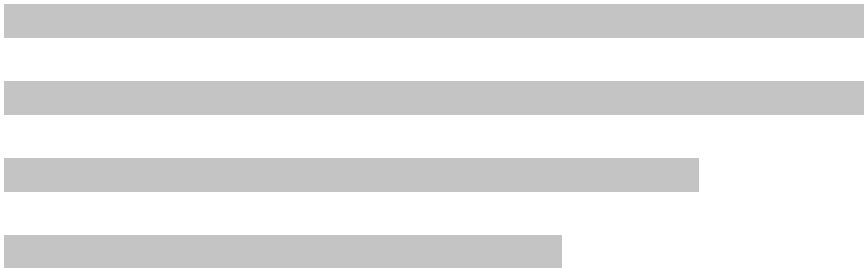


# 2018

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# Letter from the President



On 11/15/2015, the East Bay Institute of the Environment (EBIE) announced our campus goal to achieve carbon neutrality. The EBIE team outlined the details from several previous meetings, our carbon footprint, and the structures necessary for successful implementation of our plan. As President of EBIE, I am pleased that the climate action planning process has been organized and implemented in a timely and effective manner. The EBIE team and students have put together a comprehensive plan and discussion of how our university will achieve Carbon Neutrality by 2020.

The EBIE team has outlined how Cal State East Bay will achieve carbon neutrality by 2020. The EBIE team has outlined how Cal State East Bay will achieve carbon neutrality by 2020. The EBIE team has outlined how Cal State East Bay will achieve carbon neutrality by 2020. The EBIE team has outlined how Cal State East Bay will achieve carbon neutrality by 2020.

I would like to acknowledge the leadership of the East Bay Green and Sustainability Committee, the EBIE team, and the Climate Action Planning and Carbon Neutrality Task Force. Research, planning, and implementation are all part of the process. We will continue to work together to achieve our goal of carbon neutrality by 2020.

  
Sandy M. Noveck  
President

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# **TABLE OF CONTENTS**

**Letter from the President**

**TABLE OF CONTENTS**

**I. Introduction**

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## **VI. Energy Efficient Buildings and Energy End-Uses**

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## **XIII. Climate Action Management**

### **Appendix A**

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# I. Introduction

## Background



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**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**





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**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**





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## 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***

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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

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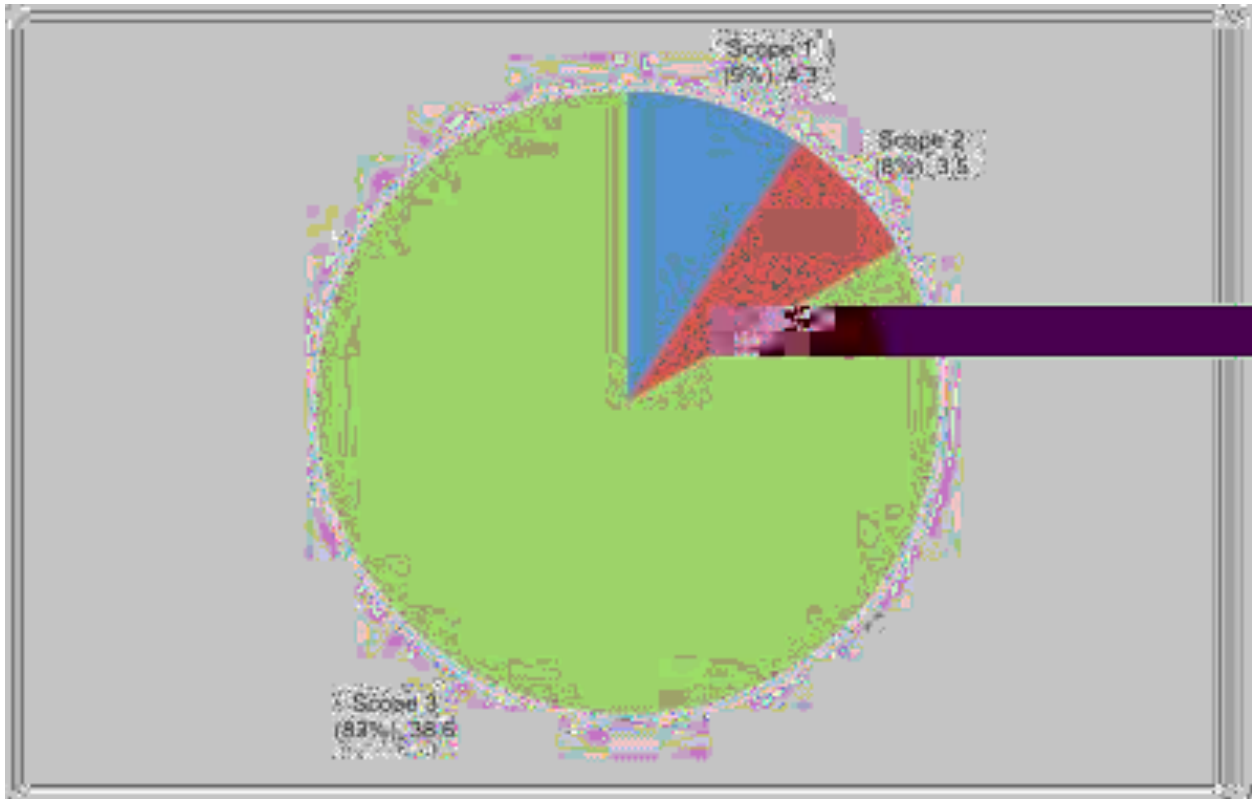


Figure III.3. AY 2013/2014 GHG Emissions by Scope presented in thousands of metric tonnes of eCO and as a percentage in parentheses.









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**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.<sup>21</sup>**

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<b>ENERGY RESOURCES</b>	<b>CA-CP CUSTOM</b>	<b>CA-CP CUSTOM</b>
	<b>POWER MIX*</b>	<b>POWER MIX REVISED**</b>

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## **Greenhouse Gas Emissions Projections Modeling**

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

**in the absence of**

! **CAP Emissions**





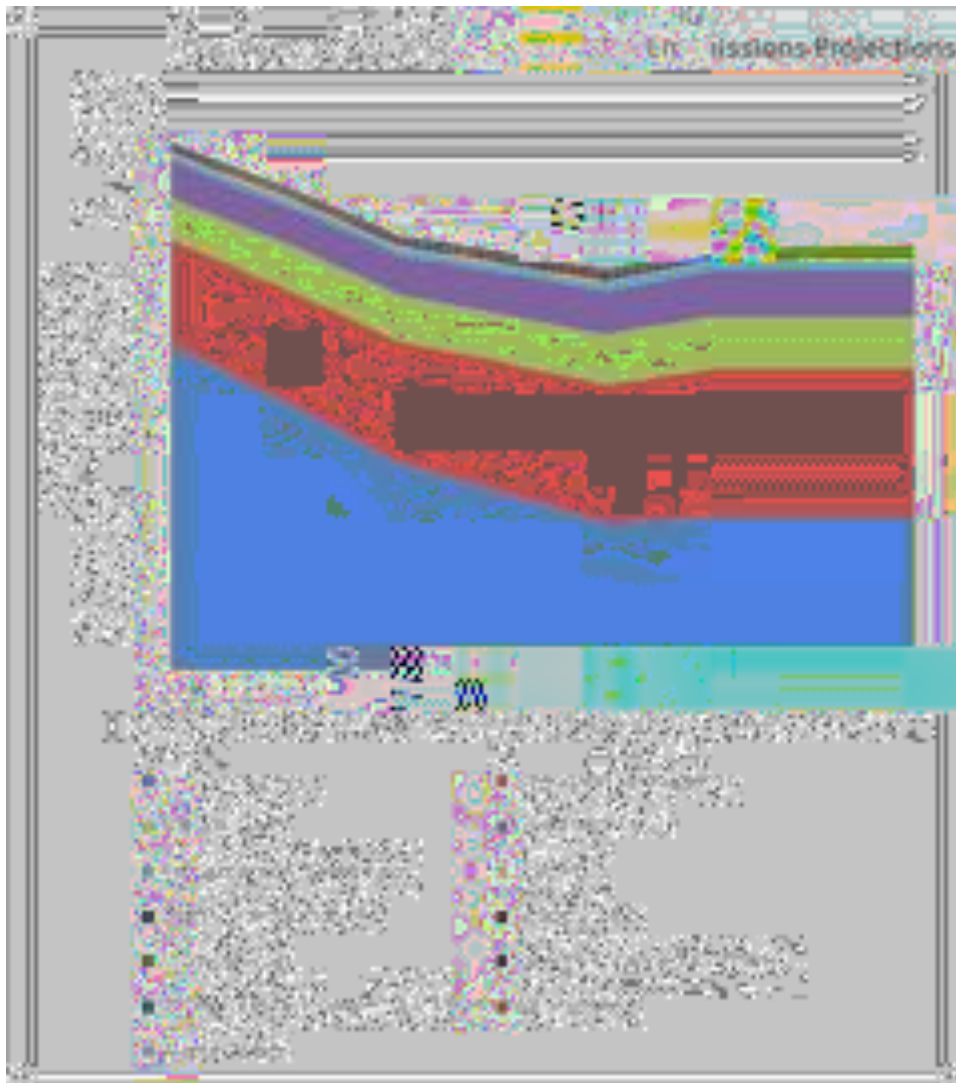


Figure III.5. GHG emissions projections: business-as-usual scenario. Includes emissions from the Hayward and Concord Campuses.

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## BAU Emissions Projection Modeling for Electricity and Natural Gas Usage

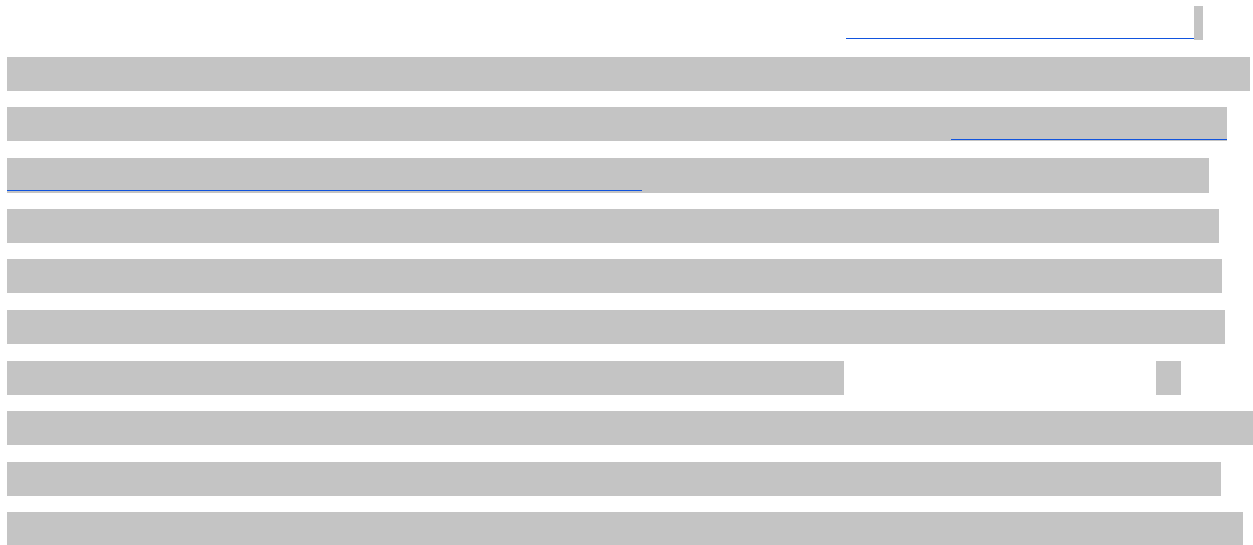
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**Table III.5. Gross square footage (ft<sup>2</sup>) by building type: 2015 and in 2040 (Assumes that maximum buildout specified in the 2009 Campus Master Plan is achieved in 2040)**

<b>Building Type</b>	<b>2015</b>	<b>Maximum Buildout</b>
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**Table III.6. Projected EUIs of Campus Building Types in thousands of British thermal units per square foot (kBtu/ft<sup>2</sup>) for new buildings by year, and for retrofits (Rtro). The table values are for total energy use, including both electricity and natural gas.**

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<b>Building Type</b>	<b>1978</b>	<b>1982</b>	<b>1995</b>	<b>2006</b>	<b>2013</b>	<b>2020</b>	<b>2027</b>	<b>2034</b>	<b>2040</b>	<b>Rtro</b>
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**Figure III.8. Projected combined business-as-usual commute emissions from student, faculty, and staff commuting.**

## **CAP Emissions Reduction Modeling**

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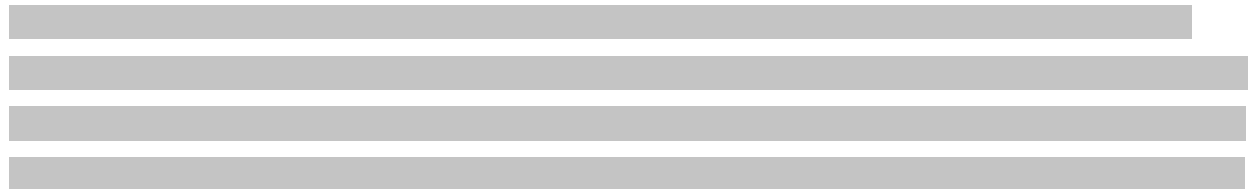
## Scope 1 and 2 Carbon Neutrality Modeling





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**



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


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

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**Tab**









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**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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## The Action Steps

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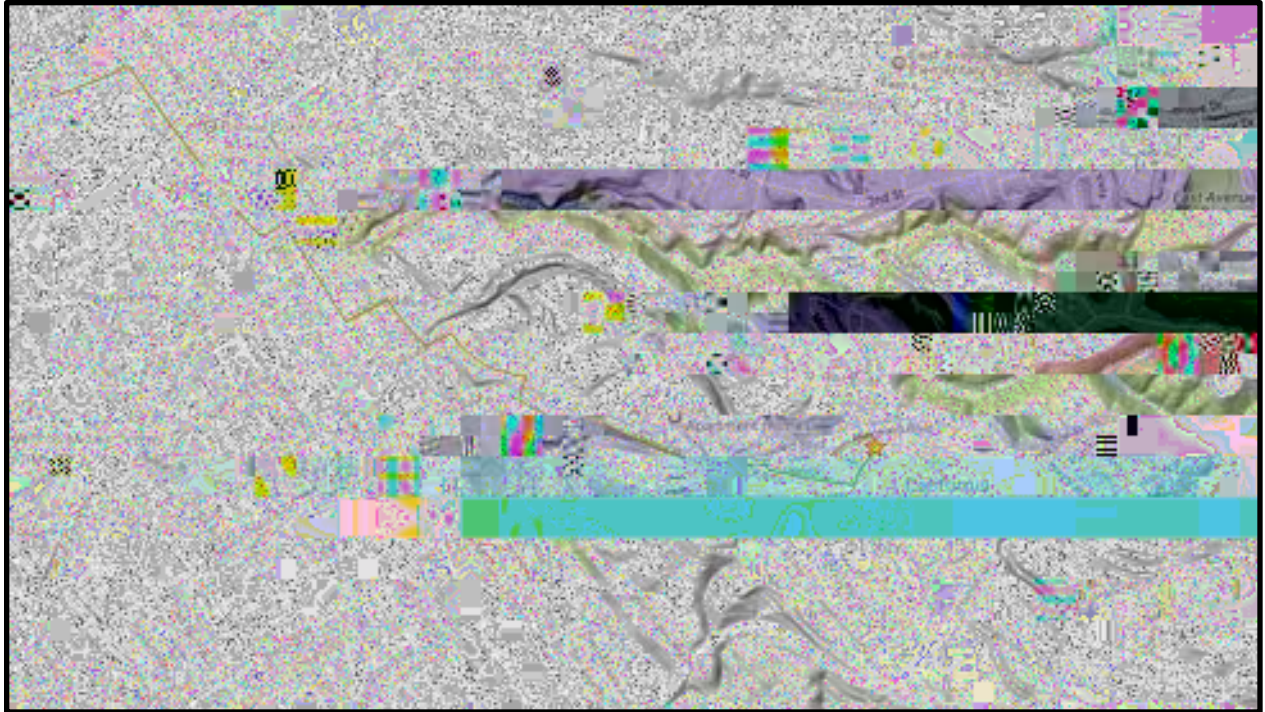


Figure V.1. Map illustrating the Cal State East Bay Hayward Campus and adjacent area. The orange line indicates the bike route from the Hayward BART Station while the green shaded area shows the location of hiking and biking trails running from Memorial Park (roughly northwest of the campus) to East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

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**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/>





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**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.**

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

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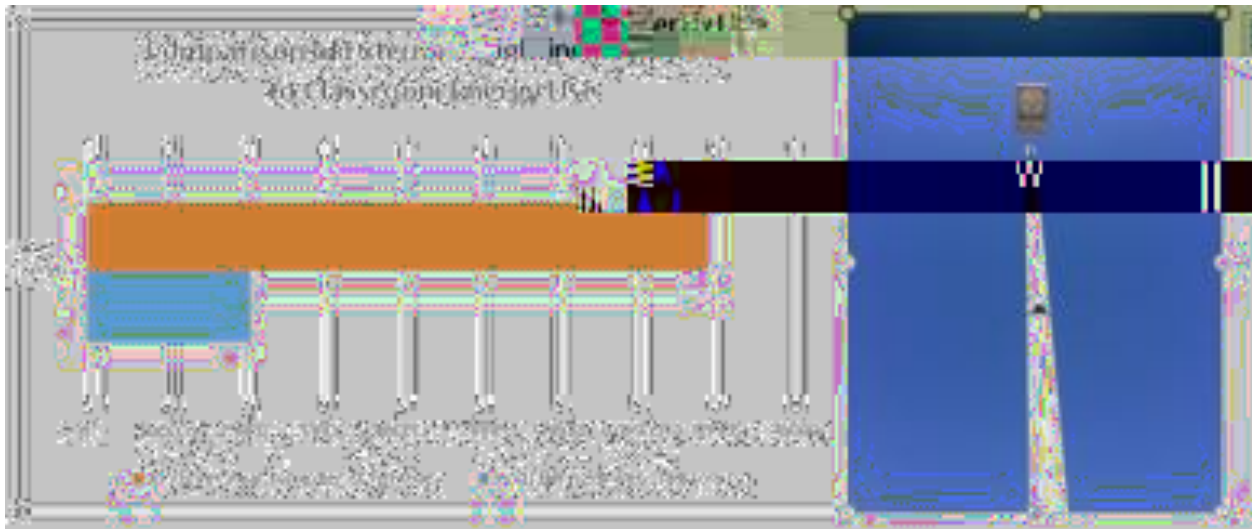
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**Table VI.4. Current and projected lighting costs for LED general service linear fixtures (dollars per kilolumen, \$/klm)**

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**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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**The Action Steps**

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## **VII. Housing**

### **Background**



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## VIII. Procurement

### Background



### Accomplishments

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## The Action Steps

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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.





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## Faculty Engagement

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## Accomplishments

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## Campus as a Living Lab



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## **XI. Finance**

### **Background**



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**Table XII.1. State-**



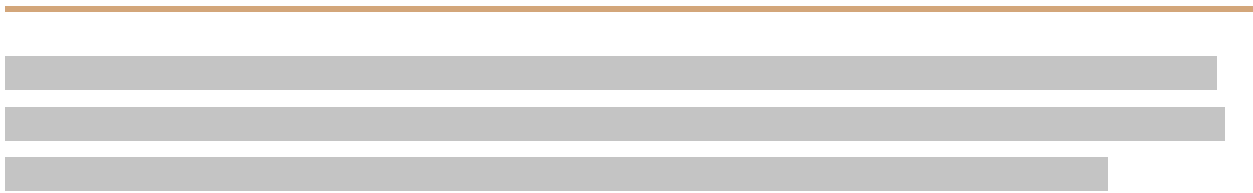
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## The Action Steps

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## Glossary







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# **Acknowledgements**

**Primary Authors**

**Climate Action Planning Task Force**

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## **Campus Sustainability Committee**



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**Endorsed By**