2023

CLIMATE ACTION PLAN

SAN DIEGO
COMMUNITY
COLLEGE DISTRICT

Prepared by:
EcoMotion Inc.

DRAFT

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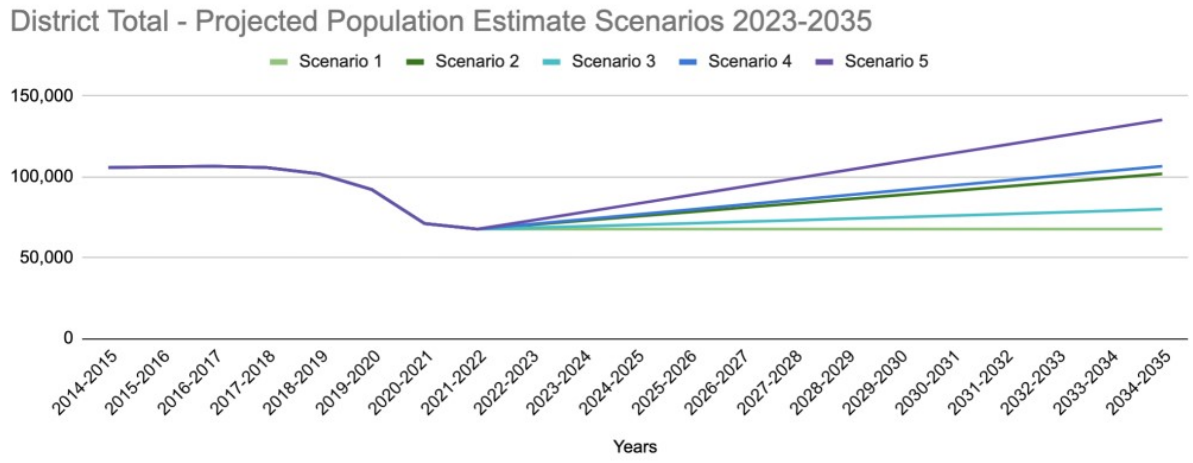
Executive Summary

This is San Diego Community College District's first Climate Action Plan. It is an important first step in climate action planning at the District. The Plan includes data as well as options for future actions. The Plan calls out the need for the District to engage in a formal stakeholder process to establish goals and to make commitments.

The Plan begins with "SDCCD at a glance." Efforts thus far position the District well for substantive climate action planning. The Plan documents the District's impressive green track record with solar, thermal energy storage, battery energy storage, efficiency, use of reclaimed water, and more.

A focal point of the Plan is the uncertainty regarding student headcounts. Five projections are presented with their emissions. The planning scenarios range from no-growth to max build out, to a doubling of students through online learning. Each of these scenarios was modeled through the year 2035, harmonizing the City of San Diego carbon neutrality goal by 2035. The highest growth level would increase SDCCD's GHG emissions from 62,325 to 97,850 MT.



The 2022 SDCCD GHG Inventory is presented in brief. The key finding is that the DIstrict's current carbon footprint is 62,325 metric tonnes. Fully 73% of the footprint is from student, faculty, and staff commuting to campus. The next largest sources of emissions are 2) natural gas used in the fuel cells, 3) natural gas used for space and water heating, and 4) purchased electricity. The GHG inventory also presents the District's Nitrogen Footprint of 29.85 metric tonnes of reactive nitrogen.

The Plan includes a discussion of goals and commitments. At this point the District has made no commitments, but each of the recent Facilities Master Plans for the four colleges, discusses sustainability. A robust stakeholder engagement process is recommended for the near future to make goals and to make commitments as so many jurisdictions have.

Stakeholders will also be highly instrumental in defining mitigation measures. For each resource use that is responsible for emissions, campus officials and stakeholders can take initial concepts presented in the Plan and customize them for SDCCD. The Plan presents initial mitigation strategies for electricity, natural gas, water/wastewater, waste management, and the use of refrigerants and fertilizers.

The Plan takes a look at pathways to carbon neutrality. It presents a practical approach, identifying first those measures that can be executed with no capital costs, and then advancing to those with small costs and quick paybacks, progressing to measures with significant capital costs likely necessary to reach milestones and achieve goals in time.

Solar systems and fuel cells can be sourced through third parties who provide financing. Same with EV infrastructure. Other measures, such as controls and lighting upgrades will likely need to be budgeted. Major equipment upgrades and retrofits, such as installing electric heat pumps, will require sophisticated engineering and capital expenditures.

The Climate Action Plan concludes with ten recommendations for next steps. These range from planning timelines, to substantive research, and most importantly to bringing together officials and their deputies, as well as stakeholders, that can help suggest and then define goals. With goals and commitments codified, the Plan is updated with action steps.

Introduction

Initial Climate Action Planning

This is San Diego Community College District's first District-wide Climate Action Plan. It covers the entire College District which is made up of five tracked facilities: City College, College of Continuing Education (which operates in seven locations), Mesa College, Miramar College, and District Facilities. SDCCD salutes the individual campus efforts with sustainability and climate action. These efforts have involved dozens of dedicated faculty, staff, and students.

This first-cut Climate Action Plan (CAP) complements SDCCD's first and brand-new, 2022 Greenhouse Gas Inventory. The inventory focuses on SDCCD's main sources of emissions.

Included in the GHG inventory are emissions from electricity and natural gas, transportation energy on campus as well as student, faculty, and staff commuting, plus wastewater management, waste management, and the use of fertilizers and refrigerants on campus. Future editions will focus to a greater extent on the inclusion of embedded carbon in goods consumed by SDCCD… things like paper products and food.

SDCCD at a Glance

San Diego Community College District has come a long way since opening in 1914 with four faculty members and 35 students attending classes at San Diego High School. That marked the establishment of City College. In 1964, Mesa College opened and served 1,800 students. Miramar College was established in 1969 on 140 acres of land just north of the Miramar Naval Air Station. Its Continuing Education program serves students at seven locations.

In 1972, the District was formed when voters approved separating its four colleges from the San Diego Unified School District. The San Diego Community College District covers 196 square miles, a geographic area that is home for over one million residents. The 100,000+ students that take courses at SDCCD make it the second largest of the State's 73 community college districts.

<u>Facilities</u>

San Diego Community College District is made up of four colleges and the District Facilities:

- City College
- Continuing Education
- Mesa College
- Miramar College
- District Facilities

There are seven Continuing Education sites. One is co-located at Mesa College; another at Miramar College. The other five are independent facilities:

- ECC Educational Cultural Complex
- CHA Cesar E Chavez
- MCC Mid City
- MIR CE Miramar (located at Miramar College)
- MES CE Mesa (located at Mesa College)
- NCC North City Campus
- WCC West City Campus

The District consists of 142 buildings and a total of 4,724,941 gross square feet of space; 2,014,959 square feet of "assignable" space. SDCCD also has 1,261,443 square feet of parking structures at its campus locations.[1]

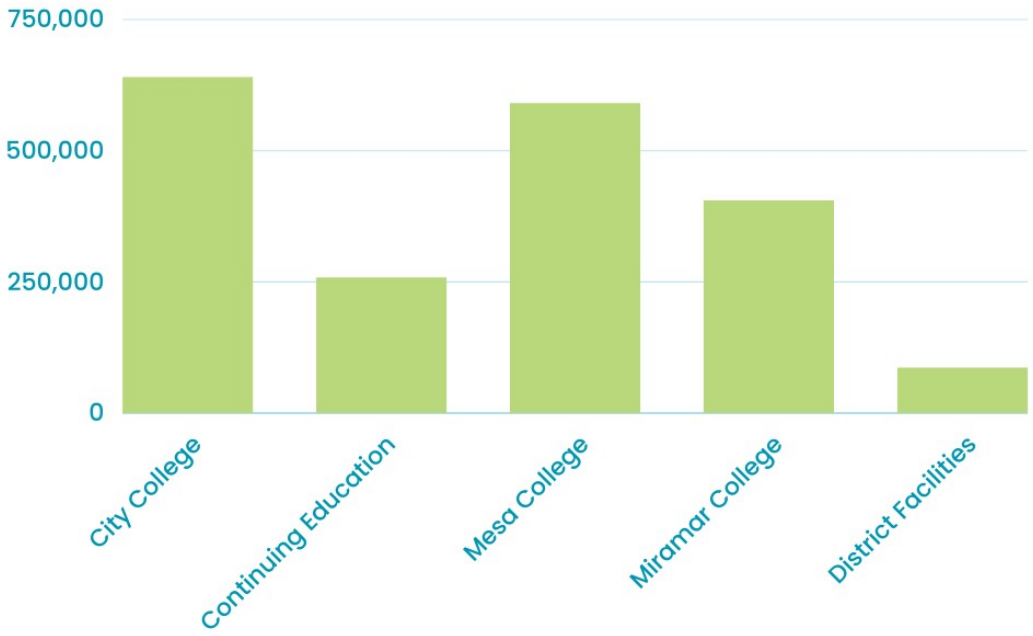
Acres Per Campus

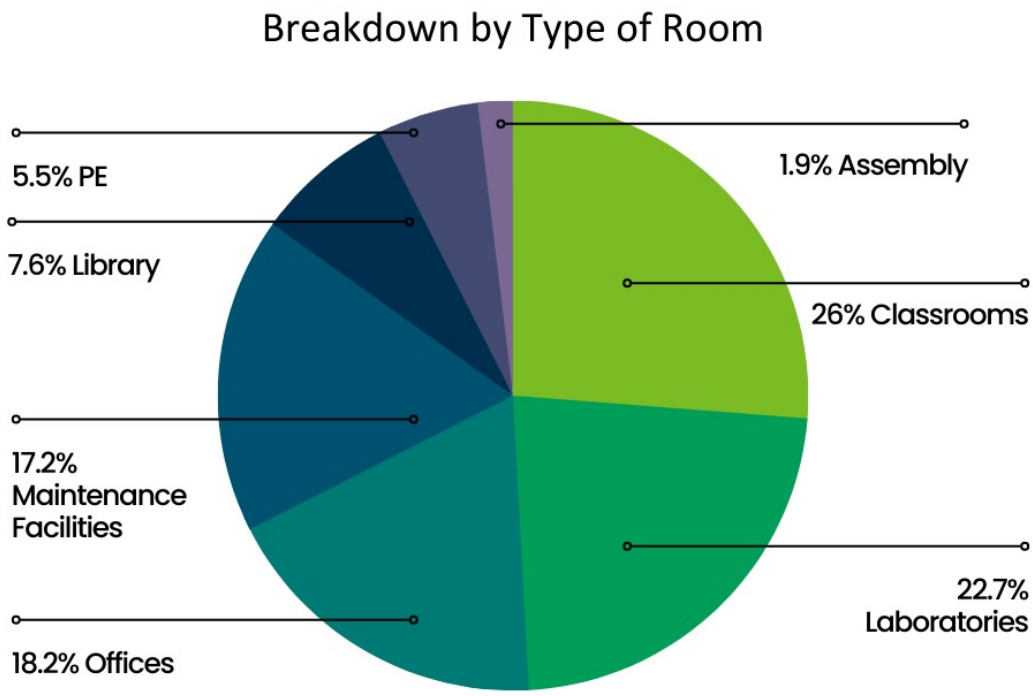
Campus	Gross	Usable
City College	58.72	46.22
Continuing Education	39.63	36.04
Mesa College	112.6	84.5
Miramar College	120.48	105
District Facilities	N/A	6.71

2022 Building Space Per Campus

Campus	Square Footage
City College	639,197
Continuing Education	257,288
Mesa College	589,816
Miramar College	404,117
District Facilities	85,818

[1]The Facilities Utilization Space Inventory Options Net (FUSION) is a database maintained by the California Community Colleges Chancellor Office (CCCCO) and includes descriptive data on building and rooms for each college and district within the State.





Facilities Master Plans: Each of the four college's has been responsible to develop its own Facilities Master Plan. They were prepared by different consultants, and speak to the unique nature of the campuses… a federation of independent states/institutions. They are impressive,recent, and highly valuable compendia, completed in 2021 - 2022.

SDCCD's Green Track Record

There is no question that SDCCD has been a leader in terms of greening. Widespread efficiency gains have been put in place throughout, most recently funded by California's Proposition 39.

Many of the District's green initiatives are behind the scenes. Miramar's thermal energy storage tank cuts peak demand for power during the heat of the day. The one million gallon storage tank at the central plant at Miramar College helps balance energy demand between peak and low-use times, creating substantial energy and dollar savings. Also at Miramar is the solar pool heating system at the Ned Baumer Aquatics Center which saves more than 25,000 therms of natural gas per year.

SDCCD Green Steps to Date

- Energy Efficiency
- Water Efficiency
- Use of Reclaimed Water
- Thermal Energy Storage
- Solar Photovoltaic
- Solar Thermal
- Solar Ready
- Battery Energy Storage Systems
- Fuel Cells
- LEED Certified Buildings
- Transit Links
- EV Charging

In 2022, SDCCD generated 56.1% of its overall power consumption on site using fuel cells at Mesa and Miramar Colleges and impressive solar systems. SDCCD was an early pioneer with the installation of battery energy storage systems, both at City College's library and a Continuing Education site. Other environmental accomplishments include the construction of 42 LEED certified buildings. In addition, the District has a novel purple pipe irrigation system at Miramar and has established transit links for students.

The District's Green Building Policy requires that all new buildings and major renovations obtain at least a Leadership in Energy and Environmental Design (LEED) Silver certification from the U.S. Green Building Council. The Policy also requires that 10% of a project's total energy is generated from renewable resources such as solar and thermal energy.[2]

[2] San Diego Community College District, Green Building Policy, first edition 2014, (updated 1/28/2015)

Currently, the SDCCD is on track to obtain 42 LEED certifications, more than any single organization in San Diego County. The installation of 16 EV charging stations throughout the District are part of ECOtality's nationwide EV project, deploying electric vehicles and charge infrastructure in 18 major cities. There are now ~30 EV chargers on SDCCD sites.

Solar installations are now in place on buildings and parking structures throughout the District. A 20-year Power Purchase Agreement (PPA) provides for carport solar arrays at Mesa and Miramar Colleges, and the District's main office and rooftop systems at City College and Continuing Education's Mid-City Campus. A number of facilities at Miramar are "solar ready." There's a SDG&E-owned system atop the roof of the Skills Center at the Educational Cultural Complex. There's also a District-owned installation on the Career Technology Center at City College. Its vertical array is the largest of its kind in the country.

The Coronavirus Pandemic

"We are living in interesting times." That's for sure. A curse for some. "Unusual" does not do justice to the profound societal impacts of the coronavirus.

March 2020, American society and much of the world came to a grinding halt. The coronavirus paralyzed schools, cities, and workplaces of all kinds. Almost everything changed. At one point, there were curfews. The pandemic was profound: Over seven million Earth citizens killed, a million of them Americans, and many aspects of our lives changed forever.

Zoom… We all went virtual. SDCCD went virtual. Classrooms empty. While we all longed for personal interaction, we all also found the great benefits of zoom. Less commuting. Less time dressing up and down. Less gas. Greater levels of productivity.

So now SDCCD is "not the man it used to be." Prior to the pandemic, there was talk and planning for expansion of SDCCD's facilities. Now, the campuses are still quiet and quite empty. Much as corporations are having a hard time getting their workers back into their beautiful offices, SDCCD students have found a new normal. Many are off campus. Will they return?

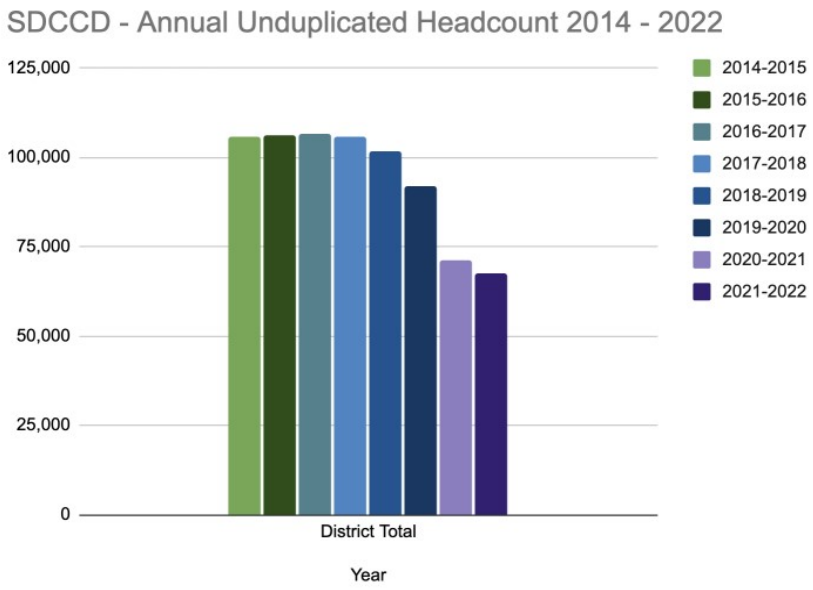
Student Population Variable

San Diego Community College District is among the largest of the State's community college districts. SDCCD serves approximately 100,000 students each year. But the pandemic hit the District like all others. Enrollment plummeted more than 30%. Now, the pandemic is officially over, but its lasting legacy is how society works and learns. What will the new normal be in

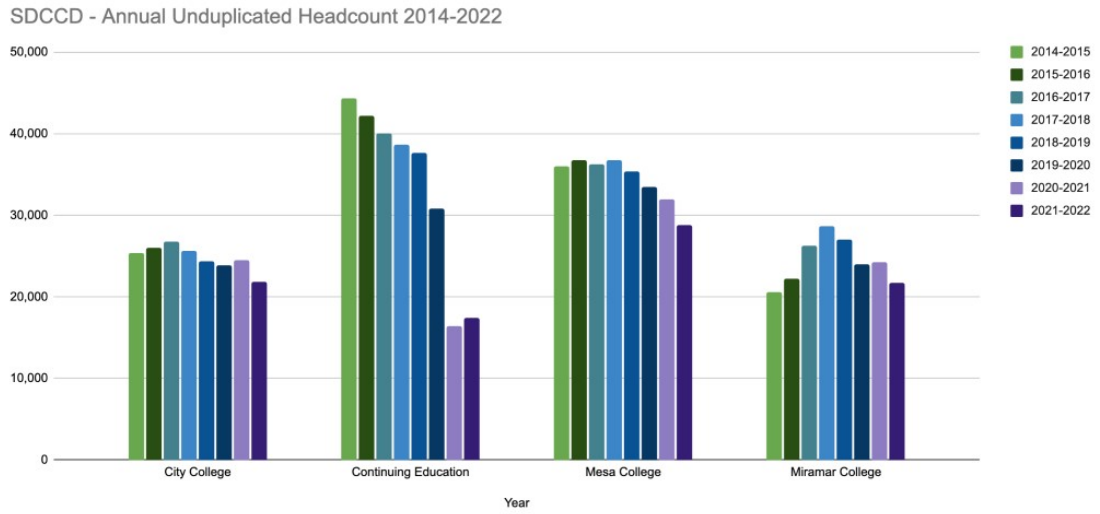
terms of on-campus study? The following table and graphs show student population numbers and their declines – negative growth rates – due to the pandemic.

Student Population 2014 - 2022

Year	District Total
2014-2015	105,814
2015-2016	106,199
2016-2017	106,604
2017-2018	105,781
2018-2019	101,879
2019-2020	92,085
2020-2021	71,076
2021-2022	67,647



The graph shows that the student count was already dropping somewhat in 2018-2019 and 2019-2020, before dropping precipitously in 2020-2021 when the pandemic was in full force. The graphs and table below show the populations on each of the four campuses. Note the drop in Continuing Education numbers.



Student Unduplicated Headcount Growth Rates

Year	City	Rate	Cont Ed	Rate	Mesa	Rate	Miramar	Rate	District	Rate
2014-2015	25,435	N/A	44,295	N/A	35,992	N/A	20,556	N/A	105,814	N/A
2015-2016	26,034	2.36%	42,197	-4.74%	36,779	2.19%	22,180	7.90%	106,199	0.36%
2016-2017	26,797	2.93%	40,063	-5.06%	36,259	-1.41%	26,213	18.18%	106,604	0.38%
2017-2018	25,637	-4.33%	38,654	-3.52%	36,724	1.28%	28,659	9.33%	105,781	-0.77%
2018-2019	24,351	-5.02%	37,594	-2.74%	35,357	-3.72%	27,084	-5.50%	101,879	-3.69%
2019-2020	23,913	-1.80%	30,850	-17.94%	33,424	-5.47%	23,997	-11.40%	92,085	-9.61%
2020-2021	24,494	2.43%	16,455	-46.66%	31,893	-4.58%	24,202	0.85%	71,076	-22.81%
2021-2022	21,835	-10.86%	17,378	5.61%	28,810	-9.67%	21,756	-10.11%	67,647	-4.82%

Mesa College experienced a drop in students starting in 2017 due to a cost-savings plan. In the Fall of 2018, Mesa offered 67 fewer sections than the previous Fall. Thus even before the pandemic, Mesa College experienced a decrease in Day-Only students, and increases in both

"On-Campus + Online" students, and "Online-Only" students. At Mesa, "Online-Only" students increased from 11 - 18% between 2014 and 2018.[3]

Student Population Definitions

Definitions plague counts and are complex at SDCCD. Like other community colleges, some students are full-time. Some are on campus, others are studying virtually. Others are part time. At Miramar 79% of students are part time. Others take courses at multiple campuses. Some go for one semester and not the other. Many high school students take courses; 16% of students in the 21-22 calendar year were high school students, what is called "high school concurrent."

SDCCD tracks student populations in four ways:

1. FTES Full-Time Equivalent Students: SDCCD, like most community colleges, is fluid in terms of student populations. Unlike a four-year, traditional college with a fixed number of students, sometimes in dorms, community colleges have a preponderance of part-time students… 70% overall in the case of SDCCD. Part-time is defined as a student course load of less than 12 credits per semester. Full-time equivalent takes those part-time students and determines their full-time equivalent number.

2. Annual Unduplicated Headcount: Headcount is the number of individual students. In the "Annual Unduplicated Headcount" each student is counted once for the school year – regardless of how many semesters – and regardless of the number of courses in which the student enrolls. Drops, never attends, and canceled classes are excluded, Apprenticeship, contract and fee-only students are also excluded.

[3] Mesa College Facilities Master Plan: https://go.boarddocs.com/ca/sdccd/Board.nsf/files/C2XMUA5C743E/$file/2021-05-11_Mesa%202030_CMP.pdf

Student Population 2014 - 2022

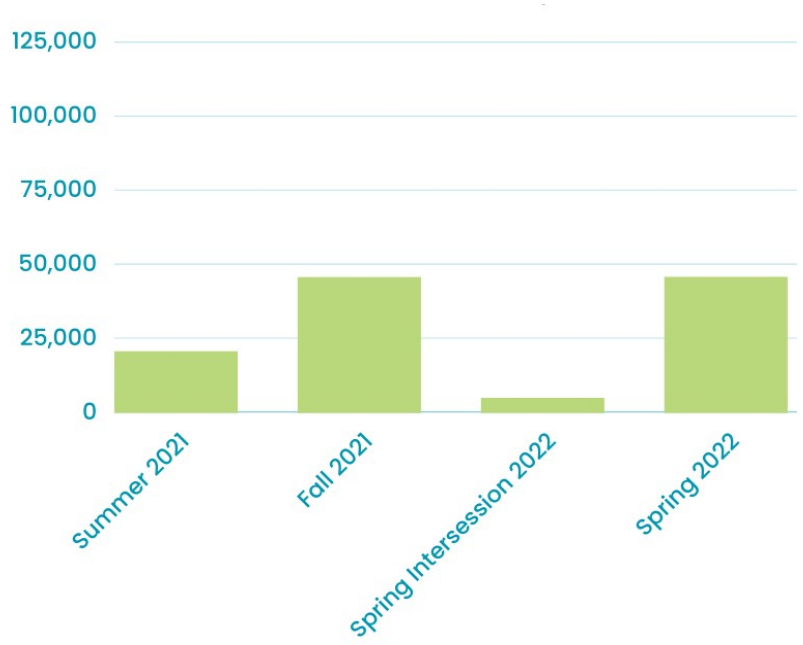
Year	City College	Continuing Education	Mesa College	Miramar College	District Total
2014-2015	25,435	44,295	35,992	20,556	105,814
2015-2016	26,034	42,197	36,779	22,180	106,199
2016-2017	26,797	40,063	36,259	26,213	106,604
2017-2018	25,637	38,654	36,724	28,659	105,781
2018-2019	24,351	37,594	35,357	27,084	101,879
2019-2020	23,913	30,850	33,424	23,997	92,085
2020-2021	24,494	16,455	31,893	24,202	71,076
2021-2022	21,835	17,378	28,810	21,756	67,647

Note that there is a discrepancy between the sum of the unduplicated values presented by each college, and the District total presented. These are both presented in SDCCD's most useful and annual Facts on File document. For the 2021/2022 academic year, the sum of the colleges' reported values was 89,779 students while the District reported 67,647. EcoMotion assumes this difference is explained by the District count which treats a student taking courses on multiple campuses as one.

3. Headcount by Term: SDCCD notes with deserved pride that "SDCCD serves approximately 100,000 students annually." This value – the "District total" – is unduplicated within a term. But it is duplicated when looking at multiple terms. Headcount by term is based on the number of students in the Fall term plus the number of students in the Spring term. There is also the Summer Term and Spring Intersession. Here is a summary of the 21-22 academic year:

Headcount by Term

Term	Number of Students
Summer 2021	20,647
Fall 2021	45,601
Spring Intersession 2022	4,882
Spring 2022	45,686
District Total	**116,816**



SDCCD also presents headcount by terms as reported by each of its four colleges. For 2021-2022, this sum of headcounts by terms from each college was 139,806 higher than the District reported value of 116,816. The District's value is unduplicated across campuses. A student taking courses on two campuses is only counted once in the District total. This District headcount is double-unduplicated, unduplicated in semesters and unduplicated across campuses in any given year.

Summary of 2021/2022 Student Population Values

Full Time Equivalent Students	34,554
Annual Unduplicated – Sum of values reported by each college	89,779
Annual Unduplicated – District total	67,647
Headcount by Term – Sum of colleges' values	139,806
Headcount by Term - District "double-unduplicated" total	116,816

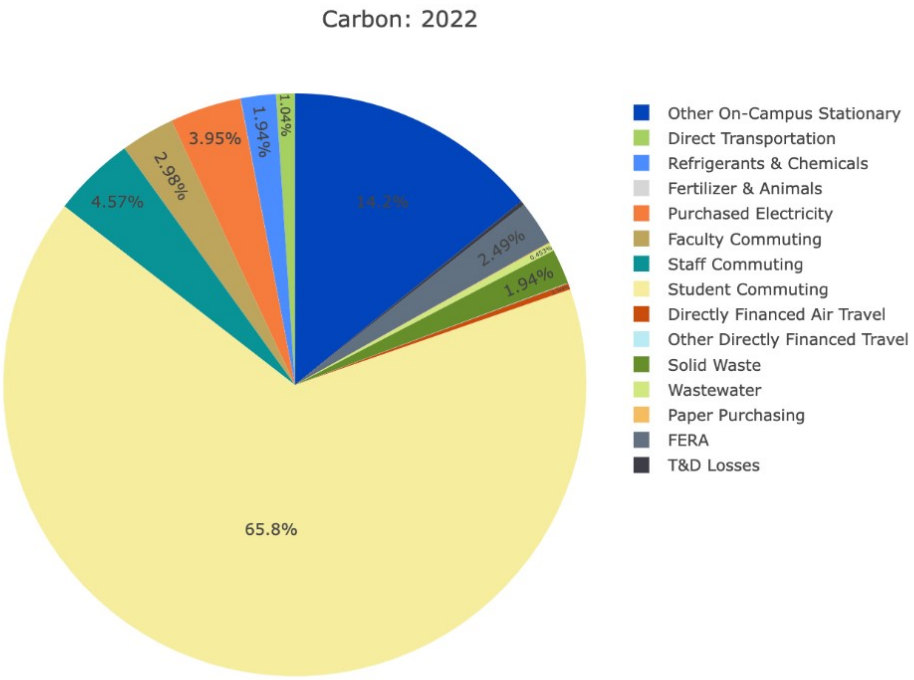
4. Student Enrollment: Enrollment is also used although not in this report. The definition of enrollment is the number of seats enrolled, what is considered a duplicated headcount. Most students have multiple seats in different classes during the same semester.

Current Snapshot

In the latest year tracked, the 21 - 22 academic year, District-wide there were 34,554 FTES and 67,647 Annual Unduplicated students. These levels reflected 4% and 5% drops respectively from the prior year.[4] In the prior year, following the 2019 - 2020 data, the District saw a 22.81% drop, which was down 9.61% from pre-pandemic times. Overall enrollment dropped from 101,879 down to 67,647, a drop of 34,232 students or 33.6% as a result of the pandemic.

[4] San Diego Community College District, Facts on File, 2021 - 2022.

2022 GHG Inventory Summary



Inventory Highlights

The biggest source of CO2e emissions at San Diego Community College District - by far – is moving students, faculty, and staff to and from the campus. This represents 73.35% of the District's carbon footprint as measured in calendar year 2022.

The next biggest source of emissions is 8.44% for use of natural gas to power fuel cells on campus. Following next is emissions from natural gas on campus for "conventional uses" or the central heating plants on each campus, 5.76% of the District total. The fourth biggest source is the emissions from purchased electricity 3.95%.

Categories

Fiscal Year	Scope	Source	CO2 (kg)	CO2 (MTCDE)	CH4 (kg)	CH4 (MTCDE)	N2O (kg)	N2O (MTCDE)	GHG MTCDE
2022	1	Other On-Campus Stationary	8,812,788	8,812.79	354	9.92	7	1.89	8,824.59
2022	1	Direct Transportation	641,225	641.22	34	0.97	22	5.94	648.13
2022	1	Refrigerants & Chemicals	0	0.00	0	0.00	0	0.00	1,212.17
2022	1	Fertilizer & Animals	0	0.00	0	0.00	32	8.52	8.52
2022	2	Purchased Electricity	2,462,399	2,462.40	22	0.62	0	0.00	2,463.02
2022	3	Faculty Commuting	1,839,571	1,839.57	98	2.75	66	17.58	1,859.91
2022	3	Staff Commuting	2,817,793	2,817.79	153	4.28	100	26.45	2,848.53
2022	3	Student Commuting	40,576,029	40,576.03	2,201	61.63	1,427	378.02	41,015.68
2022	3	Directly Financed Air Travel	213,620	213.62	0	0.00	2	0.66	214.28
2022	3	Other Directly Financed Travel	19,315	19.32	1	0.03	1	0.18	19.52
2022	3	Solid Waste	0	0.00	43,142	1,207.97	0	0.00	1,207.97
2022	3	Wastewater	0	0.00	10,082	282.31	0	0.00	282.31
2022	3	Paper Purchasing	29,458	29.46	0	0.00	0	0.00	29.46
2022	3	FERA	561,360	561.36	35,364	990.18	5	1.26	1,552.80
2022	3	T&D Losses	137,811	137.81	1	0.03	0	0.00	137.85

Scopes

Fiscal Year	Scope	CO2 (kg)	CH4 (kg)	N2O (kg)	GHG MTCDE
2022	1	9,454,013	389	62	10,693.41
2022	2	2,462,399	22	0	2,463.02
2022	3	46,194,958	91,043	1,601	49,168.30

Totals

Fiscal Year	CO2 (kg)	CH4 (kg)	N2O (kg)	Gross MTCDE	Offsets (MTCDE)	Compost (MTCDE)	Non-Additional Sequestration (MTCDE)	Biogenic (MT CO2)	Net MTCDE
2022	58,111,370	91,453	1,662	62,324.73	0.00	0.00	0.00	0.00	62,324.73

2022 Baseline Emissions

There is no question: The year 2022 was typical. But pre-pandemic years are long-gone and thus not particularly relevant. So calendar year 2022 serves as a baseline by default. This is not a typical year, values will certainly change, and we will thus keep a keen eye to the future. EcoMotion recommends an update by 2025 if not before.

What are the baseline emissions? Overall, in 2022, the inventory finds overall campus emissions of 62,325 metric tons CO2e. But now let's back up and determine where these emissions come from and thus how to control them, and reduce them over time. We begin with policies.

Goals and Commitments

To date, there have been no formal proclamations of goals and/or commitments related to climate action planning, and reducing carbon emissions. Each of the four colleges has, however, been through a rigorous Facilities Master Plan (FMP) process. The result of these four planning efforts has been the development of an impressive plan for each campus.

The Facilities Master Plans are dense and unique documents, created by considerable engagement and analysis. They reflect thoughtful processes involving many stakeholders. The documents cover each college's enrollment, demographics, plans and aspirations. Sustainability and climate action are small elements in each plan. But within the FMPs, there are rather strong comments and commitments to sustainability.

EcoMotion concludes this Plan with a number of recommendations, among which is the recommendation to engage in a formal process of District-wide goal-setting around energy and climate. It appears that a planning process at Miramar College got close to this, making a series of recommendations for actions to be considered to mitigate the climate crisis. But overall, the District has taken no specific action and has not made any specific commitments to carbon neutrality as so many other institutions have.

Climate Action Mandates

State of California Climate Action

Assembly Bill 32: The passage of AB 32, the California Global Warming Solutions Act of 2006, required California to reduce its GHG emissions to 1990 levels by 2020 – a reduction of approximately 15% below emissions expected under a business-as-usual scenario.

Senate Bill 32 / AB 197: SB 32 of 2016 built upon AB 32 and requires California to reduce statewide GHG emissions by 40% below the 1990 level by 2030.

Executive Order B-55 / Governor Newsom Directive: Executive Order B-55 was issued by Governor Jerry Brown in 2018 with a goal to achieve carbon neutrality as soon as possible, no later than 2045… and to achieve and maintain negative net emissions thereafter.

Executive Order N-79-20: Executive Order N-79-20 was issued by Governor Newsom in 2020 and called for phasing out of internal combustion passenger vehicles by 2035 in the State of California. Bill covers all new passenger cars and trucks as well as all drayage/cargo truck, off-road vehicles, and equipment sold in California will be zero emission by 2035.

AB 1279: The California Climate Crisis Act, 2022, establishes the policy of the State to achieve carbon neutrality as soon as possible, but no later than 2045 and maintain negative net emissions thereafter. The bill directs CARB to develop policies and plans to ensure that by 2045, statewide anthropogenic emissions are reduced at least 85% below 1990 levels.

CARB Scoping Plans

AB 32 directs CARB to scoping plans that detail how the State of California will achieve the established GHG reduction goal. Each scoping plan includes a suite of policies to help the State achieve its goals. The first AB 32 Scoping Plan was published in 2008. CARB is required to update no less than every five years. Updates were published in 2013, 2017, and 2022. The 2022

update sets the path for achieving carbon neutrality by 2045 and develops an analysis of achieving carbon neutrality by 2035.

City of San Diego Goal

Continuing Education's Facilities Master Plan suggests that by default, SDCCD is bound to carbon neutrality by 2035. "There are Federal, State, and California Community College's goals for carbon neutrality.… Probably the most aggressive one that applies is the City of San Diego."

San Diego's 2015 Climate Action Plan, the original plan, was considered a landmark municipal policy. It was updated in 2022 and unanimously approved by the San Diego City Council after considerable stakeholder input. The City-wide goal is to be net zero by 2035. The Plan has a concurrent goal of cutting GHG emissions in half by 2035. The City's community initiative is called, "Our Climate, Our Future."

Aligning a campus's carbon goals with the local jurisdiction is not at all unusual. In May 2021, the Massachusetts Institute of Technology (MIT) updated its climate action plan. It steps up its ambitious goals to achieve net zero campus carbon emissions by 2026 and to eliminate all direct emissions by 2050. Its Office of Sustainability reports that, "Our teams are working to understand and leverage the alignment of net zero commitments between MIT and the City of Cambridge, the Commonwealth of Massachusetts, and the Federal [government]."

ACUPCC: American College and University Presidents Climate Commitment

In 2006, twelve leading colleges founded ACUPCC, the American College and Presidents Climate Commitment. Nearly 700 institutions, representing six million students, have signed to date, making their GHG inventories, Climate Action Plans, and progress reports publicly available. Through the commitment, each institution pledges carbon neutrality by 2050 or a prior year.

California Universities' Climate Commitments

University of California has committed to carbon neutrality on all of its campuses and in all of its operations by 2025... that's 100% clean electricity by then. U.C. Merced has already met the goal. The University of Southern California has a goal of carbon neutrality by 2025. Occidental College is committed to carbon neutrality in its operations and direct energy use by 2040, and before 2050 when accounting net zero emissions associated with the use of products (scope 3).

California State Universities (CSUs) have varying goals. Eleven CSUs have published climate action plans, most setting a goal to achieve carbon neutrality, with dates ranging from 2020 to 2050. Systemwide, the CSU targets carbon neutrality by 2045, with an interim goal of 80% below 1990 levels by 2040. Note that CSU systemwide goals are largely Scope 1 and 2; many of the campuses' CAPs include Scope 3 emissions… the so-called supply-chain emissions.

California Community Colleges Goal

The California Community Colleges constitute the largest higher education system in the world. Fully 116 colleges served 2,324,885 students in 2019-20. The California Community Colleges Board of Governors adopted its Climate Change and Sustainability Policy in 2019. The framework policy was updated in 2021.

Taken from the Framework: "In alignment with statewide goals adopted by the California Air Resources Board, California Community Colleges can strive to eliminate greenhouse gas emissions by 2035. To achieve this, it is recommended to reduce campus/district GHG emissions by at least 75% by 2030 and 100% by 2035 to align with State goals." Underline intentionally added to flag operative terms.[5]

SDCCD Strategic Planning: Goal E: State of the Art Facilities is one of six goals that came out of the recent SDCCD 2023 - 2030 Strategic Plan. Within Goal E is Objective E3: Develop an Energy Strategic Plan (ESP) to increase efficiency, reduce costs, carbon and other harmful emissions and waste by products, and to maximize renewable and clean energy use.[6]

SDCCD's Environmental and Climate Action Planning

Is SDCCD a balkanized district in terms of climate? Perhaps "a federation" sounds better. Instead of central control in terms of master planning, there is a strong, decentralized culture within SDCCD.

Each of the recent Facility Master Plans was prepared by a different consulting firm with different emphases and priorities. The commonality? Each of the four colleges have gone through exhaustive planning processes. And each of the end products, the Facilities Master Plans, include sustainability and related goals in varying degrees.

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[5] California Community Colleges Board of Governors Climate Action and Sustainability Framework, 2021, https://www.cccco.edu/About-Us/Chancellors-Office/Divisions/College-Finance-and-Facilities-Planning/Climate-Action-and-Sustainability

[6] SanDiego Community College District, 2023 - 2030, District Strategic Plan, July 2022.

City College: Dated 25 July 2022, the consultant team – Rossling, Nakamura, Terada Associates – was the master plan architect for City College.[7] Page 52 - 53 of the Plan cover sustainability, service and infrastructure. The plan takes a preliminary stab at sustainability.

Continuing Education: Fully 273 slides in length, the Miramar Facilities Master Plan was facilitated and prepared by Moore, Ruble, Yudell Architects and finalized in 2022.[8] Of the College-wide strategies presented, one is sustainability and resiliency. In addition, the College of Continuing Education is proud of its green steps. It has a LEED Silver building at CE Mesa, a LEED Gold building at West City along with bioswales there, the ECC has solar panels covering its surface parking, MidCity has solar on the roof, North City has a green roof, and many Continuing Education campuses have EV charging.

The Continuing Education Facilities Master Plan recommended that SDCCD develop a resilience plan with a vulnerabilities assessment. Like the Mesa plan, the Continuing Education plan also suggests that the College is bound by the City of San Diego's commitment to carbon neutrality by 2035. The College of Continuing Education's plan anticipates resistance from Culinary Arts regarding decarbonization and electrification, as many chefs prefer cooking on gas stoves.

Mesa College: The Mesa College 2030 Comprehensive Master Plan is a draft PowerPoint presentation dated May 11, 2021. Mesa College is to be credited for having perhaps the most active environmental sustainability committee. Led by a dedicated professor, Mesa has been pushing for climate action, working STARS certifications and climate action planning. Mesa successfully crafted, and with Institutional Effectiveness and Research, developed and distributed a sustainability-related survey which has been very useful for this CAP.[9] Mesa College served 28,810 students in 2021-22, making it the largest college in the San Diego Community College District and the 18th largest in the California Community College system. Mesa College demonstrates its commitment to climate crisis solutions in a robust, three-pronged approach.

1. The District Policy on Environmental Sustainability requires district-wide coordination and monitoring of sustainability projects, such as those released recycling , energy and water consumption, maintenance and repair of equipment, and facilities construction and remodeling.

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[7] San Diego City College, Facilities Master Plan 2022, Draft, July 25, 2022.
[8] Miramar Facilities Master Plan, Moore Ruble Yudell, Architects & Planners. April 18, 2022
[9] Mesa College 2022 Environmental Sustainability Survey Results, Fall 2022: https://www.sdmesa.edu/about-mesa/institutional-effectiveness/institutional-research/data-warehouse/data-reports/2022%20Environmental%20Sustainability%20Survey%20Results.pdf

2. The Environmental Sustainability Committee [10] is a faculty and staff committee focused on:
    a. Raising awareness about environmental justice issues
    b. Supporting sustainability initiatives
    c. Promoting interdisciplinary cooperation and inclusion of sustainability topics in the curriculum
    d. Helping students identify green careers
3. TerraMesa is a student-led environmental sustainability and conservation club dedicated to raising awareness of environmental justice, promoting sustainability, and empowering students by acting as an intermediary for their environmental concerns. The club's activities include supporting student, facility, and staff ideas for sustainability projects through the Green Fund.

Under the banner of Stewardship, "Mesa College will develop and sustain processes that prioritize environmental justice and sustainability, reduce Mesa College's carbon footprint, and allocate its human, physical, technological, and fiscal resources around the goal of increasing student access, success, and parity in outcomes across racial/ethnic groups and all disproportionately impacted groups. On page 64 is more supporting language, the need to "create a sustainable campus."

EcoMotion valued discussions with a member of Mesa College's Environmental Sustainability Committee on how to get action.[11] "Should we use carrots and/or sticks?" While much of this Plan presents mitigation measures that are incentivized, there are other ways of getting action. For instance, on commuting and trying to get students, faculty and staff out of single occupant vehicles, there are a number of ways to dis-incentivize this: increase parking fees, reduce the number of parking spaces, and move parking farther away.

Miramar College's Sustainability Goals

In 2021, a master planning process at Miramar College resulted in a plan titled "Facilities Path to 2035."[12] A Sustainability Workshop was conducted and facilitated by consulting firm Steinberg Hart on November 4, 2021. The workshop included stakeholders from Miramar College's Environmental Stewardship Committee.

[10] Mesa Environmental Sustainability Committee: https://www.sdmesa.edu/about-mesa/governance/committees/environmental-sustainability-committee.shtml
[11] Communications with Michelle Rodriguez, Professor, Political Sciences Dept., Mesa College, April - May 2023.
[12] San Diego Miramar College, Facilities Path to 2035, Steinberg Hart, April 18, 2022.

Within Section 4: Future Vision, is Section 4.36 that presents four goals for sustainability at Miramar College. The goals are couched as “aspirational” and “recommendations” but present a robust set of actions for peer and District consideration.

1. Carbon Neutral Buildings
2. Carbon Neutral Transportation
3. Zero Waste
4. Social Justice and Equity

Carbon Neutral Buildings

Aspirational Goals

- Establish a path for carbon neutral buildings and optimize energy efficiency for new buildings and in existing buildings. The following objectives and strategies are recommendations for achieving that goal.

Objectives

Long-Term Objectives (by 2040)

- Carbon-neutral campus
- Reduce energy use intensify for all college buildings to 26 - 30 Energy Use Intensity (EUI)
- Building decarbonization by phasing out existing gas burning equipment

Short-Term Objectives (by 2025)

- Conduct energy audit of all existing buildings
- Develop energy conservation strategic plans to be implemented by 2025 and 2030
- 100% clean energy by 2030
    - Increase onsite renewable energy generation capacity or
    - Supplement with off-site renewable energy to offset campus energy use
- Submetering 100% of buildings

Strategies

Long-Term Strategies

- Phase out existing natural gas equipment
- High efficiency heating and cooling systems
- Retro commissioning

Short-Term Strategies

- Participate in San Diego Community Power (SDCP) for off-site renewables

- No new gas equipment in buildings
- Upgrade lighting to all LED
- Participate in demand response program
- Install daylight and occupancy sensors
- Onsite battery storage to replace fossil fuel generators
- Upgrade appliances to be Energy Star

Carbon Neutral Transportation

Aspirational Goals

- Establish a framework to address commuting and campus fleet carbon neutrality goals. The following objectives and strategies are recommendations for achieving that goal.

Objectives

Long-Term Objectives (by 2040)

- Carbon neutral fleet
- Increase use of sustainable types of commuting by 50% by 2030

Short-Term Objectives (by 2025)

- Reduce single-occupied vehicle commuting to campus by 30%
- Create an integrated transportation system
- Include bus, bike, carpooling, and walking to increase sustainable commuting by 30%

Strategies

Long-Term Strategies

- Establish routes that allow scooters and bikes to be safely ridden on campus

Short-Term Strategies

- Educate staff and students that transportation is a large contributor of GHG emissions
- Expand bike parking capacity
- Expand electric vehicle charging stations
- Dedicate parking areas for ride sharing program
- Keep users on campus by creasing more opportunities on campus
- Coordinate buses with class schedule

Zero Waste

Aspirational Goals

Create a road map that strives for zero waste campus through a circular economy. The following objectives and strategies are recommendations for achieving that goal

Objectives

Long term objectives (by 2040)

- Become a zero waste campus
- Become a paperless campus for all administrative processes
- Reduce the use of plastic packaging
- Short-Term Objectives (by 2025)
- Increase the total waste diversion by 15% relative to its 2022 diversion rate
- Default all printers to double-side printing
- Work toward a target goal of reducing the pounds of waste power person per year on campus

Strategies

Long-Term Strategies

- Develop a policy to phase out single-use plastics
- Increase recycling
- Increase material reuse
- Eliminating landfill waste

Short-Term Strategies

- Reduce the use of plastic packaging
- Composting food and landscape waste
- Reducing the carbon footprint of food service by increasing plant-based, locally produced options
- Educate employees about sustainable purchasing guidelines
- Implement sustainable purchasing best practices
- Develop campus wide guidelines for targeted environmentally preferred products
- Installing water bottle refilling stations at targeted campus locations

Social Justice and Equity

Aspirational Goals

- Establish and promote campus wide sustainability awareness that supports San Diego Miramar College students and employees to promote a culture of Social Justice and

Equity. The following objectives and strategies are recommendations for achieving that goal.

Objectives

Long-Term Objectives (by 2040)

- Achieve Gold STARS level of the Association of for the Advancement of Sustainability in Higher Education (AASHE)

Short-Term Objectives (by 2025)

- Create a center for sustainability and community engagement to encourage environmental education and climate justice
- Integrate health and wellness measures into the new building as well as retrofitting and building upgrades plans

Strategies

Long-Term Strategies

- Create a diverse and inclusive campus culture of sustainability

Short-Term Strategies

- Promote sustainability through educational components on campus to highlight the advantages for Sustainability such as energy saving, cost saving, water conservation, healthy materials, etc.
- Increase opportunities for students to engage in sustainability leadership effort
- Install sustainable feature signage in the campus for a learning and teaching opportunity
- Develop and publicize an easily accessed Sustainability website

The Bottom Line: Saving Energy Dollars

While SDCCD has no set goals for energy management or carbon neutrality, no one can argue with saving energy dollars that can be better applied to the mission of educating students. If the District can be more efficient in its procurement and use of energy, savings can be accrued, the savings can be used to support higher education. Saved energy dollars can be put to work educating our youth and community.

Immediate Goal: Smart Management to Save Money

- Smart investments in energy and water efficiency, DERs, storage, etc.
    - Investments in measures with less than 5 year paybacks

- Positive cash flow deals for longer term measures/capital costs
- Energy savings of 5, 10, 25, 50% over time

Options for Climate Commitments

<u>New Construction Commitments</u>

- LEED
- Living Building Challenge
- Energy Star
- Decarb/Gas free?
- Other? Resilience?

<u>Campus Net Zero Commitments</u>

- ACUPCC
  - Second Nature, The Presidents' Commitment: American Colleges and Universities Presidents' Climate Commitment (ACUPCC), signers agree to net zero by 2050 at the latest
- AASHE (rating system)
  - STARS Silver, Gold, Platinum (AASHE). The Association for the Advancement of Sustainability in Higher Education, rigorous point system to achieve levels

Key Emissions Sources and Mitigating Measure Options

This section of the Plan presents initial options for mitigating greenhouse gasses at San Diego Community College District. Each of these areas is presented in a cursory manner. In future editions of the CAP, stakeholders will be put into teams to address each of these and other resource areas.

Electricity

Electricity is one of the resource areas related to greenhouse gasses that can often be addressed cost-effectively. SDCCD is already benefiting financially from its solar and fuel cell investments. Behind the scenes, investments in thermal energy storage and energy efficiency are silently saving energy and money. Thanks to new and better and cheaper technology, such as lighting controls, there are more efficiency opportunities that make sense from a climate, and an economic, perspective.

Electricity use at SDCCD went through a big dip during the pandemic. Less use at Mesa College during the pandemic caused there to be overproduction. Now use is rebounding and close to

being in line with onsite generation. In the near future, electric vehicles and EV growth on campus will be an important new electric load and factor to track.

Electricity typically accounts for about a third of GHG emissions. It's a big deal. Fortunately, in California, electricity is getting greener and greener thanks to State regulation. In San Diego, the option to draw power from San Diego Community Power allows for even greener power. And SDCCD has taken this option.

EcoMotion salutes the District for its forward-thinking and progressive energy investments. Major solar arrays help power the Miramar and Mesa campuses. Fuel cells are deployed at these campuses as well. Nearly 60% of the power used by SDCCD in 2022 was self generated. To continue driving down purchases of electricity from off-campus sources, SDCCD will consider a range of options.

Mitigating Measure Options: Electricity

- Benchmark sites to gauge relative intensity
- Continue to invest in more efficient use, lighting etc.
- More solar – take advantage of the solar-ready facilities at Miramar
- Evaluate additional fuel cells at City, compare with solar + storage
- Buy balance of power 100% green from SDCP
- Better controls of major systems, thorough integration
- Produce hydrogen for mobility needs

Natural Gas

Natural gas is used for space and water heating on campus. To a limited extent it is used in food services. A major use of natural gas at SDCCD is to power the fuel cells at Mesa and Miramar. EcoMotion recommends careful consideration of a proposal to add fuel cells at City College.

Mitigation Measure Options: Natural Gas

- More efficient use, eg insulation
- Purchase green hydrogen
- Electrify using heat pumps
- Remove fuel cells in time unless hydrogen option is developed
- Add solar thermal systems on campus
- Effective energy management system
- Eliminate use of natural gas on campus

Transportation

There are three forms of transportation energy that are incorporated into the greenhouse gas inventory: the On-Campus Fleet; Directly Financed (business) Travel fully paid by SDCCD; and Student, Faculty, and Staff Commuting.

On Campus Fleet: SDCCD has taken steps to promote and purchase electric landscaping equipment across campuses. This can be done District-wide. Note that Low Carbon Fuel Standard credits apply to this transition. SDCCD could also seek grants for EV Buses from the Air Quality Management District, California Energy Commission, or other California and federal grant programs.

Commuting Energy: For many institutions, the amount of energy used to get there and back home, can be as great as the energy used on campus. Commuting is energy intensive, and here to date, it is carbon intensive. Preliminary analysis shows that SDCCD commuters – students, faculty and staff – racked up 127 million miles of commuting in the 2021 - 2022 school year. The distance to the moon is 238,900 miles. Thus commuters could have driven to the moon 532 times, or done 267 laps around the moon!

Given the magnitude of SDCCD's Scope 3 transportation emissions, the District might examine where their student population is geographically clustered, and then offer shuttles with routes and frequencies that make the largest impact. However, the shuttles would need to be viewed as being convenient.

Careful stakeholder engagement between SDCCD officials and the students is needed to make this strategy impactful. Since SDCCD serves a segment of the population that is of a lower socioeconomic status, a meaningful alternative to driving could be attractive because students could save on fuel costs. Another possible strategy is to create a portal where students can see which other students live close to them. And then they could organize carpooling.

Mitigation Measure Options: Transportation

- On-Campus Fleet
    - Policy to buy efficient vehicles; all-electric priority
    - Policy to accelerate the retirement of the least efficient vehicles
    - Rightsizing vehicle use with the task
    - Develop plan to track and minimize use

- Business Travel
    - Purchase offsets

    - Track costs and energy consumption

- Commuting
    - Appealing incentives for walking
        - New running shoes every year!
        - Free coffee at the commissary
        - Tuition discount for carbon-free commuters (5-10%)

    - Alluring incentives for biking
        - Super-convenient and secure bike parking
        - Point system to reward long-term behavior
        - On-campus convenient and free bike repair services

    - Enticing incentives for carpooling
        - Raffle prizes skewed toward least-carbon options
        - Recognition for these carbon-free and low-carbon options

    - Compelling incentives for bus / trolley riders
        - Arrange more convenient trolley and bus routes for students
        - Provide free Pronto passes
        - Prizes for milestones achieved

    - Awesome incentives for EV drivers
        - Arrange bulk purchase and distribution of discounted EVs
        - Subsidize EV leases for students that purchase EVs
        - Free parking
        - Free charging
        - Preferential parking (shaded parking)
        - Double incentives/recognition for EV-carpooling

    - Disincentives for Drivers
        - Increase parking fees
        - Reduce available parking
        - Move parking further away from campus
        - Shaded parking only for carpools, EVs, etc.

Waste Management / Recycling

Currently SDCCD diverts about 25% of its waste stream. This is the amount that is recycled. Another significant amount of SDCCD's waste is green waste, and it is sent to special facilities where it is composted. The balance of waste is landfilled and is the focus of mitigation.

Mitigation Measure Options: Waste Management

- Raise awareness on the campuses
- Continue to promote recycling
- Institute purchase policy sourcing zero-waste products, low footprint supplies
- Install more water bottle filling stations
- Ban the sale of single use plastic water bottles on campus
- Control food service use of plastic utensils, etc.
- Compost food waste
- Additional recycling bins if needed
- Increase diversion rate / increase recycling
- Create a reuse center
- Manage demolition debris carefully, repurpose

Water / Wastewater

Moving water is California's number one use of electricity. Lots of pumping energy, up from aquifers and over passes,. The water system uses approximately 20% of the State's electricity and 30% of its natural gas for business and home use, according to data from 2001—accounting for more than 5% of California's greenhouse gas emissions.[13]

In 2022, SDCCD consumed 75.4 million gallons of water. SDCCD is to be credited with its leadership with reclaimed water, and the District's investments in the purple pipe system used for irrigation at Miramar.

For water mitigation, SDCCD could invest in water controls for all restrooms. Invest in things like waterless urinals, dual-flush toilets and sensor faucets. In addition, SDCCD could look into integrating native plant landscaping and integrated pest management to reduce water and nitrogen use in the form of reducing or phasing out fertilizer use.

Other water strategies: SDCCD could integrate water recapture designs specifications into new building construction. That water could then be used for landscaping. Other water reduction measures could be rain barrels--use that water for landscaping.

[13] Public Policy Institute of California, Fact Sheet, December 2022, "Water and Energy in California."

Mitigation Measure Options: Water / Wastewater

- Continued education and awareness
- Install efficient devices… toilets, aerators, etc.
- Waterless urinals (carefully installed only)
- Xeriscaping, unless purple pipe water available
- Rainwater capture, bioswales, etc.

Refrigerants

The primary use of refrigerants on campus is for HVAC systems, notably rooftop systems.

Mitigation Measure Options: Refrigerants

- Provide routine maintenance of air conditioning systems
- Manage the efficient use of AC on campuses
- Eliminate unnecessary cooling through effective controls

Fertilizers

There are a number of sources of nitrous oxides on SDCCD campuses, from boilers on campus, to tailpipe emissions, to fertilizers used on the SDCCD grounds.

Mitigation Measure Options: Fertilizers

- Xeriscape, fertilizer-free planting
- Minimize use of fertilizers
- Manage precise timing of application
- Use composting to boost soil nutrients

Forecasting Future Emissions

One of the most discouraging aspects of climate action planning, is that often as goals are set to cut emissions, other factors come into play that force emissions up. Many cities, for example, are growing, and despite per-capita emissions reductions, they experience overall emissions reductions.

Same with SDCCD. Anticipated growth may cause increased energy use on campus even when per-student energy use may drop. A step or two backward for every step forward. Overall emissions may rise, while significant measures are taken. In that case, more significant measures may be needed to meet goals.

2022 Growth Scenarios

At this time, City College and Mesa College are nearly built out, near to being at capacity. Growth can occur at Miramar and through Continuing Education.

Miramar's Facilities Master Plan was completed in 2022. It presents enrollment trends and limited data. The Annual Unduplicated Headcount at Miramar grew from 2015 - 2019 growth at 13.6% annually, from just over 20,000 to 27,067 in 2019. Despite the pandemic, the FMP shows that the headcount is expected to grow to 37,178 by 2035.

The FMP presents detailed analysis of space requirements and the utilization rates of current facilities. It makes clear what will need to be added through capacity load analysis,and the capacity-to-load ratio for lecture halls, laboratories,offices, conference rooms, library, and instructional media facilities. It presents Weekly Student Contact Hours (WSCH), a measure of attendance. Miramar's projected WSCH for 2035 is 90,006.

The Miramar FMP covers California Code of Regulations Title 5 space standards. The College needs space in three capacity load categories: laboratory, classroom lecture, and instructional media. Miramar will need an additional 27,326 square feet of space by 2035. That's adding 6% more space to the current square footage of 424,108. Most of this is in classrooms and labs, but also space required for offices, library, and instructional media. Miramar's Facilities Master Plan assumes a 1% growth in WSCH over the next decade and that student headcount will grow at the same rate.

Since so many students are part time, measuring Weekly Student Contact Hours (WSCH) is also used by Mesa College to envision its needs for future facilities. Mesa's projection is for an annual increase of 1.7% of WSCH through 2025, then 1.4% in the far term (2026 - 2030), for a cumulative growth rate of 13.2% over the next ten years.

Online Education Wildcard

Gen Z, as many SDCCD students are, are now masters of online everything. Will they come back to school? Will they insist on the convenience of online learning? This is a wildcard in terms of campus facility planning.

Online learning is and certainly will significantly cut down on the District's GHG footprint for commuting. But how does this align with SDCCD facility use? It certainly makes planning difficult. If many students go online, will there be more teachers who need offices? Or will they too become virtual elements in the SDCCD ecosystem?

GHG inventories in the future may well account for online learning, and the transfer of carbon footprints from the District itself, to the homes of the students. At this time, SIMAP recommends an accounting of 1 - 3 kWh per telecommuting student per day, defaulting to 100 - 350 kG CO2e/year for each part-time student. EcoMotion recommends holding off on this imprecise value for this inventory, and to consider incorporating telecommuting emissions values in subsequent inventories.

Despite the Online wildcard, the major variable in the equation, this Climate Action Plan presents five scenarios, five future projections:

- Scenario #1: No Growth
- Scenario #2: Back to Pre-Pandemic Times
- Scenario #3: The 1.3% Annual Growth Trajectory
- Scenario #4: The Max Capacity Scenario
- Scenario #5: On-Line Doubles Enrollment

Scenario #1: No Growth

SDCCD's student population was declining before the pandemic, and then took a nosedive in the 2019/2020 academic year. The pandemic hit in March of 2020, shut down occurred then. The next year, 2020/2021 was when the full brunt of the pandemic hit and enrollment plummeted. In this scenario, it is assumed that there will not be a bounceback nor a return to growth from the 2022/2023 levels In this scenario.

Year	City College	Continuing Education	Mesa College	Miramar College	District Total
2022-2023	21,835	17,378	28,810	21,756	67,647
2023-2024	21,835	17,378	28,810	21,756	67,647
2024-2025	21,835	17,378	28,810	21,756	67,647
2025-2026	21,835	17,378	28,810	21,756	67,647
2026-2027	21,835	17,378	28,810	21,756	67,647
2027-2028	21,835	17,378	28,810	21,756	67,647
2028-2029	21,835	17,378	28,810	21,756	67,647
2029-2030	21,835	17,378	28,810	21,756	67,647
2030-2031	21,835	17,378	28,810	21,756	67,647
2031-2032	21,835	17,378	28,810	21,756	67,647
2032-2033	21,835	17,378	28,810	21,756	67,647
2033-2034	21,835	17,378	28,810	21,756	67,647
2034-2035	21,835	17,378	28,810	21,756	67,647

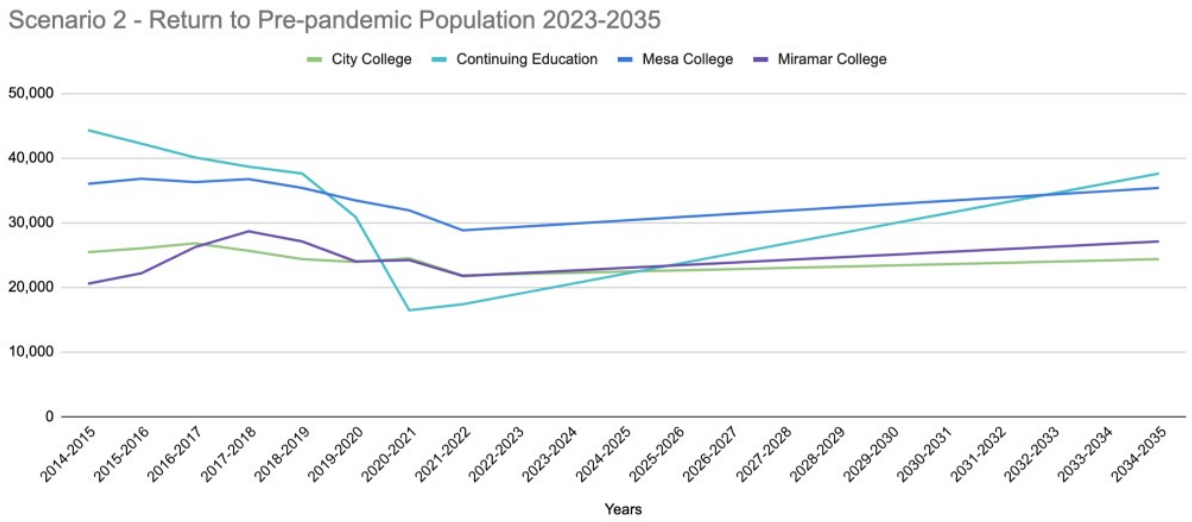
Scenario #1 Rough Order Emissions: In this case, overall emissions will remain at the 2022 Baseline year value of 62,325 MT.

Scenario #2: Back to Pre-Pandemic Times

Currently, SDCCD's annual unduplicated headcount is 67,647, down 33.6% since pre-pandemic times, the 2018-2019 academic year. Thus the first scenario is to cautiously project that SDCCD will recover, bouncing back to pre-pandemic times, to pre-March 2020. To achieve this scenario's target, the student population will have to grow from 67,647 by 50.6% and 34,232

students to reach the 2018-2019 level of 101,879. The accompanying tables present growth rates and declining student populations by campus and in aggregate.

Year	City College	Continuing Education	Mesa College	Miramar College	District Total
2018-2019	24,351	37,594	35,357	27,084	101,879
2019-2020	23,913	30,850	33,424	23,997	92,085
2020-2021	24,494	16,455	31,893	24,202	71,076
2021-2022	21,835	17,378	28,810	21,756	67,647
2022-2023	22,029	18,933	29,314	22,166	70,280
2023-2024	22,222	20,488	29,817	22,576	72,913
2024-2025	22,416	22,043	30,321	22,986	75,547
2025-2026	22,609	23,598	30,824	23,395	78,180
2026-2027	22,803	25,153	31,328	23,805	80,813
2027-2028	22,996	26,708	31,832	24,215	83,446
2028-2029	23,190	28,264	32,335	24,625	86,080
2029-2030	23,383	29,819	32,839	25,035	88,713
2030-2031	23,577	31,374	33,343	25,445	91,346
2031-2032	23,770	32,929	33,846	25,854	93,979
2032-2033	23,964	34,484	34,350	26,264	96,613
2033-2034	24,157	36,039	34,853	26,674	99,246
2034-2035	24,351	37,594	35,357	27,084	101,879



Scenario #2 Rough Order Emissions: To broadly estimate SDCCDs carbon footprint in this scenario, EcoMotion has straight-lined projections using student population as the only metric. We assume increased student population will increase commuting, and increase use of water (thus wastewater), etc. Thus current emissions are increased by 50.6% to suggest an annual CO2e value for the entire District of 93,861 MT.

Scenario #3: The 1.3% Annual Growth Trajectory

The second scenario draws upon pre-pandemic growth at SDCCD. For several years (~2014 - 2018) the District was growing at 1.3% per year. Scenario #2 assumes that the District will get back on track with this level of growth starting in the 23/24 academic year. SDCCD will have to turn a corner to do so, and to once again achieve positive growth. For the past three years, the District has experienced losses of 9.6%, 22.8%, and 4.8% respectively. In this scenario, it is assumed that the District will once again grow at 1.3% until 2035.

Year	City College	Continuing Education	Mesa College	Miramar College	District Total
2022-2023	22,119	17,604	29,185	22,039	68,526
2023-2024	22,406	17,833	29,564	22,325	69,417
2024-2025	22,698	18,065	29,948	22,616	70,320
2025-2026	22,993	18,299	30,338	22,910	71,234
2026-2027	23,292	18,537	30,732	23,207	72,160
2027-2028	23,594	18,778	31,131	23,509	73,098
2028-2029	23,901	19,022	31,536	23,815	74,048
2029-2030	24,212	19,270	31,946	24,124	75,011
2030-2031	24,527	19,520	32,361	24,438	75,986
2031-2032	24,845	19,774	32,782	24,756	76,974
2032-2033	25,168	20,031	33,208	25,077	77,974
2033-2034	25,496	20,291	33,640	25,403	78,988
2034-2035	25,827	20,555	34,077	25,734	80,015

This scenario assumes that much of the growth on the capacity constrained campuses will be online. Mesa is nearly maxed out in terms of facility use. If it grows at 1.3% annually, the equivalent of this increased population will be online.

Scenario #3 Rough Order Emissions: Emissions will rise from 2022 Baseline year value to 80,015, a growth of 12,368 students and 18.3% above the 2021-2022 District total headcount of 67,647. Thus overall SDCCD emissions will be 18.3% higher than the Baseline Year value at 73730 MT.

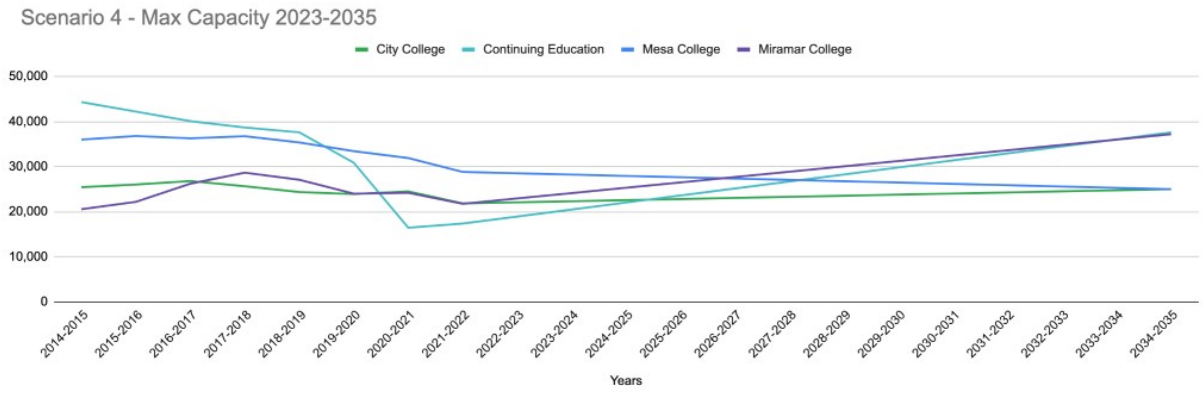
Scenario #4: Maximum Capacity Scenario

A third growth scenario assumes that SDCCD will max itself out in terms of student populations, based on space limitations. Mesa is already largely maxed out, City has some but little room to grow, while Miramar has the space for significant expansion. Continuing Education can expand using satellite facilities.

City College is clearly constrained being located in San Diego's urban core where space is very limited. There is little room for expansion there. Its Facilities Master Plan suggests a maximum student population of 25,000. It is currently at 21,835. For the purposes of this planning scenario, it is assumed that Continuing Education will return to 2018/2019 levels of 37,594 students. It is believed that Mesa College taps out at a 25,000 headcount as well, given space constraints and the College's impact to the surrounding neighborhood.

According to Miramar's Facilities Master Plan, the campus is projected to grow to 37,178 students in 2035. That's the annual unduplicated value. It maxes out there. Thus from the 2021/2022 value of 21,756 students, Miramar can by 15,422 students grow by 71% to 37,178 in 13 years. That's 1,186 students added each year of the 13-year period, a compound annual growth rate of over 4%. These maximum capacity values are based on the Annual Unduplicated (AU) student value.[14] By this metric, Mesa has already maxed out its capacity.

Year	City College	Continuing Education	Mesa College	Miramar College	District Total
2022-2023	22,078	18,933	28,517	22,942	70,644
2023-2024	22,322	20,488	28,224	24,129	73,640
2024-2025	22,565	22,043	27,931	25,315	76,637
2025-2026	22,809	23,598	27,638	26,501	79,634
2026-2027	23,052	25,153	27,345	27,688	82,630
2027-2028	23,296	26,708	27,052	28,874	85,627
2028-2029	23,539	28,264	26,758	30,060	88,624
2029-2030	23,783	29,819	26,465	31,246	91,621
2030-2031	24,026	31,374	26,172	32,433	94,617
2031-2032	24,270	32,929	25,879	33,619	97,614
2032-2033	24,513	34,484	25,586	34,805	100,611
2033-2034	24,757	36,039	25,293	35,992	103,607
2034-2035	25,000	37,594	25,000	37,178	106,604



[14] The maximum capacity numbers presented are from the City and Miramar College Facilities Master Plans. Mesa College's capacity is reportedly maxed out due to neighborhood space and traffic congestion constraints. Mesa College has been exploring adding dorms.

Maximum Capacity Scenario Growth Potential

College	21-22 AU	Maximum	Delta	Potential Increase
City College	21,835	25,000	3,165	14.5%
Continuing Education	17,378	44,295	20,216	116.3%
Mesa College	28,810	25,000	-3,810	-13.2%
Miramar College	21,756	37,178	15,422	71%
Totals	89,779	131,473	34,993	39%

Scenario #4 Rough Order Emissions

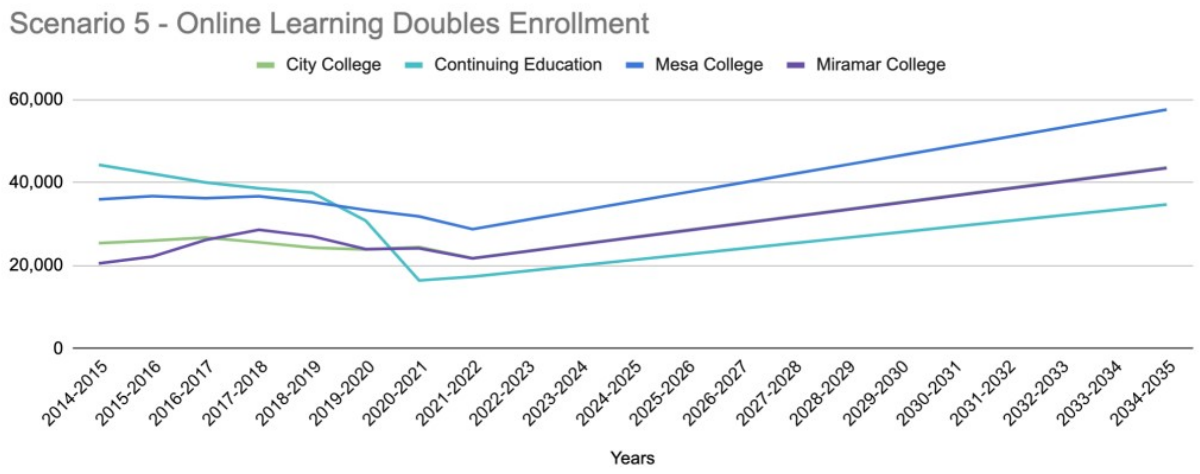
The potential growth at the four colleges is 38,803 students. (Mesa is not netted out.) This boosts the 2021/2022 count of 67,647 students to 106,450, a gain of 57%. This would boost emissions from 62,325 MT to 97,850 MT.

Scenario #5: Online Learning Doubles Enrollment

Scenario #5 is based on the assumption that online learning is the wave of the future. Given its ease and efficiency, this scenario suggests that it doubles enrollment. And rather than suggesting a doubling of the GHG impact, EcoMotion assumes that there will be great efficiencies in terms of campus use. It will make twice the efficiency of all facilities as students are coordinated to come to campus at alternate times, and about half as often as they would have otherwise.

With a doubling of students there are efficiencies. There will be no need for additional parking or classrooms or lecture halls. There will be increased administrative and faculty support.

Year	City College	Continuing Education	Mesa College	Miramar College	District Total
2022-2023	23,515	18,715	31,026	23,430	72,851
2023-2024	25,194	20,052	33,242	25,103	78,054
2024-2025	26,874	21,388	35,458	26,777	83,258
2025-2026	28,553	22,725	37,675	28,450	88,461
2026-2027	30,233	24,062	39,891	30,124	93,665
2027-2028	31,913	25,399	42,107	31,797	98,869
2028-2029	33,592	26,735	44,323	33,471	104,072
2029-2030	35,272	28,072	46,539	35,144	109,276
2030-2031	36,952	29,409	48,755	36,818	114,480
2031-2032	38,631	30,746	50,972	38,491	119,683
2032-2033	40,311	32,082	53,188	40,165	124,887
2033-2034	41,990	33,419	55,404	41,838	130,090
2034-2035	43,670	34,756	57,620	43,512	135,294



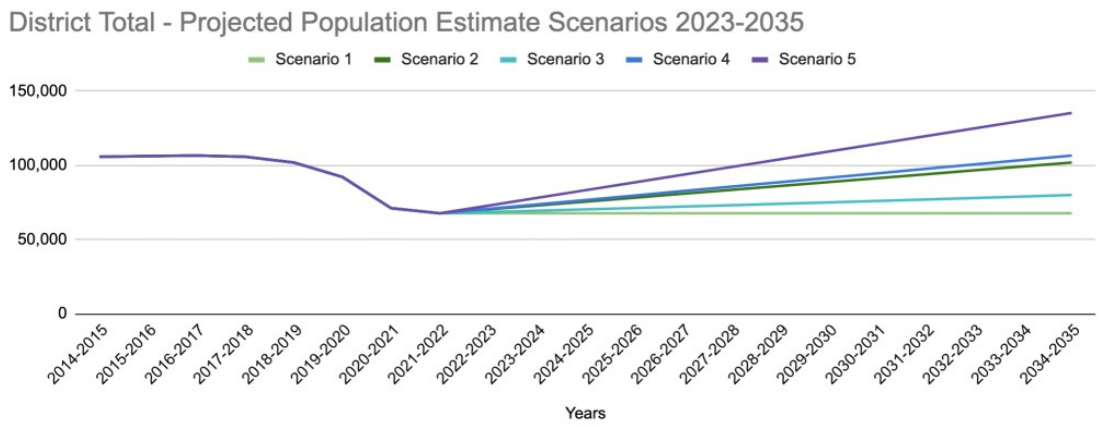
Scenario #5 Rough Order Emissions

Scenario #5 assumes a doubling of campus populations from the 2022 baseline year, while increasing the footprint by 25%. This is the result of increased administration, as well as support services – offices, etc. – for additional faculty. As such, this scenario would result in 77,906 metric tonnes of CO2e emissions annually in the Business as Usual scenario.

Summary of Growth and Emissions Scenarios

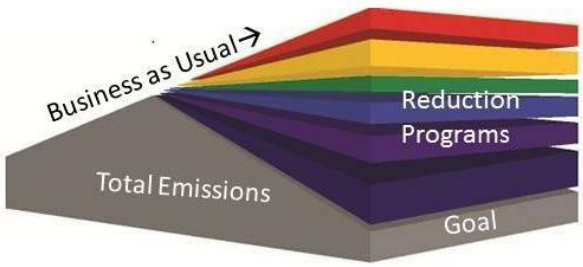
2035 Annual CO2e Emissions

Scenarios	Growth Rate	Emissions Level
Scenario #1: No Growth	0	62,325
Scenario #2: Back to Pre-Pandemic Times	50.6%	93,861
Scenario #3: 1.3% Growth Scenario	18.3%	73,730
Scenario #4: Max Growth Scenario	57%	97,850
Scenario #5: Online Doubles Students	25%	77,906



Pathways for Cutting Emissions

The Wedges… for Emissions Reductions



Discussion of Aspirational Pathways

There will likely be goals for zero net carbon emissions by 2035. That's the City of San Diego's goal.

Other Southern California institutions have set different targets: Santa Monica College is committed to a 15% reduction of total carbon by 2025 relative to 2008 values. It is committed to a 20% reduction of Scope 1 + Scope 2 Carbon by 2030 relative to 2008 values. California State University at Northridge is committed to a 50% reduction of Scope 1 + Scope 2 Carbon by 2030 relative to 2012, then an 80% reduction of Scope 1 + Scope 2 Carbon by 2035 relative to 2012, and a 50% reduction of Scope 3 Carbon by 2035 relative to 2012.

Before getting into specific strategies and tactics for mitigating emissions, let's consider some aspirational goals. These may well provide some useful fodder in the goal-setting process. Here are a number of aspirational pathways for consideration:

Zero Carbon 24 * 7

Zero emissions means that all mobility must be renewable powered, all the time. No net energy metering. All natural gas use must either be hydrogen or eliminated.

This goal rids our vernacular of the word "net." Offsets, for instance, allow us to net out emissions. You emit, but you buy a pass – and offset – and you can claim no net emissions.

Now the challenge is to be green 100% of the time, 24 * 7. This means that every electron of electricity is coming from a green source. It could be stored but the stored energy has to be green. So utilities that offer 24*7 green services are matching daytime solar, with wind, hydropower sparingly, geothermal, etc.

Energy Independence Pathway

The energy independence pathway is as conservative as it gets. You rely on your own means. Like a pioneer on the frontier, you are responsible for your own well-being and sustenance. You want power? Deliver it. No more reliance on and payments to large monopolies. In this pathway, SDCCD would still be grid connected, but not grid dependent.

As such, the energy independence pathway is based on onsite energy production and storage. It also involves food production and it has a water dimension too, complete with rainwater harvesting and filtration. It's also tied with being a zero-waste community.

Energy Resilience Pathway

The Energy ResiliencePathway builds on the energy independent pathway, with more energy storage. This pathway involves onesite production, energy storage, definition and control of critical loads for emergencies.

Fully Decarbonized Pathway

This is aspirational. No combustion of fossil fuels on campus. No natural gas on campus even if used in a fuel cell (chemical use vs. combustion). This pathway has no gasoline. It eliminates all gas-fired boilers for space and water heating and involves the extensive switch to heat pumps for electrification.

The Green Hydrogen Pathway

The Green Hydrogen Pathway involves tapping into a new fuel that can be used in many applications, from power generation, to fuel cells, to combustion in stove tops. Currently, green hydrogen costs about $5/kilogram while "conventional" hydrogen costs about $1.50/kg. The key to this pathway is price and timing. Advocates say that the price of green hydrogen will fall to $1.00/kg. But when?

For San Diego Community College District, green hydrogen could be used 1) to power the fuel cells (with modification by Bloom), and 2) to provide fuel for the boilers on campus. Potentially, the District could offer students, faculty, and staff green hydrogen fuel for their commuting vehicles.

Immediate Steps

Let's turn from aspirational to practical and to immediate steps.

- 100% Green with SDCP

At this time, all but two of the SDCP accounts are on the SDCP PowerOn rate. That rate assures that 50% of all delivered kWh are green, mostly solar and wind. The 100% green rate offered by SDCP is Power100. Rates were examined and the basic cost difference in the AL-TOU rates is an

additional average of 2.14% higher cost over the PowerOn rates for 2023. There are some accounts with smaller loads on the non-demand TOU-A accounts. The average difference of the TOU-A Power100 rates was about 1% higher. Below is a monthly rate comparison from the SDCP website:

Time-of-Use – AL-TOU-2 - Commercial (Secondary Voltage)

Commercial: AL-TOU2	SDG&E 44.5% Renewable	SDCP PowerOn 54.9% Renewable + 5% Carbon Free	SDCP Power100 100% Renewable
Generation Rate ($/kWh)	$0.14243	$0.19292	$0.20042
SDG&E Delivery Rate ($/kWh)	$0.16142	$0.16141	$0.16141
SDG&E PCIA ($/kWh)	$0.05485	-$0.00162	-$0.00162
Franchise Fees ($/%)	$0.00395	$0.00395	$0.00395
Total Electricity Cost ($/kWh)	$0.36265	$0.35665	$0.36415
Average Monthly Bill ($)	**$24,679.12**	**$24,271.44**	**$24,781.83**

Average Monthly Usage: 68,053 kWh
Average Monthly Demand: 153.7 kW

Rates current as of February 1, 2023

In 2022, SDCP paid $5,994,605 for utility-furnished electricity. Had the rates all been Power100, it would have increased the amount by $125,887, or 2.1% higher. Both PowerOn and Power100 rates will increase in 2023, but the delta of 2.1% is likely to remain based on the SDCP projections.

- **City College Fuel Cell Consideration**

From a financial standpoint, Bloom Energy fuel cells are very attractive to the District and are serving well at Mesa College and at Miramar College. From a climate action standpoint, however, the current fuel cells are not as attractive for SDCCD as they are for other jurisdictions. Note that Bloom Energy is developing a fuel cell that will run on 100% green hydrogen.

Fuel cells are generally cleaner than the grid, but in San Diego, with SDCP's 50% green option, the current fuel cells at Mesa and Miramar emit more greenhouse gasses than the grid. The fuel cells at Mesa and Miramar, and those considered for City College, are favorable financially, but absent a fuel switch to green hydrogen, result in higher emissions levels than either SDCP's 50% green or 100% option. SDCP's Power100 electricity is carbon free. The 50% green option is responsible for 378 pounds of CO2 emissions per MWh.[15] Bloom fuel cells emit 679 - 883 pounds of CO2/MWh.

If the fuel cells can be converted to green hydrogen, and the green hydrogen is available for SDCCD, then the fuel cell emissions fall to zero and they become a financially and

[15] San Diego Community Power, posted on website, May 2023.

environmentally beneficial system. EcoMotion recommends a thorough economics and environmental analysis of the fuel cell option for City College, comparing fuel cells versus deployment of additional solar and storage there.

- **Define Functionality of Sophisticated Energy Management System**

The third immediate step recommended is a comprehensive engineering review of existing controls and options for advanced controls. This may have already been done by our engineering firm colleagues. The goal is to be able to limit peak demand – using effective storage on campus – and to be able to effectively participate in SDG&E Emergency Load Reduction Program. Note that as more EVs are purchased by the District, and as students have more EVs, the District may benefit from exploring Vehicle Grid Integration and how to prepare the infrastructure for such.

- **Analyze Potential for Additional Solar and Storage**

An immediate step is to analyze the potential for additional solar and storage. A number of sites have been considered at City College, Mesa College, and Miramar College and are presented in the next chapter.

Near-Term Steps

- Maximize energy efficiency
- Invest in the select Energy Management Systems
- Address central plants' inefficiencies/deficiencies
- Invest or Partner for Additional Solar
- Invest or Partner in Energy Storage Systems
- Address commuting energy/emissions

Longer-Term Steps

- Consider fuel cell emissions: Switch to green hydrogen? Terminate Bloom contracts?
- Cut water use, capture rainwater, bioswales
- Eliminate all non-functional turf
- Expand purple pipe at Miramar, options for other locations
- Eliminate natural gas use? Building decarbonization
- Address embedded carbon in materials

- Attain goals

Costs of CO2e Reduction Pathways

The costs of mitigation measures can be seen as arrays of possibilities. Certain measures can be installed at no cost and save money from day one. Other measures have costs but provide returns over time. And then there are measures that represent significant capital costs but that transform energy and resource use in line with sustainability.

Policies and Mandates

SDCCD will no doubt have to pay for carbon mitigation. But there are policies and mandates that will not cost the District, and which will result in less CO2e. parking policy, for instance, can reduce commuting emissions by limiting the number of spots, or by jacking up parking prices.

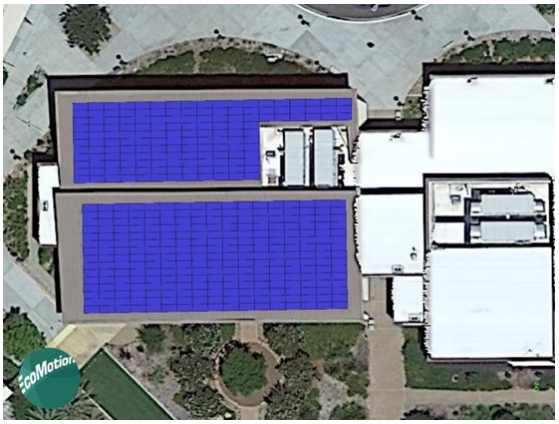
Best Case: No-Cost, Profitable Strategies

Solar PPAs / Third-Party Financing: These are the best case, the strategies to look out for. And SDCCD has done just this. The large solar arrays at Mesa and Miramar were installed thanks to a Power Purchase Agreement (PPA) with third parties. They invested the money and are paid for those systems' output. SDCCD pays for every kWh generated. The good news. It was all no money down, and the price that SDCCD pays is less than the price that would be paid to either SDG&E or SDCP. There may be opportunities for additional solar PPAs, notably at City and Miramar. Below are helioscope images/layouts of potential solar systems at City, Mesa, and Miramar. EcoMotion finds additional capacity for each: City College 175.1 kW; Mesa College 388.4 kW, and Miramar College 714.4 kW.

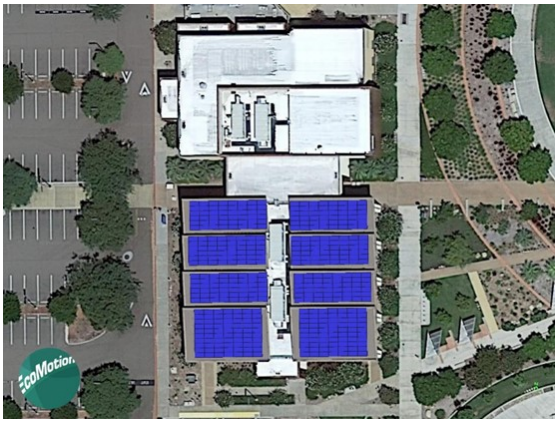
City College Business Tech Bldg: 125.6 kW PV

City College Arts and Humanities Bldg: 49.5 kW PV

Miramar College M-100 Bldg: 183.2 kW PV

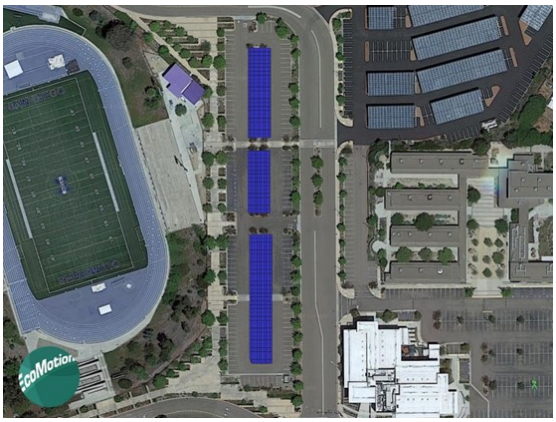


Miramar College San Diego Hua Xia Chinese School 137 kW PV



SDCCD Miramar College G-3 Parking Structure: 394.2 kW PV

Mesa College Stadium Parking Lot: 388.4 kW PV



Miramar College additional solar carports Lot 1: 1,040 kW PV

Future solar installations will be compensated under California's new NEM tariff, solar billing. In the new solar billing plan, otherwise known as NEM 3.0, excess energy generated from PV systems that are exported to the grid will not be compensated as handsomely as the excess energy generated from the existing PV systems on SDCCD campuses. However, despite this new reality, opportunities that are cost effective or come in at parity could still be realized from new PV installations.

The Mesa College stadium parking and the solar-ready facility at Miramar College has been modeled with both solar alone and solar + storage. In both cases the addition of energy storage reduces the payback period. For Miramar, the payback drops from 8.5 to 7.5 years. Note that additional solar systems at Mesa will only be needed if the fuel cells are removed.

Additional Solar or Solar + Storage at SDCCD Campuses Under SDCP NEM3 Solar Billing

SDCCD Location	kW	Generation kWh	Exported for Net Billing	Cost /watt	Total PV Cost	ESS kWh Capacity	ESS Cost	Project Cost	Direct Payment Incentive	Net Cost	25 Year Net Savings	Payback Years	IRR
City College Solar Ready Bldgs	175.1	289,904	0%	$3.00	$525,300	N/A	N/A	$525,300	30%	$367,710	$4,036,898	3.1	31.7%
Miramar Solar Ready Bldgs	714.4	1,191,262	66.4%	$3.00	$2,143,200	N/A	N/A	$2,143,200	30%	$1,500,240	$4,317,820	8.5	11.7%
Miramar Solar Ready Bldgs with ESS	714.4	1,191,262	63.3%	$3.00	$2,143,200	200	$200,000	$2,343,200	30%	$1,640,240	$5,947,682	7.3	13.9%
Mesa Stadium Parking Solarports	388.4	602,513	61.2%	$6.00	$2,330,400	N/A	N/A	$2,330,400	30%	$1,631,280	$1,197,178	17.1	4.0%
Mesa Stadium Parking Solarports with ESS	388.4	602,513	53.3%	$6.00	$2,330,400	250	$250,000	$2,580,400	30%	$1,806,280	$2,931,899	12.3	7.4%

Fuel Cell Contracts with Bloom Energy: SDCCD has taken bold/pioneering steps with fuel cells in partnership with Bloom Energy. Like a PPA, the fuel cells are owned and operated by Bloom Energy. SDCCD pays a "tolling rate" to Bloom for their use, and pays directly for the natural gas that they consume, and saves money in the process. As previously discussed, SDCCD is currently considering additional fuel cells in the District, this time at City College.

Battery Energy Storage Systems: SDCCD can explore additional opportunities for SDCCD with battery energy storage systems (BESS). These can be owned and operated by third parties that

guarantee their ability to cut peaks and conduct arbitrage, while also taking responsibility for their ongoing maintenance.

Electric Vehicle Charging Infrastructure: Another potential no-cost option is EV charging in partnership with third parties. There are significant EV incentives provided by San Diego Gas and Electric that either SDCCD or a third party can tap.

Second Best: Low-Cost Measures with Results

Second best are small investments with fast paybacks. Once the payback is achieved in 2,3,4,5 years… then the savings can be reapplied.. This second option represents mitigation measures that pay off quickly, and/or that produce deep carbon savings. Lighting has been a classic case, and SDCCD does have additional lighting to upgrade, things that could not be completed with the State's Proposition 39 funding.

- Energy-Efficient Lighting
- Lighting Controls
- Building Controls / Energy Management System
- Installation of EV chargers, with SDCCD maintaining RECs and LCFS credits

Controls and ELRP: As recommended in the Energy Master Plan Phase 1 Assessment, SDCCD will benefit from controls.[16] If it can cut electric loads in a coordinated fashion, the District can participate in SDG&E's programs, including the Emergency Load Reduction Program (ELRP). This program pays up to $2.00/kWh at super peak periods. Coupling BESS – and discharging in concert – with controllable loads can be a means to fully support the local grid, while earning revenues for the District to recoup the equipment costs, and then to allow for greater investments to dig deeper for cost and carbon savings.

SDCP 100% Green Rate: Or measures that achieve significant savings in terms of CO2e emissions. An example of this is the recommendation to move all electric meters from SDCP's 50% green rate, to its 100% rate. This represents an increase of only 2.14% on the bill, while cutting. SDCCD will likely be looking at the cost per ton of CO2e avoided in its future planning. How much will it cost to cut CO2 in existing buildings? In some cases where that is prohibitive, offsets can be purchased.

[16] San Diego Community College District, Energy Master Plan Phase 1 Assessment, prepared by EcoMotion, November 2022.

The Third Option: Capital Upgrades for Deep Savings

The third option is expensive but important. There will no doubt be longer-term capital equipment upgrades and requirements to reach whatever goal the District adopts. While the first two options are great, it takes the third to achieve the penetration of change necessary to avert the climate calamity.

- Central Plant Upgrades
- Replacing Boilers with Heat Pumps

An example of this is building decarbonization. In existing buildings, changing out boilers for space and water heating, and replacing them with electric heat pumps can be important and expensive. This speaks to maximizing the end-use efficiency to minimize the size and capital cost of the equipment required for electrification.

Tracking Progress and Accountability

SDCCD will track climate action results to verify reductions and to gauge the savings measures' impacts toward the goals set. Progress reports will be provided quarterly by a designated staff member, with an annual report of greater depth flagging overall progress, key accomplishments and lessons, as well as challenges to successful implementation. SDCCD could have multiple students help in this endeavor. This is another great learning opportunity and could create translatable skills for students to be able to get great Green jobs post graduation.

Each year, metrics will be tracked for resource savings, economic savings, job creation, and carbon reductions:

Resource Savings

- Kilowatt-hour savings
- Therms of natural gas savings
- Gasoline and other transportation fuel savings
- Water savings
- Recycling diversion rate

Economic Savings

- Electricity bill savings
- Natural gas bill savings
- Water efficiency savings
- Other resource savings

Job Creation

- Types of jobs
- Number of jobs
- Economic development value

Greenhouse Gas Savings

- Source of emissions reductions
- Tonnes of emissions reductions
- Cost per tonne of avoided emissions
- Percentage of reduction goal achieved in each period

Economic values will be considered and analyzed to track discrepancies with the Climate Action Plan and to update the Plan accordingly. Which mitigation measures are successful? Which areas need additional support? What new opportunities are on the horizon? A working draft will be maintained with quarterly updates. It is recommended that the Climate Action Plan is updated and reissued every two years.

Concluding Recommendations

1. **Treat this document as a first step.** First and foremost, treat this document as a first step. It brings together data from the 2022 Greenhouse Gas Inventory with perspectives on SDCCD at this moment in time. Caution: This moment in time is hardly representative. It is barely post-pandemic. Things are not back to usual. There is a new normal being established… one that has and will have profound impacts on the District.

2. **Prepare for the Next Step**

   As always, when on the first step, think about the next step. Prepare for it. Watch your step, or you may tumble! Climate action planning is about taking deliberate steps. This Plan is an initial cut, a plan for action with lots of options. Next steps are to set goals, to make commitments, to assign accountability, and to measure carefully.

3. **Plan a Formal Stakeholder Engagement Process**

   Just as the Facilities Master Plans drew out the insights and wisdom of many stakeholders for each campus, SDCCD's next steps in Climate Action Planning will benefit from a broad set of constituencies determining what's best for the District. So Step 3 is the time to bring in a broader set of creative minds. Stakeholder engagement is like a

funnel… drawing ideas together to be carefully processed and refined. EcoMotion recommends that the process is guided by facilitated workshops.

4. **Set Goals and Make Commitments**

   Now is the time for the leaders, in this case the SDCCD Chancellor's Office, to take the input from stakeholders, to weigh and balance and prioritize, to lean on retained subject matter experts, and to set goals and make commitments.

5. **Develop Least-Cost Supply Curves for Avoided CO2e**

   Step 5 involves calculations. This is the time for quantification which can lead to prioritization of measures. How much will specific mitigation measures cost and save? Supply curves of avoided carbon graphically depict amounts saved at specific prices.

6. **Establish Tracking Systems for Data Collection**

   Establish means to track key resources, systematically, full accountability..need ongoing data collection, recommend revising inventory at a minimum of every five years. Given the pandemic, EcoMotion recommends updating this inventory by 2025.

7. **Take Initial Steps with Big Impacts, Program Implementation**

   Planning done, time for implementation, and with caution in the selection of measures. EcoMotion flags two measures for immediate implementation:

   - A first order of business is consideration of switching the entire SDCCD system to SDCP's 100% green rates. Doing so will cut the carbon intensity of all power purchased and consumed on campus.
   - The second order of business is to invest in sophisticated control systems for major energy systems. This visibility and control will save energy and money. This may well amplify energy storage's multiple/stacked benefits.

8. **Prepare quarterly updates / annual reports; Identify accountability**

EcoMotion recommends that this Plan is followed up regularly. A schedule needs to be instituted, with milestones. Then identified staff will be responsible for preparing quarterly and

annual updates. Closely associated, SDCCD can develop an Accountability Matrix to identify and then hold responsible parties accountable for climate action steps and milestones.

9. **Continuous commissioning of the initiative's implementation**

As measures are implemented – be they policies, programs, capital improvements, etc. – they must be routinely tracked and evaluated for their effectiveness. Measures that are falling short of desired outcomes, will be flagged. A simple green, yellow, and red marking system will provide for easy review of initiatives' status.

10. **Establish a Green Revolving Fund**

The final recommendation is to establish a green revolving fund with governance over revenue flows.[17] A percentage of savings from mitigation measures will flow into the fund to leverage additional carbon mitigation. The GRF, depending on its governance, will provide funds for maintenance officials to immediately address efficiency and carbon-free upgrades on campus.

Appendices

Glossary of GHG and Climate Action Terms and Abbreviations

This glossary contains definitions for common terms and abbreviations used in developing greenhouse gas inventories and climate action plans. The definitions were adapted from a number of sources including the U.S. Environmental Protection Agency, the California Air Quality Board website, Merriam-Webster Online, and Wikipedia.

AB 32: See Assembly Bill 32 below, the California Global Warming Solutions Act of 2006.

Adaptation: The ability of a system to adjust to the potential impacts of climate change or other environmental disturbances. Compare to Mitigation, which means the ability to reduce the amount of emissions caused by an activity.

Additionality: A criterion for assessing whether a project has resulted in GHG emission reductions or removals in addition to what would have occurred in its absence. This is an important criterion when the goal of the project is to offset emissions elsewhere.

[17] There is an existing Green Fund that was established at Mesa College. It is funded with faculty donations and is very small.

Allowance: A commodity giving its holder the right to emit a certain quantity of GHGs.

Alternative Fuels: Substitutes for traditional fossil-fuel-derived liquid motor vehicle fuels like gasoline and diesel. Alternative fuels include biodiesel, hydrogen, electricity, compressed natural gas, methanol, ethanol, and mixtures of alcohol-based fuels with gasoline.

Alternative Fuel Vehicle: A vehicle powered by an alternative fuel as opposed to traditional gasoline or diesel.

Anthropogenic: Refers to greenhouse gas emissions or reductions that are a direct result of human activities.

Assembly Bill 32 (AB 32): The Global Warming Solutions Act of 2006 is the law that set the State of California's 2020 greenhouse gas emissions reduction target of reducing greenhouse gas emissions to 1990 levels. It also directed the California Air Resources Board to develop a Scoping Plan to outline how best to reach the 2020 target.

Atmosphere: The blanket of air surrounding the Earth that supports life. The atmosphere absorbs energy from the sun and retains heat. It also recycles water and other chemicals and protects the Earth from high-energy radiation and the frigid vacuum of space.

Baseline Emissions: The amount of greenhouse gas emissions released in a designated year against which future changes in emissions levels are measured.

BAU, or Business as Usual: What to expect in the normal course of events.

Biodiesel: A form of diesel fuel manufactured from vegetable oils (used or new) or animal fats. Biodiesel can be used in its pure form (B100) or blended with petroleum diesel in varying proportions.

Biofuels: Fuel made from plant material, e.g., wood, straw, and ethanol from plant matter.

Boundaries: GHG accounting and reporting boundaries can have several dimensions, i.e., organizational, operational, geographic, business unit, and target boundaries. The inventory boundary determines which emissions are accounted for and reported by the company.

Building Envelope: The physical separation between the interior and the exterior of a building – made up of the walls and insulation, windows and doors, roof, foundation, etc. The envelope serves as the outer shell (sometimes called the skin) of the building, and allows for control of the indoor environment (e.g., heating, cooling, moisture control, air pressure).

California Public Utilities Commission (CPUC): Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. Its purpose is to "protect consumers and ensure the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy."

Cap and Trade System: A system that sets an overall emissions limit, allocates emissions allowances to participants, and allows them to trade emissions credits with each other.

Carbon Sequestration: The uptake of CO2 and storage of carbon in biological sinks.

Carbon Dioxide (CO_2): The dominant greenhouse gas. CO_2 also serves as the reference to compare all other greenhouse gasses (see Carbon Dioxide Equivalent). The major source of CO_2 emissions is fossil fuel combustion. Significant CO_2 emissions are also produced by forest clearing, biomass burning, and non-energy production processes such as cement production.

CO2-Equivalent (CO2e): The universal unit of measurement to indicate the global warming potential (GWP) of each of the six greenhouse gasses, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gasses against a common basis

Carbon Footprint: The total set of greenhouse gas emissions caused directly and indirectly by an individual, organization such as SDCCD, event, or product.

Climate: The average weather (usually taken over a 30-year time period) for a particular region and time period. Climate is not the same as weather. It is the average pattern of weather for a particular region. Climatic elements include average annual temperature, humidity, sunshine, wind speed, precipitation, and other measures of atmospheric conditions.

Climate Action Plan: A plan that is in set in place for a city, college, or other jurisdiction to follow in order to control and improve its energy use and emissions

Demand Response: Actions or programs offered by the local utility to induce ratepayers to temporarily reduce or shift peak electrical consumption when so requested. These requests would typically be in response to either a constrained electrical grid or suddenly increasing electrical prices.

Direct GHG Emissions: Emissions from sources that are owned or controlled by the reporting company.

Double Counting: Two or more reporting companies take ownership of the same emissions or reductions.

Emissions: Pollution (including noise, heat, radiation and greenhouse gasses) discharged into the atmosphere by individual, residential, commercial, and industrial activities and facilities. A greenhouse inventory measures emissions from a variety of sources (for example: from the burning of natural gas or of transportation fuels) and sectors (such as from industrial or residential buildings).

Emissions Coefficients: The greenhouse gas "impact" that comes from a given utility's fuel mix. Every electric utility, for example, generates power from a "portfolio" of power sources: natural gas plants, nuclear plants, dams, etc. That utility's emissions coefficients are determined by its specific mix. The coefficients change on a year-to-year basis.

Emission Factor: A factor allowing GHG emissions to be estimated from a unit of available activity data (e.g., tons of fuel consumed, tons of product produced) and absolute GHG emissions.

Emission Uncertainty: Uncertainty that arises whenever GHG emissions are quantified, due to uncertainty in data inputs and calculation methodologies used to quantify GHG emissions.
Energy Conservation: Reducing energy consumption. Energy conservation can be achieved by simply turning off appliances or equipment, or through advances in efficiency (getting the most productivity from each unit of energy).

Energy Efficiency: Using less energy to provide the same level of service or complete the same task. For example, a more efficient light will use less electricity to provide the same amount of illumination.

Fuel Efficiency: The distance a vehicle can travel on an amount of fuel. This is most often measured in miles traveled per gallon of fuel. A higher-efficiency vehicle travels farther on a gallon of fuel than similar vehicles.

Fuel Mix: Every electric utility generates power from a "portfolio" of power sources: natural gas plants, nuclear plants, dams, etc. That utility's fuel mix determines its emissions rate per kWh of electricity produced. In California, the Renewable Portfolio Standard regulates the utility mix.

Fugitive Emissions: Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing transmission, storage, and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc. , like refrigerants released as a result of leaks, fertilizers from golf courses.

GHG Capture: Collection of GHG emissions from a GHG source for storage in a sink.

GHG Offsets: Offsets are discrete GHG reductions used to compensate for (i.e., offset) GHG emissions elsewhere, for example to meet a voluntary GHG target or cap. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the mitigation project that generates the offsets. To avoid double counting, the reduction giving rise to the offset must occur at sources or sinks not included in the target or cap for which it is used.

GHG Program: A generic term used to refer to any voluntary or mandatory international, national, subnational, government, or non-governmental authority that registers, certifies, or regulates GHG emissions or removals outside the company, e.g., CDM, EU ETS, CCX, and CCAR.

GHG Project: A specific project or activity designed to achieve GHG emission reductions, storage of carbon, or enhancement of GHG removals from the atmosphere. GHG projects may be stand-alone projects, or specific activities or elements within a larger non-GHG related project.

GHG Protocol Initiative: A multi-stakeholder collaboration convened by the World Resources Institute and the World Business Council for Sustainable Development to design, develop, and promote the use of accounting and reporting standards for business. It comprises two separate but linked standards – the GHG Protocol Corporate Accounting and Reporting Standard and the GHG Protocol Project Quantification Standard. GHG Protocol Project Quantification Standard. An additional module of the GHG Protocol Initiative addressing the quantification of GHG reduction projects. This includes projects that will be used to offset emissions elsewhere and/or generate credits.

GHG Removal: Absorbtion or sequestration of GHGs from the atmosphere.

GHG Sink: Any physical unit or process that stores GHGs; usually refers to forests and underground/deep sea reservoirs of CO2.

Global Warming: An increase in the near-surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming occurring now or predicted to occur as a result of increased emissions of greenhouse gasses due to human activity. Also known as "climate change" given the anticipated variations in heating and cooling, floods and droughts, etc.

Global Warming Potential: A value that is used to compare the abilities of different greenhouse gasses to trap heat in the atmosphere. GWPs are based on the heat-absorbing ability of each gas relative to that of carbon dioxide (CO2). For example, methane has a global warming potential of 28.

Green Building: A structure constructed using materials and building practices that reduce its impact on the environment throughout its entire life (siting, design, construction, operations, and deconstruction). Green buildings are resource efficient, using less energy, water, and other materials.

Green Infrastructure: The network of trees, plants, and natural ecosystems in a community. These provide services to a community, such as decreasing rainwater runoff, providing healthy soils, removing air pollutants and greenhouse gasses from the atmosphere, and providing shade and beautification.

Green Power: A generic term for renewable energy sources and specific clean energy technologies that emit fewer GHG emissions relative to other sources of energy that supply the electric grid. Includes solar photovoltaic panels, solar thermal energy, geothermal energy, landfill gas, low-impact hydropower, and wind turbines.

Greenhouse Effect: Carbon dioxide and other atmospheric gasses warm the surface of the planet by trapping heat close to the surface of the Earth. In a natural state, the greenhouse effect warms the planet, making it habitable by humans. However, human activities have dramatically increased the amount of carbon dioxide and other greenhouse gasses in the atmosphere. Higher levels of greenhouse gasses trap more heat, causing average global temperatures to rise.

Greenhouse Gas (GHG): A gas, including water vapor, which traps heat close to the surface of the Earth, contributing to global warming and climate change. For the purposes of this standard, GHGs are the following six gasses: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6).

Greenhouse Gas Inventory (GHG Inventory): The EPA defines a GHG Inventory as follows: **"**A greenhouse gas inventory is an accounting of greenhouse gasses (GHGs) emitted to or removed from the atmosphere over a period of time. Policy makers use inventories to establish a baseline for tracking emission trends, developing mitigation strategies and policies, and assessing progress. An inventory is usually the first step taken by entities that want to reduce their GHG emissions."

Infrastructure: The basic shared physical structures needed for an urban area to function in an efficient, safe manner. The term typically refers to items such as roads, drinking water systems, sewers, energy systems, and telecommunication systems in a community.

Indirect Emissions: Emissions that are a consequence of the operations of the reporting company, but occur from sources owned or controlled by another company, e.g., as a consequence of the import of electricity, heat, or steam. Insourcing. The administration of ancillary business activities, formally performed outside of the company, using resources within a company.

Intensity Ratios: Ratios that express GHG impact per unit of physical activity or unit of economic value (e.g., tons of CO2 emissions per electricity generated). Intensity ratios are the inverse of productivity/efficiency ratios. Intensity target. A target defined by reduction in the ratio of emissions and a business metric over time, e.g., reduce CO2 per ton of cement by 12 percent between 2000 and 2008.

Intergovernmental Panel on Climate Change (IPCC): International body of climate change scientists. The role of the IPCC is to assess the scientific, technical and socio-economic information relevant to the understanding of the risk of human-induced climate change (www.ipcc.ch).

Inventory: A quantified list of an organization's GHG emissions and sources.

Inventory Boundary: An imaginary line that encompasses the direct and indirect emissions included in the inventory. It results from the chosen organizational and operational boundaries.

Inventory quality. The extent to which an inventory provides a faithful, true, and fair account of an organization's GHG emissions.

Grid: The transmission and distribution system for electricity made up of a network of synchronized power providers and operated by one or more control centers. The United States mainland has three grids: the Eastern Interconnect, the Western Interconnect, and the Texas Interconnect.

Kilowatt (kW): A unit of power equal to one thousand watts. The amount of power that a power source has the capacity to generate is typically measured in terms of kW (or, in the case of larger systems, in terms of megawatts (MW). Kilowatt-hours (kWh), by contrast, is a measure of how much energy is actually used or generated over a specific period of time (i.e., one hour).

Kilowatt-hour (kWh): An amount of electricity equivalent to the use of one kilowatt for one hour. A hundred watt light bulb that is on for 10 hours uses one kilowatt-hour of electricity (100 watts x 10 hours = 1,000 watt-hours = 1 kilowatt-hour).

Kyoto Protocol: A treaty negotiated in December 1997 at the City of Kyoto, Japan. It committed its signatories to reduce their collective emissions of greenhouse gasses by 5.2% compared to the year 1990. Some 37 industrialized countries and the European Community signed the treaty, which provided for a number of flexible mechanisms to reach the reductions goals. The United States did not sign the treaty, and Canada withdrew from the treaty in 2011.

Leakage (Secondary effect): Leakage occurs when a project changes the availability or quantity of a product or service that results in changes in GHG emissions elsewhere.

LEED, or Leadership in Energy and Environmental Design: A building certification program run under the auspices of the U.S. Green Building Council (USGBC). LEED concentrates its efforts on improving performance across five key areas of environmental and human health: energy efficiency, indoor environmental quality, materials selection, sustainable site development and water savings.

Life Cycle Analysis: Assessment of the sum of a product's effects (e.g., GHG emissions) at each step in its life cycle, including resource extraction, production, use phase and waste disposal.

Megawatt (MW): One million watts. A typical power plant generates 500 - 1,000 MW of power.

Methane (CH4): A greenhouse gas that traps 21 times the amount of heat as carbon dioxide. Methane is produced through the decomposition of waste in landfills, animal digestion, decomposition of animal wastes, incomplete fossil fuel combustion, and the production and distribution of natural gas, oil, and coal.

Metric Ton (or tonne): Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2,205 lbs or 1.1 short tons (the common form of ton used in the United States).

Mitigation: A human intervention to either reduce the amount of greenhouse gasses being emitted into the atmosphere or remove previously emitted gasses from the atmosphere.

Mitigation Measures: The primary component of the Climate Action Plan. The "implementation" measures are specific short and long-term policies, programs, and actions that the organization will carry out to reduce its greenhouse gas emissions.

Mobile Combustion: Burning of fuels by transportation devices such as cars, trucks, trains, airplanes, ships, etc.

Model Uncertainty: GHG quantification uncertainty associated with mathematical equations used to characterize the relationship between various parameters and emission processes.

Nitrous Oxide (N_2O): A greenhouse gas with the ability to trap 265 times the amount of heat as a molecule of CO_2. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

Off-Peak: The opposite of Peak (see below), that is, the time or hours of the day when demand for electricity is at its lowest.

Operational Boundaries: The boundaries that determine the core direct and indirect emissions associated with operations owned or controlled by the reporting company. This assessment allows a company to establish which operations and sources cause direct and indirect emissions, and to decide which optional emissions to include that are a consequence of its operations.

Optional Emissions: Emissions that are a consequence of the activities of the reporting company, but are not part of the reporting companies core direct or indirect emissions as defined by Climate Leaders (e.g., employee commuting).

Organic Growth/Decline: Increases or decreases in GHG emissions as a result of changes in production output, product mix, plant closures, and the opening of new plants.

Organizational Boundaries: The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).

Peak Usage Period or Peak Demand: The time period during which the maximum level of demand for electricity occurs. Peak demand may be measured daily, monthly, seasonally or yearly, but for a utility it is the highest point of customer consumption of electricity on a given day.

Photovoltaic (PV): Refers to the effect of sunlight (photons) generating electricity without mechanical conversion. Typically used in conjunction with the equipment associated with a solar electric system, such as "PV panels" or "PV system."

Primary Effects: The specific GHG reducing elements or activities (reducing GHG emissions, carbon storage, or enhancing GHG removals) that the project is intended to achieve.

Process Emissions: Emissions generated from manufacturing processes, such as cement or ammonia production.

Renewable Energy/Power: Energy generated from sources that are naturally replenished or not used up in the course of providing power (e.g., wind, solar, biomass, and geothermal). This is in contrast to the burning of fossil fuels, which destroys the fuel source and thereby depletes the overall amount of fuel available.

Renewable Portfolio Standard (RPS): Each electric utility generates power through a "portfolio" of sources: natural gas power plants, nuclear plants, large hydroelectric plants, etc. In California, the make-up of the portfolio is regulated by the Renewable Portfolio Standard. In 2010 the standard was raised to require 33% of all energy be from "renewable sources" by 2020. With the passing of SB 100, the RPS calls for 44% renewable sources by 2024 and 60% by 2030.

Reversibility of Reductions: This occurs when reductions are temporary, or where removed or stored carbon may be returned to the atmosphere at some point in the future.

SB 375: California Senate Bill 375, passed in 2008, was designed to reduce vehicle emissions by integrating land use with transportation planning.

Scope: Defines the operational boundaries in relation to indirect and direct GHG emissions.

Secondary Effects (Leakage): GHG emissions changes resulting from the project not captured by the primary effect(s). These are typically the small, unintended GHG consequences of a project.

Sequestered Atmospheric Carbon: Carbon removed from the atmosphere by biological sinks and stored in plant tissue. Sequestered atmospheric carbon does not include GHGs captured through carbon capture and storage.

Sequestration: The uptake and storage of carbon from the atmosphere. Most commonly refers to trees and plants absorbing carbon dioxide through photosynthesis.

SIMAP: Sustainability Indicator Management and Analysis Platform: is a carbon and nitrogen-accounting platform that offers campuses a simple, comprehensive, and affordable online tool to track, analyze, and improve campus-wide sustainability. It is a web-based tool housed at the University of New Hampshire Sustainability Institute.

Smart Grid: An electricity system that utilizes two-way communication between power suppliers and consumers. This allows for adjustments to a facility's operations to save energy, reduce cost, and increase the reliability of the power supply. A smart grid includes a monitoring system at facilities that can turn off or adjust systems to reduce demand at peak times when power is more expensive. For example, a smart grid could temporarily turn off selected appliances, such as washing machines, or adjust a building temperature by a few degrees to save power.

Smart Meter: An electrical meter that tracks power consumption in real-time, communicates with the local utility company for monitoring and billing purposes, and (if connected to a smart grid) can adjust a building's energy use automatically to reduce demand on the power grid at peak use times.

Solar Panel: A photovoltaic cell that can convert light directly into electricity. Typical solar cells use semiconductors made from silicon.

Solar Thermal: Refers to devices that use the heat from the sun to heat water.

Stationary Combustion: Burning of fuels to generate electricity, steam, heat, or power in stationary equipment such as boilers, furnaces, etc.

Structural Change: A change in the organizational or operational boundaries of a company that result from a transfer of ownership or control of emissions from one company to another.

Sustainability: In a broad sense, the capacity to endure. In ecology, the word describes how b SDCCD can also pair any of these efforts with education opportunities: Recycling drives, Composting workshops, education on reducing plastic and its lifecycle costs, importance of waste diversion, etc…

Therm(s): A unit of measurement of natural gas. A single therm is approximately the energy equivalent of burning 100 cubic feet of natural gas. It is equivalent to 100,000 British thermal units (BTU) or about 29.3 kilowatt-hours of electrical energy.

Tonne: see Metric Ton

U.S. Environmental Protection Agency (EPA): The federal environmental science, research, education, assessment, and regulatory agency. The mission of the Environmental Protection Agency is to protect human health and the environment.

United Nations Framework Convention on Climate Change (UNFCCC): Signed in 1992 at the Rio Earth Summit, the UNFCCC is a milestone Convention on Climate Change treaty that provides an overall framework for international efforts to (UNFCCC) mitigate climate change.

Value Chain Emissions: Emissions from the upstream and downstream activities associated with the operations of a reporting company.

Verification: An independent assessment of the reliability (considering completeness and accuracy) of a GHG inventory.

Vehicle Grid Integration: The process whereby batteries in electric vehicles can both receive power from the grid, and can supply power to the grid during peak periods. Formerly known as V2G, Vehicle to Grid.

Waste Characterization Study: An analysis of a facility's waste not being recycled or composted that involves sorting the garbage produced by type (e.g., paper, food waste, plastic) to determine what is being thrown away.

Waste Diversion: A waste reduction strategy focused on the recycling or composting of materials, diverting what would otherwise have been sent to a landfill for use in new products or materials. The waste diversion rate refers to the percentage of wastes being reduced, reused (repurposed), and recycled.

Waste Reduction: Techniques such as source reduction, recycling, or composting that reduce waste generation or prevent waste from being created at all.

Waste Stream: The total flow of solid waste from homes, businesses, institutions and manufacturing plants that is recycled, composted, burned, or disposed of in landfills.

Watt: The standard measure of an amount of energy, usually electricity. For example, a 60 watt light bulb requires 60 watts of electricity to turn on. Energy use is measured in terms of the number of watts used over a period of time (see kilowatt-hour).

Weather: The specific condition of the atmosphere at a particular place and time. It is measured in terms of such factors as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather changes from hour to hour, day to day, and season to season. Climate is the average of weather over time and space. A simple way of remembering the difference is that climate is what you expect (e.g., cold winters) and weather is what happens (e.g., a blizzard).