

## STAFF REPORT

**DATE:** May 9, 2022

**TO:** Natural Resources Commission Special Meeting

**FROM:** Dianna Jensen, CAAP Project Director, PWET City Engineer  
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**SUBJECT: 2020-2040 Climate Action and Adaptation Plan (CAAP)  
Cost Effectiveness Analysis and Greenhouse Gas Reduction**

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### **Recommendation**

1. Discuss prioritized CAAP actions analysis materials and information provided at the April 25, 2022 Natural Resources Commission.
2. Consider making a cohesive summary motion from the NRC to City Council with recommendations on CAAP actions analysis and implementation. Alternatively, determine that the NRC does not have a summary recommendation to City Council and the Council staff report will include the questions and answers that resulted from the NRC discussion.

### **Background and Presentation Overview**

The NRC Regular Meeting on April 25, 2022 included a two-hour (time-limited) CAAP presentation and in-depth discussion of the draft additional scope items requested at the December 7, 2021 City Council meeting. The NRC then moved to have an NRC Special Meeting on May 9, 2022 to complete NRC CAAP recommendations to City Council for their May 24, 2022 meeting CAAP discussion.

At the April meeting, the CAAP project management team presented information and analysis developed in response to the Contract Addendum #2 approved by City Council on February 1, 2022. Meeting materials included the PowerPoint (PPT) presentation and Excel Workbook with CAAP actions analysis including greenhouse gas (GHG) reduction potential; cost effectiveness analysis (CEA); actions addressing climate risk and co-benefits.

### **Commission Discussion, Questions and Responses**

Commission discussion / questions with responses during the meeting will be provided in the meeting minutes. The full April 25, 2022 meeting video is available at <https://www.cityofdavis.org/city-hall/commissions-and-committees/natural-resources-commission/meeting-videos>. The updated PPT from the meeting and the updated Excel Workbook are attached to this meeting packet.

Commissioners were also offered the opportunity to submit additional questions by April 28, 2022. The questions received following the meeting and responses from the project management team (in blue) are provided here:

**Follow-up Comments/Questions from J Johnston** (email received 4-27-2022):

#1 *Accounting for Population Increases* – How was future population and business growth incorporated into the estimates? On the city ballot now is a business development that is projected to increase the city's total emissions by 4-5% depending on how far employees have to travel. Also in the works are several housing developments that have been approved but not built (e.g., the West Davis Active Adult Community, the Chile Ranch Project) plus others that are asking for approval (e.g., Palomino Place). The recently adopted Housing Element (Table 22) projects an 8.1% increase in population and a 16.5% increase in jobs by 2036. These will certainly increase the GHG emissions in a BAU scenario. The calculations presented don't seem to include any allowance for growth. To get meet a 2030 target of X% reduction below the 2020 baseline, we would need to reduce emissions by X% of the 2020 value plus all of the emissions that would result in projects built between 2016 and 2030. The calculations don't seem to support this. The sum of the emissions savings in the spreadsheet is 100,600 (sum of column F excluding A2b and A3b, the mandatory measures). The claim (presentation slide 6) is that this is a 33% reduction from 2016 levels. 100,600 is 33% of 304,848, which is considerably less than the inventory value of 467,598. To achieve the claimed 33% reduction below 2016, we need to save 154,307 and if future growth is considered, we'd have to save even more, depending on what the future growth assumptions are. So, this is an area that needs clarification. Was future growth considered and how much? Why doesn't the total GHG reduction equal 33% of the inventory value? Is the 33% incorrect?

[If the mandatory measures are assumed, the total reductions are 133,950 which is claimed to be 42% below 2016. 133,950 is 42% of 318,929, also below the 2016 value, and doesn't seem to include any growth estimates.]

This question was asked and largely answered during the 4-25-2022 NRC meeting, with additional explanation here. J Lathan, AECOM, described that future population and employment growth was factored into the future emissions scenario. That future scenario assumes population and employment growth as well as emissions reductions from implementation of statewide vehicle efficiency programs which are significant enough to counteract the population and employment growth so that the 2030 and 2040 future emissions levels are lower than the 2016 levels. So, the 2030 and 2040 emissions forecast scenarios are already below 2016 levels, and when the draft CAAP actions are added to that future scenario, the result is 36% below 2016 levels in 2030 in the voluntary action scenario, for example.

#2 *Presentation* – I think I understood that the presentation shown in the meeting reflected expected reductions due to state vehicle (and other) efficiency standards. In other words, even if we did nothing, there would be some reductions (shown as a declining black line in the slide). I'll offer the opinion that to the general public, the slide in the packet is more understandable – X% below the current value shown as a horizontal line. I presume the state standards are included in the CAAP calculations and it confuses the general message to pull

those out. One important question I have, though, is why the 2016 values in those graphs are about 375,000 when the inventory value is 467,000?

This concern is addressed in the updated PPT presentation. As noted at the 4-25-2022 meeting, there was an illustrative (not substantive) error in the PPT sent in the NRC materials packet, which was corrected in the version presented at the meeting and is also attached to this materials packet.

#3 On-road Transportation (B2). *Develop an aggressive plan to transition the municipal vehicle fleet to alternative fuels (e.g., electric, battery electric vehicle, hydrogen).* The savings here (7,656,450) seem high and might need to be checked. I know it includes maintenance, so take off 2M for that. Divide the remainder by the number of city vehicles (268) and \$5/gal gas cost, you get each vehicle needing 4220 gal/yr. On a daily basis,  $4220 \times 15 \text{ mpg} / 365 = 173 \text{ mi per day}$ . That's probably more than a Davis police cruiser's demand, and seems way too much for a fire truck, maintenance truck, or city staff car.

This is correct. Upon further analysis, two math errors were discovered:

1. AECOM multiplied VMT by cost *per gallon* of gasoline rather than price *per mile* of gasoline. This was the primary driver of the very high savings.
2. AECOM also accounted for 100% of the City's fleet being electric by 2030, but for the emissions reductions estimates AECOM is assuming that just 50% of the fleet will be electric vehicles (EVs) by 2030 (with 100% being EV by 2040). This update had a relatively small impact on the numbers.

The updated cost per metric ton for this action is \$(550).

#4 Fehr & Peers Report – The OD Travel Patterns Report contains a wealth of information on trips and distances but does not put them together into VMT values for travelers going various places and how those might be affected by different priority actions. For instance, a regional bus system (a potential priority action) might affect travelers to Yolo Co. and Dixon and maybe downtown Sacramento, but not more distant destinations. The actual VMT of local travelers who might be tempted to get on their bikes or take Unitrans isn't available. I think these numbers can be teased out of the report with some time. My question is, given that the report has been available for only a short time (April 11, 2022), did AECOM do this analysis and incorporate the results in the GHG reductions attributed to the different actions? Or does the CAPCOA methodology not account for this degree of granularity in its methods?

AECOM had the results of the Origin-Destination (OD) Travel Study early in the process, prior to developing the initial draft list of actions, and relevant information was used in quantifying GHG reductions from on-road travel-related actions based on the necessary inputs for the California Air Pollution Control Officers Association (CAPCOA) equations that were applied. In general, the CAPCOA equations do not require the granularity of results provided in the OD Travel Study since the CAPCOA Handbook and its equations was designed to be

readily usable for a variety of audiences to easily estimate GHG reduction potential from different actions.

*#5 UCD Interactions* – UCD is working on its own TDM program. Were their plans considered in this analysis? Since a good number of workers coming from out of town are actually going to UCD, the UCD Go Club plans might influence our GHG reduction estimates. Or is it the case that UCD travel/GHG is excluded from the trip counts in the F&P report? It wasn't clear on a quick read.

Trips that start at UC Davis and end outside of the City and trips that start outside of the City and end at UC Davis were excluded from the City's revised 2016 GHG inventory and the GHG forecasts. There may be collaborative potential with UC Davis when the City is ready to design and implement its Transportation Demand Management (TDM) program, but UC Davis' potential program was not a factor in estimating GHG reduction potential from this action since the team deferred to the CAPCOA methodology for equation inputs.

*#6 Counting Co-Benefits* – My comment about weighting co-benefits did not relate to assigning the various co-benefits to various actions. It applies to the next step of summing the co-benefits. When you do that, there is a natural tendency to want to favor the actions with the larger numbers of co-benefits. As I pointed out, not all co-benefits are of equal weight. Compare "public safety", for instance, to "quick wins - fast starts". Multiple times in the presentation that statement was made that "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." which hints that they might be decision variables. If that's the intent, they should reflect some degree of rigor and proportionality like we expect in numerical calculations.

D Edwards, AECOM, responded to this comment during the 4/25 NRC meeting. The decision support matrix provided does not weight any specific co-benefits as this information was provided for context and is not intended to provide results or guidance about how/which actions should be further prioritized. Commissioners may have co-benefits that they wish to prioritize and this matrix is intended to provide additional support for decision making. Assigning weights to specific co-benefits can also sometimes be an arbitrary process unless there is consensus about which criterion or criteria are broadly more important than others.

*#7 C1 Water. Develop financing/incentive options ... climate-ready private landscapes, such as installing drought tolerant, native, climate-ready plants...* This action is said to be addressing flood hazards. The climate-related flood hazard is the increase in large storm intensities (the 100-yr flood events). Low impact development, which is being described here, is designed for the 85<sup>th</sup> percentile annual storm which correlates to the 2-year storm. These storms don't cause flooding. The measures in C1 do have co-benefits but they don't prevent hazardous flooding.

As noted, co-benefits are additional benefits that an action provides. The focus of this action is to reduce water demand as one strategy to adapt to future drought conditions, not flood mitigation. This action does not assume a design standard to prevent hazardous flooding but may increase pervious surfaces and thus reduce sheet flow and localized ponding/flooding during extreme precipitation events. As with all of the actions, any potential co-benefits it provides are just one point of consideration when determining the City's priorities.

*#8 Missing actions -- A question that was asked but not answered at the meeting was: After all this analysis, and seeing that we're coming up a bit short of the target, are there any additional actions that AECOM would suggest adding to the list, or revisiting any proposed actions that were not included in this evaluation? For example, wastewater emissions are projected to be 9-11% of the total and don't drop much as a result of the actions on the current list. One suggestion that I believe was put forth in the public meetings but didn't make the final cut, was utilizing the flared methane to produce electricity for WWTP power. It might make sense to revisit that. Are there others that AECOM or staff might want to consider or reconsider now that we have a better idea of what the proposed action list is accomplishing?*

It is true that the CAAP data in the Workbook and the PPT presentation show that the City of Davis is able to meet 2030 targets for GHG emissions reduction, depending on approach to certain building energy actions (voluntary vs. mandatory). However, the data does NOT show that the 2040 carbon neutrality target will be met with implementation of the current actions.

While this may be concerning, it is important to note that it is not unexpected. Addressing carbon reduction through implementation of the CAAP is necessarily an iterative process. All analysis is projected; actual GHG reductions will be measured through monitoring results of implemented actions and continuing to update GHG Inventories. Recommendations for regular 2020-2040 CAAP updates will be integrated into the CAAP document. The project management team recommends an interim CAAP review and update after two years (2023-24), and every five years following that (2028, 2033, 2038) in order to track progress and identify any course corrections needed to attain the interim goals at 2030 and community carbon neutrality by 2040. The City has also made a commitment to update the GHG Inventory every two years, which will provide regular 'checks' on the progress of carbon reduction. The last inventory was completed in April 2020; the additional transportation analysis was completed by Fehr and Peers in April 2021. The next GHG Inventory update is targeted to be completed in early 2023, following adoption of the 2020-2040 CAAP. This will provide an excellent resource for evaluating and monitoring GHG reduction measures included in the plan, and 're-calibrating' actions required to achieve City Council-adopted targets.

Revisiting additional actions, revising or re-prioritizing current actions or other options to reduce carbon emissions (mitigation) or address climate risk

(adaptation) may be decided upon between now and 2030 / 2040. Most significantly, as we approach the 2030 target, the City will be monitoring, measuring, adjusting and updating the CAAP and the implementation actions to meet carbon neutrality by 2040. Emerging and evolving policies, opportunities, funding and technology will be constantly being made at the federal, state and local level to address GHG reduction between now and then, based on federal actions and on the State of California carbon neutrality goal of 2045 adopted in 2018 (Executive Order B-55-18 to Achieve Carbon Neutrality, <https://www.ca.gov>)

The City of Davis, in collaboration with regional and state partners, will be responsive to these changes and improved prospects for carbon sequestration and reduction.

Also note that ALL of the actions identified during the process last year were included in the Action Selection and Prioritization (ASAP) multi-criteria assessment, which then resulted in the currently prioritized 29 actions, based on the analysis at that time. This analysis is still available, and these 29 actions will have further information developed with Implementation Roadmaps as part of the CAAP. (The template for these Roadmaps was reviewed by the NRC, but the roadmaps for each action have not been completed, based on CC request for the CEA and GHG analysis.) However, as has been previously stated, all +/- 80 actions will be included in the 2020-2040 CAAP, whether prioritized or not. At any time, City staff, Council or Commissions can recommend 'elevating' an action to priority or short-term implementation status.

In summary, the project management team is not currently recommending additional or revised actions (prior to the May 24 City Council meeting), but the opportunity remains for new/non-prioritized actions to be elevated.

**Follow-up Comments/Questions from R McCann (email received on 4-28-2022):**

**B8 – revisit parking pricing study:** The projected savings for this measure appears to assume that at least 3% of the transportation emissions come from searching for parking spaces. I have not experienced more than a couple of blocks of driving to find a parking space downtown, so I think these savings are greatly overestimated for the parking situation in Davis. (Parking pricing is likely to be much more effective in a congested city with few parking alternatives such as walking a couple extra blocks.)

Estimated GHG reductions are not calculated based on drivers circling and looking for parking; they are from discouraging driving to a location in the first place and encouraging travel mode shift thereby avoiding Vehicle Miles Traveled (VMT) in the process. The calculations are based on VMT within the Downtown Area and assume parking pricing is applied throughout that same area. The CAPCOA methodology for this calculation also notes that implementing residential parking permit programs in areas outside of the paid parking district can help prevent parking intrusion in those areas. Finally, the CAPCOA

methodology notes that GHG reductions from parking pricing can range from 0-30% of community area VMT; the calculation results in Davis are approximately 4.5% reduction in VMT in the Downtown Area based on the methodology provided.

**A5 – Increase green power usage:** These assumptions should clarify part of these reductions come from increased demand via electrification (and of which sectors), and ensure that there is not double counting from electrification of those sectors.

AECOM will add a statement to the high-level GHG analysis comments in the Action Analysis Workbook that the GHG reduction estimates also include increased electricity demand from EV charging use. AECOM has confirmed double counting is not happening within this action.

**A3(a) and D3 - rental energy efficiency & air filtration:** These two measures overlap almost entirely and should be combined, with D3 listed as a significant co-benefit for A3(a).

AECOM agrees that these two actions could be combined since they are topically related. However, if City Council rejects any mandatory actions (like D3), then the GHG reduction estimates from A3(a) would also fall away. The team will defer to NRC and staff recommendations on how best to proceed. Perhaps these actions can be combined following City Council approval of the final actions list.

**A1(a) – End of life electrification:** The emission reductions seem low, especially for 2040 when there should be nearly complete turnover after an ordinance is adopted by 2024, unless these are based on emissions in the existing electricity grid and further reductions are embedded in A5.

A1(a) is the voluntary implementation option. The assumptions listed in the Action Analysis Workbook are that natural gas space heaters last 15 years, so almost 7% of the stock needs to be replaced per year ( $7\% = 1/15$ ). As a voluntary approach that is not requiring electrification at time of replacement, 10% voluntary participation was assumed, which gives 0.7% of natural gas space heaters per year that electrify, while all other replacements are for new natural gas systems ( $0.7\% = 10\% * 7\%$ ). AECOM assumes implementation begins in 2023, so 7 years of implementation by the 2030 target year would replace about 5% of existing natural gas space heaters ( $4.9\% = 0.7\% * 7 \text{ years}$ ). This same approach would result in 11% replacement by 2040. AECOM applied a similar approach for natural gas water heaters with a 12-year expected life span (so, turnover rate of about 8% per year). The mandatory action calculations are similar and replace the 10% voluntary participation estimate with a 90% ordinance enforcement estimate.

**B1 charging infrastructure:** Cost estimates for this should be readily available from PG&E, SCE and SDG&E filings at the CPUC, along with other public utilities e.g., SMUD, at least as a placeholder.

California Public Utilities Commission (CPUC) sources for developing costs for B2 were referenced, specifically as it relates to expected cost of electricity in 2030. AECOM referenced US Energy Information Administration (EIA) for the estimated cost of gasoline in 2030, which was then localized to the California market. While sources for costs associated with EVs and EV infrastructure are available, the reason that this action (B1) is not costed for the CEA relates to how the GHG emissions reductions are estimated. The GHG estimates are based on the projected market share of EVs in 2030. To provide an accurate cost per metric ton of GHG reductions, the CEA would need to look at the overall cost of the market transition to EVs in Davis. These costs and savings would not reflect the cost of implementing the Davis EV Charging Plan and would be misleading.

**D6 and D4 – urban and stormwater management:** (1) not clear how D6 creates additional GHG reductions, and that those reductions are on such a large scale, especially in 2040 when the electricity grid will largely be 100% green/renewables, (2) I don't see the distinction between these two measures, unless D4 is an incremental addition to the existing plans listed in D6. If that's the case, then this should be made clear.

1) D6 GHG reduction estimate calculations are not based on stormwater management; the estimated GHG reductions are from implementation of organic diversion requirements outlined in SB 1383, as related to the final statement in action D6 "...and solid waste reduction programs."

2) D4 is a specific measure to increase the use of green stormwater infrastructure and enhance natural water infiltration in public infrastructure, whereas D6 is focused on implementing the City's existing plans and policies. Currently the City's stormwater studies largely focus on maintenance of the City's existing stormwater system and not green stormwater infrastructure, so there may be value in keeping both actions in the list.

During the April meeting, Josh Lathan, AECOM, provided an overview of the data related to GHG reduction potential and analysis of 2030 and 2040 target achievement. This included discussion of two possible approaches to three of the Building Energy and Design actions—voluntary action vs. mandatory or required (ordinance) implementation, which have a significant impact on target achievement.

Emily Schwimmer, AECOM, provided a CEA overview, with a primer on how to use the Workbook, along with an example of data in one of the actions. Diana Edwards, AECOM, addressed other actions context information, such as the top actions related to co-benefits and to climate hazards addressed.

Even though the PowerPoint identifies top five actions in these various areas for discussion purposes, neither the NRC nor City Council is being asked to identify top actions at this point. Instead, the previous and recent analysis of each action (ASAP and information in the Excel Workbook—CEA, GHG reduction and other analysis), along with yet-to-be developed Implementation Roadmaps for each prioritized action, will be used to determine criteria for selecting actions.

Note that while the data in the Workbook is helpful for making decisions about priority actions in the CAAP, the data does not give us ‘answers’ to which actions to select. Cost effectiveness findings provide just one data point and GHG reduction potential another for prioritizing actions and should be considered along with other criteria, including potentially co-benefits, actions that offer specific benefits to lower-income households, climate hazards addressed, public acceptance, momentum or other factors.

**Attachments**

- ATT 1      Davis Draft Actions Analysis Workbook  
ATT 2      Davis CAAP PowerPoint Presentation (Updated) to NRC, April 25, 2022