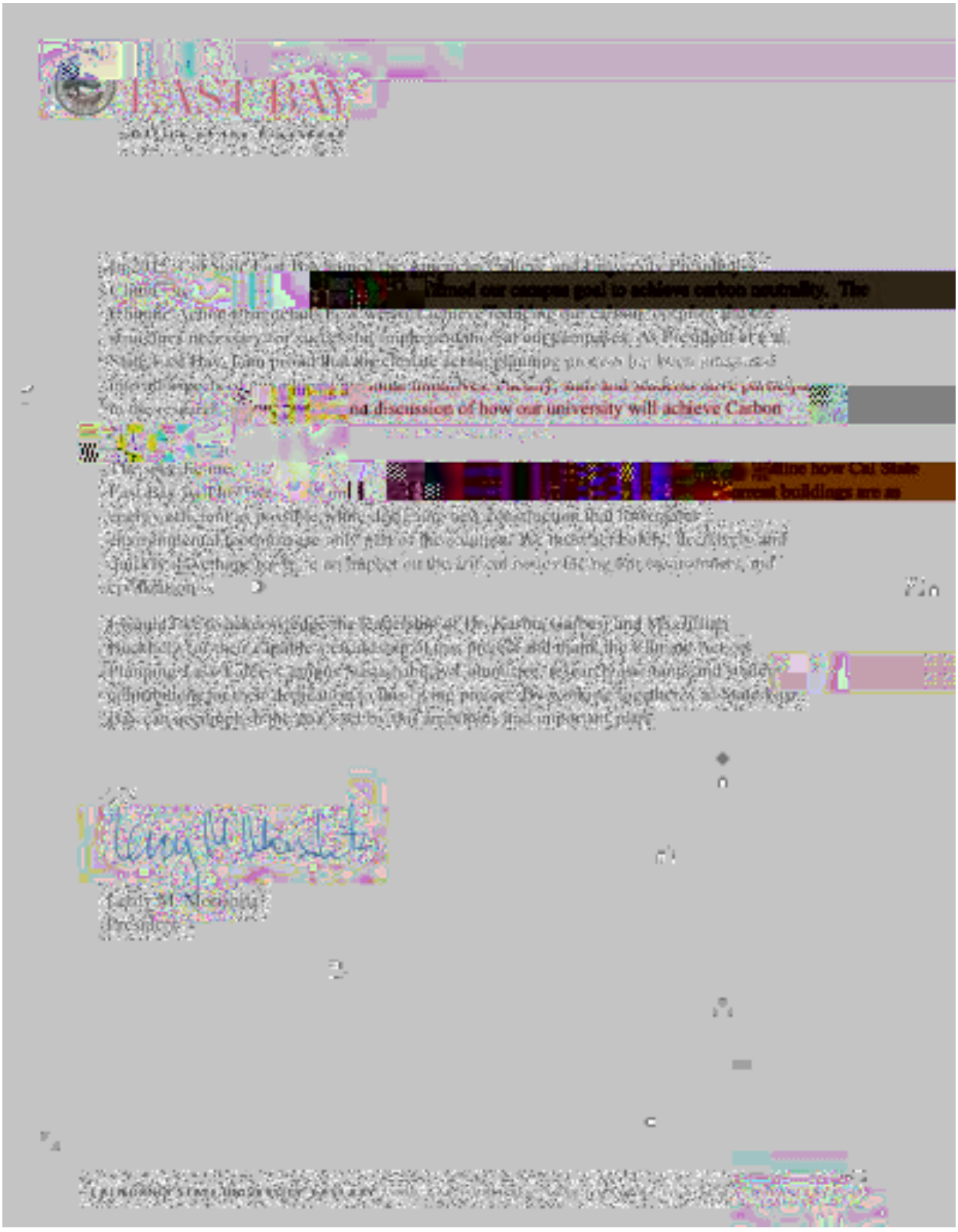
CAL STATE EAST BAY

2018

Letter from the President



VI. Energy Efficient Buildings and Energy End-Uses

VII. Housing

VIII. Procurement

IX. Landscaping

X. Education

I. Introduction

Background

Figure I.2. Climate warming in California relative to other U.S. states. Source: National Climatic Data Center, State Annual and Seasonal Time Series, National Oceanographic and Atmospheric Administration. Available online at

Figure I.3. Comparison of East Bay's and other CSU campuses' emissions profiles. Top: Total campus emissions. Bottom: Emission per FTE-student. Emissions reported here are a common subset of those reported by the CACP Calculator, that were selected by Second Nature from emissions reported to it by the different universities. Therefore Cal State East Bay emissions reported here, were based on the 2016 GHG Inventory, but are different because some categories are excluded. (Data

Approach

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Figure II.1. Cal State East Bay GHG emissions reductions under the CAP scenario. The red area shows the residual emissions after reductions in place on any given date; all other wedges show University-initiated emissions reductions by source. The top-most boundary of all of the wedges shows projected business-as-usual emissions in the absence of a climate action plan.

Umbrella Policies

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Table III.1. Summary from the *AY2013/2014 Greenhouse Gas Inventory*

Scope 2	139,826.4	3,357,214.6	3,331.6	50.6	3,455.6
Scope 3	454,826.3	37,853,696.2	5,310.1	2,091.5	38,609.7
All Scopes	664,942.5	44,997,081.2	9,002.3	2,221.2	46,361.6
All Offsets					244.7

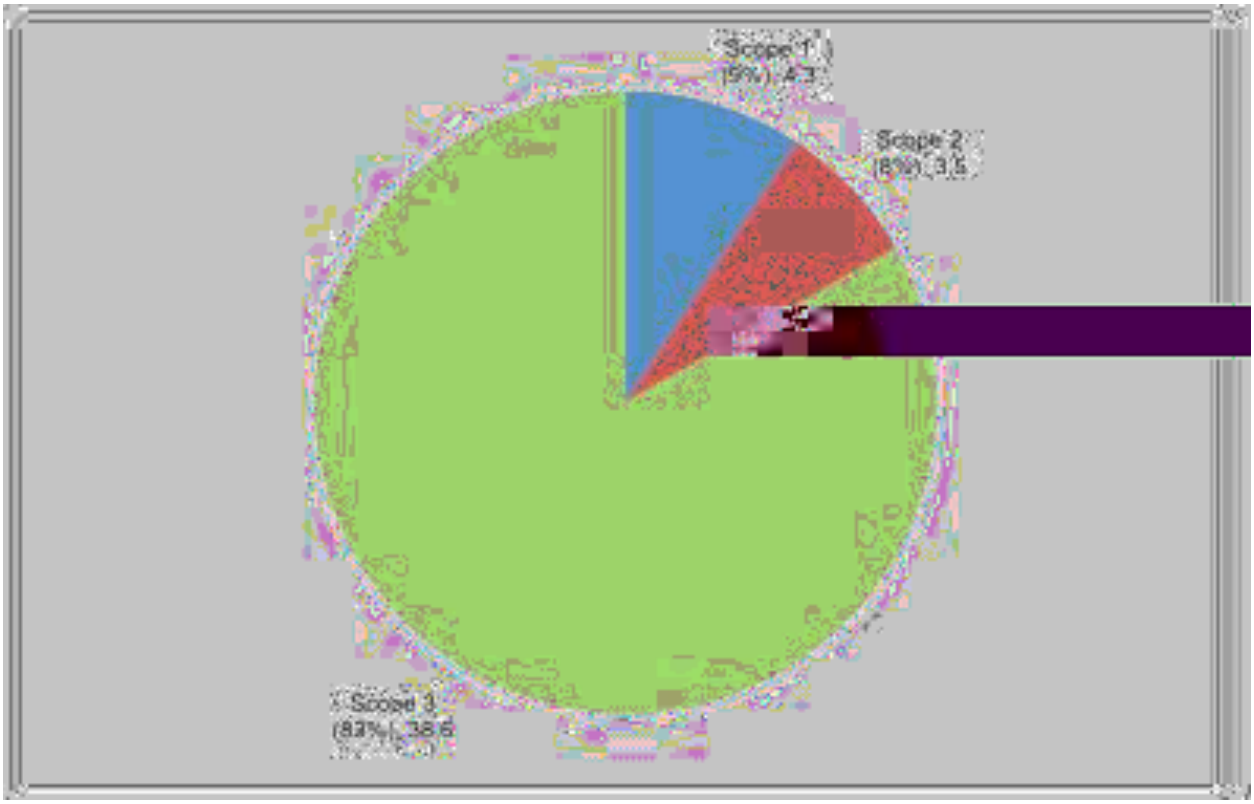

Figure III.3. AY 2013/2014 GHG Emissions by Scope presented in thousands of metric tonnes of eCO and as a percentage in parentheses.

Table III.3. The 2014 Shell Energy Custom Power Mix assuming the unspecified portion is 100% coal (CA-CP Custom Power Mix) and then with the assumption that the unspecified power mix reflects the State of California's average power mix (CA-CP Custom Power Mix Revised). Details described in footnote.[21]

ENERGY RESOURCES	CA-CP CUSTOM POWER MIX*	CA-CP CUSTOM POWER MIX REVISED**

Greenhouse Gas Emissions Projections Modeling

- **Business-as-usual (BAU) Emissions**

  in the absence of

- **CAP Emissions**

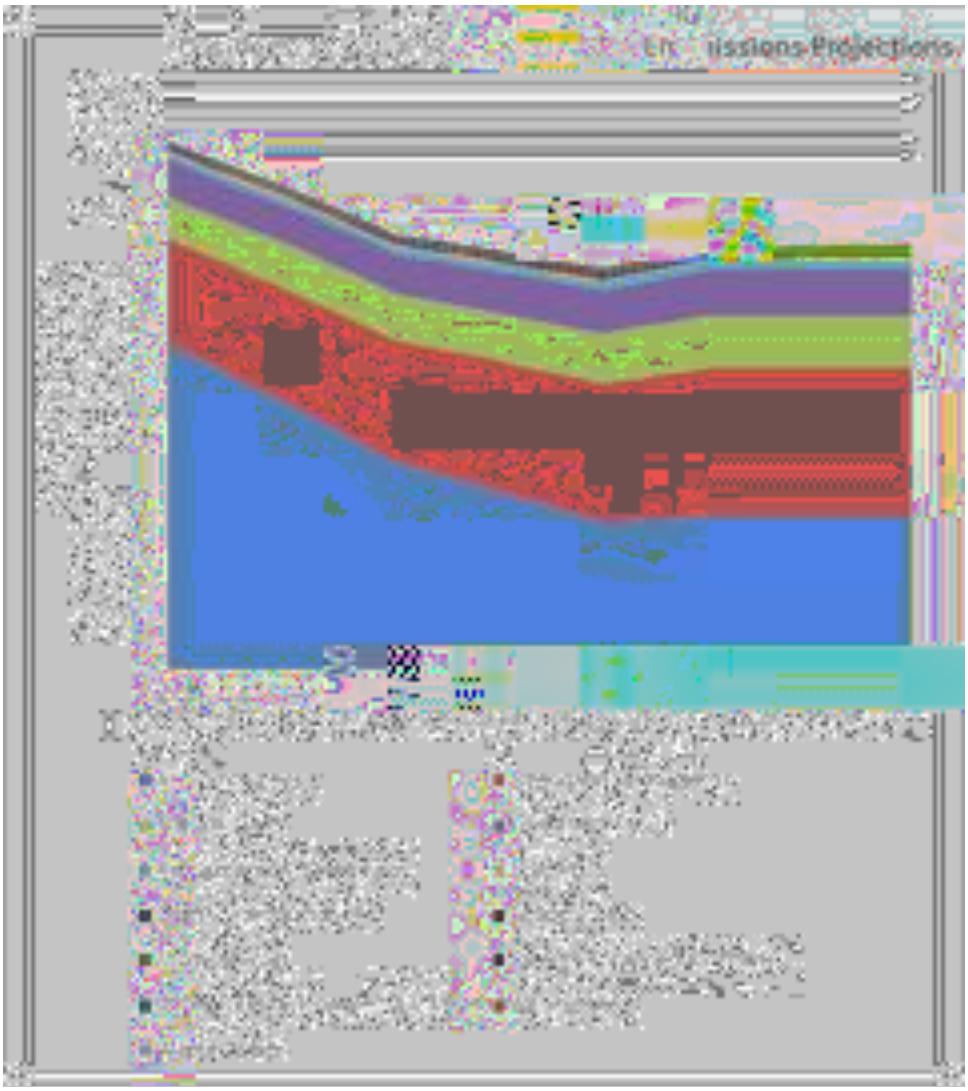

Figure III.5. GHG emissions projections: business-as-usual scenario. Includes emissions from the Hayward and Concord Campuses.

BAU Emissions Projection Modeling for Electricity and Natural Gas Usage

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Table III.5. Gross square footage (ft^2) by building type: 2015 and in 2040 (Assumes that maximum buildout specified in the 2009 Campus Master Plan is achieved in 2040)

Building Type	2015	Maximum Buildout

Table III.6. Projected EUIs of Campus Building Types in thousands of British thermal units per square foot (kBtu/ft^2) for new buildings by year, and for retrofits (Rtro). The table values are for total energy use, including both electricity and natural gas.

Building Type	1978	1982	1995	2006	2013	2020	2027	2034	2040	Rtro

Figure III.8. Projected combined business-as-usual commute emissions from student, faculty, and staff commuting.

CAP Emissions Reduction Modeling

Scope 1 and 2 Carbon Neutrality Modeling

Figure III.10. Scope 3 emissions reductions under the CAP. The red area shows residual emissions, all other wedges show University-initiated emissions reductions under the CAP.

IV. Energy Management and Supply

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reduce uncertainty

Table IV.1. BAU-projected electricity demand and PV panel area that would be needed to provide 100% of that demand with solar energy.[39] (Note the BAU demand excludes that portion of campus energy currently supplied by on-site photovoltaics)

Table IV.2. Total Electricity and Natural Gas Energy Use in AY2015/2016 and Land Areas of the Hayward and Concord Campuses.

Tab

Figure IV.5. Building-integrated photovoltaics, such as on this day-care center in Germany, can be used on new campus buildings with PV displacing the cost of wall and roofing material.

Table IV.4. Electricity and Natural Gas Use in 2015 by Various Campus Locations.

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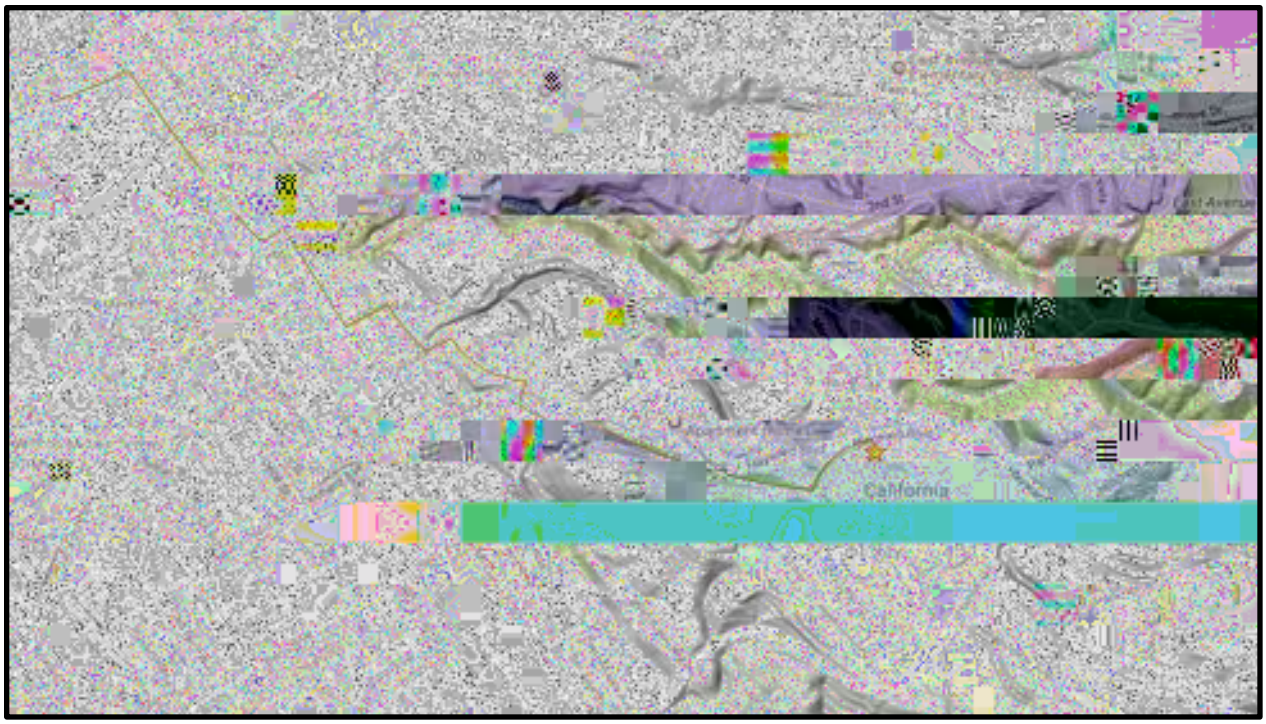

Figure V.1. Map illustrating the Cal State East Bay Hayward Campus and adjacent area. The orange line indicates the bike route from the Hayward BART Station while the green shaded area shows the location of hiking and biking trails running from Memorial Park (roughly northwest of the campus) to East Avenue Park (roughly northeast). Trail map courtesy of Velo Routes: http://veloroutes.org/bikemaps/?route=74948#

Figure V.2. A wide range of approaches are available to reduce commuting-related GHG emissions. This plot was compiled by ENVT 4800 Sp2016.

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Energy Efficient Building Design

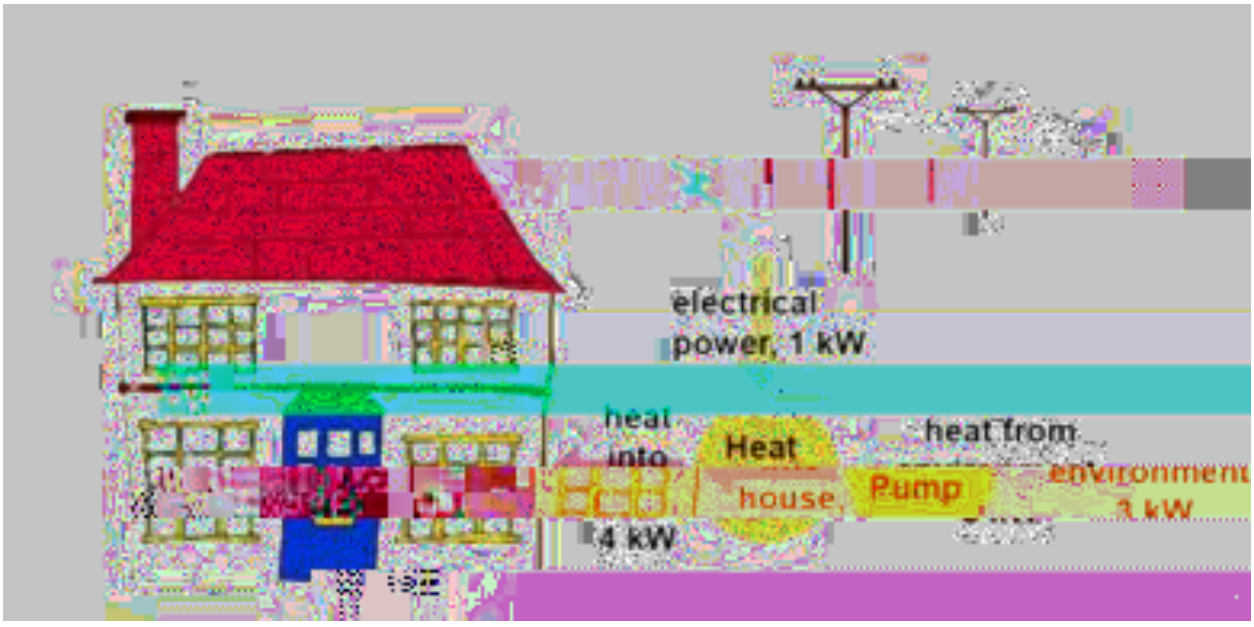

Figure VI.2. Heat pumps deliver more heat energy to the building than they use. Source: http://www.powerknot.com/2011/03/01/cops-eers-and-seers/

Table VI.1. Natural gas use in U.S. educational institutions. The breakdown by end-use is based on average national data, since the University currently lacks the submetered data on the different natural gas end uses on campus.

Source: Energy Information Administration, Commercial Building Energy Consumption Survey, Table Available online: https://www.eia.gov/consumption/commercial/data/2012/c&e/cfm/e8.php

Table VI.2. Electricity Consumption by End Use in Education in the United States.

LED Lighting

Table VI.4. Current and projected lighting costs for LED general service linear fixtures (dollars per kilolumen, $/klm)

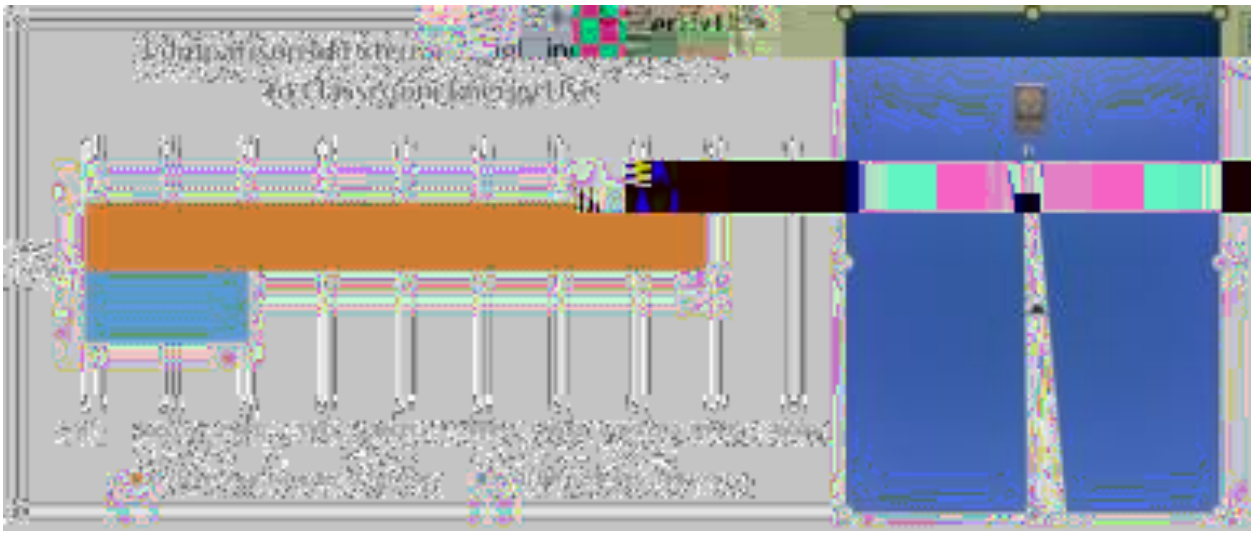

Figure VI.3. Exterior lighting dominates lighting energy use on the Concord Campus, according to a Spring 2017 Energy Audit Conducted by students in the Environmental Studies Senior Seminar. That use is dominated by the 250-W high-pressure sodium lights with inefficient magnetic ballasts shown at right.

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VII. Housing

Background

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VIII. Procurement

Background

Accomplishments

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IX. Landscaping

Background

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Figure IX.1. Hayward Campus open space includes 130 acres in the enclosed polygon (marked by white dots and line segments).

Figure IX.2. Concord Campus open space includes approximately 300 acres, as marked.

Faculty Engagement

Accomplishments

Campus as a Living Lab

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XI. Finance

Background

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Table XII.1. State-

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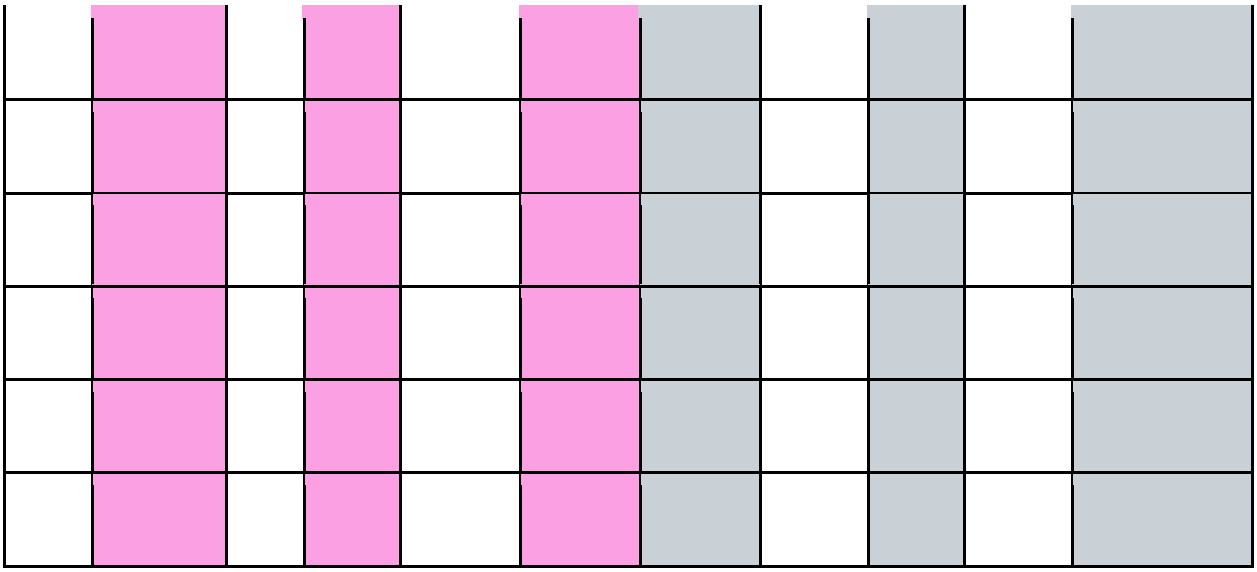

Glossary

Acknowledgements

Primary Authors

Climate Action Planning Task Force

Campus Sustainability Committee

Endorsed By