Report of the Task Force on the Climate Crisis

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Executive Summary: UC San Diego – Showing the World How to Address the Climate Crisis

The planet is in the midst of a profound climate crisis. The Intergovernmental Panel on Climate Change prescribes that we must reduce greenhouse gas emissions by 50% by 2030. In December 2019 the UC academic council endorsed a set of principles[1] for the 'climate change challenge', and UC President Janet Napolitano promptly offered her support[2]. She reiterated her earlier commitment to a climate emergency declaration, signed by all 10 chancellors in 2019[3], calling for a "*drastic societal shift to combat the growing threat*".

To address the climate crisis, an initial framework —"10 scalable solutions"[4] — was developed at UCSD. However, implementing emissions reductions is a challenge that has so far mostly eluded both governments and other institutions. The UC is no exception – while it plans to reduce its emissions with "carbon neutrality by 2025"[5], this is woefully inadequate. Problems include a lack of accountability[6], a reliance on both dubious offset mechanisms[7] and biogas (about which experts have misgivings[8]), and a very delayed reckoning with emissions from aviation and transportation (deferred to 2050)[9]. As highlighted among the 10 scalable climate solutions, what is needed is not carbon neutrality, but genuine decarbonization (i.e. actual emissions reductions). This must be done by setting specific goals and creating accountability mechanisms. The UC also needs to rapidly reorient its teaching and research and prepare for the health effects of the climate crisis.

Although UCSD is currently one of the biggest emitters (> 300,000 tonnes per year of C02)[10] within the 10-campus UC system, it is also in a unique position to lead on this issue:

- It has a dynamic Chancellor who has shown remarkable success in targeted fund-raising.
- It hosts the Scripps Institution of Oceanography where many of the original insights into modern climate science were discovered and the contributions of its scientists are internationally recognized.
- It has unrivalled cross-disciplinary resources spanning engineering, climate sciences, social sciences, natural sciences, medicine and humanities: the climate crisis calls for transdisciplinary solutions.
- It is currently building on-campus housing to construct a city-like environment that can serve as a 'living laboratory' for doing decarbonization experiments.
- It has a health system capable of mitigating the predicted health crisis that will accompany eco-anxiety, emergent infectious diseases, population migrations and increased disparities.

ETHOS: In strategizing on how to address the climate crisis, the task force took inspiration from UCSD's success in its broad-based promotion of diversity, equity and inclusion, which also required a fundamental change in campus culture. The task force suggests an analogous approach to the climate crisis be modeled on this effort, including an integration of leadership and initiatives to engage faculty and staff and students. Specifically, **UCSD must reorient its ethos to put emissions reductions into the fabric of all operations**.

ACTION: Unabated emissions will give us 1.5 degrees C heating as soon as 2030[1]. This will further exacerbate the fires[11], housing insurance woes[12], and eco-anxiety[13] that are already affecting UC members, and it will correspond to a terrifying increase in extreme weather events elsewhere. UCSD is poised to give us genuine hope by leading the UC system, which is the biggest employer in the 5th largest economy in the world. **UC San Diego must quickly commit to genuine decarbonization, establish mechanisms to hold itself accountable, prepare for health consequences and reorient its teaching and research mission.**

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[1] https://senate.universityofcalifornia.edu/_files/reports/kkb-jn-climate-change-principles.pdf
[2] https://senate.universityofcalifornia.edu/_files/reports/jn-to-bhavnani-climate-12-13-2019.pdf
[3] https://www.universityofcalifornia.edu/news/university-california-declares-climate-emergency
[4] https://www.universityofcalifornia.edu/news/10-scalable-solutions
[5] https://ucop.edu/carbon-neutrality-initiative/index.html
[6] https://www.sandiegouniontribune.com/opinion/commentary/story/2019-12-18/university-california-ucsd-climate-goals-just-hot-air
[7] https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia/
[8] https://www.nceas.ucsb.edu/files/research/projects/UC-TomKat-Replacing-Natural-Gas-Report_2018.pdf
[9] https://www.ucop.edu/sustainability/policy-areas/climate-change-and-clean-energy/index.html
[10] https://www.ucop.edu/sustainability/_files/annual-reports/2018-annual-sustainability-report
[11] https://news.berkeley.edu/topics/fire/
[12] https://www.latimes.com/business/story/2019-08-28/hiltzik-california-fire-insurance-crisis
[13] https://sustainability.ucsf.edu/1.830

Statement of Principles and Implementation Procedure

This report lists 35 concrete actions on decarbonization of electricity, transportation and other elements on campus, and a reorientation of teaching, research and health services and health preparedness. **The report urges a fundamental culture-change, akin to that initiated by the UC's promotion of Diversity, Equity and Inclusion, but here to put carbon emissions reductions into the fabric of every UCSD operation**. Implementing these changes requires accepting the principles, and approving an implementation procedure.

1. Accept the FIVE PRINCIPLES of emissions reduction
2. Make emissions reduction and the climate crisis part of the portfolio of Vice Chancellors and Deans
3. Repurpose funds and raise new funds for the 35 concrete actions below
4. Support the formation of a new Academic Senate committee, tentative title: 'Emissions Reduction and Climate Crisis, ERCC'.

35 Concrete Actions

DECARBONIZATION
Instead of "carbon neutral by 2025", genuine decarbonization plans must be developed. The effort must be accountable and span campus energy, ground transportation, buildings, aviation, food and zero-waste goals.

Cogeneration Plant (campus electricity generation and heating/cooling)
1. Undertake substantial fundraising to replace the cogeneration plant with a majority electric supply to campus (sourced from 100% renewables as soon as possible) while ensuring resiliency to shutdowns.

Transportation
2. Make facilities and transportation accountable to Scope 3 transportation goals now (not 2050).
3. Budget for replacement of the campus fleet by majority electric vehicles by 2025.
4. Measure campus-related aviation at the department level and develop plan for substantial reductions.
5. Make public transportation free at point of use for all; incentivize carpooling and bus use.
6. Fund dedicated UC San Diego staff to arrange co-investment opportunities with Metropolitan Transit System to deliver rapid buses from San Diego areas to old town trolley from 2021 onwards.
7. Promote campus awareness of San Diego 2020 Bond Measure for doubling of bus service.
8. Officially support a one-day per week telecommuting culture for knowledge workers.
9. Support location-efficient mortgages to encourage campus members to live close to the trolley/buses.

Waste
10. Organic Waste: Build or source a large-scale composting facility than can recover organic waste.
11. Prohibit single-use plastic from campus vendors and mandate emissions labeling on food.
12. Resource Green Labs and animal care facilities to reduce waste.

Other
13. Measure the emissions footprint of all items acquired through campus procurement.
14. Make vegetarian meals the default choice in campus dining rooms, and start meatless Mondays.
15. Replace most gasoline-powered leaf blowers by electric.
16. Test carbon pricing schemes at UCSD for aviation and cars.
17. Create transparency rules regarding corporate influence over energy and climate scholarship.
18. Shift campus banking away from large fossil-fuel funders such as Bank of America.
19. Invest in campus green infrastructure as a means to decarbonize.

TEACHING
UCSD has a moral and practical responsibility to educate all students on the climate crisis and climate justice.

Interdisciplinary courses
20. Increase the frequency of existing interdisciplinary courses on the climate crisis.
21. Establish new models of teaching credit, course funding and numbering for interdisciplinary courses on the climate crisis.

22. The EVC should create a special program to provide full teaching credit for faculty who co-teach climate crisis classes across disciplines.

Within-discipline courses
23. The EVC should create a special program to support faculty to develop new courses on climate change within their disciplinary perspective.

Infusing climate into existing courses
24. The EVC should provide funding for workshops to train faculty to infuse climate change content into existing courses.

General Recommendations
25. Within the proposed new holistic teaching evaluations, the Academic Senate CAP instructions and department chairs should encourage and reward faculty efforts to teach the climate crisis.
26. Put climate crisis teaching into regular department and college reviews and require climate crisis themes in stated learning outcomes.

RESEARCH

UCSD must incentivize faculty and graduate students to re-direct their research efforts.

27. Direct a subset of new FTEs to climate crisis hiring in social sciences, arts and humanities and business.
28. Steer research funds towards encouraging new-time investigators to begin climate crisis research projects.

HEALTH AND PREPAREDNESS

UCSD must dedicate resources to Health Care systems, preparedness and mental health needs.

UCSD Health Care
29. Measure the emissions of the existing UC Health Care Facilities.
30. Design the New Hillcrest Hospital to include Climate-Specialties such as Disaster Preparedness and Public Health Research.
31. Expand Telemedicine to reduce transportation emissions.
32. Prioritize the climate crisis in all aspects of medical education.
33. Create a special fund to support climate crisis teaching and organizing of clinical faculty.
34. Recognize climate crisis work in the assessments and career advancement of clinical faculty.

Mental Health of our campus community
35. Increase the number of mental health counselors in the Faculty and Staff Assistance Program, and provide eco-anxiety training for them and for student mental health counselors.

Appendix

Statement of Principles and Implementation Procedure
Undertaking the 35 concrete actions requires first accepting the principles of emissions reduction and then adopting an implementation procedure involving the administration, Deans, and the Academic Senate, in concert with the wider campus.

1. Accept the FIVE PRINCIPLES of emissions reduction
UC San Diego adopted a strategic plan[14] that aligns the efforts to be a student-centered, research-focused, service-oriented public university. In 2020, nothing is more important in exemplifying this vision than how we address the climate crisis. To foster the most immediate and substantive response to the climate crisis, we agree to practice these five basic principles of emissions reduction, as individuals, in groups, and as a campus community:

i) We acknowledge that the negative impacts of the climate crisis will fall disproportionally on the poor, the vulnerable, and the young. We accept that it is the historical responsibility for individuals, entities and institutions who have emitted the most, and who have the greatest capacity to act, to cut emissions first.

ii) We are committed to decarbonize our campus energy, buildings, food and transportation systems, including commuting and business travel, as drastically and as quickly as possible.

iii) We are committed to prepare all of our students with knowledge and training about the climate crisis and climate justice by incorporating it in our teaching.

iv) We are committed to align our research efforts to identify and implement climate solutions and to address the myriad consequences of the climate crisis on all life, including human health and our spiritual, social and economic well-being.

v) We are committed to the enforcement of policies that promote the fulfillment of these principles.

Accepting these principles of emissions reduction will guide myriad decisions: for example, using Zoom conferencing instead of taking that flight; allowing one's staff or lab members to telecommute one day per week; encouraging default vegetarian options in department catering; building climate change examples into one's standard class; starting a climate crisis research project with campus-provided seed money; and taking advantage of the campus itself (buildings, land use, transport, etc.) as a decarbonization testbed for innovating sustainable development (i.e. using the campus as a living laboratory).

2. Make emissions reduction and the climate crisis part of the portfolio of Vice Chancellors and Deans
Senior administrators and Deans must be given specific expectations about goals on emissions reduction and the climate crisis, and must be held accountable to reaching those goals in their evaluations. The VC of Resource Management must be given Decarbonization goals from those below (most of 1 through 19), the VC of Research (numbers 27 and 28) and the VC of Health Sciences (29 to 34). Others specific actions fall under different administrators. The academic senate will ensure that Teaching the climate crisis is well-supported on campus.

3. Repurpose funds and raise new funds for the 35 concrete actions below
Replacing the co-generation plant with mostly electric input is a costly item in the hundreds of millions. Replacing the campus fleet with electric vehicles and partnering with the city to provide rapid buses to the Old Town Trolley Line from points in San Diego, and undertaking other transportation goals will be in the tens of millions. Supporting teaching, research and healthy objectives will be in the millions.

4. Support the formation of a new Academic Senate committee, tentative title: 'Emissions Reduction and Climate Crisis, ERCC'.
It is anticipated that members would serve 2 year terms, to provide constancy. Their business will be to document progress towards the concrete actions below, and to liaise with divisions and chairs on Teaching, and to help formulate goals for VCs and Deans.

[14] https://plan.ucsd.edu

35 Concrete Actions

Decarbonization

When UC talks about emissions reductions it uses the language of "carbon neutrality". This depends on the use of offsets. Offsets mean that UC continues to produce emissions while paying someone else to reduce emissions in a way they would not have done had UC not paid (this is problematic, see below). "Decarbonization" instead refers to actual emissions reductions – which is what UC should do.

UCSD emits more than 300,000 tonnes per year of carbon dioxide[15]. This is categorized into Scope 1 and 2 (emissions related to campus electricity, natural gas inputs and the campus fleet), and Scope 3 (transportation to campus and campus-related aviation). Whereas the UC Office of the President (UCOP) has set "carbon neutral" goals for 2025 for Scope 1 and 2, the timeline for Scope 3 is 2050. This is so late as to mean no current goals in practice, which is all the more perplexing as we could, with modest investment and policy, easily achieve substantial near-term emissions reductions quickly in this area.

Most of UCSD's Scope 1 and 2 emissions are related to its energy generation plant (called 'cogeneration'). This currently takes in ~80% natural gas and ~20% electricity and generates campus heating/cooling via high temperature water. It also generates electricity. The emissions are ~200,000 tonnes of C02 per year. "Carbon Neutral by 2025", the official plan for UCSD, aims to reduce this to zero[16]. This will mainly be done in three ways: 1) of the electricity supplied to campus, UCOP will ensure that 100% of it is renewable by 2025, 2) of the natural gas supplied to UCSD, about 40% will be replaced by so-called "directed biogas", which means that UCSD will pay some other site in the country to use biogas instead of natural gas (biogas generates fewer emissions), 3) UCSD/UCOP will pay for carbon offsets – e.g. cooking stoves will be bought for people in Darfur/Uganda so they burn wood pellets instead of trees, and emissions are therefore reduced.

Unfortunately, the prospect that these solutions will, in fact, yield carbon neutrality at UCSD, or any of the UCs, by 2025 appears remote for the following reasons:

a) There appears to be a fundamental problem of accountability. At UCSD this is manifest in the fact that the same office that handles UCSD's climate action plan also handles the waste goals – yet UCSD is only 38% of the way to meeting its 2020 waste goals[17]. If UCSD can get away with not meeting its waste goals with little apparent accountability, this does not bode well for the much more challenging prospect of reducing emissions. Regarding the specific emissions goals, Greenhouse Gas emissions were supposed to be reduced to 1990 levels by 2020[18]. While the Task Force has not been able to ascertain exactly where we are in this regard, we can report the answer given to the UCSD Graduate Student Association Climate Action Group after their persistent enquiries to VC Matthews' office (facilities): *"We should know our final 2020 emissions levels by late 2021. At that time, if the mitigation measures have not lowered emissions enough to meet the 2020 goal, VC Matthews will discuss with campus leadership the option of buying high quality offsets to make up the difference. In the meantime, there is discussion among UC campuses and UCOP to remove the 2020 goal as it was set as an interim target en route to 2025"* [19] [20].

b) The reliance on directed biogas is problematic because it is unclear if there is enough to be bought for the UCs over this period, and also biogas is subject to methane leaks just like natural gas[21] - as it uses the same piping. Methane is ~80 times more potent a Greenhouse Gas compared to Carbon Dioxide[22].

c) There is much well-motivated skepticism about carbon offsets[23] [24] [25]. Even when carbon offsets are carefully sourced, as they are by the UCOP, to be 'additional' (i.e. that the emissions reductions would not have occurred

[15] See page 58 of https://www.ucop.edu/sustainability/_files/annual-reports/2018-annual-sustainability-report
[16] https://sustain.ucsd.edu/_files/focus/UCSD-Climate-Action-Plan-2019-final.pdf
[17] https://www.sandiegouniontribune.com/opinion/commentary/story/2019-12-18/university-california-ucsd-climate-goals-just-hot-air
[18] See page 16 of https://sustain.ucsd.edu/_files/focus/UCSD-Climate-Action-Plan-2019-final.pdf
[19] We are grateful to the UCSD Graduate Student Association Climate Action Group for sharing information: https://tinyurl.com/t38ztwn
[20] Given that making 1 tonne of concrete emits ~1 tonne of C02 one might speculate that the massive construction on campus over the last two years must have bloated emissions much more than anticipated. https://tinyurl.com/v6gmufm
[21] https://www.nceas.ucsb.edu/files/research/projects/UC-TomKat-Replacing-Natural-Gas-Report_2018.pdf
[22] https://en.wikipedia.org/wiki/Atmospheric_methane
[23] https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia/
[24] https://www.technologyreview.com/s/614216/whoops-californias-carbon-offsets-program-could-extend-the-life-of-coal-mines/
[25] https://www.technologyreview.com/s/613326/californias-cap-and-trade-program-may-vastly-overestimate-emissions-cuts/

had we not paid for the project), there is much uncertainty about their effectiveness[26]. For example, war could break out in Darfur in which case the cookstoves project we are relying on would be affected; or huge fires could erase forest preservation projects in the Amazon. As things stand, for the entire UC system, there are 12 pilot projects that have been vetted for offsets[27], and only two of these appear to have any promise for scaling up to tens or hundreds of thousands of tonnes of C02 equivalent. Yet, the combined emissions of all the campuses, after the directed biogas solution, are in excess of 500,000 tonnes per year of C02. There are many other problems with offsets. For example, even when it seems they are additional now (i.e. the emissions reductions would not have occurred without UCSD making the payments) that additionality could vanish as the UN and large countries start taking climate action and making payments to such projects. There is also an important moral argument to be made that we can and should reduce emissions at their source rather than relying on third party carbon offsets – we need to keep fossil fuels in the ground, not burn them and hope we can make good in some other way. If UC is to be a world leader, this is a poor precedent.

We conclude that "carbon neutrality by 2025" is not an accountable, realistic or moral solution for UCSD.

Apart from the cogeneration plant, a major source of UCSD's emissions is campus aviation and transportation[28]. Because these Scope 3 emissions have been given a 2050 time frame, there does not appear to be any accountability to properly resource VC Matthews's office to make serious changes. Having said that, we acknowledge that UCSD has one of the largest electric vehicle infrastructures of any campus[29], that it has facilitated staff/faculty leasing of Electric Vehicles[30], and that it also has a cutting-edge microgrid, and some installed solar and battery storage. To build on this foundation, and propel UCSD forward to genuine decarbonization, we propose the following concrete solutions.

Cogeneration Plant

1. Undertake substantial fundraising to replace the cogeneration plant with a mostly electric supply to campus (sourced from 100% renewables as soon as possible), while ensuring resiliency to shutdowns. Instead of using predominantly natural gas (even if 'displaced' elsewhere by biogas), we could run our heating/cooling and local electricity needs from majority electricity input[31]. This requires a new plant, which will be several hundred million dollars. Stanford recently did the same, at a cost of 485 million, most of which will be returned in savings within 35 years[32]. We do not have the expertise to estimate the costs for UCSD, but we note that if this seems like a lot of money, a multi-billion dollar seismic retrofit is slated for UC via current bond measure, that UCSD has raised 2 billion from fundraising for other purposes, and that a global redo of energy systems *has* to happen to meet the "rapid, far-reaching and unprecedented changes in all aspects of society" called for by the IPCC, backed by all governments[33].

An important issue when considering powering UCSD with mostly electricity (instead of mostly natural gas) is to build in campus resiliency in the face of power shutdowns. Such shutdowns will become more likely with the fires exacerbated by climate change. The campus will need backup systems and to use the microgrid to maintain electricity to hospitals, data-servers and critical research infrastructure.

Transportation

2. Make facilities and transportation accountable to Scope 3 transportation goals now (not 2050). Efforts must be made now to reduce emissions from ground transportation and campus-related aviation. Administrators at UCSD must be charged with specific goals for these emissions reductions, and they must be resourced to achieve these goals, and be evaluated accordingly. The provision of the light rail trolley to UCSD in 2021 is a propitious movement for UCSD to better 'plug' the campus into public transportation.

3. Budget for replacement of campus fleet by majority electric vehicles by 2025. It is part of UCSD's climate action plan to replace the fleet; however it has not been possible to ascertain progress towards this goal beyond the statement

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[26] https://law.stanford.edu/publications/managing-uncertainty-in-carbon-offsets-insights-from-californias-standardized-approach/
[27] https://tinyurl.com/wssgx24
[28] https://sustain.ucsd.edu/_files/focus/UCSD-Climate-Action-Plan-2019-final.pdf
[29] http://rmp.ucsd.edu/strategic-energy/ev/rdd.html
[30] http://rmp.ucsd.edu/strategic-energy/ev/offers.html
[31] UCOP has said it will source 100% of the electricity input to campuses from renewable electricity by 2025. Presumably if the electricity input to a campus such as UCSD was radically increased by 2025, the majority of this could also be sourced from renewables?
[32] http://eprijournal.com/electric-university/
[33] https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

given to the UCSD Graduate Student Association that: *"over 60% of the fleet is already hybrid, all-electric, compressed natural gas, or renewable biodiesel"*[34]. We note that hybrid cars are an improvement but not adequate towards decarbonization, and that natural gas and biodiesel still entail substantial emissions.

4. Measure campus-related aviation at the department level and develop a plan for substantial reductions. Regarding measurement, most or all business-related aviation (faculty, graduate students, postdocs, visiting undergraduates for open houses) is logged through MyTravel. It would be easy for Information Technology experts to build code to extract destinations and compute per-passenger emissions. This could be logged per department and communicated regularly within-department and to the wider institution for the purpose of creating concrete emissions goals.

A plan must be developed for reducing campus aviation. This could include a) providing better on-campus virtual conferencing capabilities[35], b) changing department cultures to encourage virtual seminar 'visits' and virtual open-house visits, c) adjusting expectations for study-abroad, including building in an awareness of climate justice[36] d) signing up UCSD to the 'flyingless' movement[37].

5. Make public transportation free at point of use for UCSD faculty, staff and students; incentivize carpooling and bus use. a) UCSD should make Metropolitan Transport System (MTS) passes part of faculty/staff benefit packages. This will be cost-effective because UCSD can obtain MTS passes at about 10% of the cost (~$60/year) that faculty/staff would have to pay if they purchased these passes directly from MTS (~$600/year).

b) UCSD should encourage faculty and staff to support a new parking-permit plan, which is a pay-per-use instead of a per month program. Under this plan, outlined together with the UCSD director Josh Kavanagh, people who commute to campus in a single occupant vehicle < 5 days per week would pay a reduced amount for parking. This system would be carefully structured to provide a fiscal reward to people who choose to not drive on some days by carpooling, taking public transportation, or telecommuting, while also not penalizing faculty/staff who need to drive to work (for example to facilitate child pick up after school) or faculty/staff (such as physicians) who have to park at UCSD on weekends as well as workdays. Parking would be billed on a daily basis based on drive-by license-plate monitoring within UCSD lots. Execution of this pay-per-use parking plan in conjunction with free MTS bus passes would provide a fiscal incentive for people to carpool or take public transportation on days when it is possible for them without penalizing people for whom it is not feasible.

6. Fund dedicated UC San Diego staff to arrange co-investment opportunities with Metropolitan Transit System to deliver rapid buses from San Diego areas to old town trolley from 2021 onwards. UCSD can use its knowledge of where faculty/staff, students and postdocs live to establish express routes from areas with high densities of UCSD commuters to the nearest light rail station. Putting in express transport, for example, from Ocean Beach to Old Town would take hundreds of cars off the road per day from that location alone.

7. Promote campus awareness of San Diego 2020 Bond Measure for doubling of bus service. An ambitious plan[38] is been developed by SANDAG and MTS for a huge expansion of public transportation, to be put to the voters in November 2020, but few San Diego and UC members know about it. UCSD must promote knowledge and provide support for this measure among the campus community.

8. Officially support a one-day per week telecommuting culture for knowledge workers. Telecommuting has a huge decarbonization benefit due to a reduction in transportation.

9. Support location-efficient mortgages to encourage campus members to live close to the trolley/buses. Location efficient mortgages[39] provide a larger loan when the cost of transportation is expected to be lower—for example for a public transportation-based commute. This could be modeled after the existing program at the University of

[34] https://tinyurl.com/t38ztwn
[35] http://www.bristol.ac.uk/media-library/sites/transportplan/documents/UoB_Hosting%20a%20VAC_WEB.pdf
[36] Many UCSD students travel to countries such as Tanzania for study-abroad. The per student emissions for a return flight are around 5.2 tonnes of C02, while the mean per capital emissions for one year for a Tanzanian are 0.2 tonnes of C02: https://www.offsetters.ca/education/calculators/flight-emissions-calculator and https://data.worldbank.org/indicator/EN.ATM.CO2E.PC?locations=TZ
[37] https://noflyclimatesci.org/institutions
[38] https://elevatesd2020.com
[39] https://www.cnt.org/projects/rethinking-mortgages

Washington[40]. Setting this up would require partnering with a specific lender(s) and advertising the availability of this option on campus.

Waste

In 2004, UCOP mandated that each UC campus divert 90% of its waste to recycling and compost by 2020. Some UCs are on track, such as UC Irvine, which has achieved 83% diversion. But UCSD falls short at only 38%[41].

10. Organic Waste: Build or source a large-scale composting facility than can recover organic waste. Large amounts of organic waste are generated by our huge campus every day. According to VC Matthews' office's response to the UCSD Graduate Student Association[42]: *"Until 2021 when EDCO Disposal completes its new anaerobic digester in Escondido, the San Diego region has no post-consumer composting or anaerobic digestion available. (The City of San Diego's Miramar Greenery only accepts pre-consumer food and green waste, and no other compostable items are allowed.) As a result, UC San Diego has not been able to transition its restaurants, markets, food vendors and tenants, food trucks, and catering operations to compostable foodservice ware. This will happen when we are able to send post-consumer food and other organic waste to EDCO's new facility, hopefully in 2021."* UCSD should pay careful attention to this – if this is not an option soon, a dedicated campus facility must be built.

11. Prohibit single-use plastic from campus vendors and mandate emissions labeling on food.

a) According to VC Matthews' office's response to the UCSD Graduate Student Association[43]: "*While Real Estate and other departments can add sustainability measures to new contracts (and are already doing so), existing contracts with vendors, suppliers and tenants are more difficult to alter until they come up for renewal. That being said, many vendors and tenants are already moving to more sustainable practices as their customers ask for them. For example, University Center works with its current food vendors in Price Center to transition them off single-use or other foam food service-ware and plastic bags. Transitioning restaurants, suppliers, and others will take time."* UCSD should pay careful attention – vendor contracts should be altered as soon as possible; single use plastics must go.

b) UCSD must also adopt carbon labeling of food items in our cafeterias[44]. This promotes climate awareness and gives consumers a fast, convenient way to make food purchase decisions based on impact.

12. Resource Green Labs and animal care facilities to reduce waste. UCSD's Green Labs program[45] aims to: *"engage laboratory faculty, staff and students in performing assessments, reducing waste and improving recycling, replacing inefficient equipment and transitioning to best practices."* It is unclear whether this program is properly resourced. For example, a communique on Dec 21st 2019 from a PhD researcher in Pacific Hall noted: *"This week, I was informed by the PacHall staff that they are switching all the cages in our [research] room to disposable plastic containers .... The reason provided was that the transfer of the cages to central washing would require the cages to be autoclaved before being moved, and this would be too much work for the animal facility staff. Instead, cages will be incinerated after use - this means from our room alone with cage changes twice a week and at least 2-3 experiments being run a week, we would be burning up to 250+ cages a week. This level of waste and environmental damage is completely unacceptable. Switching to these cages and burning them completely invalidates any of the current efforts by labs to make sure the climate crisis does not accelerate any faster than its current frantic pace."*

Other

13. Measure the emissions footprint of all items acquired through campus procurement. We should be able to guide our purchasing decisions with information on carbon impact. According to VC Matthews' office's response to the UCSD Graduate Student Association[46]: "*The Sustainability office is also working with Integrated Procure-to-Pay Solutions to set up sustainability meetings with some of the university's largest suppliers, including Amazon, Office Depot, Grainer, Fisher Scientific, and/or VWR to partner on transitioning to reusable or other new types of packaging. In addition, Sustainability and Facilities Management is working with Athletics to transition them to zero waste sporting events, and zero waste event guidelines now exist for departmental-sponsored events"*. UCSD should pay careful attention to this and

[40] https://en.wikipedia.org/wiki/Location_Efficient_Mortgage
[41] https://sustainability.ucsd.edu/_files/UCSanDiegoZeroWastePlan.pdf
[42] https://tinyurl.com/t38ztwn
[43] ibid
[44] https://www.sciencedirect.com/science/article/abs/pii/S0306919211001096
[45] https://sustain.ucsd.edu/involve/green-labs.html
[46] https://tinyurl.com/t38ztwn

make sure that a comprehensive emissions measurement plan is soon instantiated for procurement. UCSD purchasers can then instantiate the principles of emissions reduction when they choose between vendors.

14. Make vegetarian meals the default choice in campus dining rooms, and start meatless Mondays. Animal agriculture, especially for red meat consumption, is responsible for a large proportion of Greenhouse Gas emissions (13 to 18%)[47]. Some universities such as Goldsmiths London and the University of Portugal have gone so far as to ban red meat outright[48] [49]. UCSD can start with meatless Mondays in campus dining halls.

15. Replace most gasoline-powered leaf blowers by electric. Gasoline-powered leaf blowers are used dozens, perhaps hundreds, of times per day at UCSD. Apart from the Greenhouse Gas Emissions, the toxic pollution from these devices is appalling: the smog from using one of these for one hour is equivalent to driving a Camry from Los Angeles to Denver[50]. The Task Force has not been able to ask questions of VC Matthews office on this matter, but informal enquiries suggest that: a) a pilot project to replace these with electric blowers is underway, b) that electric blowers are as much as three times more expensive, c) that some functions – such as blowing leaves out of storm drains cannot be done with electric blowers as they are not strong enough, d) that raking leaves is very labor intensive, and e) that one major reason to blow leaves around the campus owes to liability concerns about people tripping. Difficult as it might be, UCSD must promptly address this issue and replace most of these polluting devices. We note that they have been banned in many towns in the US, including Del Mar and Encinitas[51] and the state of California is considering banning them[52].

16. Test carbon pricing schemes at UCSD for aviation and cars. Other UCs have pioneered tests of carbon pricing, see case studies here[53] and a report to the Yale University administration on the social cost of carbon here[54]. Regarding aviation, we could emulate the UCLA levy[55] on work-related flights, but increase it to a more substantial $25, and ear-mark the proceeds for new graduate student climate crisis projects or faculty teaching workshops. Regarding private car use, one possibility is to impose a carbon impact fee. This would need to have equity at its core, recognizing that campus members who come from further away may least be able to afford it and have worse options for public transportation. The monies raised could be matched by UCSD and funneled to public transportation options such as above.

17. Create transparency rules regarding corporate influence over energy and climate scholarship[56]**.**
In 2015 UC sold off investments in coal and tar sands oil and in 2019 UC's Chief Financial Officer honored the successful Fossil Fuel Divestment campaign[57] at all 10 campuses and pledged to divest both the endowment and the pension of fossil fuel investments[58]. Now it is time for UCSD to reject donations from the fossil fuel industry (which currently provides funding to various groups on campus). UCSD should also make public all previous and current funding for climate and energy research.

18. Shift campus banking away from large fossil-fuel funders such as Bank of America. UCSD Business and Financial Services confirmed (January 2020) that Bank of America is our main bank. Bank of America is number 4 in the world for financing the fossil fuel industry[59]. UCSD should shift all its banking operations away from banks that profit from fossil fuels and towards, for example, credit unions that are certified to have much less exposure. Likewise there is a Chase branch in the Price center. Chase is at number 1 in financing fossil fuel operations[60]. UCSD should promptly renegotiate Chase's contract.

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[47] https://skepticalscience.com/animal-agriculture-meat-global-warming.htm
[48] https://www.theguardian.com/environment/2019/aug/12/goldsmiths-bans-beef-from-university-cafes-to-tackle-climate-crisis
[49] https://www.newsweek.com/portugals-oldest-university-bans-beef-fight-climate-change-we-are-experiencing-climate-1461344
[50] https://ww2.arb.ca.gov/resources/fact-sheets/small-engines-california
[51] https://drive.google.com/file/d/1GR1niTtOs6dTgomyNwGawmRqPS2aBuFc/view?usp=sharing
[52] https://www.sfchronicle.com/business/article/California-s-latest-pollution-push-Banning-14951305.php#
[53] https://secondnature.org/climate-action-guidance/iv-case-studies/#resource9
[54] https://carbon.yale.edu/sites/default/files/files/Carbon-charge-report-041015.pdf
[55] https://secondnature.org/wp-content/uploads/UCLA-case-study.pdf
[56] Thanks to Edward Hall and co-authors of the "Harvard University Response to the Climate Crisis" white paper for this suggestion: https://tinyurl.com/wcure4n
[57] A majority of voting faculty at each of the 10 campuses endorsed the memorial that requested that the Regents divest the endowment of fossil fuel stocks: https://fossilfreeuc.net
[58] https://www.latimes.com/opinion/story/2019-09-16/divestment-fossil-fuel-university-of-california-climate-change
[59] Over the three year period 2016 to 2018 the financing from Bank of America to fossil fuel companies was 106 billion dollars: http://priceofoil.org/content/uploads/2019/03/Banking-on-Climate-Change-2019-final.pdf
[60] Ibid. 195 billion over that same period.

19. Invest in campus green infrastructure as a means to decarbonize. Examples of green infrastructure at UCSD includes bioswales for stormwater management, green roofs, urban agriculture, food forests, foodwaste-to-soil and energy biodigesters and composting systems. Green Infrastructure can reduce carbon emissions in various ways, for instance, energy and operational efficiencies gained by integrated organic waste management, water harvesting, flood control, green buildings/green roofs/green walls, tree canopy shading/cooling, climate-friendly regenerative agriculture/aquaculture, sequestering carbon in trees and soil, providing green spaces and trails that encourage walking and human-powered transport.

Teaching

UCSD has a moral and practical obligation to teach tens of thousands of students about the climate crisis. This will prepare them to think critically about what, for many, will be the biggest problem of their lives; to help them be part of collective action on genuine emissions reductions; and to provide them with relevant skills for a workplace that is going to be increasingly affected by climate concerns: from healthcare, to engineering, to insurance.

In our view, teaching about the climate crisis is not the same as teaching about the physical basis of climate change. While teaching the former (the climate crisis) must encompass the latter (the physical basis of climate change) it must also cover: a) psycho-socio-political topics, for example the more than 40 year history of how the fossil fuel industry has systematically distorted the science, misled the public and influenced the political system; and, for example, a sober analysis of how emissions have radically escalated under the current political-economic systems of the US and other major countries; and b) the topic of climate justice – i.e. the recognition that the people who did the least to incur our planetary predicament (the poor, the vulnerable, those in the global South, and the young) are going to incur the worst consequences[61]; and how societal solutions to the climate crisis must be just.

While many departments at UCSD have faculty who are doing outstanding teaching on climate topics, and while UCSD is especially well-positioned to lead in interdisciplinary education on the climate crisis, teaching efforts must be quickly scaled up to reach thousands of students. Here we organize our summary and recommendations into four categories:

<u>Category 1: Courses that cover climate change as an interdisciplinary topic</u>

These courses cover the basic understanding of the climate system, how it is changing, the impacts of climate change, aspects of communicating the climate crisis, the socio-political basis of the crisis and economic, social and technological solutions. The main such interdisciplinary course at present is SIO109/POLI117 (Bending the Curve: Climate Solutions). This could be taught more frequently.

20. Increase the frequency of existing interdisciplinary courses on the climate crisis. Departments and colleges should integrate these courses into existing elective and general requirements.

Further, the development of other interdisciplinary courses should be encouraged. Interdisciplinarity is one of the hallmark characteristics of our university; one that has historically differentiated us from others. To take a famous example, the work on neural networks in the 1980's that led to the founding of the world's first Cognitive Science department not only defined a new academic field, but introduced and pioneered the breakthroughs that directly led to the Deep Learning revolution in Artificial Intelligence that is dominant today. With its seminal contributions to climate science and its growing research activities across divisions, UCSD is well-placed to develop new interdisciplinary classes.

21. Establish new models of teaching credit, course funding and numbering for interdisciplinary courses on the climate crisis. This can be done via the Undergraduate Council and Educational Policy Senate committees, together with the Dean of Undergraduate Education.

22. The EVC should create a special program to provide full teaching credit for faculty who co-teach climate crisis classes across disciplines. Providing full credit for co-teaching would encourage more faculty to teach these classes, which includes content that is outside of their specific discipline, and ensure that faculty can also learn more in the process.

<u>Category 2: Courses that cover an aspect of climate change, or a perspective on climate change, from within a discipline.</u>

[61] http://www.columbia.edu/~jeh1/mailings/2018/20181206_Nutshell.pdf

For example SIO25 (Climate Change and Society) mostly focuses on the physical basis of climate change and is taught by faculty at SIO; for example MAE119 (Introduction to renewable energy: solar and wind) is taught within engineering; and PSYC185 (Psychology of the Climate Crisis) is taught in Psychology. An attempt at a full listing is here[62], and includes classes in urban studies, economics, and anthropology, to name a few. Recent courses in this area (e.g. Climate Change Studies CCS102, CCS101, SIO190) were developed with funding from the Understanding and Protecting the Planet program[63].

23. The EVC should create a special program to support faculty to develop new courses on climate change within their disciplinary perspective.

Category 3: Teaching climate change across the curriculum (infusing climate into existing classes)

Category 1 concerns interdisciplinary courses that run the full gamut of topics under the climate crisis; Category 2 concerns within-discipline teaching focused on climate change; Category 3 concerns the typical classes taught at UCSD, but in which faculty infuse climate change examples into the material. For example, a biology class, when teaching about plants, could cover bio-sequestration of carbon in topsoil; or a general sociology class could include an analysis of the climate movement. This approach takes advantage of existing courses, and ensures that students hear climate change topics from different perspectives.

24. The EVC should provide funding for workshops to train faculty to infuse climate change content into existing courses. These workshops could be facilitated through the Teaching and Learning commons, in a collaboration that would support faculty in these efforts and improve the visibility and the outcomes of this project. Adequate support (funding) should be provided to faculty to participate in these workshops and to create and implement new curricula. Course content that is produced as part of these workshops can be highlighted on the developing climate curriculum website at UCSD, and on other UC-wide websites such as through the UC-CSU NXTerra[64].

Category 4: General recommendations, and other comments

25. Within the proposed new holistic teaching evaluations, the senate CAP instructions and department chairs should encourage and reward faculty efforts to teach the climate crisis.

26. Put climate crisis teaching into regular department and college reviews and require climate crisis themes in stated learning outcomes. This can be done via Undergraduate Council.

While we favor a General Education Requirement for undergraduates on par with the current DEI requirement, after consultation with stakeholders across campus, we do acknowledge practical impediments. This approach would likely lengthen time-to-degree, and also inculcate an undesirable check-box like approach to education. Instead, we endorse the above, creative, approaches.

Another option that teachers can be made aware of is that approval could be given for some climate change classes under the Diversity, Equity and Inclusion requirement[65]. This is a potentially strong avenue to scaling up education because all undergraduates are required to take these classes. However, because the DEI committee[66] requires that these classes be fundamentally structured around the experience of, for example, African Americans, Hispanics, Native Americans and others in the United States, few faculty with expertise in climate science, or the sociology/economics/politics of climate issues, will be equipped to teach them. This is an area where, if administrative impediments to co-teaching were eliminated, significantly novel interdisciplinary course offerings that serve both societal goals could emerge.

Under Research, below, we recommend climate crisis hiring – this will naturally increase the number of classes taught, but will take many years to get in place.

[62] https://climatecurriculum.ucsd.edu/demo-home/climate-change-coursework/
[63] https://scripps.ucsd.edu/research/upp
[64] https://www.nxterra.orfaleacenter.ucsb.edu

[65] https://undergrad.ucsd.edu/programs/dei.html
[66] http://undergrad.ucsd.edu/_files/DEI-Call-Letter-FA192.pdf

Research

UCSD hosts the Scripps Institution of Oceanography where many of the original insights into modern climate science were discovered and the ongoing contributions of its scientists are internationally recognized. Likewise, there are numerous impressive research programs, and highly esteemed individual investigators, on the main campus, focused on aspects of energy, engineering, materials, economics, urban studies and planning, and global policy pertinent to the climate crisis. Yet we note that the climate crisis is fundamentally a problem of human behavior change. Oddly, between 1990 and 2018, globally, only 0.12% of all climate-related funding was spent on social science[67]. To take one example, at UCSD, in the Psychology department, as far as we can ascertain, not a single faculty member of 32 is so far doing research on the climate crisis, even though a dozen or more are studying social aspects of psychology.

The climate crisis must incorporate climate justice[68], an ethical dimension rather than an environmental or physical one. Climate justice recognizes that those who did the least to incur the problem of global heating, the young, the poor, especially those in the global south, will incur the worst consequences[69]. It also recognizes in the United States that indigenous peoples, Hispanics and African Americans are disproportionately affected. These important topics overlap with humanities departments such as ethnic studies, history and philosophy, and provide key research opportunities within them.

UCSD could encourage more research on the climate crisis, especially in these under-represented, yet critical, fields such as social science, humanities and business. On January 13th the Task Force met with Vice Chancellor of Research Sandra Brown. She agreed to strengthen funding streams towards the problem.

27. Direct a subset of new FTEs to climate crisis hiring in social sciences, arts and humanities and business.

28. Steer research funds towards encouraging new-time investigators to begin climate crisis research projects. This could include providing seed funding for projects to get pilot data; or for graduate student fellowships to allow student to branch out past their advisors.

Health and Preparedness

We start by considering the overall operations of UC San Diego Health, and then cover mental health resources for UCSD faculty, staff and students.

UC San Diego Health

First, health care provision generates a lot of emissions. The health care sector's contribution to greenhouse gas emissions ranks it 13th in the world, making it nearly equivalent to that of the UK[70]. Second, the climate crisis will have huge effects on health. Both the Lancet[71] and the New England Journal of Medicine[72] have characterized the health consequences of climate change as the "biggest global health threat" of the 21st century. Sir Richard Feachem, DSc MD, director of UCSF's Global Health Group had this to say:

"There are only four scenarios that could actually kill hundreds of millions of people. Nuclear war, meteorites, and pandemics are all merely feasible. But climate change is already underway." [73]

The health effects of climate disruption include increased injuries and premature deaths tied to extreme weather, expansion of respiratory distress related to the changing environment, growth in emergent infectious disease linked to changes in permafrost melt and food- and water-borne illness, and new threats to mental health associated with climate-anxiety. Because children, elderly and chronically ill patients from low-income communities are especially at risk, UC San Diego Health, more than other San Diego health care systems, will bear the brunt of this increased and more frequent disease.

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[67] https://www.sciencedirect.com/science/article/pii/S2214629619309119
[68] https://en.wikipedia.org/wiki/Climate_justice
[69] http://www.columbia.edu/~jeh1/mailings/2018/20181206_Nutshell.pdf

[70] https://noharm.org
[71] The *Lancet* Countdown is an international, multidisciplinary collaboration dedicated to monitoring the evolving health profile of climate change. https://doi.org/10.1016/S0140-6736(19)32596-6
[72] https://www.nejm.org/doi/full/10.1056/NEJMp1913916?query=TOC
[73] https://www.ucsf.edu/magazine/climate-crisis-health-crisis

To deal with the emissions, UC San Diego Health must accelerate its transition to a low-carbon economy. To deal with the consequences of the climate crisis, UC San Diego Health must improve community resilience, assure health equity, and improve access to care. It must also reorient its teaching mission.

UC San Diego Health can implement decarbonization in the way we (A) operate our hospitals and deliver care, (B) educate our medical students, interns and residents and (C) prepare our staff and faculty.

A. Hospitals and Health Care Delivery.

UC San Diego Health has four sites for hospitals and health care delivery: (1) the Jacobs/Thornton Hospital complex on the La Jolla Campus, (2) the Rady Children's Hospital in Kearny Mesa, (3) the current Hillcrest Hospital in downtown San Diego and (4) numerous satellite outpatient care centers throughout San Diego and Imperial counties towards the Arizona border to the East, the Mexico border to the South and Riverside county to the North. Each site offers unique opportunities for decarbonization and preparedness, and UC Health leadership.

29. Measure the emissions of the existing UC Health Care Facilities. While UC San Diego Hillcrest and La Jolla have met the "healthier food challenge"[74] the health system needs to now commit to equivalent programs for (a) leadership engagement and organization-wide decarbonization via leaner energy and decreased emissions, (b) waste abatement and increased recycling, (c) safer chemicals in its materials and (d) leveraging purchasing power of sustainable products. Health Sciences should begin by appointing an academic Climate Change Coordinator.

30. Design the New Hillcrest Hospital to include Climate-Specialties such as Disaster Preparedness and Public Health Research. A new hospital and health care complex is envisioned for Hillcrest campus that could be designed as a living laboratory for clinical care, education and research in public health. With extant research, teaching and clinical expertise in acute care (trauma, burn, emergency medicine, infectious, respiratory disease and psychiatry), Hillcrest hospital is in a unique position for expanding research and education in disaster preparedness and public health. New construction could use the best possible low-emissions, zero-waste, and toxic-free methods, and to incorporate public transportation to a maximum.

31. Expand Telemedicine to reduce transportation emissions. The delivery of health care is expensive but its true cost does not even include the emissions impact of travel. Telemedicine is an easy way to reduce emissions in healthcare provision. Telemedicine needs investment and its use by patients, staff and faculty needs to incentivized by exploiting travel UC Health remote care sites, promoting remote access to specialty care and developing compensation plans.

B. Medical Students, Interns and Resident Education.

UC San Diego Health School of Medicine, Pharmacy and Public Health have a unique opportunity to reach tomorrow's health professionals.

32. Prioritize the climate crisis in all aspects of medical education. The Deans of each school should make health climate awareness and decarbonization a priority to all teaching efforts that is at par with their school's systematic efforts to ensure equity and diversity of faculty and students. Climate awareness should also be a requirement in the recruitment of the new Dean for the School of Public Health.

C. Faculty Training and Awareness**.**

UC San Diego Health School of Medicine, Pharmacy and Public Health staff faculty have a unique opportunity to increase their awareness as health professionals.

33. Create a special fund to support climate crisis teaching and organizing of clinical faculty. Unlike other faculty, many health sciences faculty are self-supported and uncompensated for service and teaching. Health Sciences must support faculty engagement in climate activities, specifically as climate champions. It could appoint an academic Climate Change Coordinator who could help these climate champions to develop interdisciplinary programs within health sciences.

[74] http://www.healthierhospitals.org

34. Recognize climate crisis work in the assessments and career advancement of clinical faculty. The Schools of Medicine, Pharmacy and Public Health should establish a Clinical Enrichment Program with specific funding and opportunities for faculty to both take CME courses that offer internship opportunities, campus projects and research opportunities related to the health consequences of climate and climate solutions.

Mental Health Care Provision for UC faculty, staff and students

In 2017, the American Psychological Association named the condition of "eco-anxiety" specifically in relation to climate change[75]. UCSF recently convened a climate change and mental health task force[76] and eco-anxiety amongst UC members is already a real thing[77]. At UCSD, the Director of the Faculty and Staff Assistance Program, Crystal Green PhD, reported in January 2020 that:

"It is too soon to have any real data from our new tracking of presenting issues that include climate crisis anxiety, depression and trauma, but we know it's coming. I personally saw three clients last week who were bereft about the loss of animal life and habitat in Australia due to the months-long wildfire crisis there. It is the same every time news hits of another disaster, like a tsunami or wildfire, including those in our own state of California which have affected thousands of people and animals on or near campuses in our own "UC family". UC San Diego Faculty and Staff Assistance Program clinicians routinely see scientists and staff from Scripps Institute of Oceanography, as well as other researchers and staff on campus, for stress and grief around the climate crisis, fear of losing research opportunities, species loss, and even impending job/career loss (see van Susteren on "pre-traumatic stress disorder"[78] – not yet a DSM diagnosis)."

Dr. Green's team of five counsellors serve more than 16,000 campus staff and faculty and their household members, as well as retirees, emeriti and Postdocs and International Scholars from all over UCSD. Clearly this level of counselling support for so many inadequate, and also the counsellors could benefit from training on eco-anxiety and climate grief.

Regarding UCSD students, EVC Simmons presented data[79] at a Representative Assembly meeting in December 2019 on the escalating mental health crisis amongst our students, and a general campus email from the Chancellor on January 9th 2020 affirmed UCSD's commitment to student-centered mental health resources. Dr. Reina Juarez, director of Counseling and Psychological Services, affirmed in January 2020 that her counselors see eco-anxiety, saying:

"In the Academic Year 2018-2019, 28% of 4,659 individual students (12% of the student population) being seeing at Counseling and Psychological Services were diagnosed with anxiety disorders. The psychosocial determinants of anxiety included stressors of all kinds such as interpersonal relations, health issues, family concerns, academic performance, finances, geopolitical and socio cultural unrest, and including eco anxiety – ranging from pollution and sustainability concerns to the loss of "home" at a local and global level, as more areas in the world become inhospitable."

35. Increase the number of mental health counselors in the Faculty and Staff Assistance Program, and provide eco-anxiety training for them and for student mental health counsellors.

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[75] https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf
[76] https://psych.ucsf.edu/climatechange
[77] https://sustainability.ucsf.edu/1.830
[78] https://www.vice.com/en_us/article/vvzzam/climate-change-is-giving-us-pre-traumatic-stress
[79] http://senate.ucsd.edu/media/409820/compiled-presentations.pdf