	-\$5,288	-\$657

Electrification Impacts - 3 story Multifamily

Findings have been updated since working group

Climate zone 7

Measure & Packages	Cost-Effectiveness		Per Home Results		
	On-Bill ≥ 1.0 is cost effective	TDV ≥ 1.0 is cost effective	Compliance Margin (Efficiency TDV)	Incremental Cost	Annual Bill Savings (on-bill)
Electrification + Basic EE + PV	5.2	3.5	20.0%	\$2,777	\$723
Electrification + Basic EE	--	9.1	20.0%	\$697	-\$69

Climate zone 10

*Solar analysis is under NEM 2.0

Measure & Packages	Cost-Effectiveness		Per Home Results		
	On-Bill ≥ 1.0 is cost effective	TDV ≥ 1.0 is cost effective	Compliance Margin (Efficiency TDV)	Incremental Cost	Annual Bill Savings (on-bill)
Electrification + Basic EE + PV	5.5	4.1	13.6%	\$2,237	\$621
Electrification + Basic EE	--	∞	13.6%	\$446	-\$112

Electrification Impacts - 5 story Multifamily

Findings have been updated since working group

Climate zone 7

Measure & Packages

Explore the impact, cost-effectiveness, and compliance margins for the studied packages.

Cost-Effectiveness

On-Bill

≥ 1.0 is cost effective

TDV

≥ 1.0 is cost effective

Per Home Results

Compliance Margin

(Efficiency TDV)

Incremental Cost

Annual Bill Savings

(on-bill)

Electrification + Basic EE + PV

2.8



3.9



10.9%

\$1,387

\$192

Electrification + Basic EE

--



2.9



10.9%

\$608

-\$74

Climate zone 10

*Solar analysis is under NEM 2.0

Measure & Packages

Explore the impact, cost-effectiveness, and compliance margins for the studied packages.

Cost-Effectiveness

On-Bill

≥ 1.0 is cost effective

TDV

≥ 1.0 is cost effective

Per Home Results

Compliance Margin

(Efficiency TDV)

Incremental Cost

Annual Bill Savings

(on-bill)

Electrification + Basic EE + PV

3.5



3.9



7.1%

\$1,266

\$238

Electrification + Basic EE

--



2.7



7.1%

\$361

-\$137

Electrification Impacts - Non-Residential

	CZ 7 OB	CZ 10 OB	CZ 7 TDV	CZ 10 TDV
Medium Office				
AE	\$ (8,344)	\$ (39,558)	\$ (26,640)	\$ (55,776)
AE + Eff	\$ 81,615	\$ 60,448	\$ 883	\$ (12,771)
AE + Eff + load	\$ 172,558	\$ 179,822	\$ 25,974	\$ 24,434
Retail				
AE	\$ 27	\$ (23,537)	\$ 6,365	\$ 4,560
AE + Eff	\$ 108,988	\$ (11,657)	\$ 62,690	\$ 16,846
Quick Service Restaurant				
AE	\$ (508,124)	\$ (513,698)	\$ (153,463)	\$ (134,770)
AE exc gas cook	\$ (10,034)	\$ (14,708)	\$ 12,300	\$ 10,535
AE exc gas cook + Eff	\$ 12,410	\$ (564)	\$ 26,553	\$ 16,995
AE exc gas cook + Eff + load	\$ 30,876	\$ 18,290	\$ 39,592	\$ 27,521
Hotel				
AE	\$ (420,077)	\$ (377,324)	\$ 284,663	\$ 276,031
AE + Eff	\$ (326,992)	\$ (238,992)	\$ 294,989	\$ 310,997
AE = All Electric				
Eff = Efficiency Measures				
load = load flexibility				

Tentative Electrification Ordinance Timeline

- Sustainability Commission - May
- City Council Sustainability Workshop - June
- Hold WG Meeting to review SSC recommendation - July
- Present ordinance to City Council - August - Pending review from new CBO
- Send ordinance to California Energy Commission for approval - September*
- File ordinance with California Building Standards Commission - October
- Potential codes effective as soon as November 2023

*Depending on CEC meeting agenda availability

Working Group Comments

San Diego Building Electrification Coalition has provided specific changes to the draft ordinance but is pleased to see the City of Chula Vista moving forward with an all-electric new construction reach code. This will future-proof buildings and avoid costly retrofits in the future, while providing a healthier and cleaner environment.



Thank You!!

Questions or comments?

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Extra Slides

Cost Efficiency

Cost efficiency information mainly comes from Statewide Reach Code Team cost effectiveness studies that can be found in the links below. Where possible, information for 2022 code cycle was used but if that was not available, 2019 code cycle information was used.

For more information please visit :

- <https://explorer.localenergycodes.com/> - Interactive tool to view study results
- <https://localenergycodes.com/> - PDF of studies
- www.youtube.com/channel/UCs5oIFOvtMRgwoB7N_O6yag/videos - Study results presentations



Multi Family - Cost Efficiency (Previous Study)

3 Story

Climate Zone	Electric/ Gas Utility	Source Energy Comp Margin	Efficiency TDV Comp Margin	On-Bill (per Dwelling Unit)		2022 TDV (per Dwelling Unit)	
				B/C Ratio	NPV	B/C Ratio	NPV
7	SDGE	18%	31%	0.7	(\$308)	3.9	\$2,978
10	SDGE	15%	19%	0.0	(\$1,223)	4.2	\$2,064

5 Story

Climate Zone	Electric/ Gas Utility	Source Energy Comp Margin	Efficiency TDV Comp Margin	On-Bill (per Dwelling Unit)		2022 TDV (per Dwelling Unit)	
				B/C Ratio	NPV	B/C Ratio	NPV
7	SDGE	5%	6%	0.0	(\$7,953)	0.7	(\$825)
10	SDGE	1%	3%	0.0	(\$11,591)	0.3	(\$1,706)

- Additional solar should help improve on-bill impacts

Multi Family - Cost Efficiency (New Study)

Table 13. 5-Story Cost-Effectiveness Results per Dwelling Unit: All-Electric Prescriptive Code

Climate Zone	Electric /Gas Utility	Efficiency TDV Comp Margin	Source Comp Margin	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Utility Cost Savings		Incremental Cost		On-Bill		TDV	
						First Year	Lifecycle (2022\$)	First Year	Lifecycle (2022\$)	B/C Ratio	NPV	B/C Ratio	NPV
CZ01	PGE	14%	9%	-1,146	147	(\$49)	\$1,209	(\$4,639)	(\$5,788)	>1	\$6,998	>1	\$9,816
CZ02	PGE	9%	6%	-888	120	(\$45)	\$809	\$608	\$1,185	0.7	(\$375)	3.0	\$2,270
CZ03	PGE	11%	7%	-874	120	(\$46)	\$778	\$608	\$1,185	0.7	(\$407)	3.1	\$2,421
CZ04	PGE	9%	6%	-824	113	\$18	\$2,130	\$608	\$1,185	1.8	\$945	3.1	\$2,393
CZ04	CPAU	9%	6%	-824	113	\$230	\$8,205	\$635	\$1,211	6.8	\$6,994	3.0	\$2,367
CZ05	PGE	12%	6%	-871	117	(\$47)	\$706	\$608	\$1,185	0.6	(\$479)	2.8	\$2,065
CZ05	PGE/SCG	12%	6%	-871	117	(\$99)	(\$919)	\$608	\$1,185	0.0	(\$2,103)	2.8	\$2,065
CZ06	SCE/SCG	9%	5%	-739	104	(\$10)	\$986	\$608	\$1,185	0.8	(\$199)	2.9	\$2,183
CZ07	SDGE	11%	6%	-735	106	(\$74)	(\$500)	\$608	\$1,185	0.0	(\$1,685)	2.9	\$2,215
CZ08	SCE/SCG	8%	4%	-710	100	(\$79)	(\$644)	\$608	\$1,185	0.0	(\$1,829)	3.0	\$2,259
CZ09	SCE	7%	4%	-725	100	(\$53)	(\$51)	\$608	\$1,185	0.0	(\$1,236)	3.0	\$2,274
CZ10	SCE/SCG	7%	4%	-729	84	(\$111)	(\$1,615)	\$361	\$831	0.0	(\$2,445)	2.7	\$1,374
CZ10	SDGE	7%	4%	-729	84	(\$137)	(\$2,404)	\$361	\$831	0.0	(\$3,234)	2.7	\$1,374
CZ11	PGE	8%	5%	-790	92	(\$86)	(\$663)	\$361	\$831	0.0	(\$1,494)	3.1	\$1,656
CZ12	PGE	9%	6%	-809	96	(\$83)	(\$527)	\$361	\$831	0.0	(\$1,358)	3.0	\$1,620
CZ12	SMUD/PGE	9%	6%	-809	96	\$62	\$2,831	\$361	\$831	3.4	\$2,000	3.0	\$1,620
CZ13	PGE	7%	5%	-754	88	(\$83)	(\$686)	\$361	\$831	0.0	(\$1,517)	3.0	\$1,570
CZ14	SCE/SCG	6%	3%	-803	84	(\$131)	(\$2,085)	\$361	\$831	0.0	(\$2,916)	2.2	\$928
CZ14	SDGE	6%	3%	-803	84	(\$165)	(\$3,106)	\$361	\$831	0.0	(\$3,937)	2.2	\$928
CZ15	SCE/SCG	3%	1%	-602	65	(\$105)	(\$1,775)	\$361	\$831	0.0	(\$2,606)	1.9	\$695
CZ16	PG&E	9%	11%	-1,388	142	(\$127)	(\$675)	(\$4,886)	(\$6,142)	9.1	\$5,467	>1	\$6,704