HAZARDOUS WASTE MANAGEMENT PLAN - LOOKING INTO THE FUTURE

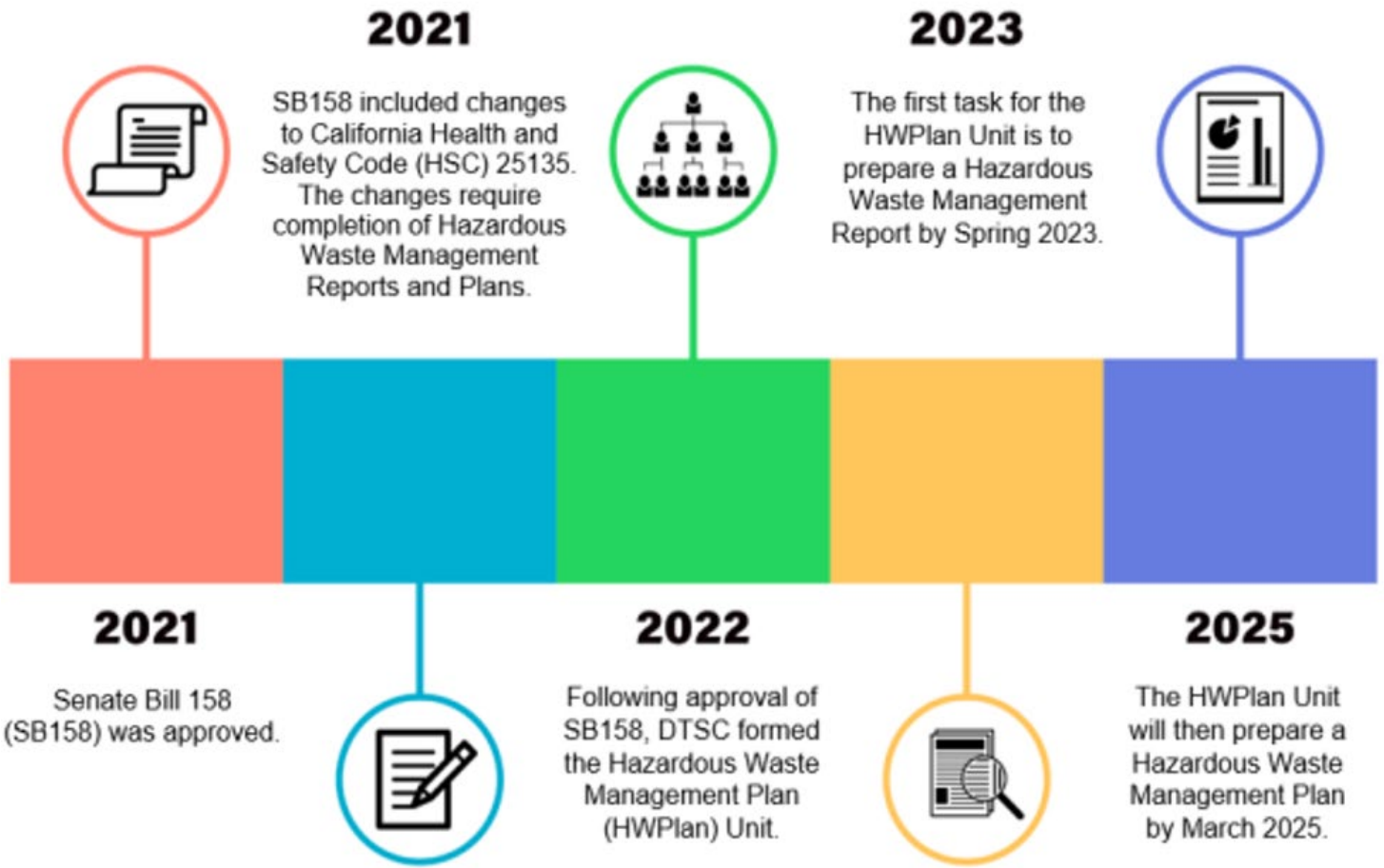
TH-B4

March 27, 2025

Ryan Dominguez, Supervising Hazardous Substances Engineer I
Kayla Kuhl, Hazardous Substances Engineer
Karen Peng, Environmental Scientist
Spencer Eberhard, Environmental Scientist

Agenda

- Background for the Hazardous Waste Management Plan
- Findings of the Hazardous Waste Management Report
- Overview of the Hazardous Waste Management Plan
- Summary and Next Steps
- Q&A


2021
SB158 included changes to California Health and Safety Code (HSC) 25135. The changes require completion of Hazardous Waste Management Reports and Plans.
2023
The first task for the HWPlan Unit is to prepare a Hazardous Waste Management Report by Spring 2023.
2021
Senate Bill 158 (SB158) was approved.
2022
Following approval of SB158, DTSC formed the Hazardous Waste Management Plan (HWPlan) Unit.
2025
The HWPlan Unit will then prepare a Hazardous Waste Management Plan by March 2025.

Background

- Report and Plan due every three years
- First Report published in 2023
- First Plan due in 2025
  - Draft published March 2025
  - Three public hearings by BES
  - BES will vote July 15/16

Agenda

- Background for the Hazardous Waste Management Plan
- Findings of the Hazardous Waste Management Report
- Overview of the Hazardous Waste Management Plan
- Summary and Next Steps
- Q&A

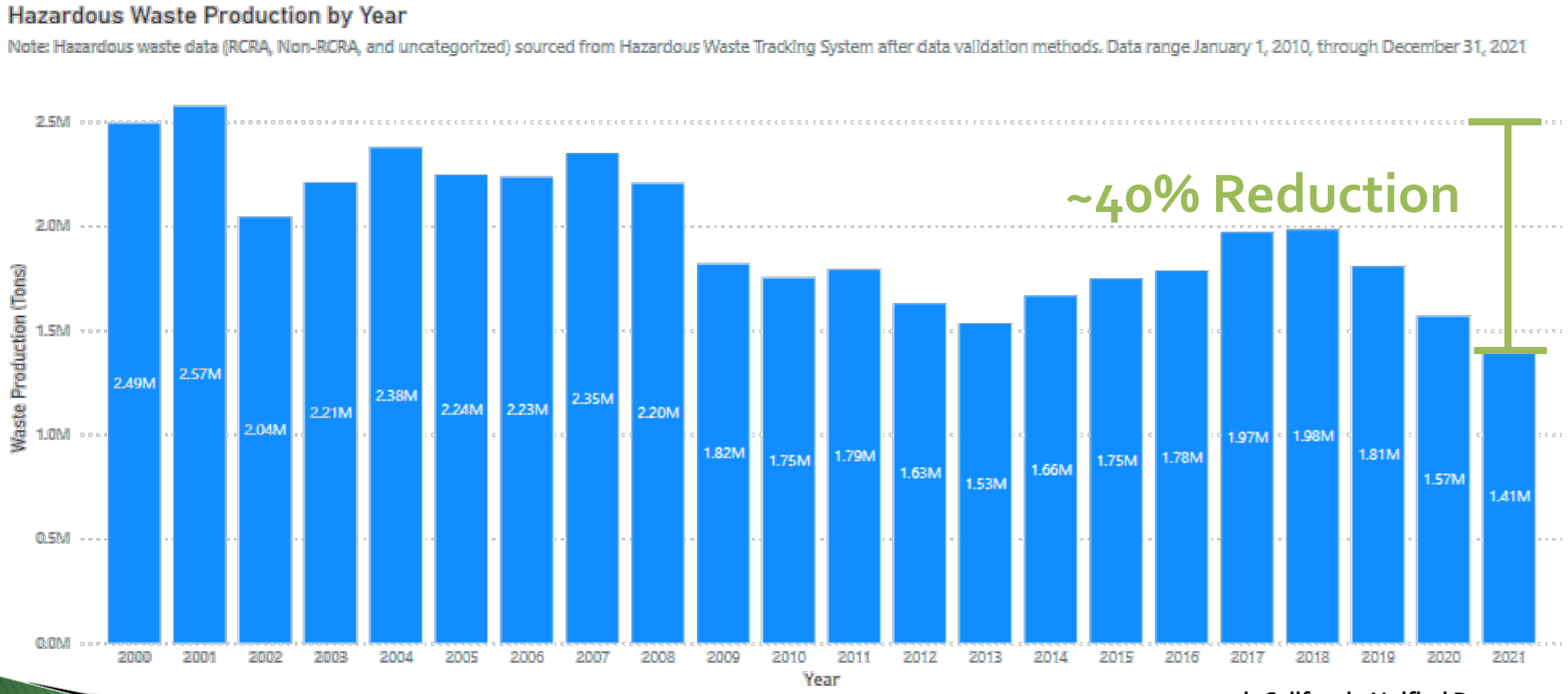
Key Findings of the 2023 Report

The number of generators increased from about 55,000 to 94,500 between 2010 to 2021.

The majority (81%) of hazardous waste generated since 2010 is identified as hazardous in California but not federally.

Contaminated soil, waste oil and mixed oil, and other inorganic solid waste are the top three hazardous waste streams consistently.

Manifested Hazardous Waste Generation (2000-2021)

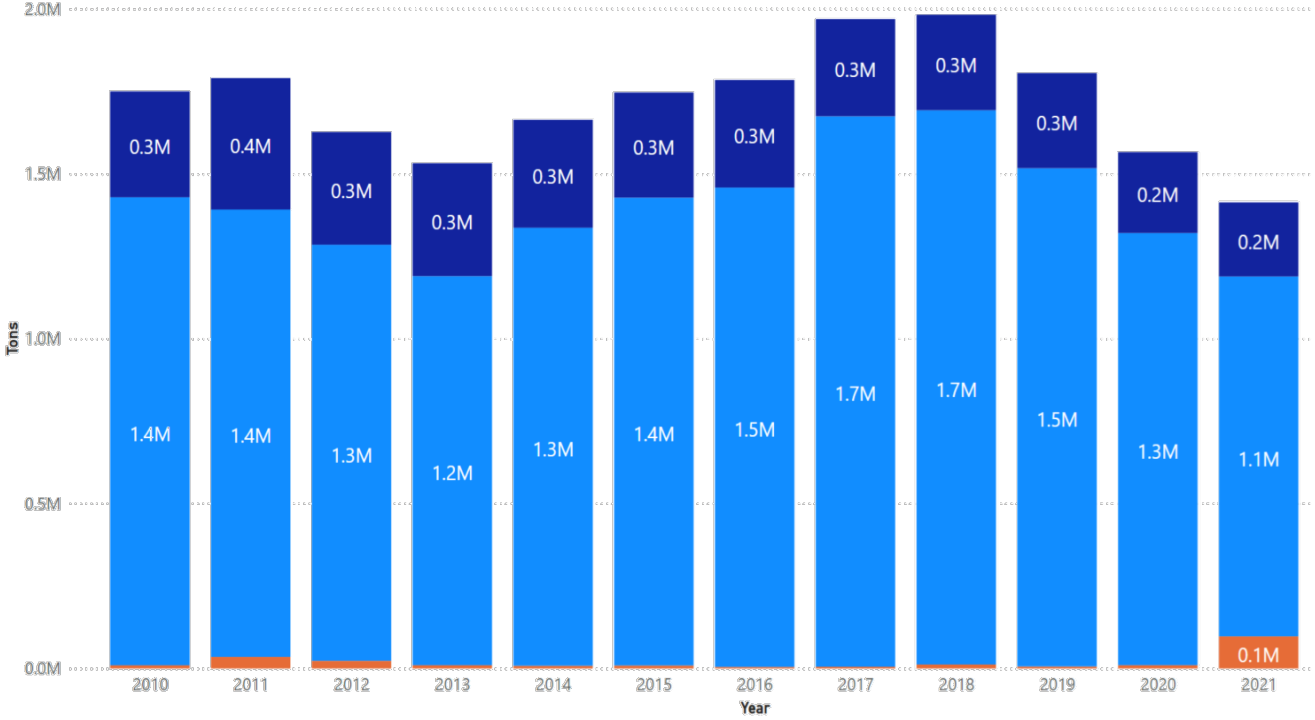


Manifested Hazardous Waste Generation (2010 – 2021)

RCRA

Non-RCRA

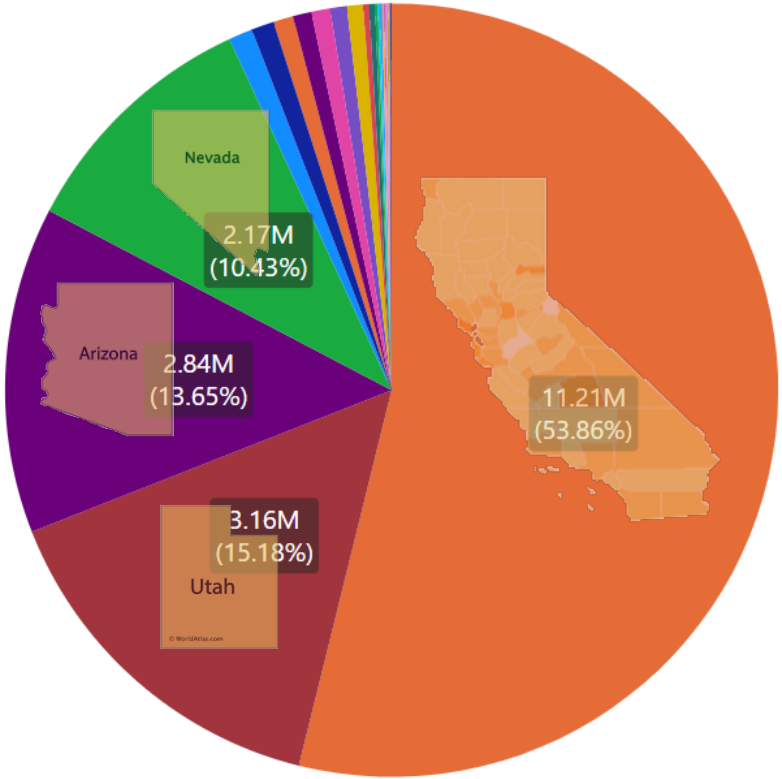
Uncategorized



Key Findings of the 2023 Report

- 54% of hazardous waste generated in California was managed in-state (since 2010)

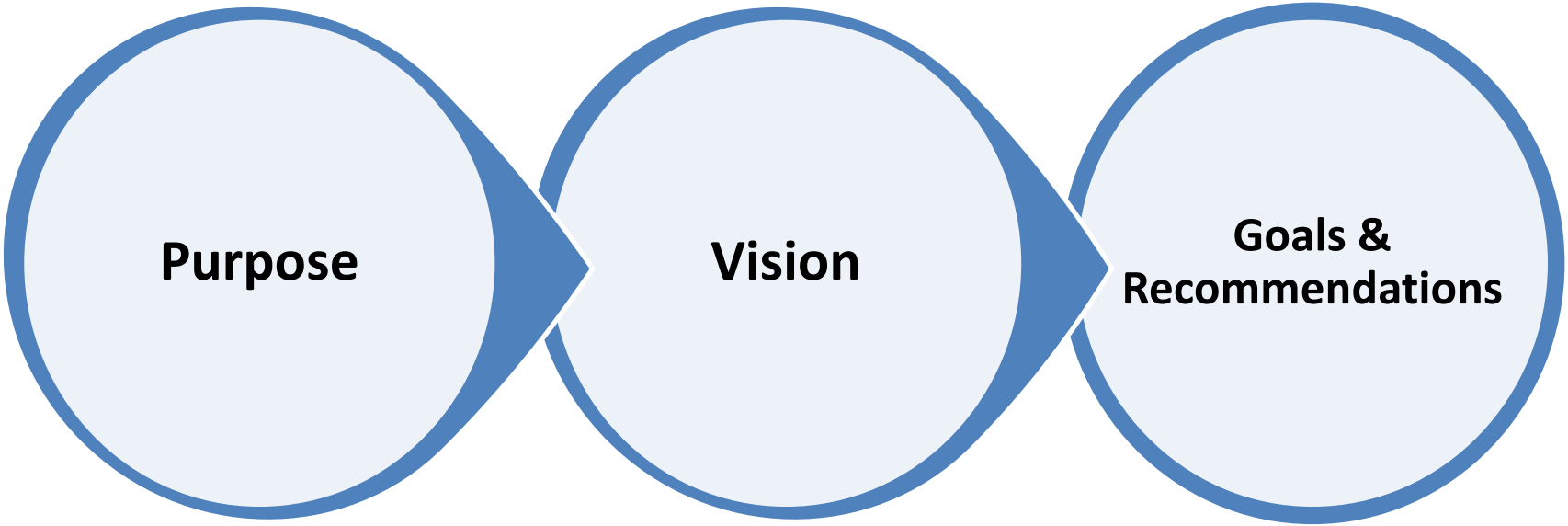
- Average distance travelled between generators and destination facilities = 500 mile



Agenda

- Background for the Hazardous Waste Management Plan
- Findings of the Hazardous Waste Management Report
- **Overview of the Hazardous Waste Management Plan**
- Summary and Next Steps
- Q&A

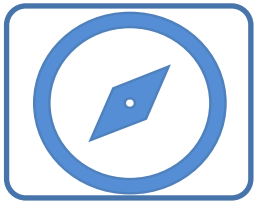
Overview of the Hazardous Waste Management Plan



Purpose

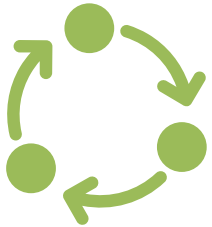
1. Comprehensive planning document for the management of hazardous waste in the state

2. Inform state and local hazardous waste management efforts



3. Guide implementation of DTSC's Hazardous Waste Management Program

Vision



Support of a Circular Economy

Foster Sustainable Management Practices

Invest in Research and Innovation

Goals

Goal 1	Reduce environmental health impacts by promoting environmental justice initiatives.
Goal 2	Improve access to information.
Goal 3	Identify opportunities for reduction by analyzing current waste generation and utilizing the waste management hierarchy.
Goal 4	Establish a modern waste reduction program.

Goals

Goal 5	Apply financial instruments to encourage reduction in hazardous waste generation.
Goal 6	Remain at forefront of environmental and public health protection by ensuring proper identification of hazardous waste.
Goal 7	Identify alternative management standards for certain non-RCRA hazardous wastes while ensuring protection of public health and the environment.

Goals

Goal 8	Expand research for future Hazardous Waste Management Reports and recommend ways to improve data reporting of hazardous waste.
Goal 9	Ensure California's generators are able to utilize all aspects of the hazardous waste management hierarchy in support of a circular economy.
Goal 10	Expand forecast capabilities to better anticipate the state's capacity needs.

Goals 3 and 4 – Waste and Disposal Reduction

Goal 3	Identify opportunities for reduction by analyzing current waste generation and utilizing the waste management hierarchy.
Goal 4	Establish a modern waste reduction program.

Goals 3 and 4 – Two Phase Approach to Waste Reduction

Short Term

- Lithium-Ion Batteries
- Incinerable Waste

Lo

- Moder
  Reduc
  – SB 14 Database

Lithium-Ion Batteries – A Growing Waste

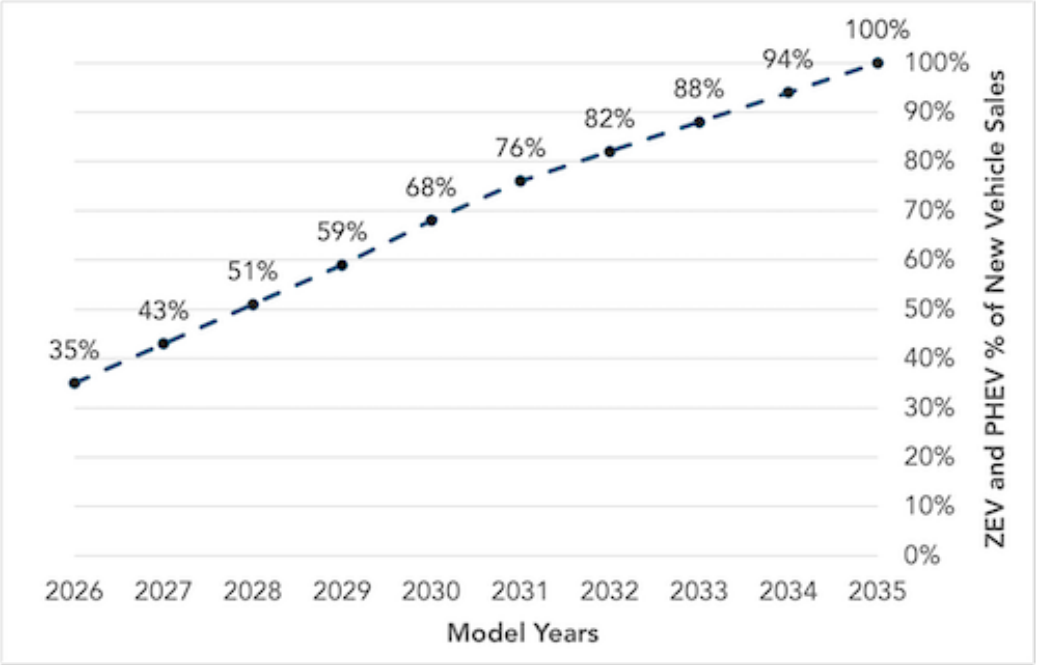
How many are generated?

What are the concerns?

What can DTSC do?

Lithium-Ion Batteries – ZEVs

- Zero-Emission Vehicles (ZEVs)
- Advanced Clean Cars II
  - 100% sales of ZEVs by 2035
- 2.2 million ZEV sales through 2024 in CA



Graph Source: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii

Lithium-Ion Batteries – Small Rechargeable

- Voluntary survey of rechargeable batteries recycled
- ~390,000 lbs of Li-ion batteries collected annually

Lithium-Ion Batteries – A Growing Waste

How many are generated?

What are the concerns?

What can DTSC do?

Lithium-Ion Battery Concerns

- Unmanifested
- Reclamation+Recycling
- Ignitable and Reactive
- Small, medium, and large

Lithium-Ion Batteries – A Growing Waste

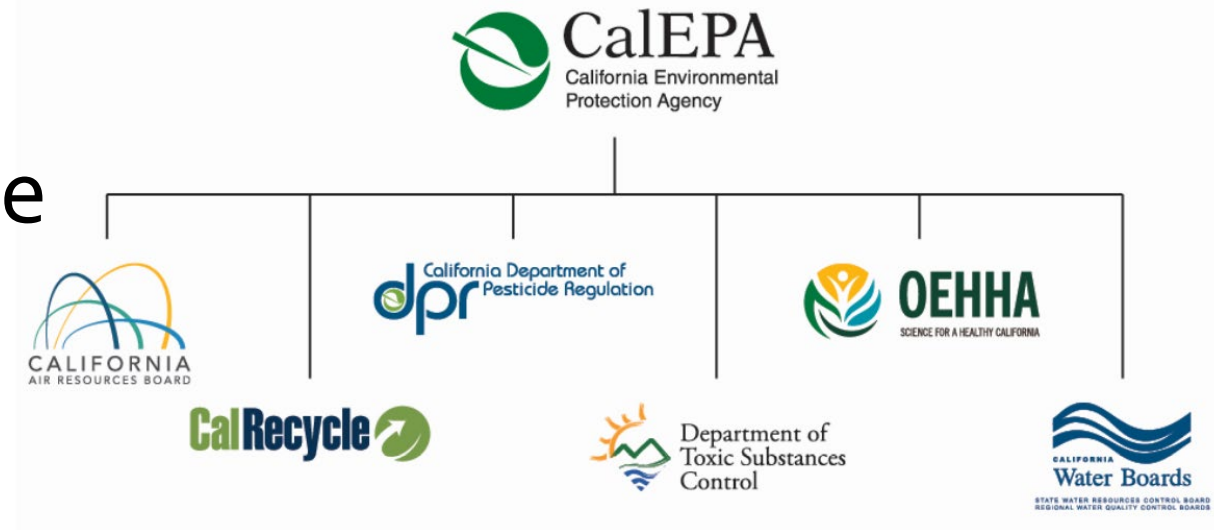
How many are generated?

What are the concerns?

What can DTSC do?

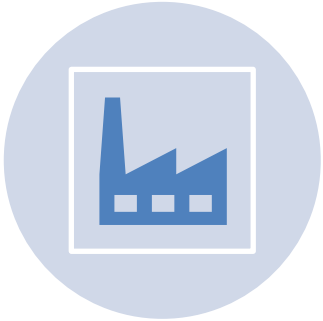
Foster Recycling and Reuse of Lithium-Ion Batteries

- Interdepartmental workgroup
- Stay up-to-date



Incinerable Waste– A Historical Challenge

What is incinerable waste?



What are the concerns?

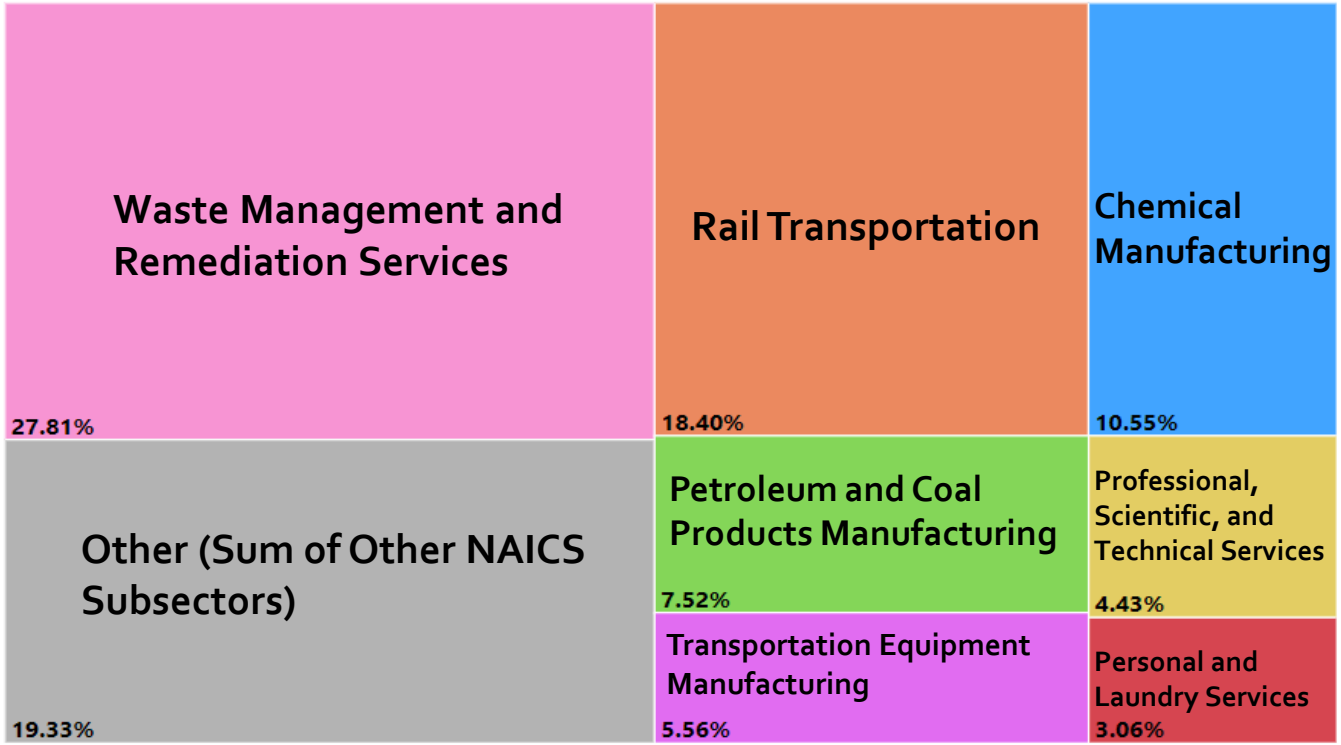
What can DTSC do?

Incinerable Waste- What is it?

Incinerable waste: Hazardous Waste sent to an incinerator as treatment

- Defined by treatment method, not waste type
- Incineration destroys toxic constituents and reduces volume of waste

Incinerable Waste

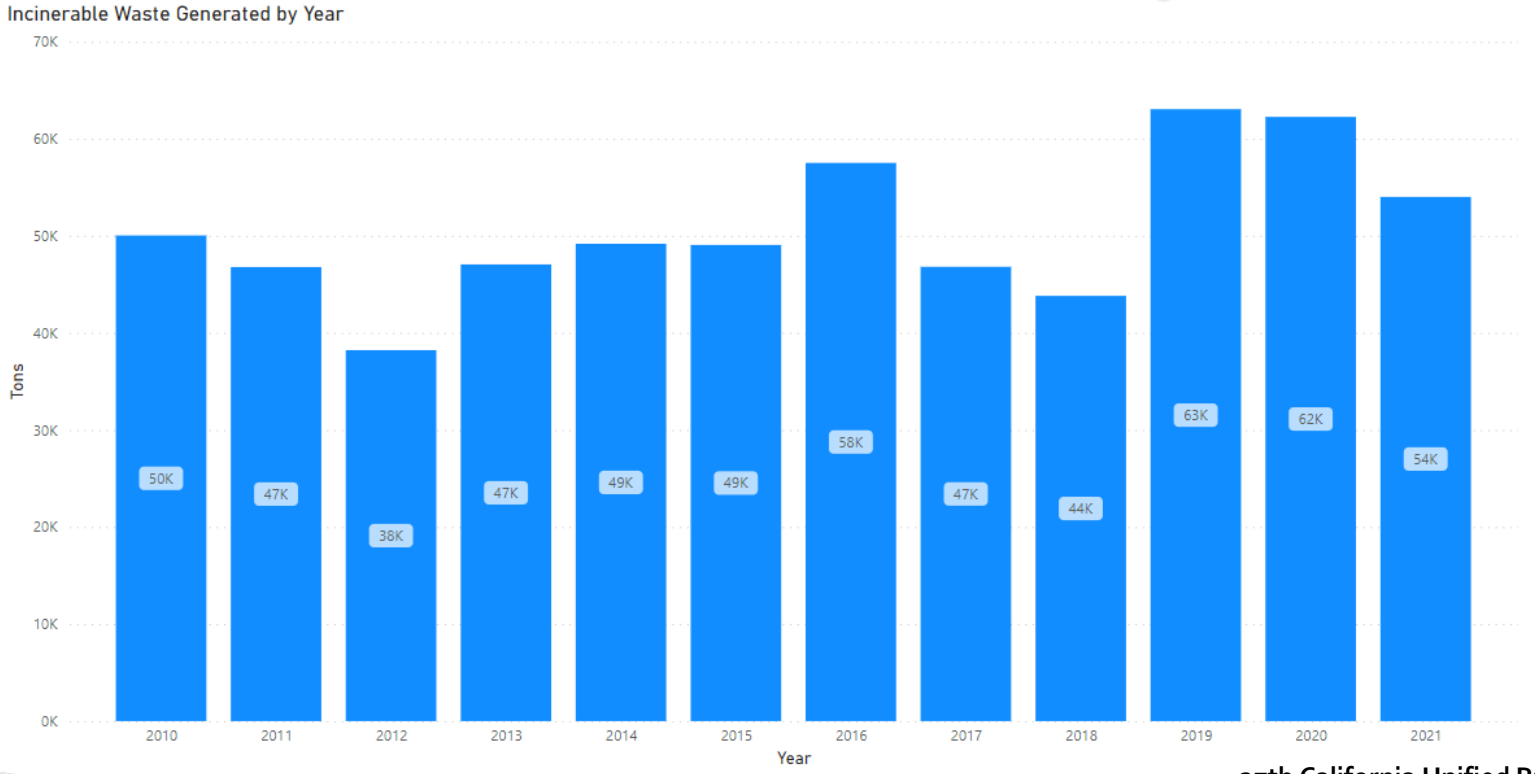


Incinerable Waste

Varied waste streams

- Solvents
- Metal based wastes
  - Chromium
  - Barium

Incinerable Waste Generated by Year



Incinerable Waste – A Historical Challenge

What is incinerable waste?

What are the concerns?

What can DTSC do?

Why Incinerable Waste?

- No commercial hazardous waste combustors/incinerators in California
- Nationwide capacity issues
- Potential for impacts

Hazardous Waste Commercial Combustors

Imbalances

- Illegal disposal
  - Greater impacts than proper management
- Potential impacts on federal funding

Incinerable Waste– A Historical Challenge

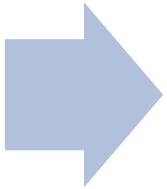
What is incinerable waste?

What are the concerns?

What can DTSC do?

Historical Reduction Successes

1990's DTSC Incinerable Waste Minimization Project:



53% reduction of incinerable waste from participating facilities in five years

Potential Alternative Technologies

- Difficult for incinerators to be approved
- Alternative technologies:
  - Super Critical Water Oxidation (SCWO)
  - Pyrolysis
  - Wet Air Oxidation

Any Questions?

5 Minute Question Break

Goals 3 and 4 – Two Phase Approach to Waste Reduction

Short Term

- Lithium-Ion Batteries
- Incinerable Waste

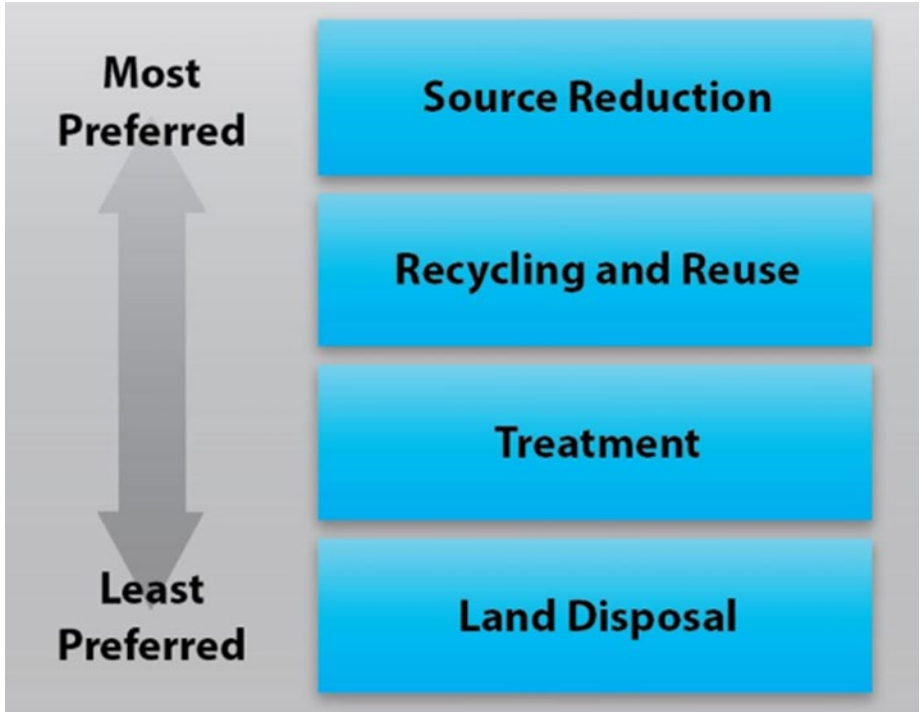
Long Term

- Modern Waste Reduction Program – SB 14 Database

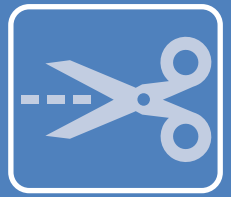
Waste Management Hierarchy

HSC Article 11.8

HSC Article 11.9

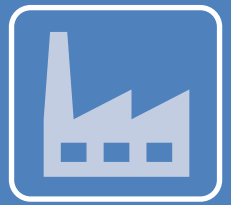


Challenges to Reduction



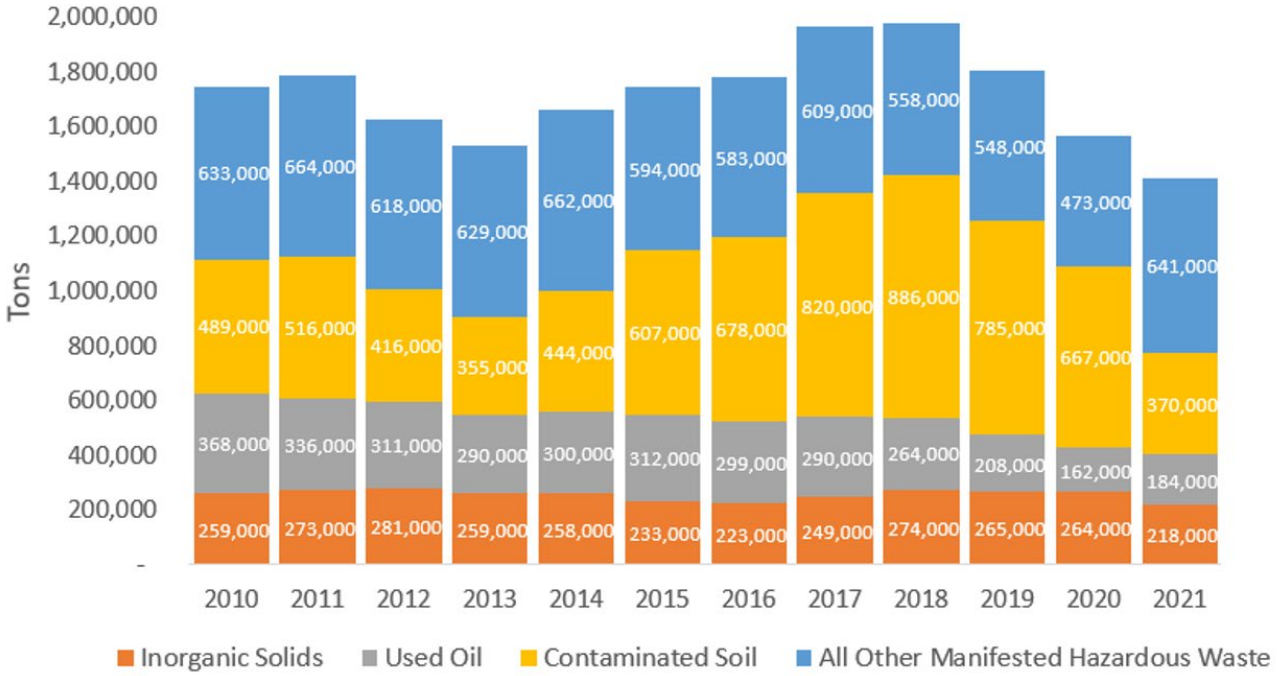
Easy reduction techniques likely already implemented

Limitations to efficiency and substitutions



Some industries face unique challenges to reduction

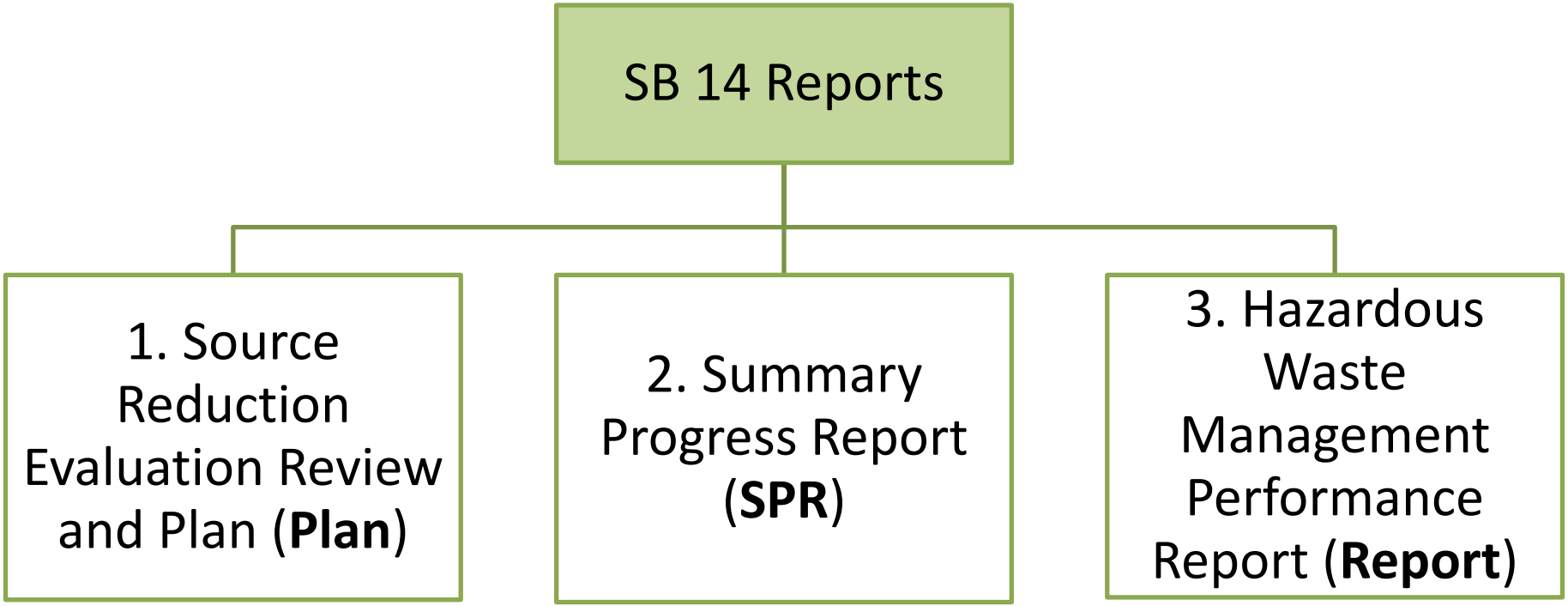
Hazardous Waste Streams 2010-2021



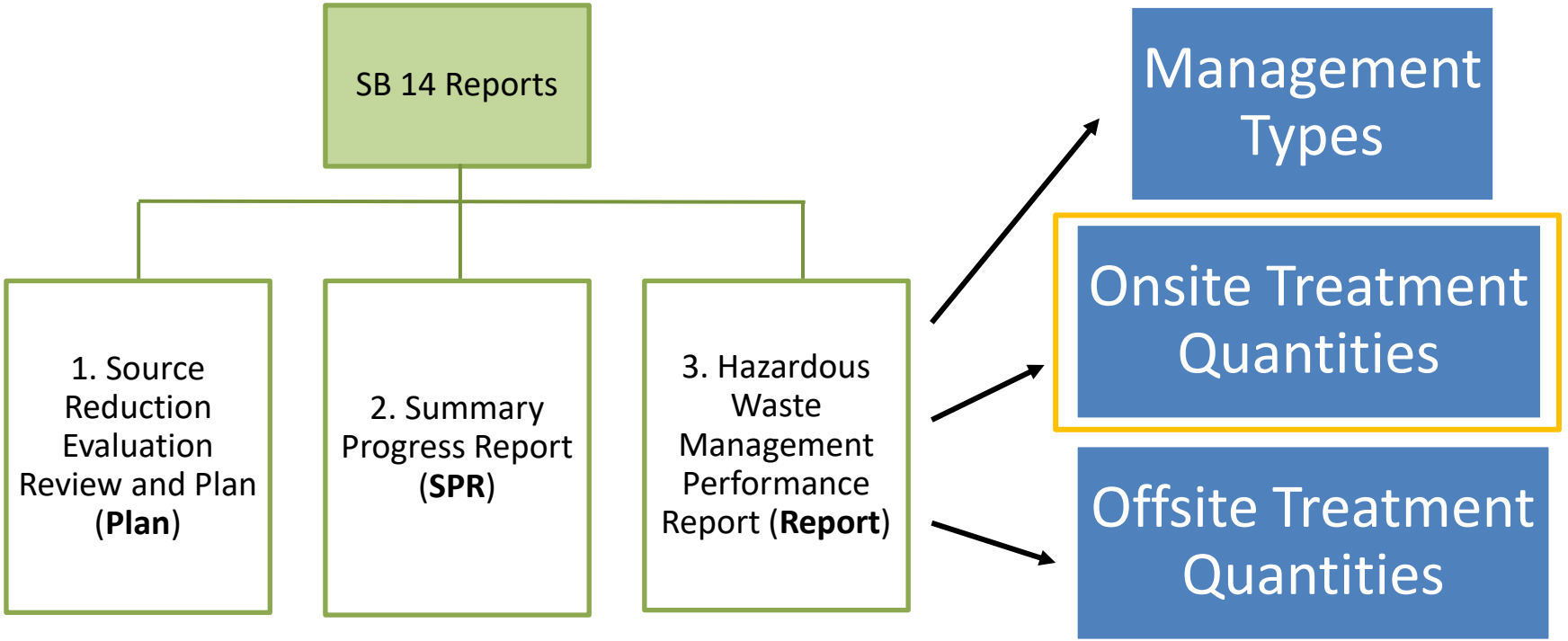
SB 14 Reports

- Article 11.9 of Health and Safety Code (HSC)
  - Senate Bill (SB) 14
- Reporting requirements:
  - Generate 12,000+ kg/yr. of hazardous waste **OR**
  - Generate 12+ kg/yr. of extremely hazardous waste
- Prepared every 4 years

SB 14 Reports



SB 14 Report Onsite Treatment Quantification



Loss of Source Reduction Analysis & Technical Support for CUPAs

SB 1018

- DTSC no longer required to choose 2 generator categories every 2 years
- DTSC's duty to implement Article 11.9 is contingent upon funding
- SB 14 reports now only requested upon as part of the CUPA inspection process

SB 14 Database

- Database to house SB 14 reports
  - Centralize data
- Submit select information into database
  - Separate from requirements to prepare SB 14 reports
- 2 concepts

SB 14 Database

Would improve:

1
Quantification of source reduction & generation

2
Technical evaluations on source reduction technologies

3
Public accessibility to data

SB 14 Database Considerations and Timeline

- Rulemaking amendment is anticipated
  - Estimated to be ready by 2028
- Generators still need to prepare SB 14 reports
  - Database submission is a separate process

Waste Reduction Next Steps

- Future plans are dependent on resources
- We strive to collaborate with CUPAs and industry!

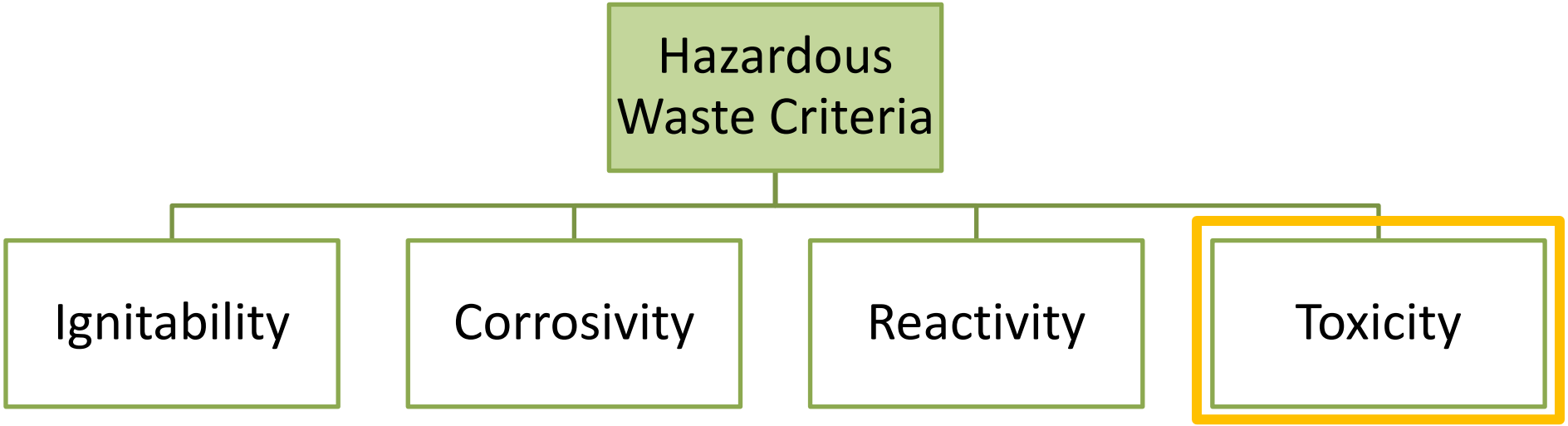
What could waste reduction mean to you?

How can a modern waste reduction program best serve everyone?

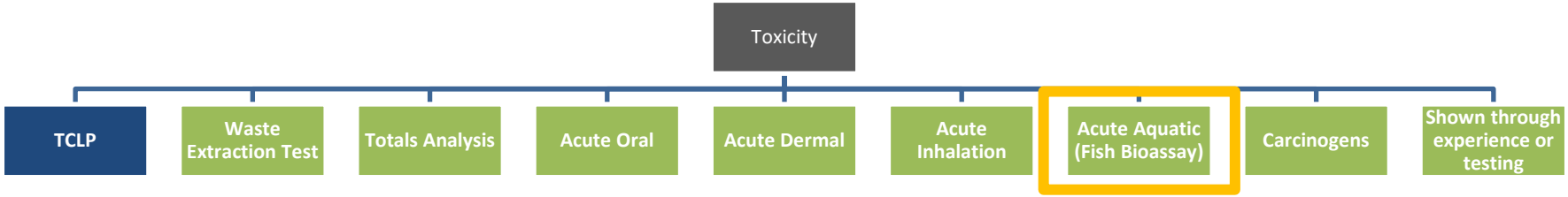
Goal 6 – Proper Identification of Hazardous Waste

Goal 6	Remain at forefront of environmental and public health protection by ensuring proper identification of hazardous waste.

Goal 6 – Evaluate Hazardous Waste Criteria



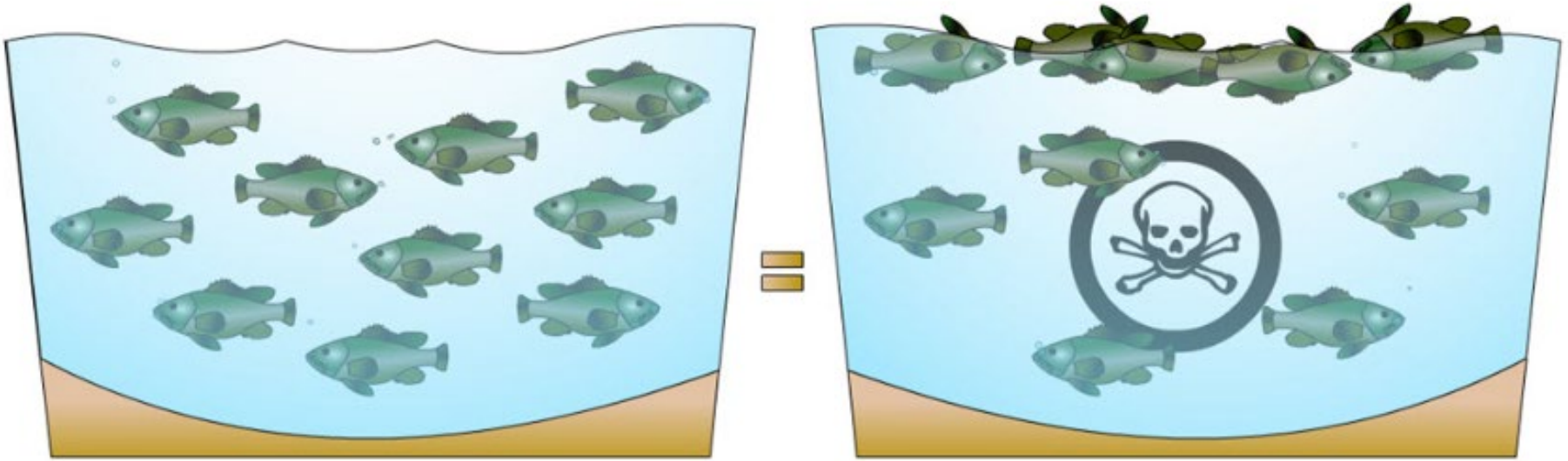
Goal 6 – Evaluate Hazardous Waste Criteria



Federal Criteria

California's Additional Criteria

Fish Bioassay in California's Criteria



LC_{50} < 500 mg/l

Acute Aquatic Toxicity

Goal 7 – Alternative Management Standards (AMS)

Goal 7	Identify and evaluate alternative management standards for certain non-RCRA hazardous wastes while ensuring protection of public health and the environment.

Examples of Projects that Generate Soil

Affordable housing

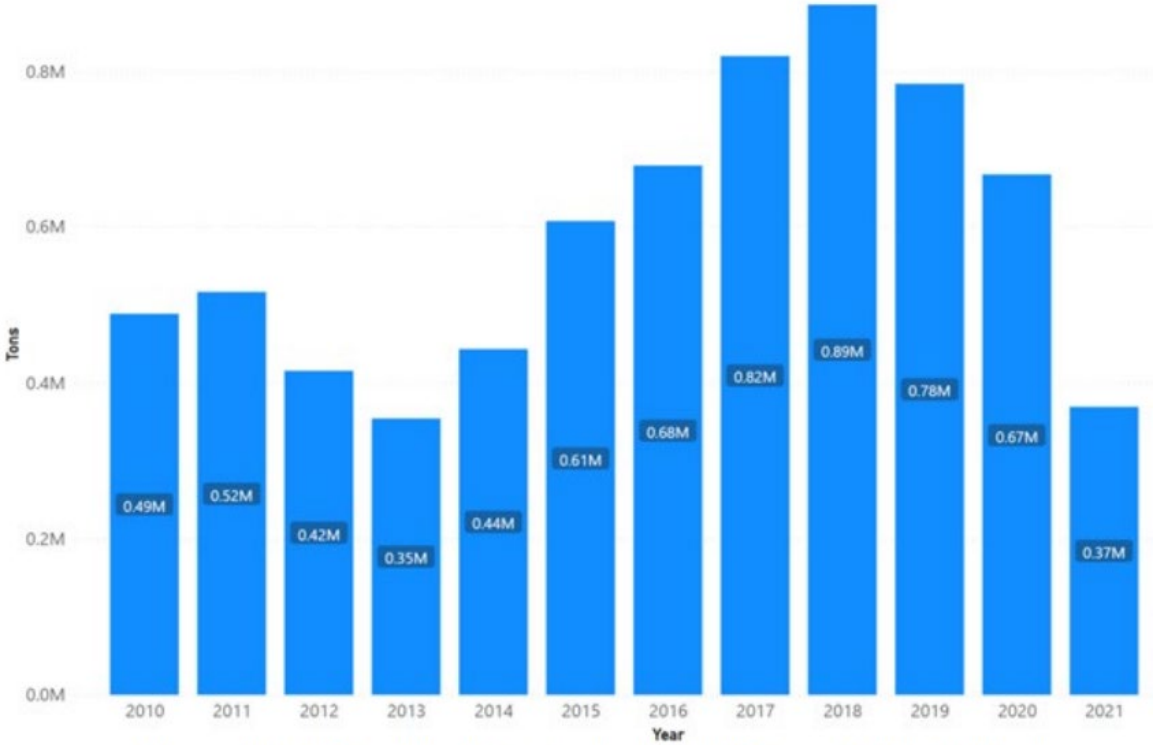
Commercial developments

Public utility projects

Infrastructure upgrades

Site cleanups (Brownfields)

Contaminated Soil Generation



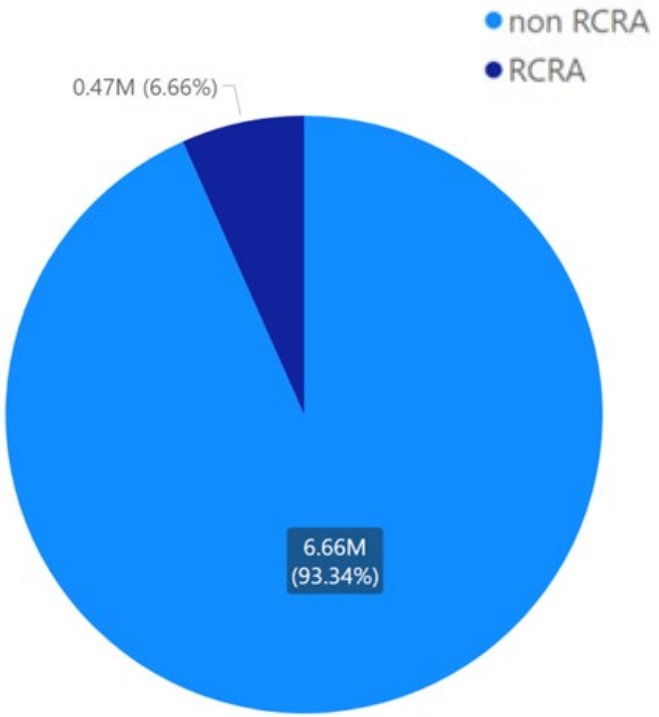
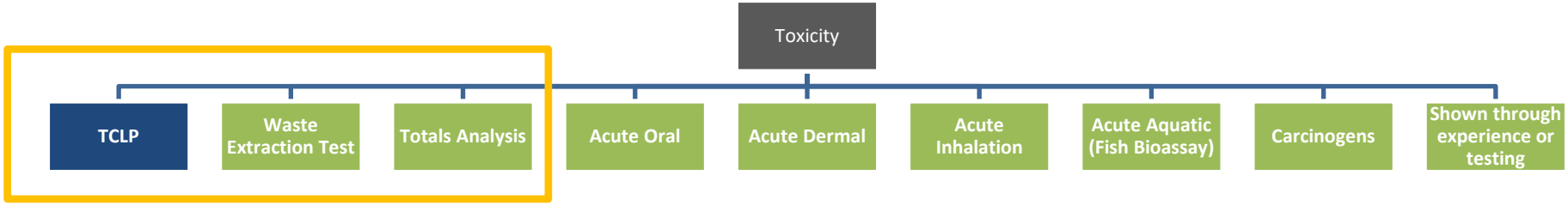


Figure 2.3-9: Quantity of Contaminated Soil Generated in California

Alternative Management of Non-RCRA Soil



Federal Criteria

California's Additional Criteria

Typical Laboratory Test Methods for Soil

Requirement	Test	Purpose	What is Measured	Concentration Limit
RCRA and California	Toxicity Characteristic Leaching Procedure	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Toxicity Characteristic Leaching Procedure (TCLP)
California	Waste Extraction Test	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Soluble Threshold Limit Concentration (STLC)
California	Total Digestion Test	Addresses other possible routes of exposure to toxic chemicals such as surface run-off, airborne dispersal, and direct on-site land contamination.	Total Concentration	Total Threshold Limit Concentration (TTLC)

Typical Laboratory Test Methods for Soil

Requirement	Test	Purpose	What is Measured	Concentration Limit
RCRA and California	Toxicity Characteristic Leaching Procedure	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Toxicity Characteristic Leaching Procedure (TCLP)
California	Waste Extraction Test	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Soluble Threshold Limit Concentration (STLC)
California	Total Digestion Test	Addresses other possible routes of exposure to toxic chemicals such as surface run-off, airborne dispersal, and direct on-site land contamination.	Total Concentration	Total Threshold Limit Concentration (TTLC)

Typical Laboratory Test Methods for Soil

Requirement	Test	Purpose	What is Measured	Concentration Limit
RCRA and California	Toxicity Characteristic Leaching Procedure	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Toxicity Characteristic Leaching Procedure (TCLP)
California	Waste Extraction Test	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Soluble Threshold Limit Concentration (STLC)
California	Total Digestion Test	Addresses other possible routes of exposure to toxic chemicals such as surface run-off, airborne dispersal, and direct on-site land contamination.	Total Concentration	Total Threshold Limit Concentration (TTLC)

Typical Laboratory Test Methods for Soil

Requirement	Test	Purpose	What is Measured	Concentration Limit
RCRA and California	Toxicity Characteristic Leaching Procedure	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Toxicity Characteristic Leaching Procedure (TCLP)
California	Waste Extraction Test	Laboratory simulation of how leachate may form in a landfill setting.	Soluble Concentration (Leachability)	Soluble Threshold Limit Concentration (STLC)
California	Total Digestion Test	Addresses other possible routes of exposure to toxic chemicals such as surface run-off, airborne dispersal, and direct on-site land contamination.	Total Concentration	Total Threshold Limit Concentration (TTLC)

TWW Facilities

- AMS already allowed for Treated wood waste (TWW)
- Specific composite lined non-hazardous landfills accept TWW
  - 59 in total

Goal 7 – Alternative Management Standards for Non-RCRA Soil

- Disposal of some non-RCRA soil in landfills with liners and leachate collection systems
- Increase access to protective management in California
- Reduce miles traveled to dispose of non-RCRA soil and green house gas emissions

Any Questions?

5 Minute Question Break

Goal 8 –Improve Data Reporting

Goal 8	Expand research for future Hazardous Waste Management Reports and recommend ways to improve data reporting of hazardous waste.

Goal 8 – Waste Code Modification

Replace Two Codes

CWC 611 – Contaminated Soils

CWC 181 – Other Inorganic Solid Waste

Adding New Codes

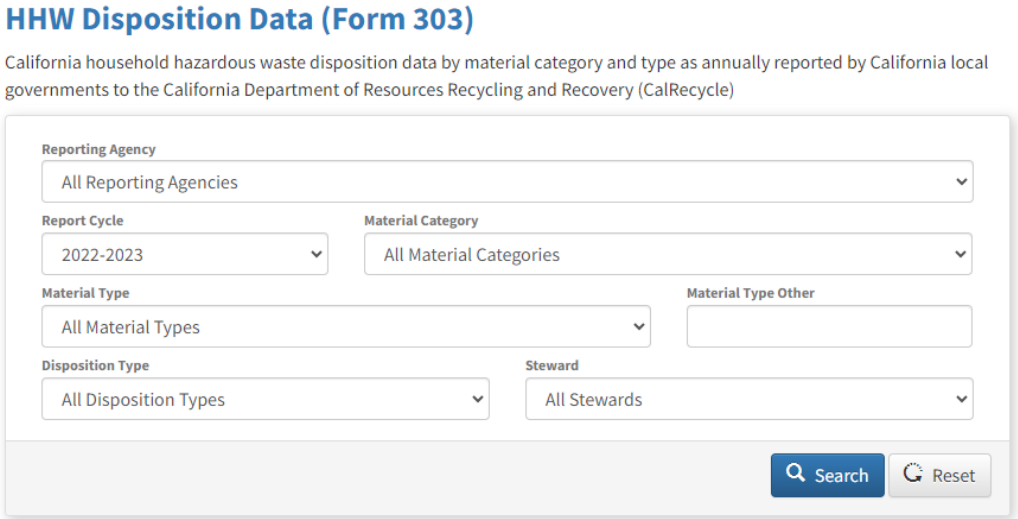
Soils – with 19 new codes

Other Inorganic Solid Waste – with 19 new codes

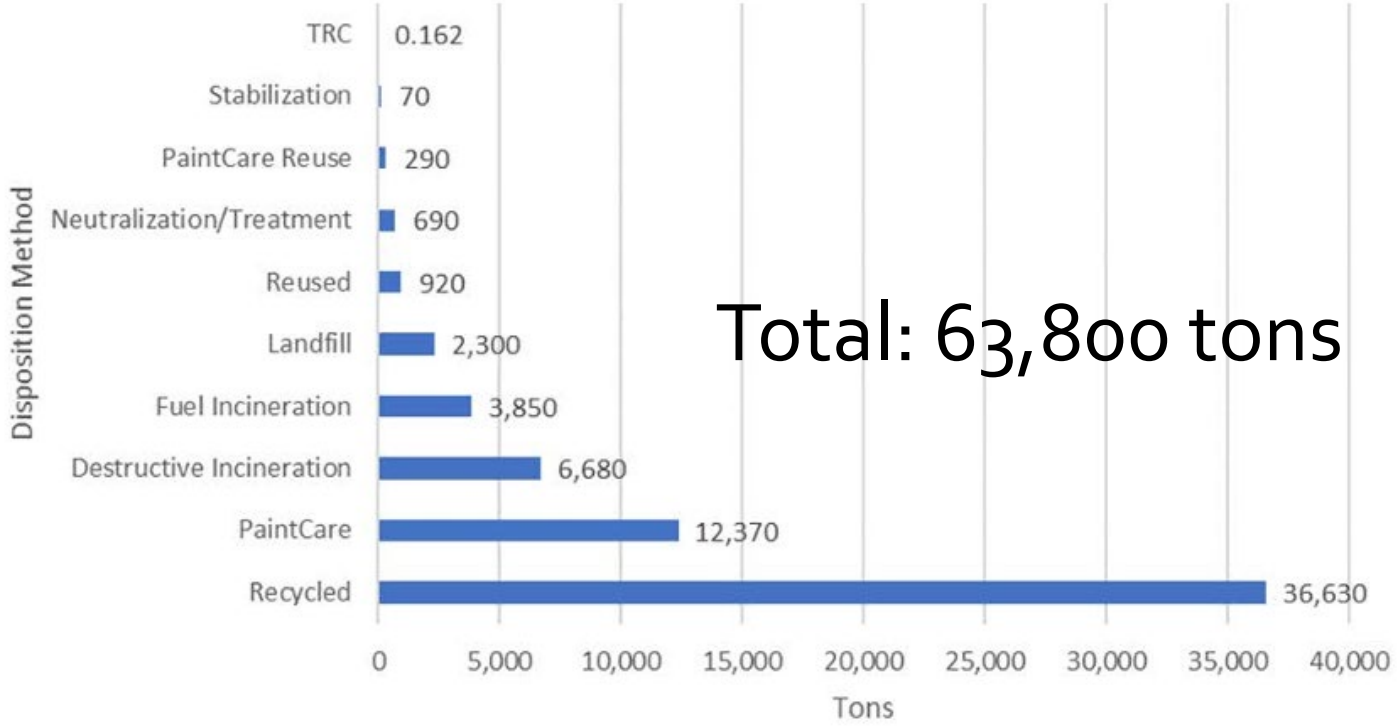
Waste Code Modification Infosheet

Goal 8 – Household Hazardous Waste

- Managed by specific Household Hazardous Waste (HHW) Facilities
- CalRecycle Form 303:
  - Type
  - Amount
  - Disposition



HHW Disposition Metrics



Total: 63,800 tons

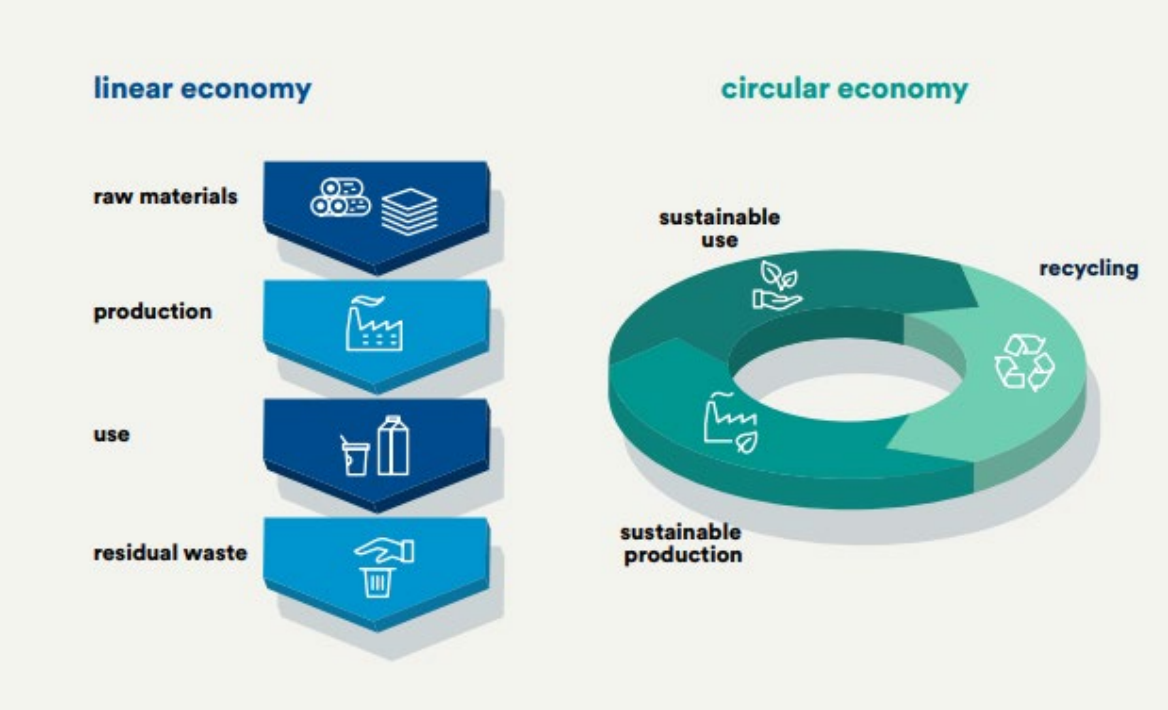
Future HHW Research

- How much HHW do non-hazardous waste facilities receive?
- How can DTSC work with local agencies?

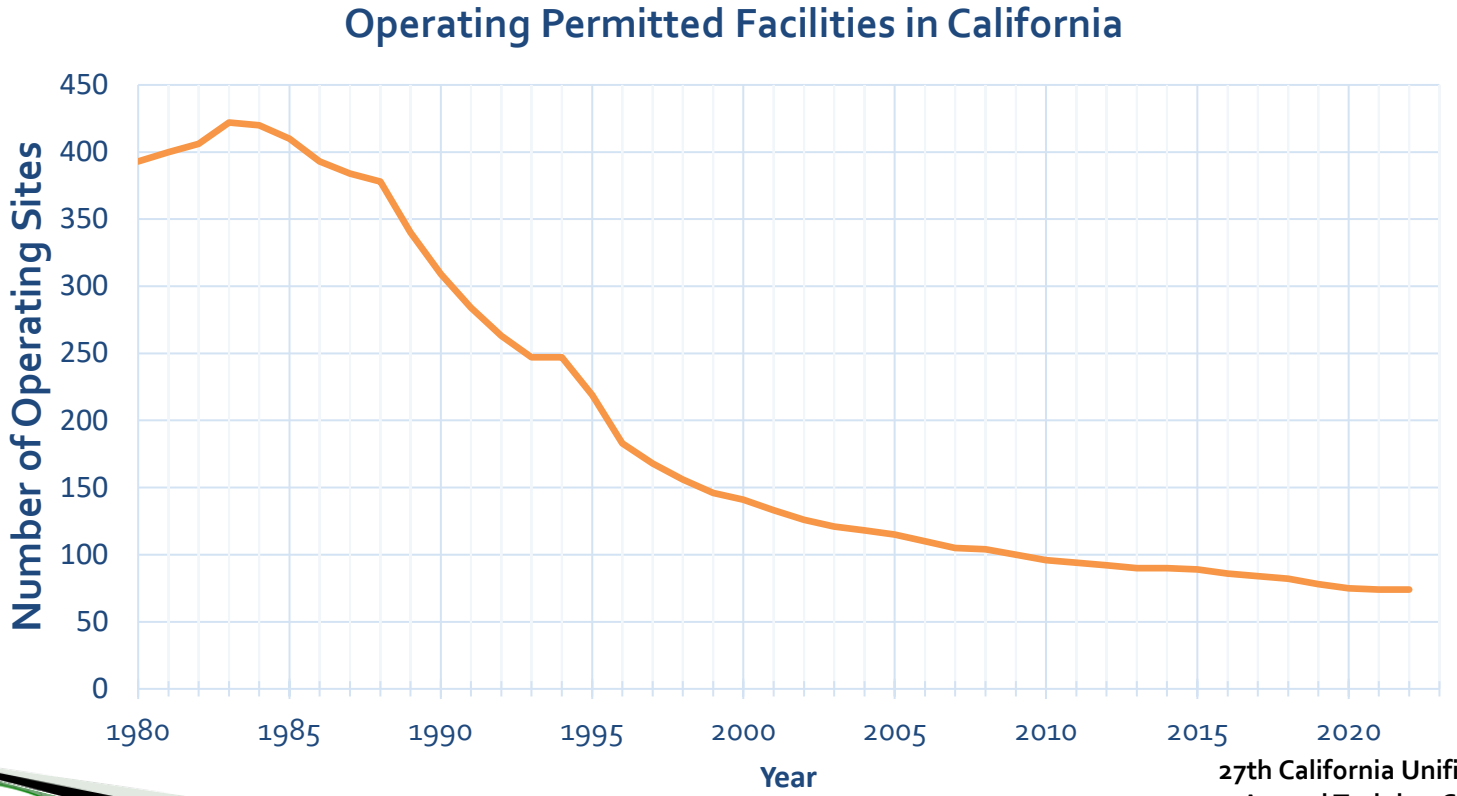
Goal 9 – Support a Circular Economy through the Waste Management Hierarchy

Goal 9	Ensure California's generators are able to utilize all aspects of the hazardous waste management hierarchy in support of a circular economy.

Circular Economy



Decrease in Facilities

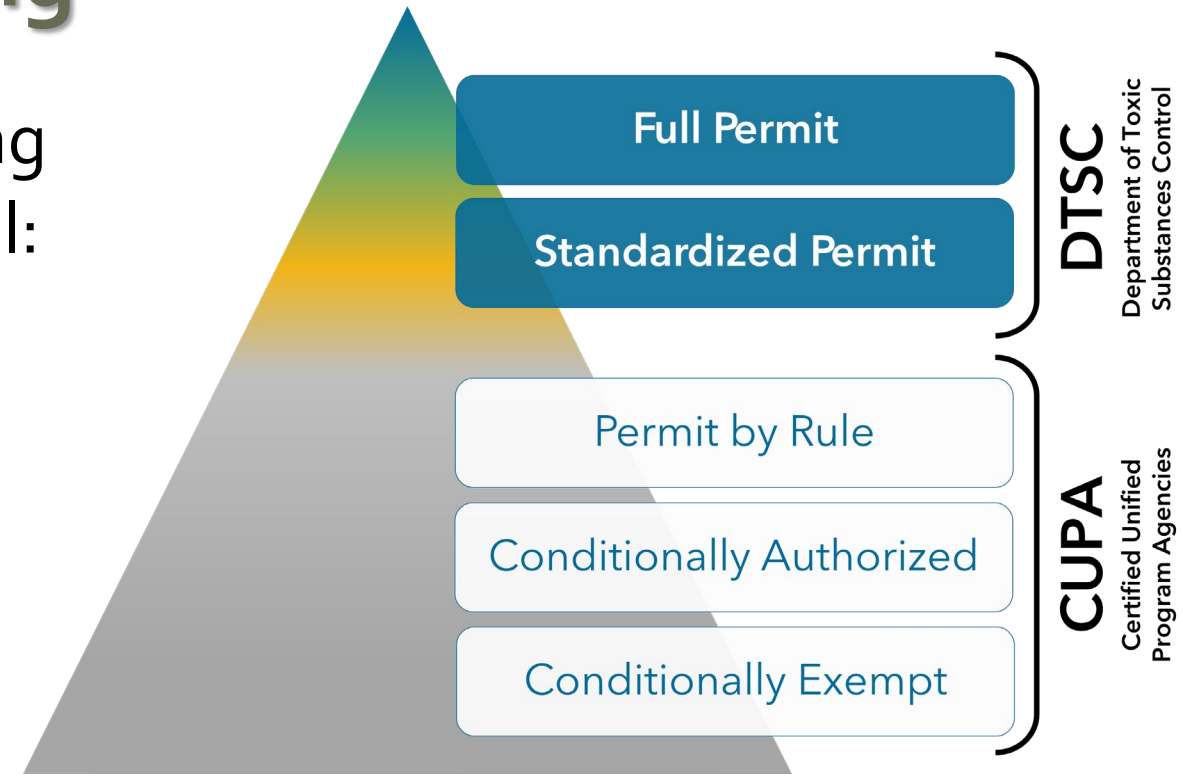


Working Towards a Circular Economy

- A circular economy needs recycling
- California has limited recycling capacity
- How to incentivize facilities?

Tiered Permitting

- DTSC is researching allowing additional:
  - Treatment technologies
  - Waste types



Agenda

- Background for the Hazardous Waste Management Plan
- Findings of the Hazardous Waste Management Report
- Overview of the Hazardous Waste Management Plan
- **Summary and Next Steps**
- Q&A

Summary

- First Hazardous Waste Management Plan
- Stepping stones towards a broader vision
- Modernizing waste management

2025 Draft Hazardous Waste Management Plan: Next Steps

Any Questions?

Ryan Dominguez, Supervising HSE
ryan.dominguez@dtsc.ca.gov
916-251-8023