Population Growth vs. Landfill Capacity vs. Recycling Mandates in California Counties

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Abstract

As population growth increases in Monterey, Fresno, Kern, San Luis Obispo, Santa Barbara, and Ventura counties, so does waste production. More waste is a cause for concern because landfills have limited capacities. In order to combat the increase in waste, cities, counties, and the state are creating recycling mandates to ensure waste is being handled appropriately. More specifically, the trash generated by residents and construction and demolition (C&D) materials are being recycled and reused instead of thrown into landfills. This report indicates that increases in recycling mandates in California cannot withstand the increase in waste generation from population growth. Another way to combat waste is to introduce ways to reuse materials. These ideas are explored via case studies and later in the paper.

Introduction

The population continues to grow across the United States regardless of the crises we face. By 2030, California's population is projected to reach 44 million. Annual growth rates are expected to be 0.8 percent, similar to growth experienced in the first decade of this century. Even so, average annual increases between now and 2030 will exceed 333,000—equivalent to adding the population of a city the size of Santa Ana each year [1].

Since 2012, disposal per resident has increased from 5.3 to 6, while the recycling rate has decreased from 50 percent to the current 42 percent. That is equivalent to almost 2,200 pounds every year, roughly the weight of a subcompact car. The California Department of Resources Recycling and Recovery (CalRecycle) measures individual disposal in terms of PPD because it considers both recycling rate and overall disposal (recycling and compost are not counted as trash) [2]. Although California's recycling rate remains above the national average of 34.7 percent, results are well below the state's 2020 goal of 75 percent [2].

California Legislature and then-Governor Jerry Brown set an ambitious goal of 75 percent recycling, composting, or source reduction of solid waste by 2020, calling for the state and CalRecycle to take a statewide approach to decrease California's reliance on landfills. Unfortunately, that goal was not met. According to an annual report from the CalRecycle, California achieved a 42 percent recycling/composting rate in 2020, up from 37 percent the year before [3].

This research paper focuses on Monterey, Fresno, Kern, Kings, Santa Barbara, Ventura, and San Luis Obispo counties and their statistics. Due to the interest in local sustainability, San Luis Obispo County and its surrounding counties were the subjects for this paper.

1 - California, Public Policy Institute. "Population - California's Future." PPIC.org, Public Policy Institute of California, Jan. 2018, https://www.ppic.org/wp-content/uploads/r-118hj2r.pdf.

2 - Group, California Public Interest Research. "The State of Waste in California." CALPIRG, CALIFORNIA PUBLIC INTEREST RESEARCH GROUP, 15 Nov. 2018, https://calpirg.org/reports/cap/state-waste-california#:~:text=Californians%20throw%20away%206%20pounds,person%20per%20day%20(PPD).

3- Department of Resources Recycling and Recovery. (2020). State of Disposal and Recycling in California Calendar Year 2020. Publication # DRRR-2021-1706. https://www2.calrecycle.ca.gov/Publications/Details/1706

Assumptions

First, population growth in each county is linearly interpreted. The data was collected from the 2019 Census spreadsheet titled, “County Population Totals: 2010-2019.” The data contained annual estimates of the resident populations from July 1, 2010, to July 1, 2019. That data was used to generate a trendline to form annual population growth in terms of change in population over the change in years. Percentage growth was determined by comparing the first data point on July 1, 2010, to the last data point on July 1, 2019.

Second, all the landfill capacities were taken from the CalRecycle’s Solid Waste Information System (SWIS) database. The “remaining capacities” numbers are the most up-to-date numbers. The landfills inspection dates vary, meaning the numbers are inconsistent from a given year. Nevertheless, the data was still used to create landfill capacity graphs.

Third, waste generation statistics were taken across the whole state of California instead of in the specified counties. The information provided by the CalRecycle and the Environmental Protection Agency (EPA) was on a statewide basis.

Fourth, recycling mandates are from the statewide level. The information provided by the CalRecycle was on a statewide basis. More specific county or city mandates are shown in the case studies.

Population

The purpose of studying population growth was to determine future trends based on data from 2010. The most recent data from the 2020 Census shows Fresno, Kern, Monterey, San Luis Obispo, Santa Barbara, and Ventura have projected population growth while Kings County does not. California's population has seen a very recent decline at the state level, but that has not impacted the seven counties associated with this paper. From 2010 to 2020, California's population grew by 5.8% [4]. However, the most recent information from the Census shows that from 2020 to 2021, the population declined by 0.7% [5].

The trajectory in population growth is shown in the graphs below via a trendline. The line's slope is the change in population over the change in years, and all are assumed linear. The factors contributing to the trends are not within the scope of this research paper. Nonetheless, the data is important to analyze the trend in population quantity.

As noted above, Californians throw away roughly 2,200 pounds of trash every year. When the 2,200 pounds per year is associated with the trend in county population growth, this gives a rough estimate of how much additional trash is being generated in the future. The additional amount of population and the additional amount of trash are indicators of how counties should prepare for greater pollution potential.

It is also important to know that residential trash is not the only waste going into landfills. The other materials will be discussed in the Landfill section of this paper.

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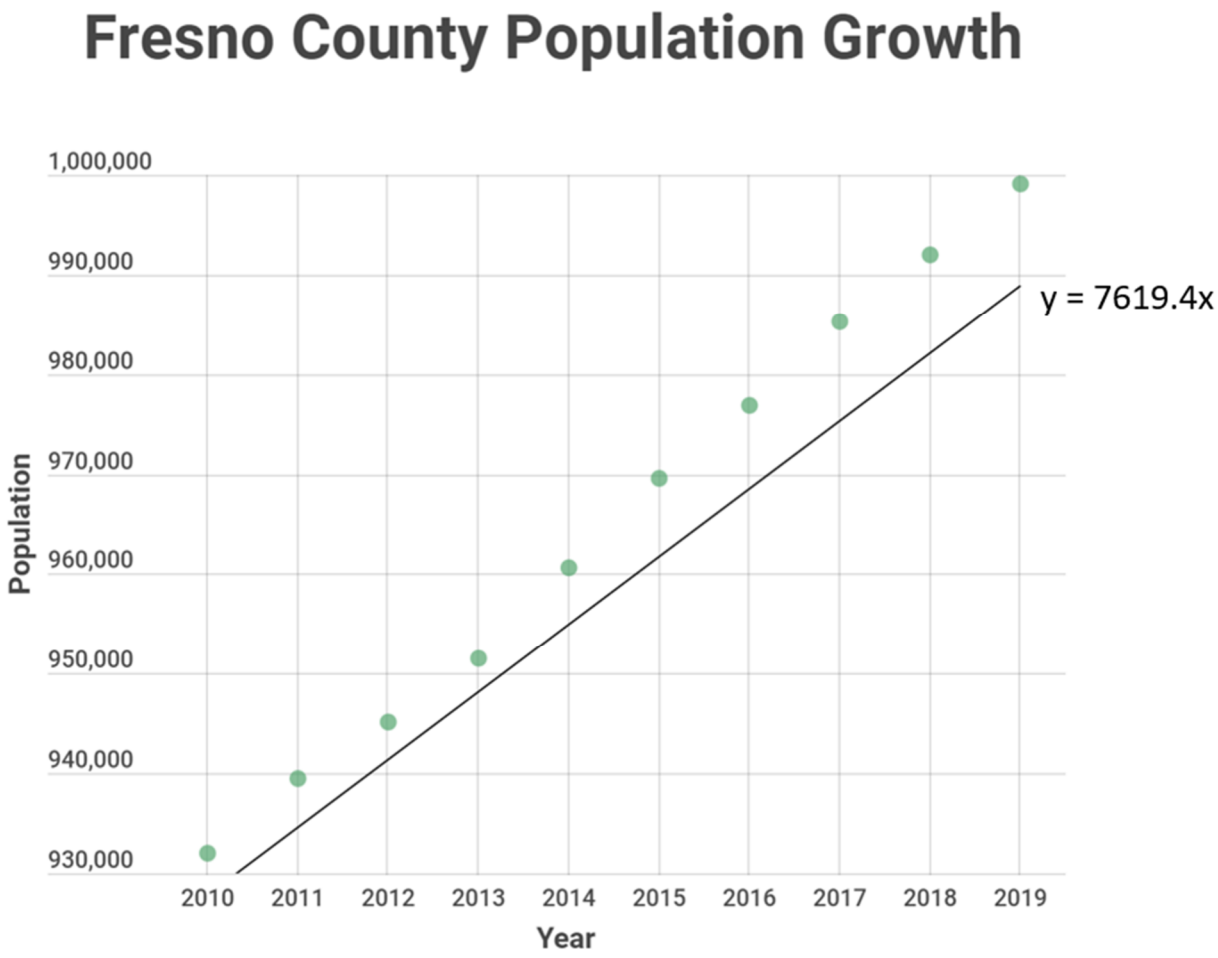
4 - Johnson, Hans, et al. "California's Population." Public Policy Institute of California, Public Policy Institute of California, 2 Feb. 2022, https://www.ppic.org/publication/californias-population/#:~:text=From%202010%20to%202020%2C%20California's,first%20time%20in%20California's%20history.

5 - Bureau, US Census. "New Vintage 2021 Population Estimates Available for the Nation, States and Puerto Rico." Census.gov, 21 Dec. 2021, https://www.census.gov/newsroom/press-releases/2021/2021-population-estimates.html.

Fresno County

Fresno County has shown consistent growth over the last ten years. Graph 1 shows there is a positive upward trend. Data analysis indicates roughly 7,620 more people live in Fresno County each year. Over the ten years, there was an increase of 7.4%



Graph 1. Fresno County Population Growth over the last ten years with trendline [6].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

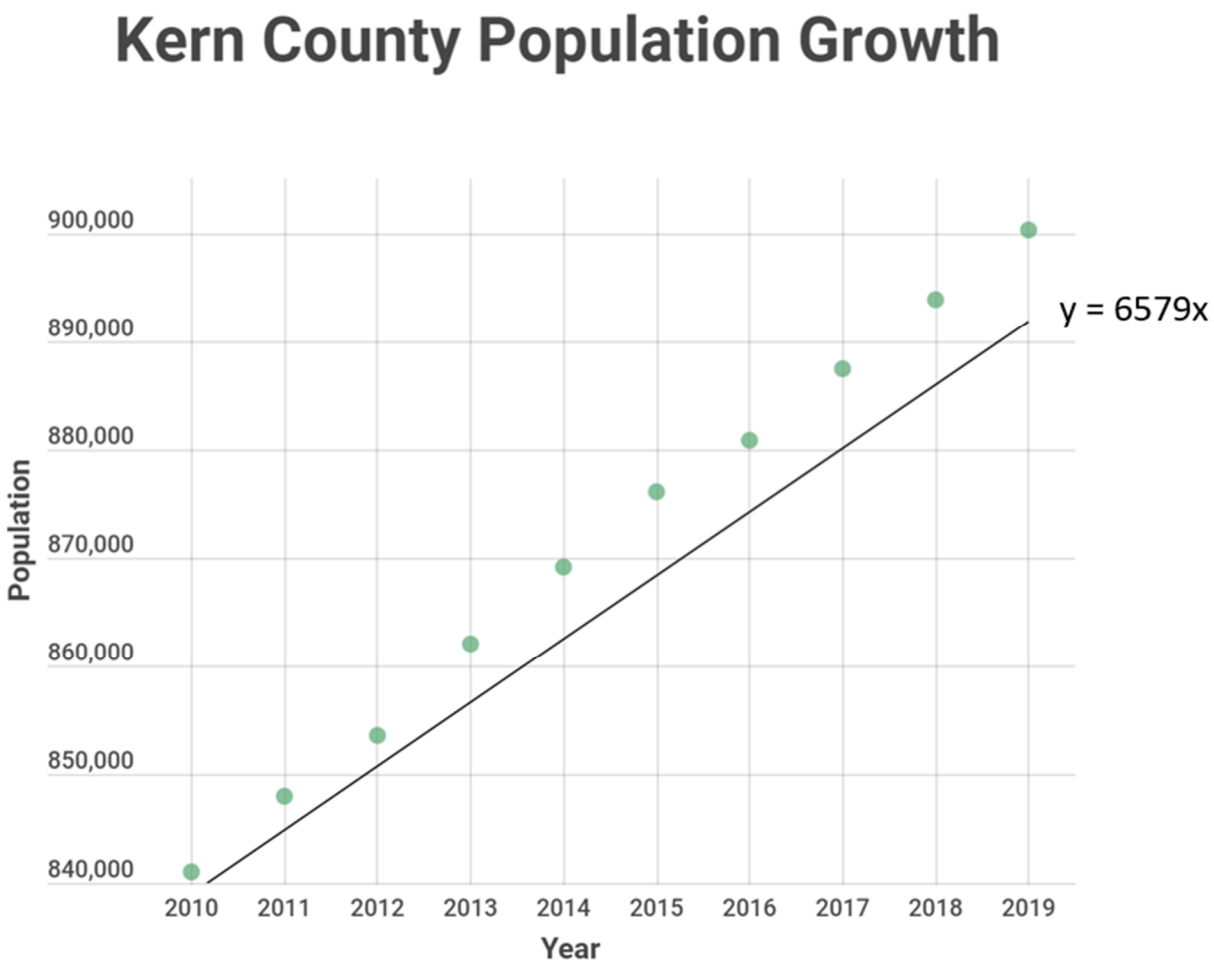
Additional pounds of trash = (7,620 people/year) * (2,200 pounds/year) * 1 year
= 16,764,000 pounds or 8,382 tons

The calculation shows that Fresno County should expect an additional 7,620 people and 8,382 tons of trash every year. Based on the 2018 Waste Characterization Disposal Facility-Based Study, Fresno County ranks 11th out of all California counties based on total tons disposed of.

6 - Bureau, US Census. "County Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

Kern County

Kern County has shown consistent growth over the last ten years. Graph 2 shows there is a positive upward trend. Data analysis indicates roughly 6,579 more people live in Kern County each year. Over the ten years, there was an increase of 7.2%



Graph 2. Kern County Population Growth over the last ten years with trendline [6].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

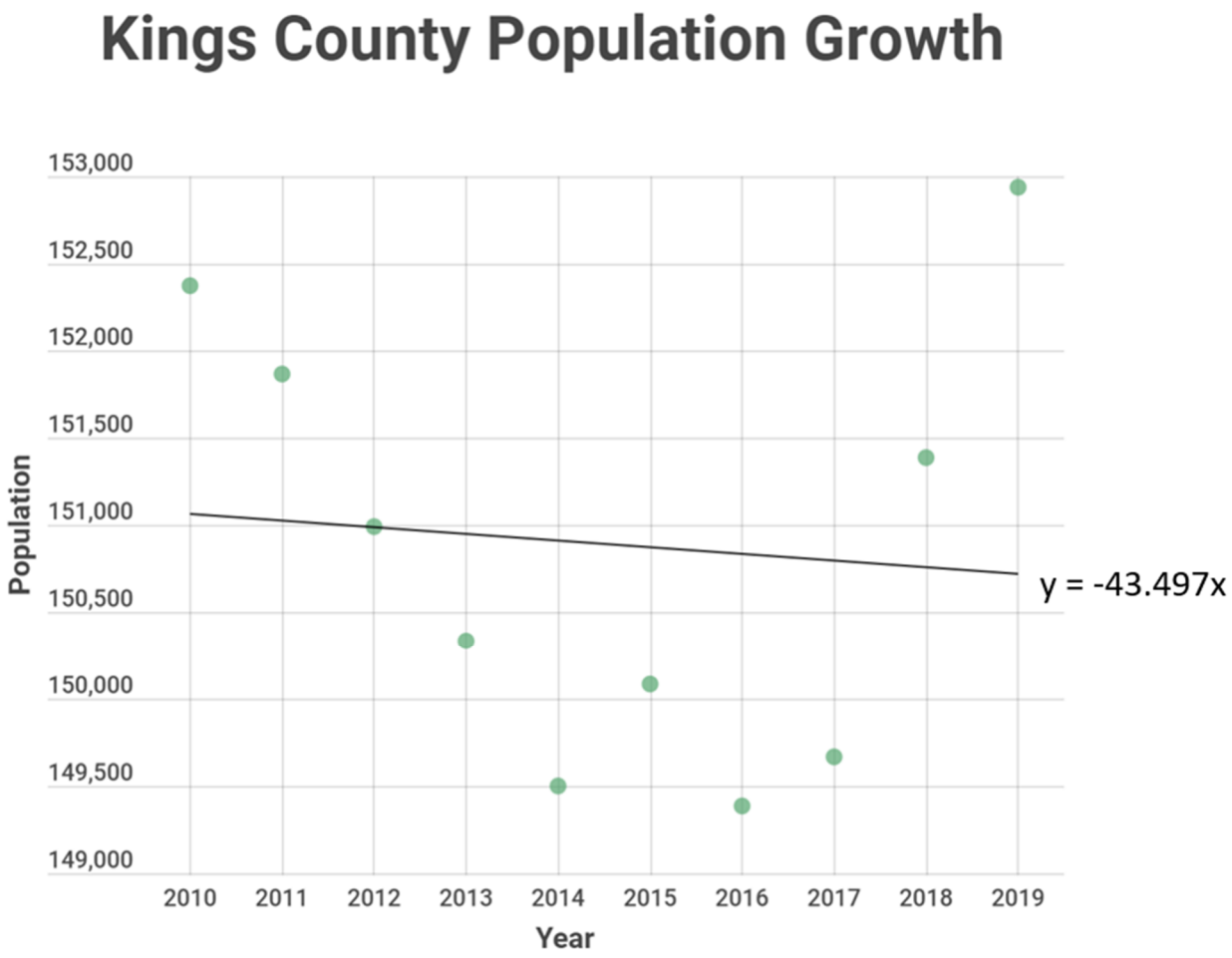
Additional pounds of trash = (6,579 people/year) * (2,200 pounds/year) * 1 year
= 14,473,800 pounds or 7,237 tons

The calculation shows that Kern County should expect an additional 6,579 people and 7,237 tons of trash every year. Based on the 2018 Waste Characterization Disposal Facility-Based Study, Kern County ranks 9th out of all California counties based on total tons disposed of.

6 - Bureau, US Census. "County Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

Kings County

Kings County has shown consistent growth over the last ten years. Graph 3 shows there is a negative downward trend. Data analysis indicates roughly 44 people leave Kings County each year.



Graph 3. Kings County Population Growth over the last ten years with trendline [6].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

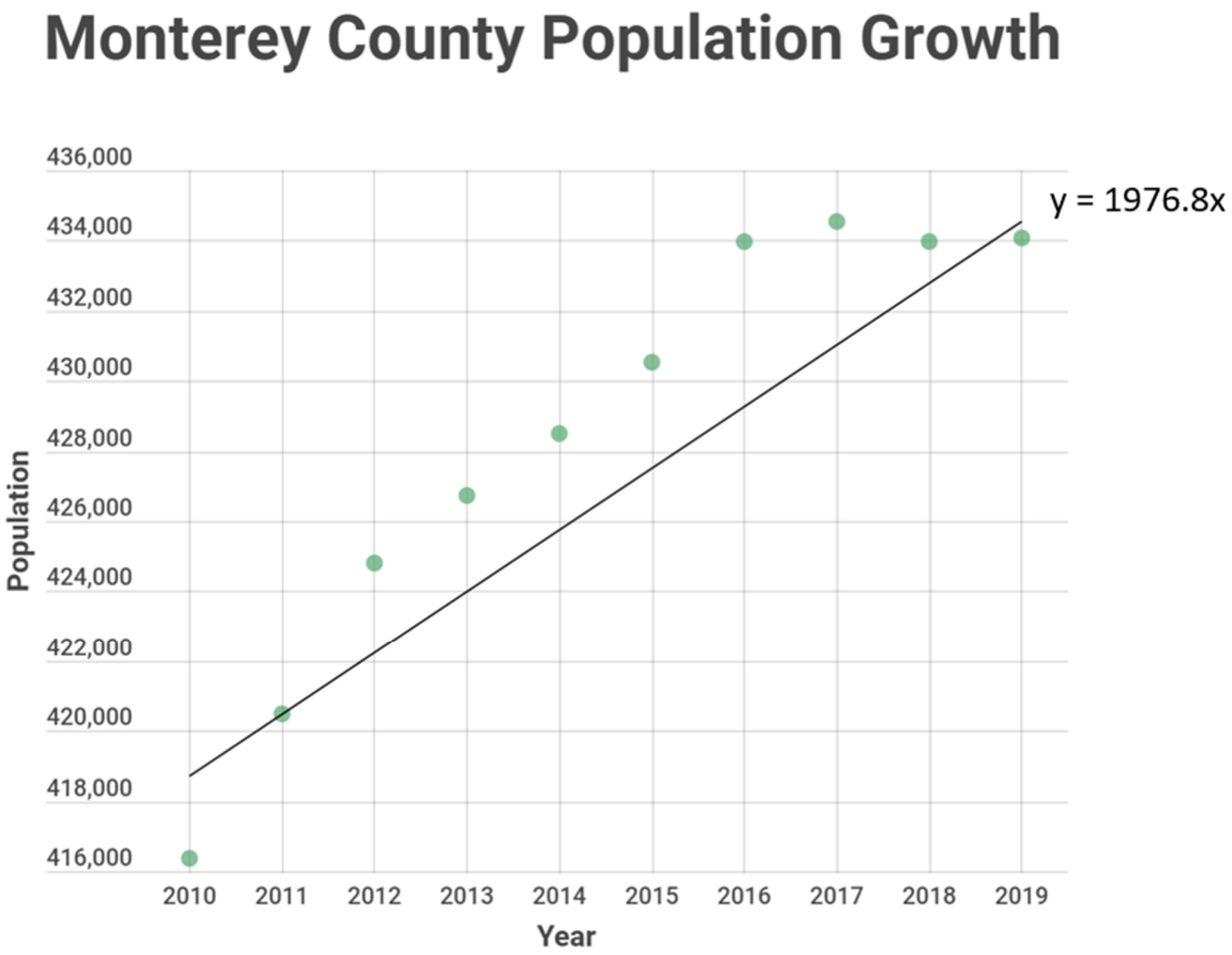
Additional pounds of trash = (-44 people/year) * (2,200 pounds/year) * 1 year
= -96,800 pounds or -48.4 tons

The calculation shows that Kings County should expect to lose 44 people and 48.4 tons of trash every year. Based on the 2018 Waste Characterization Disposal Facility-Based Study, Kings County ranks 38th out of all California counties based on total tons disposed of.

6 - Bureau, US Census. "County Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

Monterey County

Monterey County has shown consistent growth over the last ten years. Graph 4 shows there is a positive upward trend. Data analysis indicates roughly 1,977 people move to Monterey County each year. Over the ten years, there was an increase of 4.6%.



Graph 4. Monterey County Population Growth over the last ten years with trendline [6].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

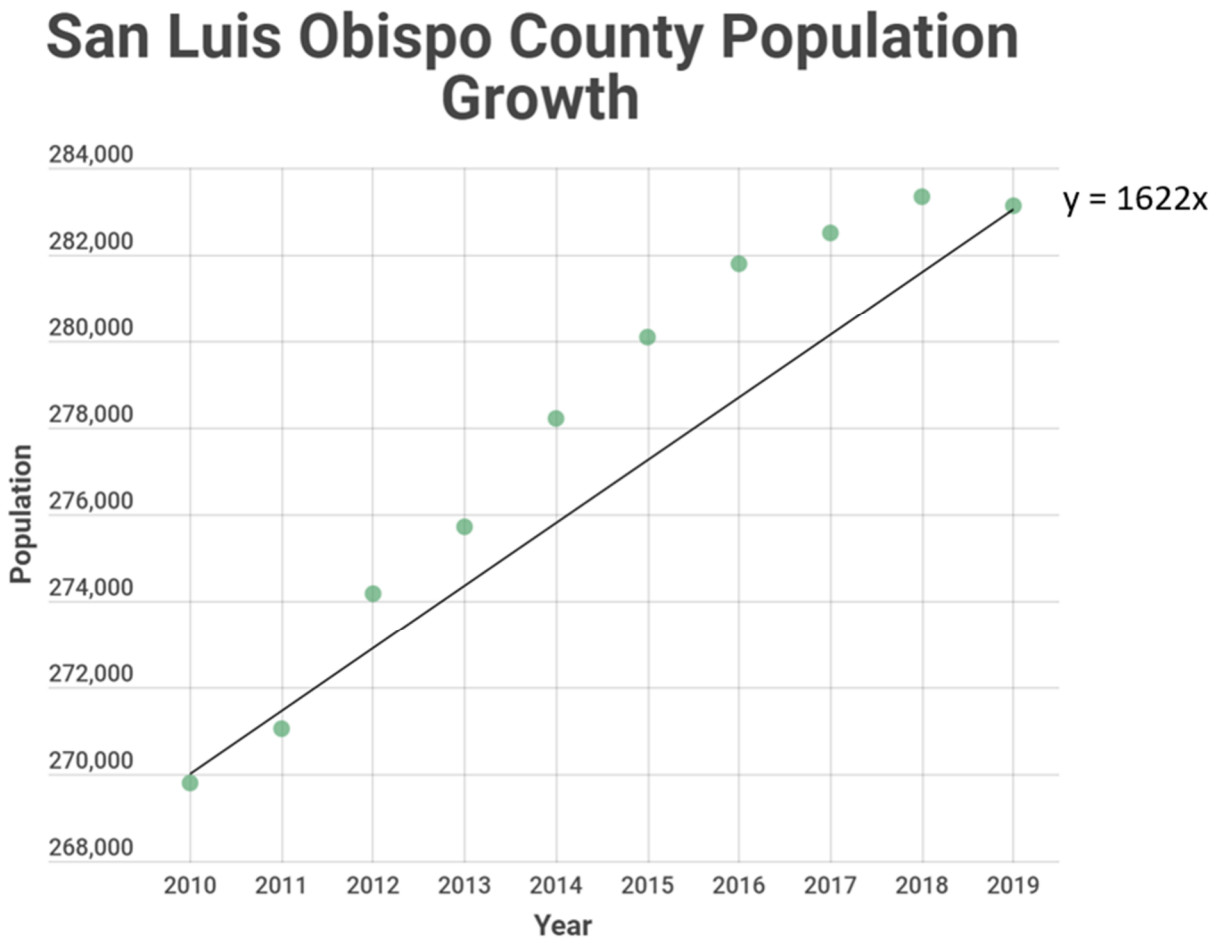
Additional pounds of trash = (1,977 people/year) * (2,200 pounds/year) * 1 year
= 4,349,400 pounds or 2,175 tons

The calculation shows that Monterey County should expect an additional 1,977 people and 2,175 tons of trash every year. Based on the 2018 Waste Characterization Disposal Facility-Based Study, Monterey County ranks 20th out of all California counties based on total tons disposed of.

6 - Bureau, US Census. "County Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

San Luis Obispo County

San Luis Obispo County has shown consistent growth over the last ten years. Graph 5 shows there is a positive upward trend. Data analysis indicates roughly 1,622 people move to San Luis Obispo County each year. Over the ten years, there was an increase of 5.0%.



Graph 5. San Luis Obispo County Population Growth over the last ten years with trendline [6].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

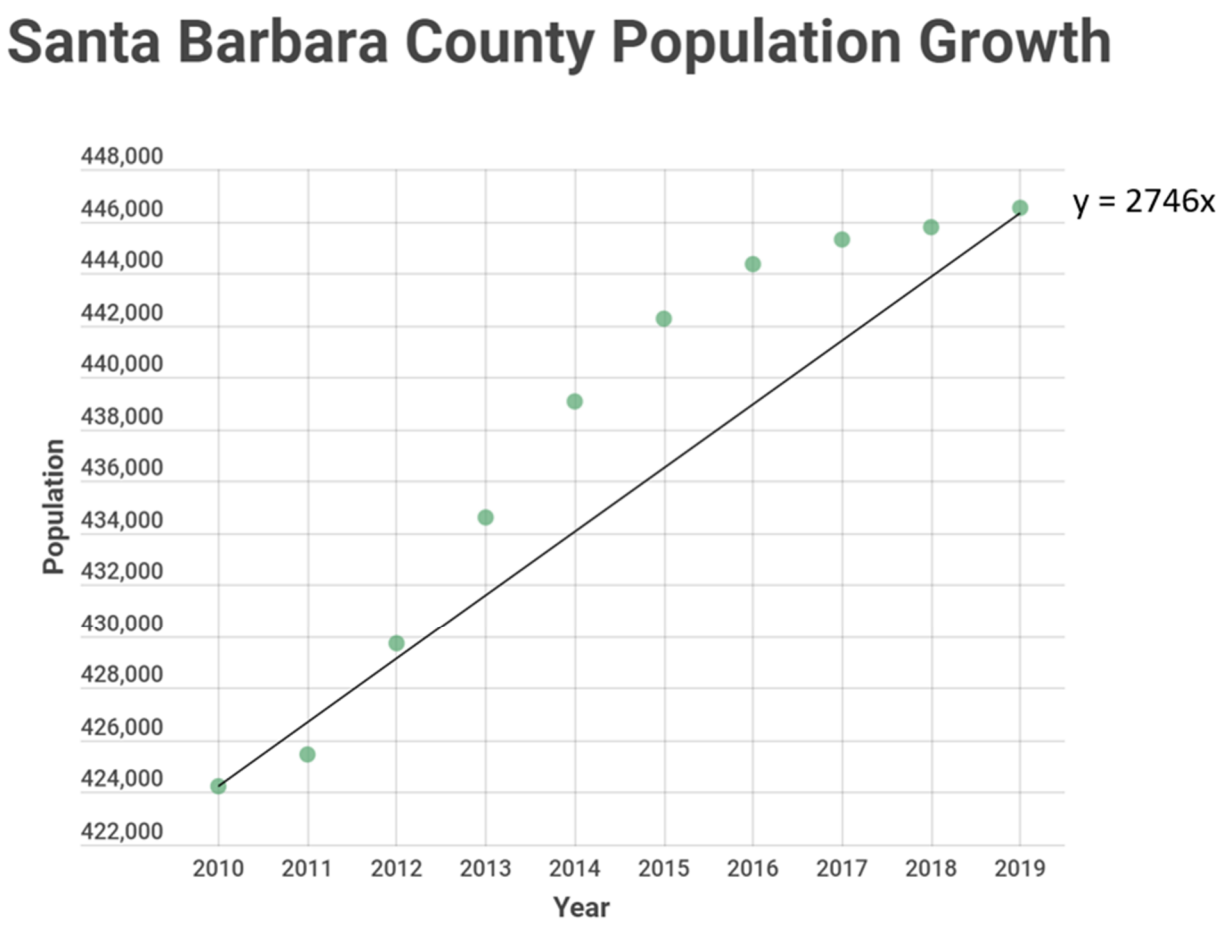
Additional pounds of trash = (1,622 people/year) * (2,200 pounds/year) * 1 year
= 3,568,400 pounds or 1,784 tons

The calculation shows that San Luis Obispo County should expect an additional 1,622 people and 1,784 tons of trash every year. Based on the 2018 Waste Characterization Disposal Facility-Based Study, San Luis Obispo County ranks 23rd out of all California counties based on total tons disposed of.

6 - Bureau, US Census. "County Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

Santa Barbara County

Santa Barbara County has shown consistent growth over the last ten years. Graph 6 shows there is a positive upward trend. Data analysis indicates roughly 2,746 people move to Santa Barbara County each year. Over the ten years, there was an increase of 5.3%.



Graph 6. Santa Barbara County Population Growth over the last ten years with trendline [6].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

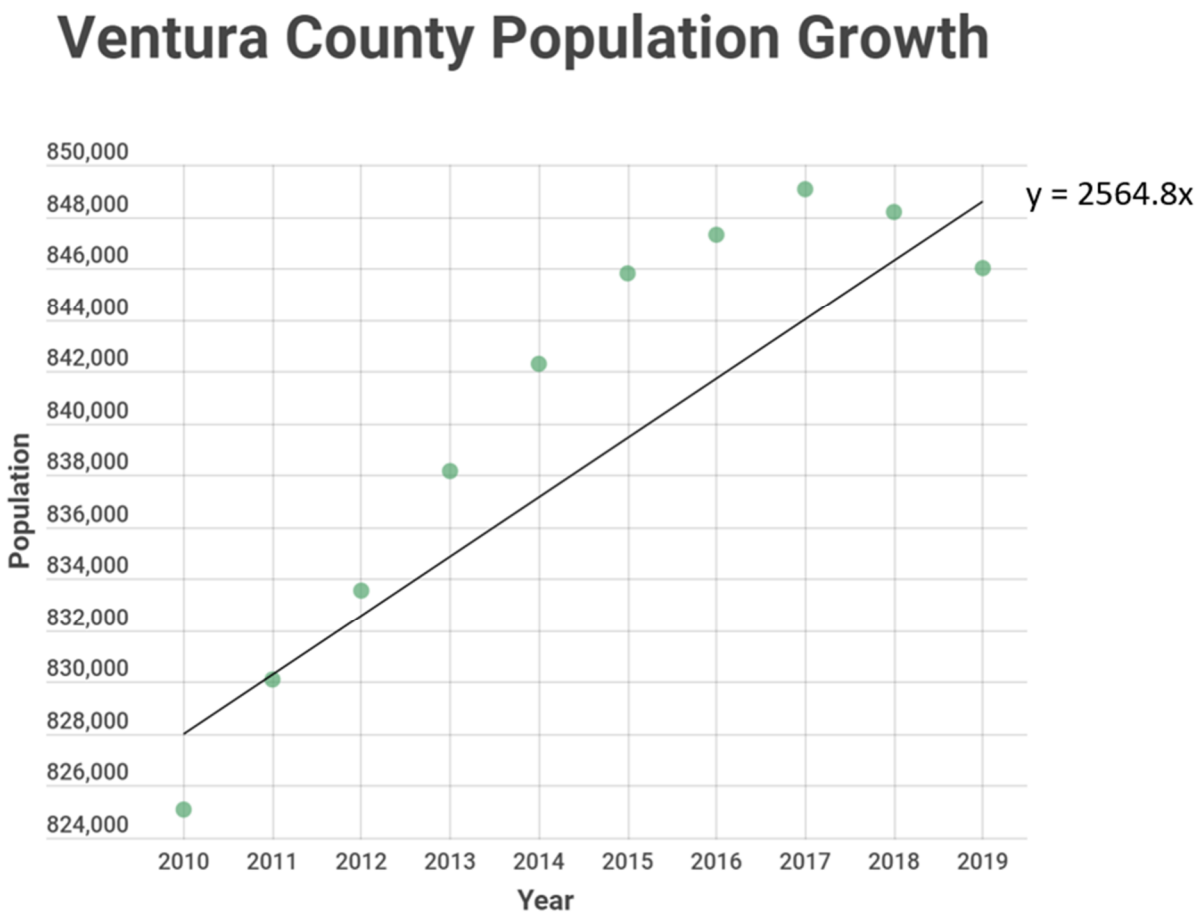
Additional pounds of trash = (2,746 people/year) * (2,200 pounds/year) * 1 year
= 6,041,200 pounds or 3,021 tons

The calculation shows that Santa Barbara County should expect an additional 2,746 people and 3,021 tons of trash every year. Based on the 2018 Waste Characterization Disposal Facility-Based Study, Santa Barbara County ranks 19th out of all California counties based on total tons disposed of.

6 - Bureau, US Census. "County Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

Ventura County

Ventura County has shown consistent growth over the last ten years. Graph 7 shows there is a positive upward trend. Data analysis indicates roughly 2,565 people move to Ventura County each year. Over the ten years, there was an increase of 2.7%.



Graph 7. Ventura County Population Growth over the last ten years with trendline [6].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

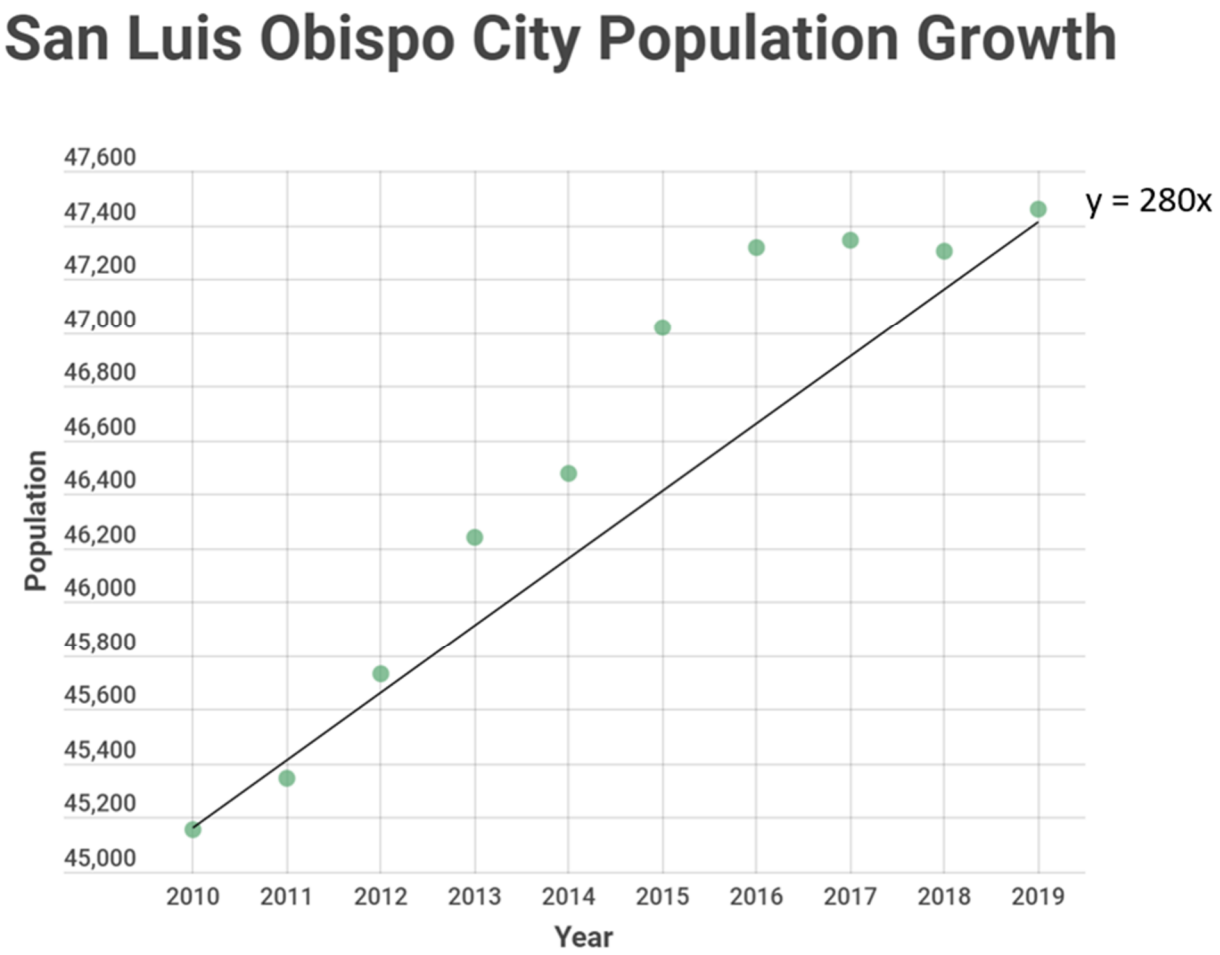
Additional pounds of trash = (2,565 people/year) * (2,200 pounds/year) * 1 year
= 5,643,000 pounds or 2,822 tons

The calculation shows that Ventura County should expect an additional 2,565 people and 2,822 tons of trash every year. Based on the 2018 Waste Characterization Disposal Facility-Based Study, Fresno County ranks 10th out of all California counties based on total tons disposed of.

6 - Bureau, US Census. "County Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html.

San Luis Obispo City

San Luis Obispo has shown consistent growth over the last ten years. Graph 8 shows there is a positive upward trend. Data analysis indicates roughly 280 people move to San Luis Obispo City each year. Over the ten years, there was an increase of 5.1%.



Graph 8. San Luis Obispo County Population Growth over the last ten years with trendline [7].

To calculate the estimated additional tonnage of trash thrown into the landfills, the slope was multiplied by the pounds per year.

Additional pounds of trash = (280 people/year) * (2,200 pounds/year) * 1 year
= 616,000 pounds or 308 tons

The calculation shows that San Luis Obispo should expect an additional 280 people and 308 tons of trash every year.

7 - Bureau, US Census. "City and Town Population Totals: 2010-2019." Census.gov, 8 Oct. 2021, https://www.census.gov/data/tables/time-series/demo/popest/2010s-total-cities-and-towns.html.

Landfills

A landfill is a waste management unit at which waste is discharged in or on land for disposal. The landfill does not include surface impoundment, waste pile, land treatment unit, injection well, or soil amendments [8]. During landfill operations, a scale or weighbridge may weigh waste collection vehicles on arrival, and personnel may inspect loads for wastes that do not accord with the landfill's waste acceptance criteria. Afterward, the waste collection vehicles use the existing road network on their way to the tipping face or working front, where they unload their contents. After loads are deposited, compactors or bulldozers can spread and compact the waste on the working face. Before leaving the landfill boundaries, the waste collection vehicles may pass through a wheel-cleaning facility. If necessary, they return to the weighbridge for re-weighing without their load. The weighing process can assemble statistics on the daily incoming waste tonnage, which databases can retain for record-keeping. In addition to trucks, some landfills may have equipment to handle railroad containers [9].

In 2020, California generated 77.4 million tons of waste. Of the total materials, 52 percent were sent to landfills, 17 percent were exported as recyclables, 12 percent were composted, anaerobically digested or mulched, and another 13 percent were recycled, or source reduced. The remainder went to alternative daily cover, beneficial reuse, transformation, and engineered municipal solid waste [3]. The 40 million tons that went to the landfill consisted mostly of organic, paper, inerts, plastic, other materials, special waste, metal, glass, electronics, and household hazardous waste.

There are forty-six landfills within Fresno, Kern, Kings, Monterey, Santa Barbara, San Luis Obispo, and Ventura counties. Twenty-four are still open, and twenty-two are closed. The closure is the process during which a landfill or disposal site, or a portion thereof, is no longer receiving waste and is being prepared for post-closure maintenance according to an approved plan and construction schedule. When a site is closed, it has ceased accepting waste and has been closed in accordance with applicable statutes, regulations, and local ordinances in effect at the time [8].

Landfills and their locations were studied to pinpoint the regions of California that are most susceptible to pollution. Landfills are being designed bigger than ever to meet the needs of increased trash across the state of California. It is important to see the correlation between large populations and large landfills or smaller populations and smaller landfills.

The capacity of landfills is measured in cubic yards. For this report, the maximum permitted capacity and remaining capacity values were used to study the percentage of capacity still left.

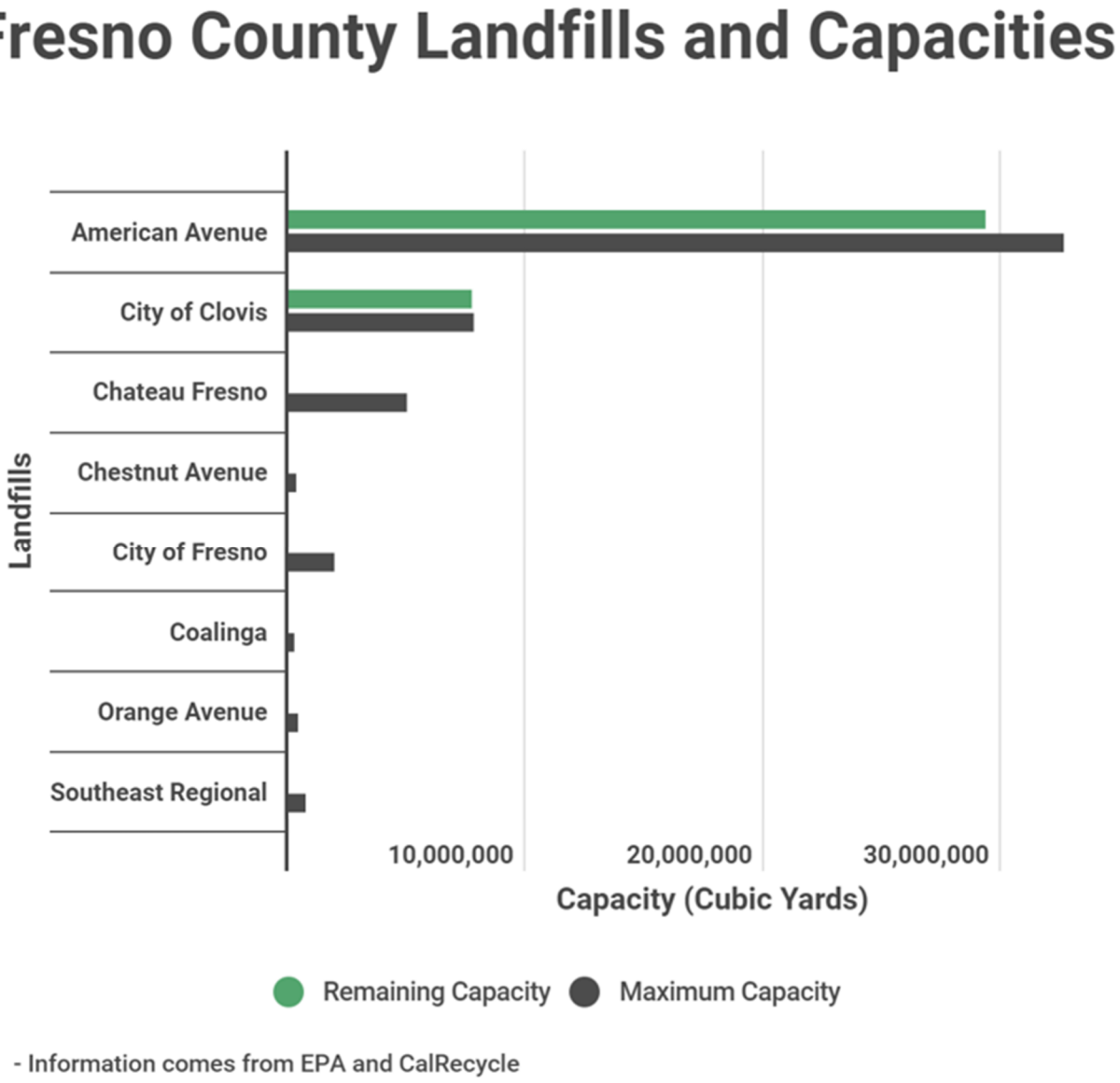
3- Department of Resources Recycling and Recovery. (2020). State of Disposal and Recycling in California Calendar Year 2020. Publication # DRRR-2021-1706. https://www2.calrecycle.ca.gov/Publications/Details/1706

8 - California, State of. Closure/Postclosure of Disposal Sites, CalRecycle, 2018, https://www.calrecycle.ca.gov/swfacilities/closure.

9 - County, Cumberland. "How a Landfill Operates." How a Landfill Operates, Cumberland County, 22 Feb. 2020, http://www.co.cumberland.nc.us/departments/solid-waste-group/solid-waste-management/locations/ann-street-landfill/how-a-landfill-operates.

Fresno County

There are a total of eight landfills in Fresno County [10]. Currently, two are still open and have very large capacities. Graph 9 shows the landfills and their capacities below.



Graph 9. Fresno County Landfills and Capacities

The American Avenue Landfill opened in 1971 and is 440 total acres. With a maximum permit capacity of 32,700,000 cubic yards and throughput of 2,200 tons per day, the landfill is currently at 10% capacity, and its projected closure year is 2044 [11].

10 - U.S, EPA. "Landfill Technical Data." EPA, Environmental Protection Agency, 2021, https://www.epa.gov/lmop/landfill-technical-data

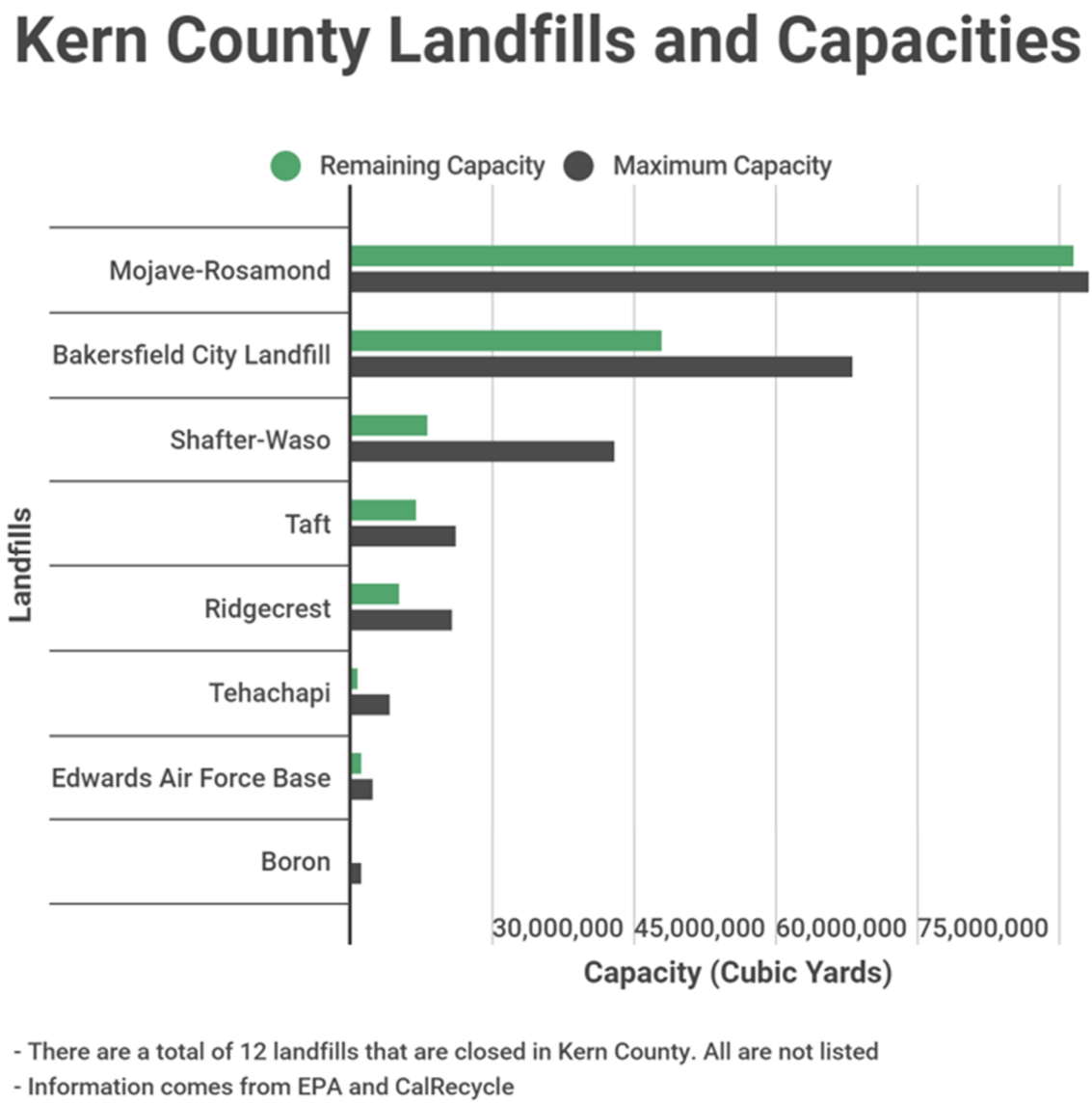
11 - California Department of Resources and Recovery, CalRecycle. "SWIS Facility/Site Activity Details American Avenue Disposal Site (10-AA-0009)." Calrecycle.ca.org, Calrecycle, 2005, https://www2.calrecycle.ca.gov/SolidWaste/Site/Search.

The City of Clovis Landfill opened in 1957 and is 210 total acres. With a maximum permit capacity of 7,800,000 cubic yards and throughput of 2,000 tons per day, the landfill is currently at 1% capacity, and its projected closure year is 2055 [12].

12 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details City Of Clovis Landfill (10-AA-0004).” Calrecycle.ca.org, Calrecycle, 2012, https://www2.calrecycle.ca.gov/SolidWaste/Site/Search.

Kern County

There are a total of twenty landfills in Kern County [10]. Currently, eight are still open and have very large capacities. Graph 10 shows the landfills and their capacities below.



Graph 10. Kern County Landfills and Capacities.

The Mojave-Rosamond Landfill opened in 1973 and is 1,688.5 total acres. With a maximum permit capacity of 78,000,000 cubic yards and throughput of 3,000 tons per day, the landfill is currently at 2% capacity, and its projected closure year is 2123 [13].

10 - U.S, EPA. “Landfill Technical Data.” EPA, Environmental Protection Agency, 2021, https://www.epa.gov/lmop/landfill-technical-data.

13 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Mojave-Rosamond Sanitary Landfill (15-AA-0058).” Calrecycle.ca.org, Calrecycle, 2013, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3892?siteID=706.

The Bakersfield Metropolitan Landfill opened in 1992 and is 2,285 total acres. With a maximum permit capacity of 53,000,000 cubic yards and throughput of 4,500 tons per day, the landfill is currently at 38% capacity, and its projected closure year is 2045 [14].

The Shafter-Wasco Landfill opened in 1972 and is 357.5 total acres. With a maximum permit capacity of 27,895,179 cubic yards and throughput of 1,500 tons per day, the landfill is currently at 72% capacity and its projected closure year is 2056 [15].

The Taft Recycling and Sanitary Landfill opened in 1972 and is 171.9 total acres. With a maximum permit capacity of 11,000,000 cubic yards and throughput of 800 tons per day, the landfill is currently at 37% capacity, and its projected closure year is 2064 [16].

The Ridgecrest Recycling and Sanitary Landfill opened in 1969 and is 320 total acres. With a maximum permit capacity of 10,500,000 cubic yards and throughput of 701 tons per day, the landfill is currently at 52% capacity, and its projected closure year is 2042 [17].

The Tehachapi Sanitary Landfill opened in 1973 and is 239.8 total acres. With a maximum permit capacity of 4,000,000 cubic yards and throughput of 1,000 tons per day, the landfill is currently at 87% capacity, and its projected closure year is 2021 [18].

The Edwards Air Force Base-Main Base Landfill is 137 total acres. With a maximum permit capacity of 2,250,000 cubic yards and throughput of 120 tons per day, the landfill is currently at 52% capacity, and its projected closure year is 2021 [19].

The Boron Landfill opened in 1973 and is 120.2 total acres. With a maximum permit capacity of 1,057,000 cubic yards and throughput of 200 tons per day, the landfill is currently at 82% capacity, and its projected closure year is 2048 [20].

14 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Bakersfield Metropolitan (Bena) SLF (15-AA-0273).” Calrecycle.ca.org, Calrecycle, 2013, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3931?siteID=742.

15 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Shafter-Wasco Recycling & Sanitary LF (15-AA-0057).” Calrecycle.ca.org, Calrecycle, 2001, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3891?siteID=705.

16 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Taft Recycling & Sanitary Landfill (15-AA-0061).” Calrecycle.ca.org, Calrecycle, 2019, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3895?siteID=709.

17 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Ridgecrest Recycling & Sanitary Landfill (15-AA-0059).” Calrecycle.ca.org, Calrecycle, 2010, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3893?siteID=707.

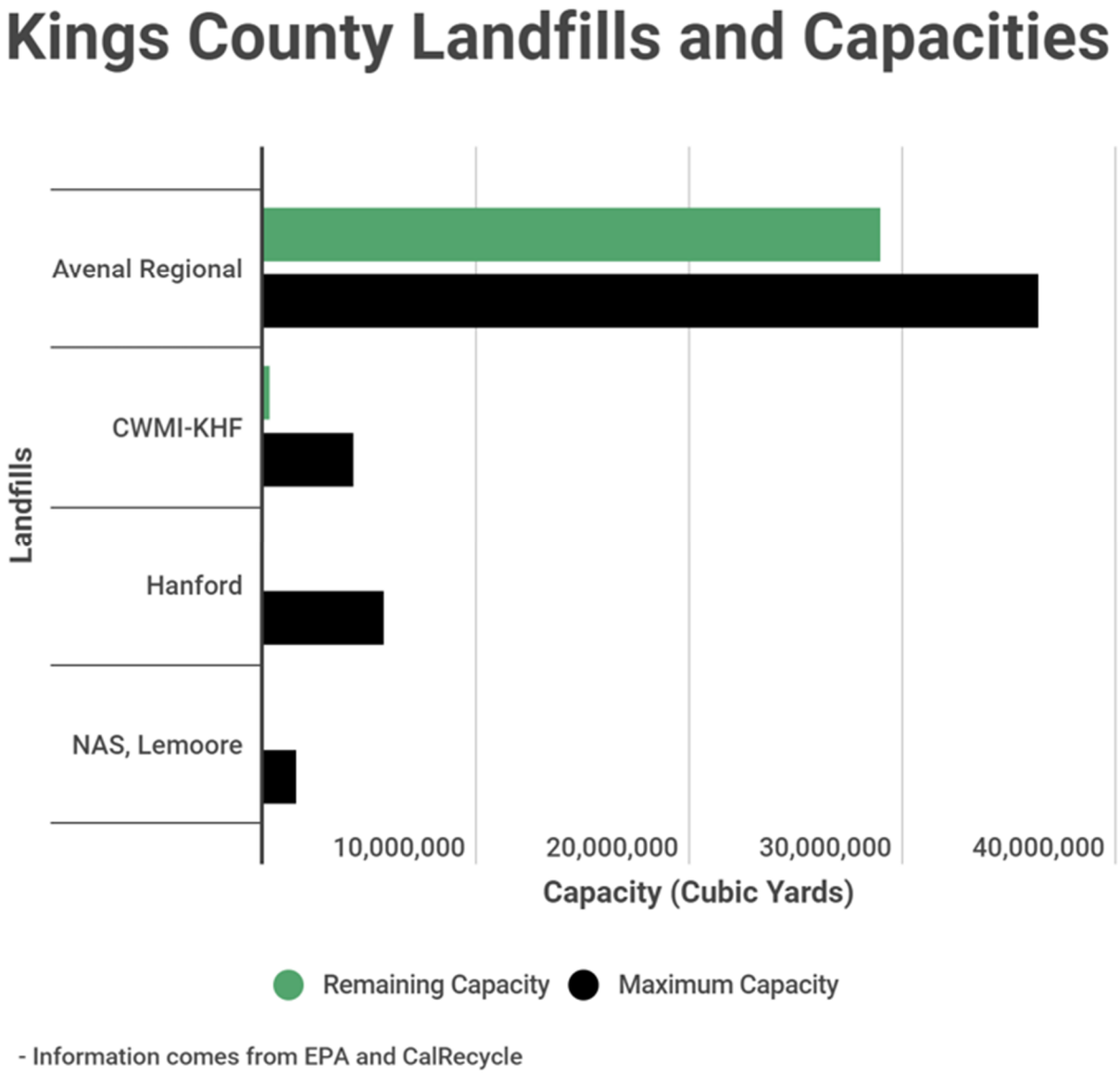
18 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Tehachapi Sanitary Landfill (15-AA-0062).” Calrecycle.ca.org, Calrecycle, 2013, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3896?siteID=710.

19 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Main Base Sanitary Landfill, Edwards AFB (15-AA-0150).” Calrecycle.ca.org, Calrecycle, 2001, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3910?siteID=723.

20 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Boron Sanitary Landfill (15-AA-0045).” Calrecycle.ca.org, Calrecycle, 2019, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3880?siteID=694.

Kings County

There are a total of four landfills in Kings County [10]. Currently, two are still open and have very large capacities. Graph 11 shows the landfills and their capacities below.



Graph 11. Kings County Landfills and Capacities.

The Avenal Regional Landfill opened in 1976 and is 173 total acres. With a maximum permit capacity of 36,300,000 cubic yards and throughput of 6,000 tons per day, the landfill is currently at 20% capacity, and its projected closure year is 2108 [21].

The CWMI – KHF (MSW Landfill B-19) Landfill opened in 1998 and is 1,600 total acres. With a maximum permit capacity of 4,200,000 cubic yards and throughput of 2,000 tons per day, the landfill is currently at 93% capacity, and its projected closure year is 2081 [22].

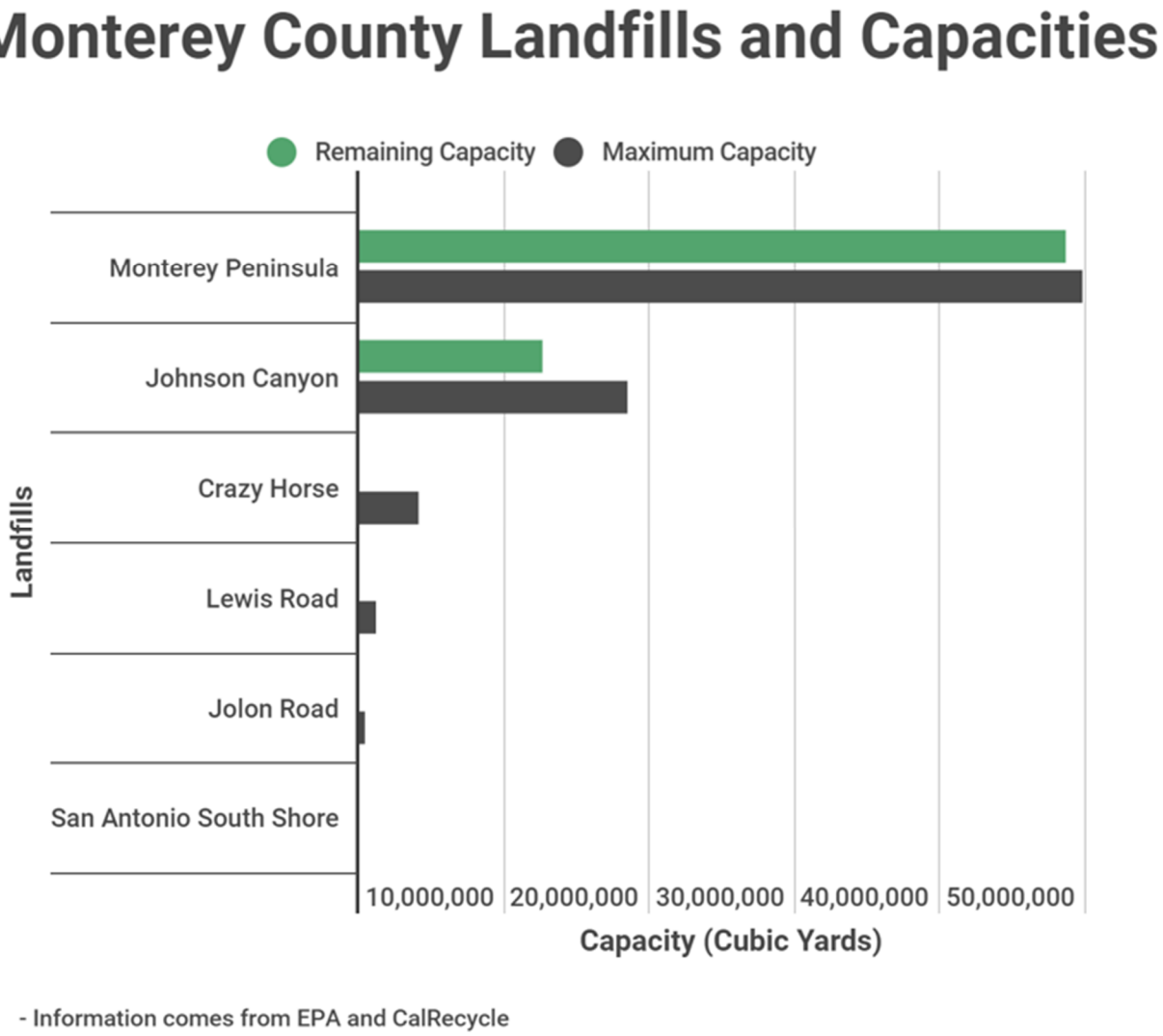
10 - U.S, EPA. “Landfill Technical Data.” EPA, Environmental Protection Agency, 2021, https://www.epa.gov/lmop/landfill-technical-data.

21 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Avenal Regional Landfill (16-AA-0004).” Calrecycle.ca.org, Calrecycle, 2020, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3755?siteID=898.

22 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details CWMI, KHF (MSW Landfill B-19) (16-AA-0021).” Calrecycle.ca.org, Calrecycle, 2013, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/3769?siteID=912.

Monterey County

There are a total of six landfills in Monterey County [10]. Currently, two are still open and have very large capacities. Graph 12 shows the landfills and their capacities below.



Graph 12. Monterey County Landfills and Capacities.

The Monterey Peninsula Landfill opened in 1966 and is 466.6 total acres. With a maximum permit capacity of 49,700,000 cubic yards and throughput of 3,500 tons per day, the landfill is currently at 2% capacity, and its projected closure year is 2132 [23].

The Johnson Canyon Sanitary Landfill opened in 1934 and is 163 total acres. With a maximum permit capacity of 18,500,000 cubic yards and throughput of 1,694 tons per day, the landfill is currently at 32% capacity, and its projected closure year is 2042 [24].

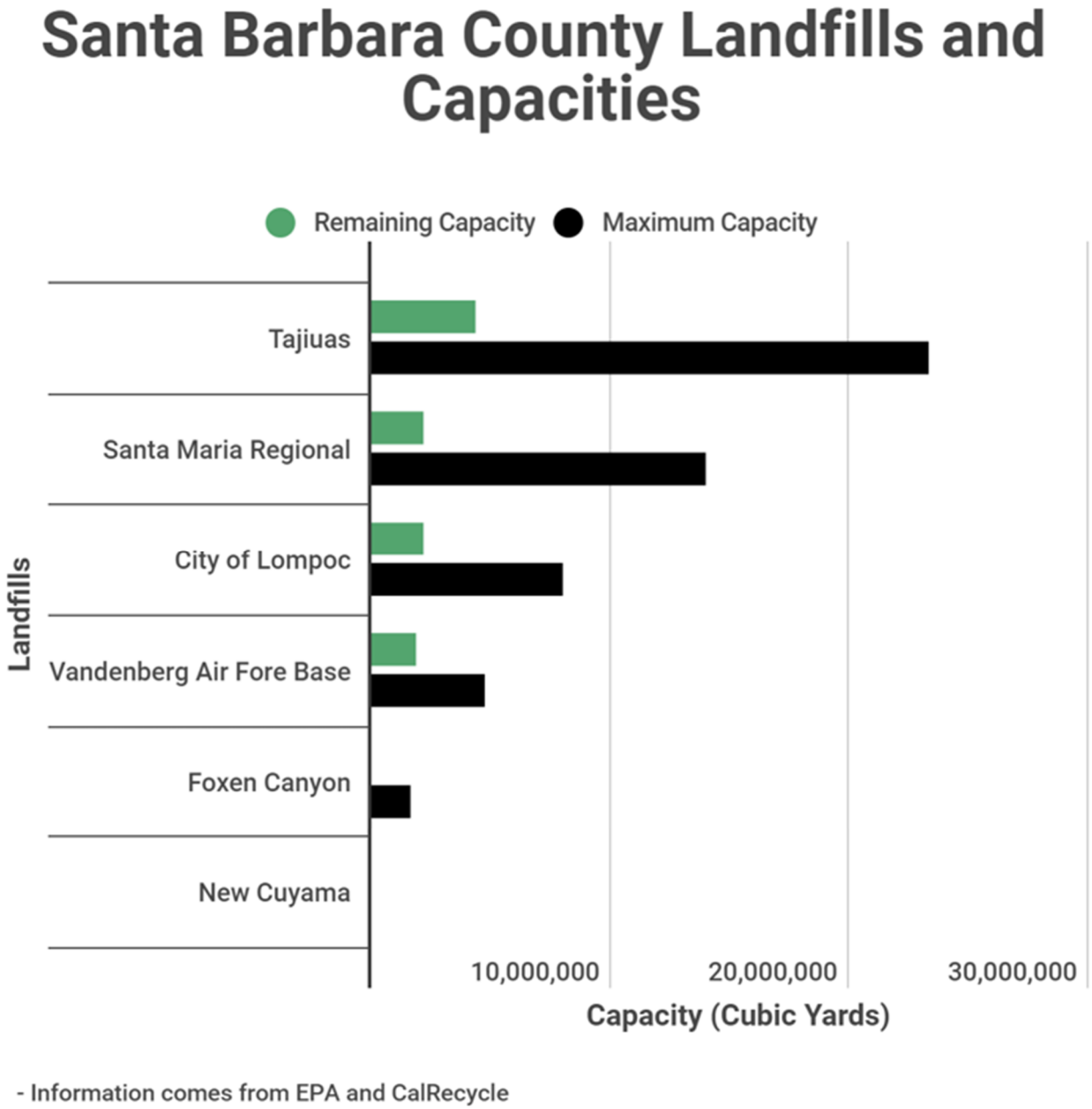
10 - U.S, EPA. “Landfill Technical Data.” EPA, Environmental Protection Agency, 2021, https://www.epa.gov/lmop/landfill-technical-data.

23 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Monterey Peninsula Landfill (27-AA-0010).” Calrecycle.ca.org, Calrecycle, 2004, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/2642?siteID=1976.

24 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Johnson Canyon Sanitary Landfill (27-AA-0005).” Calrecycle.ca.org, Calrecycle, 2021, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/2636?siteID=1971.

Santa Barbara County

There are a total of six landfills in Santa Barbara County [10]. Currently, four are still open and have very large capacities. Graph 13 shows the landfills and their capacities below.



Graph 13. Santa Barbara County Landfills and Capacities.

The Tajiuas Sanitary Peninsula Landfill opened in 1967 and is 357 total acres. With a maximum permit capacity of 23,300,000 cubic yards and throughput of 1,500 tons per day, the landfill is currently at 81% capacity, and its projected closure year is 2036 [25].

10 - U.S, EPA. “Landfill Technical Data.” EPA, Environmental Protection Agency, 2021, https://www.epa.gov/lmop/landfill-technical-data.

25 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Tajiguas Res Rec Proj & Sanitary LF (42-AA-0015).” Calrecycle.ca.org, Calrecycle, 2016, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1252?siteID=3283.

The Santa Maria Regional Landfill opened in 1955 and is 290.9 total acres. With a maximum permit capacity of 13,998,400 cubic yards and throughput of 858 tons per day, the landfill is currently at 84% capacity, and its projected closure year is 2027 [26].

The City of Lompoc Landfill opened in 1961 and is 115 total acres. With a maximum permit capacity of 7,970,000 cubic yards and throughput of 400 tons per day, the landfill is currently at 73% capacity, and its projected closure year is 2045 [27].

The Vandenberg Air Force Base Landfill opened in 1941 and is 217 total acres. With a maximum permit capacity of 4,721,017 cubic yards and throughput of 400 tons per day, the landfill is currently at 60% capacity, and its projected closure year is 2064 [28].

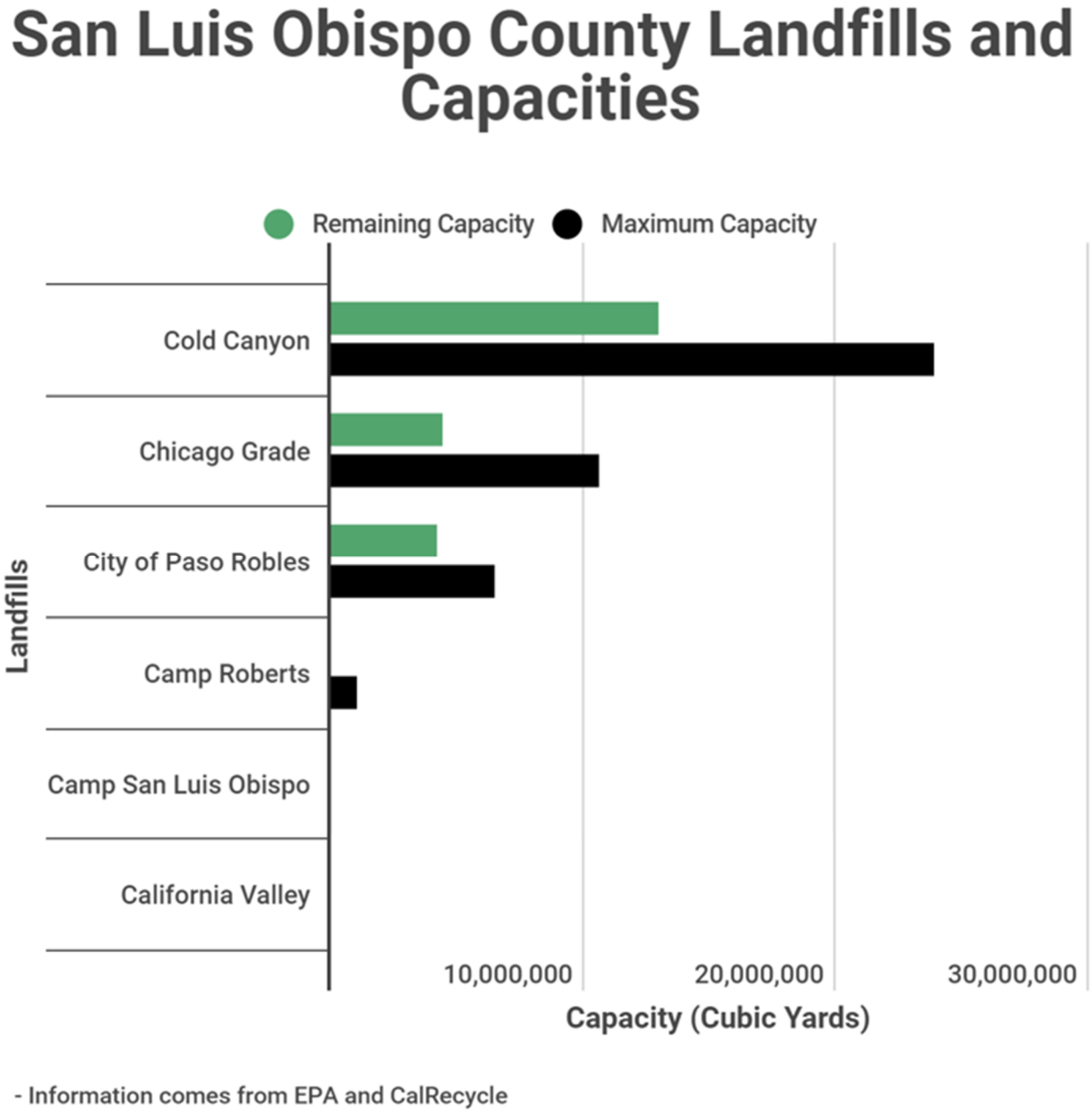
26 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Santa Maria Regional Landfill (42-AA-0016).” Calrecycle.ca.org, Calrecycle, 2018, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1253?siteID=3284.

27 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details City Of Lompoc Sanitary Landfill (42-AA-0017).” Calrecycle.ca.org, Calrecycle, 2006, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1254?siteID=3285.

28 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Vandenberg AFB Landfill (42-AA-0012).” Calrecycle.ca.org, Calrecycle, 2014, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1249?siteID=3280.

San Luis Obispo County

There are a total of six landfills in San Luis Obispo County [10]. Currently, four are still open and have very large capacities. Graph 14 shows the landfills and their capacities below.



Graph 14. Santa Barbara County Landfills and Capacities.

The Cold Canyon Landfill opened in 1965 and is 209 total acres. With a maximum permit capacity of 23,900,000 cubic yards and throughput of 1,650 tons per day, the landfill is currently at 46% capacity, and its projected closure year is 2080 [29].

10 - U.S, EPA. “Landfill Technical Data.” EPA, Environmental Protection Agency, 2021, https://www.epa.gov/lmop/landfill-technical-data.

29 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Cold Canyon Landfill, Inc. (40-AA-0004).” Calrecycle.ca.org, Calrecycle, 2020, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1509?siteID=3171.

The Chicago Grade Landfill opened in 1970 and is 188 total acres. With a maximum permit capacity of 10,600,000 cubic yards and throughput of 500 tons per day, the landfill is currently at 58% capacity, and its projected closure year is 2039 [30].

The City of Paso Robles Landfill opened in 1970 and is 80 total acres. With a maximum permit capacity of 6,495,000 cubic yards and throughput of 450 tons per day, the landfill is currently at 35% capacity, and its projected closure year is 2051 [31].

The Camp Roberts Solid Waste Disposal Landfill opened in 1989 and is 85.4 total acres. With a maximum permit capacity of 1,004,579 cubic yards and throughput of 618 tons per day, the landfill is currently at 55% capacity, and its projected closure year is 2031 [32].

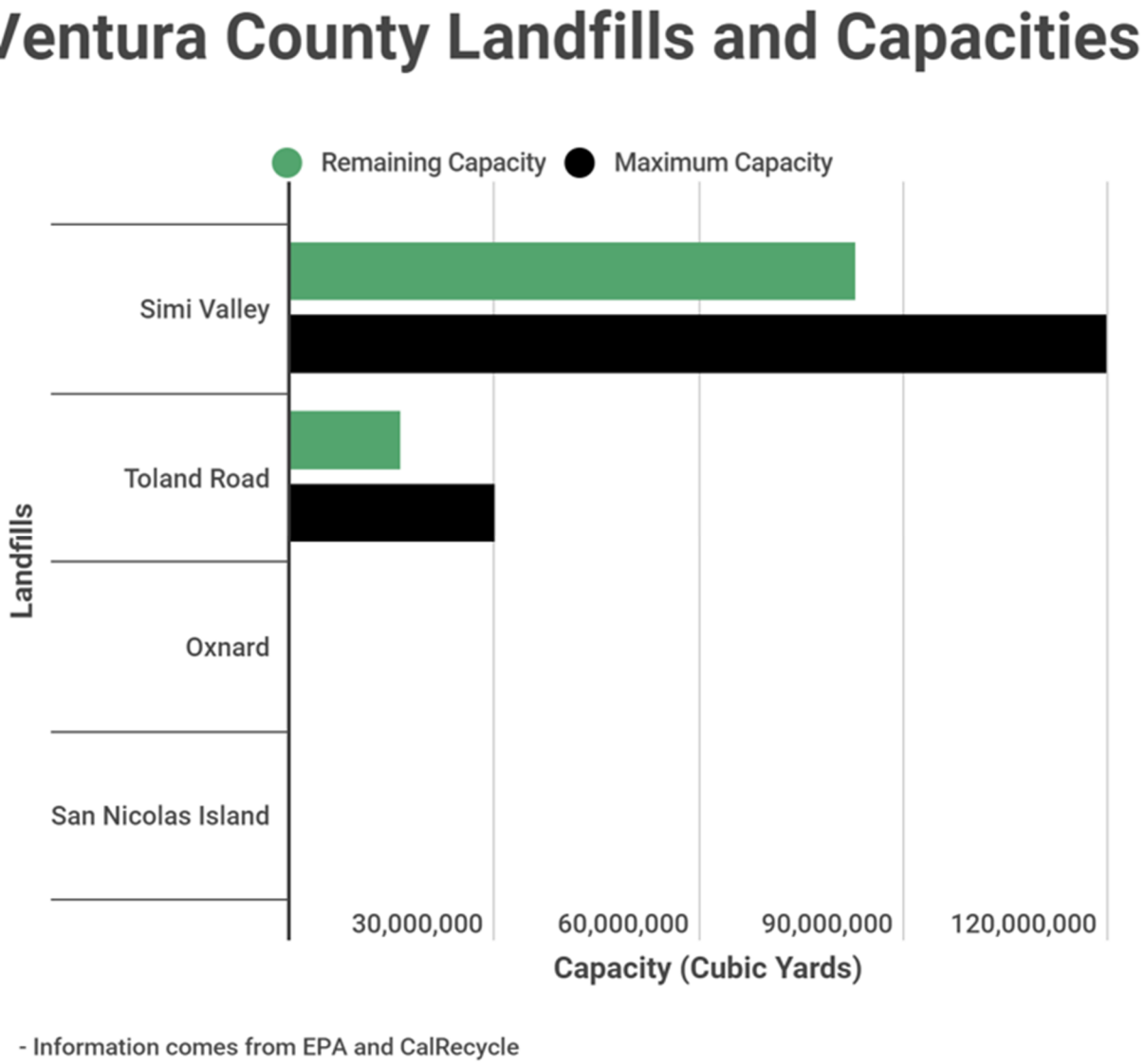
30 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Chicago Grade Landfill (40-AA-0008).” Calrecycle.ca.org, Calrecycle, 2011, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1512?siteID=3174.

31 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details City Of Paso Robles Landfill (40-AA-0001).” Calrecycle.ca.org, Calrecycle, 2017, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1506?siteID=3168.

32 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Camp Roberts Landfill (40-AA-0002).” Calrecycle.ca.org, Calrecycle, 2015, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1507?siteID=3169.

Ventura County

There are a total of four landfills in Ventura County [10]. Currently, two are still open and have very large capacities. Graph 15 shows the landfills and their capacities below.



Graph 15. Santa Barbara County Landfills and Capacities.

The Simi Valley Landfill opened in 1970 and is 887 total acres. With a maximum permit capacity of 119,600,000 cubic yards and throughput of 64,750 tons per day, the landfill is currently at 31% capacity, and its projected closure year is 2063 [33].

The Toland Road Landfill opened in 1970 and is 216.5 total acres. With a maximum permit capacity of 30,000,000 cubic yards and throughput of 2864 tons per day, the landfill is currently at 46% capacity, and its projected closure year is 2027 [34].

10 - U.S, EPA. “Landfill Technical Data.” EPA, Environmental Protection Agency, 2021, https://www.epa.gov/lmop/landfill-technical-data.

33 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Simi Valley Landfill & Recycling Center (56-AA-0007).” Calrecycle.ca.org, Calrecycle, 2019, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/608?siteID=3954.

34 - California Department of Resources and Recovery, CalRecycle. “SWIS Facility/Site Activity Details Toland Road Landfill (56-AA-0005),” Calrecycle.ca.org, Calrecycle, 2011, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/606?siteID=3952.

Recycling Mandates

The mandates provided are specific to recycling trash generated by residents and construction and demolition materials in California from 2010 to the present. They do not include legislature associated with funding. All Assembly and State Bills are located on CalRecycle's website. See 36 for 2010 to 2014, 37 for 2015 to 2019, and 38 for 2020 in the Bibliography section.

1998

AB 939, known as the Integrated Waste Management Act, was passed because of the increase in the waste stream and the decrease in landfill capacity. As a result, the current California Integrated Waste Management Board (CIWMB) was established. A disposal reporting system with CIWMB oversight was established, and facility and program planning was required. AB 939 mandates a reduction of waste being disposed: jurisdictions were required to meet diversion goals of 25% by 1995 and 50% by the year 2000. AB 939 also established an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance [35].

2002

Chapter 501, Statutes of 2002 (Kuehl, SB 1374) seeks to assist jurisdictions with diverting their construction and demolition (C&D) waste material, primarily focusing on CalRecycle developing and adopting a model C&D diversion ordinance by March 1, 2004, for voluntary use by California jurisdictions. This bill would require the board, not later than March 1, 2004, after holding a public hearing, to adopt one or more model ordinances suitable for modification by any local agency, that the agency may adopt that will require a range of diversion rates of construction and demolition waste materials from landfills from 50 to 75%, as determined by the board [36].

2010

AB 1343 (Huffman)--Architectural Paint: Recovery Program. Creates a product stewardship program for architectural paint, which requires manufacturers to develop and implement a program to collect, transport, and process postconsumer paint to reduce the public costs and environmental impacts of the management of postconsumer paint in California. The bill further requires CalRecycle to administer the program, approve and disapprove plans, and provide oversight to ensure a level playing field among manufacturers. (Chapter 420)

AB 2398 (Perez)--Product Stewardship: Carpet. Creates a product stewardship program for carpet and requires a manufacturer or product stewardship organization acting on behalf of a manufacturer(s), to establish and submit to CalRecycle a product stewardship plan aimed at increasing the amount of carpet diverted from landfills and recycled into secondary products. (Chapter 681)

35 - County, El Dorado. "Environmental Management." The Integrated Waste Management Act AB 939, n.d., https://www.edcgov.us/Government/emd/solidwaste/pages/the_integrated_waste_management_act_ab_939.aspx.

36 - California, Legislative Information. "Senate Bill No. 1374." Bill Text - SB-1374 Solid Waste: Construction and Demolition Waste Materials: Diversion Requirements: Model Ordinance., n.d., https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200120020SB1374.

37 - California, State of. "History of California Solid Waste Law." History of California Solid Waste Law, 2010-2014, CalRecycle, 5 Sept. 2018, https://www.calrecycle.ca.gov/Laws/Legislation/CalHist/2010to2014/.

SB 228 (DeSaulnier)--Plastic Bags: Compostable Plastic Bags. Requires manufacturers of compostable plastic bags meeting specific American Society for Testing Materials (ASTM) standards to ensure the bag are easily identifiable from other bags. (Chapter 406)

2011

AB 341 (Chesbro)--Solid waste: Diversion. AB 341 (1) requires CalRecycle to issue a report to the Legislature that includes strategies and recommendations that would enable the state to divert *75 percent of the solid waste generated in the state from disposal by January 1, 2020*; (2) requires businesses that meet specified thresholds in the bill to arrange for recycling services by January 1, 2012; (3) streamlines the amendment process for non-disposal facility elements, by allowing changes without review and comment from a local task force; and (4) allows a solid waste facility to modify their existing permit, instead of having to undergo a permit revision, under specified circumstances. (Chapter 476)

AB 525 (Gordon)--Solid Waste: Architectural Paint Recycling Program. Establishes the Architectural Paint Stewardship Account and the Architectural Paint Stewardship Penalty Subaccount in the Integrated Waste Management Fund. (Chapter 573)

AB 818 (Blumenfield)--Solid Waste: Multifamily: Dwellings. Requires the owner of a multifamily dwelling that contains five or more living units to arrange for recycling services. (Chapter 279)

SB 567 (DeSaulnier)--Recycling: Plastic Products. Expands the scope of plastic products currently subject to a sales prohibition if environmental claims are not consistent with specific American Society for Testing and Materials Standards. (Chapter 594)

SB 909 (La Malfa)--Treated Wood Waste: Disposal. Requires that an Internet web site and toll-free number be added to the point-of-display posting required of wholesalers and retailers of treated wood and treated wood-like products. (Chapter 601)

2012

AB 837 (Nestande)--Plastic Products. Places the onus to substantiate the environmental marketing claim of a plastic food container product on the manufacturer or supplier of that product. This requirement would sunset on January 1, 2018. (Chapter 525)

AB 845 (Ma)--Solid Waste. Prevents a local entity from restricting or placing limits on the importation of solid waste into a privately-owned, solid waste facility based on place of origin. (Chapter 526)

AB 1181 (Butler)--Weights and Measures. Prohibits a person who is purchasing a commodity (including beverage containers) to pay the seller less than the highest applicable price represented by the purchaser to the seller for that commodity or less than a price per unit that is established by law or regulation. (Chapter 662)

37 - California, State of. “History of California Solid Waste Law.” History of California Solid Waste Law, 2010-2014, CalRecycle, 5 Sept. 2018, https://www.calrecycle.ca.gov/Laws/Legislation/CalHist/2010to2014/.

38 - California, State of. “History of California Solid Waste Law.” History of California Solid Waste Law, 2015-2019, 5 Oct. 2020, https://www.calrecycle.ca.gov/Laws/Legislation/CalHist/2015to2019.

AB 1647 (Gordon)--Waste Tires. Strengthens CalRecycle's enforcement against illegal waste tire facilities and waste tire haulers, while streamlining the hearing process against noncompliant waste tire facilities or haulers by authorizing the department to utilize informal administrative hearings. (Chapter 534)

2013

AB 513 (Frazier)--Tire Recycling Program: Rubberized Asphalt Concrete. Requires the Department of Resources Recycling and Recovery to award rubberized asphalt concrete grants for local public works projects, disability access projects at parks and Class I Bikeways. (Chapter 499

AB 1398 (Pavley)--Solid Waste: Recycling: Enforcement Agencies. Clarifies the ambiguity in existing law that governs the responsibilities between the Department of Resources Recycling and Recovery and local enforcement agencies. Also deletes and incorrect cross reference and revises the definition of the term commercial solid waste to include all types of solid waste generated by a commercial entity or multifamily dwelling. (Chapter 509)

SB 254 (Hancock)--Solid Waste: Used Mattresses: Recycling and Recovery. Establishes a statewide mattress recycling program to be developed, implemented, and administered by a single mattress recycling organization comprised of manufacturers, renovators, and retailers. (Chapter 388)

2014

AB 1594 (Williams)--Waste Management. Provides that the use of green material as alternative daily cover is disposal and does not constitute diversion through recycling. (Chapter 719)

AB 2355 (Levine)--Local Agencies: Streets and Highways: Recycled Materials. Requires a local agency that has jurisdiction over a street or highway to either adopt the standards developed by Transportation for recycled paving materials or discuss failed standards at a regularly scheduled public hearing. (Chapter 609)

SB 270 (Padilla)--Solid Waste: Single-Use Carryout Bags. Prohibits a retail establishment from providing a single-use carryout bag to a customer at the point of sale SB 270 allows recycled paper bags, compostable plastic bags, or reusable bags to be made available for purchase. (Chapter 850)

2015

AB 888 (Bloom, Chapter 594, Statutes of 2015) Waste Management: Plastic Microbeads. Prohibits the selling of personal care products containing plastic microbeads in California.

37 - California, State of. "History of California Solid Waste Law." History of California Solid Waste Law, 2010-2014, CalRecycle, 5 Sept. 2018, https://www.calrecycle.ca.gov/Laws/Legislation/CalHist/2010to2014/.

38 - California, State of. "History of California Solid Waste Law." History of California Solid Waste Law, 2015-2019, 5 Oct. 2020, https://www.calrecycle.ca.gov/Laws/Legislation/CalHist/2015to2019.

AB 901 (Gordon, Chapter 746, Statutes of 2015) Solid Waste: Reporting Requirements: Enforcement. Updates recycling and composting reporting requirements and provides enforcement authority for those requirements and existing disposal reporting requirements.

SB 162 (Galgiani, Chapter 351, Statutes of 2015) Treated Wood Waste. Requires the wood preserving industry to provide certain information relating to the potential danger of treated wood to wholesalers and retailers of treated wood and wood-like products.

2016

AB 1419 (Eggman, Chapter 445, Statutes of 2016) Hazardous Waste: Cathode Ray Tube Glass. (1) Changes statutory definitions of cathode ray tube components; (2) states CRT panel glass exceeding specified concentration levels for barium is not a hazardous waste if certain criteria are met; (3) establishes specific end-uses for CRT panel glass that is recycled and meets certaincriteria, and; (4) provides the Department of Toxic Substances Control authority to prohibit any of the end-uses listed in the bill if those uses are subsequently determined to pose environmental or public harm.

AB 2153 (Garcia, Chapter 666, Statutes of 2016) The Lead-Acid Battery Recycling Act of 2016. Creates numerous requirements related to lead-acid batteries. Among the major provisions, the bill: (1) starting in April 2017 places a $1 fee on consumers and a $1 fee on manufacturers for the sale of a lead-acid battery; (2) starting in 2022 increases the consumer fee to $2 and eliminates the manufacturers' fee responsibility; (3) creates the Lead-Acid Battery Cleanup Fund, to be used by DTSC for clean-up costs associated with lead-acid battery contamination, including the repayment of a general fund loan for cleanup costs associated with Exide's battery recycling facility in Vernon; (4) requires dealers to charge a consumer a refundable deposit on the sale of new lead-acid batteries if a used lead-acid battery is not returned by the consumer at the time of sale; (5) allows dealers to keep the deposit if a consumer fails to return a used lead-acid battery within 45 days; (6) credits manufacturers the amount that they have paid into the Lead-Acid Battery Cleanup Fund against future liability judgements; 7) authorizes a loan of $1.2 million from the California Tire Recycling Management Fund to the Board of Equalization (board) for fee collection costs and requires repayment of the loan by October 1, 2017.

AB 2812 (Gordon, Chapter 530, Statutes of 2016) Solid Waste: Recycling: State Agencies and Large State Facilities. Requires CalRecycle to provide guidance for collecting and recycling recyclable materials in office buildings of state agencies and large state facilities.

2017

SB 458 (Wiener, Chapter 648, Statutes of 2017) Beverage container recycling: pilot projects. Authorized CalRecycle to approve up to five pilot projects, proposed by local governments, with the intent of providing convenient beverage container redemption opportunities in unserved convenience zones.

AB 906 (Bloom, Chapter 823, Statutes of 2017) Beverage containers: polyethylene terephthalate. Clarified the chemical composition and melting point of polyethylene terephthalate (PET) to

exclude certain derivatives, such as polyethylene terephthalate monoethylene glycol (PETG) from being included in the same Resin Identification Code.

2018

SB 720 (Allen, Chapter 374, Statutes of 2018) Environmental Education: Environmental Principles and Concepts. (1) Stated the intent of the Legislature that environmental literacy constitutes an important curriculum content area; (2) provided strategies for the Superintendent of Public Instruction to improve statewide environmental literacy; and, (3) clarified the process for the Office of Education and the Environment, within CalRecycle, to update the Environmental Principles and Concepts.

SB 1335 (Allen, Chapter 610, Statutes of 2018) Solid waste: food service packaging: state agencies, facilities, and property. (1) Beginning January 1, 2021, prohibited a food service facility, located within a state-owned facility, from dispensing prepared, ready-to-eat food or beverages that are not packaged in a reusable, recyclable, or compostable manner, as prescribed by CalRecycle; (2) Required CalRecycle to adopt regulations to determine allowable food service packaging and publish a list of approved food service packaging within 90 days of adopting the regulations.

AB 2493 (Bloom, Chapter 715, Statutes of 2018) Beverage container recycling: recycling centers and payments. Authorized CalRecycle to issue payments electronically within the California Beverage Container Recycling Program and altered operational and payment requirements for recycling centers that utilize reverse vending machines (RVMs) or other unmanned automated equipment.

2019

AB 827 (McCarty, Chapter 441, Statutes of 2019) Solid waste: commercial and organic waste: recycling bins. (1) Required commercial waste and organic waste generators, as defined by the Integrated Waste Management Act, to provide recycling and organic waste bins to customers; (2) provided an exemption from these requirements to full-service restaurants; and, (3) required CalRecycle to develop model signage by July 1, 2020.

2020

AB 793 (Ting & Irwin, Chapter 115, Statutes of 2020) Recycling: plastic beverage containers: minimum recycled content. Required beverage manufacturers to utilize minimum percentages of post-consumer recycled plastic (minimum recycled content) for all plastic beverage containers subject to the California Refund Value (CRV). The minimum recycled content requirement will increase from 15 percent on January 1, 2022, to 25 percent on January 1, 2025, to 50 percent on January 1, 2030.

38 - California, State of. “History of California Solid Waste Law.” History of California Solid Waste Law, 2015-2019, 5 Oct. 2020, https://www.calrecycle.ca.gov/Laws/Legislation/CalHist/2015to2019.

39 - California, State of. “History of California Solid Waste Law.” History of California Solid Waste Law, 2020-2024, 5 Oct. 2020, https://www.calrecycle.ca.gov/laws/legislation/calhist/2020to2024.

AB 2287 (Eggman, Chapter 281, Statutes of 2020) Solid waste: plastic products: certification. (1) Updated the plastic labeling statute to conform with current standards for compostability and degradability; (2) Provided authority to CalRecycle to issue guidelines and adopt standards for labeling of plastic products; (3) Extended the due date of the recommendations from the Statewide Commission on Recycling Markets and Curbside Recycling from January to July 2021; (4) Exempted parks, as defined, from providing recycling and organic waste bins to customers until January 1, 2022.

2021

AB 341 (Chesbro, Chapter 476, Statutes of 2011) sets forth the requirements of the statewide mandatory commercial recycling program.

39 - California, State of. “History of California Solid Waste Law.” History of California Solid Waste Law, 2020-2024, 5 Oct. 2020, https://www.calrecycle.ca.gov/laws/legislation/calhist/2020to2024.

Case Studies

Carlsbad Smokestacks

Name: Carlsbad Energy Center Project – Encina Power State Demolition
Date: December 2019
Specific: Chimney Demolition
Permitting process:

WASTE	6		Permit	Y	Prior to demolition of existing structures, the project owner shall complete and submit a copy of a San Diego County Air Pollution Control District (District) Asbestos Renovation and Demolition Notification Form to the CPM and the District for review. The project owner shall remove all asbestos-containing material (ACM) from the site prior to demolition.	Will be provided in January 2020		
WASTE	5	a	Plan		The project owner shall prepare a Demolition and Construction Waste Management Plan for all wastes generated during demolition and construction of the facility and shall submit the plan to the CPM for review and approval. The plan may be submitted in two sections: Demolition activities and Construction activities. Both sections of the plan shall contain, at a minimum, the following: • a description of all demolition and construction waste streams, including projections of frequency, amounts generated, and hazard classifications; and • management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans. • a reuse/recycling Debris Management Plan for demolition and construction materials that meets or exceeds the waste diversion goals established by the Integrated Waste Management Compliance Act (Pub. Resources Code, § 41780 et seq.) and CAL Green Title 24, California Code of Regulations, Part 11sections 4.408, 5.408, 301.1.1 and 301.3.		10/16/2019	11/12/2019

Waste Management Plan
The objective for solid waste management is to meet or exceed the waste diversion goals established by the Integrated Waste Management Compliance Act (Pub. Resources Code, § 41780 et seq) and CALGreen Title 24, California Code of Regulations (CCR), Part 11 Sections 4.408, 5.408, 301.1.1 and 301.3

Pre demolition words from NRG
Chris Rimel, Communications manager for plant owner NRG:

- Demolition wastes are managed as recyclable and non-recyclable materials
- An estimated 34,000 tons of scrap metal will be recycled at a scrap metal facility, and 50,000 tons of concrete will be used onsite."
- Approximately 2,700 tons of abated asbestos and 1,500 tons of non-recyclable materials will be disposed of at approved landfills." [40]

Results
Demolition time period: 4/7/2020 to 12/18/2020
Total Days: 167

Breakdown:

Chimney Demolition	167 days	Mon 4/27/20	Fri 12/18/20	
Mobilization	15 days	Mon 4/27/20	Fri 5/15/20	22
Remove Breeching	15 days	Mon 5/18/20	Fri 6/5/20	69
Liner Removal	50 days	Mon 6/8/20	Fri 8/14/20	70
Platform Removal	20 days	Mon 8/17/20	Fri 9/11/20	71
Concrete Shell Removal top 324'	59 days	Mon 9/14/20	Tue 12/8/20	72
Concrete Shell Removal Bottom 53'	8 days	Wed 12/9/20	Fri 12/18/20	73

Projects Contractor: Brandenburg Corporation
The information came from the Carlsbad Energy Center Project – Encina Power Station Demolition, which Cabrillo Power submitted I LLC on 01-13-2020

40 - Diehl, Phil. "Landmark Carlsbad Smokestack Coming Down." Los Angeles Times, Los Angeles Times, 30 Oct. 2020, https://www.latimes.com/california/story/2020-10-30/landmark-carlsbad-smokestack-coming-down.

Conclusion

The Carlsbad Smokestacks is a good example of how iconic structures can be reused onsite. The project waste management plan was to meet or exceed the waste diversion goals established by the Integrate Waste Management Compliance Act. However, no official statistics have been released to NRG, the project planned on reusing materials onsite and disposing of hazardous waste appropriately.

40 - Diehl, Phil. “Landmark Carlsbad Smokestack Coming Down.” Los Angeles Times, Los Angeles Times, 30 Oct. 2020, https://www.latimes.com/california/story/2020-10-30/landmark-carlsbad-smokestack-coming-down.

San Luis Obispo County

Background

CalRecycle estimates that construction and demolition materials are estimated to account for between 21.7 to 25.5 percent of the disposed waste stream. If we run the numbers, that means out of the 40 million tons that made it to the landfill, 9 to 10 million tons were construction and demolition materials. On a global scale, buildings generate nearly 40% of annual global emissions. Building Materials and Construction are responsible for 11% of the 40%.

Solution

In January 2017, the new California Green Building Standards Code (Cal Green) required all structures (residential and commercial) to recycle 65% of the waste generated by construction and demolition. Now, San Luis Obispo County Building Code states all new construction, alterations and additions, demolitions, including county projects, shall be required to divert at least 75%, with a goal to increase diversion to 80% (as local recycling facilities are available), for all project construction and demolition debris.

Process

Applicants shall complete and submit a waste management recycling plan at the construction permit application submittal. Before receiving the project's final inspection or notice of completion, the applicant/contractor shall submit a recycling and disposal report that documents that the project's diversion requirement has been met. The diversion requirement is satisfied if the application/contractor has diverted at least 75% percent of the total construction and demolition debris generated by the project via reuse or recycling unless an exemption has been granted. Applications or contractors shall make reasonable efforts to ensure that all construction and demolition debris diverted or landfilled are measured and recorded using the most accurate method of measurement available.

Interview

After communicating with Michael Byrd, the Environmental Health Specialist of SLO County Planning and Building Department, the county is excited and happy to move forward with more accountability and conscious use of construction and demolition materials. The 19.08.060 Additional requirements section of the building ordinance made the waste management recycling plan mandatory, and the waste management plans are available on SLO County's website.

Conclusion

San Luis Obispo County has turned a building code from voluntary to required. It is cheaper and faster to fully demolish a house and send the materials to a landfill than follow the waste management plans set for the county. To combat the waste of construction and demolition materials, SLO County makes sure the process is documented in a way that involves multiple steps. Contractors have to be more aware of how they handle materials and hopefully see potential in demolition materials. The county will be providing more in-depth information once they can gather data from certified recycling facilities and landfills.

City of Palo Alto

Background

CalRecycle estimates that construction and demolition materials are estimated to account for between 21.7 to 25.5 percent of the disposed waste stream. If we run the numbers, that means out of the 40 million tons that made it to the landfill, 9 to 10 million tons were construction and demolition materials. On a global scale, buildings generate nearly 40% of annual global emissions. Building Materials and Construction are responsible for 11% of the 40%.

Solution

Effective July 1, 2020, demolition will no longer be allowed. Deconstruction, the careful disassembly of building components to maximize reuse and recycling, will now be required. The City of Palo Alto's goal of the new Deconstruction & Construction Materials Management Ordinance is to recover valuable building material by requiring projects that would have previously been allowed to demolish a structure to deconstruct it. Deconstruction and source separation of materials allow for reuse of the materials (which is better than recycling) and a higher recycling rate for those materials that cannot be reused [40].

Process

The new deconstruction and source separation requirements are limited to residential and commercial projects where structures are completely removed. All deconstruction and construction projects are required to utilize GreenWaste of Palo Alto for the collection of all materials if using containers (bins or debris boxes) at project sites. Contractors can continue to self-haul material by using trucks, but must still source separate materials and deliver them to one of the City approved processing facilities listed in Green Halo.

Before building permit application submittal, projects must obtain a salvage survey by a City approved reuse organization. After building permit issuance, deconstruct structures by carefully disassembling building components. Materials are separated into either reuse or recycle categories. Before building permit application submittal, projects must obtain a salvage survey by a City approved reuse organization. After building permit issuance, deconstruct structures by carefully disassembling building components. Materials are separated into either reuse or recycle categories. Before final inspection for the building permit, contractors must upload certification to Green Halo that all materials indicated on the salvage survey were properly salvaged by a City approved reuse organization and upload all other material weights from deconstruction to Green Halo.

Conclusion

Palo Alto recognizes that the scope of these requirements will need to expand. The timing and scope of the expansion are still under consideration and will be dependent on lessons learned from this initial phase [40]. Palo Alto already has a relatively high recycling rate of 44% for construction projects. However, the new requirement will prevent tons of valuable materials from landfilling demolished homes and reduce greenhouse gas emissions. The basis of this decision is to make a systematic change. If the building sector can change the wording of its requirements and provide a more positive outlook on operations, then the community will come together.

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Conclusion

This report shows a correlation between population growth, reduction in landfill capacities, and stricter recycling mandates. Fresno, Kern, Monterey, San Luis Obispo, Santa Barbara, Ventura counties all show positive upward trends in population growth. As a result, there will be an increase in trash. Kings County had a negative downward trend in population growth but still experiences a large amount of trash. The analysis clarifies that regardless of the population trend in counties, the generation of trash at a state level is still increasing.

The results from the landfill section showed that the size of landfills in a county is not directly related to the size of the population in that county. Kern County has the largest by volume landfill but does not have the largest population. Kings County has the smallest population but has very large landfills. These relationships mean trash is being transported and disposed of in other locations. Transportation is one of the leading contributors to greenhouse gas emissions in the United States, so transporting trash across the state is another contributor to pollution.

The results from the recycling mandates section show California Legislature continues to try and create stricter mandates for single-use items. Beverage containers, plastic bags, food service packaging, and educational programs are consistently brought to the table but based on the numbers from CalRecycle, recycling rates are decreasing.

With the climate crisis and rampant consumerism, California needs to end trash pollution and waste. Consumers placing items in the right bin alone will not solve systematic problems like unrecyclable product designs and a lack of end markets for materials. Getting to zero waste requires innovations to improve existing recycling programs and create new pathways for waste reduction, reuse, and recycling.

During our interview, Tracie Onstad Bills, the California Resource Recovery Association Executive Director, said that California leads the nation in recycling initiatives. If California creates a goal, policy, law, and reaches it, then the country follows. If California does not reach that goal, such as AB 341, the state adapts and changes.

Deconstruction, recycling ordinances, and companies dedicated to reusing are needed now. Silverado concrete company, Cal Trans, MAVCO Deconstruction, Zero Waste Sonoma, LEED building waste management plans, International Recycling Group, AMP Robotics, and Agilyx are just a handful of solutions we need now. The cradle-to-cradle mentality for materials will ensure longer lives, but ultimately, California needs to adopt a circular economy to ensure a zero-waste future. The outcome of the case studies will be a stepping stone for California and the whole United States. This report encourages more research about trends in waste disposal, other methods to improve the way waste is handled, and how humans will adapt to the crisis of pollution we face today.

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