

# **CITY OF HAYWARD**

Hayward City Hall  
777 B Street  
Hayward, CA 94541  
[www.Hayward-CA.gov](http://www.Hayward-CA.gov)



CITY OF  
**HAYWARD**  
HEART OF THE BAY

## **Agenda**

**Monday, September 11, 2017**

**4:30 PM**

**City Hall, Conference Room 2A**

## **Council Sustainability Committee**

**CALL TO ORDER****ROLL CALL****PUBLIC COMMENTS:**

(The Public Comment section provides an opportunity to address the City Council Committee on items not listed on the agenda as well as items on the agenda. The Committee welcomes your comments and requests that speakers present their remarks in a respectful manner, within established time limits, and focus on issues which directly affect the City or are within the jurisdiction of the City. As the Committee is prohibited by State law from discussing items not listed on the agenda, any comments on items not on the agenda will be taken under consideration without Committee discussion and may be referred to staff.)

**APPROVAL OF MINUTES**

1. [MIN 17-117](#) Approval of Minutes of Council Sustainability Meeting on July 10, 2017  
  
**Attachments:** [Attachment I Minutes of Council Sustainability Meeting on July 10, 2017](#)

**REPORTS/ACTION ITEMS**

2. [RPT 17-116](#) Pioneers For Sustainable Communities - Final Reports on Littering & Composting  
  
**Attachments:** [Attachment I Staff Report](#)  
[Attachment II Survey on Attitudes and Behaviors About Compost and Littering](#)  
[Attachment III Changing Attitudes Toward Organic Waste Disposal and Composting with Games](#)  
[Attachment IV Using Communication to Reducing Littering and Illegal Dumping](#)
3. [RPT 17-117](#) East Bay Energy Watch Programs for Small and Medium-Sized Businesses  
  
**Attachments:** [Attachment I Staff Report](#)

4.     [RPT 17-118](#)     CY 2015 Greenhouse Gas Emissions Inventory  
  
      **Attachments:**   [Attachment I Staff Report](#)  
                          [Attachment II Residential Natural Gas Usage & Heating Degree Days](#)
5.     [ACT 17-056](#)     Design and Construction Approach for the Solar Photovoltaic System Project at the Water Pollution Control Facility - Phase II  
  
      **Attachments:**   [Attachment I Staff Report](#)
6.     [RPT 17-119](#)     Proposed 2017 Agenda Planning Calendar  
  
      **Attachments:**   [Attachment I Staff Report](#)

**FUTURE AGENDA ITEMS****COMMITTEE MEMBER/STAFF ANNOUNCEMENTS AND REFERRALS****ADJOURNMENT**



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**File #:** MIN 17-117

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**DATE:** September 11, 2017

**TO:** Council Sustainability Committee

**FROM:** Director of Utilities & Environmental Services

**SUBJECT**

Approval of Minutes of Council Sustainability Meeting on July 10, 2017

**RECOMMENDATION**

That the Committee reviews and approves the minutes of the Council Sustainability Committee meeting on July 10, 2017.

**ATTACHMENTS**

Attachment I      Minutes of Council Sustainability Meeting on July 10, 2017

CITY COUNCIL SUSTAINABILITY COMMITTEE MEETING  
Hayward City Hall – Conference Room 2A  
777 B Street, Hayward, CA 94541-5007

July 10, 2017  
4:30 p.m. – 6:30 p.m.

MEETING MINUTES

CALL TO ORDER: Meeting called to order at 4:30 p.m. by Chair Mendall.

ROLL CALL:

Members

- Al Mendall, City Council Member/CSC Chair
- Elisa Márquez, City Council Member
- Francisco Zermeño, City Council Member

Staff:

- Alex Ameri, Director of Utilities & Environmental Services
- Stacey Bristow, Interim Director of Development Services
- Jan Lee, Water Resources Manager
- Erik Pearson, Environmental Services Manager
- Jeff Krump, Solid Waste Program Manager
- Mary Thomas, Management Analyst
- Christopher Sturken, CivicSpark AmeriCorps Fellow
- Carol Lee, Administrative Secretary (Recorder)

Others:

- Shova Ale Magar, Waste Management of Alameda County (WMAC)
- Vanessa Barberis, WMAC
- Chris Bradt, Frontier Energy/BayREN
- Tatiana Geftor, Frontier Energy

PUBLIC COMMENTS

None.

1. Approval of Minutes of Council Sustainability Meeting on May 8, 2017.

It was moved by Council Member Zermeño, seconded by Council Member Márquez, and carried unanimously, to approve the minutes of the Council Sustainability Committee meeting of May 8, 2017.

## 2. Update on Sustainable Groundwater Management Activities

Water Resources Manager Jan Lee provided a brief overview and discussed two actions for Committee consideration. Ms. Lee also mentioned a small portion of the East Bay Plain Subbasin that is not covered by a Groundwater Sustainability Agency (GSA), but will be covered as part of the proposed MOU between East Bay Municipal Utility District (EBMUD) and the City.

Council Member Zermeño asked how difficult it would be to incorporate the unmanaged subbasin area into the City corporate boundaries. Director Ameri explained that the subject property is located in Union City, and incorporation is highly unlikely.

Chair Mendall suggested that staff consider recouping some cost for acting on the owner's behalf, noting that staff time will be involved with such coordination.

Discussion ensued regarding grant funding and the cost allocations for the remaining portion not funded by the State. Staff explained that the cost will be shared equitably based on acreage and benefit to each agency. Chair Mendall expressed his concerns that the cost sharing was not divided proportionally between EBMUD and the City, but deferred to staff to ensure that it would be divided equitably.

It was moved by Council Member Zermeño, seconded by Council Member Márquez, and carried unanimously, for staff to take the necessary actions to bring to the City Council for consideration a resolution authorizing execution of an MOU with EBMUD to partner on Sustainable Groundwater Management Act activities and supporting EBMUD's grant application for funding assistance to prepare the Groundwater Sustainability Plan.

## 3. Annual Update on City's Waste Reduction and Recycling Programs

Chair Mendall announced that staff would present Item 4, Update on PAYS Implementation, before Item 3, Annual Update on City's Waste Reduction and Recycling Programs.

Solid Waste Program Manager Jeff Krump presented the report and mentioned some new outreach efforts implemented to increase the diversion rate. Committee members and staff discussed the various services that Waste Management of Alameda County (WMAC) offers, rate setting, the shortcomings regarding bulky item removal service, illegal dumping, and the need for short-notice bulky item removal for multifamily dwellings.

The Committee asked staff to consider innovative methods to increase bulky item removal service participation, and work with WMAC staff to fully utilize the City's

six weekly allotted abandoned debris removals in order to alleviate Maintenance Services staff, who usually responds to such requests.

Chair Mendall requested that staff consider another site for the next Compost Giveaway event. Council Member Zermeño suggested Leidig Court and Tennyson Road. Staff appreciated the suggestion, and will consider the possibility of hosting future events at the suggested site. Council Member Zermeño also suggested providing wood chips, in addition to the free compost, to increase the aesthetics of our neighborhoods.

#### 4. Update on PAYS Implementation

Management Analyst Mary Thomas presented the report, and highlighted completed PAYS projects and active PAYS proposals.

The Committee discussed potential barriers to the program, staff time dedicated to the program, and the proposed flexible repayment terms of five to ten years.

Chair Mendall asked that staff reevaluate the effectiveness of the program in a year to ensure that the participation outweighs the cost of the City to implement the program.

The Committee recommended allowing flexible repayment terms from three to ten years and allowing for prepayment without penalty.

It was moved by Council Member Márquez, seconded by, Council Member Zermeño and carried unanimously, to recommend to Council adoption of a resolution to modify the PAYS Program repayment terms per the Committee's direction.

#### 5. Consideration of CMFA Open PACE

Management Analyst Mary Thomas presented the report on Property Assessed Clean Energy (PACE).

Committee members and City staff discussed potential risks, contractor screening, State legislation, consumer protection requirements, and feedback from Hayward community members.

The Committee was in favor of the Association of Bay Area Governments' addendum. The Committee also expressed their support of staff bringing a revised resolution before Council that removes any of the current PACE programs operating in Hayward that decide not to sign the addendum.

It was moved, and carried unanimously, for staff to take the necessary actions to bring to the City Council for consideration a resolution authorizing the City Manager to join CMFA Open PACE and sign ABAG addendums to the RCSA.

## 5. Proposed CSC 2017 Agenda Planning Calendar

Director Ameri mentioned that staff has reached out to Hayward Unified School District (HUSD) regarding lead testing at the schools before the summer recess, at no cost to HUSD, and did not receive a response. The Committee commented that no further action is needed, but was glad that staff would be available if HUSD responded.

Council Member Zermeño expressed his desire for staff to pursue bike sharing. Chair Mendall and staff responded that the City would have to construct the appropriate infrastructure to support the use of bicycles, and achieve the critical mass before pursuing bike share programs within the City.

Chair Mendall inquired why Car Sharing was on the September Agenda, and wanted to confirm that there had been noteworthy updates since the Committee had last discussed the topic. Staff responded that notable updates will be presented.

Chair Mendall requested that an update on the Zero Net Energy Goal be addressed within a year's time.

Chair Mendall noted that the September agenda looks full. Environmental Services Manager, Erik Pearson mentioned that the Accelerating Multifamily Building Upgrades may potentially be postponed.

Director Ameri informed the Committee that staff had been considering a Climate Literacy Requirement resolution which the Sierra Club wished to recommend to HUSD. At this time, the Sierra Club has not presented the resolution to HUSD, and staff will not be bringing this item before the Committee for consideration. The Committee agreed.

### COMMITTEE MEMBER/STAFF ANNOUNCEMENTS AND REFERRALS:

None.

ADJOURNMENT: 6:07 p.m.

Attendance	Present 07/11/17 Meeting	MEETINGS		
		Present to Date This Fiscal Year	Excused to Date This Fiscal Year	Absent to Date This Fiscal Year
Elisa Márquez	✓	1	0	0
Al Mendall*	✓	1	0	0
Francisco Zermeño	✓	1	0	0

✓ = Present    O = absent    X = excused

\* Chair





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**File #:** RPT 17-116

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**DATE:** September 11, 2017

**TO:** Council Sustainability Committee

**FROM:** Director of Utilities & Environmental Services

**SUBJECT**

Pioneers For Sustainable Communities - Final Reports on Littering & Composting

**RECOMMENDATION**

This is an informational report.

**ATTACHMENTS**

Attachment I	Staff Report
Attachment II	Survey on Attitudes and Behaviors About Compost and Littering
Attachment III	Changing Attitudes Toward Organic Waste Disposal and Composting with Games
Attachment IV	Using Communication to Reducing Littering and Illegal Dumping



DATE: September 11, 2017

TO: Council Sustainability Committee

FROM: Director of Utilities & Environmental Services

SUBJECT: Pioneers for Sustainable Communities – Final Reports on Littering & Composting

## RECOMMENDATION

That the Committee reviews and comments on this informational report.

## SUMMARY

This report presents the final reports for the littering and composting projects of the Pioneers for Sustainable Communities program for the 2016/2017 academic year. The reports and videos produced by the program document the students' experiences, findings and recommended approaches to conducting outreach related to littering and composting.

## BACKGROUND

Pioneers for Sustainable Communities (PFSC), originally called the Sustainable City Year Program (SCYP), is a partnership between the City and California State University East Bay (CSUEB) and included four projects for the 2016/2017 academic year. The projects are Trail Planning; Art Master Plan; Outreach to Increase Composting; and Outreach to Reduce Littering. For the littering and composting projects, CSUEB prepared reports for each academic quarter. The Fall 2016 quarter report was presented to the Committee on [March 13, 2017](#). Additional reports on this topic include an update to the Committee on [November 14, 2016](#), and a report from [June 28, 2016](#), when Council authorized a Memorandum of Understanding with CSUEB to establish the PFSC.

Hayward's General Plan, adopted by Council in 2014, includes the following policy regarding City partnerships with higher education institutions:

**ED-4.1 – Town Gown and Communiversities Partnerships.** The City shall collaborate with local colleges to develop strategic “town gown” or “communiversities” partnerships that enhance the Hayward community and economy, improve the overall educational experience of college students, and assimilate college students and graduates into the Hayward community.

## DISCUSSION

This report summarizes the littering and composting reports (Attachments II, III, and IV) from the winter and spring quarters. The work completed by the Environmental Ethics class in the fall quarter was continued through the winter and spring quarters by students in the following courses:

### Winter:

- COMM 4107: Relational Communication in Organizations - Assistant Professor Lonny Brooks
- COMM 3004: Quantitative Communication Research Methods - Assistant Professor Yung-I Liu
- MM66: Interactive Content Delivery - Assistant Professor Ian Pollock

### Spring:

- COMM 4107: Relational Communication in Organizations - Assistant Professor Lonny Brooks
- HDEV 3203: Applying Theory and Methods of Human Development - Professor Jiansheng Guo

Survey – In early 2017, Assistant Professor Yung-I Liu's Quantitative Communication Research Methods class of 22 students conducted a survey to gather attitudes toward and perceptions of litter and its effects and the issues surrounding composting. 110 people responded to the survey via email, phone or in person. Complete survey results are in Attachment III and key findings included:

- 55% of respondents believe that laziness and lack of caring are perceived as the main reasons for litter.
- 18% of respondents believe that a lack of trash cans is a main reason for litter.
- 86% of respondents had heard the term "food scraps."
- 38% of respondents had heard the term "food soiled paper."
- 55% of respondents have a green organics cart.
- 84% of those without a green organics cart would be somewhat or very likely to use it if they had one.

Using Games as an Outreach Strategy – During the winter quarter Assistant Professors Brooks and Pollock led 39 undergraduate students and 7 graduate students in a project called Changing Attitudes Toward Organic Waste Disposal and Composting Through Games. The undergraduate students were divided into 7 teams and each developed a game concept. Each one is briefly described in Attachment III. The graduate students in a graduate seminar called Interactive Content Delivery, Assistant Professor Ian Pollock guided students to use human-centered design principles develop a full-scale prototype for a game booth. The game, called Recycolution, is similar to the arcade game known as Dance-Dance Revolution. It is a recycling sorting game where the participant watches images on a screen and steps on the appropriate

space on the “dance floor” to sort each item. The students suggested that this game could be used in a booth at a community event. They developed a promotional two-minute film that will be shown during the Committee meeting.

Students in the Spring quarter classes, Relational Communication in Organizations and Applying Theory and Methods of Human Development, built upon the work of the fall and winter quarter classes. The spring quarter project was titled Using Communication to Reducing Littering and Illegal Dumping, which is summarized in Attachment IV. Students became familiar with the City’s existing programs by participating in the Citywide cleanup event in May and a regular Keep Hayward Clean and Green Task Force cleanup event and observing City crews cleaning up illegally dumped materials. Based on class discussions and field experiences, students created videos, presentations and storyboards with ideas on how the City might raise awareness about the negative effects of illegal dumping

**Hang Tags** – To gain experience with implementing an outreach strategy, students hung simple brochures or hang tags on carts when they were out for collection day. Two versions of the hang tags are pictured below. Over several weeks in April and May, students distributed approximately 6,000 tags to single-family households.



**Final Video** – For the final deliverable, CSUEB will produce a five-minute film highlighting the projects associated with littering and composting with a particular emphasis on City employee, staff, volunteer and student experiences. This film should be available for viewing during the September 11 Committee meeting. As noted in Attachment IV,

“The film will communicate with authenticity the story of our collective efforts in the often messy, worthwhile and global saving effort of littering and composting worth our time and community building efforts. We used the Human centered design approach of IDEO to study the user experience in its many dimensions and facets in the collective experience of recycling, composting, illegal dumping and anti-littering messaging. The film and footage is vital in documenting how our urban lives are transforming into more conscious, environmentally aware citizens and members of an interconnected ecological landscape locally, regionally and on a global level.”

Year End Event – An end-of-year celebration for the PFSC Program was held on May 18, 2017, at Hayward City Hall. Attendees included Mayor Halliday and Council members Lamnin and Zermeno. Outside dignitaries included CSUEB President Morishita, CSUEB Provost Edward Inch, Acting Administrator for US EPA, Region 9, Alexis Strauss and Sustainability Advisor for US EPA, Region 9, Laura Bloch. Students made brief presentations including one about the Recycolution game, which was very well received.

## STRATEGIC PRIORITIES

This agenda item does not directly relate to one of Council’s Strategic Initiatives.

## FISCAL IMPACT

The cost of the 2016/2017 PFSC program was \$150,000, with the City and the University each paying \$75,000. The composting and littering projects cost \$37,500, which was paid from the Recycling and Stormwater Funds. In addition, Environmental Services staff spent time working with students and faculty from the University. The US Environmental Protection Agency has also contributed by providing funding to the University of Oregon to provide technical assistance to universities in California to assist with adoption of Oregon’s program model.

## SUSTAINABILITY FEATURES

The PFSC Program supports several General Plan policies, including those that strive to reduce greenhouse gas emissions. In addition, the program has the following sustainability features or benefits:

- A primary goal of the composting project will be to reduce the volume of organic material sent to landfills and to improve the City’s overall solid waste diversion rate.
- Reducing litter will not only improve the community’s appearance, but will also help prevent trash from entering the storm drain system and creeks, which will help the City meet its trash reduction goals mandated by the Regional Water Quality Control Board.

## NEXT STEPS

A key objective of the PFSC program was to expose students to real-world issues and work experiences and to explore new ways for the City to work with CSUEB. This objective was certainly accomplished. With consideration of the Committee's comments, staff may use ideas and strategies generated by the students in future outreach efforts related to minimizing littering and maximizing separation of organics for composting. Staff intends to maintain and build upon relationships that were developed with CSUEB staff and faculty, which may lead to additional collaboration in the future.

Prepared by: Erik Pearson, Environmental Services Manager

Recommended by: Alex Ameri, Director of Utilities & Environmental Services

Approved by:

A handwritten signature in black ink, appearing to read 'K. McAdoo', is positioned above a horizontal line.

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Kelly McAdoo, City Manager

# Survey on Attitudes and Behaviors About Compost and Littering

Winter 2017  
Communication



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## ACKNOWLEDGEMENTS

This report was made possible by the collaboration and support of the City of Hayward, including

- The City Council: Barbara Halliday (mayor), Sara Lamnin, Francisco Zermeno, Marvin Peixoto, Al Mendall, Elisa Marquez, and Mark Salinas
- The City Manager, Kelly McAdoo
- Managements Analyst, Laurel James (and P4SC program coordinator for the City)
- City Employees who helped plan and implement the projects: Erik Pearson, Mary Thomas, and Jeff Krump.

This pioneering year of P4SC would not have been possible without the generous support of Cal State East Bay President, Leroy M. Morishita.





## About Pioneers for Sustainable Communities

Pioneers for Sustainable Communities (P4SC) is a year-long partnership between Cal State East Bay and a community partner that represents local or regional government. P4SC is one of a network of campuses nationwide—the EPIC-N Network—that have adopted a model of using course-based, faculty-lead, student research to support the sustainability goals of local communities. P4SC focuses on sustainability, social justice, and quality of life in the San Francisco East Bay region. It leverages the expertise of faculty and the enthusiasm, time, and innovative ideas of students, providing thousands of hours of research to support local partner sustainability programs including: data acquisition and analysis, stakeholder surveys, geo-spatial mapping and referencing used to establish socio-environmental baselines, track progress, and facilitate planning and communications.

- **P4SC Reports** present the final results of one or more full-time equivalent courses devoted to a single P4SC project.
- **P4SC Mini-Reports** present the results of partial courses devoted to a PSC project, typically used for projects in progress.

## About Cal State East Bay

Cal State East Bay's beautiful main campus is located in the Hayward hills with panoramic views of the San Francisco Bay shoreline. Situated above the city of Hayward, the campus offers an ideal setting for teaching and learning and yet easy access to the many cities along the bay. The University has a satellite campus in Concord, a professional development center in Oakland, and a significant presence online. Founded in 1957, Cal State East Bay is one of 23 universities of the California State University system (CSU). With an enrollment over 15,800 students, Cal State East Bay is recognized as a regionally engaged and globally oriented university with a strong commitment to academic innovation, student success, engaged service learning, diversity, and sustainability.

## P4SC Directors and Staff

Karina Garbesi, P4SC Co-Director, Professor and Director of the Environmental Studies Program, Department of Anthropology, Geography, and Environmental Studies, Cal State East Bay

Craig Derksen, P4SC CO-Director, Assistant Professor of Philosophy, Department of Philosophy, Cal State East Bay

Audrey Wade, P4SC Program Coordinator, Cal State East Bay

*With support by Jillian Buckholz, Director of the Office of Sustainability*



## About the City of Hayward

The City of Hayward was incorporated in 1876. With a population of 150,000, Hayward is the sixth largest city in the Bay Area and proudly the second most diverse City in California. A Charter City, Hayward operates under the Council-Manager form of government with a directly elected Mayor and six member City Council. Hayward is a full service City comprised of thirteen departments providing services ranging from public safety and public works to library and community services. The City strives to be a safe, clean, green, and thriving community for all of its residents. To learn more about the City of Hayward, visit [www.Hayward-ca.gov](http://www.Hayward-ca.gov).





# Survey on Attitudes and Behaviors About Compost and Littering

## REPORT AUTHOR(S)

LOGAN KEY

YUNG-I LIU

## COURSE PARTICIPANTS

### **P4SC Instructor:**

Yung-I Liu

COMM 3004 Quantitative Communication Research Methods

### **P4SC Student Participants**

1. Anastasia Makinen
2. Cassondra Baizas
3. Christina Urbina
4. Daisy Cabrera
5. Daniel McGuire
6. Danielle Dyer
7. Dannie Carman
8. Derek Herbert
9. Emmanuel Escobal
10. Fernando Romero
11. Gabriela Montenegro
12. Jalen Francis
13. Jenna Joseph
14. Kaboua Lo
15. Kestutis Rushing
16. Logan Key
17. Nathalie Saravia Razo
18. Paul Andrew Morrison
19. Regina Rederford
20. Robert Sharkey
21. Sophia Karkazis
22. Thamina Shah



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## PROJECT DESCRIPTION

### **Objectives**

The City of Hayward has identified the prevention of littering, and the promotion of composting as routes toward greater sustainability. They are partnering with California State University, East Bay to help meet these ends. To establish solid foundations for this strategy we are including a course in quantitative research. The researchers surveyed for attitudes, awareness, knowledge, perceptions, and behaviors as they regard to littering and composting, as well as the media consumption habits and demographic information of the participants.

### **Research Method**

Researchers administered a survey to individuals in the Bay Area, primarily Hayward residents. The survey was administered in person and via e-mail and telephone. 110 people participated in this study. The survey items consisted of 31 questions (16 Likert scales and 15 closed-answer questions).

The first section of the questionnaire asked questions regarding attitudes toward and perceptions of litter and its effects, in general and in Hayward. The second section of the questionnaire asked about attitudes toward, perception of, and knowledge of the issues surrounding composting. The final section of the questionnaire asked questions about media usage and demographic information.



## California State University East Bay

# Implied Consent to Participate in Research (Littering and Food Scrap Sorting Survey)

Researchers in the Department of Communication at California State University, East Bay, and the Utilities & Environmental Services Department of the City of Hayward would like your participation in a survey. The researchers, Yung-I Liu, is an assistant professor at California State University, East Bay, and Mary Thomas, Management Analyst-Utilities & Environmental Services of the City of Hayward, are conducting research for the Pioneers for Sustainable Communities (aka The Sustainable City Year Program). The purpose of this survey is to learn more about your perceptions of littering and food scrap sorting. We would like to use your careful and honest feedback to develop effective approaches to reduce littering and increase composting in Hayward. You are being asked to participate in this study because you are a resident in Hayward/the San Francisco Bay Area.

If you agree to participate in this research study, you will be interviewed over the phone or in person for approximately 10 minutes, or you will fill out the questionnaire (please see attached), which will take approximately 10 minutes to complete. There will be no additional cost to you for participating in this research.

Please answer each question to the best of your ability. You will face no risks. It is important to note that: (1) your participation is voluntary, (2) you may withdraw from the study at any time with no penalty, and (3) you are free to not answer any question for any reason. You will be guaranteed privacy and confidentiality. No names or identities will be used in any published reports of the research. Please do not write your name on this form or the questionnaire. The research data will be kept in a password protected computer, and only the researchers will have access to the data. At the conclusion of the study, all identifying information will be removed and the data will be kept in a password protected computer in a locked office. There will be no compensation for participating in this research.

Please complete the questionnaire on your own, without discussing it with your friends. If you have any questions while completing the questionnaire, please contact the questionnaire administrator and he/she will discuss your question with you. If you have any further questions about the study, you may contact the researchers by email at [yungi.liu@csueastbay.edu](mailto:yungi.liu@csueastbay.edu) or phone at (510) 885-3188, or [mary.thomas@hayward-ca.gov](mailto:mary.thomas@hayward-ca.gov) or phone at (510) 583-4724. Questions about your rights as a study participant, or comments or complaints about the study, may also be addressed to the Office of Research and Sponsored Programs at (510) 885-4212.

If you are 18 years or older and have read and understood this consent form and agree to participate, please fill out the survey now. If you do not wish to participate, you may simply return the blank survey, with no penalty to yourself. If you do participate, **completion and**



**return of the survey indicates your consent to the above conditions.** Thank you in advance for your cooperation and support.

## California State University East Bay

### Verbal Consent

Hello, my name is \_\_\_\_\_ and I am a student at CSUEB conducting a research study on littering and food scrap sorting.

The survey will take approximately 10 minutes of your time. Your participation is voluntary, and you may answer only those questions you want to answer. You may stop at any time during the course of the survey with no penalty.

Would you like to participate in the survey? Your answers will be kept confidential, and there is little or no risk or benefit to you in answering these questions.

“May I ask you a question to see if you are eligible to participate?”

If the answer is “Yes,”

Are you at least 18 years of age or older?

- ☐ Yes
- ☐ No

If subjects are eligible, let them know the actual research questions are about to begin now.

If the answer is “No,” say “Thank you for your time. Goodbye.”





## **Recruiting Script**

Hello, my name is \_\_\_\_\_. I am a student at CSUEB in the Communication Department. I am conducting research on littering and food scrap sorting in Hayward/the San Francisco Bay Area, and I am inviting you to participate because you live in Hayward/the San Francisco Bay Area.

Participation in this research includes taking a survey about your perceptions of littering and food scrap sorting, which will take approximately 10 minutes.

If you have any questions, I can be reached at \_\_\_\_\_ @ \_\_\_\_\_.



## Littering and Food Scrap Sorting Survey

### A. We are going to ask a few questions about littering in Hayward.

Please indicate the extent to which you agree or disagree with each of the following statements.

1. Littering is a problem in Hayward.

1	2	3	4	5	6	7
<b>Strongly Disagree</b>						<b>Strongly Agree</b>

2. I know people who litter.

1	2	3	4	5	6	7
<b>Strongly Disagree</b>						<b>Strongly Agree</b>

3. I understand why a person might litter.

1	2	3	4	5	6	7
<b>Strongly Disagree</b>						<b>Strongly Agree</b>

4. Why do you think people litter? (check all that apply)

- ☐ A lack of trash cans
- ☐ They don't care or laziness
- ☐ They don't know that it is a problem
- ☐ There is already so much litter, they don't think one more piece matters
- ☐ Peer pressure (they don't want to look like they care in front of their friends)
- ☐ Other (please specify)

5. Of the reasons above, what do you think is the main reason that people litter?

- ☐ A lack of trash cans
- ☐ They don't care or laziness



- ☐ They don't know that it is a problem
- ☐ There is already so much litter, they don't think one more piece matters
- ☐ Peer pressure (they don't want to look like they care in front of their friends)
- ☐ Other (please specify)

**I am going to read you a series of messages targeted at people who litter. Please tell me if these messages have big impact on you, some impact, or no impact.**

6. "Litter on the street eventually ends up in the bay and harms marine life"  
(1) **Big impact** (2) **Some impact** (3) **No impact**
7. "Cleaning up litter in Hayward costs taxpayers millions of dollars"  
(1) **Big impact** (2) **Some impact** (3) **No impact**
8. "Litter makes a community less desirable and lowers property values"  
(1) **Big impact** (2) **Some impact** (3) **No impact**
9. "Litter attracts pests like rats and roaches"  
(1) **Big impact** (2) **Some impact** (3) **No impact**
10. "Litter is harmful to the health of the children that live in a neighborhood"  
(1) **Big impact** (2) **Some impact** (3) **No impact**
11. "90% of Hayward residents think it is wrong to litter"  
(1) **Big impact** (2) **Some impact** (3) **No impact**

**B. We are going to ask a few questions about sorting food scraps.**

12. For this survey, we are going to use the term "food scraps," which means all the leftover scraps you have after cooking or eating and any food that has gone bad. Have you heard the term "food scraps" before?  
  - ☐ Yes
  - ☐ No



13. For this survey, we are going to use the term “food soiled paper,” which means all the paper, napkins and cardboard that has touched food, like a pizza box or used paper plate. Have you heard the term “food soiled paper” before?
- ☐ Yes
- ☐ No
14. Do you have your own trash carts or do you share your carts with your neighbors?
- ☐ Own
- ☐ Share
15. Do you have a green organics cart?
- ☐ Yes
- ☐ No (skip to question 17)
16. How often do you put your food scraps and food soiled paper in the green cart?
- ☐ Always
- ☐ Most of the time
- ☐ Sometimes
- ☐ Never (skip to question 18)
17. If you had access to a green cart, how likely would you be to sort out your food scraps and food soiled paper to put in the green cart?
- ☐ Very likely
- ☐ Somewhat likely
- ☐ Not likely
18. When you sort your food scraps and food soil paper, why do you do it? (skip if they do not sort; check all that apply)
- ☐ It is good for the environment
- ☐ It is the way I was told to do it
- ☐ It helps cut my garbage bill
- ☐ Other (please specify)
19. When you do not sort your food scraps, what are the main barriers? (check all that apply)
- ☐ I don’t have a green cart
- ☐ I didn’t know that food scraps and food soiled paper should go in the green cart
- ☐ It smells
- ☐ It attracts bugs
- ☐ It’s overwhelming because I don’t know what items go in which carts



- ☐ It's inconvenient – I don't have time  
☐ Other (please specify)

20. Do you have a kitchen pail for collecting food scraps?

- ☐ No  
☐ Yes

21. Did you know that you can get a kitchen pail for free as part of your garbage service?

- ☐ No  
☐ Yes

**I am going to read you a series of messages about sorting food scraps. Please tell me if these messages have big impact on you, some impact, or no impact.**

22. “Sorting your food scraps keeps waste out of our landfills”  
**(1) Big impact (2) Some impact (3) No impact**

23. “Sorting your food scraps can help you save money on your garbage bill by downsizing your trash cart”  
**(1) Big impact (2) Some impact (3) No impact**

24. “Sorting your food scraps reduces climate change”  
**(1) Big impact (2) Some impact (3) No impact**

25. “Sorting your food scraps helps California maintain its rich top soil because the food scraps are composted and used at farms”  
**(1) Big impact (2) Some impact (3) No impact**

26. “80% of Hayward residents sort their food scraps”  
**(1) Big impact (2) Some impact (3) No impact**

**C. Finally, we would like to know some general information about you.**

27. How many people, including yourself, live in your household? \_\_\_\_\_



28. What is the primary language in your household?

---

29. Where do you most often get news and information? (check all that apply)

- ☐ Television
- ☐ Radio
- ☐ Printed Newspapers
- ☐ Printed Magazines
- ☐ Websites
- ☐ Social Media
- ☐ Friends and family
- ☐ Other (please specify)

30. Which social media do you use frequently? (check all that apply)

- ☐ Facebook
- ☐ Twitter
- ☐ Pinterest
- ☐ Instagram
- ☐ YouTube
- ☐ Other (please specify)
- ☐ None

31. Have you ever visited the City of Hayward's website?

- ☐ Yes
- ☐ No

**Thank you for participating in this survey!**



## RESULTS

### Data Analysis Results

#### Littering and Food Scrap Sorting Survey

##### A. We are going to ask a few questions about littering in Hayward.

Please indicate the extent to which you agree or disagree with each of the following statements.

1. Littering is a problem in Hayward.

[Strongly Disagree]							[Strongly Agree]
1	2	3	4	5	6	7	
6.4%	6.4%	16.4%	13.6%	26.4%	15.5%	15.5%	

2. I know people who litter.

[Strongly Disagree]							[Strongly Agree]
1	2	3	4	5	6	7	
12.7%	13.6%	10.9%	13.6%	15.5%	7.3%	26.4%	

3. I understand why a person might litter.

[Strongly Disagree]							[Strongly Agree]
1	2	3	4	5	6	7	
20.9%	16.4%	10.0%	16.4%	11.8%	9.1%	15.5%	

4. Why do you think people litter? (check all that apply)

19.9% – A lack of trash cans  
 35.0% – They don't care or laziness  
 16.5% – They don't know that it is a problem  
 21.4% – There is already so much litter, they don't think one more piece matters  
 5.6% – Peer pressure (don't want to look like they care in front of their friends)  
 1.5% – Other | [0.4% - Won't get in trouble] [1.1% – Not Specified]

5. Of the reasons above, what do you think is the main reason that people litter?

18.0% – A lack of trash cans  
 55.0% – They don't care or laziness  
 13.5% – They don't know that it is a problem  
 9.9% – There is already so much litter, they don't think one more piece matters  
 1.8% – Other (Not Specified)  
 0.9% – Other (Won't get caught)  
 0.9% – Peer pressure (they don't want to look like they care in front of their friends)



6. "Litter on the street eventually ends up in the bay and harms marine life"  
64.2% – Big impact    30.3% – Some impact    5.5% – No impact
7. "Cleaning up litter in Hayward costs taxpayers millions of dollars"  
45.5% – Big impact    38.2% – Some impact    16.4% – No impact
8. "Litter makes a community less desirable and lowers property values"  
63.6% – Big impact    27.3% – Some impact    9.1% – No impact
9. "Litter attracts pests like rats and roaches"  
74.5% – Big impact    20.9% – Some impact    4.5% – No impact
10. "Litter is harmful to the health of the children that live in a neighborhood"  
66.4% – Big impact    27.3% – Some impact    6.4% – No impact
11. "90% of Hayward residents think it is wrong to litter"  
41.3% – Big impact    36.7% – Some impact    22.0% – No impact

**B. We are going to ask a few questions about sorting food scraps.**

12. For this survey, we are going to use the term "food scraps," which means all the leftover scraps you have after cooking or eating and any food that has gone bad. Have you heard the term "food scraps" before?  
86.4% – Yes  
13.6% – No
13. For this survey, we are going to use the term "food soiled paper," which means all the paper, napkins and cardboard that has touched food, like a pizza box or used paper plate. Have you heard the term "food soiled paper" before?  
38.5% – Yes  
61.5% – No
14. Do you have your own trash carts or do you share your carts with your neighbors?  
69.4% – Own  
30.6% – Share





15. Do you have a green organics cart?

55.2% – Yes

44.8% – No (skip to question 17)

16. How often do you put your food scraps and food soiled paper in the green cart?

33.9% – Always

12.5% – Most of the time

30.4% – Sometimes

23.2% – Never (skip to question 18)

17. If you had access to a green cart, how likely would you be to sort out your food scraps and food soiled paper to put in the green cart?

48.4% – Very likely

35.8% – Somewhat likely

15.8% – Not likely

18. When you sort your food scraps and food soil paper, why do you do it? (skip if they do not sort; check all that apply)

51.5% – It is good for the environment

29.7% – It is the way I was told to do it

15.8% – It helps cut my garbage bill

1.0% – Other (Social Responsibility)

1.0% – Other (City Ordinance)

1.0% – Other (Not Specified)

19. When you do not sort your food scraps, what are the main barriers? (check all that apply)

21.8% – I don't have a green cart

14.6% – I didn't know food scraps and food soiled paper should go in the green cart

14.1% – It smells

15.0% – It attracts bugs

11.2% – It's overwhelming because I don't know what items go in which carts

21.4% – It's inconvenient – I don't have time

1.4% – Other (Not Specified)

0.5% – Other (Run out of room)

20. Do you have a kitchen pail for collecting food scraps?

69.1% – No

30.9% – Yes



21. Did you know that you can get a kitchen pail for free as part of your garbage service?

80.0% – No

20.0% – Yes

I am going to read you a series of messages about sorting food scraps. Please tell me if these messages have big impact on you, some impact, or no impact.

22. “Sorting your food scraps keeps waste out of our landfills”

42.2% – Big impact    47.7% – Some impact    10.1% – No impact

23. “Sorting your food scraps can help you save money on your garbage bill by downsizing your trash cart”

56.4% – Big impact    33.6% – Some impact    10.0% – No impact

24. “Sorting your food scraps reduces climate change”

40.9% – Big impact    41.8% – Some impact    17.3% – No impact

25. “Sorting your food scraps helps California maintain its rich top soil because the food scraps are composted and used at farms”

48.1% – Big impact    43.5% – Some impact    8.3% – No impact

26. “80% of Hayward residents sort their food scraps”

27.8% – Big impact    44.4% – Some impact    27.8% – No impact

**C. Finally, we would like to know some general information about you.**

27. How many people, including yourself, live in your household? \_\_\_\_\_

1 – 2.7%

2 – 20.9%

3 – 15.5%

4 – 25.5%

5 – 18.2%

6 – 11.8%

7 – 3.6%

8 – 1.8%

Mean: 3.95



28. What is the primary language in your household?

79.1% - English

13.6% - Spanish

0.9% respectively - Cantonese, Pashto, Sinhalese, Tagalog, Tamil, Telugu, Urdu, Vietnamese

29. Where do you most often get news and information? (check all that apply)

20.6% – Television

11.1% – Radio

4.3% – Printed Newspapers

2.5% – Printed Magazines

20.3% – Websites

23.7% – Social Media

16.6% – Friends and family

0.6% – Other (Not Specified)

0.3% – Other (Teachers)

30. Which social media do you use frequently? (check all that apply)

29.9% – Facebook

15.0% – Twitter

6.3% – Pinterest

22.8% – Instagram

18.5% – YouTube

1.5% – Other (Snapchat)

0.5% – Other (G-Mail)

1.5% – Other (Not Specified)

3.9% – None

31. Have you ever visited the City of Hayward's website?

23.9% – Yes

76.1% – No

**Thank you for participating in this survey!**



## CONCLUSION

### **Key Findings**

#### **Section A**

Littering is perceived as a problem in Hayward

13.6% neutral

26.4% agree slightly

15.5% agree

15.5% agree strongly

Laziness and lack of caring are perceived as the main reasons for litter.

Chosen by 55.0% of respondents

Respondents were most impacted by:

Harm to marine life (64.2% big impact, 30.3% some impact)

Cost to taxpayers (45.5% big impact, 38.2% some impact)

Lowered property values (63.6% big impact, 27.3% some impact)

Attracting Pests (74.5% big impact, 20.9% some impact)

Harm to children (66.4% big impact, 27.3% some impact)

#### **Section B**

86.4% of respondents **had** heard the term “food scraps.”

61.5% of respondents **had not** heard the term “food soiled paper.”



55.2% of respondents have a green organics cart.

48.4% of those without would be very likely to use if they had one.

35.8% of those without would be somewhat likely to use if they had one.

“How often do you put your food scraps away in the green cart?”

33.9% – Always

30.4% – Sometimes

23.2% – Never

People sort food scraps because:

51.5% – It is good for the environment.

29.7% – It is the way I was told to do it.

15.8% – It helps cut my garbage bill.

People do not sort because

21.8% – Do not have a green cart.

21.4% – It’s inconvenient-I don’t have time.

15.0% – It attracts bugs.

14.6% – Didn’t know food scraps and food soiled paper should go in the green cart.

14.1% – It smells.

11.2% – Overwhelming because I don’t know which item goes in which cart.

69.1% of respondents **did not** have a kitchen pail.

80.0% of respondents **did not** know that kitchen pails are free as part of garbage services.



Respondents were most impacted by:

Sorting food keeps waste out of landfills (42.2% big impact, 7.7% some impact)

Sorting can save on garbage bills (56.4% big impact, 33.6% some impact)

Sorting food scraps reduces climate change (40.9% big impact, 41.8 some impact)

Sorting food scraps help maintain top soil (48.1% big impact, 43.5% some impact)

## **Section C**

Average household size: 3.95 people

Primary household language

79.1% – English

13.6% – Spanish

Sources of news and information

23.7% – Social Media

20.6% – Television

20.3% – Websites

16.6% – Friends and Family

Social media usage

29.9% – Facebook

22.8% – Instagram

18.5% – YouTube

15.0% – Twitter

6.3% – Pinterest



76.1% of respondents **had not** visited the City of Hayward's website.

### **Students' Reflections on the Learning Experience**

For most of the students this was their first real world experience with quantitative research. This was the first opportunity for many to become acquainted with the terms and methods utilized in quantitative research. Many reported that this was their first time really utilizing programs such as Excel or SPSS, and saw the value that these skills could have in future academic and career endeavors.

Several students reported an increased confidence in their communication skills as a result of administering this questionnaire. They said that it was initially uncomfortable for them to approach strangers and ask for their time, but they worked through it as they had no other option. These students reported more success gaining participants when they had a script or gave statistics and information regarding the issues.

Many students discovered that people can be impatient or resistant when it comes to surveys. Many people reported trouble gaining participants, and learned that persistence is crucial when it comes to recruiting strangers in person.

Several students reported an increased awareness of waste management. One student mentioned learning that the green cart could be used for food scraps, and that food pails were free as part of waste services. One reported that this was their first time hearing the term "food scraps" or "food soiled paper." Many were surprised to learn that Hayward had such robust waste-management programs.

Students also learned from their individual datasets. Nearly every student reported laziness as the primary perceived cause of litter, which was the primary cause in the aggregated data as well.

One student was very surprised to see that their friends who took the survey had different views than they did regarding litter. They say this illustrated first-hand the value of survey research- without the data from this questionnaire, this student says they would have falsely assumed their friends' opinions on the issues.



## **Recommendations For Future Projects**

### **Suggestions for Researchers**

Several researchers reported participant impatience at the length of the questionnaire, and participant confusion due to switching scales. To alleviate participant impatience, researchers recommended shortening the survey. To reduce confusion, researchers recommended keeping similar scales together in future questionnaires.

Several researchers also reported issues with getting responses from people on the street or on campus. One researcher contradicted this, finding participant recruitment easy, as they utilized telephone and e-mail for their surveys. Researchers who had trouble recruiting participants found more success when they had a script ready or presented some information on the topic.

Many researchers came up with community-based recommendations. Some recommended including local statistics on litter and its effects and also listing fines for littering and dumping. One researcher noted that homeowners seemed more interested in the topic than non-owners and wondered if different tactics might be useful when attempting to reach owners or non-owners. One researcher noted the fact that businesses, schools, and organizations produce more litter than families and so recommended targeting these groups for future research.

### **Proposed Questions for Future Questionnaires**

Researchers were asked to recommend closed-answer questions for future surveys. Here are some of the most salient and most-recommended questions.

- Do you feel that Hayward provides adequate resources for residents who want to sort waste?
- Are there enough trash cans in Hayward?
- Is it OK to litter when there are no receptacles around?
- Do you know that the fine for littering is 1,000 dollars?
- Do you clean up after people who litter?
- Would you follow social media groups that focus on waste management?





- Would you be interested in participating in community cleanup events?
- Demographics: Age, ethnicity
- Do you rent or own?

# **Changing Attitudes Toward Organic Waste Disposal and Composting with Games**

Winter 2017

Department of Communications

**PIONEERS FOR SUSTAINABLE COMMUNITIES REPORT**



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## ACKNOWLEDGEMENTS

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The City Council: Barbara Halliday (mayor), Sara Lamnin, Francisco Zermeno, Marvin Peixoto, Al Mendall, Elisa Marquez, and Mark Salinas

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California State University, East Bay Faculty Collaborators, Ian Pollock, Professor in Art Department and Director, Graduate Multimedia Program, and Anthony Carlos, Library

Waste Management of Alameda, Inc. Collaborators, Ingrid Severson and Shova Ale

This pioneering year of P4SC would not have been possible without the generous support of Cal State East Bay President, Leroy M. Morishita.





## About Pioneers for Sustainable Communities

Pioneers for Sustainable Communities (P4SC) is a year-long partnership between Cal State East Bay and a community partner that represents local or regional government. P4SC is one of a network of campuses nationwide—the EPIC-N Network—that have adopted a model of using course-based, faculty-lead, student research to support the sustainability goals of local communities. P4SC focuses on sustainability, social justice, and quality of life in the San Francisco East Bay region. It leverages the expertise of faculty and the enthusiasm, time, and innovative ideas of students, providing thousands of hours of research to support local partner sustainability programs including: data acquisition and analysis, stakeholder surveys, geo-spatial mapping and referencing used to establish socio-environmental baselines, track progress, and facilitate planning and communications.

- **P4SC Reports** present the final results of one or more full-time equivalent courses devoted to a single P4SC project.
- **P4SC Mini-Reports** present the results of partial courses devoted to a PSC project, typically used for projects in progress.

## About Cal State East Bay

Cal State East Bay's beautiful main campus is located in the Hayward hills with panoramic views of the San Francisco Bay shoreline. Situated above the city of Hayward, the campus offers an ideal setting for teaching and learning and yet easy access to the many cities along the bay. The University has a satellite campus in Concord, a professional development center in Oakland, and a significant presence online. Founded in 1957, Cal State East Bay is one of 23 universities of the California State University system (CSU). With an enrollment of over 15,800 students, Cal State East Bay is recognized as a regionally engaged and globally oriented university with a strong commitment to academic innovation, student success, engaged service learning, diversity, and sustainability.

## P4SC Directors and Staff

Karina Garbesi, P4SC Co-Director, Professor and Director of the Environmental Studies Program, Department of Anthropology, Geography, and Environmental Studies, Cal State East Bay

Craig Derksen, P4SC CO-Director, Assistant Professor of Philosophy, Department of Philosophy, Cal State East Bay

Audrey Wade, P4SC Program Coordinator, Cal State East Bay

*With support from Jillian Buckholz, Director of the Office of Sustainability*



## About the City of Hayward

The City of Hayward was incorporated in 1876. With a population of 150,000, Hayward is the sixth largest city in the Bay Area and proudly the second most diverse City in California. A Charter City, Hayward operates under the Council-Manager form of government with a directly elected Mayor and six member City Council. Hayward is a full service City comprised of thirteen departments providing services ranging from public safety and public works to library and community services. The City strives to be a safe, clean, green, and thriving community for all of its residents. To learn more about the City of Hayward, visit [www.Hayward-ca.gov](http://www.Hayward-ca.gov).



# Changing Attitudes Toward Organic Waste Disposal and Composting Through Games

## REPORT AUTHOR(S)

Brianna Callahan-Gray

Lonny Brooks

## COURSE PARTICIPANTS

### **P4SC Instructor**

COMM4107: Lonny Brooks, Assistant Professor of Communication

MM66: Ian Pollock, Assistant Professor of Art

### **P4SC Student Participants**

A total of 39 undergraduate students worked to produce small-scale prototype games to increase and promote awareness of recycling and composting commonly referred to as three-stream sorting. A number of these students took part in the Zero Up Game Jam as well along with students from various CSUEB departments in business, computer science, and communication.

A total of 7 graduate students as a seminar team produced a workable digital and interactive prototype game called Recycolution that Waste Management of Alameda, Inc., and the City of Hayward have an active interest in developing as part of the redesign of WM's current portable game booth to use at street festivals for promoting sustainability awareness for the City of Hayward and the City of Oakland. The regional EPA representative has much interest in this game as well.

### ***Students in Comm 4107: Relational Communication in Organizations***

#### **Mean & Green**

Kevin Jung

Robyn Sison

Ryan Yee

#### **Green & Clean**

Shannon Bahr

Christine Gohil

Angie Mercado

Yingyi Zhou

#### **Com Pow**





---

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Monika Starr

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Jonathan North

**Better Tomorrow**

Shannon Panec

Tritia Maniquis

Jessica Bryant

**Let Us Compost**

Arian Amin



---

Khosbayar Batgerel

Erica Medina

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Laura Greene

Ken Imah

Connie Tang

Yasser Moten

Stephen Leber

Madlen Bouthillier

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## OBJECTIVES

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The City of Hayward has identified composting as a route toward greater sustainability. They are partnering with California State University, East Bay to help meet these ends. The students of COMM 4107 Relational Communication in Organizations in Winter 2017 were tasked with developing games to improve attitudes about Compost and Organic Waste.

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## GAME DESIGN

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## GAME AND ENVIRONMENTAL PUBLIC RELATIONS DEVELOPMENT

The City of Hayward and Waste Management of Alameda, Inc. (WM), decided to see what student teams might develop in creating a promotional game booth based on the existing game booth that WM had in use and wished to redesign. Their call for development described what they had created and what they now wanted to redesign.

Waste Management is currently developing creative content for a new interactive 3-stream educational booth for streetfest events. A number of years ago, WM worked with another University as a class project to create a concept of a booth game. Unfortunately, the resulting concept was too expensive to materialize, so WM is looking to try once more and this time with Cal State East Bay and the City of Hayward.

Some Guidelines for Creative Development of Zero Waste Game:

- Interactive, fun and educational game/playable media, focused on 3-stream sorting.
- Provide guidance on proper waste handling; Includes recycling, compost, and trash.
- Regarding trash: specifically address hazardous waste and bulky pickup vs. dumping and littering.
- Try to include representative, key items from each stream.
- Game style should be both child and adult friendly.
- Game should be portable (for ease of heavy use & transport for events) and be free standing or fit within a 6'-8' long table and standard event booth area (10' x 10').
- Features should include a strong visual element, the "why" or "need" for recycling and composting and sorting correctly.
- For optimum customer experience, game should be visually driven, rather than text based.
- Game concept should go beyond the standard sorting, "what goes where" and not be a spinning wheel game.
- Product should be designed with economic viability as a factor (production costs of game not to exceed \$5,000).

Games are an often under appreciated communication tool. Games allow us to model complex relationships and experiments with choices in a complex system. Games are a way to have fun and bring people together around a common activity while consciously or unconsciously discovering and exploring ideas around social relations, political, and economic systems, and developing personal and interpersonal skills.

The students simulated creating environmental public relations (PR) practice firms and developed a value proposition for their companies with their recycling game as their deliverable product. Student teams created their own simulated PR firms using an approach for sustainable entrepreneurship known as Models of Impact (MOI) developed by Anthony Manos at VERNICE, Inc. With MOI, student PR firms developed



their pitch and value propositions for their firm and the game they designed for increasing awareness of 3-stream sorting via public awareness interactive games.

Student firms developed their own self-styled names for their firms:

1. No GPMs
2. Green and Clean
3. Mean and Green
4. Compost Cadets
5. Better Tomorrow
6. Waste Management
7. Lettuce Compost

Students created their games based on principles of human centered design from IDEO, a design firm based in Palo Alto that has developed design processes for sustainability focused efforts for community and urban challenges.

*“Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.” —Tim Brown, President and CEO, IDEO*

Their games developed through a **three phase process** known as **inspiration** where students engaged in research about recycling and composting, **ideation** where students sorted and clustered their ideas based on this research and then transformed them into insight statements, and **storyboards** for outlining how various audiences might interact with their games and finally implemented these ideas into small scale prototypes to materialize their ideas for feedback and final implementation.

Student firms created these games by creating a series of design questions known in the design processes as “How Might We...” questions. These questions asked the following:

- How might we get people interested and actively involved in composting and recycling?
- How might we develop a well informed audience with up to date information, activity meetings and access to composting and recycling?
- How might we incorporate social media in order to have a following of people interested in composting and bringing awareness to local neighborhoods that lack information?

Student simulated PR firms created storyboards based on various audiences diverse in age, gender, and ethnicity and considered how they might approach and interact with the game booth.

The City of Hayward met with the class on several different occasions. During these visits the City explained the significance and importance of composting, as well as



recycling. The City of Hayward showed the class a video that briefly described what composting is and how one can incorporate composting in their daily lives. The video explained what composting is and how to properly separate items in the proper bins (recycle, composting, and trash bins). The City focused the majority of the presentation on the benefits the City offers to those who compost and the long term goals the City has set in place to accomplish.

Some of the goals the City has in place are to reduce the amount of waste in Hayward by 80% by the year 2020. Another goal is to have waste that is sent to landfills to contain less than 10% of materials that are compostable or recyclable. Along with informing the class of the long term goals, the City went into great detail on the benefits available to those who compost; throughout the presentation the City emphasized how convenient and beneficial composting can be and many classmates were surprised at the number of services the City offered. One service that surprised most of the class was the Organics Service which involves the City distributing free green carts/bins for families and businesses to separate their trash conveniently. Along with being able to separate trash with convenience, the City and Waste Management have a franchise agreement with one another to ensure that trash from homes and businesses is collected in a timely manner. The City briefly described the process of what happens to the collected material once it arrives to the composting facilities (Redwood Facility and Blossom Valley).

One thing that the City emphasized several times was the importance and value of education. From their experience and knowledge most people do not compost or do not compost correctly because they do not know how. A lot of people are also unaware of many of the services the City offers to those who would like to start composting. The City went over “Compost Giveaways”, which consist of the City of Hayward giving out free bags of compost to community members once a year. When the class heard this information they were immediately intrigued and astonished. Most of the students asked details for the next event (with intentions of going), some students even asked why they haven’t heard of this giveaway. The City also informed the class of a couple of different outreach groups (Waste Management, Cascadia, and the City-led outreach) that attends events and talks to the Hayward community with the intention of informing and teaching others the importance and convenience of composting.

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## THE GAMES

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### No GPMs

#### **No GPMs Presentation Notes:**



## Ready, Set, Sort

No GPM's Environmental  
Consulting Group



### Game Design

- Name: Ready, Set, Sort !
- Slogan: Why Waste, When You Can **Sort** !
- Type: Exciting and Competitive Speed Sorting Game



## Game Instructions

Game leader will control the lighting on the board

Led remote control lighting that will flash colors for specific holes in the board.  
(Red=Trash Blue=Recycle  
Green=Compost)

Once it lights up the person is timed to put the correct items in the bin.

The items are objects that will have compost or reusable items pictured on it. The objects will be easy to differentiate for kids and adults.

It's a timed game meant for two people at a time

Winner can win gift card to their favorite "green" restaurant or choose from a prize we'll have in Buckets

## Inspiration : Batak Pro Lite Game



## Photo Booth

#wmnogpms





## Materials Needed

Budget  
\$2000

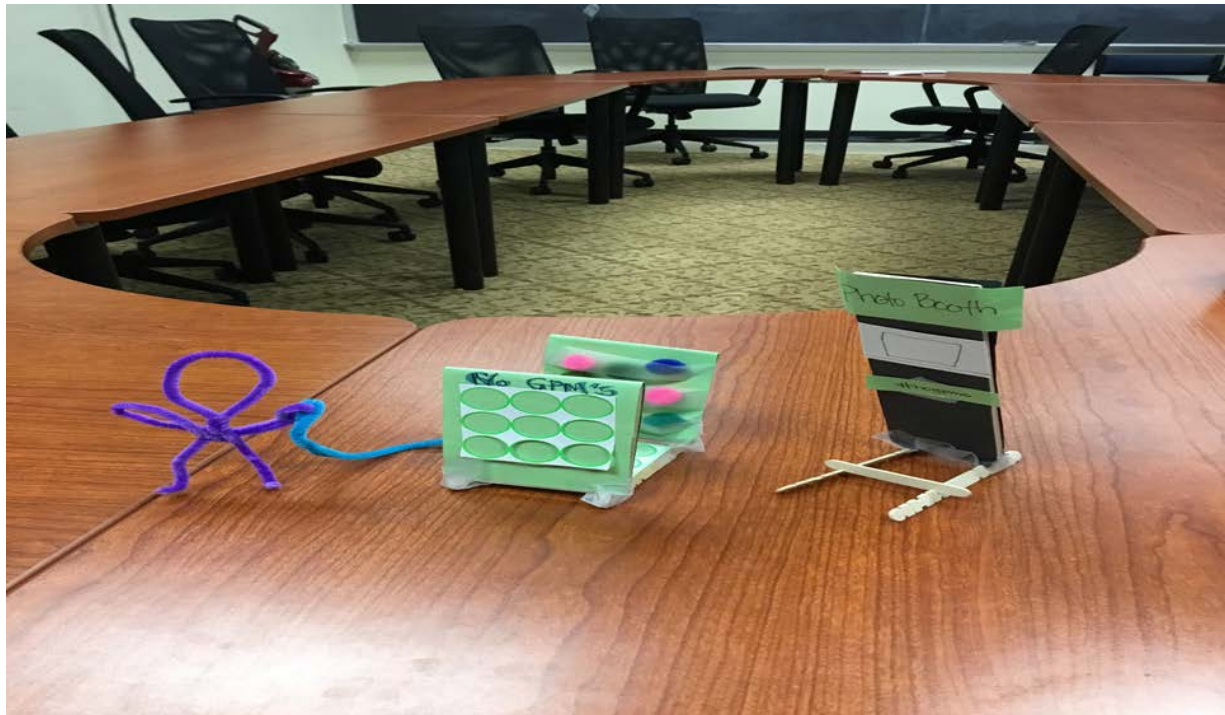
2 Wood / Plastic panels about 5ft  
high and 2 ft wide

LED lights (Remote Controlled)  
For both sides

12 Baskets (Clients Style  
Preference) 6 for each side

Paint

Custom Poster Board  
(Instructional Diagram)







## GREEN AND CLEAN

Green and Clean created a game called “Eco-go”. This game is a flash card, with two different teams (Red team and Blue team), that is played on an app. The “Eco-go” app has three different levels the players can go through. The first level would be a booth game. The second level consists of the flashcard questions, which would have questions about composting, recycling, and gardening. Finally, the third level would have a paintball, canon ball, and coloring section for the gamers. This game is meant to target all age groups. Adults can enjoy the question trivia, while children will enjoy the learning games and eventually participate in the question trivia.

The Green and Clean team definitely created a game with a different approach than the other teams. This team wanted to create a game that was applicable to all age groups and was the only group to create a game that would not cost a dime (because creating apps is free). This team has proposed a vision that once their app is to become popular, other companies will want to promote their ads on it, which will end up creating revenue.

### **Green and Clean Presentation Notes:**

◉ *Model of Impact: Social Action* ◉ *Revenue Model: Advertisement* ◉ *Value Proposition: We have utilized technology to create a game experience that will stay with the booth participants long after they leave* ◉ *Products: Phone app that is both fun and educational. Game involving app and physical props (flashcards)*

#### *Our Game Design Eco - Go*

◉ *Booth game- Eco-Wiz Level (Flash card game)* ◉ *Red Team* ◉ *Blue Team* ◉ *Prizes for the team who gets three answers correct*

#### *Stage One*

◉ *Eco-Wiz Level (Flash Card Game on the App)* ◉ *Multiple choice questions about Composting/Recycling*

◉ *Eco-Learn Level* ◉ *Composting Tips* ◉ *Gardening Tips* ◉ *Local Event listing*

#### *Stage Two*

◉ *Nationwide distribution of the app across all Waste Management* ◉ *Paintball level* ◉ *Cannon level* ◉ *Coloring Book level* Stage Three

*Why create waste when you can easily create compost?*

*Learn how to compost with the swipe of your finger.*

*Plan for an extravagant tomorrow by making extraordinary choices today.*



## MEAN AND GREEN

Mean and Green created a game called “Trash Me”. This game is a card/board game where the players wear cards on headbands that have a picture of some type of waste. The players will ask the others players clues on what the waste is and try to guess what the waste is and where it goes when it becomes trash. Throughout the game there are clues that will be available to the players to help them guess what card is on their headband. The clue cards/posters will consist of items that are organic, landfill, and recyclable materials. The overall purpose of the game is to teach the players about composting. At the end of the game there aren’t any losers or winners but there are tickets to the “Davis Street Complex” where the players can learn more about composting and recycling.

Mean and Green are determined to use their game to impact all generations by a social impact. Not only will this game be fun for all age groups but it will teach and motivate everyone to compost and recycle correctly. Mean and Green are not interested in a money profit, but they are interested in motivating others to help rebuild/save the environment.

### Mean and Green Presentation Notes:

#### *Environmental Consulting Practice*

☐ *Impact Model: Social Awareness*

☐ *Revenue Model*

*Booth Game Encouraging Composting Awareness*

*Game Design*

☐ *TRASH ME!*

*Think*

☐ *Heads Up! but themed around trash and where it goes.*

*How To Play*

☐ *Players will wear a printed card with waste on it. to narrow down and guess what they are.*

☐ *The player will*

☐ *Player is encouraged*

*bin they belong in. what they are:*

☐ *The player will*

*Clues*

☐ *Posters like these with silhouette images will be in the booth to narrow down the possible item they are.*

*How To Play*

☐ *Players can switch off turns and play a few rounds. ☐ Players will learn what items go in what bin.*

☐ *There are no winners*

*“ticket” to visit the Davis Street Complex to learn more about recycling and composting.*



### *Slogans*

*☐GOING GREEN IS AS EASY AS 1,2,3 BINS! ☐SUSTAINABILITY TODAY FOR A TOMORROW*

### COMPOST CADETS

The Compost Cadets created an innovative separating game that involved a kiddie pool (which signified the ocean), magnetic fishing rods and mock waste with magnets attached. The pool would be filled with mock waste as two players would fish for trash and put the collected trash into the proper waste bins (recycle, trash, compost). Whoever sorts the most trash correctly would win a prize. Everyone who interacts with the game tent would receive refrigerator magnets and/or stickers to put on their bins at home to remind them where materials go. Compost Cadets' overall goal of their game is to promote positive waste sorting.

The Compost Cadets hope to use their game as a way to interact with the community while building a sense of togetherness amongst the community. They believe that this game will help bring neighbors together, which can help make the journey more interesting and fun. This game will hopefully turn composting into a habit, which will help the community's sustainability flourish. Along with the game, the group thought that email blasts would be a quick and free method to spread information to the community. In order to keep costs at a minimum, the group would reuse materials from previous games as well as shop in bulk for other needed materials, which would keep the cost as low as \$25 per game. What makes this game stand out is it shows that pollution and trash do not just happen on land, but happens in water as well.



## Compost Cadets Presentation Notes:



Proper waste sorting is an easily learned practice that promotes environmental ownership for our local community.





## "Cleaning up the Ocean"

### Materials needed:

- Kiddie pool
- Magnetic fishing rods
- Mock "waste" with magnets attached
- Whiffle balls to add to the challenge
- Recycle, trash, compost bins

### Rules

- Two players at a time
- Players use their fishing rod to "fish" out the waste
- Sort the waste in the appropriate bins
- Whoever can sort the most correct items wins and gets a prize

## Slogans

- Stop, think, sort. For what it's worth, 5 seconds can save the Earth!
- For a better tomorrow, begin composting and build the bright future today.
- Treat the planet how you would want to be treated, and it will do the same to you.
- Let's think green and keep the Earth clean!



## Additional Information

- Promote positive waste sorting through social media, interact with community members.
- Send out fridge magnets and/or stickers to put on bins that can visually help proper sorting.
- Email and text blasts to keep people inspired
- School newsletters

## BETTER TOMORROW

The group Better Tomorrow decided to create a game that targeted mostly children. The goal of this game would show/teach the players the full cycle of composting after it is picked up. The game would be set up like a game board, each spot on the board would be a different step throughout the compost journey and the game piece would be an apple core, moving through the different steps of composting. The different steps of the game go as follows: apple core, garbage, landfill, methane OR alternatively, apple core, organics, compost, garden. The players can see what happens if they do or do not compost, which shows them the importance of composting and the effect that one person can have on the world. At the end of the game the players can see that by composting the apple core, they have contributed to planting an apple tree or they have contributed to more trash on the planet. There would also be a series of compost questions asked to the players throughout their board game journey.

The group's overall goal is to create a more sustainable future by taking a childhood game and incorporating education into it. Because the goal is to teach others the importance of sustainability, the budget for this project is kept at a bare minimum. The group intends to reuse both recycled materials and materials from past games to create their game.



## **Better Tomorrow Presentation Notes:**

*Mission Statement • To create a simplified learning experience for children to understand the importance of composting: Composting is a sustainable practice that will benefit the community and environment for future generations*

### *Objectives*

- *Learn the full cycle of composting after the apple core is placed in the composting bin*
- *What happens after the garbage is picked up?*
- *The idea of the game is for players to understand that the decisions they make can either lead to a new apple tree or lead to hindering our future*

### *Process*

#### **COMPOSTING PROCESS=GAMEBOARD**

#### **F G G**

• *A roadmap showing the journey of an apple core from disposal to the growth of another apple tree* • *Players are asked questions about how they dispose their apple core (organics) which determines where it goes next... - Organize the step-by-step process of composting - Learn the benefits of composting* • *Apple core → Garbage → Landfill → Methane*

*Apple core → Organics → Compost → GARDEN* • *Visuals of the apple core, organics bin, waste bin, garbage truck, facility, landfill, windrow piles, compost and a garden as well as information about each step*

### *Game Questions*

- *Sand, coal and ashes can be compost. True or False*
- *Heat is used for the decomposition process. True or False*
- *Can coffee grounds, egg shells and horse manure be compost? Yes or no*
- *Fill in the blank: Water + oxygen + \_\_\_\_\_ = Composting*
- *Name one reason why composting is important for the environment.*



## WASTE MANAGEMENT AND ASSOCIATES

### Waste Management and Associates Presentation Notes:

# Waste Management & Associates

-Rebecca, Adam, Aaron, Thomas



## Awareness and Involvement

-Bringing the Community Closer

-Business/Employee Engagement

-Makes a more stable connection

Between the people that run the city,  
And those that live in the city.







## Sustainability

- Natural Environment which leads to
- Healthy Communities which leads to
- Healthy People which leads to
- Stable Economy



## Road To Awareness

Relay Race





## LETTUCE COMPOST

### Lettuce Compost Presentation Notes:

## LETTUCE COMPOST



## Target: Kids

- Kids are the future
- Kids influence parents



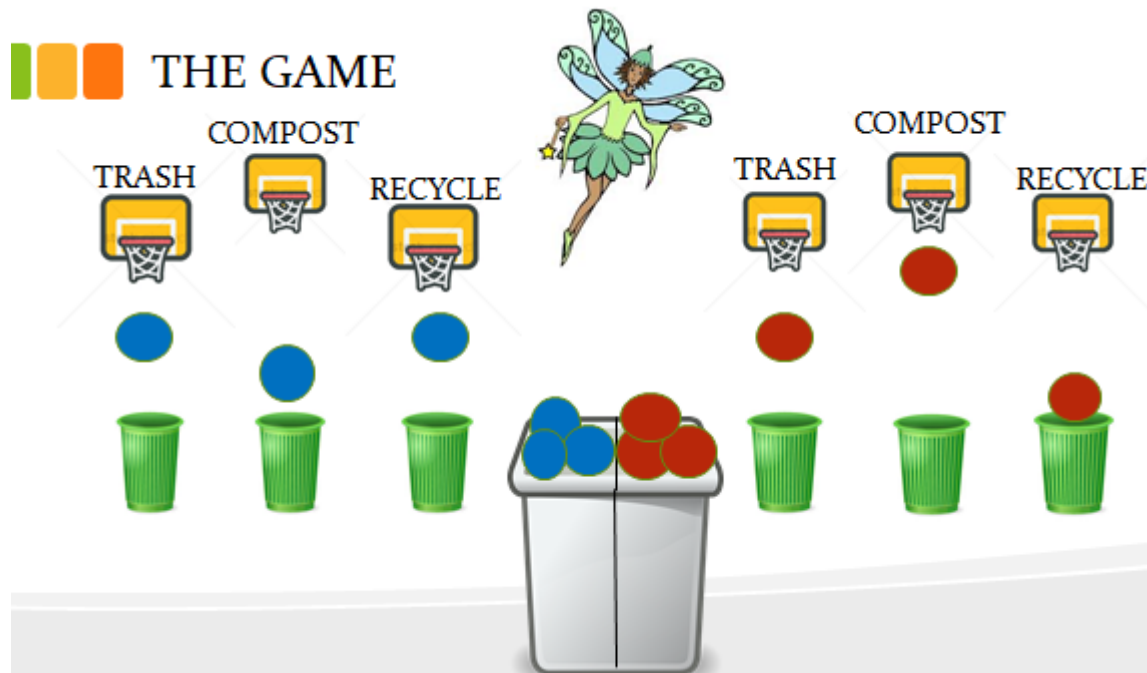


## COMPOST FAIRY



- Brings the “magic” of composting into homes
- Informs and educates children and adults about composting
- Sings songs and visits schools

## THE GAME





## SPREADING THE WORD



#FEEDHERRIGHT

## SLOGANS

- MINDFUL WASTE, PROBLEMS ERASED
- EARTH IS ALIVE, FEED HER RIGHT
- IN THE DIRT, NO MORE HURT
- COME POST ABOUT YOUR COMPOST!





## GRADUATE SEMINAR GAME DEVELOPMENT

OR

## THE ADVENT OF RECYCOLUTION

The graduate students in a graduate seminar called *MM66: Interactive Content Delivery* taught by Professor Ian Pollock used human-centered design principles in developing a final and workable full scale digital prototype for their game booth in working with WM and the City of Hayward. They developed a promotional film and accompanying powerpoint presentation, with details as follows:

### **Recycolution Game Demonstration and Pitch**

Today we want to show you our amazing new recycling game that we developed by using human-centered design thinking, featuring:

- A. Discovery
- B. Learning
- C. Building

### **Developing the Recycolution Game**

Our challenge was to develop a game that would educate, train, and inspire users to become better recyclers.

To accomplish this task we had to go directly into the community and speak with people who recycled or didn't, learn from experts, and witness firsthand for ourselves what happens at recycling and waste facilities...Overall, we wanted to know why people recycle and why they don't.

- We spoke to extreme recyclers who shared what motivated them to become life-long recyclers.
  - a. Each were motivated by a deep-seated passion.
  - b. They had vivid mental maps and a clear vision about the impact of waste on the environment and future generations.
- We spoke to non-recyclers, who spoke about their reservations to practice this behavior.





- Experts also offered input:
  - a. 2% of people recycle.
  - b. Recycling is labor intensive.
  - c. Older people are more likely to recycle.
  - d. Recycling is not seen as cool.
  - e. Recycling is too common place (people aren't moved by it).

Next, we had to synthesize the crucial insights from our fieldwork and identify common themes, recycling challenges, and then discuss how we might address them in our game.

- After an intensive discussion we came up with the following challenge statements:
  - a. It is difficult to see the real impact of our recycling.
  - b. It is difficult to know what to recycle and where.
  - c. We can't see the consequences of waste.

These insights led us to develop solutions starting with “How Might We...” statements to address these obstacles to recycling:

“How might we.....”

- I. ...develop playful ways to learn about the recycling and recycling locations?
- II. ...use playable media to help train/educate people into becoming practicing recyclers?
- III. ...design an interactive game which will enable urban residents to visualize/realize the impact of individual and collective recycling efforts?
- IV. ...create a way for people to focus on the positive aspects of recycling and remove the stigma?

These “How Might We...” statements propelled us into the prototyping stage.

- We took a week to individually think about game prototypes that would address our “how might we” questions and we came up with some diverse but relevant ideas that we presented in our next meet up.



- There was the proposal to develop an augmented reality game titled “Trash Bandit.”
- Another team member suggested making a narrative game about a dystopian future where trash has spread to every inch on the planet.
- To address the problems of sorting, a carnival style mallet game was recommended and an old school top-down game was proposed which tasked players with collecting thrown away items and place them in the correct bins to advance to the next level.

We went back and forth on each, cross-referenced them to our design challenge, reflected on feasibility and viability. Suddenly, when we looked at these renditions, ideas emerged:

- I. Mix the sorting/collecting game with the carnival style mallet game.
- II. Take advantage of the physical space where this game will be showcased.
- III. Add in game elements of throwing objects in the right bin or hoop.

The result: A ‘Dance-Dance Revolution’ style game, but with a recycling twist.

- In order to understand how this game would play out in the field, a basic prototype was built using Power Point slides, upbeat music, and floor panels made from paper and cardboard.

The Alpha Testing results were encouraging:

- I. Participants were having fun.
- II. Participants learned new information—even those who are regular recyclers.
- III. Participants immediately started implementing what they learned.
- IV. Our observation of participants helped us to tweak the speed of the game, improve visuals, and drove us to include specific sound effects.



## The Advent of Recycolution

Mateo Fowler | Laura Greene | Ken Imah | Connie Tang |  
Yasser Moten | Stephen Leber | Madlen Bouthillier |  
03.14.2017

“Everything has a place,  
and there is a place for  
everything.” - Aunt Mona

- ❶ **Pizza boxes, paper towels and napkins are paper so they go in the blue recycling cart.**  
 **Nope.** They're often contaminated with food and grease and can't be reused as paper. They can go in your green organics cart.
- ❷ **Foam meat trays and egg cartons should go in the blue cart.**  
 **Nope.** Unfortunately all foam products should go in the black landfill cart; they are not easily recycled.
- ❸ **Throw plastic bags away; they can't be recycled.**  
 **Nope.** Clean bags can be recycled! Just bag-the-bags and put right into the blue recycling cart.
- ❹ **It's best to put food scraps down the garbage disposal.**  
 **Nope.** Food and grease can clog pipes and cause backups and sewer spills. Prime cloggers are cheese, gravy, salad dressing and meats. Plus, it takes a lot of resources and energy to remove all of the food waste at the water treatment plant. Place all of your food scraps in the green organics cart.
- ❺ **I need to wash all the bottles and containers before I recycle them.**  
 **Nope.** Just make sure they're empty and fairly clean—use a spoon, spatula or napkin to clean out the container (and compost the napkin in your green organics cart).

5 Recycling Myths - RecycleSmart





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## Our design challenge

Design an interactive 3-stream educational game that will be:

Adult and child friendly

Visually driven

Affordable

Portable

~~Inclusive of representative items for each stream~~

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## What is design thinking?

"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success." —Tim Brown, President and CEO, IDEO

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## Key Elements of Design-Thinking

- Human-Centered
  - Collaborative
  - Optimistic
  - Experimental
  - Positive Social Impact
-

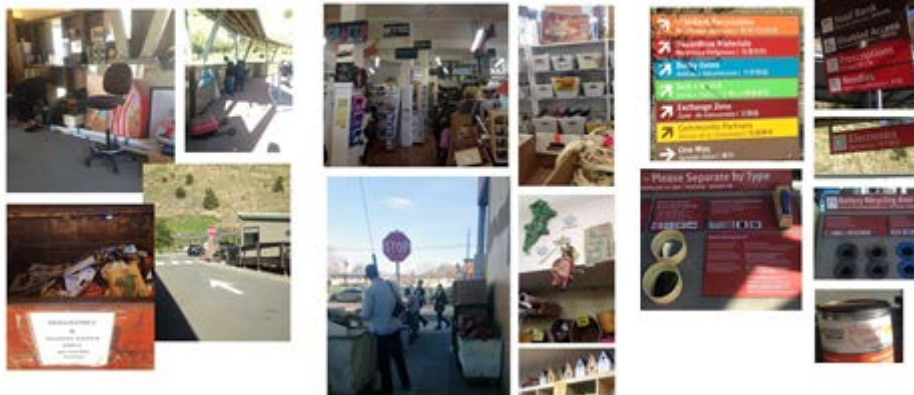


## Inspiration/Discovery

### Inspiration/Discovery



### Inspiration/Discovery






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## Inspiration/Discovery

Extreme Recycler:

Joanne (Walnut Creek, CA)




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## Inspiration/Discovery

Extreme Recycler:

Stuart (Walnut Creek, CA)



Recycling for over 30 years

Boycott non eco-friendly businesses

Each person's mountain of trash as a legacy

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# Ideation/Learning

## Ideation/Learning



## Ideation/Learning

We learned the existence of the following recycling challenges:

- It is difficult to see the real impact of our recycling
- It is difficult to know what to recycle and where
- We can't see the consequences of waste



## Ideation/Learning

"How might we" use playable media to learn about recycling and recycling locations?

"How might we" use playable media to help train/educate people into becoming practicing recyclers?

"How might we" design an interactive game which will enable urban residents to visualize/realize the impact of individual and collective recycling efforts?

"How might we" create playable media to focus on the positive aspects of recycling and remove the stigma?

## Prototyping/Implementation

### Prototyping/Implementation





## Prototyping/Implementation

Participants were having fun

Participants learned new information—even those who are regular recyclers

Participants immediately started implementing what they learned

Our observation of participants helped us to tweak the speed of the game, improve visuals, and drove us to include specific sound effects

To conclude, this class has worked tirelessly for the past 12 weeks researching, learning, and prototyping to create a game embodying the true ethos of Human-Centered Design

- Our game is inspired by insights derived from our field work, crafted on our learnings, and prototyped in the actual field
- We know this game will teach better recycling habits and assist us to tackle the waste problems we are facing
- Our game is specific yet also flexible to any community in our country which supports recycling





## GAME JAM

In conjunction with the game development for promoting recycling and awareness of three stream sorting, Professors Ian Pollock and Lonny Avi Brooks created a 'Zero Up Sustainability Game Jam' where students from the departments of communication, biology, computer science and business worked together over one day long session to create board games to promote issues of sustainability.

This was a 7 hour long free-form open prototyping event where students had the opportunity to meet and make new friends and learn to create playable media to communicate important details about environmental practices.

Student teams developed three board games from the Zero Up Game Jam:

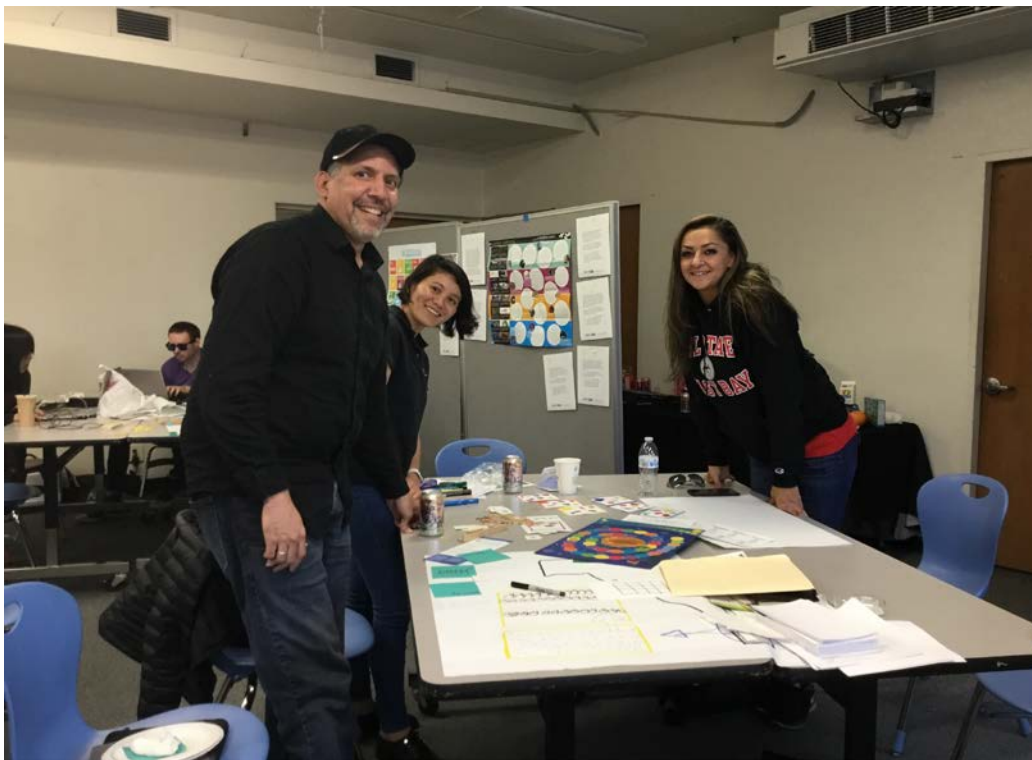
- I. Solar Domination game: Players see how rapidly they can develop competing solar grids that acquire more power as they build their solar grids through competitive strategy and luck.







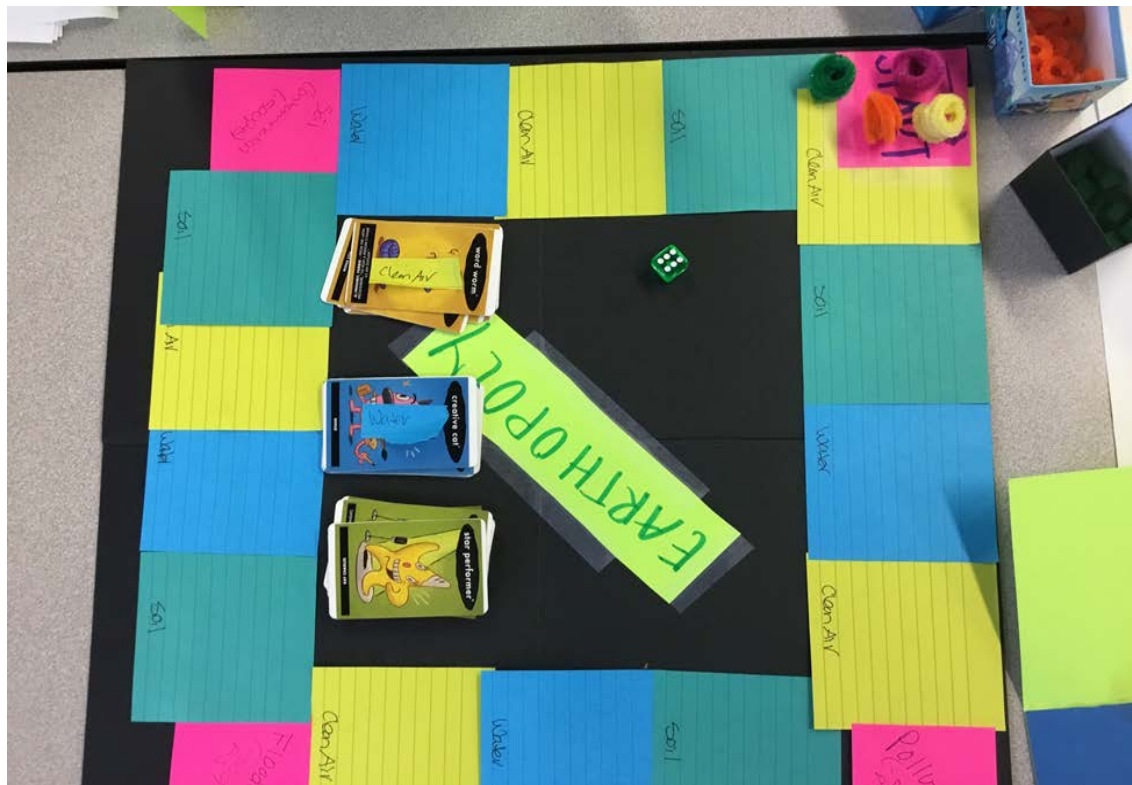
- II. Permaculture game: Players learn how to build effective farms through the cultivation of sustainable and self-sufficient crops.

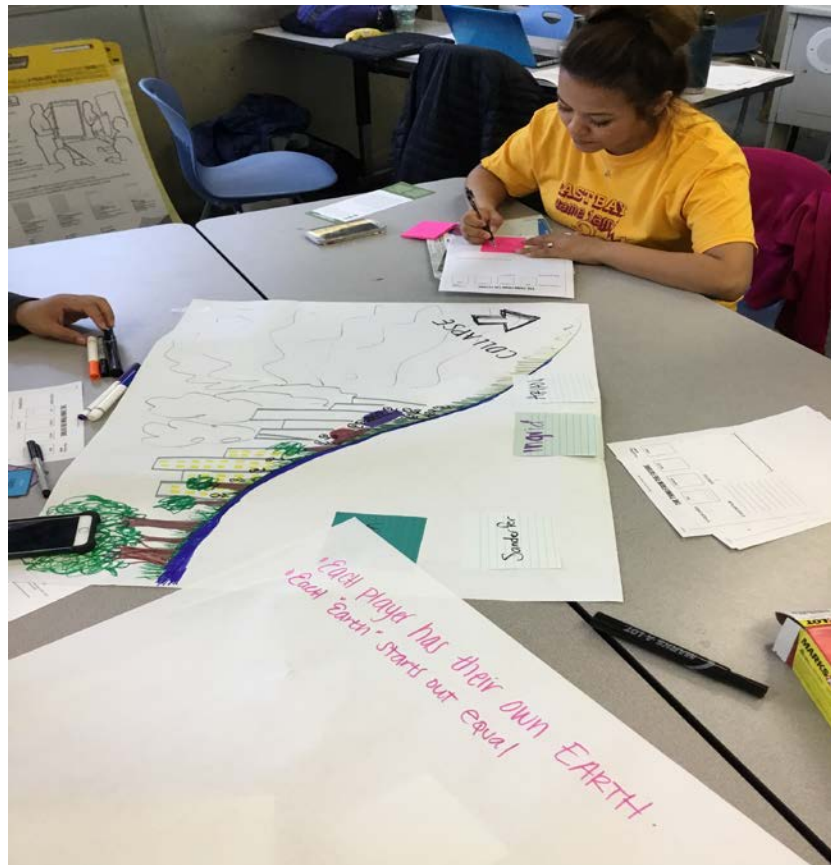






- III. Earthopoly: Players learn how to create a more sustainable Earth by transforming the cut throat competitiveness of capitalism into a collective winning strategy to add to everyone's well being.








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## REFLECTIONS

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### QUICK REFLECTIONS

The list below quotes from students' quarterly journals and includes positive statements the students made regarding their compost/recycling journeys.

- I am also spreading the word about composting to as many people as I can.
- One of my cousins started composting and she is even spreading the word to other people that she knows. It is a slow process, but I believe little by little, with each and every person and household making the change to start composting if they aren't, things will start shaping up and we will see a greater amount of action and participation taking place.
- I also have been trying to get in-touch with the landlord to request a bucket from Waste Management.
- If I had a bucket it would probably encourage me to do more and also allow for my roommates to partake into composting.
- Composting is a really great process to help with the environment. Glad I have been exposed to it, so I can do better for the Earth.
- This week, I did a little composting. I did do more research on composting this week and found out tea bags are a part of composting.
- As stated last week, I am planting aloe vera, but I also started planting carrots and lettuce. I am trying to be more efficient in life. my plants have officially started growing And I cannot wait until they are fully developed. Just thinking about it makes me excited.
- I have gotten better at recycling, especially paper and cardboard boxes. I'm finding myself using more of my eco friendly bags
- Since I have not been composting, I have been recycling in my regular routine.
- Now, I feel like if I have a banana peel, I will either wait until get home to throw it in a compost bin, or I will even go put it in the dirt somewhere.
- This week i was able to help my friend learn more about composting while she cooked. I should her how to set aside a destinate area for her scraps while she cooked.
- I have been using a compost bin at my house for a long time now
- So composting has been easy since placing a bin in the house. It has become a habit in the home, however taking out the trash of it twice a week has been hard to



remember and the funk has been real. But other than that everything has been going great.

- So composting so far has been a lot easier. I recently bought a composting bin that is not tiny and hides the smell well.
- Ever since I have been introduced to composting, I have become more aware and if I don't compost something that I am supposed to, I start to feel guilty for some reason.
- This week, I continued composting and got a chance to talk to a few of my co-workers about it. To my surprise most of them already did compost.
- I usually throw everything in the "waste" can because I didn't really care to think about throwing it in the right spot. But now I'm more aware of throwing my trash where it belongs.
- I asked her why she doesn't use a kitchen compost pail and she didn't even know what that was! I told her to contact her city to have them send out a free one to her house. She was so excited and I was happy that I was able to apply my learned knowledge from this course to our discussion.
- I had not been to the recycling center in years, but the process is still easy and quick.
- Taking this class is making me think more green, so, I am planning on recycling again. I haven't done it for more than several years now.

The list below reflects direct quotes from students' quarterly journals. This specific list is negative opinions affiliated with the students' compost/ recycling journeys. Many of the students mentioned education and convenience being a reason why they don't compost/ recycle.

- Composting has been hard for me to do lately because I've been swamped with school and work that when I'm home, I don't even have time to cook or anything nor time which results in not composting.
- I feel like composting in some places aren't as educating to the community like the city of Hayward and I have found this to be a problem because the area where I live and surrounding cities just don't seem to compost or even know what it is.
- I feel like a big part of why people don't compost is that they either don't know about it or they feel too lazy to do so.
- My family is just not ready to make that drastic change yet. So for now I am doing composting solo.
- I have been eating out a lot so composting hasn't been a big deal.
- It made me realize that part of the reason why composting and the green bin isn't used to its full potential is probably because people just don't know.



- I have found that it is much harder than I originally thought to change my habits. I'm consistently in a rush and find that I sort my trash to the point of almost not even thinking about it.
- Last week was very hectic, so I did not do very well composting.
- I have to admit, this week I was really bad at keeping up with composting. I have a midterm on Monday, the super bowl, and other things going on in life that has made it easy for me to not be good with composting. I threw a lot of compostable stuff in the garbage unfortunately.
- It's easier to just throw everything in the garbage when you're extremely busy.

## SOME DETAILED FINAL STUDENT REFLECTIONS

*Ecotopia opened my eyes to a world that I never knew could exist, and yet might one day be possible. It encouraged me to look beyond what I already see and envision a better world in the near future. It left me to ponder what I can do to help improve the environment, sustainability, and overall health and wellbeing of the planet. It starts with changing my own habits and then working to influence and motivate others to do the same.*

*The consulting and game design group project was quite enjoyable. It was exciting to explore my creativity and work with a team to develop a game design for a real life company and then pitch the product design to them. I got a more in depth understanding of storyboarding and prototyping. Having learned new techniques, to benefit me as I apply them to my future endeavors.*

*I learned that sustainability through composting and recycling is so much more than what I understood before. The importance of its impact on my life and the lives around me is irrevocable. I have now found respect for people in this field of study and industry. I am also more knowledgeable and aware of how important it is for environmental awareness and that go green campaigns should be taken more seriously in our society. I feel like I accomplished something of value this quarter thanks to this course.*

--Shannon Bahr

*I really enjoyed this course and the objectives I was able to obtain. Composting is a norm in my house and has been for some years, so instead of doing the composting assignments at my house I did them at my boyfriend's apartment. I learned so much from seeing their struggles and progress and was glad that I could spread the word about the importance of proper waste sorting and composting to them. Successful word-of-mouth was one of the main elements we hoped to achieve in this course about composting, so I was glad I could see that through.*





*Ecotopia was an eye opening book and I was grateful we were assigned to read it. It was refreshing to imagine a futuristic nation that relied on the Earth and clean living. The theme of the novel went along with the course by focusing on the environment. Not only did it relate to the course material, but I could associate it with current times even though the novel was written in the 1970s. Trump's war on the climate has just begun, and continually hearing overwhelming news coverage of his climate change denials, going to war with the EPA, and overall inattentiveness to basic scientific facts, makes me worry constantly about how our environment will be negatively impacted. Ecotopia was a breath of fresh air and let my mind wonder to a peaceful world that could exist if our communities and governments make the right choices when it comes to clean living.*

*Creating our project for the City of Hayward and Waste Management was exciting. It was fun to work with my group members to collaborate on ideas and work with each other as a team. Not only did I learn from the chapters and in class assignments, but the overall gist of the process of the project was so valuable because many people in the class, including myself, will be able to apply this process to opportunities in our careers. Collaborating with team members, expanding ideas, working as a client, working with your clientele, are all scenarios that many of us will encounter so I am relieved we were able to see the process through.*

*--Katherine Epps*

*I really liked how we partnered with Waste Management and the City of Hayward because I truly felt we were helping make a difference. They came a few times which was great and we really dove into helping them create a composting game. Learning about the future of composting related to our Ecotopia reading. We want a clean environment that is sustainable and pro-compost. That is what we saw in the reading as well as futuristic ideas for other things like cars.*

*Our composting journal was my favorite. I have composted for a few years so it really taught me to dig deep and truly focus on certain aspects of composting. Overall, the class assignments and activities all related to each other, making for an exciting and meaningful quarter.*

*--Shannon Panec*

**Using Communication to Reducing Littering and Illegal  
Dumping  
Spring 2017  
Department of Communications  
PIONEERS FOR SUSTAINABLE COMMUNITIES REPORT**



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## ACKNOWLEDGEMENTS

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The City Manager, Kelly McAdoo

Managements Analyst, Laurel James (and P4SC program coordinator for the City)

City Employees who helped plan and implement the projects: Erik Pearson, Mary Thomas, and Jeff Krump

This pioneering year of P4SC would not have been possible without the generous support of Cal State East Bay President, Leroy M. Morishita.



## About Pioneers for Sustainable Communities

Pioneers for Sustainable Communities (P4SC) is a year-long partnership between Cal State East Bay and a community partner that represents local or regional government. P4SC is one of a network of campuses nationwide—the EPIC-N Network—that have adopted a model of using course-based, faculty-lead, student research to support the sustainability goals of local communities. P4SC focuses on sustainability, social justice, and quality of life in the San Francisco East Bay region. It leverages the expertise of faculty and the enthusiasm, time, and innovative ideas of students, providing thousands of hours of research to support local partner sustainability programs including: data acquisition and analysis, stakeholder surveys, geo-spatial mapping and referencing used to establish socio-environmental baselines, track progress, and facilitate planning and communications.

- **P4SC Reports** present the final results of one or more full-time equivalent courses devoted to a single P4SC project.
- **P4SC Mini-Reports** present the results of partial courses devoted to a PSC project, typically used for projects in progress.

## About Cal State East Bay

Cal State East Bay's beautiful main campus is located in the Hayward hills with panoramic views of the San Francisco Bay shoreline. Situated above the city of Hayward, the campus offers an ideal setting for teaching and learning and yet easy access to the many cities along the bay. The University has a satellite campus in Concord, a professional development center in Oakland, and a significant presence online. Founded in 1957, Cal State East Bay is one of 23 universities of the California State University system (CSU). With an enrollment of over 15,800 students, Cal State East Bay is recognized as a regionally engaged and globally oriented university with a strong commitment to academic innovation, student success, engaged service learning, diversity, and sustainability.

## **P4SC Directors and Staff**

Karina Garbesi, P4SC Co-Director, Professor and Director of the Environmental Studies Program, Department of Anthropology, Geography, and Environmental Studies, Cal State East Bay

Craig Derksen, P4SC CO-Director, Assistant Professor of Philosophy, Department of Philosophy, Cal State East Bay

Audrey Wade, P4SC Program Coordinator, Cal State East Bay

*With support from Jillian Buckholz, Director of the Office of Sustainability*

## About the City of Hayward

The City of Hayward was incorporated in 1876. With a population of 150,000, Hayward is the sixth largest city in the Bay Area and proudly the second most diverse City in California. A Charter City, Hayward operates under the Council-Manager form of government with a directly elected Mayor and six member City Council. Hayward is a full service City comprised of thirteen departments providing services ranging from public safety and public works to library and community services. The City strives to be a safe, clean, green, and thriving community for all of its residents. To learn more about the City of Hayward, visit [www.Hayward-ca.gov](http://www.Hayward-ca.gov).



# Using Communication to Reducing Littering and Illegal Dumping

## REPORT AUTHOR(S)

Janelle Laberinto McCarthy

Niara Williams

## COURSE PARTICIPANTS

### P4SC Instructor

Lonny Brooks Ph.D.

Associate Professor of Communication

**P4SC Student Participants** COMM 4107 Relational Communication in Organizations (Spring 2017) including:

First Name	Last Name	Project	Innovation Role
Heidi	Mackintosh	Hang Tag	Storyteller
Kaboua	Lo	Hang Tag	Collaborator
Benjamin	Hawklyn	Hang Tag	Collaborator
Nicholas	Sears	Hang Tag	Cross Pollinator
Jessica	Irrera	Hang Tag	Caregiver
Robert	Sharkey	Hang Tag	Anthropologist
Brenda	Brown	Illegal Dumping	Hurdler
Janelle Christine	Laberinto	Keep Hay Clean	Experimenter
Ryan	Edmonson	Keep Hay Clean	Anthropologist
Niara	Williams	Keep Hay Clean	Set Designer
Jordan	Beveridge	Keep Hay Clean	Storyteller
Melissa	Medina	May 13 cleanup	Storyteller
Juana	Davila	May 13 cleanup	Collaborator
Paul Andrew	Morrison	May 13 cleanup	Storyteller
Dannie	Carman	May 13 cleanup	Director
Kahealani	Simmons	May 13 cleanup	Caregiver
Amy	Hoang	May 13 cleanup	Hurdler
Nathalie	Saravia Razo	May 13 cleanup	Set Designer
Joshua	Lo	May 13 cleanup	Collaborator
Julieanna	Navarro	May 13 cleanup	Collaborator
Mitchell	Scorza	May 13 cleanup	Director
Kyle	Van Schaack	May 13 cleanup	Cross Pollinator
Jessica	Allman	May 13 cleanup	Anthropologist

Cesear	Saavedra	Ride Along	Experimenter
Briana	Williams	Street Team	Set Designer
Robin	Craig	Street Team	Storyteller
Justin	Aguilar	Street Team	Collaborator
Davon	Gray	Street Team	Director
Logan	Key	Street Team	Anthropologist
Jennifer	Cao	Street Team	Caregiver
Karina	Flores	Street Team	Cross Pollinator
Najma	Amiri	Street Team	Storyteller
Pamela	Simeon		

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## OBJECTIVES

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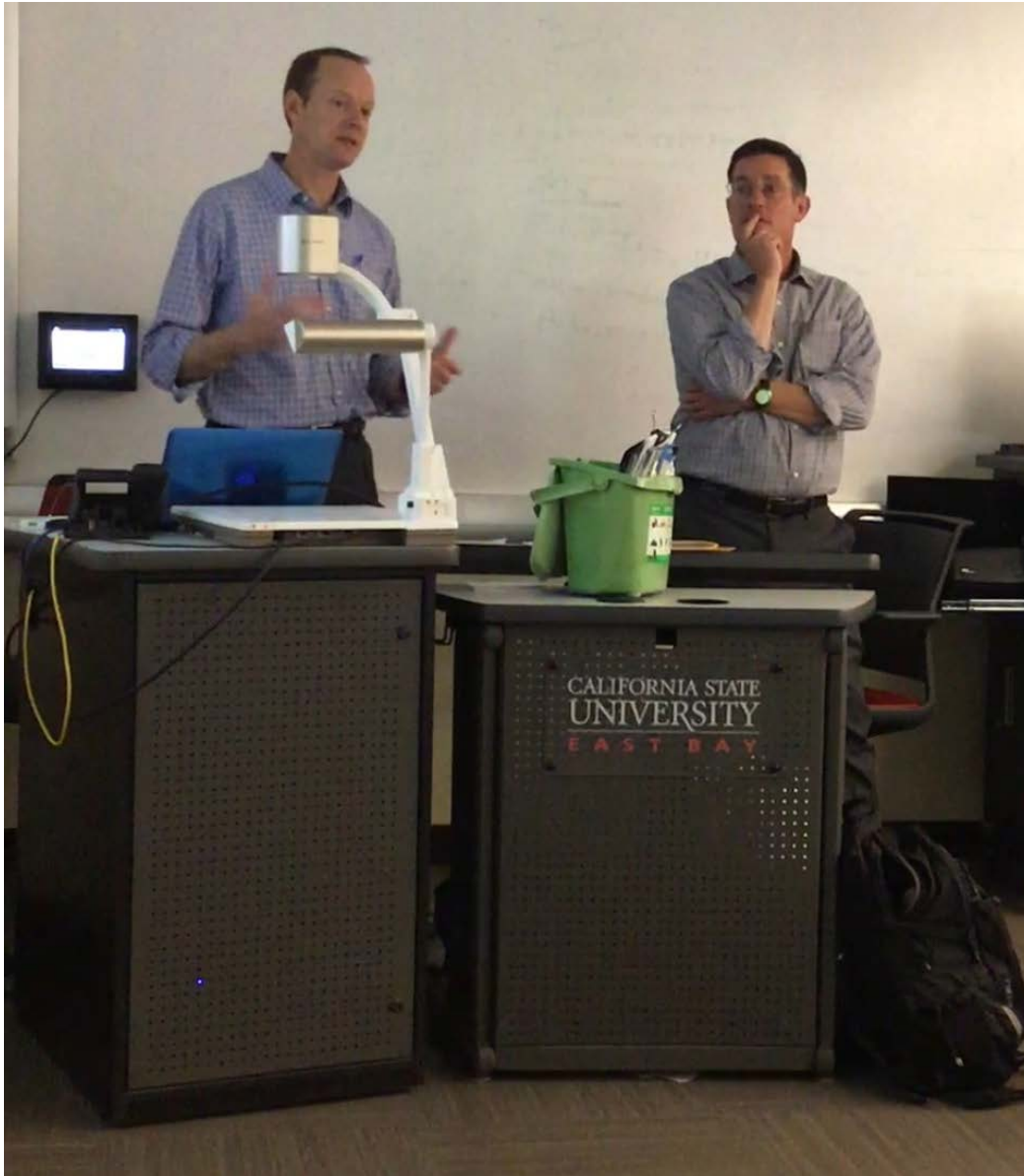
Deploy work done in the field of Communication to the projects and problems associated with littering in the city of Hayward, thus giving the students a chance to apply their knowledge and contribute to valuable projects.

The final deliverable in collaboration with the city of Hayward is to produce a five minute film highlighting the projects associated with littering and composting with a particular emphasis on city worker, staff, volunteer and student experiences. This film is part of a campaign to engage the local community in carrying out sustainable practices. This film will be submitted in September 2017 as an addendum to the report.

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## CITY OF HAYWARD PROJECTS AND IDEO HUMAN CENTERED DESIGN (HCD) PROCESSES

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Eric Pearson and Jeff Krump presenting City of Hayward project initiatives to students in COMM 4107.



By using a human-centered design (HCD) approach, inspired by IDEO.org (a prominent design firm and socially aware organization dedicated to solving industrial and human design problems), students learned about the challenges facing the City of Hayward with respect to anti-littering and anti-dumping. At the beginning of the course City of Hayward employees Erik Pearson and Jeff Krump informed the class about the projects of the city and framed the issues. The City of Hayward asked us to create a film that would help inform the public about the issue and transform their behavior with respect to these issues. Rather than creating slick branding messages that can seem inauthentic about the challenge at hand, we decided to highlight the unique and invaluable perspectives of workers, expert staffers, community volunteers and student researchers/volunteers as they engaged in a number of city projects that address these issues. We wanted to reveal and highlight the complicated nature of the problem, the challenging nature of the issues, what the workers experience daily as they engage in constant struggle with littering and dumping, the dedicated community spirit of the volunteers and students in finding and implementing solutions. In order to do this, students used ethnographic (participant observation) methods of documentation including film and community engagement to reveal what the city does to address recycling, littering and dumping.

a) The groups formed in COMM 4107 (Relational Communication in Organizations) began to work toward solutions to the issues of recycling, littering, and dumping in the City of Hayward by coming up with ‘How Might We’ questions that needed to be answered, using IDEO HCD. The three questions below capture the essence of the initiative projects presented by Erik Pearson and Jeff Krump.

1. “Every small change towards a purpose adds up to tremendous shift. How might we engage those who are aware of the negative impact of dumping, unnecessary waste, and other environmental hazards, yet does not make changes in their actions because they believe what they do or don’t do is of little impact to the overall cause?” - Angilee Stokesberry, Waste Not Want Not
2. “How might we communicate the significant environmental impact of littering to the residents of Alameda County while also providing simple, visible, and well-distributed dumping options for all residents?” - Melissa Medina, Fate of the Waste
3. “How might we get more individuals out into the public to become aware of these environmental problems that harm the world and those currently living in it? In other words, how might we get others to sympathize with those experiencing



lesser quality living than them and want to make change?” - Julieanna Navarro,  
Waste Side Story

### **The Student Group teams and their Members**

(some members of each team worked on different Hayward city projects to provide diverse insights in order to provide and document multiple perspectives)

The Green Initiative – Jordan Beveridge, Ryan Edmonson, Janelle Laberinto, Niara Williams

Waste Not Want Not –Justin Aguilar, Brenda Brown, Robin Craig, Angilee Stokesberry, Briana Williams

Fate of the Waste – Dallas Crudupt, Juana Davila, Melissa Medina, Rebecca Olmos, Andrea Gonzalez

Waste Side Story – Jessica Allman, Julieanna Navarro, Mitchell Scorza, and Kyle Van Schaack

Big Fluffy Pandas – Paul Morrison, Kahealani Simmons, Nathalie Razo, Dannie Carman, Amy Hoang, Joshua Lo

Downtown Streets Team – Jennifer Cao, Logan Key, Davon Gray

Hang Tag Project – Robert Sharkey, Benjamin Hawklyn, Nicholas Sears, Jessica Irrera

Bulky Trash Pickup – Heidi Mackintosh, Cesar Saavedra, Faboua Lo, Pamela Simeon

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## IDEO AND HUMAN-CENTERED DESIGN

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IDEO.org defines human-centered design as “a creative approach to problem solving and the backbone of our work at IDEO.org. It’s a process that starts with the people you’re designing for and ends with new solutions that are tailor-made to suit their needs. Human-centered design is all about building a deep empathy with the people you’re designing for; generating tons of ideas; building a bunch of prototypes; sharing what you’ve made with the people you’re designing for; and eventually putting your innovative new solution out in the world.”

In essence, human-centered design is designing with specific people in mind. How will the designs of products, services, spaces, or systems affect the people they are being designed for?

There are three phases to the HCD process: Inspiration, Ideation, and Implementation.

1. Inspiration: Immerse yourself in people’s lives to truly understand their needs
  - a. Choose a design challenge
  - b. Plan your research methods (interviews, ethnography, etc)
  - c. Build an interview guide
  - d. Explore additional research methods
  - e. Capture your learnings
2. Ideation: Analyze what is learned from the Inspiration phase, identify opportunities for design, and prototype possible solutions
  - a. Brainstorm multiple ideas and select the most promising ones
  - b. Determine what to prototype using storyboards
  - c. Create a prototype
  - d. Test the prototype and receive feedback
  - e. Revise the prototype using the feedback and iterate
3. Implementation: Bring solution to life

In order to find a solution to the anti-littering/dumping issue in the City of Hayward, the students of Comm 4107 participated in various cleanup activities around Hayward, recorded their experiences, and created storyboards using IDEO HCD to bring about change. The storyboard ideas were organized into three categories:

1. Awareness

- a. Create a powerpoint presentation to garner more attention that is distributed amongst different schools
  - b. Community outreach to neighboring cities
  - c. Social media campaigns for upcoming cleanup events
  - d. Seek local news media coverage
  - e. Mailed flyers for upcoming cleanup events
  - f. Accessibility to proper separated trash bins throughout the entire city, not just highly populated areas
2. Education
- a. Early education in elementary and middle schools
  - b. Create programs at public schools for children and teens to take part in during the summer - high schools for credit and community service hours
3. Visuals
- a. Revamp website and give it a place of prominence on social media
  - b. Create a recycling tracking app for people to receive gift cards for actively recycling
  - c. Signs and hang tags are unobtrusive ways to educate people on proper dumping habits
  - d. Mailed newsletters highlighting outstanding residents who are already keeping Hayward clean and green
  - e. Commercial advertising the importance of keeping Hayward clean with a catchy slogan

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## STUDENT EXPERIENCES

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The students had a variety of experiences and reflections on them.



How might we... see a change that takes hold in the practices of disposing of waste in the people of Hayward, that they themselves may propel the movement for themselves and generations to come? How might we keep the people of Hayward involved and stay involved for their own future's sake in regards to cleaner waste practices?





The Green Initiative participated in the Keep Hayward Clean & Green Task Force event at Weekes Park in Hayward, CA on April 22, 2017. Waste Side Story participated in the Keep Hayward Clean & Green Task Force event at Weekes Park in Hayward, CA on May 13, 2017. With their “How Might We” questions in mind, they participated in picking up trash and interviewed staff members and CSU East Bay students. Waste Side Story created a video of their experience.

How might we... discourage and enforce illegal dumping? How might we ensure that all Hayward residents are aware of their options to properly dispose of unwanted bulky items and litter?



Ultimate impact would be money better spent on more worthy expenditures. The impact would be spending the money collected from violators to promote programs and relieve taxpayers.

Waste Not Want Not also participated in the Keep Hayward Clean & Green Task Force event on May 13, 2017. They captured their experience through photographs. They saw items left behind on the sidewalks for weeks before being picked up. The above photograph shows items left on the sidewalk in the Hayward Hills near CSU East Bay. They also created a prez presentation to show their findings.

<https://prezi.com/view/OCPEjQSs9JypftujT9nw/>



How might we... communicate the significant environmental impact of littering to the residents of Alameda County while also providing simple, visible, and well-distributed dumping options for all residents?



Fate of the Waste documented their experience at the May 13, 2017 clean up event through photographs.

Ryan Edmonson: “My experience participating in the Keep Hayward Clean & Green Event was fulfilling. Upon arriving to the event, I was surprised to find out how many people actually participated. It wasn't until we finished cleaning that I found out during our interview, a lot of the participants are from CSUEB. The keep Hayward Clean & green actually relies a lot on the relationship with CSUEB. I'm not sure if they have the same relationships with Chabot and the surrounding Hayward high schools who need community work service hours, but I definitely think it would grow the program, as I didn't speak to anyone from these institutions. I found out that there was some confusion as to what we were doing. There was actually a woman that stopped traffic to ask us what we were doing. While some people were happy to see people cleaning and would give us smiles and thumbs up as they honked their horns, others thought we were serving some type of community service because we had committed a crime.

I think that the outskirts of downtown Hayward would benefit from cleaner, and more accessible garbage cans. They were few and far between when we were cleaning our areas. Ironically, when I went to my friend's daughter's birthday in the Hayward hills, that wasn't the situation. Not only were the receptacles clean and not overflowing, there were also recycling bins as well. My friend chose the park because only the people in the area knew about it, making it less traveled. It was ironic, because the area we were cleaning was more frequented, yet, I didn't see any recycling bins, and the garbage cans were dirty and overflowing. If someone wanted to dispose of their waste in a proper way, it might not even be a possibility. I definitely think there's room for growth in these areas, but again, I'm pleased with my experience."

Students read and reflected upon how to assist people in transforming behavior by reading the work by Chip and Dan Heath, *Switch: How to Change Things When Change Is Hard*.

Niara Williams "As we take away from chapter one, I can identify with ways to improve my own behavior and thought process. As different as the rational and emotional system may sound, these systems need to balance in order to pass change through people and organizations."

Dallas Crudupt "Behavior is a habit we learn behavior and technologically improve it."

Rebecca Olmos "The biggest insight about the switch was the use of the elephant and the rider to represent the emotion and rational parts of your brain. It gave a visual of how difficult it could be to control your emotions when trying to change. I also thought it was interesting that they say laziness is often exhaustion because of self control. Self control is a resource that can be used up. I never thought that controlling yourself, but with the visual, it's much easier to understand the connection. I am interested to see what other insights this book can teach me about change"

Melissa Medina: "My main take away from chapter one is that if you want to spur change, you not only need to convince the person/organization involved in a logical manner, but also appeal to their emotions as well as show them logistical steps necessary to make the change. Chip and Dan Heath go on to explain that this is due to the fact that the brain is comprised of two distinct and independent systems: the rational and the emotional. There is often tension between these systems, as they each seek different goals. While the rational mind is able to set and pursue goals based on logical outcomes, the emotional mind tends to chase feelings, most often pleasure-based or pain-avoidant. Therefore, if you want to change behavior, both systems must be on



the same page. The Heath brothers introduce a great analogy to illustrate this concept, wherein the emotional mind is represented by an elephant, whereas the rational mind is compared to the rider of the elephant. This analogy gave me an idea of just how little control the rational mind has when the emotional mind wants to stray. This analogy reminded me of the times when I'm on a diet and my rational mind is on board, yet my emotional mind has other plans. The only way to succeed in this scenario, as with all the scenarios presented in this chapter, is to get the elephant on the same page as the rider (for example, by reminding the elephant of the feeling of long-term success). The other important element Dan and Chip note is to lay the path, meaning to set up an environment where success can be achieved easily. All in all, the Heath brothers made a great case for the fact that when the rational and emotional minds are in opposition, change is almost impossible; however, when the rational mind is clear, the emotional mind is on board with the rational mind's goal, and a clear path to success is laid out, enormous change is possible."

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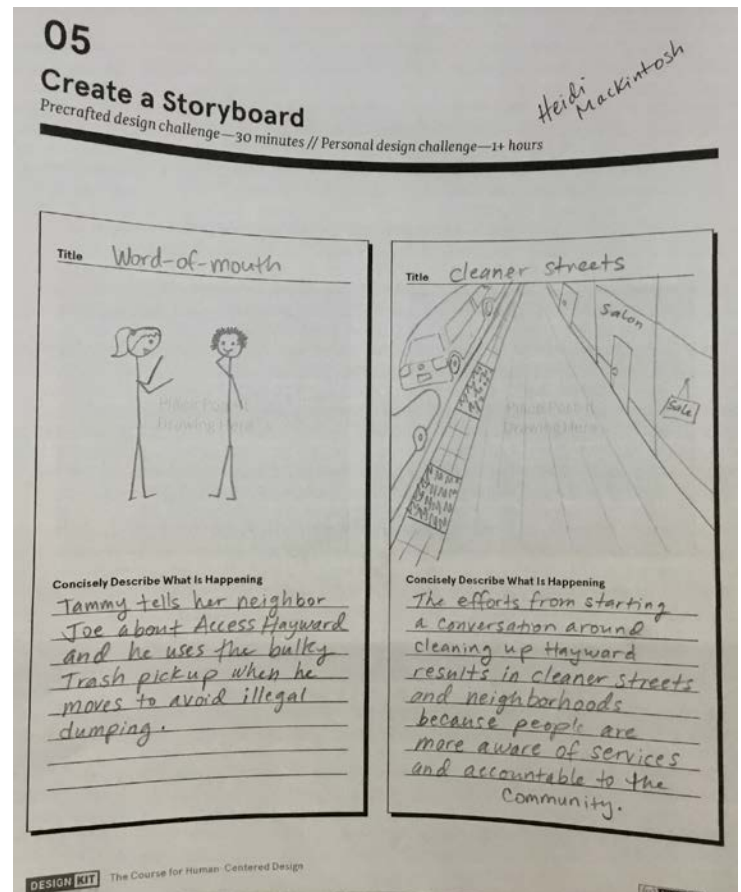
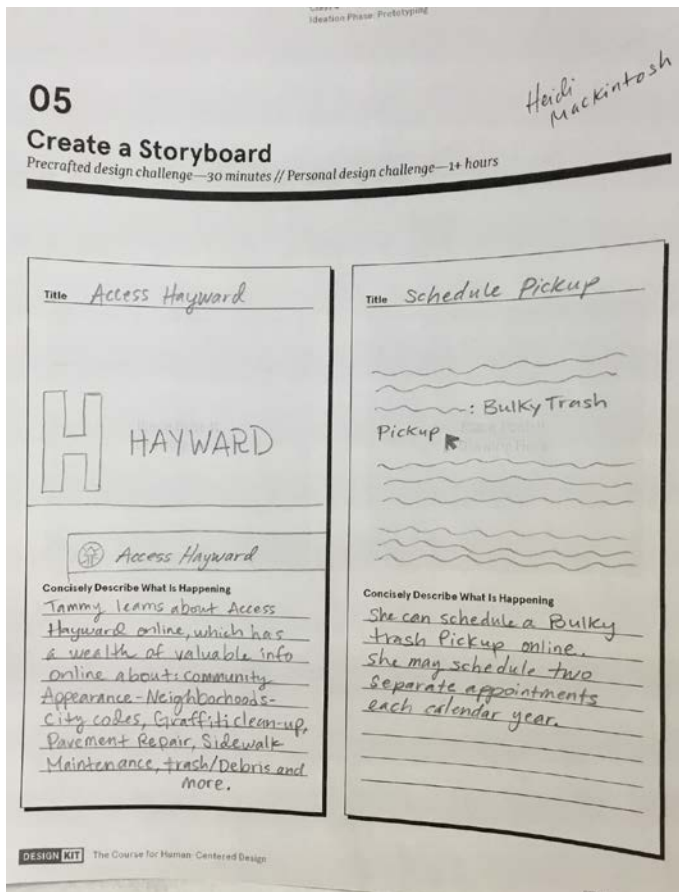
## HCD STORYBOARDS

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### **Project Storyboards from Illegal dumping to Hang Tagging**

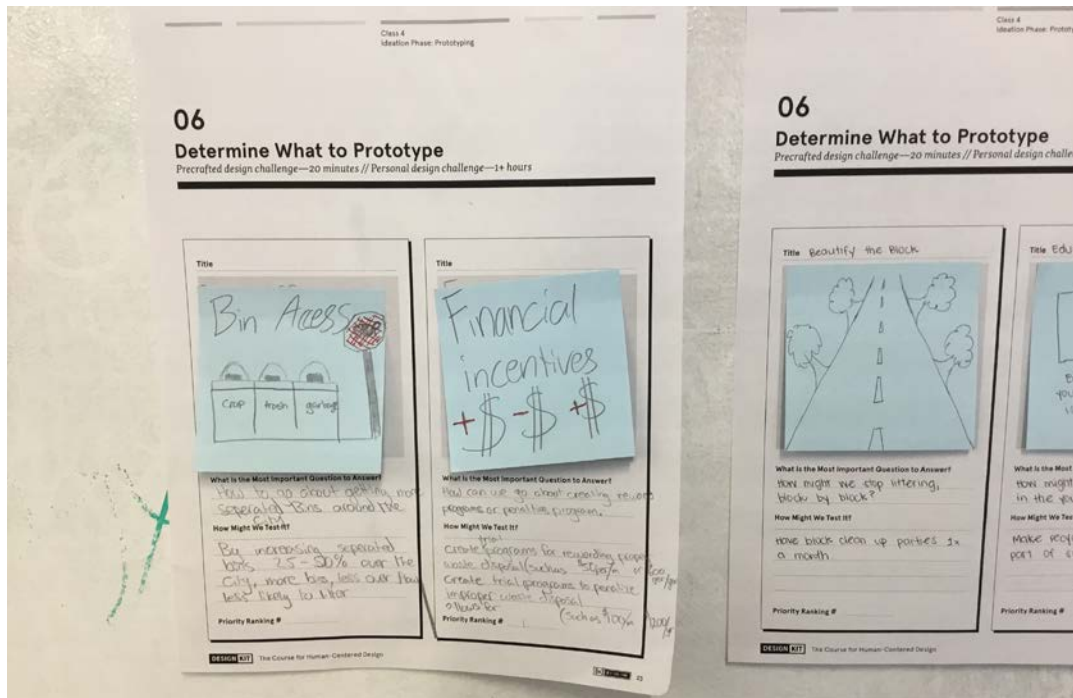
The storyboard presentations were used to illustrate the path towards community involvement. Storyboards were used to capture student project experiences as a method to organize the scenes for the final film in development and to provide a blueprint for the student film editors to follow.

## How might we raise awareness among the residents of the negative effects of dumping?

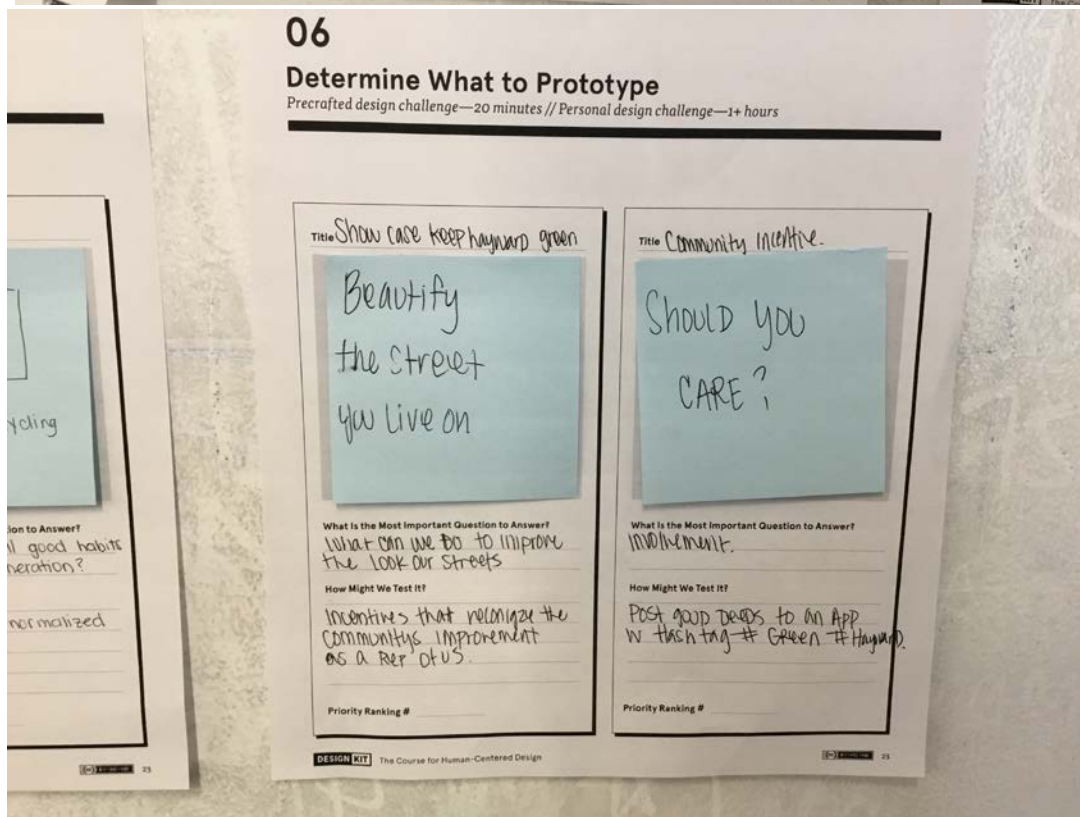
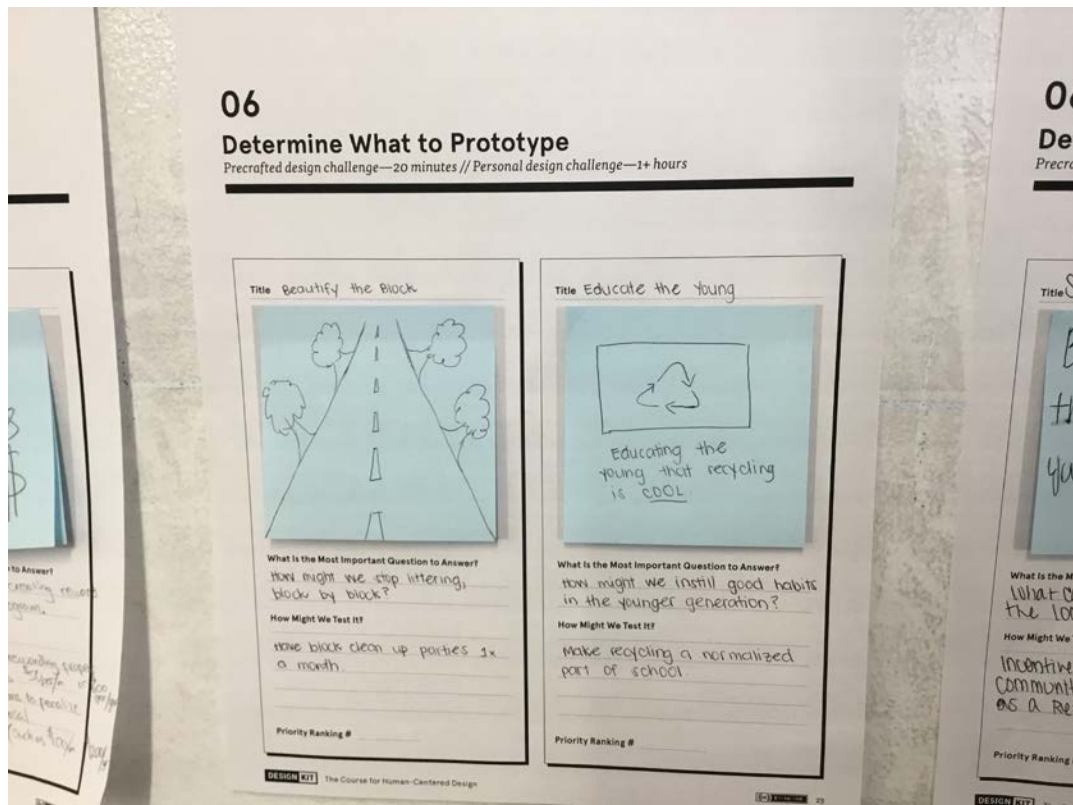


By visiting Access Hayward (<http://user.govoutreach.com/hayward/faq.php>), residents of Hayward can schedule bulky trash pickup. Through word-of-mouth about the effects of illegal dumping on the community of Hayward, residents can create cleaner streets.

## Goal: To Change the Dumping Habits of the Citizens of Hayward

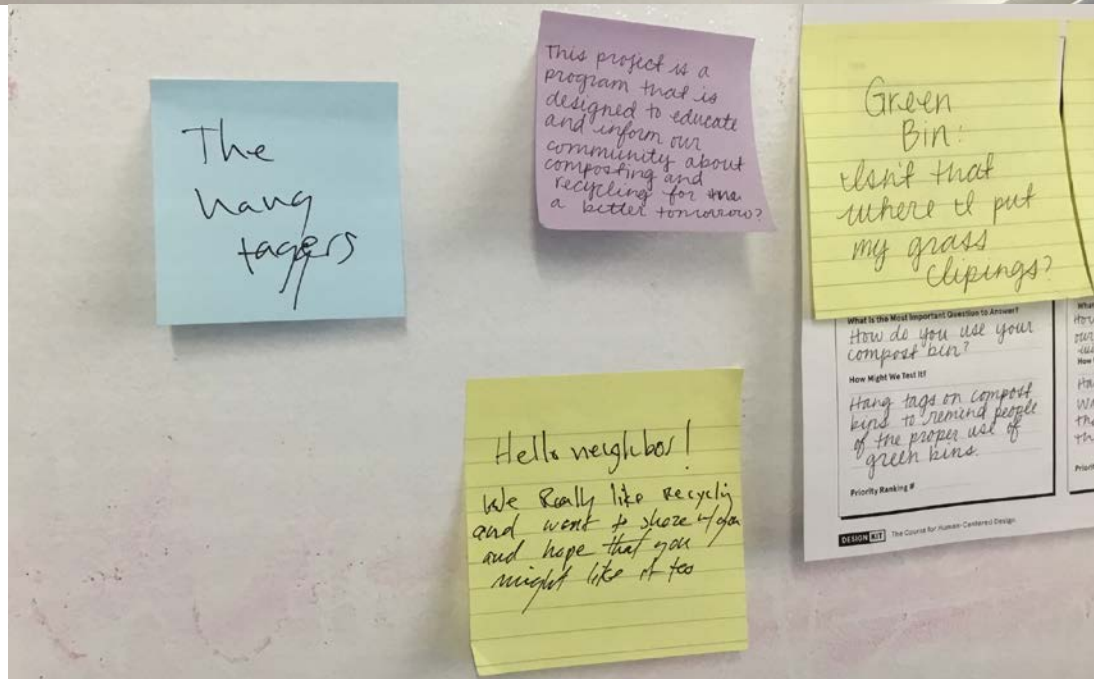
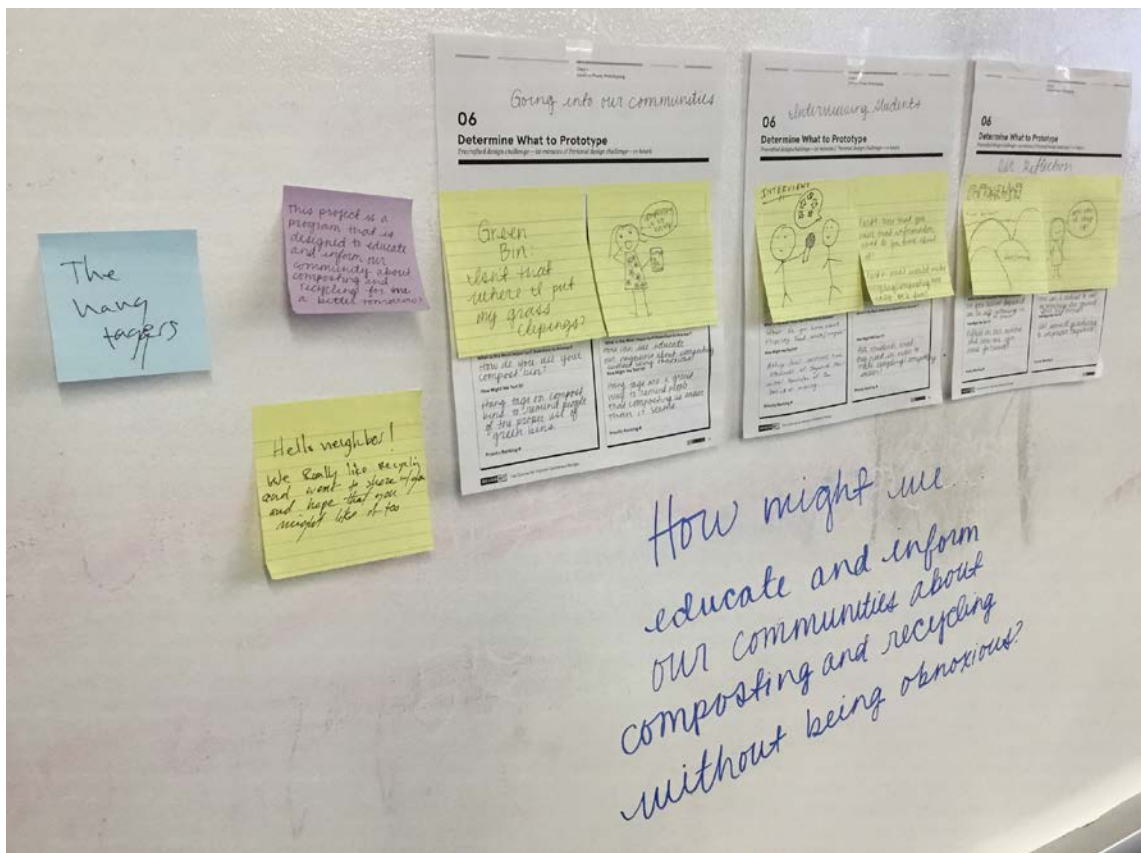


To change the dumping habits of the citizens of Hayward, better bin access and financial incentives should be utilized.

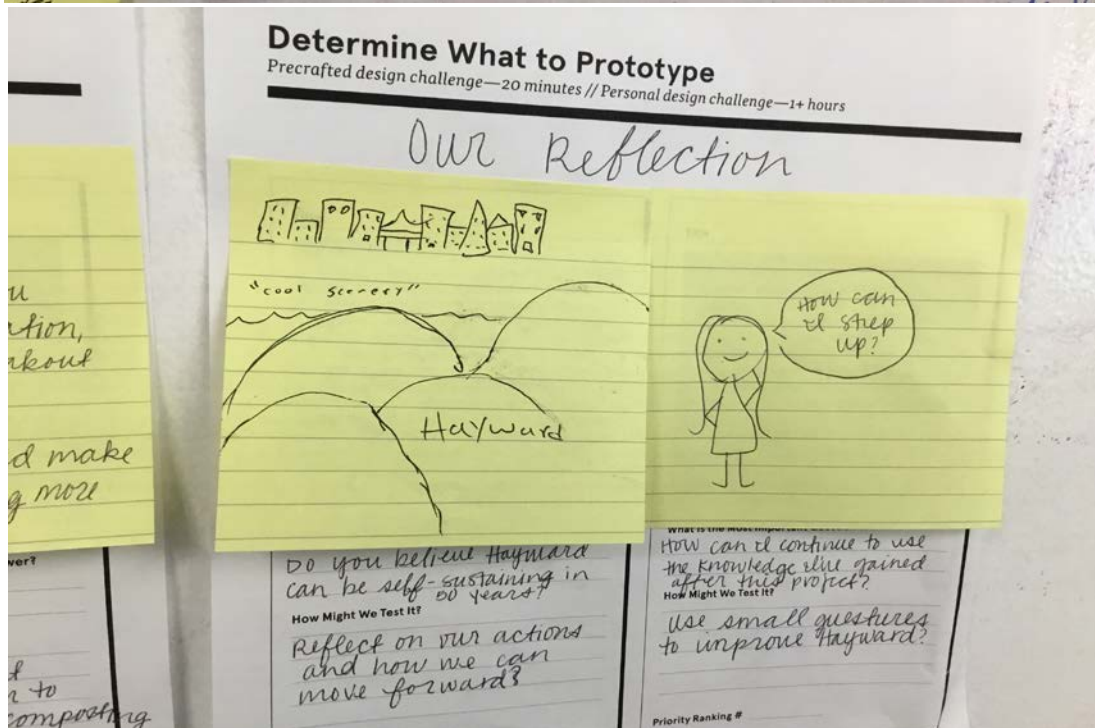
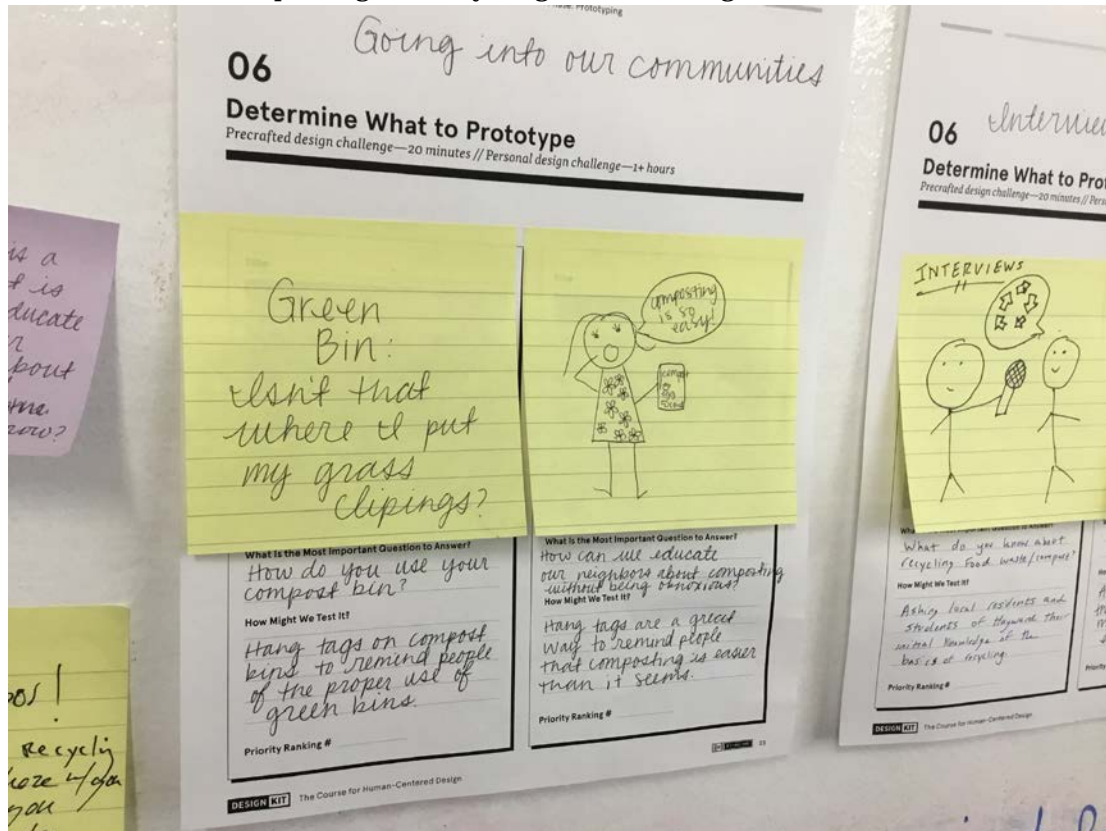




## Make it a Mission to Beautify the City, One Street at a Time.

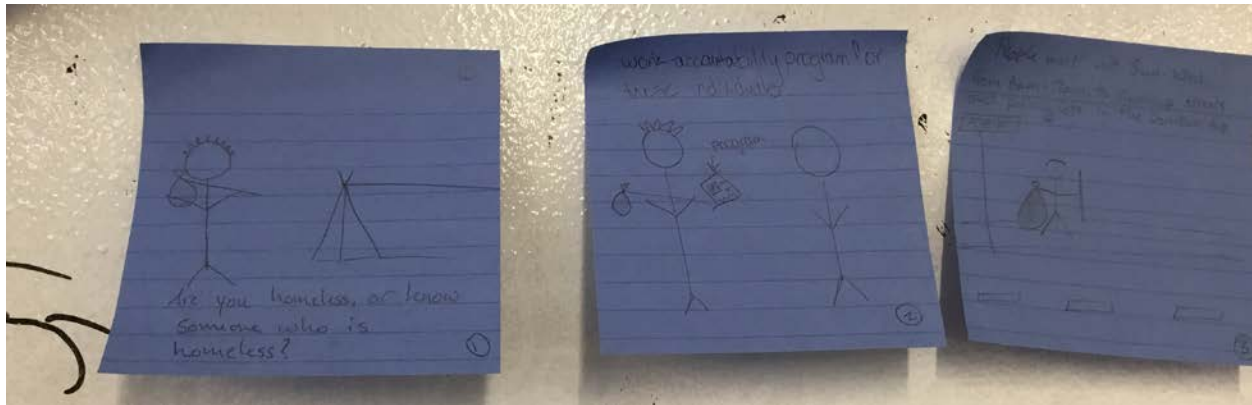


The Hang Taggers want to know, "How might we educate and inform our communities about composting and recycling without being obnoxious?"

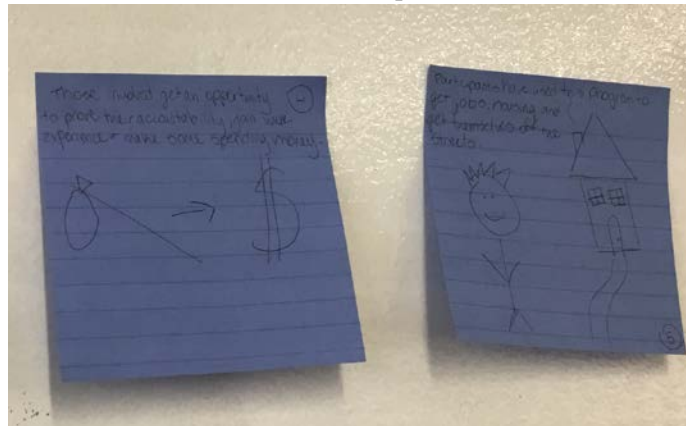


Informational hang tags on people's garbage bins help them sort their trash into their respective bins.

## How Might We Inform More Homeless People about the Downtown Streets Team



Through word-of-mouth, the homeless population can learn about opportunities to clean up their communities for work experience and resources.

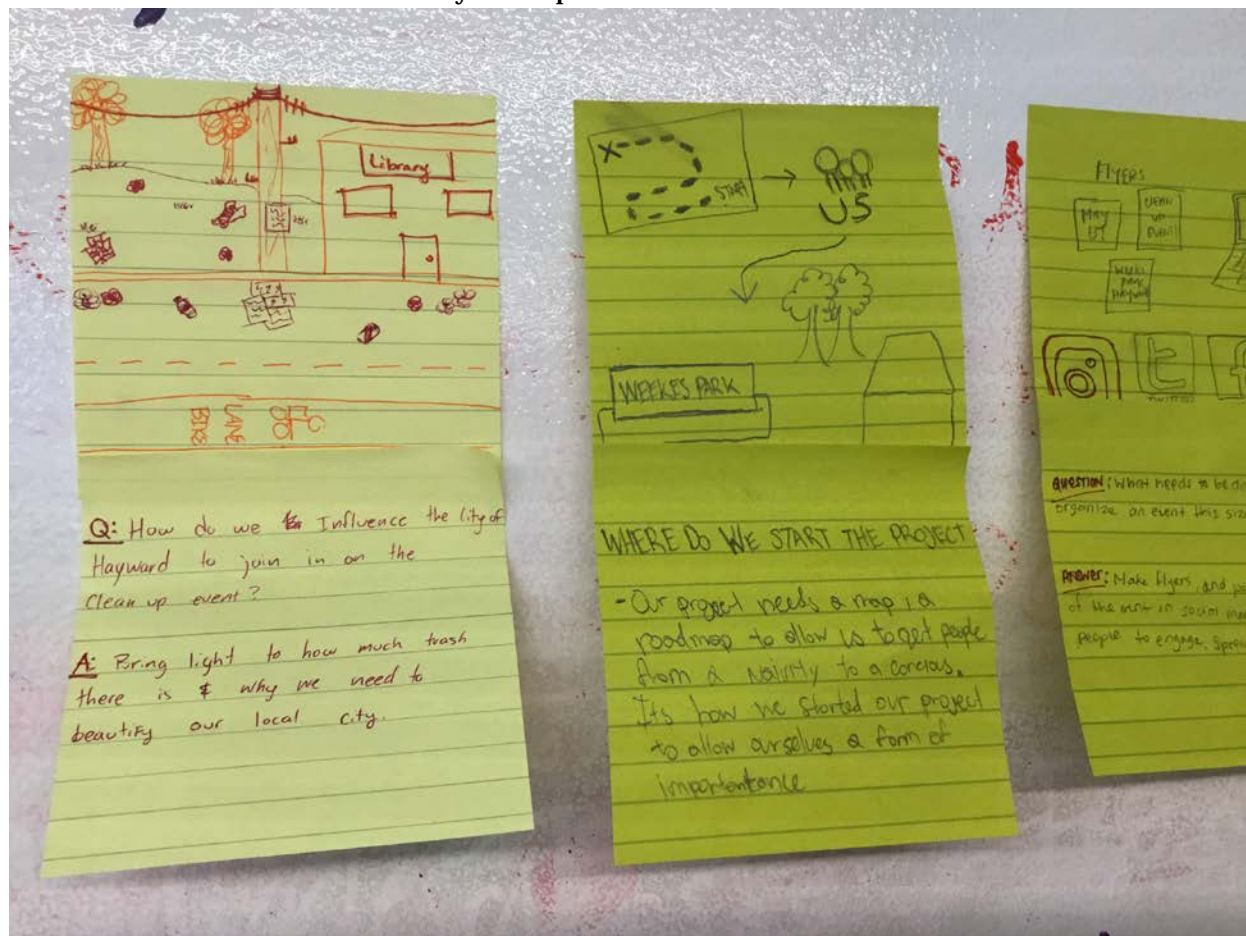


Volunteering to clean up streets and parking lots in Downtown Hayward has afforded homeless individuals the opportunity for jobs, money, and housing.

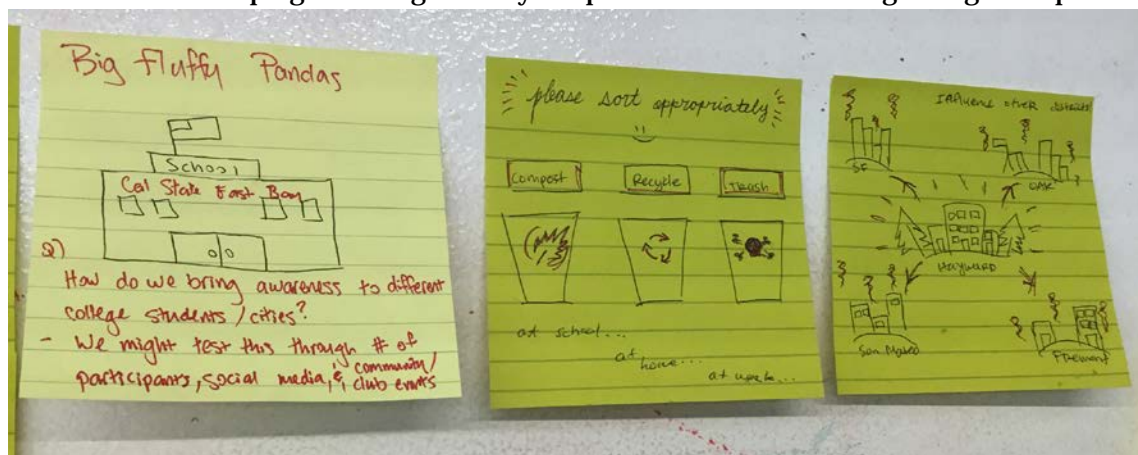


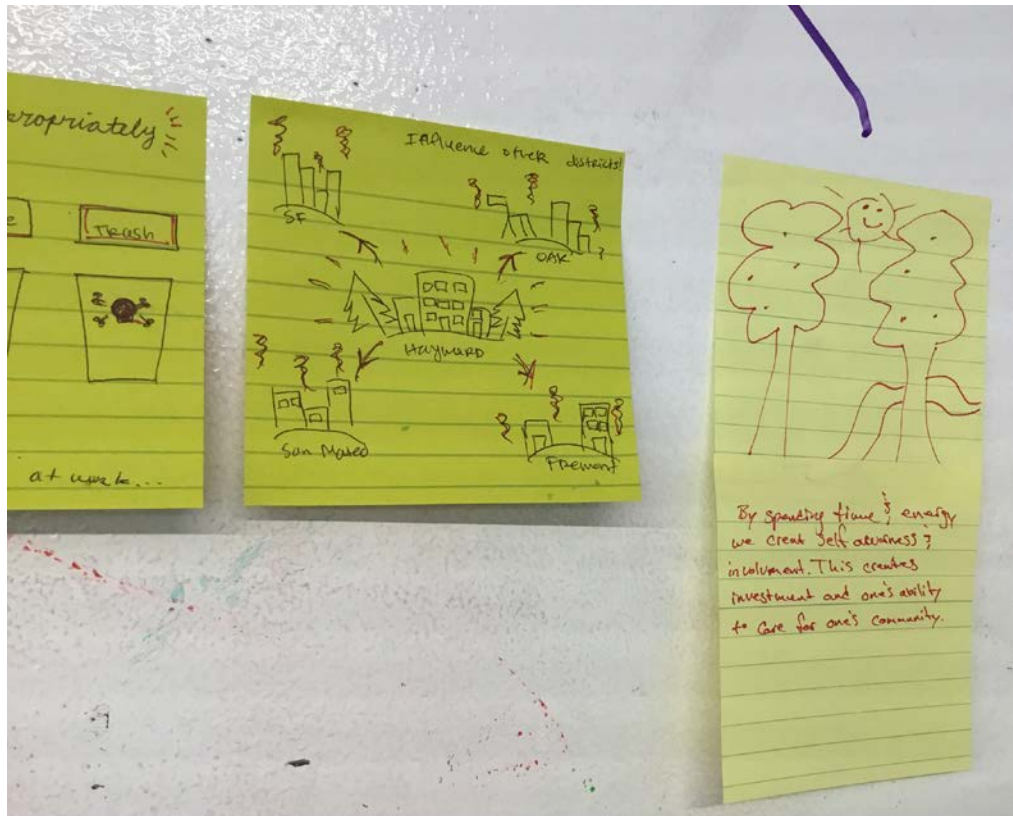
## How Might we Bring Recycling Awareness to College Students and Cities?

How can Hayward spread awareness to other cities?



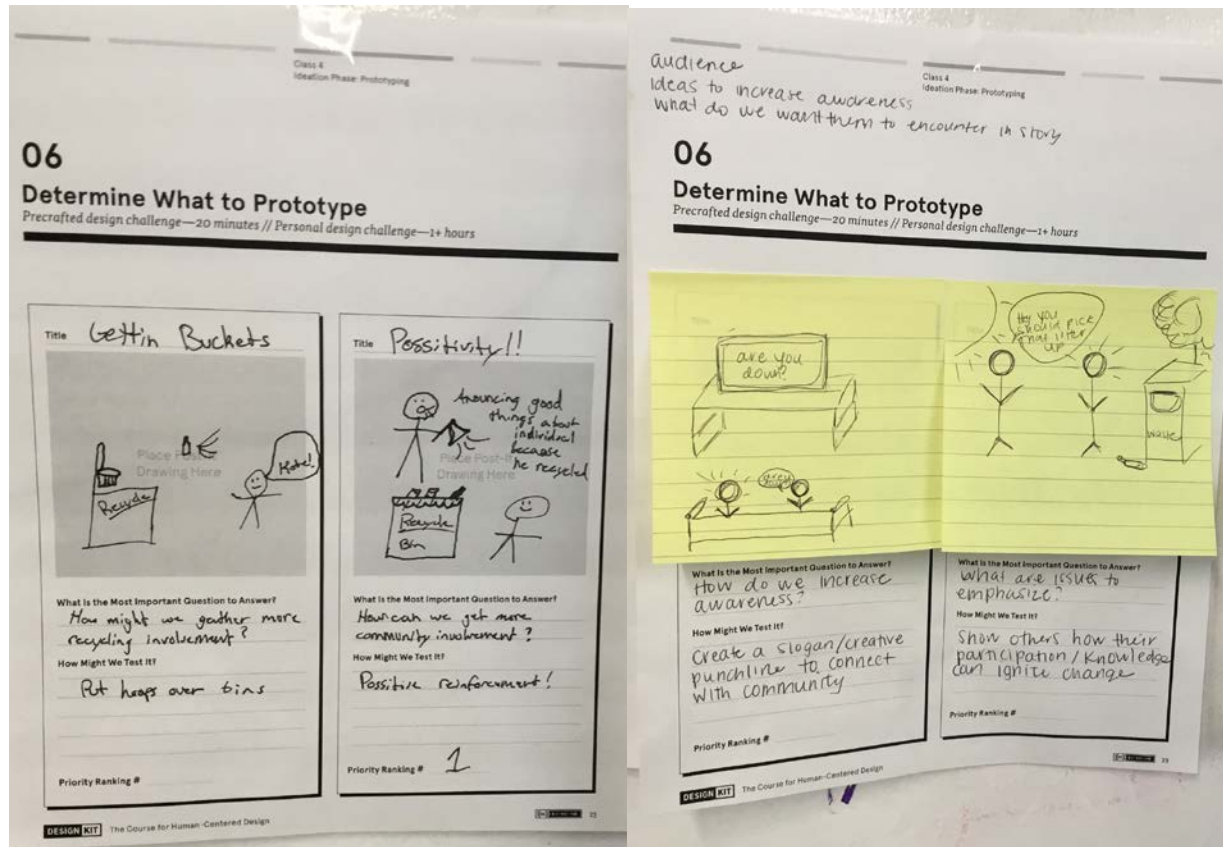
The Big Fluffy Pandas participated in the Keep Hayward Clean & Green event on May 13th. Social media campaigns are a good way to spread awareness among college campuses.



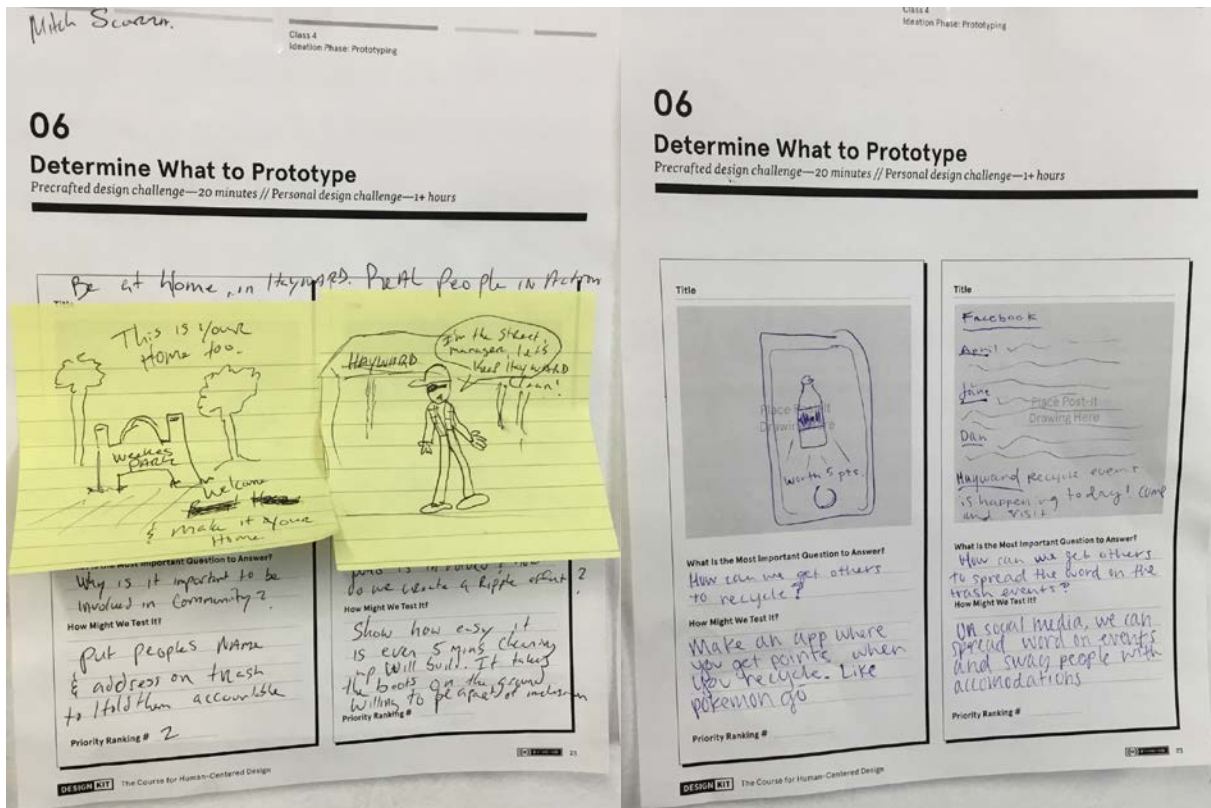


Self-awareness and individual involvement can jumpstart community involvement.

## How Might we Create a Ripple Effect of Involvement Using Very Little Individual Time to Create Maximum Output by Connecting Common Ground?



Educational recycling games and positive reinforcement can get children involved.



Create a catchy slogan to connect the community and build an accessible mobile app recycling game. Hold each other accountable.



### Final Student Video Pitches

Each student team presented a pitch, the value proposition of their project that encapsulated the meaningful impact of the City of Hayward project they had worked on in conjunction with developing a storyboard that captured their experience for the film in development. Student teams shaped the final outcome and editing of the five minute film reflecting on the variety of their shared experiences and to influence community members locally and regionally who will likely view the final video. Students presented their pitches, that were documented on video and that will appear in the film, by answering the question: What kind of impact do you want to make as part of your project team (social impact, personal impact, local/community impact, environmental impact, etc.)? What is your one-minute value proposition for your team's work this quarter? In the wake of the U.S. decision not to continue the Paris Climate Accord, smaller scale actors have arisen in our nation to continue with the Paris Climate Accord protocols. California has led the path in this effort and with this project, local stakeholders such as the City of Hayward with our student Pioneers for Sustainable Communities, are making a generational and sustainable pathway for a carbon neutral future.

The Communication VideoLab editors are reviewing the storyboards our students have created along with the compilation of student photo and video footage gathered to edit the final video deliverable and share out.



Logan Key (the student team leader) and his final pitch of the team's storyboard ideas for the Pioneers For Sustainable Communities film for the City of Hayward.



Niara Williams (the student team leader) and her final pitch of the team's storyboard ideas for the Pioneers For Sustainable Communities film for the City of Hayward.



Andrea Rodriguez (the student team leader) and her final pitch of the team's storyboard ideas for the Pioneers For Sustainable Communities film for the City of Hayward.



Mitchell Scorza (the student team leader) and his final pitch of the team's storyboard ideas for the Pioneers For Sustainable Communities film for the City of Hayward.



Paul Morrison (the student team leader) and his final pitch of the team's storyboard ideas for the Pioneers For Sustainable Communities film for the City of Hayward.

### **Conclusion**

The primary deliverable, to conclude our design process, is to develop a short five-minute film (to be delivered to the City of Hayward in September 2017) by representing the lived experience of workers, volunteers and students involved in sustainable projects with the City of Hayward and our CSUEB Pioneers for Sustainable Communities project. The film will communicate with authenticity the story of our collective efforts in the often messy, worthwhile and global saving effort of littering and composting worth our time and community building efforts. We used the Human centered design approach of IDEO to study the user experience in its many dimensions and facets in the collective experience of recycling, composting and anti-illegal dumping and anti-littering messaging. The film and footage is vital in documenting how our urban lives are transforming into more conscious, environmentally aware citizens and members of an interconnected ecological landscape locally, regionally and on a global level.



# CITY OF HAYWARD

Hayward City Hall  
777 B Street  
Hayward, CA 94541  
[www.Hayward-CA.gov](http://www.Hayward-CA.gov)

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**File #:** RPT 17-117

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**DATE:** September 11, 2017

**TO:** Council Sustainability Committee

**FROM:** Director of Utilities & Environmental Services

**SUBJECT**

East Bay Energy Watch Programs for Small and Medium-Sized Businesses

**RECOMMENDATION**

That the Committee reviews and comments on this informational report.

**ATTACHMENTS**

Attachment I      Staff Report





DATE: September 11, 2017

TO: Council Sustainability Committee

FROM: Director of Utilities & Environmental Services

SUBJECT East Bay Energy Watch Programs for Small and Medium-Sized Businesses

#### RECOMMENDATION

That the Committee reviews and comments on this informational report.

#### BACKGROUND

In January 2017, staff provided the Committee with a [report](#) about regional energy programs, including the East Bay Energy Watch (EBEW). EBEW is a partnership with Pacific Gas and Electric company (PG&E) and the counties of and cities within Alameda and Contra Costa Counties.

Hayward's General Plan, adopted by Council in 2014, includes the following programs regarding regional energy programs available to businesses:

NR-10. Financing Program for Commercial Energy Efficiency Retrofits. The City shall work with regional agencies and organizations to develop a commercial energy efficiency retrofit financing program for commercial and industrial properties.

NR-17. Business Engagement in Climate Programs. The City shall engage local businesses and business organizations (e.g., Chamber of Commerce, the Keep Hayward Clean and Green Taskforce, the Alameda County Green Business Program) in climate-related programs.

#### DISCUSSION

EBEW programs serve residential, municipal, and commercial customers. The focus of this report is on the services provided to small and medium-sized businesses, which are provided under contract by DNV GL and the Community Energy Services Corporation (CESC). The programs currently offered to business include:

Your Energy Manager (YEM) – Businesses receive free analysis for energy and water efficiency upgrades, including incentives and financing options.

East Bay Energy Watch Business Program – The EBEW small and medium sized business program offers a comprehensive package of energy-efficiency measures including lighting retrofits; refrigeration tune-ups, controls, and seals replacement; and referrals to appropriate HVAC programs. Program staff provide a no-cost energy assessment to identify potential energy-saving equipment options and determine potential incentives. Participating independent contractors can install recommended improvements. Cash rebates are identified and typically cover 50% of the project cost.

From 2012 to 2016, as a contractor to EBEW, DNV GL has achieved 4,650,000 kilowatt hours (kWh) in energy savings in the City of Hayward. The most popular building types serviced include small/large office, small retail, restaurants, groceries, and refrigerated warehouse.

To date, in 2017 EBEW has:

- Completed more than 53 projects (including 15 Hard-to-Reach businesses<sup>1</sup>)
- Installed energy efficiency lighting at 32 Hayward School District sites
- Achieved more than 1,413,637 kWh in energy savings
- Created more than \$1,371,106 in economic activity (total project costs)
- Distributed more than \$130,000 in incentives

A DNV GL representative will present more details about the program at the Committee meeting.

Tennyson Road Campaign – Staff recently worked with CESC to do a targeted campaign to the small and medium-sized business on Tennyson Road. In late August, staff sent a letter describing the services offered by EBEW to 180 businesses within the Tennyson corridor. CESC is currently following up by visiting the businesses in person. Assessments can be performed on the spot or by appointment.

Microfinance – EBEW also works with [Mission Asset Fund](#), which offers small loans (microfinancing) to businesses who need assistance with the out-of-pocket costs of an energy efficiency project. PG&E's on-bill financing is available for projects valued at \$5,000 and above. Mission Asset Fund loans are for projects that cost less than \$5,000. Loans are issued with no fees and zero interest. EBEW's goal is to reach 20 businesses this year with a focus on Hard-to-Reach businesses.

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<sup>1</sup> Hard-to-reach business customers include those that are small (fewer than 10 employees), businesses in leased space, and business owned or managed by non-English speakers.

Green Business Coordination – When EBEW representatives contact businesses about energy efficiency, information about the Alameda County Green Business Program is also provided.

## STRATEGIC PRIORITIES

This agenda item supports the Complete Communities and Tennyson Corridor Strategic Initiatives. The purpose of the Complete Communities Strategic Initiative is to create and support structures, services, and amenities to provide inclusive and equitable access with the goal of becoming a thriving and promising place to live, work and play for all. The purpose of the Tennyson Corridor Strategic Initiative is to develop an attractive, cohesive, thriving Tennyson Corridor through thoughtful engagement of residents, businesses and community partnerships.

This item supports the following goal and objective of the Complete Communities Strategic Initiative:

Goal 1: Improve quality of life for residents, business owners, and community members in all Hayward neighborhoods.

Objective 4: Create resilient and sustainable neighborhoods.

This item also supports the following goal and objective of the Tennyson Corridor Strategic Initiative:

Goal 5: Increase Community Resiliency.

Objective 6: Reduce resident utility bills through efficiency

## FISCAL IMPACT

EBEW programs do not impact the City's General Fund. EBEW programs are funded by California utility ratepayer funds administered by PG&E under the auspices of the California Public Utilities Commission (CPUC). Environmental Services staff spend some staff time coordinating services in Hayward.

## SUSTAINABILITY FEATURES

Participation in regional energy programs allows Hayward to benefit from regional marketing activities and to access funding that would otherwise be unavailable. Such programs focus on improving energy efficiency, increasing the use of renewable energy, and conserving water – all of which support the City's sustainability and long term greenhouse gas reduction goals.

## NEXT STEPS

Staff will continue to work with EBEW administrators and program implementers to offer energy efficiency services to Hayward businesses and will track the results of the Tennyson corridor campaign.

Prepared by: Erik Pearson, Environmental Services Manager

Recommended by: Alex Ameri, Director of Utilities & Environmental Services

Approved by:

A handwritten signature in black ink, appearing to read 'K. McAdoo', is positioned above a horizontal line.

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Kelly McAdoo, City Manager



# CITY OF HAYWARD

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**File #:** RPT 17-118

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**DATE:** September 11, 2017

**TO:** Council Sustainability Committee

**FROM:** Director of Utilities & Environmental Services

**SUBJECT**

CY 2015 Greenhouse Gas Emissions Inventory

**RECOMMENDATION**

That the Committee reviews and comments on this informational report.

**ATTACHMENTS**

Attachment I Staff Report

Attachment II Residential Natural Gas & Heating Degree Days



DATE: September 11, 2017

TO: Council Sustainability Committee

FROM: Director of Utilities & Environmental Services

SUBJECT CY 2015 Greenhouse Gas Emissions Inventory

## RECOMMENDATION

That the Committee reviews and comments on this informational report.

## SUMMARY

The City Council has set greenhouse gas (GHG) emission reduction targets for the Hayward community. To track progress, staff completes a full community GHG inventory every five years. This report provides the results of calendar year 2015 inventory and compares it to the previous two inventories. The table below summarizes the emissions totals for the three sectors - energy, transportation, and solid waste. Emissions are displayed in metric tons of carbon dioxide equivalent<sup>1</sup> (MT CO<sub>2</sub>e).

Table 1: GHG Emissions by Sector (MT CO<sub>2</sub>e)

	2005	2010	% Change*	2015	% Change*
Energy Emissions	395,790	373,453	-5.6%	365,711	-7.6%
Transportation Emissions	696,013	644,044	-7.5%	664,442	-4.5%
Solid Waste Emissions	62,285	28,628	-54.0%	24,909	-60.0%
Total Emissions	1,154,088	1,046,125	-9.4%	1,055,061	-8.6%
Hayward Population <sup>2</sup>	140,305	146,002	4.1%	159,104	13.4%
Total Emissions/Capita	8.23	7.17	-12.9%	6.63	-19.4%

\*Percent change is compared to the baseline year of 2005

In 2015, the Hayward community achieved an 8.6% reduction in GHG emissions compared to 2005. Total per capita emissions were 19.3% lower in 2015 given Hayward's increasing population. If we consider population growth, Hayward is making good progress toward

<sup>1</sup> Carbon dioxide is not the only gas that contributes to climate change. Each greenhouse gas causes varying amounts of warming. For example, one ton of methane (CH<sub>4</sub>) causes the same amount of warming as 23 tons of CO<sub>2</sub> (1 ton of CH<sub>4</sub> = 23 tons CO<sub>2</sub>e). To simplify reporting, it is standard practice to report carbon equivalent emissions (CO<sub>2</sub>e) as opposed to the actual emissions of each gas.

<sup>2</sup> Population data source: California Department of Finance estimates for the end of each year (1/1/2006 and 1/1/2011, and 1/1/2016): [www.dof.ca.gov/Forecasting/Demographics/Estimates/](http://www.dof.ca.gov/Forecasting/Demographics/Estimates/)

meeting Council's 2020 goal of a 20% emissions reduction. However, the goals adopted by Council in the 2040 General Plan apply to the total GHG emissions, not the per capita amount.

## BACKGROUND

The last report on GHG emissions was presented to the Council Sustainability Committee in July 2016 and included a partial inventory for calendar year 2015; however, transportation and solid waste-related data were not yet available at that time. The 2016 report and previous reports are available on the City's [Climate Action Plan](#) page.

The purpose of this report is to update the Committee on the 2015 community GHG emissions inventory. The City of Hayward's General Plan Policy NR-2.4 sets the following GHG emissions reduction targets.

### NR-2.4: Community Greenhouse Gas Reduction

The City shall...reduce community-based GHG emissions by 20 percent below 2005 baseline levels by 2020, and strive to reduce community emissions by 61.7 percent and 82.5 percent by 2040 and 2050, respectively.

To track compliance with these targets, the City conducts community GHG emissions inventories every five years, starting with 2005 as the baseline year. For 2005 and 2010, staff worked with ICLEI–Local Governments for Sustainability and StopWaste to complete the inventories. For the 2015 inventory, Hayward's CivicSpark Fellows used the Statewide Energy Efficiency Collaborative's (SEEC) ClearPath software. SEEC is a collaboration between ICLEI, the Institute for Local Government, the Local Government Commission, and all California investor-owned utilities.

All three inventories use the Global Protocol for Community-Scale (GPC) methodology to calculate GHG emissions. The GPC methodology is a global reporting standard created by ICLEI, the World Resources Institute, and C40 Cities Climate Leadership Group. The Global Covenant of Mayors for Climate and Energy, which the Hayward City Council voted to join on March 7, 2017, has adopted the GPC as its standard reporting format.

Over the past ten years, the organizations mentioned above have continuously refined and updated the GPC methodology to estimate emissions more accurately. In response, staff has recalculated select emissions for the 2005 and 2010 inventories in ClearPath to make an apples-to-apples comparison. Therefore, the numbers reported in this report do not match the numbers from previous reports. In particular, the data sources and methodology for calculating the transportation sector have been updated since 2010 to include a more detailed breakdown of vehicle types.

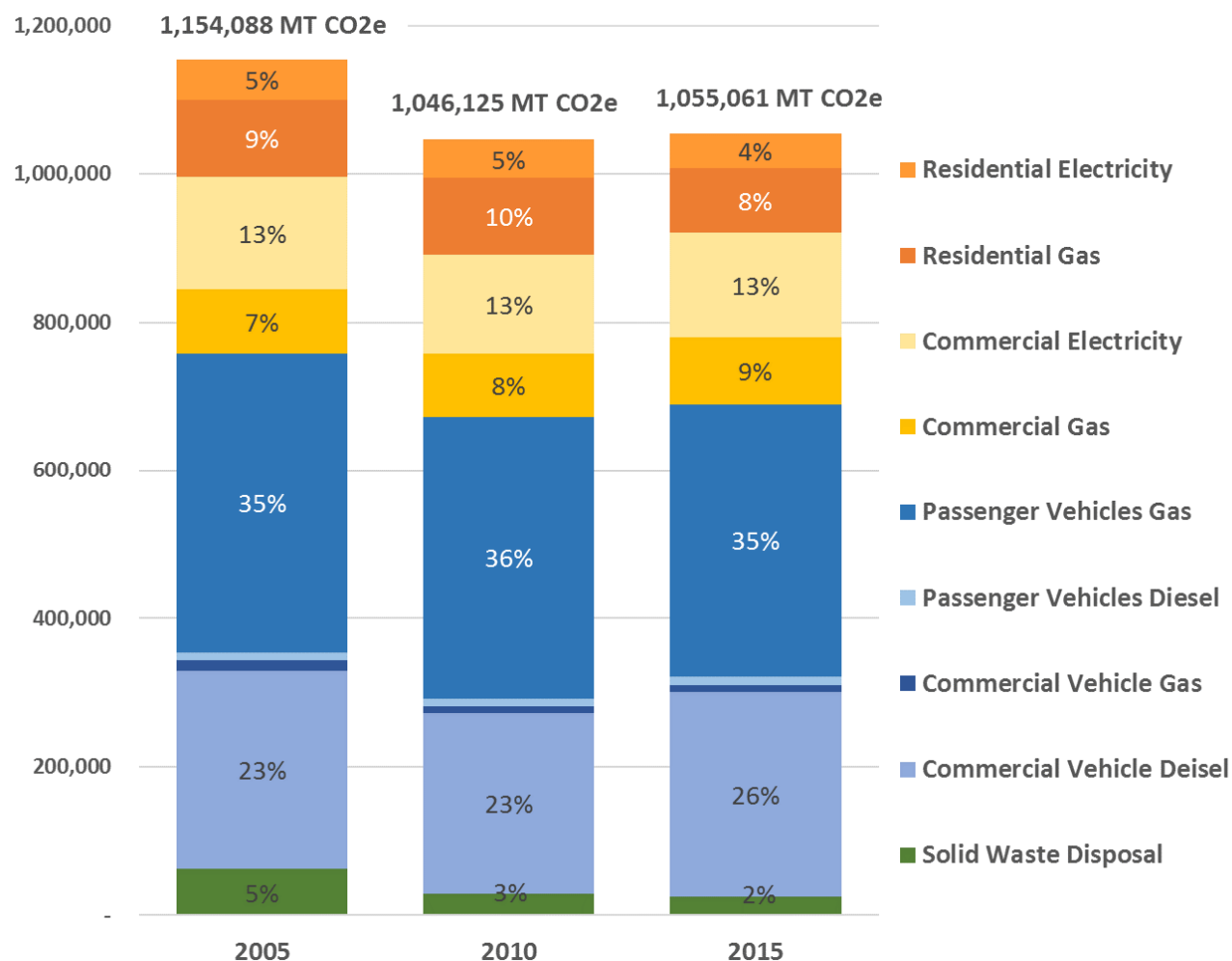
Since the baseline year of 2005, staff has also begun to track additional emissions from wastewater and public transit sources. However, because these emissions were not included in the baseline year and an apples-to-apples comparison cannot be made, they have been left out of the year-to-year comparison.

In the discussion below, staff has made educated guesses about the factors driving emission reductions or increases. However, for some trends, sufficient data sources are unavailable to draw conclusions. Because of this, staff applied and was selected to participate in a U.S. Department of Energy Project: Analyzing Drivers of Change in Greenhouse Gas Emissions Inventories. In the coming months, the City will work with ICLEI to help develop a “contribution analysis,” which can be used to help explain trends in greenhouse gas emissions inventories and forecast future changes.

## DISCUSSION

Hayward’s GHG inventory is comprised of three sectors: energy, transportation, and solid waste. The chart below shows the subsector breakdown for each year and the percent of each subsector for that year. Transportation, shown in shades of blue, is the largest sector, making up 60-63% of the total. Energy makes up 34-35% of the total and solid waste makes up 2-5%.

Figure 1: GHG Emissions by Subsector (MT CO<sub>2</sub>e)<sup>3</sup>



<sup>3</sup> The percentages for each subsector are relative to the total emissions for each year.



## Energy Sector

As shown in Table 2 on page 5, energy emissions in 2015 were 7.6% below 2005 levels. Emissions decreased 2% more from the 5.6% reduction achieved in 2010. Emissions from residential electricity, residential gas, and commercial electricity usage all declined in 2015. The primary reason that electricity emissions have decreased is that Pacific Gas & Electric Company (PG&E) sources have become cleaner over the past ten years as PG&E strives to meet the State's Renewable Portfolio Standard goal of 33% by 2020, and PG&E's continued use of large hydro and nuclear energy, which typically has low GHG emissions.

The 16% reduction in residential gas emissions in 2015 is likely related to the mild winter that year, which reduced the need for residents to heat their homes. A mild winter equates to fewer Heating Degree Days (HDD). HDD is the unit which measures how many degrees, and for how many days, outside air temperatures were lower than the base temperature of 65 degrees Fahrenheit. In 2015, Hayward saw fewer days when outside temperatures dipped below 65 degrees compared to 2005 and 2010 (see Attachment II).

Despite the warm winter, natural gas emissions from the commercial sector increased by 5% in 2015. This is likely due to the improved economy and increase in business activities. However, there may be additional factors driving this increase, which staff hopes to uncover as part of the DOE contribution analysis.

### Data Inputs for Table 2:

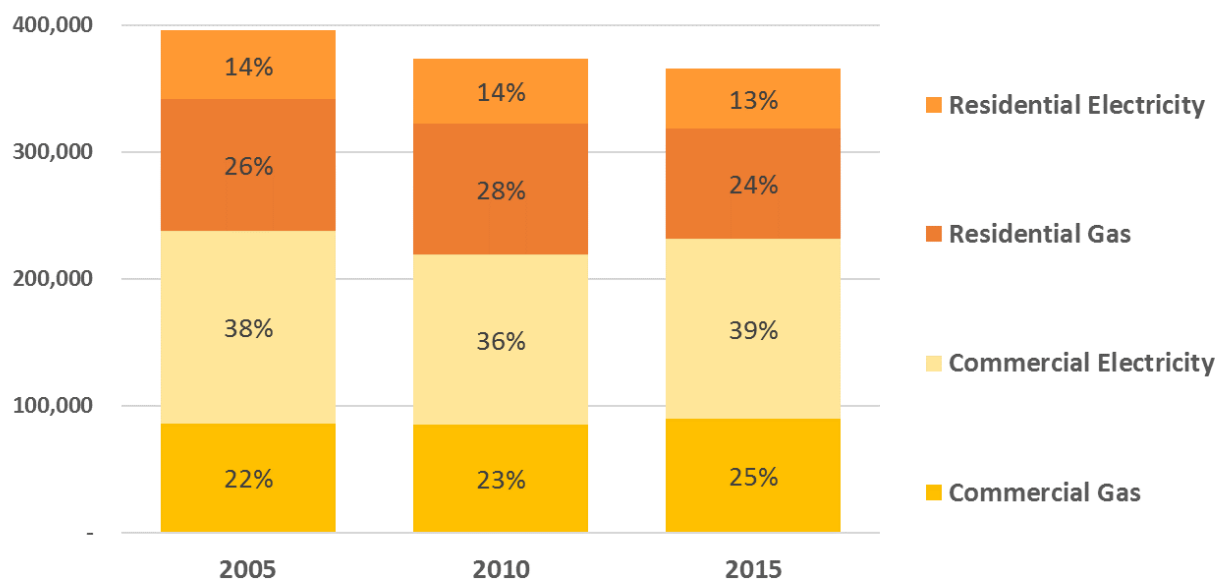
- Usage: PG&E provides the City with total kWhs and Therms for all residential and commercial buildings in Hayward.
- Emission Factor for Electricity = Average MT CO<sub>2</sub>e emitted per kWh, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). This factor has decreased over time as PG&E's electricity sources have become cleaner.
- Emission Factor for Natural Gas = Average MT CO<sub>2</sub>e emitted per therm, including CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. This factor remains constant.

Table 2: Energy Sector GHG Emissions

		2005	2010	% Change*	2015	% Change*
Residential Electricity	kWh	242,674,455	252,427,371	4%	241,804,751	0%
	Emission Factor	0.000224	0.000203	-9%	0.000196	-12%
	MT CO2e	54,288	51,335	-5%	47,334	-13%
Residential Gas	Therms	19,496,859	19,400,629	0%	16,326,344	-16%
	Emission Factor	0.005317	0.005317	0%	0.005317	0%
	MT CO2e	103,674	103,162	0%	86,815	-16%
Commercial Electricity	kWh	678,989,309	657,204,663	-3%	722,945,746	6%
	Emission Factor	0.000224	0.000203	-9%	0.000196	-12%
	MT CO2e	151,894	133,653	-12%	141,519	-7%
Commercial Gas	Therms	16,160,661	16,041,943	-1%	16,933,488	5%
	Emission Factor	0.005317	0.005317	0%	0.005317	0%
	MT CO2e	85,934	85,303	-1%	90,043	5%
Total Energy MT CO2e		395,790	373,453	-5.6%	365,711	-7.6%

\*Percent change is compared to the baseline year of 2005

Figure 2: Energy Sector GHG Emissions (MT CO2e)<sup>4</sup>



<sup>4</sup> The percentages for each subsector are relative to the total emissions for each year.

## Transportation Sector

As shown in Table 3, transportation emissions in 2015 were 4.5% below emissions in 2005. This is less than the 7.5% reduction achieved between 2005 and 2010. As seen in the table below, the total vehicle miles traveled (VMT) decreased in 2010 and then increased again in 2015. This is likely related to the economic recession and recovery. While total passenger VMT for 2015 remains lower than 2005, total commercial VMT is higher than in 2005, especially for diesel construction vehicles.

Overall emissions factors have decreased in all categories over the last ten years as vehicles have become cleaner.<sup>5</sup> Passenger diesel vehicles have experienced the greatest decrease and commercial gas have experienced the least.

### Data Inputs for Table 3:

- Usage: The Metropolitan Transportation Commission (MTC) provides the City with estimated VMT for passenger and commercial vehicles. MTC uses modeling software and data from regional transportation studies to come up with these estimates.
- Emission Factors = Average MT CO<sub>2</sub>e emitted per mile, including CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. This factor is calculated for each of the vehicle categories below using California Air Resources Board (CARB) data for Alameda County. CARB uses transportation studies to estimate the ratio of vehicle types by VMT and the pollution levels for each type.

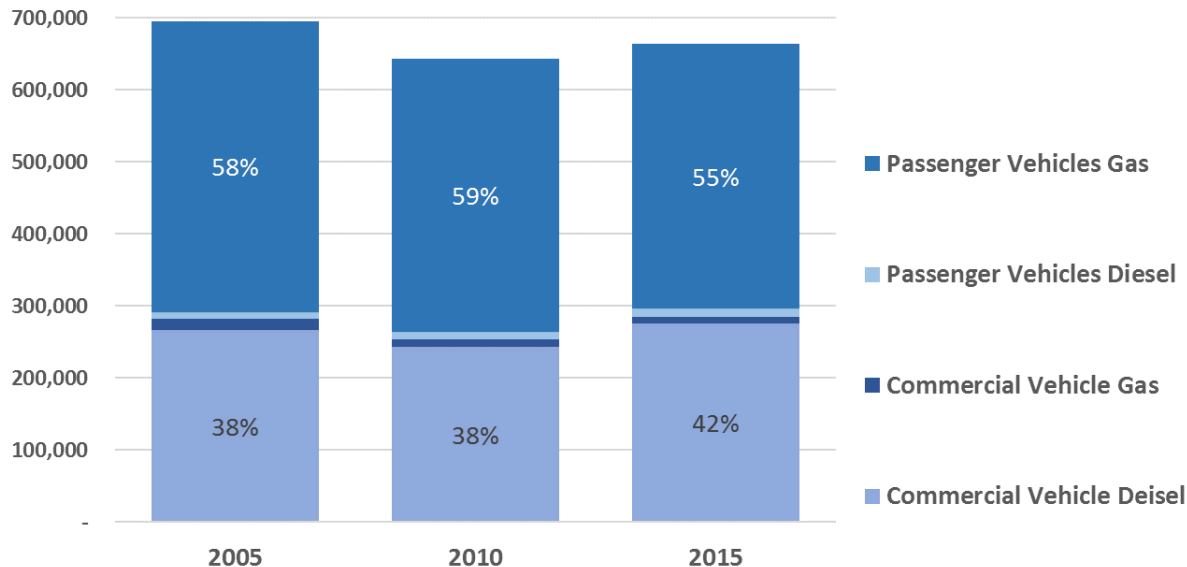
Table 3: Transportation Sector GHG Emissions

		2005	2010	% Change*	2015	% Change*
Passenger Gas	Miles (VMT)	977,958,199	916,538,305	-6.3%	936,472,744	-4.2%
	Emission Factor	0.000413	0.000415	0.5%	0.000393	-4.9%
	MT CO <sub>2</sub> e	403,877	380,315	-5.8%	367,744	-8.9%
Passenger Diesel	Miles (VMT)	15,579,684	16,459,159	5.6%	19,305,403	23.9%
	Emission Factor	0.000656	0.000628	-4.2%	0.000583	-11.1%
	MT CO <sub>2</sub> e	10,216	10,342	1.2%	11,258	10.2%
Commercial Gas	Miles (VMT)	10,883,273	7,069,442	-35.0%	6,832,281	-37.2%
	Emission Factor	0.001369	0.001367	-0.1%	0.001365	-0.3%
	MT CO <sub>2</sub> e	14,895	9,661	-35.1%	9,325	-37.4%
Commercial Diesel	Miles (VMT)	165,254,960	149,177,668	-9.7%	174,788,663	5.8%
	Emission Factor	0.001616	0.001634	1.1%	0.001580	-2.2%
	MT CO <sub>2</sub> e	267,025	243,726	-8.7%	276,114	3.4%
Total Transportation MT CO <sub>2</sub> e		696,013	644,044	-7.5%	664,442	-4.5%

\*Percent change is compared to the baseline year of 2005

<sup>5</sup> Two of the 2010 emissions factors increased compared to 2005. The emissions factors likely increased because less efficient vehicles made up a greater share of total vehicles on the road that year. One possibility is that the age of the vehicles may have decreased their fuel efficiency, which may be related to the economic downturn.

Figure 3: Transportation Sector GHG Emissions (MT CO2e)



### Solid Waste Sector

Solid Waste emissions in 2015 were 60% below emissions in 2005. This dramatic reduction is primarily because the Altamont Landfill completed a landfill gas to liquified natural gas plant in 2009, which allowed it to achieve an estimated 93% methane gas capture rate. The reduction is also due in part to Hayward's efforts to increase diversion of organic material away from landfills. Over this ten-year period, Hayward implemented mandatory recycling and organics.

### Data Inputs for Table 4:

- Usage: CalRecycle provides the City with the total tons of waste disposed into landfills that originated from Hayward.
- Emission Factor = Average MT CO2e emitted per ton of waste, comprised solely of methane. This factor applies a methane oxidation rate based on the estimated mix of organic and non-organic material in the waste. This factor also gives credit for any methane captured at the landfill.

Table 4: Solid Waste Sector GHG Emissions

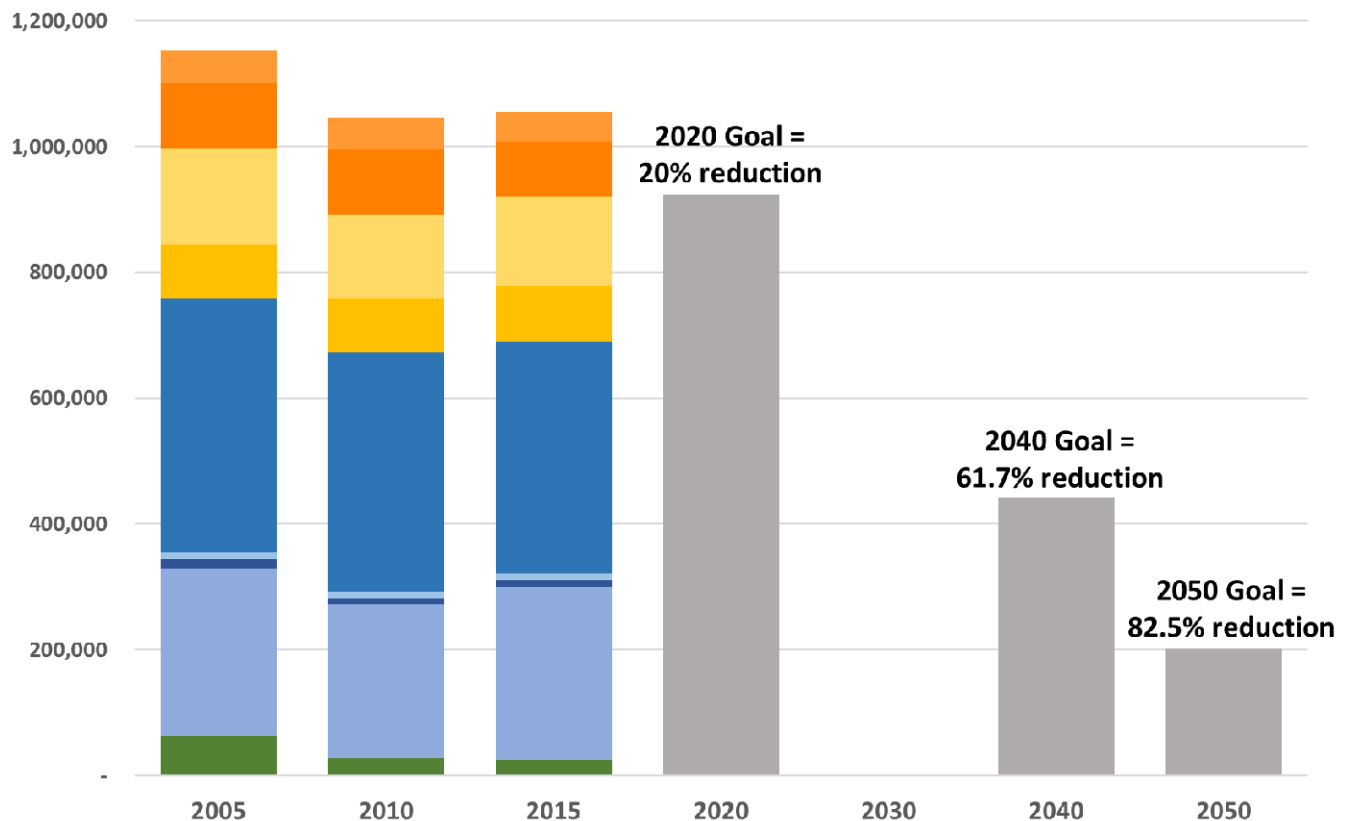
		2005	2010	% Change*	2015	% Change*
Waste Sent to Landfill	Tons of waste	173,509	119,483	-31.1%	108,106	-37.7%
	Emission Factor	0.358973	0.239595	-33.3%	0.230410	-35.8%
	MT CO2e	62,285	28,628	-54.0%	24,909	-60.0%
Total Solid Waste MT CO2e		62,285	28,628	-54.0%	24,909	-60.0%

\*Percent change is compared to the baseline year of 2005

### Emission Reduction Goals

The chart below shows the inventories in 2005, 2010, and 2015, as well as the emission reduction targets for 2020, 2040, and 2050. At the current trend, Hayward will fall short of its 2020 goal of a 20% total emissions reduction.

Figure 4: GHG Emission Inventories and Goals



### Progress Towards the 2020 Goal

East Bay Community Energy (EBCE) is a newly formed community choice aggregator (CCA) that will serve cities in Alameda County and the County unincorporated areas. EBCE will take over the role of procuring energy for its customers and PG&E will continue to provide transmission and billing services. The Agency is scheduled to launch in Spring of 2018. In the implementation plan submitted to the California Public Utilities Commission, EBCE stated that it intends to provide electricity that is at least 10% cleaner than PG&E in terms of GHG emissions. EBCE's mission is to deliver cleaner electricity, and 10% cleaner should be considered the minimum improvement over PG&E.

Table 5 on page 9 shows three scenarios for the possible impact of EBCE on Hayward's 2020 GHG emissions. For all three scenarios, staff is assuming that transportation, solid waste, and natural gas emissions remain flat because staff does not anticipate that there will be sufficient

reductions in any of these categories by 2020 to make up for Hayward's growing population and increased commercial activity.

Table 5 separates out Direct Access (DA) customers, which make up 16% of Hayward's electricity load. DA customers will not be automatically enrolled in EBCE. Instead, they will need to proactively switch their energy contracts to EBCE. The three scenarios below each assume a different DA switch rate to EBCE. The City is aware of some DA customers, such as Cal State East Bay, and can conduct outreach to these customers. However, PG&E will not share the full list of DA customers with the City due to data-privacy regulations.

Staff feels that the first scenario in Table 5 is the minimum impact that EBCE will deliver. It assumes that EBCE will procure 73% of its electricity from GHG-free sources, either renewables or hydropower (this is 10% cleaner than PG&E). In addition, this scenario assumes that there will be a 5% opt out rate for Hayward customers, who will instead be served by PG&E. Finally, it assumes that 20% of the DA energy load will switch to EBCE. The first scenario would result in an overall emission reduction of 9.1% in 2020, far short of the 20% reduction goal set by Council.

The second, middle scenario assumes that EBCE will procure 85% of its electricity from GHG-free sources. It assumes that 5% of customers will opt out and that 50% of the DA energy load will switch to EBCE. This scenario results in an overall emissions reduction of 13.3%, still short of the 20% goal.

Staff feels that the third scenario is the maximum impact that EBCE will be able to deliver. It assumes that EBCE will procure 100% of its electricity from GHG-free sources. It assumes that 10% of Hayward customers will opt out due to potentially higher costs. Finally, it makes the optimistic assumption that 65% of the DA energy load will switch to EBCE. This scenario would result in an overall emissions reduction of 20.1%, meeting Council's goal.

Table 5: Three Scenarios Showing Potential Impact of EBCE

Scenario #	Assumptions			Total GHG Reduction from 2005 - 2020
	GHG-Free Electricity	Opt Out Rate	DA Load Switch to EBCE	
1	73%	5%	20%	-9.1%
2	85%	5%	50%	-13.3%
3	100%	10%	65%	-20.1%

As mentioned above, these results reflect total emission reductions, not per capita reductions. For all three scenarios above, Hayward will achieve a greater than 20% per capita emissions reduction due to increasing population.

### The 2040 Goal

Hayward's 2040 General Plan sets a goal of achieving a 61.7% GHG emissions reduction by 2040 as compared to 2005. Staff has calculated a theoretical scenario that will achieve this goal in Table 6 on page 10.

To achieve the 2040 goal, there will need to be a significant reduction in emissions from the transportation sector, the largest contributor to Hayward's GHG inventory. Unfortunately, the City has limited control over regional transportation patterns. The method used to calculate transportation emissions in Hayward includes both local trips as well as vehicles traveling regionally on highways through Hayward. Any programs to reduce vehicle trips on Hayward roads, such as increased bike ways and car sharing, would pale in comparison to highway trips.

Fortunately, the State is actively developing policies and implementing strategies to address emissions from the transportation sector. The State of California's Alternative Fuels Plan, created by the California Energy Commission and Air Resources Board, lays out a path for majority electrification of passenger and commercial vehicles. The agencies estimate that the California could reduce its transportation GHG emissions as much as 70% by 2050<sup>6</sup> if it implements the recommendations set forth in the Plan.

The scenario in Table 6 makes the following assumptions to reduce Hayward's emissions by 61.7% by 2040. Staff feels that these assumptions are ambitions and will largely depend on State leadership, cultural change, and technological advances over the next 22 years.

1. It assumes EBCE's procurement practices and local efficiency efforts can reduce electricity emissions by 75% compared to 2015.
2. It assumes that gas efficiency efforts and energy-switching<sup>7</sup> measures will reduce natural gas emissions by 70% compared to 2015.
3. It assumes that state and local efforts to electrify vehicles and reduce vehicle trips result in a 50% reduction in transportation emissions compared to 2015.
4. It assumes that increased waste diversion, especially of organic material, will reduce solid waste emissions by 60% compares to 2015.

Table 6: 2040 Emissions Reduction Scenario

Hayward GHG Emissions Summary Table (MT CO2e)	2005	2015	2040	% Change from 2015	% Change from 2005
Electricity Emissions	206,182	188,853	47,213	-75.0%	-77.1%
Natural Gas Emissions	189,608	176,858	53,057	-70.0%	-72.0%
Transportation Emissions	696,013	664,442	332,221	-50.0%	-52.3%
Solid Waste Emissions	62,285	24,909	9,964	-60.0%	-84.0%
Total Emissions	1,154,088	1,055,061	442,455	-58.1%	-61.7%

<sup>6</sup> California Air Resources Board & California Energy Commission (2007). State Alternative Fuels Plan. <http://www.energy.ca.gov/2007publications/CEC-600-2007-011/CEC-600-2007-011-CMF.PDF>

<sup>7</sup> Energy switching refers to replacing gas appliances with electric appliances, such as hot water heaters, clothes dryers, or stove tops.

## Limitations of this Inventory

The GHG inventory method that Hayward uses, along with most cities worldwide, was originally designed by ICLEI and partners in the early 2000s. The focus then and now is on measuring emissions from the data sources that are most readily available, such as utility data. This approach is practical, but it comes with limitations.

### Reporting Timeframe

One of the most significant limitations is the five-year gap between each inventory, which makes it difficult to assess the progress and effectiveness of policies and programs. There are regional efforts to increase the frequency of data availability. For example, MTC has recently launched a data portal to provide transportation data, rather than each city having to request the data. Unfortunately, this data only covers certain years. In addition, PG&E has created tailored reports specifically designed to help with emissions inventories<sup>8</sup>. Unfortunately, the PG&E reports are often significantly delayed.

Staff is currently working with the East Bay Energy Watch (EBEW), StopWaste, and other Bay Area cities to discuss ways to streamline the inventory process. One possibility may be for the Bay Area Air Quality Management District (BAAQMD) to take the lead on data gathering and providing the necessary emission factors to each city, rather than each city gathering data and calculating these factors on their own. Another possibility may be for EBEW to hire a consultant to do annual inventories for individual cities, which is currently done for cities in San Mateo County.

### Missing Emission Sources

Another limitation is that the current inventory omits large sources of emissions over which the City may have some influence. Specifically, the inventory does not include the upstream emissions of the goods consumed in Hayward. For example, emission reductions from green purchasing policies would not be reflected in the current inventory. And food, one of the biggest contributors to GHG emissions worldwide, is not reflected in Hayward's inventory.

As mentioned above, the reason upstream emissions are not included is that it is difficult to obtain data on consumer consumption patterns. However, some attempts are being made. In 2016, the BAAQMD launched a project with UC Berkeley to create [consumption-based inventories](#) for Bay Area cities<sup>9</sup>. Staff has concerns with the data sources used for this project, but feels that the intent is meaningful.

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<sup>8</sup> There are currently discussions between investor owned utilities and local government advocates about energy data access and privacy issues. In particular, many cities in the bay area have struggled to get energy data for their industrial users. Hayward has not yet encountered this issue, but it could in the future.

<sup>9</sup> The City's current inventory is a hybrid of consumption and production. For example, energy consumed by residents is consumption-based and energy consumed by industry is production-based. The State of California performs a true production-based inventory, measuring all emissions produced in California from all sectors, including agriculture.



## STRATEGIC PRIORITIES

This agenda item is an informational report, and does not relate to one of the Council's Strategic Initiatives.

## NEXT STEPS

Staff will continue to work with StopWaste and regional agencies to identify potential opportunities to streamline GHG inventories on a county or regional level, with the goal of increasing the frequency of reporting to annually rather than every five years.

Staff will also continue to implement the GHG reduction programs identified in Hayward's General Plan. As mentioned above, one highlight is that East Bay Community Energy will be serving Hayward customers by 2020, which as mentioned above may have a positive impact on the 2020 inventory. Additional reduction actions will need to be identified for Hayward to meet its 2040 and 2050 goals.

Most Alameda County cities have not set GHG emission reduction goals beyond 2020. These cities will be updating their Climate Action Plans over the next year to set future goals, which creates an opportunity to establish regional goals as well as city-specific goals.

The potential solutions to GHG emissions are evolving rapidly. Just a few years ago, staff could not have predicted the formation of EBCE, the rise of electric cars and trucks, and the trend towards self-driving cars. Given the rapid changes that are taking place, staff recommends adopting shorter-range GHG emission reduction goals. Staff will return to the Committee at a future meeting to present the possibility of establishing 2025 and 2030 goals and potential strategies to help the City meet these goals.

Prepared by: Mary Thomas, Management Analyst,  
Chris Sturken, CivicSpark AmeriCorps Fellow

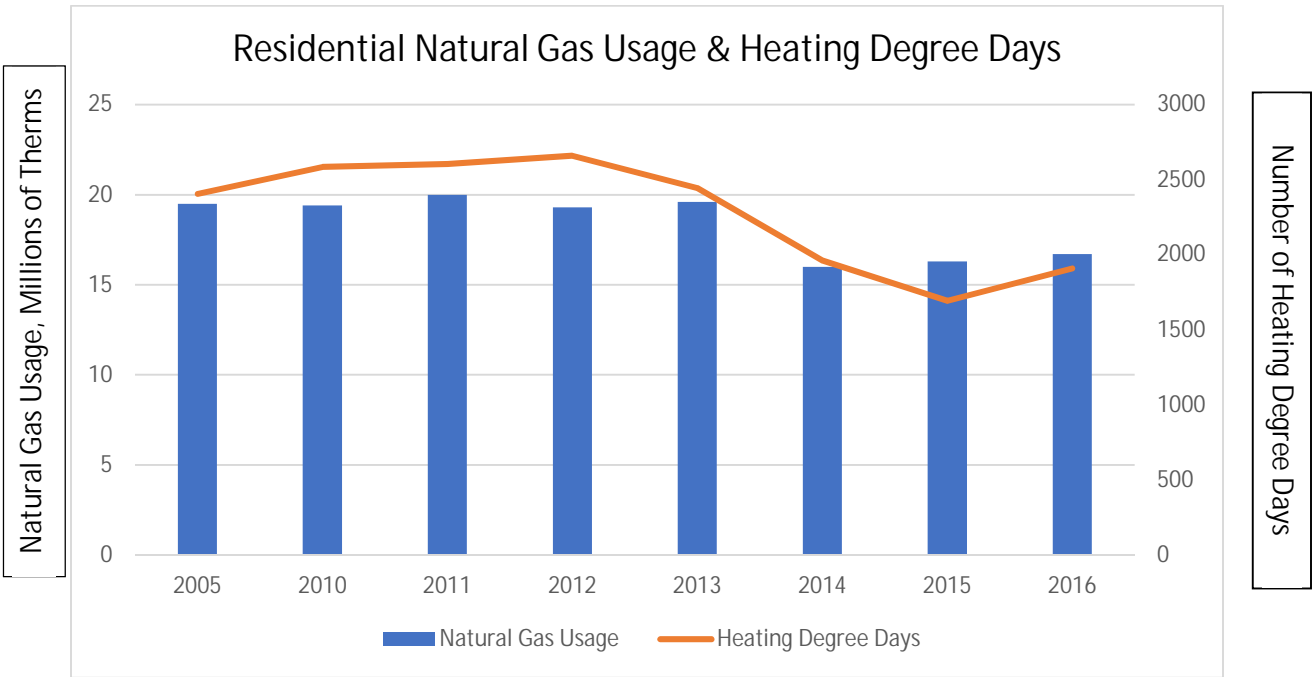
Recommended by: Alex Ameri, Director of Utilities & Environmental Services

Approved by:



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Kelly McAdoo, City Manager





# CITY OF HAYWARD

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**File #:** ACT 17-056

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**DATE:** September 11, 2017

**TO:** Council Sustainability Committee

**FROM:** Director of Utilities & Environmental Services

**SUBJECT**

Design and Construction Approach for the Solar Photovoltaic System Project at the Water Pollution Control Facility - Phase II

**RECOMMENDATION**

That the Committee reviews and comments on this report, and provides direction regarding the appropriate design and construction approach for an additional one-megawatt or larger solar photovoltaic system at the Water Pollution Control Facility (WPCF).

**ATTACHMENTS**

Attachment I      Staff Report



DATE: September 11, 2017

TO: Council Sustainability Committee

FROM: Director of Utilities & Environmental Services

SUBJECT: Design and Construction Approach for the Solar Photovoltaic System Project at the Water Pollution Control Facility - Phase II

## RECOMMENDATION

That the Committee reviews and comments on this report, and provides direction regarding the appropriate design and construction approach for an additional one-megawatt or larger solar photovoltaic system at the Water Pollution Control Facility (WPCF).

## BACKGROUND

In 2009, the City began studying the feasibility of constructing a large solar photovoltaic (PV) system at the WPCF. Initially, a 500 kilowatt, privately designed, constructed, owned, and operated facility was envisioned. In this scenario, the City would purchase the energy from the private company through a Power Purchase Agreement (PPA). At the time, only private entities could take advantage of the tax-write off component of the incentives associated with this type of project. A request for proposals (RFP) seeking PPA development was issued in May 2009, and staff interviewed the top three respondents.

At the same time, a low-cost loan from the California Energy Commission (CEC) became available, which allowed staff to study if owning a system may be a better economic choice than purchasing the generated energy from a private party who would also own the system. Based on initial findings, staff began negotiating a turn-key project (where the City would own the system) with the top three respondents, and pursuing the CEC loan, which also provided further incentives via rebates. In parallel, staff pursued Net Energy Metering (NEM) for the project, which allowed the City to sell excess unused energy to PG&E. At the same time, staff recommended increasing the system size and output to one megawatt, in part to take full advantage of NEM, and in recognition of the needs at WPCF.

The modified project approach to allow a design-build contract was approved by the City Council on [November 9, 2009](#). REC Solar, of San Luis Obispo, was selected to construct the facility. The project was successfully completed in 2011. Despite its location next to the bay with salty air and generally corrosive environment, the system has operated very well. On many sunny, mild days it still produces very close to its rated output of one megawatt of power.

A few years after the solar photovoltaic project was put in service, the City upgraded its combined heat and power cogeneration facility at WPCF which uses bio-gas, a renewable by-product of the wastewater treatment process, to produce more renewable energy. Because some of the energy produced by the cogeneration system is at times excess to the needs of WPCF, the City decided to explore options to further benefit from the excess energy it produced. NEM limits onsite generation to one megawatt, so the existing solar PV system caused the WPCF to reach the limit for NEM. The City found a new tariff, called Renewable Energy Self-Generation Bill Credit Transfer or RES-BCT, which would allow the City to export its excess energy generated by both the solar PV and the upgraded cogeneration system. Under RES-BCT, the City is authorized to produce up to five megawatts of power and export its excess energy to a limited number of other City facilities. This not only allowed more efficient use of the cogeneration energy, but it also opened the door for the expansion of the City's solar PV installation at the WPCF.

## DISCUSSION

Over the past couple of years, staff has prepared a site adjacent to the existing solar PV system, including soil preparation and grading, to accommodate a second phase of solar PV at the WPCF. The approximately 8-acre site, comparable to the space occupied by the existing solar PV system, is expected to be ready in the next two months. Given the efficiency improvements achieved in solar PV panel technology in the past few years, the site can be used to generate more power than one megawatt; possibly as high as 1.5 megawatt. However, because of regulations related to the number of sites that can be included in the export portfolio of a RES-BCT tariff, staff has determined that the tariff can only allow an addition of 500 kilowatts of power. Staff is proposing a larger expansion, likely beyond one megawatt, in anticipation of new regulations from the recently formed [East Bay Community Energy \(EBCE\)](#) which would not only allow but encourage local clean energy producers to generate and transfer to EBCE as much clean energy as they can produce.

### Various Approaches to Design and Construction

There are various ways that the design, procurement, and construction of the new solar system can be processed. The two main options are conventional design-bid-build, and as an alternative, design-build approach. Advantages and disadvantages of each are discussed below.

#### Design-Bid-Build

This approach is similar to the overwhelming majority of the public works and utilities projects managed by the City. Under this process, the City selects a professional services company through a request for proposals process to design the facility and prepare Plans, Specifications, and a probable Estimated cost of construction, or PS&E documents. The Council reviews and approves PS&E documents and calls for competitive bids. Typically, the contractor that submits the lowest bid is awarded the project.

The advantage of this approach is that the City has full control over the design and the project specifications, and that the City benefits from the contractors' competition in receiving the bids for the same design. While this is a tried and true approach for the typical construction, such as paving roads, building buildings, or pipelines, the disadvantage is that it is not necessarily the best approach for constructing unique projects or projects with many unknowns. It is best to allow a firm that is familiar with the work and considered an expert in the field to design, value engineer, and construct the facility for the City.

## Design-Build

This approach would allow a company that has been selected based on a bid process to design and build a facility for its client, in this case, the City. Because there are qualitative variables other than the low cost involved, such as the merits of the design, or in case of buildings, architectural features and quality of design, the selection may not be solely based on the lowest cost. The advantage of this approach is that a very competent, experienced builder is going to design a facility that they have designed and constructed multiple times before and perfected it, and therefore there is less room for including features in design or requirements in the specification to render the project hard to build, less functional, or less than state of the practice.

The City has used this approach in the past, and a couple of recent examples in Utilities and Environmental Services would be the construction of existing solar PV system at the WPCF (or any other Solar PV system built in the City) and the recent construction of the Co-Generation system at the WPCF. For the latter, the City used engineering consultant services to produce a preliminary (i.e., 10%) facilities plan. As importantly, this approach eliminates finger-pointing between separate designers and builders related to different elements of design, specifications, and constructability, since a single firm would be responsible for the project.

The disadvantages include that the City could lose some control over the design, features, and ease of operability and maintenance. Furthermore, there could also be a perception that the project could have been done less expensively.

## Requested Committee's Direction

Staff would appreciate policy direction on the following two questions.

1. Would it be appropriate for this specialized project, to be processed as a design-build project, or should it go through the conventional design-bid-build process?
2. If the Committee is in support of a design-build approach, should the staff first attempt to negotiate an agreement for this new phase with REC Solar, the successful previous design-builder of the existing facility at WPCF, or should staff request proposals from various builders and then negotiate with the lowest cost proposer? In either case, the approval authority for any negotiated cost will be with the Council.

## ECONOMIC IMPACT

Unlike the existing solar PV facility, the energy produced by the new facility would almost exclusively be used for export to either other City buildings or facilities to help the City meet its Zero Net Energy goal, or sold to EBCE. While the financial variables are numerous and hard to precisely predict this early in the project, staff believes the project's impact on City residents and businesses to be neutral.

## STRATEGIC PRIORITIES

This agenda item supports the Complete Communities Strategic Initiative. The purpose of the Complete Communities strategy is to create and support structure, services, and amenities to provide inclusive and equitable access with the goal of becoming a thriving and promising place to live, work and play for all.

Goal 1: Improve quality of life for residents, business owners, and community members in all Hayward neighborhoods.

Objective 1: Increase neighborhood safety and cohesion.

By producing more emissions free energy from renewable sources, this project in a small measure contributes to the health and wellbeing of our residents throughout the City.

## FISCAL IMPACT

The cost for this project is estimated at between \$4M to \$6M depending on the size of the system that is finally selected. The money will be funded by a combination of a small state grant and the Wastewater Improvement Capital Fund. Benefitting accounts will reimburse the Wastewater Improvement Capital Fund as they consume the electric energy over the years. Given the use of the RES-BCT tariff, a ten to fifteen-year project payback period it is estimated.

The payments from the benefitting accounts would be in line with what they would have paid to other electric service providers. Therefore, there will be no adverse impact on the General Fund's participating accounts.

## SUSTAINABILITY FEATURES

The installation of additional solar PV in municipal facilities would allow the City to work towards producing local, GHG-free electric energy, from renewable sources. This project will get the City a step closer to meeting the Council's stated goal of Zero Net Energy (ZNE) for City municipal services by 2025. The City is currently producing more than 50 percent of its electric energy from renewable sources and purchase just over 8,000,000 kWh from PG&E. Depending on the selected project size, this project can potentially produce an additional 2,300,000 to 4,000,000 kWh and get the City substantially closer to meeting its municipal ZNE goal.

## PUBLIC CONTACT

The project is at the Hayward Shoreline and located on the City's WPCF property. Impact on neighboring businesses would be minimal. No public contacts have been made at this point.

## NEXT STEPS

Based on the Committee's recommended alternative, staff will prepare responsive documents and present it to Council for review and action.

Prepared and Recommended by: Alex Ameri, Director of Utilities & Environmental Services

Approved by:



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Kelly McAdoo, City Manager





# CITY OF HAYWARD

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**File #:** RPT 17-119

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**DATE:** September 11, 2017

**TO:** Council Sustainability Committee

**FROM:** Director of Utilities & Environmental Services

**SUBJECT**

Proposed 2017 Agenda Planning Calendar

**RECOMMENDATION**

This is an informational report.

**ATTACHMENTS**

Attachment I Staff Report



DATE: September 11, 2017

TO: Council Sustainability Committee

FROM: Director of Utilities & Environmental Services

SUBJECT Proposed 2017 Agenda Planning Calendar

#### RECOMMENDATION

That the Committee reviews and comments on this report.

#### DISCUSSION

For the Committee's consideration, staff suggests the following tentative agenda topics.

November 2017
Car Sharing
Recycled Water Program
Review of Last Winter's Mountain Tunnel Shutdown
Addressing Litter from Disposable Food Packaging
2018 Agenda Planning Calendar
Unscheduled Items
Sustainable Groundwater Plan
Accelerating Multifamily Building Upgrades (California Energy Commission grant)
Stormwater Trash Reduction Requirements
Laundry to Landscape Ordinance
Progress Toward 2025 ZNE Goal
Tiny Homes

## NEXT STEPS

Upon direction from the Committee, staff will revise the above list, schedule items accordingly for the November 2017 meeting, and prepare suggested agenda topics for 2018.

Prepared by: Erik Pearson, Environmental Services Manager

Recommended by: Alex Ameri, Director of Utilities & Environmental Services

Approved by:

A handwritten signature in black ink, appearing to read 'K. McAadoo', is positioned above a horizontal line.

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Kelly McAadoo, City Manager