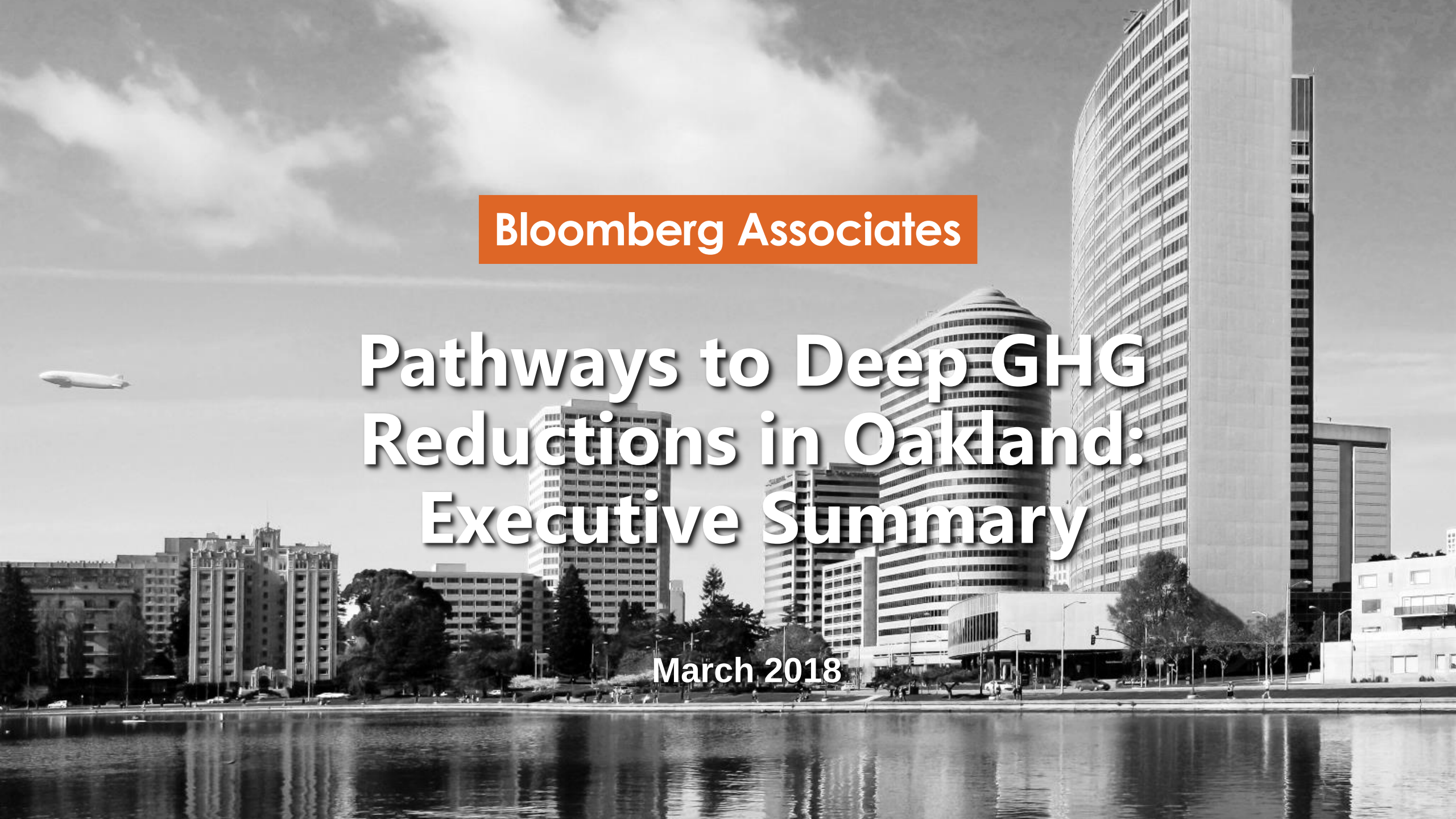


Bloomberg Associates

Pathways to Deep GHG Reductions in Oakland: Executive Summary

March 2018

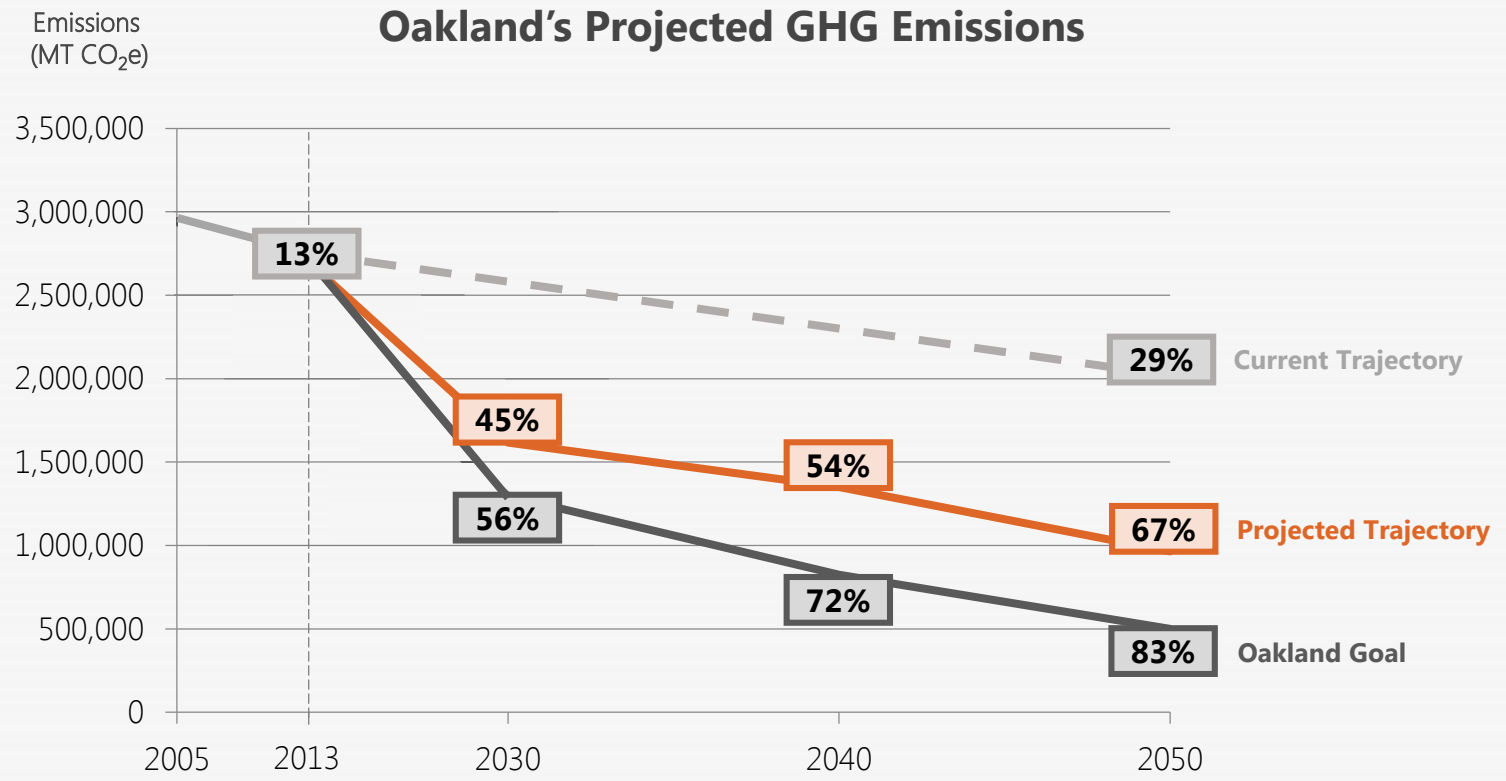
At its current pace, Oakland will not meet its 2050 GHG reduction goal

In 2009, **Oakland adopted an ambitious greenhouse gas (GHG) goal** to reduce its core emissions 83% by 2050 from a 2005 baseline.

In 2013, Oakland's GHG emissions decreased 13% from its 2005 baseline. **If Oakland continues on its Current Trajectory, it will only achieve a 29% decrease in emissions by 2050,** accounting for population and economic growth – far short of its adopted target.

Even accounting for expected changes, including market trends and technological advances, State and Federal policies, and adopted and funded City policies (Projected Trajectory) **Oakland will not achieve its 2050 goal**.

Meeting the 2050 goal is technically feasible, but will require significant City leadership, investment, and policy changes in both the near-term and long-term.



Source: Bloomberg Associates Analysis, CURB

Bloomberg Associates worked with Oakland for over a year to evaluate potential pathways that would enable the City to achieve its GHG reduction goals

Between September 2016 and February 2018, Bloomberg Associates worked with the City of Oakland to **identify opportunities and measure the impact of deep GHG reductions, utilizing a new climate planning tool called CURB**. CURB was developed by the World Bank, C40, Global Covenant of Mayors, Bloomberg Philanthropies, and many others to assist cities create climate action plans.

CURB is designed to:

- Provide '**strategic-level' analysis** to help the City identify and prioritize low carbon infrastructure and GHG reduction actions
- Help cities make the best use of limited funding by **focusing on the actions with greatest impact**
- Allow cities to **quickly see the emission implications and cost effectiveness of potential actions**

Oakland is the first city in North America to use the tool in-depth as a key input to its climate planning and will share its experience as a pilot with other interested cities.

CURB measures the GHG impacts of more than 100 actions across six sectors:

Private Building Energy*

Municipal Buildings & Public Lighting

Electricity Generation

Solid Waste

Waste & Wastewater

Transportation*

*Given that 86% of Oakland's GHG emissions are generated by private buildings and transportation, analysis focused on these sectors in CURB.

CURB enables users to understand how changes to distinct building systems and a city's transportation sector impacts GHG emissions

To understand what Oakland needs to do to put it on a pathway to meet its GHG targets, Bloomberg Associates developed and modeled two GHG scenarios.

The first forecasts the GHG impacts of expected changes to the City's buildings and transportation systems if the City takes minimal additional action (its "**Projected Trajectory**") in 2030 and 2050. The second models the scale of change needed to achieve Oakland's long-term GHG goal ("**Deep Decarbonization**") in 2030 and 2050. Within these scenarios, the analysis focused on 60 distinct actions.

Buildings

CURB categorizes buildings in two ways…

- **Type**: Existing or New
- **Use**: Residential or Commercial

… and includes actions across **seven building systems:**

- Lighting
- Appliances
- Space Heating
- Cooling
- Water Heating
- Water Fixtures
- Building Envelope

Transportation

CURB organizes transportation into **four sets of potential actions** across **11 modes of transportation**:

- Transit Oriented Development
- Passenger Mode Shift
- Vehicle Electrification
- Fuel Efficiency

Energy

This analysis **assumes Oakland reaches 100% carbon-free energy by 2030.**

A carbon-free grid is critical to Oakland achieving an 83% reduction.

Taking action to reduce GHG emissions provides many benefits to Oakland residents

	Buildings Co-Benefits	Transportation Co-Benefits
Social Equity	• Energy costs have a disproportionate impact on lower income residents • Energy efficiency measures lower energy bills, saving money for households and businesses	• Improving public transit service and pedestrian and bicycle infrastructure is likely to benefit those without access to a private vehicle
Local Economy	• Reduction in building energy use reduces costs • When a business or household lowers their energy costs, the savings can be spent elsewhere in the local economy, resulting in additional jobs	• Reducing transportation costs through alternative modes of transportation (e.g., walking, biking, and mass transit) can provide savings over private car usage • These savings can be spent elsewhere in the local economy, resulting in additional jobs
Energy Independence	• Reducing the use of imported fossil fuels lowers the community's vulnerability to energy price and supply shocks	• Reducing fossil fuel usage lowers the community's vulnerability to energy price and supply shocks
Deferred Infrastructure	• Reducing energy consumption can help defer the need for new sources of energy generation	• Reduced vehicle use will result in less wear and tear on roads, decreasing frequency of repairs
Public Health	• Reducing fossil fuel use in buildings and energy generation reduces the emission of air pollutants, improving air quality and lowering risks of asthma, respiratory disorders, heart attacks and cancer	• Transit-oriented urban design reduces the number of vehicles on the road, reducing congestion and improving regional air quality • Active forms of transportation (such as walking and biking) reduce obesity and other health risks and improve public health

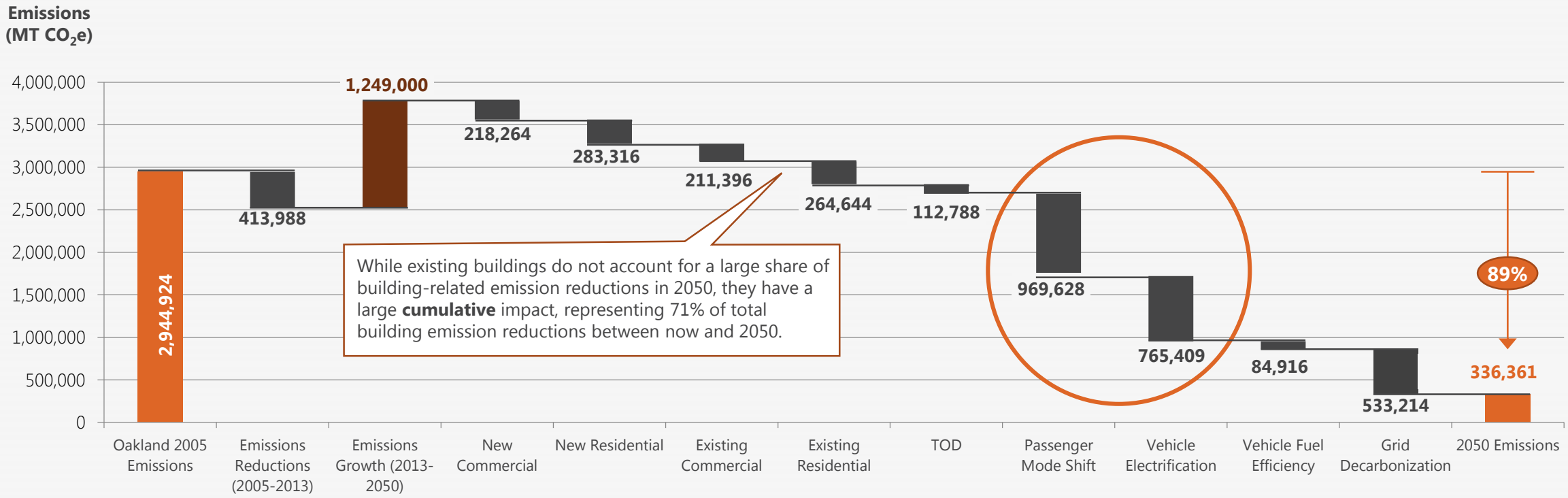
Transportation offers the largest opportunities for GHG reductions in the 2030 Deep Decarbonization scenario, but Oakland must make progress in all areas

2030 Emissions Reductions in Deep Decarbonization Scenario

Source: Bloomberg Associates Analysis, CURB

Shifting to less carbon intensive modes of transport and electrifying vehicles offer the largest GHG reductions in the 2050 Deep Decarbonization scenario

2050 Emissions Reductions in Deep Decarbonization Scenario



Source: Bloomberg Associates Analysis, CURB

Filtering actions by overall GHG reduction potential enables the City to target its efforts for maximum impact

To reduce building emissions, significant City action is needed to electrify Heating Systems and improve Insulation and Windows in existing buildings.

Extent to Which City Action is Required to Achieve Deep Decarbonization

Building System	Overall GHG Reduction Potential	New Buildings				Existing Buildings			
		Residential		Commercial		Residential		Commercial	
		2030	2050	2030	2050	2030	2050	2030	2050
Lighting	2%								
Appliances	1%								
Space Heating	**18%**								
Water Heating & Fixtures	3%								
Cooling	1%								
Building Envelope	**12%**								

Legend

- **Low** — **Minimal City action required** to achieve goals
- **Medium** — **Moderate City action required** to achieve goals
- **High** — **Significant City actions required** to achieve goals
- **Priority City action**

Source: Bloomberg Associates Analysis, CURB

Filtering actions by overall GHG reduction potential enables the City to target its efforts for maximum impact

To reduce transportation emissions, significant City action is needed to reduce private vehicle trips and electrify vehicles.

Extent to Which City Action is Required to Achieve Deep Decarbonization

		Mode Share		Vehicle Electrification	
Overall GHG Reduction Potential		**39.8%**		**50.6%**	
Mode Type	Current Mode Share	2030	2050	2030	2050
Private Autos and Trucks	69.1%	**40%**	**20%**		
Motorcycle	1.6%				
Taxi/TNC 1 to 2 Pass.	1.6%	**3%**			
TNC Pooled Ride	N/A				
Shared Minibus	N/A				
Bus/BRT	11.9%	**15%**			
BART	6.5%		**14%**		
Amtrak	1%				
Ferryboat	0.1%				
Biking	3.3%				
Walking	4.9%		**12.5%**		

Legend

- **Low** — **Minimal City action required** to achieve goals
- **Medium** — **Moderate City action required** to achieve goals
- **High** — **Significant City actions required** to achieve goals
- **Priority City action**

Source: Bloomberg Associates Analysis, CURB

The CURB analysis shows that a few changes are key to reducing Oakland's GHG emissions

While cities must take an "all of the above" approach to climate action to achieve deep reductions, the analysis shows that not all actions are equal. Given the projected changes that will occur to Oakland's building and transportation systems as new technologies are adopted and State and Federal regulations take effect, **there are a few changes that have an outsized impact on the city's GHG emissions**.

1. **Shift to 100% carbon-free energy**
2. **Eliminate fossil fuels from building heating systems**
3. **Improve building insulation and windows**
4. **Significantly shift people away from private auto trips**
5. **Accelerate the electrification of vehicles**

To achieve the changes identified in this analysis, Oakland should focus on a few key actions

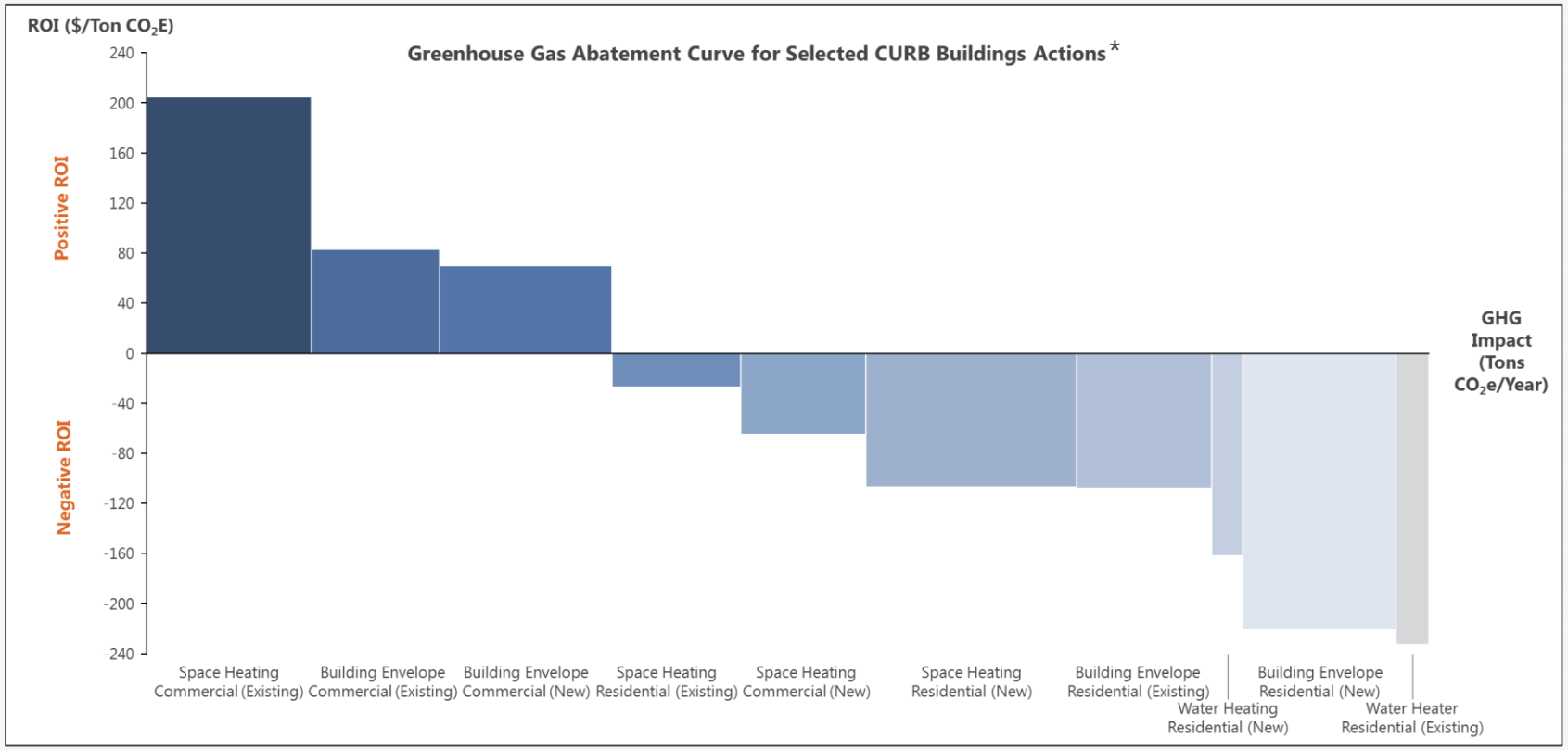
This analysis identifies the specific actions the City needs to take to change its building and transportation systems to go beyond the Projected Trajectory and achieve its GHG reduction goals.

Near-Term Actions (2018-2030)	Long-Term Actions (2030-2050)
• Update codes for new buildings to eliminate gas heating systems by 2030 • Accelerate the electrification of space heating systems and dramatically improve building envelopes in existing buildings	• Eliminate fossil fuel use in all buildings

• Increase mass transit options and coverage • Continue to build out pedestrian and bike infrastructure • Accelerate the electrification of private vehicles and low capacity taxi/TNC vehicles	• Continue to support regional investments to expand transit options • Prioritize low carbon modes of transportation in infrastructure investments • Ensure the electrification of shared mobility vehicles

Many of the buildings actions needed to achieve Oakland's goal have a positive ROI; others may require financial incentives or mandates for widespread adoption

Oakland's GHG Abatement Curve outlines the cost effectiveness of each building action relative to its potential impact on GHG emissions; however it does not identify who pays that cost or receives that benefit.



*Collectively, all other buildings actions reduce GHG emissions by 32,000 tons of CO_2e per year (6% of total buildings-related reductions), at a weighted average ROI of $-1,000.

Key Takeaways

- Commercial Buildings actions tend to produce a positive ROI; property owners should be able to take action without additional economic incentives from the City
- Oakland will need to place particular emphasis on the residential building stock – and may need to commit financial resources to incentivize residential retrofits
- Due to limitations of CURB, this analysis is not available for transportation actions

Source: Bloomberg Associates Analysis, CURB

Successful cities use four key types of policies to achieve transformational change and reduce GHG emissions

1 Lead by Example

Small in overall GHG impact, but critical to provide highly-visible examples, demonstrate value and pilot new technologies.

2 Incentivize Action

Spur early action through incentives that catalyze other actors, create examples, and produce more reductions sooner (greater cumulative impact).

3 Require Results

Enact performance-based standards or targets that do not target specific actors or technologies, but focus on impacts.

4 Mandate Action

Takes full advantage of City policymaking, regulatory, and enforcement authorities. Principal burden of implementation is on private actors with City setting policy, enforcing actions, and potentially providing assistance.

Several cities have enacted programs to accelerate change in the specific building and transportation systems targeted for Oakland

Bloomberg Associates produced case studies of eight programs implemented in other cities that are accelerating change in the buildings and transportation systems targeted for Oakland.

1 Lead by Example

Vancouver
Net Zero Standards for Municipal Buildings

Seattle
Vehicle Electrification

2 Incentivize Action

Melbourne
Building Energy Efficiency Incentives

Chicago
EV Purchase Subsidies

3 Require Results

Brussels
Passive House Standards & Subsidies

Milan
Low Emission Zone and Congestion Charge

4 Mandate Action

Austin
Point-of-Sale Energy Audits

Nottingham
Workplace Parking Levy

The actions need to aggressively reduce Oakland's GHG emissions can be implemented through a range of City policies and investments

Serve as the basis for the update of Oakland's Energy and Climate Action Plan (ECAP)	• The action areas identified in this analysis should serve as the focus for policy priorities in the next ECAP, to be released in 2020 • The technical and financial components of this analysis can help justify Oakland's sustainability priorities to Council and the public
Incorporate top CURB actions into the Capital Improvement Program (CIP) prioritization framework	• The changes and actions identified by this analysis provide a clear set of criteria that should be included as one factor in evaluating potential projects for City investments • Investments that advance one of the priority changes (e.g., shift people from private auto trips) should be given additional credit during project prioritization
Incorporate top CURB actions into other funding processes	• The City should leverage other funding sources (e.g., seismic retrofits, affordable housing) that impact Oakland's buildings and transportation systems to address priority actions where appropriate (e.g., including window upgrades as part of seismic retrofits, ensuring high efficiency heating systems in affordable housing)
Use priorities as key inputs into department-level plans and policies	• Department plans, such as neighborhood-specific plans, should incorporate policies that align with the changes identified by this analysis (e.g., shifting people away from private auto trips) • Scan citywide codes and policies to identify opportunities to achieve the priority changes (e.g., update the City's Green Building Ordinance with a focus on space heating)