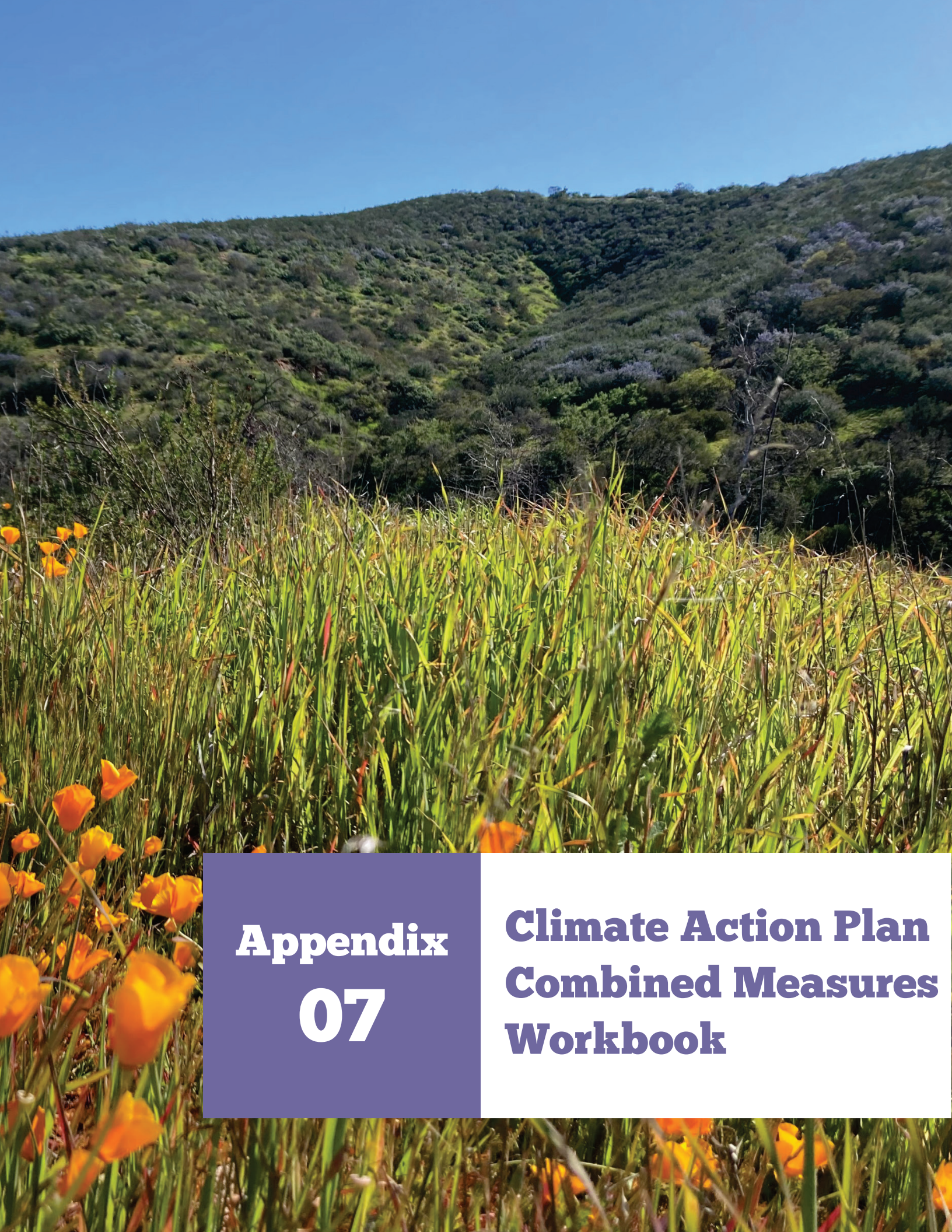

Appendix 07

Climate Action Plan Combined Measures Workbook

GHG Measure Reduction Summary

Anthropogenic GHG Emissions Projections with Legislative Reductions

Emissions Category	GHG Emissions ($MTCO_2e$)					
	2019	2030	2035	2040	2045	2050
On-road Transportation	1,331,000	1,033,000	756,000	513,000	512,000	527,000
Electricity	599,000	202,000	38,000	20,000	0	0
Natural Gas	478,000	540,000	561,000	579,000	597,000	616,000
Solid Waste	193,000	219,000	206,000	194,000	184,000	175,000
Agriculture	134,000	127,000	124,000	122,000	120,000	118,000
Propane	121,000	127,000	129,000	131,000	132,000	133,000
Off-road Transportation	71,000	99,000	106,000	110,000	114,000	118,000
Water	39,000	31,000	8,000	4,000	0	0
Wastewater	18,000	19,000	19,000	19,000	19,000	19,000
TOTAL Emissions with Legislative Reductions	**2,984,000**	**2,397,000**	**1,947,000**	**1,693,000**	**1,678,000**	**1,705,000**
Percent Reduction from 2019 with Legislative Reductions		-19.7%	-34.8%	-43.3%	-43.8%	
CAP Targets (percent reduction from 2019 levels)		-43.6%	-58.8%	-71.9%	-85.4%	
CAP Targets ($MTCO_2e$)		1,683,156	1,229,840	837,806	434,185	
Needed reductions to meet CAP Targets from 2019 levels ($MTCO_2e$)		1,300,844	1,754,160	2,146,194	2,549,815	
Needed reductions to meet CAP Targets from Legislative reductions		713,844	717,160	855,194	1,243,815	

Anthropogenic GHG Emission Reductions by Sector (Community)

Sector	GHG Reduction ($MTCO_2e$)				
	2030	2035	2040	2045	2050
Solid Waste	39,177	67,228	91,346	117,943	112,621
Water and Wastewater	10,488	4,063	2,981	1,869	1,869
Agriculture and Conservation (A-1.1 A-3.1, A-5.1)	74,500	93,165	110,491	128,183	146,276
Energy	319,382	282,621	370,632	519,440	586,593
Built Environment and Transportation	247,224	270,046	310,257	425,078	578,103
TOTAL Reductions from Community Measures	**690,770**	**717,122**	**885,707**	**1,192,515**	**1,425,463**

Anthropogenic GHG Emission Reductions by Sector (County Operations)

Sector	GHG Reduction ($MTCO_2e$)				
	2030	2035	2040	2045	2050
Solid Waste	1,305	5,313	7,610	11,762	10,877
Water and Wastewater	3	1	0	0	0
Agriculture and Conservation	0	0	0	0	0
Energy	13,715	14,698	16,135	16,858	17,582
Built Environment and Transportation	21,607	20,881	17,776	23,663	24,869
TOTAL Reductions from County Operations Measures	**36,630**	**40,893**	**41,520**	**52,283**	**53,328**

Carbon Storage Measures

Sector (Action)	GHG Reduction ($MTCO_2e$)				
	2030	2035	2040	2045	2050
Agriculture and Conservation (A-1.2)	76	459	841	1,223	-
Agriculture and Conservation (A-2.1)	2,498	3,675	4,852	6,029	7,206
Agriculture and Conservation (A-2.2)	439	601	674	747	821
Agriculture and Conservation (A-4.1)	10,758	47,691	84,623	121,556	0
TOTAL Reductions from Carbon Storage Measures	**13,771**	**52,425**	**90,991**	**129,556**	**8,027**

Analysis of CAP Targets Achievement with Anthropogenic GHG Emissions Reductions Measures

Sector	GHG Emissions ($MTCO_2e$)				
	2030	2035	2040	2045	2050
Solid Waste	178,519	133,460	95,044	54,295	51,501
Water and Wastewater	39,509	22,937	20,019	17,131	17,131
Agriculture and Conservation (A-1.1 A-3.1, A-5.1)	52,500	30,835	11,509	-8,183	-28,276
Energy (Electricity, Natural Gas, Propane)	535,903	430,681	343,234	192,701	144,826
Built Environment and Transportation (On-road and Off-road Transportation)	863,169	571,073	294,967	177,258	42,028
TOTAL	**1,669,600**	**1,188,986**	**764,773**	**433,202**	**227,210**
Percent Reduction Below 2019 Levels	-44.0%	-60.2%	-74.4%	-85.5%	-92.4%
Additional Reductions Needed to meet CAP Targets ($MTCO_2e$) (negative value = surplus reductions)	-13,556	-40,855	-73,033	-983	

Analysis of CAP Targets Achievement with Anthropogenic GHG Emissions Reductions and Carbon Storage

Sector	GHG Emissions ($MTCO_2e$)				
	2030	2035	2040	2045	2050
Total GHG Emissions with Anthropogenic GHG Emissions Reductions	1,669,600	1,188,986	764,773	433,202	227,210
Percent reduction below 2019 levels	-44.0%	-60.2%	-74.4%	-85.5%	-92.4%
GHG Emissions Removed By Carbon Storage Measures	13,771	52,425	90,991	129,556	8,027
Total GHG Emissions with Anthropogenic GHG Emissions Reductions and Carbon Storage Measures	1,655,829	1,136,560	673,782	303,646	219,183
Percent reduction below 2019 levels	-44.5%	-61.9%	-77.4%	-89.8%	-92.7%
Additional Reductions/Storage Needed to meet Aspitational Goal: Net Zero ($MTCO_2e$)	1,655,829	1,136,560	673,782	303,646	219,183

Target Setting for County of San Diego CAP Update			
County of San Diego Target Emissions and Target Percent Reduction from 2019 Emissions Levels			
Year	**Target Emissions Levels (MTCO2e/yr)**	**CAP GHG Reduction Target (relative to 2019 levels)**	**Reductions from Legislative BAU Needed to Achieve Target (MTCO2e/yr)**
2019	2,984,000	--	--
2030	1,683,156	43.6%	713,844
2035	1,229,840	58.8%	717,160
2040	837,806	71.9%	855,194
2045	434,185	85.4%	1,243,815

Notes:
MTCO2e/yr = metric tons carbon dioxide equivalent per year

CARB 2022 Scoping Plan - Emissions Reductions by Sector

Sectors	**CARB's Statewide GHG Inventory (MMTCO2e/yr)**	**2022 Scoping Plan Scenario (MMTCO2e/yr)**			
	2019	**2030**	**2035**	**2040**	**2045**
Agriculture	31.40	20.10	18.34	16.56	15.30
Residential and Commercial	40.50	26.82	17.77	9.70	4.40
Electric Power	60.20	39.20	31.11	27.92	8.68
High Global Warming Potential (GWP)	20.70	9.90	9.80	9.70	9.00
Industrial	80.40	40.55	29.14	18.50	11.52
Recycling and Waste	8.80	9.18	8.72	8.34	7.99
Transportation	162.40	80.58	53.06	26.71	7.94
Carbon Dioxide Removal (CDR)	0.00	-6.77	-35.11	-62.90	-74.99
Total	**404.4**	**219.6**	**132.8**	**54.5**	**-10.2**

Notes:
MMTCO2e/yr = million metric tons carbon dioxide equivalent per year
Sources:
https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents
https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-PATHWAYS-data-E3.xlsx
CARB 2022. California Greenhouse Gas Inventory for 2000-2020 — by Category as Defined in the 2008 Scoping Plan.
https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/ghg_inventory_scopingplan_sum_2000-20.pdf

Applicable Emission Sectors

Emission Sectors	**Applicable to County of San Diego?**
Agriculture	Yes
Residential and Commercial	Yes
Electric Power	Yes
High Global Warming Potential (GWP)	No
Industrial	Yes
Recycling and Waste	Yes
Transportation	Yes
Carbon Dioxide Removal (CDR)	No

Application of Statewide Emissions Reductions by Sector to Applicable Sectors in the County of San Diego

Milestone Year	**All Statewide Sectors**		**Statewide Sectors Applicable to County of San Diego**	
	Statewide Emissions (2019 Inventory and 2022 Scoping Plan Scenario) (MMTCO2e)	**Percent Reduction from 2019 levels**	**Statewide Emissions (2019 Inventory and 2022 Scoping Plan Scenario) (MMTCO2e)**	**Percent Reduction from 2019 levels**
2019	404.40	n/a	384	n/a
2030	219.56	46%	216	43.6%
2035	132.83	67%	158	58.8%
2040	54.53	87%	108	71.9%
2045	-10.16	103%	56	85.4%

Notes:
MMTCO2e/yr = million metric tons carbon dioxide equivalent per year

Sector	Strategy	Measure	ID	Action	GHG Reductions by Action ($MTCO_2e$)			
					2030	2035	2040	2045
Solid Waste	Increase Solid Waste Diversion in the Unincorporated Area and County Operations	SW-1: Achieve zero waste in County operations	SW-1.1	Adopt a County Operations zero waste policy by 2030 to achieve zero waste (90% diversion).	1,305	2,479	2,479	2,479
		SW-2: Achieve zero waste within the unincorporated area	SW-2.1	Update the County's Strategic Plan to Reduce Waste by 2028 to include strategies to achieve 80% diversion by 2030 and zero waste (90% diversion) by 2045.	37,804	44,313	51,001	57,779
	Increase Availability of Sustainable Solid Waste Facilities in the Unincorporated Area and County Operations	SW-3: Improve waste management practices at County-owned solid waste facilities to reduce emissions	SW-3.1	Expand landfill gas systems at County-owned landfills to exceed State requirements by 10% by 2045.	-	2,834	5,131	9,283
		SW-4: Improve waste management practices in the unincorporated area to reduce emissions and increase waste diversion	SW-4.1	Conduct a feasibility study by 2027 and implement a landfill gas system pilot project at privately managed landfills by 2030 to exceed State requirements by 10% by 2045 in the unincorporated area.	1,373	22,915	40,345	60,164
				Total	***40,481***	***72,540***	***98,956***	***129,705***

SW-1.1
Adopt a County Operations zero waste policy by 2030 to achieve zero waste (90% diversion).

	2019	2030	2035	2040	2045
Solid waste emissions ($MTCO_2e$)	3,000	2,000	3,000	3,000	3,000
Waste Diversion Rate [1]	42.47%	80%	90%	90%	90%
Increased waste diversion		38%	48%	48%	48%
Adjusted forecasted emissions from solid waste ($MTCO_2e$)		695	521	521	521
Reduced solid waste emissions ($MTCO_2e$)		**1,305**	**2,479**	**2,479**	**2,479**

[1] Data provided by County

SW-2.1
Update the County's Strategic Plan to Reduce Waste by 2028 to include strategies to achieve 80% diversion by 2030 and zero waste (90% diversion) by 2045.

	2019	2030	2035	2040	2045
GHG Emissions from unincorporated county waste disposal ($MTCO_2e$)	73,641	75,608	75,965	76,502	77,039
Waste Diversion Rate [1]	60%	80%	83%	87%	90%
Increased waste diversion		20%	23%	27%	30%
Adjusted forecasted emissions from solid waste ($MTCO_2e$)		37,804	31,652	25,501	19,260
Reduced solid waste emissions ($MTCO_2e$)		**37,804**	**44,313**	**51,001**	**57,779**

[1] County of San Diego Climate Action Plan Dashboard

SW-3.1
Expand landfill gas systems at County-owned landfills to exceed State requirements by 10% by 2045.

	2019	2030	2035	2040	2045
Emissions from County owned landfills [3] [4]	23,415	18,795	17,006	15,394	13,925
Current LFG capture% [1]	85%	85%	85%	85%	85%
Targeted LFG capture % [2]		85%	87.5%	90%	95%
Increased LFG capture % (see notes)		0%	3%	5%	10%
Emissions reduction		**-**	**2,834**	**5,131**	**9,283**

[1] San Diego County Air Pollution Control District (n.d.). Emissions Inventory Request Instructions. Landfill Operations. Available:
From source [1] cited here: "The District will default to a collection efficiency of the landfill gas collection system of 85% as aligned with CARB's regulation
[2] *Current MSW Industry Position and*
State-of-the-Practice on LFG Collection
Efficiency, Methane Oxidation, and
Carbon Sequestration in Landfills (v2, prepared by SCS Engineers 2009)
The source reported that collection efficiencies upwards of 90% can be achieved for landfills with clay covers and landfill gas recovery systems.
[3] All County owned landfills are closed landfills
[4] Fugitive emissions exclude emissions from Viejas landfill as the landfill does not have an existing LFG system and County staff have indicated infeasibility to install one.

SW-4.1

Conduct a feasibility study by 2027 and implement a landfill gas system pilot project at privately managed landfills by 2030 to exceed State requirements by 10% by 2045 in the unincorporated area.

	2030	2035	2040	2045
Emissions from Borrego Landfill ($MTCO_2e$)	1,615	1,461	1,322	1,196
Existing LFG Capture (%) [1]				
Emissions from Otay Landfill ($MTCO_2e$)	119,519	108,145	97,854	88,542
Existing LFG Capture (%) [2]				
LFG capture after implementing the incentives program [3]	85%	88%	91%	95%
Increased LFG capture at Borrego Landfill under incentive program	85%	88%	91%	95%
Emissions reductions at Borrego Landfill ($MTCO_2e$)	1,373	1,286	1,203	1,136
Increased LFG capture at Otay Landfill under incentives program	0%	3%	6%	10%
Emissions reductions at Otay Landfill ($MTCO_2e$)	-	21,629	39,142	59,028
Emissions Reduction ($MTCO_2e$)	**1,373**	**22,915**	**40,345**	**60,164**

[1] Borrego Landfill does not currently have a landfill gas capture (LFG) system.

[2] SDAPCD Landfill Operations Emissions Calculation Methodology (last updated November 1, 2021). Available: https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/landfill/APCD-landfill1-revised-Nov-2nd-2021.pdf

Per this source: "Based on CARB's Staff Report: Initial Statement of Reasons for the Proposed Regulation to Reduce Methane Emissions from Municipal Solid Waste Landfills dated May 2009, the District will apply a landfill gas collection efficiency of 85% when calculating fugitive gas in all emission inventories completed for reporting years 2016 and later, if the facility has been subject to CARB's regulation to reduce Methane Emissions from Municipal Solid Waste Landfills."

[3] *Current MSW Industry Position and State-of-the-Practice on LFG Collection Efficiency, Methane Oxidation, and Carbon Sequestration in Landfills (v2, prepared by SCS Engineers 2009)*
The source reported that collection efficiencies upwards of 90% can be achieved for landfills with clay covers and landfill gas recovery systems.

Sector	Strategy	Measure	ID	Action	GHG Reductions by Action ($MTCO_2e$)			
					2030	2035	2040	2045
Water and Wastewater	Decrease Potable Water Consumption in the Unincorporated Area and County Operations	W-1: Develop policies and programs to increase water efficiency, retention, recycling, and reuse to reduce potable water consumption in County operations	W-1.1	Implement the County's Water Efficiency Plan to require water-efficiency measures in new and existing County buildings/operations to reduce potable water use intensity by 28% by 2030.	3	1	0	-
		W-2: Develop policies and programs to increase indoor and outdoor water conservation (including water efficiency, retention, recycling, and reuse) in new and existing development in the unincorporated area	W-2.1	Amend the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar water efficiency requirements and reduced outdoor water use for landscaping requirements for new development to reduce potable water consumption from new development by 17% in the unincorporated area.	37	16	16	-
			W-2.2	Amend the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar water efficiency requirements for existing development projects with qualifying improvements.	320	81	41	-
			W-2.3	Update the Green Building Incentive program by 2026 to include incentives for water efficiency, conservation, and reuse improvements for new and existing development to reduce potable water consumption in the unincorporated area.	64	16	8	0
			W-2.4	Implement the Waterscape Rebate Program to incentivize water efficiency and conservation to reduce outdoor water consumption in the unincorporated area.	21	8	6	0
	Increase Stormwater Collection, Water Pumping, and Wastewater Treatment Efficiency	W-3: Develop programs to increase stormwater and wastewater treatment efficiency to reduce imported potable water use in the unincorporated area	W-3.1	Increase wastewater treatment efficiency through the East County Advanced Water Purification Program to produce 12,900 acre feet of water each year by 2030.	10,046	3,942	2,911	1,869
				Total	**10,491**	**4,064**	**2,981**	**1,869**

W-1.1

Implement the County's Water Efficiency Plan to require water-efficiency measures in new and existing County buildings/operations to reduce potable water use intensity by 28% by 2030.

	2019	2030	2035	2040	2045
County facilities building area (square feet) [1]	10,267,001	11,536,014	11,944,128	12,300,195	12,656,263
County facility water use (without water efficiency measures [gal]) [2]	394,890,322	443,699,209	459,396,125	473,091,229	486,786,332
County facility water use intensity (without water efficiency measures [gal/sf]) [2]	38	38	38	38	38
County facility water use (with water efficiency measures [gal]) [3]	394,890,322	319,514,362			
Forecasted number of County employees		21,153	21,901	22,554	23,207
Water use per employee based on 2030 water consumption (gal/employee) [4]		15,105			
Forecasted County facility water use with water efficiency measures (gal)		319,514,362	330,817,943	340,679,990	350,542,037
Forecast County facility water use intensity (with water efficiency measures [gal/sf]) [3]		28	28	28	28
Forecasted water savings each target year (gal)		124,184,847	128,578,181	132,411,239	136,244,296
Water savings (million gal) [5]		124	129	132	136
% savings from 2019 water use		19%	67%	66%	65%
% reduction from 2019 water use intensity		28%	28%	28%	28%
Local Water Distribution EF (kWh/million gal) [6] [7]	292				
Energy savings (MWh)		36	38	39	40
County-Specific electricity EF ($MTCO_2e$/MWh) [7]		0.074	0.014	0.007	-
Emission reduction ($MTCO_2e$)		**3**	**1**	**0**	**-**

Projected water savings from DGS's Water Conservation Plan (HCF) [3]	100,770
Projected water savings from DGS's Water Conservation Plan (gal)	75,375,960
HCF to gallons conversion factor	748

Notes

[1] Building Area, County Government Facilities, 2019. Data provided by County on March 22, 2024. Scaled by projected growth in number of County employees
[2] Net water usage in 2019: Data from DPW provided by County. Scaled by projected growth in number of County employees.
[3] DGS' Water Conservation Plan provided by County (Claire Moss) to Ascent on April, 12, 2023: 100,770 HCF water savings in 2030 (Table ES-3)
[4] Assumes that water use per employee would be constant starting in 2030 (based on water savings from the Water Conservation Plan)
[5] HCF refers to hundred cubic feet, also referred to as one "unit" of water, equivalent to 748 gallons.
[6] Average of City of San Diego's three Water Treatment Plants
[7] Most County facilities are located outside unincorporated county

W-2.1

Amend the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar water efficiency requirements and reduced outdoor water use for landscaping requirements for new development to reduce potable water consumption from new development by 17% in the unincorporated area.

	2019	2020	2025	2030	2035	2040	2045
Total water-related electricity use (MWh)							
Upstream Electricity Use	161,000	161,800	165,000	166,000	166,000	168,000	169,000
Local Treatment and Distribution Electricity Use	12,000	14,000	22,000	22,000	22,000	22,000	22,000
Water-related electricity use: existing development (MWh)							
Upstream Electricity Use			165,000	165,000	165,000	165,000	165,000
Local Treatment and Distribution Electricity Use			22,000	22,000	22,000	22,000	22,000
Water-related electricity use: new development (MWh) assuming the updated code is implemented from 2026 [5]							
Upstream Electricity Use				1,000	1,000	3,000	4,000
Local Treatment and Distribution Electricity Use				-	-	-	-
Electricity use associated with water use in new non-residential development (MWh)							
Upstream Electricity Use [1]				320	320	960	1,280
Local Treatment and Distribution Electricity Use [1]				-	-	-	-
Water share by SDCWA member agency water authority supply (%)	79%						
Water share by SDCWA member agency local supply (%)	14%						
Groundwater Supply (%)	7%						
Upstream energy intensity (kWh/AF)	1,946						
Local distribution energy intensity (kWh/AF)	139						
New Residential Development							
Number of residents in homes with grey water systems (increase from 2025) [5]				2,327	4,654	8,155	11,656
Gal per day per occupant from showers, bathtubs, and lavatories (2019 CA Plumbing Code)				25	25	25	25
Gal per day per occupant for laundry (2019 CA Plumbing Code)				15	15	15	15
Days per year				365	365	365	365
AF per gallon	0.00000307						
Outdoor water savings from using greywater (AF/yr)				104	209	366	522
Water share by SDCWA member agency water authority supply (AF)				82	164	288	411
Electricity required (kWh)				159,801	319,603	560,026	800,449
Water share by SDCWA member agency local supply (AF)				15	30	53	75
Electricity required (kWh)				2,091	4,182	7,328	10,474
Groundwater Supply (AF)				7	14	25	36
Electricity required (kWh)				992	1,985	3,478	4,971
Electricity savings from greywater - upstream (kWh)				159,801	319,603	560,026	800,449
Electricity savings from greywater - local (kWh)				22	44	78	111
Electricity savings from greywater - upstream (MWh)				160	320	560	800
Electricity savings from greywater - local (MWh)				0.02	0.04	0.08	0.11
New Non-Residential Development							
CALGreen Tier 2 water consumption reduction target for new non-residential development (%) [3] [4]			20%	20%	20%	20%	20%
Reduced electricity consumption (MWh) from water use in new non-residential development		0					
Upstream Electricity Use				64	64	192	256
Local Treatment and Distribution Electricity Use				-	-	-	-
GHG Reductions							
Electricity Emission Factor ($MTCO_2e$/MWh)							
Upstream (California Statewide Average)				0.17	0.04	0.02	-
Local Grid Supply				0.17	-	0.02	-
New Residential, Emissions Reduction ($MTCO_2e$)							
Upstream Electricity Use				26.60	13.34	11.69	-
Local Treatment and Distribution Electricity Use				0.004	-	0.002	-
Total Emissions Reduction, New Residential Development ($MTCO_2e$)				26.61	13.34	11.69	-
New Nonresidential, Emissions Reduction ($MTCO_2e$)							
Upstream Electricity Use				11	3	4	-
Local Treatment and Distribution Electricity Use				-	-	-	-
Total Emissions Reduction, New Nonresidential Development ($MTCO_2e$)				10.65	2.67	4.01	-
Total Emissions Reductions ($MTCO_2e$), Residential and Nonresidential Development				**37**	**16**	**16**	**-**
Percentage Change in Water-related Electricity Use Relative to 2030 projection				17%			
[1] Proportion of water end uses in urban consumption data							
Residential outdoors	31%						
Residential indoors	37%						
Commercial and institutional outdoors	15%						
Commercial and institutional indoors	10%						
Industrial	5%						
Energy Production	2%						
Source: California Department of Water Resources, found at PPCI, 2023. Water Use in California's Communities. Available: https://www.ppic.org/publication/water-use-in-californias-communities							
Total non residential indoors	17%						
Total non-residential outdoors	15%						

[2] CALGreen Tier 2 non-residential Prerequisite: 20% or 25% water savings over the "water use baseline". Source: A5.602.2 CALGreen VERIFICATION GUIDELINES TIER 2 CHECKLIST 2022 CALGreen Code. Available: https://www.dgs.ca.gov/-/media/Divisions/BSC/CALGreen/BSC-TP132c-2022-CALGreenTier-2-

[3] A water reduction prerequisite amount is not available from CALGreen Tier 2 for non-residential uses. The measure quantification uses greywater as a proxy for outdoor water reduction.

[4] Elective measures from CA Green Building Code Source: Section 4.3 (Source: https://codes.iccsafe.org/content/CAGBC2022P1/chapter-5-nonresidential-mandatory-measures)	Related measures in CAPCOA, 2021 Measures (GHG reduction potential)
A. Rainwater catchment system	not in CAPCOA
B. Potable water elimination Use of captured rainwater Use of recycled water Water treated for irrigation use of greywater use of drought tolerant plant	Use Locally Sourced Water Supply (moderate); Use Grey Water (small); Design Water-Efficient Landscapes
C. Landscape water meter	not in CAPCOA

[5] Amended County's Code of Regulatory Ordinances to be implemented from 2025

W-2.2

Amend the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar water efficiency requirements for existing development projects with qualifying improvements.

		2030	2035	2040	2045
Average annual improvement to newly permitted system in non-residential land use (Addition) (A) in sq ft [1]	21,910				
Water use (gal) [4]	6,281,011				
CALGreen Tier 2 Water consumption reduction target for non-residential development (%) [2]		20%	20%	20%	20%
Residential capture rate	5%				
Number of residents in homes with grey water systems (increase from 2025) [5]		24,633	24,749	24,924	25,099
Gal per day per occupant from showers, bathtubs, and lavatories (2019 CA Plumbing Code)		25	25	25	25
Gal per day per occupant for laundry (2019 CA Plumbing Code)		15	15	15	15
Days per year		365	365	365	365
AF per gallon	0.00000307				
Outdoor water savings from using greywater (AF)		1,104	1,109	1,117	1,125
Reduced water consumption in improvement to newly permitted system in residential land use (gal)		359,638,150	361,336,860	363,892,590	366,448,320
(gal)		1,256,202	1,256,202	1,256,202	1,256,202
Total reduced water consumption (gal)		360,894,352	362,593,062	365,148,792	367,704,522
Water share by SDCWA member agency water authority supply (%)	79%				
Water share by SDCWA member agency local supply (%)	14%				
Groundwater Supply (%)	7%				
Water share by SDCWA member agency water authority supply (gal)		284,138,583	285,476,007	287,488,179	289,500,351
Electricity required (MWh)		1,818	1,827	1,840	1,852
Water share by SDCWA member agency local supply (gal)		52,051,345	52,296,348	52,664,958	53,033,567
Electricity required (MWh)		54	54	54	55
Groundwater Supply (gal)		24,704,424	24,820,707	24,995,655	25,170,603
Electricity required (MWh)		50	50	50	51
Total Upstream Electricity Use		1,818	1,827	1,840	1,852
Local Treatment and Distribution Electricity Use		103	104	105	105
Electricity Emission Factor ($MTCO_2e$/MWh)	Upstream (California Statewide Average)	0.1665	0.0417	0.0209	-
	Local Grid Supply	0.1665	0.0417	0.0209	-
GHG Reductions ($MTCO_2e$)		**320**	**81**	**41**	**-**

[1] Permit data provided by County on April 26 2023

[2] CALGreen Tier 2 non-residential Prerequisite: 20% or 25% water savings over the "water use baseline". Source: A5.602.2 CALGreen VERIFICATION GUIDELINES TIER 2 CHECKLIST 2022
A water reduction prerequisite amount is not available from CALGreen Tier 2 for non-residential uses. The measure quantification uses greywater as a proxy for outdoor water reduction.

Elective measures from CA Green Building Code Source: section 4.3 (Source: https://codes.iccsafe.org/content/CAGBC2022P1/chapter-5-nonresidential-mandatory-measures)	Related measures in CAPCOA, 2021 Measures (GHG reduction mitigation potential)
A. Rainwater catchment system	not in CAPCOA
B. Potable water elimination Use of captured rainwater Use of recycled water Water treated for irrigation use of greywater use of drought tolerant plant	Use Locally Sourced Water Supply (moderate); Use Grey Water (small); Design Water-Efficient Landscapes (small)
C. Landscape water meter	not in CAPCOA

[4] CALEEMOD results

Land use	Quantity	Unit	Total sq ft	Indoor water use (Mgal)	Outdoor water use (Mgal)
Res (condo/townhouse)	100	DU	100000	6.5154	4.10754
Non-res (general office)	100	1000 sq ft	100000	17.7734	10.8934
Note: CalEEMod v 2020.4.0 used for estimating water consumption					
See SDCv8.pdf		(284,113,950)			

[5] Amended County's Code of Regulatory Ordinances to be implemented from 2025

Note: Permit data provided by County on April 26, 2023

Improvement to newly permitted system (Addition) greater than 20 sq ft	A
Update to existing structure (Alteration) greater than 20 sq ft	B

From data provided by County on addition and alteration of existing buildings, following assumptions were made:

New Primary Residential Structure is marked B as per County emails	-
Rebuild on Existing Foundation is identified as A	
Major Remodel, No Addl Sq. Ft. is not factored in as there is no sq ft built (only demolished)	
Demolition SFD is not factored in as there is no sq ft built (only demolished)	
Records with no completion year are not taken into consideration	
Records for the year 2023 are not taken into consideration	

W-2.3

Update the Green Building Incentive program by 2026 to include incentives for water efficiency, conservation, and reuse improvements for new and existing development to reduce potable water consumption in the unincorporated area.

		2025	2030	2035	2040	2045
CALGreen Tier 2 Water consumption reduction target for non-residential development (%) [2]			20%	20%	20%	20%
Number of residents in homes with grey water systems	*assuming 1% participation*		4,927	4,950	4,985	5,020
Gal per day per occupant from showers, bathtubs, and lavatories (2019 CA Plumbing Code)			25	25	25	25
Gal per day per occupant for laundry (2019 CA Plumbing Code)			15	15	15	15
Days per year			365	365	365	365
AF per gallon	0.00000307					
Outdoor water savings from using greywater (AF)			221	222	223	225
Number of residents per housing unit			3	3	3	3
Housing units with greywater			1,521	1,544	1,554	1,565
Reduced water consumption in improvement to newly permitted system in residential land use (gal)			71,927,630	72,267,372	72,778,518	73,289,664
Water consumed by non residential developments compared to total water consumption (%) [4]	32%					
Non residential water consumption (acre-ft)		31,630	31,781	31,931	32,157	32,382
Non residential water consumption in existing developments (acre-ft)			31,630	31,630	31,630	31,630
Reduction in water consumption in non residential developments (%)	20%					
Reduced water consumption in improvement to newly permitted system in non-res land use (gal)	*assuming 1% participation*		63	63	63	63
Total reduced water consumption			71,927,693	72,267,435	72,778,581	73,289,727
Water share by SDCWA member agency water authority supply (%)	79%					
Water share by SDCWA member agency local supply (%)	14%					
Groundwater Supply (%)	7%					
Water share by SDCWA member agency water authority supply (gal)			56,629,960	56,897,445	57,299,880	57,702,314
Electricity required (MWh)			362.35	364.07	366.64	369.22
Water share by SDCWA member agency local supply (gal)			10,374,042	10,423,043	10,496,765	10,570,487
Electricity required (MWh)			10.67	10.72	10.79	10.87
Groundwater Supply (gal)			4,923,691	4,946,947	4,981,937	5,016,927
Electricity required (MWh)			9.93	9.97	10.04	10.12
Total Upstream Electricity Use			362.35	364.07	366.64	369.22
Local Treatment and Distribution Electricity Use			20.59	20.69	20.84	20.98
Electricity Emission Factor ($MTCO_2e/MWh$)	Upstream (California Statewide Average)		0.17	0.04	0.02	-
	Local Grid Supply		0.17	0.04	0.02	-
GHG Reduction ($MTCO_2e$)			**64**	**16**	**8**	**-**

[1] Data provided by County on April 26 2023

[2] CALGreen Tier 2 non-residential Prerequisite: 20% or 25% water savings over the "water use baseline". Source: A5.602.2 CALGreen VERIFICATION GUIDELINES TIER 2 CHECKLIST 2022 CALGreen Code. Available: A water reduction prerequisite amount is not available from CALGreen Tier 2 for residential uses. The measure quantification uses greywater as a proxy for outdoor water reduction.

Elective measures from CA Green Building Code Source: section 4.3 (Source: https://codes.iccsafe.org/content/CAGBC2022P1/chapter-5-nonresidential-mandatory-measures)	Related measures in CAPCOA, 2021 Measures (GHG reduction mitigation potential)
A. Rainwater catchment system	not in CAPCOA
B. Potable water elimination Use of captured rainwater Use of recycled water Water treated for irrigation use of greywater use of drought tolerant plant	Use Locally Sourced Water Supply (moderate); Use Grey Water (small); Design Water-Efficient Landscapes (small)
C. Landscape water meter	not in CAPCOA

[3] Amended County's Green Building Incentive Program to be implemented from 2026

[4] Source: California Department of Water Resources, found at PPCI, 2023. Water Use in California's Communities. Available: https://www.ppic.org/publication/water-use-in-californias-communities/

W-2.4

Implement the Waterscape Rebate Program to incentivize water efficiency and conservation to reduce outdoor water consumption in the unincorporated area.

		2019	2030	2035	2040	2045
Turf removal						
Units (sq ft) [2]			450,000	700,000	950,000	1,200,000
Water savings (gal/sq ft) [1]			44	44	44	44
Water savings in gal [2]			19,800,000	30,800,000	41,800,000	52,800,000
% saving fromTurf removal			95%	95%	95%	95%
Stormwater harvesting system						
Units (number of rain barrel equivalents [rain barrels or cisterns]) [2]		613	1,800	2,800	3,800	4,800
Water savings (gal/rain barrel equivalent)			621	621	621	621
Water savings in gal [2]			1,117,800	1,738,800	2,359,800	2,980,800
% saving from Stormwater harvesting system			5%	5%	5%	5%
Total saving from Turf removal and Stormwater harvesting system in gal			20,917,800	32,538,800	44,159,800	55,780,800
Gallon/Acre-foot conversion factor [3]	325,851.43					
Total Emissions from Water sector ($MTCO_2e$)		39,000	31,000	8,000	4,000	-
Total Water Use (Acre-Feet)			92,851	94,937	97,047	98,056
Total Water Use (gal)			30,255,630,994	30,935,357,074	31,622,903,588	31,951,687,680
Emissions/gal ($MTCO_2e$/gal)			0.0000010	0.0000003	0.0000001	-
Emissions reduced by updating Waterscape Rebate Program ($MTCO_2e$)			**21**	**8**	**6**	**0**

[1] SDCWA/SoCal WaterSmart Water Savings Table, provided by DPW Watershed, December 13, 2023.
[2] 613 rain barrel equivalents distributed in 2019; this calculation assumes 50,000 sq ft of turf removal and 200 rain barrel equivalents (rain barrels or cisterns) per year beginning in 2022
[3] Convertunits.com

W-3.1

Increase wastewater treatment efficiency through the East County Advanced Water Purification Program to produce 12,900 acre feet of water each year by 2030.

ECAWP Energy Consumption		**2030**	**2035**	**2040**	**2045**
Wastewater/Water Recycling/Solids Handling (kWh) [1]	44,000,000				
Dechlorination facility (kWh) [1]	100,000				
Pump Stations (kWh) [1]	6,000,000				
Total Annual Electricity Consumption (kWh)	50,100,000				
Total Annual Electricity Consumption from the grid (MWh)	50,100				
County specific Electricity Emission Factor ($MTCO_2e$/MWh)		0.0036	0.0004	0.0001	0.0000
Emissions from grid electricity use ($MTCO_2e$)		182	22	6	-
Annual Water Production (AF) [1]	12,900				
Reduced imported water supply due to Advanced Water Purification Program (AF)	12,900				
Annual Water Production (million gal) [1]	4,203				
Reduced imported water supply due to Advanced Water Purification Program (million gal)	4,203				
Avoided GHG emissions from the avoided imported water supply					
Upstream energy intensity (kWh/AF)	1,946				
Local distribution energy intensity (kWh/AF)	139				
Upstream energy use avoided from reduced imported water supply (MWh)	25,103				
Local distribution energy use avoided from reduced imported water supply (MWh)	1,793				
Electricity Emission Factor ($MTCO_2e$/MWh)					
Upstream (California Statewide Average)		0.17	0.04	0.02	-
Local Grid Supply		0.17	0.04	0.02	-
Avoided emissions from reduced imported water supply ($MTCO_2e$)					
Upstream		4,179	1,048	524	-
Local Grid supply		4,179	1,048	524	-
Total		8,358	2,095	1,048	-
Avoided wastewater treatment GHG emissions					
Wastewater Treatment Weighted Emission Factor* ($MTCO_2e$/million gallon) [2]	0.44				
Avoided wastewater treatment emissions from reduced imported water supply ($MtCO_2e$)		1,869	1,869	1,869	1,869
Net emissions reduction ($MTCO_2e$)		**10,046**	**3,942**	**2,911**	**1,869**

[1] Data from email sent by the County (Meghan Kelly) to Ascent on 6/23/2023
[2] Emission factor is calculated based on proportion of water treated at Point Loma Wastewater Treatment Plant, San Luis Rey Wastewater Treatment Plant, and Encina Water Pollution Control Facility and emisson factors at these facilities.

Sector	Strategy	Measure	ID	Action	GHG Reductions by Action ($MTCO_2e$)			
					2030	2035	2040	2045
Agriculture and Conservation	Preserve Natural Lands and Improve Land Management Practices to Protect Habitat and Increase Carbon Storage	A-1: Acquire and manage conservation lands to preserve natural lands and maximize carbon storage potential in the unincorporated area	A-1.1	Acquire 11,000 acres of conservation lands by 2030 and 1,000 acres per year thereafter to preserve land in perpetuity	63,242	71,968	81,291	91,218
			A-1.2	Develop a Habitat Restoration Resource Management Framework for County-owned land by 2030 and restore 80 acres per year thereafter to increase carbon storage.	76	459	841	1,223
		A-2: Develop a tree planting program that expands canopy across the unincorporated area and prioritizes underserved communities	A-2.1	Expand the County's existing tree planting initiative and implement an Equity Driven Tree Planting Program to plant 70,560 trees by 2030 and 6,650 trees per year thereafter on County property and in the unincorporated area.	2,498	3,675	4,852	6,029
			A-2.2	Implement the County's Landscaping Ordinance to require tree planting in new single family residential development in the unincorporated area.	439	601	674	747
	Support Climate-Friendly Farming Practices and Preserve Agricultural Land	A-3: Preserve agricultural lands to prioritize carbon storage and balance economic and development goals	A-3.1	Implement the Purchase of Agricultural Conservation Easement (PACE) Program to preserve 6,058 acres of agricultural land by 2030 and 400 acres per year thereafter.	9,699	12,210	14,736	17,327
		A-4: Incentivize carbon farming to expand carbon storage capacity on agricultural land and support climate-friendly farming practices in the unincorporated area	A-4.1	Develop a Climate Smart Land Stewardship Program by 2026 to increase carbon sequestration on 3,000 acres by 2030 and 36,214 acres by 2045.	10,758	47,691	84,623	121,556
		A-5 : Reduce greenhouse gas emissions from agricultural operations	A-5.1	Develop a program by 2026 to incentivize a transition to cleaner fuels and the efficient use of energy to reduce agricultural operations emissions in the unincorporated area.	1,559	8,987	14,465	19,638
				Total	***88,271***	***145,590***	***201,482***	***257,739***

A-1.1

Acquire 11,000 acres of conservation lands by 2030 and 1,000 acres per year thereafter to preserve land in perpetuity.

		2030	2035	2040	2045
Historic conservation acreages over the past 10 years (2013-2022) (Acre) [1]	8,898.60				
Retired Dwelling Units (DUs) due to historic conservation acreages over the past 10 years (2013-2022) [1]	1,000.68				
Ratio of acres conserved to DUs retired (Acre:DU)	0.11				
Acres of Easements assumed, total, 2019 to 2030 (Acres)	11,000.00				
Acres of Easements assumed, per year, 2031 to 2050 (Acres) [3]	700.00				
Historic conservation acreages, 2015-2019 [1]	4,062.94				
Historic retired DUs, 2015-2019 [1]	708.39				
Acres of Easements relative to 2019 (Acres)		11,000	14,500	18,000	21,500
No. of DUs avoided relative to 2015 (historic retired DUs, 2015-19 + estimated DUs avoided, relative to 2019)		1,945	2,339	2,733	3,126
Emissions avoided by extinguishing DUs ($MTCO_2e$) [2]					
Construction		17,528	20,630	23,746	26,947
Operations					
Mobile		38,947	43,201	48,038	53,395
Area		2,957	3,555	4,153	4,752
Energy					
Electricity		43	51	60	69
Natural Gas		2,957	3,555	4,153	4,752
Water		410	494	577	660
Waste		401	482	563	644
Total emissions ($MTCO_2e$)		**63,242**	**71,968**	**81,291**	**91,218**
Total Emissions avoided by extinguishing DUs ($MTCO_2e$)		**63,242**	**71,968**	**81,291**	**91,218**

[1] Conservation acreages data (broken down by County Preserve, Parcel Acreage, and retired DUs) provided by County (Claire Moss) to Ascent on June 23, 2023.

[2] Scaled from modeling results from CalEEMod Version 2022.1 for 100 single family homes using a rural setting in San Diego county.

[3] Data provided by County during measure review (comment by Meghan Kelly)

A-1.2

Develop a Habitat Restoration Resource Management Framework for County-owned land by 2030 and restore 80 acres per year thereafter to increase carbon storage.

Acres restored per year beginning in 2030 [1]	80
Start year	2030

	2030	2035	2040	2045
Acres restored by target year	80	480	880	1,280

Class of Conservation Practice (COMET-Planner) [2]	Conservation Practice Standard (CPS)	Conservation Practice Implementation	$MTCO_2e$ sequestered per year			
			2030	2035	2040	2045
Restoration of Disturbed Lands	Critical Area Planting (CPS 342)	Restore Highly Disturbed Areas by Planting Permanent Vegetative Cover	42	252	462	671
	Land Reclamation - Abandoned Mined Land (CPS 543)	Restoring Abandoned Mine Lands by Planting Permanent Vegetative Cover	-	-	-	-
	Land Reclamation - Currently Mined Land (CPS 544)	Restoring Currently Mined Lands by Planting Permanent Vegetative Cover	-	-	-	-
	Land Reclamation - Landslide Treatment (CPS 453)	Restoring Land Slide Areas by Planting Permanent Vegetative Cover	15	87	160	233
	Riparian Restoration	Restore Degraded Riparian Areas by Planting Woody Plants	20	120	219	319
Total carbon sequestered per year ($MTCO_2e$)			**76**	**459**	**841**	**1,223**

[1] Acreage data provided by County.
[2] COMET Planner (http://comet-planner.com/)

Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions Associated with Selected Conservation Practices

Practice	Quantity (acres)	CO_2 ($MTCO_2e$/yr)	N_2O ($MTCO_2e$/yr)	CH_4 ($MTCO_2e$/yr)	$MTCO_2e$/yr	Proportion (Input)
Restore Highly Disturbed Areas by Planting Permanent Vegetative Cover	1,000	1,049	-	-	1,049	50%
Restoring Abandoned Mine Lands by Planting Permanent Vegetative Cover	1,000	1,049	-	-	1,049	0%
Restoring Currently Mined Lands by Planting Permanent Vegetative Cover	1,000	1,049	-	-	1,049	0%
Restoring Land Slide Areas by Planting Permanent Vegetative Cover	1,000	729	-	-	729	25%
Restore Degraded Riparian Areas by Planting Woody Plants	1,000	996	-	-	996	25%
						100%

A-2.1
Expand the County's existing tree planting initiative and implement an Equity Driven Tree Planting Program to plant 70,560 trees by 2030 and 6,650 trees per year thereafter on County property and in the unincorporated area.

		2015	2019	2020	2025	2030	2035	2040	2045
Number of trees planted per year from 2015 to 2025 [1]	3,731								
Total number of Trees to be planted per year from 2025 onwards on County property and private property	6,650								
Total number of trees planted		3,731	14,924	18,655	37,310	70,560	103,810	137,060	170,310
Default Annual CO_2 accumulation per tree for Miscellaneous Trees ($MTCO_2e$/tree/year) [2]	0.0354								
Annual Sequestration from Planted Trees ($MTCO_2e$/year)						**2,498**	**3,675**	**4,852**	**6,029**
Trees planted per year after 2030							6,650	6,650	6,650

[1] Per County, achieved average of 3,731 trees and median of 3,661 trees per year 2015-2021 on DPR property. Assuming this continues through 2025.
[2] Source: Appendix A of CalEEMod Version 2020.4.0

A-2.2

Implement the County's Landscaping Ordinance to require tree planting in new single family residential development in the unincorporated area.

		2019	2020	2021	2025	2030	2035	2040	2045
Forecasted Modified Number of Single Family Residences in Unincorporated County		145,287	145,907	146,527	149,821	152,108	154,394	155,429	156,464
Number of New Single Family Residences starting in 2020						6,201	8,487	9,522	10,557
Trees planted per new Single Family Residence						2	2	2	2
Total trees planted in New Single Family Residences						12,402	16,974	19,044	21,114
Default Annual CO_2 accumulation per tree for Miscellaneous Trees ($MTCO_2e$/tree/year) [1]	0.0354								
Annual Sequestration from Planted Trees ($MTCO_2e$/year)						439	601	674	747
Total GHG Reductions ($MTCO_2e$)						**439**	**601**	**674**	**747**

[1] From Appendix A of CalEEMod Version 2020.4.0

A-3.1
Implement the Purchase of Agricultural Conservation Easement (PACE) Program to preserve 6,058 acres of agricultural land by 2030 and 400 acres per year thereafter.

		2030	2035	2040	2045
Total land purchased under the PACE program (acres) from Fiscal Year 2013-14 to 2022-23 [1]	3,316				
DUs extinguished [1]	163.29				
DU avoided factor for the purchased land (DU/Acre) [1]	0.0492				
Land purchased 2015-2019 [1]	1,185				
Land to be purchased from 2019 to 2030 (acres)	4,873				
Agricultural land preserved by 2030	6,058				
Land to be purchased from 2031 to 2050 per year (acres)	400				
Land purchased since 2015 (acres)	1,185	6,058	8,058	10,058	12,058
DU's offset		298	397	495	594
Emissions avoided ($MTCO_2e$) [2]					
Construction		2,688	3,500	4,304	5,119
Operations					
Mobile		5,973	7,329	8,708	10,143
Area		453	603	753	903
Energy					
Electricity		7	9	11	13
Natural Gas		453	603	753	903
Water		63	84	105	125
Waste		61	82	102	122
Total emissions ($MTCO_2e$)		9,699	12,210	14,736	17,327
Total emissions avoided ($MTCO_2e$)		**9,699**	**12,210**	**14,736**	**17,327**

[1] Data provided by County (Claire Moss) to Ascent on PACE easement acquisitions by fiscal year (FY2013/14 through FY2022/23) and calendar year (2013 through March 29, 2023) on February 7, 2023, and June 13, 2023. Data provided: number of PACE easements, total acres acquired, number of DUs extinguished by year.
[2] Scaled from modeling results from CalEEMod Version 2022.1 for 100 single family homes using a rural setting for San Diego county. Modeling conducted separately for different target years.

A-4.1

Develop a Climate Smart Land Stewardship Program by 2026 to increase carbon sequestration on 3,000 acres by 2030 and 36,214 acres by 2045.

Carbon Farming Practice [1]	Type of land [3]	COMET Planner agricultural system type [1]	Acreage on which practice can be implemented [3] (2030)	$MTCO_2e$ sequestered per year [2]	Acreage on which practice can be implemented [3] (2045)	$MTCO_2e$ sequestered per year [2]
Compost	Crops (Slope <25%)	Cropland	1,000	3,164	8,554	27,061
Compost and Nutrient management (0% synthetic fertilizer use)	Crops (Slope <25%)	Cropland	1,000	3,176	8,554	27,163
Compost	Rangeland/grassland/ pasture (Slope <25%)	Grazing Land	1,000	4,419	15,167	67,024
Riparian restoration	Wetlands (on crop land and range/ pasture)	Cropland	-	-	480	209
Hedgerows	Nursery/ornamental	Cropland	-	-	3,460	98
Total carbon sequestered per year ($MTCO_2e$)			**3,000**	**10,758**	**36,214**	**121,556**

Conversions:

1 acre =	43,560	square feet	3,460 acre =	150,698,003	square feet
Length of side (feet)	209		Length of side (feet)	12,276	
Perimeter of 1 acre land (linear feet)	835		Perimeter (linear feet)	49,104	
Perimeter of 3,460 1 acre parcels (linear feet)	2,888,175				
Linear ft to acres factor (Acres/Linear ft) [3]	0.229				

Assuming the width of hedgerows is 10 feet. A hedgerow that is at least 10 feet wide (20 feet long) is a minimum size so it can incorporate several rows of plants to be effective. Source: Tenth Acre Farm, 2023. How to Plant a Hedgerow in the Home Landscape. Available: https://www.tenthacrefarm.com/how-to-plant-a-hedgerow/#:~:text=If%20you%20can%20swing%20it%2C%20a%20hedgerow%20that,plantings%20along%20a%20property%20line%20can%20do%20wonders.

[1] Practice and associated acreage data provided by County.

[2] COMET Planner (http://comet-planner-cdfahsp.com/) - see notes below for details

[3] https://www.inchcalculator.com/acreage-calculator/

[3] Data provided by County

A-5.1

Develop a program by 2026 to incentivize a transition to cleaner fuels and the efficient use of energy to reduce agricultural operations emissions in the unincorporated area.

		2019	2025	2030	2035	2040	2045
Agricultural Land (Acres) in unincorporated county		114,746	114,746	112,385	110,023	109,578	109,132
GHG Emissions from Agriculture Equipment (except irrigation pumps)		66,144	63,269	61,164	59,214	57,297	55,515
Diesel consumed in Agriculture Equipment (except irrigation pumps) in SD Region (gal)				6,555,384	6,330,316	6,121,236	5,927,000
Gasoline consumed in Agriculture Equipment (except irrigation pumps) in SD Region (gal)				238,913	235,806	232,950	230,328
Ratio of Agriculture Land Acreage - Unincorporated County to San Diego Region	88%						
Diesel consumed in Agriculture Equipment (except irrigation pumps) in unincorporated SD County (gal)				5,768,738	5,570,678	5,386,687	5,215,760
Gasoline consumed in Agriculture Equipment (except irrigation pumps) in unincorporated SD County (gal)				210,243	207,509	204,996	202,689
Diesel Ag equipment population in San Diego Region				4,504	4,355	4,216	4,086
Gasoline Ag equipment population in San Diego Region				618	605	593	581
Diesel Ag equipment population in unincorporated San Diego County				3,964	3,832	3,710	3,596
Gasoline Ag equipment population in unincorporated San Diego County				544	532	521	512
Incentives to switch to Tier 4 equipment (except irrigation pumps)							
Percent of Existing Farm Equipment that could feasibly switch to Tier 4				2.5%	7.5%	10.0%	15.0%
Average Fuel Economy Savings by Switching from Tier 2 to Tier 4 Final [1]	2.5%						
Number of Diesel Ag equipment that could feasibly switch to Tier 4				99	287	371	539
Number of Gasoline Ag equipment that could feasibly switch to Tier 4				14	40	52	77
Emissions reduced from Existing Farm Equipment switching to Tier 4 Final ($MTCO_2e$)				38	111	143	208
Transition to electric equipment (except irrigation pumps)							
Percent of existing and new farm equipment that could feasibly transition to electric equipment [4]				2.5%	15%	25%	35%
Number of Diesel Ag equipment that could feasibly switch to electric equipment				99	575	927	1,259
Number of Gasoline Ag equipment that could feasibly switch to electric equipment				14	80	130	179
Emissions reduced from transition to electric equipment ($MTCO_2e$)				1,529	8,882	14,324	19,430
Emissions from increased electric load by transitioning Ag equipments to electric (except irrigation pumps							
Diesel saved by transition to Agriculture Equipment (except irrigation pumps) (gal)				144,218	835,602	1,346,672	1,825,516
Gasoline saved by transition to Agriculture Equipment (except irrigation pumps) (gal)				5,256	31,126	51,249	70,941
Assumed average efficiency of diesel engines [2]				40%	40%	40%	40%
Assumed average efficiency of gasoline engines [5]				33%	33%	33%	33%
Assumed average efficiency of electric heating [3]				100%	100%	100%	100%
Electricity consumed (MWh)				2,410	13,974	22,533	30,563
Electricity Emission Factor ($MTCO_2e$/MWh)				0.0036	0.0004	0.0001	-
Emissions from electricity use ($MTCO_2e$)				9	6	3	-
Agricultural Equipment Emissions ($MTCO_2e$)				61,164	59,214	57,297	55,515
Net Emissions Reduction from Measure A-6.2				**1,559**	**8,987**	**14,465**	**19,638**
% reduction				3%	15%	25%	35%
units transitioned				225	982	1,481	2,054

[1] For engines >751 HP, Tier 4 Final fuel efficiency is improved by up to 5 percent over Tier 2 engines.(https://www.cummins.com/engines/tier-4-final-1). CAT states a 5 reduction over Tier 4 interim

[2] General Power. 2022. Diesel Generator vs. Gas Generator: Which is More Efficient? Available at https://www.genpowerusa.com/blog/diesel-generator-vs-gas-generator-which-is-more-efficient/#:~:text=Diesel%20generators%20introduce%20and%20compress,percent%20of%20total%20load%20capacity.

[3] U.S. DOE. 2021. Electric Resistance Heating. Available: https://www.energy.gov/energysaver/home-heating-systems/electric-resistance-

[4] California Executive Order N-79-20 (sets a goal to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible).

[5] ottovonschirach, 2021. What is the efficiency of gasoline engine? Available at https://ottovonschirach.com/what-is-the-efficiency-of-gasoline-engine/

Sector	Strategy	Measure	ID	Action	GHG Reductions by Action ($MTCO_2e$)			
					2030	2035	2040	2045
Energy	Increase Building Energy Efficiency, Renewable Energy, and Electrification in the Unincorporated Area and County Operations	E-1: Develop policies and programs to increase energy efficiency, renewable energy use, and electrification in County Operations	E-1.1	Implement the County Facilities Zero Carbon Portfolio Plan to achieve 90% reduction in operational carbon emissions by 2030 through building electrification and zero net energy construction, energy efficiency, energy management, and renewable energy use and generation	13,715	14,698	16,135	16,858
		E-2: Develop policies and programs to increase energy efficiency and electrification in the unincorporated area	E-2.1	Amend the County's Code of Regulatory Ordinances by 2026 to require all-electric equipment in new residential, commercial, and industrial construction to reduce energy emissions from new development in the unincorporated area.	17,734	39,512	59,394	80,358
			E-2.2	Increase energy efficiency and reach 30% electrification in residential and 17% electrification in non-residential existing development in the unincorporated area by 2030 by: -Amending the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar energy efficiency requirements for existing development projects with qualifying improvements. -Adopting a Building Energy Performance Standard by 2026 for commercial and multi-family residential properties. -Developing a program by 2026 to incentivize building electrification and energy efficiency (e.g., electrically powered appliances, heat pumps)	124,742	209,086	292,283	439,082
		E-3: Develop policies and programs to increase renewable energy use, generation, and storage in the unincorporated area	E-3.1	Amend the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar renewable energy requirements for new residential and non-residential construction to increase renewable energy generation in new development.	252	69	28	-
			E-3.2	Expand and implement the County's streamlined solar permitting process to install 5,002 kW of renewable energy on existing development by 2030 and 12,505 kW by 2045.	29	5	2	-
			E-3.3	Develop a program to provide 100% renewable energy to residents and businesses participating in San Diego Community Power by 2030 in the unincorporated area.	176,625	33,948	18,925	-
				Total	***333,097***	***297,319***	***386,766***	***536,299***

E-1.1

Implement the County Facilities Zero Carbon Portfolio Plan to achieve 90% reduction in operational carbon emissions by 2030 through building electrification and zero net energy construction, energy efficiency, energy management, and renewable energy use and generation.

Reductions from natural gas phase out		**2019**	**2030**	**2035**	**2040**	**2045**
Forecasted natural gas usage in buildings and facilities (therms)		2,461,283	2,610,863	2,678,853	2,746,844	2,814,835
Natural gas usage in existing buildings and facilities (therms)		2,461,283	2,461,283	2,461,283	2,461,283	2,461,283
Target electrification rate [1]			93%	95%	100%	100%
Reduced natural gas use (therms)			2,428,102	2,544,911	2,746,844	2,814,835
Natural gas emissions factor ($MTCO_2e$/therm)			5.32E-03	5.32E-03	5.32E-03	5.32E-03
GHG reductions from natural gas savings in existing buildings and facilities ($MTCO_2e$)			12,919	13,541	14,615	14,977
Natural gas use in new buildings and facilities (therms)			149,580	217,570	285,561	353,552
Target electrification rate [4]			100%	100%	100%	100%
Reduced natural gas use (therms)			149,580	217,570	285,561	353,552
Natural gas emissions factor ($MTCO_2e$/therm)			5.32E-03	5.32E-03	5.32E-03	5.32E-03
GHG reductions from natural gas savings in new buildings and facilities ($MTCO_2e$)			796	1,158	1,519	1,881
Total GHG reductions from natural gas savings in buildings and facilities (MTCO2e)			**13,715**	**14,698**	**16,135**	**16,858**
Additional electricity use and emissions						
Assumed average efficiency of natural gas heating [2] [3]			78%	78%	78%	78%
Assumed average efficiency of electric heating [4]			100%	100%	100%	100%
MWh per therm conversion	0.029					
Total therms offset due to electrification (therms)			2,577,682	2,762,481	3,032,405	3,168,386
Total electricity needed to offset natural gas (MWh)			58,307	62,487	68,593	71,669
Local Government Electricity Emission Factor ($MTCO_2e$/MWh)			0.00	0.00	0.00	0.00
Total GHG emissions from electricity use ($MTCO_2e$)			-	-	-	-
Potential for Reductions from ZNE construction						
Forecasted electricity use in buildings and facilities (MWh)		113,285	124,603	129,744	134,886	140,027
Electricity use in existing facilities (MWh)			113,285	113,285	113,285	113,285
Forecasted growth in electricity use (relative to 2019) (MWh)			11,318	16,458	21,600	26,742
Additional electricity use from elimination of natural gas in new buildings and facilities (MWh)			58,307	62,487	68,593	71,669
Total electricity use that could be reduced through ZNE construction (EE + renewables)			69,625	78,946	90,193	98,411
Emissions Reductions ($MTCO_2e$)			**13,715**	**14,698**	**16,135**	**16,858**

Sources:

[1] Target electrification rates adjusted to achieve 90% reduction in operational carbon emissions by 2030

[2] https://www.energy.gov/sites/prod/files/2014/05/f15/fupwg_may2014_new_gas_technologies.pdf

[3] https://www.aceee.org/sites/default/files/publications/researchreports/a1602.pdf

[4] U.S. DOE. 2021. Electric Resistance Heating. Available: https://www.energy.gov/energysaver/home-heating-systems/electric-

E-2.1
Amend the County's Code of Regulatory Ordinances by 2026 to require all-electric equipment in new residential, commercial, and industrial construction to reduce energy emissions from new development in the unincorporated area.

	2019	2025	2030	2035	2040	2045
Fuel switching from natural gas						
Forecasted natural gas usage in the unincorporated county (therms)	86,039,213	94,000,000	97,300,000	101,200,000	104,500,000	107,900,000
Natural gas use in existing land uses (as of 2025) (therms)			94,000,000	94,000,000	94,000,000	94,000,000
Anticipated growth in natural gas use in unincorporated county (therms)			3,300,000	7,200,000	10,500,000	13,900,000
Estimated growth in residential natural gas use (therms)			1,378,992	3,008,709	4,387,701	5,808,481
Target electrification rate for new residential development			100%	100%	100%	100%
Estimated growth in non-residential natural gas use (therms)			1,921,008	4,191,291	6,112,299	8,091,519
Target electrification rate for new non-residential development			80%	85%	90%	95%
Reduced natural gas usage in new residential development (therms)			1,378,992	3,008,709	4,387,701	5,808,481
Reduced natural gas usage in new non-residential development (therms)			1,536,807	3,562,597	5,501,069	7,686,943
Remaining natural gas therms from new development			384,202	628,694	611,230	404,576
Natural gas emissions factor ($MTCO_2e$/therm)			0.00545	0.00545	0.00545	0.00545
GHG reductions from natural gas savings from new development ($MTCO_2e$)			15,891	35,814	53,894	73,550
Additional electricity use and emissions						
Assumed average efficiency of natural gas heating [1] [2]		78%	78%	78%	78%	78%
Assumed average efficiency of electric heating [3]		100%	100%	100%	100%	100%
MWh per therm conversion		0.029				
Total therms offset from natural gas heating use (therms)			2,915,798	6,571,306	9,888,770	13,495,424
Total electricity needed to offset natural gas (MWh)			65,955	148,643	223,684	305,266
Electricity Emission Factor ($MTCO_2e$/MWh)			0.0036	0.0004	0.0001	0.0000
Total GHG emissions from electricity use by reducing natural gas use ($MTCO_2e$)			239	66	27	-
Fuel switching from propane						
Forecasted propane usage in the unincorporated county (gal)	20,872,121	21,500,000	21,900,000	22,200,000	22,500,000	22,700,000
Propane use in existing land uses (as of 2025) (gal)			21,500,000	21,500,000	21,500,000	21,500,000
Estimated growth in propane use in unincorporated county (gal)			400,000	700,000	1,000,000	1,200,000
Target electrification rate			90.0%	92.5%	95.0%	97.5%
Reduced propane usage (gal)			360,000	647,500	950,000	1,170,000
Remaining propane usage from new development			40,000	52,500	50,000	30,000
Propane emissions factor ($MTCO_2e$/gal)			0.01	0.01	0.01	0.01
GHG reductions from propane savings from new development ($MTCO_2e$)			2,095	3,768	5,528	6,808
Assumed average efficiency of propane [4] [5] [6]			36%	36%	36%	36%
Assumed average efficiency of electric heating [3]			100%	100%	100%	100%
MWh per gal conversion		0.028				
Total gal offset from propane heating use (gal)			360,000	647,500	950,000	1,170,000
Total electricity needed to offset propane (MWh)			3,627	6,524	9,572	11,789
Electricity Emission Factor ($MTCO_2e$/MWh)			0.0036	0.0004	0.0001	0.0000
Total GHG emissions from electricity use Offsetting propane use ($MTCO_2e$)			13.14	2.90	1.13	-
Emissions Reductions ($MTCO_2e$)			**17,734**	**39,512**	**59,394**	**80,358**
Energy-related emissions (leg-adjusted) ($MTCO_2e$)			860,000	719,000	721,000	720,000
% reduction			2%	5%	8%	11%

Assumption
LPG generators have the same power and performance as petrol generators [5]. Diesel (40% efficiency [4])contains about 10% more energy by volume than petrol [6].
Sources:
[1] https://www.energy.gov/sites/prod/files/2014/05/f15/fupwg_may2014_new_gas_technologies.pdf
[2] https://www.aceee.org/sites/default/files/publications/researchreports/a1602.pdf
[3] U.S. DOE. 2021. Electric Resistance Heating. Available: https://www.energy.gov/energysaver/home-heating-systems/electric-
[4] General Power. 2022. Diesel Generator vs. Gas Generator: Which is More Efficient? Available at https://www.genpowerusa.com/blog/diesel-generator-vs-gas-generator-which-is-more-efficient/#:~:text=Diesel%20generators%20introduce%20and%20compress,percent%20of%20total%20load%20capacity.
[5] FloGas. 2022. Comparable Portable Generators. Available at: https://www.bing.com/search?q=lpg+generator+efficiency&cvid=53f86bab04b548cdba264f22f2b12bcc&aqs=edge.0.0j69i64j69i11004.7717j0j4&FORM=ANAB01&PC=U531
[6]Business Today. 2018. Generator Fuel Efficiency: What You Need to Know. Available at https://businesstoday.co.ke/generator-fuel-efficiency-need-know/

E-2.2

Increase energy efficiency and reach 30% electrification in residential and 17% electrification in non-residential existing development in the unincorporated area by 2030 by:
-Amending the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar energy efficiency requirements for existing development projects with qualifying improvements.
-Adopting a Building Energy Performance Standard by 2026 for commercial and multi-family residential properties.
-Developing a program by 2026 to incentivize building electrification and energy efficiency (e.g., electrically powered appliances, heat pumps).

	2019	2025	2030	2035	2040	2045
Fuel switching from natural gas in existing residential buildings						
Existing natural gas usage in residential buildings (therms)	35,953,748	35,953,748	35,953,748	35,953,748	35,953,748	35,953,748
Annual building electrification rate (per year) [1]						
Target electrification rate for existing residential buildings [1]			30%	50%	70%	90%
Number of housing units captured			50,940	84,900	118,859	152,819
Reduced residential natural gas usage (therms)			10,786,124	17,976,874	25,167,624	32,358,373
Natural gas emissions factor ($MTCO_2e$/therm)			0.00545	0.00545	0.00545	0.00545
GHG reductions from natural gas to electric fuel switching - existing residential buildings ($MTCO_2e$/year)			58,784	97,974	137,164	176,353
Fuel switching from natural gas in existing non-residential buildings						
Existing natural gas usage in non-residential buildings (therms)	50,085,465	50,085,465	50,085,465	50,085,465	50,085,465	50,085,465
Annual building electrification rate (per year) [1]						
Target electrification rate for existing non-residential buildings [1]			17%	28%	39%	66%
Reduced non-residential natural gas usage (therms)			8,514,529	14,023,930	19,533,331	33,056,407
Natural gas emissions factor ($MTCO_2e$/therm)			0.00545	0.00545	0.00545	0.00545
GHG reductions from natural gas to electric fuel switching - existing non-residential buildings (MTCO2e/year)			46,404	76,430	106,457	180,157
Increased GHG emissions from natural gas to electric fuel switching - existing residential and non-residential buildings						
Assumed average efficiency of natural gas heating [2]			78%	78%	78%	78%
Assumed average efficiency of electric heating [3]			100%	100%	100%	100%
MWh per therm conversion		0.029				
Total therms offset from natural gas use (therms)			19,300,653	32,000,804	44,700,955	65,414,780
Total electricity needed to offset natural gas (MWh)			436,581	723,858	1,011,136	1,479,682
Electricity Emission Factor ($MTCO_2e$/MWh)			0.0036	0.0004	0.0001	0.0000
GHG emissions increased from natural gas to electric fuel switching existing residential and non-residential buildings (MTCO2e/year)			1,582	322	120	-
Fuel switching from propane to electricity in existing residential and non-residential buildings						
Forecasted propane usage in the unincorporated county (gal)	20,872,121	21,500,000	21,900,000	22,200,000	22,500,000	22,700,000
Propane use in existing land uses (as of 2025) (gal)			21,500,000	21,500,000	21,500,000	21,500,000
Annual building electrification rate (per year) [1]						
Target electrification rate			17%	28%	39%	66%
Reduced propane usage (gal)			3,655,000	6,020,000	8,385,000	14,190,000
Remaining propane usage from existing development			17,845,000	15,480,000	13,115,000	7,310,000
Propane emissions factor ($MTCO_2e$/gal)			0.01	0.01	0.01	0.01
GHG reductions from propane to electric fuel switching - existing residential and non-residential buildings (MTCO2e/year)			21,268	35,030	48,792	82,572
Increased GHG emissions from propane to electric fuel switching - existing residential and non-residential buildings						
Assumed average efficiency of propane [4]			36%	36%	36%	36%
Assumed average efficiency of electric heating [3]			100%	100%	100%	100%
MWh per gal conversion		0.028				
Total gal offset from propane heating use (gal)			3655000	6020000	8385000	14190000
Total electricity needed to offset propane (MWh)			36,827	60,656	84,486	142,975
Electricity Emission Factor ($MTCO_2e$/MWh)			0.0036	0.0004	0.0001	0.0000
GHG emissions increased from propane to electric fuel switching existing residential and non-residential buildings (MTCO2e/year)			133.42	26.96	10.01	-
Emissions Reductions ($MTCO_2e$/year)			**124,742**	**209,086**	**292,283**	**439,082**

[1] Mozingo. 2021. Zero-Carbon Buildings in California: A Feasibility Study
[2] https://www.aceee.org/sites/default/files/publications/researchreports/a1602.pdf
[3] U.S. DOE. 2021. Electric Resistance Heating. Available: https://www.energy.gov/energysaver/home-heating-systems/electric-resistance-
[4] Alternative Fuels Data Center, 2021. Fuel Properties Comparison (https://afdc.energy.gov/files/u/publication/fuel_comparison_chart.pdf)

E-3.1

Amend the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar renewable energy requirements for new residential and non-residential construction to increase renewable energy generation in new development.

	2030	2035	2040	2045
Increased electricity use after applying measure E-2.1 (MWh)	69,583	155,167	233,256	317,055
KWh to KW factor for San Diego, CA [1]				
MWh to MW factor for San Diego, CA				
Capacity of solar panels installed due to implementation of measure E-3.1 (MW)	43	97	146	198
Total emissions from increased electricity use after applying measure E-3.1 ($MTCO_2e$)	252	69	28	-
GHG emissions reduction ($MTCO_2e$)	**252**	**69**	**28**	**-**

Estimated reductions are beyond the 2022 Title 24 code and CALGreen which currently require solar to cover electricity in a home with no electric water heater or stove
Under current code, solar PV system must be sized to provide for full annual energy usage of mixed-fuel home; size calculation does not include furnace, water heater, stove, dryer
E-2.1 estimates the increased electricity demand from electrification of natural gas uses in new development

[1] Average annual kW converted to average annual kWh using NREL's PVWatts Calculator using "San Diego county" as the address.

E-3.2
Expand and implement the County's streamlined solar permitting process to install 5,002 kW of renewable energy on existing development by 2030 and 12,505 kW by 2045.

		2030	2035	2040	2045
Average sq ft of development with solar installation in last 5 years (2018 to 2022) (sq ft per year) [1]	1,257				
Average number of permits issued in last 5 years (2018 to 2022) [1]	6,863				
Average annual kW solar installed in last 5 years (2018 to 2022) [1]	50,022				
Average electricity generation through permits issued annually (kWh) [2]	80,061,811				
Conversion to MWh	80,062				
Increase in KWh generation with expanded program compared to last 5 years average (%)		10%	15%	20%	25%
Increase in number of permits under expanded program (avg per year)		686	1,029	1,373	1,716
Electricity generation with updated program (kWh)		88,067,993	92,071,083	96,074,174	100,077,264
Electricity generation with updated program (MWh)		88,068	92,071	96,074	100,077
Increased solar generation due to updated program (MWh)		8,006	12,009	16,012	20,015
Increased solar generation due to updated program (kWh)		8,006,181	12,009,272	16,012,362	20,015,453
Electricity emissions factor (MTCO2e/MWh)		0.0036	0.0004	0.0001	0.0000
Emissions reduced from expanded solar permitting process (MTCO2e)		**29**	**5**	**2**	**-**
Increased solar installed (kW)		5,002	7,503	10,004	12,505
Average number of solar permits per year after implementation of the measure		7,550	7,893	8,236	8,579

[1] Data provided by County (Claire Moss) to Ascent on March 29, 2023
[2] Average annual kW converted to average annual kWh using NREL's PVWatts Calculator using "San Diego county" as the address.

E-3.3

Develop a program to provide 100% renewable energy to residents and businesses participating in San Diego Community Power by 2030 in the unincorporated area.

		2019	2030	2035	2040	2045
Electricity use in unincorporated county (GWh)		1,830	2,520	2,591	2,667	2,744
Reductions from other measures (MWh)	*E-3.2*		8,006	12,009	16,012	20,015
Remaining demand (GWh)			2,512	2,579	2,651	2,724
Total Forecasted Demand in unincorporated county (GWh)			2,512	2,579	2,651	2,724
Participation rate in 100% renewable option			95.1%	96.7%	98.4%	100.0%
Electricity emissions factor ($MTCO_2e$/MWh) (from CAP Appendix 3)			0.074	0.014	0.007	-
Emissions from electricity demand ($MTCO_2e$)			185,726	35,094	19,239	-
GHG Reductions from increased participation in SDCP 100% option ($MTCO_2e$)			**176,625**	**33,948**	**18,925**	**-**
Electricity emissions factor ($MTCO_2e$/MWh) with increased participation in SDCP 100% option			0.0036	0.0004	0.0001	-
Electricity emissions factor ($lbCO_2e$/MWh) with increased participation in SDCP 100% option			7.9870	0.9800	0.2613	-

Sector	Strategy	Measure	ID	Action	GHG Reductions by Action ($MTCO_2e$)			
					2030	2035	2040	2045
Built Environment and Transportation	Decarbonize the On-Road and Off-Road Vehicle Fleet	T-1: Reduce fleet and small equipment emissions from County Operations	T-1.1	Implement the County's 2019 Electric Vehicle Roadmap and 2023 Green Fleet Action Plan to reduce fleet emissions 35% by 2030 and 100% by 2045.	7,900	9,772	10,234	13,250
			T-1.2	Amend Board policy to require 100% of landscaping equipment used on County property to be zero-emissions by 2030.	5	5	5	5
		T-2: Increase the use of low-carbon and zero-emission landscaping and off-road construction equipment in the unincorporated area	T-2.1	Develop a program by 2026 to provide residents and businesses incentives to purchase alternative fuel and/or zero-emission construction and landscaping equipment to reduce emissions 3% by 2030.	2,072	3,762	7,773	-
			T-2.2	Develop and adopt a landscaping equipment ordinance to require the use of zero emission landscaping equipment by 2030 and zero emission construction equipment by 2045 in the unincorporated area.	7,638	7,750	7,839	86,376
		T-3: Install electric vehicle charging stations and provide incentives for zero-emissions vehicles in the unincorporated area	T-3.1	Increase the use of electric and other zero-emission vehicles in the unincorporated area by: - Installing 2,040 publicly available electric vehicle charging stations by 2028. - Requiring the electrification of loading docks and idling reduction in new commercial and industrial development by 2030. - Amending the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar electric vehicle charging infrastructure installations and preferential parking for ZEVs for new multi-family residential and non-residential construction. - Developing a program by 2026 to incentivize EV purchases and school bus electrification	218,884	232,645	270,436	297,184
	Support Active Transportation and Reduce Single-Occupancy Vehicle Trips	T-4: Reduce emissions from County employee commutes	T-4.1	Expand County Benefit Program by 2026 to provide County employees with tax-free transportation benefits, alternative work schedules, and expand part-time or full-time teleworking options to reduce vehicle miles traveled from employee commutes by 40% in 2030 and 64% in 2045.	12,800	9,900	6,500	8,960
			T-4.2	Develop a rebate program by 2026 for County employees to purchase electric vehicles, bicycles, and scooters for commute use.	903	1,204	1,037	1,448
		T-5: Improve County roadways to encourage walking, biking, rolling to/from transit and destinations and increase transportation efficiency	T-5.1	Implement the County's Active Transportation Plan to install 345 miles of sidewalk and 315 miles of bikeways by 2030 to encourage alternative modes of transportation in the unincorporated area.	1,756	2,425	2,100	2,800
			T-5.2	Develop a countywide Safe Routes to Schools program to reduce vehicle miles traveled to schools by 1.2% by 2030.	214	144	82	82
		T-6: Support transit and transportation demand management to reduce single occupancy vehicle trips in the unincorporated area	T-6.1	Develop a program to provide free transit passes and/or free trips in the unincorporated area to reduce vehicle miles traveled in the unincorporated area by 1.2% by 2030.	3,051	2,396	1,582	2,146
			T-6.2	Increase access to Transit Priority Areas by 5% in the unincorporated area and implement transit-supportive roadway treatments such as traffic signal communication and curb extensions along County-maintained roadways to optimize traffic flow for transit and pedestrians by 2030.	12,615	19,709	19,444	35,198
			T-6.3	Increase access to first/last mile transportation services and connections (e.g., neighborhood electric vehicles, microtransit, bike/scooter-share) to reduce vehicle miles traveled by 7% within the unincorporated area by 2030.	994	1,215	1,001	1,292
				Total	**268,831**	**290,927**	**328,033**	**448,742**

T-1.1

Implement the County's 2019 Electric Vehicle Roadmap and 2023 Green Fleet Action Plan to reduce fleet emissions 35% by 2030 and 100% by 2045.

		2019	2027	2030	2035	2040	2045
Replace Gasoline Vehicles with EVs							
County fleet emissions from on road gasoline vehicles with ACCII impact ($MTCO_2e$)		21,109		15,811	10,473	6,001	5,726
Gasoline vehicles replaced with EVs [3] [4] [7]			501	551	601	651	701
Weighted Gasoline emission factor ($MTCO_2e$/mile) [1]				0.000329	0.000307	0.000295	0.000288
Gasoline consumption per vehicle (gal/vehicle) [2]				521	493	475	465
Reduced Gasoline consumption by transition to EVs (gal)				286,917	296,009	309,388	325,798
Baseline and forecasted gasoline consumption in on-road vehicles (gal)		2,369,929		2,662,855	2,757,060	2,839,251	2,921,442
Remaining gasoline consumption after transition to EVs (gal)				2,375,938	2,461,051	2,529,863	2,595,643
Adjusted emissions from gasoline use in on-road vehicles ($MTCO_2e$)				14,107	9,349	5,347	5,087
Emission reduction due to transition to EVs ($MTCO_2e$)				1,704	1,124	654	639
Additional electric load due to transition to EVs							
Gal to MWh factor	27.32						
Electricity needed to offset reduced gasoline use (MWh) [2]				10,501	10,834	11,324	11,924
Electricity emissions factor ($MTCO_2e$/MWh)				0.0036	0.0004	0.0001	0.0000
Emissions from added electricity load ($MTCO_2e$)				38	5	1	-
Net emissions reductions from replacing gasoline vehicles with EVs ($MTCO_2e$)				1,666	1,120	653	639
Replace existing diesel and gasoline vehicles with more fuel efficient vehicles [5]							
Forecasted Emissions by Fuel from County Fleet Operations (MTCO2e)							
Emissions from Fuel: Gasoline (from on-road vehicles) after replacing gasoline vehicles with EVs				14,145	9,354	5,348	5,087
Emission from Fuel: Petroleum based Diesel				62	61	61	62
Emissions from Fuel: Renewable Diesel				6,574	6,808	7,087	7,462
Total emisions from fuel (Gasoline, Petroleum Diesel, Renewable Diesel)				20,781	16,223	12,497	12,612
Percent reduction in vehicle fleet emissions below future forecasts years [6]				30%	53%	77%	100%
Annual reduction in fleet emissions from forecast (MTCO2e)				6,234	8,652	9,581	12,612
Target fleet emissions after reduction (MTCO2e)				14,547	7,571	2,916	-
GHG Reductions from reducing County's Fleet Emissions (MTCO2e)				6,234	8,652	9,581	12,612
Total reductions (MTCO2e)				**7,900**	**9,772**	**10,234**	**13,250**
Forecasted Emissions by Fuel from County Fleet Operations [5]							
Emissions from Fuel: Electricity				4	1	0	-
Emissions from Fuel: Gasoline (from on-road vehicles)				15,811	10,473	6,001	5,726
Emissions from Fuel: Petroleum based Diesel				62	61	61	62
Emissions from Fuel: Renewable Diesel				6,574	6,808	7,087	7,462
Total forecasted emissions				22,450	17,343	13,150	13,250
Percent reduction				**35%**	**56%**	**78%**	**100%**

[1] Calculated using EMFAC, 2021, assuming County has the same vehicle mix as San Diego region
[2] Using county-wide Emission Factor from EPIC (Assumes EVs are not exclusively charged at County facilities)
[3] Per County's EV Roadmap and Green Fleet Action Plan, the calculation assumes 250 vehicles in 2025 and 251 vehicles in 2027 (a total of 501 by 2027) replaced with
[4] Adding 50 EVs every 5 years from 2030 through 2050 as per discussion with the County in meeting dated 5/11/2023
[5] This measure addresses only on-road vehicles (and excludes aircraft and landscape eqipment)
[6] Data provided by County (Meghan Kelly) to Ascent via email on 6/26/2023
[7] Assumption: only gasoline vehicles would be replaced with EVs because 79.72% of fuel consumed for on road transportation is gasoline while only 0.12% petroleum based diesel is consumed by on road vehicles. Other fuel types used by in the County fleet are used of construction activities and aircraft.

County Regulatory ordinance related to measure T-1.1

H-1: If EV infrastructure is available at the site where an EV Capable vehicle is stationed and the EV Capable vehicle is at least 75% depreciated, that vehicle will be included in the annual list for vehicle replacement.
H-2: All vehicles purchased will be b) energy-efficient and low emissions within the vehicle class/type, e; d) meet the criteria of the County definition of Electric Vehicle (EV) Capable when available. DGS will use the County of San Diego Green Fleet Action Plan to assist departments in developing Five-Year Vehicle Replacement Plan
F-22: DGS may include provisions for potential electric vehicle charging stations in parking areas

T-1.2

Amend Board policy to require 100% of landscaping equipment used on County property to be zero-emissions by 2030.

	2019	2030	2035	2040	2045
Landscaping equipment emissions	4	5	5	5	5
Percent of equipment transitioned to zero-emissions		100%	100%	100%	100%
Emissions reduced from equipment transitioning to zero emission equipment ($MTCO_2e$)		**5**	**5**	**5**	**5**

T-2.1

Develop a program by 2026 to provide residents and businesses incentives to purchase alternative fuel and/or zero-emission construction and landscaping equipment to reduce emissions 3% by 2030.

		2019	2025	2030	2035	2040	2045
Diesel consumed in Construction Equipment in San Diego region (gal)				24,749,749	26,109,800	27,469,868	28,829,163
Gasoline consumed in Construction Equipment in San Diego region (gal)				765,682	776,225	787,640	787,081
Ratio of Construction Jobs - Unincorporated County to San Diego region (From EPIC's inventory report)	25%						
Diesel consumed in Construction Equipment in unincorporated county (gal)				6,187,437	6,527,450	6,867,467	7,207,291
Gasoline consumed in Construction Equipment in unincorporated county (gal)				191,420	194,056	196,910	196,770
Emissions from Construction and Mining equipment (MT CO_2e)		44,179	61,410	67,738	73,461	75,849	78,454
Emissions from existing construction and mining equipment (assuming implementation starts from 2026) (MTCO $_2e$)				61,410	61,410	61,410	61,410
Increase in emissions (beginning in 2026) ($MTCO_2e$)				6,328	12,051	14,439	17,044
Number of diesel fueled Construction Equipment in San Diego region				13,918	14,425	14,925	15,317
Number of gasoline fueled Construction Equipment in San Diego region				9,323	9,573	9,833	9,764
Number of diesel fueled Construction Equipment in unincorporated county				3,479	3,606	3,731	3,829
Number of gasoline fueled Construction Equipment in unincorporated county				2,331	2,393	2,458	2,441
Incentives to switch to Tier 4 equipment							
Percent of Existing Equipment that (because of the County Program) switch to Tier 4 Final [6]				3%	5%	10%	0%
Average Fuel Economy Savings by Switching from Tier 2 to Tier 4 Final [1]	2.5%						
Number of diesel fueled Construction Equipment in unincorporated San Diego county that switch to Tier 4 Final				104	180	373	
Number of gasoline fueled Construction Equipment in unincorporated San Diego county that switch to Tier 4 Final				70	120	246	
Emissions reduced from Existing Construction Equipment switching to Tier 4 Final (MTCO $_2e$)				51	92	190	
Transition to electric equipment							
Percent of existing and new equipment that (because of the T-2.1) transition to electric equipment [2]				3%	5%	10%	
Number of diesel fueled Construction Equipment in unincorporated San Diego county that can feasibly switch to electric				104	180	373	
Number of gasoline fueled Construction Equipment in unincorporated San Diego county that can feasibly switch to electric				70	120	246	
Emissions reduced from Transition of electric equipment (MTCO $_2e$)				2,032	3,673	7,585	
GHG Reductions from T-2.1 ($MTCO_2e$)				2,083	3,765	7,775	
Emissions from increased electric load by transitioning Construction equipment to electric							
Diesel saved by transitioned Construction Equipment (gal)				185,623	326,373	686,747	
Gasoline saved by transitioned Construction Equipment (gal)				5,743	9,703	19,691	
Assumed average efficiency of diesel engines [3]				40%	40%	40%	
Assumed average efficiency of gasoline engines [4]				33%	33%	33%	
Assumed average efficiency of electric heating [5]				100%	100%	100%	
Electricity consumed (MWh)				3,090	5,429	11,414	
Electricity Emission Factor ($MTCO_2e$/MWh)				0.0036	0.0004	0.0001	
Emissions from electricity use ($MTCO_2e$)				11	2	1	
Total emissions reductions from T-2.1				**2,072**	**3,762**	**7,773**	
units transitioned				**349**	**600**	**1,238**	
				3%			

Note: GHG reductions from construction equipment in 2045 are included in T-2.2

[1] For engines >751 HP, Tier 4 Final fuel efficiency is improved by up to 5 percent over Tier 2 engines.(https://www.cummins.com/engines/tier-4-final-1). CAT states a 5

[2] California Executive Order N-79-20 (sets a goal to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible).

[3] General Power. 2022. Diesel Generator vs. Gas Generator: Which is More Efficient? Available at https://www.genpowerusa.com/blog/diesel-generator-vs-gas-generator-which-is-more-efficient/#:~:text=Diesel%20generators%20introduce%20and%20compress,percent%20of%20total%20load%20capacity.

[4] ottovonschirach, 2021. What is the efficiency of gasoline engine? Available at https://ottovonschirach.com/what-is-the-efficiency-of-gasoline-engine/

[5] U.S. DOE. 2021. Electric Resistance Heating. Available: https://www.energy.gov/energysaver/home-heating-systems/electric-resistance-

[6] Assuming 0% transition in 2045 because of the requirement for 100% electric construction equipment in T-2.3

T-2.2

Develop and adopt a landscaping equipment ordinance to require the use of zero emission landscaping equipment by 2030 and zero emission construction equipment by 2045 in the unincorporated area.

		2019	2025	2030	2035	2040	2045
Diesel consumed in Landscaping Equipment in San Diego region (gal)				189,303	202,330	216,701	216,673
Gasoline consumed in Landscaping Equipment in San Diego region (gal)				9,571,664	9,789,980	9,976,995	10,152,103
Ratio of Population - Unincorporated County to San Diego region	14%						
Diesel consumed in Landscaping Equipment in unincorporated county (gal)				26,502	28,326	30,338	30,334
Gasoline consumed in Landscaping Equipment in unincorporated county (gal)				1,340,033	1,370,597	1,396,779	1,421,294
Emissions from lawn and garden equipment ($MTCO_2e$)		7,233	7,631	7,697	7,757	7,841	7,922
Emissions from existing lawn and garden equipment (as of 2025) ($MTCO_2e$)				7,631	7,631	7,631	7,631
Emissions from new lawn and garden equipment ($MTCO_2e$)				66	126	210	291
Percent of equipment that transitions to zero emission equipment				100%	100%	100%	100%
Emissions reduced from transitioning to zero emission equipment ($MTCO_2e$)				7,697	7,757	7,841	7,922
Emissions from increased electric load by transitioning Landscaping equipment to electric							
Percent of equipment that could feasibly transition to zero emission equipment				100%	100%	100%	100%
Diesel saved by transitioned Landscaping Equipment (gal)				26,502	28,326	30,338	30,334
Gasoline saved by transitioned Landscaping Equipment (gal)				1,340,033	1,370,597	1,396,779	1,421,294
Assumed average efficiency of diesel engines [1]				40%	40%	40%	40%
Assumed average efficiency of gasoline engines [2]				33%	33%	33%	33%
Assumed average efficiency of electric heating [3]				100%	100%	100%	100%
Electricity consumed (MWh)				16,371	16,764	17,109	17,400
Electricity Emission Factor ($MTCO_2e$/MWh)				0.0036	0.0004	0.0001	0.0000
Emissions from electricity use ($MTCO_2e$)				59	7	2	-
Emissions from requiring use of zero emission construction equipment by 2045							
Transition to electric equipment							
Percent of existing and new equipment that (because of the County Program) transition to electric equipment [2]							100%
Number of diesel fueled Construction Equipment in unincorporated San Diego county that can feasibly switch to electric							3,829
Number of gasoline fueled Construction Equipment in unincorporated San Diego county that can feasibly switch to electric							2,441
Emissions reduced from Transition of electric equipment ($MTCO_2e$)							78,454
				Note: Prior to 2045, GHG reductions from construction equipment are calculated in T-2.1			
Emissions from increased electric load by transitioning Construction equipment to electric							
Diesel saved by transitioned Construction Equipment (gal)							7,207,291
Gasoline saved by transitioned Construction Equipment (gal)							196,770
Assumed average efficiency of diesel engines [1]							40%
Assumed average efficiency of gasoline engines [2]							33%
Assumed average efficiency of electric heating [3]							100%
Electricity consumed (MWh)							119,675
Electricity Emission Factor ($MTCO_2e$/MWh)							0.0000
Emissions from electricity use ($MTCO_2e$)							-
Total emissions reductions from T-2.3 ($MTCO_2e$)				**7,638**	**7,750**	**7,839**	**86,376**

Notes:
SORE sold in California on or after January 1, 2024 to be zero-emission. (https://calcattlemen.org/wp-content/uploads/2022/01/2022-CARB-SORE-Factsheet-Final-Final.pdf)
SORE refers to spark-ignition engines which are 25 horsepower or less. Most landscaping equipment come under this category
Implementation can include a combination of transition to electric and Tier 5 (available for application from 2028)

[1] General Power. 2022. Diesel Generator vs. Gas Generator: Which is More Efficient? Available at https://www.genpowerusa.com/blog/diesel-generator-vs-gas-generator-which-is-more-efficient/#:~:text=Diesel%20generators%20introduce%20and%20compress,percent%20of%20total%20load%20capacity.
[2] ottovonschirach, 2021. What is the efficiency of gasoline engine? Available at https://ottovonschirach.com/what-is-the-efficiency-of-gasoline-engine/
[3] U.S. DOE. 2021. Electric Resistance Heating. Available: https://www.energy.gov/energysaver/home-heating-systems/electric-resistance-

T-3.1

Increase the use of electric and other zero-emission vehicles in the unincorporated area by:
- Installing 2,040 publicly available electric vehicle charging stations by 2028.
- Requiring the electrification of loading docks and idling reduction in new commercial and industrial development by 2030.
- Amending the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar electric vehicle charging infrastructure installations and preferential parking for ZEVs for new multi-family residential and non-residential construction.
- Developing a program by 2026 to incentivize EV purchases and school bus electrification

	2019	2030	2035	2040	2045
Ratio of Modified unincorporated San Diego County Population to San Diego Region population	0.145	0.141	0.139	0.137	0.136
Increase light duty EV/PHEV Population					
EV Forecasts and Targets					
EMFAC2021 ACC II Light Duty Pop - Countywide [1]		2,384,780	2,404,764	2,439,856	2,476,692
EMFAC2021 ACC II Light Duty Pop - Unincorporated San Diego County		336,899	334,138	333,582	337,111
EMFAC2021 ACC II Light Duty EV/PHEV Pop - Countywide [1]		475,731	1,063,733	1,631,431	2,037,270
EMFAC2021 ACC II Light Duty EV/PHEV Pop - Unincorporated San Diego County		67,207	147,804	223,053	277,300
Calculated EMFAC2021 ACC II Light Duty EV/PHEV percentage		20%	44%	67%	82%
Targeted EV/PHEV Pop percentage under measure		31%	55%	78%	93%
Increased EV/PHEV Pop percentage under measure		11%	11%	11%	11%
Targeted EV/PHEV Pop under measure		104,439	183,776	260,194	313,514
Additional EV/PHEV Pop under measure		37,232	35,972	37,141	36,213
EMFAC2021 EV:PHEV Ratio with ACC II adjustments		4.5	6.3	7.9	9.0
Additional EV Pop under measure		30,486	31,037	32,984	32,592
Additional PHEV Pop under measure		6,746	4,935	4,157	3,622
Additional GHG emissions from EVs					
Average annual miles per EV for unincorporated San Diego County (mi/vehicle) [5]		16,908	16,218	15,280	14,424
New EV VMT under measure		515,468,636	503,369,833	504,008,653	470,112,906
Average Efficiency of EV LDV (kWh/100-mi) [4]		41.00	46.00	50.00	52.00
Charged amount (kWh)		211,342,141	231,550,123	252,004,327	244,458,711
Charged amount (MWh)		211,342	231,550	252,004	244,459
County-wide Electricity Emission Factor (MTCO2e/MWh)		0.0036	0.0004	0.0001	0.0000
Additional emissions from electric load from EVs (MTCO2e)		766	103	30	-
Additional GHG emissions from PHEVs					
Average annual miles per PHEV for unincorporated San Diego County (mi/vehicle) [5]		17,297	16,782	15,739	15,010
New PHEV VMT under measure		116,682,003	82,810,804	65,433,526	54,363,297
Average emissions factor from PHEV (gCO2e/mi) [1]		149	134	132	130
Additional PHEV emissions under measure (MTCO2e)		17,335	11,096	8,650	7,059
Average Efficiency of EV LDV (kWh/100-mi) [4]		41	46	50	52
Charged amount (kWh)		47,839,621	38,092,970	32,716,763	28,268,914
Charged amount (MWh)		47,840	38,093	32,717	28,269
County-wide Electricity Emission Factor (MTCO2e/MWh)		0.004	0.000	0.000	-
Additional emissions from electric load from EVs (MTCO2e)		173	17	4	-
Emissions avoided from Equivalent Gasoline/Diesel Vehicles					
Average emissions factor from Gasoline/Diesel mix (gCO2e/mi) [1]		325	318	316	320
Average annual miles per Gasoline/Diesel for unincorporated San Diego County (mi/vehicle)		13,008	11,680	9,852	8,034
Reduced Gasoline/Diesel VMT (mi)		632,150,639	586,180,637	569,442,179	524,476,203
Reduced Gasoline/Diesel emissions under measure (MTCO2e)		205,323	186,205	180,169	167,740
Total Emission Reductions from Increased LDV EV/PHEV Mix (MTCO2e)		**187,222**	**175,006**	**171,489**	**160,681**

T-3.1 (continued)

Increase the use of electric and other zero-emission vehicles in the unincorporated area by:
- Installing 2,040 publicly available electric vehicle charging stations by 2028.
- Requiring the electrification of loading docks and idling reduction in new commercial and industrial development by 2030.
- Amending the County's Code of Regulatory Ordinances by 2026 to require (Tier 2) CALGreen or similar electric vehicle charging infrastructure installations and preferential parking for ZEVs for new multi-family residential and non-residential construction.
- Developing a program by 2026 to incentivize EV purchases and school bus electrification

Increase medium and heavy duty EV/PHEV Population					
State-level EV Forecasts and Targets	**2019**	**2030**	**2035**	**2040**	**2045**
Statewide Medium- and Heavy-Duty Population [2]		(47,575,233)	2,139,839	2,237,119	2,358,292
Statewide Medium- and Heavy-Duty EV population [2]		107,184	325,963	575,437	797,170
Statewide MDV EV Population Target under 2020 MSS [3]		40,788	181,177	387,900	582,910
Statewide HDV EV Population Target under EO N-79-20 [3]		171,176	361,272	601,485	827,867
Statewide Target Percent Increase in Commercial EVs		**98%**	**66%**	**72%**	**77%**
Unincorporated San Diego County Target Percent Increase in Commercial EVs		98%	66%	72%	77%
					-362108%
EMFAC2021 Medium/Heavy Duty Pop - Countywide [1]		149,313	154,389	160,489	167,814
EMFAC2021 Medium/Heavy Duty Pop - unincorporated San Diego County		21,093	21,452	21,942	22,842
EMFAC2021 Medium/Heavy Duty EV/PHEV Pop - Countywide [1]		8,224	24,706	43,371	59,631
EMFAC2021 Medium/Heavy Duty EV/PHEV Pop - unincorporated San Diego County		1,162	3,433	5,930	8,117
Calculated EMFAC2021 Medium/Heavy Duty EV/PHEV percentage		6%	16%	27%	36%
EMFAC2021 Medium/Heavy Duty conventional vehicle Pop - Countywide [1]		141,089	129,683	117,118	108,183
EMFAC2021 Medium/Heavy Duty conventional vehicle Pop - unincorporated San Diego County		19,932	18,019	16,013	14,725
Increased EV/PHEV Pop percentage under measure		98%	66%	72%	77%
Targeted EV/PHEV Pop under measure		2,298	5,713	10,195	14,364
Additional EV/PHEV Pop under measure		1,136	2,280	4,266	6,248
Target Percentage of EV/PHEV under measure		11%	27%	46%	63%
Additional GHG emissions from EVs					
Average annual miles per EV (mi/vehicle) [1]		22,428	20,732	18,994	17,664
New EVMT under measure		25,472,731	47,266,508	81,023,198	110,359,396
Average Efficiency of EV medium/heavy duty (kWh/100-mi) [1]		100	99	99	100
Charged amount (kWh)		25,530,510	46,801,250	80,106,575	110,075,017
Charged amount (MWh)		25,531	46,801	80,107	110,075
County-wide Electricity Emission Factor (MTCO2e/MWh)		0.0036	0.0004	0.0001	0.0000
Additional GHG emissions from EVs (MTCO2e)		92	21	9	-
Emissions from Equivalent Gasoline/Diesel Vehicles					
Average emissions factor from Gasoline/Diesel mix (gCO2e/mi) [1]		1,247	1,220	1,221	1,237
Average annual miles per Gasoline/Diesel (mi/vehicle) [1]		15,540	15,902	16,611	17,785
Reduced Gasoline/Diesel VMT under IN-2.1 (mi)		17,649,761	36,255,236	70,854,337	111,112,576
Reduced Gasoline/Diesel VMT (mi)		25,472,731	47,266,508	81,023,198	110,359,396
Reduced Gasoline/Diesel emissions under TR-2.1 (MTCO2e)		31,754	57,659	98,956	136,503
Net GHG emissions avoided from increased MHDV EVs (MTCO2e)		**31,662**	**57,639**	**98,947**	**136,503**
Net GHG emissions avoided from increased EVs (MTCO2e)		**218,884**	**232,645**	**270,436**	**297,184**

Sources:

[1] EMFAC 2021 results for San Diego County Region adjusted for ACC II ZEV requirements for new vehicles. Requirements pertain to both PHEVs and ZEVs.
[2] EMFAC 2021. Statewide EV population. (EMFAC 2021 does not account for statewide targets under EO N-79-20)
[3] CARB's 2020 Mobile Source Strategy META Tool
[4] Source: Community inventory and forecast from EPIC

T-4.1

Expand County Benefit Program by 2026 to provide County employees with tax-free transportation benefits, alternative work schedules, and expand part-time or full-time teleworking options to reduce vehicle miles traveled from employee commutes by 40% in 2030 and 64% in 2045.

	2019	2030	2035	2040	2045
County employee commute miles (scaled by change in employee forecast) (VMT)	101,575,675	114,130,542	118,168,182	121,690,905	125,213,629
County employee commute emissions ($MTCO_2e$)	39,000	32,000	22,000	13,000	14,000
Percent reduction in employee commute miles below 2019 levels with transportation benefits [1]		40%	45%	50%	64%
Annual employee commute miles after reduction (VMT)		68,478,325	64,992,500	60,845,453	45,076,906
Reduction in emissions		40%	45%	50%	64%
Reduction in emissions with transportation benefits ($MTCO_2e$)		12,800	9,900	6,500	8,960
Reduction in VMT below 2019 levels with transportation benefits		45,652,217	53,175,682	60,845,453	80,136,723
Total reduction in emissions ($MTCO_2e$)		**12,800**	**9,900**	**6,500**	**8,960**

SUPPORTING INFORMATION

Existing Benefits

The following is a summary of existing benefit offerings, employee participation, and associated costs for a pre-pandemic and the most recent fiscal year.

Benefit	Amount	Utilization (FY)			
		2018-2019 *[Pre-pandemic]*		2020-2021 *[Previous FY]*	
		Employee Count	Total	Employee Count	Total
Transit reimbursement	$30 – 85*	844	$390,616	252	$88,524
Parking reimbursement	$50 – 300*+	1,267	$1,544,532	1,015	$1,654,091
County Ride Sharing Program (through SANDAG) reimbursement	$25+	10	$1,650	1	$125

*Depending on job classification; +Depending on work location

Source: Email from Meghan Kelly to Ascent on 4/6/23 (Subjectline:FW: draft/deliberative - County Employee commute data)

T-4.2

Develop a rebate program by 2026 for County employees to purchase electric vehicles, bicycles, and scooters for commute use.

		2025	2030	2035	2040	2045
Average rebate per vehicle	$ 2,000					
No. of EVs purchased using rebate each year (from 2026) through 2050 [1]	120					
No. of EVs purchased using rebate by each target year (from 2026)			600	1,200	1,800	2,400
Annual VMT per County employee			5,395	5,395	5,395	5,395
New Employee Commute VMT from battery electric vehicle purchased using rebate program (from 2026)			3,237,300	6,474,599	9,711,899	12,949,199
Percent of Employee Commute Annual VMT from the rebate program (new employee commute e-VMT/total annual employee commute VMT)			3%	5%	8%	10%
Emission reduction ($MTCO_2e$)			908	1,205	1,038	1,448

Additional GHG emissions from EVs

Average Efficiency of EV LDV (kWh/mi) [1]	0.41	0.46	0.5	0.52
Charged amount (MWh)	1,327	2,978	4,856	6,734
County-wide Electricity Emission Factor ($MTCO_2e/MWh$)	0.0036	0.0004	0.0001	0.0000
Additional emissions from electric load from EVs ($MTCO_2e$)	5	1	1	-
Net Emission reduction ($MTCO_2e$)	**903**	**1,204**	**1,037**	**1,448**

[1] Data from email receieved from County (Meghan Kelly) during second review of measures

T-5.1

Implement the County's Active Transportation Plan to install 345 miles of sidewalk and 315 miles of bikeways by 2030 to encourage alternative modes of transportation in the unincorporated area.

	2019	2030	2035	2040	2045
VMT from passenger vehicles (%)		93%	93%	93%	92%
VMT from passenger vehicles per year (miles)		3,026,461,227	3,096,467,690	3,145,237,071	3,192,017,469
Emissions from passenger vehicles		780,263	529,267	303,686	302,802
Provide Pedestrian Network Improvement [1]					
Existing sidewalk length [2] (miles)	330.54				
Increased sidewalk length with measure [existing + increase from action] (miles) [2]		345	360	375	390
Elasticity of household VMT with respect to the ratio of sidewalks-to-streets [3]					
Percent reduction in GHG emissions [4]		0.2%	0.4%	0.7%	0.9%
Expand Bikeway Network Miles (applicable to class I, II, and IV bikeway) [5]					
Existing bikeway miles [2]	158				
Bikeway miles with measure [existing + increase from action] (miles) [2]		315	472	629	786
Bicycle mode share [6]					
Vehicle mode share [6]					
Average one-way bicycle trip length (miles per trip) [6]					
Average one-way vehicle trip length (miles per trip) [6]					
Elasticity of bike commuters with respect to bikeway miles per 10,000 population [6]					
Percent reduction in GHG emissions		0.006%	0.013%	0.019%	0.025%
Net emission reduction from the measure (%)		0.23%	0.46%	0.69%	0.92%
Net VMT reduction from LDVs from the measure (%) [7]		0.23%	0.46%	0.69%	0.92%
Net emission reduction from the measure (MTCO2e)		**1,756**	**2,425**	**2,100**	**2,800**
Net VMT reduction from LDVs from the measure (miles)		6,810,768	14,189,556	21,748,021	29,515,564

[1] CAPCOA, 2021, measure T-18. Provide Pedestrian Network Improvement
[2] Source: Information received from attachment through email from Meghan sent to Ascent on 5/24/23 (see information below)
[3] Frank, L., M. Greenwald, S. Kavage, and A. Devlin. 2011. An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy. WSDOT Research Report WA-RD 765.1, Washington State Department of Transportation. April. Available: www.wsdot.wa.gov/research/reports/fullreports/765.1.pdf. in CAPCOA, 2021
[4] Maximum reduction possible is 6.4% (CAPOA, 2021)
[5] Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Found in CAPCOA, 2021
[6] Pucher, J., and Buehler, R. 2011. Analysis of Bicycling Trends and Policies in Large North American Cities: Lessons for New York. March. Available: http://www.utrc2.org/sites/default/files/pubs/analysis-bike-final_0.pdf. Found in CAPCOA, 2021
[7] The percent reduction in VMT would be the same as the percent reduction in GHG emissions (Source, CAPCOA, 2021)

T-5.2
Develop a countywide Safe Routes to Schools program to reduce vehicle miles traveled to schools by 1.2% by 2030.

		2019	2025	2030	2035	2040	2045
Morning peak hours passenger daily VMT		1,682,582	1,707,513	1,733,366	1,755,730	1,780,222	1,803,601
Morning peak hours passenger emissions per year ($MTCO_2e$)			190,657	155,069	104,135	59,645	59,369
% VMT to schools [1]	12%						
Number of school days in California [2]	180						
VMT to schools per year				37,440,716	37,923,778	38,452,801	38,957,773
Passenger emissions from school trips per year (MTCO2e)				18,608	12,496	7,157	7,124
VMT and GHG reduction from countywide SR2S program strategy and/or infrastructure updates (see notes below):							
% VMT reduction by outreach activities [3] [4]	1.2%						
Total VMT reduction (%)	1.2%						
Total GHG reduction (%)	1.2%						
Emisions reduction ($MTCO_2e$)				**214**	**144**	**82**	**82**

[1] Assuming percent of trips to be same as percent of morning peak hour passenger VMT(Nationally, 10%–14% of car trips during morning rush hour are for school travel. Source: DOT SR2S https://www.transportation.gov/mission/health/Safe-Routes-to-School-Programs)
[2] NCES, n.d. State Education Practices (SEP). Availabe at: https://nces.ed.gov/programs/statereform/tab1_1-2020.asp
[3] Outreach activities that provides families and students with customized information, incentives, and support to encourage the use of SR2S
[4] For taking a conservative approach, the calculations assume that implementation will achieve half of maximum potential reduction possible from the measure described in CAPCOA, 2021

T-6.1

Develop a program to provide free transit passes and/or free trips in the unincorporated area to reduce vehicle miles traveled in the unincorporated area by 1.2% by 2030.

		2030	2035	2040	2045
Transit accesible passenger VMT (miles)		986,265,265	1,168,100,150	1,365,124,344	1,885,611,101
GHG from Transit accesible passenger VMT ($MTCO_2e$)		254,273	199,659	131,809	178,873
Eliminate Transit Fares [1] [5]					
Percent reduction in transit fare with measure [1]		100%	100%	100%	100%
Percent of plan/community transit routes that receive reduced fares		100%	100%	100%	100%
Elasticity of transit ridership with respect to transit fare [3]	0.3				
Transit mode share in community [4]	2.4%				
Vehicle mode share in community [4]	94.9%				
Statewide mode shift factor [4]	57.8%				
Emissions Reduction [1] [5] (%)		1.20%	1.20%	1.20%	1.20%
VMT reduction from measure 7.3 (%) [2] [5]		1.20%	1.20%	1.20%	1.20%
Emission Reduction ($MTCO_2e$)		**3,051**	**2,396**	**1,582**	**2,146**
VMT Reduction (miles)		11,835,183	14,017,202	16,381,492	22,627,333

Note:

[1] CAPCOA 2021 (T-29. Reduce Transit Fares)

[2] The percent reduction in passenger vehicle fuel consumption would be the same as the percent reduction in GHG emissions (Source, CAPCOA, 2021)

[3] Handy, S., K. Lovejoy, M. Boarnet, and S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf. Found in CAPCOA, 2021

[4] Federal Highway Administration (FHWA). 2017a. National Household Travel Survey–2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Found in CAPCOA, 2021

[5] The measure reductions will be applicable to Transit accessible VMT only

T-6.2

Increase access to Transit Priority Areas by 5% in the unincorporated area and implement transit-supportive roadway treatments such as traffic signal communication and curb extensions along County-maintained roadways to optimize traffic flow for transit and pedestrians by 2030.

	2025	2030	2035	2040	2045
Unincorporated County Population within one-mile of Transit Priority Areas (TPAs) [1]	134,601	135,914	137,227	141,584	145,940
Percent of Unincorporated Population within one-mile of TPAs (future condition without this action)	27%	28%	28%	28%	29%
Percent Increase in Unincorporated Population within one-mile of TPAs (future condition with this action)		5%	10%	15%	30%
Transit accessible passenger VMT from TPAs (%)		33%	38%	43%	59%
Transit accessible passenger VMT from TPAs (miles)		986,265,265	1,168,100,150	1,365,124,344	1,885,611,101
Transit accessible passenger VMT after applying other VMT measures (miles)		979,023,928	1,153,474,471	1,342,934,116	1,855,647,522
GHG from Transit accesible passenger VMT after applying other VMT measures (%)		33%	38%	43%	59%
GHG from transit accesible passenger VMT ($MTCO_2e$)		254,273	199,659	131,809	178,873
GHG from transit accesible passenger VMT after applying other VMT measures ($MTCO_2e$)		252,303	197,090	129,626	175,991
Percent reduction in VMT and GHG emissions [2]		5%	10%	15%	20%
Emission reduction ($MTCO_2e$)		**12,615**	**19,709**	**19,444**	**35,198**
VMT reduction		48,951,196	115,347,447	201,440,117	371,129,504

[1] Transit Priority Areas (TPAs) are defined as areas within a half mile of a "major transit stop," which is defined in Public Resources Code 21064.3 as a site containing any of the following: (a) an existing rail or Bus Rapid Transit station; (b) A ferry terminal served by either a bus or rail transit service; (c) the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods. The TPAs used in this calculation are based on the planned transit systems of SANDAG's 2021 Regional Plan.

[2] CAPCOA, 2021, Measure T-25. Extend Transit Network Coverage or Hours; T-26. Increase Transit Service Frequency; T-27. Implementation Transit-Supportive Roadway Treatments; T-28. Provide Bus Rapid Transit; T-1. Increase Residential Density; T-2. Increase Job Density; T-3. Provide Transit-Oriented Development; Integrate Affordable and Below Market Rate Housing

T-6.3

Increase access to first/last mile transportation services and connections (e.g., neighborhood electric vehicles, microtransit, bike/scooter-share) to reduce vehicle miles traveled by 7% within the unincorporated area by 2030.

	2025	2030	2035	2040	2045
Intrazonal VMT (VMT within a TAZ) (annual) [1]	55,460,663	55,205,792	54,950,920	54,973,822	54,996,724
Intrazonal VMT (VMT within a TAZ) (annual) after applying other VMT measures		55,073,702	54,691,368	54,585,972	54,480,468
Share of Intrazonal annual VMT (VMT within a TAZ) compared to total passenger VMT, after applying other VMT measures		2%	2%	2%	2%
GHG from Intrazonal VMT compared to total passenger emissions (%), after applying other VMT measures		2%	2%	2%	2%
GHG from Intrazonal VMT after applying other VMT measures compared to total passenger emissions ($MTCO_2e$)		14,199	9,348	5,271	5,168
Percent reductions in intrazonal VMT		7%	13%	19%	25%
Emissions reduced by applying measure to Intrazonal VMT ($MTCO_2e$)		994	1,215	1,001	1,292
Total emission reduction ($MTCO_2e$)		**994**	**1,215**	**1,001**	**1,292**
VMT reduced by applying measure to Intrazonal VMT (miles)		3,855,159	7,109,878	10,371,335	13,620,117

[1] VMT data from SANDAG, adjusted by Fehr & Peers to exclude military and tribal lands