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OPENING ACCESS TO SCENARIO PLANNING TOOLS

By Jim Holway, FAICP, Ph.D.

In the face of increasing complexity and uncertainty, planners, public officials, and community residents need new tools to anticipate and shape the future. We have been working with an informal network of scenario planning tool developers and users, The Open Planning Tools Group, to identify mechanisms for expanding access to and use of these tools. We believe scenario planning and access to scenario planning tools can help communities and regions prepare for the future through a variety of visioning, land use, transportation, and other planning efforts.

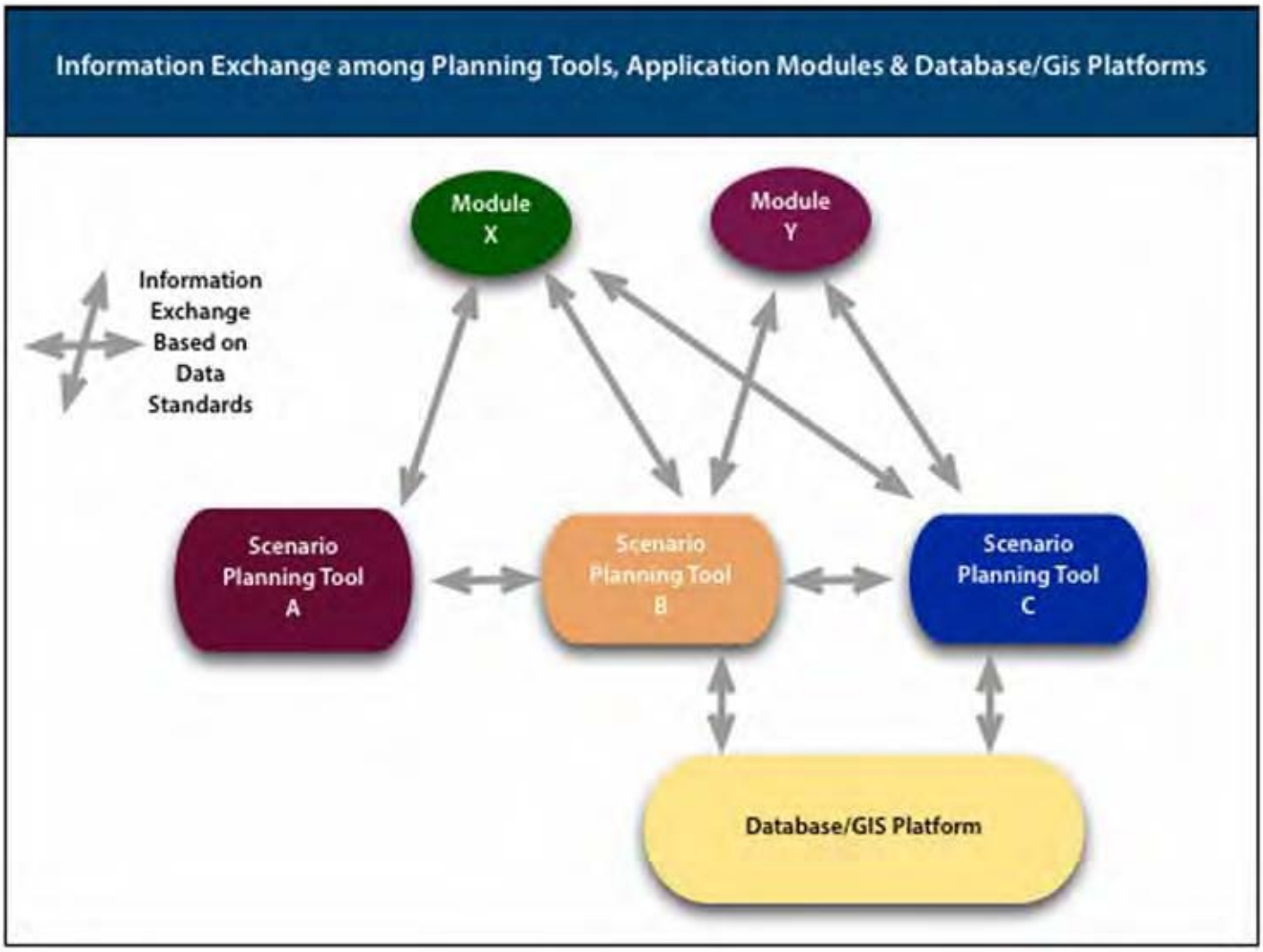
Decisions about the future are often controversial due to competing economic interests, different cultural values, and divergent views about property rights and the role of government. Broader and more effective civic engagement is needed to ensure community support for decisions about development and other land-related policies and public investments.

Over the last 40 years, regional agencies have used sophisticated land use models, such as UrbanSim, PECAS, MEPLAN, What If?, TRANSIMS, SLEUTH, UPLAN, and DRAM/EMPAL, to forecast future land use as part of their infrastructure planning. These models utilize stochastic, gravity, input/output, allocation, cellular automation, or agent based algorithms to forecast where and when growth will occur based on economic and land use policy assumptions. The scenario planning tools discussed here are not intended to replace these models; rather they can be used with these models to provide a rich assessment of how forecasted futures fit with a community's sustainability goals. As we move to an anticipatory planning paradigm these models can be used to create a range of futures with scenario planning tools used to understand their implications. The traditional predict and-plan paradigm is inadequate to address all of these challenges. We need to move toward developing and implementing planning tools and processes that foster anticipation and adaptation.

Scenario planning is a promising method to help communities respond to ... challenges ... whether for regional visioning, comprehensive planning, or project site planning.

Scenario planning is a promising method to help communities respond to these challenges. It deals with a range of potential futures, whether for regional visioning, comprehensive planning, or project site planning, and provides decision makers, experts, and the public better and more comprehensible information on what these futures might mean for their communities. However, despite their potential, scenario planning tools have not been employed widely for a number of reasons. Three concepts are considered to be critical to the scenario planning and tool-building process: collaboration, capacity building, and creation of an open environment for engagement. Collaborative problem solving facilitates resolution of interrelated issues that cannot be resolved by one organization alone. Capacity building is needed to enable individuals and organizations to apply scenario planning methods and tools effectively to their specific planning concerns. An open environment for information sharing and education will help accelerate the use and improvement of scenario planning tools in multiple settings.

The Lincoln Institute of Land Policy and Sonoran Institute, with our other Open Planning Tools Group partners, have convened a community of software developers, planners, and other tool users concerned with the advancement of scenario planning. Participants in our November 2011(2nd annual) OPT group workshop in Salt Lake City concluded that future efforts should focus on five key opportunities: increasing understanding and acceptance of scenario planning; overcoming the complexity and cost of tools; improving access to existing data; enhancing interoperability among different tools; and creating mechanisms to integrate foresight and anticipation into planning processes and implementation. The emergence of new and improved scenario planning tools over the last 10 years offers promise that the use of scenario planning can increase and that the goal of providing open access to the full potential of scenario planning tools is within reach. We produced a L*incoln Institute Policy Focus Report: Opening Access to Scenario Planning Tools* in early 2012 that recommended seven immediate actions to facilitate this goal. The OPT group achieved the first recommendation by launching a new website, <www.Scenari-



oPlanningTools.org> to serve as the online host for this initiative. The other 6 recommendations are:

1. Develop a curriculum on scenario planning for the next generation of professional and citizen planners.
2. Establish a model process for conducting scenario planning and show how it can be used with existing community planning processes.
3. Illustrate different uses of scenario planning tools in various stages of the planning process to facilitate increased use of scenario planning.
4. Establish data standards to improve information sharing, starting with development and place types for land use patterns.
5. Initiate a model collaborative project to demonstrate the potential for integrated tools, models, and modules.
6. Advance new concepts of anticipatory governance by using foresight and anticipation to address uncertainty and future challenges.

At the November 2012 (3rd Annual) OPT group workshop recently concluded in Portland, Oregon, we developed workplans and new partnerships to advance progress on these and related efforts.

Brief History of the Open Planning Tools Group

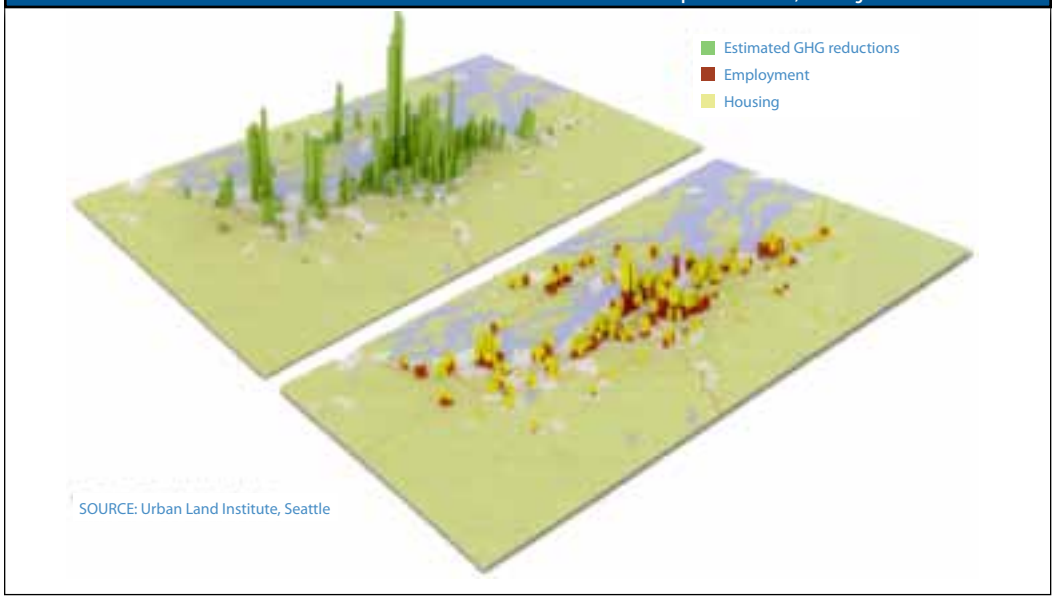
Western Lands and Communities, a joint venture of the Lincoln Institute of Land Policy and the Sonoran Institute, held a workshop in February of 2010 in Phoenix to consider several planning support systems and how to best target our future investments in this area. A principal conclusion of this workshop was a call for building a coalition to partner on advancing these tools in an open source environment.

Western Lands and Communities partnered with U.S. EPA to sponsor a convening in November 2010 in Denver to bring together interested tool developers, users, potential funders and universities to confirm whether there was sufficient interest and resources to partner on open source tool development and to determine how we should proceed. As a result of the Denver meetings an informal group, which has evolved to be known as the Open Planning Tools Group, continued meeting via monthly conference calls and informal gatherings at related conferences to advance these efforts. As additional tool users and developers have joined the growing network the focus has evolved from targeting the development of "open source" tools to working with both open source and proprietary products in an effort to expand access to and use of such tools in an environment encouraging interoperability and openness to application innovation in general. To connect with these efforts visit www.ScenarioPlanningTools.org, click on "join our community" and sign up for the OPT group.

What Are Open Planning Tools

Our focus has evolved from initially focusing on development of products with "open source" code to working with open source and proprietary products that are seeking to create an environment which facilitates integration of all such tools and the sharing of data and application modules across various software platforms. People are the most important aspect of this effort because the intellectual capital of programmers, coders, tinkerers, designers, and users provides the resources required to build software collaboratively. In addition, legal frameworks in the form of special open source licenses allow participants to clearly understand the use of intellectual contributions and provide rules that guard against unfair use or misuse. A technical

Estimation of Greenhouse Gas Reduction Based on Alternative Land Use Options in Seattle, Washington



background is not necessary to be an open source contributor. In fact, feedback and requests from non-technical users provide important guidance to improve tools and enhance the user experience.

Open source thinking does not eliminate the need for proprietary systems, nor does it discourage innovation or devalue proprietary tools; rather it helps to improve them. Proprietary systems can decide to participate in and benefit from an environment of collaboration, particularly through the adoption of consistent data input and output standards and improved interoperability among different software tools. Additionally, open source efforts can significantly increase the points of interaction with tools for new users and developers, thus benefiting both open source and proprietary systems. Software provided at no cost under an open source license need not eliminate financial benefits from supporting, enhancing, and distributing such software. Open source approaches can actually generate economic value through service models that allow tool developers and consultants to charge for value added around open source software, as well as increase returns to proprietary products through the secondary effects of increasing the number and diversity of users.

> Three concepts are considered to be critical to the scenario planning and tool-building process: collaboration, capacity building, and creation of an open environment for engagement.

More broadly, open source approaches and thinking help participants succeed in an environment that promotes further adoption of scenario planning practice and enlarges the role for open source and proprietary tools. Experience indicates that an open source approach to tool interoperability and access to data can increase the relevance, adoption, and usability of all scenario planning tools, as well as knowledge about the strengths and appropriate market niches of the different tools.

About the Author

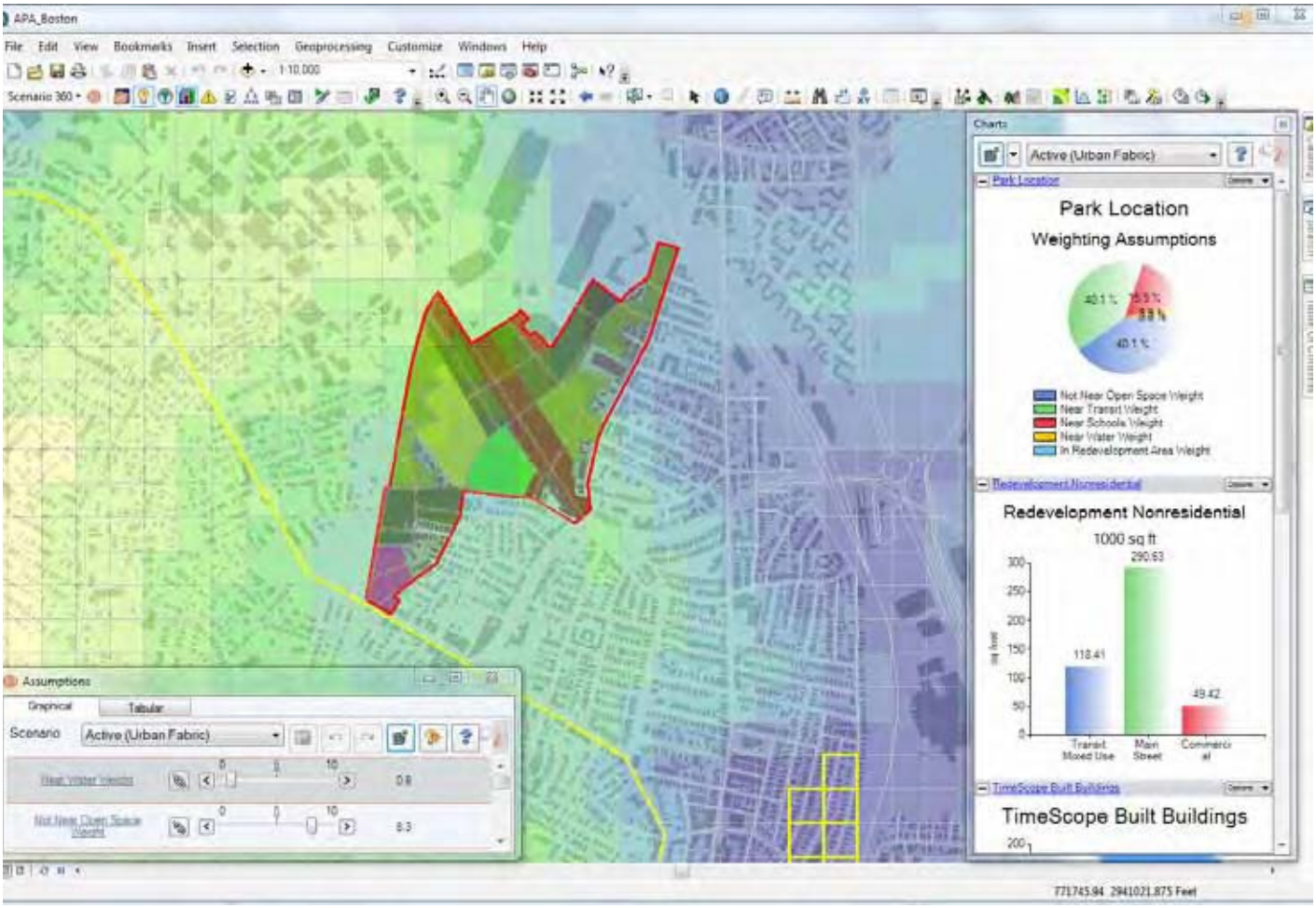
Jim Holway, FAICP, Ph.D. of the Sonoran Institute is co-author of **Opening Access to Scenario Planning Tools** with CJ Gabbe, Frank Hebbert, Jason Lally, Robert Matthews, and Ray Quay who also contributed to this article. The OPT group also received technical assistance and website launching efforts from PlaceMatters and OpenPlans withthe funding and organizational assistance of the Lincoln Institute of Land Policy especially Peter Pollock.

Community Planning Association of Southwest Idaho

CommunityViz: Planning on Your Feet

By Doug Walker

The people at Meridian Table 7 were on their feet. Their chairs were pushed roughly back and they were standing in a tight bunch around their table, leaning in to pore over the glowing map on their table, gesturing, talking, and, well… planning.



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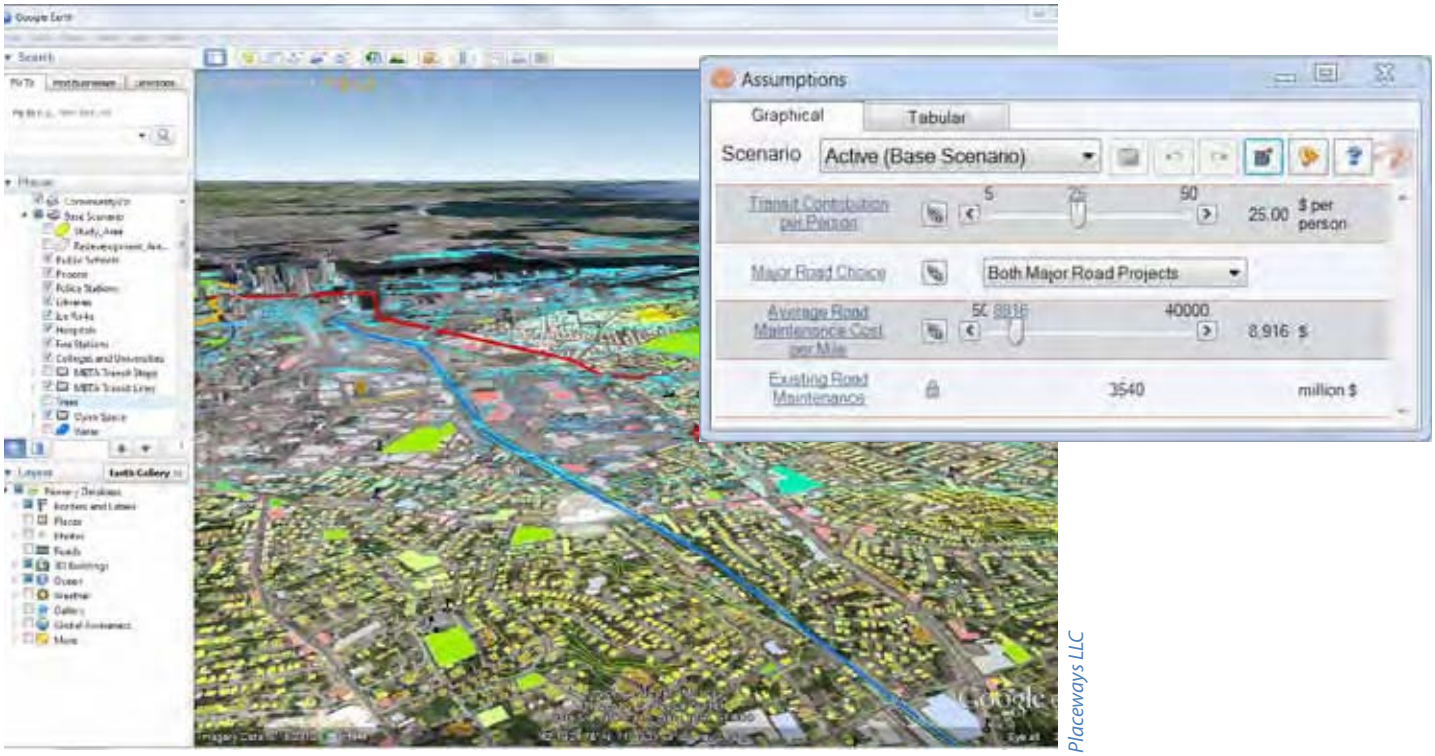
A Tool for People

As I looked around the workshop room I saw similar scenes playing out at 8 other tables as well; we had more than 50 participants that day and there had been similar numbers the past two days in other locations. These were citizens of southwestern Idaho, there to help design scenarios for the regional long-range transportation plan called Communities in Motion 2040, being developed by the Community Planning Association of Southwest Idaho (COMPASS), the area's MPO.

What triggered my mental camera shutter for the scene playing out at Meridian Table 7 was my own happy, visceral sensation that this was public involvement the way it's supposed to be: engaging, collaborative, and, by golly, on-your-feet. That's one of the goals we strive toward in making CommunityViz®, the planning software that was glowing on the center of the table that day. We take to heart the adage that planning is both a technical and a political process—political in the sense of involving the body politic: people.

In designing CommunityViz, we try to provide planning tools that make sense to people. There are maps, of course, which most people understand. But not quite everyone speaks "map," and different people have different ways of absorbing information. So to the maps we add just about every visualization and communication medium we can think of: real-time 3D visualizations; dynamic charts and neat tables; links that play audio and video clips when something happens; as many detailed reports as even the greenest eyeshade could desire.

More fundamentally, we design for interaction. We want users, like those folks at Meridian Table 7, to have a conversation with the plans and models they are contemplating. They draw on the maps and in return get rich information about what their sketch might imply—impact indica-



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tors displayed in interactive charts; features on the map changing colors to reflect new data, targets being met, and more. We use a lot of slider-bar controls for variable inputs, partly to make adjustments easy but also to encourage people to give them a try. How much total transit funding would $X per capita yield? What will happen if this particular transportation project goes in? Users who start asking questions like that, and then get answers back right away as the CommunityViz "dynamic analysis engine" does its thing, are naturally more engaged than they would be with a static paper map or a planner's lecture. They transform from passive listeners to active participants in the planning process. They start to understand issues and trade-offs more fully and completely. Curiosity goes up; skepticism goes down; imagination starts to work. Chairs start pushing back.

A Tool for Scenario Building

Meridian Table 7 was creating scenarios using the "place type" approach, in which you paint the map using a palette of representative neighbor-

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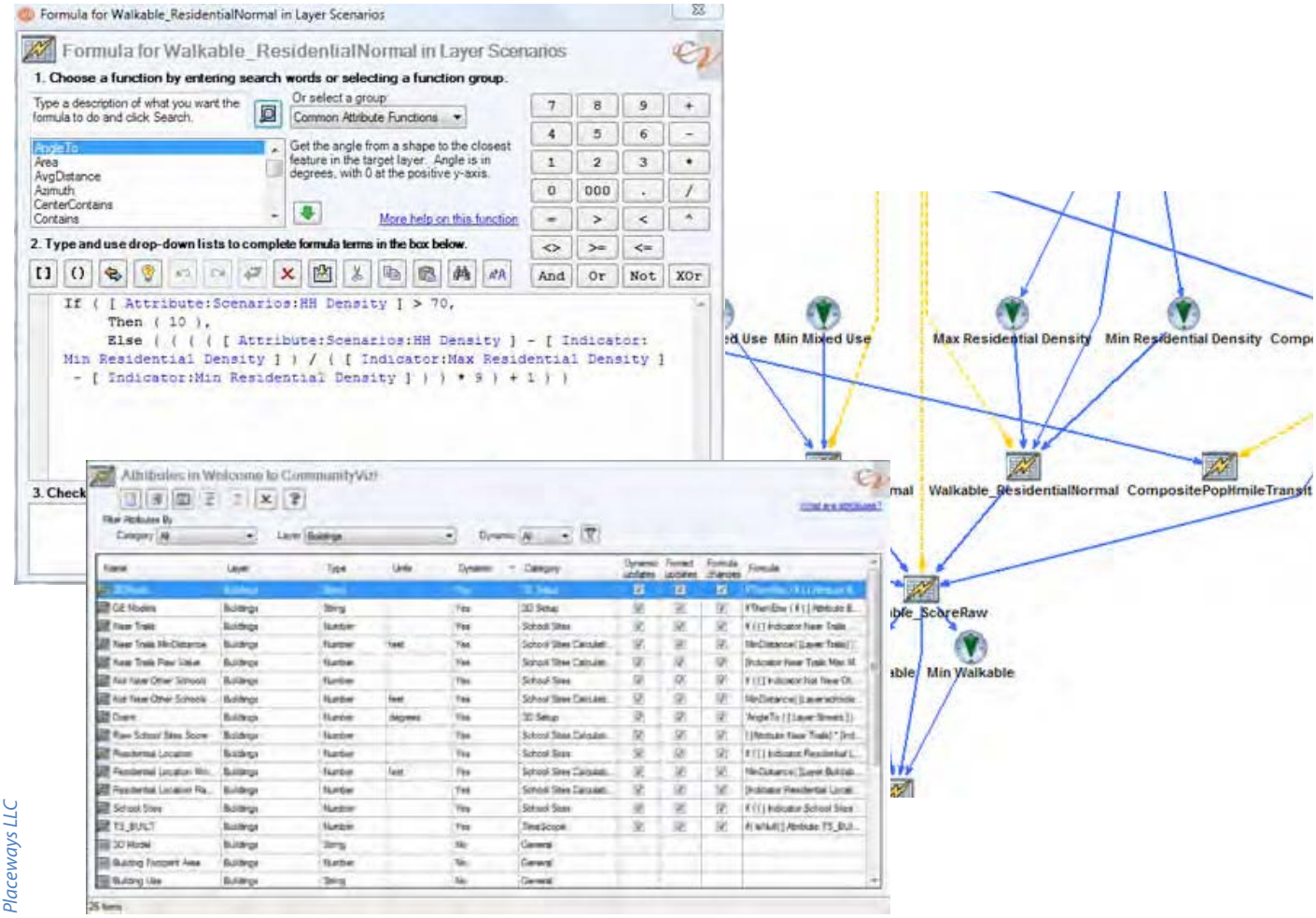

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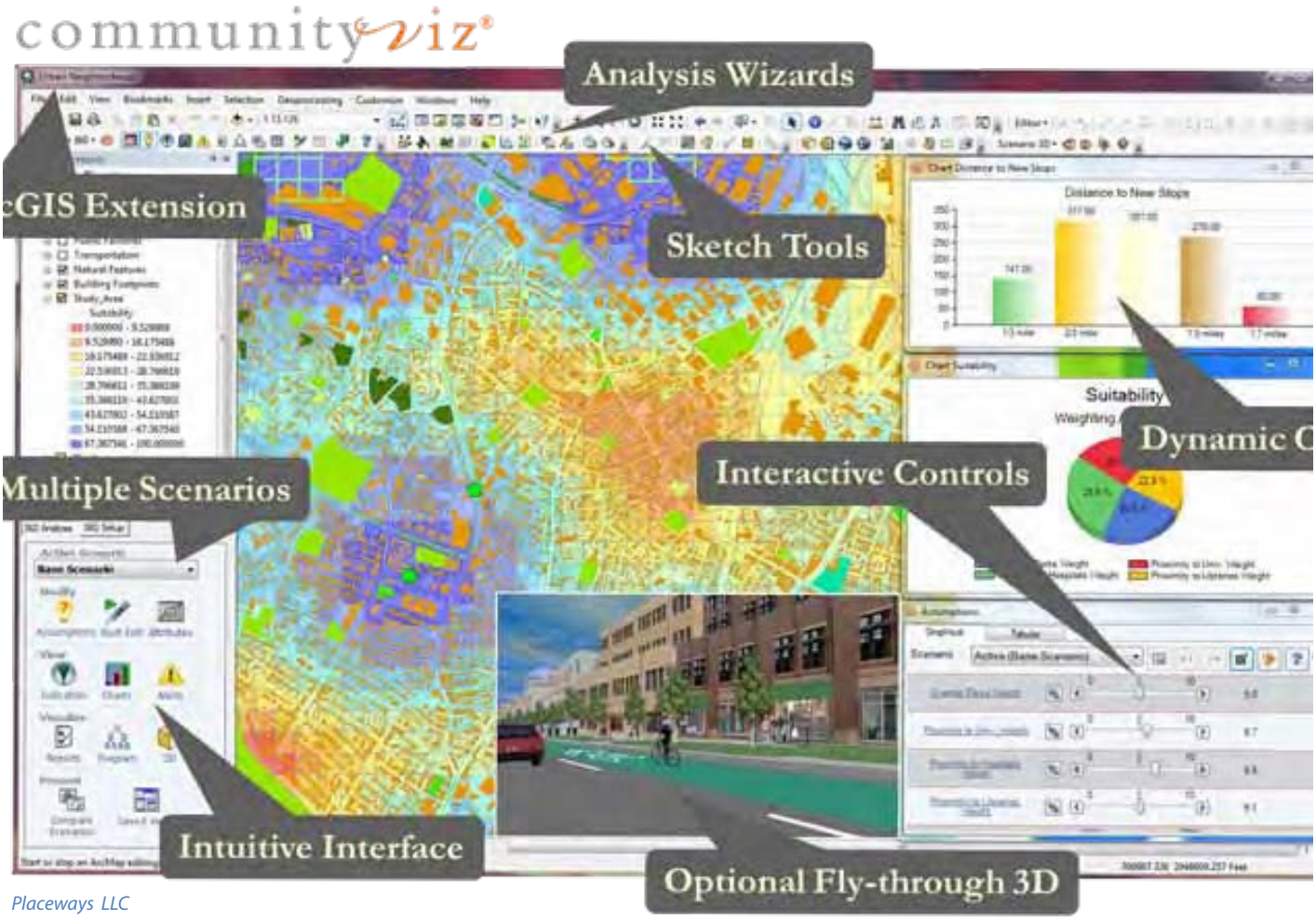
hood types. CommunityViz supports that method and many others. For a finer control, for example, you can place specific numbers of jobs and housing units. Some regions do their whole plan on a spreadsheet and then apply it to the map to see what happens (CommunityViz has features that help automate this). Others use conventional feature sketching or low-tech/high-tech hybrid combinations of paper and computer together.

You can also take a very different approach to building scenarios: computerized growth allocation. The CommunityViz Allocator helps simulate patterns of growth over time based on the interplay of capacity and demand. Together with its related tools (Build-Out, Suitability, and others) it helps identify where growth is likely to occur, and where and when demands on public services and infrastructure will arise.

Working with the scenarios you build is part of the CommunityViz DNA: its two main components are even called Scenario 360 and Scenario 3D. Side-by-side maps, charts, and tables help people tease out the trade-offs and benefits each scenario implies.

A Tool for Modelers

A few months before the Meridian workshop, I had been at a conference where scenario planning tools were being discussed. "This isn't kindergarten!" thundered a planning consultant during his presentation. "You aren't going to plan the fate of 5 million people with Crayolas and a coloring book." I had the uncomfortable feeling he was thundering at me—the CommunityViz guy in the audience—or perhaps other practitioners of what Uri Avin calls "lightweight sketch planning tools." If only the thundering one had known that I and the rest of the CommunityViz team completely agree. We are of the Teddy Roosevelt School of planning tool design, speaking softly with an interface full of friend-



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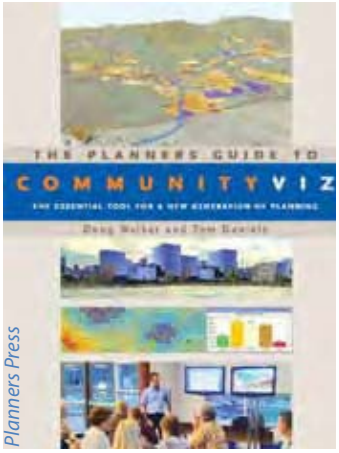
ly icons and easy controls, while carrying quite a large stick of sophisticated modeling tools within.

If you need to (and whether you need to or not is a subject for another paper), CommunityViz can go really deep. Internally, the software packs a kind of super geospatial spreadsheet: an analysis-creation framework that lets you write formulas and models using over 80 analysis functions—not just numeric ones like those in Excel, but also spatial, topological, statistical, text, and others. The formulas automatically update their results when anything in your scenario plan changes—input assumptions, map sketches, data layers—and they work for practically anything a planner cares about and a GIS analyst can write a model for. In Meridian, for example, participants had easy access to about 50 real-time indicators of performance and impact related to the plans they were suggesting. That's how one table realized they were creating a Boise-sized city in a rural area, and another discovered they would never have the budget needed to serve the transit they envisioned. During post-workshop analysis, we used another 100 indicators and related calculations to learn even more about every aspect of each scenario's implications.

CommunityViz models are completely open, transparent, and exposed for anyone to look at, edit, localize, reuse, and share. Also, it's built to use others' models in addition to sharing its own. This is one of the reasons we are part of the Open Source Planning Tools consortium, where we are trying to encourage more modelers to share their work openly with a growing ecosystem of scenario planning practitioners.

When even a 'super geospatial spreadsheet' isn't enough, CommunityViz connects efficiently and bi-directionally with external models of all sorts: ordinary spreadsheets including detailed fiscal impact models, databases, scripts, and other GIS modeling tools. The most common connection



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is to travel demand models, but we've also seen regional planners using CommunityViz as a framework for organizing modeling data on topics like natural hazards risk management, biodiversity impacts, and nonpoint source pollution. We like the "framework" approach because it makes sense: one tool can't and shouldn't try to do everything, and specialized topics need specialized models. Similarly, going deep on something like growth forecasting calls for a heavyweight application like UrbanSim. But used at its best, CommunityViz takes advantage of advanced science and sophisticated quantitative models, and then presents their results in a clear, visual way that is meaningful to regular people.

A Tool for Many Applications

Regional sketch planning like the kind the folks at Meridian Table 7 were doing isn't the only thing regional planners do, and the same goes for CommunityViz. What the package tries to offer is a planner's tool belt of accessible, people-friendly tools for almost every stage of the comprehensive planning process. CommunityViz includes built-in, easy-to-use wizards for setting up common planning applications like build-out, growth allocation, suitability analysis, and others too numerous to cover here. Sometimes planners use these tools as accessories to strengthen their long-range plans (a careful build-out analysis, for example, is very helpful for informed land-use sketching), but at least as often they are used for stand-alone studies. And again, planners can use these tools at many levels ranging from quick-and-approximate to highly detailed.

The "Community" in the name still confuses some newcomers, who think communities have a limited size. In reality, the tool works perfectly well at any scale from site to region, limited only by desktop computing horsepower. Scaling up and down, from local jurisdiction to region and back, also works.

The Story of CommunityViz

In the late 1990s, two Vermonters named Lyman Orton and Noel Fritzinger had the audacious idea that a visually oriented, game-like computer program could make the public planning process more inclusive, transparent, and informed. Working through the philanthropic Orton Family Foundation, they recruited the ingenious software designer Brenda Faber, along with many other innovators, to build the first version of CommunityViz. It caught on, and the project spun off into its own dual-bottom-line company (a for-profit with a mission), Placeways, in 2005. Today there are thousands of licensees in all 50 states and in 40 countries around the world. For less than $1000 users get commercial-quality software, technical support, and periodic upgrades to new versions and improvements. CommunityViz works as an add-on to Esri's ArcGIS® geographic information systems software.

User Community and Resources

We encourage anyone and everyone to buy and use CommunityViz, and it is used by regional planning agencies, governments at all scales, private planning firms, NGOs, and many university planning programs. Placeways provides CommunityViz-based planning services, and many other consulting firms use the tool in their practice as well, but outside consultants are not required and many groups use it on their own.

APA publishes a book that is full of practical examples and case studies; it's called The Planners Guide to CommunityViz [Planners Press: 2011]. Placeways' website also has a rich set of learning materials, case studies, and the complete help system online.

Closing Thoughts

Like a good plan, CommunityViz is never really finished. We are constantly developing and redeveloping its features, adding new capabilities and improving existing ones. We are also excited to be part of an evolving ecosystem of planning tools and technology.

Our overarching goal for CommunityViz is to provide the best possible tool for informed, collaborative decision-making on plans large and small: informed by the best available science and modeling; collaborative in a way the information makes sense to people and people make sense to each other. And if we can do it then yes, we want people doing planning up out of their chairs and, by golly, on their feet.

About the Author

Doug Walker is the President and Principal of Placeways LLC. *The author wishes to thank Liisa Itkonen, Amy Luft, Carl Miller, and the planning staff at COMPASS for their contributions to this article and permission to feature their project.*

Better Data & Tool Interoperability on the Scenario Planning Horizon

By Thom York and Eliot Allen, LEED AP-ND
Criterion Planners

While regional scenario planning is enjoying a renaissance, the bane of these processes for many planners and modelers remains the assembly of data and its usability by multiple tools with different requirements. In its recent report Opening Access to Scenario Planning Tools, the Lincoln Institute of Land Policy identified major challenges to use of scenario planning tools, and chief among them is the acquisition and use of quality data, and the lack of interoperability across tools.*

*www.lincolninst.edu/pubs/2027_Opening-Access-to-Scenario-Planning-Tools

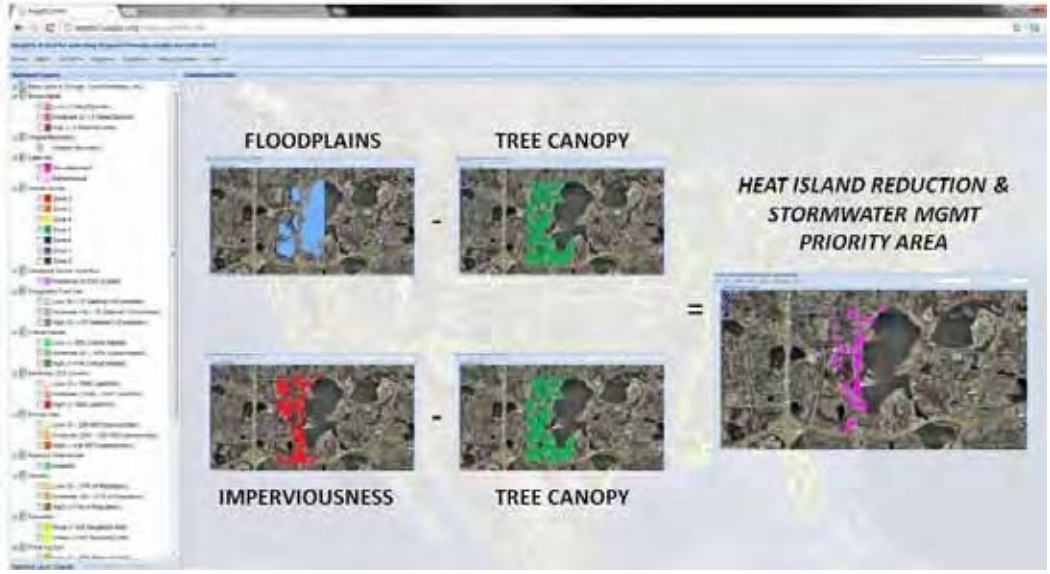

Figure 1. *In this illustrative example from Minneapolis, RegGIS users intersect data layers to define a priority area for LEED heat island reduction and stormwater measures.*

These barriers have limited the use of urban and regional modeling since personal computers and geographic information systems (GIS) were first introduced, and progress reducing them has been slow because of the large number of data generators, numerous competing tool providers, an absence of common data and modeling standards, and the lack of cooperative processes to formulate such standards. While these impediments remain formidable, progress in reducing them is accelerating, and new opportunities exist for interested practitioners to take part in several initiatives, including the following examples.

A re-energized conversation about common data & modeling standards

For years, practitioners have bemoaned their data and interoperability problems, and periodic attempts by APA, URISA, and others have pushed the rock a little farther up the hill, e.g. APA's Land Based Classification System. Beginning in 2010, a new group of tool providers and users convened to increase planning tool access and cooperation. Called the Open Source Planning Tool Group (Google Group: OSPT-Ecosystem), it has grown to several dozen participants that conduct regular calls and meetings to report on and encourage open access tool work, including data standards and tool interoperability. The group is notable for its diversity, including public, private, academic, and non-profit entities, creating a particularly favorable setting for developing consensus-based, cross-cutting standards. Additionally, www.scenarioplanningtools.org has been launched by the Lincoln and Sonoran Institutes to draw an even wider audience into the scenario tools conversation. With OSPT's leadership, and the support of others, the prospects for reaching some modest amount of first-ever standardization seems possible.

More accessible national data for local planning

Several federal and non-profit initiatives have recently changed the data landscape for regional and local planning, particularly web-served analytical tools that are pre-loaded with data at a relatively fine grain, e.g. Census block groups. HUD's Office of Sustainable Housing & Communities has become a leader in promoting tool-supported scenario planning with its regional and community grants, and the Department has also upgraded web access to key housing and community data used by localities (www.huduser.org).

EPA has made similar strides with its Smart Location Database (SLD) and Impervious Surface Growth Model (ISGM). The SLD characterizes the built environment by Census block groups using the "D" variables from transportation research to

estimate changes in travel behavior (https://edg.epa.gov/data/Public/OP/SLDv02_docs.zip). EPA's ISGM is pre-loaded with national density and accessibility data for Census block groups, which are used to estimate new impervious surface from proposed development based on density and location (https://edg.epa.gov/data/Public/OP/ISGM_beta.zip). At the Commerce Department, EDA has launched the Triple Bottom Line web tool that uses national data sets to characterize the impacts of local economic development projects. (http://www.pdx.edu/cupa/sites/www.pdx.edu.cupa/files/TBL%20Project%20Overview%201-12.pdf). And in a major step for data access, the Census Bureau released its first application program interface (API) that allows software developers to create tools that interface directly with Bureau databases (http://www.census.gov/developers/).

In the national non-profit sector, the U.S. Green Building Council has provided its seventy-nine regional chapters with RegGIS, an open source web version of Criterion Planner's INDEX software that functions as a "smart" data warehouse of environmental conditions tied to USGBC's LEED program for certifying green construction, such as prioritizing LEED stormwater measures in vulnerable watersheds (Figure 1). As with the federal web tools, RegGIS is pre-loaded with national datasets, making it immediately usable by chapter members, who can also upload their own local data to augment national information, and edit data layers to create custom delineations of 'issue footprints' that merit extra LEED attention in a region.

SPARC: A COMMON DATA SCHEMA FOR SCENARIO PLANNING

One of the biggest impediments to greater use of scenario tools in metropolitan areas is the absence of common data schemas that are accepted and used by agencies, tool modelers, and other planning process participants. As any modeler knows, undertaking a regional planning project in a typical U.S. metropolitan area can involve dozens of uncoordinated data sets with widely varying formats, documentation, and quality, adding significant technical burdens to plan making and public participation. A common data schema, if adopted and used by all stakeholders, can vastly improve process efficiency, accuracy, and timeliness.

To address this need, Criterion Planners recently released SPARC, a first-of-its-kind schema and data service designed specifically for regional scenario planning (Figure 2, www.sparcdata.com). Served from the cloud and accessible from any web browser, agencies can use SPARC to efficiently organize disparate local databases into uniform regional data sets ready to support multiple scenario planning tools and public processes (Figure 3). The schema normalizes local data into regional

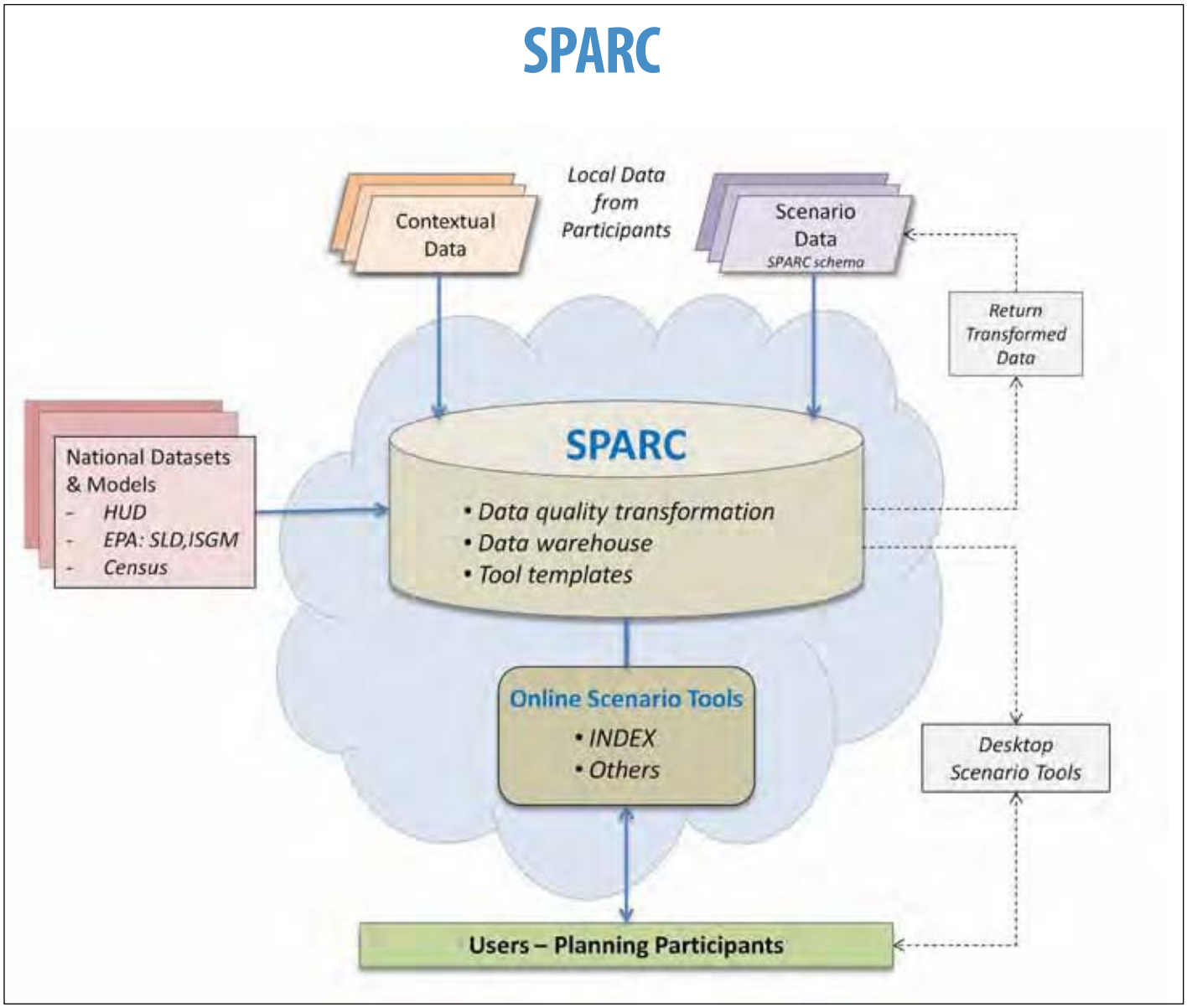

Figure 2. *SPARC is an open source, cloud-served data service that transforms multiple datasets into a uniform, high-quality database capable of supporting numerous scenario planning tools, either online or through desktop applications.*

groups of land-use, transportation, infrastructure, environment, policy focus areas, and 3D features. The schema is a set of open source scripts defining database storage objects and native-database triggers which perform the following functions:

- Transform uploaded raw GIS data into standardized form.
- Publish "query layer" view objects for each transformed standardized layer so desktop GIS applications (ArcMap, QGIS) can add them to a map as with any layer.
- Apply data quality checks and fixes to the incoming data.

For tool interoperability, SPARC provides templates that any scenario planning tool provider can use to express input data requirements and output results using the same data object taxonomy. These tool templates allow local planners to easily re-purpose one tool's data for another tool, cost-effectively expanding the set of tools that can be leveraged by planners in a process.

Developed under the sponsorship of the University of Texas School of Architecture, SPARC is supporting regional planning projects in Texas, Mississippi, and Florida, and has been shared with the OSPT Group for national review. Criterion is also available for questions or comments about the schema, and encourages suggestions for its improvement (eliot@crit.com).

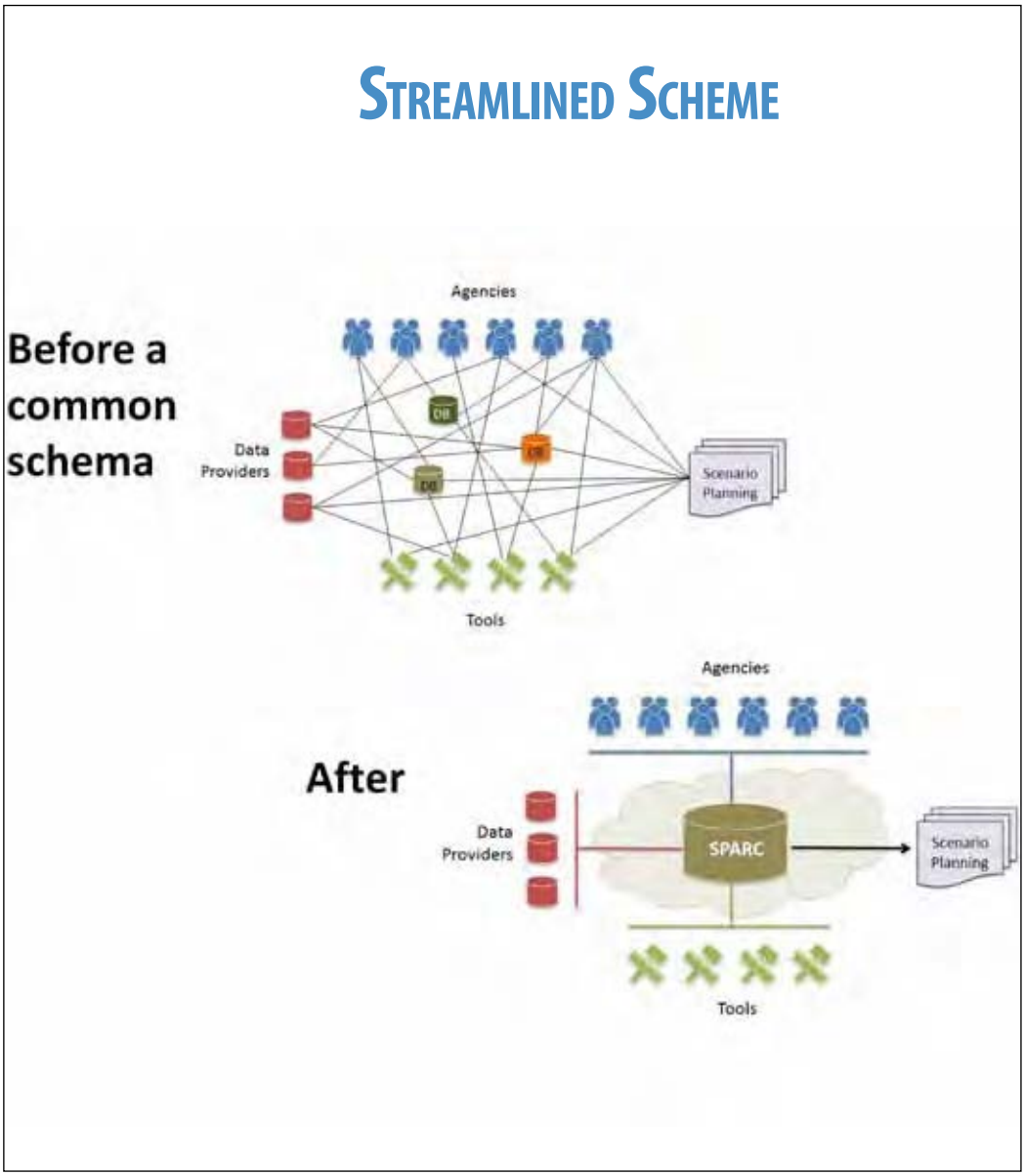

Figure 3. A common data schema is essential for efficient regional-scale scenario planning. The typical "before" condition illustrated here is untangled and streamlined "after" a common schema normalizes data and tool requirements.

Data Quality & Interoperability Wizard

While a common data schema is a huge step for scenario planning, data quality ultimately determines its usability across the multiple tools usually involved in a regional process. And just as there are many entities producing data in a typical metro area, there will be varying degrees of quality in their files that must be cleaned and fixed for regional use. SPARC makes this task easier by applying a data quality wizard containing a variety of checks and, in many cases, automatically improving the quality of uploaded data in the following ways:

- Geometry-Level Quality Assurance, where for example individual geometries are re-projected, unrealistically small geometries deleted, slivers removed.
- Intra-Layer Quality Assurance ensuring topological integrity between geometries in the same layer, for example detecting overlapping polygons and filling voids between polygons.
- Inter-Layer Quality Assurance ensuring relational integrity between geometries in different layers, for example ensuring a hierarchical nesting of boundary polygons from parcels through census blocks, TAZs, cities and counties.

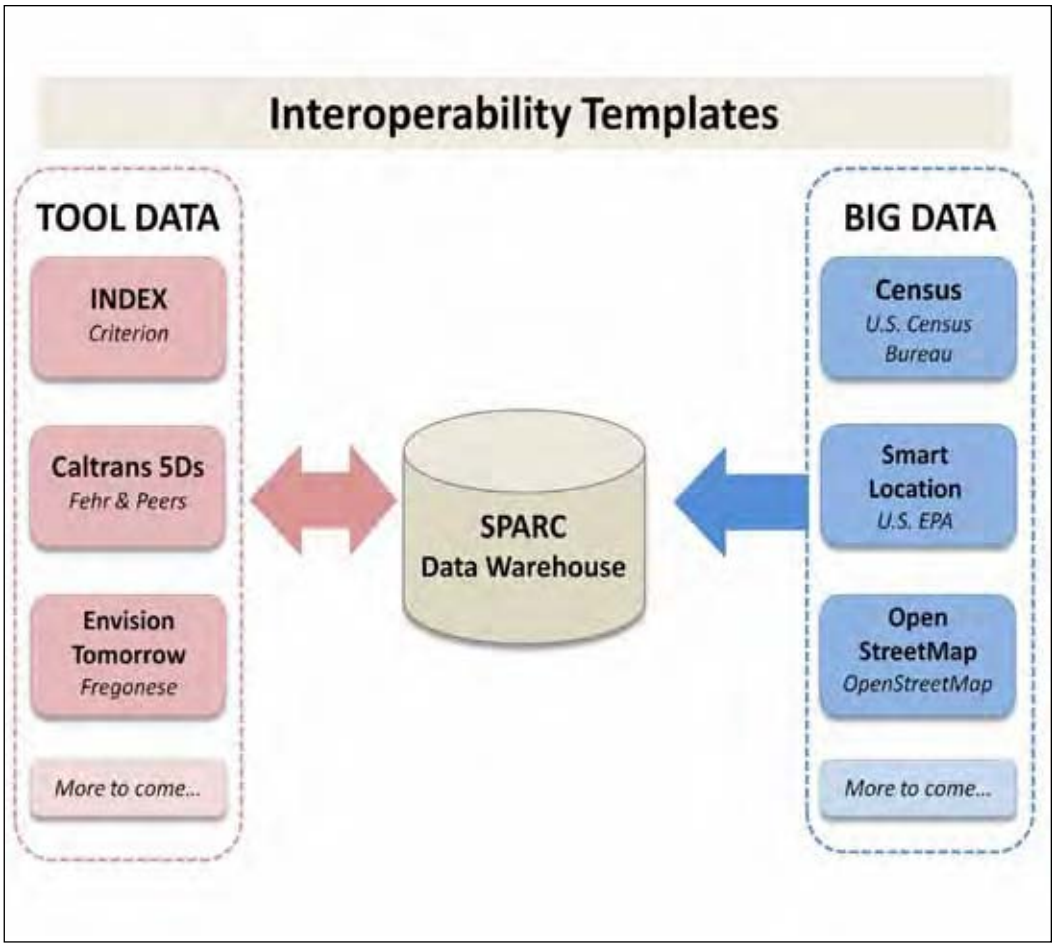

Figure 4. *To achieve interoperability, 'tool templates' use a common schema to specify required inputs. A local user's SPARC-transformed data is therefore immediately usable with any 'templated' tool.*

The data quality wizard acts as a gateway to SPARC's data warehouse and templated scenario tools. Using the wizard, participating jurisdictions in the Central Texas Sustainable Places project (http://www.capcog.org/divisions/regional-services/cats/) and S.E. Florida's Seven50 project (www.seven50.org) will be able to upload local GIS files for quality validation before using them in multiple scenario tools. SPARC's "tool agnostic" approach is what makes it a breakthrough for interoperability (Figure 4).

What's next?

Technology advances, open source software, social media, and creative modelers are all converging on scenario planning in ways that surely make it more accessible to a wider audience of participants; better linked to local issues and preferences; and more visually descriptive of choices and impacts. These trends are already producing exciting results in data initiatives, such as the regional MetroBoston DataCommons (http://metrobostondatacommon.org), and local crowd-sourcing of data for community decision-making (http://shareabouts.org).

Continued progress on these fronts will depend to a large degree on more of the data and interoperability advancements described here. In particular, momentum on critical items like data standards will depend on practitioners getting involved and working collaboratively to establish best practices. It isn't glamorous work, but it is essential to successfully institutionalizing metropolitan scenario planning. ❑

About the Authors

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Using Interactive DIY Tools for Planning and Decision Making

By Ken Snyder, CEO, PlaceMatters

One of the challenges as new technology emerges is finding a "User Friendly" interface that works with large groups and is intuitive enough that the technology does not get in the way of process or content. There has been on-going work on this challenge for some time but high costs and/or "one-off" solutions have prevented widespread use. PlaceMatters has been teaming with academics and tool providers tackling this interactive user interface challenge and has found an operable solution from mass-market gaming technology and a suite of interactive applications.

Figure 1: SketchUp rendering of DIY touchtable set-up

PlaceMatters has used these touchtables and screens in several projects, and will highlight here our work integrating the use of the touchtables with GIS and scenario planning tools as part of a pilot project on Cape Cod that examined the linkages between land use, transportation, and climate change.

The use of Wii remotes to create DIY "smart boards" was pioneered by Johnny Chung Lee (at the time, with Carnegie Mellon's Human-Computer Interaction Institute). Over time, these "smart boards" have evolved and incorporated various improvements. Teachers, in particular, have contributed to the development and refinement of these touch screens. PlaceMatters developed a touch screen, finding that reverse projection screens (our original screen was a shower curtain) to work best (visit walkshop.us for more information).

Although screens are useful, since PlaceMatters works regularly on scenario planning and other mapping exercises, we began experimenting with ways to use the Wii remotes with projectors shining directly down onto tables to create an easy mapping interface. In total, we made nine generations of the touchtable, experimenting with projector models, different stands and projector mounts, and different table surfaces.

Case Study: Touchtables for Cape Cod Scenario Planning

The U.S. Department of Transportation's Volpe National Transportation Systems Center (the Volpe Center) coordinated a number of key federal, state, regional and local partners including EPA, FWS, NOAA, the Cape Cod Commission, and Cape Cod town planners to participate in a model process for future climate change discussions using technical tools and scenarios.

PlaceMatters' task was to design a pilot stakeholder scenario planning process that attempted to address transportation related aspects of climate change factors as well as possible climate change adaptation approaches on Cape Cod. PlaceMatters worked closely with Placeways and the University of Colorado to develop a workshop interface using CommunityViz™ that allowed participants, using PlaceMatters' DIY touchtables, to digitally place jobs, housing, and transportation, and then see the performance of their scenario against several metrics in real time through easy to understand charts and other visual representations. The interactivity and ability to turn on and off map layers enabled a detailed conversation about the complex impacts of development patterns on greenhouse gas emissions, and potential climate change mitigation and adaptation strategies.

In addition to placing jobs and housing, participants could add new transit service areas with a variety of service frequencies. Participants could also change frequencies on existing stops using a paintbrush tool.

Lessons Learned from Using Touchtable on Cape Cod

Since the Cape Cod project was designed as a pilot project, the PlaceMatters team was asked to look critically at the workshop format, the scenario planning technology, and the use of touchtables and comment on lessons learned. Some of the lessons are summarized here, to facilitate improved use of DIY touchtables in future projects.

Figure 2: PlaceMattersd demonstrates DIY Tablet.

Lessons Learned

Workshop Prep

- Collect and deliver data as quickly as possible. Unfortunately, it is more often the rule than the exception for people to underestimate the gaps in the data, the condition of the data, and time it will take to deliver data to the service provider. The PlaceMatters team recommends at least three months for data preparation and the creation of a baseline scenario. A list of minimum data requirements and proxies should be provided to agencies with clear deadlines on when data will be delivered to the team responsible for developing the models and scenarios.
- Conduct a full dry run of the agenda/workshop days in advance to run through the exercises, address technology issues, and to revise the agenda as needed. In the case of Cape Cod, the team would have discovered in a dry run that the allocation of jobs and housing took too much time. Eliminating the smaller number chips from the menu so participants were forced to place larger allotments of jobs and housing on the map may have been one solution.
- Cape Cod has a unique situation where most of the existing population centers are in vulnerable areas. One of the most important strategies for decreasing VMT is to add density to existing town centers. It is nearly impossible, however to follow this strategy with out a direct tradeoff in the

Figure 3: Participants at the scenario planning workshop on Cape Cod add jobs and housing directly to the GIS map and instantly see changes in performance metrics

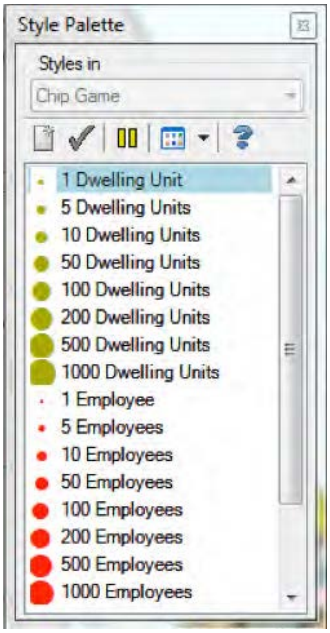


Figure 4: Palettes used in building scenarios

number of dwelling units placed in sensitive areas. Some participants questioned how appropriate this approach was for the Cape given the restrictions on growth, which in turn restricts some strategies and puts more emphasis on the need for technology improvements. This can be a learning opportunity for the participants.

Structure of the Workshops

- Some participants found the time pressure to place job and housing challenging.
- Participants emphasized a preference for hands-on work time, rather than presentations from the team.
- The organizers discussed the possibility of having two separate full day workshops to allow for data processing between the days. This might be a feasible option, but only when the number of people who could participate is not negatively affected.
- Some participants felt that the focus on climate change mitigation was lost in the larger context of planning for growth. Greenhouse gas emissions and sea level rise impacts were presented as things to consider during the planning exercise instead of being the primary focus of the exercise.
- Participants also felt that it was important that these exercises not be "everything to everyone." The Cape pilot suffered a little from having too many goals and tasks.

Scenario Planning and GIS Technology

- Although indicators were updated frequently, some felt that there was a need for better explanation and immediate feedback between placement of dots and indicators, i.e., "real time scenario planning" where the indicators were automatically updated on a sidebar.
- However, network based analyses are very computationally intensive and cannot happen in a live scenario planning event. This is a limitation of computational power and not of CommunityViz in particular. The Cape Cod set up took about 1 to 2 minutes to run, so "real time" indicator updates were not possible, although updating regularly was feasible, although required pausing the exercise briefly.
- One suggestion was adding a "mixed use" chip with equal jobs/households.
- The participants could have weighed in the assumptions and desired goals about population and job growth, sea level rise, greenhouse gas levels, and transit opportunities before the workshop through on-line surveys or webinars.

Figure 5: Participants discuss sensitive areas to protect

Using the DIY Touchtables

- Test the room where the table will be used ahead of time. Natural daylight and halogen lights, for instance, can interfere with the infrared camera in the Wii and make the touchtables not function correctly (or in some cases, at all).
- Think about how the use of technology constrains the conversations and limits creative thinking. The exercises in this workshop were done under time constraints and were region-wide. In the case of Cape Cod, a "preferred scenario" workshop was added to give stakeholders more time to consider the results of the first workshop and work in sub-regions to develop a scenario with stakeholder buy-in.
- Train table facilitators well in advance and have them practice. Table facilitators need to be facile with the tools, not learning at the workshop. It is recommended you have a roaming technical assistant to deal with any issues.

Overall, the use of CommunityViz and the touchtables helped pull together information and provide for a highly interactive workshop and learning experience. It is important to assess what is the most appropriate technology for a project, based on the goals. For the Cape Cod project the touchtables made it possible for people to interact directly with the maps, which met some of the scenario planning goals. However, some felt the technology resulted in participants focusing on whether the data being shown was accurate and what current condition information could be presented rather than what could happen in the future. Low-tech options can be more appropriate depending on desired outcomes. One option may have been talking generally on paper about overall distribution of growth and then focusing the interactive exercises on smaller areas with more "real time" indicator response.

Where feasible, many of the recommendations above have been incorporated into other projects that use the touchtables. For example, the Texas A&M and their Texas Sea Coastal Watershed Program was inspired by the Cape Cod project to build their own touchtables and post about it. They provide links to a PDF on how they built one (bit.ly/XaMeXK) and links to information about the application they developed, CHARM (bit.ly/ZrbN8H), which enables coastal citizens to interact with fairly complex scenarios involving coastal hazards and resources.

FIgure 5: Kids in Little Rock Arkansas use the DIY touchtable to learn about the region at the kickoff event of Imagine Central Arkansas

Commercially Available Touch Screen and Touchtable Products

Although the DIY touchtable is much less expensive and is relatively portable, there are circumstances where a commercially available touchscreen or touchtable might be preferred. Some options include:

Touchtable.com was an early inspiration for PlaceMatters DIY work. They have high-end units the size of a dinner table that allow users to rotate the screen to their perspective and use a number of interactive mapping features. PlaceMatters felt the price was too high to have multiple units and to ship them frequently.

Circle 12 uses a technology development by Diamond Touch that also has a projector shining down on a table but then uses a special surface sensitive to touch. This technology allows multiple users and the system can keep track of who is touching the table. You can see a demo of this table done at the APA conference at vimeo.com/channels/placematterstools.

Another options is a touch sensitive monitor. PlaceMatters use the HP Compaq L2105tm, which is small but very affordable. Ideum, based in Albuquerque, has been producing really impressive products over the last few years, including software applications that are highly intuitive. They have a 55" screen that mounts onto a base so that it works well in a more permanent setting (like an exhibit space). Tablets are also an option, if the software you are interested in using is compatible.

Building Your Own Touchtable

PlaceMatters has experimented with the Wii remote hacks for three reasons:

- We can build a touchtable for less than $2000, which means we can use as many as

Figure 6: Participants in Boise Idaho work through a scenario planning exercise with CommunityViz (image: Placeways)

20 of them in a large meeting format.

- With the new slim projectors (Casio and Epson have ones we like) we can work in relatively bright rooms and create a system that is quite portable, making it possible to transport multiple units.
- The DIY style helps avoid accusations that we are using too much of a small budget on technology (it also seems to make people more tolerant of any technological glitches).
- More details on how to build a system can be found below (an expansion of a blog PlaceMatters posted on the Public Laboratory for Open Technology and Science website). Those who are short on time and/or are less inclined to pull out the power tools and epoxy putty to make your own, PlaceMatters sells touchtable kits (store.placematters.org) with all the equipment and parts collected and the necessary customizations done for you.

In the spirit of DIY, PlaceMatters hopes others will build and experiment with touchtables and share what they have learned. PlaceMatters teamed with the Texas and Delaware Sea Grant programs of Texas A&M and the University of Delaware in hosting the first Touchtable User's Conference, in February 2013. A good place to share insights is on the Public Laboratory for Open Technology and Science website (publiclaboratory.org), where PlaceMatters first blogged about our own DIY experiments. Feel free to contact PlaceMatters at info@placematters.org if you have any questions or comments, or for information on purchasing a touchtable kit.

About the Author:

Ken Snyder is founder and CEO of PlaceMatters. He was named by Planetizen, in 2011, as one of the 25 leading thinkers and innovators in the field of Urban Planning and Technology. He is a past Chair of the American Planning Association's Technology Division, and currently sits on the Boards of the National Charrette Institute, and the Florida House Institute.

Alluvial Fans Meet Geodesign

By Shannon McElvaney

Geodesign integrates science and social values into landscape planning and lets us move from designing around geography to designing with geography. In Southern California, geodesign techniques are used to plan for continued growth in hazardous areas atop alluvial fans while preserving natural resources.

Figure 1: *Crescent Cove, Laguna Beach, California.*

Reframing an Old Idea

Design that considers geography has been going on since humans started designing. Ancient cultures built settlements in close proximity to water and with good mountain views; they designed cities to maximize shading and natural cooling; and they positioned themselves in proximity to natural resources and trade routes. For thousands of years, design considering nature was, well, just natural. Over time, "progress" drove us away from these natural ways. Technological advances made it much easier for mankind to conquer—and even defy—nature. In the process, we have unintentionally created many of the problems we face today. But there is growing recognition that we can ameliorate many of these problems by designing with geography—a technique known as Geodesign. Geodesign is a new way of framing an old idea, made possible by new advances in science and information technology that change the dynamics of decision making.

Thinking Geodesign

Born from landscape architecture, geographic information systems (GIS) technology has a complex pedigree. GIS and design have long been intertwined, hard to separate, and competitive. GIS was built for mapping, planning, and spatial analyses at the macro and meso scale, while computer-aided design (CAD) was the tool for engineering and architecture at the meso and micro scale. Ill-defined and arbitrary to begin with, these boundaries are beginning to blur further with the introduction of Geodesign. So exactly what is Geodesign? It's a combination of geography and design. Geography is about place and processes, the human and the natural, across both space and time. It seeks to organize, understand and describe the world. Design is a creative act requiring imagination. Design can produce something entirely new, or improve upon something that already exists. It often requires the creation of a sketch or model, followed by an iterative process of rapid redesign and evaluation of alternatives in order to attain the desired result. Geodesign combines the best of both of these worlds, providing a new way of thinking that integrates science and values into the design process. By giving designers robust tools that support rapid evaluation of design alternatives and the probable impacts of those designs, Geodesign provides the framework for exploring issues from an interdisciplinary point of view. It is an integral framework for holistic design that moves from designing around geography to actively designing with geography.

Balancing Hazards with Plans

Southern California's Mediterranean climate and varied landscape of beaches, deserts, and mountains have made it one of the most desirable places to live in the world. Topping out at over 25 million

Figure 2: *(Above)An Alluvial Fan in Death Valley, California.*

Figure 3: *(Above right) Esri's ArcGIS Explorer was used to create a 3D View of the 2005 Development on Magnesia Spring Canyon AlluvialFan, Rancho Mirage, California.*

people in 2010, the region is the second most populous in the United States, and the population explosion and housing boom have pushed many developers to build in high-hazard areas atop alluvial fans. Alluvial fans are gently sloping, fan-shaped landforms that are created by the natural deposition of eroded materials from an upland source. Up to 40 percent of Southern California's 10 counties[1] are covered by alluvial fans,[2] which can be subject to dramatic changes caused by natural disasters.[3] All 10 of these counties have been declared flood disaster areas multiple times in recent years, and the frequency of such occurrences will only rise as the number of people and structures located in areas of risk continues to increase.

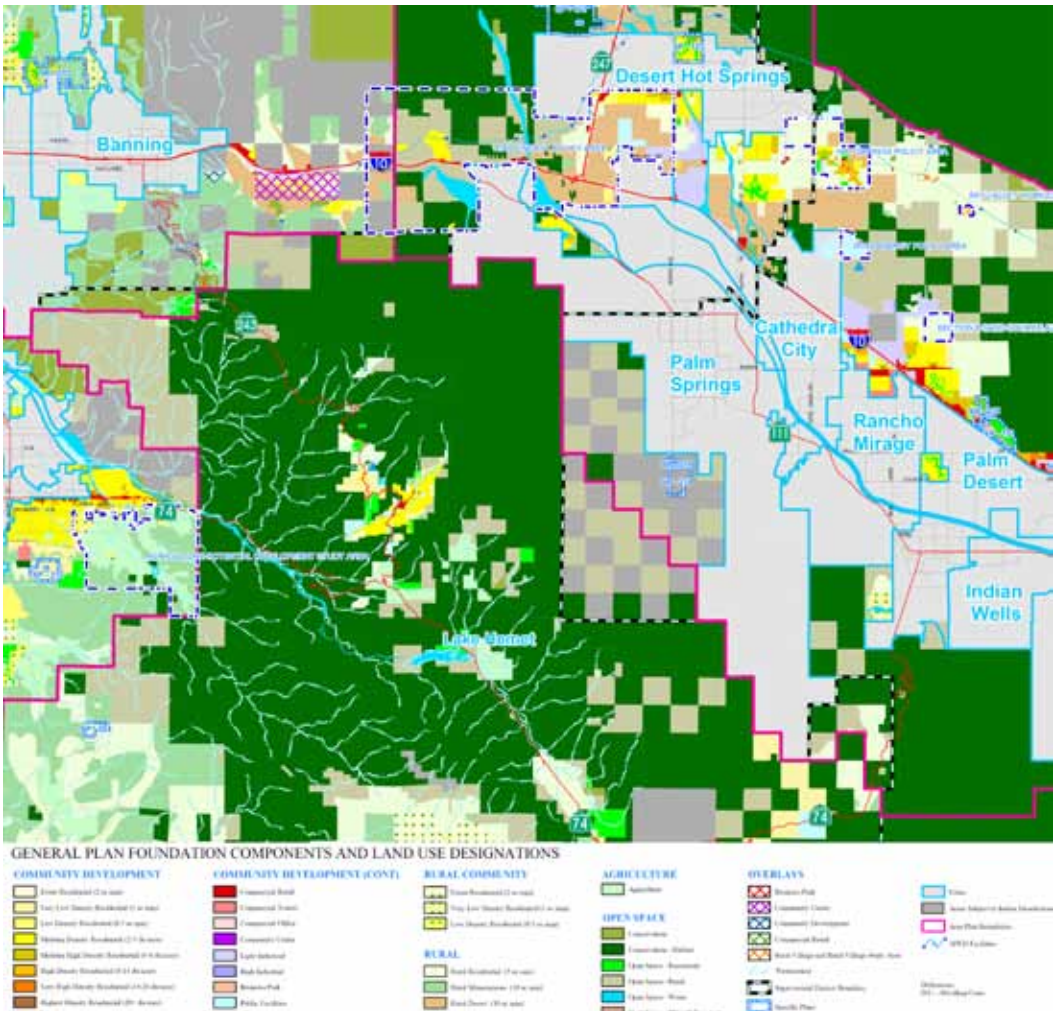
Flood management has been successful at protecting life and property but has resulted in the loss of riparian and wetland habitats, worsening water quality, and decreased groundwater recharge. Increasingly, alluvial fans are being recognized for the multiple benefits they provide, including groundwater recharge, critical habitat, ecological connectivity, open space, aesthetic beauty, and recreation.[4]

Today, a more balanced and integrated approach to flood management and land-use planning is needed—one that conserves the beneficial values provided by alluvial fans while minimizing risk.[5] GIS software and Geodesign techniques have proved to be the perfect fit for the development of prescreening tools to help both developers and local government officials weigh the true costs and benefits of development proposals.

The Alluvial Fan Task Force

2030 population growth projections for California indicate that an overwhelming majority of housing development will occur on alluvial fans, posing significant risks to people, property, and the environment.[6] Most of the long-ranging financial consequences will fall on local governments, which are often hit with the double impact of disaster recovery costs coupled with declines in tax revenue that follow major disasters. To address these multiple issues, the California State Assembly established the Alluvial Fan Task Force to review alluvial fan flood history, develop a model ordinance that would reduce long-term flood damage, and create land-use guidelines for development on alluvial fans.[7]

The task force recommended a GIS-based decision support tool as the best means of implementing a new model ordinance. It was determined that the tool should allow developers and counties to prescreen proposed designs based on a complex set of scientific factors, building codes, and floodway design recommendations early in preliminary and conceptual design stages. In essence, anyone would be able to freely sketch onto a web-based mapping interface to create design alternatives and receive instant feedback on possible hazards



and risk while maximizing the ecological and cultural benefits of alluvial fans. This Geodesign tool was called the Alluvial Fan Land Planning Tool.

Alluvial Fan Planning Tool

The task force started the project with a series of fact-finding meetings where experts from multiple disciplines met to discuss the many complex aspects of the problem. This collaboration clarified key issues and resulted in a six-step decision support narrative that would help guide the development of the Alluvial Fan Land Planning Tool. The six steps are:

Step 1— Identify whether the proposed site is on a regulated floodplain with adequate hazard protection

The first step in assessing the potential flood hazard of a given site in Southern California is to determine whether the site is within a Federal Emergency Management Agency (FEMA)-defined Special Flood Hazard Area (SFHA). Equally important is to determine whether adequate flood control structures are currently in place to protect the property.

Step 2— Consider relative flood hazard

Flood hazards on alluvial fans are difficult to model because of the highly variable nature of alluvial fans themselves. The geology and topography of the upland watershed, the slope of the fan surface, and the uncertainty of flow paths contribute to this difficulty. Although not definitive, step 2 involves assessing the relative alluvial fan (AF) flood hazard by examining the age of the the sediments and surface material, history of flooding, slope, vegetation cover, amongst others.

Figure 5: *The desert tortoise is a species common to the alluvial fan environment.*

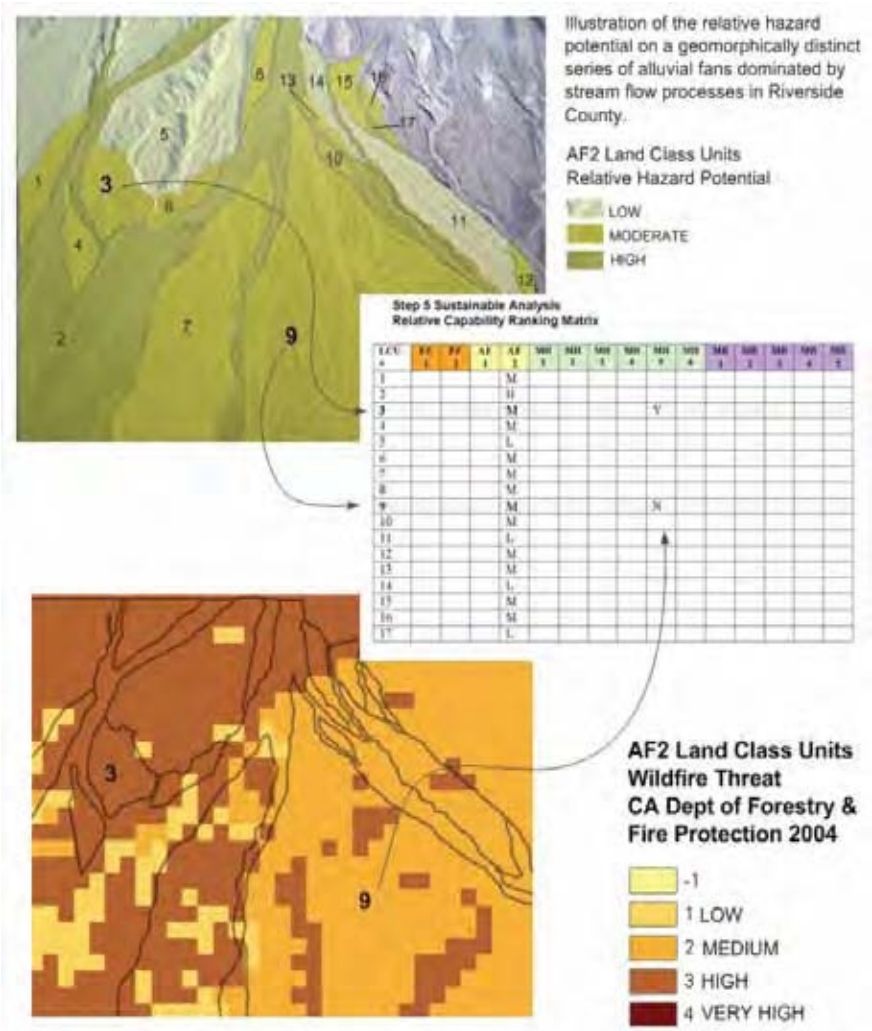
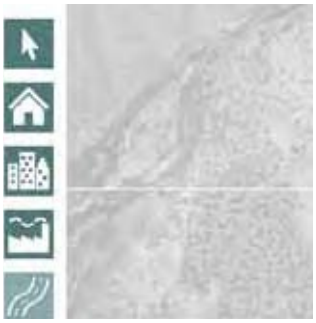


Figure 4: *(Above) The map at top depicts Land Classification Units. The bottom map depicts fire threat. The table in the middle is formed by the union of all maps created in steps 2–4 and forms one of the templates that will drive the ranking and subsequent evaluation of sustainability criteria weighing risks and benefits between LCUs.*



Step 3— Consider other hazards present on the proposed site

Alluvial fans are areas of rapid geologic change. They can go through long periods of relative quiet and then be subject to dramatic changes caused by floods, debris flows, earthquakes, or fires. In this step, the analysis turns to identifying existing nonflood hazards.

Step 4— Consider beneficial resources present on the proposed site

This step requires the creation of map data that depicts the locations of those aspects of alluvial fans that are considered to have beneficial values. These require the identification of groundwater recharge areas, ecologically valuable areas, mineral resources, culturally significant zones, and projected land-use change.

Step 5—Consider capacity to address multiple objectives consistent with FloodSAFE13

Sustainability analysis (SA) provides a multicriteria-based evaluation framework[8] that allows the user to assess the capability and suitability of a given alluvial fan site for various purposes.

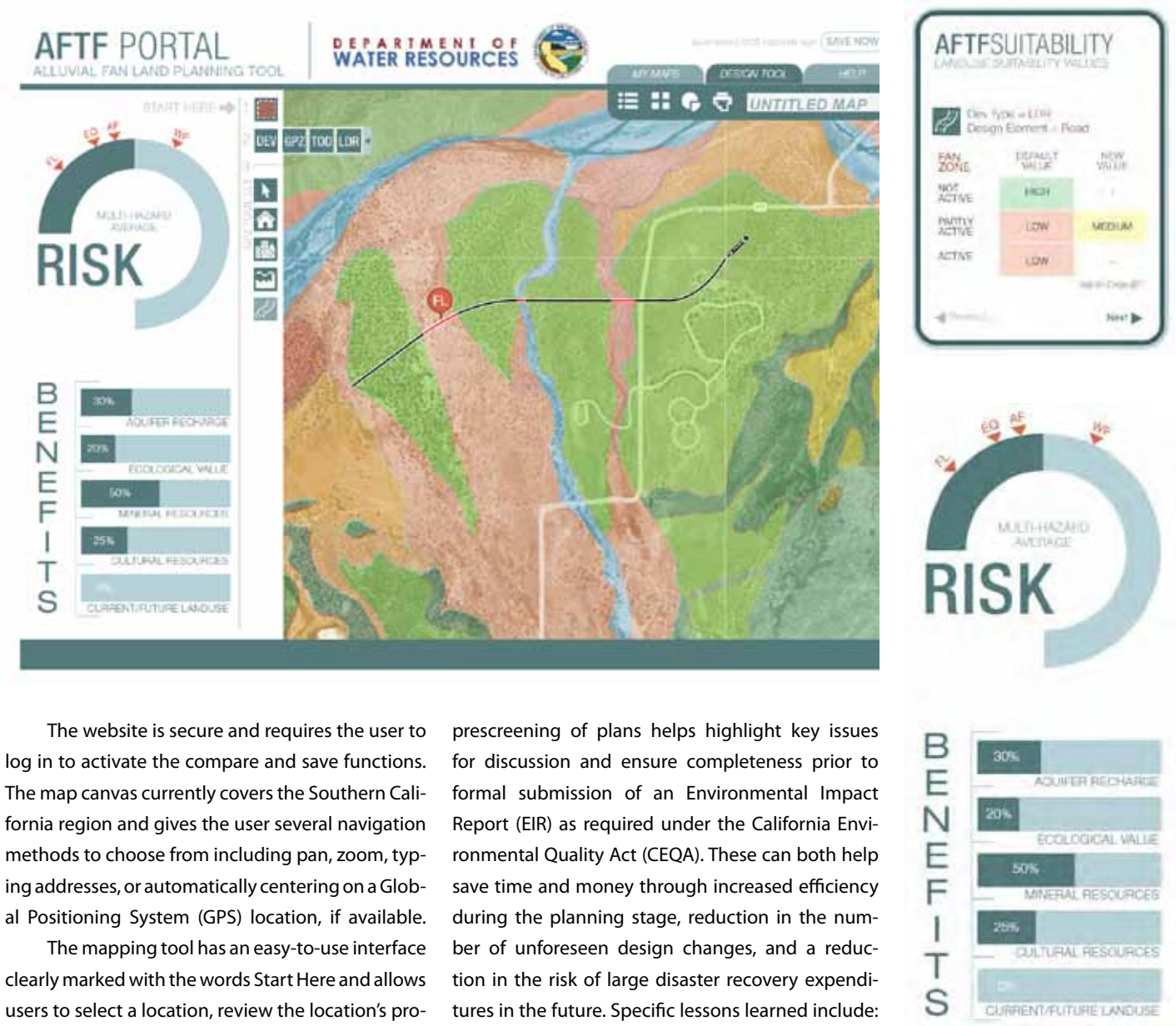
Step 6—Consider problem-solving economic strategies

The premise for the economic (ECON) tools is that by being smart up front, taking a holistic and integrated approach to assessing risks and encouraging avoidance, and putting financing and insurance programs in place that handle the risks, the Southern California region may be able to minimize and balance potential costs and impact to life and property and create financially sustainable alluvial fan floodplain management systems.The ECON tools provide methods to formulate economic strategies for sustainable development on alluvial fans that acknowledge private property rights and local costeffectiveness.

For example, one of the suggestions includes incorporating alluvial fan management objectives within an area's integrated regional water management (IRWM) Plans. These steps created a framework and set of models that describe how the natural world operates and the influence it might have on the built environment, and vice versa. The core map layers are backed by expert opinion, historic occurrences, and vetted scientific information. Dozens of known design and program elements were assembled into a database that further strengthens the feedback results with sound cost estimates associated with construction or mitigation.

Web Map Portal

So how does a fairly sophisticated program become accessible and easy for developers, regulators, and the public to use? It starts by creating an Internet web map portal that serves various map layers in a navigable, searchable map interface. The application supports a number of Internet browsers, requires no installation of special software, and runs on any mobile or desktop devices that support these browsers.



The website is secure and requires the user to log in to activate the compare and save functions. The map canvas currently covers the Southern California region and gives the user several navigation methods to choose from including pan, zoom, typing addresses, or automatically centering on a Global Positioning System (GPS) location, if available.

The mapping tool has an easy-to-use interface clearly marked with the words Start Here and allows users to select a location, review the location's profile, and then compare it to other locations. Once a location has been selected, the user is presented with a location profile or summary report that includes detailed information about the site's multiple hazards and/or multiple benefits. Alternatively, the user can save and compare a number of profiles from different areas using the map comparison view.

Lessons Learned

The benefits of the Alluvial Fan Land Planning Tool are many. It assists developers and regulators in consistently applying a suite of local planning tools for development on alluvial fans. The prescreening of plans helps highlight key issues for discussion and ensure completeness prior to formal submission of an Environmental Impact Report (EIR) as required under the California Environmental Quality Act (CEQA). These can both help save time and money through increased efficiency during the planning stage, reduction in the number of unforeseen design changes, and a reduction in the risk of large disaster recovery expenditures in the future. Specific lessons learned include:

- Building easy-to-use geodesign tools that incorporate existing regulatory frameworks with which all new development must comply helps ensure adoption by developers, planners, and landscape architects who require fast, effective methods for evaluating site opportunities and constraints.
- Transparency, repeatability, and consistent use across the region are vital to successful adoption by officials, developers, and the public. Creating a toolset that incorporates both science- and value-based process, evaluation, and impact models vetted by

Figure 5: The interactive GIS map allows users to sketch various design elements directly on the map and then receive instant feedback on the potential impact of those designs on the left-hand dashboard, displayed here as risk or benefits.

experts is essential.

- The web-based geodesign prototype demonstrates that a simple spatial decision support tool could give a large number of users with little or no GIS training the ability to select site-specific program elements or land-use options, perform analyses of alternative scenarios, and balance performance versus cost to meet their particular needs.
- Simple sketching tools allow end users to draw their own areas, apply changes, and assess consequences of those changes at a scale that is meaningful to them.

Geodesigning the Future

Future plans may include expanding the capability of the Alluvial Fan Land Planning Tool to aggregate land-use and best management practices and capture the cumulative impact of implementation practices across Southern California. Tying this data to spatially enabled dashboards that already track the area's ecological diversity, groundwater recharge rates, nutrient and sediment loads, water quality, projected land-use change, and disaster response and recovery could increase the effectiveness of sustainability planning throughout the region. Real-time monitoring of data, fine-tuning of models against data, and the identification and analysis of trends against baseline data could all help minimize harmful effects of landscape change throughout the basin.

Experts have begun to suggest with greater frequency that it may be more effective and less costly to locate new development outside hazard areas than attempt to control the hazard itself. Certainly the ever-increasing costs of disaster recovery and loss of water recharge support that hypothesis, especially as regulatory policies have already begun to limit the alteration of floodways when alternative methods of flood control are technically feasible.[9] Perhaps an integrated approach to sustainable development using geodesign tools like the Alluvial Fan Land Planning Tool will help make the adoption of sustainable practices for future development on alluvial fans a viable alternative.

About the Author

Shannon McElvaney is the Global Industry Manager for Community Development and a geodesign evangelist at Esri, where he is developing geodesign tools, processes, and techniques that will enable people to design and build livable, sustainable, healthy communities. He has more than 20 years of experience applying a broad range of geospatial technologies across a variety of industries.He was formerly the GIS and Site Control Manager for the $22B MASDAR City Development Program in Abu Dhabi, developing the world's first carbon neutral, zero waste city. Shannon can be reached at smcelvaney@esri.com.

Geodesign Case Studies in Regional and Urban Planning

An expanded version of the Alluvial Fan Land Planning Tool story appears in McElvaney's recently published book, Geodesign Case Studies in Regional and Urban Planning. The book is currently available from Esri Press and a number of other online providers.available from Esri Press in the Summer of 2012.

Acknowledgments

Special thanks go to Boykin Witherspoon III, California State University's Water Resource Institute, for his contributions to this chapter. Additional thanks go to the project's sponsors that include the California Department of Water and the many appointed members of the Alluvial Fan Task Force who contributed their efforts and energy to the project.

Key Links

Alluvial Fan Task Force, Department of Water Resources, California State University, San Bernardino http://aftf.csusb.edu/index.htm

Alluvial Fan Task Force, The Integrated Approach for Sustainable Development on Alluvial Fans http://aftf.csusb.edu/documents/IA _ Final _ Oct2010 _ web.pdf

California State Assembly Bill CA 1147 http://www.water.ca.gov/floodmgmt/fpo/sgb/fcs/docs/ab1147 _ pamphlet _ rev6.pdf

Notes and References

1 The 10 counties of Southern California are Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura.

2 Alluvial Fan Task Force. The Integrated Approach for Sustainable Development on Alluvial Fans. July 2010, 9.

3 Ibid., 51.

4 State of California Multi-Hazard Mitigation Plan, 2010, 3.

5 Ibid., 4.

6 Ibid., 74.

7 Ibid., iii.

8 Multicriteria-based evaluation, a type of overlay analysis, is a technique used for comparing the importance of dissimilar things using a common set of values. In this case, certain factors like proximity to seismic faults, fire or landslide potential, and water recharge potential are classified as being more or less important than other factors so that when combined, they help inform decision making based on their importance.

9 State of California Multi-Hazard Mitigation Plan, 2010, 82.

Kona Community Development Plan

By Michael Kwartler, FAIA

Kona is a district on the western coast of the Big Island of Hawaii. It is a popular tourist destination that has been experiencing robust growth, with a population increase from 29,942 residents in 1990 to approximately 41,940 in 2005 (an increase of 40 percent). However, population numbers tell only one part of the story; growth in housing units provided a more realistic picture.

Between 1990 and 2000, the number of new housing units (many of them second homes) increased from 7,947 housing units in 1990 to 13,330 in 2000, an increase of more than 67 percent. This asymmetrical increase created disproportionate land consumption and infrastructure needs, contributing to community concerns about the loss of significant natural, cultural, and agricultural resources. The community also experienced difficulty providing the infrastructure necessary to accommodate growth.

The Kona Community Development Plan (CDP) was designed to translate the broad goals and policies of Hawaii County's General Plan, adopted in 2005, into specific actions and priorities for particular geographic areas in the districts of North and South Kona.

Because of planning false starts and the fact that irreversible development was compromising the Region's quality of life and spectacular natural and cultural resources, the citizens of North and South Kona were skeptical about participating in yet another planning exercise. The challenge to the consultants was to first build trust among Kona's community that their participation this time would result in tangible action, based on decisions consensually agreed upon.

The Environmental Simulation Center (ESC) collaborated closely with Gianni Longo, Principal of ACP-Visioning & Planning, who designed and ran the year-long public process for the CDP. ESC provided technical analysis, GIS maps, and visual simulations throughout the process. Emphasis was placed on visually simulating options in both two and three dimensions and on using 3-D images to frame the issues and engage the public in making informed choices.

Methodology/Process

The conventional way to approach the public starts with the wrong question; "How do you like this proposal?" and is typically raised in the wrong setting – the public hearing. Visions, charrettes, and workshops start by asking a very different question: "What do you want?" The results of each activity informed the content of succeeding ones to ensure that the public was involved in making all critical decisions for the CDP.

The Kona CDP public involvement process consisted of three phases:

- Gathering Ideas—created the foundation of ideas upon which all subsequent activities were based;
- Mapping the Future— addressed critical questions and identified where future growth should occur; and
- How Do We Grow? Charrettes 1 and 2—identified preferred development patterns.

Figure 1. *Mapping the Future Workshop, during which participants simulated the process of land consumption and growth by placing chips where they wanted future development to occur (ACP Visioning and Planning).*

Gathering Ideas

The idea-gathering phase consisted of two major activities: structured interviews and public meetings. In September 2005, the consultant team conducted a series of structured focus group interviews with a variety of stakeholder groups, including representatives from the tourism industry, the development community, business, large and small property owners, native Hawaiians, social service organizations, long-term residents, and newcomers. These interviews were structured to expose perceptions, attitudes, and critical issues faced by the Kona community.

To ensure balanced demographic and geographic participation of residents, 109 individual public meetings were held in private homes – 'kitchen meetings' - throughout Kona from November 2005 through January 2006. These meetings were offered "on-demand," where trained facilitators arranged to meet with interested parties to gather ideas using a prescribed format that involved general brainstorming and responses to critical questions. More than 800 residents generated 3,496 ideas that were recorded and sorted into 18 categories. These categories established a set of goals that captured the desired outcome for the future of Kona. The results of the 109 kitchen meetings proved to be extremely valuable in capturing the participants concerns, values, ideas and vision for the region's future, and were used throughout the vision planning process.

Mapping the Future

The first exercise was designed to address questions related to the policy and implementation issues that had been raised by the structured interviews and ideas generated at the kitchen meetings.

The second exercise was designed to answer the question, "where do we grow?" It was a four-hour activity attended by more than 350 residents organized into 32 groups. It initiated a dialog on regional character, cultural priorities, environmental protection issues, land consumption, and preferred locations for future growth.

GIS was the critical tool used during Mapping the Future. The consultants found the County's GIS to be wanting, and spent considerable time connecting, updating, and 'ground truthing' the GIS with stakeholders.

This Mapping the Future segment enabled participants to begin to deal with the issue of balancing future growth with the imperative of respecting ancestral cultural resources and protecting the unique environmental features of the Kona region. A variety of GIS-based maps and analyses provided technical background and informed the participants' discussion. Participants first considered and mapped historic sites and

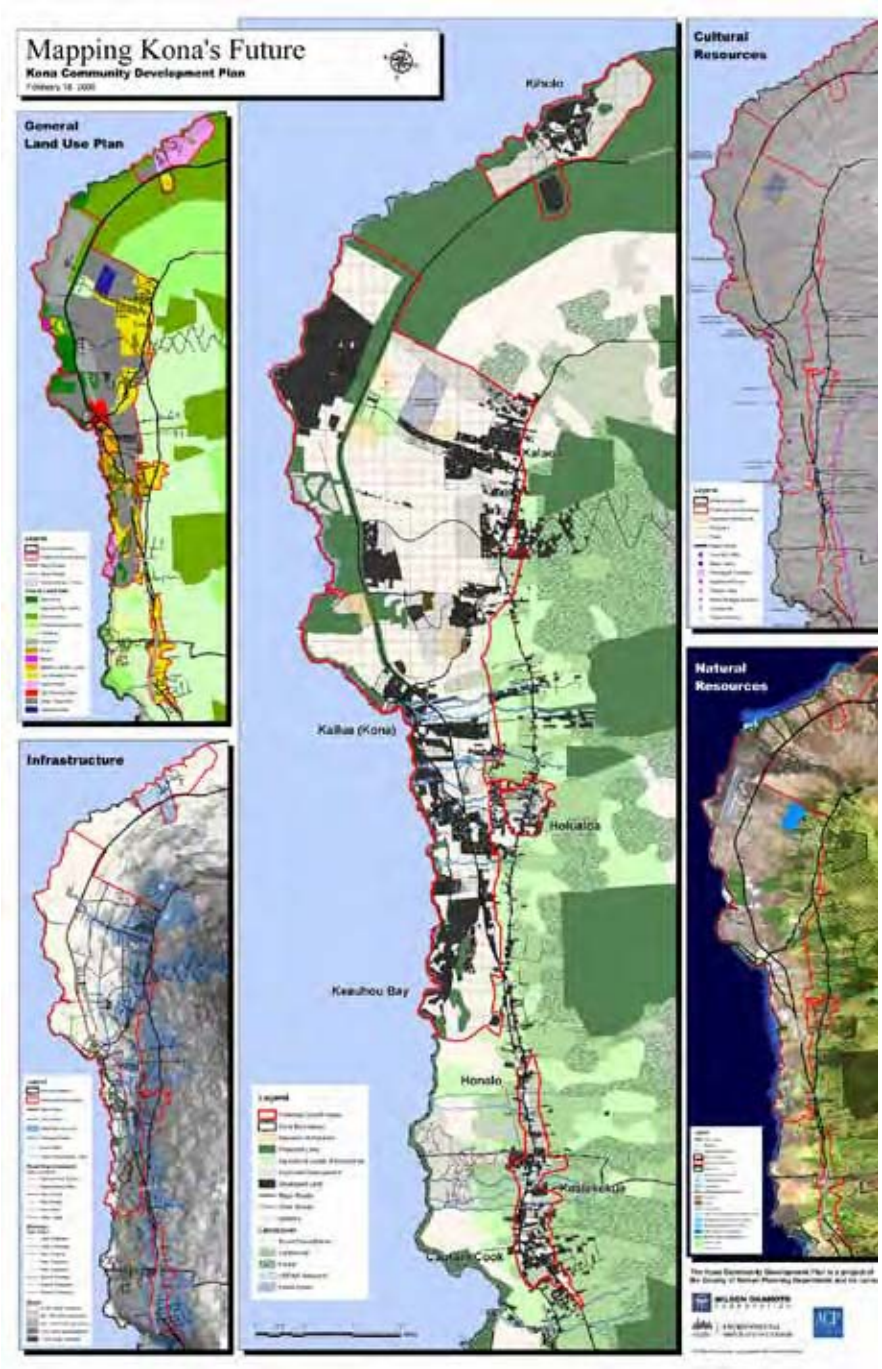


FIGURE 2

FIGURE 3

Figure 2. *Each table of workshop participants was given a large printout with a series of maps. Some tables were given maps for the entire 800-square mile region, and they concentrated on rural issues. Other tables were given maps that focused on the county's preferred urban expansion area (pictured). The center map was the main working map and showed already developed or developing areas, roads, protected lands, and the county's preferred urban expansion areas. Four other thematic maps were provided for reference: the county's general land use plan, infrastructure, cultural resources, and natural resources. (Environmental Simulation Center)*

Figure 3. *A typical map produced by one group during Kona's Mapping the Future exercise. The red chips represent areas where those participants preferred to see growth. After the workshop, each group's map was scanned and entered into the GIS, thereby capturing the preferences of every participant and highlighting where there is consensus for growth. (Environmental*

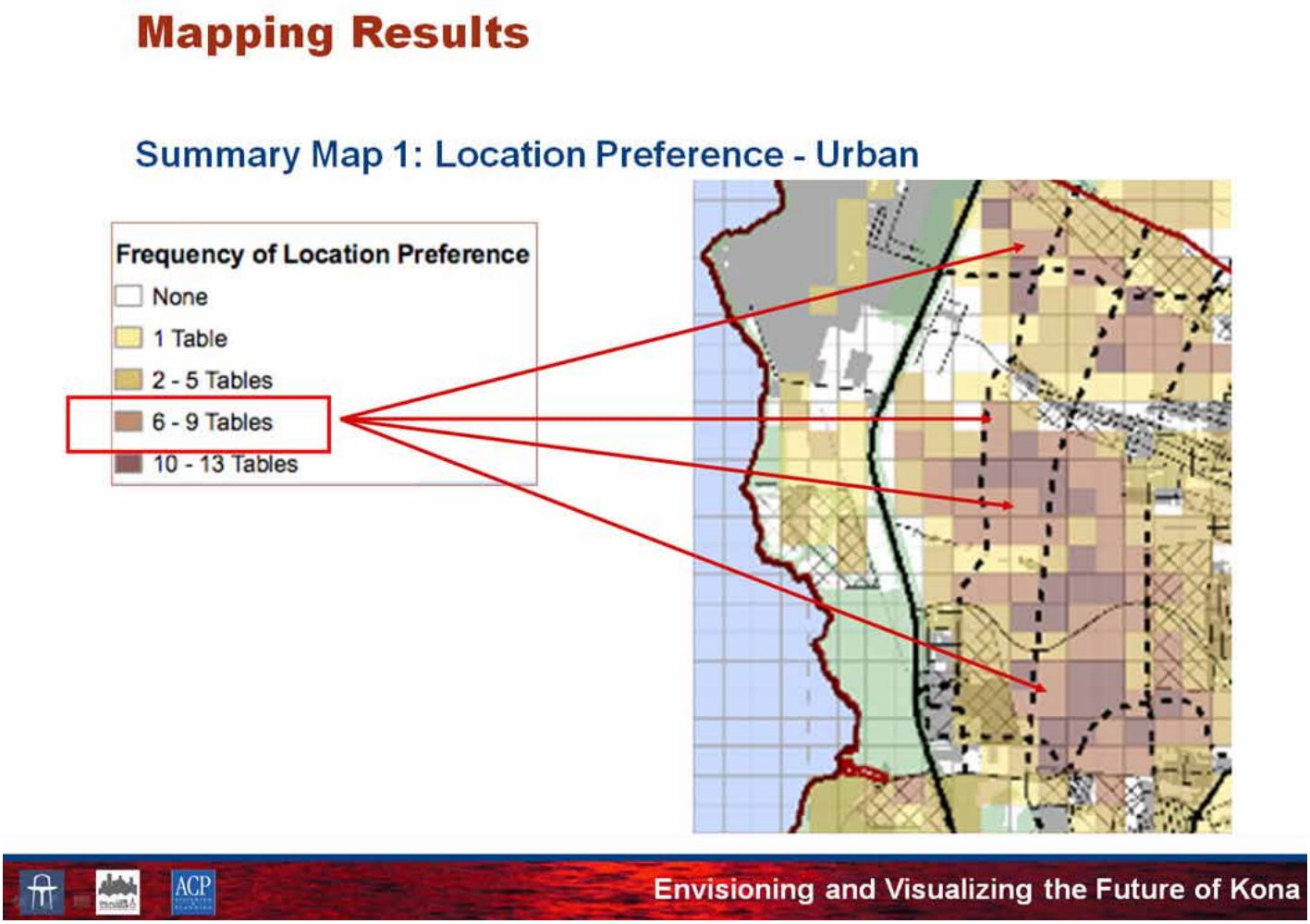


FIGURE 4

Figure 4. *Results of Mapping the Future exercise which illustrate the frequency of location preferences from 1 Table to 10-13 Tables. (Environmental Simulation Center)*

other geographic and environmental features that should be protected. They then recommended appropriate locations where future growth should occur, based on cultural and geographic constraints and on land available within areas defined by the County General Plan as Urban Expansion Areas.

The Mapping the Future exercise "Where do we grow?" also involved an intuitive simulation of the process of land consumption and growth in Kona over the next 15 years. Participants, working in groups of 10, were given a number of chips, each representing an area of 40 acres. The total number of chips represented the amount of land needed to accommodate expected population growth if current development trends were to continue. Participants were asked to place chips in areas where they wanted future growth to occur. They were able to indicate intensity of development by doubling or tripling chips in particular areas.

The results of this simulation game indicated strong consensus on a number of locations within the General Plan's designated Urban Expansion Area. These preferred Growth Opportunity Areas (GOAs) focused the majority of future development in the urbanized area of North Kona, limiting development in South Kona to infill and redevelopment and where incentives were to be used to stimulate development. All the maps generated by the public were digitized and integrated into the project's GIS to gain an understanding of the public's preferences. In an innovative use of GIS, these composite maps were used to analyze the degree to which there was consensus on both the location and intensity (degree of development) of future develop-

Figure 5

Figure 5. *The Growth Opportunity Areas (GOAs, outlined in black) were created from the locational choice developed during the Mapping the Future exercise and further refined in subsequent workshops using a variety of constraints including areas of significant habitat and agricultural use, steep slopes, flood zones, and existing land ownership. Actual buildable land was calculated in the GIS to ensure that the GOAs were the correct size to accommodate the anticipated future growth. (Environmental Simulation Center)*

Figures 6. *Land consumption scenarios from lowest to highest density and lowest land consumption. (Environmental Simulation Center)*

OPPOSITE PAGE FROM TOP

Figure 7. View of village center with parking behind the buildings

Figure 8 Streets with curb cuts for driveways

Figure 9 Uniform Housing Types, Building Setbacks, and Lot sizes

Scenario A

Development: distributed using current zoning densities

Additional Acres Needed: 9,265

Scenario B

Development: distributed at the average density of current trends

Additional Acres Needed: 1,492

Scenario C

Development: Distributed at a density of five dwelling units per acre, which represents approxiamtely the maximum density allowed under current zoning

Additional Acres Needed: 990

Scenario D

Development: distributed at eight dwelling units per acre

Additional Acres Needed: 661

Figure 6

Figure 7

ment. Once agreement was reached on where future growth should occur, the focus of the public process shifted to how that development should occur.

How Do We Grow-Charrettes 1 & 2

The third phase included two charrettes designed to address the development concepts and the character and quality of future growth. Each charrette consisted of public meetings, open houses, and meetings with the Kona CDP Steering Committee.

To determine their relative importance, development principals based on public comments gathered during the Mapping the Future workshop were rated by participants in the first charrette indicating community preferences related to the location and type of future development.

Participants were also asked to review the locations of the previously designated GOAs on a large-scale GIS map and to comment on their appropriate-

Figure 8

Figure 9

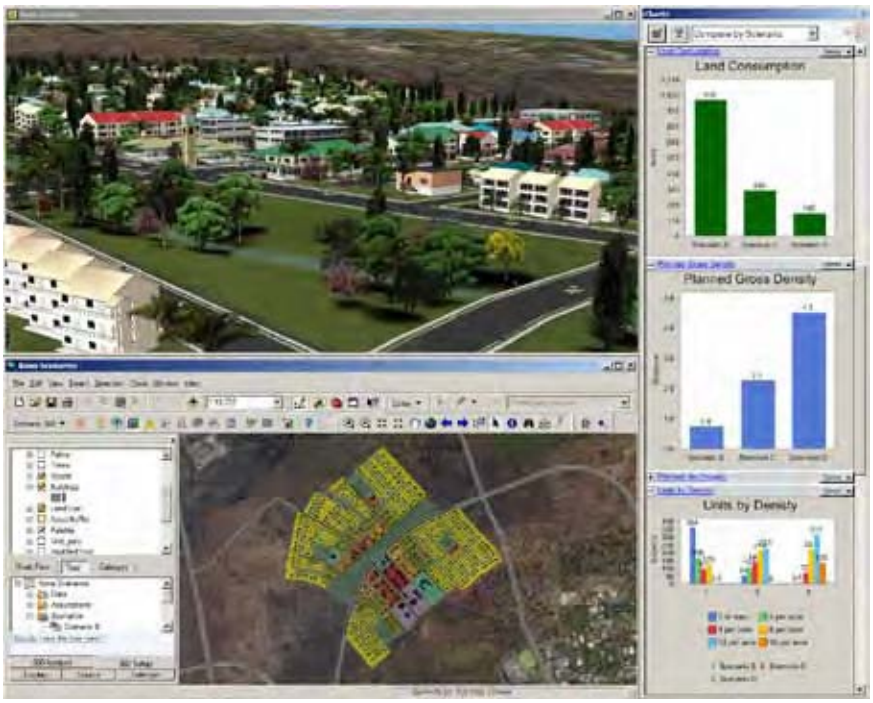


Figure 10. *View of 3D model, for Scenario D the town center in Community Viz©*

ness, based on their knowledge of the terrain, information about existing and proposed roads, environmental constraints, and the relationship of selected areas to existing and proposed developments.

During the first charrette, participants analyzed four future development scenarios that simulated what would happen if future growth were to be accommodated at four different densities. Responses to each of the scenarios indicated that the public's preferences were strongly in favor of higher density scenarios. The preferred density of 5 to 8 DU's/Acre was used to develop the preferred land use scenario and to inform the visual simulations of future of a prototypical GOA.

A total of seventeen 3-D "building blocks" based on typical Kona building types were created to illustrate conditions likely to result under the preferred scenario including concerns about uniformity and scale. The building blocks were presented and rated during the second charrette. Based on these preferences, a prototypical GOA was created in real time 3-D by assembling the building blocks. The ability to move throughout the 3-D model proved to be critical to building trust among the participants that they were not being manipulated by a pre-pathed edited animation.

Conclusions

The vision set forth by the public and articulated in the Kona CDP rethought the way land will be used in the region in the future. The vision was a dramatic shift in emphasis from growth by disconnected and often gated subdivisions to the creation of integrated villages and neighborhoods. As visually simulated in the real-time 3D model, a prototypical GOA is linked and walkable, and offers mixed uses and a variety of building types.

The vision expressed in the Kona CDP could not have been achieved without the use of visualizations that allowed the public to work directly with technical information and visualize the outcome of a variety of future scenarios. The melding of intuitive knowledge brought to the table by the public and the technical analysis contributed by the consultant team ensured that the participants made informed and technically sound decisions while pursuing a vision for the region consistent with their values and expectations. And, finally, it required innovative partnerships of private, public, and civic interests committed to the implementation of the vision over the long term.

In September 2009, the State's chapter of the APA awarded the CDP its Outstanding Planning Award. "Receiving this recognition from the state's professional planners is special to us" said Mayor Kenoi, "because it affirms the County of Hawaii's commitment to planning for the future in collaboration with our communities."

About the Author

Michael Kwartler, FAIA, is the founder and President of the Environmental Simulation Center, a non-profit laboratory created to develop innovative applications of IT for community planning, design and decision-making. He directed the design and development of CommunityViz© scenario planning and decision support software used by communities across the country. He co-authored Visioning and Visualization: People, Pixels, and Places with Gianni Longo.

Best Practices in Scenario Planning: Using Envision Tomorrow Plus

By John Fregonese and C.J. Gabbe, AICP

Land use and transportation scenario planning allows a community or region to envision the long-term future it wants, rather than accept the trends frequently embodied in existing plans. Scenario planning is an approach that allows decision-makers, stakeholders and the public to consider a wider range of possible futures than typical in most traditional planning.

Scenario planning is a methodology for better understanding futures not easily estimated otherwise. Scenario planning explores what might be possible, allowing a community or region to consider various ways of reaching shared goals. Scenario planning usually includes a technical component that utilizes a sketch planning tool, such as Envision Tomorrow Plus.

Through the process of conceptualizing, designing, and evaluating a series of future scenarios, we can identify a preferred and feasible course of action. While every process is different, we use an adaptable step-by-step approach to scenario planning. This approach has been successful in diverse scenario planning projects from Dallas to Denver, and Southern California to Southern Louisiana. Although the steps are presented sequentially, we often choose to work through the steps in a different order and/or to repeat some steps in an iterative process:

Step 1: Create a Framework for the Scenario Planning Process.

Step 1 means getting started with scenario planning. This includes defining the political and technical leadership for the process, the geographical scope of the process, potential funding sources, and preparing a public engagement strategy.

Step 2: Select Evaluation Criteria.

Step 2 involves creating a set of guiding principles that will serve as objectives to guide the process. Regions use these guiding principles to select the evaluation criteria used to analyze the scenarios later in the process. Examples of evaluation criteria include greenhouse gas emissions, access to transit, or housing affordable to a mix of incomes.

Step 3: Set Up for Scenario Planning: Tools, Data and Building Blocks.

Step 3 begins by selecting a scenario planning tool, such as Envision Tomorrow Plus. After the tool is selected, one can begin gathering necessary data to create scenarios. As part of this step, the specific building blocks are created to use in the development of scenarios with the sketch planning tool.

Step 4: Evaluate Current Base Conditions and Create a Reference Case Scenario.

Step 4 entails evaluating both the current base conditions of a community or region, and creating a reference case scenario that is based on current plans and policies.

Step 5: Develop and Evaluate Alternative Scenarios.

Step 5 begins with engaging the public, usually using highly interactive public workshops and online feedback mechanisms, regarding options for the future. This input is used to inform alterna-

tive land use and transportation scenarios. At the end of this step, each scenario is evaluated and prepared for the selection of a preferred scenario.

Step 6: Select the Preferred Scenario.

In Step 6 the public's feedback is gathered and analyzed to design a preferred scenario, with an accompanying set of strategies.

Step 7: Begin Implementation.

The community or region can begin implementing its priority strategies, and monitoring the ongoing movement towards the goals in the plan.

The Development of Envision Tomorrow Plus

From our experience leading these processes for cities and regions, large and small, across the country, we developed a robust scenario planning tool. This tool allows planners to design and test land use decisions at a range of scales. We have used Envision Tomorrow Plus to maximize development feasibility around transit, identify development (and redevelopment) priorities, test and refine regional transportation plans, and evaluate future greenhouse gas emissions. Envision Tomorrow Plus includes Microsoft Excel and ArcGIS-based components:

The Prototype Builder, a return on investment (ROI) spreadsheet tool, can be used to model buildings and test the physical and financial feasibility of development. The tool allows the user to examine land use regulations in relation to the current development market and consider the impact of parking, height requirements, construction costs, rents and subsidies. We use this tool to see what "pencils." We also start each scenario modeling process by creating a library of prototype buildings (Step 3), a tangible scale that is also rich with building-related data.

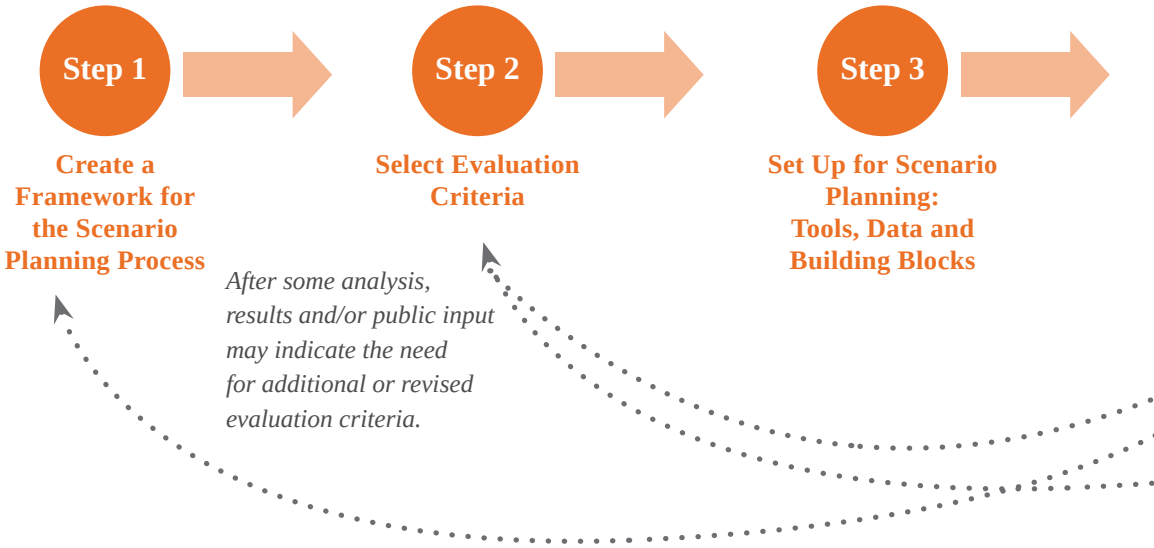
The Scenario Builder adds scenario-building functionality to ArcGIS. The Scenario Builder allows users to create development types (mixes of buildings, streets, open spaces and other attributes) and "paint the landscape" by allocating different development types across the study area to create unique land use scenarios. The tool allows real-time evaluation of each scenario through a set of user-defined evaluation criteria, created in Step 2 of the scenario planning process. The indicators frequently measure each scenario's impact on land use, housing, sustainability, transportation, and economic conditions. It also allows communities and regions to monitor implementation (Step 7) over the short and long-terms.

We are currently working closely with the University of Utah and University of Texas at Austin to expand Envision Tomorrow Plus through a series of new modules or apps. This app development began in 2011 when we moved Envision Tomorrow toward

Each building block reflects the key land use characteristics and mix of building and uses. Assumptions of the accompanying transportation characteristics, type of streets, civic uses and open spaces are also included.

Adapting the Step-by-Step Process for Different Planning Needs

The scenario planning process is not always linear or entirely predictive. It is recommended to take a flexible approach and when appropriate, to take opportunities to revisit previous actions with new information gained during the process. This graphic highlights the potential for adaptation and interaction between the steps.



open source and teamed with the University of Utah's Metropolitan Research Center (MRC), funded by a HUD Sustainable Communities grant for Utah's Wasatch Front. Now, we are working closely with the MRC to operationalize the research of Drs. Arthur C. Nelson, Reid Ewing and others into a package of 20 user-friendly and fully documented apps, including:

The Travel App

This app models the effects of density (residential units and nonresidential space per acre), diversity (land use mix), distance to transit, destination accessibility, land-use connectivity through design, development scale, and demographics, on internal capture of trips within mixed-use developments (MXDs); external trips by walking, transit, and private vehicle; and vehicle miles traveled (VMT).

Air Quality and Climate Impacts App

The Travel App generates VMT reductions that will be converted by the air quality app into reduction in categorical pollutants and greenhouse gas emissions.

Fiscal Impacts App

The fiscal impacts app generates current and future local fiscal revenues (property taxes, sales taxes from both on-site functions to indirect expenditures by workers and residents on-site), utility revenue, and other taxes and fee revenue. It also generates current and future fiscal costs (through spatially-based capital and operating expenditures). A fiscal benefit-cost ratio is calculated.

Workforce Housing App

This app estimates the number of jobs by income range (based on BLS occupational data) and location, and shows and calculates the percent of persons in the labor force at comparable income levels living within a 10-minute walk and bicycle distance, and within 10-, 20- and 30-minute transit distance.

Public Health App

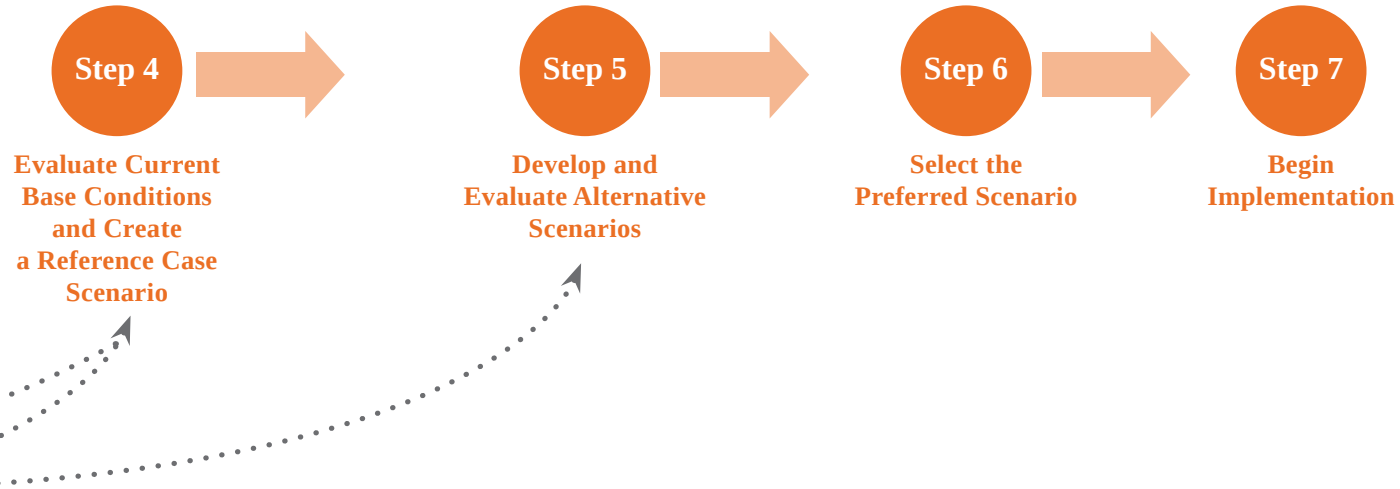
The public health app uses results from the travel app to generate walking, bicycling, and transit use associated with different urban forms at different locations and with different transit options across the study area. Public health evaluation criteria include average BMI level under current conditions, and alternative scenarios.

Transportation Safety App

The transportation safety app develops coefficients to calculate transportation-related injury accidents that can be applied to the travel modeling.

H+T+E Costs App

The H+T+E app generates H+T+E costs under current conditions and future scenarios. Hous-



ing costs will vary by energy consumption, which will be provided by the building energy app. The transportation costs are based on the travel app. Energy costs are based on local energy data, as available, calibrated for the building prototypes.

Development Capital App

Different urban forms generate savings that can become capital for new investment. The ROI app generates annual investment returns that can be capitalized. The building energy use app generates energy savings that can be monetized and capitalized. The fiscal impact app generates fiscal savings associated with different urban forms that can also be capitalized.

In addition to this app development by the University of Utah, in 2012 we began another HUD-funded partnership with the University of Texas at Austin, under the leadership of Dr. Robert Patterson, to calibrate the University of Utah apps for the Austin region, and to create a set of new pioneering apps. These apps include a Proximity Engine App, Amenity Placement App, and an Urban Forest App.

Envision Tomorrow Plus in Use: Wasatch Choice for 2040

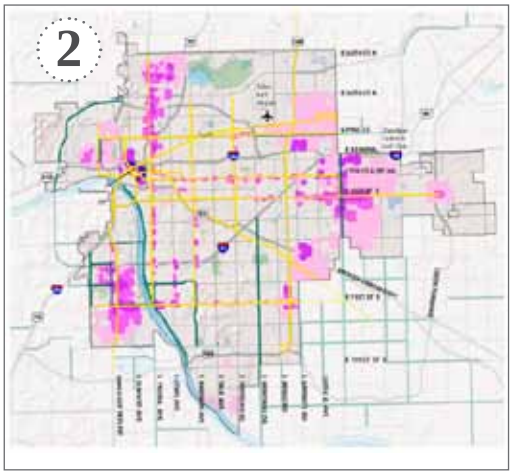
Utah's Wasatch Front has exemplified best practices in scenario planning. In the late 1990s, when growth pressure was overwhelming existing infrastructure, Envision Utah found that changing development patterns and expanding transit could reduce the need for billions of dollars of roadway improvements. The ensuing Quality Growth Scenario was based on the public's preferred scenario and refined using a set of land use and transportation models.

Today the Salt Lake City region is in the midst of implementing Wasatch Choice for 2040, the region's 2005 vision and Regional Transportation Plan. This process includes a series of implementation plans for six "catalytic sites" across the region. These sites are a mix of urban and suburban, and include existing rail, streetcar, and Bus Rapid Transit infrastructure. Envision Utah is conducting a stakeholder process and creating a series of scenarios for each catalytic site using Envision Tomorrow Plus. The scenarios are illustrating the land use, transportation and economic tradeoffs associated with each site. In the catalytic site adjacent to a planned rail station in downtown Provo, for instance, Envision Tomorrow Plus was used to assess the fiscal impact of the preferred scenario, which would add thousands of new units to the downtown area over the next several decades. It was determined that no new capital expenditures would be needed and that the added tax revenue from the additional development would far exceed the additional costs to schools, police, fire and other city services. Mod-

What Does a Land Use and Transportation Scenario Look Like?

A scenario map shows where future growth and investment could occur. This series of scenarios for Tulsa, Oklahoma, modeled alternative futures based on different growth and transportation patterns. 1. Trends Continue; 2. New Communities; and 3. Centered City.

Scenario maps can visually articulate how a change today can have a big impact in the future. For example, the amount of surface parking required for a retail store may seem like a minor issue at the neighborhood scale, but over time and across the city, the amount of land consumed just by surface parking lots can be enormous. By adjusting specific requirements a community can simulate and then evaluate the impact of any number of policy choices.



Tulsa Scenario Map

NEW GROWTH

Low Density | Medium Density | High Density

TRANSPORTATION INVESTMENTS

Mass Transit | Road

About the Authors

John Fregonese, President of Fregonese Associates, is a national leader in the practice of scenario planning. He is also currently leading the development of Envision Tomorrow Plus, a set of open source set of planning tools that are being used by planners around the United States.

C.J. Gabbe, AICP, is a Ph.D. student in the UCLA Department of Urban Planning. C.J. was a project manager with Fregonese Associates, and a co-author of the Lincoln Institute of Land Policy's Opening Access to Scenario Planning Tools.

eling the preferred scenario in Provo allowed local officials to realize the potential for significant additional revenue if they supported market-friendly zone changes and focused additional city resources on livability infrastructure, such as streetscape enhancements and additional urban open space.

The Future of Scenario Planning Tools

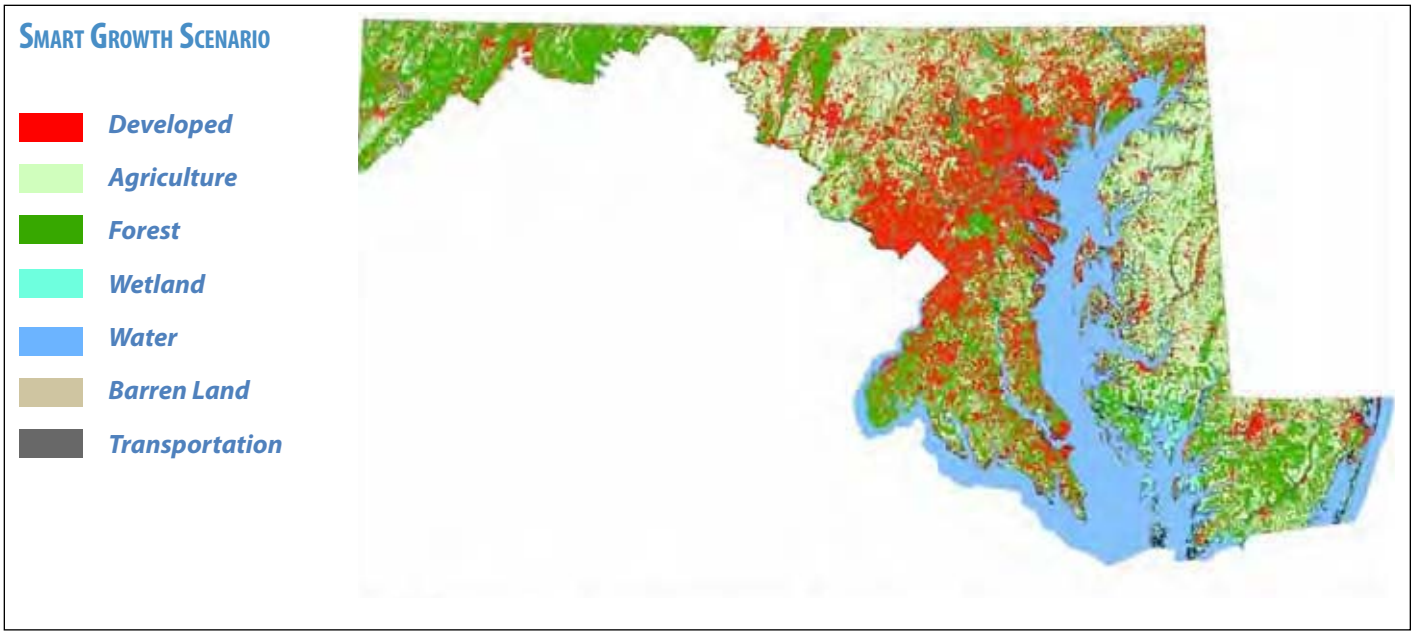
The future of scenario planning, and the class of tools used to model different futures, is bright. We are heartened by the steps the federal government, and states like California and Oregon, have taken to institutionalize regional land use and transportation scenario planning. Scenario planning tools are becoming increasingly sophisticated. Several trends point toward continued and heightened tool use and evolution. More cities, counties, MPOs and non-profit organizations are using scenario planning techniques. A reason for the expanded user-base for scenario planning are the HUD-DOT-EPA Partnership for Sustainable Communities planning grants and capacity building initiatives, of which scenario planning is a major part. From a tool development perspective, we see continued collaboration between tool developers, universities, and public agencies as the best way to tie together research and practice into a set of usable tools. Scenario planning tools, like Envision Tomorrow Plus, will likely continue moving to open source, and will be increasingly more compatible with each other. We are optimistic that initiatives like the Lincoln Institute of Land Policy and Sonoran Institute's ScenarioPlanningTools.org will move this forward.

In addition to these technical advances in scenario planning, it will be critical to use scenario modeling within the framework of transparent, implementation-focused planning efforts. A combination of political and technical processes will allow cities and regions to successfully move toward achieving their goals.

Maryland Department of Planning's Growth Simulation Model

By Richard Ebert Hall, AICP

Enabling smart growth is a guiding principle of the Maryland Department of Planning (MDP). The Growth Simulation Model (GSM) it developed is one of the prime tools it uses to pursue that goal.



Originally constructed 20 years ago with the help of a grant from the U.S. Environmental Protection Agency, the model has become integral to the work of state planners. The GSM helps illustrate growth projections across the landscape based on various assumptions. Planners use it to see and measure projected changes in landscape and development patterns. It has become one of the most used growth models in the country because it:

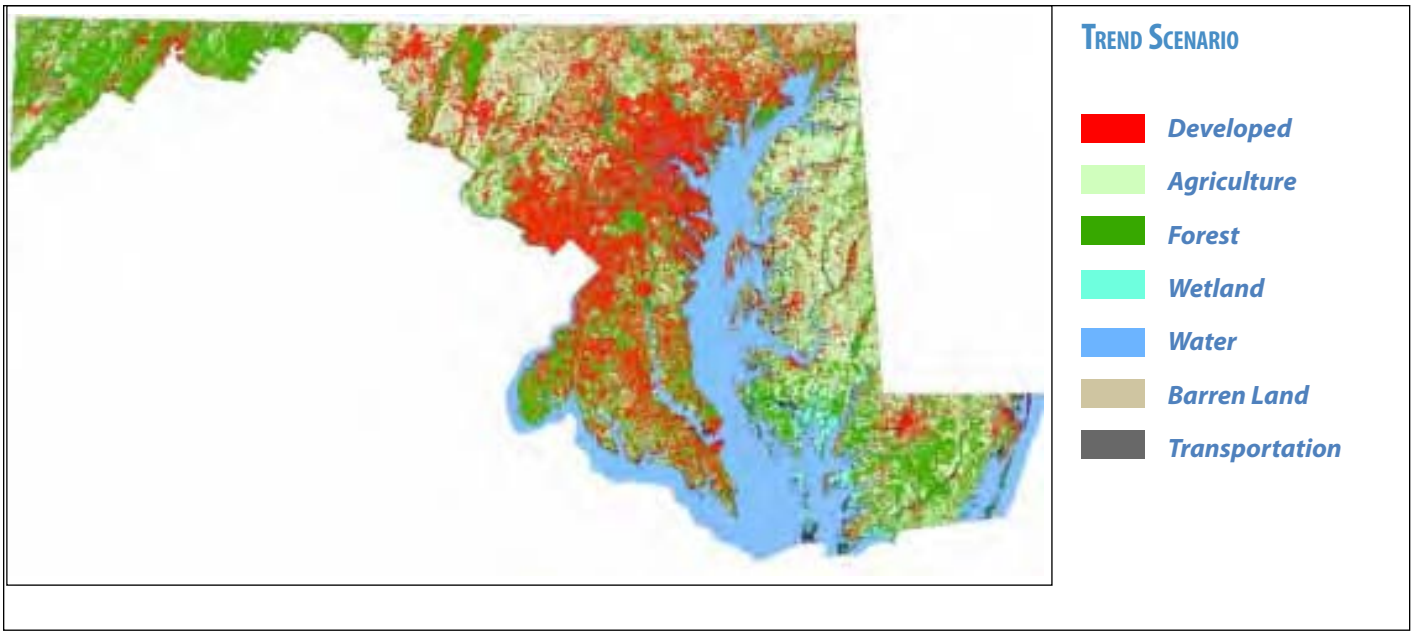
- Employs a parcel database, local zoning, sewer and other inputs that well represent on-the-ground realities.
- Is scalable, able to be adapted to projects as diverse as properly sizing a sewage pumping station or analyzing environmental impacts on the nation's largest estuary, Chesapeake Bay.
- Can be customized for a variety of stakeholders by processing local data and other variables.

Its origins and applications

The model was originally created to visualize the impact of projected growth on water quality in the Patuxent River Watershed as part of a demonstration project for the Chesapeake Bay Watershed. Maryland planners developed the model to examine future growth scenarios and impacts on a wide range of scales. The GSM is not an "off the shelf" product or a "black box" model. It uses local zoning maps in conjunction with planners' interpretations of the rules associated with the zoning maps. In that way, the model can best simulate the characteristics of an individual zoning district, of which there are more than 1,200 in Maryland.

The model has been enhanced and refined several times over the years. In 1996, the first edition of Maryland's statewide parcel dataset became a key base unit of analysis. That enhancement dramatically improved the level of detail and the ability to assess development capacity (the number of dwelling units potentially accommodated under different land-use scenarios). As geographic information system (GIS) and input data have improved, the uses, applications and diversity of the model have increased.

An extremely important application continues to be the implementation of Maryland's landmark smart growth legislation passed 15 years ago. The 1997 Priority Funding Areas (PFA) Act required areas targeted for future growth and development to be sized appropriately for a 20-year growth projection. The GSM helps the agency evaluate the relationship between projected growth and land supply and the local PFA maps in a consistent, uniform way. Many local governments have recognized the GSM's value in helping them vi-



sualize growth scenarios as they develop their long-range comprehensive plans. The department has been able to explore the impact of growth on water and air quality, transportation, water and sewer planning as well as the fiscal impact. Since the model's output is at the parcel level, the analysis is able to be scaled up at a local, regional and statewide level. The GSM analysis has informed legislation, policy discussions, and program implementation including PlanMaryland, Maryland's first state development plan, and the Sustainable Growth & Agricultural Preservation Act of 2012.

Description of the Simulation Model

The model uses data from GIS overlays. The GIS database includes information on land use, watershed and county boundaries, zoning, sewer service and protected lands (agricultural easements, parks, etc.). The database also includes parcel-level information from the Maryland Department of Assessments and Taxation. The complete database includes the following data for every parcel of land in the study area:

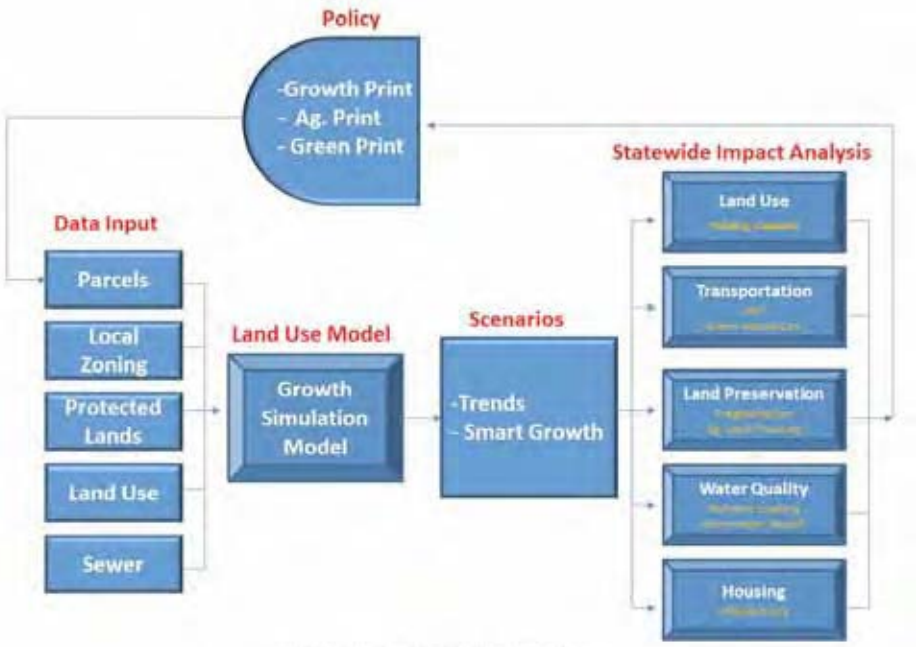
- Zoning
- Sewer service category
- Existing land use
- 12-digit sub-watershed
- Number and date of improvement(s) (i.e., major structures)
- Value of parcel and improvement(s)
- Address and owner
- Capacity for development
- New land use per each scenario

Small-area forecasts are used for population, household and employment projections for counties with Transportation Analysis Zones (TAZ). For non-TAZ counties, recent (10-year) growth patterns using parcel data are analyzed for trends. Future growth was assumed to follow a similar pattern unless otherwise altered by a scenario.

Currently, 2010 is used as the base year and 2035 as the planning horizon, which can be adjusted. Household and employment projections are allocated to categories of developable land (parcels). The data is based on the projections and the relative capacity of developable land. The capacity of each parcel of developable land in each watershed is based on its size (number of acres), current land use/cover type, zoning and sewer service category. Simulated land management options are unique to each scenario. The analysis includes:

- Projected land use change
- Projected growth allocated per parcel
- New household capacity per parcel
- Estimates for acreage, source of wastewater disposal and existing and projected units.

MDP Analysis Tools Overview Chart



Growth Scenario Maps

Two default scenarios that MDP uses to estimate future land-use change are "Current Policies" and "Smart Growth." The Current Policies scenario assumes that land will continue to develop in line with the government programs and policies -- zoning, sewer service areas, etc. -- currently in place. The second scenario, Smart Growth, projects future land-use based on some basic principles of smart growth. These include concentrating growth around existing development and targeted growth areas, particularly Priority Funding Areas (PFA), and protecting agricultural and forest land by assigning more restrictive zoning to these areas.

Smart Growth Impact Analysis

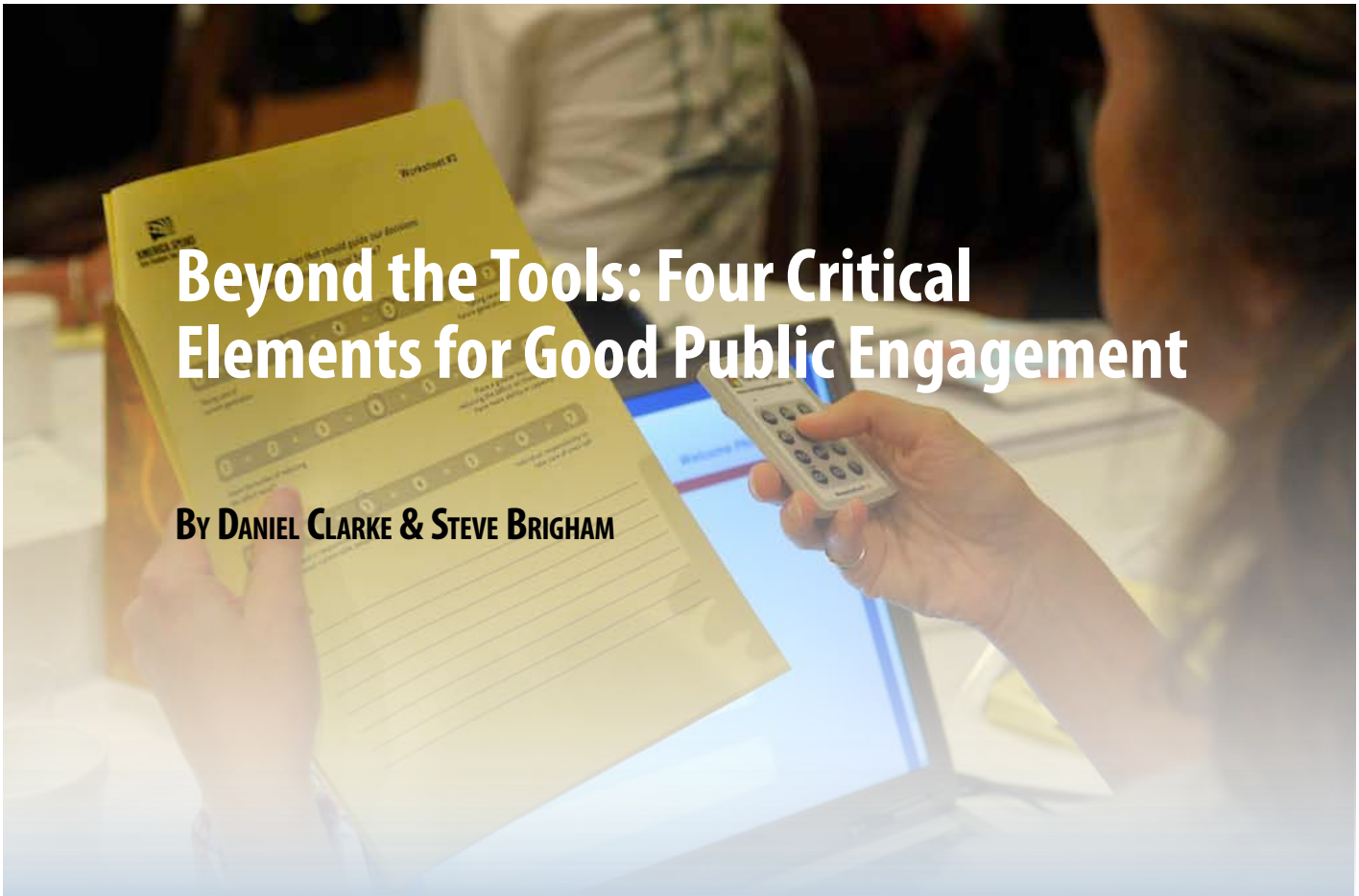
MDP can use the GSM's output to assess many types of impact analysis for future growth scenarios. It has calculated, for instance, that Maryland would save nearly 300,000 acres of resource land under a smart growth scenario and reduce non-point source nitrogen pollution by 53 percent per year between now and 2035, compared with a "Current Policies" scenario. A Smart Growth scenario would see a reduction in vehicle miles traveled by 30 percent and a reduction of greenhouse gas emissions by 6.4 percent. The Smart Growth scenario, calculated from 2010 to 2035, also foresaw a reduction in the need for new:

- Road miles by 36 percent
- Road construction and maintenance costs by 28 percent
- Water and sewer infrastructure by 3 percent
- School construction costs by 10 percent

Most recently, Maryland has developed and is implementing its first statewide development plan known as PlanMaryland. The GSM was used for the plan's comparison of potential growth scenarios and its assessment of future impacts on land, water, transportation and other infrastructure. The model has also been used to illustrate the outcomes of alternative land-use scenarios on the Chesapeake Bay and on local water quality. It can show the impact that development patterns have on non-point source nitrogen loading rates, which affect the health of waterways. The model's analysis shows that more compact patterns of growth on sewer systems have a less negative impact on the bay than low-density development on septic systems. The GSM has been used in Maryland's BayStat process (http://www.baystat.maryland.gov/) as well as with the Chesapeake Bay Program. Now and for the past 20 years, the model has helped decision-makers appraise potential policy changes and legislation in Maryland and beyond.

About the Author

Richard Eberhart Hall, AICP
Secretary of the Maryland Department of Planning is co-author of Maryland Department of Planning's Growth Simulation Model with Stephanie Martins, AICP. Secretary Hall's experience ranges from the technical and practical aspects of planning assistance and analysis to roles in advocating and advising on policy and legislation matters.



Beyond the Tools: Four Critical Elements for Good Public Engagement

By Daniel Clarke & Steve Brigham

Back in 1998, when we inaugurated the public engagement model now known as the 21st Century Town Meeting™, we stood as one of the early innovators using interactive technologies in public meetings. We have used this model – and variations of it – ever since in a wide variety of public policy and planning settings and very frequently in urban and regional planning efforts.

***Figure 1**: Diverse group in a facilitated roundtable discussion*

During that time, we have seen numerous other interactive tools emerge that we have utilized in our engagement work, including GIS tools like INDEX and CommunityViz. Without a doubt, these tools and many others have increased the value of public engagement for everybody involved, including citizens, stakeholders, planners, and policy makers.

For citizens and stakeholders, the tools help to make planning issues more accessible, and the planning process more transparent. They support informed engagement, including important context citizens need to understand. They also provide levity and excitement to public meetings, which really helps people stay focused and engaged on important issues and tasks. With tools like these, planners and policy makers can see how citizens and stakeholders react when they are presented with real choices and real information about the impact of those choices. Yes, the tools are great, and the development of tools has come a long way in the past 10-15 years. Moreover, for regional planning with its broad geography, complex issues and long timeframe, support tools are essential.

There is a risk, however, of becoming too enamored with the tools and losing sight of how to effectively utilize them in a larger effective public engagement context. Many planners know this, but we have seen many meetings where the tools and technology dominate the meeting, and we have seen many good intentions lead to ineffective efforts in engaging the public.

In this article, we focus on four elements that are critical for good public engagement, beyond the selection and use of interactive technologies and planning tools:

- Linking to decision making
- Diverse representation
- Informed participation
- Good meeting design and facilitation

Linking to Decision Making

Core to our belief in citizen engagement is that people should have the opportunity to influence the decisions that impact their lives. The fact is too many public meetings do not have any significant influence on the end result – a policy change or new plan. Good public engagement does not waste time asking citizens and other stakeholders to provide input that has no real potential to impact decision making or outcomes

In our initial meetings with planning clients, we insist on clarity about what they want citizens to potentially influence. Many clients are accustomed to sharing information with the public about what is to be done, or what might be done. Or they look to present something that they hope the public will accept or endorse without much back and

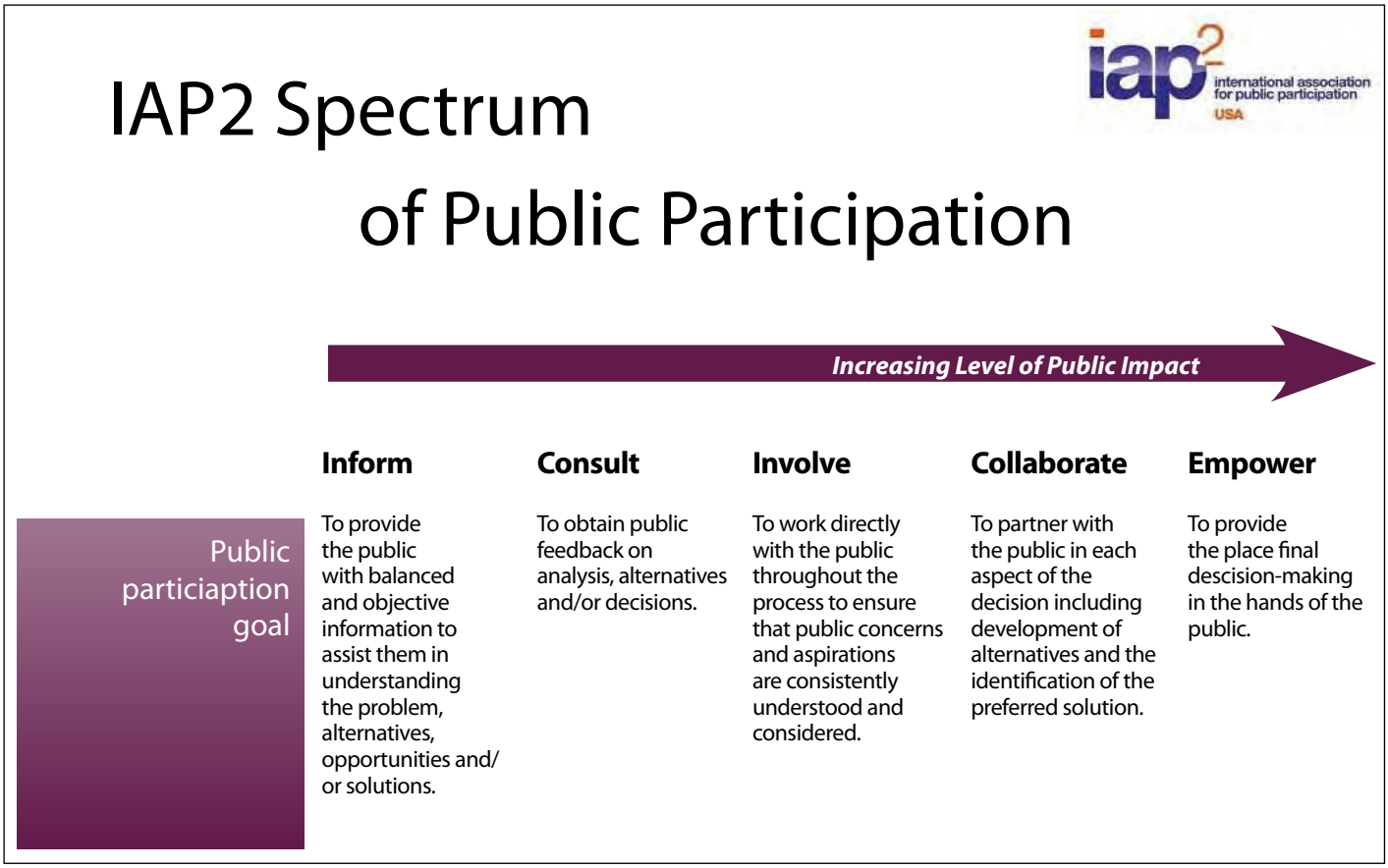


Figure 2: *IAP2 Chart of engagemnt goals.*

forth. But they are far less used to allowing citizens to genuinely influence a decision or plan. In our experience the most successful planning encourages and enables citizens to shape and refine plan development up to final reviews and approval.

A very different shortcoming we see in some public meetings is policy makers or planners asking very open-ended questions: "What are the most important issues?" "What do you want to see in the future?" There is a time and place for assessing all of the opportunities and challenges in a community. And there is a time and place for identifying what people envision for their future. However, done poorly, this leads to discussions about issues that are not that closely linked to the policy questions at hand, to the plan that needs to be developed, or to the resources that are realistically available. And when this is done poorly, it both raises expectations about what will get addressed and, ultimately, skepticism about participating in a public process when results don't transpire.

We believe it is absolutely essential when organizing community engagement to link the public's directions and decisions directly to a plan's development. This requires putting something on the table that can genuinely be influenced by the public input. It also requires clarity and transparency about what is fixed and cannot be influenced. The former can be difficult for those who are accustomed to not involving the public in a meaningful way to influence decisions. The latter can be difficult, especially for elected officials that want to appear responsive to anything the public says.

We recommend that at the beginning of the project, and as it evolves over time, to continually ask yourself:

- What are the decisions that need to be made now?
- What information do participants need to consider the options?
- And what input do I want from people to help inform that decision?

A guide we have found useful in clearfying the purpose of public engagment was created by the International Association of Public Participation (above).

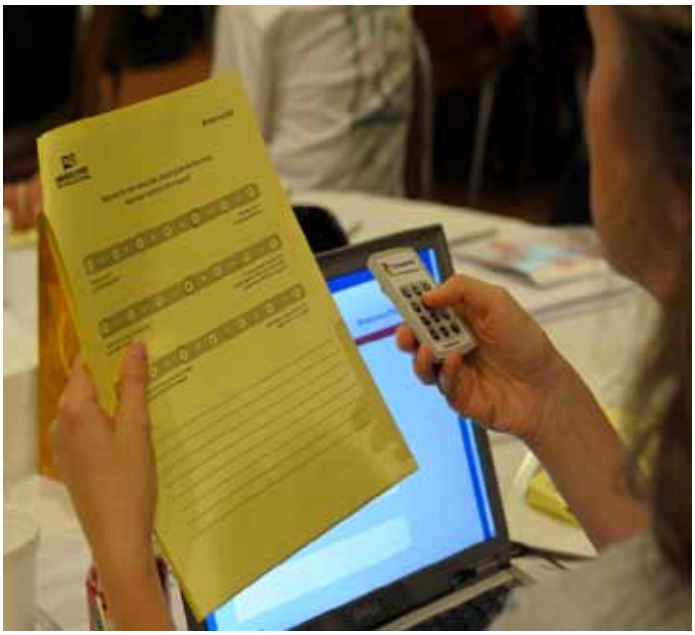


Figure 3: (Above) *Participants prepare for map-based discussion at forum.*

Figure 4: *(Above right) Participant polling preferences from options on thier worksheet*

Public participation occurs across a spectrum. Each element along the spectrum can have high value in community engagement. But it is critical to be intentional in your actions about where you need to be along the spectrum.

None of this is to suggest that the decision-making authority is transferred to the participants (unless you are on the empower end of the spectrum, which is very rare). In planning and in most policy-making arenas, there are many other factors that need to be assessed. And in the end, it is the elected officials and policy makers that must make the final decisions, but they must do it with the best information they can acquire from meaningful public input just as they do with professional planning expertise from staff and consultants.

After the input has been received, other factors considered, and decisions made, the transparency must continue with elected officials and planners making clear what the final decisions are, why they made them, and how public input factored in. They need to show what they were able to include from the public input, and just as important, what they could not include and why.

Making this link between community engagement and decision making helps build higher levels of collaboration and shared responsibility between government, citizens, and other stakeholders. This is especially important when broad public support and multi-sector support is required for successful plan implementation. Proclamations are often made about the importance of diverse voices being a part of public processes. Then there is the counter retort that "We advertise public meetings, but nobody comes!" Often planners don't know how to recruit diverse groups of people to public meetings, and certainly not in ways that are representative of the community.

So, why is diverse representation important? First, it is the right thing to do. If a plan is being developed that will impact a community, all perspectives should be heard. Second, engaging all perspectives can increase the chances of successful implementation, because the plan will have broader community support and more credibility with elected officials. The community will feel greater ownership of the plan and take greater responsibility for implementation. Finally, it makes for better decisions and plans. The challenges facing planning and so many other policy issues are complex and cross-sector. Good strategies require input from as many different perspectives as possible.

Diversity across stakeholder groups is reasonably straightforward. Most planning efforts we have witnessed have some structure such as a task force or committee to engage people with expertise and a stake in different areas, including environment, housing, and business, among many others. Representatives from these areas engage in discussion with planners and with each other

***Figure 5**: Participants observing instant polling results.*

to protect their concerns. They read draft materials and provide input. This effort usually goes well, though conflicting interests can be hard to manage.

Diversity across the general citizenry is generally more challenging. How do you get a large and diverse group of citizens engaged? How do you get a diversity of people in one room together? What is the diversity that we should be aiming for? In what ways do we plan to engage residents and how will that differ with the way we engage other stakeholders groups.

One note here about residents vs. stakeholders. When we talk about engaging residents (or citizens) we are talking about members of the general public that do not represent any particular interest except perhaps their own. When we talk about stakeholders, we are talking about individuals or organizations that are representing a specific interest or set of interests: preserving biodiversity, supporting business growth, advocating for lower-income housing, etc. Of course, the boundary between the two is not always clear. Almost all of the people representing stakeholder groups are residents, and many of the residents have certain issues that are more important to them than others. However, the distinction has been helpful to us, and we believe that planning efforts need to increase the level of engagement with residents while maintaining good engagement with stakeholder groups.

Many planners will shy away from speaking directly about engaging a diverse group of people across race and income. They tend to use less specific references and say "we want to engage those that have been under-represented or not involved in previous planning efforts." It is okay to use this language sometimes, but planners also need to be explicit and intentional to achieve the diversity they are aiming for.

What diversity should planners engage? We believe the best answer is that participants should match as best as possible the demographics of the community along age, race, income, and gender. We have not seen a meeting or project that scored perfectly on all these, but we have seen many that get close, and that is a big improvement over most efforts.

What does this mean at a practical level? It means you need to set clear targets for your engagement efforts. Usually you can use recent U.S. Census figures. It means developing strategies for engaging each different demographic, especially the "hard to reach". It also means tracking how well you are doing achieving your targets.

People often ask us what we suggest for engaging the hard to reach. Many factors are important, but the truth is that the hard to reach are (unfortunately) hard to reach. To use a tired but true cliché, the most important factor is not what you know, but who you know. When you engage racial minority groups or low-income people, you have

Figure 6: *(Right) Participants engaged in discussion at workshop*

Figure 7*: (Far right) Participant studying a discussion guide*

to work with people they trust. This usually leads to churches, community based organizations, and other "grass-top" leaders. When a minister in a church suggests on Sunday morning that the community should get engaged, it goes a lot further than a PSA or flyer.

In our work, and in our recommendations to others, we engage these local organizations and leaders very early in our planning efforts. We bring them on board in ways that allows them to give some input to the way we do public engagement. We position the project so that it is worth their time and effort to be involved and ask the members in their community to be involved. In many cases, where we want a community organization to do a lot of outreach, we will offer stipends to cover some of their time.

Another helpful tactic is to hire community organizers. These are usually individuals who already have some connection with the community. They can help gain access to local organizations and spend time working the community, attending meetings, and knocking on doors to talk with people and get them engaged.

All of this probably sounds labor intensive. It can be, but a little bit can go a long way. One way we have found to reduce costs on some of our larger projects is to recruit and train "semi-volunteers". These people, we sometimes call them Ambassadors, receive a small monthly stipend and training from us to reach out and engage their community. These people usually have other jobs, but want to be more involved in their communities, have free time in the evenings and weekends, and appreciate the small amount of money and training they receive.

Aside from this outreach, the other important facts for engaging the hard to reach are more about logistics. When you can, meet people where they are, in their communities. Go to the churches and community meeting places they already know. For big meetings, provide support services, from language translation to childcare and transportation assistance. Community based groups can also help with "turn-out logistics" such as providing car and van pools to your events.

Achieving diverse representation helps build legitimacy for the community engagement and the planning activity in the eyes of elected officials, community leaders, and the public.

Informed Participation

As a general rule, planners are more experienced with public meetings and public engagement than public officials in other policy areas, and are better at providing useful and timely information in public meetings. The challenge frequently, though, is that the information is often too dense or detailed and too laden with jargon and "insider" terminology, all of which can overwhelm and confuse an earnest gathering of citizens. Thus, there are important questions to consider when

preparing for the "content" of a public meeting:

What is the "frame" for the information? How will it be organized and towards what outcome? This is connected with how engagement is linked to decision making, which was discussed above.

- What is the minimal amount of information that participants need to understand this frame and the relevant issues?
- What are the best methods for conveying this information that are accessible and engaging?

In short, seek to make that four-inch think study into four-page briefs and articulate presentations, considering these communication issues in the process:

Right Amount of Information: Planners and other meeting organizers sometimes error on the side of providing too much information, so much that the critical bits of information get lost. Other times they error on the side of not enough information and the public might feel the planners are not being transparent. Focus on the right amount of information and best methods to convey the necessary background information and most relevant data

Clear and Simple Materials: Presentations, maps and other materials need to provide just enough context so that people have some shared understanding of the situation and focus very quickly on the most important issues and questions. This information needs to be presented in a clear and simple manner to be accessible to as many people as possible.

Maps Accessible to the Layperson: Maps are a great tool, but planners need to remember most people do not have anywhere near the same level of experience reading maps. A good base map is almost always useful to help people get oriented to the geography but be prudent with how many GIS layers you include.

Tools that Leverage Learning: Here the new digital and GIS tools can help organize, animate and guide the public through a learning process and raise their level of effective participation.

Planners have a strong desire and appreciation for the need to help citizens better understand the context, the issues, and the impact of different choices in planning. However, they need to remember that residents will only be able to absorb and understand so much. Focus on the most critical information to convey, and invest resources to make that information clear and accessible. This builds an important foundation for much more successful community engagement.

Good Meeting Design and Facilitation

Once you've implemented an effective plan to ensure a turnout of diverse citizens, and once you've streamlined what is critical to be presented and how, one more factor determines the level of success of your public engagement: how you deliver it. Public meetings are not the only way method of community engagement, but they will always be an important component. We always say that 50% of great facilitation is having the right meeting design. Meeting design is much more art than science, and one improves their art. Critical to the design process is understanding what cultivates positive group dynamics for the meeting.

There are many places meeting design can go wrong. An opening that does not make it clear what the meeting is about can confuse people. A long and detailed presentation can drain everybody's energy. Poorly worded discussion questions or instructions can send people working in different directions. Allowing one or two people to dominate the conversation can frustrate everybody else. Over the years, we have found the following design principles to be most helpful:

Balance Presentation & Engagement: Balance the right amount of information presentation with table discussion and other types of interaction. Too little presentation and citizens have insufficient guidance to hold a good conversation; too much presentation and citizens are potentially either overwhelmed and don't know where to start or they are left with too little time to engage in good conversation.

Right Discussion Questions: Pay close attention to discussion questions. We almost always conduct a focus or simulation group prior to a public meeting so we can test the questions we plan to pose. Sometimes we realize we're way off; sometimes we realize we just need a few tweaks. A good discussion question leads to quality discussions and helps yield the input, ideas, or perspectives you hope for. A poor discussion question can lead to group frustration either because it is too open-ended, too limiting, or too confusing or ambiguous.

Right Tools: Find the right tools for each meeting (and whether they are even necessary) and the right timing for each tool. For example, like many planners, we use polling keypads frequently at our meetings. Just like a great deal of forethought is invested in the right discussion questions, the same goes for polling questions. Polling questions can be used to ascertain who is attending (and how that compares to local demographics), what are people's priorities (either of what you provide or what they self-generate), how they evaluate various options being considered, and so on. Providing the context is critical, as is the actual framing of the question, and the options or scales you choose. We never treat the use of keypads casually, nor do we any tool we use. Invest the right time upfront to figure out what purpose it will serve, what outcome you seek, and process will best yield the desired result.

Invest Real Time in Design: In our experience insufficient attention is paid to putting together the right agenda for a meeting. Most members of the public prefer a well structured meeting with clear objectives and clear guidance on how to participate. Developing the right sequence of activities requires an iterative design process. We will go through several draft meeting designs before settling on the right one.

Excellent Facilitation: Select someone who has strong facilitation and moderation skills to lead the meeting. Good facilitators can both cre-

ate the right tone and environment as well as 'hold the space' so that citizens know what is expected from them. They are welcoming, clear, intentional, and open. They give people a sense of purpose for their work and a sense of appreciation for what they share, both the positive and the negative. Some agencies have skilled facilitators internally; some don't. You might not always be able to find or provide a quality, neutral facilitator for your meetings, but especially when the stakes are high use of an outside skilled facilitator can be the difference between a successful and a disappointing meeting.

One final note on facilitation, we have found that often planners are better served during a public meeting if they can quietly and carefully listen to what others have to say and respond to feedback (praise and critique) from a position as the expert planner and not as a facilitator of the meeting. Letting someone else facilitate can liberate you to play the other critical roles you need to play to move a planning process forward.

Conclusion

Over the past decade, we have found that it is essential to get a critical mass of diverse citizens involved in significant ways throughout a planning process. It is hard work, but well worth it. During the engagement process, we help citizens digest complex issues to ensure the choices to be evaluated make sense and the dialogue is informed and practical.

By bringing citizens together in productive forums, in which the right conversations are effectively framed, we are able to help citizens move beyond their differences to find common ground, thereby increasing the likelihood that effective engagement leads to shared priorities, clear recommendations, and broad support for the planning effort.

We have a great respect for urban planners. They typically do more community engagement than most other areas of government. We know that planners have also made important progress in employing good methods (small group discussion, keypad polling) for successful public meetings.

As regional planning continues to grow in importance, and as more elected officials and policy makers act on the need for regional collaboration and decision making, good citizen engagement practices and tools will become increasingly important to deal with increasingly complex issues.

About the Authors

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Afterword

By Uri Avin, FAICP

There is much good news in the articles on scenario tools and applications in this newsletter. The progress reported by Criterion on solving the vexing problems of data organization and consistency and the potential of SPARC – the common data schema – is big news.

Advances in CommunityViz's depth and public engagement modalities will advance the state of the practice. The promised apps that will accompany Envision Tomorrow Plus's new web-based tool are tantalizing. Geodesign sounds like a powerful advance in the combinatorial methodology to support decision making in environmentally fragile areas. The Kona Plan Case study from ESC demonstrates nicely how software tools can move a community through a planning effort in which visualization plays a key role in public understanding of and support for growth choices. The attributes of successful public engagement are further dissected in lessons for practice distilled from the vast experience of America Speaks.

In thinking about the application of these scenario tools to regional-scale planning, however, there are aspects of the tools and their underlying assumptions that should be critically examined in order to more broadly advance the state of the practice. Regional-scale planning differs in fundamental ways from jurisdiction or sector scale planning. I briefly discuss these key differences which shape my take on the issues surrounding scenario-building tools that I want to highlight. I organize the issues around three related headings: scale vs. public knowledge, end-state vs. contingency planning, and the hidden role of bias.

Regional planning realities affecting scenario-building tools:

Here are some observations on regional planning that influence my take on regional scenario-building and tool use:

- Large multi-jurisdiction regions are shaped by dynamics that are complex and not easily modeled or understood by anyone; the demographic, socio-economic, environmental, market, political and other forces at play undermine simplistic predictions
- Residents of large regions may know and understand their part of the region well but not the whole region making it very hard for them to opine on who needs what and what goes where
- Coming to terms with major, policy-driven changes in regional development patterns requires a good understanding of trade-offs; but beyond robust information, it also requires a lot of "working through" if strong, emotionally-vested values are challenged and need reconciliation

Scale vs. Public Knowledge

Many of the tools described were originally developed for smaller scale applications where the issues were clear to the public or to decision makers very familiar with their context; scaling the tools up to the region assumes that they can still capture and convey growth dynamics in half day workshops and can sufficiently inform the public to make choices that are meaningful and durable. This is a tall order, even obeying all the good meeting design principles from America Speaks. To cope with this scale/knowledge mismatch, most scenario-building conducted in this context severely limits the public's range of choices and options to a set of land use patterns. (Trends/Sprawl vs. various levels and styles of Smart Growth.) If time allows, there may be some iteration of choices following feedback on initial impacts. Predefined PlaceTypes (i.e. prototypical images and descriptions of development types like Urban Mixed Use or Low Density Suburban) facilitates the growth allocation process.

Nevertheless, there is something fundamentally askew with this model of scenario-building.

(M)ost scenario-building conducted in this context severely limits the public's range of choices and options to a set of land use patterns...

The selection of the "preferred scenario", the next step in the process per Fregonese and Gabbe, assumes that local planners have the ability to implement the major shifts in jobs and housing that the Smart Growth patterns typically generate and that local jurisdictions will accept these changes which will have significant fiscal and other impacts typically not (or poorly) accounted for in current tools. Oftentimes these visions stand in stark contrast to local plans and the twain never meet. This challenge goes to the nature of the scenarios sought and to their conceptual framework.

End-State vs. Contingency Planning Approaches

The tools described develop scenarios directed towards selecting a preferred outcome in a mode that is best described as end–state or as "predict and plan". However, where the forces affecting the future are very unclear, where a long term horizon is chosen (like 40 years of more,) where the region is very heterogeneous and where much change can be anticipated, then quite another mode of scenario thinking is more appropriate.

Sometimes called Contingency Planning (Chakraborty, Knaap *et al*, 2010) or Anticipatory Governance (Quay, 2010) or Futures Planning (Avin, 2007,) this mode of scenario building seeks to create many more than the 3-5 usually developed in the end-state mode. It is based on a rigorous analysis of forces for change, their probability and impact. This approach has been well developed and described in the business, defense, energy and climate sector literatures; the outcome of such efforts is not a single preferred scenario but a range of outcomes for which a robust set of actions (short and medium term especially) have been selected and for which telltale indicators are specified so that organizations can adapt rapidly. Scenarios developed in this way go well beyond a Sprawl/Compact growth dichotomy and incorporate a much wider range of inputs and outcomes.

Whether or how sketch tools can evolve towards supporting contingent scenario development is an open question and a challenge. The growth allocation wizard featured in CommunityViz or "What if?," which allows users to specify the rules under which growth will be allocated (i.e. to select or specify and weight key factors), is an important step in this direction. Rulemaking, however, is dependent on a lot of analysis (how important a factor is job accessibility for housing location, for example?) and narrative development and this has to be an offline exercise. The tools we have are stronger conceptually in impact analysis and evaluation than in crafting plausible scenarios.

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This challenge also affects process design. Sporadic forays into the regional community to solicit ideas or feedback during a process faces great challenges in soliciting representative, thoughtful responses as Clark and Brigham note. This is compounded by the complexities introduced by a contingent approach. Instead of relying on intermittent public workshops as the vehicle for advancing scenarios my experience suggests that convening a representative but selective, smallish steering committee throughout these 1-3 year processes holds much more promise for understanding, working through and vesting in the scenarios developed and the actions prioritized. Yankelovich and Friedman (2010), in making explicit the stages necessary for wise public judgment, imply the limits inherent in one-of-a-kind efforts and in social media. Back when, Helling (1998) laid out the ca-

About the Author

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veats that go with community–wide visioning efforts in her detailed analysis of the Atlanta region's extensive and expensive visioning experience.

The Hidden Role of Bias

Bias can enter tool and process design in many ways:

- Where PlaceTypes are the vehicle for scenarios in end-state processes, bias can enter through the palette of PlaceTypes selected
- In the way in which a Trends scenario is defined. Trends scenarios can mean various things including:
  - A straight line or trendline extrapolation of current development approvals/permits over a given timeframe (e.g. 2000 – 2010 or a longer timeframe) by type (e.g. housing type, employment type) and location (e.g. tier)
  - A modification of the above current trends definition based on new, given market forces as expressed in projections by groups like Dunn and Bradstreet and similar proprietary models
  - A modification of current trends based on new regulations
  - A continuation of current policies that influence growth trends but which acknowledge inevitable trends like an aging population and related housing and mobility preferences
  - The Official MPO Numbers by TAZ as Approved by the County

Indeed, it is unclear that "Trends" is a meaningful baseline rather than being approached as another scenario to be worked up.

- In the lack of controls on the market feasibility of how much housing and jobs can be shifted around (which the planners must somehow untangle after the fact). This lack of market validation, let alone exploration, dogs and undermines most scenario efforts
- In the selection of the formulas that drive the outcomes from the placement of PlaceTypes and transportation-related assumptions (like VMT or TOD impacts on mode split)
- In the indicators selected or left out; oftentimes indicators unfavorable to desired outcomes are ignored like increased VHT for transit or marginal GHG reductions for land use shifts (other, perhaps, than at a per capita level)
- In the predilection for assessing and quantifying a narrow set of costs rather than grappling with the thornier quantification of benefits
- In how table facilitators introduce and manage discussion and action during public or

stakeholder work sessions.

- Not allowing devil's advocate options in the room
- Not scrutinizing the assumptions behind model algorithms

Planners should check these areas of possible bias as part of their due diligence before investing in tools that, because they are affordable and promise "buzz", can come to dominate meetings and processes, rather than serve them, as Clark and Brigham note.

Academics have not really focused on the wave of regional planning now being done via sketch planning tools despite their increasing popularity in the field, much spurred by the HUD's Sustainable Communities Initiative. Only a few academics have been involved in research that supports shortcuts for evaluating impact outcomes. In part, this is because generalizing the cause-and-effect outcomes of planning actions (e.g. beefing up the 4 or 5 "D's", or the induced growth from new highway capacity) is a risky business and the subject of much debate among researchers. Promising advances are being made here though. The ET+ apps sound interesting and others like SmartGAP - a pending online tool that predicts the regional effects of Smart Growth actions on travel behavior – seem to be harvesting the best thinking on elasticities and meta-analyses in the field. The next edition of the venerable text, *Community Analysis and Planning Techniques* by Richard Klosterman (1990), for example, will show how traditional planning methods such as extrapolation, cohort-component, and shift-share can be used to support the scenario development process.

Last Word

Tools that facilitate the evaluation and display of scenarios are making great strides. They are becoming more visually appealing and accessible and are moving towards common standards. They are interfacing better with exterior models and incorporating new research findings into less simplistic formulas. It is unclear, however, that these evolving tools can or should replace the necessary dialog and debate in the formulation of scenarios, especially when contingency planning is called for. Precisely because many tools now promise to create meaningful scenarios, and with "public buy-in", there is this temptation to shortchange the careful crafting of scenarios. Likewise, the arduous task of coming to public judgment, in Yankelovich's turn of phrase, must still be done slowly and continuously, if the buy-in is to have long term traction and the ongoing involvement of a core group of community stakeholders. The iterative use of tools which incorporate meaningful feedback can play a role in supporting such momentum but cannot substitute for this face-to-face work.

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Editor's Corner

In the days of yore when computers filled sealed rooms and the anointed high priests of the secrete data order presided, it was promised that spewing forth of miles of magnetic tape would come the answers – to all your questions. Where from came the answers was not yours to questions. This was the new Truth – all were to believe.

It the windy distant rugged lands of Alinsky and Davidoff came war cries of disbelief and distrust. The answers of the magnetic mystics were not to be trusted! What these street warriors believed was the truth of the People's streets was for all of us.

In the intervening decades this schism of data and beliefs have remained in their own tense corners until… Perhaps it was the 1984 Super Bowl XVIII when Apple's heroine athlete crashed the Big Brother screen and the data became transformed into information for all of us. It as inevitable that backroom models would came under skeptical scrutiny and we began to see that the data churned out by the still mystical models was not certainties but possibilities.

The Regional and Intergovernmental Division is honored to provide this important issue profiling the emerging visualization and decision support modeling tools from not a remote priest class but a new order populists seeking to bring useful information to their respective communities. The authors are leading the field in both developmental as well as in-the-field applications from this generation of modeling tools. They also provide rich guidance to further learning resources as well as giving candid, critical insights into the limitations of this generation.

For my part, have had the opportunity to work with all of the tools reported on here and have some advice for consideration. When my commissioners at the Northeastern Illinois Planning Commission requested information on up-dating our agency modeling capabilities, I summarized the staff and consultants finding as follows. "While you may spend millions of dollars on a Stradivarius violin, if your child is not a well trained musician, the music will still be terrible." The same is still true of these tools. What goes in, how it is processed and how it comes out depends to expertise like we have here to run the tools. They are not yet off the shelf boxes but are very useful when applied by skilled users.

While some of the tools such as CommunityViz are becoming affordable and an increasing number of agencies have installed them, most still need skilled and creative expertise to use them. The other clear message we have is that the role of the public has, in no way, been eclipsed by these sophisticated tools, and as most of the articles here emphasize, these tools are a support to more effective public engagement. AmericaSpeaks advocates and Uri Avin emphasizes, face-to-face deliberation of a broad, diverse public is still the stuff of successful planning.

What these tools are doing is to define a common ground to negotiate a balance of visualized, factually based information between those of strongly held beliefs and opinions, and the decision makers responsible for public actions. With these scenario tools the schism between data-based information and active community interests is being mended.

I will also venture to speak for most of this issue's contributors in venturing that the current negative assault on planning activities (especially stainability initiatives) will be best overcome with more community engagement, not less, and these tools can help bring facts and defensible decision-making with the increased public and media scrutiny.

In this issue the first article by Jim Holoway provides a concise overview of the field drawn from his timely publication "Opening Access to Scenario Planning Tools" for Lincoln Institute for Land Policy. Your first "click" after reading this issue should be to order a copy from Lincoln. Much need in the field is the consortium's efforts to forge consistency and compatibility between the tool sets.

The second article by Doug Walker of Place Ways profiles their CommunityViz tool. It is perhaps the most accessible and used of the modeling tools. Having worked on two recent regional plans, I find CommunityViz provided the promised scenario models leading to successfully adopted plans. One of these CommunityViz projects was the 2040 Regional Comprehensive Plan of the Northwestern Indiana Regional Planning Commission (NIRPC), receiving this year's APA Award for a Plan.

The next article by Ken Snyder of PlaceMatters focuses on their innovations to make the models responsive to interactive public planning especially with "hands-on" touch tables. Then Shannon McElvaney takes into the sophisticated research potential of these GIS based tools and ESRI's exploration into development of three-dimensional analysis tools that they label as Geodesign.

An early leader of three dimensional tool development, Michael Kwartler of the Environmental Simulation Center

provides a case example of tool supported, place-based planning and urban design in a new Hawaii community. Michael provided early input into the Orton Foundation's development of CommunityViz and continues to build links between two-dimensional map tools and design visualization tools.

Eliot Allen of Criterion has been one of this field's true pioneer innovators with their robust INDEX tool kit. While INDEX is not an open architecture tool, their tool is the most real-time, interactive of the tools. It was our core tool in developing the NIPC 2040 Regional Framework Plan, which also received the APA Award for a Plan in 2006. The tool was installed at the agency by Criterion with the needed staff training and support to maintain its on-going staff use.

One of the preeminent regional planners, John Fregonese, has continued to advance the tools that were launched with the Envision Utah project and now advanced to a suite of tools and state-of-the-art Apps that may be an indicator of the next generation of tools. The Maryland Department of Planning provides a clear illustration of scenario modeling tool used for state-wide planning.

Capping-off our scenario tools exploration is AmericaSpeaks with their strong, clear reminder that public planning is for and with the people. While being a leading proponent practitioner of a number of group interaction tools that compliment these scenario modeling tools, their deep commitment is to the democracy of planning and a timely reminder of the importance of reaching out to and engaging the public in the planning process.

The final Afterword article by Uri Avin provides the reality check of a leading expert's assessment of the strengths and limitations of this current generation. Uri provides a candid critique from a tools advocate with the experience to define their limits.

Some areas for future exploration here include the groupware tools such as those used by AmericaSpeaks and the mushrooming world of social media. The APA Technology Division is a source for information on Social Networks for planners, especially the work of Jennifer Cowley at The University of Ohio.

A concept that may not be explicit enough is that all these tools and engagement efforts go to creating a truly interactive planning process where the diverse voices of the public do make a difference in shaping a plan. It is an assumed core value of these tool users.

There are two contributors whose schedules did not allow a submission I want to include in these notes. The first is MetroQuest, which some may consider more a communication than modeling tool. But, in providing understanding, graphic information and visualizations that inform and excite the public, they have no peer. And an informed and supportive public is a dire need to the whole planning field.

The other is Mike McKeever; currently executive director of Sacramento Area Council of Government (SACOG). Mike's early development of the PLACE3S model was a guide for a number of the featured tools. SACOG has continued to evolve their version of PLACE3S and is perhaps the best example of tool application to a complete regional planning process from vision, to a growth management model that is integrated with the long range transportation plan. All those involved with the HUD Regional Sustainability grant projects should look to SACOG for a guiding model.

The Regional Sustainability grants will be a subject of our next Regional and Intergovernmental e.Journal and we are looking for good articles profiling the grant projects.

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