

# SCENARIO PLANNING PRACTICES AMONG PEER MPOS

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National Capital Region  
**Transportation Planning Board**

## **SCENARIO PLANNING PRACTICES AMONG PEER MPOS**

Prepared by ICF for Metropolitan Washington Council of Governments / National Capital Region Transportation Planning Board (COG/TPB).

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Revised on July 16, 2021 to correct tools used by Southern California Association of Governments (SCAG) for *Incorporating Decision Making Under Deep Uncertainty (DMDU) Pilot Study*.

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The National Capital Region Transportation Planning Board (TPB) is the federally designated metropolitan planning organization (MPO) for metropolitan Washington. It is responsible for developing and carrying out a continuing, cooperative, and comprehensive transportation planning process in the metropolitan area. Members of the TPB include representatives of the transportation agencies of the states of Maryland and Virginia and the District of Columbia, 24 local governments, the Washington Metropolitan Area Transit Authority, the Maryland and Virginia General Assemblies, and nonvoting members from the Metropolitan Washington Airports Authority and federal agencies. The TPB is staffed by the Department of Transportation Planning at the Metropolitan Washington Council of Governments (COG).

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# INTRODUCTION

Many MPOs across the country conduct scenario planning activities to support transportation-related decision-making in their regions. This white paper documents the state of the practice of thirteen peer MPOs, detailing the application and tools used, based on research conducted in the winter and spring of 2021. This white paper outlines the peer MPO selection process and questionnaire development and provides a summary of the peer MPO responses.

## PROJECT PURPOSE AND CONTEXT

COG/TPB is seeking to increase organizational awareness and understanding of scenario planning. Toward this end, the agency has embarked upon a study to explore scenario planning processes and tools that could complement its travel demand modeling capabilities, enabling the agency to generate and evaluate alternative possible futures quickly and efficiently across a broad range of topics. The study scope includes development of three white papers, of which this white paper is the second. It documents the state of the practice of peer MPOs regarding scenario planning to support transportation planning decision-making, detailing the application and tools used. The research phase of the study will culminate in a workshop for COG/TPB staff and any other identified stakeholders to digest the results of the research and to identify interests and priorities for applying the findings to future planning initiatives and agency capacity-building programs. The project will conclude with a summary report of findings from the research and workshop, including recommended next steps. The report will serve as an in-house resource for COG/TPB agency business planning and work programs that involve scenario planning applications and associated investments in tools, data and staff capabilities.

## REPORT PURPOSE AND CONTEXT

This is the second of three white papers as specified in the study scope. It seeks to report the state of the practice among peer MPOs regarding scenario planning to support transportation planning and decision-making. Peer MPO selection and research occurred during the winter and spring of 2021. It outlines the peer MPO selection process, questionnaire development, and a summary of the peer MPO responses.

## RESEARCH METHOD

Peer MPOs were selected through an analysis of quantifiable characteristics and input from the Oversight Committee. MPOs with similar regional demographics and agency capabilities were identified. Criteria used to select peer MPOs included attributes such as the following:

- Documented experience with scenario planning methods and tools (particularly the tools that were researched for the white paper on scenario planning tools);
- Population size and growth rate of the area covered by the agencies;
- Regional economic generators and transportation infrastructure;
- Staff resources and agency structure; and
- Jurisdictional membership (e.g., multistate, capitol city).

Once a list of peer MPOs was constructed, COG/TPB staff and the consulting team finalized a list of 15 agencies to contact. The questionnaire was designed to gather a comprehensive understanding of the selected peer MPOs. Subject matter included organizational structure, responsibilities, and scenario planning processes/experiences. The instrument consisted of 30 questions formatted in a variety of styles ranging from matrices that could be filled in by respondents to short open-ended responses. Each peer MPO was queried about one scenario planning study they had conducted, as selected by the consulting team, and respondents were invited to provide insights from other scenario planning experiences. The COG/TPB Project manager emailed the questionnaires directly to contacts at the peer MPOs. A copy of the questionnaire is provided in Appendix A.

Ultimately, 13 of the 15 selected peer MPOs responded to the request for information (Table 1). Three of the agencies, Delaware Valley Regional Planning Commission (DVRPC), Denver Regional Council of Governments (DRCOG), and Sacramento Area Council of Governments (SACOG), completed web-conference interviews with COG/TPB staff and the consulting team in lieu of filling out the questionnaire. To structure each interview, the team “pre-populated” a questionnaire with information gleaned from agency websites and publications, sent the partially completed form to the agency for review, and focused the hour-long discussion on open-ended questions or detailed information that required an in-person response. Some of the summary tables indicate “n/a” responses for these three agencies because the topics were not covered in the discussions and the information was not subsequently found with online research.

**Table 1 Peer MPO Questionnaire Participants**

Agency	Featured Study	Tools (in additional to travel model/ GIS)
Atlanta Regional Commission (ARC)	<p>Winning the Future, Sharpening our Focus: SHRP2 Element C08. December 2016.</p> <p>Overview: ARC created scenarios that considered, among other things, how technological advances relate to the greying of the population, equity considerations and the delivery of goods and services. Used to guide policy discussions and regional plans.</p> <p>Topics addressed: transportation, equity, technology</p>	<p>VisionEval, GreenSTEP, Regional Strategic Planning Model, (RPSM), and Rapid Policy Analysis Tool (RPAT), Conveyal</p>
Chicago Metropolitan Agency for Planning (CMAP)	<p>ON TO 2050. October 2018.</p> <p>Overview: CMAP undertook an “alternative futures” scenario planning process that assessed trends in the region and strategies to plan for the potential future impacts of several trends.</p> <p>Topics addressed: transportation, environment, climate</p>	<p>Envision Tomorrow (ET), UrbanSim/ UrbanCanvas</p>

Agency	Featured Study	Tools (in additional to travel model/ GIS)
Denver Regional Council of Governments (DRCOG)	<p>2050 Metro Vision Regional Transportation Plan. August 2020.</p> <p>Overview: DRCOG used scenario planning to better understand the relationship between the built environment, multimodal transportation strategies and mobility outcomes.</p> <p>Topics addressed: environment, transportation (multimodal strategies and mobility outcomes)</p>	UrbanSim
Delaware Valley Regional Planning Commission (DVRPC), Philadelphia	<p>Dispatches From Alternate Futures: Exploratory Scenarios For Greater Philadelphia. July 2020.</p> <p>Overview: DVRPC used this exploratory scenario planning exercise to illustrate how the region may change over the next 30 years. A series of news articles from the future, which are based on modeling, research, and dialogue with a working group. Four scenarios included: DELAYED EXPECTATIONS: A world overcome by climate change and economic slowdown; PEOPLE POWER: Grassroots movement to a more just and sustainable future; TECHNOLOGY IN THE DRIVER’S SEAT: Big Tech takes control; and INCLUSIVE TECH: A new equitable economy emerges through open source technologies. This exercise is a key step in developing Connections 2050 Long-Range Plan; the plan will identify potential actions to respond to or benefit from uncertainties so the region can plan and prepare for whichever environment comes to fruition.</p> <p>Topics addressed: technology, environment, climate, economy, housing, funding.</p>	Uplan, UrbanSim/ Urban Canvas, VisionEval (RPAT)
Mid-America Regional Council (MARC), Kansas City	<p>Integrated Planning Framework, May 2018, and Connected KC 2050. June 2020.</p> <p>Overview: MARC engaged policy committees and other interested parties in a scenario planning process designed to examine key forces and trends to help create a policy framework for regional plans.</p> <p>Topics addressed: transportation, economics, climate, technology.</p>	Envision Tomorrow (ET); UrbanSim/ UrbanCanvas; Conveyal

Agency	Featured Study	Tools (in additional to travel model/ GIS)
Metropolitan (Met) Council, Minneapolis	<p>2040 Transportation Policy Plan. June 23, 2020.</p> <p>Overview: Met Council used this process to consider two long-term investment scenarios and clarify the funding choices the region faces for their future transportation system. The Current Revenue Scenario assumes only inflationary increases in the revenue sources - no increases in local, state or federal tax rates are assumed. The “Increased Revenue Scenario” assumes revenues that the region might reasonably be able to attain through policy changes and decisions that increase local, state, or federal funding sources.</p> <p>Topics addressed: transportation and investment strategies.</p>	Cubeland
Metroplan Orlando	<p>2045 Metropolitan Transportation Plan Technical Series #8 Scenario Planning - Background &amp; Development. October 2020.</p> <p>Overview: Metropolitan Conducted a scenario planning exercise to support the development of the MetroPlan Orlando 2045 Metropolitan Transportation Plan (MTP). This process identified a variety of potential futures based on a detailed analysis of trends and uncertainties, and evaluated needs, priorities, and strategies against each of these futures.</p> <p>Topics addressed: demographics, trade, economy, land use, environment, technology.</p>	None other than in-house travel demand model and GIS tools
Miami-Dade Transportation Planning Organization (TPO)	<p>Smartplan Beach Northeast Corridors Land Use Scenario and Visioning Planning (LUS&amp;VP). June 2020.</p> <p>Overview: TPO performed the LUS&amp;VP is to integrate transportation and land use planning, thereby maximizing the effectiveness of transit investments along the SMART Plan corridors.</p> <p>Topics addressed: transportation, land use, transit, investment strategies</p>	ESRI 3D Land Use Evaluation Tool; Remix
Metropolitan Transportation Commission (MTC), San Francisco	<p>Horizon Futures Final Report Resilient and Equitable Strategies For The Bay Area’s Future. January 2020.</p> <p>Overview: MTC created a report that explores how a potential suite of strategies could put the Bay Area on a more resilient and equitable path forward over the next 30 years.</p> <p>Topics addressed: transportation, resilience, equity.</p>	Fehr & Peers TDM+, Conveyal



Agency	Featured Study	Tools (in additional to travel model/ GIS)
<p>Puget Sound Regional Council (PSRC), Seattle</p>	<p>VISION 2050 Supplemental Environmental Impact Statement (SEIS). March 2020.</p> <p>Overview: PSRC reviewed the environmental impacts of regional growth alternatives in the VISION 2050 Supplemental Environmental Impact Statement (SEIS). UrbanSim output served as inputs to the regional travel demand model and other supplemental analyses. <i>Stay the Course</i> extends the VISION 2040 Regional Growth Strategy to 2050, which includes compact growth focused in Metropolitan and Core cities with regional growth centers. This is the required “no action alternative” under SEPA. <i>Transit Focused Growth</i> directs a greater amount of population and employment growth to areas with existing or planned high capacity transit. This alternative incorporates an ambitious goal of 75 percent population and employment growth in areas served by high-capacity transit. <i>Reset Urban Growth</i> is more distributed throughout the urban growth area, while still assuming a large share of growth to Metropolitan and Core cities. This alternative includes more growth in outlying areas and shares similarities to growth trends from 2000 through 2016.</p> <p>Topics addressed: land use, environment, transit</p>	<p>UrbanSim/ UrbanCanvas; also (in previous studies) Transit Competitiveness Index (TCI) tool and Transit Sketch Planning tool</p>
<p>Sacramento Area Council of Governments (SACOG)</p>	<p>2020 Metropolitan Transportation Plan/Sustainable Communities Strategy. 2020.</p> <p>Overview: SACOG’s Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) pro-actively links land use, air quality, and transportation needs.</p> <p>Topics addressed: transportation. Land use, public health</p>	<p>Envision Tomorrow (ET), VisionEval, TMIP_EMAT</p>

Agency	Featured Study	Tools (in additional to travel model/ GIS)
<p>Southern California Association of Governments (SCAG), Los Angeles</p>	<p>Incorporating Decision Making Under Deep Uncertainty (DMDU) Pilot Study. 2020-2021 (currently in progress).</p> <p>Overview: SCAG is participating in an FHWA Travel Model Improvement Program (TMIP) pilot project to incorporate Decision Making Under Deep Uncertainty (DMDU) Approaches in transportation planning activities to better address uncertainty in its long-range planning practice. The Robust Decision Making (RDM) framework being piloted is a sketch-level scenario planning approach that generates thousands of scenarios to "stress-test" proposed policies and to identify policy-relevant strategies that are robust across the scenarios. SCAG's goals for the study are to better understand the uncertainties generated by the 2020 pandemic; to learn how TMIP-EMAT can support decision making for planning, and to apply the methodology to analyze SCAG's long range plan. Note: SACOG (Sacramento) is also participating in the DMDU pilot program, with Garrett Ballard-Rosa as the key contact.</p> <p>Topics Addressed: transportation (mobility strategies), climate, and environment.</p>	<p>TMIP-EMAT, VisionEval</p>
<p>Wasatch Front Regional Council (WFRC), Salt Lake City</p>	<p>Wasatch Choice 2040 Regional Transportation Plan. 2015.</p> <p>Overview: WFRC created four planning scenarios to review with partners, stakeholders, and the public and based on the feedback, one preferred scenario was created.</p> <p>Topics Addressed: transportation, land use, and housing</p>	<p>Envision Tomorrow (ET); UrbanSim/ UrbanCanvas</p>
<p>* Bold-face type indicates a scenario planning tool that was researched by the consulting team in the separate Scenario Planning Tools white paper for this project. All the studies incorporated some data and analysis functions from in-house travel demand models and GIS platforms.</p>		

# SUMMARY OF FINDINGS

## Profile of Respondents

To provide additional context, in addition to the characteristics of the respondents, details about COG/TPB’s regional socio-economic characteristics, agency structure and resources, and experience with modeling and scenario planning tools are also provided.

## REGIONAL SOCIO-ECONOMIC CHARACTERISTICS

The base year for socio-economic projections among respondents varied between 2015 and 2020 and the forecast year varied between 2040 and 2050. Within the next 30 years, anticipated future year population in most of the regions was between three million and five million. The Chicago region was projected to have a population of almost eleven million, and the Southern California region’s forecast was far larger than any of the others, with an anticipated future population of 21 million. The COG/TPB regional forecast of nearly seven million is close to that of the Atlanta region’s projection of 8.2 million. Atlanta’s population increase of 37 percent, however, is higher than the 28 percent increase anticipated in the DC region, which is comparable to the regional growth rates projected for Denver and Sacramento (Table 2).

Employment forecasts ranged from 1.3 million in the Kansas City region to 9.5 million in Southern California. The median forecasted employment was about 2.5 million, which is lower than the COG/TPB’s forecast of 4.2 million. The COG/TPB region’s employment forecast is comparable to those of Atlanta and San Francisco. Its anticipated 35 percent increase in the number of jobs is similar to projected growth rates in the Denver and Salt Lake City regions. Employment in the Seattle and San Francisco regions was anticipated to grow at least fifty percent (Table 2).

**Table 2: Population and Employment Statistics**

MPO	Base/ Future Year	Population	Population Increase	Employment	Employment Increase
COG/TPB	2015	5,391,000	28%	3,161,000	35%
	2045	6,926,000		4,274,000	
ARC	2020	6,000,000	37%	3,000,000	23%
	2050	<b>8,200,000</b>		3,700,000	
CMAP	2015	8,500,000	27%	4,100,000	22%
	2050	<b>10,800,000</b>		5,000,000	
DRCOG	2020	3,362,000	30%	2,168,000	37%
	2050	4,387,000		2,979,000	
DVRPC	2015	5,717,933	12%	3,168,237	12%
	2045	6,376,067		3,541,050	
MARC	2020	2,100,000	24%	1,100,000	18%
	2050	2,600,000		1,300,000	
Met Council	2015	2,973,000	23%	1,620,000	24%
	2040	3,653,000		2,016,000	

MPO	Base/ Future Year	Population	Population Increase	Employment	Employment Increase
Metroplan	2015	1,976,483		1,090,610	
	2045 (four alternative forecasts)	3,218,018	63%	2,005,236	84%
		2,466,000	25%	1,550,549	42%
		3,218,018	63%	2,005,268	84%
		3,905,200	98%	2,445,512	124%
Miami-Dade TPO	2015	2,629,881	34%	1,337,040	37%
	2045	3,533,007		1,835,712	
MTC	2015	4,005,000	35%	2,677,000	51%
	2050	5,408,000		4,043,000	
PSRC	2017	4,067,000	43%	2,233,000	52%
	2050	5,823,000		3,392,000	
SACOG	2016	2,376,311	26%	1,060,751	25%
	2040	2,996,832		1,330,813	
SCAG	2016	19,518,000	10%	8,695,000	10%
	2045	<b>21,443,000</b>		9,566,000	
WFRC	2019	2,424,100	50%	1,669,000	34%
	2050	3,641,900		2,230,900	

**Transportation Assets**

**Table 3: Transportation Assets**

Transportation Asset	Number of Peer MPOs With Asset
International Airport	13
Regional Airport	10
International Marine Port	6
Interstate Passenger Rail	12
Interstate Passenger Bus	11
Interstate Freight Rail	13
Interstate Highway	13
Regional Passenger Rail	12
Regional Passenger Bus	11
Local Passenger Rail	9
Local Passenger Bus	13
Regional Greenway/ Bicycle Network	13

The research team compiled a list of twelve major transportation assets present in the COG/TPB region for the purpose of comparing them to infrastructure in the regions studied. All the regions had an international airport, interstate freight rail and highway networks, local bus systems, and regional greenway/ bikeway networks. Most had interstate passenger rail and bus services and regional bus services. More than half had local passenger rail networks, and slightly less than half had an international marine port. PSRC and MTC also listed passenger ferry systems, and CMAP noted approximately 16 active intermodal facilities with more than 15 million annual twenty-foot container (or twenty-foot equivalent unit) lifts (Table 3).

## Economic Generators

Similar to the COG/TPB region, predominant economic generators in nearly all regions included trade/ transportation/ utilities, education and health services, and financial activities. All the participating respondents also cited local government as a top employer, although this was not in the top rank of COG/TPB jobs. Only two respondents cited natural resources and mining as important economic drivers (Table 4).

**Table 4: Economic Generators**

NAICS Supersectors	COG/TPB	Number of Citations	Percent of 10 Respondents*
<b>Goods-Producing Industries</b>			
Natural Resources and Mining		2	20%
Construction	X	8	80%
Manufacturing		6	60%
<b>Service-Providing Industries</b>			
Trade, Transportation, and Utilities	X	10	100%
Information		9	90%
Financial Activities	X	9	90%
Professional and Business Services	X	8	80%
Education and Health Services	X	9	90%
Leisure and Hospitality	X	7	70%
Other Services	X	4	40%
<b>Government</b>			
Federal Government (non-military)	X	7	70%
State Government		5	50%
Local Government		10	100%
Military	X	5	50%
* Responses not collected from DVRPC, DRCOG, and SACOG			

## AGENCY STRUCTURE AND RESOURCES

### Structure

Most of the nation's MPOs are housed within a regional council of governments or function as a stand-alone public sector agency. The National Capital Transportation Planning Board (TPB) is housed within the Metropolitan Washington Council of Governments (MWCOG). The respondent group was similar to the national profile: nine (70 percent) were housed within a COG, and four (30 percent) were structured as stand-alone agencies. MTC has some contracted, staff-sharing functions with the Association of Bay Area Governments but is a separate entity (Table 5).

**Table 5: Agency Structure**

MPO	Stand-alone Agency	Housed within COG
COG/TPB		X
ARC*		X
CMAP	X	
DRCOG		X
DVRPC		X
MARC		X
Met Council		X
Metroplan Orlando	X	
Miami-Dade TPO	X	
MTC**	X	
PSRC		X
SACOG		X
SCAG***		X
WFRC		X
* Georgia requires every county to be a member of a Regional Commission, which has a variety of state mandated responsibilities. ARC has 10 member counties. The MPO is housed within ARC but has a planning area of 20 counties, which requires coordination with adjacent RCs and the state DOT.		
** MTC is a stand-alone agency but shares/contracts its staff with the Council of Governments (ABAG)		
*** The SCAG region (which contains the largest MPO in the US) encompasses 14 subregional COGs.		

### Annual Planning and Programming Funds

Unified Planning Work Program budgets, typically expressed in two-year increments, varied from as little as \$2 million in Salt Lake City (WFRC) to as much as \$93 million in the Los Angeles region (SCAG) and \$74 million in San Francisco (MTC). PSRC in Seattle and CMAP in Chicago had budgets in the \$20 to \$30 million range, followed closely by COG/TPB at \$18.4 million. Other UPWP budgets were between \$8 million and \$15 million. CMAP, Met Council, and PSRC cited funding sources above and beyond Federal funds with state and local match dollars, and MARC noted the value of in-kind local services.

Transportation Improvement Programs varied as well, with amounts that were not necessarily proportionate to the relative dollar value of UPWP budgets among the group. SCAG had the highest dollar value of funded projects at \$35.3 billion, more than twice the value of the second highest amounts at CMAP (\$17 billion) and COG/TPB (\$16 billion), and three times the value of the \$10 billion programs at MTC and DVRPC. ARC and PSRC TIP programs were in the \$6 billion to \$8 billion range, while Metroplan and Met Council's TIP allocations were in the range of \$1.5 billion. WFRC's TIP was \$40 million, and MARC's \$4.6 million TIP was nearly ten times smaller than WFRC's.

**Table 6: UPWP and TIP Funds**

MPO	UPWP (Fed PL/FTA + State and Local Match)	TIP
COG/TPB	\$18,410,554	\$15,960,000,000
ARC	\$14,200,000	\$6,300,000,000

CMAP	\$21,715,000	\$17,000,000,000
DRCOG	\$18,658,614	\$2,146,998,000
DVRPC	\$30,620,531	\$9,588,871,000
MARC	\$6,869,123	\$4,621,192
Met Council	\$11,100,000	\$1,200,000,000
Metroplan	\$8,500,000	\$1,500,000,000
Miami-Dade TPO	\$10,000,000	\$8,257,000,000
MTC	\$74,000,000	\$10,300,000,000
PSRC	\$30,491,000	\$4,300,000,000
SACOG	\$28,144,436	\$2,400,000,000
SCAG	\$93,000,000	\$35,300,000,000
WFRC	\$2,000,000	\$40,000,000

**Staff Capabilities**

Respondents were asked to complete a table indicating the number of staff by function, with the understanding that some staff might serve more than one purpose (e.g., a planner with GIS skills). The responses, which did not include information for DRCOG, DVRPC, and WFRC, portrayed a wide array of staffing arrangements. The total staff counts (which did not double-count people that served more than one function) represented a wide range from as many as 330 to as few as 26. COG’s total staff count (60) was comparable to PSRC’s (67). It is possible that some agencies provided information only about the MPO team within the larger agency, while others reported the numbers for the entire agency, which could include planning areas other than transportation.

Of particular interest to this project are the comparable numbers of planners, GIS analysts, and travel modelers. The numbers of planners were highest in the California MPOs, with 80 at SCAG and 60 at MTC, followed by 41 at CMAP. ARC and PSRC’s planning staff were in the 15-22 range, while Met Council, MARC, Metroplan, and Miami-Dade TPO, like COG, all had 10 or fewer planners. The numbers of GIS analysts and travel demand modelers were much more similar across all agencies, ranging from 4-10 GIS analysts (except for SCAG which reported 20 GIS staff) and 3-10 travel demand modelers; by comparison, COG has 3 GIS analysts and 8 travel modelers (Table 7).

**Table 7: Staff Capabilities**

MPO	Mgr	Planner	GIS	Travel Model	Other Analysis	Public Engagement	Fin / Admin	Other	Total****
COG/TPB	14	9	3	8	7	2	2	15	60
ARC TMAG*	1	15	0	3	7	1	1	n/a	25
CMAP	7	41	7	7	11	11	21	3	108
DRCOG	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DVRPC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
MARC	1	7	4	2	3	2	1	7	26
Met Council	3	10	10	5	5	3	5	n/a	30
Metroplan	5	8	4	3	8	6	3	n/a	17
Miami-Dade	4	5	1**	1**	1**	2	4	3	19
MTC	15	60	4	4	2	5	40	210	330
PSRC	3	22	2***	4***	19	5	13	5	67
SACOG	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SCAG	20	80	20	10	12	20	30	15	180
WFRC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
* ARC data is for Transportation Access and Mobility Group (TAMG) only. The detailed response to the questionnaire provides additional information about staff from the larger regional council who contribute to TAMG activities, such as GIS analysts and additional data analysts that support the travel demand model, as well as public engagement professionals.									
** Miami-Dade GIS, Travel Modeling, and Other Analysis are all handled by the same staff person									
*** PSRC left the GIS and Travel Demand Model fields blank; consulting team filled in these numbers from an online staff directory.									
**** Total represents all staff without double-counting staff that serve more than one function. Some agencies may have counted all staff at the regional council, while others reported only the MPO staff numbers.									

## EXPERIENCE WITH MODELING AND SCENARIO PLANNING TOOLS

### Travel Demand Modeling Tools

The COG/TPB travel demand model is built on a CUBE software platform. It is a Trip-Based Model (TBM) with about 3,722 Traffic Analysis Zones (TAZs). The agency is in the process of developing an Activity-Based Model (ABM). When asked about the characteristics of their agency’s travel demand model, most respondents described a hybrid of in-house tools that used traditional TBM methods, and noted they either also used or were developing ABM tools. CUBE was the most commonly used software platform: ARC, Met Council, and WFRC listed CUBE (or “Citilabs,” which is now owned by Bentley) as their primary tool, and the two Florida MPOs ran models developed by FDOT that used a CUBE platform. . The number of Traffic Analysis Zones (TAZs) in each model varied widely from one MPO to the next, from as few as 1,500 in Metroplan, MTC, and SACOG to as many as 11,000 in SCAG. The number of TAZs in the other agencies’ models were generally in the range of 2,500 to 6,000 (Table 8).



**Table 8: Travel Demand Modeling Tools**

Agency	Software tool	Trip-based (TBM) / Activity-based (ABM)	No. TAZs (approx.)
COG/TPB	CUBE	TBM, with ABM under development	3,722
ARC	CUBE and VISUM	CUBE: ABM; VISUM: TBM	CUBE ABM: 6,000; VISUM TBM: 5,000 (due to license limits)
CMAP	Emme and CT-RAMP	Emme: TBM; Emme + CT-RAMP: ABM	Emme: 3,632; Emme + CT-RAMP: 1,944
DRCOG	Focus, runs on Transcad	ABM	2,812
DVRPC	Travel Improvement Model Version (TIM) 2.0, based on Tranplan, migrated to VISUM + Python	TIM 2.0 TBM, with TIM 3.0 ABM under development	3,550
MARC	EMME	TBM	2,500
Met Council*	Citilabs (i.e, Bentley CUBE), Tourcast	ABM	3,000
Metroplan Orlando	Citilabs (i.e., Bentley CUBE) CFRPM Model (FDOT)	TBM	1,500+
Miami-Dade TPO**	Citilabs (i.e. Bentley CUBE) SERPM (FDOT)	ABM and TBM	4,236
MTC	In-house	ABM	1,454
PSRC***	SoundCast, EMME	SoundCast: ABM; EMME: TBM	3,750
SACOG****	SACSIM / DAYSIM	ABM	1,533
SCAG	CT-Ramp2 and TransCAD	ABM	11,267
WFRC	Citilabs (i.e., Bentley CUBE)	TBM	3,000
* Met Council ABM was a TBM during the scenario planning study			
** Miami-Dade uses the Southeast Florida Regional Planning Model which covers Miami-Dade, Broward and Palm Beach counties			
***PSRC has developed a customized set of software programs and mathematical procedures collectively referred to as the “SoundCast” travel model. SoundCast produces detailed spatial and network data that are used to analyze how the region’s transportation infrastructure and environment are likely to be impacted by future growth and development as represented by VISION 2050 growth alternatives. Selected travel model outputs also serve as inputs to both UrbanSim and the regional air quality model and analysis. To learn more, visit: <a href="https://www.psrc.org/activity-based-travel-model-soundcast">https://www.psrc.org/activity-based-travel-model-soundcast</a> .			
**** For more information about SACOG model, email <a href="mailto:sacsim@sacog.org">sacsim@sacog.org</a> , visit agency website Travel Demand Model page, and the Github Open Data Portal for GIS info.			

## Scenario Planning Tools

Participants were asked about their experience with the scenario planning tools being researched for this study. The most frequently used tool was UrbanSim/Urban Canvas (used periodically by eight respondents, and used once by one more, totaling nine (70%) of the 13 MPOs. Remix was used periodically by three (23%) of respondents, and Envision Tomorrow was used periodically by two respondents (15%) and used once by two respondents (15%), Participants were also asked why they considered but did not use a given scenario planning tool. The most common reasons were the cost and/or the learning curve associated with the tool (Table 9).

**Table 9: Experience with Scenario Planning Tools**

Scenario Planning Tool	Use Periodically	Used Once	Considered But Not Used	Never Considered or No Response
UrbanSim / Urban Canvas	8	1	0	4
Remix	3	0	2	8
Envision Tomorrow (ET)	2	2	0	9
UrbanFootprint / RapidFire	2	0	2	9
VisionEval	1	1	4	7
TMIP_EMAT	0	2	3	8
Cube Land	0	2	2	9
TRIMMs	0	0	0	13
CommunityViz	0	0	4	9
Uplan	0	0	2	11
CityEngine	0	0	2	11
TDM+	0	0	0	13

## Scenario Planning Initiative Experiences

### PROJECT SCOPING AND ENGAGEMENT

#### Reasons for Conducting Scenario Planning Process

Most of the MPOs developed exploratory scenario planning processes to examine potential trends and disruptors that could affect (negatively or positively) the region's ability to meet its goals. Topics typically included evolving transportation technologies, socio-economic trends, and, in at least one case, potential long-term impacts of the COVID-19 pandemic on travel demand.

Within the group of agencies that conducted scenario planning for other reasons, Met Council in Minneapolis created an Increased Revenue Scenario to demonstrate needs beyond current resources and to allow for unfunded projects to have a place in the plan. The Miami-Dade TPO Land Use Scenario and Visioning studies engaged stakeholders in creating land use scenarios that support TOD in designated transit corridors. PSRC in Washington State and the two California MPOs routinely incorporate land use and environmental scenarios into long range transportation plans in response to state-mandated GHG reduction goals. WFRC in Salt Lake City used scenarios to engage the public in addressing quality-of-life impacts of rapid growth affecting the region and the entire state (Table 10).

**Table 10: Reasons for Conducting Scenario Planning Process**

MPO	Reasons for conducting scenario planning process
ARC	As a bridge between the 2016 plan and 2020 plan update, the "Sharpening Our Focus" exercise looks more closely at our adopted "Winning The Future" framework. We wanted a documented regional discussion about key drivers and disruptors that could potentially impact our ability to achieve goals and to lend clarity on projects, programs and strategies that would be most effective in decades to come. We would then be well-positioned to construct a long-range plan that reflects the region's stated policies and matches clear investment priorities with measurable progress toward our larger goals.
CMAP	We wanted to take a more engaging, accessible approach, reduce overall time/labor expenditure, and focus on policies.
DRCOG	Building on the long-range vision developed through scenario planning in the 1990s, the 2050 Metro Vision analysis was an exploratory exercise about how different land use and transportation approaches could impact travel behavior over time. We weren't trying to choose projects and select a preferred scenario. We wanted to generate information that would inform the plan and set the template for the kinds of projects we needed.
DVRPC	In the early 2000s we were doing normative scenario planning around land use patterns. The 2012 Choices and Voices scenarios online tool helped elicit public input and preferences. Then we began using exploratory methods to inform the plan with an understanding of the driving issues shaping the region, starting with the 2016 Future Forces exercise. The Dispatches report is the latest iteration of exploratory scenarios. We added some COVID-related articles toward the end of the process.
MARC	We wanted to explore and raise awareness of future "driving forces" of change – external factors which could pose a significant threat or provide an added push towards achieving regional goals. Our goal was to identify resilient and robust strategies that would help us inch towards our goals, regardless of what the future may hold.
Met Council	We created an Increased Revenue Scenario to demonstrate needs beyond current resources and allow for unfunded projects to have a place in the plan. It was built on recommendations from a statewide funding commission study on how transportation funding was or was not meeting needs. Our scenario added detailed studies of regional investment priorities within major project type categories (e.g. high-capacity transit, managed freeway lanes, interchange conversions).
Metroplan	Scenario Planning was built into our long-range needs assessment to better understand and plan for disruptive and emerging technologies/trends; and as a means of communicating these issues and impacts to our stakeholders and decision makers.
Miami-Dade TPO	Building upon plans to implement a 2002 locally approved surtax for rapid transit, the Land Use Scenario and Visioning studies are an innovative approach being used for the first time to coordinate concurrent the MPO's land use visioning processes with rapid transit studies conducted by other agencies. A series of public charrettes generated land use scenarios that support TOD in each transit corridor and raised awareness of how linking land use and transportation is the foundation of a sustainable community.
MTC	Our prior long-range planning work was too constrained, leading to scenarios that were only mildly different from one another and didn't reflect big uncertainties about the future. The 2017 North Bay fires, AV vehicles driving our local streets, and shifting federal policies required us to embrace an uncertain future and to find resilient strategies (policies and investments) to a variety of future conditions.

PSRC	Washington State environmental law requires consideration of alternatives to evaluate environmental impacts. That was the primary reason for looking at multiple scenarios. As a planning process, we also wanted the ability to talk with our elected leaders about why one scenario would be better, and our leaders wanted to know how growth would affect climate change, housing, and other key issues.
SACOG	The Preferred Scenario for the 2020 MTP/SCS was built upon a series of plans and scenario planning exercises dating back to the 2050 vision established through the scenario-based Regional Blueprint adopted in the early 2000s. Key issues addressed in the 2020 scenario planning initiative included a new, more ambitious target for GHG reduction emissions set by the California Air Resources Board (CARB) that require more efficient land use and transportation patterns; slower growth than anticipated in the original Blueprint; potential deployment of new transportation technologies including electric vehicles; and TDM and pricing programs to reduce VMT. The Preferred Scenario was developed from an initial Discussion Scenario, which provided a way to discuss policy trade-offs and guide assumptions about growth and transportation investment.
SCAG	The scenario planning process focuses on land use scenarios, including baseline, plan alternatives, and EIR alternatives. The purpose is to evaluate which land use scenario might lead to lower VMT, which is related to reaching regional GHG reduction targets mandated by California Senate Bill 375. We also calculated impacts of different land use scenarios on public health, building energy consumption, building water consumption, building fiscal impact, and natural and farmland conservation indicators.
WFRC	Rapid growth. Utah has been the #1 fastest growing state over the last decade. Concern over a decline in quality of life has been increasing among Utahans.

**Scope, Budget, Time Frame, and Funding Sources**

Each respondent provided links to and/or copies of scoping documents, often incorporated into study technical reports. DVRPC noted the agency did not develop a stand-alone scope document but recommended purchasing a hard copy of the Ralston Wilson *Handbook for Scenario Planning*<sup>1</sup> as a very useful technical resource for scoping a scenario planning process.

Most the respondents could not provide an exact budget for the scenario planning study because the project was bundled into the overall UPWP. Broadly, the project budgets ranged from a lower end of about \$200,000-\$400,000 to a moderate range of \$800,000-\$900,000, with one project (CMAP) budgeted at nearly \$3 million. Most of the funding for all of the projects was from the UPWP budget. ARC allocated about \$300,000 in additional funds from a FHWA SHRP2 grant, and about 25 percent of the \$450,000 WFRC project budget was provided by a private foundation. Most of the initiatives were completed in about two years. Metroplan’s study took one year, and PSRC, Miami-Data and MTC’s initiatives spanned three to four years (Table 11).

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<sup>1</sup> Wilson, Ian, William Ralston, and Shedden Ralston. 2006. *Scenario Planning Handbook: Developing Strategies in Uncertain Times*. South Western Educational Publishing. ISBN0324312857 (ISBN13: 9780324312850)

**Table 11: Scenario Planning Study Budget and Time Frame**

MPO	Overall budget	Other sources	Resources allocated to MPO staff	Resources allocated to Consultant	Resources allocated to Partners	Time Frame
ARC	\$300k from FHWA grant + substantive MPO staff time on RTP update.	FHWA grant for vision plus two other SHRP2 elements.	\$313,250 (71% of FHWA grant)	\$86,750 (29% of FHWA grant)	-	Approx 2 years (Sep 2015 to Dec 2017)
CMAP	\$2,860,300 incl local match	-	\$1,952,200	\$140,000	none	18 months
DRCOG	n/a	n/a	n/a	n/a	n/a	n/a
DVRPC	n/a	n/a	n/a	n/a	n/a	n/a
MARC	UPWP for staff, no separate budget	-	100%	-	-	2 years
Met Council	\$800,000 est for plan process, incl local match from motor vehicle sales tax	-	\$750,000	-	\$50,000 to MNDOT, Counties, Transit Provider	2 years
Metroplan	\$185,500	-	\$65,000	\$120,500	n/a	12 months
Miami-Dade TPO	\$900,000 approx	-	\$132,000 (approx)	\$700,000 (for Beach-NE Corridor)	\$60,000	3 yrs, pending Rapid Transit Study for Beach-NE Corridor
MTC	Approx 8 FTE over 4 years	-	-	Minimal consultant funding; mostly in-house	-	4 years (2 for Horizon/Futures Planning, 2 for Blueprint/Plan Finalization)
PSRC	\$200,000	-	20,000 est staff hours	\$200,000	-	3 years
SACOG	n/a	n/a	n/a	n/a	n/a	n/a
SCAG	n/a	n/a	n/a	n/a	n/a	n/a
WFRC	\$450,000	25% foundation	50%	50%	-	2 years

### Staff and Consultants Involved in Scenario Planning Studies

The MPOs were asked to rate the level of involvement of five types of participants in their scenario planning study: MPO Planner (project manager); additional MPO Planner(s); MPO GIS Analyst(s); MPO Travel Demand Modeler(s); and Consultants. Input from the 12 MPOs that answered this question indicated that project managers and planners were closely involved in nearly all aspects of the studies, while travel demand modelers and GIS analysts were involved in key aspects or all aspects of nearly every study. Consultants were closely involved in four of the 12 studies and involved in key aspects of five other studies. Other types of staff and partners engaged in some processes included agency communications and public/government affairs staff, outside subject matter experts, and nonprofit organizations (Table 12).

**Table 12: Staff and Consultant Roles in Studies**

Participant	Closely involved in all aspects	Involved in some key aspects	Provided some input but not closely involved	Not involved / No Response
MPO Planner (Project Manager)	11	1	0	0
MPO Planner(s)	10	2	0	0
MPO GIS Analyst(s)	2	7	1	2
MPO Travel Demand Modeler(s)	5	6	0	1
Consultants	4	5	1	2

### Organizations Involved in Scenario Planning Studies

Participants were asked about the types and roles of organizations involved in their study processes (Table 13). The most frequently cited organizations, grouped into four categories of roles, were as follows:

- Decision Makers: MPO Boards (85% of the 13 studies), followed distantly by Project Oversight Committees (23%) and MPO Technical Committees (23%).
- Key Partners: FHWA/ FTA and State DOTs (each 38%), followed by local government staff (31%).
- Advisors: MPO Technical Committees (46%) followed by MPO Citizen Advisory Committees and local government staff (each 38%).
- Stakeholders: Nonprofit groups and civic organizations (69% and business organizations (62%), followed by local government elected bodies (54%) and neighborhood associations (46%).

**Table 13: Roles of Participating Organizations**

Organization	Decision Maker		Partner		Advisor		Stakeholder	
	No.	Pct	No.	Pct	No.	Pct	No.	Pct
MPO Board	11	85%	1	8%	0	0%	0	0%
Project Oversight Committee	3	23%	2	15%	4	31%	0	0%
MPO Technical Committee (s)	3	23%	3	23%	6	46%	0	0%
MPO Citizen Advisory Committee(s)	0	0%	0	0%	5	38%	2	15%
Other MPO committees or panels	1	8%	1	8%	4	31%	2	15%
Local government elected bodies	1	8%	2	15%	2	15%	7	54%
Local government staff	0	0%	4	31%	5	38%	2	15%
Regional gov't agency other than MPO	0	0%	3	23%	3	23%	3	23%
State DOT	1	8%	5	38%	2	15%	2	15%
FHWA/ FTA	1	8%	5	38%	1	8%	4	31%
Other State or Federal agency	0	0%	2	15%	2	15%	4	31%
Neighborhood Associations	0	0%	0	0%	1	8%	6	46%
Non-profit groups/ civic organizations	0	0%	2	15%	2	15%	9	69%
Businesses/ chambers of commerce	0	0%	1	8%	2	15%	8	62%

NOTE: Total number of studies was 13. Some groups played more than one role, so the total counts for each group may add up to more than 13. Percentages are based on a total of 13 studies.

## Roles of Stakeholders at Key Decision Points

Participants were asked to pinpoint, where feasible, the key stakeholders that provided input and that made final decisions at key decision points in a scenario planning process. Based on input from partner agencies, committees, consultants, and/ or the public, the MPO staff typically made the final decisions, sometimes with approval from the MPO Board (Table 14).

**Table 14: Roles of Stakeholders at Key Decision Points**

Key Decision Points	Who Provided Input	Who Made Decision
Developing scope of work	MPO staff with partner agencies. PSRC sent out a call for public input.	MPO staff, often with Board approval.
Appointing oversight committee	MPO technical committees, partner agencies and sometimes stakeholder groups in the cases where an oversight group was formally appointed.	If a committee was formally created, the MPO Board approved it.
Selecting consultants	MPO staff with input from technical advisory committee partners (e.g., DOT, transit agency); one agency engaged additional partners.	MPO Staff
Selecting scenario planning tool(s)	MPO staff and sometimes consultants.	MPO staff
Defining technical specifications (e.g., forecasting methods, data sources)	MPO staff with input from technical advisory committees and consultants. Some engaged funding entities or partners with a particular stake in the process.	MPO staff
Evaluating scenario results	Stakeholders and technical committees, sometimes with public input and Delphi subject matter expert panels.	MPO staff, sometimes with Board approval
Selecting a preferred scenario (if applicable)	Stakeholders and technical committees, sometimes with public input.	MPO staff, sometimes with Board approval
Identifying recommended actions (e.g., policies, investments, studies)	Stakeholders and technical committees.	MPO Staff, sometimes in coordination with implementing partners.
Adopting or approving study recommendations.	Stakeholders and technical committees.	MPO Board



## Engagement Techniques

Twelve of the 13 peer MPOs responded to a question about the engagement techniques they used within their study. Nearly all respondents hosted public forums and workshops, and 75% conducted stakeholder forums / workshops and public surveys / polls (Table 15).

**Table 15: Engagement Techniques**

Engagement Techniques	Percent of 12 Agencies citing use of Technique for Scenario Study
Public forums / workshops	92%
Stakeholder forums / workshops (invitation-only)	75%
Public surveys and polls (via web, social media, telephone, and/or on paper)	75%
Advisory panel meetings	58%
Interviews	50%
Other	42%
Focus Groups	25%

## ANALYSIS TOOLS AND APPROACHES

### Scenario Planning Tools Used for Featured Studies

When respondents were asked about which tools they used in their featured scenario planning studies, the most frequent response was in-house travel demand models and/ or customized in-house tools. UrbanSim was used for five of the 12 studies examined. Other off-the-shelf tools applied to one or two projects included REMI, Envision Tomorrow, VisionEval, TMIP\_EMAT, TRIMMS, MOVES, and STOPS (Table 16).

**Table 16: Scenario Planning Tools Used for Study**

Tool	Count
In-house regional travel demand model, including FOCUS (DRCOG), Southeast Florida Regional Planning Model (MetroPlan Orlando), and SoundCast (PSRC)	10
In-house land use, economic, or other modeling tool including Impacts 2050 (ARC)	6
UrbanSim	5
REMI	2
Envision Tomorrow	2
Vision Eval	1
TMIP_EMAT	1
TRIMMS	1
US EPA Moves model	1
FTA Simplified Trips-on-Project Software (STOPS)	1

### Data Purchasing Needs

Very few respondents purchased data for their studies. Two respondents bought some datasets to support forecasting for other MPO work, but not specifically for the scenario planning initiative.

## Training Methods

When asked if training was required for staff to become proficient with the methods and tools being used to produce the scenario planning products, all the respondents said no. Some said their staff had enough technical skills to learn what was necessary during the course of the project.

## Level of Effort (LOE) Required for Study Tasks

The peer MPOs were asked to think about the overall LOE (e.g., time spent by staff and consultants) required to conduct their scenario planning studies, and to rate a list of typical activities on a scale of one to five, with one indicating a very low LOE and five indicating a very high LOE. Tasks that required the highest LOE were data preparation (cleaning, coding) with a score of 3.80 followed by selecting and maintaining scenario planning tools, which were both ranked at 3.67. The activity that required the lowest LOE was data collection (baseline, historical trends) with a score of 2.25. Preparing reports and development analysis methods were also considered relatively low LOE tasks, with scores of 2.63 and 2.7, respectively (Table 17).

**Table 17: Study Level of Effort**

Task	Average LOE Score (5.0 = highest)
Data preparation (cleaning, coding)	3.80
Selecting scenario planning tool(s)	3.67
Ongoing tool maintenance	3.67
Preparing and facilitating stakeholder and public meetings	3.57
Model setup (inputting data, preparing to run)	3.50
Tool training	3.44
Model calibration & validation	3.40
Generating baseline and alternative scenario forecasts using the calibrated technical tool(s)	3.33
Identifying performance metrics for scenario testing	3.00
Developing/ designing scenarios (i.e., identifying what will be tested and how results will be depicted)	3.00
Evaluating scenario impacts and interpreting results	2.90
Developing analysis methods/ assumptions*	2.70
Preparing reports and presentations	2.63
Data collection (baseline, historical trends)	2.25

## Challenges

When asked what sorts of challenges were particularly associated with a high LOE, the peer MPOs cited the time and effort required to structure the model inputs, measures, and reporting mechanisms; the need for close coordination between the project planners and modeling staff; and the preparation and facilitation of stakeholder meetings. Top responses included the following:

- Selecting appropriate measures to track and report;
- Selecting model inputs;
- Developing an accurate model (e.g., assumptions, coding, network);
- Budgeting the correct time for model phases;
- Facilitating communication between the project team and the model development team;
- Planning and executing stakeholder meetings.

Table 18 includes descriptions volunteered by several agencies regarding tasks they rated with an LOE of 4 or 5.

**Table 18: Challenges Associated with High LOE Tasks**

Agency	Challenges associated with tasks rated Level 4 or 5 LOE
ARC	The items highlighted [on the LOE chart] proved to be those activities which consumed the greatest amount of staff time. An entire document is dedicated to the development of the analysis approach (C08 Volume 2 – Scenario Development Process) and determining which models were most appropriate for our expectations.
CMAP	We did not go a quantitative route for this scenario planning process, so it was necessary to think through the various alternative futures through data-driven storytelling. We created memos outlining the impacts of each scenario as well as companion videos to engage the public (see example). The memo development along with communications and outreach pieces of this process were the most time intensive.
MARC	Most challenging part of this process was determining what measures to track and report on in order to be able to influence policy for the MTP. This process generates a wealth of information, and the challenge is to distill it down to something that can be communicated, understood and helpful for the process.
Met Council	<p>Creating a regional model network of projects that are not thoroughly documented yet requires making up a lot of information and building a network to represent it. This requires collaboration between model staff and project staff to get the assumptions right or as close to right as possible, but also requires significant technical work.</p> <p>The performance measures piece started with an exhaustive list of possible measures and required a lot of input on which measures are best to represent the values of the region, but also technically feasible. This took some time to work through with many stakeholders involved but also with internal staff understanding what data is available and able to be gathered in the manner necessary for the effort. This was not specific to scenario analysis, but an important input.</p>
Metroplan	Number and level of detail for each scenario – more time consuming than challenging.
Miami-Dade TPO	These tasks required managing a significant amount of data in order to create scenarios and reviewing the results to ensure that outcomes were logical. This was significant as the scenarios were developed, while maintaining the County totals. Also, developing the scenarios was quite intensive as the team needed an extensive knowledge of the current conditions along the corridor, planned developments and future opportunities. Lastly, preparing and running the model can be time-consuming. We decided to use one Consultant team to run the model for each Corridor to maintain the coding of the stations and other parameters used on the model, especially on STOPS, the same across the board.

Agency	Challenges associated with tasks rated Level 4 or 5 LOE
MTC	<p>The work to design the model assumptions, design/code the models, run the models, validate and QA/QC model results, and interpret results was a major lift. It was a particularly large lift because of the breadth of topics that were being explored and their modeled interconnections. The economic, land use, and travel models run individually but create inputs and feedback loops for the other models resulting in a sequential analysis that to complete one run from start to finish can require days. With hundreds of variables and assumptions each requiring a validation phase it took an enormous amount of effort to build out new modeling capabilities.</p> <p>In hindsight we did not budget enough time for the various modeling phases. The number of scenarios we explored created more effort, and the breadth of focus areas led to more work than we had staff resources to complete in the time available. If more “modules” for different focus areas had been built in advance and a more stable set of models existed from the start this would have helped, but often our planning process is the opportunity to make improvements/ expansions.</p> <p>On engagement, we were very committed to getting our work out to others for input. With so many meetings and events to attend in a short window of time to keep the overall process moving, it was always a multi-month sprint to collect and make sense of feedback.</p>
SCAG	Data Preparation: need to develop new sets of socioeconomic data as model input to reflect land use scenarios.
WFRC	It took a lot of effort to plan and execute our meetings that involved local stakeholders because we were balancing the needs of multiple partners, wanted the events to be really efficient (a great use of participants time), and the logistics of having so many meetings was a challenge.

**Division of Labor**

Nine of the 13 peer MPOs provided rough estimates of the division of labor among MPO staff, consultants, and other parties associated with application of technical tools to their selected scenario planning study. For example, if the MPO handled all the technical analyses in-house, the MPO proportion would be 100%. If the agency hired consultants or partnered with the State DOT to set up and run the models, the proportions might be spread across the MPO and the other entities (e.g. MPO staff 50%, consultants 40%, state DOT 10%).

In five of the nine studies, MPO staff handled 90% to 100% of the work, and two others relied upon MPO staff for more than two-thirds of the work. Most of the remaining work on all studies was done by consultants. Metroplan allocated 60% of their project work to consultants and handled the other 40% in house. Miami-Dade TPO, unlike the other agencies, assigned only 25% of the work to MPO staff; consultants handled 60% and the rest was spread across local government, State DOT, and outside partners (Table 19).

**Table 19: Division of Labor for Studies**

Agency / Partner Involved in Applying Technical Tools	MPO Staff	Consultants	Local government staff	State DOT staff	Other partners
MARC	100%				
Met Council*	100%				
SCAG	100%				
MTC	92%	4%	2%	<1%	2%
PSRC	90%	10%			
ARC	70%	30%		<1%	
WFRC	65%	35%			
Metroplan	40%	60%			
Miami-Dade TPO	25%	60%	2%	5%	8%
* Met Council noted consultants may have contributed project details from prior studies.					

## PROJECT OUTCOMES AND LESSONS LEARNED

### Study Outcomes

The peer MPOs were asked about the typical outcomes and responses to their scenario planning activities. Frequently cited results included generating a broad vision and goals, updating the long-range transportation plan, and creating an action plan. At least half of the respondents also noted that the scenario planning initiative generated follow-up studies, fostered partnerships to implement the vision, and resulted in adopted regional policies (Table 20).

**Table 20: Scenario Planning Initiative Outcomes / Responses**

Outcome / Response	Count	Percent of 12 Responses
Generated a regional vision and broad goals or principles	10	83%
Created an action plan or “next steps”	10	83%
Updated or amended regional long-range transportation plan	10	83%
Conducted follow-up studies or initiatives	8	67%
Created/ strengthened partnerships to implement the vision*	7	58%
Adopted regional policies	6	50%
Updated or amended regional transportation improvement program	5	42%
Local jurisdictions updated plans, policies, or regulations**	4	33%
Regularly monitored and reported outcomes over time	4	33%
Other partners conducted follow-up actions***	1	8%
Other****	1	8%
* MTC: Created better understanding of the funding need beyond existing resources		
** MTC: Required comprehensive plan updates, by state statute		
*** MTC: Corridor studies		
**** MTC: Created a vision for funding need and Legislative initiatives		

In response to a follow-up question about their sense of the study's most significant outcomes, many of the respondents noted the importance of the clarity and direction provided by the scenario planning exercise(s) as a foundation for long-range plans or corridor studies. Several also said the scenario planning studies helped them to facilitate discussions with stakeholders and raise awareness of different topics.

### **What Went Well, What They Would Do Differently**

In response to a two-part question about what worked and what they would have done differently with their featured scenario planning initiative, many respondents said the engagement and awareness generated by the process was very valuable. A few described some of the improvements to the technical rigor of their analyses. Considering what they would do differently in the future, many respondents said they would plan more time for engaging staff and stakeholders in challenging discussions about initial assumptions and scenario design, and to allow for iterative processes to update or change the analysis based on feedback. Several expressed an interest in using a different type of scenario planning process, e.g., some who had completed normative visioning processes wanted to try exploratory processes, while others wanted to conduct narrowly focused strategic issues, such as financial feasibility assessments (Table 21)

**Table 21: What Went Well, What They Would Do Differently**

MPO	What Went Well	What They Would Do Differently
ARC	<p>The level of engagement and interest from committee members and other stakeholders related to drivers of change and alternate futures was at a level rarely seen around any initiative undertaken by the agency. Discussions were robust and lively, and we frequently found ourselves disappointing people when we had to curtail the conversation and move on in the agenda due to time constraints.</p>	<p>In our early learning about the complexities of exploratory scenario development, measurement, and evaluation, we realized that we may have been overly optimistic on what can be accomplished during the 18-month schedule. It's not an adequate timeframe for the robust analysis, board collaboration, and stakeholder engagement needed to advance to a preferred vision. For the anticipated next stages, we will select a tool that will measure key transportation impacts of various scenarios against pre-determined metrics, without requiring complex data inputs and new calculations. A “mid-weight” tool for this kind of exercise is more refined than a sketch-planning tool, but achievable within the desired time horizon and engagement goals of this initiative. See “Recommendations for Future Applications” in “CO8 Volume 3 – Scenario Analysis” for a discussion on our thoughts about the modeling tools used.</p>
CMAP	<p>The scenario videos came out very well and were engaging for a broad audience. We are also proud of the number of residents we engaged. We connected with more than 2,500 residents at 127 workshops and five topical forums, and over 61,000 interacted with the kiosks.</p>	<p>While the alternative futures approach was certainly engaging for the general public, it was a bit unsatisfying for some of our partners and advisors, who wanted to get much more into the details. We could have created a parallel tool or series of conversations for that audience.</p>

MPO	What Went Well	What They Would Do Differently
DRCOG	<p>We want to stay more and more rooted in reality. Using the state-established county control totals provided more flexibility than our usual reliance on "baked in" totals from each county's planning and zoning database. We included the development pipeline layer in UrbanSim which helped to assure the localities we were using real-life information. There's a pretty jaw-dropping difference between the local adopted plans and the available space for development. There is a lot of risk that the land use model assumes overbuilding. That's fine in a normative process when you can load up any given place any way you want. In this process, we could ratchet up or down the capacity based on zoning and urban form, make it more realistic. If all the master-planned communities grew according to the early 2000s plans, our transportation plan would be totally inadequate. We kept economic growth assumptions the same across all scenarios – in future we might be able to fine tune it. We also went from a parcel level UrbanSim land use model, which was difficult to communicate to our local governments and reduced our ability to do pro forma.</p>	<p>I wish we had more time, started earlier. You can spend a lot of time in scenario planning weighing implications and assumptions and inputs and methods. It doesn't occur to anyone to just settle for "good enough" but those drawn-out conversations rob us of the time we need to run the model. Learning from the previous process, we shifted some of those conversations to the staff level, which saved us some time. Technical tasks such as adding 300 miles of managed lanes with ramps took a lot of coding and detailed thought, along with filtering down the data to a few succinct bullets of realistic, meaningful information for the board. That limits the ability to loop back on questions that get raised during the process. Another challenge is managing expectations about the influence of scenario planning on project selection. We tried to be clear from the outset that we wouldn't use scenario planning to directly make project selection decisions. We just wanted to test land use and multimodal investment packages from a philosophical perspective. That was the right political move, to bring people along in a very diverse region. But then when we got to the project selection process, we got some pushback from some stakeholders about the connection between the scenario planning exercise and the actual plan. We noted that we had to keep some projects for air quality, safety and freight movement goals. We struck a good middle ground in terms of balancing the scenarios with the RTP decision making process, but we need to keep evolving.</p>



MPO	What Went Well	What They Would Do Differently
DVRPC	<p>We talked with scenario planning experts around the country and kept hearing that we needed a land use model, which is an expensive thing that takes a lot of staff time. We built an UrbanSIM model which we mostly used in house rather than for public presentations, as it was sort of raw, but it really helped us to get the detailed geographic data set up about population, employment, and especially the development pipeline. Fascinating to see that almost all the commercial development we're seeing right now is gigantic warehouse space served by trucks because of online retail.</p>	<p>For the next plan update, we won't do visioning or exploratory scenario planning. We're going to focus more heavily on the financial plan. Part of what's driving that is the ongoing crisis about the unsustainability of the highway trust fund, and now our transit ridership is down by exponential numbers due to the pandemic, while warehouse space and home-based delivery is going to generate a lot more truck traffic. Capacity is not a critical investment, especially since PennDOT can only fund about 20% of system preservation needs. So we really need to have a strategic conversation about how to spend those very limited dollars - build on the discussions with our financial committee during this process about investments for exploratory scenarios, e.g. the climate scenario could involve shrinking the network and shifting to more eco-friendly investments like dirt roads and roundabouts with embedded stormwater management systems.</p>
MARC	<p>Lots of engagement and involvement at various points in the process. Couple of workshops with 100+ participants. This process generates great interest in the community.</p>	<p>Our process was more exploratory, "what if?", in nature. Next time, we'll attempt to do a more normative process, where we can set targets for various measures, and attempt testing various transportation/land use patterns to arrive at our preferred future.</p>
Met Council	<p>There was eventually acceptance of the need for the investment scenarios as it created some consensus among stakeholders about why we need additional resources (or for what projects). The conversations with stakeholders, particularly regional funding partners, helped further a shared understanding of the planning process and why the funding scenarios matter. Overall, the stakeholder engagement was challenging but productive.</p>	<p>The technical analysis was initially missing from the project and added later and hasn't been widely used to demonstrate what you get from the different scenarios. The focus is primarily on the projects, not the outcomes. Having a process that focuses on the outcomes would better facilitate a discussion about why resources and prioritization of them is important. Unfortunately, the measures piece proved to be too much to try to accomplish in the initial timeline, so it was added later. Would include it more prominently up front.</p>
Metroplan	<p>Project went as expected. Notable outreach event, "Future Fest": <a href="https://www.youtube.com/watch?v=M_eLWMEvrU4">https://www.youtube.com/watch?v=M_eLWMEvrU4</a></p>	<p>More face-to-face public engagement (pandemic limited this approach), more probabilistic and quantitative impacts of each scenario and project.</p>

MPO	What Went Well	What They Would Do Differently
Miami-Dade TPO	A couple of things that went well during this process were the public outreach efforts and the scenario development. The outreach included, but was not limited to, several Charettes with interactive and live polling which provided communication and feedback from stakeholders; and meetings with the Study Advisory Committee which provided feedback from local and state organizations.	The team was satisfied with the progress of the study, only minor changes were needed due to the current situation with the pandemic. For example, converting SAC meetings to virtual meetings. In the future, we will include in the scope provisions for in-person/virtual meetings. This will allow more flexibility to the SAC members to participate.
MTC	We delivered our strongest analytical work to date and provided our most robust engagement to our widest audience ever. We're very proud of the technical rigor that went into the plan and our ability to not only hear from many more voices, but voices we hadn't heard before and voices that were answering questions that directly informed active decisions.	We would need to have a serious conversation about managing the staff resources, scope of work and timeline. On engagement crunches, web-based platforms offer an exciting new tool that we hope to add as a more significant tool in future efforts. We would benefit from having better basic baseline data and more stable models, both efforts that are already underway as we wrap up this planning phase.
PSRC	Our Data Team was great at running models, preparing and analyzing data, and assembling data for our environmental review.	Models are limited in their ability. I hope that models will continue to improve and best practices will become better able to address facets not covered by models.
SACOG	What used to be most important of Blueprint is the map of future land use patterns. That map is 14 years old now, so it's not as central to the discussion. The principles of that effort are the things that have lasted as a framework for ongoing discussion. The Sustainable Communities Strategy has pretty much replaced the Blueprint as a much more financially constrained version that we can continually update. The Blueprint/ SCS Implementation reporting is the vehicle for continuing that conversation. A lot of the work since Blueprint and beyond has been around changing the land use laws and ordinances.	We're probably going to shift from well-defined big scenarios to much more sensitivity testing exercises – tweaking variables. We'd look at infill versus greenfield, but looking more at what-ifs – fuel prices go up, if we have major floods – much more resiliency testing. That's something we're scoping this year.
SCAG	No comment (featured DMDU pilot study is currently getting underway)	Purpose of the project is to consider Decision Making under Deep Uncertainty (DMDU) method and Vision Eval as the tool for next plan [following up on land use scenario tools used for previous plan].
WFRC	Local engagement and engagement between partners.	Even more local engagement. A bigger emphasis on equity considerations. A formalized progress monitoring system in place.

## Additional Studies, Recommended Resources and Advice

### Advice for Peer MPOs

Many of the peer MPOs offered insights and suggestions for other agencies considering conducting a scenario planning process. Common messages included thinking carefully about the key questions and engagement process to figure out an appropriately detailed technical approach; communicating clearly with board members and the public; and networking with other agencies through consortia.

**Table 22: Advice for Peer MPOs**

MPO	Advice
ARC	Don't focus too much on trying to measure the outcomes in precise metrics for comparison purposes to decide which scenario is "best". That's not how the world works. Exploratory scenario planning should be about engaging in a dialogue about what's possible and anticipating both good and bad things that can happen (and how can we incentivize/ mitigate those impacts through proactive policy decisions). The pandemic has demonstrated that we need to be prepared for the possibility of major upheaval in our lives and to never assume that the status quo is a given or change is gradual. Expand the definition of plausibility and game out the possibilities so you can be as prepared as possible when/if the next big disruption occurs.
CMAP	We didn't use a technical approach for alternative futures primarily because there were various separate technical analyses taking place for ON TO 2050 that we felt served as the best way to engage technical/policy audiences. To engage the general public, we wanted something a bit more lighthearted and fun that would draw people in. To determine whether a scenario planning process or tools are right for your agency, it may be helpful to think about what your ultimate goals are in the process. Although scenario planning can be very helpful to evaluate policy alternatives, the time and effort that the modeling and other technical components take may not always be necessary.
DVRPC	Shifting the paradigm to start from the narrative. We've continually used this Impacts2060 model which has some built-in elasticities such as the relationship between urban development and walk trips – it's pretty sophisticated but really just a linked spreadsheet that allows us to see the ripple of impacts. The TMIP_EMAT process told us more about what the model does than what the outcomes would be.
Met Council	Think through the purpose and evaluation up front and ensure that you have the resources to accomplish it all so that the engagement on the results is meaningful.
Metroplan	Take more time to thoroughly communicate key issues / drivers of change. Global pandemic impacted original engagement plan and technical timeline.
Miami-Dade TPO	The scenario planning process proved to be a very useful tool as a supporting role to the transit studies and the Locally Preferred Alternative. This process has undoubtedly helped in the efforts of moving the SMART Plan forward and seeking federal funds.
MTC	Have a conversation early on with executives, board members and all decision makers on the need to keep the scenario planning within a reasonable scope. Make sure there is understanding of the resource required to take on expansions in scope. Have a strong project manager in the lead, who is not responsible for any tasks other than project management. Robust scenario planning is likely to require the collaboration of many making strong project management key. Do your best to start from an as-solid-as-possible data + modeling foundation to begin with. As the scenario planning process unfolds it is surely to stress the weakest and most unstable elements of the model.
SCAG	Joining a consortium or user community of scenario planning tools before making determination is a good starting point to learn experiences from existing users.

## Recommended Resources

The last section of the questionnaire asked the peer MPOs to volunteer information about other studies by their agency or others, as well as general texts or websites that could be helpful. Responses included the following. Reports for which hyperlinks were provided are downloaded and provided with the digital folders of project materials (Appendix B).

- ARC provided a Dropbox link to numerous reports and presentations about their ongoing scenario planning experience.
- CMAP suggested reviewing the Invent the Future normative scenario planning process for the agency's first comprehensive regional plan, GO TO 2040.
- DVRPC recommended a Dispatches from the Future report on Preparing Philadelphia for Highly Automated Vehicles, noting it did not involve modeling but described trends and issues. They also noted information about the Impacts2060 tool was on github.
- MARC recommended their reports on "driving forces" and "forecasting the future" at <https://connectedkc.org/plan-development/> as well as an overview at <https://www.marc.org/Regional-Planning/Creating-Sustainable-Places/Plans/Scenario-Planning>
- Met Council offered to share some high-level exploratory modeling of CAV scenarios for their 2018 plan update.
- Metroplan recommended an overview at [https://metroplanorlando.org/wp-content/uploads/2045MTP\\_TS14\\_ScenarioPlannning-Summary\\_Adopted-20201209.pdf](https://metroplanorlando.org/wp-content/uploads/2045MTP_TS14_ScenarioPlannning-Summary_Adopted-20201209.pdf)
- MTC noted the ongoing Horizon effort has many reports at <https://mtc.ca.gov/our-work/plans-projects/horizon/futures-planning> Additionally, the Plan Bay Area 2050 effort which built on Horizon has many resources available at: <https://www.planbayarea.org/2050-plan/final-blueprint/plan-bay-area-2050-final-blueprint-documents> They also recommended reviewing the San Francisco ConnectSF plan.
- PSRC provided a link to reports from VISION 2050 and VISION 2040, including various research papers at <https://www.psrc.org/vision>
- SACOG recommended reviewing the original 2004 Blueprint 50-year growth vision for the region based on seven smart growth principles, described in Appendix D of the 2020 MTP/SCS: Land Use Forecast Documentation. They also noted their staff was participating in the FHWA TMIP Pilot project on Incorporating Decision Making Under Deep Uncertainty Approaches in Transportation Studies.
- ARC and SCAG recommended The Lincoln Institute's Consortium for Scenario Planning resources: <https://www.lincolinst.edu/research-data/toolkits/scenario-planning>.
- Metroplan suggested checking TRB and APA scenario planning resources.

## APPENDIX A. QUESTIONNAIRE

### Part 1: Scenario Planning Initiative Experience (these questions apply to <<NAME OF STUDY>>)

- 1. Why did you conduct this scenario planning process?** For example, what were the key concerns or questions you wanted to address? Was there a catalytic event or emerging concern that prompted it? Did it build upon a previous study?

- 2. Is a scope of work available that describes the process and methods used for this scenario planning initiative?** If so, please transmit to us by email, or provide the URL below.

- 3. Who was closely involved in the day-to-day work of the study?** Please put an X into the appropriate level for each type of participant in the table below.

Type of Participant	Closely involved in all aspects of the project	Involved in some key aspects (e.g., contributed substantively to research, analysis, data prep, oversight)	Provided some input but not closely involved (e.g., attended periodic workshops, provided some raw data)	Not involved
MPO Planner (Project Manager)				
MPO Planner(s)				
MPO GIS Analyst(s)				
MPO Travel Demand Modeler(s)				
Other MPO Staff (please specify, add rows as needed)				
Other Staff (please specify, add rows as needed)				
Partner agencies / organizations (Please specify, add rows as needed)				
Consultants				

4. **Who was involved in the overall study process?** Please put an X into the appropriate level for each type of participant in the table below. Definitions of the categories in each column are included at the bottom of the table.

Organization	Decision Maker	Partner	Advisor	Stakeholder
MPO Board				
Project Oversight Committee (assembled specifically for this study)				
MPO Technical Committee (s)				
MPO Citizen Advisory Committee(s)				
Other MPO committees or panels (please specify)				
Local Government Elected Bodies				
Local Government Staff				
Regional government agency other than MPO				
State DOT				
FHWA/ FTA				
Other State or Federal agency				
Neighborhood Associations				
Non-profit groups/ civic organizations				
Private businesses/ chambers of commerce				
Other (please specify)				
<p><b>Decision Maker:</b> The agency (or agencies) that either acts as the lead agency or is required to take legal action in the decision-making process.  <b>Partner:</b> Participants who have a decision-making role at some point in the transportation decision-making process, such as Federal, State, and local resource agencies.  <b>Advisor:</b> A decision-making partner who provides feedback as to whether the decision is supported or opposed and whether there are particular issues of concern.  <b>Stakeholder:</b> Person or group that may be affected by a transportation plan, program or project. Stakeholder can include: Government agencies that are not part of the decision-making partnership, formal advocacy groups, and informal groups that come together around transportation decision making (i.e., neighborhood associations).</p>				

5. **Can you briefly describe the role of decision makers, partners, advisors, and stakeholders at key decision points in your study?** The table below lists key decision points that are common to scenario planning studies; feel free to edit these to reflect the unique nature of your study.

Typical Key Decision Points (edit as desired)	Who Provided Input	Who Made Decision
Developing the scope of work		
Appointing an oversight committee		
Selecting consultants		
Selecting scenario planning tool(s)		
Defining technical specifications (e.g., scenario base year and horizon year, forecasting methods, data sources)		
Evaluating scenario results		
Selecting a preferred scenario (if applicable)		
Identifying recommended actions (e.g., policies, investments, regional agreements, followup studies)		
Adopting or approving study recommendations		
Other key decision points (please specify)		

6. **What kinds of techniques did you use to engage stakeholders and the public?** The table below lists some common engagement techniques. Please place an X in the column next to any item that applies to your study, and add other techniques as appropriate.

Engagement Techniques	Our Study
Advisory panel meetings	
Stakeholder forums / workshops (invitation-only)	
Public forums / workshops	
Public surveys and polls (via web, social media, telephone, and/or on paper)	
Interviews	
Focus Groups	
Other (please specify)	

**7. Please tell us a little about the budget, time frame and funding sources for the study.**

<b>Project Budget and Time Frame</b>	<b>Our Study</b>
Overall budget (approx. dollar amount)	
UPWP funds allocated to support the study (approx. dollar amount or percentage of overall budget)	
Other funding sources (approx. dollar amount or percentage; please list sources, but don't worry about specifying amounts by source)	
Resources allocated to MPO staff (approx. dollar amount or percentage)	
Resources allocated to Consultant (approx. dollar amount or percentage)	
Resources allocated to Partners (approx. dollar amount or percentage; please specify partners)	
Time Frame (e.g., 6 mo, 1 yr, 18 mo, 2 years)	

**8. If your staff required any training to become proficient with the methods and tools being used to produce the scenario planning products, how was the training delivered/ provided?**

**9. What scenario planning tool(s) did you use to support the study?**

**10. Did this study require the purchase of data? If so, please describe**



**11. Thinking about the overall Level of Effort (LOE) (e.g., time, staff resources, consultants, budget) required for the study, how would you rate the following activities on a scale of one to five, with one indicating very low LOE and five indicating very high LOE? Put an X into the relevant column beside each item.**

Activity	Level of Effort (choose one)					
	1 (low)	2	3	4	5 (high)	n/a
Selecting scenario planning tool(s)						
Tool training						
Data collection (baseline, historical trends)						
Data preparation (cleaning, coding)						
Model setup (inputting data, preparing to run)						
Model calibration & validation						
Ongoing tool maintenance						
Identifying performance metrics for scenario testing						
Developing analysis methods/ assumptions*						
Developing/ designing scenarios (i.e., identifying what will be tested and how results will be depicted)						
Generating baseline and alternative scenario forecasts using the calibrated technical tool(s)						
Evaluating scenario impacts and interpreting results						
Preparing reports and presentations						
Preparing and facilitating stakeholder and public meetings						
* Analysis methods/ assumptions activity could include, for example, adjusting vehicle trip generation rates to reflect future increased walkability and transit access, or identifying potential trajectories and implications of connected/ automated vehicle market penetration						

**12. If you rated any activities with an LOE of 4 or 5, can you share your thoughts about what made them particularly time-consuming or challenging?**

**13. What would you say was the approximate division of labor between MPO staff, consultants and other parties for the activities associated with application of technical tools for the study?**  
 For example, if your MPO handled all of the technical analysis in-house, the MPO proportion would be 100%. If your agency hired consultants or partnered with the State DOT to set up and run the models, the proportions might be spread across the MPO and the other entities (e.g. MPO staff 50%, consultants 40%, state DOT 10%). A rough estimate is fine.

Agency / Partner Involved in Applying Technical Tools	Approx. division of labor
MPO Staff	
Consultants	
Local government staff	
State DOT staff	
Other partners (please specify)	

**14. What were the key outcomes of your study?** Below is a list of typical outcomes and/ or responses to scenario planning initiatives. Please place an X next to any that are applicable to the results of your study, and/ or add others.

Typical Outcomes / Responses to Scenario Planning Initiative	Check if applicable
Generated a regional vision and broad goals or principles	
Created an action plan or “next steps”	
Created/ strengthened partnerships to implement the vision	
Adopted regional policies	
Updated or amended regional long-range transportation plan	
Updated or amended regional transportation improvement program	
Conducted followup studies or initiatives	
Local jurisdictions updated plans, policies, or regulations	
Other partners conducted followup actions (please describe)	
Regularly monitored and reported outcomes over time	
Other (please specify)	

**15. In general, what would you say were the most significant outcomes of this scenario planning initiative?**

**16. What went well during the process of this scenario planning initiative?**

**17. What would you do differently next time?**

**Part 2: Experience with Modeling and Scenario Planning Tools**

**18. Please tell us a little about your MPO travel demand model.** If more than one travel demand model is currently maintained by your MPO, please provide responses for both.

Model Characteristics	Our Model
Software tool (Citilabs, Caliper, etc.)	
Type (e.g., activity based, tour-based, trip-based)	
Number of TAZs (approx.)	

**19. Please tell us about your experiences with the following scenario planning tools, and / or any other tools that you've considered or used in some way.**

Scenario Planning Tool	Never considered	Considered but not used	Used Once	Use Periodically	Capability (choose one)		
					Can run fully in-house	Can run with consultant support	Outsourced to consultant
TMIP_EMAT <sup>2</sup>							
VisionEval							
TRIMMS <sup>3</sup>							
CommunityViz							
INDEX							
Uplan							
CityEngine							
Envision Tomorrow (ET)							
UrbanFootprint / RapidFire							
UrbanSim / Urban Canvas							
Cube Land							
Remix							
TDM+							
Other Tools (please specify, add rows as needed)							

**20. If there are tools you have considered, but not used, why did you decide not to use them?**

<sup>2</sup> TMIP\_EMAT: Travel Model Improvement Program: Exploratory Modeling and Analysis Tool

<sup>3</sup> TRIMMS: Trip Reduction Impacts of Mobility Management Strategies

**Part 3: MPO Region Socio-Economic Characteristics**

**21. In your most recent long-range transportation plan (metropolitan transportation plan), what were the population and employment statistics for your MPO region?** Please indicate the numbers of persons and jobs, as well as the relevant base year and future year.

	Base year (please specify) _____	Future year (please specify) _____
Population		
Employment		
<b>Households</b>		

**22. What are major transportation assets in your MPO region?** Please check all that apply and add others as appropriate.

Major Transportation Asset	In our Region
International Airport	
Regional Airport	
International Marine Port	
Interstate Passenger Rail	
Interstate Passenger Bus	
Interstate Freight Rail	
Interstate Highway	
Regional Passenger Rail	
Regional Passenger Bus	
<b>Local Passenger Rail</b>	
Local Passenger Bus	
Regional Greenway/ Bicycle Network	
Other (please specify):	

**23. What are major economic generators in your MPO region?** Please check any categories that are significant and provide one or two examples of significant employers.

Category	Significant	Example Major Employers
Natural Resources and Mining		
Construction		
Manufacturing		
Trade, Transportation, and Utilities		
Information		
Financial Activities		
Professional and Business Services		
Education and Health Services		
Leisure and Hospitality		
Other Services		
Federal Government (non-military)		
Military		
State Government		
Local Government		

**Part 4: MPO Agency Structure and Resources**

**24. How is your MPO structured?** Please place an X next to the option that applies to your agency

Typical MPO Structures	Our Structure (select one)
Stand-alone agency	
Housed within a Council of Governments	
Housed within a Local Government	
Housed within a State DOT	
Other (please describe)	

**25. What is your MPO’s typical annual budget for planning and for programming?**

	Typical Annual Budget
UPWP	
Other planning funds (please describe)	
Transportation Improvement Program	

**26. What are the general capabilities and overall size of your MPO staff?** Within each category, it’s fine to double-count staff that serve more than one function. For example, a planner that also conducts GIS analyses could be counted in both the planning and GIS categories.

Staff Functions/ Capabilities	Approx. number of staff with this capability/ function
Management (e.g.,MPO Director, Department Heads)	
Planning/ Programming (long range plan, TIP, and other studies)	
GIS Analysis	
Travel Demand Modeling	
Other Analysis (e.g., surveys, demographics, economics; please specify)	
Public Engagement	
Finance and Administrative Support	
Other (please specify)	
Total staff ( <b>without</b> double-counting staff that serve more than one function)	

**Part 5: Advice and Additional Thoughts / Questions**

**27. In addition to the featured study that we’re examining, have you conducted other scenario planning initiatives, written technical memoranda, or prepared other reports that might be informative for us to review?** If so, please list titles and provide URLs or send us copies if possible.

**28. Please let us know if you have suggestions for helpful scenario planning books, reports, websites, agencies, or other resources. Include titles and URLs if possible.**

**29. What advice would you give to other MPOs that might want to embark on a scenario planning process and /or to invest in scenario planning tools?**

**30. Any additional thoughts or questions for us?**

*Thank you again for participating in the study! Please return your completed survey to Nicole McCall, Manager, Planning Research and Assistance, Metropolitan Washington Council of Governments / National Capitol Region Transportation Planning Board. Email: nmccall@mwkog.org Phone: (202) 962-3341*



## APPENDIX B. SUPPORTING DOCUMENTATION

The following packages of files are provided digitally with this white paper for further reference:

- Excel spreadsheet with agency contact information, data collected for the selection process, and notes about responses.
- Questionnaire and completed responses from each agency.
  - NOTE: Three of the responses (DVRPC, DRCOG, and SACOG) were completed via phone interview at the request of the respondent. The research team populated the questionnaires with notes from the interviews and additional information from agency publications and websites.
- Excel spreadsheet with tabulations of responses to questionnaire.
- Peer MPO scenario planning studies and additional reports provided by respondents.



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