Federal Highway Administration and Federal Transit Administration

Scenario Planning Workshop

Denver, Colorado

June 7-8, 2012

U.S. Department of Transportation
Federal Highway Administration/Federal Transit Administration

Transportation Planning Capacity Building
Planning for a Better Tomorrow

Location: Denver, Colorado

Date: June 7-8, 2012

Workshop Sponsor: Federal Highway Administration (FHWA), Federal Transit Administration (FTA)

Host Agency: Denver Regional Council of Governments (DRCOG)

Event Planning and Documentation: U.S. Department of Transportation (USDOT) Volpe National Transportation Systems Center (Volpe Center)

Workshop Attendees: See Appendix C

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I. Summary

This report documents the proceedings of a two-day scenario planning workshop that took place June 7-8, 2012, in Denver, Colorado. The workshop was hosted by the Denver Regional Council of Governments (DRCOG), the metropolitan planning organization (MPO) for the Denver region, at the History Colorado Center.

The workshop was co-sponsored by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). Approximately 130 participants attended the workshop, including DRCOG and Federal staff as well as representatives from State, local, and county government agencies; non-profit organizations; advocacy organizations; private sector groups; and other organizations. Several members of DRCOG's Board of Directors also attended. Appendix C includes a full list of workshop attendees.

The purpose of the workshop was to initiate a scenario planning exercise that will inform DRCOG's update to Metro Vision 2040, the regional long-range transportation plan. In hosting the workshop, DRCOG sought to highlight the scenario planning practices that the agency has undertaken in the past and intends to use when updating Metro Vision 2040. DRCOG also presented its recently developed analysis tools that will support the scenario planning effort. The workshop provided an opportunity for DRCOG to obtain feedback on how to most effectively apply the tools.

Prior to the event, FHWA and FTA sponsored two webinars during which DRCOG presented on Metro Vision 2040, the scenario planning exercise, and the suite of new tools to a national audience as well as an expert panel. The webinars and workshop were held as part of the FHWA-FTA scenario planning program, which is part of the FHWA-FTA Transportation Planning Capacity Building (TPCB) Program.

A panel of four experts[1] with expertise in scenario planning participated in the webinars and workshop. The experts included:
- Kevin J. Krizek, Professor of City Planning at the University of Colorado;
- Uri Avin, Director of the Planning and Design Center at the University of Maryland's National Center for Smart Growth;
- Reid Ewing, Professor of City and Metropolitan Planning at the University of Utah; and
- Paul Waddell, Chair of the Department of City and Regional Planning at the University of California-Berkeley's College of Environmental Design.

Discussions held during the workshop and webinars will help DRCOG improve and tailor the scenario planning exercise for Metro Vision 2040, identify key factors to consider in developing scenario alternatives and indicators, and solidify the analysis and evaluation that will ultimately produce Metro Vision 2040.

II. Background

Prior to the workshop, DRCOG conducted two webinars to share background information about Metro Vision 2040 and introduce the scenario planning process. During the first webinar held in April 2012, DRCOG presented preliminary results of a listening tour, summarized its new analysis tools, and detailed the Metro Vision update process to a public audience. The expert panel provided feedback and suggestions for DRCOG's consideration. A complete summary and audio recording of the April 2012 webinar is available on the FHWA-FTA scenario planning program website. In May 2012, FHWA and FTA sponsored a follow-up webinar solely for DRCOG staff and the panel. During this webinar, the panel had an opportunity to discuss Metro Vision 2040, the scenario planning

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[1] In addition to the four experts listed here, Glen Bolen from Fregonese Associates participated as an expert in the April webinar.

process, and the June workshop in more depth. A summary of the May 2012 webinar is available in Appendix A.

During the first day of the June 2012 workshop, FHWA and FTA staff provided background information about scenario planning and an overview of the resources offered through the scenario planning and TPCB programs. DRCOG staff then presented material about the Denver region and the agency's previous scenario planning efforts. Staff from BBC Research and Consulting, a consulting firm retained by DRCOG, introduced preliminary themes and values resulting from a regional survey that identified key issues to include in Metro Vision 2040. Following this presentation, DRCOG staff identified key goals for the Metro Vision update and presented the tools and data that the agency intends to use for the plan and scenario planning exercise.

Workshop participants had opportunities to discuss the presentations and ask questions. Following these discussions, the experts offered insights on how DRCOG could improve its scenario planning process, particularly in terms of considerations that the agency could take to ensure effective public outreach and use of its analysis tools.

In the afternoon, participants engaged in small group breakout discussions to comment on the regional survey and elements of the scenario planning exercise. As part of these discussions, participants used Brainstorm Anywhere, an interactive keypad polling tool developed by PlaceMatters, a nonprofit consultant, to select and discuss key themes for DRCOG to consider in the Metro Vision update.

During the second day of the workshop, staff from DRCOG, FHWA, FTA, and the expert panel reconvened at DRCOG's offices to engage in roundtable discussions. The discussions focused on topics of interest to DRCOG, including how the agency can maintain the momentum from the workshop for public engagement and the constraints that might influence scenario development and evaluation. Appendix B provides a complete list of the topics discussed in roundtables in addition to full agendas for the workshop and webinars.

Additional information about DRCOG's Metro Vision 2040 update and the June workshop, including copies of all presentations, is available on DRCOG's Metro Vision 2040 kickoff website.

III. Presentation and Discussion Highlights

Scenario Planning Overview

Rae Keasler, Transportation Specialist for FHWA, and Faith Hall, Environmental Protection Specialist for FTA, provided an overview of scenario planning and Federal resources available to assist agencies in adopting the approach.

There are many versions of scenario planning. In the context of metropolitan transportation planning, scenario planning often provides a framework for developing a shared vision for the future. Through developing and comparing scenarios and with the help of visualization and mapping tools, planners and others can assess trends that affect transportation and see how different alternatives meet community or regional needs. Scenario planning can help a State, community, region, or study area identify priorities, envision its ideal "future self," and evaluate what combination of policies, strategies, or actions could best realize a desired future state, or states. An important feature of the approach is extensive public involvement to solicit feedback on current trends, scenarios, and analyses. Proactive and engaged public involvement can ensure that scenario plans are supported by the public and that the vision and goals established through the scenario planning process align with those established by the State, community, region, or study area.

FHWA and FTA see scenario planning as an approach that enhances, not replaces, traditional transportation planning processes. To promote scenario planning, FHWA and FTA established a scenario planning program as part of the existing TPCB Program, which provides training and technical assistance to transportation professionals at State, Tribal, regional, and local government agencies.

Through the scenario planning program, FHWA and FTA organize regular webinars, sponsor customized training workshops, and produce and distribute scenario planning guidance, case studies, and other resources, all available on the scenario planning website. Previous FHWA- and FTA-sponsored training workshops have informed transportation agency stakeholders and the general public about scenario planning and shared best practices, lessons learned, and success factors from experts' experiences.

There are various other Federal resources that agencies can access to leverage scenario planning effort or other related initiatives, including Sustainable Communities Regional Planning and Challenge Grants offered through the Department of Housing and Urban Development (HUD), and Smart Growth Implementation Assistance offered through the Environmental Protection Agency (EPA). Many of these resources and others are offered as part of the US Department of Transportation (USDOT), EPA, and HUD Partnership for Sustainable Communities.[2]

DRCOG Overview

Jill Locantore, principal planner for DRCOG, provided an overview of the agency and its past planning efforts. DRCOG is the MPO for approximately 3 million people across a 5,000 square-mile area, including 9 counties and 47 municipalities (see Figure 1). The area is diverse and includes urban centers, smaller suburban areas, rural and agricultural areas, and mountain-side communities.
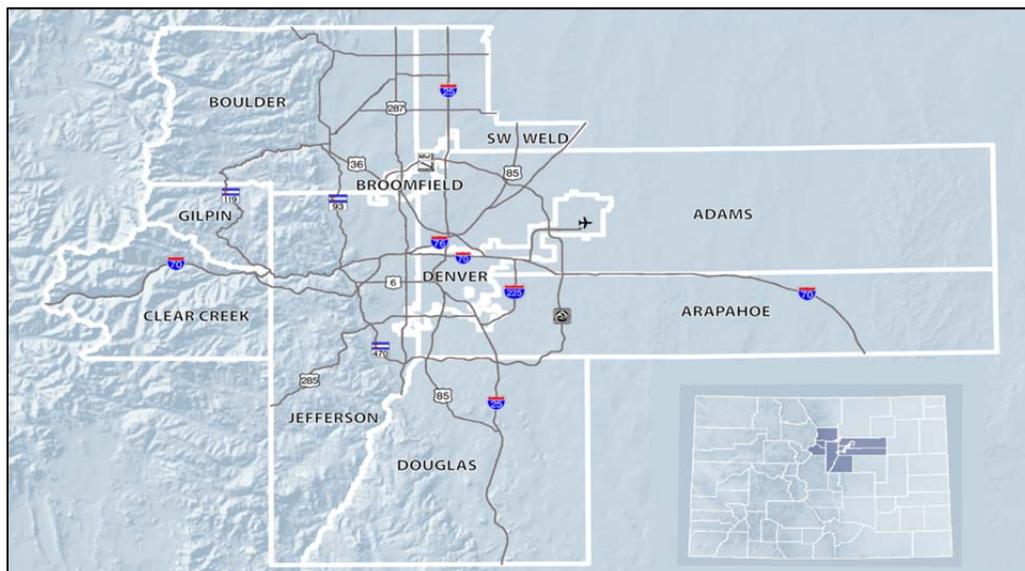
Figure 1. DRCOG region.

The agency has been incorporating scenario approach for more than a decade. In 1985, DRCOG produced its first regional master plan that was a compilation of all the local governments' master plans. DRCOG found that the regional master plan did not reflect the community's desire for future

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[2] The Sustainable Communities Learning Network is another resource for professionals working to develop more sustainable and equitable communities and regions.

growth and development, included redundancies, and did not adequately address public concerns such as air quality, increasing congestion, and rising transportation expenditures.

To resolve these discrepancies and develop a more consistent guiding vision for regional growth, DRCOG developed the original Metro Vision plan in 1997. Using a scenario planning approach, DRCOG evaluated four potential growth scenarios. Ultimately, a hybrid of two--compact and satellite development--was identified as the preferred scenario. This scenario provided a framework for growth horizons through 2020.

In 2007, Metro Vision was updated to include growth projections through 2035. Six scenarios were developed along with two main categories of indicators to assess scenario performance: land use metrics (comparing compact to dispersed development) and transportation infrastructure metrics (comparing highway investment to transit investment). Specific indicators included access to transit, driving and congestion, urban development, land consumption, and environmental impacts. The scenarios ranged from those that emphasized highway-focused development to those that offered a balance between highway/transit investments and compact/dispersed development. Ultimately, through the scenario planning process, DRCOG identified a preferred growth scenario and incorporated it into Metro Vision 2035.

Metro Vision 2040

Metro Vision 2040 represents the next major update to Metro Vision 2035. DRCOG intends to use a scenario planning approach to ensure public outreach and engagement and generate regional enthusiasm about the plan and the process. As part of Metro Vision 2040, DRCOG seeks to address ongoing regional challenges such as increasing congestion, air quality and environmental concerns, and transportation funding shortfalls. DRCOG also intends to address the transportation implications that might result from newer challenges that include:

- Aging populations in the Denver region and resulting transportation implications;
- Potential longer-term differences in housing preferences from current residents as compared to those from newer generations and a younger workforce (i.e., the "millenials");
- Increased urban growth and density;
- Encroachment of urban density on rural communities;
- Increases in cost-of-living, housing, and transportation costs (see Figure 2);
- Concerns about the built environment and public health repercussions;
- External factors such as national economic shifts; and
- Heightened environmental concerns about fossil fuel availability and greenhouse gas emissions.
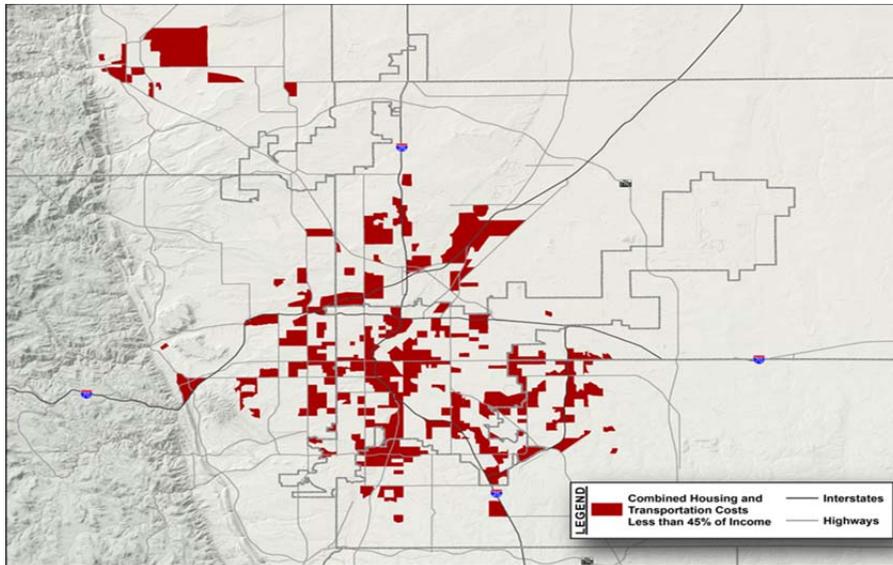
Figure 2. Areas of the Denver region where combined housing and transportation costs make up less than 45 percent of household income.

Some of the anticipated transportation implications of these trends could include effects on vehicle miles traveled (VMT) and heightened demand for transportation in employment and urban centers among others.

To conduct a more nuanced analysis of these and other regional trends, DRCOG developed several new analysis tools, described in detail below. These tools will be used as part of the Metro Vision 2040 scenario planning effort to better assess scenario outcomes.

- **Focus**, an activity-based travel demand modeling tool, synthesizes information for individual households and persons to forecast travel on a typical weekday. The model takes into account location-based data, demographic and statistical information, and travel patterns to create trips in "tours." Each tour is made up of several trips (e.g., home to work, work to recreation, recreation to home) and the model accounts for different trips made by the same person (such as driving to work and then walking to the store). As compared to DRCOG's previous travel demand models, Focus incorporates more specific geographic data, mapping trips to a specific household rather than to a broader Traffic Analysis Zone (TAZ). Because of this specificity, Focus is able to account for new kinds of trips, such as pedestrian/bicycle trips, that the older models did not. Furthermore, the Focus model accounts for differences in personal preferences, time of day shifts, and other characteristics that lead to more robust analysis.

- **UrbanSim**, currently under development, will significantly improve on DRCOG's previous land use model. The previous model relied on TAZ-level specificity while UrbanSim incorporates more detailed geographic data related to residential characteristics and land use patterns at the neighborhood and block levels. UrbanSim also includes important characteristics that incorporate price signals and location-based controls. The model will allow DRCOG to more accurately predict the timing, rate, and location of development trends. UrbanSim produces highly detailed regional development forecasts for elements such as real estate prices, construction proposals, and growth rates over time. UrbanSim also makes use of Travel Model Improvement Program (TMIP) data to predict transportation outcomes of land use patterns. TMIP is a collaboration between FHWA, FTA, the USDOT's Office of the Secretary, and EPA.

- **DynusT** is a network model currently being developed in collaboration with the University of Arizona. Previous network models used highly simplified behavioral characteristics that limited the model's accuracy and usefulness. DynusT incorporates key data sensitivities and uses a suite of dynamic traffic assignment tools to more accurately represent network models. DRCOG will use DynusT to integrate system dynamics with land use locations and to model interactions between crucial elements of the roadway network.

Listening Session Preliminary Themes

Following Ms. Locantore's presentation, staff from BBC Research and Consulting presented preliminary results from the regional listening tour.

The tour solicited the public's input on their values and opinions of regional values, strengths, and weaknesses, to help inform a framework for Metro Vision 2040 and scenarios. In addition, the listening tour provided an opportunity for DRCOG to share information about Metro Vision 2040 and the scenario planning process. The tour involved conducting online and in-person surveys, individual interviews, group discussion sessions, and public meetings who comprised a representative sample of the DRCOG regional population.

During the listening tour, participants were asked to identify important regional values and features that should be emphasized in the Metro Vision 2040 update as well as aspects of the region they thought could be improved over the next 30 years. Finally, participants identified concerns and challenges that the Denver region might face in that timeframe and that Metro Vision 2040 should address. Preliminary themes from the listening tour are highlighted below.

- **The Denver region has a variety of strengths.** For example:
  o Attractive climate and availability of a variety of natural landscapes and outdoor recreation opportunities;
  o Young workforce, which has led to an increase in employers opening facilities and regional headquarters in the area;
  o Historically high levels of public engagement and involvement;
  o Range of housing choices, providing options that suit a broad range of demographics, age groups, and individual preferences; and a
  o Pioneering "Western" spirit that encourages innovation, exploration, and a sense of camaraderie among community members

- **There are several factors that will make Denver an attractive place to live in 2040.** For example:
  o Availability of a robust, efficient, multimodal transportation system;
  o Prevalence of dense, mixed-use housing;
  o Preservation of existing rural or dispersed community development styles;
  o Strong regional economy across a range of employment options and sectors; and
  o Employment opportunities that provide options for a range of incomes and skills.

- **The Denver region may face some future challenges.** There are some areas that will present difficulties for the region or that may offer opportunities for future improvement. For example:
  o The Denver region should emphasize matching employee skills to skills desired by employers; the region should also focus on cultivating "homegrown" talent.

- o Identifying funding to implement Metro Vision 2040 will be difficult, particularly due to Colorado's Taxpayer Bill of Rights (TABOR) legislation.[3]
- o There has been agreement about some of the decisions made through DRCOG's past scenario planning processes. However, difficult trade-offs will continue to be necessary. Making trade-offs requires negotiating among competing priorities while ensuring efficient, equitable, and affordable transportation options for the entire region.
- o Currently, the Denver region does not have a comprehensive affordable housing strategy. Opportunities for affordable housing should be included in the plan.

Expert Panel Responses

Following the listening tour session, the four experts identified factors that DRCOG should consider as it begins the Metro Vision 2040 update, how DRCOG can improve the anticipated scenario planning effort, and how the agency can make most effective use of its new analysis tools. Highlights from each presentation are detailed below.

Kevin J. Krizek

- **Measure and improve regional accessibility.** The scenario planning effort should help evaluate the region's accessibility to employment, services, and other amenities as well as ways to improve this accessibility. To do so, scenario indicators and analysis should be accessibility focused such as measuring the number of jobs or schools located within a short walk from residences. By including accessibility in scenario analysis, DRCOG and its partners can identify investments that maximize accessibility improvements.

- **Conduct rigorous analysis to verify trends.** Dr. Krizek believes that many transportation planning practitioners over-emphasize certain demographic trends. DRCOG should engage in rigorous data collection and analysis to verify the implications of these trends in the Denver region.

  For example, there is a belief that younger generations are more transit oriented, reducing their per-capita VMT. However, when younger generations form households, their propensity for transit may decrease and VMT increase. As another example, there is a belief that cities that feature compact development are popular places to live and work, particularly among the "Baby Boomer" generation. Although these communities are growing in popularity, suburbs are still attracting new residents. Additionally, though compact development has resulted in smaller individual housing units, each of these households still generate a significant amount of VMT through daily work commutes, recreation, and shopping. In addition, many urban services such as schools and post offices generate trips that may counteract the VMT reduction of an otherwise compact community.

- **Address the potential offered by non-motorized transportation.** DRCOG should investigate the potential to shift a significant portion of daily travel toward non-motorized transportation, namely biking and walking. Although many areas of the region are not dense enough for non-motorized trips to catch on, urban areas like downtown Denver are well situated to shift many of its shorter trips to walking or biking. Denver's favorable urban topography, combined with increasing levels of bike advocacy and awareness, would allow the city and region to position itself as bicycle and walking oriented, thereby reducing the need for costly highway and transit investments.

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[3] TABOR limits State and local governments' abilities to raise taxes.

Uri Avin

Mr. Avin commended DRCOG for its exemplary past scenario planning work. Having engaged in multiple scenario planning efforts, Mr. Avin believes the agency is well positioned to accomplish its stated goals through the Metro Vision 2040 update. However, there are opportunities to enhance scenario planning for Metro Vision 2040. DRCOG may want to consider:

- **Developing scenarios that explore significant changes in land use and transportation rather than modifying existing scenarios used in previous efforts.** With significant past scenario planning experience, DRCOG has a unique ability to identify new and innovative scenario examples to incorporate into Metro Vision 2040.

- **Be cautious in using historic data to project current trends out to the future, given no change in current conditions (i.e., "baseline trends").** Baseline trends are typically difficult to measure or project, given fluctuations in initial conditions and difficulty in selecting metrics to identify any given trend. Thus baseline trends should be considered only as rough indicators of future patterns.

- **Evaluate potential economic, travel, and population decline in the region or parts of the region.** Although politically unpopular, decline in these and other areas is a possibility and should at least be addressed in the scenario planning effort.

- **View the new analysis tools as aids for discussion and analysis rather than as the central focus of the scenario planning effort.** In other words, DRCOG should use the tools' outputs to augment and support its decisions rather than relying on the tools to define solutions. Mr. Avin also noted that because these tools are new, they will require substantial resources to operate and manage both during their initial deployment stages and in later stages for data maintenance and support.

To complement the general public engagement that DRCOG will undertake as part of the Metro Vision 2040 scenario planning process, Mr. Avin suggested that DRCOG recruit a citizens' task force of approximately 30 people who could remain involved with Metro Vision 2040 over the course of the plan update. Through the task force, DRCOG could obtain deeper insight and feedback about the plan update as it unfolds. The task force could also help disseminate information about the scenario planning process and Metro Vision 2040 to others to ensure a broad network of support for the plan.

Finally, Mr. Avin posed some questions for DRCOG to consider as it designs the Metro Vision 2040 scenario planning process:

- What is DRCOG's role in this process? How much influence does it have over constituent municipalities?
- If the regional plan is misaligned with local plans, how will differences be resolved?
- What steps are in place to ensure that the scenarios and goals DRCOG presents to the public are feasible and fiscally compatible with the region's resources and intent?
- How will DRCOG continue to engage stakeholders in an honest discussion of trade-offs that emerge from the scenario planning exercise?
- How will DRCOG manage expectations about the feasibility and affordability of the plan's goals? For example, increased transit service may require costly investments that might not be realistic at this point in time.

Dr. Ewing presented components of a research study he conducted that assessed the differences and similarities between 80 scenario planning exercises.[4] The study compared scenario alternatives' performance on land use and transportation variables such as population growth, VMT, mode share proportions, and transportation investments (see Figure 3).
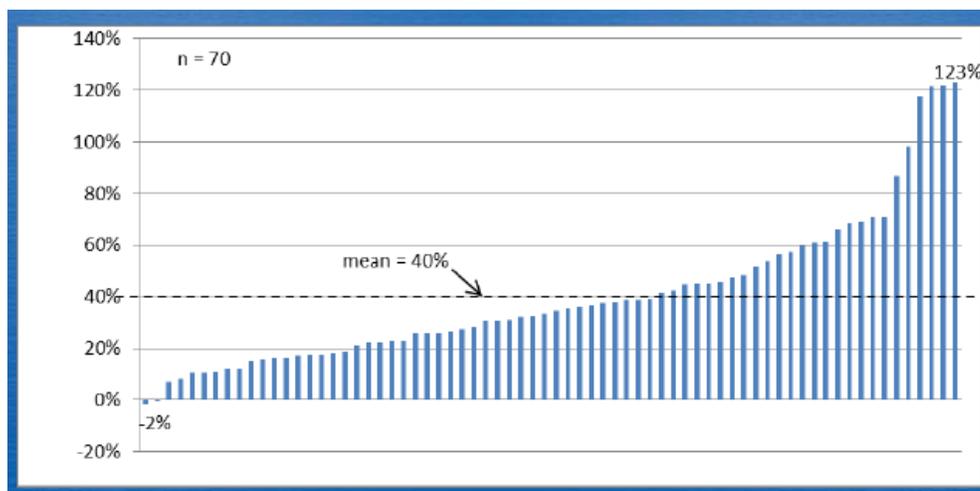

Figure 3. Average assumed population growth across all scenario planning exercises was 40 percent (in this chart, N = 70).

Through the study, Dr. Ewing examined the purpose and goals of the scenario planning processes and identified how scenario-based plans achieved their stated goals. The study also identified potential factors that may limit the success of a scenario-based plan's implementation such as growth horizons that were too short to see significant change.

Dr. Ewing examined Metro Vision 2035 alongside the other plans included in the study, identifying successful components of Metro Vision 2035 as well as potential improvements. Dr. Ewing also compared the Denver region and Metro Vision 2040 plan update with others in the study, noting areas for DRCOG to focus on and ways the agency can promote good practices throughout the plan's design and implementation:

- **There are several external trends over which DRCOG has little control but that might be helpful to include as part of scenario development and analysis.** For example, due to increased demand, fuel prices are likely to rise in the future; this will affect travel patterns as well as housing and lifestyle choices. Additionally, climate change may lead to more severe weather patterns that can impact transportation infrastructure and land uses and contribute to higher energy demand.

- **Include significant or dramatic changes as part of scenario analysis.** This will allow DRCOG to better prepare more effective strategies for the future. For example, if there was a 50 percent increase in fuel prices, housing demand in urban and transit-oriented centers could dramatically increase. Had DRCOG assumed only a modest increase in future growth and density as part of its scenarios, resulting strategies would be inadequate to meet the region's needs in the event of dramatic changes.

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[4] The study was co-authored by Keith Bartholomew. It is: "Land Use-Transportation Scenarios and Future Vehicle Travel and Land Consumption: A Meta-Analysis." *Journal of the American Planning Association* 75.1 (2009): 13-27.

- **When identifying policy recommendations that result from the scenario planning process, DRCOG should be aware of secondary or unintended effects.** For instance, the agency might recommend reducing congestion by building additional highway capacity. But this could induce nearby retail and residential development, thereby generating more traffic and limiting the benefits of the added capacity.

Paul Waddell

Dr. Waddell suggested that DRCOG be cautious of potential public resistance to the Metro Vision 2040 update and scenario planning process as based on experiences in other areas of the country. Effective strategies for mitigating any public concern include engaging citizens early on in the process, explaining each stakeholder's (e.g., citizens, planning agencies, others) roles and responsibilities in detail, and committing to transparency and inclusiveness.

Dr. Waddell also discussed additional detail about the UrbanSim model being developed in conjunction with grants from the National Science Foundation, EPA, and FHWA. UrbanSim is an open-source platform for urban and regional simulation, providing planners with a highly detailed and adaptable land use model (see Figure 4). The tool is designed to work with the activity based travel models, dynamic traffic assignment models, environmental models, or others. UrbanSim can also create interactive visualizations of development, rendering three-dimensional models of an area. These provide a powerful demonstration of different types of development at varying scales.

Figure 4. Screenshot of UrbanSim.

DRCOG will use UrbanSim for the Metro Vision 2040 update to depict regional growth and development. UrbanSim will also support an extremely detailed evaluation of scenario alternatives.

Dr. Waddell emphasized that DRCOG ensure that it adequately communicates to stakeholders the necessity of policy trade-offs. For instance, stakeholders may identify a demand for expanded highway networks and increased transit development; but they may not initially realize the cost implications of trying to accomplish both goals. DRCOG should be clear about what fiscal limitations exist and the underlying political realities that will make certain goals more or less achievable. While scenario planning can be a productive tool to foster consensus among varied parties, differences in priorities are inevitable. Preparing all stakeholders, particularly the public, for this certainty will help ensure that scenario planning will be successful in the long run.

Interactive Keypad Exercise and Breakout Groups

Following the peer presentations, PlaceMatters used Brainstorm Anywhere, its interactive tool that captures and helps sort ideas, to obtain feedback in real-time from workshop participants on Metro Vision 2040 (see Figure 4). Participants discussed several questions in a small group format, focusing on sharing their preferences for the indicators and factors that need to be considered during the Metro Vision 2040 update. The questions were posed by DRCOG; facilitators at each table, who included FHWA and FTA staff, guided the discussions.

Figure 4. Groups use keypad polling devices.

Notetakers at each table then entered each group's aggregated responses into the Brainstorm Anywhere tool. All participants were then able to use keypads to prioritize the ideas generated. At the conclusion of the exercise, the responses were displayed to all participants (see Figure 5). This exercise helped spur dynamic conversation on Metro Vision 2040 and enabled DRCOG to capture a wide range of feedback on priorities and preferences for the plan.

Figure 5. Jocelyn Hittle of PlaceMatters uses a word diagram to depict responses in Brainstorm Anywhere. The size of the word indicates the frequency with which it appeared in responses (larger words indicate more frequent responses).

Highlights from the exercise are presented below. Details on all responses received as part of this exercise are included in Appendix D.

- **What elements of the listening tour surprised you? Were there any missing elements?**
  - Some individuals believed that many listening tour respondents were already familiar with the topics at hand and were not representative of the general public. Workshop participants suggested that DRCOG communicate more clearly the methodology used for the listening tour as well as the demographic makeup of respondents.
  - Some participants expressed surprise that education was cited as a theme in the listening tour.
  - Many participants expressed concern that previous efforts to address affordable housing demand have been inadequate and that regional task forces are needed to identify consistent standards for accessibility, affordability, and quality in affordable housing developments. Participants also noted that strategies should be included in Metro Vision 2040 to support aging-in-place in communities.
  - Participants expressed a desire to see public health issues addressed in the Metro Vision plan, including issues such as obesity and asthma rates, negative health effects of environmental pollution, and the low availability of healthy food in some parts of the region, particularly in less urbanized areas and pockets within the urbanized area.

- **What indicators should DRCOG measure in the scenarios? Why are these indicators important and which ones should DRCOG focus on?**
  - Participants suggested a number of quantitative indicators to use in analyzing scenarios and voted to identify priorities. The priority indicators included: VMT, accessibility, housing and transportation costs, and public health.
  - Participants believed that showing how scenarios will reduce VMT is particularly important as this can indicate how to minimize the need for new highway construction, leading to decreased congestion, pollution, and energy usage.
  - Several participants suggested that measuring housing and transportation costs is critical to ensure that these costs do not rise to an unsustainable level. DRCOG should develop scenarios that minimize transportation costs while providing sufficient variety and quantity of housing options.
  - By identifying indicators that help measure the public health implications of scenarios, the region could reduce health care costs for residents while improving general quality of life.

- **What actions could the region take to influence these indicators?**
  - Participants suggested that DRCOG focus on policies that accelerate transit expansions and construction of planned transit and highway projects to support inter- and intra-region connectivity.
  - Participants expressed concern that it would be difficult to fund Metro Vision implementation; DRCOG should address alternative funding options such as innovative finance techniques.
  - Fostering density in city and town centers was also offered as an effective method of implementing Metro Vision 2040's policy goals. Increasing regional density would reduce overall transportation demand and also shift demand away from highways and automobiles to bicycling, walking, or public transit modes.

- **What are the external factors that will influence these indicators?**
  - Climate change is a major external factor likely to impact the region; for example, through increased fuel and energy costs, adverse weather effects, changing recreation and travel patterns, and public health impacts.

- o Changes to the national or global economy might slow development and employment growth; DRCOG should take steps to prepare for this possibility.
- o TABOR and other regional fiscal policies should be evaluated to identify ways in which the Denver region can more effectively fund Metro Vision 2040 implementation. Participants questioned what alternatives DRCOG would explore given no change in TABOR or other tax policies as well as what alternative financing mechanisms are feasible and available to accomplish Metro Vision 2040 goals.

In addition to these questions, participants engaged in discussion about their long-term goals for the region and potential challenges they saw as most significant. These discussions provided important feedback to DRCOG staff on the direction of Metro Vision 2040 and the scenario planning process.

Roundtable Discussions

During the second day of the workshop, DRCOG staff convened with the expert panel to engage in roundtable discussions focused on several topics of interest to DRCOG. Highlights from the discussions are presented below:

- **Public outreach and engagement strategies.** As part of Metro Vision 2040 outreach, DRCOG plans to form a citizens' committee comprised of 20-30 Denver region residents. The committee would support development of the plan update. In addition, other stakeholder groups will have opportunities to comment, including those formed specifically for the Metro Vision update and existing advocacy and outreach groups.

  Some experts raised concerns about the form that public input would take throughout Metro Vision 2040 process and, furthermore, how DRCOG would incorporate suggestions and input provided by various committees. Additionally, some of the experts cautioned DRCOG about preserving geographic representation and demographic distribution in the committee selection. DRCOG should emphasize that the committee will play an advisory role. The final plan will have to incorporate a broad range of requirements. Ideas from the advisory committees may not be adopted in the final version of the plan.

- **Plan overlap.** The scale and scope of how public input would be considered was also discussed. The experts expressed concerns about the process by which opinions from across the Denver region would be combined to inform the plan. Previous plans have included some components of local municipal plans; DRCOG will need to ensure that there is not too much overlap. In particular, most municipalities include plans for job growth. While the Denver region is expecting to see an increase in employment across the region, the total available increase is not likely to meet each municipality's expectation. DRCOG will need to address this potential shortage of job growth, managing municipal expectations and emphasizing that not all municipalities will be able to achieve their desired targets.

- **Market testing.** Several experts noted that other regions have effectively undertaken market testing in their scenario planning exercises. They also noted that the importance of market feasibility is commonly overlooked but is an important component of scenario planning efforts. In many cases, market forces simply do not allow for the aggressive, concentrated growth that regional scenario plans aim for. As a result, the region's performance falls short of expectations. Experts urged DRCOG to include fiscal and market testing methods in designing the scenario options that Metro Vision 2040 will evaluate.

  Market testing also supports plan implementation by ensuring that strategies are in place to help achieve the plan's goals. There are multiple ways to market test, but no consensus was reached on the most reliable method. Furthermore, although land use and transportation

models can support market testing, these may not be the most robust way of assessing fiscal realities.

- **Policy tradeoffs.** Some regional goals and growth targets might be incompatible. For example, regional housing preference surveys may indicate that the bulk of the region would like to live in low-density communities such as single-family, large-footprint lots. If that same group also indicated that they desired transit accessibility in their community, DRCOG would need to manage expectations of the enormous costs the region would incur to provide transit service to low-density communities.

- **Realistic scenarios.** Experts suggested that DRCOG avoid emphasizing the importance of the indicators used to evaluate the scenarios. Other regional planning efforts have generated scenarios that result in marginal gains in areas such as reduction of VMT, average distance traveled to work, or maximizing dwelling units per acre. While these metrics are an important way to view and compare scenarios, they do not provide the most complete picture of a given scenario. Using quantitative indicators as the primary basis for selecting a desired scenario may result in an infeasible scenario or one that requires more extensive investments than the region can afford at this time. Experts suggested that Metro Vision 2040 will be more successful if scenario evaluation focuses on how scenarios will meet regional goals rather than simply how scenarios lead to small percentage gains in indicators.

- **Feasibility of transit as a broad-scale solution.** Although many communities in the region have expressed a desire for transit service, experts raised concerns that the region as a whole does not have adequate density to warrant providing transit service. Experts cited a density of 11-12 dwelling units (DU) per acre as the minimum necessary to support downtown transit service, and many communities in Denver are closer to a density of two-three DU/acre. Although in the long term communities may see development to a degree that would enable transit, in the short term the transportation network might not be able to accommodate the expansion.

  DRCOG could emphasize strategies that encourage non-motorized transportation rather than focusing only on transit strategies and encouraging densification over time in locations surrounding activity centers where this makes sense. These strategies, combined with improving accessibility, will maximize congestion reduction and public health benefits given current levels of service and available funding.

- **Avoid relying on tools.** Some of the experts cautioned against relying too heavily on DRCOG's new analysis tools. While these provide valuable insight about development trends, outcomes, and land use inputs, their results are limited to the quality of inputs provided to the tools. With insufficient or inaccurate inputs, the tools' results may be skewed. Furthermore, the tools will require significant resources to operate and maintain, including staff time and technological and financial resources.

- **Potential to overwhelm the public.** The experts also cautioned that there is a possibility of performing *too much* public outreach as part of the Metro Vision plan. The experts suggested limiting public meetings unless sufficient new results and information are available. Repeated outreach in a single area or community may result in the public feeling overwhelmed and losing interest. This could be mitigated by distributing information through different channels, Including social media, to sustain and foster the public's interest.

IV. Conclusion

During the scenario planning workshop, participants had opportunities to better understand the Denver region, the scenario planning process anticipated for Metro Vision 2040, and potential challenges and opportunities that the update will address.

Throughout the workshop, DRCOG gained valuable feedback from the experts and workshop participants, identifying key themes and goals that should be included in the plan and areas for improvement that will help guide future workshops and meetings. Additionally, the discussions helped DRCOG consider how to best engage in scenario analyses.

As a result of the workshop, DRCOG staff gained valuable insight about stakeholders' perceptions of the scenario planning process. DRCOG will use this feedback to inform future workshops and meetings. Finally, the workshop enabled DRCOG to share lessons learned with a regional and national audience, contributing to the scenario planning practice as a whole. Overall, the insights and feedback obtained through the workshop will help DRCOG engage in a successful scenario planning process for Metro Vision 2040.

Appendix A: May 2012 Webinar Summary

In preparation for the June workshop, DRCOG conducted two webinars in April and May 2012. The April 2012 webinar was conducted as part of the FHWA/FTA scenario planning program webinar series and was open to a national audience as well as Denver regional stakeholders.

The second webinar, held in May 2012, provided an opportunity for the expert panel to provide additional insight about the tools and their implications for the Metro Vision update. The panelists raised several questions for DRCOG to take into consideration when conducting the Metro Vision 2040 update and scenario planning process, as summarized below:

- How does Denver compare to similarly sized metropolitan areas, particularly with regard to challenges and opportunities?

- Has DRCOG evaluated the Denver region in the context of national growth projections and urbanization trends?

- How does the Denver regional plan compare with those of these other metropolitan areas?

- What efforts will be taken to ensure that the Denver region builds on previous scenario planning efforts both in Denver and nation-wide?

- To what degree have goals and objectives from previous scenario planning exercises been met? If they have not been met, why not? How will DRCOG incorporate past lessons learned into implementation strategies for Metro Vision 2040?

- On what geographic scale will the June workshop and other discussions occur? Will the conversation take place at a regional scale or will there be municipal-level or neighborhood-level discussions? Who will aggregate the findings and conclusions from smaller discussions back to the regional level, and how will DRCOG address any differences and conflict?

- Visioning exercises may not adequately address the reality of conflicting regional demands and expectations; how will DRCOG balance any conflicting demands that emerge?

- What are the "what-ifs" that have not been addressed in previous scenario planning efforts? How might they influence the scenarios that DRCOG presents to the public? For example, increasing fuel prices or climate change may lead to significant changes in travel behaviors, housing preferences, and large-scale regional development and growth rates. How does DRCOG plan to take these external trends into account?

Following the experts' discussion of these questions with DRCOG staff, staff provided experts with more background and logistics information to help them prepare for the June workshop.

Appendix B: Webinar and Workshop Agendas

April Webinar Agenda

1:00 pm   Welcome and purpose of webinar
            Charlie Goodman, Director, Office of Systems Planning, FTA

1:05 pm   Introduction of webinar speakers
            Jim Thorne, FHWA Resource Center

1:10 pm   Overview of DRCOG's Previous Scenario Planning Efforts and Metro Vision 2040
            Jill Locantore, DRCOG

1:30 pm   DRCOG's new scenario planning tools
            Erik Sabina, DRCOG

1:45 pm   Expert panel
            Reid Ewing, University of Utah
            Kevin Krizek, University of Colorado
            Paul Waddell, University of California at Berkeley
            Uri Avin, National Center for Smart Growth, University of Maryland[5]

2:30 pm   Q&A
            Jim Thorne, FHWA Resource Center

2:45 pm   Conclusion
            Jim Thorne, FHWA Resource Center

May Webinar Agenda

1:00 pm   Welcome and introductions, purpose of May 30 webinar, recap of April 5 webinar
            Jill Locantore, DRCOG

1:05 pm   The Denver region today: challenges, opportunities, trends
            Fred Sandal, DRCOG

1:25 pm   Q&A

1:35 pm   Metro Vision 2040 Listening Tour preliminary results
            Kevin Williams, BBC Research and Consulting

1:55 pm   Q&A

2:05 pm   June 7 workshop agenda and roles
            Jill Locantore, DRCOG

2:15 pm   Q&A

June Workshop Agenda

June 7 – All attendees

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[5] During the June 2012 workshop, Mr. Avin was with Parsons Brinckerhoff

12:30 pm	Welcome and overview of the day
	Jim Taylor, Immediate Past Chair, DRCOG Board, Littleton Council Member

12:45 pm	Metro Vision 2040: Where are we now and where are we going?
	Jill Locantore and Fred Sandal, DRCOG

1:00 pm	FHWA and FTA perspectives on scenario planning
	Rae Keasler, FHWA
	Faith Hall, FTA

1:15 pm	Metro Vision 2040 Listening Tour Preliminary Results
	Kevin Williams and Jen Garner, BBC Research and Consulting

2:00 pm	Commentary from expert panel on regional planning and scenario analysis
	Reid Ewing, University of Utah
	Kevin Krizek, University of Colorado
	Paul Waddell, University of California at Berkeley
	Uri Avin, National Center for Smart Growth, University of Maryland

3:00 pm	Tabletop discussions: "What if?" Alternative future scenarios for the Denver region
	Introduced by Jocelyn Hittle, PlaceMatters

3:50 pm	Break

4:05 pm	Audience polling and commentary on key themes from tabletop discussions
	Jocelyn Hittle, Place Matters
	Expert panel

4:55 pm	Wrap-up and next steps
	Jim Taylor, Immediate Past Chair, DRCOG Board, Littleton Council Member

June 8 – DRCOG staff, FHWA/FTA staff, and expert panel

8:00 am	Recap of highlights from day one and introduction to day two
	Jocelyn Hittle, PlaceMatters
	Jill Locantore and Erik Sabina, DRCOG

8:15 am	Roundtable 1
	Moderated by Jim Thorne, FHWA Resource Center

9:45 am	Roundtable 2
	Moderated by Jim Thorne, FHWA Resource Center

11:00 am	Wrap up and next steps
	DRCOG staff

Questions for Roundtable #1: Building and Assessing Scenarios
- Based on the workshop discussions and results of the Listening Tour, how might DRCOG best use scenario planning to explore the issues that came up?
  - Which issues are best suited to scenario planning, versus other methods?
  - How could DRCOG "operationalize" each issue?
    - What would be key scenario inputs?

- How would DRCOG measure the scenario outcomes? What would be key indicators?

- To what extent should the scenarios vary "external variables" that are beyond DRCOG's control? What assumptions should be held constant across the scenarios?

- What's the proper balance between "realistic" scenarios versus more extreme scenarios that may be unlikely due to political or other factors but more clearly illustrate the alternatives?

- Are there constraints that DRCOG should consider when building or assessing scenarios?

- What add-ons to DRCOG's new tools would experts suggest ("off the shelf" or otherwise)?

Questions for Roundtable #2: Next Steps
- What are key lessons learned from other regions' scenario planning efforts? Pitfalls to avoid?

- How can DRCOG maintain the momentum built from this workshop and these roundtables?
   - How can DRCOG use scenario planning as a tool for engaging both traditional and non-traditional partners?

- What does DROCG need to get started (e.g., data, staff, funding)?

- Are there other resources that the experts can recommend?

- Do the experts feel confident that DRCOG is well situated to proceed with establishing scenarios for evaluation?

- What happens after scenario analysis? How can the outcomes be best translated to the public/community?

Appendix C: Workshop Attendees

Name	Organization/Agency
Adrienne Dorsey	Adams County
Alan White	City of Englewood
Alice Hanson	City and County of Broomfield
Alisa Fine	USDOT Volpe National Transportation Systems Center
Amelia Sidinger	Volunteers of America, Safety of Seniors Handyman Program
Angie Fyfe	Governor's Energy Office
Arthur Griffith	Douglas County, Engineering
Beth Wyatt	Community Enterprises
Bill Haas	Federal Highway Administration, Colorado Division
Bob Watts	Castle Rock
Bob Yunke	Southwest Energy Efficiency Project
Brad Queen	Center for Resource Conservation
Bradley Zieg	InterNeighborhood Cooperation
Bryce Matthews	Town of Parker
Carol Maclennan	Pleasant Hill Properties, LLC
Carolyn Ingebritson	Your Castle Real Estate
Caryn Wenzara	City and County of Denver
Catherine Marinelli	Metro Mayors Caucus
Cec Ortiz	Rose Community Foundation
Chad Ochsner	REMAX Alliance
Charmaine Knighton	Federal Transit Administration, Region 8
Chris Spelke	Denver Housing Authority
Christine Connally	Denver Regional Council of Governments
Christopher Conner	Denver's Road Home
Cindy Christensen	Christensen Consulting, LLC
Crissy Fanganello	PW Policy & Planning
Curt Weitkunat	Douglas County
Darin Stavish	Colorado Department of Transportation
David Gaspers	City and County of Denver
David Beckhouse	Federal Transit Administration, Region 8
Deirdre Oss	City of Denver CPD
Ed Peterson	Colorado Department of Transportation
Ellen Ittelson	City and County of Denver

Name	Organization/Agency
Elliot Sulsky	Felsburg Holt & Ullevig
Erik Sabina	Denver Regional Council of Governments
Faith Hall	Federal Transit Administration
Fred Sandal	Denver Regional Council of Governments
Gene Putnam	City of Thornton
Glenda Lainis	City of Thornton
Gretchen Armijo	Colorado Department of Public Health and Environment
Hope Dalton	Tri-County Health Department
Huiliang Liu	City of Aurora
J.J. Folsom	MIG, Inc.
Jacob Riger	Denver Regional Council of Governments
Janice Finch	City and County of Denver
Jayla Sanchez-Warren	Denver Regional Council of Governments
Jennifer Tomeny	Denver Inter Neighborhood Cooperation
Jessica Osborne	Colorado Department of Public Health and Environment
Jessica Prosser	City of Arvada
Jessica Scott	City and County of Denver
Jill Locantore	Denver Regional Council of Governments
Jim Benson	City of Commerce City
Jim Taylor	City of Littleton
Jocelyn Hittle	PlaceMatters
Jody Norman	JNN Enterprises
Joe Fowler	Douglas County
Joe Gierlach	Nederland
John Fernandez	City of Aurora
John Firouzi	City of Arvada
Jon Cater	Federal Highway Administration, Colorado Division
Judith Marquez	FRESC
Julie Farrar	Denver Commission for People with Disabilities
Julie Herman	Colorado Green Building Guild
Julie McKay	Boulder County
Karly Malpiede	Congresswoman DeGette
Kathleen Osher	Transit Alliance
KC Becker	City of Boulder

Name	Organization/Agency
Keith Walzak	MIG, Inc.
Ken Lloyd	Regional Air Quality Council
Kevin Krizek	University of Colorado
Kim Larson-Cooney	Arapahoe Community College
Kristine Chan-Lizardo	University of Colorado Denver
Laura Hoeppner	City of Centennial
Lisa Randall	Federal Highway Administration Resource Center
Lisa Wild	General Services Administration
Loretta Daniel	City of Aurora
Lynn Goering	Centennial Senior Commission
Mark Shotkoski	Northwest Parkway LLC
Marsha Osborn	City of Aurora
Marty Hudson	Castle Rock
Marv Falconburg	City of Brighton
Mary Munekata	Town of Parker
Matthew Appelbaum	City of Boulder
Megan Carr	Civitae
Meghan McColloch	Castle Rock
Melissa Kendrick	Kendrick Consulting Inc.
Michelle Martin	Weld County
Mike Salisbury	Southwest Energy Efficiency Project
Molly Hanson	Jefferson County Public Health
Pat Palmer	Centennial
Patrick Horvath	The Denver Foundation
Paul Waddell	University of California at Berkeley
Pete Tovani	ET Squared
Phil Cernanec	City of Littleton
Rae Keasler	Federal Highway Administration
Randall Rutsch	City of Boulder
Randle Loeb	Metropolitan Denver Homeless Initiative
Richard Kisseberth	Poli-Health Inc.
Robin Reilley	Denver Regional Council of Governments
Robin Smith	Federal Highway Administration
Rod Horton	Colorado Association of Transit Agencies

Name	Organization/Agency
Rod Vaughn	Federal Highway Administration Resource Center
Russell Clark	Jefferson County
Sally Payne	City of Wheat Ridge
Samaria Crews	FRESC
Sharon Richardson	City of Federal Heights
Sheila Lynch	Tri-County Health Department
Stacey Nerger	Adams County
Stephen Mikolajczak	City of Lone Tree
Steve Erickson	Denver Regional Council of Governments
Steve Hebert	City of Lone Tree
Steve Koster	Douglas County
Stuart McArthur	Town of Bennett
Su Ryden	Colorado House of Representatives
Susan Aldretti	Denver Metro Association of Realtors
Susan Wood	Regional Transportation District
Suzi Walker	Denver Regional Council of Governments
Tanya Ishikawa	Federal Heights
Terry Ruiter	City and County of Denver
Tim Frazier	Colorado Department of Transportation
Tina Yankee	Our Savior's Lutheran
Tom Quinn	Lakewood City Council
Uri Avin	Parsons Brinckerhoff
Vivian Stovall	Colorado Commission on Aging
Wes Marshall	University of Colorado Denver
Will Toor	Boulder County
Yuki Yamada	USDOT Volpe National Transportation Systems Center

Appendix D: Brainstorm Anywhere Responses[6]

Question 1: Were there missing elements from the Listening Tour?
- Would like to see strategies to support local businesses and local economy with the context of the region as whole
- With RTD's W corridor line, identified need for density at each of these stations. What about the people that already live in close proximity of the stations and the impact on their lives? Will rent go up and will people get forced out of the area
- Bike friendly, walkable communities well covered but does not adequately cover ADA accessibility
- Importance of the Platte River and its connection to economic development
- Homelessness
- Importance of density and location and how to target it and make good out of it
- Climate change and resiliency, how to adapt, sustainability issues, Peak oil
- Trade-offs that you face in development, lack of understanding; can't have it all
- Food production, politics, and solutions
- Social equity, looking at ALL minorities
- Choices weren't required, we want it all was the result
- Who was contacted, what was the methodology?
- For the in depth interviews; who were they?
- Would like to see the listening tour report, we're just seeing this, would like to digest
- Follow the wish list ideas through this process, would like to see a comparison later
- Tradeoffs and challenges
- How would these answers be different from 5 years ago? What was new about this information this time around?
- Need to be able to better map trends to tradeoffs. There were not a lot of opportunities to discuss these tradeoffs.
- Divide those who are informed and those not familiar with DRCOG
- Desire to have it all
- Difficult to discern an outstanding issue to people
- Everything seemed fairly even in question
- Ranking of choices in the listening tour
- Discussion about Vision as in metro vision, more focused on reiteration of common problems
- What is unifying vision behind issues that we can work towards
- Having a report card on what we've done before asking where we want to go
- Lack of momentum for health care in long term
- To planning need funding, tabor keeps us stuck
- Expanding areas like 16th St Mall
- LRT is the most expensive in terms of fares to user
- Housing options is an important discussion
- There are a lot of surface parking lots that could be in-filled, need to look at incentives/dis-incentives. Need to discuss
- Acceptance of density
- Looking to local officials for sustainability and density
- Make local officials accountable
- We do not meet current air quality standards, ozone standards
- People do not want to see density
- Affordable housing attacked viewed negatively; How to get beyond affordable housing perceptions

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- Education about affordable housing
- Workforce housing branding
- Money spent on outside infrastructure
- No developer will go to area if outside infrastructure demand is too great
- Local government finance; How do you pay for everything and what happens if you don't pay for it?
- Action items

Question 2: What indicators should we measure in our scenarios?

Top Ideas[7]
- Per capita energy use in built environment (commercial, residential, affordable and accessible housing, and public sector building including schools)
- Length of residency and home ownership
- Where people live vs. where people work (housing production vs. current stock)
- Usage of transit by mode by age
- Degree of mixed use.
- Number of transportation options available to residents that appropriately matches the area (rural vs. suburban vs. urban)
- Cost of housing and transportation as percentage of total income
- Public health, asthma rates, obesity rates
- Mode share
- Accessibility to services and jobs - Kevin's table
- Health (e.g., accessibility to food, parks, care, costs of care, how is care financed)
- Economic indicators - jobs accessible by mode/how much these jobs pay, VMT user fees, true costs of transportation (across all modes/populations, regional wealth)
- Some measuring of VMT
- Housing and Transportation Costs
- Accessibility - to sites, services, destination (as well as right at the sites) plus bike pedestrian stuff
- Infrastructure cost with each scenario. TOTAL "costs" (e.g. transportation, and other things) ROI
- Mode share - even though it hasn't changed much, still important to measure
- Housing characteristics, size of houses, household composition and size, housing preferences, affordability (H+T) index, ability for those with fixed incomes to find suitable housing

Other Ideas
- Utility costs as percentage of income
- Universal design
- Need to track affordability related to transit
- Type of housing
- Water demand for different development scenarios
- How many houses are intergenerational (household makeup, access)
- Access to services, particularly for high need populations
- Health issues
- Healthcare availability (beds per capita)
- Fiscal impact of growth (positive and negative)
- Percentage of sidewalks and streets ADA compliant

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[7] Each participating group was asked to highlight the top two ideas from their table's discussion.

- Number of banks and credit unions increasing loans to small businesses
- Look at the jobs/housing balance and make sure the types of housing available near jobs are a good match
- Citizen debt
- Water quality and quantity
- Vehicle miles travel, other methods of travel, time and accessibility
- Rate of success of education, educational outcomes; high school graduation rates
- Homelessness
- Employment
- Job training
- Number of people driving alone vs. carpools/high occupancy vehicles/other methods of transportation
- Disparities across different communities and minority groups
- Homeownership
- Varieties/diversity of housing options
- Traffic congestion
- Water use
- Happiness/contentment
- Length of intended stay/living in the city
- Energy use
- Perception of crime on transportation choices and where to live
- Personal health as impediment to consider biking walking - active transportation
- Measures of effectiveness and number that dropped off in past scenario planning need to revisit them
- VMT
- Access to education health care employment
- Water conservation and efficiency
- Reduction in VMT
- Person-per-square-mile density
- Acres of open space
- Number of bus route added on annual basis
- Number of seniors moving to specific communities
- Accessibility to housing
- Accessibility vs. mobility measures, not measuring mobility for mobility's sake
- Percentage of short trips that have mode changed to bike and pedestrian or safe bike and pedestrian infrastructure accessibility measure.
- Choices in neighborhoods
- Gaps in services, food deserts is one example, what other services do people need
- Education, how to measure workforce development of our own kids vs. influx (could also apply to health issue).
- Education, how to keep people in neighborhood schools, good schools across the region
- Equity measures
- Housing and transportation combined cost of living
- Quality of life/accessibility of opportunity indicators (e.g., what happens with water and how they could constrain growth or cause costs to rise?)
- Water usage and quality
- Utilization of other modes
- Sub-regional differentiation/baseline identification
- Education/quality of education
- Climate change, environment greenhouse gases, carbon dioxide
- Food cost and access to food

- Cost of local food vs. cost of food imported from a distance, trade-off costs
- Transportation, average trip length to meet daily needs, trip distance and time
- Cost of transportation and number of transportation options
- Cost of living
- Access to education, measuring success in education levels
- Education funding and how that effects quality
- Number of unrelated people living in same household
- Top two choices for group are: 1) cost of living comprised of transportation, food, housing costs (used as a macro indicator); 2) accessibility to necessary services and goods as a proxy for quality of life
- Don't outdo Urban Growth Boundary
- Combine costs of affordability and transportation
- VMT
- Amount of land consumed for urban growth
- Amount of open space set aside
- Miles of highways not added to the system
- Housing and affordability
- Jobs housing balance
- Don't assume someone will buy a house and work in area for 20 years
- Accessibility vs. distance
- Distance to schools, grocery stores, etc.
- Walkability index
- Health
- Safety, driving on the roads is dangers
- Solving congestion is not a goal
- Not adding indicators but rather understanding them
- Bicycle, biking access, pedestrian
- Transportation choices and housing choices
- VMT: air emissions, energy consumed, cost of system, cost of fuel
- Different types of VMT
- Parking spaces
- Innovative walkability index that connects
- Access to all travel needs
- Transit and food deserts, access to services and needs
- Walking and bicycling mode share
- Foreclosure and neighborhood stabilization measures (e.g. crime
- Water-management and infrastructure
- Trip distances to services etc., not just time
- Availability of multi-modal facilities, connectivity barriers
- Housing plus transportation cost
- Health indicators - wide variety
- Traffic safety pedestrian bicycle walk cars fatalities
- Middle skill job access
- Total transportation costs - public and private
- Walkability and bikeability measures
- Weather extremes and how we are prepared to respond to them
- VMT and VMT per capita, trip distances, daily activity patterns, how these patterns change with land use
- urban design, sidewalk characteristics, amenities for pedestrians and citizens, "eyes on the street", complete streets

- Number of households that are within a particular distance to transit, i.e. transit accessibility
- Access to healthy food, being able to walk/take transit to the grocery store; access to recreational opportunities

Question 3: What actions could the region take to influence these indicators?

Top Ideas[8]
- Include per capita energy factor in transportation and affordability
- Develop integrated model where everyone agrees on increased transparency
- Get a better sense of vision for 2040 (what those changes mean, what the future actually looks like)
- Start thinking of planning for economic development as a region (stop competing with each other for econ development opportunities), think of the region as a unit
- Incorporating the residents into the conversation about the type of changes that might happen in the area as a result of regional projects.
- Offer more incentives to the developers and builders for including bike lanes, access to transit, mixed use etc.
- Retrofit existing urban land use patterns to make them more walkable, bikeable, etc. (focus on urban form) example: infill
- Focus on equitable means of transportation for individual communities, specifically low-income and minority groups
- Build out FASTRACKS sooner than later
- Fix the state constitution TABOR
- Address state constitution limitations to resolve financial challenges
- Implement a complete transportation network for metro area - this is the only way a community could increase density/quality of life. We need "first mile/last mile" connections.
- Regional policy and coordinated approach to underserved populations
- Maximize efficiencies in infrastructure
- Ability to walk to activities, for everyone and kids
- Need to increase density. Need to support people willing to take a chance with density.
- zoning and density
- Housing costs and transportation
- Communities to have political will to appropriately locate development/redevelopment/infill and accessibility
- Transportation pricing
- Urban growth boundary or more compact developments
- Invest more and do Incentives for good things - e.g., bike pedestrian facilities, last mile etc. expanded connectivity
- Incentivize mixed income housing; e.g., at transit stations and other places
- More investment in walking, public transit, biking, wayfinding, not just money but marketing and outreach/training, too
- Innovative financing measures to have leverage to implement projects; example: regional infrastructure bank

Other Ideas
- Leveling the playing field between public and nonprofit developers
- Make transparency within governments
- Evaluate fiscal impacts of growth
- Encourage more mixed use development (remove financial and regulatory barriers)

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[8] Each participating group was asked to highlight the top two ideas from their table's discussion

- Provide reduced/free fare to encourage transit use
- Start thinking about revenue sharing for certain services between municipalities/governments (could happen through DRCOG, etc.)
- Stop pitting planning and economic development against each other
- DRCOG identifies and coordinate initiatives that could have best impacts regionally (example: aerotropolis, public/private partnerships,
- Start thinking of DRCOG as a unit
- Working water appropriation rights to allow rain catchment legal
- Create a process for understanding what's possible and understand benefits and trade-offs (i.e., impact of cutting of access points in certain places.)
- Increase the number of bike lanes
- Invest in multiple modes of transportation within each corridor; transit, walking, and biking
- Educate communities to solve their problems; use other methods of motivation than funding
- Build more bike lanes
- Adopt inclusionary zoning ordinances
- Region engaged in land banking especially around transit stations
- Statutory changes to support more comprehensive planning mandatory elements
- Connectivity between multimodal forms of transportation
- Revenue sharing of sales and property taxes, (worked for stadiums, other special districts)
- Regional schools equity, strengthen neighborhood schools
- More programming authority vested in DRCOG with a stronger tie to goals, more teeth
- Economic development industry clusters , tie education toward the sectors of economy we're trying to recruit
- Density/land use - controlled by municipalities. Regional coordination is contentious and this has not traditionally been DRCOG agenda to deal with this. Difficult to identify a single action!
- Look at active transportation systems at regional level and make some incentives/requirements (or promote existing ones) that Federal/State funding need to include complete streets design.
- Promote Bike to Work Day. Need to create/encourage/develop more life experiences where folks can engage in different modes of transportation (e.g., how to use bus/ask for transfers, etc.) - to increase comfort levels. Need to start as early as possible. Expand current programs and institutionalize policies to promote alternative transportation by schoolchildren.
- Stronger focus on urban centers/more equitable and flexible definition of transportation terms (e.g., corridor, cluster, center) on a regional basis.
- Find a way for local governments to help equitably implement vision.
- Cool roof technologies
- More parks
- Electric charge stations
- Foster and support non profits
- What urban form will minimize cost of government infrastructure and maintenance
- Minimize need for additional infrastructure
- Promote infill rather than greenfield development
- Coordinate comprehensive plans and measure value of coordination through sustainability indicators to remove barriers
- One method throughout region for evaluating comp plans
- Impact fees and pricing policies
- Providing infrastructure to minimize climate change and energy dependence
- Show the true costs of transportation. Need more education as part of process
- Health/obesity especially childhood

- Show the subsidies to all modes of transportation. Which gives the best return on investment?
- Public health component
- Look at tax code, limitations on what can do and how it affects things. Limitations of sales tax approach.
- Look at other ways to fund operations and maintenance.
- Is the walking infrastructure there?
- Modify zoning codes to allow higher density, reduce parking, and provide more affordable housing. Education of residents as to why
- Can we do an overall regional walk-score
- Need to build a political will to support density. Douglas County has an unlimited density zone but no one will fight the political battle
- Vehicles in the local level, can people give up their cars
- Vehicle cost per mile, what is real cost to operate?
- Visualize what density will look like
- Cost of time of driving, vs. ability to do other things on transit
- Public officials that understand the issues
- Time of travel is very important factor, big lifestyle impact. VMT masks other factors like impact of congestion
- Have people take pictures of what they want. Helps to visualize what they want
- Real costs of building all these roads. Long-term costs. Opportunity costs
- Need facilities for all modes to access property- ramps, bike parking, etc. Needs to be reflected in codes
- The vicious cycle of induced travel
- Need more visualization and experience of all modes to know how to plan for them
- Temporary nature of congestion relief due to road construction
- Ability to maintain the roads we build, O&M. Many governments have decreasing budget in O&M even if can build new roads
- All the crumbling bridges, what is becoming unsafe
- Walking and biking
- Pricing policies that make develop pay more, why taxpayers pay for large private development
- Transportation Improvement Program allows more development
- Where do we put new development
- Where do we put the new jobs? Put jobs within walking/transit distance of housing
- Only need to buy house close to transit
- Still demand for single family, suburban
- Parking with new developments
- Regional fee for every existing and new parking space
- Where we locate new develop in relation to new jobs
- Rewriting zoning code
- Communities need help making political decisions
- DRCOG needs economic development department to assist communities make political development decisions
- Pricing for everything
- More pricing mechanisms. Shifting costs. Experience direct costs of driving
- Parking management
- "Reward" good planning and zoning actions
- Reduce parking lots and structures at transit stations
- More transit routes in neighborhoods

- Better partnership and collaboration regarding affordable housing, and quality affordable housing for seniors and the disabled
- Create a regional food hub - aggregates distribution from small sources and allocates fresh food across the region

Question 4: What are some external factors that might affect the indicators?

Top Ideas[9]
- Alternative macroeconomic models that includes the cost of natural resources
- Regional climate change
- Peak oil
- The economy
- Peak oil; gas prices change; cost of motorized transportation (surcharges, tolls, fares, etc.)
- Global warming/climate change, increase in natural disasters
- Global economy
- Climate change
- New transportation modes, e.g., driverless cars/vehicles
- Economic factors, e.g., recession, continued funding challenges, need for very difficult trade-offs such as health care
- Politics
- Fuel/energy costs, alternative fuels - what will this mean?, electric cars, widespread plug ins for electric cars, nuclear fusion
- Our future environment - climate change
- Economic issues
- Resistance to taxes
- Economy is always a factor
- national and global economy
- Cost of oil
- Federal agency policy changes emphasis areas of FTA, FHWA, HUD, EPA, etc.
- The water situation, droughts, shortages
- Resistance by realtors and lenders to embrace the changing market
- TABOR, and the ability to pay for programs

Other Ideas
- Cost of natural resources
- Need a valid economic model that has tipping points in it
- China
- Stagnant economy
- Questioning underlying assumptions
- Acknowledging global warming
- Climate change
- Drought
- Political climate
- Natural disasters
- Scientific breakthroughs that affect our lifestyle
- Lending practices specifically in regards to home loans change
- Drinkable/potable water availability
- Presidential/government official elections
- Changing public attitudes about active living, health

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[9] Each participating group was asked to highlight the top two ideas from their table's discussion

- Political will
- Job market, national economic trends
- International political or economic strife, wars, displaced persons, etc.
- Fluctuation of materials cost for built environment projects
- Political will to address issues
- International instability
- State and Federal funding
- TABOR, Galagher, initiative process (state constitution), policy environment, surface transportation authorization, other Federal regulations
- Energy prices
- Public health, impact on economy, resources, drain on public sector
- Global economy
- Gas tax is a perverse incentive, need a new user fee paradigm
- Dwindling water resources and an increase in wildfires
- Terrorist attack
- Increase building construction costs
- Raising energy costs
- Civil unrest, increased crime
- Income disparity leading to civil unrest
- Political gridlock
- Immigration
- Technology changes that we can't foresee
- Population migration
- Demographic shifts
- Value of dollar in trade
- Collapse of financial markets
- Veterans issues on healthcare
- Epidemic
- Lack of financing, Federal funding decline
- Need to get past only me, short term view. Foster long-term view
- Technology change. What if jobs do not come back due to computers? etc. Eliminating working class and middle class jobs
- Pandemic
- Need an education process of what is needed to keep area doing well in terms of funding. Skiers need to get to mountains, etc.
- The problem of earmarks and uncertainly of Federal funding
- Banks, finance
- Weather patterns, forest fires changes relocation patterns and choice in housing
- Cost of energy
- Interest rates
- Crumbling infrastructure
- Federal dollars
- Who wins the election
- Federal regulations
- Tax credits for home ownership
- Cultural shift
- Demographic shifts
- Obesity
- Constructions costs
- Cost of light rail

- Maintenance
- VMT/mileage fee/tax
- Extreme gas price increases and shortages
- School open enrollment policies
- Federal funding
- Gas prices
- Global economic repercussions
- Cost of education is prohibitive to economic health