

Appendix C
Updated GHG Calculations

SB 375 GHG Reduction Targets and GHG Emissions under the Proposed Amendment from Passenger Vehicles and Light-Duty Trucks, 2035

	Proposed Amendment	Approved Plan	Change from Approved Plan PEIR
	Per Capita Reductions from 2005 Levels	Per Capita Reductions from 2005 Levels	
Per Capita Reduction under the Proposed Amendment (On-Model Results Only)	-17.7%	-19.3%	1.6%
Per Capita Reduction under the Proposed Amendment (Off-Model Results Only)	-3.0%	-3.0%	0.0%
CARB Adjustment Factor for EMFAC 2007-2014 ¹	1.7%	1.7%	0.0%
Induced Demand Adjustment Factor ²	0.3%	0.2%	0.1%
Per Capita Reductions	-18.6%	-20.4%	1.8%
CARB Target	-19%	-19%	

Calculation to Estimate Per-Capita GHG Emissions from the Entire On-Road Transportation Sector, 2035 compared to 2016

Components Used in the Calculation	2016	2035 Proposed Amendment	2035 Approved Plan	Change from 2035 Approved Plan PEIR
Total Emissions from the Entire On-Road Transportation Sector (MMTCO ₂)	12.2	7.6	7.5	0.1
Total Population in the San Diego Region (Residents)	3,287,280	3,620,348	3,620,348	0
Per Capita Emissions (MTCO ₂ /capita)	3.71	2.10	2.07	0.027621654
Percent Reduction under the proposed Amendment, 2035 compared to 2016		-43%	-44%	1%

Reference Point and GHG Emissions under the Proposed Amendment, 2030

	Proposed Amendment Annual Emissions (MMTCO₂e)	Approved Plan Annual Emissions (MMTCO₂e)	Change from Approved Plan PEIR
GHG Emissions in the San Diego Region in 2016	25.8	25.8	0
GHG emissions in the San Diego Region in 2030 ¹	20.4	20.3	0.1
2030 SB 32 Reference Point (40% below 2016 levels)	15.6	15.6	0
Accelerated 2030 Scoping Plan Reference Point (48% below 2016 levels)	13.4	N/A	N/A

Reference Points and GHG Emissions under the Proposed Amendment, 2045 and 2050

	Proposed Amendment Annual Emissions (MMTCO₂e)	Approved Plan Annual Emissions (MMTCO₂e)	Change from Approved Plan PEIR
GHG Emissions in the San Diego Region in 2016	25.8	25.8	0
GHG Emissions in the San Diego Region in 2045 with proposed Amendment ^{1,2}	17.6	17.5	0.1
2045 Reference Point (carbon neutral target in EO B-55-18 and AB 1279)	3.9	0	3.9
GHG Emissions in the San Diego Region in 2050 with proposed Amendment ¹	17.8	17.7	0.1
2050 Reference Point (80% below 2016 levels per EO S-3-05)	5.2	5.2	0

Emissions Category		2021 Regional Plan
		Legislative-adjusted Projection
On-road Transportation	Activity - VMT	<p><u>Light-Duty Vehicles:</u> California Advanced Clean Car (ACC) Program (meet 1 million EV by 2025), without SAFE rule impact</p> <p><u>Heavy Duty Vehicles:</u> 1. Senate Bill 1 (The Road Repair and Accountability Act of 2017) and CARB Tractor Trailer GHG Regulation 2. EPA Phase 2 GHG Regulation</p>
	Emission Factor - g CO2e per mile	<u>Data Source:</u> EMFAC2017
Energy - Electricity	Activity - MWh	<p>Title 20, Title 24, federal appliance efficiency standards up to 2019 Current rate structures and behind-the-meter storage and generation Solar capacity assumed in CEC forecast below through 2030</p> <p><u>Data Sources and Assumptions:</u> Latest CEC 2020 IEPR demand forecast 2020–2030 mid demand case (draft version as of Dec 2020, to be adopted by early 2021)</p>
	Emission Factor - lbs CO2e per MWh	<p>SB100 (2018): 1. RPS-eligible renewable resources: 50% by 2026, 60% by 2030 2. RPS- eligible renewable resources and zero-carbon supply: 100% by 2045</p> <p>Community Choice Energy Programs (operational by RP adoption at the end of 2021): 100% renewable by 2030 or 2035 goal 1. <u>San Diego Community Power</u> (Chula Vista, Encinitas, Imperial Beach, La Mesa and San Diego) - phased roll-out starts 2021, with 55% GHG free electricity offering and 95% participation rates in both residential and commercial sector 2. <u>Clean Energy Alliance</u> (Carlsbad, Del Mar, and Solana Beach) - single phase roll-out beginning in May 2021, 90% participation rate of bundled customer, renewable target consistent with SB100 (60% RE by 2030)</p>
Energy - Natural Gas	Activity - therms	<p>Title 20, Title 24, federal appliance efficiency standards up to 2019</p> <p><u>Data Sources and Assumptions:</u> CEC 2019 IEPR demand forecast 2020–2030 mid demand case (adopted early 2020)</p>
	Emission Factor - MT CO2e per therm	0.00545 MT CO2e per therm

Industrial	GHG Emissions	<u>Data Sources and Assumptions:</u> San Diego region jobs projection (SANDAG)	
Aviation	GHG Emissions	<u>Data Sources and Assumptions:</u> Airport Development Plan (2019) constrained passenger projection through 2050	
Marine Vessels	GHG Emissions	<p>Commercial Harbor Craft (CHC) Regulation (2007, amended in 2010, fully implemented by 2022) to reduce emissions of diesel particulate matter (PM), oxides of nitrogen (NOx), and Reactive Organic Gases (ROG) from diesel engines used on CHC operated in Regulated California Waters (within 24 nautical miles of the California coast).</p> <p>Ocean-Going Vessel Clean Fuel Regulation (beginning in 2009) and North American Emission Control Area (beginning in 2015) to reduce sulfur content of diesel fuel used in OGV.</p> <p>Ocean-Going Vessel At-Berth Regulation (2007) and proposed regulation (implementation through 2029) to require container vessels, passenger vessels, and refrigerated-cargo vessels to connect to shore power for a percent of their visits or use an approved alternative to shore power.</p> <p><u>Data Sources and Assumptions:</u> CARB ORION Database v1.0.1</p>	
Water	GHG Emissions	<p><u>Data Sources and Assumptions:</u> San Diego County Water Authority's estimate of active and passive conservation savings (Post-2018) Active: Implementation of water conservation program Passive: future savings from appliance standards, plumbing code change, and updated MWELO</p>	
Wastewater	GHG Emissions	San Diego region population projection	
Solid Waste	Annual tons generated	San Diego region population projection	
	Emission factor, MT CO2e/short ton	0.79 MT CO2e/short ton	
Agriculture	GHG Emissions	Average cattle population of the years 2017-2019 was used for the projection years 2020-2050.	
Rail	GHG Emissions	San Diego region rail transportation jobs projection	
Other fuel	GHG Emissions	The CARB GHG inventory values for the years 2016-2018 were downloaded from the CARB GHG inventory Query tool. These CARB values were projected to 2050 using the forecast function and these were scaled down to San Diego region values using ratios below:	
		Sector	Ratio
		Agriculture	SD Ag revenue/CA Ag revenue
		Commercial	SD Manufacturing sector Employees/CA manufacturing sector employees
		Residential	SD population/CA population
		Transportation	SD VMT/CA VMT
		Energy	SD T&D establishments/A T&D establishments
		Manufacturing	SD Manufacturing sector Employees/CA manufacturing sector employees

Off-road Transportation	GHG Emissions	<p><u>Data Sources and Assumptions:</u> OFFROAD ORION v1.0.1. SORE2020 Model (v1.1) RV2018 Model Database PC2014 Model Database</p>
Fertilizerr	GHG Emissions	<p>Emissions from fertilizer use were calculated based on ICLEI method. Farm nitrogen, non-farm nitrogen, urea, lime and crop residue nitrogen were projected using the GROWTH function in Excel (b=1). <u>Data sources and assumptions</u> The fertilizer tonnage report by year were downloaded from the cdfa website to calculate the emissions according to the ICLEI model of N2O emissions from managed soils, and CO2 emissions from Lime and Urea Applications</p>

Summary - Proposed Amendment

Emission Category	GHG Emissions (MT CO2e)							GHG Emissions (MMT CO2e)				
	2016		2025	2035	2045	2050		2016	2025	2035	2045	2050
1 On-Road Transportation (LDV)	10,856,923	42%	8,169,375	6,228,319	6,101,459	6,038,030	34%	10.9	8.2	6.2	6.1	6.0
2 Electricity	5,267,039	20%	3,392,104	1,304,499	204,014	204,014	1%	5.3	3.4	1.3	0.2	0.2
3 Natural Gas	3,103,209	12%	3,339,523	3,443,573	3,526,720	3,569,024	20%	3.1	3.3	3.4	3.5	3.6
4 Industrial	2,051,828	8%	2,237,964	2,353,073	2,468,051	2,514,430	14%	2.1	2.2	2.4	2.5	2.5
5 On-Road Transportation (HDV)	1,348,565	5%	1,362,061	1,359,596	1,385,626	1,398,642	8%	1.3	1.4	1.4	1.4	1.4
6 Other Fuels	1,137,608	4%	1,362,321	1,452,015	1,514,022	1,540,707	9%	1.1	1.4	1.5	1.5	1.5
7 Off-Road Transportation	621,322	2%	723,203	830,318	912,542	953,704	5%	0.62	0.72	0.83	0.91	0.95
8 Solid Waste	590,873	2%	623,868	650,740	668,596	673,339	4%	0.59	0.62	0.65	0.67	0.67
9 Water	244,337	1%	280,803	152,921	-	(0)	0.0%	0.24	0.28	0.15	-	(0.00)
10 Aviation	213,353	1%	289,052	343,726	399,142	429,874	2%	0.21	0.29	0.34	0.40	0.43
11 Rail	111,282	0.4%	170,658	186,130	198,060	202,099	1%	0.11	0.17	0.19	0.20	0.20
12 Wastewater	73,014	0.3%	77,091	80,412	82,618	83,204	0.5%	0.07	0.08	0.08	0.08	0.08
13 Agriculture	53,265	0.2%	60,758	60,758	60,758	60,758	0.3%	0.05	0.06	0.06	0.06	0.06
14 Marine Vessels	48,000	0.2%	55,131	64,877	76,623	82,368	0.5%	0.05	0.06	0.06	0.08	0.08
15 Soil Management	47,041	0.2%	35,115	37,764	40,614	42,119	0.2%	0.05	0.04	0.04	0.04	0.04
Total	25,767,658	100%	22,179,027	18,548,721	17,638,845	17,792,311	100%	25.8	22.2	18.5	17.6	17.8

Summary - Approved Plan w/o SAFE Vehicle Corrections

Emission Category	GHG Emissions (MT CO2e)							GHG Emissions (MMT CO2e)				
	2016		2025	2035	2045	2050		2016	2025	2035	2045	2050
1 On-Road Transportation (LDV)	10,404,317	40%	7,786,162	5,783,611	5,637,500	5,596,652	32%	10.4	7.8	5.8	5.6	5.6
2 Electricity	5,267,039	20%	3,392,104	1,304,499	204,014	204,014	1%	5.3	3.4	1.3	0.2	0.2
3 Natural Gas	3,103,209	12%	3,339,523	3,443,573	3,526,720	3,569,024	20%	3.1	3.3	3.4	3.5	3.6
4 Industrial	2,051,828	8%	2,240,740	2,348,822	2,468,051	2,508,103	14%	2.1	2.2	2.3	2.5	2.5
5 On-Road Transportation (HDV)	1,761,445	7%	1,682,590	1,659,696	1,690,091	1,709,802	10%	1.8	1.7	1.7	1.7	1.7
6 Other Fuels	1,137,608	4%	1,362,355	1,451,963	1,514,022	1,540,629	9%	1.1	1.4	1.5	1.5	1.5
7 Off-Road Transportation	621,322	2%	723,203	830,318	912,542	953,704	5%	0.62	0.72	0.83	0.91	0.95
8 Solid Waste	590,873	2%	623,868	650,740	668,596	673,339	4%	0.59	0.62	0.65	0.67	0.67
9 Water	244,337	1%	280,803	152,921	-	(0)	0.0%	0.24	0.28	0.15	-	(0.00)
10 Aviation	213,353	1%	289,052	343,726	399,142	429,874	2%	0.21	0.29	0.34	0.40	0.43
11 Rail	111,282	0.4%	170,658	186,130	198,060	202,099	1%	0.11	0.17	0.19	0.20	0.20
12 Wastewater	73,014	0.3%	77,091	80,412	82,618	83,204	0.5%	0.07	0.08	0.08	0.08	0.08
13 Agriculture	53,265	0.2%	60,758	60,758	60,758	60,758	0.3%	0.05	0.06	0.06	0.06	0.06
14 Marine Vessels	48,000	0.2%	55,131	64,877	76,623	82,368	0.5%	0.05	0.06	0.06	0.08	0.08
15 Soil Management	47,041	0.2%	35,115	37,764	40,614	42,119	0.2%	0.05	0.04	0.04	0.04	0.04
Total	25,727,932	100%	22,119,154	18,399,809	17,479,351	17,655,688	100%	25.8	22.1	18.4	17.5	17.7

Change from Approved Plan EIR w/o SAFE Vehicle Corrections

Emission Category	GHG Emissions (MMT CO2e)				
	2016	2025	2035	2045	2050
On-Road Transportation (LDV)	0.5	0.4	0.4	0.5	0.4
Electricity	0.0	0.0	0.0	0.0	0.0
Natural Gas	0.0	0.0	0.0	0.0	0.0
Industrial	0.0	0.0	0.0	0.0	0.0
On-Road Transportation (HDV)	-0.5	-0.3	-0.3	-0.3	-0.3
Other Fuels	0.0	0.0	0.0	0.0	0.0
Off-Road Transportation	0.0	0.0	0.0	0.0	0.0
Solid Waste	0.0	0.0	0.0	0.0	0.0
Water	0.0	0.0	0.0	0.0	0.0
Aviation	0.0	0.0	0.0	0.0	0.0
Rail	0.0	0.0	0.0	0.0	0.0
Wastewater	0.0	0.0	0.0	0.0	0.0
Agriculture	0.0	0.0	0.0	0.0	0.0
Marine Vessels	0.0	0.0	0.0	0.0	0.0
Soil Management	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.1	0.1	0.2	0.1

On-road Transportation (LDV + HDV)

Results and Output Summary

LDV

No SAFE Rule

Projection Year	2025	2035	2050
VMT (Miles per weekday)*	80,488,000	81,971,912	84,143,843
CO2 Emissions (Tons per weekday)**	25,716	20,920	20,139
Conversion Factor	318	317	318
GHG Emissions (MT CO2e)	8,169,375	6,641,611	6,394,751
GHG Emissions (MMT CO2e)	8.2	6.6	6.4
GHG Reduction from SANDAG EV Programs (Subtracted)	-	(0.34)	(0.28)
GHG Reduction from SANDAG TDM Programs (Subtracted)	-	(0.08)	(0.08)
GHG Emissions (MT CO2e)	8,169,375	6,228,319	6,038,030
GHG Emissions (MMT CO2e)	8.2	6.2	6.0

HDV

Projection Year	2025	2035	2050
VMT (Miles per weekday)*	4,659,318	5,366,307	5,938,672
CO2 Emissions (Tons per weekday)*	4,549	4,545	4,674
Conversion Factor	299	299	299
GHG Emissions (MT CO2e)	1,362,061	1,359,596	1,398,642
GHG Emissions (MMT CO2e)	1.4	1.4	1.4

EV Off-Model

	2025	2035	2050
Combined Regional Charger + Vehicle Incentive Programs (MT CO2 per year) (1)		334,556	276,677
Conversion Factor (MT CO2e per MT CO2)	N/A	1.01	1.01
GHG Reduction from SANDAG EV Programs (MT CO2e)		337,352	278,990
GHG Reduction from SANDAG EV Programs (MMT CO2e)		0.34	0.28

GAS LDA, LDT1, LDT2, MDV under EMFAC2017

TDM Off-Model

Total Weekday Vehicle Miles + Vehicle Trips Reduction

GHG Emission Avoided	2025	2035	2050
Total avoided (Trips + Miles) - MT CO2e	N/A	75,939	77,732
Total avoided (Trips + Miles) - MMT CO2e		0.08	0.08

Total Weekday Vehicle Trip Reduction

	2025	2035	2050
Vanpool - weekday trips (2)		7,853	8,837
Carshare (N/A) (3)			
Pooled Rides (4)		2,123	2,106
TDMO (5)		46,121	72,436
Total - average weekday	N/A	56,097	83,379
Total Annual Trips		19,465,777	28,932,559
gram per trip avoided (No SAFE Rule)		6	6
GHG avoided (No SAFE Rule) - MT CO2e		110	159

net trip reduction

weekday * 347 (weekday per year for LDA, LT1, LDT2, MDV)

Total Weekday Vehicle Miles Reduction

	2025	2035	2050	
Vanpool - weekday miles (2)	N/A	400,805	450,486	Within SD county
Carshare (No 2050) (3)		176,896		
Pooled Rides (4)		11,658	11,540	
TDMO (5)		364,337	579,172	Net VMT reduction
Total		953,696	1,041,198	
Total Annual Miles		330,932,552	361,295,803	weekday * 347 (weekday per year for LDA, LT1, LDT2, MDV)
gram per mile avoided		229	215	
GHG avoided - MT CO2e		75,829	77,573	

May prorate, but not included here
linear interpolation

References

Reference name, link and access date

- 1 "Copy of SANDAG_EV_Scenario_Model_10012020_Final RP Preferred Scenario", SANDAG, provided 10/07/21
- 2 "DRAFT_GHG Calculator Vanpool", SANDAG provided 10/07/21
- 3 "DRAFT_GHG Calculator Carshare", SANDAG provided 10/07/21
- 4 "DRAFT_GHG Calculator Pooled Rides", SANDAG, provided 10/07/21
- 5 "DRAFT_GHG Calculator TDMO", SANDAG, provided 10/07/21

On-road Transportation 2016

Results and Output Summary

83,935,181	SANDAG Series 14 VMT, average weekday miles
80,146,048	SANDAG Series 14 VMT, average weekday miles, LDV
3,789,133	SANDAG Series 14 VMT, average weekday miles, HDV
28,957,637,331	SANDAG Series 14 VMT, annual miles
12,205,488	MT CO2e emissions, TOTEX
10,856,923	MT CO2e emissions, TOTEX, LDV
1,348,565	MT CO2e emissions, TOTEX, HDV

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)
LDV	34,024	319	10,856,923
HDV	4,492	300	1,348,565
Total	38,516	N/A	12,205,488

SANDAG ABM Input and Output for 2016 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX
Annual	83,822,214	37,624	170.2	721.2	38,516 tons per day

On-road Transportation 2025

Results and Output Summary

85,147,318	SANDAG Series 14 VMT, average weekday miles
80,488,000	SANDAG Series 14 VMT, average weekday miles, LDV
4,659,318	SANDAG Series 14 VMT, average weekday miles, HDV
29,375,824,816	SANDAG Series 14 VMT, annual miles
9,531,436	MT CO2e emissions, TOTEX
8,169,375	MT CO2e emissions, TOTEX, LDV
1,362,061	MT CO2e emissions, TOTEX, heavy-duty
9,279,858	MT CO2e emissions, RUNEX only
316	gram CO2e per mile, RUNEX only

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)
LDV	25,716	318	8,169,375
HDV	4,549	299	1,362,061
Total	30,266	N/A	9,531,436

SANDAG ABM Input and Output for 2025 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX
Annual	85,147,318.3	29,466.9	212.6	586.3	30,265.8 tons per day

On-road Transportation 2035

Results and Output Summary

87,338,219	SANDAG Series 14 VMT, average weekday miles
81,971,912	SANDAG Series 14 VMT, average weekday miles, LDV
11,582,338	SANDAG Series 14 VMT, average weekday trips, LDV
5,366,307	SANDAG Series 14 VMT, average weekday miles, HDV
30,131,685,615	SANDAG Series 14 VMT, annual miles
28,280,309,553	SANDAG Series 14 VMT, annual miles, LDV
3,995,906,462	SANDAG Series 14 VMT, annual trips, LDV
8,001,206	MT CO2e emissions, TOTEX
6,641,611	MT CO2e emissions, TOTEX, LDV
1,359,596	MT CO2e emissions, TOTEX, heavy-duty
7,779,206	MT CO2e emissions, RUNEX only
6,480,086	MT CO2e emissions, RUNEX only, LDV
159,761	MT CO2e emissions, STARTEX only, LDV
258	gram CO2e per mile, RUNEX only
229	gram CO2e per mile, RUNEX only, LDV
6	gram CO2e per trip, STARTEX only, LDV

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)	CO2_RUNEX (tons per day)	CO2e_RUNEX (MT per year)	CO2_STARTEX (tons per day)	CO2e_START (MT per year)
LDV	20,920	317	6,641,611	20,412	6,480,086	503	159,761
HDV	4,545	299	1,359,596	4,343	1,299,121	-	-
Total	25,465	N/A	8,001,206	24,754	7,779,206	503	159,761

SANDAG ABM Input and Output for 2035 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX
Annual	87,338,219.2	24,754.2	207.7	503.2	25,465.2 tons per day

On-road Transportation 2050

Results and Output Summary

90,082,516	SANDAG Series 14 VMT, average weekday miles
84,143,843	SANDAG Series 14 VMT, average weekday miles, LDV
12,669,115	SANDAG Series 14 VMT, average weekday trips, LDV
5,938,672	SANDAG Series 14 VMT, average weekday miles, HDV
31,078,467,851	SANDAG Series 14 VMT, annual miles
29,029,625,853	SANDAG Series 14 VMT, annual miles, LDV
4,370,844,520	SANDAG Series 14 VMT, annual trips, LDV
7,793,393	MT CO2e emissions, TOTEX
6,394,751	MT CO2e emissions, TOTEX, Light-duty SB375 Vehicles
1,398,642	MT CO2e emissions, TOTEX, heavy-duty
7,567,679	MT CO2e emissions, RUNEX only
6,232,857	MT CO2e emissions, RUNEX only, LDV
159,836	MT CO2e emissions, STARTEX only, LDV
244	gram CO2e per mile, RUNEX only
215	gram CO2e per mile, RUNEX only, LDV
6	gram CO2e per trip, STARTEX only, LDV

Vehicle Class	CO2_TOTEX (tons per day)	Conversion factor - weighted average of all vehicle class (CO2e per CO2 * weekdays per year)	CO2e_TOTEX (MT per year)	CO2_RUNEX (tons per day)	CO2e_RUNEX (MT per year)	CO2_STARTEX (tons per day)	CO2e_START (MT per year)
LDV	20,139	318	6,394,751	19,629	6,232,857	503	159,836
HDV	4,674	299	1,398,642	4,461	1,334,821	-	-
Total	24,814	N/A	7,793,393	24,091	7,567,679	503	159,836

SANDAG ABM Input and Output for 2050 (ABM2+ 14.2.2 provided by Ying, 02/13/2023)

	VMT	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX
Annual	90,082,515.5	24,090.5	219.8	503.4	24,813.7 tons per day

Electricity

Results and Output Summary

1.082	Transmission and Distribution Losses, CED 2020-2030
527	lbs CO2e per MWh, SDG&E 2016 Emission Factor
43%	SDG&E 2016 Renewable Content
836	lbs CO2e per MWh, DA Emission Factor
10%	DA Renewable Content

Calendar Year	Renewable/GHG-free Content (%)			Electricity Emission Factor (lbs CO2e/MWh)		
	San Diego Community Power	SDG&E Bundled or CEA	Direct Access	San Diego Community Power	SDG&E Bundled	Direct Access
2025	67%	47%	47%	308	493	493
2030	100%	60%	60%	0	370	370
2035	100%	73%	73%	-	249	249
2045	100%	100%	100%	-	-	-
2050	100%	100%	100%	-	-	-

Calendar Year	SD Region Electricity Sales (GWh)			Electricity Emission Factor (lbs CO2e/MWh)			GHG Emissions from Grid Supply (MT CO2e)	GHG Emissions Removed from Natural Gas & Added to Electricity (MT CO2e)	Electricity Associated with Water Treatment & Removed from Electricity (MT CO2e)	Total GHG Emissions (MT CO2e)
	San Diego Community Power	SDG&E Bundled	Direct Access	San Diego Community Power	SDG&E Bundled	Direct Access				
2025	7,408	5,775	3,059	308	493	493	3,256,139	204,014	68,048	3,392,104
2030	7,189	6,403	3,154	0	370	370	1,733,379	204,014	53,095	1,884,298
2035	7,459	6,137	3,155	-	249	249	1,137,543	204,014	37,058	1,304,499
2045	8,031	5,573	3,157	-	-	-	-	204,014	-	204,014
2050	8,333	5,275	3,158	-	-	-	(0)	204,014	(0)	204,014

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	5,267,039
2017	5,079,953
2018	4,985,318
2019	4,580,431
2020	4,340,868
2021	3,432,788
2022	2,350,338
2023	3,909,669
2024	3,701,614

2025	3,392,104
2026	3,083,528
2027	2,781,064
2028	2,480,200
2029	2,181,751
2030	1,884,298
2031	1,765,877
2032	1,648,672
2033	1,532,699
2034	1,417,970
2035	1,304,499
2036	1,188,299
2037	1,073,425
2038	959,893
2039	847,718
2040	736,915
2041	627,493
2042	519,476
2043	412,880
2044	307,721
2045	204,014
2046	204,014
2047	204,014
2048	204,014
2049	204,014
2050	204,014

References

Reference name, link and access date

- 1 "Encinitas-SD Community Power Implementation Plan"
<https://perma.cc/2N6X-FNYM>
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- 2 "SDCP May2020 Board Meeting re Procurement"
<https://perma.cc/76Y3-58D2>
accessed August 4, 2020
- 3 CEC IEPR Forecast 2020-2030 (CED 2019)
"TN231525_20200115T103018_CED 2019 Forecast - SDGE Mid Demand Case"
Accessed March 3, 2020
- 4 CEC IEPR Forecast 2020-2030 (CEDU 2020)
"TN235861_20201204T150530_DRAFT CEDU 2020-2030 Forecast Update - IOU Planning Area Consumption and Sa"
Accessed Dec 3, 2020

Natural Gas

Results and Output Summary

0.0054540 MT per therm of natural gas

Calendar Year	SD Region Natural Gas Sales (therms)	GHG Emissions (MT CO2e)	GHG Emissions associated with Electric Gen & Removed from Natural Gas (MT CO2e)	GHG Emissions associated with UEG co-gen Therms & Added to Natural Gas (MT CO2e)	Total GHG Emissions (MT CO2e)
2016	585,360,937	3,192,578	207,608	118,239	3,103,209
2025	628,689,290	3,428,892	207,608	118,239	3,339,523
2030	640,276,291	3,492,088	207,608	118,239	3,402,719
2035	647,766,840	3,532,942	207,608	118,239	3,443,573
2045	663,011,857	3,616,089	207,608	118,239	3,526,720
2050	670,768,387	3,658,393	207,608	118,239	3,569,024

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	3,103,209
2017	3,150,849
2018	3,168,934
2019	3,279,568
2020	3,282,447
2021	3,289,410
2022	3,302,439
2023	3,315,303
2024	3,331,280
2025	3,339,523
2026	3,354,375
2027	3,370,158
2028	3,384,559
2029	3,394,605
2030	3,402,719
2031	3,410,852
2032	3,419,004
2033	3,427,174

2034	3,435,364
2035	3,443,573
2036	3,451,801
2037	3,460,048
2038	3,468,314
2039	3,476,600
2040	3,484,905
2041	3,493,229
2042	3,501,572
2043	3,509,935
2044	3,518,318
2045	3,526,720
2046	3,535,141
2047	3,543,582
2048	3,552,043
2049	3,560,524
2050	3,569,024

References

Reference name, link and access date

- 1 "TN231608_20200121T095704_CED 2019 Baseline Natural Gas Forecast - Mid Demand Case"
CEC IEPR Forecast 2020-2030 (CED 2019)
Accessed March 3, 2020

Industrial

Results and Output Summary

Calendar Year	Manufacturing Sector jobs Increase Compared with 2016 (%)	Population Increase Compared with 2016 (%)	VMT Increase Compared with 2016 (%)	Housing Increase Compared with 2016 (%)	Jobs Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	0%	0%	0%	0%	0%	2,051,828
2025	15%	6%	1%	9%	12%	2,237,964
2030	21%	8%	3%	14%	12%	2,277,624
2035	26%	10%	3%	19%	17%	2,353,073
2045	34%	13%	5%	23%	24%	2,473,225
2050	37%	14%	6%	24%	27%	2,514,430

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	2,051,828
2017	2,078,069
2018	2,101,038
2019	2,123,998
2020	2,146,981
2021	2,169,963
2022	2,192,945
2023	2,215,927
2024	2,238,910
2025	2,237,964
2026	2,245,896
2027	2,253,828
2028	2,261,760
2029	2,269,692
2030	2,277,624
2031	2,292,714
2032	2,307,804
2033	2,322,894
2034	2,337,983
2035	2,353,073
2036	2,365,089
2037	2,377,104
2038	2,389,119

2039	2,401,134
2040	2,413,149
2041	2,425,164
2042	2,437,179
2043	2,449,194
2044	2,461,210
2045	2,473,225
2046	2,481,466
2047	2,489,707
2048	2,497,948
2049	2,506,189
2050	2,514,430

References

Reference name, link and access date

- 1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
- 2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020
- 4 CARB GHG Inventory Query tool, download 09/22/2020

Other fuel

Results and Output Summary

Calendar Year	SD Region jobs in manufacturing sector	SD Manufacturing Sector jobs Increase Compared with 2016 (%)	SD Region jobs in Transmission and Distribution (T&D) sector	SD T&D jobs Increase Compared with 2016 (%)	SD Region Population	SD Population Increase Compared with 2016 (%)	SD Region annual VMT	SD VMT Increase Compared with 2016 (%)	Ag ratio	CARB Ag fuel emissions	Total Commercial GHG Emissions (MT CO2e)	Total Electricity Transportation and Distribution GHG Emissions (MT CO2e)	Total Residential GHG Emissions (MT CO2e)	Total Transportation GHG Emissions (MT CO2e)	Total Manufacturing GHG Emissions (MT CO2e)	Total Ag GHG Emissions (MT CO2e)	Total GHG emissions
2016	100,498	0%	3,226	0%	3,287,280	0%	29,269,804,435	0%	0.038	3,254,861	195,449	436,328	132,701	6,339	243,316	123,476	1,137,608
2025	116,046	15%	4,536	41%	3,470,848	6%	29,419,469,989	1%	0.032	2,946,067	225,687	613,475	140,112	6,371	280,959	95,718	1,362,321
2030	121,359	21%	4,741	47%	3,552,485	8%	30,099,876,093	3%	0.030	2,706,327	236,020	641,285	143,407	6,519	293,822	82,484	1,403,537
2035	126,618	26%	4,947	53%	3,620,348	10%	30,106,743,494	3%	0.029	2,708,924	246,247	669,095	146,147	6,520	306,555	77,451	1,452,015
2045	134,848	34%	5,230	62%	3,719,685	13%	30,797,122,430	5%	0.025	2,430,985	262,253	707,363	150,157	6,670	326,480	61,164	1,514,087
2050	137,503	37%	5,371	67%	3,746,073	14%	31,169,562,483	6%	0.024	2,368,989	267,416	726,497	151,222	6,750	332,908	55,914	1,540,707

Output Summary

Calendar Year	Total GHG Emissions
2016	1,137,608
2017	1,123,275
2018	1,186,375
2019	1,223,844
2020	1,261,956
2021	1,301,318
2022	1,340,607
2023	1,381,167
2024	1,423,234
2025	1,362,321
2026	1,372,223
2027	1,383,649
2028	1,389,843
2029	1,395,562
2030	1,403,537
2031	1,411,826
2032	1,419,507
2033	1,430,327
2034	1,441,631
2035	1,452,015
2036	1,456,990
2037	1,463,640
2038	1,470,163
2039	1,476,523
2040	1,482,771
2041	1,488,859
2042	1,494,866
2043	1,500,934
2044	1,507,427
2045	1,514,087
2046	1,519,645
2047	1,525,127
2048	1,530,403

2049	1,535,595
2050	1,540,707

References

Reference name, link and access date

- 1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
- 2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020
- 3 County Business Patterns, download 12/22/2020
- 4 CARB GHG Inventory Query tool, download 09/22/2020
- 5 California Agriculture Statistics review, download 12/22/2020

Off road

Results and Output Summary

	2025	2035	2050
Horse Power>25 HP emissions (MMT CO2e emissions)	0.51	0.60	0.69
Horsepower = 25 HP emissions (MMT CO2e emissions)	0.03	0.03	0.03
Horse Power <25 HP emissions (MMT CO2e emissions)	0.10	0.11	0.12
Pleasure Craft emissions (MMT CO2e emissions)	0.07	0.08	0.10
Recreational vehicles emissions (MMT CO2e emissions)	0.00	0.00	0.00
Total	0.72	0.83	0.95

Assumption

Number of days per year	365
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Model runs results and sources

1 ORION HP > 25 emissions by vehicle Category (tons/day)

	2025	2035	2050
Agricultural	3.3	3.3	3.3
Airport Ground Support	55.0	65.3	72.5
Cargo Handling Equipment	10.8	15.9	16.7
Construction and Mining	671.3	817.6	944.1
Industrial	291.9	309.2	325.6
Light Commercial	73.8	77.0	79.1
Military Tactical Support	59.6	59.6	59.6
Portable Equipment	222.9	271.7	365.7
Transportation Refrigeration Unit	21.1	23.5	27.3
Grand Total	1,409.7	1,643.2	1,894.0

ORION HP = 25 emissions by vehicle Category (tons/day)

1

	2025	2035	2050
Agriculture	11.7	10.8	10.4
Airport Ground Support	0.020	0.021	0.025
Construction and Mining	3.9	4.3	4.5
Industrial	1.1	1.1	1.1
Light Commercial	6.7	7.0	7.2
Transportation Refrigeration Unit	1.6	1.8	2.1

Grand Total	25.0	25.0	25.3
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SORE HP = 25 emissions by vehicle Category (tons/day)

2

	2025	2035	2050
Agriculture	0.0001	0.0001	0.0001
Industrial	0.0002	0.0001	0.0001
Lawn	46.35	50.92	58.84
Light Commercial	8.33	8.96	9.54
Grand Total	54.68	59.88	68.38

SORE HP < 25 model emissions by vehicle category (tons/day)

2

	2025	2035	2050
Agriculture	0.0007	0.0008	0.0008
Airport	0.0000	0.0000	0.0000
Industrial	0.0001	0.0001	0.0001
Lawn	116.79	120.43	121.16
Light Commercial	158.49	178.69	202.38
Transport	3.94	4.12	4.27
Grand Total	279.2	303.2	327.8

RV emissions (tons/day)

3

	2025	2035	2050
Sum of Red_EXHAUST_CO2	0.12	0.03	0.02
Sum of EXHAUST_CO2	9.51	11.10	13.57

Pleasure Craft emissions (tons/day)

4

	2025	2035	2050
SumOf_CO2-Baseline	203.2	232.5	283.8

References

Reference name, link and access date

- 1 OFFROAD ORION v1.0.1. model, downloaded 01/03/2021
- 2 SORE2020 Model (v1.1) , downloaded 12/22/2030
- 3 RV2018 Model Database, downloaded 12/24/2020
- 4 PC2014 Model Database CY2020 to CY2050 , downloaded 12/21/2020

Solid Waste

Results and Output Summary

Calendar Year	SD Region Population	Annual tons generated	Tonnage Increase Compared with 2016 (%)	Emission factor, MT CO2e/short ton	Capture rate	Oxidation rate	Total GHG Emissions (MT CO2e)
2016	3,287,280	3,317,216	0.0%	0.79	75%	10%	590,873
2025	3,470,848	3,502,456	5.6%	0.79	75%	10%	623,868
2030	3,552,485	3,584,836	8.1%	0.79	75%	10%	638,542
2035	3,620,348	3,653,317	10.1%	0.79	75%	10%	650,740
2045	3,719,685	3,753,559	13.2%	0.79	75%	10%	668,596
2050	3,746,073	3,780,187	14.0%	0.79	75%	10%	673,339

Output Summary

Calendar Year	Total GHG Emissions
2016	590,873
2017	609,941
2018	632,097
2019	602,467
2020	606,034
2021	609,601
2022	613,168
2023	616,735
2024	620,301
2025	623,868
2026	626,803
2027	629,738
2028	632,673
2029	635,607
2030	638,542
2031	640,982
2032	643,421
2033	645,861
2034	648,301
2035	650,740
2036	652,526
2037	654,311
2038	656,097
2039	657,882

2040	659,668
2041	661,453
2042	663,239
2043	665,024
2044	666,810
2045	668,596
2046	669,544
2047	670,493
2048	671,441
2049	672,390
2050	673,339

References

Reference name, link and access date

- 1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
- 2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020
- 3 Multi-year Countywide Origin Summary, download 04/01/2020
- 4 City of San Diego Waste Characterization Study 2012-2013, download 2015
- 5 "Oceanside_Characterization Summary_022417" provided by Colleen Foster, Oceanside, 04/11/19
- 6 "Chula Vista Waste Characterization Study Report_1-2016_FINAL", Provided by Manuel Medrano, via Cory Downs, Jan 31, 2019
- 7 EPA WARM Model v15, May 2019 model updated October 2019, downloaded 09/15/2020

Water

Results and Output Summary

1.082	Transmission and Distribution Losses, CED 2020-2030
527	lbs CO2e per MWh, SDG&E 2016 Emission Factor
43%	SDG&E 2016 Renewable Content
530	Upstream electricity emission factor, CAMX EF from eGRID2016 (lbs CO2e/MWh)
1,862	Imported treated water energy intensity (kWh/AF) (3)
1,817	Imported untreated water energy intensity (kWh/AF) (3)

Calendar Year	Renewable/GHG-free Content (%)		Electricity Emission Factor (lbs CO2e/MWh)	
	CAMX Average	SDG&E Bundled	California Average	SDG&E Bundled
2016	43%	43%	530	527
2025	47%	47%	493	493
2030	60%	60%	370	370
2035	73%	73%	249	249
2045	100%	100%	-	-
2050	100%	100%	(0)	(0)

Calendar Year	Water Demand (AF)		Water Treated at Local WTPs (MWD untreated + Local Surface + Local Ground + Desal) (AF)	CAMX Average Emission Factor (lbs CO2e/MWh)	SDG&E Emission Factor (lbs CO2e/MWh)	Upstream GHG Emissions (MT CO2e)	Local Water Treatment GHG Emissions - Removed from Electricity (MT CO2e)	Total GHG Emissions (MT CO2e)
	Imported Treated	Imported Raw						
2016	138,312	282,726	436,306	530	527	185,411	58,925	244,337
2025	170,707	348,945	538,496	493	493	212,754	68,048	280,803
2030	177,593	363,020	560,218	370	370	166,002	53,095	219,097
2035	183,634	375,368	579,273	249	249	115,863	37,058	152,921
2045	193,411	395,354	610,115	-	-	-	-	-
2050	198,619	406,000	626,544	(0)	(0)	(0)	(0)	(0)

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)	GHG Emissions Removed from Electricity (MT CO2e)
2016	244,337	58,925
2017	254,489	60,691
2018	276,912	67,084
2019	245,897	58,910
2020	254,041	61,000
2021	262,145	63,090
2022	270,209	65,180
2023	278,233	67,270
2024	286,218	69,361
2025	280,803	68,048
2026	268,915	65,168
2027	256,800	62,232
2028	244,459	59,241
2029	231,891	56,195
2030	219,097	53,095
2031	206,249	49,982
2032	193,208	46,821
2033	179,973	43,614
2034	166,544	40,359
2035	152,921	37,058
2036	138,334	33,523
2037	123,591	29,950
2038	108,690	26,340
2039	93,633	22,691
2040	78,420	19,004
2041	63,074	15,285
2042	47,559	11,525
2043	31,875	7,724
2044	16,022	3,883
2045	-	-
2046	-	-
2047	-	-
2048	-	-
2049	-	-
2050	(0)	(0)

References

Reference name, link and access date

- 1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
- 2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020
- 3 MWD 2015 UWMP Appendix K
<https://perma.cc/QXE3-VQHY>
- 4 "SDCWA Water Source Breakdown_annual"
"prima_export_data"
"2016 Water Use Data Request"
Provided by SDCWA, Eric Rubalcava, 10/23/18
- 5 Data all collected through 2016 and 2018 Snapshots, raw data in each jurisdiction's inventory MDW
12 water treatment facilities owned and operated by SDCWA or one of its member agencies
https://www.sdforward.com/pdfs/EIR_final/Section%204.16%20Water%20Supply.pdf
<https://perma.cc/3749-GL3L>
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Carlsbad Plant EIR
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<https://perma.cc/FC4C-WMRA>
- 6 SDCWA Supply
<https://www.sdcwa.org/sites/default/files/FY%202018%20Reliability%20Pie%20Chart.jpg>
- 7 2020 Urban Water Management Plan Progress Memo, Nov 2020, accessed Jan 3, 2021
https://www.sdcwa.org/sites/default/files/2016-12/Board/2020_agendas/2020_11_12SpecialWPE.pdf
Accessed 01/03/2021

Rail

Results and Output Summary

Calendar Year	SD Region jobs in support activities for rail transportation	Rail Transportation jobs Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	39	0%	111,282
2025	60	53%	170,658
2030	63	60%	178,456
2035	65	67%	186,130
2045	69	78%	198,060
2050	71	82%	202,099

Output Summary

Calendar Year	Total GHG Emissions
2016	111,282
2017	122,696
2018	130,689
2019	138,683
2020	146,677
2021	152,006
2022	157,335
2023	162,664
2024	167,993
2025	170,658
2026	172,217
2027	173,777
2028	175,337
2029	176,896
2030	178,456
2031	179,991
2032	181,526
2033	183,061
2034	184,596
2035	186,130
2036	187,323
2037	188,516
2038	189,709
2039	190,902
2040	192,095

2041	193,288
2042	194,481
2043	195,674
2044	196,867
2045	198,060
2046	198,868
2047	199,675
2048	200,483
2049	201,291
2050	202,099

References

Reference name, link and access date

- 1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
- 2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020
- 3 County Business Patterns, download 12/22/2020

Wastewater

Results and Output Summary

Calendar Year	SD Region Population	Population Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	3,287,280	0%	73,014
2025	3,470,848	6%	77,091
2030	3,552,485	8%	78,904
2035	3,620,348	10%	80,412
2045	3,719,685	13%	82,618
2050	3,746,073	14%	83,204

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	73,014
2017	73,510
2018	74,032
2019	74,447
2020	74,887
2021	75,328
2022	75,769
2023	76,210
2024	76,650
2025	77,091
2026	77,454
2027	77,817
2028	78,179
2029	78,542
2030	78,904
2031	79,206
2032	79,507
2033	79,809
2034	80,110
2035	80,412
2036	80,632
2037	80,853
2038	81,074

2039	81,294
2040	81,515
2041	81,736
2042	81,956
2043	82,177
2044	82,398
2045	82,618
2046	82,735
2047	82,853
2048	82,970
2049	83,087
2050	83,204

References

Reference name, link and access date

- 1 SANDAG DS38, SCS scenario for Regional Plan, Allison W, Rachel Cortes, 12/10/20 and 03/26/21
- 2 Demographic and Socioeconomic Estimates Region, August, 19, 2020, download 12/10/2020

Aviation

Results and Output Summary

1.6% Annual Increase, Constrained Passenger Forecast

Calendar Year	SD Airport Total Passenger	Passenger Increase Compared with 2016 (%)	SAN Total GHG Emissions (MT CO2e)	CRQ Total Emissions (MT CO2e)	Total GHG Emissions (MT CO2e)
2016	20,729,353	0%	202,422	10,931	213,353
2025	27,736,698	34%	270,849	18,204	289,052
2030	30,027,785	45%	293,221	22,244	315,465
2035	32,508,118	57%	317,442	26,284	343,726
2045	38,100,345	84%	372,050	27,093	399,142
2050	41,247,483	99%	402,781	27,093	429,874

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	213,353
2017	228,263
2018	249,259
2019	259,598
2020	264,346
2021	269,157
2022	274,032
2023	278,972
2024	283,979
2025	289,052
2026	294,194
2027	299,405
2028	304,686
2029	310,039
2030	315,465
2031	320,965
2032	326,539
2033	332,190
2034	337,919
2035	343,726
2036	349,613
2037	354,774
2038	360,016
2039	365,343

2040	370,755
2041	376,254
2042	381,840
2043	387,516
2044	393,283
2045	399,142
2046	405,095
2047	411,143
2048	417,288
2049	423,531
2050	429,874

References

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Marine Vessel

Results and Output Summary

Calendar Year	Ocean-Going Vessel - OFFROAD Adopted Rule (tons per day)	Harbor Craft - OFFROAD Adopted Rule (tons per day)
2016	334	71
2025	438	71
2030	507	71
2035	582	71
2045	762	70
2050	852	69

Calendar Year	Ocean-Going Vessel - OFFROAD compared to 2016	Ocean-Going Vessel - Port of SD Inventory (MT CO2e)	Harbor Craft - OFFROAD compared to 2016	Harbor Craft - Port of SD Inventory (MT CO2e)	Total GHG Emissions (MT CO2e)
2016	0%	22,500	0%	25,500	48,000
2025	31%	29,525	0%	25,606	55,131
2030	52%	34,204	1%	25,646	59,850
2035	75%	39,264	0%	25,613	64,877
2045	128%	51,412	-1%	25,211	76,623
2050	156%	57,501	-2%	24,867	82,368

Output Summary

Calendar Year	Total GHG Emissions (MT CO2e)
2016	48,000
2017	48,792
2018	49,585
2019	50,377
2020	51,169
2021	51,961
2022	52,754
2023	53,546
2024	54,338
2025	55,131
2026	56,074
2027	57,018
2028	57,962

2029	58,906
2030	59,850
2031	60,855
2032	61,861
2033	62,866
2034	63,871
2035	64,877
2036	66,051
2037	67,226
2038	68,401
2039	69,575
2040	70,750
2041	71,925
2042	73,099
2043	74,274
2044	75,448
2045	76,623
2046	77,772
2047	78,921
2048	80,070
2049	81,219
2050	82,368

References

Reference name, link and access date

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Agriculture

Results and Output Summary

Calendar Year	SD Region Cattle Population	Cattle Population Increase Compared with 2016 (%)	Total GHG Emissions (MT CO2e)
2016	10,900	0%	53,265
2025	12,433	14%	60,758
2030	12,433	14%	60,758
2035	12,433	14%	60,758
2045	12,433	14%	60,758
2050	12,433	14%	60,758

Output Summary

Calendar Year	Total GHG Emissions
2016	53,265
2017	52,776
2018	64,993
2019	64,504
2020	60,758
2021	60,758
2022	60,758
2023	60,758
2024	60,758
2025	60,758
2026	60,758
2027	60,758
2028	60,758
2029	60,758
2030	60,758
2031	60,758
2032	60,758
2033	60,758
2034	60,758
2035	60,758
2036	60,758
2037	60,758
2038	60,758
2039	60,758
2040	60,758

2041	60,758
2042	60,758
2043	60,758
2044	60,758
2045	60,758
2046	60,758
2047	60,758
2048	60,758
2049	60,758
2050	60,758

References

Reference name, link and access date

- 1 United States Department of Agriculture National Agricultural Statistics Service quick stats, download 09/15/2020

Soil Management

Results and Output Summary

Calendar Year	Oats Acres Harvested	Crop residue Nitrogen [kg N]	Farm Nitrogen [kg N]	Non-Farm Nitrogen [kg N]	Nitrogen EF [Kg N2O-N/kg N]	Farm N volatilized [kg]	Non-Farm N volatilized [kg]	N Volatalization EF [kg N-N2O/(kg NH3-N+NOx-N volatilised)]	Farm N Leached [kg]	Non-farm N Leached [kg]	Leaching EF [kg N2O-N/(kg N leaching/runoff)]	Amount of Lime applied to soil [tonnes]	Lime EF [ton C/tonnes of Lime]	Amount of Urea Applied to Soil	Ures EF [tonne C/tonne Urea]	Total Farm fertilizer emissions [Metric tons]	Total non-Ag emissions [Metric tons]	Total fertilizer emissions [Metric tons]
2016	2,100	7,990	2,733,538	4,759,808	0.01	273,354	475,981	0.01	820,061	1,427,942	0.0075	216	0.125	559	0.2	17,507	29,534	47,041
2025	2,091	7,996	2,545,395	3,034,402	0.01	254,540	303,440	0.01	763,619	910,321	0.0075	195	0.125	500	0.2	16,287	18,828	35,115
2030	2,131	8,176	2,639,806	3,148,316	0.01	263,981	314,832	0.01	791,942	944,495	0.0075	198	0.125	508	0.2	16,881	19,535	36,415
2035	2,172	8,359	2,737,717	3,266,506	0.01	273,772	326,651	0.01	821,315	979,952	0.0075	200	0.125	516	0.2	17,496	20,268	37,764
2045	2,255	8,738	2,944,571	3,516,362	0.01	294,457	351,636	0.01	883,371	1,054,909	0.0075	206	0.125	532	0.2	18,796	21,818	40,614
2050	2,298	8,935	3,053,786	3,648,369	0.01	305,379	364,837	0.01	916,136	1,094,511	0.0075	208	0.125	540	0.2	19,481	22,637	42,119

Output Summary

Calendar Year	Total GHG Emissions
2016	47,041
2017	58,446
2018	20,574
2019	24,431
2020	33,862
2021	34,109
2022	34,358
2023	34,608
2024	34,861
2025	35,115
2026	35,371
2027	35,630
2028	35,890
2029	36,152
2030	36,415
2031	36,681
2032	36,949
2033	37,219
2034	37,490
2035	37,764
2036	38,040
2037	38,318
2038	38,597
2039	38,879
2040	39,163
2041	39,449
2042	39,737
2043	40,027
2044	40,319
2045	40,614
2046	40,911

2047	41,209
2048	41,510
2049	41,813
2050	42,119

References

Reference name, link and access date

- 1 San Diego County Crop report, download 12/15/2020
- 2 Fertilizer tonnage report by year, download 01/04/2021
- 3 N₂O EMISSIONS FROM MANAGED SOILS, AND CO₂ EMISSIONS FROM LIME AND UREA APPLICATION, download 06/12/2020
- 4 International Fertilizer Association Fertilizer Converter