

Boston Zero Waste Planning

First Meeting- Zero Waste Advisory Committee
February 12, 2018



Boston Waste Management History

1980s

Residents organize recycling drop-offs throughout city



2000s

City introduces single-stream recycling



1990s

City launches curbside recycling collection (dual-stream)



2010s

City expands curbside leaf and yard waste collection, and launches food waste drop-offs



BOSTON WASTE MANAGEMENT HISTORY CONTINUED

2014

Zero waste planning process included in City's Climate Action Plan



2017

Mayor forms Zero Waste Advisory Committee



2016

Zero Waste Municipal Leaders Summit



SF Environment



2018

Zero Waste Plan recommendations complete

BOSTON ZERO WASTE GUIDING PRINCIPLES

1/ Make Zero Waste a Key Priority

- *Define the Goal*
- *Develop a Strategy*
- *Expand Resources*
- *Work Collaboratively*

2/ Focus First on Wasting Less, Diverting More

- *Lead by Example*
- *Engage Large Generators of Waste*
- *Facilitate Residential Waste Reduction*

3/ Support This Work Through Local Business

- *Job training, innovation, research*
- *Worker safety and health*

4/ Sustain This Work Through Culture Change

ROLE OF ZERO WASTE ADVISORY COMMITTEE (ZWAC) AND SUBCOMMITTEES



Review data

Develop recommendations specific to residential, institutional, commercial and industrial (ICI) sectors

Engage with community and networks.

Develop ideas and final recommendations

OVERVIEW OF TEAM, TASKS, TIMELINE



Team

Perlmutter Associates



Center for EcoTechnology

Zero Waste Associates



Zero Waste Advisors:

Team

Zero Waste Advisors:

*Richard Anthony
Zero Waste Associates*

*Peter Engel
Kessler Consulting*

*Margaret (Maggie) Gainer
Gainer and Associates*

*Susan Hubbard and Alex Danovitch
Eureka Recycling*

*Jeffrey Morris
Sound Resource Management*

*Bob Gedert
Resource Recycling Systems*

Tasks

Approach:

Task 1: Facilitate and organize meetings

Objective: Obtain stakeholder input from City's advisors and the public

Task 2: Gather and analyze data

Objective: Identify opportunities for expansion or improvement

Task 3: Waste reduction and diversion opportunity assessment

Objective: Identify opportunities for decreasing volume of discards from all sectors

Task 4: Cost-Benefit Analysis

Objective: Analyze Plan milestones and identify funding options

Tasks

Approach, cont'd:

Task 5: Zero Waste Plan

Objective: Develop a cutting edge, implementable Zero Waste Plan

Task 6: Market Development Study

Objective: Understand and strengthen demand side of Zero Waste loop in Boston

Task 7: Public education case studies

Objective: Document how leading cities successfully raised awareness

INTRODUCTION TO ZERO WASTE

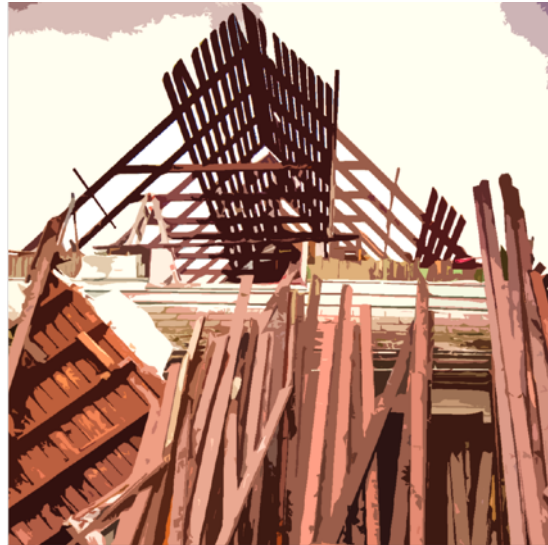
A blue-tinted photograph of a university campus. In the center, a large, leafy tree stands next to a statue of a man in a long coat, mounted on a stone pedestal. The background shows classical buildings with arched windows and columns. The overall scene is lush and green, with a strong blue color cast.

ZERO WASTE =

Reduce



Reuse



Recycle



**Focus first on reducing and reusing,
then recycle, compost, digest and redesign the rest**

ZERO WASTE IS A GOAL

Where all discarded materials are designed to become resources for others to use



ZERO WASTE WILL

Conserve & recover all resources



ZERO WASTE WILL

Not burn or bury them



ZERO WASTE WILL

Eliminate all discharges to land, water or air



INTERNATIONAL DEFINITION OF ZERO WASTE



No Burn, No Bury, No Toxic Emissions

<http://zwia.org/standards/zw-definition/>

Methane

21-72x

CO₂

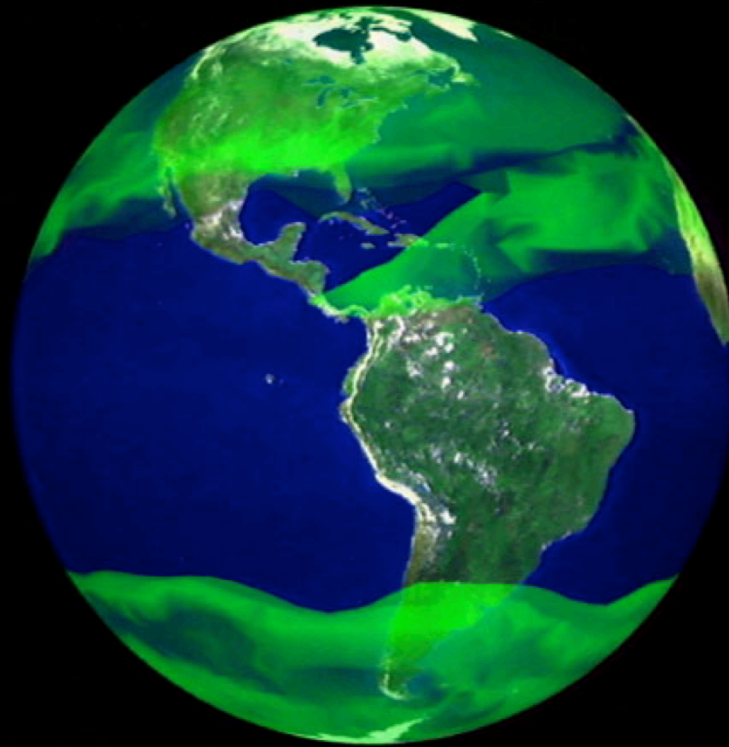


Photo: Nasa

Wasteberg



71:1

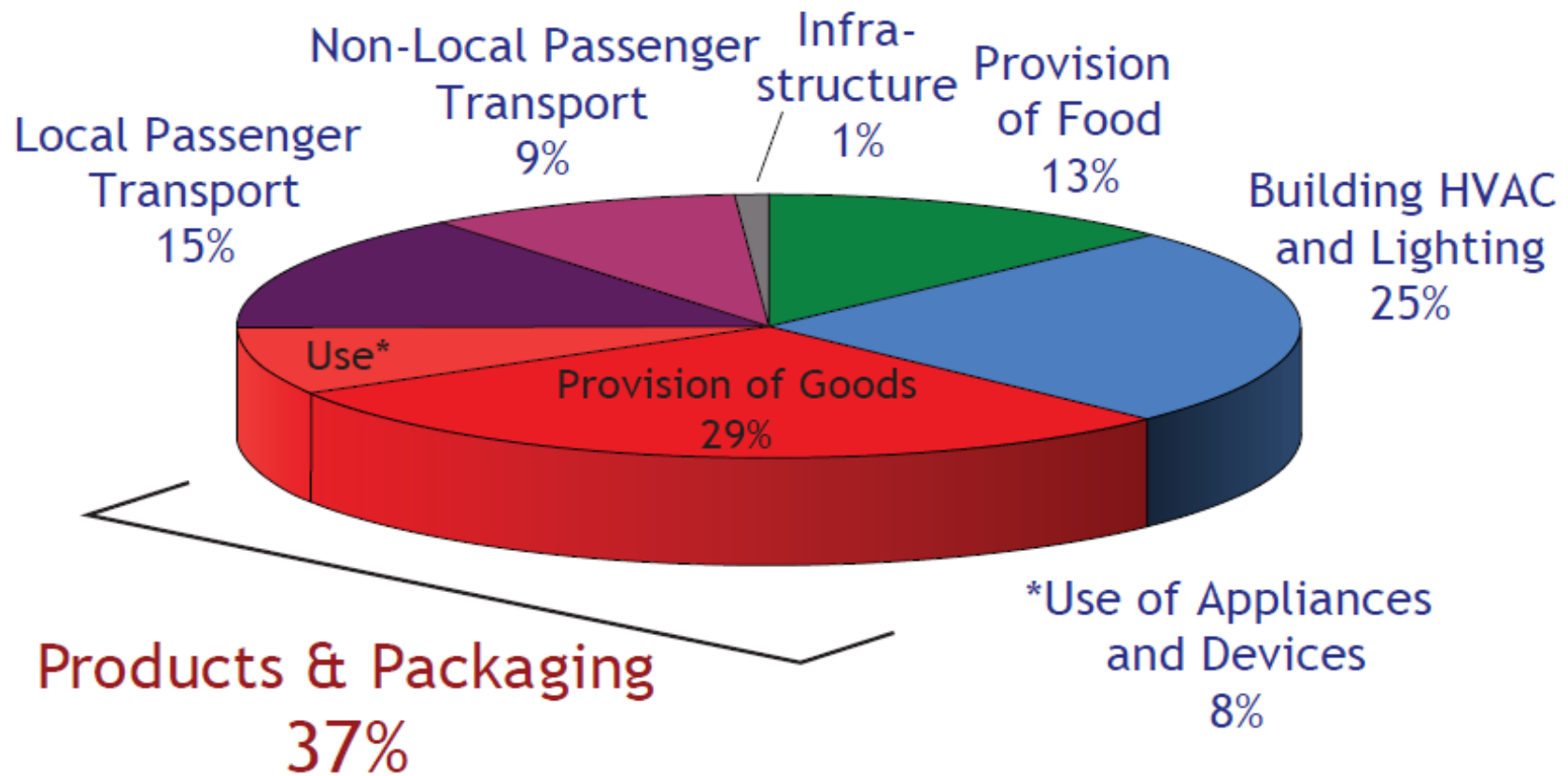


Figure 1: U.S. Greenhouse Gas Emissions: Systems-based view.

Source: U.S. EPA, 2009.

(Provision of Goods: all consumer goods including building components and vehicles.)

RECYCLING & COMPOSTING IN CA = ELIMINATING ALL CAR EXHAUST IN CA



Zero Waste and Good Green Jobs

Recycling Industry =
Size of Auto Industry

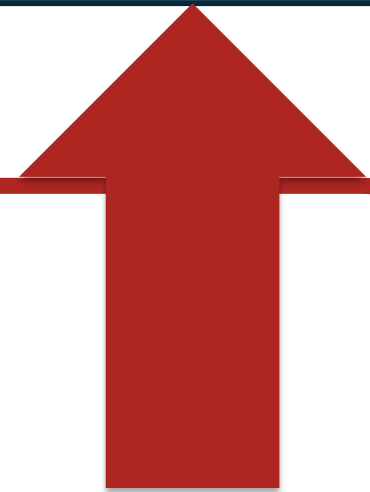
10,000 tons of discarded material =	
Burn or Bury: 1 job	Composting: 4 jobs
	Recycling: 10 jobs
	Reuse: 75 –250 jobs

Source: www.ilsr.org

ZERO WASTE MANAGEMENT

UPSTREAM

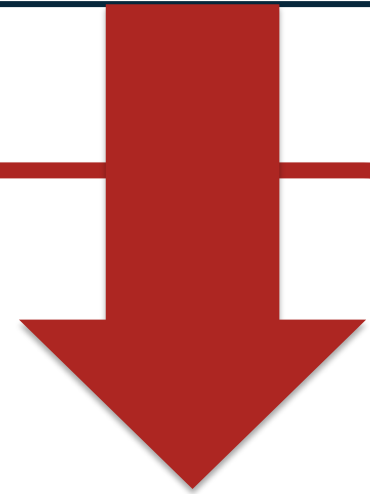
- Rethink
- Reduce
- Product Redesign
- Clean Production
- Product Stewardship



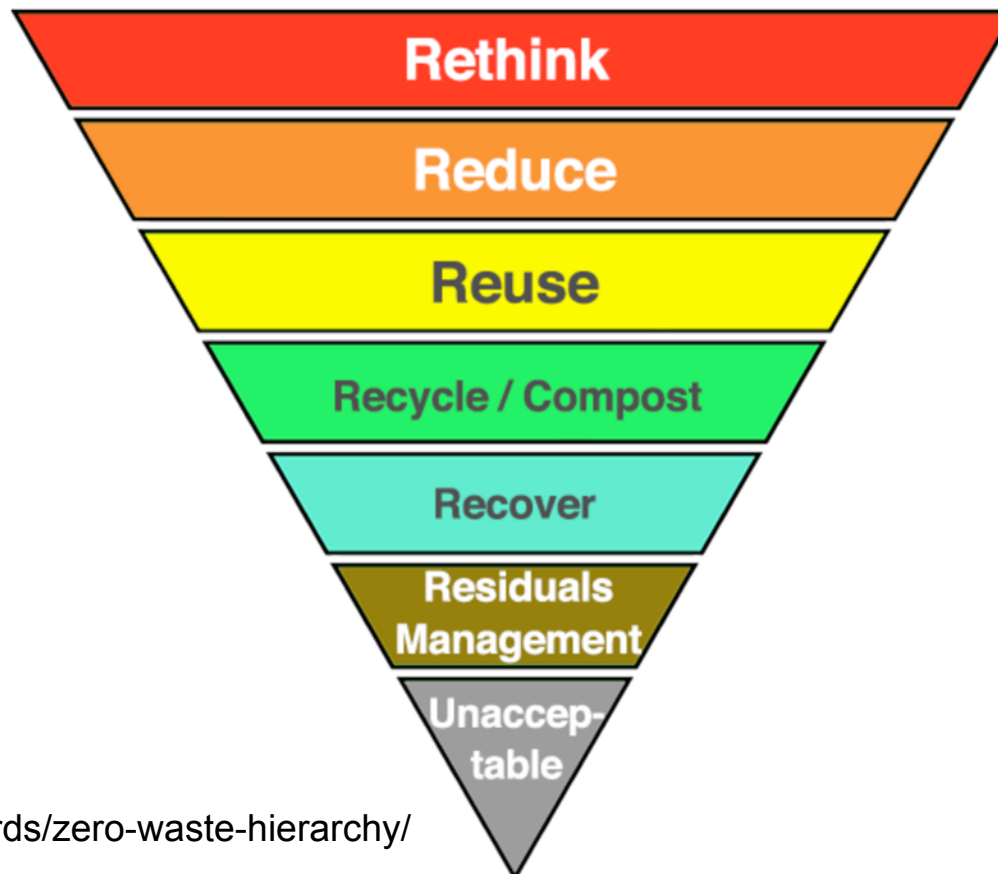
ZERO WASTE MANAGEMENT

DOWNSTREAM

- Reuse
- Recycle
- Compost/Digest
- Resource Recovery Parks



ZERO WASTE HIERARCHY OF HIGHEST & BEST USE



<http://zwia.org/standards/zero-waste-hierarchy/>

ZERO WASTE DRIVERS FOR BUSINESS



Raytheon

Raytheon's Road to Zero Waste

Integrated Defense Systems (IDS)
Brian Balukonis, Solid Waste Process Owner, ZWBA
brian_j_balukonis@raytheon.com

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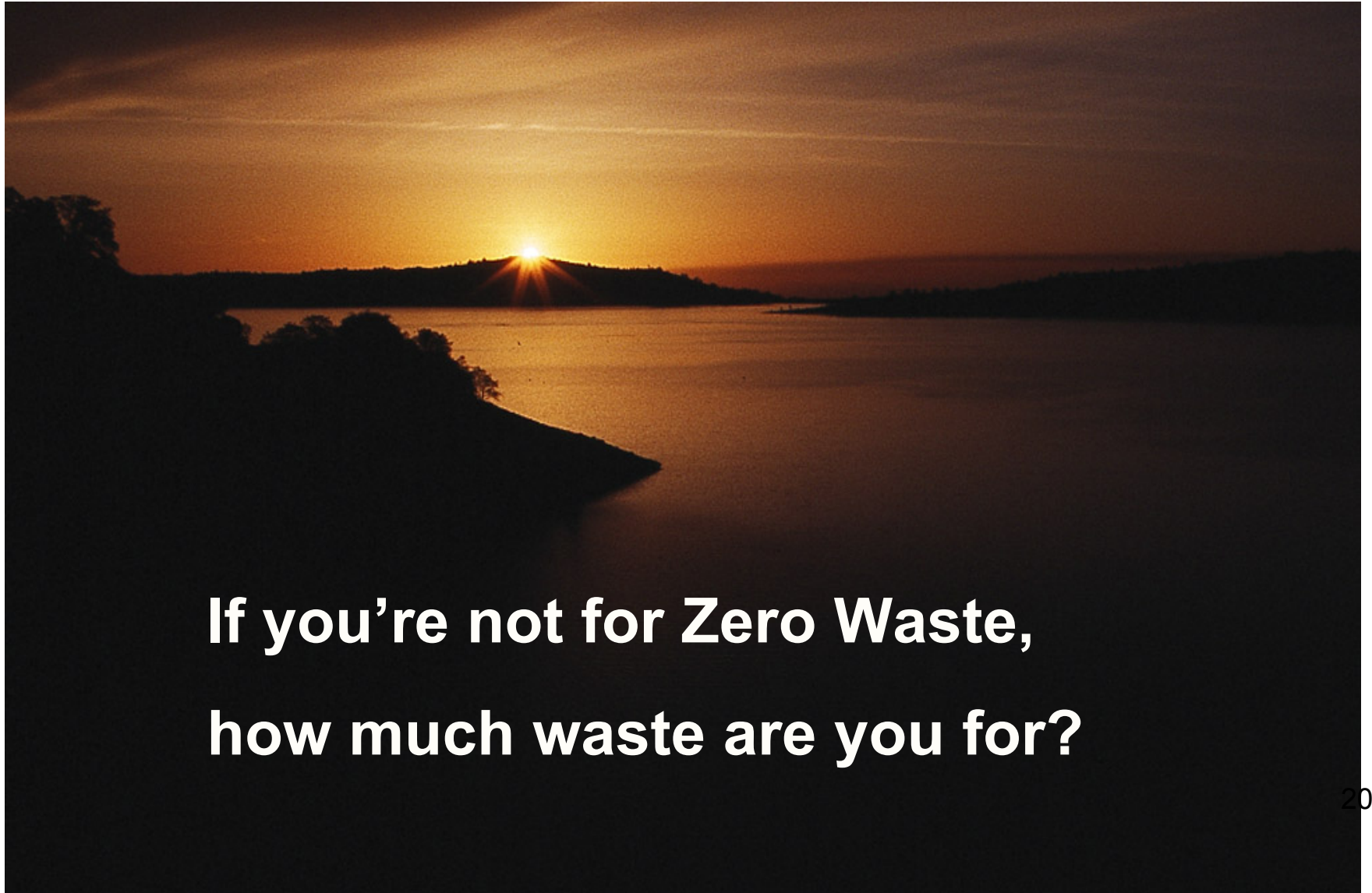


ZERO WASTE DRIVERS FOR COMMUNITIES



ZERO WASTE COMMUNITIES IN THE U.S.





**If you're not for Zero Waste,
how much waste are you for?**

MATERIALS GENERATION IN BOSTON



MATERIALS GENERATION IN BOSTON

Generation =
Disposal + Recycling

MATERIALS GENERATION IN BOSTON

$$\text{Recycling Rate} = \frac{\text{Recycling}}{\text{Generation}}$$

RESIDENTIAL GENERATION IN BOSTON

Disposal =
189,809 Tons

Recycling =
50,474 Tons

Generation = 240,283 Tons

Source: Boston Public Works Department, FY 17 Actual Tonnages and Tip Fee by District

RESIDENTIAL GENERATION IN BOSTON

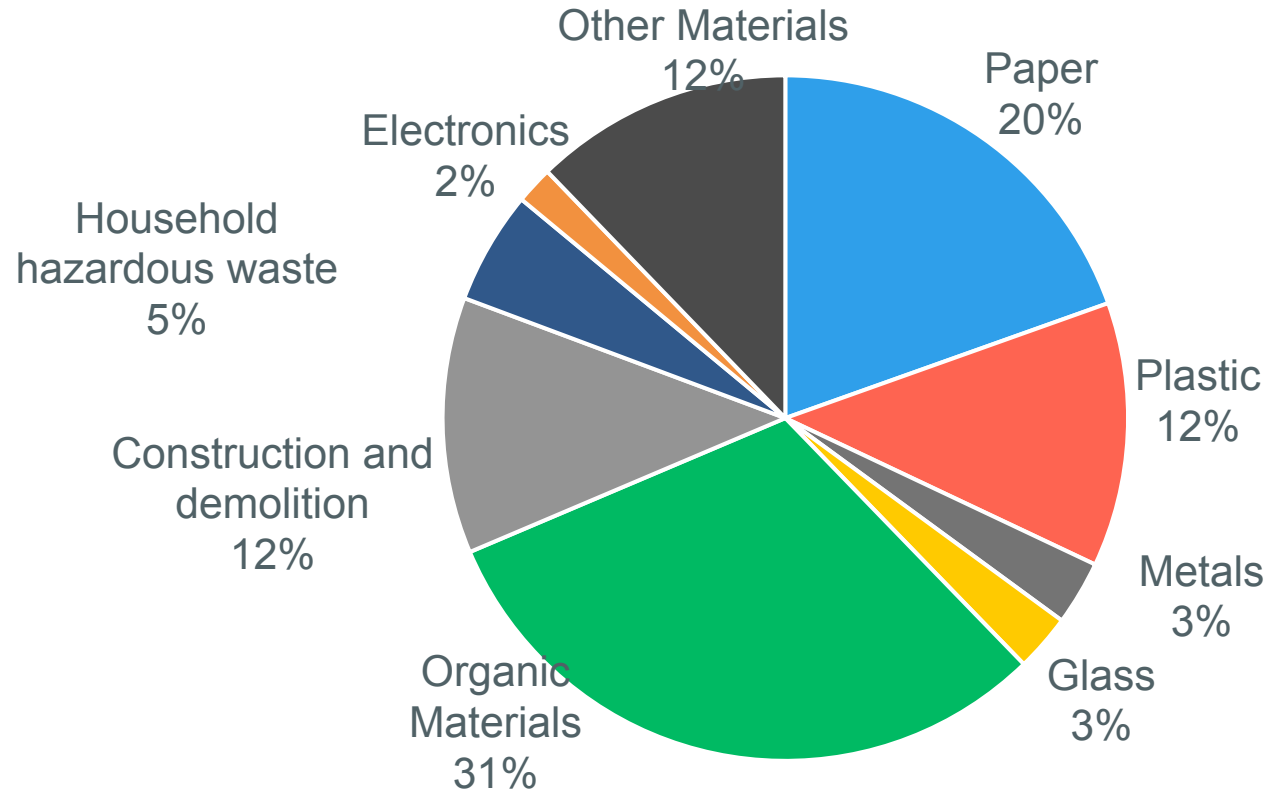
Disposal =
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Recycling =
50,474 Tons

21% Recycling Rate

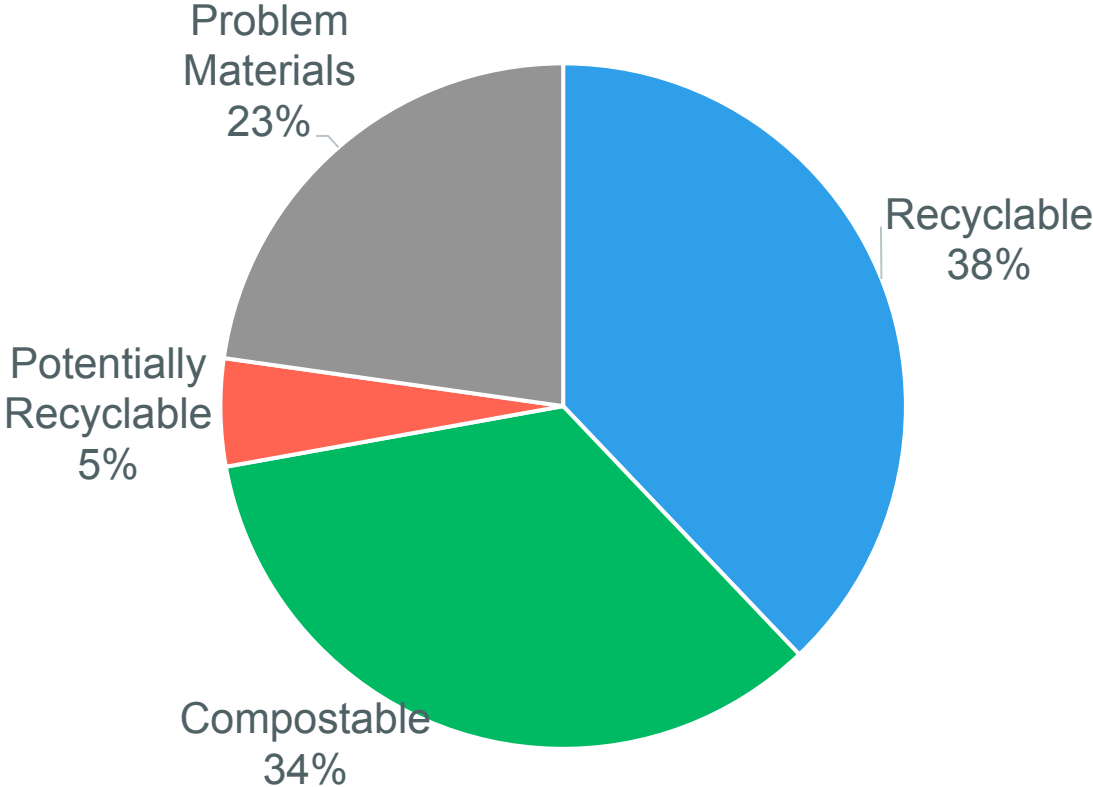
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RESIDENTIAL DISPOSAL COMPOSITION BY MATERIAL CATEGORY



Source: 2016 Waste Characterization Study in Support of Class II Recycling Program (Saugus, SEMASS, Havervill)

RESIDENTIAL DISPOSAL COMPOSITION BY RECOVERABILITY



Source: 2016 Waste Characterization Study in Support of Class II Recycling Program (Saugus, SEMASS, Havervill)

INDUSTRIAL COMMERCIAL INSTITUTIONAL GENERATION IN BOSTON

Disposal =
683,891 Tons

Recycling =
231,841 Tons

Generation = 915,732 Tons

Source: Mass DEP Solid Waste Data Update, includes MSW, C&D and Non-MSW disposal
2014 California Commercial Generator Waste Study based on Tons Per Employee Per Day

INDUSTRIAL COMMERCIAL INSTITUTIONAL GENERATION IN BOSTON

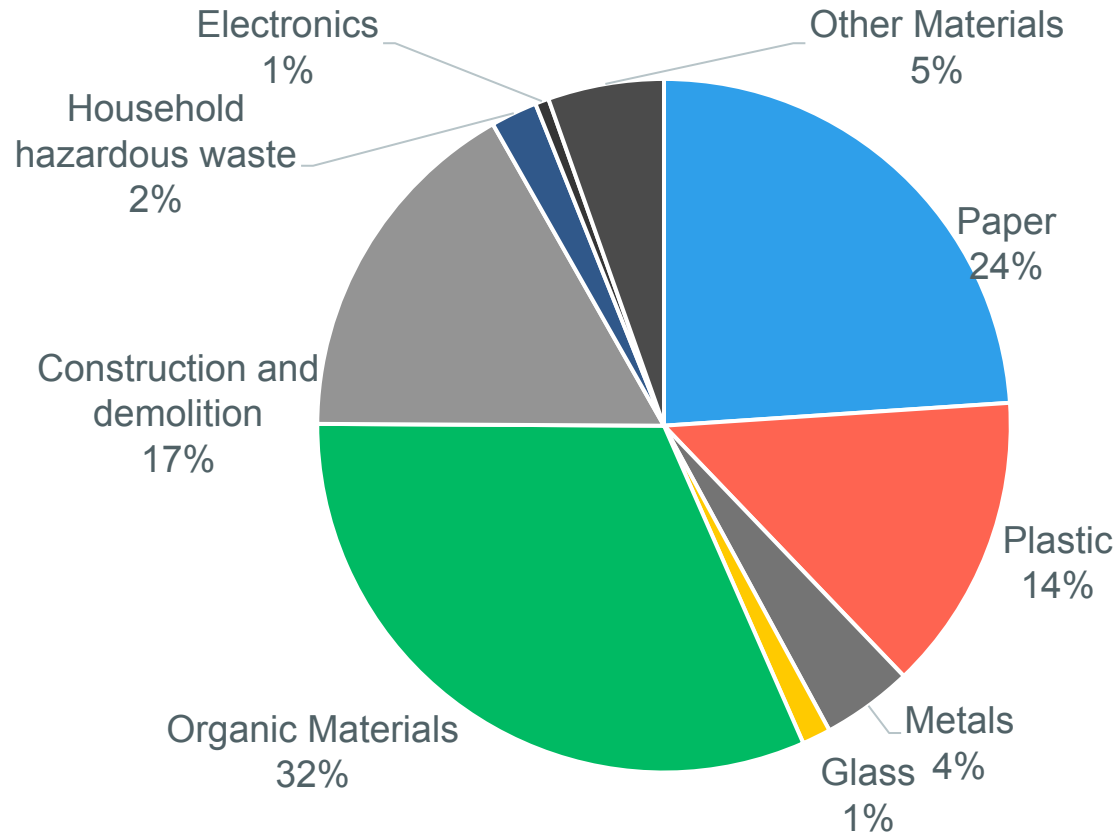
Disposal =
683,891 Tons

Recycling =
231,841 Tons

25% Recycling Rate

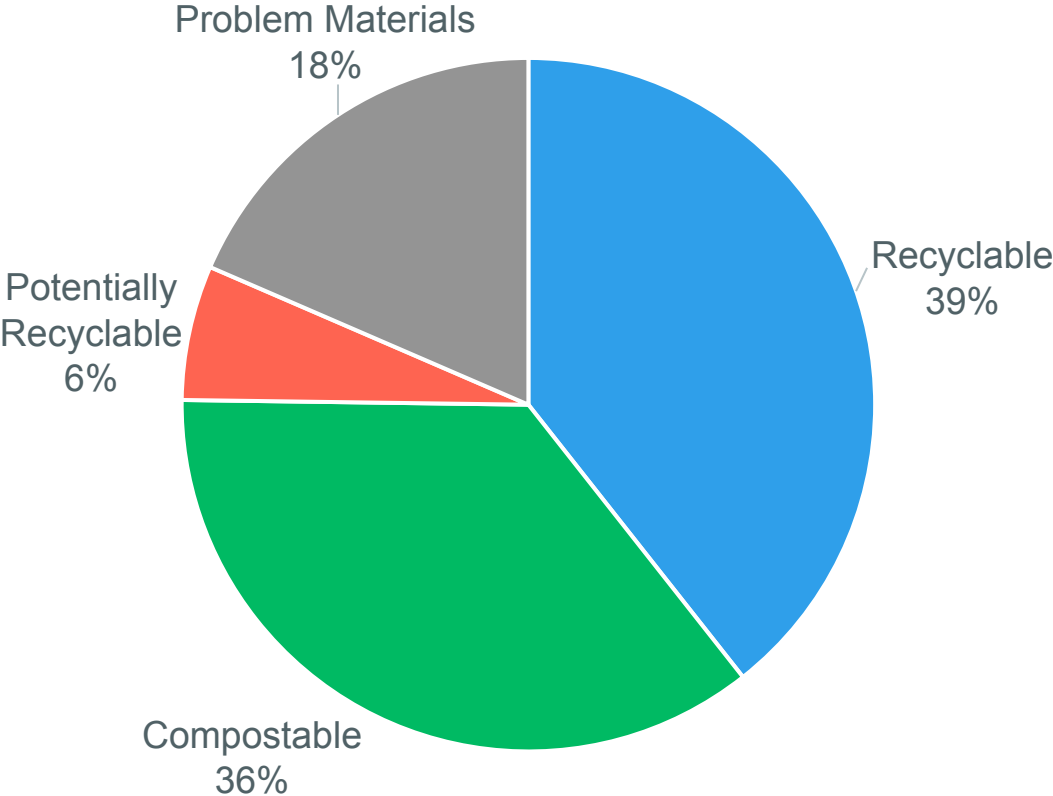
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COMMERCIAL DISPOSAL COMPOSITION BY MATERIAL CATEGORY



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COMMERCIAL DISPOSAL COMPOSITION BY RECOVERABILITY



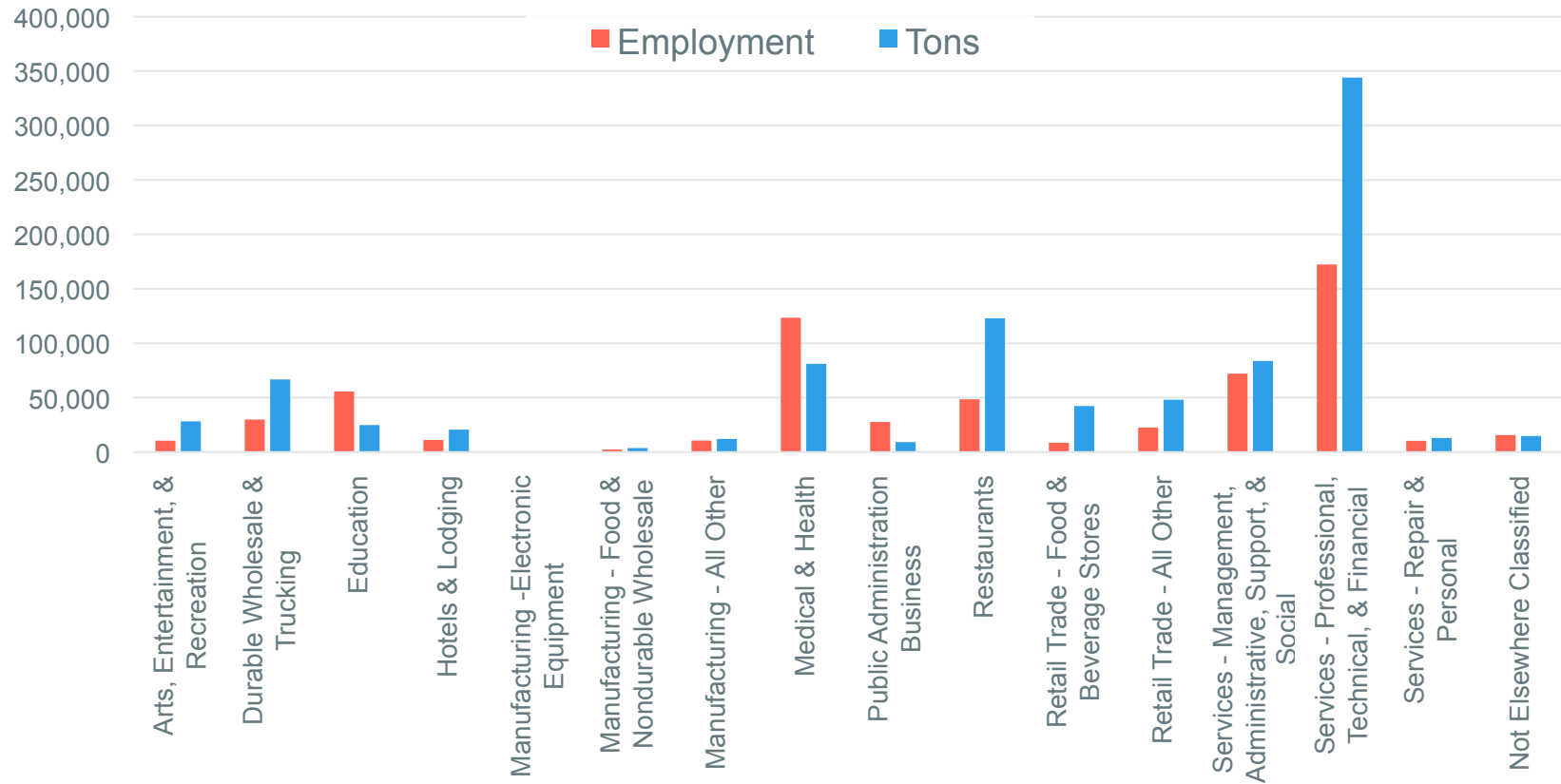
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INDUSTRIAL COMMERCIAL INSTITUTIONAL GENERATION PROJECTIONS

North American Industry Classification System Category	Tons Per Employee Per Year		
	Disposal	Recycling	Generation
Arts & Entertainment	2.56	0.53	3.09
Wholesale & Trucking	0.60	2.40	3.00
Education	0.43	0.08	0.51
Hotels & Lodging	1.72	0.41	2.13
Manufacturing - Electronics	0.31	0.43	0.74
Manufacturing - Food	1.28	0.57	1.85
Manufacturing - All Other	0.45	1.04	1.49
Medical & Health	0.67	0.07	0.74
Public Administration	0.32	0.06	0.38
Restaurants	2.40	0.51	2.91
Retail - Food & Beverage	1.21	5.43	6.64
Retail - All Other	2.14	0.27	2.41
Services - Management	0.74	0.70	1.44
Services - Professional	1.86	0.44	2.30
Services - Repair & Personal	0.94	0.57	1.51
Not Elsewhere Classified	0.50	0.70	1.20

Source: 2014 California Commercial Generator Waste Study

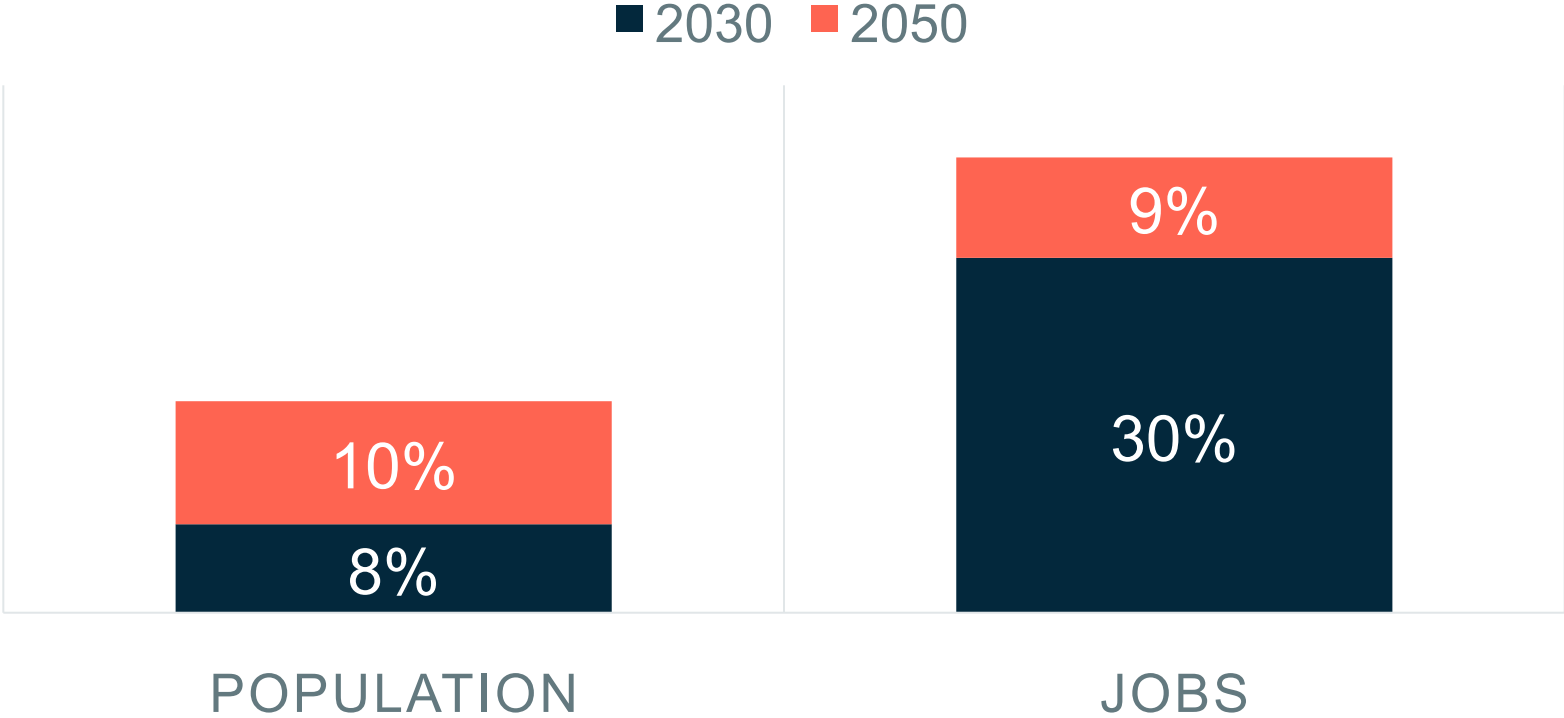
EMPLOYMENT ESTIMATES AND GENERATION PROJECTIONS



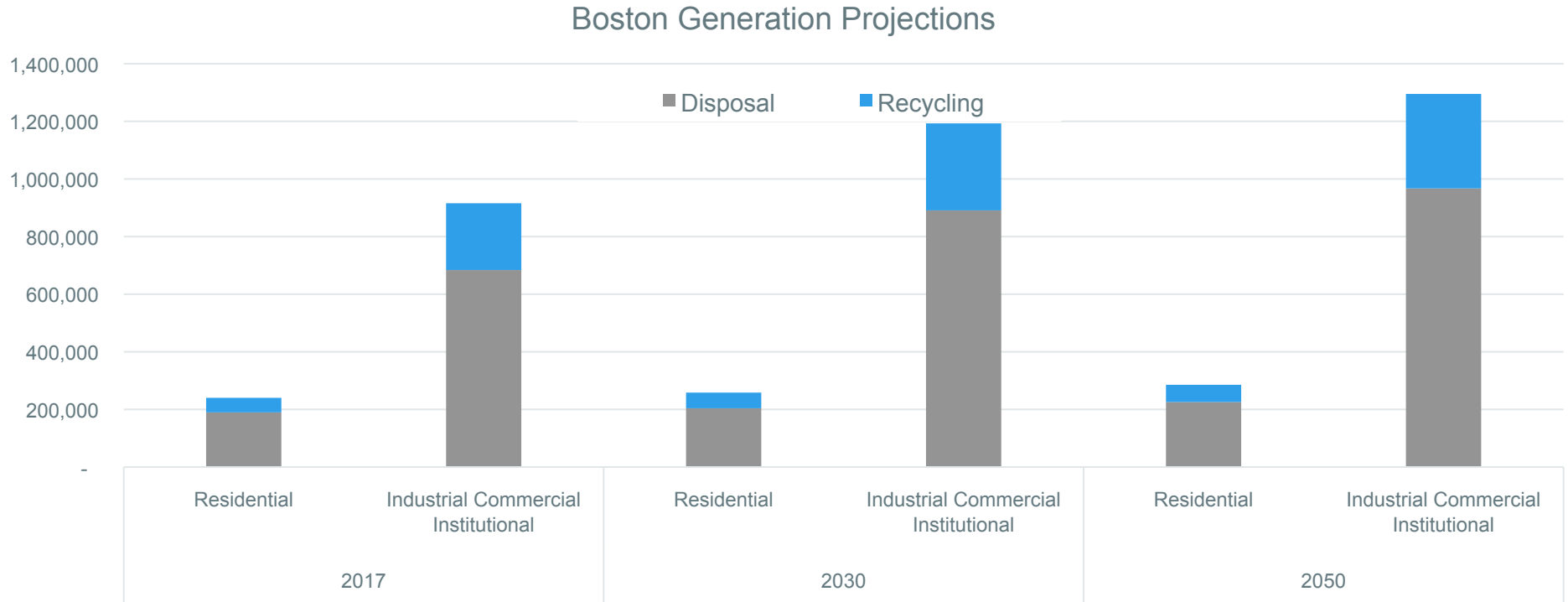
Employment Estimates: Labor and Work Force Development Mass.gov

Disposal Projection: 2014 California Commercial Generator Waste Study based on Tons Per Employee Per Day - Scaled to Boston using Mass DEP Solid Waste Data Update, includes MSW, C&D and Non-MSW disposal

BOSTON GROWTH PROJECTIONS



BOSTON GENERATION PROJECTIONS



Projected Growth in Boston: Imagine Boston, page 21

Residential Generation: Boston Public Works Department, FY 17 Actual Tonnages and Tip Fee by District

Commercial Generation: 2014 California Commercial Generator Waste Study, Tons per Employee per Day, page 10 Scaled to Boston using Mass DEP Solid Waste Data Update, includes MSW, C&D and Non-MSW disposal

COMMUNITY AND STAKEHOLDER ENGAGEMENT

Variety of Approaches:

- Greenovate Blogs, webinars, events
- Surveys
- Interviews
- Community and Business Meetings
- Slide Show
- ZWAC Constituent Outreach



Next Steps

Us: Continued Research

*You: Subcommittee Meeting, Outreach,
Develop short-list of ideas*



THANK YOU



MATERIALS GENERATION IN BOSTON



Generation =
Disposal + Diversion

$$\text{Diversion Rate} = \frac{\text{Diversion}}{\text{Generation}}$$

Residential Generation in Boston

Disposal =
189,809 Tons

Diversion =
50,474 Tons

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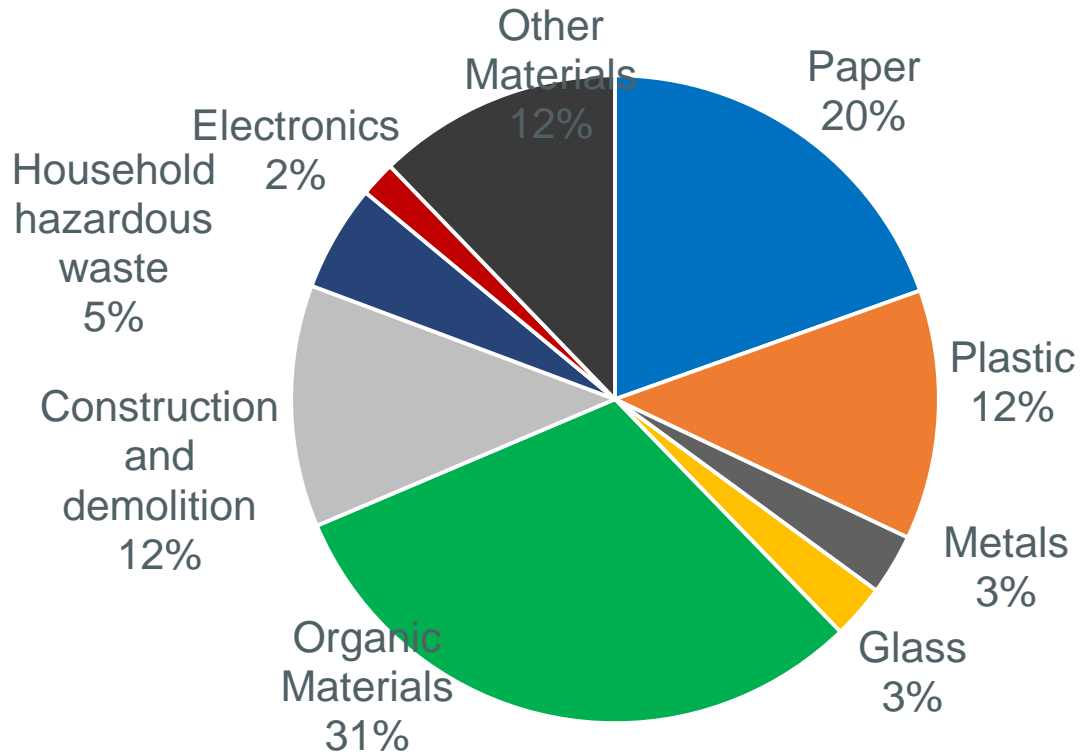
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21% Diversion Rate

Residential Disposal Composition by Material Category

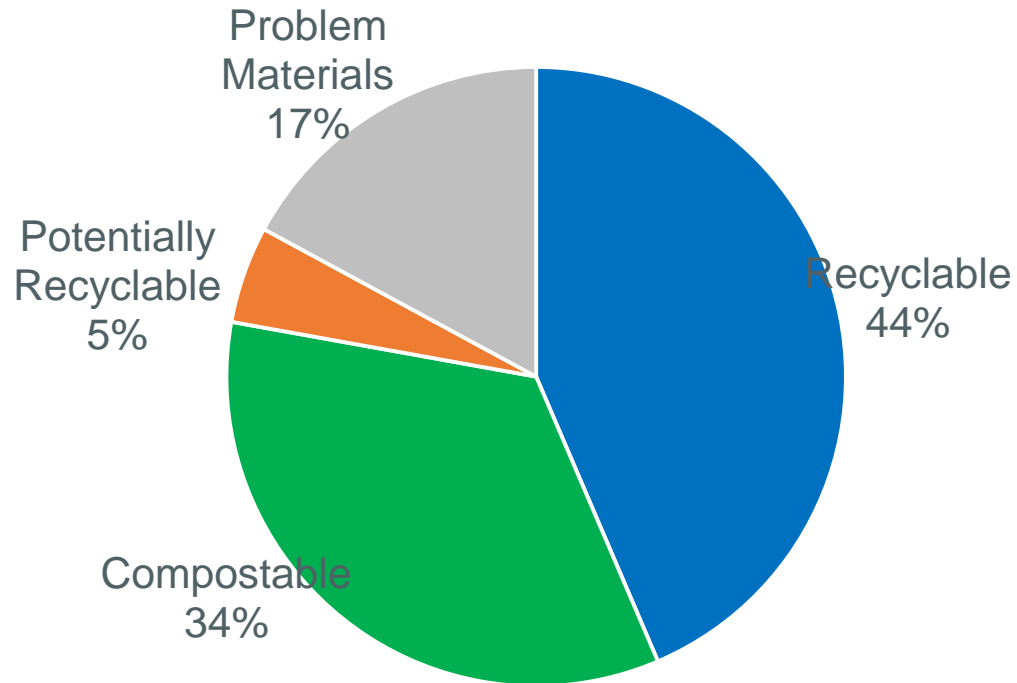


FY 17 Disposal

189,809 Tons

Source: 2016 Waste Characterization Study in Support of Class II Recycling Program (Saugus, SEMASS, Havervill)

Residential Disposal Composition by Recoverability



FY 17 Disposal

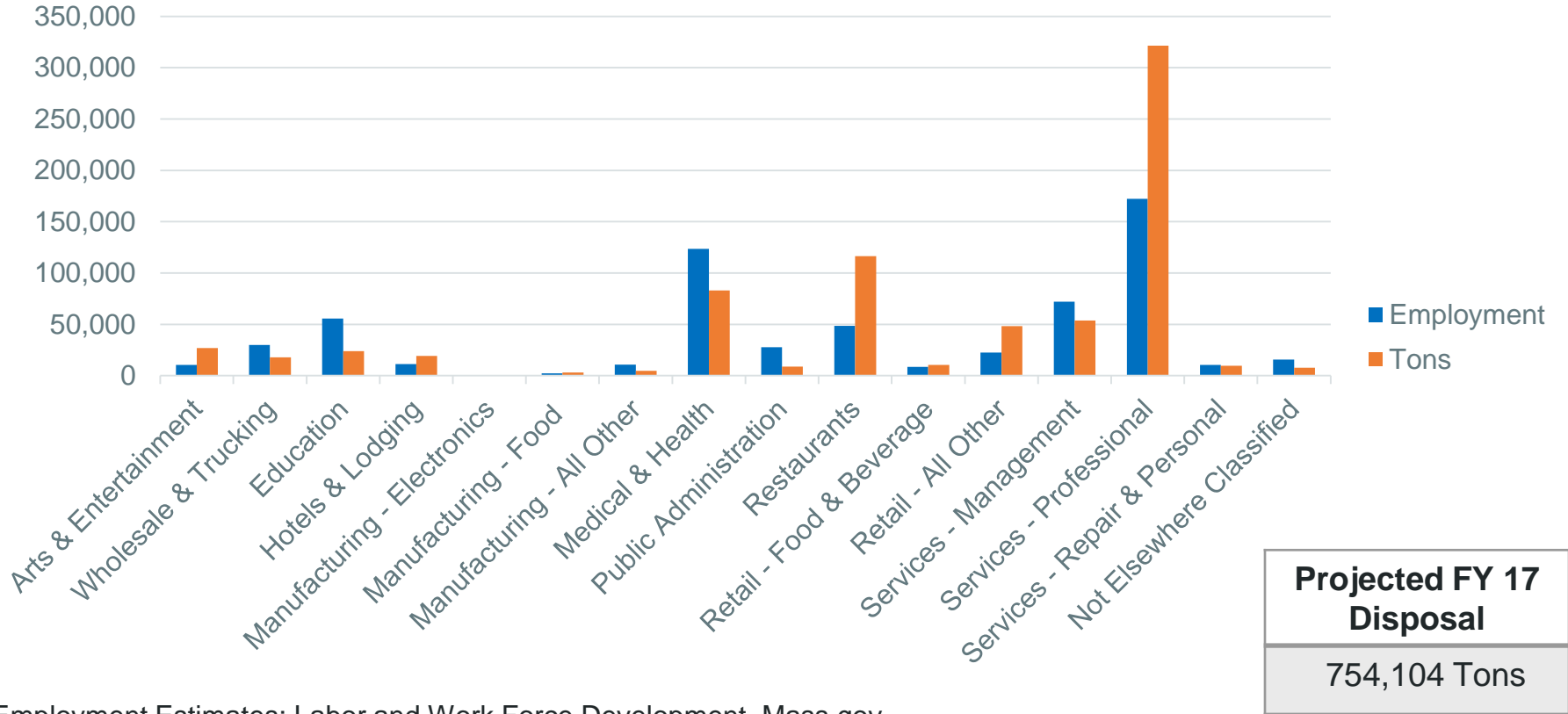
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Commercial Generation Projections

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Manufacturing - Electronics	0.31
Manufacturing - Food	1.28
Manufacturing - All Other	0.45
Medical & Health	0.67
Public Administration	0.32
Restaurants	2.40
Retail - Food & Beverage	1.21
Retail - All Other	2.14
Services - Management	0.74
Services - Professional	1.86
Services - Repair & Personal	0.94
Not Elsewhere Classified	0.50

Commercial Employment Estimates and Disposal Projections



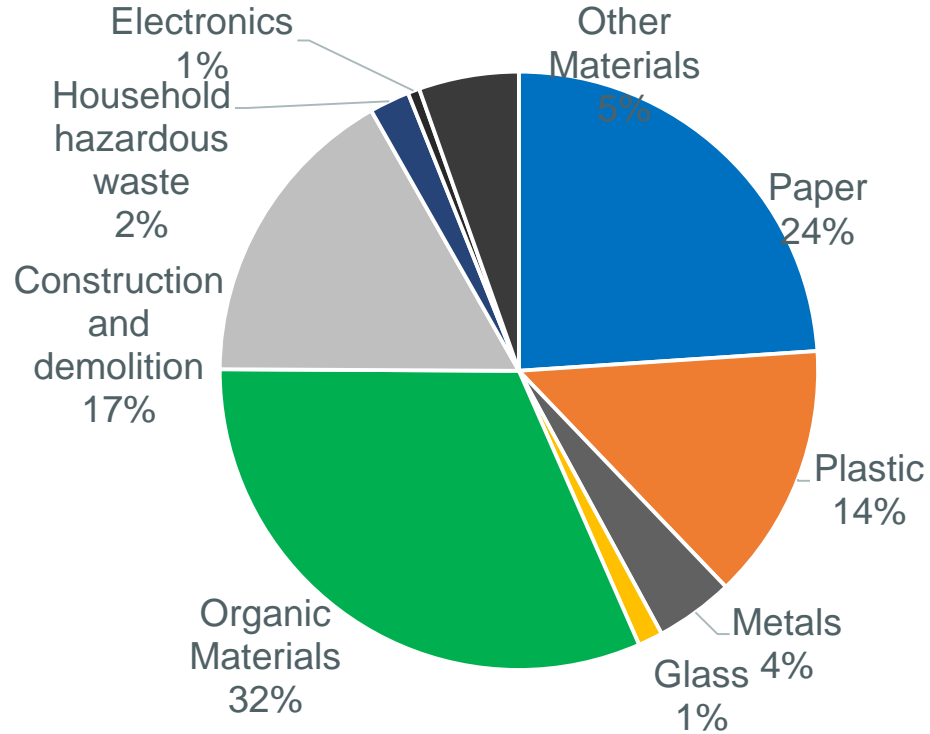
Employment Estimates: Labor and Work Force Development Mass.gov

Disposal Projection: 2014 California Commercial Generator Waste Study based on Tons Per Employee Per Day

**Projected FY 17
Disposal**

754,104 Tons

Commercial Disposal Composition by Material Category



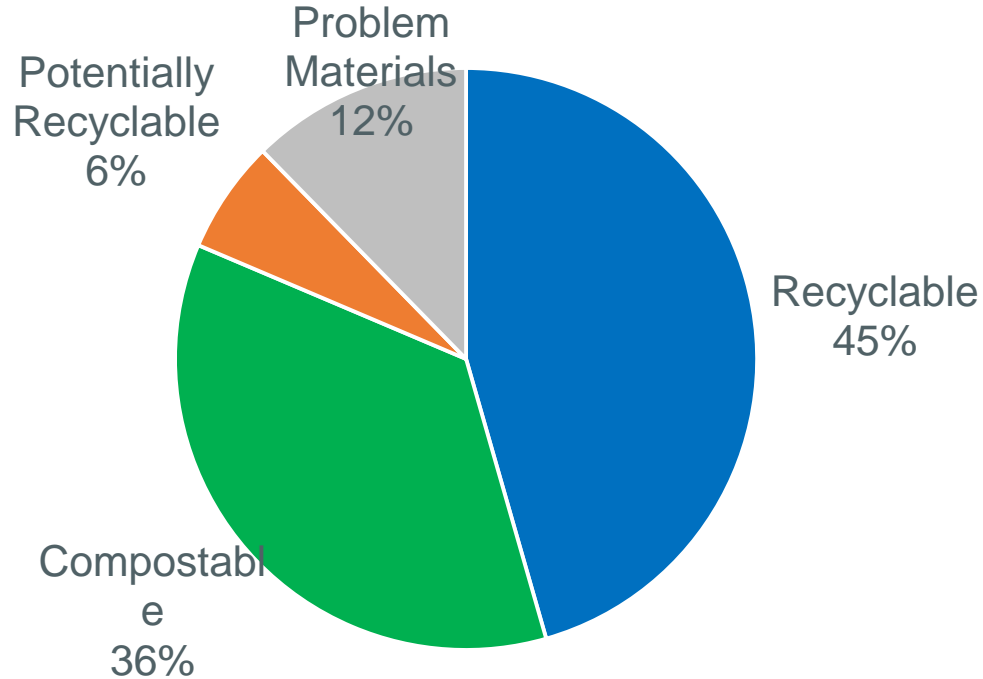
**Projected FY 17
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Source: 2016 Waste Characterization Study in Support of Class II Recycling Program (Saugus, SEMASS, Havervill)

Disposal Projection: 2014 California Commercial Generator Waste Study based on Tons Per Employee Per Day

Commercial Disposal Composition by Recoverability



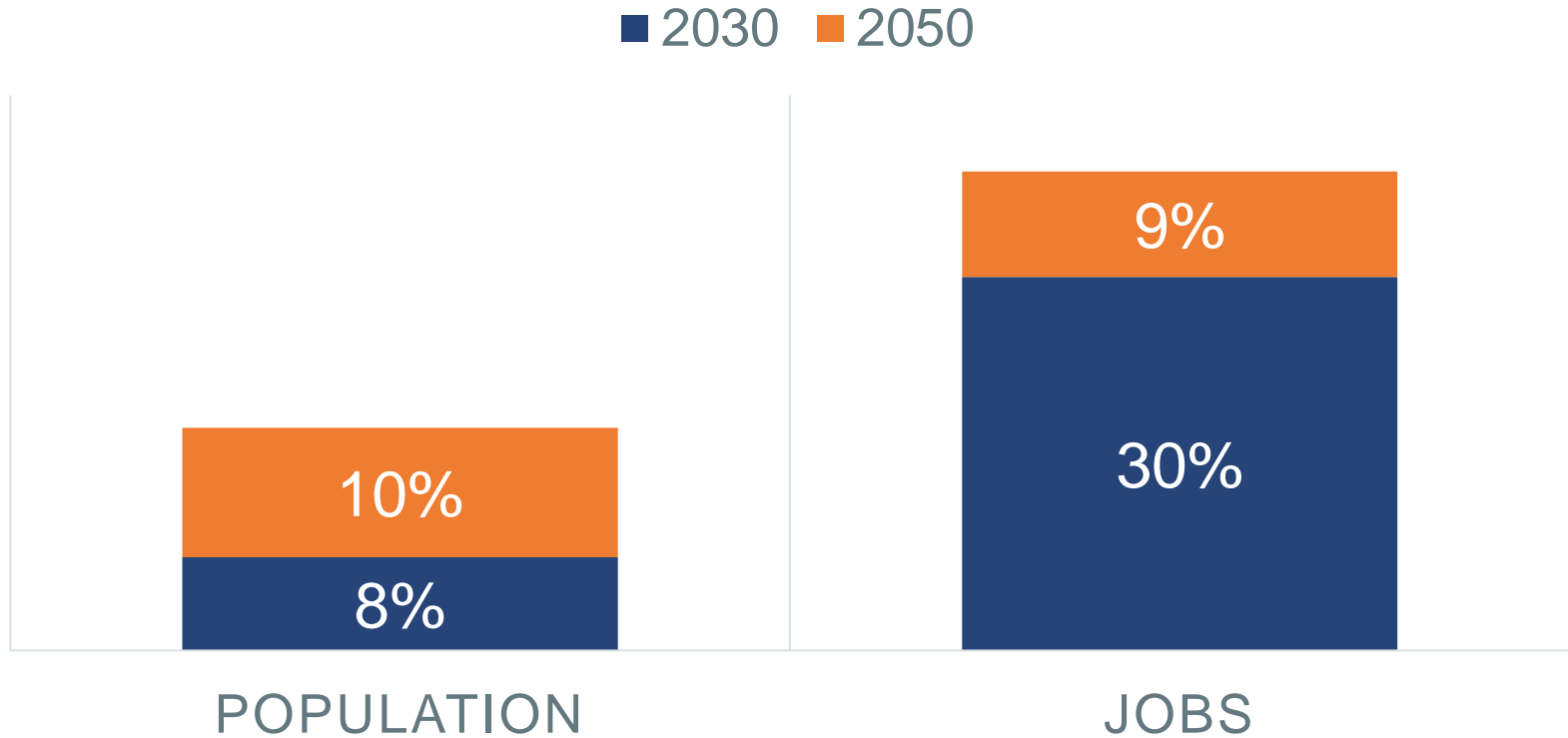
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754,104 Tons

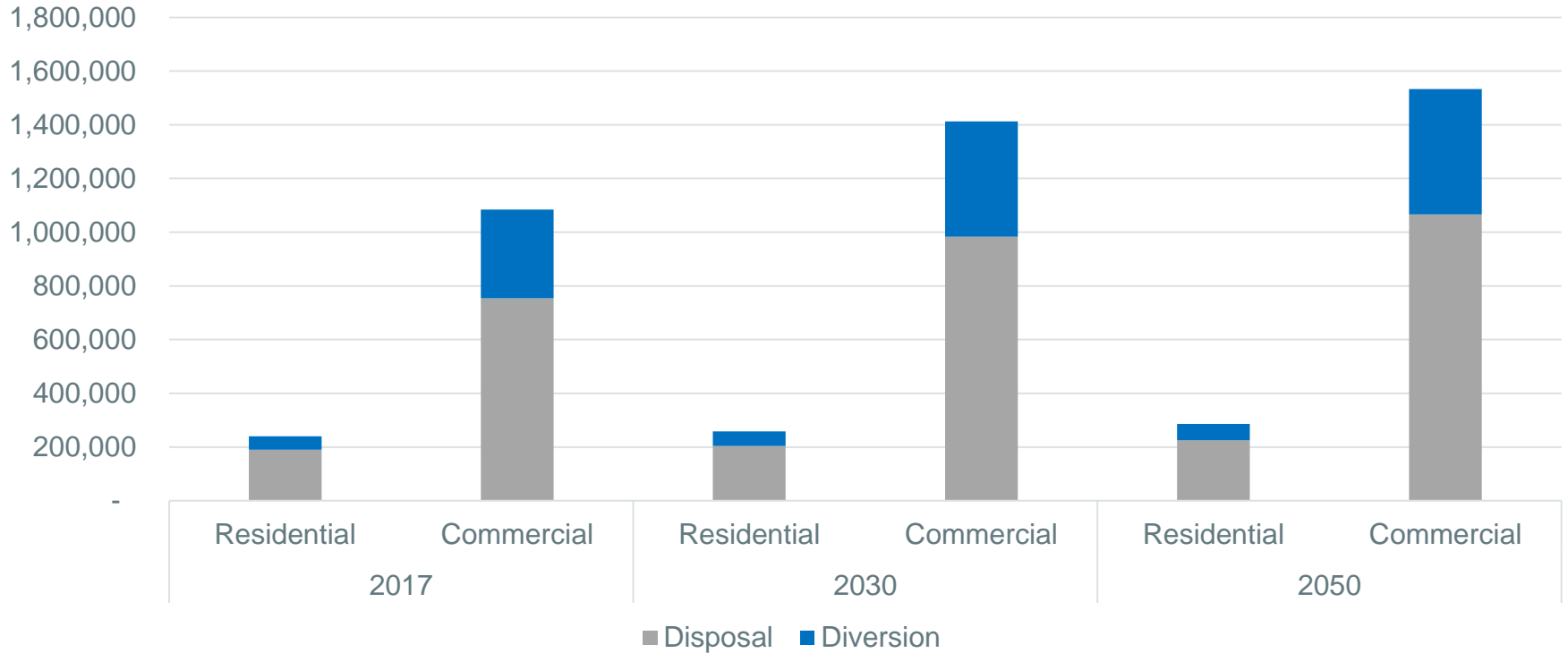
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Boston Growth Projections



Boston Generation Projections



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