

Scenario Planning Peer Workshop
Sponsored by the Federal Highway Administration

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Workshop Host Agencies: Tennessee Department of Transportation
Federal Highway Administration, Tennessee Division

Workshop Participants:
Chattanooga-Hamilton County Regional Planning Agency
Cleveland Urban Area Metropolitan Planning Organization
Kimley-Horn and Associates, Inc.
Knoxville Regional Transportation Planning Organization
Lakeway Area Metropolitan Planning Organization
Memphis Area Transit Authority
Memphis Urban Area Metropolitan Planning Organization
Nashville Area Metropolitan Planning Organization
North Central Florida Regional Planning Council
University of Tennessee-Knoxville
Volpe National Transportation Systems Center

TABLE OF CONTENTS

I. Summary 3

II. Background 3

III. Day One Presentations and Discussion 3

 A. Welcome..... 3

 B. Overview of Scenario Planning 4

 C. Scenario Planning Process 5

 D. Current and Future Trends in Tennessee 8

 E. Scenario Planning Process I 9

 E.1. Nashville MPO Scenario Planning Process Overview..... 9

 E.2. Memphis MPO Scenario Planning Process Overview..... 11

 E.3. Knoxville TPO Scenario Planning Process Overview..... 13

 F. Scenario Planning Process II: Panel Presentation..... 14

 G. Chips Exercise 16

IV. Day Two Presentations and Discussion 18

 A. Highlight of Results from Chips Exercise 18

 B. Tools for Implementing Scenario Planning 19

 C. Getting Started 20

 D. Action Planning 21

 E. Conclusions 22

Appendix A: Contact for Additional Information and Agenda 23

Appendix B: List of Presenters and Attendees..... 24

I. Summary

The following report summarizes a peer exchange in Nashville, Tennessee, on scenario planning tools and techniques. The event focused on how some of Tennessee's metropolitan planning organizations (MPOs) and other agencies nationwide have implemented scenario planning approaches that link transportation and land use planning. Event participants discussed general process steps as well as software programs and tools for developing and analyzing scenarios. Additionally, participants exchanged knowledge on some challenges, success factors, and lessons learned related to implementation of scenario planning.

On the first day of the day-and-a-half event, a speaker from the Federal Highway Administration (FHWA) provided participants with an overview of the scenario planning process. A peer speaker from the North Central Florida Regional Planning Council (NCFRPC) detailed that agency's scenario planning process and discussed best practices. Peer speakers from the Nashville, Memphis, and Knoxville MPOs then described each respective agency's application of scenario planning for updating the long-range plan. Lessons learned and challenges from these applications were discussed in a panel format. Finally, presenters from Kimley-Horn and Associates, Inc., a consulting firm, engaged participants in a "chips" exercise. The exercise demonstrated an interactive process for creating scenarios to explore regional development trends and their implications.

On the second day of the workshop, a scenario planning software package was used to digitize and display the results of completed scenarios from the previous day's chips exercise. The results indicated that even identical inputs, such as existing land use patterns or demographic variables, can lead to different pictures of future regional growth. A staff member from the FHWA Resource Center provided an overview of tools and technologies available to facilitate scenario planning. Finally, the NCFRPC peer speaker and a staff member from the U.S. Department of Transportation, Volpe National Transportation Systems Center (Volpe Center), conducted sessions on how agencies considering utilizing the technique in the future can get started. During the discussion session, participants exchanged ideas about networking tactics for continuing ongoing efforts.

FHWA and the Tennessee Department of Transportation (TDOT) jointly hosted the peer exchange at the Nashville Public Library in downtown Nashville. Event participants included staff from FHWA, the Tennessee DOT, Chattanooga-Hamilton County Regional Planning Agency, Cleveland Urban Area MPO, Knoxville Regional transportation planning organization (TPO), Lakeway Area MPO, Memphis Area Transit Authority, Memphis Urban Area MPO, Nashville Area MPO, NCFRPC, the University of Tennessee (UT)-Knoxville, Kimley-Horn and Associates, Inc., and the Volpe Center. See Appendix B for a complete list of speakers and attendees.

II. Background

Scenario planning is an analytical tool and framework to identify and assess future growth alternatives and their implications. 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 approach is that it actively involves the public, the business community, and elected officials on a broad scale. Through structured activities and other processes, stakeholders are educated about growth trends and discuss their visions for regional growth and trade-offs. Stakeholder feedback can then be incorporated into plans for the future.

III. Day One Presentations and Discussion

A. Welcome

Angie Midgett, TDOT

Ms. Midgett welcomed all participants to the workshop, noting that workshop participants had a range of knowledge and familiarity with scenario planning. She stated that the purpose of the workshop was to encourage conversation on scenario planning tools, processes, and best practices so that participants can apply knowledge of the technique to their own agencies and regions.

Ms. Midgett stated that there are several approaches to scenario planning. For example, “low-tech” approaches rely less on computer modeling and other types of technology than do “high-tech” approaches. Participants should assess their planning needs and the resources available in their regions to determine which approach fits best.

B. Overview of Scenario Planning

Sharlene Reed, FHWA Office of Planning

Ms. Reed presented an overview of scenario planning and FHWA’s role in supporting its use. Scenario planning employs a wide range of possible future situations to facilitate public decision-making on land use policies and transportation investments. It provides a glimpse into the future and helps visualize “what could be.” The approach can enhance a community’s ability to anticipate future growth trends while prioritizing the use of limited resources.

There are typically six steps in a scenario planning process:

- **Step 1. Define driving forces of change.** Identify the major sources of change that affect the future, whether those forces are predictable or not.
- **Step 2. Determine patterns of interaction.** Consider how driving forces could combine to determine different future conditions. To understand the patterns of interaction that exist between driving forces, planners can develop matrices that identify the driving forces and potential positive or negative outcomes.
- **Step 3. Create scenarios.** When generating scenarios, planners should consider the implications of different strategies in different environments. The goal is to bring life to the scenarios so that a community can easily recognize patterns that work.
- **Step 4. Analyze the implications.** By employing various software tools, such as a geographic information system (GIS), planners can show how scenarios interact. This analysis can help both the public and decision-makers understand the consequences of potential actions and impacts of each scenario.
- **Step 5. Evaluate scenarios.** Planners can measure scenario outcomes by comparing indicators related to land use, transportation, demographics, environment, economics, technology, and other driving forces. For example, one scenario might have a strong environmental indicator but a weak indicator in its ability to create economic benefits.
- **Step 6. Monitor indicators.** Scenario planning is an ongoing process. As the future unfolds, planners need to assess and compare real growth patterns to the selected scenarios in order to make new decisions or create policies to address changing conditions.

Scenario planning offers the following benefits:

- Provides an analytical framework and process for understanding complex issues.
- Facilitates consensus building by giving communities the capacity to participate actively in the planning process.
- Includes tools and techniques to assess the impact of transportation and other public policy choices on a community.
- Allows an opportunity to recognize the impact of trade-offs among competing goals.
- Yields an enhanced decision-making framework by bringing together many viewpoints.
- Helps to improve management of increasingly limited resources.

FHWA supports scenario planning in the transportation planning process. As part of this support, FHWA provides feedback on efforts being planned or implemented, shares and provides information on scenario planning efforts nationwide, identifies resources and tools for use in scenario planning, and facilitates peer workshops. More resources, including case studies, techniques, and tools, can be found on the FHWA scenario planning website at www.fhwa.dot.gov/planning/scenplan/.

C. Scenario Planning Process

Marlie Sanderson, NCFRPC

The NCFRPC is the MPO for the north-central Florida region, which includes 11 counties and 33 incorporated municipalities. The agency's voting board comprises seven city commissioners from the city of Gainesville and five commissioners from Alachua County. The population of the north-central Florida region is approximately 504,100.

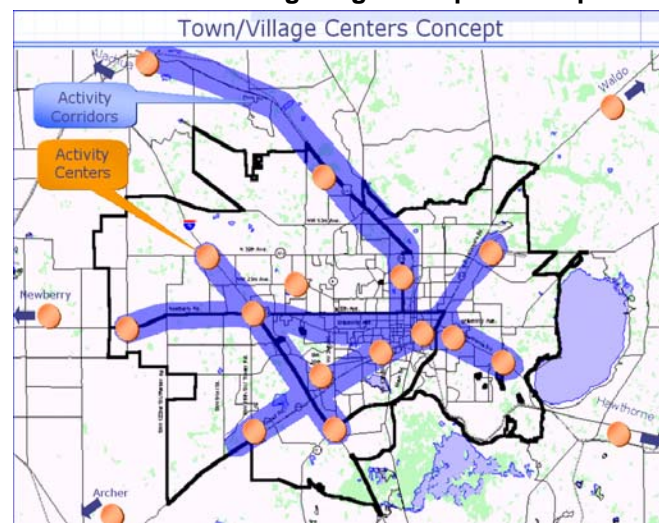
Using Scenario Planning to Update the Long-Range Transportation Plan

NCFRPC used a scenario planning process to develop its 2025 long-range transportation plan (LRTP) in 2005. In 1997, the Center for Urban Transportation Research¹ evaluated the LRTPs for all of Florida's MPOs and found that many agencies spent an extensive amount of time and energy on quantitative data analysis. As a result of this finding, the NCFRPC decided to use scenario planning to highlight more qualitative aspects of planning, such as how values and preferred growth visions interact when developing scenarios. Additionally, NCFRPC believed that a scenario planning-based approach to updating the LRTP would help better capture the attention of local elected officials.

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 NCFRPC 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," the scenario that 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.

Figure 1. Town/Village Centers Concept Scenario from the NCFRPC long-range transportation plan.



¹ <http://www.cutr.usf.edu/index.shtml>

Measuring Scenario Outcomes

Mr. Sanderson noted the importance of comparing and contrasting scenarios to understand how future growth patterns might affect transportation and land use.

Various measures can be used to evaluate scenarios, such as the extent to which the scenario impacts vehicle miles of travel, average trip length, transit ridership, amount of converted farmland, air quality, or energy consumption. For example, when assessing the four scenarios developed for the 2025 LRTP update, NCFRPC found that the westward growth scenario consumed the most amount of land and had the least amount of congested lane miles. The compact growth scenario consumed the least amount of land but had the highest number of congested lane miles.

Ultimately, NCFRPC developed a hybrid scenario based on components that commissioners preferred from all scenarios except the 'westward growth' concept. The hybrid scenario ultimately became a framework for the NCFRPC project needs plan.

As a result of the scenario planning process and exchanges on land use and transportation with MPO staff, Alachua County commissioners adopted policies that encouraged development in areas served by water and sewage services. These policies were adopted into the comprehensive plan.

Visioning for 2035 LRTP

Currently, the NCFRPC is engaging in a 2-year visioning effort as part of the update to the 2025 LRTP. The planned adoption date for the 2035 updated plan is November 2010. Some of the issues being considered and their potential effects on transportation include:

- Climate change.
- Energy independence.
- A "peak oil" scenario (in which oil production rapidly decreases while consumption rapidly increases).

As part of this visioning process, the NCFRPC is considering how these issues might affect the region's transportation network and its integration with land use. While no future growth scenarios for 2035 have yet been developed, they will reflect the three major goals of the LRTP (to promote multi-modalism, sustainability, and safety). The scenarios to be developed will likely focus on transportation and not land use, such as a "bus emphasis" scenario to focus on transit networks.

Each scenario will also consider a peak oil situation in which land use changes will reflect severely restricted driving.

Lessons Learned

- **Making trade-offs can help move the scenario planning process forward.** Before implementing its scenario planning process for the 2025 LRTP, NCFRPC decided not to conduct a model validation (a process to evaluate how well a computer simulation replicates "real-world" traffic counts). The NCFRPC's model validation process was expected to be labor and time intensive and comprise half of the budget for the LRTP. NCFRPC requested permission from FHWA and the Florida Department of Transportation (FDOT) to use a 3-year-old model in order to focus the LRTP budget on testing alternative land use scenarios. FHWA and FDOT granted permission, and NCFRPC was able to devote an increased amount of time and energy to a scenario planning process.

MPOs seeking to use the same approach as the NCFRPC might have to first consider whether the region is in an air quality attainment area. The NCFRPC was in an attainment area and so did not have to spend time ensuring that the travel demand model met air quality standards. MPOs in non-attainment areas might require more time to validate their models.

- **Ensure use of a robust computer simulation tool.** All of Florida’s MPOs were required to use the same computer simulation tool to measure scenarios. This tool was not robust enough to recognize all of the benefits of clustering development or all land use changes (such as measuring the increase in walking/biking trips that could occur as a result of compact development). This could be a reason why—contrary to the NCFRPC’s expectation—the compact growth scenario resulted in a high number of congested lane miles.
- **Slow rate of regional growth can make scenario planning more difficult.** Scenario planning can be a useful visioning tool to consider how transportation effects and is affected by land use decisions. However, the slow rate of growth predicted in the Gainesville area (an additional 67,300 people over a 20-year timeframe) made it difficult to see drastic differences between scenario outputs. To address this challenge, MPO planners in slow growing regions can choose a longer timeframe for visioning future growth.
- **Collaborate with local government.** Mr. Sanderson reported that it is important to remember that land use planning is the responsibility of local governments and not MPOs. When visioning future growth, MPOs should take care to address potential conflict points between the agency and city and county planners. Collaboration with local government should be a key step to coordinating future transportation and land use visions. For example, the scenario planning community meetings organized by NCFRPC were important venues where city and county commissioners could interact with MPO staff.

Discussion

Q: Are modal split assumptions different based on land use patterns?

A: Yes, the mode splits varied in different scenarios. For example, under the compact village scenario, higher modal share was allocated to transit.

Q: Are all MPOs within Tennessee required to use a common travel demand model?

A: No, all of Tennessee’s MPOs use the same modeling software but maintain independent versions of their model that are specific to each MPO’s region.

Q: Did NCFRPC complete a cost-benefit analysis of the four scenarios developed for the 2025 LRTP?

A: Yes, the cost-benefit analysis is part of the process for measuring scenario outcomes.

Q: When assessing the percentage of population served by transit for each of the four scenarios, did NCFRPC receive many questions about how these figures were determined?

A: No, NCFRPC did not receive many questions about how it determined the percentage of population served by transit. To develop the percentage figures, NCFRPC calculated what percentage of population would included within a quarter-mile “buffer” zone around transit systems.

Q: Does NCFRPC plan to look at how changes in fuel economy such as increased use of hybrid vehicles, electric buses, etc., might impact transportation systems under a peak oil scenario?

A: NCFRPC will consider these changes with the help of the consultants (the Renaissance Planning Group) that are assisting the agency in completing the 2035 LRTP.

Comment: There can be constraints to developing or adopting a preferred scenario that are not realistic. Some regions may encounter resistance to scenario planning if existing local land use policies do not support what the scenario presents.

A: NCFRPC did not encounter this type of resistance. Fiscal constraint was the primary consideration when developing the adopted project needs plan for the LRTP.

Q: How did the development community respond to the four scenarios?

A: NCFRPC invited development community stakeholders to community meetings when developing and assessing scenarios, but the turnout was small

Q: How did the NCFRPC conduct a traffic analysis when measuring outcomes for the four scenarios?

A: NCFRPC coded over 450 traffic zones and also worked with city and county planners to compare these zones with what was included in the adopted comprehensive plan.

Q: How did the NCFRPC develop the total numbers for population and employment for the four scenarios?

A: All MPOs in Florida are required to use the state's forecasts for growth totals. These growth totals were the control used to measure outcomes of all scenarios. The same socioeconomic information was used as an input for each scenario, although each of the four concepts involved a different distribution of this information.

Q: How did NCFRPC translate the state's forecast into units appropriate for the scenarios?

A: NCFRPC does not use any land use categories in the transportation model. The model uses dwelling units, type of dwelling unit, and number of jobs as proxies for population, employment, and other factors.

Q: Is there growth in adjoining counties to Alachua County?

A: Outlying counties are experiencing significant growth. The NCFRPC computer model was designed to count growth at the perimeter of Alachua County to somewhat account for increased growth in adjoining counties. NCFRPC has considered expanding the MPO boundary to more formally account for this growth in the model, but this is a difficult and political issue to address.

Q: NCFRPC has seven city and five county commissioners on its board. How are other transportation modes represented?

A: The city of Gainesville operates the bus system so this is represented by the board's seven city commissioners.

Q: Did the NCFRPC play a role in developing the Alachua County comprehensive plan and was this plan used to develop the LRTP?

A: Yes, the comprehensive plan was used to update the LRTP. The MPO has a role in developing the Alachua County and city of Gainesville comprehensive plans but not the comprehensive plans of the seven other cities in Alachua county.

Q: Do these seven cities have a seat on the MPO's board?

A: No. The county commission represents these seven smaller cities.

Q: How does the comprehensive planning process occur in Tennessee?

A: In Tennessee, there are no requirements for comprehensive plans unless a jurisdiction has zoning regulations. However, the plan does not have to be a formal, written document; a set of policies can comprise a comprehensive plan.

D. Current and Future Trends in Tennessee

Jeff Bryan, Volpe Center

Mr. Bryan asked participants to brainstorm about current and future growth, transportation, and land use-related trends in Tennessee. Participants reported a variety of general state trends, such as increasing sprawl and loss of farmland. Changing state demographics also have implications for transportation and land use considerations. For example, an increasingly older population that does not or cannot drive might underscore the need for housing developments that are within walking distance of shopping and other amenities.

To address these trends and others, participants suggested some of the following responses at the local, regional, or state level:

- Investment in transit systems.
- Education of policy-makers and the public on links between transportation and land use.
- Encouragement of employers offering telecommuting/flex-time options to employees as ways to ease congestion and improve air quality.

- Emphasis of alternatives to driving such as biking or walking to reduce vehicle miles traveled (VMT), promote health, and improve air quality.
- Increased emphasis on collaboration between the public and private sectors when addressing transportation and land use.
- Consideration of regional cultures and values when engaging in transportation and land use decision-making.

Mr. Bryan concluded the session by emphasizing that sharing these types of ideas and insights with stakeholder groups can be an integral part of the first step of a scenario planning process, which is to define the driving forces of change.

E. Scenario Planning Process I

Matt Meservy and Max Baker, Nashville MPO

Tim Moreland and Pragati Srivastava, Memphis MPO

Mike Conger, Knoxville TPO

Speakers from the Nashville, Memphis, and Knoxville T/MPOs described each agency's scenario planning process to update its LRTP. Each agency represented a different stage of the scenario planning process.

The Nashville MPO, for example, is in the early stages of building a model to assess completed scenarios. The agency used several software modeling tools to evaluate the region's potential for growth and also developed two initial scenarios. To continue the scenario planning effort, the agency conducted public visioning workshops. The Memphis MPO utilized an intensive public involvement effort to develop several scenarios focusing on four different areas but is still scoping how the approach could be used in the future. The Knoxville TPO, which is in the early stages of the scenario planning process, calibrated a land use model but did not complete an analysis of all scenarios due to time constraints for approving the LRTP.

Each agency's effort is related in more detail in sections E.1, E.2, and E.3 below.

E.1. Nashville MPO Scenario Planning Process Overview

The Nashville MPO was established in the 1960s and serves a seven-county region. From 2004-2006, the Nashville MPO used an analysis tool, the Urban Land Use Allocation Model (ULAM), to evaluate two land use scenarios ("traditional" growth and "compact center" growth). ULAM was built with monetary assistance from TDOT in 2005.

In 2007, the Nashville MPO began the Tri-County Transportation and Land Use Study to explore growth options for three of its member counties. The effort involves conducting public visioning workshops to identify regional growth goals and developing several scenarios to test growth alternatives. Several workshops have been held and the scenarios are currently being finalized. More information on the Tri-County effort is available at <http://www.nashvillempo.org/tricounty.html>.

Building a Growth Assessment Model

The Nashville MPO used Community Viz, a GIS-based software package, to build a model for identifying potential regional growth areas. To make the data more manageable, modelers first broke the MPO region down into counties. Each county was treated as a separate "micro-model." Within counties, parcels were tagged with a Traffic Analysis Zone (TAZ) number for inclusion in a traffic demand model. The parcels were then aggregated into a "macro-model" containing 2,012 TAZs.

The strategy for allocating current and future growth involved first identifying the supply of buildable areas, then determining demand for these areas, and finally measuring suitability of buildable areas for growth. The aggregate map of supply, demand, and suitability will be used to assess how the region is

growing and could grow in the future. Steps for allocating current and future growth are described in more detail below.

Determining Supply

An inventory of potential development areas was developed using data from land use plans, zoning regulations, and urban design standards. Data were also collected at the local level, including information from comprehensive and corridor plans as well as layers such as environmental features (e.g., wetlands, slopes, soils, and historic areas), transportation, public utilities, land use and development patterns, socioeconomic information, and schools.

In addition, data obtained from nearly 50 jurisdictions were compiled to create a land use map showing development types including single-family and multi-family residential areas; open space and agricultural areas; and commercial, office, and industrial zones. Character areas were then created to aggregate land use and development characteristics from different regions.

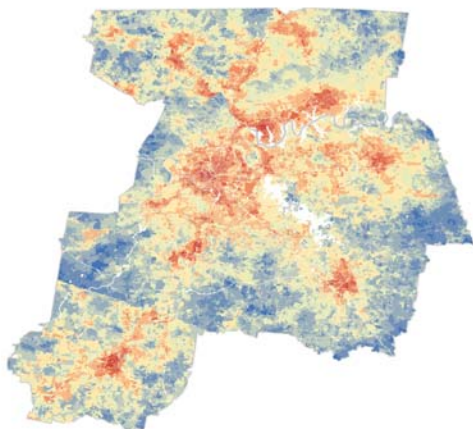
Once the inventory of potential development areas was complete, the MPO used a multi-step process to determine the potential developable sites. First, a map was developed to show all environmental features of a site. Next, a composite map aggregated all environmental features and showed areas deemed highly constrained for development, such as wetlands, parking lots, or roadways. Highly constrained areas were removed from the model, leaving a map that showed the remaining area for potential development. Other areas were then removed to account for internal site improvements that would support site development, such as stormwater management infrastructure. Finally, an aggregate map was produced to show all areas remaining for potential development.

Determining Suitability

To determine the suitability and desirability of buildable areas, the agency met with focus groups to assess priority locations for development. The focus groups included planning policy-makers, real estate agents and developers, and utility departments. Data were also obtained from tax assessments and censuses.

Each parcel was evaluated on its proximity to several factors, such as water/sewer infrastructure, network roads, major intersections, parks and other recreational opportunities, transit stations, and environmental features (e.g., floodplains, rare species). Mr. Baker noted that environmental features do not necessarily constrain development but will likely be important factors to consider when plotting regional growth. An aggregate map for the Nashville region was created to display the suitability of each parcel (see Figure 2). In the aggregate map, red coloring indicates the parcel(s) with highest suitability for development; blue coloring indicates the parcel(s) with the lowest suitability.

Figure 2. Map of Nashville MPO region showing suitability of parcels for future development.



Determining Demand

To assess demand for development, population and employment growth were projected to 2035 for both residential and non-residential areas at the household and square footage levels. Distribution of future growth was then plotted on a map using inputs from the supply, demand, and suitability analyses.

Preliminary results from the regional demand allocations suggested that the allocation does not work well on a regional scale as central counties tend to attract many more households and square footage due to the counties proximity to most of the suitability factors.

But when each county is tied to the respective control totals, the allocation results appear much more reasonable.

Future Work

The Nashville MPO anticipates using the Community Viz-based model for current and future transportation projects, including the Tri-County Land Use and Transportation Study. Model enhancements might be made in the future. For example, the MPO plans to improve suitability factors to provide a more detailed perspective on sites that are available for development. In addition, the agency plans to add indicators such as carbon footprints and revenue generation to better assess scenarios.

E.2. Memphis MPO Scenario Planning Process Overview

The Memphis MPO is a bi-state (Tennessee and Mississippi) agency that includes a total of 16 jurisdictions (15 cities and unincorporated Shelby County). The MPO serves a total population of 1.2 million.

A scenario planning approach was used to develop the agency's 2030 LRTP to help identify connections between land use and transportation and vision alternatives to the region's private car-oriented travel. In addition, the approach was used to heighten local decision-makers' awareness of land use and transportation issues.

The 2030 LRTP process began in 2007 with an aggressive timetable to allow plan adoption in early 2008. The plan's primary goals included an emphasis on vibrant communities that support accessibility and mobility.

Use of Scenario Planning Approach for Public Involvement

Scenario planning provided a framework for an intensive public participation process based on use of visualization techniques. Several stakeholder groups were engaged as part of this process, including:

- Memphis MPO Board and committee members.
- Focus groups representing special population segments such as low-income, minority, and limited English proficient populations.
- The Transportation Planning Advisory Committee (TPAC), a diverse group of about 20 members. Members included developers, stay-at-home mothers, bicycle advocates, planners, retirees, and environmentalists.

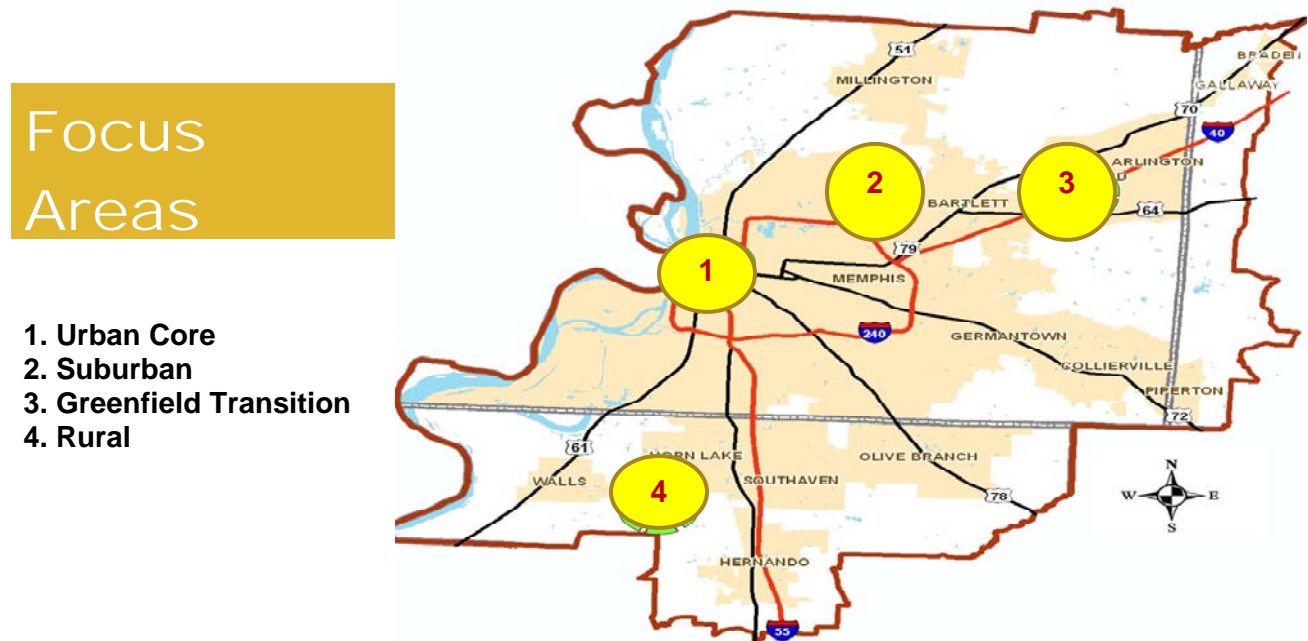
Various public involvement techniques were carried out with help from these stakeholder groups. For example, the MPO provided disposable cameras to the TPAC members, who were asked to take pictures of transportation-related elements in their neighborhoods that they liked and did not like. Participants returned hundreds of pictures showing their preferences (e.g., narrow streets with traffic-calming devices) and dislikes (e.g., severely neglected pedestrian facilities; large arterials with truck traffic and no sidewalks). The MPO found that this technique was very well received by the TPAC; participants were enthusiastic about the effort. Some individuals, for example, enlarged their favorite photographs to poster size or asked for two cameras.

Several recurring themes emerged from the public participation process that were consistent with the Memphis MPO's goals for the LRTP, such as enhancement of the quality of life through the integration of land use and transportation, improvement of travel safety, and support of "mixed-use" development.

Developing Scenarios and Evaluating Outcomes

Using the public's preferences and LRTP goals as a framework, the Memphis MPO developed scenarios for four different focus areas within the region, including the "urban core," "suburban," "greenfield transition," and "rural" areas (see Figure 3).

Figure 3. Map of Focus Areas used by the Memphis MPO for Scenario Development.



Two scenarios were developed for each focus area: "business as usual" and "alternative development" (i.e., better integration of land use and transportation). For example, the new development scenario in the urban core focus area included mixed-use development, elimination of surface parking (with the creation of a single parking garage), improvement of street connectivity, and addition of transit systems.

To prepare and evaluate the scenarios for each of the focus areas, the Memphis MPO inventoried existing conditions using GIS data, aerial photography, and travel demand data. Next, existing development constraints were identified using locally adopted plans and policies. Third, the two scenarios were formulated based on the collected data. Finally, trade-offs between scenarios were identified according to several indicators, such as the percentage change in vehicle trips and VMT.

The Memphis MPO used a comparative analysis to assess the outcomes of all scenarios. For example, all scenarios resulted in a consistent reduction of vehicle trips and VMT in the five- to seven-percent range.

Future Work

The Memphis MPO reported some challenges in using the scenario planning approach for the LRTP development, including difficulty getting local jurisdictions' buy-in and addressing data gaps for cities that do not have comprehensive plans. In addition, Mr. Moreland and Ms. Srivastava noted that scenario planning is a labor-intensive process due to the time it takes to develop and analyze scenarios. The agency has a small staff and continuing efforts for the future could be a challenge. Utilizing consultants to augment staff resources is one option, but this also can increase the cost.

The agency anticipates that scenario planning techniques could be incorporated into the process for developing the MPO's land use plan and regional transit plan, as well as the update to the bicycle and pedestrian plan. The agency is also discussing updating the travel demand model with alternatives analysis.

E.3. Knoxville TPO Scenario Planning Process Overview

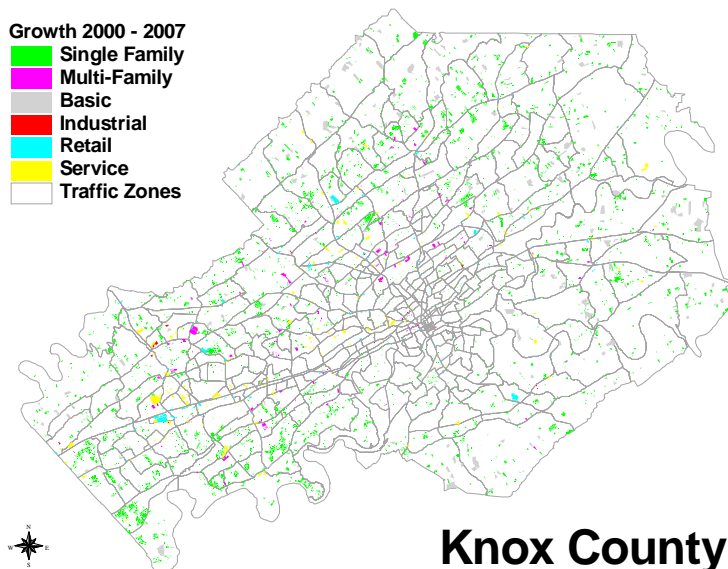
The Knoxville TPO, which serves a population of approximately 450,000 in a four-county region, began a scenario development process for the 2009-2034 Regional Mobility Plan, the update to the 2030 LRTP. The agency used ULAM to assess what types of growth trends to include in the scenarios as well as develop future year land use data that was needed for the travel forecasting effort. However, due to the short timeframe in which the agency needed to finalize the LRTP for approval, scenario analysis was not fully implemented.

Building the Land Use Model

An extensive amount of transportation and land use data for a nine-county modeling area were required for ULAM, including total population, number of households, vehicles per household, and employment information. Data-gathering support was provided by the Knoxville Metropolitan Planning Commission's GIS and research staff as well as the Knoxville TPO's Technical Committee and other regional planning agencies.

After gathering the data for ULAM, historic growth from 2000-2007 was mapped to calibrate the model and highlight land use development patterns and trends. Growth from the same time period within Knox County was also assessed at the parcel level (see Figure 4). The past growth trend has been low-density, dispersed development. When growth figures were projected to 2035, Knox County received the majority of anticipated development. Using ULAM, the Knoxville TPO also analyzed locations of activity clusters as a way to tie travel demand into the land use model.

Figure 4. Parcel growth from 2000-2007 for Knox County, TN.



The model then aggregated and filtered all inputs to display a picture of developable land (e.g., vacant lots or underutilized areas), constraints for growth, approved development, and potential redevelopment areas for each county. Some of the developable land was removed from the model due to environmental considerations such as slope.

Market considerations, such as price of land, were also factored in to the model to provide a more robust picture of current and potential regional growth. By combining these figures with historic trends and approved development data, agency staff could identify the areas most desirable for development.

The agency also conducted a charrette and mailed a survey to the development community. The survey solicited feedback on considerations used to identify preferred locations for residential and commercial development. The Knoxville TPO identified three land use alternative scenarios that were set up in the ULAM model:

Assessing Trends for Growth Scenarios

Based on results from the ULAM model, the Knoxville TPO was able to identify three land use alternative scenarios:

- “Historical Trend” (i.e., continuation of past growth trends).
- “Sustainable Development” (i.e., concentration of mixed-used development along key nodes and corridors).
- “Targeted Road Investments” (i.e., how growth/development might occur if a proposed interstate bypass was constructed).

The agency also conducted a charrette and mailed a survey to the public to solicit feedback on preferred regional growth.

The scenarios were modeled in ULAM to produce a picture of where development and growth should be allocated. The scenarios were run through the travel demand model to produce comparative data on each scenario’s outcome in terms of factors such as VMT and congested lane miles of roadway.

Challenges

Mr. Conger reported on a few lessons learned from the Knoxville TPO’s scenario planning and land use modeling process:

- **Ensure sufficient time when engaging in a modeling process.** Due to the difficulty of finding data for inclusion in the land use model, the labor intensiveness of calibrating the model to ensure its accuracy, and the aggressive timeline for updating the 2009-2034 Regional Mobility Plan, the Knoxville TPO did not have sufficient time to allow for public and other technical input on the development of all three scenarios. As a result, the agency shifted its primary focus to the historical trend scenario.
- **Calibrate the land use model to ensure accurate, valid results.** When engaging in a data-collection process, the Knoxville TPO found that the data required to run ULAM, such as zoning information, were not available for all of the counties. The agency projected figures for these counties and in some cases used the default variables that were built into the model. The estimated figures, once run in the model, led to results that were not always accurate or valid. In addition, the travel demand model was not sensitive enough to recognize all variables. For example, the model did not have a formal mode choice component so it could not recognize the benefits of compact growth strategies such as shifting trips to transit. The agency had to undergo several rounds of model calibration which took significant time and energy.
- **Consider utility of model for scenario planning.** Some models might require more manual manipulation than others before they can be used for assessing scenarios. For example, ULAM was a very good tool for inventorying land uses and provided a defensible method of allocation; however, using the software to create scenarios was more difficult.

Future Efforts

The Knoxville TPO plans to continue the scenario planning and modeling processes in the future. Anticipated future directions include working to update the travel demand model to increase sensitivity to land use policies, review of default variables in ULAM to ensure their appropriateness for the region, and determination of performance measures to assess land use scenarios.

F. Scenario Planning Process II: Panel Presentation

Tim Moreland and Pragati Srivastava, Memphis MPO

Matt Meservy and Max Baker, Nashville MPO

Mike Conger, Knoxville TPO

Peer speakers from the Memphis, Nashville, and Knoxville T/MPOs participated in a panel presentation on the lessons learned and challenges encountered during each agency's scenario planning process. Questions from the audience and responses from each MPO are detailed below.

Q: How user-friendly are ULAM and Community Viz?

Nashville: Our experience was that Community Viz was very user-friendly. ULAM required more experience with the product.

Knoxville: Unlike travel demand models, which have well-established users' communities, land use models like ULAM are a new frontier. We hired a consultant who was an expert with ULAM to assist us with its use.

Q: What software package did Memphis use to determine results from the scenario analysis?

Memphis: Community Viz.

Q: Nashville used focus groups as part of its public participation process. Was there a lot of participation in these focus groups?

Nashville: We had three focus groups. Out of the three, the least attended was the utility department's group. There was good representation in the other two groups from real estate agents, developers, planners, and other stakeholders. The groups were developed with input from a public relations consultant.

Q: It can be very expensive to utilize consultants' services for developing the LRTP and for scenario planning efforts. What is each MPO doing to develop its in-house scenario planning capabilities?

Memphis: We are in the process of purchasing Community Viz software to increase our in-house scenario planning and LRTP development capacities.

Knoxville: We have a very small staff to work on scenario planning efforts. In the near future, we will determine how to begin developing the next update to the LRTP and how to assign staff for various tasks. We might explore additional scenario planning tools.

Nashville: We also have a small staff, and the scenario planning process has been very labor intensive. It took a long time to find and process data for the first cycle, but we now have a better understanding of what is involved; and we do not anticipate the process will be as labor intensive if we use it for the next LRTP update. There was a learning curve involved.

NCFRPC: We found that it can be difficult to retain modeling staff. These staff are very marketable and sometimes begin working as consultants. We partner with city planners to help with our modeling efforts and hire consultants for other types of technical modeling.

Q: How was Memphis' TPAC selected and was this group truly representative of the community?

Memphis: The MPO has a citizens' advisory committee comprised of individuals appointed by the mayor. Some members from this committee were invited to serve on the TPAC. It can be difficult to get a truly representative sample of any community, especially when that community is as diverse as the Memphis area population. We conducted other public participation projects, such as the public workshops, as a way to capture as broad an audience as possible in the conversation.

Q: How did the Nashville MPO account for redevelopment when determining the supply of buildable areas?

Nashville: Currently, redevelopment is not accounted for in buildable area inventory; however, in the future, we will set up a manual process to account for redevelopment.

Knoxville: It can be difficult to account for redevelopment. For example, in our land use model we assumed that development would occur on vacant land but this might not be true all of the time. Some industries could expand by adding more people to a shift rather than developing a new building. To account for these situations, we inserted a "fudge factor" to assign some growth to existing facilities.

Q: Have any of the MPOs experienced interaction between the land use and transportation model/travel demand model?

Knoxville: Yes, there is interaction with a market analysis. For example, we can run a travel demand model to show how a new highway might extend accessibility to a downtown retail area. If a certain area has become more accessible to an activity center it will be scored higher and thus have more likelihood for development.

Q: Many jurisdictions have their own comprehensive plans. Did Knoxville make a special effort to coordinate with local governments on the scenario planning effort?

Knoxville: Yes, we tried to involve local TPO jurisdictions during the process of developing the historical trend alternative, although due to the time constraints we were not able to fully develop additional scenarios. It was more challenging to involve all of the jurisdictions outside of the TPO. However, within the modeling domain and air quality nonattainment area, we worked closely with the State Office of Local Planning, which has connections to several of those local governments, to get feedback. Moving forward, there are some efforts underway to develop a comprehensive vision for future growth for the entire nine-county region. We will try to determine how to combine these efforts with the MPO's vision and transportation planning efforts.

Q: How accurate are the long-term market projections in terms of developable land? How accurate is that for predicting where things would go in the future?

Memphis: The market projects are fairly accurate but not for every land use. Our projections are geared toward residential and commercial development.

Q: How did Nashville obtain data on water and sewer infrastructure when most utility companies do not have a long-range plan? In addition, how much input did the MPO have from the school board on school enrollment?

Nashville: It was challenging to obtain long-term data on water and sewer infrastructure. The companies told us that "they go where the market goes" so they do not necessarily develop long-term plans. We used existing infrastructure as data inputs. We did not collect information on school enrollment. Some schools are perceived as being good or bad and we did not have a way to evaluate or address that.

G. Chips Exercise

Matt Noonkester and Camille Barchers, Kimley Horn and Associates, Inc.

Overview of Exercise

Mr. Noonkester and Ms. Barchers facilitated an interactive group exercise called the "chips" game. The game demonstrated a process for developing and analyzing preferred growth scenarios. Benefits of the chips game include widespread application with the general public and the low cost of use. In addition, the game presents an opportunity to increase participants' understanding of land consumption associated with different development scenarios that use the same population and employment forecast inputs.

It was emphasized that the chips game is a useful "low-tech" tool. The total cost for developing the exercise could range from the hundreds to low thousands as the primary components include maps, paper, markers, stickers (to indicate areas of preferred growth) and a flip chart (to record groups' growth preferences). The results from the game do not have to be digitized; outcomes can be evaluated and assessed in group discussions or using only paper and pencil.

The chips game implemented at the workshop was a modification of an exercise implemented for the Brownsville MPO in Cameron County, Texas. To play the game, participants gathered in small groups comprised of six to eight individuals. Each group sat at a table with a large working map

Figure 5. Start-Up Materials for Chips Game.



(42 inches by 55 inches) and several smaller resource maps (e.g., environmentally-sensitive areas, major thoroughfares, land suitability) (see Figure 5).

The working maps, which were identical, displayed the urbanized portion of Cameron County and included several background layers for the game, including political boundaries, major roads, transit systems, existing land use patterns, floodplains, and other environmental features.

Participants were presented with a choice of three development scenarios represented by one of three envelopes. Each envelope contained different types and amounts of game pieces to accommodate the same population and employment forecasts for 2035. Game pieces represented different development types, patterns, and intensities.

Each envelope used at the event was labeled either as a “trend” (i.e., primarily suburban growth and an automobile-dominated environment), “vibrant center” (i.e., primarily dense and mixed-use development), and “hybrid” (i.e., components from both trend and vibrant center; emphasis on multimodal transportation) scenario.

Participants were instructed to choose one of the development scenario envelopes to start the game. The chosen scenario would provide a framework to guide placement of the game pieces. Game piece trading sheets were also provided so that participants could trade pieces with one another, if desired. For instance, participants could trade one suburban neighborhood and two strip commercial corridor pieces for a suburban regional activity center.

In playing the game, teams placed game pieces on the map to designate areas of future residential, employment, or mixed-use development (see Figure 6). Teams also used colored markers to indicate areas of open spaces or greenways, areas of constrained development, new roads, and transit routes. Game pieces were then affixed to the large working maps using tape. At the conclusion of the hour-long exercise, teams presented their maps to the other groups (see Figure 7), highlighting the chosen scenario and the team’s vision for preferred growth. The different development patterns that evolved in each group were compared and discussed.

In preparation for the next day’s morning session that highlighted results from the exercise, a clear layer of acetate grid was overlaid on each map. The affixed game pieces were translated to different cells on the grid. By coding the cells that contained game pieces and inserting these data into an appropriate software program, an MPO could perform a GIS-based analysis of scenario outcomes.

Figure 6. Discussing Placement of Chips.



Figure 7. Teams Present Maps to the Group.



Overall, the participants found the exercise to be a productive learning experience. The chips exercise can emphasize the links between land use and transportation planning while educating the public and decision-makers on the nature of the development process.

IV. Day Two Presentations and Discussion

A. Highlight of Results from Chips Exercise

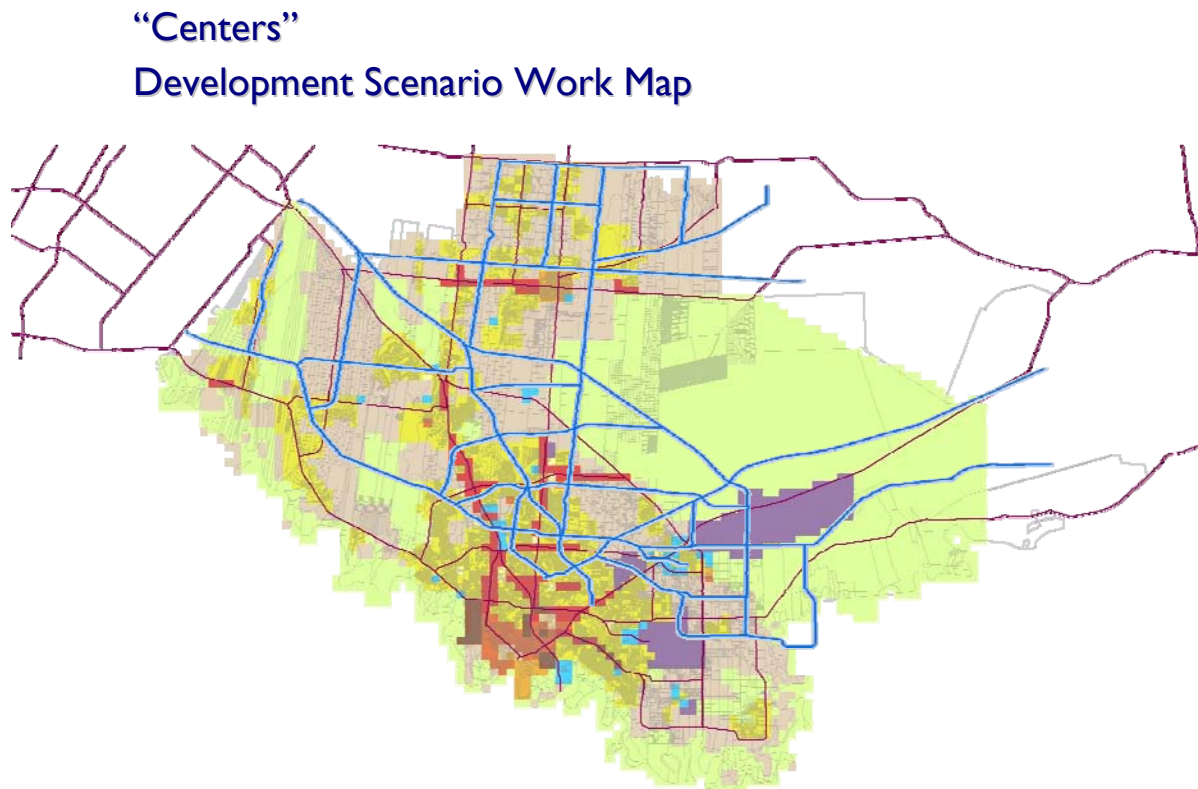
Matt Noonkester and Camille Barchers, Kimley-Horn and Associates, Inc.

Mr. Noonkester and Ms. Barchers reviewed results from the previous day's development chips exercise. Each group had focused on different trends and values despite being presented with identical inputs. For example, one table focused on development of a multi-modal transportation system while incorporating land conservation initiatives such as an emphasis on wildlife corridors, farmland preservation, and greenway linkages. Another table focused on providing transit to improve regional mobility. This group introduced certain development types and patterns that supported a regional transit system.

Using Community Viz software as an example tool, Ms. Barchers presented results from two of the scenarios developed by participants in the chips exercise.

For example, the "Centers" scenario displayed increased road connectivity and commercial development clustered in downtown with outposts of development (see Figure 8). An evaluation matrix was also presented to compare specific indicators, such as acres developed and new housing units constructed, for each scenario.

Figure 8. Example of Digitized Chips Scenario from Workshop.



It was noted that games such as the chips exercise can be used as part of a successful public outreach strategy during a scenario planning process. To build and sustain buy-in for the planning process, scenarios developed in collaboration with the public should be displayed to the same public.

Discussion

Q: What is a typical timeframe from starting a trend analysis to getting results?

A: A typical timeframe for a comprehensive scenario planning process is 6 months. However, in some communities, the timeframe could be choppy or less consistent due to political factors, resource availability, or other issues. Developing a model to analyze scenarios might take a few weeks while calibrating the model could go on for as long as increased precision is desired. It is important to ensure all factors are in place before going to the public as mistakes might undermine public trust in the process.

Q: Where in the process do planners develop the scenario descriptions, such as “hybrid” or “dense”?

A: Setting the scenario descriptions generally occurs after the initial public outreach process and citizens’ visions can be taken into consideration.

Q: How would a region experiencing flat or declining growth still use scenario planning?

A: It can be challenging to implement scenario planning in this type of region due to the small differences between alternatives. One approach to address scenario development in this type of region is to create two sets of maps—one representing allocated growth and the other representing a full build-out potential for an area. Additionally, some slow growing regions choose to vision growth for a longer period, such as 50 or even 100 years, to consider more growth potential over time.

B. Tools for Implementing Scenario Planning

Jim Thorne, FHWA Resource Center

Mr. Thorne provided an overview of the role of tools in scenario planning and provided information on additional resources. He noted that one premise of scenario planning is that it is better to “get the future imprecisely right” than to “get the future precisely wrong” when developing transportation plans. Tools can help people involved in scenario planning get the future as “imprecisely right” as possible.

Mr. Thorne asked participants to provide feedback on why tools might be helpful for a scenario planning process. Participants suggested that tools are necessary for several reasons, including:

- Providing a baseline measurement.
- Assessing growth options.
- Capturing community values or ideals.
- Illustrating concepts/visuals.
- Helping to direct public investment.
- Facilitating effective public engagement.
- Measuring outcomes of options.

In general, tools can provide decision-makers and the public with the information they need to make educated decisions. A variety of technology tools can help communities consider scenarios and make better decisions. FHWA does not recommend one software package over another; the choice of software will depend on the user's resources and goals. Some examples of tools include:

- **Information resources**, including websites such as www.placematters.com, www.smartgrowthamerica.org, www.fgdc.gov, www.fhwa.dot.gov/planning/landuse/, www.natureserve.org/, www.teaming.com, www.smartcommunities.ncat.org/, <http://worldwind.arc.nasa.gov/>, and egis.hud.gov/egis/.
- **Visualization tools and techniques**, such as photo montage, architectural drawings, visual preference surveys, visual kiosks, wireless keypad polling, aerial images, and Box City (<http://www.cubekc.org/>).

- **Modeling and scenario analysis tools** using software such as INDEX and Paint the Town (<http://www.crit.com/>), What If? (<http://www.crit.com/>), MetroQUEST (<http://www.envisiontools.com/>), UrbanSim (<http://www.urbansim.org/index.shtml>), CommunityViz (<http://www.communityviz.com/>), and the Transportation Economic and Land Use Model (www.telus-national.org/products/telum.htm).
- **Process tools and techniques** such as civic participation, the PLACE³S process, and field research. As part of the public participation process, planners can conduct large-scale town meetings, visioning workshops, or “low-tech” exercises such as the “chips” game. In some situations, small breakout groups during public meetings could help encourage discussion. The International Association of Public Participation (www.iap2.org) provides a useful framework for how to approach these processes.

Instead of concentrating on one aspect of planning for the future, many impact analysis tools and GIS models used in scenario planning estimate the future impacts of decisions made about land use, transportation system, and the environment. These tools take into account the interconnections between many aspects of planning. For example, if a change to the transportation system is proposed for an area, the model will estimate the impact of this change on land use and the environment. Additional changes in these areas may then need to be made to accommodate the initial change. Through this process, these tools help people recognize the interactions and realistically plan for the future.

Mr. Thorne additionally provided examples of other scenario planning efforts, including:

- **The Community 2050 initiative** (www.slocog.org/cm/Community2050/Home.html) led by the San Luis Obispo Council of Governments, the regional planning agency for the region. 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 and alternatives mapping, residents brainstormed ideas for new development and built their own growth scenario.
- **The Delaware Valley Regional Planning Commission (DVRPC) “What If” planning effort** . DVRPC undertook a “What If” scenario planning effort that explored a range possible issues that could affect the region’s future. A qualitative assessment of 12 scenarios was conducted. From this exercise, DVRPC focused in detail on five scenarios using quantitative methods. The agency considered which scenario was most likely, which scenario had advantages and disadvantages for the region, and how the region could prepare to address potential impacts. Insights gained from this exercise were used to inform the transportation plan update process.
- **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 (www.bmtsonline.com/files/bmts/pdfs/TransportationTomorrow2030.pdf). The 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.

C. Getting Started

Marlie Sanderson, NCFRPC

Overview

Mr. Sanderson provided an overview of the steps NCFRPC took to initiate and develop its scenario planning process. If applicable, these basic steps can be used as guidelines for other MPOs that are considering use of the approach.

First, it is important to consider the base and horizon years for which scenarios will be developed. To achieve better consistency between all of 26 Florida MPOs' LRTPS, all MPOs must use the same base year (2007) and horizon year (2035) when updating their regions' plans.

Second, MPOs can conduct visioning with their board members and the public to brainstorm about what the future might look like. The visioning process can provide ideas for future growth goals. In the NCFRPC region, visioning led to the following goals for the LRTP: multi-modalism, sustainability, and safety. Once goals for the future are developed, scenarios can be developed.

Next, evaluation measures can be created to assess how well a scenario has addressed the LRTP's goals. The NCFRPC, for example, used the percentage of population served by transit as an evaluation measure for how well scenarios addressed the LRTP's multimodal goal. Changes in vehicle emissions and transit mode share were measures for sustainability and total number of traffic crashes were the primary measure for safety. After testing and evaluating scenarios, MPOs can obtain the necessary information to determine which scenario to adopt in the LRTP.

Finally, MPOs engaging in the scenario planning process can select projects for implementation. The NCFRPC's LRTP contains six projects that are fiscally constrained for a 20-year timeframe.

Challenges

Mr. Sanderson reported one challenge of scenario planning can be coordinating between county and MPO staff. For example, in Gainesville, county planning staff believed that the currently adopted comprehensive plan reflected the future. As a result, they did not encourage alternative land use scenario testing. The MPO produced only one land use scenario based on data from the comprehensive plan, which reflects a trend towards westward growth.

It can also be difficult to coordinate between LRTP project implementation and scenario development: projects implemented in the LRTP might not reflect scenarios. For example, the six fiscally constrained projects included in the NCFRPC's LRTP are all for eastern areas of the county, rather than the western areas where growth is predicted to occur. Mr. Sanderson noted that it is important to invest strategically and, to the extent possible, ensure coordination between growth and infrastructure.

Discussion

Q: What is the University of Florida student population and did the NCFRPC account for growth in the student population?

A: The student population is approximately 45,000. The NCFRPC works closely with university planners, who also sit on the MPO's technical committee. The university is predicting a moderate increase in the student population but not a large amount of growth.

Q: How does the NCFRPC show transit ridership?

A: NCFRPC typically goes through a 5-year cycle where the results of scenario analysis are compared to the adopted comprehensive land use plan. After showing the results, it is hoped that changes are incorporated into the next update to the land use plan.

Q: Do land use planners participate in the transportation planning process?

A: County planners are on the MPO's technical committee. City planners are also on the committee but they do not work on land use issues. It can be difficult to "connect the dots" between goals for the transportation system and what is included in the comprehensive plan.

D. Action Planning

Jeff Bryan, Volpe Center

To conclude the peer exchange, participants gathered in small breakout groups to discuss key lessons learned during the workshop as well as ideas of next steps for agencies interested in continuing an existing scenario planning process, adapting the process for a future LRTP update, or initiating a process for the first time. Participants then shared findings from the breakout discussions with the large group. Some of the potential next steps discussed in large group format included:

- Encourage linkages between transportation and land use planning during the public involvement process.
- Identify best practices for public involvement.
- Identify partnership opportunities with other agencies to collaborate on future scenario planning efforts.
- Encourage collaboration between MPOs and the state department of transportation (DOT) on the scenario planning process. For example, the state DOT might be able to help provide access to data or resources that the MPOs cannot access. In addition, the state DOT might be able to facilitate a higher-level approach to coordinating several MPOs for a regional or statewide scenario planning effort.
- Develop a white paper on currently available tools, resources, and data for scenario planning.
- Scope costs of scenario planning software for agency adoption.
- Consider the range of software programs available to implement scenario planning techniques and identify the program that best meets the needs of the agency and resources that are available.
- Identify additional land use data; some MPOs had difficulty identifying these data for all areas.
- Obtain more knowledge on making regional socioeconomic projections based on state-provided figures.

E. Conclusions

The workshop was a productive learning experience overall. 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 “low-tech” and “high-tech” approaches and participating in the hands-on chips exercise. Many participants reported that they anticipated incorporating scenario planning into the next update of their agencies’ LRTPs. Others mentioned that they would work on evaluating and comparing visioning tools to assess applicability for their regions.

Appendix A: Contact for Additional Information and Agenda

For More Information

Key Contact:	Jeanne Stevens, Director of Long-Range Planning at TDOT
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Workshop Agenda

<i>June 4</i>	
9:30 am	Welcome Angie Midgett, TDOT – Long-Range Planning Division
10:00 am	Overview of Scenario Planning Sharlene Reed, FHWA – Office of Planning
10:15 am	Scenario Planning Process: North Central Florida Regional Planning Council Marlie Sanderson, NCFRPC
11:00 am	Break
11:15 am	Current and Future Trends in Tennessee Jeff Bryan, Volpe Center
12:00 pm	Working Lunch – Video of North Carolina DOT’s Visualization of the I-26 Asheville Connector for the Public Participation Process Sharlene Reed, FHWA Office of Planning
1:00 pm	Scenario Planning Process I Matt Meservy and Max Baker, Nashville MPO Tim Moreland and Pragati Srivastava, Memphis MPO Mike Conger, Knoxville MPO
2:00	Break
2:10 pm	Scenario Planning Process II: Panel Presentation Matt Meservy and Max Baker, Nashville MPO Tim Moreland and Pragati Srivastava, Memphis MPO Mike Conger, Knoxville MPO
3:00 pm	Break
3:10 pm	Chips Exercise Matt Noonkester and Camille Barchers, Kimley-Horn and Associates, Inc.
5:00 pm	Adjourn
<i>June 5</i>	
9:30 am	Highlight of Results from Chips Exercise Matt Noonkester and Camille Barchers, Kimley-Horn and Associates, Inc.
10:00 am	Break
10:15	Implementing Scenario Planning Jim Thorne, FHWA Resource Center
11:00 am	Getting Started Marlie Sanderson, NCFRPC
11:45 am	Action Planning Jeff Bryan, Volpe Center
12:30 pm	Adjourn

Appendix B: List of Presenters and Attendees

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