General response

RMI’s analysis suggests that Colorado must reduce vehicle miles traveled by 20% in order to meet its climate goals, even under the most optimistic electric vehicle adoption scenarios. The State of Colorado has a goal of reducing VMT by 10% under reference case, and though that is a smaller goal than our analysis suggests we need, it is a necessary step in the right direction. Colorado is one of just a handful of states to have set this kind of VMT reduction goal.

However, we won’t reduce vehicle miles traveled while investing in highways that make it even easier to drive. Our analysis is just the latest in a mounting body of research and real-world evidence showing that highway widenings ultimately lead to more congestion, air pollution, and carbon—all of which move Colorado further from its transportation and climate goals.

We are pleased to hear that CDOT is considering the impacts of induced demand in its modeling and transportation plans. And it is also great to hear of CDOT’s investments in transit, road pricing, and active transportation.

RMI is happy to share and walk through our analysis and we would welcome the opportunity to review CDOT’s models. The transportation sector as whole would benefit from an open dialogue among academics, practitioners, and state DOTs to better understand the true impacts of our investments and pollution mitigation efforts.

Point-by-point Response

Intro: As such, it concerns us that today’s report, which appears to be based on a generic calculator tool developed in California, did not cross check against the specifics of CDOT’s projects or the modeling analysis we are developing in support of project review documents. The report appears to look only at a simple calculation of lane mileage, omitting a broad range of other factors pertinent to traffic modeling that affect vehicle miles traveled, mitigations, and the geographic nuances of individual projects.

- No model ever captures the full complexity of reality—neither ours nor CDOTs. The important question is whether or not the model is alert to the most important drivers of impact. The most critical input here is the lane expansion/debottlenecking (and temporary reduction in travel time). Other factors—like the managed lane and proposed “micro-transit service”—are not the dominant phenomena, and therefore would not change the fundamental answer. Statistician George Box had it right when he said “it would be very remarkable if any system existing in the real world could be exactly represented by any simple model. However, cunningly chosen parsimonious models often do provide remarkably useful approximations”. What we have done is provide a useful approximation, based on the most critical inputs.
- In contrast, the travel demand models used by state DOTs and MPOs consistently underestimate the VMT impacts of highway capacity projects. The NCST Induced Travel calculator takes a different approach, using real-world VMT data from decades of highway expansion projects to estimate induced travel from new lane miles.

1) Streamlining a choke point is not the same as across the board capacity expansion: As drivers across the front range know from frustrating weekend drives, I-70 narrows from three lanes to two as travelers
approach the mountains, and then reverts to three lanes further westbound. The road already functions as a three-lane highway, albeit with the inefficiencies of this “hour glass” configuration that narrows at a choke point on a steep curve. This results in significant delays as well as crashes due to drivers merging abruptly. Streamlining this configuration performs differently than an across-the-board capacity expansion. Rigorous traffic modeling would account for this type of consideration;

- RMI’s analysis was never meant to address highly context-sensitive highway projects; instead, it gives a range of likely outcomes associated with a highway expansion. The lane expansions themselves are not the proximate cause of more driving, it is the (temporary) improvement in travel times. Anything you do to improve a road’s carrying capacity and travel times will induce additional travel—whether that is addressing a choke point or a broader capacity expansion.

2) Managed lanes perform differently than general purpose lanes: managed lane configurations such as are being utilized on I-70 projects have a meaningful impact on congestion and traffic — resulting in less traffic across all lanes as well as behavior changes due to the pricing of the managed lane itself. I would hope that the new model employs rigorous review of managed lane scenarios given that emphasis on the I-70 corridor including the peak period shoulder lanes. Notably, the peak period shoulder lane is an innovation that CDOT developed with corridor stakeholders to provide weekend capacity on the shoulders, while minimizing the larger environmental impacts that would occur with a full-time lane. With respect to Floyd Hill, the only build alternatives that CDOT is considering include addition of a managed lane;

- RMI commends CDOT for the use of managed lanes; however, we believe that the use of managed lanes does not require an expansion. Instead, DOTs across the country should consider this and other innovations aimed at managing traffic on existing road space. Expanding a highway to create a managed lane doesn’t change the fundamental law of induced demand.

3) Models should factor mitigation and addition of transit: as recently presented to the transportation commission, CDOT is working on a new microtransit service (as well as mobility hubs in key places like Idaho Springs) to ensure that use of the new lane is truly multimodal. This concept has received strong endorsement from local stakeholders like Clear Creek County. Given CDOT’s focus on this innovative project, it would be very concerning if a model did not include this significant assumption of incorporating transit into the corridor;

- It is great to hear that CDOT is working on a new micro-transit service. RMI wholeheartedly agrees that models should seek to more accurately estimate the impacts of transit and other mitigation measures. This is an area that deserves much more attention, as policymakers and practitioners lack sufficient evidence to understand the benefits or harms of various transportation interventions. The benefits of new concepts such as “mobility hubs” and “micro-transit” are still not fully understood or agreed upon. RMI will be working with a broad coalition of nonprofits and academic institutions to model those benefits. In contrast, the science behind induced demand is firmly and universally established. For now, therefore, we are focusing on evidence-based analysis of highway widenings—and there are decades worth of evidence, across a wide range of scenarios, that show us that more highway lanes mean more traffic and more emissions over the long run.
4) Induced demand is not a one-size-fits-all and the actual use patterns along the corridor must be considered: The reality is that the peak I-70 traffic — so closely connected with our state’s ecotourism economy — is not simply reduced by the inefficiency of Floyd Hill in its current configuration. Our traffic models, as well as lived experience, show that Coloradans spend hours sitting in traffic on I-70 as they travel to and from the mountains, especially on weekends. To the extent that traffic is a deterrent to tourists and others, it is likely they are choosing to recreate elsewhere because of the frustrations caused by I-70. For example, we watched in real-time during COVID as travelers eager to explore the vast great outdoors visited parks in record numbers, which meant traffic across the state including in some places that were previously “off the beaten path”. We do not view this project as one that is likely to shift development patterns or daily commutes, so much as address a specific choke point where traffic and accidents currently proliferate given the heavy use of this road to access the mountain corridor and all it has to offer;

- Our work was not focused on comprehensive cost-benefit analysis for Colorado’s economy; instead, we are demonstrating that this approach is antithetical to Colorado’s stated GHG and VMT reduction goals.

5) Models that include induced demand should also factor pollution from sitting in traffic to have accurate pros/cons: as noted above, we fully agree that induced demand needs to be modeled on capacity projects and, again, CDOT is taking the lead on building out these models (an area in which we are well ahead of many of our counterpart agencies). However, it is also true that sitting in traffic creates pollution. Both need to be included to accurately assess net impact. For us to assess the accuracy of the new model, we would need to fully understand how it incorporates sensitivities that are key to accurate traffic modeling.

- There is a robust body of research and data clearly showing that this is not the case. While highway widenings that speed up traffic may temporarily reduce the concentration of local air pollutants at chokepoints, aggregate GHG emissions will increase. This research has shown that emissions are strongly correlated with length of travel (VMT) and weakly correlated with congestion. And while cars may emit more GHG per mile while idling and in stop-start traffic than they do when cruising at low speeds (30-45 mph), traveling at higher speeds is less fuel efficient and produces more GHG per mile. Sitting in traffic and point pollution will be even less of an issue as more cars come equipped with stop-start technology (which automatically turns the engine off when the car stops moving, re-starting it when the driver takes their foot of the brake).