GOVERNING BOARD REGULAR MEETING/ STUDY SESSION

2020 – 21 ANNUAL SUSTAINABILITY REPORT CONTRA COSTA COMMUNITY COLLEGE DISTRICT

NOVEMBER 10, 2021

Table of Contents

I. Executive Summary 2

II. Districtwide Sustainability Highlights: Progress and Current Status 3

III. Sustainability Committee Accomplishments 9

A. Contra Costa Community College (CCC) 9

B. Diablo Valley College (DVC) 11

C. Los Medanos College (LMC) 14

IV. Baseline Usage Data and Analysis 15

V. Next Steps 24

VI. Appendices 25

A. Background: Mandates and Codes A-1

B. Policies Toward Zero Net Energy, Carbon Neutrality and Zero Waste B-1

C. Board of Governors Climate Change and Sustainability Policy – May 2019 ..... C-1

D. Glossary D-1

I. Executive Summary

The State of California has been rapidly developing long range energy and sustainability goals, mandates and plans in realization that action is necessary in order to deescalate a myriad of problems, including wildfires, coastal erosion from rising seas, disruption of water supply, health threats from air pollution, contaminated soil, unhealthy water and many other issues that contribute to large equity gaps and have damaging impacts on the economy.

Climate crisis and increased equity gaps have many major and contributing common factors. How we procure and use our energy, procure our materials, generate and dispose of waste, landscape our property, irrigate our landscape, maintain our investments, travel to work or school, share our food, and so many other factors, all contribute to environmental justice and thus equity for all. Many studies have noted that polluted air, dirty water and soil are all associated with illnesses, and those conditions put people more at risk with the current pandemic. Research also shows that these environmental factors contribute significantly more toward so-called "fence-line communities," defined as areas situated near facilities that produce hazardous waste. While these environmental factors impact all people, it is important to note these factors disproportionately impact young people and future generations, and disproportionately affect people of color and people in poverty, thereby exacerbating existing inequities and limiting opportunities. Closing equity gaps requires continued conversations, strategy and ultimately a collective call to action to improve our educational system, our internal infrastructure and operations.

This report provides a summary of 4CD's 2020-21 sustainability highlights, progress and current status, challenges and steps we must take in order to develop and advance a comprehensive 4CD policy on sustainability. As a step toward developing a comprehensive 4CD policy, this year the sustainability committees reached consensus to collectively pursue eight main 4CD sustainability goals, which align with various state mandates, policies and plans referenced in this report. Additionally, the committees reached a common agreement as to how we can collectively move forward the crucial dialogue and action towards these goals. Specifically, goals were identified as either 4CD lead with campus involvement or campus lead with 4CD involvement or solely campus lead. 4CD sustainability teams and college users continue to complete energy and water-savings projects as well as waste reduction projects. The college sustainability committees have continued to make strides in engaging faculty, staff and students in change management: namely, changing behaviors to conserve energy and resources. With each of us experiencing unprecedented change in our everyday lives as a result of the global pandemic, the change management needed to avert a global climate crisis seems as if it may be more achievable.

This report also looks forward in this year, as we plan to continue to engage in this vision and determine resources required in order to advance our newly developed 4CD sustainability goals with each of the campuses, while aligning their vision with

these goals. This information will also be tied together in the Facilities Master Plans, as many of the goals will require further development and funding for our infrastructure and buildings. Finally, this report highlights the early stages of that process, as the activities, projects, initiatives and events of the college sustainability committees collectively continue to foster an increased awareness about the way 4CD and its colleges can foster the best possible environment for our students and continue to provide an enriched and student-focused academic experience.

Planning and implementing solutions to achieve statewide goals will take determination, perseverance, culture shifts, funding, and collaboration from the entire 4CD community. Just as we have worked together to go to remote operations and continue to press on in a global pandemic, we will also need to continue to lead the way and work together to move the dial substantially for the climate justice movement.

II. Districtwide Sustainability Highlights: Progress and Current Status

Several codes, standards, legislative actions and executive orders have been requiring California to become Zero Net Energy (ZNE), Zero Carbon or Carbon Neutral and Zero Waste. As codes and mandates shift, so must our planning and implementation of those requirements, both on the capital construction side as well as for operations and infrastructure. The implementation progress of the mandates is summarized below. Included is a brief synopsis of how our current capital projects in design and construction phases are incorporating these requirements with the overall goal in getting us closer to ZNE, carbon neutrality and zero waste.

All New Buildings and Major Renovations LEED Silver Target Requirement:

- Contra Costa College (CCC) New Science Building and PE/Kinesiology (PE/K)
- Diablo Valley College (DVC) PE/K and Art Complex
- Los Medanos College (LMC) Brentwood and Kinesiology/Athletics and Student Union

By 2030, 50% of all existing buildings must be retrofit to ZNE and by 2045, achieve statewide carbon neutrality – Green House Gas (GHG) Reductions:

- New Science Building at CCC designed to be ZNE Ready
- DVC PE/K and Art Buildings are targeting ZNE using existing onsite PV
- Driving the energy use intensity down during design is key
- Moving toward electrification of our buildings (all electric heating, domestic hot water)

By 2020, 75% waste diversion from landfill (SB 1383 in 2022 ratchets this down):

- Composting of food waste and food soiled paper goods are required
- Zero Waste Initiative at DVC and District Office are launching us toward this goal

Water use allowed in new buildings continues to ratchet down:

- Drought tolerant, native plants encouraged in all projects

Currently, all buildings being designed and built will be considered existing buildings when many of the mandates goals/timelines are realized. Thus, optimizing bond funds to install very efficient lighting, efficient heating, ventilation and air conditioning systems, electric vehicle charging stations, and drought tolerant native plants, designing for excellent indoor air quality and many more features all help us to be on track to meet future mandates. They also tie into many of our existing policies, strategic plan objectives and will help to reduce equity gaps. As a result, 4CD has set various design-based energy targets for its bond funded project renovations and new building construction. These targets are intended to reduce the energy usage and demand of the building, so it can be planned as a ZNE building with the addition of solar PV.

Each new building and large renovation project has a target goal of being LEED Silver certified, beating Title 24 State Energy Codes by a minimum of 10%; receiving PG&E's Savings by Design Incentives for high efficiency buildings; and, in some cases, achieving ZNE. Additionally, 4CD targets using drought tolerant, native plants in new building landscaping, to reduce water usage and reduce maintenance. These goals and requirements will help 4CD move closer to ZNE; reduce energy and water usage and reduce future waste on all large renovation and new building projects, while creating buildings that require lower annual operating costs use more recycled materials and result in healthier buildings for students, faculty and staff.

In addition to the large bond projects, we continue to seek grant money and other programs to plan, develop and implement projects to help lower greenhouse gases resulting from transportation and other end uses. In last year's report, we highlighted the success of receiving and implementing grant funding that provided for 80 new Level 2 Electric Vehicle Charging Stations (EVCS) that we installed districtwide, bringing our total to 86. 4CD received Bay Area Air Quality Management District (BAAQMD) grants (Contra Costa Transit Authority) and participated in the PG&E EV Charge Program, totaling approximately $894,000 in contributing funds, which covered most of the construction and equipment costs for the EVCSs.

This year we would like to highlight projects that have received awards as well as some “firsts” at 4CD. The CCC Science building is designed to be ZNE Ready. It was the first to be designed as such, and it was awarded the California Community Colleges Board of Governors Energy and Sustainability Award for the Best Overall Large District Innovative Project. During the project’s design phase, targets were developed to create a building that uses energy well below similar benchmark science buildings. The building has an all-electric heating and air conditioning system (which prevents the burning of fossil fuels) and will utilize existing campus solar Photovoltaic (PV) power to offset part of its energy use, promoting clean, green power. Designing and constructing buildings with sustainability features incorporated from the beginning is the most responsible use of bond funds as it also reduces the total cost of ownership to the college.

The next project we would like to highlight is the DVC Physical Education Complex and the Art Complex. Together, these are the first 4CD projects that are being designed as ZNE and also targeting ZNE LEED Certification. Much like the CCC Science building, both feature all-electric heating and air conditioning systems (which prevents the burning of fossil fuels) and will utilize existing campus solar Photovoltaic (PV) power to offset its energy use, promoting clean, green power.

Finally, the LMC Kinesiology/Athletics and Student Union Complex has the distinction of receiving an Award of Honor in the Growth Category through the 2021 Community College Facility Coalition (CCFC). The Community College Facilities

Coalition (CCFC) a statewide organization recently presented LMC and LPA Architects with a Growth Award of Honor at their annual CCFC Professional Design Awards. The award, received for the college's Kinesiology/Athletics and Student Union Complex will be presented at the 2021 CCFC conference this month.

In addition to the above articulated code, mandates and energy efficiency requirements, the State Chancellor's Office Board of Governors (BOG) also adopted a new California Community College Board of Governors Climate Change and Sustainability Policy in May 2019. Details of this policy are noted in the Appendix of this report. Worth noting is this policy sets sustainability goals for 2030 with intermediate targets in 2025, encouraging districts to adopt their own local resolutions. In 2020, there has been movement in this area at several community college districts: Los Angeles Community College District signed the Clean Energy and Sustainability Resolution, committing to eliminate carbon-based electricity consumption by 2030 and replacing all other carbon-based energy use with clean, renewable energy sources by 2040. Miracosta Community College District also adopted the 2019 Board of Governors Climate Change and Sustainability Plan, in addition to their own climate change goals. In 2021-2022, we will collaborate with college leadership and sustainability committees to bring forward a similar resolution for the Governing Board's (GB) for consideration.

This year the three sustainability committees met to agree upon 4CD sustainability goals. Often goals are "reach" goals that are above and beyond what would normally be expected. For us, these goals actually align with the state mandates and BOG policies, but they are still going to be challenging to achieve. The sustainability committees agreed to collectively pursue eight large 4CD sustainability goals noted below, which align with various state mandates, policies and plans. Each goal was assigned to be either 4CD lead with campus involvement or campus lead with 4CD involvement or solely campus lead. These goals will feed into a future GB resolution. We will also use this as a basis for future planning of infrastructure upgrades as well as future building retrofits in our Facilities Master Plan, as well as a guidepost for fine tuning campus operations. The table below shows our goals.

Categories	Goals by 2025	Goals by 2030
#1: GHG	Reduce greenhouse gas emission to 30 percent below 1990 levels.	Reduce greenhouse gas emission to 40 percent below 1990 levels.
#2: Renewable Energy	Increase renewable energy consumption to 25 percent.	Increase renewable energy consumption to 50 percent.
#3: Green Building & Zero Net Energy	50 percent of all new buildings and major renovations will be constructed as ZNE.	100 percent of all new buildings and major renovations will be constructed as ZNE. 50% of all existing building will be ZNE.
	50 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating with focus on healthy buildings.	100 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating with focus on healthy buildings.
	All new building and major renovations will beat T24 by 15% and participate in PG&E Savings by Design Program or equivalent.	All new building and major renovations will beat T24 by 15% and participate in PG&E Savings by Design Program or equivalent.
	New buildings or major renovations shall not use onsite fossil fuel combustion for space and water heating.	New buildings or major renovations shall not use onsite fossil fuel combustion for space and water heating.
	Reduce energy usage per square foot by 20% to target EUI of 60 kBTU/sq.ft./year, using 2019 as baseline	Reduce energy usage per square foot by 40% to target EUI of 50 kBTU/sq.ft./year, using 2019 as baseline
#4: Transportation	ZEV shall account for 25% of our fleet vehicles. Achieve 30% reduction in single-occupancy vehicle (SOV) transportation for employees and students.	ZEV shall account for 50% of our fleet vehicles. Achieve 50% reduction in SOV transportation for employees and students.
#5: Zero Waste	Achieve 75% diversion rate and 25% reduction in overall municipal waste	Achieve 90% diversion rate and 50% reduction in overall municipal waste
#6: Procurement	Increase procurement of sustainable products and services by 20 percent compared to current levels.	Increase procurement of sustainable products and services by 25 percent compared to current levels.
#7: Water	Reduce our overall water usage by 25% compared to 2010 baseline	Reduce our overall water usage by 30% compared to 2010 baseline
#8: Curriculum	Seek to further integrate sustainability into the academic curriculum. Will solicit and evaluate feedback from faculty, staff, and students and community organizations to monitor the effects of sustainability and energy conservation efforts on instructional programs and the environment.	

At the District Office, we launched the Zero Waste Initiative in alignment with Goal#5 above. We engaged in planning exercises with Isma'il al-Shabazz, Custodial Manager at DVC, along with the DVC Sustainability Committee members, to ensure we are following best practices. This initiative focuses on reducing the amount of overall waste that we create by reducing our consumption, reusing and recycling as much as possible and composting food waste and soiled papers. We were able to launch this effort by having our Sustainability Coordinator Intern, Moises Rocha, lead the effort by seeking advice, training, and developing and implementing the plan to get all the three stream bins located throughout our building as well as provide training to our custodial staff and our staff on how to properly use the bins. Mr. Rocha also developed an informational story map showing landfill in our college community, links to cancer and how reducing waste directly impacts equity and student success https://storymaps.arcgis.com/stories/741bb48b9d514c2aa6b84a653352bc9b.

We are taking this initiative and sharing it with each of the campuses, starting at SRC, where we hope to complete implementation and training in spring of 2022.

This year, due to the COVID-19 pandemic, we also focused on getting our buildings ready for return to work by improving the ventilation and filtration systems. During this project, we focused on long-term solutions, repairing the central heating, ventilation and air conditioning systems by repairing the outside air controls and adding higher efficiency filtration to the units. By focusing on long-term repairs, we ensured our buildings have healthy indoor air quality and optimized energy usage/cost, without adding portable air purifiers unless necessary as they require additional maintenance and energy and take away resources from long term fixes.

There are several other opportunities to reduce energy, water and overall materials usage, most of which require additional funding. For example, most of the interior lighting systems have not been retrofitted to LED fixtures. Several of our existing buildings have outdated and broken building automation system (BAS) controls, resulting in simultaneous heating and cooling and excessive fan energy. Updated BAS controls would allow for much smarter and more comfortable operation of the

heating and air conditioning systems and lighting systems in addition to automatic fault detection software to help operations and maintenance staff find and repair high usage problems. They would also help maintain consistent indoor air quality and ventilation. Each of these energy reduction opportunities need to be included in future bond funding as well as additional PV and battery storage.

III. Sustainability Committee Accomplishments

We continued to organize and facilitate 4CD sustainability meetings with DVC, LMC and CCC attending in-person and via Zoom. Due to the pandemic, some committees experienced a shift in their focus and priorities. These types of meetings allow each committee to learn and share resources to help provide efficiency and unity in sustainability initiatives across 4CD.

Listed below are the 2020-21 College Sustainability Committees detailed accomplishments.

A. Contra Costa College (CCC)

Bay Area Bike To Wherever Day

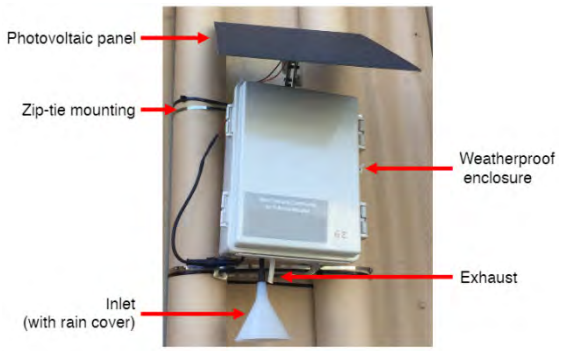
On September 24, 2020, the school hosted an Energy Station for the Bay Area Bike to Anywhere Day. The Bike to Work Day, which was changed to Bike to Anywhere because of the pandemic, is traditionally held in May.

Participants are rewarded with some exercise, fresh air and, the added environmental benefit of reducing pollution, traffic congestion and helping our fight against climate change.

Culinary Department Arbor Day Event

On March 11, 2021, the Culinary Department hosted another Arbor Day event in their Culinary Garden. Arbor Day is a secular day of observance in which individuals and groups are encouraged to plant trees. Trees provide many benefits, especially in the fight against climate change, by removing carbon dioxide from the air and storing it in the soil. Ten new fruit trees were planted in the area next to the garden. The Culinary department provided cookies and snacks with all who attended.

Improving Air Quality on Campus

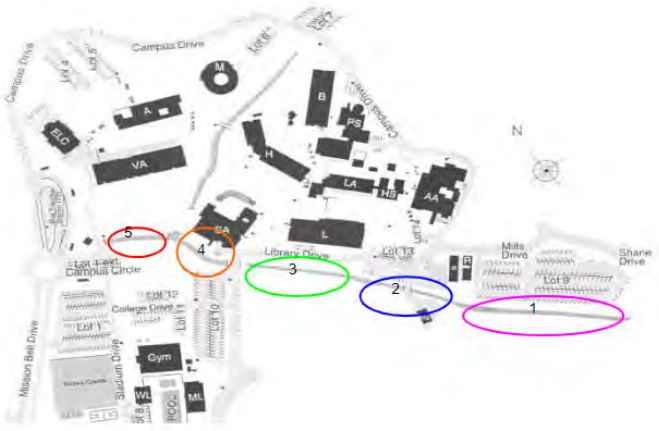


As part of the East Bay County research program, the school partnered with the UC Berkeley Research Team to deploy Berkeley Aerosol Black Carbon Detector (ABCD) seen above to measure the air quality. Black carbon, commonly known as soot, is produced by the incomplete combustion of fuels – emitted from large trucks, trains, and marine vessels – it is an air pollutant to everyone, especially residents in urban areas. To learn more about the ABCD click here.

The Rheem Creek Clean-up Project:

CCC has partnered with several organizations, including the city of Richmond, on a multiphase project to restore ecological function to the Rheem Creek. This project will restore the ecological biodiversity of the creek by implementing nature-based solutions throughout the watershed and reduce the risk of flooding to nearby residents by building climate change resilience.

The image below shows the sections of the Rheem Creek that pass through CCC and will be worked on as part of the restoration process.



Building and Grounds Department, a Green Business

Green businesses are described as companies that do not negatively impact the environment, economy, or community. These types of businesses are forward-thinking regarding human rights, environmental concerns, and related issues. Environmental responsibility is the primary characteristic distinguishing green Businesses from those that do not monitor their environmental impact.

B. Diablo Valley College (DVC)

Visioning exercise conducted around waste to develop long-term goals

The committee has drafted goals for five and ten years to reduce the overall quantity of trash produced on campus and increase the diverted amount. Specifically, DVC will aim for a 25% reduction in general waste streams by 2025 and a 50% reduction by 2030. In addition, the college will aim toward 75% diversion of waste by 2025 and 90% diversion by 2030 through recycling and compositing.

Passage of transit resolution by Classified Senate

During a retreat in November 2020, several campus leaders on sustainability met to focus on the future of transportation to campus. They set a goal to reduce the number of single-vehicle drivers to campus by 30% before 2025 and 50% by 2030. To achieve these goals, DVC will need to employ several strategies, such as: 1. boost the use of public transportation; 2. encourage carpooling by students and employees; 3. increase online/hybrid classes; and 4. increase use of zero-emission vehicles. These goals align with 4CD long-term sustainability goals and facilities master plans.

Published Four Newsletters

The sustainability committee published four newsletters this year that covered a wide array of sustainability topics to engage and educate the community continuously. These newsletters have generated a positive community response. As a result, the sustainability committee also saw an increase in membership. The newsletters can be accessed here.

Helped ASDVC organize Earth week with speakers on 4 consecutive days

Earth Day is meant to be spent celebrating the planet's clean natural resources. However, in recent years, the day has been used to raise awareness about global climate change. This year's Earth Day theme was: Restore Our Earth. To capture this year theme, ASDVC & the DVC sustainability committee held a four-day event that covered:

- Sustainable Eating – Monday, April 19th
- Professional Development – Tuesday, April 20th
- Performing Arts and the environment – Wednesday, April 21st
- EARTH DAY! Environmental Justice – Thursday, April 22nd

The virtual event was a great success! To learn more, click here.

Added EV charging stations at PHC (14) and SRC (10)

California aims to have five million ZEVs on the road by 2030, roughly one-third of California's registered vehicles. Since the transportation industry in California accounts for 40% of the greenhouse gases (GHGs) in California, achieving these goals will have a massive impact on reducing GHGs and a drastic improvement in air quality.

In 2020, the Sustainability Committee drafted a goal to reduce single-vehicle trips to campus and increase the percentage of zero-emission vehicles owned and operated by the college. The resolution sets goals of:

- 30% reduction in single-vehicle travel to campus by the end of 2025 and 50% reduction by 2030 50% by 2030
- 25% of fleet vehicles shall be zero-emission vehicles by 2025 and 50% by 2030

The addition of these new charging stations, which were covered by grants/funding from 551ContraCosta, PG&E, and BAAQMD, will encourage and incentivize our community to make the switch.

ASDVC

Spring 2021

Earth week:

ASDVC held a four-day virtual event that replaced our traditionally one-day, in-person celebration of Earth Day (4/22).

Waste Monitoring Amendment:

To align ourselves with 4CD sustainability goals, ASDVC tried to amend our bylaws to include trash monitoring. Unfortunately, the amendment did not make it out of the rules and legislation committee. However, the changes were added to the Earth Week Google Folder.

Water Refill Stations:

ASDVC water refill stations campaign inspired DVC administration to install water refill stations throughout each building on campus. The use of reusable containers helps fight pollution, reduce waste, and reduce energy consumption typically used when creating new materials.

Fall 2021

Campus-wide Education

ASDVC will continue its educational outreach to students about the agreed-upon 4CD sustainability goals. ASDVC recognizes that there has to be student, faculty and staff support for these initiatives to achieve.

Virtual Event:

The current pandemic has created some strains and difficulties in terms of getting students together. ASDVC has found creative and innovative ways to connect and inform the student body on the various sustainability efforts.

Bike Rack Initiative:

To tackle the bike congestion at particular points on campus, ASDVC is continuing to partner with 511 Contra Costa and the maintenance and operation department at DVC to install additional bike racks. The goal is to incentivize students living reasonably close to the campus to bike instead of drive promoting cleaner air on campus.

On Site Composting:

ASDVC is working with several campus stakeholders to establish an onsite composting at the DVC campus. Organic waste in landfills generates methane, a potent greenhouse gas. By composting wasted food and other organics, methane emissions are significantly reduced.

C. Los Medanos College (LMC)

Increase information to the college population about recycling and sustainability:

Recycling is important because it prevents pollution, reduces the need to harvest new raw materials, saves energy, and reduces greenhouse gas emissions. It also saves money, reduces the amount of waste that ends up in landfills, and allows products to be used to their fullest extent.

Increasing bottle filling stations on campus:

A key benefit of filtered water bottle filling stations is their ability to provide safe drinking water. The majority of stations use high-performance filters that remove common contaminants such as chlorine and lead. It is estimated that 80 percent of plastic bottles end up in the landfill. Filtered water bottle filling stations serve as an alternative to plastic water bottles by

encouraging people to refill their water bottles with tap water that's safe, healthy and accessible.

Encourage faculty to incorporate sustainability as a part of student curriculum:
Environmental education (EE) connects us to the world around us, teaching us about natural and built environments. EE raises awareness of issues impacting the environment upon which we all depend and actions we can take to improve and sustain it.

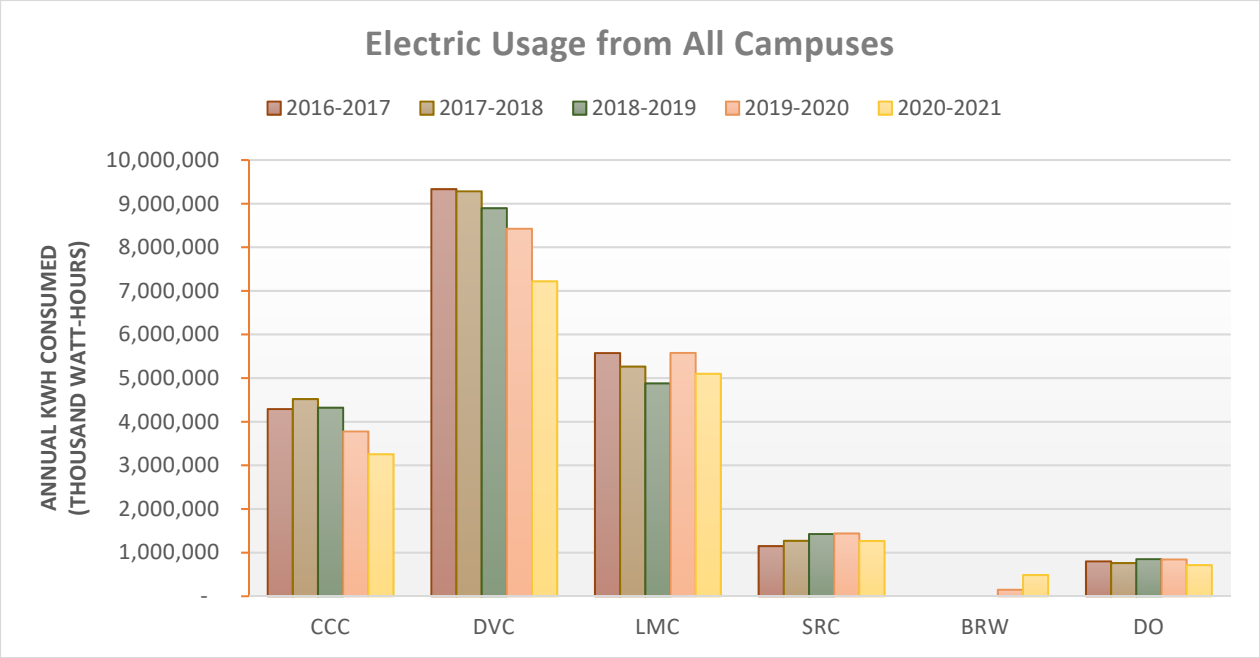
Install signage in pick up and drop off areas to encourage motorist to limit idle time and reduce emissions:
According to the U.S Department of Energy, reducing vehicle idling time saves fuel and money, cuts pollution and greenhouse gas emissions, and contributes to U.S. energy security. Decreasing idle time can also reduce engine wear and associated maintenance costs, especially for heavy-duty trucks.

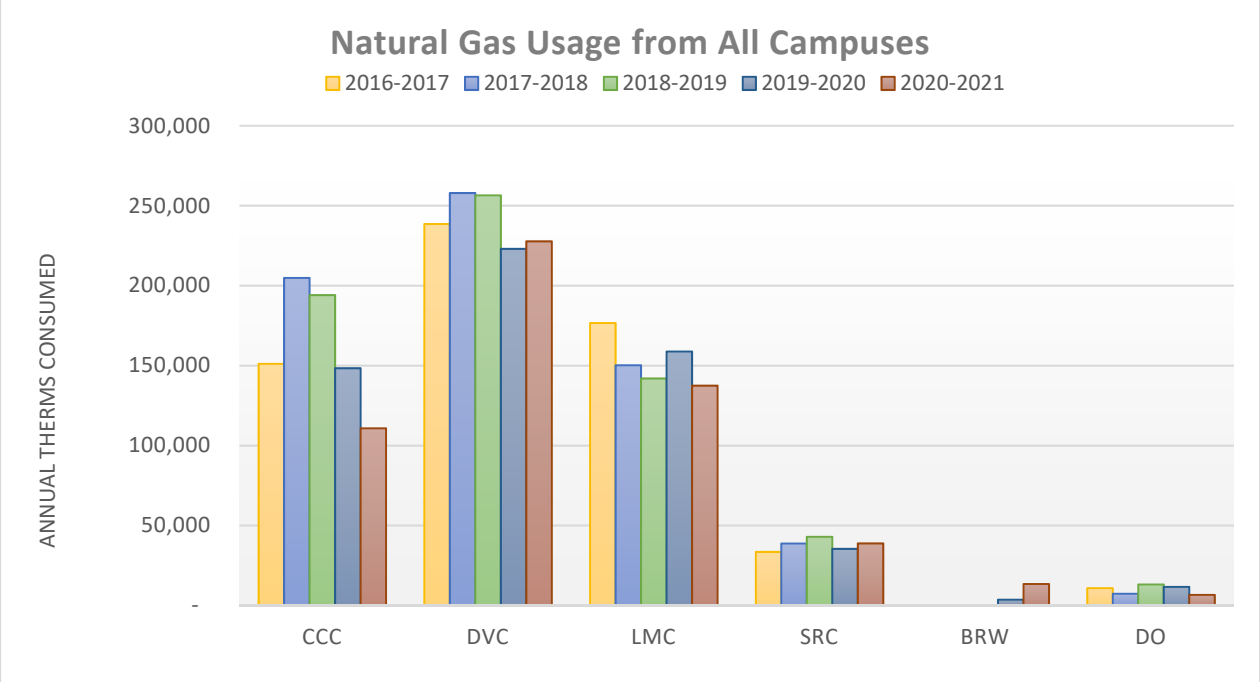
IV. Baseline Usage Data and Analysis

In order to show measurable progress toward energy efficiency and water and waste reduction efforts, baseline usage is required along with annual usage comparisons to the baseline. The table on the following page shows the historical electricity and gas usage of all 4CD-owned facilities combined over the past five years.

The graphs that follow show electric energy usage has been steadily decreasing over the past five years at CCC, DVC, LMC and the District Office (DO). The San Ramon Campus (SRC) has been increasing somewhat, which warrants some study. The gas usage has been slowly decreasing at each campus as well, with a bit of a rise at SRC. During the last two fiscal years, nearly all sites were able to greatly reduce the operating hours of building systems, from March 2019 on, due to the pandemic. This largely impacted the 2020-21 electric usage and marginally impacted the gas usage. Brentwood (BRW) was a leased facility where utilities were incorporated into the lease. During the 2019-20 fiscal year, the new BRW came online and had only been operational for a few months. During this fiscal year, BRW's energy usage was much

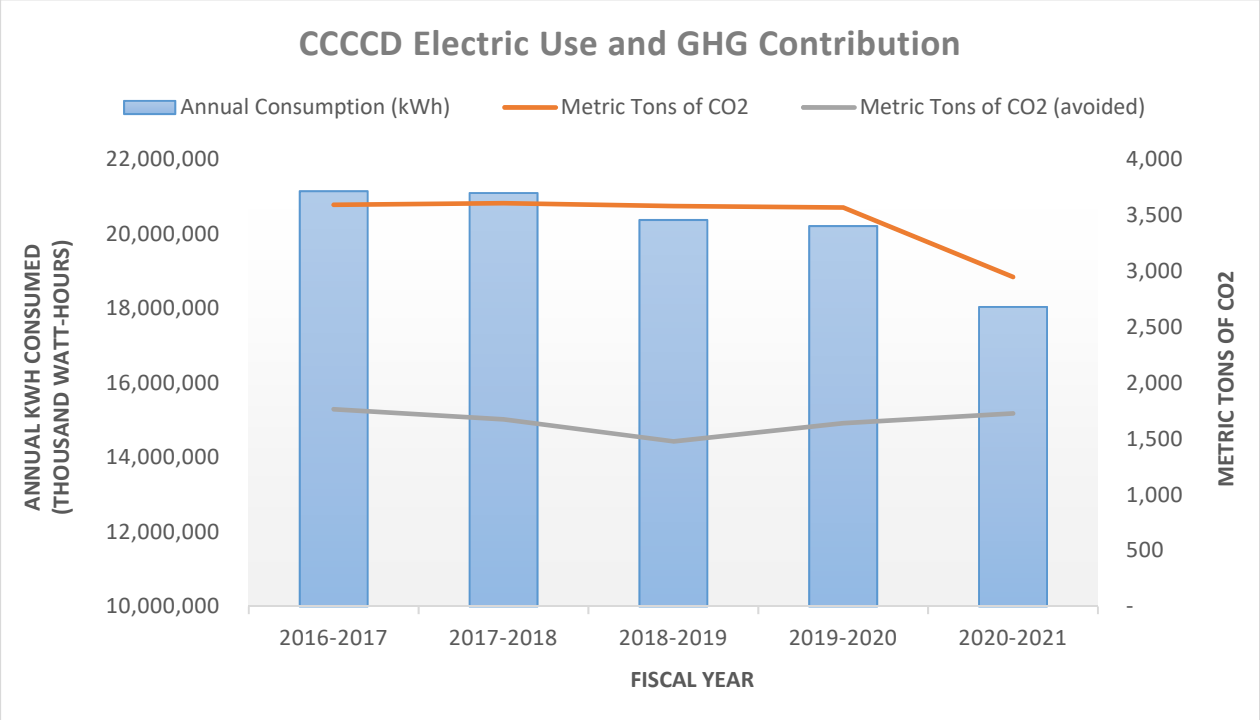
higher, since it had more spaces being used most days. It will likely increase further, as classes extend hours and are offered more fully in-person.



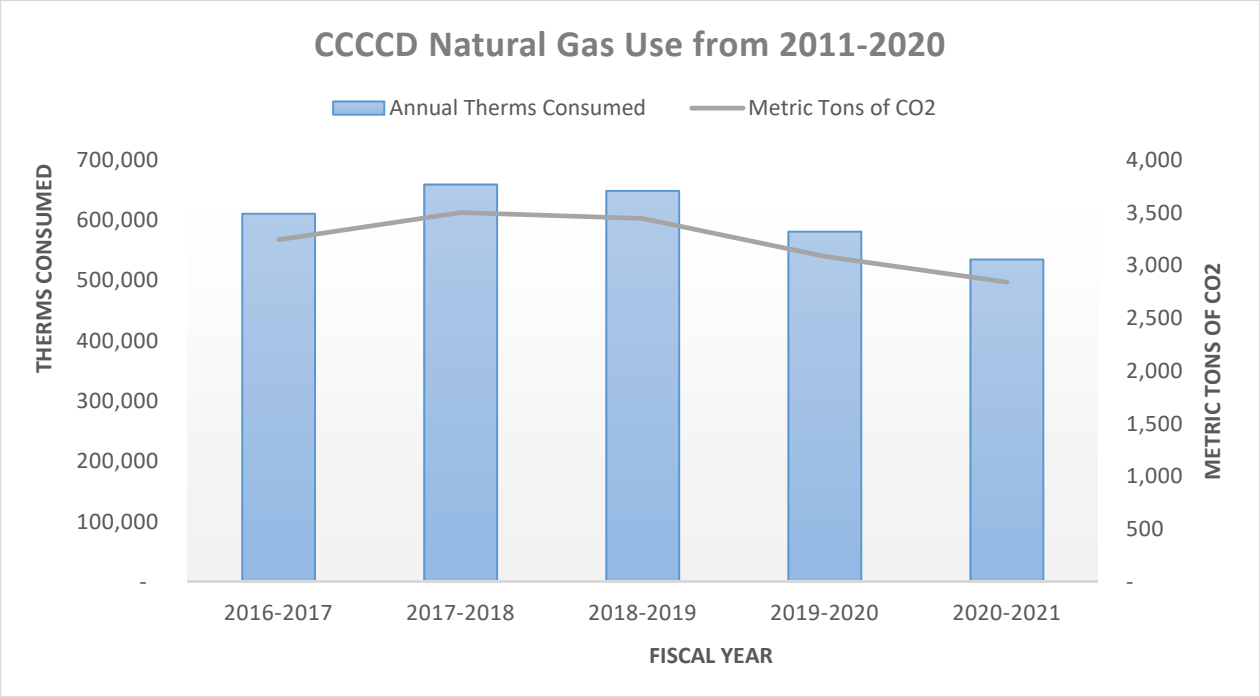


4CD's electric usage has dropped slightly over the past five years, largely due to COVID 19, since there have been reduced operating hours in some of the buildings. Compared to 2013, the

overall drop this year was roughly 15%, while the overall gross area of 4CD has increased by 11%, or 171,000 square feet. This shows that while our building quantity and size have increased over the years, we have been able to marginally reduce our usage, pointing toward an overall reduction in energy per square foot (otherwise known as EUI). The graph below also shows the greenhouse gas contribution of our electric consumption, as well as our avoided GHG consumption. The avoided GHG consumption is from our green, renewable solar PV panels at CCC, DVC and LMC. The further we can reduce our energy usage, and the more PV (or other renewable energy) we are able to install on our campuses, the more we can reduce our contribution to climate change.



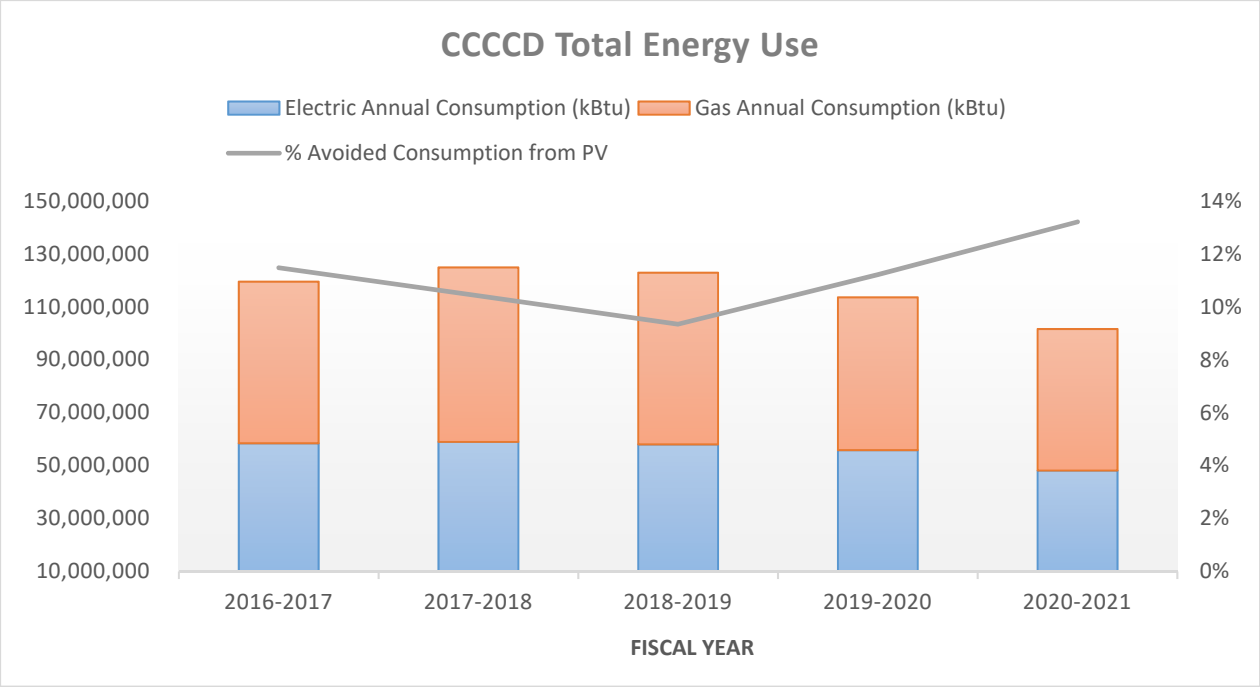
The gas usage has also dropped, though less dramatically from the electricity usage during this pandemic year. The gas usage is our largest contributor to greenhouse gas emissions and we are causing this by burning natural gas on our campuses, and generating this pollution in our communities. Gas is primarily used for heating our buildings. This can be converted to green renewable energy by shifting our building systems to all electric, using highly efficient heat pump technologies for heating and cooling systems as well as heating domestic hot water. Making this shift would then increase our electric usage, decrease our gas usage and allow us to offset this usage with green, renewable, carbon free solar PV on our campuses. This would also reduce our energy costs annually. The alternative is to buy clean, green energy, from the electricity grid. This would require higher annual utility costs to get us toward carbon neutrality. The most likely cost effective strategy is to add additional PV to our campus and to switch our grid purchases to clean, green renewable energy.



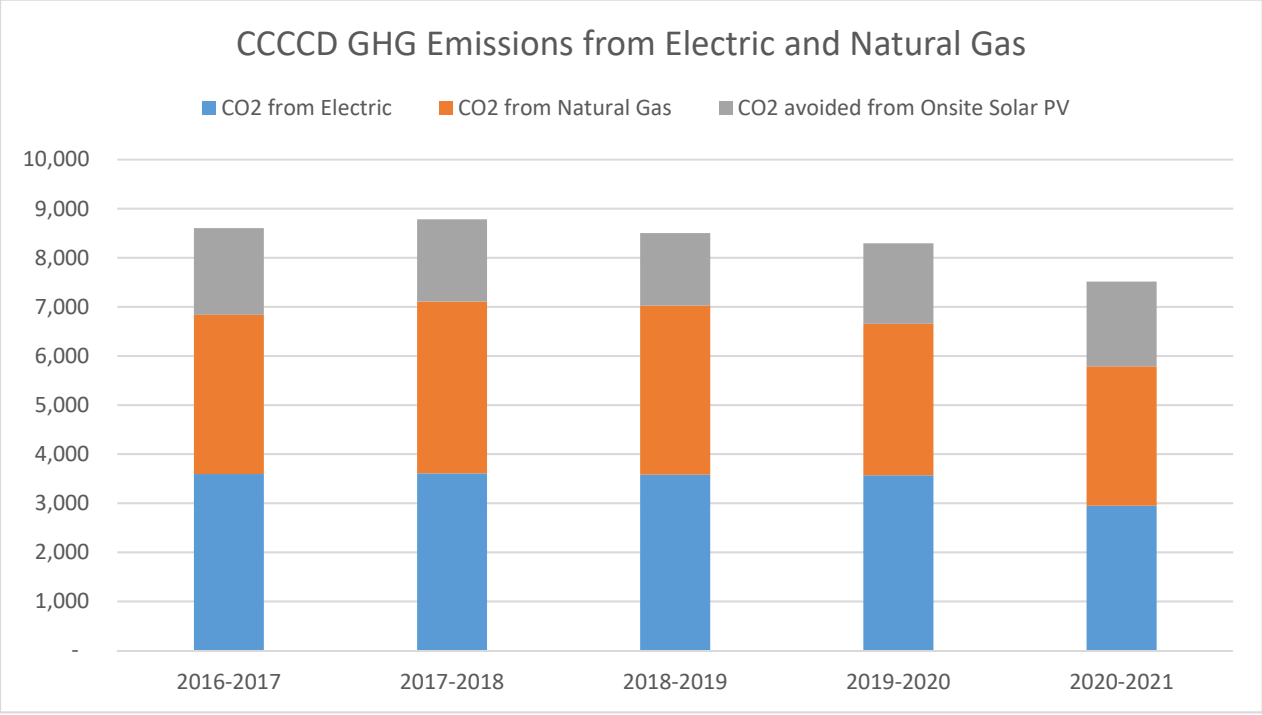
In the chart below, we converted the electric and gas usage to the same unit of energy (kBtu) to better compare overall energy usage. As the graph shows, our gas usage is higher than our electric usage, and thus a larger contribution to our GHG emissions. The electric side is much easier to offset currently with green power, such as wind and solar PV. Thus, converting our gas usage to electric usage will be key in reducing our Scope 2 GHG emissions. Converting to gas fired equipment to electric heat pump equipment also reduces our energy consumption, as it is much more efficient. This conversion would reduce the BTU of the gas usage in the graph below by 15-24%, thus requiring an even smaller PV system to offset that load.

In a typical higher educational institution, the transportation of students and faculty to and from the campus is one of the main contributors of GHG emissions. Transportation contributes to the largest emissions overall in California as well. These emissions are considered Scope 3 emissions (whereas onsite usage like gas and electricity are Scope 2 emissions). Transportation emissions can be reduced by reducing the miles we drive, shifting to electric or hybrid vehicles, carpooling, using public transportation, and finally working/learning remotely and avoiding the commute as much as possible. We do not have measured data compiled for this usage yet, but we are targeting a compilation of the baseline usage in the upcoming year so we can begin to measure progress toward our long term goals.

This graph also shows 9-13% of our overall energy is offset by our onsite solar PV systems. In the past, we showed this offset based on electricity alone, which converts to roughly 16-25% of our overall electricity usage.

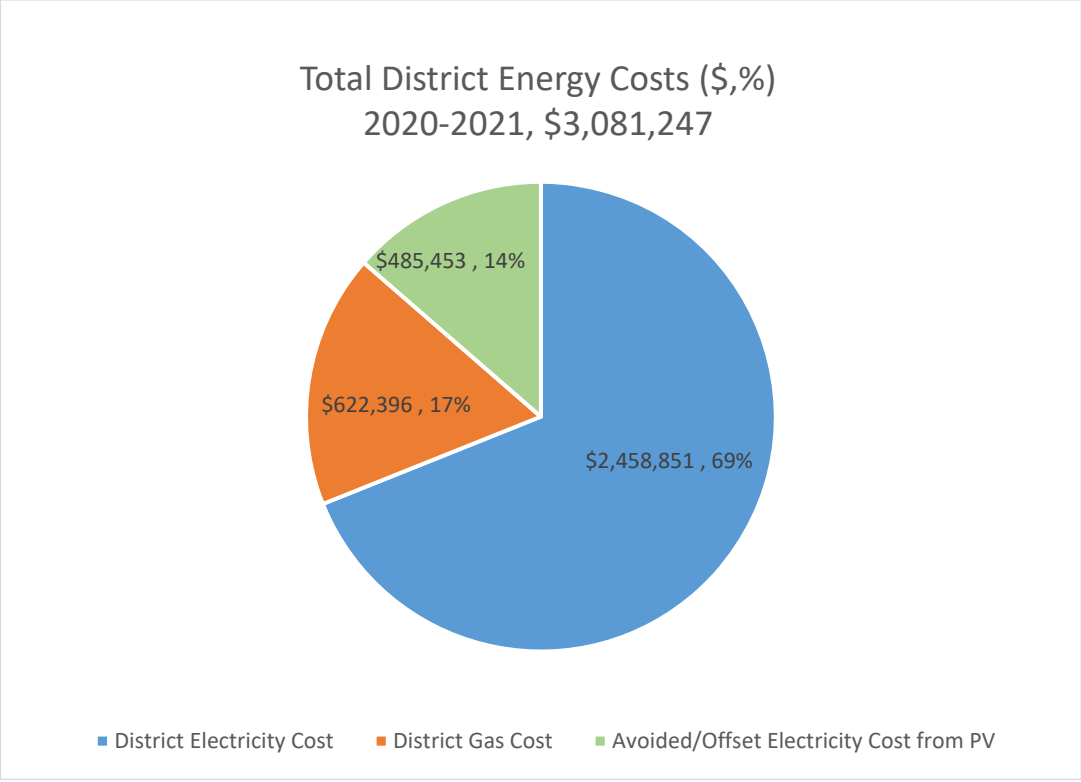


The chart below illustrates the story of where our GHG emissions are coming from and how much we are able to avoid them from our onsite solar PV. Having onsite PV systems is one of the most common ways in which to significantly reduce GHG emissions and meet our 4CD goals.



The chart below shows the 2020-221 energy consumption costs, which include BRW for an entire year. Due to the pandemic, all campuses had a reduction in usage and cost, due to buidling HVAC and lighting systems being shut off or reduced hours of operation during largely remote learning. It should be noted that the PV systems installed in 2008-09 are resulting in roughly $500,000.00 in annual avoided electricity costs. We project the annual energy consumption costs may be roughly $3.5M in a normal operational year with BRW on line for a full year and more traditional in-person classes and operations increasing. As a comparison, the total energy costs in 2013 were $2,889,312, for roughly 83% of the energy we consumed this fiscal year. This means our energy rates (gas and electricity) have risen 28% between 2013 and 2021.

Shifting our campuses to be all electic, while installing additional PV and battery storage at each campus would result in even more avoided annual electricity costs and obviously reduce a recurring expense item for our colleges. More importantly, this would reduce our overall GHG emissions and help us make important contributions toward climate change.



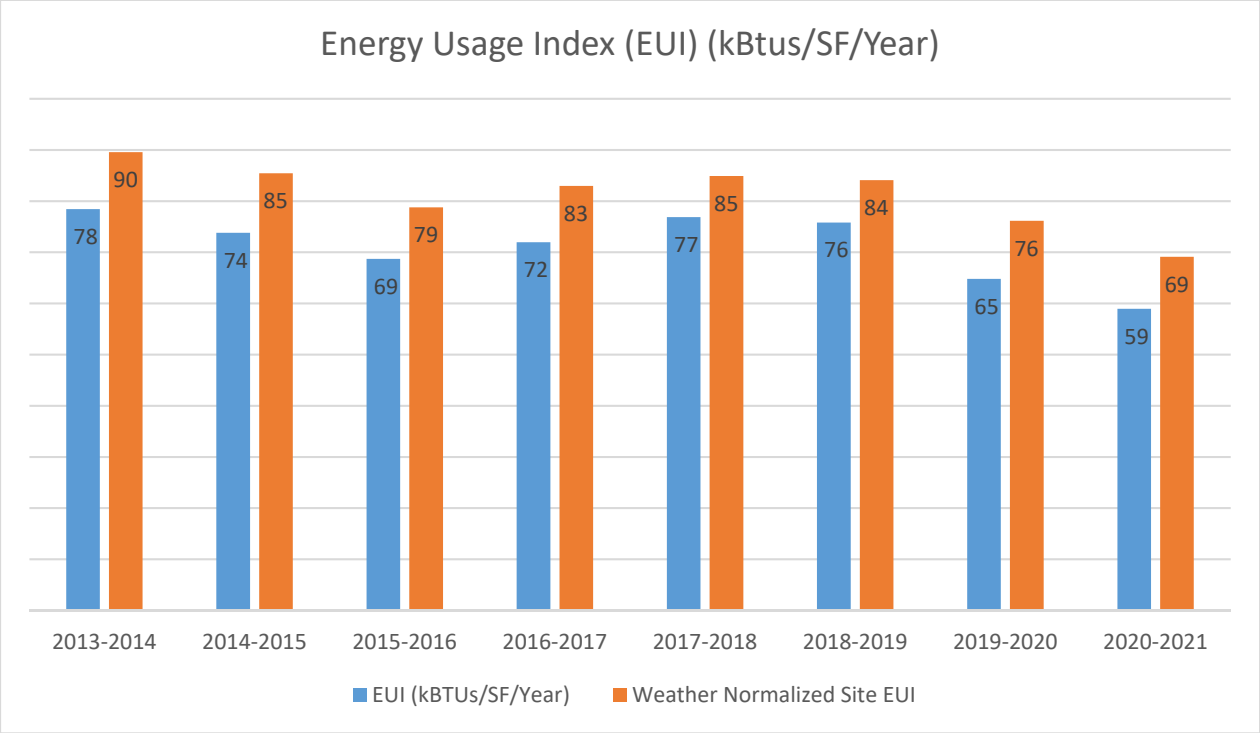
The onsite generation only supplies a portion of 4CD's overall electricity needs. In a good year, that amounts to roughly 25% of electricity usage, or 11% of the overall combined energy usage in terms of BTUs. Again, to meet various state mandates of

ZNE, carbon reduction or neutrality, and to reduce our annual utility budgets, we will need to add extra PV and battery storage and switches to all electric campuses. Depending on how this is integrated into our campuses, it could also increase our resiliency during power outages.

Our existing onsite solar energy systems were installed between 2008 and 2009 in two phases. The system is nearly 14 years old. More frequent and higher maintenance costs will likely be undertaken in order to generate electricity at an optimum rate. For the past three years, inverters at each of the campuses have had component failures, resulting in the PV generation systems shutting down for two to three months, awaiting parts. When a PV system is shut down, it results in excess purchased power, and thus an increase in the overall utility costs as well as an increase in our GHG contributions. The inverters on these systems are approaching the end of their useful life as well, and will need to be replaced soon.

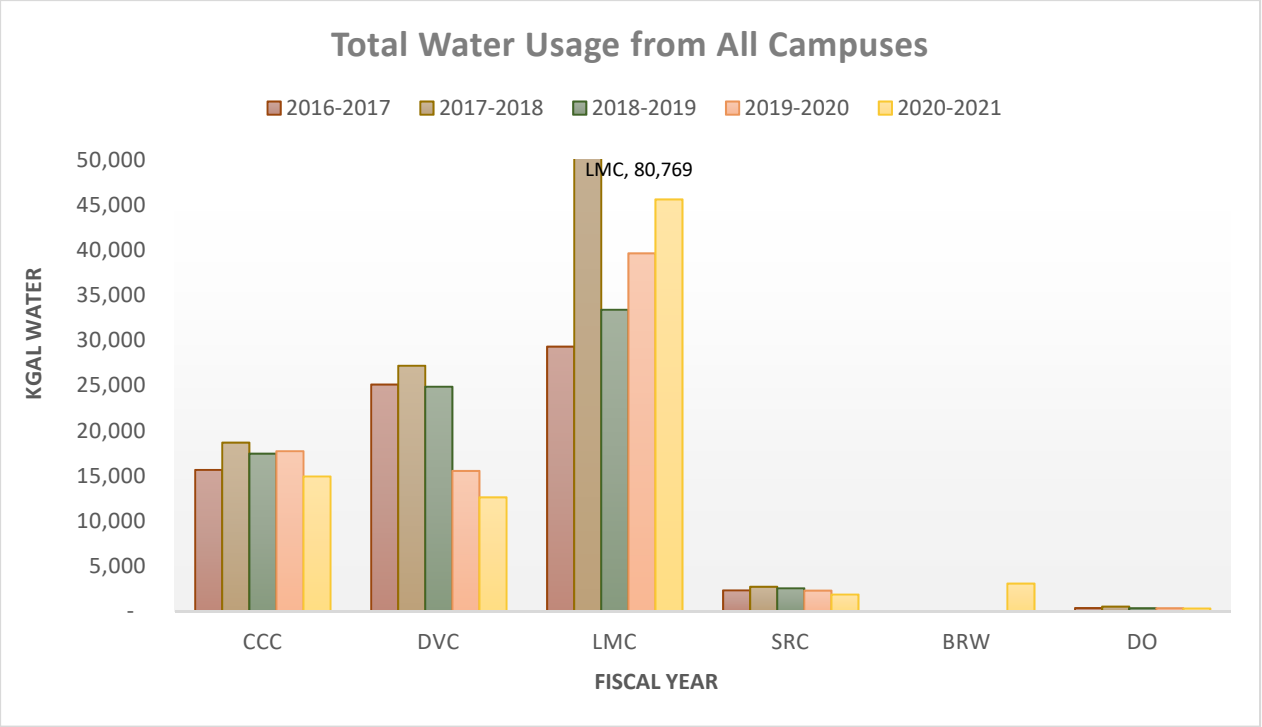
Finally, energy usage is a function of the area of the buildings that are operating on campus. As the conditioned area increases, the usage typically increases. The chart on the following page normalizes the energy usage to the gross area of the buildings owned and operated by 4CD and also shows a weather normalized metric for comparison. The floor area of our buildings has increased by nearly 102,000 square feet in the past year and 171,000 square feet since 2013. Using an EUI helps us look at our energy usage per square foot, and helps level the playing field. All new bond buildings are projected to have much lower EUIs, in order to achieve current energy efficiency codes, and future mandates of existing buildings. So, as we replace buildings or modernize them, we should also see our EUI dropping.

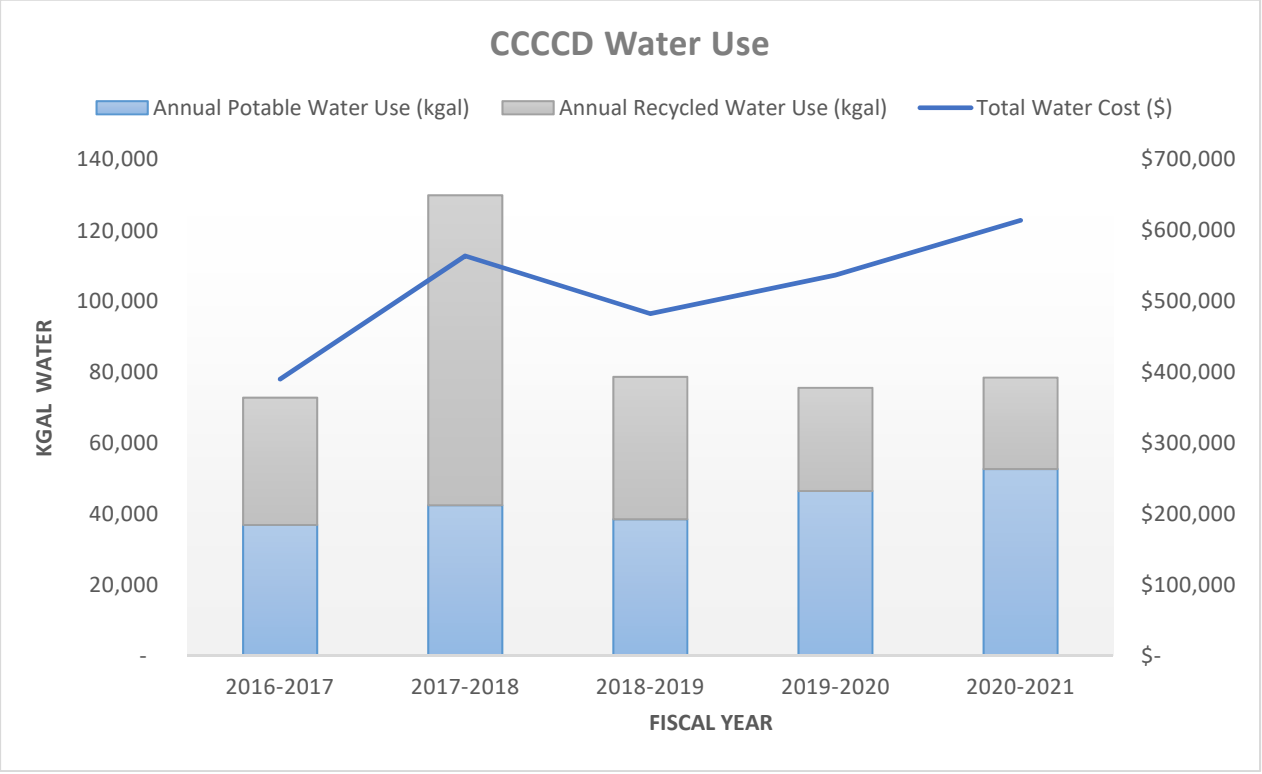
EUI is a common performance factor that can be compared against benchmarks in the same climate and in the same type of usage (college/university, office buildings, and so on. Currently, 4CD only has EUIs for the entire campus, as there is only one meter at each campus. Individual building meters would allow 4CD to use benchmarks to target high energy using buildings. EUIs can also be used to score a new building design against those same benchmarks. Requiring newly designed buildings to target lower EUIs is how ZNE buildings are designed and built. It is important to first reduce the EUI so that remaining energy can be offset by installing renewable energy systems. EUI is measured in thousands of BTUs per square foot per year (kBtus/SF/Year). The drop in the EUI during the 2019-20 and 2020-2021 fiscal year is most likely related to the pandemic's impact and our buildings and grounds' staff shutting off the HVAC systems in unoccupied buildings during remote work/teaching/learning. As noted above, it is not expected this trend will continue. But with newer buildings coming online, we do expect the EUI to fall compared to a normal year, as the stock is being replaced with buildings that are designed to operate with lower EUIs.



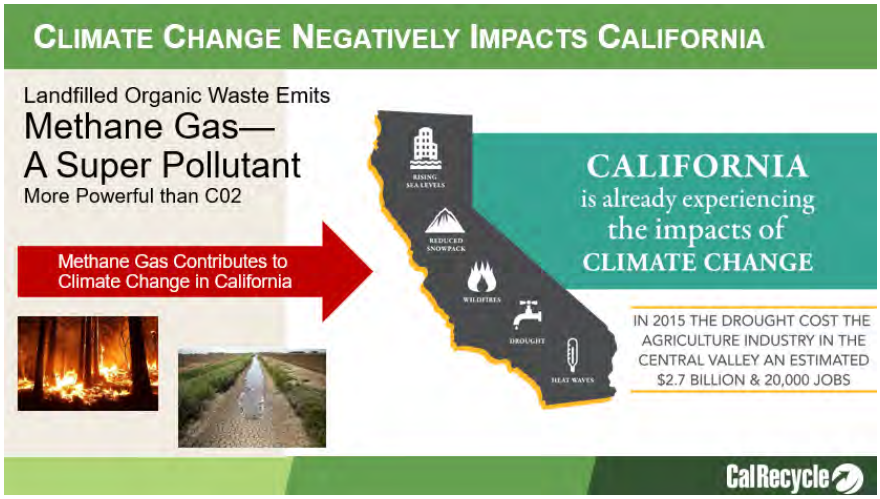
This energy usage translates into a large cost to 4CD, approximately $3.5M in operating expenses for a typical year, once in-person learning/operations resume. Reducing usage and moving toward ZNE buildings could produce large operational savings, also requiring a significant investment and careful planning.

The historical water usage has largely declined over the past several years due to mandates brought on by the California droughts. In most years, the split between potable water and recycled water is roughly 50%. Yet, in the past few years, the recycled water at LMC and BRW has been too dirty and has clogged up irrigation devices, requiring a transition to potable water for irrigation. Unfortunately, LMC uses the largest amount of water in 4CD, so shifting irrigation to potable water has a large impact on our overall potable water usage. Under normal circumstances, nearly all colleges use recycled water or well water for irrigation. Shifting as much as possible back to recycled water and reducing our potable water usage is key to helping do our part in these tragic drought conditions that we have experienced over the past few years. Our water costs have increased over time, from $415,000 in 2013 up to $615,000 this year, while our usage dropped by 15%. This translates to an overall increase in water costs by 71%.


Total Water Usage from All Campuses
2016-2017
2017-2018
2018-2019
2019-2020
2020-2021
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
KGAL WATER
LMC, 80,769
CCC
DVC
LMC
SRC
BRW
DO
FISCAL YEAR


CCCCD Water Use
Annual Potable Water Use (kgal)
Annual Recycled Water Use (kgal)
Total Water Cost ($)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$-
KGAL WATER
2016-2017
2017-2018
2018-2019
2019-2020
2020-2021
FISCAL YEAR

Waste reports have not been developed for the past several years at each of the campuses, but were required in 2017-18. Each of the reports shows a diversion rate at or below 50%. This means 50% or less of 4CD's waste goes to the recycling stream or the compost stream and the remaining portion goes to landfill. Given all the mandates and Assembly and Senate Bills around reducing organic waste, food recovery and the fact that methane is considered a super pollutant, and is emitted by landfilled organic waste, we will be shifting our focus on cleaning up our waste stream, as this contributes greatly to climate change, and impacts the equity/health of our students. We are doing this by launching the Zero Waste Initiative throughout 4CD.



V. Next Steps

In addition to energy savings projects, the Sustainability Committees at CCC, DVC and LMC continue to engage faculty, staff and students in changing behaviors to conserve energy and resources. Awareness about the many ways 4CD and its colleges can all contribute to fostering a better environment is continuously encouraged.

Much like many other California community colleges, 4CD has tremendous opportunities as well as some significant challenges ahead for meeting state-mandated energy, waste/garbage and water reductions targets. 4CD is launching a sustainability initiative in order to achieve our new 4CD goals for energy, water and waste reduction. The backcasting methods discussed in the Appendix will be utilized as one of the primary collaborative tools in this exercise to help us develop a path toward those goals.

Many challenges exist in making existing and future 4CD buildings ZNE. Many more challenges exist in a transition toward carbon neutral buildings. These goals and achievements will require additional resources and careful planning for energy systems, ensuring our infrastructure is updated appropriately and our campus loads can be met with resiliency and autonomy. An Energy Master Plan will be developed to tie into the Facilities Master Plan and Educational Plans as well as to align with state mandates. A resolution will be brought to the GB for adoption. In order to achieve and launch a Sustainability Initiative that is adaptable and can be

implemented by 2025, much work and collaboration, as well as a funding strategy will be necessary.

VI. Appendices

The Background, Policies and CCC BOG sections below provided in previous reports provide the necessary information that make past mandates easier to understand. Assembly Bills, Senate Bills, Executive Orders as well as internal 4CD resolutions and Strategic Plans will guide us toward reducing our contribution toward the climate crisis, resulting in social injustices.

APPENDIX A

BACKGROUND: MANDATES AND CODES

A. Background: Mandates and Codes

In December 2010, the GB approved Board Policy (BP) 6004, Environmental Stewardship and Sustainability. BP 6004 supports resource and environmental conservation. 4CD is committed to maintaining a policy of environmental stewardship and sustainability that supports and reinforces the use of resources to meet the needs of the present without compromising the ability of future generations to meet their needs.

BP 6004 delegates to the Chancellor or designee the authority to exercise environmental stewardship; to develop educational opportunities; and to promote environmentally responsible business processes. The intent of BP 6004 is to foster community dialog that will enhance regional awareness; advocate for environmental justice; promote responsible transportation; and economically manage the use of buildings, lands, grounds, and natural resources to be more sustainable.

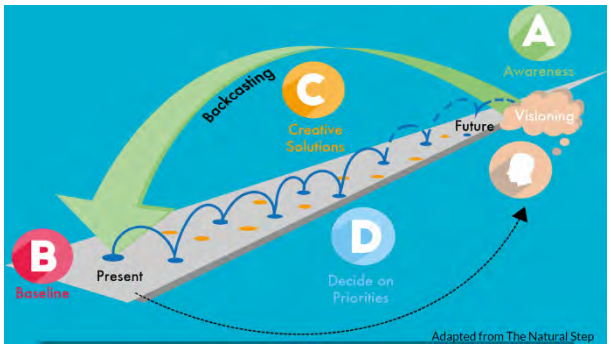
In BP 6004, 4CD has chosen to establish environmental and organizational practices that are conducive to student learning and the health, well-being, and effectiveness of all people within the community at large, and to maintain an atmosphere where students, faculty, and staff can develop the knowledge, skills, and values of environmental protection.

In June 2019 the GB approved the *Contra Costa Community College District Strategic Plan 2020 – 2025*. Strategy 5, Objective 6 of the *Strategic Plan* has a specific objective that sets a goal to "develop practices and procedures that promote sustainability in all areas of the District, including but not limited to, instruction, operations, construction, facilities, land use, energy, water conservation, and environmental integrity." To measure progress, the *Strategic Plan* emphasizes the adoption of practices and procedures that promote sustainability in all areas of 4CD.

Another key section of the *Strategic Plan 2020 – 2025* is Strategy 2, Objective 1-3 that sets a goal to "Decrease Equity Gaps for All Students." Closing equity gaps requires not only continued conversations, strategy and ultimately calls to action to improve upon our educational systems, but also addresses our internal infrastructure and operations. Both are major contributing factors to the climate crisis and therefore, equity gaps. Specifically, how we procure our energy, use our energy, procure our materials, generate and dispose of waste, landscape our property, irrigate our landscape, maintain our investments, travel to work or school, share our food, and so many other factors contribute to environmental justice and thus equity for all. Many studies have noted that polluted air, dirty water and soil are all associated with a multitude of diseases, and now those conditions put people more at risk with the current pandemic. Research shows that these environmental factors also fall significantly more along "fence-line" communities, defined as areas situated near facilities that produce hazardous waste. Climate change contributes toward social injustice and inequity issues.

While these environmental factors impact all people, it is important to note that it disproportionately impacts young people and future generations, and it disproportionately affects people of color and people in poverty, thereby exacerbating existing inequities and limiting opportunities. 48% of CCC students, 33% of DVC students and 48% of LMC students receive some form of financial aid, illustrating how our students are also impacted by these inequities.

The *Strategic Plan's* sustainability objectives require a shift in how 4CD currently operates. In 2017, 4CD's Sustainability Team led its first "Backcasting" Workshop with the DVC Sustainability Committee. Backcasting begins with the end goal in mind, moves backwards from the vision to the present state, and then moves step-by-step toward the vision, using sustainability principles. Moving backwards in this way forces organizations to determine intermediate goals necessary to reach the final end goal. As 4CD begins to implement solutions, it will inevitably need to prioritize, embrace ambiguity and be ready to adjust course in order to reach its goals.



"Backcasting" is central to the Framework for Strategic Sustainable Development, which is a framework that has helped hundreds of organizations around the world integrate sustainable development into their strategic planning and create long lasting transformative change. This initial workshop focused on the guiding principles behind the process of "backcasting" and setting a plan for future goal setting. Since its initial meeting, DVC is currently focused on institutionalizing sustainability. A full "backcasting" session was held at DVC in mid-November 2019 and more concentrated backcasting sessions were also performed in 2020 and 2021 for specific topics/goals. This process will be used at each campus to develop 4CD's sustainability goals and bring them through shared governance in order to develop a 4CD sustainability initiative. This initiative will require large shifts in operations, training on new technologies coming to buildings, integrating sustainability into every facet of our daily operations, including procuring sustainable materials, integrating sustainability into curriculum, and offering training on sustainable practices to employees and students.

Below are slides from the 4CD sustainability committees. This work was accomplished after setting the goals, where we decided which goals would be 4CD-led with campus involvement or campus-led. This process determined how (campus or 4CD) backcasting would be used as a tool to determine various intermediate steps and paths to achieve these goals.

Districtwide Sustainability Meeting

Contra Costa Community College District

pathways to success

CONTRA COSTA COLLEGE | DVC DIABLO VALLEY COLLEGE | LOS MEDANOS COLLEGE

4/19/2021 3:00pm - 4:30pm

Introductions & Meeting Goals

3:00-3:05 (5 minutes)

- What's your name/title campus and/or community affiliation?
- Desired goals of this meeting is to:
  - Look at 8 goals from last meeting and figure out where/how to backcast for each goal
    - Each campus
    - All together then take back to campuses and apply
    - District

Districtwide Sustainability Meeting

Contra Costa Community College District

pathways to success

CONTRA COSTA COLLEGE

DVC DIABLO VALLEY COLLEGE

LOS MEDANOS COLLEGE

4/19/2021 3:00pm - 4:30pm

Introductions & Meeting Goals

3:00-3:05 (5 minutes)

- What's your name/title campus and/or community affiliation?
- Desired goals of this meeting is to:
  - Look at 8 goals from last meeting and figure out where/how to backcast for each goal
    - Each campus
    - All together then take back to campuses and apply
    - District

CCC Sustainability Committee Updates

3:05-3:10 (5 minutes)

- Current Focus areas
- Successes and/or
- Challenges

CONTRA COSTA COLLEGE

DVC Sustainability Committee Updates

3:10-3:15 (5 minutes)

- Current Focus areas
- Successes and/or
- Challenges

DVC DIABLO VALLEY COLLEGE

LMC Sustainability Committee Updates

3:15-3:20 (5 minutes)

- Current Focus areas
- Successes and/or
- Challenges

LOS MEDANOS COLLEGE

What's Driving the Need for Districtwide Sustainability Initiative/Goals?

- Governing Board Sustainability Policy
- 4CD 2020-2025 Strategic Plan, Strategy 5, Objective 6
- Board of Governors Climate Change and Sustainability Policy
- State Mandates
  - California Building Code Updates, Title 24
  - Assembly Bills 32, Senate Bills 350, Executive Orders
- Initial backcasting sessions
- Internal Planning
- Facilities Master Plan (FMP)

As codes and mandates shift, so must our planning and implementation of those requirements, both on the capital construction side as well as for operations and infrastructure.

3:20-4:15 (55minutes)

Districtwide Sustainability Initiative/Goals

CATEGORY	GOALS BY 2025	GOALS BY 2030	COMMENTS
#1: GHG	Reduce greenhouse gas emission to 30 percent below 1990 levels.	Reduce greenhouse gas emission to 40 percent below 1990 levels.	Based on BOG 2019 Goals. Achieve carbon neutrality by 2045, is ultimate state goal. - Requires reducing our energy usage through lighting projects, HVAC projects, controls projects, etc. - Requires additional onsite renewable energy (PVs) as well as procurement of clean, green energy - Requires transition away from natural gas and/or convert to biogas

3:20-4:15 (55minutes)

Districtwide Sustainability Initiative/Goals

CATEGORY	GOALS BY 2025	GOALS BY 2030	COMMENTS
#2: Renewable Energy	Increase renewable energy consumption to 25 percent.	Increase renewable energy consumption to 50 percent.	Based on BOG 2019 goals. Complimentary to GHG category as this intiative requires reducing our energy consumption through energy efficiency upgrades.

CATEGORY	GOALS BY 2025	GOALS BY 2030	COMMENTS
#3: Green Building & Zero Net Energy	50 percent of all new buildings and major renovations will be constructed as Zero Net Energy	100 percent of all new buildings and major renovations will be constructed as Zero Net Energy. 50% of all existing building will be Zero Net Energy.	Based on BOG goals and State mandate for existing buildings.
	50 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating with focus on healthy buildings.	100 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating with focus on healthy buildings.	Based on BOG goals and currently meeting on all our major projects.
	All new building and major renovations will beat T24 by 15% and participate in PG&E Savings by Design Program or equivalent.	All new building and major renovations will beat T24 by 15% and participate in PG&E Savings by Design Program or equivalent.	Currently required and met on all our major projects.
	New buildings or major renovations shall not use onsite fossil fuel combustion for space and water heating.	New buildings or major renovations shall not use onsite fossil fuel combustion for space and water heating.	Shift to all electric buildings required to get to Zero Net Energy
	Reduce energy usage per square foot by 20% to target EUI of 60 kBTU/sq.ft./year, using 2019 as baseline.	Reduce energy usage per square foot by 40% to target EUI of 50 kBTU/sq.ft./year, using 2019 as baseline.	Requires implementing various energy efficiency measures such as interior LED lighting retrofits, HVAC equipment upgrades, HVAC controls upgrades to G36, plug load controls, continuous monitoring based and retro commissioning, tightening building operating hours and consolidating classes.

3:20-4:15 (55minutes)

Districtwide Sustainability Initiative/Goals

CATEGORY	GOALS BY 2025	GOALS BY 2030	COMMENTS
#4: Transportation	Zero-emission vehicles (ZEV) to account for 25% of our fleet vehicles. Achieve 30% reduction in single occupancy vehicle (SOV) transportation for employees and students.	Zero-emission vehicles (ZEV) to account for 50% of our fleet vehicles. Achieve 50% reduction in single occupancy vehicle (SOV) transportation for employees and students.	Used BOG goals for fleet side and in Eal November 2019 backcasting and neighboring CCCs. Improve access to campus resources by leveraging low carbon, community-building transportation options such as carpooling, bicycling, public transportation, and electric vehicles.
#5: Zero Waste	Achieve 75% diversion rate and 25% reduction in overall municipal waste	Achieve 90% diversion rate and 50% reduction in overall municipal waste	We're actually behind in meeting the State mandates (supposed to be at 75% diversion rate in 2020) so these goals align us with those requirements. This also combines AB1563 and other state waste targets with BOG goals.

3:20-4:15 (55minutes)

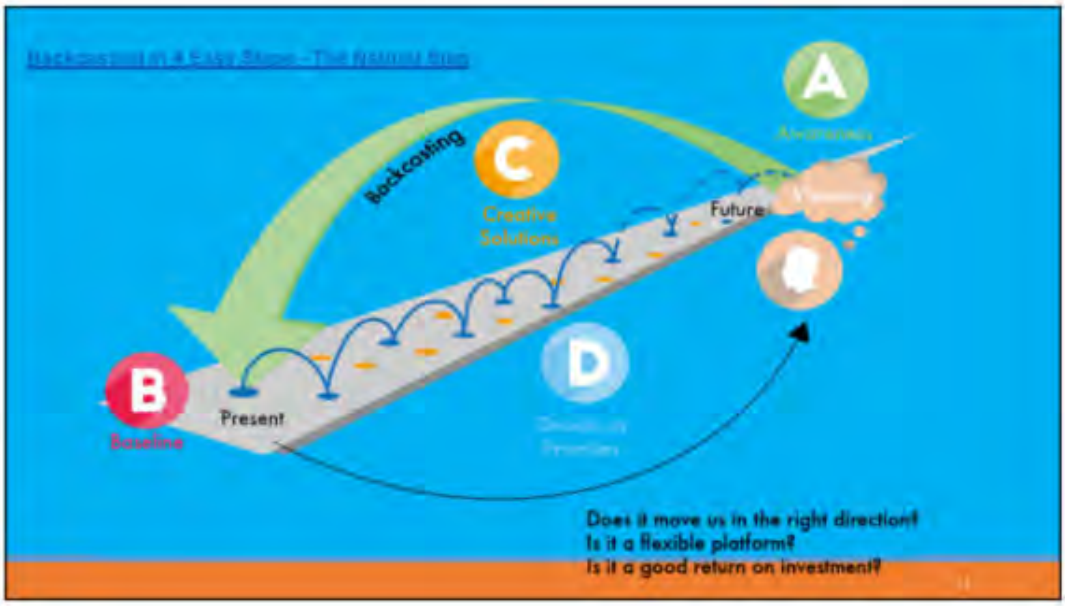
Districtwide Sustainability Initiative/Goals

CATEGORY	GOALS BY 2025	GOALS BY 2030	COMMENTS
#6: Procurement	Increase procurement of sustainable products and services by 20 percent compared to current levels.	Increase procurement of sustainable products and services by 25 percent compared to current levels.	Develop and implement an Environmentally Preferable Purchasing Policy to increase the percent of sustainable purchasing district wide. This goes hand in hand with getting us closer to zero waste by using recycled materials for products (paper, etc) and compostable materials in dining facilities as well moving toward reduction of plastics sold on campus facilities and vending machines.

3:20-4:15 (55minutes)

Districtwide Sustainability Initiative/Goals

CATEGORY	GOALS BY 2025	GOALS BY 2030	COMMENTS
#7: Water	Reduce our overall water usage by 25% compared to 2010 baseline	Reduce our overall water usage by 30% compared to 2010 baseline	The drought mandates put in place have not been released and MWELO codes drive new projects to drought tolerant, use of native plants, smart irrigation controls, leak detection that shuts water off, and drip irrigation. This goal formalizes our water reduction efforts.
#8: Curriculum	Seek to further integrate sustainability into the academic curriculum. Solicit and evaluate feedback from faculty, staff, students and community organizations to monitor the effects of sustainability and energy conservation efforts on instructional programs and the environment.		Based on 2019 BOG goals



Backcasting Example

Backcasting Terms

A — Awareness & Defining Success
- This is our long term goal

B — Current Baseline
- How much are we using now? What are we doing now?

C — Creative Solutions
- Working backwards from 2030,how do you envision our progress at each increment?
- What steps will we have taken to arrive at the incremental steps along the way?
- What innovations and solutions will we likely use?
- Factors to consider:
  - Budget
  - Timeline
  - Stakeholder involvement

D — Decide on Priorities
- What will our action plan look like?
- Does this action move us in the right direction? Can this action be built upon in future?
- Does this action bring an acceptable financial, ecological and/or social return on investment?
- This step involves step-by-step implementation and planning.
- How will you react to unplanned events?
- How do they impact the outcome of your project?
- What resources will you gain or lose from this change?
- How will you reallocate resources

The table below is the result of this meeting, assigning each goal to be District led with campus involvement, campus focused, and campus led with college local champions.

Categories	Goals by 2025	Goals by 2030	Notes	Assignment
#1: GHG	Reduce greenhouse gas emission to 30 percent below 1990 levels.	Reduce greenhouse gas emission to 40 percent below 1990 levels.	Based on BOG 2019 Goals. Achieve carbon neutrality by 2045, is ultimate state goal. - Requires reducing our energy usage through lighting projects, HVAC projects, controls projects, etc. - Requires additional onsite renewable energy (PVs) as well as procurement of clean, green energy - Requires transition away from natural gas and/or convert to biogas	District led with campus involvement.
#2: Renewable Energy	Increase renewable energy consumption to 25 percent.	Increase renewable energy consumption to 50 percent.	Based on BOG goals. Complimentary to GHG category as this intiative requires reducing our energy consumption through energy efficiency upgrades.	District led with campus involvement.
#3: Green Building & Zero Net Energy	50 percent of all new buildings and major renovations will be constructed as Zero Net Energy.	100 percent of all new buildings and major renovations will be constructed as Zero Net Energy. 50% of all existing building will be Zero Net Energy.	Based on BOG goals and State mandate for existing buildings.	District led with campus involvement.
	50 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating with focus on healthy buildings.	100 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating with focus on healthy buildings.	Based on BOG goals and currently meeting on all our major projects.	
	All new building and major renovations will beat T24 by 15% and participate in PG&E Savings by Design Program or equivalent.	All new building and major renovations will beat T24 by 15% and participate in PG&E Savings by Design Program or equivalent.	Currently required and met on all our major projects.	
	New buildings or major renovations shall not use onsite fossil fuel combustion for space and water heating.	New buildings or major renovations shall not use onsite fossil fuel combustion for space and water heating.	Shift to all electric buildings required to get to Zero Net Energy	
	Reduce energy usage per square foot by 20% to target EUI of 60 kBTU/sq.ft./year, using 2019 as baseline	Reduce energy usage per square foot by 40% to target EUI of 50 kBTU/sq.ft./year, using 2019 as baseline	Requires implementing various energy efficiency measures such as interior LED lighting retrofits, HVAC equipment upgrades, HVAC controls upgrades to G36, plug load controls, continuous monitoring based and retro commissioning, tightening building operating hours and consolidating classes.	
#4: Tranportation	Zero-emission vehicles (ZEV) shall account for 25% of our fleet vehicles. Achieve 30% reduction in single-occupancy vehicle (SOV) transportation for employees and students.	Zero-emission vehicles (ZEV) shall account for 50% of our fleet vehicles. Achieve 50% reduction in single-occupancy vehicle (SOV) transportation for employees and students.	Used BOG goals for fleet side and initial November 2019 backcasting and neighboring CCCs. Improve access to campus resources by leveraging low carbon, community-building transportation options such as carpooling, bicycling, public transportation, and electric vehicles.	Campus focused.
#5: Zero Waste	Achieve 75% diversion rate and 25% reduction in overall municipal waste	Achieve 90% diversion rate and 50% reduction in overall municipal waste	We're actually behind in meeting the State mandates (supposed to be at 75% diversion rate in 2020) so these goals align us with those requirements. This also combines AB1583 and other state waste targets with BOG goals.	Campus by campus.
#6: Procurement	Increase procurement of sustainable products and services by 20 percent compared to current levels.	Increase procurement of sustainable products and services by 25 percent compared to current levels.	Develop and implement an Environmentally Preferable Purchasing Policy to increase the percent of sustainable purchasing district wide. This goes hand in hand with getting us closer to zero waste by using recycled materials for products (paper, etc) and compostable materials in dining facilities as well moving toward reduction of plastics sold on campus facilities and vending machines.	Campus wide opportunities can be discussed that identify ways to get to this but this is a district wide policy change.
#7: Water	Reduce our overall water usage by 25% compared to 2010 baseline	Reduce our overall water usage by 30% compared to 2010 baseline	The drought mandates put in place have not been releaased and MWELO codes drive new projects to drought tolerant, use of native plants, smart irrigation controls, leak detection that shuts water off, and drip irrigation. This goal formalizes our water reduction efforts.	District led with campus involvement.
#8: Curriculum	Seek to further integrate sustainability into the academic curriculum. Will solicit and evaluate feedback from faculty, staff, and students and community organizations to monitor the effects of sustainability and energy conservation efforts on instructional programs and the environment		Based on 2019 BOG goals.	Campus led with college local champions.

APPENDIX B

POLICIES TOWARD ZERO NET ENERGY, CARBON NEUTRALITY AND ZERO WASTE

B. Policies Toward ZNE, Carbon Neutrality and Zero Waste

Several codes, standards, legislative actions and executive orders are requiring California to become ZNE, Zero Carbon or Carbon Neutral and Zero Waste. ZNE is defined as the ability to produce as much energy as is consumed over the course of a year, when accounted for at the energy generation source. In other words, on-site renewable generation produced over the course of a year will be required to offset annual usage of electricity and gas. In the last few years, and as the new building codes start to take shape, there has been a shift toward Zero Carbon, rather than ZNE. People are beginning to realize that ZNE does not necessarily get us to the ultimate goal of large greenhouse gas reductions (e.g., carbon dioxide reductions) and this is causing codes and policies to shift.

In Title 24, California's energy code, all new residential buildings will be required to be ZNE buildings in 2020 and will be required to have enough solar Photovoltaic (PV) installed to offset their annual usage. The same ZNE requirement will occur in 2030 for all new commercial buildings. For state buildings, that requirement goes into effect in 2025.

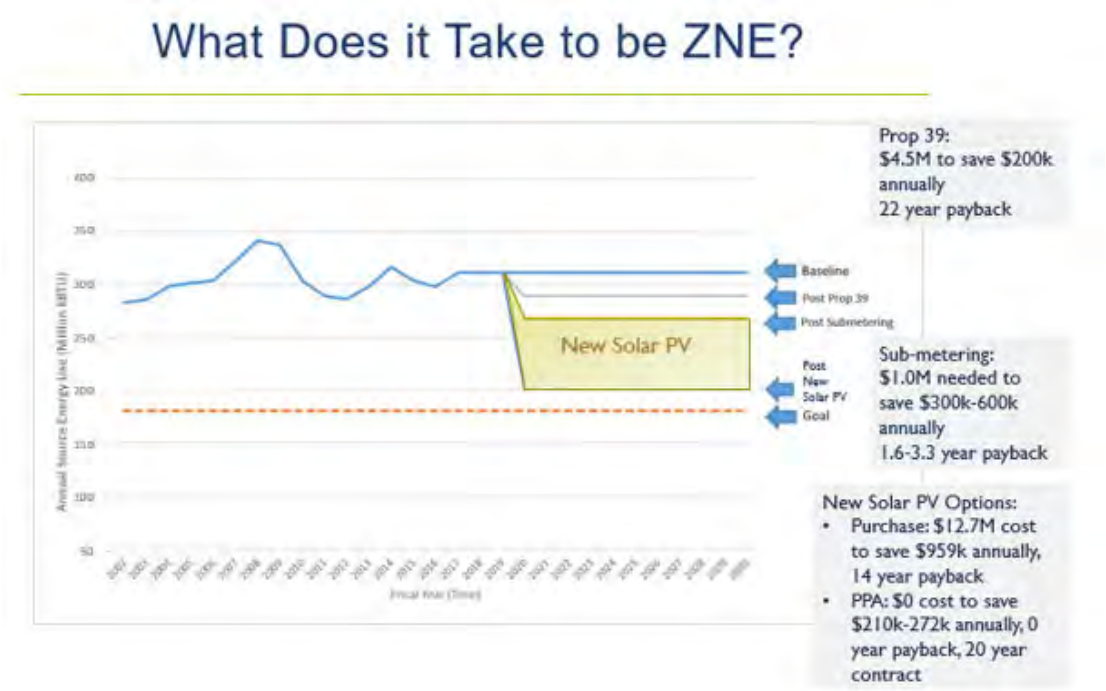
In 2012, Executive Order B-18-12 and the Green Building Action Plan established targets for achieving ZNE on new and existing state buildings as follows: "All new state buildings and major renovations beginning design after 2025 shall be constructed as ZNE facilities with an interim target for 50 percent of new facilities beginning design after 2020 to be ZNE. State agencies shall also take measures toward achieving ZNE for 50 percent of the square footage of existing state-owned building area by 2025.

There are similar mandates and executive orders in place for moving toward zero waste buildings as well, meaning everything is either recyclable or compostable, and nothing goes to landfill. Assembly Bills 341 and1826 created a statewide goal of 75% waste diversion from landfill by 2020; currently the statewide goal is 50%. Considering 4CD's 2017-18 diversion rates were below 50%, 4CD has considerable growth opportunities in this area.

Similar to many other California community colleges, 4CD is developing its goals related to energy, water and waste reduction goals, in addition to campus-based goals for improving student success, as related to energy and sustainability. 4CD also analyzed the value of its solar PV project that would add additional solar PV in order to achieve 50% ZNE by 2025. A combination of energy reduction through operations, energy reduction through retrofits and adding additional on-site renewable energy have to occur in order to come close to meeting the target 50% ZNE by 2025.

In summary, in order to reach the 50% ZNE target, 4CD needs to implement a combination of energy efficiency projects to reduce its usage as well as add

additional onsite solar PV to offset more of its usage. In order to plan for the future 50% ZNE targets on our existing buildings, the following analysis and graph were created as a first pass plan to show some of the methods that might be employed to help 4CD achieve its target. The reductions shown in the graph represent the 4CD Proposition 39 projects from the previous five years, installing sub metering at 4CD in order for it to determine how much energy each building uses, rather than only measuring the usage at the campus level, and installing additional solar PV.



The blue line shows the overall Annual Source Energy Use (in millions of kBTU). It combines gas usage and electric usage into source energy. Source energy traces the fuel requirements back to the power plant, and accounts for all the inefficiencies to get power to 4CD's buildings. The graph shows 4CD's historical source energy usage, with the 2017 usage at 317 Million kBTU. The target/goal, represented by the orange dashed line, is set at 50% of this value, which is 156 Million kBTU. In this analysis, it is assumed the usage at the campuses remains constant, but is offset by various energy conservation measures and additional on-site renewable solar PV. The Baseline, "or do nothing case" would place 4CD at continuing to use 317 Million kBTU annually, and would result in the straight blue line shown in the graph between 2017 and 2030. A straight blue line assumes the same type of weather each year, the same operating schedules, same square footage, and so on.

While PVs unfortunately were not included in the early bond budgets, and were going to require local funds as well as 4CD funds to design and install, we are actively reducing our energy usage intensity of all new bond buildings

in the design phase to lower usage and allow them to more easily become ZNE with the additional PV. The new BRW was one of the projects where significant consideration was given to a solar PV system and batteries. While alternative funding strategies were explored in detail, such as a power purchase agreement (PPA), preference was given to purchase and own a solar PV system and batteries. Because of the fast changing budgeting concerns the pandemic brought upon us, we have had to table these projects and discussions. They will, however, most certainly need to be part of a new bond, as all new projects beginning in 2025 will need to be built to be ZNE from the start and will require additional PV to get our existing buildings to the ZNE targets.

APPENDIX C

CALIFORNIA COMMUNITY COLLEGE BOARD OF GOVERNORS (BOARD OF GOVERNORS) CLIMATE CHANGE AND SUSTAINABILITY POLICY – MAY 2019

C. BOG Climate Change and Sustainability Policy – May 2019

The State Chancellor's Office BOG also adopted a new California Community College BOG Climate Change and Sustainability Policy in May 2019, which sets sustainability goals for 2030 with intermediate targets in 2025. These goals cover greenhouse gas reductions, renewable energy, transportation, ZNE, Leadership in Energy and Environmental Design (LEED), Procurement and Waste Reduction. The table below is from the adopted plan, which provides an overview of the goals. Similar to the UCs and CSUs, it covers a diverse range of sustainability topics, but has less aggressive goals in comparison.

Table 1. California Community Colleges Goals for Addressing Climate Change and Furthering Environmental Sustainability.

Goals by 2025	Goals by 2030
1. Reduce greenhouse gas emission to 30 percent below 1990 levels.	Reduce greenhouse gas emission to 40 percent below 1990 levels.
2. Increase renewable energy consumption to 25 percent.	Increase renewable energy consumption to 50 percent.
3. 25 percent of fleet vehicles are zero-emission vehicles.	50 percent of fleet vehicles are zero-emission vehicles.
4. 50 percent of all new buildings and major renovations will be constructed as Zero Net Energy.	100 percent of all new buildings and major renovations will be constructed as Zero Net Energy.
5. 50 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating.	100 percent of all new buildings and major renovations will achieve at least a Leadership in Energy and Environmental Design (LEED) "Silver" or equivalent rating.
6. Increase procurement of sustainable products and services by 20 percent compared to current levels.	Increase procurement of sustainable products and services by 25 percent compared to current levels.
7. Reduce municipal solid waste by 25 percent compared to current levels.	Reduce municipal solid waste by 50 percent compared to current levels.

"*In a continued effort to align with California's Climate Change Strategy Pillars, the Board of Governors developed a resolution to align with the vision and goals of the California Climate Change Scoping Plan,* ***and requests that each district in the California Community Colleges also adopt a local resolution****. District resolutions may also include commitments to implement the Climate Change and Sustainability Policy goals and guidance, offer environmental sciences degrees and certificates with an emphasis on climate change, and other significant local climate change strategies and environmental sustainability measures*."

Adopting a local resolution or a similar policy will help 4CD institutionalize sustainability, and align it with other districts, such as San Mateo, San Bernardino, Santa Rosa and the UCs and CSUs.

APPENDIX D

GLOSSARY OF TERMS

APPENDIX D

D. Glossary

BAAQMD

The Bay Area Air Quality Management District (BAAQMD) is a public agency that regulates the stationary sources of air pollution in the nine counties of California's San Francisco Bay Area: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma.

Backcasting

"Backcasting" is central to the Framework for Strategic Sustainable Development, which is a framework that has helped hundreds of different organizations around the world integrate sustainable development into their strategic planning and create long lasting transformative change. Backcasting begins with the end goal in mind, moves backwards from the vision to the present state, and then moves step by step toward the vision, using sustainability principles.

Carbon dioxide (CO2)

Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and also as a result of certain chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Carbon dioxide emissions are the primary driver of global climate change. It's widely recognized that to avoid the worst impacts of climate change, the world needs to urgently reduce emissions.

Carbon Neutral

Carbon Neutral is an emerging definition that relates to measuring, reducing and offsetting carbon energy used by either a building or an organization as a whole.

CCTA

The Contra Costa Transportation Authority (CCTA) works to plan, fund, and implement innovative transit programs that strengthen our diverse communities and improve the lives of residents

Compost

Compost is organic matter that has been decomposed in a process called composting. This process recycles various organic materials otherwise regarded as waste products and produces a soil conditioner. Compost is rich in nutrients.

Energy Usage Index (EUI)

Energy Usage Index (EUI) is a common performance factor that can be compared against benchmarks in the same climate and in the same type of usage (college/ university, office buildings, and so on). EUI is expressed as energy per square foot per year. It's calculated by dividing the total energy consumed by the building in one year (measured in kBtu or GJ) by the total gross floor area of the building.

Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

EV Charge Program

Pacific Gas and Electric Company (PG&E) launched the EV Charge Network program to install 7,500 EV chargers at multi-unit dwellings and workplaces throughout its

service territory, including sties in disadvantage communities. This program provides an opportunity to contribute to California's clean energy goals while also investing in your property.

GHG

Any of various gaseous compounds (such as carbon dioxide or methane) that absorb infrared radiation, trap heat in the atmosphere, and contribute to the greenhouse effect. In this report we're using it as a synonym for CO2 emissions.

LEED

LEED (Leadership in Energy and Environmental Design) is the most widely used green building rating system in the world. Available for virtually all building types, LEED provides a framework for healthy, highly efficient, and cost-saving green buildings.

Methane (CH4)

Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

PV

Solar cells, also called photovoltaic cells, convert sunlight directly into electricity. Photovoltaics (often shortened as PV) gets its name from the process of converting light (photons) to electricity (voltage), which is called the photovoltaic effect. Solar PV has specific advantages as an energy source: once installed, its operation generates no pollution and no greenhouse gas emissions, it shows simple scalability in respect of power needs and silicon has large availability in the Earth's crust.

Renewable Energy

Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, including carbon neutral sources like sunlight, wind, rain, tides, waves, and geothermal heat. The term often also encompasses biomass as well, whose carbon neutral status is under debate.

Weather Normalized

Measures the impact of weather on energy consumption. Because weather patterns vary widely day-to-day and year-to-year, weather for a given season may be colder or warmer. Energy used in keeping warm is directly dependent on how cold it is. Comparing the weather or energy consumption from one year to the next would provide only the change between those years. However, when energy consumption is "Weather Normalized" you are comparing your energy consumption over a normal weather period. Weather normalization adjusts energy usage so it can be compared to energy usage in other years over a longer period.

Zero Net Energy

The State of California defines Zero Net Energy (ZNE) for state buildings as follows: ZNE Source – Energy Efficient building that produces as much clean renewable energy as it consumes over the course of a year, when accounted for at the energy generation source. Other terms used for this include: zero-energy building (ZE), net-zero energy building (NZEB), net zero building is a building with zero net energy consumption, meaning the total amount of energy used by the building on an annual basis is equal to the amount of renewable energy created on the site