

SCENARIO PLANNING

POLICY-MAKERS STEPS COMMUNITY PREDICTIVE DESIGN USEFUL CLEARLY
TIME CHANGE NEW FORECASTING MANAGEMENT STEPS TIME SOLUTIONS
STRATEGY GOALS ORGANIZATION FUTURE ENVIRONMENT
USEFUL DRIVERS TRENDS STRATEGY STEPS
STAKEHOLDERS RANGE PROBABILITY BUSINESS
APPROACH FACTORS SOLUTIONS COMMUNITY APPROACH
STEPS TECHNIQUE POLICY-MAKERS ORGANIZATION GOALS
SOLUTIONS CITY ADAPTIVE DESIGN CHANGE CITY NEW
NEW PARTICIPANTS DRIVERS STAKEHOLDERS STEPS
ENVIRONMENT MANAGEMENT PILOT PROJECTS TRENDS POLICY-MAKERS
GOALS ANALYSIS PARTICIPANTS SOLUTIONS
PROBABILITY STEPS STAKEHOLDERS USEFUL TECHNIQUE MANAGEMENT
ORGANIZATION TRENDS FORECASTING STEPS PROBABILITY
BUSINESS TIME STRATEGY NEW RANGE ANALYSIS

Even before COVID-19 arrived, communities and organizations around the world faced extraordinary change on several fronts ranging from the torrent of disruptive technologies to record-breaking climate-related events.

Despite the enormous effort and resources devoted to corporate and community planning, few prepare for this degree of change. As it turns out, traditional planning processes are ill-equipped to address uncertainty, leading professional planners from across disciplines to examine the shortcomings of standard practices.

For example, conventional transportation and land-use planning tends to view the future as the extension of past trendlines. Regional planners often try to assign a number for traffic or housing demand by extrapolating data from past growth or migration patterns. Unfortunately, today's disruptive trends have few predicates, which is why they come with names like novel viruses and emerging technologies.

This is not to suggest that cities, counties, and companies abandon planning — getting in front of trends is more important now than ever before. Instead, we need to reinvent planning in ways that explore, characterize, and incorporate uncertainty and the “what ifs” of possible futures for any plan or project likely affected by a range of technologies, climate change, and other developments. The most urgent reason lies in your current workflow. Without considering trends, your final plans and project designs may already be obsolete.

At WGI, our professionals are on the forefront of this reinvention, creating new planning techniques and customized project design to fit clients' needs. Our team seized the opportunity for a range of next-generation techniques like exploratory scenario planning and technology foresight that apply to all our services areas.

This White Paper looks at what scenario planning means for everyone involved in community design, infrastructure, and sustainable development.

A photograph showing the hands and forearms of several people in business attire leaning over a table. They are working with various documents, pens, and numerous colorful sticky notes (orange, pink, yellow) attached to the papers. The scene suggests a collaborative planning or brainstorming session.

PLANNING AMID UNCERTAINTY

You may already notice increased attention to scenario planning. This section describes the terms and tools related to planning and uncertainty.

Forces of Change:

One of the best ways to prepare for change is understanding driving forces (also referred to as change drivers). A change driver is an internal or external pressure exerting change on an organization or entity. For planning, architecture, and engineering, some of the predominant change drivers include impacts from climate change, modular construction, technologies (e.g., parking, autonomous vehicles), and vehicle electrification.

WGI works with clients to explore and understand change drivers at the front end of planning and project design. This first step is essential for future-proofing a plan or civil engineering project.

Scenario Planning:

Scenario planning entails preparing for alternative futures. Regional agencies currently use normative scenario planning, which works to identify a preferred, and achievable, target condition. For example, a metropolitan planning agency will compare and model three growth scenarios, choosing the scenario that best directs transportation investments. Communities and campus designers also have new tools allowing planners to compare alternative infrastructure, development, and redevelopment scenarios. A downtown authority can now compare various use mixes and densities around a new transit station. These models rely on a high degree of confidence in the variable chosen and underlying data.

This White Paper is primarily concerned with a second type of scenario planning: exploratory scenario planning. Exploratory scenario planning (XSP) works well when there is less confidence in variables and emerging topics with little precedent. If normative scenario planning answers, “what would we like to happen?” exploratory scenario planning looks at, “what could happen?”

Through the structured process, stakeholders and participants with subject-matter expertise focus on the attributes of trends such as likelihood (are trends possible, plausible, or probable?), impact intensity (high, low, it depends?), and susceptibility (are certain geographies or populations more at risk?).

Scenario planning is an essential step in developing any kind of plan and project. Without considering trends, your project is apt to be quickly rendered obsolete. There is no single recipe for designing a scenario-planning workshop or process. WGI works with stakeholders to define desired outcomes first, then implements the appropriate process around those outcomes and outputs. A second and equally important use of XSP is stakeholder engagement. The process helps rally a broad range of stakeholders around a common pursuit of exploring and incorporating change (rather than fearing change and delaying action).

Predictive or Anticipatory Planning:

Predictive planning is a tool offering an alternative or supplement to long-range planning. The aim is to set a medium-term time horizon and planning phases based on information that allows credible predictions. The more immediate phases are more reliable, so successful processes will build in check-ins to assess and update predictions over time. The growing use of predictive planning is due, in large part, to the expanding field of predictive analytics that make use of simulations, machine learning, and artificial intelligence.

Technology foresight is a specialized form of predictive planning. Because technologies are typically adopted through a series of tests and pilot projects, planners can assess the results of iterative phases of hardware and software development. Once technologies are commercialized and launched, organizations can track and approximate market-adoption phases. For technology, market adoption is a key indicator of traction. If you are a policymaker, for example, you may not need to change transportation policy if market adoption is low. As we learned with shared scooters, however, rapid-adoption rates required quick action for parking, safety, and travelways.

Given technology's widespread reach into almost every facet of planning, construction, and design, WGI helps clients explore the technologies that could apply to a project now, and into the future. We've forged several partnerships with technology companies to better understand the range and types of technologies that could apply to structures, infrastructure, and community design. In making recommendations, we look at total life-cycle costs, training needs, and obsolescence factors.

Adaptive Design and Management:

Interest in adaptive design has grown, particularly for projects facing climate change-related impacts. Flexibility and adaptability are design imperatives for structures, infrastructure, and land development to meet shifting impacts from other trends and technology. There is some friction in pursuing adaptable design given the rigid codes and standards that determine allowable uses and how structures can be built.

Once we assess possible and plausible futures, we work with clients to develop projects that perform well under multiple scenarios. The final result could be a final project design, or one that can expand or readily change form. In developing solutions, we strive to produce those with co-benefits that work well under a variety of unexpected conditions. Our FlexPark™ and Complete Streets+ service areas represent our commitment to adaptable design. For more, listen to WGI's Jacob Gonzalez on the [Parker-X Podcast](#).

Pilot Projects and “Quick Build” for Streets:

Agility is as important as adaptability when seizing opportunity in changing times. What if you could test scenario-planning alternatives in real time? WGI's Team Better Block group has over 10 years of using low-cost pilots for testing, learning, iterating, and gathering comments on community, economic, and infrastructure projects in hundreds of cities across the USA. This means your projects will be more informed and more readily adopted by the community.

Quick Build is an emerging project-delivery process that allows governments to quickly deploy infrastructure to meet the rapidly changing public space and economic realities. For COVID-19 response, WGI is assisting communities in converting underused on-street and off-street parking into outdoor dining, resulting in business retention and compliance with CDC recommendations. Quick Build is growing in popularity to achieve immediate benefits from complete-streets installations without extensive roadway reconstruction and impact to adjacent businesses.



Quick Build projects like this one in Fort Wayne, Indiana support complete-street goals while enhancing business operations. Photo credit: Team Better Block and AARP

While these planning techniques are presented individually, entities often combine one or more methods in a series as they work towards plans, policies, projects, or other products. For example, a transportation agency might begin with exploratory scenario planning that allows stakeholders to assess the interplay of overlapping technologies. From there, through a strategic-planning process, the group can analyze potential impacts and identify priority actions. If new ideas require testing and finetuning, the group can create a 12-month roadmap of demonstration projects to test and refine ideas prior to making significant investments.

WGI'S EXAMPLES

GRAND RAPIDS COMMUNITY COLLEGE MASTER PLAN: A PIVOT TO INCLUDE COVID SCENARIOS

For the Grand Rapids Community College (GRCC), WGI was working toward policy and infrastructure recommendations just as COVID-19 hit the United States. To help GRCC deal with the uncertainty as its planning processes continued, WGI developed scenarios related to COVID-19 and how current and potential students, staff, GRCC, and the region might respond to the pandemic's effects. For each scenario, WGI created multiple parking and peak hour vehicle-demand forecasts. These forecasts shaped mobility policies, allowing GRCC to respond to circumstances related to both transportation and mobility, as well as enrollment and revenue situations.

HIGHWOODS PRESERVE PARKWAY IN TAMPA: THE FUTURE-PROOF ROUNDABOUT

Roundabouts are a great tool for safe and resilient road design. Roundabouts reduce speeds and severe crashes, can be designed for bicyclists and pedestrians, require less maintenance, and still work even when storms knock out power. As part of an intersection redesign, WGI completed traffic and operational analysis by performing a SIDRA modeling analysis of existing traffic volumes to determine the optimal entry, circulatory, and exit lane configuration for the roundabout. WGI also stress-tested the roundabout to determine how much growth it could accommodate. The range of volumes that the multi-modal traffic roundabout design provided the City with additional assurance that the road would perform well under a variety of growth scenarios. Design recommendations took the conceptual design that was hostile to pedestrians and bicyclists to a protected, safe design with the final plans.

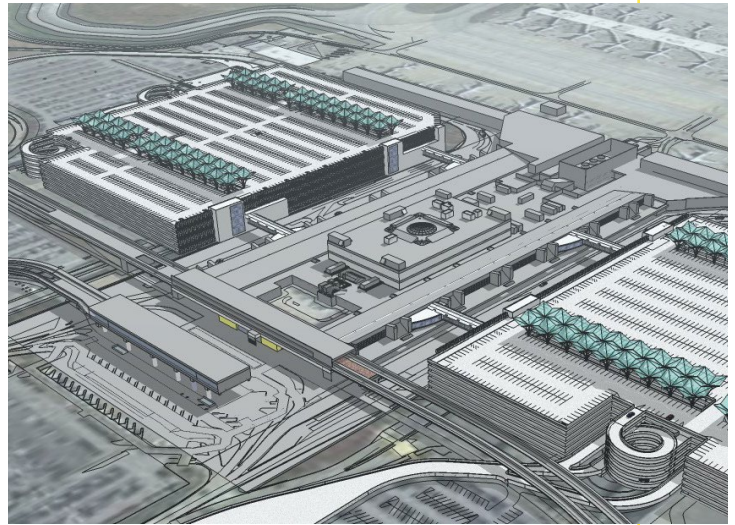


WGI conducted several traffic-volume scenarios for multiple modes to create one design that meets any one of several futures. Photo credit: City of Tampa.

HARTSFIELD-JACKSON ATLANTA INTERNATIONAL AIRPORT

MASTER PLAN: DESIGN FOR CHANGING TRENDS

Master planning at airports typically involves forecasting enplanements and the consequent expectations for on-site and off-site parking demand, pedestrian traffic, etc. Our modeling for Hartsfield-Jackson Atlanta International Airport's master plan considered short-, medium-, and long-term projections for public-parking demand and the subsequent size of the on-site parking structures. The master plan ultimately advocated replacement of the aging existing structures in phases over a five-year period. The plan proposed two new eight-level facilities, each with an option to add a ninth floor for a potential increase in the project enplanement growth rate. More recently, as the projected parking demand at HJIA was revised downward based on the growing popularity of ridesharing, we assessed various scenarios for accommodating rideshare vehicles and reduced public parking. Post-COVID, the trends have changed, so it is time to reassess again.



Other examples of scenario planning for adaptive parking projects include:

- **Private Sector and Campus:** Parking-demand forecasting, allocation, and phasing based on current and anticipated future construction for hospitals (Duke Raleigh Hospital, Atrium Health Pineville) and universities (North Carolina Agricultural and Technical State University, Colorado College)
- **Public Sector:** Parking demand forecasting based on development patterns and travel mode split for municipalities (Lake Worth, FL) and universities (University of South Florida)

GETTING STARTED

BEGIN WITH THE “WHY”

Making the switch to new planning methods requires explaining the “why” for deviating from standard process in favor of scenario planning. As mentioned above, the most compelling reason is traditional planning is poorly equipped to handle the wide array of disruptive trends that communities and organizations face. Yet, moving away from “tried-and-true” processes can be difficult. Here are several other reasons to champion scenario and other next-generation planning processes in your organization:

- **City or County Planning Offices:** Organizations like the American Society of Civil Engineers, American Planning Association, and the Federal Highway Administration are promoting scenario planning as a critical component of transportation and land-use planning.
- **Metropolitan and Regional Planning Organizations (MPOs):** MPOs need to examine not one, but a variety of transportation and smart-city technologies for near-, medium-, and long-range plans. Using technology foresight methods, the organization can chart and track the market adoption and maturation of several technologies at once.
- **Interdepartmental or Intergovernmental Workgroups:** Scenario planning can help align the interests of multiple agencies or departments, meeting the shared challenge of increasing regulatory and legal requirements related to climate change.
- **Real Estate Developers:** In addition to local market drivers, real estate developers, investors, and funders need to contend with the potential impacts of mega-trends, such as how automated vehicles might impact parking demand.
- **Civil Engineers:** Engineers already factor many climate impacts into roadway and bridge design. Engineers can also work with technology companies to explore whether there are design factors related to connected vehicles and truck platooning in roadway and bridge design.

The common threads among these examples are addressing (1) the challenges of multiple change drivers, (2) the opportunity to develop “robust” plans that perform well under a variety of plausible futures, (3) designs that can flex to meet changing conditions over time, and (4) the necessary, but difficult, shift from conventional standards used in adaptable design.



STAKEHOLDERS

While every scenario-planning process varies, the one constant is including affected stakeholders and experts. Briefly, the best way to describe the stakeholder-identification process is through four main groups:

- Groups that are most impacted by the change driver now and/or by future inaction
- Groups that are potentially impacted by taking action
- Groups that are responsible for implementation
- Experts with special insight into change drivers, levers, and funding

Where political risks are high, an organization may first want to use exploratory scenario planning with a smaller group. A smaller group exercise may also be needed to identify the full range of impacted groups and experts.

GOALS

While scenario planning is typically associated with getting in front of future impacts, planning managers should also compile lists of existing goals, challenges, and initiatives underway. This adds value to the scenario-planning process in several ways. First, any process should illuminate timeless goals for sustainability, community, and the local economy. Second, stakeholders may feel the process focuses on the future at the expense of addressing current, long-standing problems. When building a list of action items, solutions that meet both current and future challenges offer the community extended “bang for the buck.”

START AT THE END

USES AND THE PRODUCT

Your scenario-planning process should work towards an end goal, or product creation such as a plan or project blueprint. If there is not a product per se, the team should list desired outcomes. There are generally four end uses:

- 1. The Process Is The “Product”:**
In this case, the main objective is bringing diverse stakeholders together to explore how trends impact the community. This exercise can reveal hidden impacts and build awareness.
- 2. A Tangible Product:**
The process builds towards a tangible plan, policy, or project design; the process may be a stand-alone effort or connected to other planning processes.
- 3. Clarifying New Plans and Products:**
An entity may seek an entirely new product or process. For example, the unexpected rise of COVID-19 calls for a new type of science- and data-based recovery planning to fit the vagaries of a novel virus. In this case, scenario planning acts as a discovery process for formulating unprecedented courses of action.
- 4. Stress-Test Existing Plans And Policies:**
An entity or organization uses scenario planning to detect gaps in on-going plans, policies, and projects.

BEGIN PLANNING WITH TRENDS AND CHANGE DRIVERS

The first step in scenario and other planning approaches that help communities explore trends is identifying the change drivers (also referred to as forces of change). They can be large scale such as climate and technology, or at a local scale to test, for example, what would happen if a large employer ceases operation. Planners often categorize trends

through a STEEP analysis (Social and Demographic, Technology, Economic, Environment and Energy, and Policy and Government).

Once stakeholders and experts brainstorm a large list of drivers, the next step is identifying the most impactful trends and/or technologies to further investigate.



IMPACTS AND SCENARIOS

This step evaluates the impacts associated with a trend or change driver. The evaluation examines whether the impact will be:

- Positive, negative, neutral, or “it depends”
- High, medium, low, zero impact
- Possible, plausible, certain

Planners often develop scenarios based on high-low combinations of two variables (or more with the use of composite measures). This simplifies analysis and allows for consideration of four futures. The Atlanta Regional Commission (ARC) used a four-futures approach in 2016, though it considered nine variables (instead of just two). With each scenario (Full Steam Ahead, Fierce Headwinds, Technology Reigns, and Green Growth), ARC created stories around various futures related to technology, climate change, the economy, water supply, and demographics. As a regional agency, it used the results to model housing, jobs, and transportation investments.

At this point, an organization may want to quantify impacts through use of scenario-planning software and sketch models. For predictive scenarios, the process will be focused on timelines, phases, tipping points (which describe when to move from one phase to the next or when to change course), and strategies for transition. For example, an agency may chart the stages for an autonomous shuttle pilot based on performance metrics for safety, ridership, and customer satisfaction. Upon meeting goals, the shuttle operator can graduate from an expanded pilot phase to full service.

MANAGING IMPACTS

USING LEVERS

For the various impacts, planning participants should also develop lists of levers — any actions that can be used to (1) facilitate positive impacts or (2) mitigate potentially negative impacts. Levers can be regulations, funding, incentives, or other available measures.

Examples of levers include:

- **Regulations:** Zoning codes, infrastructure design standards
- **Incentives:** Financial incentives, fee waivers
- **Processes:** Accelerated use permits, expedited review
- **Training:** Job training, internships, online modules

At this point, planners may need to conduct additional modeling, assessing the effectiveness of the various levers. Quantification can help with the next step, setting priorities.

SETTING PRIORITIES

With a full list of impacts and levers, organizations likely need a framework to focus resources on the most pressing needs or important goals. According to the *Harvard Business Review*, the three main variables for priority setting are the ability to meet key goals and objectives, available resources, and timing. While each process differs, priorities and ranking factors can be grouped that show a priority for:

- Conducting more research to fill information gaps
- Solutions supported by a wide range of affected stakeholders
- Listing action items that address both current needs and potential future impacts
- Aligning existing planning processes, budgets, and reporting
- Using the scenario-planning results to attract investment or grants
- Developing near-term roadmaps (one to two years) in parallel with longer-range plan requirements
- Establishing performance and tracking metrics that signal tipping points or add clarity where a scenario moves from “possible” to “plausible”

IMPLEMENTATION

This final step details implementation stages for the identified approaches and solutions. Here are several common-use cases.

Cities and Counties:

Scenario-planning results are factored into overarching plans such as Comprehensive Plans. Scenario planning can influence several chapters: Future Land-Use Map (presentation of several growth scenarios), Transportation (preparing for mobility technology), Sustainability (goals, objectives, and policies supporting resilient design), and Water (key climate stressors with mitigation and adaptation policies).

Departments of Transportation:

The results of scenario planning and technology foresight can be integrated into Long-Range Transportation Plans (strategies for multiple time horizons), roadway design (flexible rights-of-way for various automated-vehicle types), Transportation Improvement Programs (new priorities), freight plans (e-commerce), and local projects (quick build for Vision Zero improvements).

Mixed-Use Development:

Prior to creating a site plan, developers and construction managers can reduce risk by exploring alternative futures (and thus demand). This can include design that accommodates multiple trends, adaptable parking, contingency plans, and strategic phasing.

FUTURE-PROOFING PROJECTS

With scenario strategies in hand, organizations and entities can future proof a project's design. Contact WGI to learn more about scenario planning and how it can apply to your portfolio of work.

SERVICES

WGI offers workshops as well as integrated scenario planning including:

- Half- and Full-Day Workshops
- Demonstration Projects and Quick Build
- Transportation and Mobility Plans
- Comprehensive Plans
- Smart City
- Transit-Oriented Development

We can apply scenario planning and foresight to assist project design:

- Parking Structures and FlexPark™
- Complete Streets+
- Mixed-Use Development and Master-Planned Communities
- E-commerce-related structures and mobility plans
- Master Plans and Parking Operation Enhancements

LET'S TALK.

Contact Lisa Nisenson, VP for New Mobility and Connected Communities, for more information or for a 15-minute consultation on how to apply to your projects.



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