

# SCENARIO PLANNING: EMBRACING UNCERTAINTY TO MAKE BETTER DECISIONS

By Robert Goodspeed

American cities and regions face an unprecedented array of challenges and uncertainties. When it comes to planning for the future, some communities seek transformative spatial changes, such as stopping urban sprawl and pursuing greater sustainability. Others seek resilience in the face of extreme weather, flooding, and droughts intensified by climate change. In response, many leaders are turning to scenario planning—a procedural tool that enables planners to make better decisions about the future by incorporating diverse stakeholder input and other relevant data more thoughtfully and deliberately. Scenario planning improves inclusive decision making and yields plans more likely to be implemented.

Originally developed as a tool for military and corporate strategic planning, scenario planning enables communities to create and analyze multiple plausible versions of the future. Unlike traditional approaches that begin with forecasting, scenario planning starts with a different mindset: *We can't predict the future, but we can better prepare for it.* In recent years, it has been adapted by urban planners and combined with traditional planning methods like visioning and consensus building for use in city and regional plans.<sup>1</sup>

At its core, scenario planning guides planners, community members, and other stakeholders to consider the various futures they may face—good, bad, and unexpected. Typically, normative processes consider how to plan and implement a specific, desired scenario, whereas exploratory processes build several scenarios to help plan for different futures, resulting in adaptable, effective plans. Projects may also use scenarios to analyze emerging trends or overlooked issues.

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Scenario planning does not require complex software or expensive tools, although both may be helpful. Regardless of whether flip charts or computer models are used, scenario planning engages with uncertainty, encourages careful thinking, and fosters diverse perspectives. The results produce more effective, deeply considered plans that better support tough decision making—and that are more likely to be implemented.



Through the Austin Sustainable Places Project, elected officials, property owners, local residents, and other stakeholders in Dripping Springs, Texas, use colored stickers to represent different place types—such as residential neighborhoods or mixed-use developments—as part of the process to create a normative land use scenario. Following this workshop, planners refined participants' ideas to consider different ways their community could grow. Credit: Robert Goodspeed.

## Scenario Planning in Practice

Scenario planning begins with a careful analysis of what is certain and uncertain about the future. The planning field has largely ignored uncertainty for too long, resulting in fundamentally flawed plans that are poorly suited for implementation. Indeed, inflexible plans have seen homes flooded because they were built in areas that were thought to be safe from storms, public funds wasted on infrastructure to accommodate overestimated growth, or expensive mismatches between affordable housing types and residents needs. Furthermore, planning that ignores uncertainty tends to perpetuate the status quo, rather than prepare residents for the future.

By contrast, scenario planning puts looming uncertainties at the heart of the process by prompting practitioners to identify, prioritize, and analyze the more important variables facing their cities and regions—like changing climate and weather patterns, uncertain growth trends, and shifting housing preferences. When this analysis focuses on forces within the city itself, planners can explore not only what *may* change but also what *could* change to advance community goals—or as the result of other interventions. When participants focus on external uncertainties, they can better prepare for changes in the broader environment, improving resilience to uncertain but foreseeable events. Taken together, these investigations are how scenario planning helps cities to pursue practical transformation.

Depending on a community’s goals, planners can use several different types of scenarios, exploring what *may* happen given certain assumptions or what *can* happen subsequent to certain events.<sup>2</sup> Scenarios are then combined in different types of projects, which can be implemented at different spatial scales (see table 1):

**Normative processes** create several scenarios and identify one that describes a community’s desired future as the basis for a plan. The most developed type of scenario planning, normative processes are used primarily for plans concerning land use, transportation, or both.<sup>3</sup> Such projects encourage a synthesis of quantitative analysis and discussion of community values, resulting in detailed scenarios and plans that enjoy stakeholder buy-in. Normative scenario planning processes can also incorporate scenarios that focus on uncertainties beyond the immediate control of city leaders—such as the amount of economic or population growth—to build a plan that describes how the city should respond under these different conditions.

**Exploratory processes** are generally qualitative and thus best used to build a shared understanding of complex, new trends among diverse stakeholders. These projects create multiple hypothetical future scenarios, based on both changing trends and potential decision making, allowing planners to analyze uncertainties beyond city or regional control. These projects improve understanding of key trends, recognition of uncertainties, and insights about existing plans.

Table 1

### Examples of Urban Scenario Planning Projects

EXAMPLE	PROJECT TYPE	SCALE	CASE OUTCOMES
Envision Utah (1999) <sup>4</sup>	Normative project (focus on transformation)	Metropolitan Region	Shared vision to slow sprawl and invest in transit
Gwinnett County (GA) 2030 Unified Plan (2009) <sup>5</sup>	Normative project (focus on external uncertainties)	County	Detailed scenarios with recommendations for different levels of economic growth
Sahuarita (AZ) Exploratory Scenario Project (2014) <sup>6</sup>	Exploratory project	Municipality	Direction on regional collaborations and the need to form a municipal water utility

## The Scenario Planning Toolbox

A clearly organized process is essential to coordinate the collaboration that drives scenario creation and analysis. Many projects also incorporate certain digital tools to model and analyze specific scenarios. These two elements are often closely intertwined, as participants provide key inputs and scrutinize results. Regardless of the specific tools chosen, responsible practitioners ensure close collaboration between the experts who design and implement the tools and other stakeholders—especially as experts often bring assumptions that particular scenario projects may want to challenge.

### PROCESS TOOLS

Scenario projects draw on various methods of collaboration and participation in order to achieve their goals. Although some engage only small groups of stakeholders while others feature broad public participation, effective scenario planning at any scale requires including a diverse array of participants. Various templates exist, but most share several key stages, each of which can involve participatory or collaborative workshops (see figure 1).<sup>7</sup>

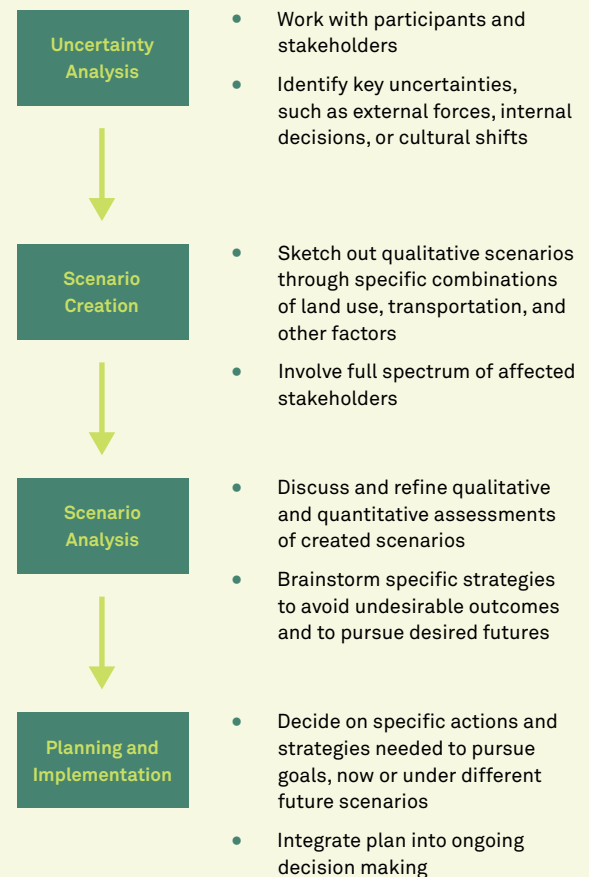
### DIGITAL TOOLS

Whether or how scenario projects use digital tools depends on the nature of the scenarios being created, the types of analysis needed, and the resources at hand—but certain types of software can be powerful, informative additions to the process when available:

- **Systems Modeling:** Models of urban systems like stormwater infrastructure or transit networks can be an extremely useful way to create and test alternate scenarios. Planners often use these tools in close collaboration with modeling experts, including engineers and university-based researchers. More complex models require additional expertise to operate, but they too are powerful; for instance, cellular automata-based models can predict urbanization patterns, and econometric models like UrbanSim link transportation infrastructure to land development patterns.

Figure 1

### Typical Steps in a Scenario Planning Project



- **Demographic and Economic Modeling:** Communities can use a variety of well-known demographic and economic models to create detailed population scenarios. For example, they can use demographic projections to describe a city's future population under various migration scenarios.
- **Place-Type Development and Analysis:** These tools allow planners to sketch different land uses and calculate a complex suite of indicators that describe the different patterns. Because they require less customization than other forms of models and speak directly to widespread land use planning questions, such programs are among the most popular and useful ways to create scenarios (see box on page 4).

## Recommendations for Practice

### USE SCENARIO PLANNING FOR VIABLE LONG-RANGE STRATEGIC PLANS

Although planning approaches based on accommodating predicted growth worked for many 20th-century communities, writing plans this way today leaves many vulnerable to economic, technological, and climate-related uncertainties. All long-term strategic plans, prepared at all levels of government, could benefit from scenarios and the voices and inputs of more diverse stakeholders. Scenario planning empowers communities to grapple with broader trends, educate the public, and catalyze collaboration, consensus-building, and action.

### CREATE SCENARIOS WITH AND WITHOUT HIGH-TECH TOOLS

There is a common myth that scenario projects require big budgets and complex computer models. While models can provide useful insights and analysis, these tools do not define the scenario planning process: Even model-intensive projects require extensive qualitative discussions and analyses to ensure that participants understand them thoroughly and leverage them appropriately and effectively. Practitioners should therefore use modeling software if appropriate and when possible, but they should not neglect well-proven qualitative scenario methods, which can generate useful insights, understanding, and creativity with little more than paper and a pencil.

### TEACH SCENARIO PLANNING METHODS TO THE NEXT GENERATION

Given its growing popularity and relevance to urban planning challenges, scenario planning should be taught as part of professional degree programs in urban planning and related fields. The current standards used by the Planning Accreditation Board, which accredits urban planning programs in North America, specifies that degree curricula must include discussions of the future—specifically “relationships between past, present, and future in planning domains, as well as the potential for methods of design, analysis, and intervention to influence the future.”<sup>8</sup> Scenario planning clearly addresses this issue and ought to be more explicitly acknowledged in future standards.

## TOOLS FOR SCENARIO DEVELOPMENT AND ANALYSIS

### CommunityViz [communityviz.city-explained.com](http://communityviz.city-explained.com)

An ArcGIS extension that functions as a planning toolbox used to create and analyze place types, among many other functionalities

### Envision Tomorrow [envisiontomorrow.org](http://envisiontomorrow.org)

An ArcGIS extension that links with a set of spreadsheets to allow planners to sketch and analyze land use patterns with flexibility

### UrbanFootprint [urbanfootprint.com](http://urbanfootprint.com)

A web-based planning tool similar to Envision Tomorrow that also facilitates analysis of additional topics, such as health impacts or risk for flooding, sea-level rise, and fire

This policy brief is based on the forthcoming book by Robert Goodspeed, *Shaping Places with Scenarios: A New Approach to Urban and Regional Planning* (Cambridge, MA: Lincoln Institute of Land Policy).

- <sup>1</sup> For discussions about the use of scenario planning in urban planning, see Arnab Chakraborty and Andrew McMillan, “Scenario Planning for Urban Planners: Toward a Practitioner’s Guide,” *Journal of the American Planning Association* 81, no. 1 (Winter 2015): 18–29; and Lewis D. Hopkins and Marisa Zapata, eds., *Engaging the Future: Forecasts, Scenarios, Plans, and Projects* (Cambridge, MA: Lincoln Institute of Land Policy, 2007).
- <sup>2</sup> Lena Börjeson, Mattias Höjer, Karl-Henrik Dreborg, Tomas Ekvall, and Göran Finnveden, “Scenario Types and Techniques: Towards a User’s Guide,” *Futures* 38, no. 7 (September 2006): 723–739.
- <sup>3</sup> For more on normative scenarios, see Federal Highway Administration, *Scenario Planning Guidebook*, 2011; Oregon Department of Transportation, *Oregon Scenario Planning Guidelines*, 2013; and Keith Bartholomew, “Land Use-Transportation Scenario Planning: Promise and Reality,” *Transportation* 34, no. 4 (July 2007): 397–412.
- <sup>4</sup> Brenda Scheer, *The Utah Model: Lessons for Regional Planning* (Las Vegas, NV: Brookings Mountain West, 2012), 1–27.
- <sup>5</sup> Gwinnett County, *2030 Unified Plan*, February 2009, <https://www.gwinnettcounty.com/web/gwinnett/departments/planninganddevelopment/gwinnett2030unifiedplan>.
- <sup>6</sup> Joe Marlow, Hannah Oliver, Ray Quay, and Ralph Marra, “Integrating Exploratory Scenario Planning into a Municipal General Plan Update” (working paper, Cambridge, MA: Lincoln Institute of Land Policy, December 2015).
- <sup>7</sup> For a useful discussion of how to organize scenario workshops, see Bill Ralston and Ian Wilson, *The Scenario-Planning Handbook: A Practitioner’s Guide to Developing and Using Scenarios to Direct Strategy in Today’s Uncertain Times* (Mason, OH: Thomson/South-Western, 2006).
- <sup>8</sup> Planning Accreditation Board, “PAB Accreditation Standards and Criteria Approved March 3, 2017,” [www.planningaccreditationboard.org/index.php?s=file\\_download&id=500](http://www.planningaccreditationboard.org/index.php?s=file_download&id=500).