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## **Radical Uncertainty: Scenario planning for futures**

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## Abstract

The use of scenario planning in urban and regional planning practice has grown in the last decade as one way to face uncertainty. However, in adapting scenario planning from its origins in the business sector, planners have eliminated two key components: 1) the use of multiple scenarios, and 2) the inclusion of diverse organizations, people and interests through deep deliberations. We argue that this shift limits the ability for planners to plan for multiple plausible and futures that are shaped by an increasing number of diverse actors. In this paper, we use case study research to examine how uncertainty was considered in four scenario planning processes. We analyzed and compared the cases based on analytical categories related to multiple futures and diversity. We found that the processes that used multiple, structurally distinct scenarios explored a wider range of topics and issues shaping places. All four relied heavily on professional stakeholders as the scenario developers, limiting public input. Only one of those processes that included multiple futures captured the differential effects that scenarios would have on diverse people and interests. All in all, the purpose of the scenario planning drove the participant diversity and ultimately the quality and use of the scenarios.

## Introduction

Planning practice necessarily must deal with imperfect foresight to plan for uncertain futures in diverse communities. To plan for an uncertain future, planning practice relies on modes such as visioning, forecasting, and scenario selection. These methods allow planners to identify possible directions for a community and then chart a path to achieve that future possibility. Planners produce a single vision, rely on a single forecast, select a single scenario, and create a single plan in an attempt to reach that desired future (Hopkins and Zapata 2007). Such an approach to planning fails to account for the 'radical' uncertainty of the future and does not account for the diversity of publics that inherently shape the future (Hajer and Wagenaar 2003). The question explored in this paper is: how does 'scenario planning', as an alternative to the aforementioned methods, account for these uncertainties and diversities? Uncertainty and diversity crucially interact with one another and public planning has the ability to harness them both to create better plans and planning methods.

The scenario-planning process gained notoriety when Shell Oil Company utilized it to successfully weather the 1970s oil crisis (Wack 1985; Van der Heijden 1996; Schwartz 1996). In the corporate approach, scenario planning generates multiple, plausible scenarios for a company or an industry and then constructs plans around these multiple futures. Scenario planning in planning practice was initially widely used in land-use and transportation planning (Myers and Kitsue 2000; Avin and Dembner 2001). Contrast this to traditional planning, which looks at a planning horizon (20-30 years into the future) scenario planning is expected to look at plausible events that may or may not be in the planners' control, nevertheless, need to be addressed. When these events happen may

matter because of lead-time considerations, however in general, horizons take on a secondary roles.

However, its use in planning has deviated from the corporate use in two ways. First, scenario planning is used to develop preferred-scenario alternatives; this is in plans where a single alternative or “preferred scenario” is selected. Second, scenario planning usually calls for ‘wide participation’ rather than ‘deep participation’ of highly diverse participants. Because it is logistically infeasible to include ‘wide’ and ‘deep’ participation (Mutz 2006), public planning processes usually solicit information from either a large sample (through surveys and charettes) or from a small number of ‘professional participants’ (through a limited number of workshops). These particular adaptations mean that planners miss the opportunity for deep deliberation amongst diverse people; this limits the representation of diversity within places as well as pronounced differences between them.

In this paper we briefly examine the standard scenario planning literature to extract various lessons for public planning, especially in dealing with uncertainty. We examine four scenario-planning processes to identify the practices in which they did or did not account for these issues. Each case elucidates the strengths, weaknesses, and challenges of scenario planning. We argue that planning practices will be more effective in preparing for future uncertainty through the inclusion of multiple, structurally distinct scenarios generated from deep deliberation amongst highly diverse community members.

### **Future Uncertainty**

When a community chooses to collectively plan for a particular future, it sets a clear path of action and emphasizes shared goals (Isserman 1984; Wachs 1982). However, such an approach to planning is problematic for two reasons. First, planners and communities

do not anticipate, prepare for and respond to the natural uncertainty of whether or not such a future will materialize (Shearer 2005; Quay 2010; Chakraborty et al. 2011). Second, conventional planning that relies on a traditional “predict and plan” approach fails to account for the diversity of publics comprising a community (Myers and Kitsue 2000; Abbot 2005).

*Multiple futures.* In their work on network governance, Hajer and Wagenaar (2003) identify uncertainty as one of the five challenges that planners and policymakers face and ask them to urgently respond to today’s ‘radical’ uncertainty. Quay (2010) argues that uncertainty could be better addressed through anticipatory governance, which considers and prepares for a range of plausible futures, specifically discussing scenario planning. Preparing for multiple futures allows planners to consider a range of issues that could shape their community. They can also identify what is within their community’s control, and what is beyond it. Such a planning mode recognizes that planners cannot always chart a path to the future and steer the boat there.

Scenario planning in the business sector generally focuses on the development of long- or medium-range futures (approximately 15 – 20 years) (Smith 2007). However, the time horizons are largely unimportant to scenario planning; instead the focus is on events. That is instead of painting the picture of the future at a given horizon year, the idea of scenario planning is to describe a process and key events that present fork the river (in Wack’s terms). To be sure, most scenario planning processes from Shell’s own scenarios, United Nation’s scenarios for HIV in Africa, and Singapore’s National Scenario Planning exercise have a horizon year ranging from 10-40 years out into the future. The further the horizon year, the greater the uncertainty, the greater the number of forks and therefore

larger number of scenarios to bound the uncertainty (Intriligator & Sheshinski 1986).

It is also important to recognize that multiple futures in this approach to scenario planning are not just sensitivity analyses that characterize many projection studies such as high, medium and low (Oglivly & Schwartz 1998). They are not the outcomes of minor changes in the input conditions and variables of the same 'model' of the process, but outcomes of radically different and perhaps incommensurable models that highlight different aspects of reality<sup>1</sup>. Furthermore, some of these futures might include discontinuous ruptures such as a natural disasters, shift in technologies, dramatic changes in the institutional structure imposed externally, all of which cannot be encapsulated in futures that look to the past for direction. Such 'black swan' events can shift the paradigm in which the region operates. Even when a cataclysmic event does not happen, scenarios can challenge people to reconsider underlying and fundamental assumptions about how a place functions, sometimes articulating these assumptions for the first time. For instance, in Monteverde, Costa Rica, scenarios challenged community members to consider what kind of economic framework they wanted to operate in – one dependent on tourism or one with a diversified economy (Harwood & Zapata, 2006). Thinking through these combinations of events and processes will necessarily involve planning for and with multiple futures rather than selecting a single preferred future.

*Diversity.* Diversity refers to a wide range of 'categories' of people in places. What categories of diversity relevant for a planning process are contextual to a place and may include, for example, employment type, educational level, political affiliation, geography (i.e., rural or urban), different jurisdictions and organizations, race, or country of origin.

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<sup>1</sup> We are not necessarily referring to computer simulation models but about mental models that necessarily simplify and ignore certain aspects of reality while emphasizing others (e.g. Box & Draper 1987).

Various individuals can have different opinions and preferences, even while affirming common background social, cultural and linguistic norms, e.g. people representing different interest groups and jurisdictions within a metropolitan region. Or different groups can have incommensurable background norms that make communication and articulation of preferences and positions much harder. It is easier to account for the former rather than the latter type of diversity.

In planning processes, including diverse groups of people that share common background norms, help articulate one kind of scenarios. Diversity in opinion help us create radically different scenarios and may even help us reach a common consensus about action. On the other hand, scenarios that account for incommensurable background norms can help us empathize with others that are sufficiently different than ourselves by creating the same scenarios from multiple perspectives. Ideally, the final product, multiple scenarios, tells the stories of different futures for diverse publics. Including multiple futures eliminates the need to create a single story about a future where one population wins out over another or a homogenized vision of the future is created in the frame of one dominant group, reflecting the disproportionate effect on specific groups.

An additional frame exists for the consideration of diversity in scenario planning. Here, diversity matters as a way to further creative thinking that leads to more robust scenarios (Ogilvy 2002). Ogilvy and Schwartz (1998) describe the function of diversity within a corporation diversity within a corporation:

The full spectrum of organizational functions should also be present finance, R&D, manufacturing, marketing, and different executive levels. Internal diversity is critical to the success of the project. The key to failure, on the other hand, is the exclusion of people who are unorthodox, challenging thinkers from inside and outside the organization (p.58)

The participation across the spectrum that Ogilvy and Schwartz reference leads organizations to uncover 'black swans' and prepare for radical uncertainty. In planning processes, we can be limited in the diversity of actors within a process. The construction of scenarios occurs through careful deliberation amongst diverse participants in a small group setting, consistent with recommended by collaborative planning scholars (Forester 2006, Umemoto 2001, & Healey 1998). Here, empathy can be created, differences articulated, and radical uncertainty discovered. This transformative learning (Zapata 2013) that can occur for the participants and reflected in scenarios created, depends on how high the degree of diversity is within the group.

Further, we know that the actions of multiple agents will shape a place's future; however, we cannot say with certainty which agents they will be. For instance, the demographic concentration of Cuban-Americans and Haitian immigrants in Miami area in the later part of the 20<sup>th</sup> century has profoundly changed the character of the city and continues to influence the spatial structure of the area (Nijman 2010). If the future residents are unlikely to be similar to and share the same values as the current residents of the city, inclusion of multiple perspectives helps us to avoid the mistake of thinking that the future will necessarily be a reflection of the present and would necessarily be experienced in similar ways as the present (Scarce and Fulton 2004). Thus, scenarios that take a broad view of diversity, accounting for differences in norms and incommensurable backgrounds, help us create radically different scenarios. Once these scenarios are created, different groups can use them to make different collective and private plans in response to those

scenarios. Such scenarios can help planners fulfill Sandercock's (2004) call for futures planning that is audacious, creative, political, and therapeutic.

## Methodology

In this paper, we employ a case study methodology. Case study research is appropriate when the researcher asks "how" questions, examines current situations, and does not need to control or influence behaviour (Yin 2009). Case study research can also draw on multiple sources of data, which adds flexibility to the research design. In this paper we examine four scenario-planning cases. Each case was examined for how the process incorporated diversity and how it responded to the creation of multiple futures. The cases were selected for the purposes of comparison and contrast using several categories of analysis. Chaskin (2001) as cited by (Yin 2009) relied on a two comparative cases.

The research design follows the COSMOS Corporation's framework for considering multiple cases, as discussed by Yin; each case was analysed independently and then comparatively. As discussed below, we selected each case based on its implementation of scenario planning to be examined for its treatment of multiple futures and diversity, what Flyvbjerg (2006) refers to as "maximum variation" cases. Each case brings a different insight into how scenario planning addresses diversity and multiple futures.

We identified three of the four cases due to our own primary research on, observation of, or direct participation in the planning process. The fourth case, *Envision Utah*, was selected given its prominence in the field and recognition as an outstanding planning process. We do not endeavor to suggest that these cases are exhaustive, but we do

argue that in-depth exploration of the cases helps us tease out the key features of scenario planning as currently practiced. Other examples of scenario planning or scenario preference selection exist (e.g. Bartholomew 2007); however, these four processes provided a range of activities that add insights into how planning can respond to prepare for future uncertainties. The relationships of the authors to the projects and how data were collected are presented in [Table 1].

**[Table 1 Case selection and data collection procedure about here]**

For each case, we considered specific analytical categories related to either the use of multiple futures in the process and the treatment of diversity. For multiple futures, the categories included:

- 1) *Structurally distinct versus option alternative scenarios*: Here we examined how multiple futures were addressed in the scenario-planning process. Option alternatives are those that are used in forecasting (e.g. High-Medium-Low) and are typically used to select (or agree upon) a particular forecast. While each of those option alternatives can be evaluated on multiple attributes/indicators, in general, the options are usually arranged on a single graded scale for facilitating choice. Whereas, structurally different scenarios help us contemplate multiple distinct future and contemplate about them; in general the scenarios are largely incommensurable
- 2) *Scenario use during and following deliberations*: Following from the earlier category, we were interested in how the scenarios and the deliberations were

co-constructed. We are interested in, if the different modes of scenario planning had propensities for different types of participation.

- 3) *Use of base case:* The “base case” or “business-as-usual” (BAU) scenario is used frequently in planning activities. We wanted to see if processes that were focused on multiple futures would still employ a base case and if so, we discerned how was the base case created and for what purpose. We believed that the BAU case would be used as a catalyst to raise alarms about the future.
- 4) *Use after:* We wanted to see how organizations used multiple futures in their work long after the scenarios themselves were complete. The end of scenario planning is not to create scenarios but to prepare for them and we wanted to examine if and how these ends were met.

For the treatment of diversity we considered the following categories:

- 1) *Scenario generation:* We examined who created the scenarios and how they were created (i.e. from computer models, stakeholder perspectives, or some combination of both). What scenarios were generated and how deeply the interconnections were explored is contingent on the participants’ expertise, background, trust and involvement.
- 2) *Public engagement:* The wide range of public engagement was carefully analyzed. Our main points of interest included who participated in the process, how they participated, and when they participated. We examined the different perspective offered by participants and distinguished between public-input activities and education activities. We believed that broad based public

engagement would be limited. Instead, the focus would be on major elites and stakeholders.

- 3) *Representation of diversity*: We examined what kinds of issues related to diversity were raised. We also looked at how diversity was represented in the final scenarios.
- 4) *Use after*: We examined if there were variances in how various groups that participated in the process used the scenarios for their own purposes long after the scenario construction was complete and if so with what degree of effectiveness.

The study contributes to what Xiang and Clarke (2003) argue is scenariology – studying scenarios.

## Cases

We first provide brief descriptions of each case and identify some of the key points pertinent to each case. We then elaborate upon these points in the following section, comparing them across the cases based on the 8 elements above.

### Envision Utah

In 1997, Envision Utah was created to educate the public and decision-makers about the issues and consequences associated with rapid growth in the greater Wasatch area, a ten-county region (Briggs 2008). Under the guidance of the 100-person steering committee, Envision Utah set out to educate the public about the growth projected for the

region, to gather its input about how to accommodate this growth, and to create political and public willingness to proactively address projected-growth concerns.

The input from the public was used to generate models and corresponding maps to identify possible scenarios that the region could pursue. The four scenarios ranged from a low-density alternative with predominantly auto-oriented development to a high-density transit-oriented alternative with more compact growth and higher levels of infill and redevelopment. Scenarios were used to generate public discussion about the future growth of the region and then unofficially voted on by community members via newspaper and online ballots. The public selected “Scenario C” that focused on walkable communities yet did not have significant increases in densities. Envision Utah today continues its work informing planning and policy in Utah. The organization and its original planning process have been widely recognized for their innovative, participatory work.

### Maryland Scenario Project

Since 2007, the Maryland Scenario Project (MSP) has been an ongoing effort to promote regional decision-making and overcome the fragmentary nature of governance within a 200-mile radius of Washington DC. The area comprises of two states, an autonomous federal district, two Metropolitan Planning Organizations (MPOs) and many other regulatory and non-regulatory entities. Spearheaded by the National Center for Smart Growth (NCSG) at the University of Maryland, MSP sought to develop technical as well as institutional capacity to address the inter-related urban problems.

The Maryland Scenario Advisory Group (SAG) was set up to oversee the identification forces that drive urbanization and future public investments, regulations, and

programs that might generate outcomes that would be consistent with a Reality Check exercise that drove the development of the MSP. The SAG first conceived of the regional spatial patterns of development that included: an urban diamond that concentrated growth in the four different cities of central Maryland, a “State-preferred” alternative that concentrated growth in Priority Funding Areas (PFA), and a “business-as-usual” alternative that projected the existing patterns of growth into the future. SAG then identified the drivers of urban development in the region that were considered important and uncertain.

These spatial patterns and drivers informed the model-building part of the MSP, which was driven primarily by the staff at NCSG. This process included loosely-coupled economic, demographic, land use, and transportation models that encompassed the region but also were tailored to be responsive to the identified drivers. The scenarios were generated from various inputs including different patterns in Federal spending and fuel prices as well as internal choices such as new transit and transportation investments. These scenarios were supposed to inform the development of the Maryland State Development Plan

#### Region Forward 2050

Greater Washington 2050 is spearheaded by the Metropolitan Washington DC Council of Governments (MWCOCG), an MPO for the eight-county region and a number of independent cities in Virginia encompassing metropolitan Washington DC. In 2008, as a part of the planning effort to coordinate investments and regulations in the region, MWCOCG convened interested parties from various jurisdictions and interest groups in a year-long exercise. The main thrust of the project was to produce a compact to promote shared

regional goals. To this end, MWCOG created the Greater Washington 2050 coalition headed by the chairman of the Fairfax County, Virginia Board of Supervisors. Planning directors, mayors of various cities, and representatives from transit agencies were part of this advisory group. Thus, the group included key decision-makers in the region as well as representatives from advocacy groups such as Natural Resources Defense Council and Coalition for Smarter Growth.

A day-long scenario planning exercise was commissioned that resulted in a document titled “Big Moves”. The exercise was based on four different possible future directions in the region: “Hot and Gridlocked”, “HiTech Green”, “Federal Government Dispersal”, and “Cooperation in Hard Times”. These scenarios were constructed by asking for input from a wide range of experts and were drafted by the MWCOG staff before the day-long exercise. The scenarios are descriptive stories of how various futures might unfold for the Washington region and contain various jurisdictions and locations as characters (“Greater Washington 2050” 2009). MWCOG presented these scenarios to the subgroups within the larger exercise. Each subgroup was tasked to come up with a set of strategies that would be useful in one particular future assigned to the group. The resulting strategies were collated and presented to the larger group; they included pursuing transit-oriented and green-oriented economic development. In January 2010, MWCOG and 21 local jurisdictions approved the Washington Compact<sup>2</sup>. This compact stated common goals, such as the preservation of affordable housing and the promotion of regional activity centers, while preserving the authority and responsibility of the different jurisdictions in formulating their own actions towards the achievement of these goals.

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<sup>2</sup> The compact can be found at <http://www.regionforward.org/compact> (Accessed July 25, 2011)

## Valley Futures Project

The Valley Futures Project (VFP) examined how four futures could play out in the Central Valley of California. Coordinated by the Great Valley Center (GVC), a non-profit organization, the goal of the project was to spark a conversation about the region's challenges. For GVC, the aim of this conversation was to build capacity for regional planning and governance in order to address these challenges.

All four scenarios were included in the final project materials in which each future was described as plausible. The scenarios were based on how key issues and forces would play out over twenty years from a starting point in the present. The scenarios were created by 25–30 community leaders, with support from process consultants and the convening staff of GVC during a couple of two-day retreats. Community leaders were asked to contribute their expertise and knowledge about the region, which would be rendered on a graph. One “axis” group focused on issues that were external to the control of the region, specifically, national, economic and climatic disaster conditions. The other “axis” group synthesized issues that the region could directly influence, such as educational attainment and job training.

Once the description of the “axes” were completed, community participants then created narratives detailing the future scenario that was located in each quadrant of the final graph. GVC then assembled these narratives and repurposed them into fictional stories, each centered on a fictional but realistic character. The final product included the presentation of these stories in booklets, videos, radio segments, and a website. In the printed materials, indicators of how to know which scenario was unfolding followed the story. The organization also created facilitation guides to train people on how to discuss

the scenarios and how to integrate discussion about the scenarios into a high school curriculum.

## Comparative Analysis

In the previous section, we described the four scenario-planning cases. Each case offers insight into how scenario planning is being used in planning practice. Table 2 summarizes these differences among the cases across the two main and supporting analytical categories. We discuss each category and the similarities and differences between the cases below.

**Multiple Futures.** Future uncertainty can be planned for through the creation of multiple futures. These organizations used multiple futures to fulfill different goals. Broadly, scenarios were created and used to address a pressing concern – most of them tied to growth management, at least initially.

- 1) *Structurally distinct or option alternatives.* Except for EU, all the three created scenarios that are structurally different. The scenarios in EU on all the major indicators such as infrastructure costs and water demand are arranged on a linearly graded scale with Scenario D (the most dense pattern) scoring the best and Scenario A (continuation of current trends) scoring the worst. MSP, VFP and RF, on the other hand, created structurally distinct scenarios and one was not selected as preferred. The scenarios acknowledged things that they could not control (i.e., natural disaster, global economy). However, the processes also identified issues within the influence of the regions. The processes explored how actors (organizations and individuals) might respond if certain events transpired such as a significant drought in the agricultural CA Central Valley. Hence, some organizations identified futures for a community to work towards

achieving. Others focused on future uncertainty and how they could respond to that uncertainty. There is a state preferred scenario in the MSP, however, because the scenario planning was driven by a research center, it did not push for preferring this scenario over others though the name might suggest otherwise.

- 2) *Use during the process.* Broadly, the scenarios were used to obtain agreement between stakeholders about either issues that would shape the future of the community or actions to take to achieve a particular future. Specifically, RF wanted participants familiar with one another to collectively consider the future in order to better prepare for possible scenarios and thus sought a commitment from area jurisdictions on how to achieve collective regional goals. The VFP brought strangers together to consider the plausible futures to build capacity for regional planning and create scenarios that could be used to then educate and inspire public action. In EU, the organizers sought to reach agreement about community values and then about a specific scenario that would chart future development. Finally, in the MSP, the purpose of the exercise was to be partially academic but also to engage the various key agencies in the regional planning across the different metro regions and multiple states. MSP used the scenarios to test assumptions about the future. Thus, during the process the emphasis for RF was on identifying actions to achieve collective regional goals, in VFP to build capacity within leaders and to write scenarios, in EU to choose a scenario, and in MSP to test assumptions about the future.
- 3) *Base Case.* All four planning exercises used a contrasting scenario. While the scenarios are meant to contrast with one another, pairwise comparisons are easy to make and the existence of a base case reduces the number of pairwise comparisons that are made.

BAU or base cases have been criticized for being “strawmen”, something meant to scare people into action. In particular, the impetus of many planning processes is that the current situation ought not to be left unchecked and therefore something needs to be done. Given the projection of the trends into the future, the situation becomes untenable and therefore serves as a call for action.

While some of the future scenarios in the processes were negative, each used something resembling a base case – or a case that plays out negative trajectories – for comparison and educational purposes. In the case of the VFP, the three less-desirable scenarios were used to spur group action towards the preferred scenario even when there is no explicit acknowledgement of the preferred option. RF and MSP used a scenario against which they measured every other outcome. EU relied on a traditional BAU scenario where current trends were extrapolated to demonstrate the negative impacts on the region and to spur action against that future. All relied on contrasting future scenarios to demonstrate the different directions a community could take. This contrasting helped participants go beyond just understanding the consequences of their current actions to understanding the nuances of the futures that may occur.

**4) *Use after the process.*** For EU and the VFP, both the creation of the scenarios and then public use of the scenarios were central to meeting project objectives. In EU, the scenarios were created with public input, in part to meet goals of public involvement and to create scenarios more like to be accepted by the public. However, one was expected to be selected as preferred. The VFP intended that the scenario-creation process would inform the thinking and knowledge of regional leaders while also relying on their knowledge to develop plausible scenarios. For EU and VFP, the

scenarios were intended to serve as educational and advocacy tools. For MSP and Region Forward, the creation or use of the scenarios was never meant to extend to the general public. The use of the scenarios was essentially limited to the spur the myriad of jurisdictions and agencies into action either towards collective goals and, in some cases, towards particular goals.

**Diversity.** All four processes incorporated diverse viewpoints across various spectrums. Yet the function of these conceptions of diversity and how it would impact the processes varied considerably.

1) *Scenario generation.* The processes relied on a combination of computer models, expert input, and community member participation. EU and MSP combined large and small group discussions and consultants to iteratively develop and test scenarios. The starting scenarios were based on large public input sessions where users provided preferences. In the EU community values workshops, groups voted on density patterns and urban design aesthetics. Consultants compiled data provided by community members and then ran models to develop the scenarios. The scenarios were then reviewed by stakeholders and vetted.

The VFP and RF, alternatively, relied on community leaders and experts to construct all parts of the scenarios based on their knowledge and experience. In RF and VFP, community leaders were interviewed and in RF consultants developed the scenarios with a select group and then shared them at a workshop. In the VFP, the interviews were used to prepare the consultants for discussions that might arise. The scenarios were created in the workshops.

With a focus on planning expertise and key stakeholders in the processes, the depth of coverage on a specific issue may have been large, but the perspectives of the stakeholders drove the identification of and thus limited the breadth of issues. If part of the purpose of scenario planning is to spur creative thinking about the multiple ways the future can unfold and prepare for that future, it takes on a particular salience in scenario planning processes in two ways: Firstly, limited representation of diversity in the process limits the breadth of issues that are considered. The VFP was intended to focus on growth-management issues. However, in working with a corporate-oriented scenario-planning firm, the GVC was pushed to think about regional planning topics more broadly. The participants from a wide range of backgrounds drove the conversation in a direction where the scenarios were structured around issues related to social inequality.

Secondly, an insufficient range of diversity can lead to foregone conclusions and biases. Essentially, with more perspectives, there will be a decrease in the likelihood for bias (Taleb 2007). In RF, for example, each subgroup during the one-day workshop had representatives from multiple organizations, which contributed to the endorsement of strategies that are relatively uncontroversial. In a thought-experiment involving a suburban county (Fairfax County, VA, for instance), Federal government dispersal would disproportionately affect the suburban communities more than the District of Columbia at the same time that the burden of affordable housing generated by pressure for green development would land on the District more than the suburban counties. In Region Forward, neither the district nor these suburban counties had a chance to articulate, at least in public, what their responses

would be if each of those futures were to be realized. Thus, even while the diverse jurisdictions were represented, their representation was not effectively harnessed.

2) *Public engagement.* While the VFP developed their scenarios with community members, even this process faced challenges in the next area of analysis—public engagement. As alluded to in the previous sections, the degree to which the public could engage in the processes lacked in most cases. If the project conveners did not *a priori* identify an interest as being central to the process, they were not invited to the steering committees or targeted to attend any public workshops, where they existed. And, even the large workshops EU held and MSP’s originator, RealityCheck, the specified nature of the discussions (growth management) determined beforehand who might choose to participate. These workshops did not actually create the scenarios. They provided input that was used by planning professionals to create them. While some were then used by stakeholder groups to hold deliberations, community members were not present for those deliberations. This limits the opportunity for people to develop empathy for one another.

The VFP project focused on minor elites and community members in order to bring in a broad representation of issues, experiences, and ways of thinking world-view, including farm-worker organizers and presidents of two-person non-profit organizations. In other words, the project perceived stakeholders to be not only elected *officials* and large business and civic organizations. In three of the processes, the participants who created or most immediately created the scenarios largely included major and minor elites. Thus, community participation largely consisted of people from positions of power, such as elected officials, civil servants, and major

civic organizations, including chambers of commerce and United Way. Still, the participants were considered community leaders, not “average Joes,” and the group by the nature of the process was small, revealing the challenge of balancing small group deliberation with public engagement.

- 3) *Representation of diversity*. Diversity is represented also in the kinds of narratives that told the scenarios. The narratives in RF carefully avoided identifying specific groups of people or even specific sub-regions that would be differentially affected<sup>3</sup>. This is not surprising because the scenario exercises were meant to create a sense of urgency and unity among various jurisdictions to create a commonly accepted framework.

The VFP on the other hand intended all four scenarios to be used after the conclusion of the project, allowing for different perspectives to remain in the public eye. The VFP narratives captured how different groups of people would be affected in each of the futures. Returning to the VFP riot example, and tying back the role of multiple futures, one participant found the likelihood of riots implausible. She was willing to accept their inclusion in the scenarios because there were multiple scenarios, an acknowledgement that there could be multiple paths for the future.

MSP is more specific about the kinds of sub-regions that are affected by different region (e.g. it specifically focuses on what different counties might be able to do in response to different futures); however, the stories that MSP tells are in numbers. They are a product of complicated modeling exercises and are firmly planted in the decision-theoretic analytical frameworks. MSP did not identify how

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<sup>3</sup> Some scenarios in RF do specify Washington, DC, Virginia and Maryland, but only to the extent to which regional differences are highlighted.

different groups of people might be differentially impacted nor did it solicit input from a carefully selected diverse group of people as the GVF did<sup>4</sup>.

- 4) *Use of scenarios:* The scenarios were used by different groups in different ways. EU used the scenarios to help community members visualize future development patterns and understand the impacts of these patterns on the future. Hence the idea of the EU scenarios were visual and quantitative indicators of what different futures might be and the tradeoffs. Since EU aimed for wide participation rather than deep participation, the scenarios served not as an advocacy tool for different interest groups, but as a mechanism to build broad based support for a particular preferred future. RF scenarios, on the other hand, were used by MWCOCG to create a common framework of goals that are regionally palatable to different jurisdictions. The federal government dispersal and the cooperation in the Hard Times scenario were essentially used as a background over which a new plan called Economy Forward was created. The strategies that were formulated in a response to federal government dispersal scenario were fungible in a situation that materialized few years later with the “Fiscal Cliff” and decreased federal spending. While no direct link is acknowledged, at least one jurisdiction (Montgomery County) enacted an initiative to incentivize biotech firms<sup>5</sup>. The scenarios created in the MSP were not used to create Plan Maryland nor could we could find any evidence of organizations other than NCSG using the scenarios to prepare for the multiple futures. The GVC used the VFP to raise awareness about issues. Some organizations and people asked

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<sup>4</sup> The scenario advisory group for MSP was carefully selected to include key decision makers and technical experts.

<sup>5</sup> It should be noted that this may not mitigate the lessening importance of federal government in the region as the biotech cluster may be dependent on federal entities such as National Institutes of Health and U.S. Food and Drug Administration who are headquartered in Montgomery County.

for the GVC to present the scenarios to help launch their own planning activities. However, the widespread living room conversations and advocacy by other organizations and individuals did not occur.

## Conclusions

These four scenario-planning processes offer insight into how planning practice addresses the uncertainty of the future by thinking about how future might evolve instead of thinking about what to do about/by year 20XX. While EU and MSP have time horizons for their scenarios, they are not important. RF and MSP explicitly ignored horizons and focused on plausible events and constructed stories around them. Thus, adopting the scenario planning lens has already moved planning actors away from the notion of planning for a future date, a time horizon and similar to the use in the business world emphasizes the use of multiple futures and how the organization can decisively respond in each future. Furthermore, different management theorists have argued that diversity of opinion within the organization needs to be solicited because only such participation can make scenarios truly different, i.e. moving away from the probable to the possible.

The key assumption is that organizations, unlike regions, can act as a single entity,. Land-use transportation scenario planning is fundamentally about inter-organization and inter-group coordination. Uncertainty is compounded because of the coordinative failures, as well as failure of understanding others, has meant that scenario planning in the public realm has taken on a slightly different flavor. The focus has become choosing and therefore committing the various participants to a single future rather than exploring the ramifications of different futures on different groups and how they might react to those. In

an effort to come to an agreement about collective goals in the future, much land use transportation scenario planning has ignored the usefulness of keeping different futures in play. For instance, while EU acknowledged that there are various possible patterns of development, EU's approach was to presume that any one of those can be chosen and that once such a choice was made that the outcomes were predictable. In terms of strategic planning, goals and policies were identified based on how to achieve a selected end. Once the choice was made, the scenarios were no longer useful.

On the other hand, RF was also trying to achieve a regional compact, though it was focused on agreement between various jurisdictions rather than broad public support. In creating and using those scenarios, RF achieved a regional compact similar to what Denver had achieved a decade earlier without the use of scenarios. However, the importance of the scenarios was to prepare the various jurisdictions to think about how a possible future might affect them. The scenarios themselves were not discarded after the compact, recombination of different scenarios and responses are seen at later stages.

All of the exercises presented diversity as something important to consider in the present and in the future. From geography to political ideology to inequity, some exercises attempted to form consensus about a single path of action while others sought to understand how different people would respond to various changes in the future. Only one of them, VFP accounted for impacts of these different futures on diverse groups. While the VFP relied on multiple future scenarios to motivate people to plan regionally in order to avoid most of the possible futures, they also helped the region think through what they might do if other futures unfolded. The participants in VFP were representatives of highly

diverse groups and the scenarios that were constructed and the way they were used is reflective of that effort.

Participants in the scenario generation or vetting processes in the different cases drove the direction of the conversations and, in cases like Region Forward, led to foregone conclusions about future actions. Two of the projects paid limited attention to the social and economic issues that shaped their regions. This lack of attention may have been perceived as disconnected from the actual purpose of the projects, but other issues such as housing and workforce development were considered equally important to the future of the region. In the VFP project, the people in the room emphasized this point immediately, moving the project from one focused on growth management to one focused on regional inequity.

The extent to which the people in the room drives the conversation, reinforces the opportunity for scenario planning to be an integral part of participatory planning. Indeed, with its focus on dialogue, and collaborative writing of scenarios, the process comes close to the 'co-production' of plans between professional and community member participants. Simultaneously, as discussed above who is co-creating these plans shapes their outcome.

Further, planners should be clear when scenarios are being used as advocacy tools, versus an educational and/or decision making tool. Certainly both of these uses can interact, but planners and community members should be cognizant of the purpose of the scenarios. EU walked a careful line on this topic. Because many smart growth advocates were instrumental in starting the EU, there was skepticism that if 'sprawl scenario' was selected by the larger public, it will be pursued. In response, EU organizers emphasized that they would support the collective choice irrespective of the outcome, and the scenarios

were pointed to as a demonstration of their commitment to the exploration of a range of outcomes. Their educational efforts paid off and a middle range scenario was selected.

If the interest in scenario planning is to address the future's underlying uncertainty, the impacts of and on the people living in places should be included in these processes moving beyond simply providing input into a constrained set of issues. Given the importance of major and minor stakeholders, sometimes to the exclusion of community stakeholders, there should be a better understanding of how these stakeholders do or do not capture the uncertainty of the future, how they represent community interests. If the most 'radical' scenarios depend on perspectives of all positions of society, scenario planners must consider new ways to bring these groups together that attend to their differences while encouraging their synergy.

One of the underlying challenges planning practice faces and to which scenario planning can be specifically sensitive, is constructing the relationship between experts, major and minor stakeholders who may also be experts, and general community members. Overlaying the technical needs for modeling, necessary in some processes, with the knowledge and desires of stakeholders and community members requires diligence and care, something that publically funded agencies with limited funds and time can always attend to. However, the corporate approach to scenario planning emphasizes the support role that long-term forecasting plays in the construction of their scenarios. The models, when used, are not the scenarios. They are used along with the knowledge from the people in the room to construct the actual scenarios.

In scenario-planning circles, the lack of experience in dealing with multiple futures and diverse publics led to inadequate preparation for future uncertainty. The four cases we examined demonstrate the state of practice today. While the four processes effectively used multiple futures to varying degrees, they made less use of a broad conception of diversity to generate and use the scenarios. Instead of incorporating community members, they relied on professional participants. While it is clear that much has been achieved in scenario planning, much more needs to be done to ensure that planners are using the all parts of scenario planning to consider and plan for the radical uncertainty communities face.

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Table 2 Case selection and data collection procedure

	Author involvement	Data collection
Envision Utah (EU)	No direct research or primary participation	Secondary data sources were collected from the project website, reports by APA and DOT, newspaper coverage and scholarly publications.
Region Forward 2050 (RF)	Peripheral Participant Observation	Data from MWCOG updates, meeting minutes and public outreach documents; also, from reports in the local media.
Maryland Scenario Project (MSP)	Primary Participant	Data from personal communication between NCSG staff and Scenario Advisory Group (SAG) workshops and from peer reviewed publications.
Valley Future Project (VFP)	Researched process	Primary data sources included interviews with process participants. Secondary data was collected from archival materials and newspaper articles.

Table 2 Key features of the four case studies

	Envision Utah (EU)	Region Forward 2050 (RF)	Maryland Scenario Project (MSP)	Valley Future Project (VFP)
<b>Structurally distinct scenarios (MF-1)</b>	No	Yes	No	Yes
<b>Scenario use during the process (MF-2)</b>	Educate stakeholders and community members about future challenges; Articulate options for how future could unfold; Spur discussion tool about how preferences about said futures	Build capacity amongst regional actors collectively consider the future in order to achieve collective regional goals; Identify strategies in response to scenarios brainstormed by small groups	Test assumptions about the future	Identify unforeseen future; Build capacity amongst regional actors; demonstrate the need for regional planning; s.
<b>Use of “business-as-usual” (MF-3)</b>	Scenario A was used to demonstrate the effects of sprawl.	“Hot and Gridlocked” was the doomsday scenario, which was projected from current practices.	BAU was explicitly projected current economic structure into the future with no future investments.	A base case was not established <i>per se</i> .
<b>Use after the process (MF-4)</b>	Serve as educational and advocacy tool; Select a preferred scenario	None	None	Serve as educational and advocacy tool

<b>Scenario Generation (D-1)</b>	Community workshops to identify development pattern values; Forecasting by experts.	Created by staff experts based on input from large public workshops	Small group expert/public participation followed by technical model building.	Small group of community leaders (not necessarily decision makers).
<b>Public engagement (D-2)</b>	100-person steering committee. Public workshops to identify community values.	35 coalition members. Scenario workshop attended by over 100 participants.	33 Scenario Advisory Group members.	Invited community members to participate in process and to view/receive end project materials.
<b>Representation of diversity (D-3)</b>	Diverse perspectives brought in from government, business, and nonprofit sector. Emphasis on stakeholders. Focus on reaching consensus to act on one plan.	Included stakeholders identified as central to creating regional compact.	While stakeholders were identified they were all planning professionals or policy advocates and makers.	Cross – sectional representation sought; emphasis on community leaders not necessarily stakeholders; racial, class, geographic, and sectorial differences explored.
<b>Scenario use after the process (D-4)</b>	Educate and gain public support for smart-growth plan.	While explicit use of the scenarios were not acknowledged the scenarios helped at least few organizations to articulate responses to reduction in government spending in the region that happened soon after.	Not used beyond the process.	Used to a create awareness about issues and advocate for regional cooperation.

\*MF = Multiple futures; D = Diversity