An aerial map of East Lansing, Michigan, showing a grid of streets and a winding road. The map is overlaid on a dark blue background.

Federal Highway Administration Scenario Planning

Peer Workshop

East Lansing, Michigan

July 13, 2010

Location: East Lansing, Michigan

Date: July 13, 2010

Workshop Sponsor: Federal Highway Administration

Workshop Host Agencies: Michigan Department of Transportation
Federal Highway Administration, Michigan Division
Tri-County Regional Planning Commission

Workshop Participants: Battle Creek Area Transportation Study
Chittenden County Metropolitan Planning Organization (MPO)
City of Kalamazoo
Delta Township
Genesee County MPO
Indian Trails, Inc./Michigan Flyer
Kalamazoo Area Transportation Study
Macatawa Area Coordinating Council
Oshemo Township
Southeast Michigan Council of Governments
Southwest Michigan Council of Governments
Washtenaw Area Transportation Study
West Michigan Shoreline Regional Development Commission

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I. Summary

The following report summarizes a scenario planning workshop in East Lansing, Michigan. The workshop was a one-day technical session that preceded the 34th Annual Michigan Transportation Association Conference. The workshop provided an overview of scenario planning and shared examples from agencies nationwide that have implemented the technique. Event participants discussed general scenario planning process steps as well as analysis tools for developing, analyzing, and evaluating scenarios. Also discussed were potential challenges and benefits, possible outcomes from scenario planning, success factors, and lessons learned.

During the workshop, speakers from the Federal Highway Administration (FHWA) Office of Planning and the U.S. Department of Transportation (USDOT) Volpe Center provided participants with an overview of scenario planning and general process steps. A peer speaker from the Chittenden County Metropolitan Planning Organization (CCMPO) in Burlington, Vermont, detailed that agency's use of scenario planning to develop and update long-range transportation plans. A speaker from the FHWA Resource Center described analysis tools to assess scenarios and provided examples. Several breakout sessions facilitated dialogue about important economic, demographic, and other trends in Michigan, as well as impacts on transportation and other factors (e.g., land use). These sessions also provided opportunities for participants to discuss concerns and questions related to scenario planning, ideas for getting started, and possible next steps to continue ongoing efforts. See [Appendix A](#) for a list of key contacts and the workshop agenda.

The FHWA Michigan Division Office, Michigan DOT (MDOT), and the Tri-County Regional Planning Commission in Lansing, Michigan, co-hosted the workshop in East Lansing. Event invitees included staff from FHWA, Michigan DOT, ten of Michigan's MPOs and Councils of Government (COGs), and representatives from the City of Kalamazoo, Delta Township, Oshemo Township, and Indian Trails, Inc./Michigan Flyer. See [Appendix B](#) for a complete list of speakers and invitees.

II. Background

Scenario planning is a technique to identify and assess future alternatives related to transportation, land use, and other factors. Scenarios present stories about the future, with each alternative suggesting a different set of possible conditions and outcomes. One of the defining features of the technique is that it provides a framework for actively involving the public, the business community, and local elected officials on a broad scale. Through scenario development and assessment, stakeholders are educated about and provide feedback on the critical trends addressing a region or study area and trade-offs related to future decision-making. Stakeholder feedback can then be incorporated into plans for the future.

III. Presentations and Discussion

A. Welcome

Chris Dingman, FHWA Michigan Division Office

Mr. Dingman welcomed participants to the workshop. The purpose of the workshop is to encourage conversation on scenario planning tools, processes, and best practices so that participants can apply the technique to their own agencies, regions, or study areas.

Mr. Dingman noted that MPOs are not mandated to use scenario planning. However, the technique can enhance the traditional planning process and has become more common in transportation planning. The workshop will help expose staff from Michigan DOT and Michigan's MPOs and COGs to the concept of scenario planning, its potential benefits and challenges, and peer applications. The FHWA Office of Planning and FHWA Michigan Division can provide guidance on implementing scenario planning, including identifying available funds or facilitating dialogue between regions interested in the technique.

B. Overview of Scenario Planning

*Sharlene Reed, FHWA Office of Planning
Alisa Fine, USDOT Volpe Center*

Ms. Reed and Ms. Fine presented an overview of scenario planning and FHWA's scenario planning program. Transportation scenario planning typically involves engaging the public to create and assess a range of future alternatives. By comparing each alternative against a series of indicators, stakeholders can make better decisions about transportation investments or policies. Broadly, scenario planning helps visualize "what could be." Agencies can use the technique at many geographic scales (e.g., statewide, corridor, and regional levels) and in fast- or slow-growing regions to help anticipate future growth trends, prioritize use of limited resources, or engage the community in discussions of preferences, goals, and values. It is an adaptable and flexible technique that supports many planning activities, including long-range, corridor, or statewide planning. Stakeholders can also use qualitative or quantitative tools to analyze scenarios and outcomes.

Ms. Reed provided some historical context for scenario planning. Private industry, most notably Shell Oil, initially used the technique to support strategic and business planning. Beginning in the 1960s, transportation agencies began to use the technique to support transportation planning. This application of scenario planning has become more common over time. There are now hundreds of examples from across the country, many of which are described on the FHWA scenario planning website at www.fhwa.dot.gov/Planning/scenplan/index.htm.

FHWA Scenario Planning Program

In 2004, FHWA established a scenario planning program to promote use of the technique. As part of this program, FHWA:

- Provides feedback on efforts being planned or implemented
- Facilitates scenario planning workshops. Since 2004, FHWA has sponsored 16 workshops in 16 states.
- Shares information on nationwide efforts through workshop reports and case studies on innovative practices or lessons learned.
- Identifies resources for use in scenario planning, including public involvement and analytic tools.

Several Federal policies or programs encourage the use of scenario planning, including the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU requires that MPOs and state DOTs employ visualization techniques to describe transportation plans and that MPOs utilize a public participation process to support public feedback on the metropolitan transportation plan. Use of scenario planning can facilitate agencies' abilities to meet both of these requirements. Additionally, a set of guiding livability principles has been offered through the USDOT's recent partnership on sustainable communities with the U.S. Environmental Protection Agency and Department of Housing and Urban Development.¹ The partnership promotes scenario planning as a tool to help better integrate land use and transportation.

Next Generation Scenario Planning

Transportation agencies using scenario planning have typically focused their efforts on the relationships between transportation, land use, and demographic growth or declining growth. They have also typically used scenarios to build consensus around preferred growth patterns and transportation investments.

FHWA has identified some recent efforts as 'next generation' scenario planning. These efforts go beyond typical areas of focus to consider new trends, less predictable factors, or factors that are beyond the agency's control. New generation scenario planning might use scenarios to explore broader risks and potential transportation and land use impacts associated with:

- Demographic shifts (e.g., aging populations).

¹ For more information on the partnership, see www.epa.gov/smartgrowth/partnership/index.html

- Technological development (e.g., use of green technologies or alternative fuels).
- Fuel prices (e.g., peak oil situations).
- Climate change.
- Economic shifts.

Overall, new generation scenario planning efforts seek to capture a broader range of issues and challenges than previously considered in scenario creation and analysis. For example, the Southern California Association of Governments (SCAG) is now using scenario planning to determine what strategies might help bridge the gap between a statewide greenhouse gas emission reduction target and projected emissions based on current plans. Scenario development and analysis for this effort will be conducted through a series of sub-regional workshops. New generation scenario planning efforts may also use innovative methods to communicate with the public. For example, with the help of a consultant, the Chicago Metropolitan Agency for Planning (CMAP) developed an online tool to allow the public to construct customized scenarios, choose indicators, and view the outcomes.²

Scenario Planning Challenges

Ms. Fine detailed some common challenges encountered by some agencies, as well as potential responses to address these challenges. For example:

- **Finding time and resources.** Scenario planning can require coordination between many stakeholders, from several dozen to hundreds, over an extended period of time.³ Collecting data to build scenarios, as well as identifying and refining appropriate analysis tools, can be resource-intensive. To address these challenges, some transportation agencies have found success using 'low-tech' methods that require fewer technical resources or staff. For example, the Metropolitan Washington Council of Governments (MWCOC) in Washington, D.C., developed a one-day scenario planning workshop where participants qualitatively assessed scenarios. The total cost of the workshop was \$50,000. Partnerships with nonprofits or universities can also be an effective way to leverage resources.
- **Difficulty defining the key issues for scenarios.** Planning for extremely unlikely scenarios might not be the best use of limited resources. On the other hand, comparing scenarios that are too similar might not result in a useful assessment of alternatives. Scenarios should be appropriately defined to capture the key issues and factors while being sufficiently varied to allow analysis.⁴ Agencies can work with FHWA Division Offices, local partners, or the state DOT to help define the key issues.
- **Capturing and sustaining the public's attention.** It can be difficult to capture the attention of the public and maintain it over a long period of time. To address this challenge, agencies could consider using engaging public involvement tools, such as analysis tools that offer scenario results in real-time, or conducting regular public outreach in the form of workshops, committee meetings, focus groups, or media updates.

Scenario Planning Benefits

Scenario planning can lead to a number of benefits. Ms. Fine provided some details and examples:

- **Facilitates strategic decision-making.** Through the process of developing and assessing scenarios with public input, transportation agencies can better identify potential approaches to address the important issues facing a community or region.

² Additional information about the SCAG and CMAP new generation efforts is available at www.fhwa.dot.gov/Planning/scenplan/ngscenplanrpt.htm

³ The typical effort might last from six months to two years, but the process could take longer depending on the issues addressed.

⁴ Some research has suggested that two to four scenarios is an appropriate number for analysis.

- **Encourages broader interest in transportation planning.** Scenario planning can promote a greater interest in planning from a broader set of the population by engaging stakeholders in the creating and evaluating alternatives. It can educate participants on the possible consequences of different choices, encouraging buy-in to the transportation planning process. Additionally, scenario planning can help participants identify and appreciate the long-term tradeoffs associated with transportation decisions, which may ultimately help build support for the transportation plan.
- **Builds consensus and compromise.** While scenario planning does not always reach one optimum solution, it can build consensus between agencies and stakeholders by offering opportunities for conversation and dialogue. Some agencies have found it useful to draft memoranda of understanding to formally outline roles and responsibilities between all parties involved. Others have worked with public-private partnerships, steering committees, task forces, or third parties.
- **Helps integrate land use and transportation planning.** By viewing land use as a changing variable that has potential transportation impacts, scenario planning can spur discussion about future alternatives for both land use and transportation. Additionally, the process provides opportunities for transportation and land use professionals to discuss community preferences and collaborate on developing policies, priorities, and investments that lead a region or study area toward its preferred future.

Scenario planning is a valuable tool that can enhance the traditional transportation planning process. FHWA will continue to support scenario planning by providing guidance to transportation agencies, sponsoring workshops to share lessons learned, and supporting new tools and models that allow more robust analysis of transportation and land use impacts on a variety of factors.

C. FHWA Scenario Planning Guidebook

Alisa Fine, USDOT Volpe Center

Ms. Fine described the new FHWA scenario planning guidebook, which will be available in fall 2010 on the FHWA scenario planning website. The purpose of the guidebook is to assist transportation agencies with carrying out a scenario planning process from start to finish. Agencies can use the guidebook as a framework to develop a scenario planning approach tailored to their needs.

The guidebook includes six phases that agencies are likely to encounter when implementing the scenario planning technique. Each phase includes a range of considerations, steps, and strategies that will help manage and implement a comprehensive scenario planning effort. Each phase concludes with possible outputs. While the FHWA guidebook will focus on regional-scale scenario planning processes, it recognizes that the technique is flexible and can be used as a statewide, corridor-level, or neighborhood-scale approach.

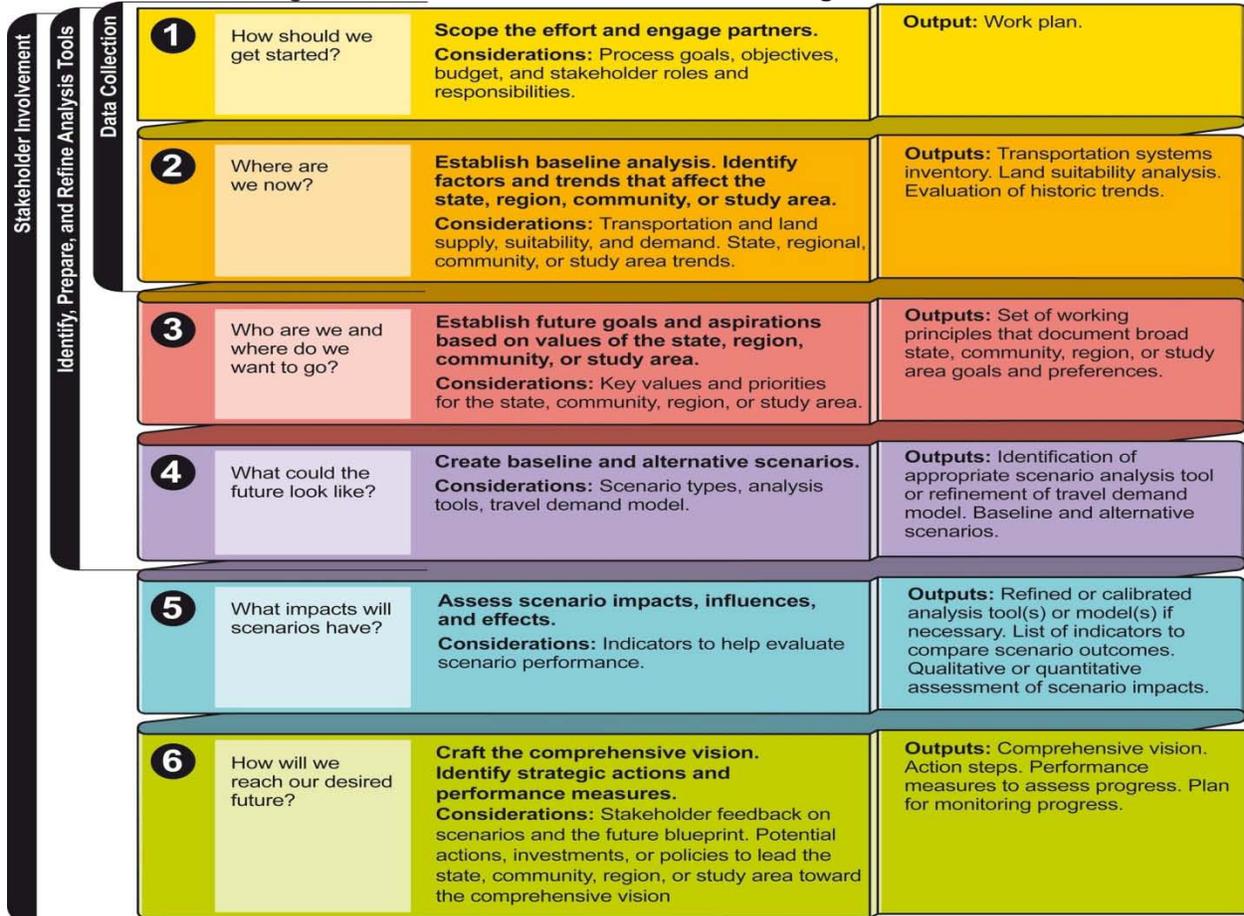
Ms. Fine detailed the six key phases (see Figure 1):

- **Phase 1: How Should We Get Started?** This phase involves gearing up to begin the scenario planning process to scope the effort and engage partners, as well as identify roles and responsibilities. The major potential output is a work plan to guide the entire process.
- **Phase 2: Where Are We Now?** This phase involves establishing a baseline analysis to assess the current state of the region or study area. It also deals with identifying factors and trends that affect planning in the region or study area. To establish a baseline analysis, agencies could collect data on the supply, suitability, and demand for transportation or land use as it relates to transportation. Potential outputs might include evaluations of each of these factors, such as a transportation systems assessment.
- **Phase 3: Who are We and Where Do We Want to Go?** This phase involves establishing regional or study area goals and aspirations based on community values. Stakeholder

involvement is particularly important during this phase to obtain the community's input on their preferences for the future. Potential outputs from this phase include a set of working principles for the future. Later in Phase 6, these principles can be refined or enhanced into a comprehensive vision to guide actions, recommendations, or strategies to lead the region or study area forward.

- **Phase 4: What Could the Future Look Like?** This phase involves creating trend and alternative scenarios. The trend scenario looks at what might happen in the region or study area in a given number of years given the continuation of current trends and investments. The alternative scenarios could vary and mix these trends in different ways. Potential outputs from this phase include identifying an appropriate scenario analysis tool (to prepare for analysis in Phase 5) and the series of trend or alternative scenarios
- **Phase 5: What Impacts Will Scenarios Have?** This phase involves using the analysis tool(s) identified in Phase 4 to evaluate scenario impacts. During this phase, agencies might also consider developing indicators related to the goals and aspirations identified in Phase 3. Indicators can be used to evaluate scenario impacts. Potential outputs from this phase include the refined analysis tool and a list of indicators.
- **Phase 6: How Will We Reach Our Desired Future?** This phase takes the results of the analysis from Phase 5 to create a comprehensive vision. As part of this phase, agencies can solicit stakeholder feedback on scenario analysis. If needed, Phases 4, 5, and 6 can be iterative processes. Potential outputs from this phase include a comprehensive vision, action steps to implement the vision, and performance measures to assess progress towards this vision.

Figure 1. FHWA Six-Phase Scenario Planning Framework



D. Phase One Discussion

Jeff Bryan, USDOT Volpe Center

Dr. Bryan detailed the guidebook's Phase 1 (How Should We Get Started?), which focuses on gearing up to begin a scenario planning process. This phase can occur as part of a transportation agency's regular planning or public involvement activities and does not have to be a separate effort. It is important to begin the effort by framing the right questions, since these provide a context for scenario development and key indicators.

Participants were asked to brainstorm how scenario planning could be used in their regions or communities. Those who had prior experience with the technique were asked to share information on getting started with others in the group. After conversing in small groups, participants reconvened for a large group discussion.

Discussion

- **Q:** What scale is appropriate for scenario planning: should it be used for big picture or project-level issues?
A: Scenario planning can be used at a range of scales, including at the neighborhood level. It is up to the agency to determine how the technique can be used most effectively to address the relevant issues.
- **Q:** Can scenario planning be used to develop a long-term vision, or should it be used to identify policies or projects that lead the region or study area toward the vision?
A: It can be used for both purposes. Phase 1 of the scenario planning process will help agencies determine the appropriate context and questions that the technique should address.
- **Q:** What are some examples of how scenario planning has been used in rural or quasi-suburban areas?
A: Burlington, Vermont, offers an example of scenarios used to address rural activity centers. Binghamton, New York, offers an example of scenarios used in a slow- or stagnant-growth region to help identify areas to invest transportation resources.⁵
- **Q:** How can agencies encourage a broad range of public stakeholders to participate in a scenario planning effort?
A: Agencies can consider using innovative methods to capture the public's attention. For example, the Memphis MPO in Memphis, Tennessee, developed a Transportation Planning Advisory Committee (TPAC) as part of its 2007 scenario planning effort to update the long-range transportation plan. The TPAC includes a range of members, such as land developers, stay-at-home mothers, bicycle advocates, planners, retirees, and environmentalists. Various public involvement techniques were carried out with the TPAC. The MPO provided disposable cameras to TPAC members, who then took pictures of transportation-related elements in their neighborhoods showing their preferences and dislikes.⁶ The exercise was very popular with the TPAC and served to encourage further interest in the transportation planning process.
- **Q:** How can planners be sure that the public is meaningfully involved in the process?
A: One way is to ensure that the public is involved as early as possible in all or most phases of scenario planning. Additionally, the public should review and validate outputs from the process, including the values and principles used to develop scenarios, scenarios themselves, indicators, and results/outcomes.

⁵ For additional information on the issues faced by the Binghamton, New York, region, and opportunities for scenario planning, see www.fhwa.dot.gov/Planning/scenplan/nyscenplanrpt.htm

⁶ For additional information on the Memphis MPO's approach and the TPAC, see www.fhwa.dot.gov/Planning/scenplan/nashscenplanrpt.htm

- Comment:** Michigan has a home rule system of local government, which is not conducive to using scenario planning. Some land use agencies (townships) have no roadway jurisdiction and some roadway agencies (county road commissions) do not have any authority to make land use decisions. Given these different missions and authorities, it is difficult to bring transportation and land use agencies together and encourage collaboration.

Response: Home rule does make it more difficult to implement scenario planning, but there are still ways to bring diverse stakeholders together. Start with the 'low hanging fruit' and efforts can grow and evolve over time, fostering stronger cross-agency relationships. Scenario planning is also very valuable from a public involvement and educational perspective; it can help build broader support for the transportation plan.
- Comment:** It is important to remember to include the private sector in scenario planning conversations.

E. Scenario Planning Process

Peter Keating, Chittenden County MPO

The Chittenden County MPO (CCMPO) serves 18 municipalities in the Chittenden County region in northwest Vermont, which has a total population of 145,000, about one-quarter of the state's total.⁷ The agency has a staff of nine and is the only MPO in Vermont. Vermont does not have any region-wide government or decision-making authority; towns and cities make all land use decisions.

Mr. Keating provided some additional context on the region and its economic and growth trends. The Chittenden County region is the population and economic center of the state. The region's largest city is Burlington, which has a population of approximately 40,000. The city's population has been stagnant for about three decades, although the region as a whole has grown during that time. The majority of growth—primarily large lot, residential development—has occurred in peripheral areas around Burlington. Outdoor and recreational tourism has traditionally been an important part of the region's economy.

CCMPO has used scenario planning for three of its long-range transportation plans (LRTPs). It has found scenario planning to be a valuable technique, especially in helping to engage the public through visualizations (e.g., scenario maps) and to facilitate strategic transportation decision-making.

Use of Scenario Planning to Develop the LRTPs

CCMPO conducted alternatives analysis to develop its 1997 LRTP and updated LRTP in 2005. As part of the analysis, CCMPO developed multiple land use scenarios, combined them with different transportation scenarios, and analyzed outcomes to formulate recommendations to include in the LRTPs. These efforts, however, were not termed scenario planning since they did not include an extensive public involvement component. Staff developed the alternatives, which were shared only with the project steering committee and MPO board.

As part of the 2007 LRTP update, CCMPO conducted a broader scenario planning effort that involved the public. Three public scenario planning workshops were held over a period of three months. The workshops, which approximately 100 individuals attended, were held in a number of locations, including a high school cafeteria, a church basement, and the county fairgrounds.

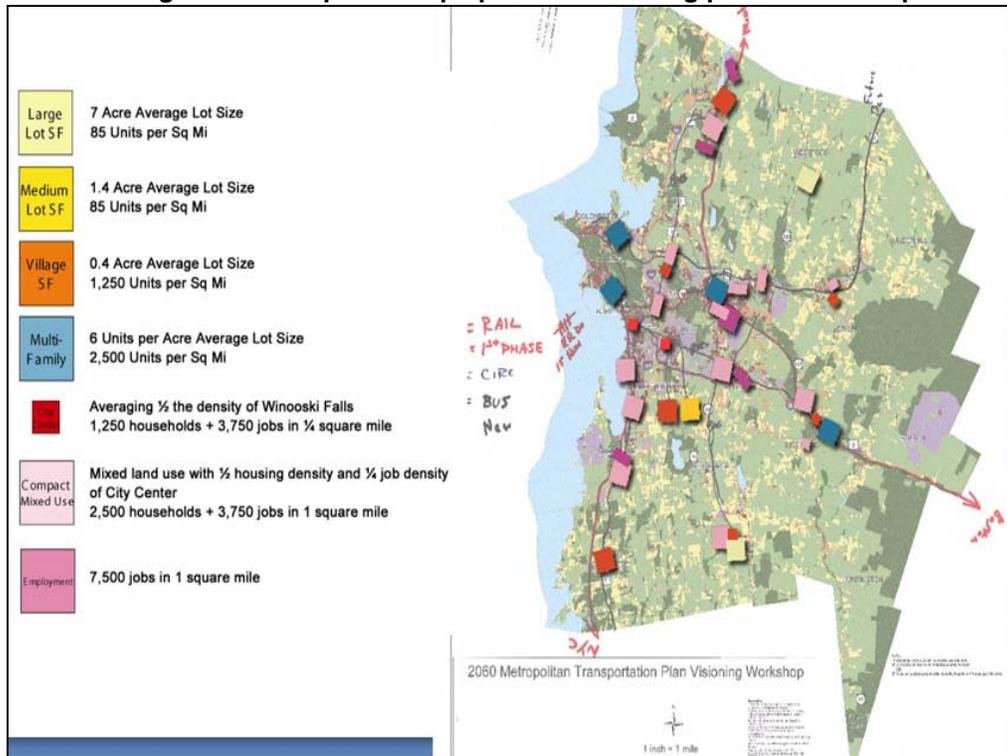
During the workshops, staff provided a primer on development trends to spark discussion on how residential development had impacted the landscape over the previous 20 years. For example, from 1990 to 2008, less than one-fifth of housing units had consumed nearly three-quarters of the newly developed land.

Workshop participants also gathered in small groups to discuss their values and preferences for the future using a 50-year horizon. CCMPO documented the discussions and then engaged participants in a

⁷ For additional information on the CCMPO, see www.ccmppo.org/

'chips' exercise. As part of the exercise, participants placed small chips on a regional map to indicate areas of preferred housing, jobs, and transportation network development. Chips could be traded to obtain different development densities. Scenarios were then compiled to reflect different groups' distribution of chips (see Figure 2 for example).

Figure 2. Example of chips placement during public workshop.

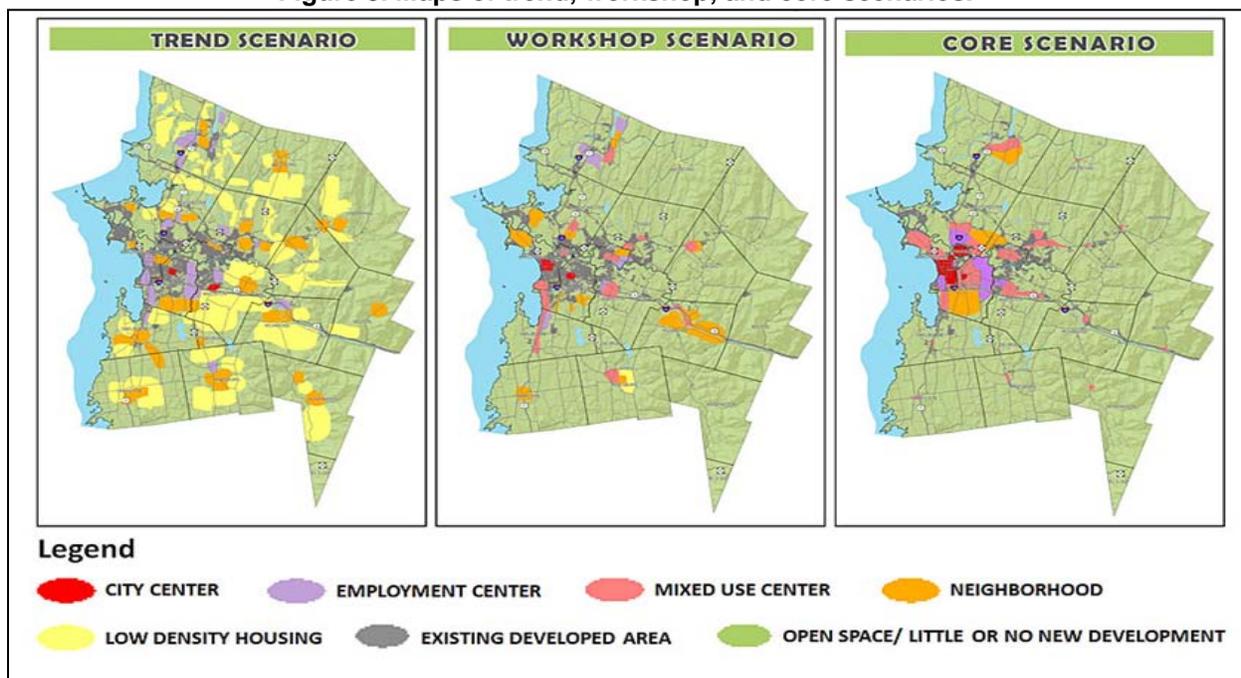


Twelve land use alternatives came out of the workshops. Each alternative represented a variation on the same theme: dispersed, mixed-use, and higher density clusters. The differences were where the clusters were placed. Since none of the workshop groups produced a trend scenario, CCMPO staff developed one together.

Although redevelopment was permitted during the public workshops, participants generally avoided placing additional development in the Burlington core area. As such, CCMPO staff developed the core scenario to test how redevelopment might affect the transportation system and number of car trips. CCMPO had initially found a low level of performance variability between the trend and workshop alternatives. Both used the same growth levels, although growth was distributed differently. While the core scenario was unlikely to occur, it facilitated analysis by offering a greater range of variability to help compare and contrast all three alternatives.

CCMPO staff then mapped each of the three alternatives using ArcMap geographic information system (GIS) software. The agency chose to map alternatives at a broad geographic scale so that the public would focus on higher-level, regional outcomes rather than on neighborhood- or street-level outcomes. It was believed that focusing on broader scale outcomes would help public stakeholders have more productive conversations about the region's future.

Figure 3. Maps of trend, workshop, and core scenarios.



Public Outreach Survey

CCMPO plans to conduct an outreach survey online to solicit feedback for the current LRTP update in mid- to late September 2010. The survey will ask questions about the three scenarios and their performance, public preferences on priority transportation projects and funding options, and goals for the region's future.⁸ The survey will also ask about public attitudes towards zoning changes. While changing zoning regulations is currently unlikely, CCMPO believed it was important to emphasize to the public that changes (e.g., zoning) might need to occur to lead the region toward its preferred future.

Mr. Keating also noted that questions about funding might elicit different responses depending on how they are phrased. For example, the 2006 survey contained a question about whether the responder would approve increasing the gas tax if the funding went only to fixing roadways. About 30 percent of responders said yes. When the question was expanded to include all modes, 45 percent said yes.

Similar outreach surveys containing 100 questions were conducted in 2001 and 2006. The current survey, however, will contain only 15 questions. CCMPO staff believed that the longer surveys required too much time from public responders.

Scenario Analysis

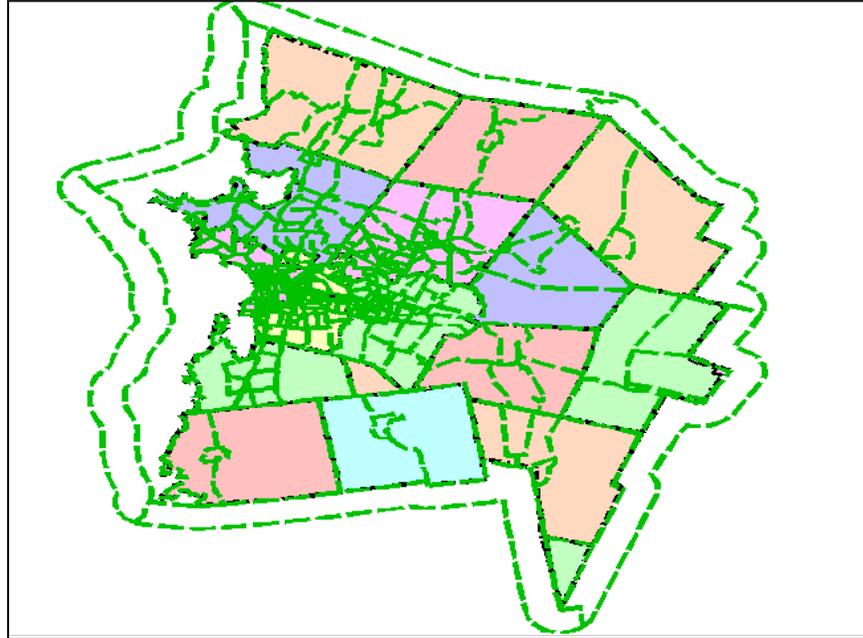
CCMPO used the four-step travel demand model to analyze scenarios. The model, which was initially developed in the late 1960s, was later expanded in the mid-1990s to include mode choices and morning and afternoon peak hour travel. In the mid-2000s, the CCMPO then transitioned its model to a TransCAD platform with customized GIS scripts. Most recently, CCMPO incorporated 24-hour updates into the model using National Household Travel Survey data. In the future, CCMPO might consider adding

⁸ The pilot version of the survey is available at www.surveygizmo.com/s3/321478/CCMPO-test-revised and is undergoing revisions.

activity-based models (trip chains), new land use models, an expanded model area, or disaggregated travel models.

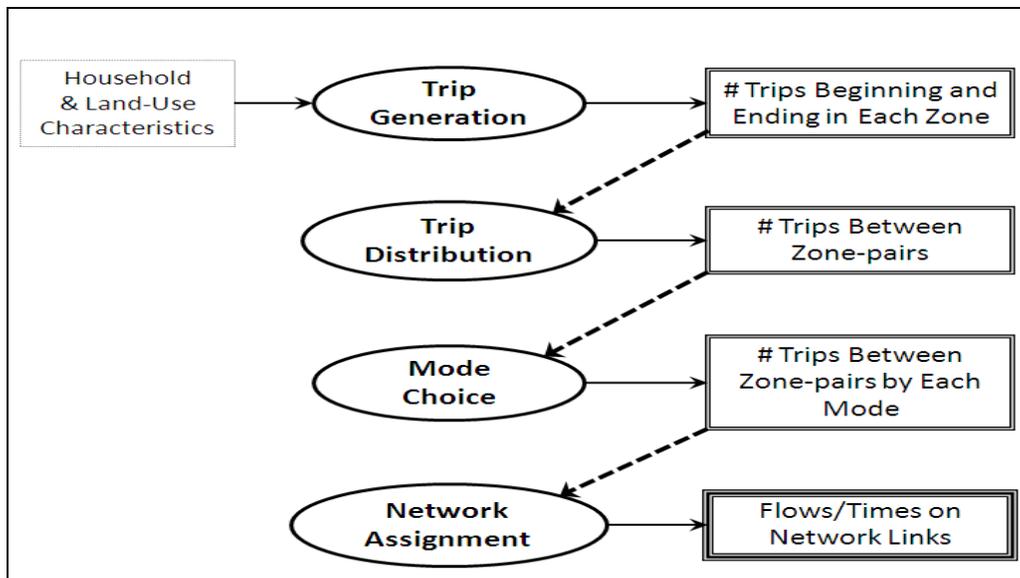
The model splits the CCMPO region into 330 Transportation Analysis Zones (TAZs) (see Figure 4). For each TAZ, CCMPO has collected information on a total of six categories, including housing units and employment by type. In the Burlington urbanized area, the TAZs are at the city block level. Outside this area, TAZs are at a larger geographic scale.

Figure 4. TAZs for the CCMPO region.



To assess scenarios, each alternative's household and land use characteristics (e.g., population and housing data) were primarily input at the trip generation step in the travel demand model (see Figure 5). Outputs from this analysis were fed into a trip distribution step and subsequently to a modal choice component. Results from these analyses were assigned to a transportation network. The resulting data outputs of the four-step travel demand model illustrated the quantitative differences between scenario alternatives.

Figure 5. CCMPO's Four-Step Travel Demand Model.



Specific indicators used to assess scenario performance included:

- Travel times.
- Congestion.
- Travel distance.
- Transit service.

Other topics, including greenhouse gas emissions, peak oil situations, and funding, were less explicitly considered as part of scenario analysis but were generally discussed during public workshops and helped frame development of the various workshop land use scenarios.

Recommended Elements for Scenario Planning

Mr. Keating noted that a comprehensive scenario planning effort will likely contain several critical elements, including:

- **Performance measures.** Scenarios must be evaluated for stakeholders to identify a preferred alternative or preferred scenario elements. Performance measures are critical for this evaluation. CCMPO developed several performance measures related to air quality, congestion, modal choice and other factors. It is also important to link performance measures to the LRTP's overall goals or vision. Public involvement can be an important aspect of this effort. For example, CCMPO solicited feedback from the public and the MPO board on whether the performance measures aligned with the LRTP's goals.
- **Regional data.** Data are important to develop a baseline assessment of the region. Projected data can help evaluate the impact of future trends on the region. Relevant data could include information on housing, jobs, population, and land consumption. Some agencies might find it useful to obtain data that are in a GIS format. CCMPO does not have its own GIS department but partnered with the Chittenden County Regional Planning Commission to obtain GIS data, maps, and to create GIS-based visualizations of scenarios. Data can help participants better understand the region, historic and projected trends, economic development patterns, geography, and other factors.
- **Analytic tools.** Tools must be used to evaluate scenario outcomes. While these tools can be either quantitatively or qualitatively based, CCMPO's tools were primarily quantitative in nature. The agency used the four-step travel demand model to analyze the transportation-related effects of land use changes.

- **Public involvement.** It is essential to involve the public throughout all phases of the process. Doing so will ensure that use of the technique helps to engage stakeholders. CCMPO experienced some difficulty engaging some segments of the population, including a younger age demographic, which have not traditionally participated in transportation planning workshops. CCMPO found it useful to conduct outreach to local high schools and universities and use a variety of media, such as email lists, websites, press releases, and online message boards, to convey information about workshops.

Lessons Learned

Mr. Keating discussed a number of lessons learned from the CCMPO's scenario planning efforts:

- **Learn from peers.** Peers can provide valuable information on lessons learned and critical success factors. For example, CCMPO hosted an FHWA-sponsored scenario planning workshop in 2007. During the workshop, peers from the Binghamton Metropolitan Transportation Planning Study in New York and the San Luis Obispo COG (SLOCOG) in California presented on their scenario planning efforts. A peer panel also occurred. As a result of the workshop, CCMPO staff developed more familiarity and comfort with scenario planning and achieved a consensus with the CCMPO board that the technique would benefit the LRTP.
- **Scenario planning can involve a significant amount of resources and time.** CCMPO's scenario planning process has taken longer than expected (going on three years). If being used to support the LRTP, it is important to align scenario planning activities with what is already occurring as part of LRTP development. Additionally, agencies should understand that commitments from staff and possibly consultants are required to conduct a successful scenario planning effort. While CCMPO hired a consultant to conduct scenario planning workshops, scenario analysis, a follow-up survey, and a final report summarizing the effort, Mr. Keating noted that he has spent approximately one-third of his time on this and other LRTP tasks.
- **Provide clear direction on stakeholders' roles and responsibilities.** CCMPO's 2005 LRTP took five years to complete. An 18-member public steering committee was developed to help guide LRTP development. Some steering committee members made several recommendations to the CCMPO board, but not all were accepted. Subsequently, up to one-third of the steering committee's members resigned. In hindsight, CCMPO believed that it should have more clearly communicated to the steering committee that its role was to function as an advisory body rather than a decision-making body. During the CCMPO's most recent scenario planning effort, the public committee was termed an advisory committee and roles were more clearly articulated to members. CCMPO believed that setting expectations upfront has facilitated a smoother process.
- **Ensure that the public can easily participate in scenario planning efforts.** The public steering committee for CCMPO's 2005 LRTP met 60 times between 2000 and 2005. CCMPO now believes that the number of meetings overburdened the committee members. In addition, the steering committee considered each of 45 performance measures developed for scenarios; this became overwhelming. To help address these types of issues and ensure that the public can easily participate, Mr. Keating recommended that agencies carefully consider the number of performance measures used to assess scenarios. There should be sufficient measures to result in a comprehensive picture of scenario performance but not too many that it is overwhelming. In addition, agencies should be strategic about what is required from committee members. Members should have substantive opportunities to contribute while not being overburdened with meetings. During its most recent scenario planning effort, CCMPO simplified the committee process, decreasing the number of performance measures and required meetings.
- **Identify a champion to advocate for scenario planning.** A champion can promote scenario planning to an MPO's staff and board. CCMPO's previous executive director championed scenario planning using a 50-year vision. The agency then adopted the technique in part due to the executive director's advocacy. Currently, however, CCMPO's board has expressed some concern about developing a 50-year plan. As a result, CCMPO has stepped back from this

horizon. While the 50-year vision formed the basis of the scenario planning workshops and the resulting scenarios, the CCMPO Board decided to limit the LRTP to a 25-year vision, mostly due to a discomfort with forecasting financial resources so far into the future.

- **Maintain staff consistency.** Throughout its current scenario planning effort, CCMPO has experienced three executive directors, three project managers, and a consultant changeover. These transitions significantly slowed the process. Maintaining staff consistency, including consistency from the MPO board, can facilitate a more seamless effort.
- **Link guiding principles and scenarios.** LRTP guiding principles were not explicitly referenced or consulted during the public workshops when stakeholders were discussing and developing scenarios. CCMPO believes that it would have been beneficial to make these linkages more explicit to ensure that scenarios reflected the overall direction and policies of the LRTP.

.Discussion

- **Q:** Is Vermont in attainment for air quality?
A: Yes.
- **Q:** What was the cost of the most recent scenario planning effort?
A: The consultant cost for CCMPO's most recent scenario planning process, including the workshops, analysis, the survey, and report, was approximately \$75,000.
- **Q:** What was the Vermont Agency of Transportation's (VTrans) perspective on the scenario planning efforts and did they participate?
A: VTrans conducted a scenario planning exercise to develop their 2009 statewide transportation plan. VTrans has supported CCMPO's scenario planning efforts and has been continuously involved with them.
- **Q:** Was project selection a criterion that was incorporated into CCMPO's scenarios?
A: It has not been incorporated yet since the process is still ongoing but it likely will be included in the future. CCMPO will likely develop a preferred scenario that incorporates elements from all of the alternatives. The preferred scenario will be used as a framework to compare transportation projects; preferred projects will match the scenario. Overall, CCMPO suspects that the scenario will have an impact on choosing preferred transportation investments.
- **Q:** Does CCMPO have the authority to implement the preferred scenario?
A: No. Land use decisions are made at the local level by cities and towns. Chittenden County has a regional land use plan but it is influential only if development proposals exceed certain thresholds and a state land use permit is required. If this is the case, and the project is determined to have substantial regional impact, then it must conform with the Chittenden County Regional Plan. CCMPO is reliant on its partners, particularly local government partners, to implement the preferred scenario. CCMPO believes, however, that the preferred scenario will be aligned with local partners' expectations.
- **Q:** Have there been large differences between the 50-year versus the 20-year analysis?
A: CCMPO has not yet run the 20-year analysis but expects that there will be significant differences between the two.
- **Q:** Did CCMPO's scenarios all use the same development levels (e.g., projections of new houses and jobs)?
A: Yes. CCMPO kept all the development levels identical across scenarios. What changed was where new development was located. The development levels assumed modest growth.
- **Q:** Does CCMPO anticipate getting responses to the online survey from outside the county?

A: Possibly. For instance, the CCMPO recently conducted a survey on park and ride preferences for a park and ride development plan. About 15 percent of survey responses were from areas outside Chittenden County

- **Comment:** It is important to remember to validate the initial vision as an agency proceeds with scenario planning. The Transportation Improvement Program could offer an opportunity to link implemented projects and the overall goals or vision. Overall, the process to validate and establish these connections will likely be iterative.

F. Breakout Session I

Jeff Bryan, USDOT Volpe Center

Dr. Bryan detailed Phase 2 (Where Are We Now?) and Phase 3 (Who are We and Where Do We Want to Go?) of the guidebook, which address establishing a baseline analysis to identify factors that affect the region or study area and establishing future goals and aspirations based on community values. These goals and aspirations then provide a framework for building scenarios. Gathering data for Phase 2 (can take more time than expected so this process should be started early. It is important to determine how to assess support for the values and priorities identified in Phase 3. A key question is: how will we know when we get there? To answer this question, stakeholders can develop indicators and performance measures in Phases 2 and 3. These can be enhanced or refined in Phase 5 during scenario analysis.

Participants were asked to brainstorm about the important trends affecting Michigan or a chosen geographic area in the state and to describe the trend using qualitative or quantitative data. Additionally, participants identified impacts of the trend on transportation and land use as well as potential responses. After conversing in small groups, participants reconvened for a group discussion.

Some of the major trends identified by groups including aging populations, stagnant, no-growth communities, and moving from smaller scale residential to larger scale corridor and commercial development. These trends are described in more detail below:

- **Aging population.** Three groups identified aging populations as a major statewide trend. Potential transportation impacts of this trend could include increased need for mobility and access to transportation, as well as a need for better signage or intersection improvements for older drivers. Also, a large segment of the aging population will no longer be able to rely on personal vehicles, which might affect transit demand or the need for accommodations such as dial-a-ride services. A potential land use impact could be the increased need for assisted living facilities in desirable locations. This trend might also be accompanied by changing quality of life values; for example, an aging population might desire more on-demand services, such as home grocery deliveries or doctor house calls. Transportation responses to this issue could include consideration of:
 - Effect of changing values on transportation projects;
 - How changing values could be incorporated when planning projects.
 - Making communities more walkable.
 - Integrating principles of the Americans with Disabilities Act into transportation design.
 - Complete streets principles.
- **Stagnant growth.** This trend has significant quality of life impacts, such as fewer civic amenities. This trend might be associated with less land use development or redevelopment. Transportation impacts could include increasing costs and difficulty maintaining existing systems or networks. A potential response to the trend could be encouraging new job growth or employment centers through zoning changes. Transportation professionals can adapt livability and sustainability principles to make communities more attractive to residents.
- **Trend from small scale residential to large scale corridor and commercial development.** This trend has transportation and quality of life impacts, including increased vehicle miles traveled, decreased property values, and limited job opportunities for some residents, as large

commercial corridors tend to be accessible by public transportation on outbound trips but not necessarily for inbound trips. An additional issue is that large scale commercial corridors are not always walkable or bikeable; these areas might also increase the potential for traffic conflicts. From a land use and transportation perspective, potential responses could include reuse of vacant property, consideration of access management strategies, and encouragement of public-private partnerships to better incorporate transit facilities into commercial areas.

G. Technical Session

Jim Thorne, FHWA Resource Center

Mr. Thorne provided an overview of the role of analytic and modeling tools in scenario planning and their contribution to Phase 4 (What Could the Future Look Like?) and Phase 5 (What Impacts Will Scenarios Have?) of the scenario planning process. These phases deal with developing and analyzing scenarios.

Developing Scenarios

There are many different types of scenarios. For example, a baseline scenario would focus on continuing trends over time while a policy option scenario would focus on the implications of different investments or strategies. An economic scenario might address what would happen in the region or study area if an economic boom or recession occurred. A hybrid scenario combines elements from several other scenario types. Most scenario planning exercises contain between three and five scenarios, including a trend and hybrid alternative.

Agencies might develop scenarios in different ways. However, public involvement is typically a key component. To facilitate public involvement in scenario development, agencies can use a wide range and variety of tools. For example, agencies could conduct:

- Small group breakouts during workshops.
- Electronic keypad polling to solicit real-time feedback on issue, values, and scenarios.
- Public opinion surveys.
- Focus groups with specific audiences.
- Individual interviews with key community leaders.

Many resources are available to facilitate public involvement in scenario planning. The National Highway Institute (www.nhi.org) offers training courses on public involvement. Additionally, the International Association for Public Participation (www.iap2.org) offers a participation spectrum showing the range of ways in which the public can participate in transportation planning and tools that support this involvement. PlaceMatters (www.placematters.org) is a nonprofit offering tools and techniques to assist regions, cities, or organizations to meet their public involvement goals. The Strategic Highway Research Program 2 developed a visioning guide (<http://shrp2visionguide.camsys.com/index.htm>). Visioning exercises can be incorporated as part of scenario planning processes.

Agencies might want to consider the following questions when developing scenarios:

- What types of scenarios and issues should be addressed?
- Will scenario development utilize a quantitative, qualitative, or hybrid approach?
- How scenarios will be communicated to stakeholders?
- Are the scenarios sufficiently different for meaningful comparison?
- Based on preliminary land use and environmental screening, are any of these scenarios fatally flawed?
- How do scenarios address the agency's vision and goals?
- How well does each of the scenarios address identified problems?
- How should scenarios be named or labeled?

Peer Examples

Mr. Thorne provided examples of scenario planning efforts nationwide that have used innovative approaches or been well-received by the public, including:

- **Metropolitan Washington Council of Governments' (MWCOC) Scenario Thinking Exercise.** MWCOC developed a one-day scenario planning workshop as part of the Greater Washington 2050 initiative. The initiative, which is led by a coalition that includes MWCOC and public, business, civic, and environmental stakeholders,²⁰ seeks to develop a regional growth vision while fostering stronger regional leadership. MWCOC engaged a consultant to develop four scenarios prior to the workshop. To develop the scenarios, the consultant conducted interviews with local leaders and focus groups comprised of MWCOC staff and others. Experts in climate change and economics reviewed the scenarios to ensure that they were valid. The scenarios were designed to represent plausible futures. They focused on:
 - **High Tech Green**, a scenario in which green infrastructure investments help foster financial growth and create new "green" jobs.
 - **Federal Government Dispersal**, a scenario in which Federal facilities slowly disperse outside the Washington region.
 - **Hot and Gridlocked**, a scenario characterized by recession and falling oil prices that derail strong climate policies
 - **Cooperation in Hard Times**, which focuses on aging population, a shrinking labor force, high health costs and energy prices, as well as government debt.

MWCOC held a one-day workshop attended by about 100 participants. Workshop participants discussed the scenarios, identifying possible regional strategies that could address the outcomes in each alternative. From these strategies, MWCOC distilled Ten Big Moves, or building blocks for policies the region could use to address emerging issues and challenges.⁹

- **The Community 2050 initiative** led by SLOCOG.¹⁰ Community 2050 is part of the California Regional Blueprint Program, an effort to help California's local transportation agencies integrate land use with transportation planning. Community 2050 was a collaborative effort between public officials and citizens. Through a series of activities at public workshops, such as interactive polling, the chips game, and alternatives mapping, residents brainstormed ideas for new development and built their own growth scenario.
- **The Metropolitan Transportation Planning Organization (MTPO) for the Gainesville Urbanized Area** used a scenario planning process to develop its 2025 long-range transportation plan (LRTP) in 2005. The scenario planning process was based on a "Rip Van Winkle" technique in which the public was asked to visualize what the future of the region might look like in 20 years and what they would change in the present. The MTPO then developed four scenarios, including:
 - "Westward growth," or a continuation of past growth trends. The hallmark of this scenario was a trend to westward growth and single-family, low-density development.
 - "Compact area," the opposite of the "westward growth" concept. Compact area involved focused growth in the community's core and included higher-density, vertical development (such as tall office buildings).
 - "Town/village centers" most closely reflected the north-central Florida counties' adopted comprehensive plans (see Figure 1). The town/village center scenario focused development within certain nodes. Higher-density activity centers provided connectivity between nodes.
 - "Radial development." The hallmarks of this scenario were activity centers arranged in a radial pattern along the city of Gainesville's major arterials. One of the arterials, Florida State Road 24, was emphasized as a primary development corridor.

As a result of the scenario planning process and exchanges on land use and transportation with MTPO staff, Alachua County commissioners adopted policies that encouraged development in

⁹ For more information on the Ten Big Moves, see www.mwco.org/uploads/pub-documents/8FZeWq20090501130317.pdf

¹⁰ For more information on Community2050, see www.slocog.org/cm/Community2050/Home.html

areas served by water and sewage services. These policies were adopted into the comprehensive plan.

- **Transportation Tomorrow 2030: Placemaking for Prosperity**, the long-range plan for the Binghamton Metropolitan Transportation Study (BMTS), the MPO for the greater Binghamton, New York, region.¹¹ The Binghamton region is slow-growing and has experienced economic challenges. As part of the scenario planning process used to develop the plan, the BMTS engaged in public visioning activities. For example, residents attending public workshops were asked to create a ‘treasured places’ map to help the agency assess how core values are reflected in local development patterns. As a result of the process, the MPO committed to focusing planning efforts on key urban arterials using the principles of placemaking and context sensitive solutions. BMTS is now beginning its next LRTP and will be using scenario planning to inform this effort.

Analyzing Scenarios

Mr. Thorne noted that to analyze scenarios, agencies must consider differences and similarities between each alternative. Indicators, such as vehicle miles traveled, percentage of open space conserved, or greenhouse gas emissions, can allow targeted comparison and ensure that identical factors are being assessed across scenarios (see Figure 6).

Figure 6. Examples of Indicators for Analyzing Scenarios.

Type of Indicator	Example of Indicator
Environmental/Land Use	Acres of non-urbanized land.
	Percentage of farms and forests.
Community Livability	Percentage of population living in clustered communities.
	Percentage of population with access to transit.
	Annual gallons of gas consumed.
Jobs/Housing	Number and/or percentage of jobs located near affordable housing.
Transportation System	Number of highway congested hours.
	Number of crashes per person and per vehicle mile traveled by crash severity and mode.
	Percentage of work or all trips by mode.
Climate Change	Greenhouse gas emissions by sector or county.

Broadly, the general steps for analyzing scenarios would include identifying and refining indicators, modeling the scenario, and measuring its performance using indicators. Next, agencies could conduct supplemental analysis, solicit feedback on analysis results, and refine scenarios if necessary.

¹¹ For more information on Transportation Tomorrow, see www.bmtsonline.com/files/bmts/pdfs/TransportationTomorrow2030.pdf

Agencies might want to consider the following questions before engaging in these steps:

- Will qualitative or quantitative methods be used to analyze scenarios?
- Do data need to be obtained or refined to support analysis?
- What types of software or models would allow appropriate scenario analysis?
- What types of indicators could be used to assess scenarios?
- How do indicators relate to the agency's or LRTP's overall goals or vision?
- Do indicators result in information that is specific and measurable?
- How will feedback be obtained?

A variety of tools can help agencies and the public consider scenarios and their outcomes. FHWA does not recommend one tool over another; the choice will depend on the user's resources and goals. Some examples of applicable tools include:

- **The four-step travel demand model.**
- **Visualization tools**, including use of GIS mapping, photo montage, simulations, and three-dimensional images.
- **Scenario planning modeling software**, including [INDEX and Paint the Town, What If?](#), [MetroQUEST](#), [UrbanSim](#), [CommunityViz](#), [CorPlan](#), the [Transportation Economic and Land Use Model](#), and the [Land Use Evolution and Impact Assessment Model](#).

H. Breakout Session II

Jeff Bryan, USDOT Volpe Center

Dr. Bryan provided an overview of Phase 6 (How Will We Reach Our Desired Future?) of the scenario planning process, which focuses on crafting a comprehensive future vision, action steps to implement the vision, and a plan to monitor progress toward the vision.

There are a few specific questions that agencies might want to consider as part of Phase 6, including:

- What have we learned from scenario review and discussions?
- What regional actions and investments can the lead agency or partnering agencies pursue, support, or implement that help the community, region, or study area achieve its desired transportation and land use patterns?
- What are the expected outcomes from these actions and investments?
- How could the region manage risk and uncertainty?
- What will the region look like and how will it function?
- What transportation networks would be in place?
- What land use/development patterns would occur in the future?

Participants were asked to gather in small groups and discuss potential next steps or action items that their agencies could take to implement scenario planning. Those who had experience with scenario planning were asked to focus on discussing steps to continue the effort. Participants then reconvened to a large group in order to report out on the discussions. Some referenced next steps included gathering updated parcel data, especially for rural areas, and identifying appropriate analysis tools that could support scenario evaluation.

Discussion

- **Q:** How can agencies encourage diverse stakeholder groups to coalesce around the vision?
A: This can be a challenge, but one way is to ensure that stakeholders have a role in the scenario planning effort early on to define its scope and the issues being addressed. Scenarios themselves can also allow stakeholders to 'test out' different alternatives. Modeling and visualization tools can help people more easily visualize potential future impacts. These exercises can help build consensus around the vision.

- **Q:** How can home rule states, like Michigan, encourage consensus building around scenarios?
- **A:** Scenarios offer important opportunities for collaboration. Stakeholders can work together to build and assess scenarios and interpret their outcomes. Given strong leadership, a consistent, ongoing effort to engage both transportation and land use agencies can gain momentum over time. It is important to be patient, however, since change can be slow. It might take time to build working relationships between agencies that historically have not been in dialogue together. Home rule states can also look to other peer states for examples of how scenario planning efforts have been successful. Some states, including Maryland and Nebraska, have changed their home rule laws to centralize transportation and land use authorities. While this is not likely to occur in Michigan, the state's agencies do realize that regional cooperation is a necessity. Scenario planning is a tool to encourage this cooperation.

IV. Conclusion

The workshop was a productive learning experience. On evaluation forms distributed during the event, participants commented that the event helped increase an understanding of the variety of tools used to implement scenario planning as well as examples of scenario planning from other parts of the nation. Other noted benefits included learning about the importance of public involvement in scenario planning and the adaptability of the technique to different scales and to address different issues. Many participants reported that they planned to share knowledge of scenario planning with their colleagues and consider how the technique could be used as part of long-range planning or other planning activities.

Appendix A: Additional Information

Key Contacts

Key Contact:	Fred Bowers, FHWA Office of Planning
Phone:	(202) 366-2374
E-mail:	Frederick.Bowers@dot.gov

Key Contact:	Chris Dingman, FHWA Michigan Division
Phone:	(517) 702-1830
E-mail:	Christopher.Dingman@dot.gov

Key Contact:	Rae Keasler, FHWA Office of Planning
Phone:	(202) 366-0329
E-mail:	Rae.Keasler@dot.gov

Workshop Agenda

9:30 am	Welcome Chris Dingman, FHWA Michigan Division
10:00 am	Introduction to Scenario Planning Sharlene Reed, FHWA Office of Planning Alisa Fine, USDOT Volpe Center
10:45 am	Discussion Jeff Bryan, USDOT Volpe Center
11:00 am	Scenario Planning Process: Chittenden County MPO Peter Keating, CCMPO
12:00 pm	Lunch
1:00 pm	Breakout Session I: Current and Future Trends in Michigan Jeff Bryan, USDOT Volpe Center
2:00 pm	Technical Session Jim Thorne, FHWA Resource Center
3:00 pm	Break
3:15 pm	Breakout Session II: Action Planning Jeff Bryan, USDOT Volpe Center
3:45 pm	Conclusions/Next Steps Chris Dingman, FHWA Michigan Division

Appendix B: List of Presenters and Invitees

Agency	First Name	Last Name
Battle Creek Area Transportation Study	Andy	Tilma
Chittenden County MPO	Peter	Keating
City of Kalamazoo	Andrea	Augustine
Delta Township/Tri-County Regional Planning Commission	Howard	Pizzo
Federal Highway Administration Michigan Division	Christopher	Dingman
Federal Highway Administration Michigan Division	Rachael	Tupica
Federal Highway Administration Office of Planning	Sharlene	Reed
Federal Highway Administration Resource Center	Jim	Thorne
Genesee County Metropolitan Planning Commission	Derek	Bradshaw
Indian Trails, Inc//Michigan Flyer	Gordon	Mackay
Kalamazoo Area Transportation Study	Kathy	Schultz
Kalamazoo Area Transportation Study	Steve	Steppek
Macatawa Area Coordinating Council	Elisa	Hoekwater
Michigan Department of Transportation	Garth	Banninga
Michigan Department of Transportation	Dennis	Clark
Michigan Department of Transportation	Sandra	Cornell-Howe
Michigan Department of Transportation	Karen	Faussett
Michigan Department of Transportation	Rick	Fowler
Michigan Department of Transportation	Jesse	Frankovich
Michigan Department of Transportation	Susan	Gorski
Michigan Department of Transportation	Josh	Grab
Michigan Department of Transportation	Andy	Irwin
Michigan Department of Transportation	Ron	Katch
Michigan Department of Transportation	Ray	Lenze
Michigan Department of Transportation	Yali	Li
Michigan Department of Transportation	Robert	Maffeo
Michigan Department of Transportation	Don	Mayle
Michigan Department of Transportation	Dalrois	McBurrows
Michigan Department of Transportation	Trinh	Nguyen
Michigan Department of Transportation	Pete	Porciello
Michigan Department of Transportation	Tim	Ryan
Michigan Department of Transportation	Bradley	Sharlow
Michigan Department of Transportation	John	Watkin
Michigan Department of Transportation	Bradley	Winkler
Michigan Department of Transportation	Donna	Wittl
Oshemo Township	Jodi	Stefforia
Southeast Michigan Council of Governments	Jennifer	Evans
Southwest Michigan Planning Commission	Anna	Rahtz
Southwest Michigan Planning Commission	Trevor	Thomas
Tri-County Regional Planning Commission	Paul	Dionne
Tri-County Regional Planning Commission	Paul	Hamilton
Tri-County Regional Planning Commission	Hary	Prawiranata
Tri-County Regional Planning Commission	Steve	Skinker
Tri-County Regional Planning Commission	Laura	Tschirhart
Volpe Center	Jeff	Bryan
Volpe Center	Alisa	Fine
Washtenaw Area Transportation Study	Eric	Bomberly
Washtenaw Area Transportation Study	Ryan	Buck
Washtenaw Area Transportation Study	Nick	Sapkiewicz
West Michigan Shoreline Regional Development Commission	Joel	Fitzpatrick