Davis Climate Action and Adaptation

Natural Resources Commission

2022





Meeting Agenda

- Update to the NRC:
 - Results of the GHG Reduction Potential Analysis and Target Achievement
 - Share approach and high-level results of Cost Effectiveness Analysis
 - Receive review comments and input on information presented



CAAP Development Overview



Update: GHG Reduction Assessment & Cost Effectiveness Analysis





GHG Quantification Approach

- CAPCOA Handbook methodology applied for most transportation actions, as well as water conservation and carbon removal actions
- Modified CAPCOA Handbook methodologies applied for most building energy actions to reflect emissions forecast scenarios
- High-level implementation assumptions defined for aspects of actions to be quantified (outlined in Action Analysis Workbook)
- Reduction estimate results compared to emissions forecasts by sub-sector to avoid over-estimation within entire sectors/sub-sectors
- GHG reduction analysis provides one data point for prioritizing actions and should be considered with other criteria – cost-effectiveness, co-benefits, actions that offer specific benefits to lower-income households, etc.



Target Scenario Analysis

	2030	2040
% of Target Achievement - Voluntary	88%	37%
% of Target Achievement - Mandatory	124%	47%





2030 – Voluntary Action Pathway





2030 – Voluntary Action Pathway



2030 – Mandatory Action Pathway





2030 – Mandatory Action Pathway







2040 – Voluntary Action Pathway





2040 – Voluntary Action Pathway



2040 – Mandatory Action Pathway





2040 – Mandatory Action Pathway





2040 Remaining Emissions – Voluntary Action Pathway





2040 Remaining Emissions – Mandatory Action Pathway





2030 GHG Reduction Potential – Market / Regulatory Reduction Actions

Action #	Action	GHG Reduction Potential (MT CO ₂ e/year)	Notes
A5	Partner with Valley Clean Energy to invest in community solar energy and provide solar battery storage, encourage all subscribers to upgrade to the UltraGreen option, and develop financing/incentive options that would support building energy efficiency improvements and electrification	34,700	Action quantifies reductions associated with City of Davis joining VCE, and VCE achieving zero-carbon portfolio by 2030
B1	Update and implement the Davis Electric Vehicle Charging Plan (2017) to determine public and private charging infrastructure needs, time frame, and implementation approach to enable all vehicles to go electric	28,050	Action quantifies market trend toward EV adoption beyond initial level estimated in ARB emissions model
D6	Allocate funding and staff resources to aggressively implement important existing climate-related efforts, such as stormwater management policies, urban water management programs and plans, the 2021 update to the Urban Forestry Management Plan, water conservation programs, and solid waste reduction programs	5,900	Action primarily quantifies impact of compliance with SB 1383 organic diversion requirements
	TOTAL	68,650	



Top 5: GHG Reduction Potential by 2030 (w/o Market/Regulatory Actions)

Action #	Action	GHG Reduction Potential (MT CO ₂ e/year)	Notes
A1(b)	Adopt requirements for electrification of all building systems that require permits at end of useful life and/or at time of remodel, including space and water heating/cooling equipment and major appliances, and include specific provisions for low-income and vulnerable populations.	25,050	Action assumes implementation starting 2023 with 90% compliance rate to convert equipment at end of useful life
A3(b)	Modify rental license program to include minimum energy efficiency and cooling/ventilation requirements.	11,400	Likely overlap with A1(b)
B8	Revisit most recent parking pricing study (Downtown Paid Parking, City Council March 5, 2019) and implement pilot projects to test their effectiveness	9,850	Action quantifies parking pricing program city-wide, not just for pilot project
A2(b)	Research and develop an ordinance requiring building energy-efficiency upgrades and electric (or other non-fossil fuel) equipment replacement at time of sale for residential and commercial properties with a defined implementation schedule for ordinance requirements and include specific provisions for low-income and vulnerable populations.	7,150	Action assumes implementation starting 2023 with 90% compliance rate to convert equipment at point of property sale; assumes 2% property turnover per year
B9	Address recommendations for developing, funding, and staffing a coordinated Transportation Demand Management (TDM) program to encourage and/or require 'all people, all trips' to implement TDM strategies, such as remote work opportunities, community education and outreach, micromobility, vanpool, rideshare, subsidized transit, employee parking cash-out, etc.	2,850	Action assumes TDM program is available to 25% of employees; VMT reductions are only applied to commute portion of VMT
	TOTAL	56,300	



Clarifying Questions





Update: Cost Effectiveness Analysis



Cost Effectiveness Analysis

How we got here

- Request for Cost Effectiveness Analysis at Dec 7, 2021 City Council meeting
- Additional Scope of Work Contract Approved
- Met with Councilmember Carson Dec 20, 2021 to further understand request
- Approach was reviewed by Councilmember Carson during Mar 7, 2022 25% update



About the Cost Effectiveness Analysis

- Estimates the cost for reducing one metric ton (MT) of carbon (CO₂e) emissions
- Provides just one data point for prioritizing actions and should be considered along with other criteria
- Considers total costs and savings incurred for implementing, operating and maintaining the action
- Does not consider:
 - Social costs/benefits
 - <u>Who</u> pays for action implementation (e.g., the City vs. consumers)
 - <u>Who</u> receives the savings (e.g., the City vs. consumers)



About the Cost Effectiveness Analysis

Description of Inputs

Target Year (2030) GHG Reductions (MT CO2e/yr.)	Annualized Capital Cost (\$)	Annual O&M Cost (\$)	Annual Savings (\$)	Annual Net Costs/Savings (\$)	Cost per MT (\$/ton based on combined costs)
GHG reductions in the target year	Capital costs associated with implementing the strategy	Costs of operating and maintaining the action	Savings realized by implementing the strategy, usually expressed as a negative number	Total costs and the total savings from implementing the action.	Annual net costs/savings divided by the number of MT CO2e/year of emission reductions.



About the Cost Effectiveness Analysis

Target Year (2030) GHG Reductions (MT CO2e/yr.)	Annualized Capital Cost (\$)	Annual O&M Cost (\$)	Annual Savings (\$)	Annual Net Costs/Savings (\$)	Cost per MT (\$/ton based on combined costs)
GHG reductions from switching from internal combustion engine (ICE) to electric vehicles (EV)	Total cost of replacing all vehicles and installing EV infrastructure.*	Annual maintenance and charging costs for EVs	Annual maintenance and fuel costs for internal combustion engine vehicles (e.g., the money <i>not</i> spent)	Total costs and the total savings from implementing the action.	Annual net costs/savings divided by the number of MT CO2e/year of emission reductions.
550	\$287,150	\$625,300	\$(1,208,200)	\$(295,750)	\$(550)

Example Inputs: Electrifying the Municipal Fleet (B2)

*Cost estimates assume:

- The City will replace vehicles at their end of useful life and, at that point, will purchase EVs.
- EVs will be the same price as ICE within this decade.
- Since the marginal costs of replacing the municipal fleet with EVs will be \$0, the only costs accounted for here are those associated with installing charging infrastructure (1:1 ratio of cars to chargers).



Top 5: Cost Effectiveness Actions (2030)

Action #	Action	Cost per Metric Ton of GHG Reductions	Notes
B9	Address recommendations for developing, funding, and staffing a coordinated Transportation Demand Management (TDM) program to encourage and/or require 'all people, all trips' to implement TDM strategies, such as remote work opportunities, community education and outreach, micromobility, vanpool, rideshare, subsidized transit, employee parking cash-out, etc.	\$(3,100)	Overall costs of operating existing services are not expected to change.
B5	Subsidize public transit so it is free for all to use and promote expansion of public transit routes and increased operation frequency within Davis to support day-to-day travel needs	\$(2,950)	Overall costs of operating public transit services are not expected to change. Cost to service provider, however, will increase.
B8	Revisit most recent parking pricing study (Downtown Paid Parking, City Council March 5, 2019) and implement pilot projects to test their effectiveness	\$(2,750)	Costs are associated with implementing the recommendations from the parking study.
C1	Develop financing/incentive options with specific provisions for low-income and vulnerable populations that promote climate-ready private landscapes, such as installing drought tolerant, native, climate-ready plants and/or xeriscaping; programs that support turf removal; installing rainwater capture and harvesting equipment; and the use of green stormwater measures to enhance natural water infiltration	\$(2,450)	GHG reductions are likely overestimated for this action. Even if GHG reductions are reduced, \$ value per MT would still result in savings or no costs.
B2	Develop an aggressive plan to transition the municipal vehicle fleet to alternative fuels (e.g., electric, battery electric vehicle, hydrogen)	\$(550)	All savings would be realized by the City.



Clarifying Questions





Additional Action Context





Action Context

% of 2030 Total	% of 2040 Total	Emissions Sub-	Action	Climate Hazard	Number of Climate	Positive Co-benefit	Negative Co-
Target	Target	sector Addressed	Interdependencies	Addressed	Hazards Addressed	Impacts	benefit Impacts
(Reductions	(R361,128 MT	and Relative					
Needed - 106,729	CO2e/yr)	Reductions					
MT CO2e/yr)							
% of emissions reduced toward total 2030 reductions target.	% of emissions reduced toward total 2040 reductions target.	Identifies the emissions sub- sector each action relates to, presents the sub-sectors contribution to total 2030 emissions, and states the amount of the sub-sector the action will reduce in 2030 (e.g., 10%).	Describe how the action is dependent on or influences other actions (e.g., potential overlap between actions A1(a) and A3(a))	Climate hazard(s) that the action addresses: • Extreme Heat • Drought • Flood • Air Quality	Count of how many climate hazards does the action address.	Count of how many positive co-benefits the action has: • Air Quality & Public Health • Equity & Inclusion • Environmental Stewardship • Biodiversity/Natural Habitat • Job Create/Economic • Water Conservation/Quality • Cost of Living Reduction	Count of how many negative co- benefits the action has (i.e., increases cost of living (B8, D3), increases inequity (B8, B10))
						 Energy Resilience Public Safety Quick Wins/Fast Starts Regional Collaboration Food Access/Security & Local/Fresh Agriculture 	

Top 3: Co-Benefits

Action #	Action	Number of Co- Benefits
C1	Develop financing/incentive options with specific provisions for low-income and vulnerable populations that promote climate-ready private landscapes, such as installing drought tolerant, native, climate-ready plants and/or xeriscaping; programs that support turf removal; installing rainwater capture and harvesting equipment; and the use of green stormwater measures to enhance natural water infiltration	5
A2	Research and develop an ordinance requiring building energy-efficiency upgrades and electric (or other non-fossil fuel) equipment replacement at time of sale for residential and commercial properties with a defined implementation schedule for ordinance requirements, and include specific provisions for low-income and vulnerable populations.	5
A1	Adopt requirements for electrification of all building systems that require permits at end of useful life and/or at time of remodel, including space and water heating/cooling equipment and major appliances, and include specific provisions for low-income and vulnerable populations.	5



Top 5: Climate Hazards Addressed

Action #	Action	Climate Hazard Addressed	Number of Climate Hazards Addressed
D6	Allocate funding and staff resources to aggressively implement important existing climate-related efforts, such as stormwater management policies, urban water management programs and plans, the 2021 update to the Urban Forestry Management Plan, water conservation programs, and solid waste reduction programs	Flood Drought Extreme Heat	3
A3(a/b)	Modify rental-license program to include minimum energy efficiency and cooling/ventilation requirements.	Air Quality Extreme Heat	2
D3	Develop policies that require air filtration and air conditioning in new and existing residential and commercial properties, with a priority on residential rental properties	Air Quality Extreme Heat	2
D7	Develop policies to expand existing public services and resources, such as cooling and weather relief centers, during extreme weather events	Air Quality Extreme Heat	2
C1	Develop financing/incentive options with specific provisions for low- income and vulnerable populations that promote climate-ready private landscapes, such as installing drought tolerant, native, climate-ready plants and/or xeriscaping; programs that support turf removal; installing rainwater capture and harvesting equipment; and the use of green stormwater measures to enhance natural water infiltration	Drought Flood	2



Clarifying Questions







Next Steps

- 1. Incorporate today's feedback
- 2. City Council May 24, 2022



