WINNING THE FUTURE

SHARPENING OUR FOCUS

SHRP2 Element C08 (Volume 4)

Addressing Uncertainty and Change in the Planning Process

ATLANTA REGIONAL COMMISSION

Prepared for USDOT / Federal Highway Administration
SHRP2 Round 5 Implementation Grant
April 2017

This document was prepared by the Atlanta Regional Commission for the United States Department of Transportation / Federal Highway Administration, in collaboration with the Department of Transportation of the State of Georgia.

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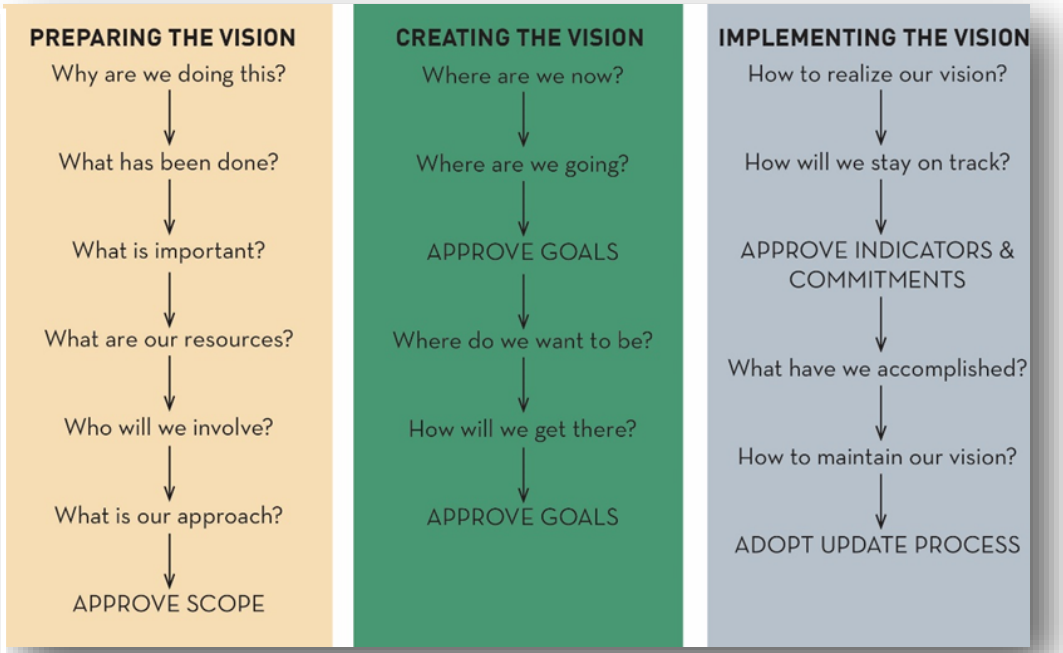
Background

ARC, as a Lead Adopter in the SHRP2 Implementation Assistance Program Round 5, executed an 18 month work plan that created a vision for the Atlanta Region following the SHRP2 C08 Report "Linking Community Visioning and Highway Capacity Planning" and associated interactive Vision Guide website PlanWorks. During this vision development process, two other SHRP2 bundle products were integrated into the process by (1) incorporating performance measures at key decision points in the planning process (CO2-Performance Measurement for Highway Capacity Decision Making) and (2) involving freight stakeholders in the process as identified by the report "Integrating Freight Considerations into the Highway Capacity Planning Process: Practitioner's Guide" (C15). The outcome was a regional vision and strategies developed through a transparent and replicable planning process.



FHWA PlanWorks Vision Guide

The SHRP2 (Strategic Highway Research Program) was created to find strategic solutions to three transportation challenges the nation is facing: improving highway safety, reducing congestion, and improving methods for renewing roads and bridges. Research has been focused in four areas: safety, renewal, reliability, and capacity. This effort will follow planning process bundles under the Capacity research area. The tools integrate environmental, economic, and community requirements into the analysis, planning, and design for new highway capacity.

This visioning effort built upon a policy foundation laid out in the 2016 iteration of *The Atlanta Region's Plan*. The long-range plan, adopted in February 2016, constructed an interdisciplinary policy framework for "winning the future". The 2016 Policy Framework allows ARC, working with other key organizations in the Atlanta Region, to advance policy objectives and work together to meet the region's tough challenges. *The Atlanta Region's Plan* also meets federal regulations for MPO long-range transportation planning and state mandates for regional commissions and comprehensive plans.

The purpose of the visioning effort was to implement the Round 5 bundle of SHRP2 products and meet the following agency-specific objectives:

- Identify a model approach for generating consensus about long-range goals and accompanying transportation investments through the use of the SHRP2 suite of visioning tools and other FHWA products;
- Promote fuller integration of freight considerations into the next iteration of *The Atlanta Region's Plan* through direct outreach to new stakeholders, including those in the Piedmont Megaregion; and
- Use enhanced performance measures to track progress, measure impact, and promote actions that yield desired results.

In terms of planning processes, this implementation assistance grant was used as a way to sharpen our focus and create more consensus for a shared vision of what "winning the future" looks like in the Atlanta Region. By starting the process of visioning now, we added front-end resources to the next long range plan update. By the time we adopt the 2020 long-range plan update, we will have a sharper focus on the key drivers that could potentially impact our ability to win the future. Similarly, we will be well-positioned to further enhance our ability to construct a long-range plan that reflects the region's stated policies and matches clear investment priorities with measurable progress toward our larger goals.

How the specific SHRP2 planning process bundle process bundles were used is shown below, along with the key deliverables produced by ARC under each. All contractual task obligations have been fulfilled and documented, although the titles and contents of certain deliverables have changed since *C08 Volume 1: Vision, Approach & Stakeholder Plan* was prepared in February 2016 (the chronologically first of the nine documents listed).

SHRP2 Bundle	Description and Deliverables
C02 **Performance Measures for Highway Capacity Decision-Making**	ARC used this product to expand the list of performance factors used in transportation decision-making during long-range planning. Performance measures were tailored to help the regional policymakers and others better understand the potential outcomes of planning decisions. By focusing on the practical application of performance metrics, ARC can better articulate the linkages between transportation, communities, and the economy. **C02 Volume 1: Best Practices in Performance Measurement for Transportation Decision Making** **C02 Volume 2: Incorporating Performance Measurement into the Planning Process** **TIP Project Evaluation Framework** *(supplemental related material; not a core deliverable)*
C08 **Transportation Visioning for Communities**	ARC worked with key partners and member governments to develop a vision for the Atlanta region. ARC integrated new approaches to scenario planning into *The Atlanta Region's Plan*. Innovative stakeholder engagement techniques were applied, including regional surveys. Scenario planning used the region's vision as a starting point for solutions and measuring performance. **C08 Volume 1: Vision, Approach & Stakeholder Engagement Plan** **C08 Volume 2: Scenario Development Process** **C08 Volume 3: Scenario Testing Procedures and Results** **C08 Volume 4: Addressing Uncertainty and Change in the Planning Process**
C15 **Integrating Freight Considerations into Highway Capacity Planning Process**	ARC concurrently finalized an update to *The Atlanta Region Freight Mobility Plan*. This planning endeavor ran in parallel to the long-range planning effort. Use of the C15 product brought freight stakeholders more fully into *The Atlanta's Region's Plan* development process. Collaboration with freight stakeholders was widened to incorporate adjacent MPOs, Georgia DOT, and key stakeholders in the Piedmont Megaregion. **C15 Volume 1: Improving the Integration of Freight into the Planning Process** **Regional Models of Cooperation Peer Exchange Summary Report: Freight Planning and Regional Cooperation in the Piedmont Atlantic Megaregion** *(supplemental related material; not a core deliverable)*

Reflections on SHRP2

Much has changed in the world since the SHRP2 research concluded. In the case of the SHRP C02 and SHRP C08 bundles, which were completed and being utilized by practitioners as early as 2009, the transportation profession's state-of-the-practice tools have significantly evolved beyond the snapshot in time reflected by the research. Even C15, completed in 2013, is already becoming dated in a rapidly evolving world.

The objective of SHRP C02 was to develop a performance measurement framework to inform a collaborative decision-making process for highway capacity planning. The measures reflect mobility, accessibility, economic, safety, environmental, watershed, habitat, community, and social considerations. Appendices provide detailed write-ups of case studies conducted as part of the project and a discussion of data sources, data gaps, and high-value data investment opportunities.

The overall intent of SHRP C08 was to demonstrate linkages between community visioning and transportation investment. It offers a new set of visioning tools that illustrate how transportation visioning early in the planning process can generate community support, not only for an individual project but for entire transportation programs. Products created by SHRP C08 include a model approach to visioning, a step-by-step visioning process, a visioning guide and case studies.

SHRP C15 was undertaken to assist public agencies in planning and implementing highway capacity that serves economic development by meeting both local community capacity needs and national shipping and market supply needs. Addressing projected freight growth can also address the potential for delays and safety concerns associated with unanticipated freight movement bottlenecks.

The SHRP2 capacity products, in general, represent a big step toward painting a picture of transportation investment as part of a holistic, integrated panorama of people, politics, mobility, economics, environment, community and social considerations. The SHRP2 C02 and C08 products are also designed to serve as useful introductory material on the topics of performance-based transportation planning and visioning. Used in the ARC implementation grant project, they remain thought-provoking in their ability to frame the inter-related nature of transportation, environment and communities, However, the more detailed support offered in the research, particularly the case studies, has been superseded by a new generation of innovations in transportation planning in communities. In addition, explosive growth in technological applications allow for more effective use of big data, dynamic modeling of performance and new tools for visioning processes.

The big picture of approaching transportation investment as part of a holistic, integrated panorama of people, politics, mobility, economics, environment, community and social considerations is more relevant today than ever. And the challenge of integrating a broad array of measures and planning data, as envisioned in SHRP C02 remains an important goal. ARC began this process nearly a decade ago, through development of *Plan 2040*, the precursor to *The Atlanta Region's Plan.*

Our scenario planning efforts have focused on identifying and creating strong linkages between land use and transportation supported by a variety of scenario planning tools such as PLACE3S and INDEX. Additional linkages between those disciplines and other areas within ARC's purview, such as aging, health, natural resources, and workforce development, continue to be a work in progress. This process is proving to be a slow, long-term endeavor, at least in ARC's experience. Given the challenges of multiple regulatory schedules and requirements by topic area, as well as data flows that were developed with no clear objective of linking them to anything outside of their immediate

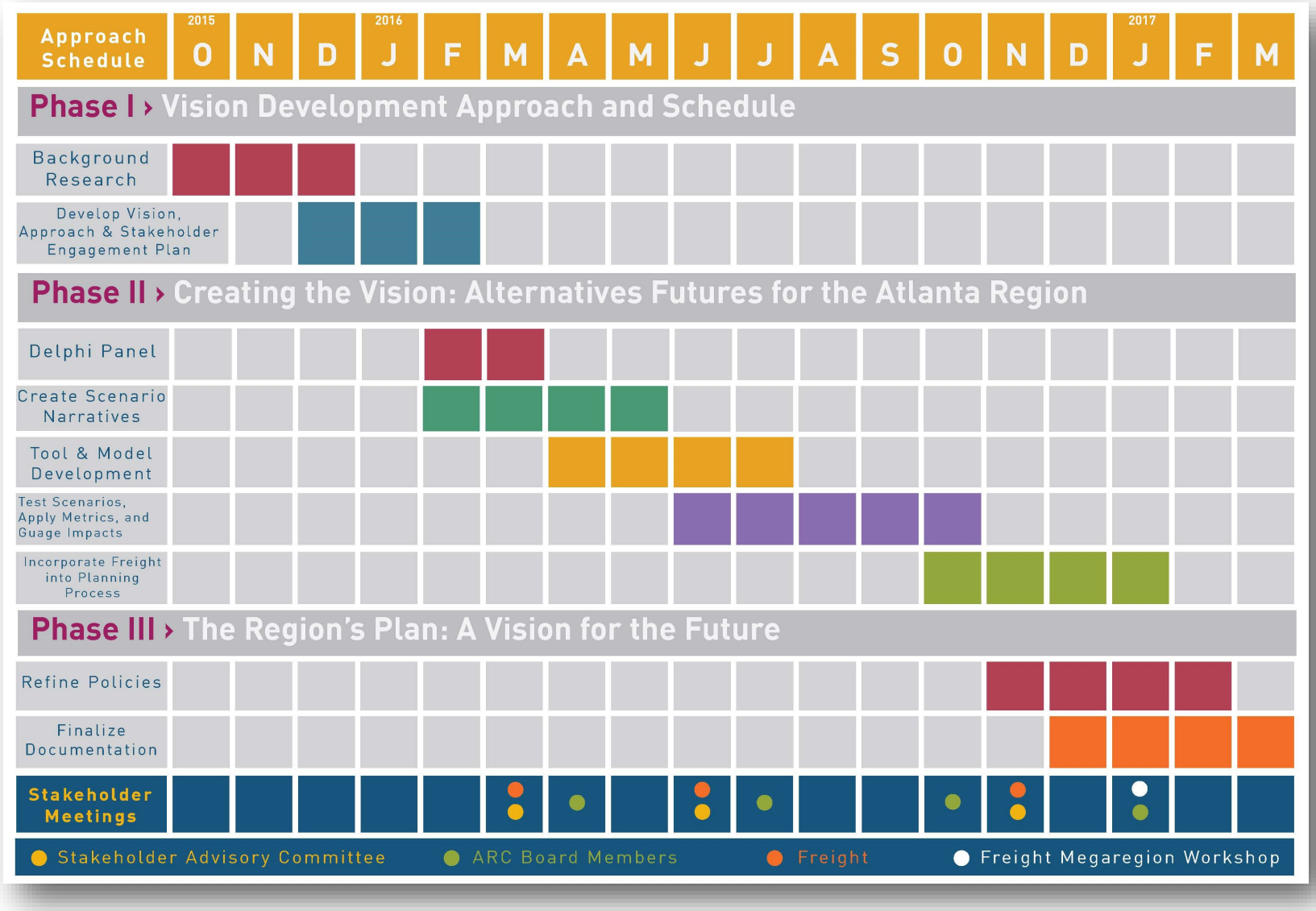
purposes, we must continue to work developing a shared understanding of each others' responsibilities, work flows, processes and timelines. This learning takes time.

As we continue to build relational linkages with community, environment, mobility and social planning colleagues, ARC's immediate implementation of performance-based planning has begun with the transportation data and outputs that are most readily available, and has also focused on strengthened collaborative relationships with other transportation agencies, including GDOT, GRTA, County DOTs, MARTA, and others, as well as first responders who can speak to matters of safety and emergency preparedness.

In three key areas, the SHRP2 products fall short of 2017 needs. First, they do not adequately include consideration of public transit in the research product frameworks. Second, they did not foresee the rapid emergence of technological innovation in vehicle operation, most notably autonomous vehicles. And thirdly, they did not anticipate the dramatic changes to visioning process brought about by new developments in scenario planning.

At this juncture where the SHRP2 research products and current state-of-the-practice begin to branch, ARC began their implementation assistance grant for SHRP2 Capacity products. ARC utilized the Lead Adopter grant provided by FHWA to hire technical consultants who could step into the gap between the research and current state-of-the-art practice. The plan involved using SHRP C08 as the overarching framework for innovation in planning and then weaving SHRP C02 and SHRP C15 into the C08 visioning process. ARC was assisted in the completion of the contractual work program by three consultants: Terry Moore of ECONorthwest, and Gerrit-Jan Knaap and Uri Avin with the University of Maryland National Center for Smart Growth Research and Education.

The general timeline of the work from October 2016 to April 2017 is shown here. The documents identified in the table on page 3 of this report summarize the key findings and recommendations at various milestones over the period. The rest of this report encapsulates a few of the major lessons learned and identifies options ARC is pursuing to build on the SHRP2 work and better integrate what we learned into our long-term work programs.



Lessons Learned

Over the past 18 months, ARC has learned a great deal about ways to improve its planning process to better address uncertainty and change. Each deliverable produced under the SHRP2 contract noted key observations, findings and recommendations related to specific topics. Below are five overarching themes which encapsulate the more detailed information contained in prior documents.

1. Planning is Fluid

The framework provided by the C08 product and the Planworks guide presents the visioning process as linear; however, a more flexible approach is needed, particularly for scenario planning. Scenario planning lends itself to preparing for multiple futures rather than selecting one, so the lines between "where are we going?" and "where do we want to be?" are constantly blurred. Since the Atlanta region could be going a variety of places, we need to constantly—throughout the planning process—survey the potential outcomes and fix our vision on winning the future, regardless of global and local trends.

In addition, the need to convey this fluidity to policy makers appeared as one of the key takeaways and benefits of the alternate future process. The lesson of planning fluidity and ongoing stakeholder engagement learned through the use of the C08 product will inform future ARC plan updates as well as regular business.

2. A Bridge is Needed

Once the region knows the future it would like to see, there is a disconnect between goal setting and policy creation. The Online visualization tool is the first of many steps in educating policy makers and the public on the outcomes of potential interventions and the progress that could be achieved across a number of indicators. While the next steps will evolve

naturally through future updates of *The Atlanta Region's Plan*, a more established and researched bridge to connect the steps would provide a helpful framework for the Atlanta region.

3. Additional Tool Development is Required

Despite using Impacts 2050, RSPM, and REMI, a number of outputs remain unexplored. All of the scenarios have the potential to disrupt how the region thinks about health, equity, and the environment. However, the current sketch tools at ARC's disposal focus primarily on transportation and economics. To create a full vision of the future, additional tools that can utilize the same inputs (for sake of consistency) should be developed. To execute more robust scenario planning processes, gaps in the modeling technology available need to be addressed. Ultimately, one technology that delivers transportation, economics, equity, environmental, and health outputs would provide the most key information to decision makers.

4. Learning for Future Applications

One of the primary takeaways from this process is the importance of considering all tools during scenario development. The Atlanta Region relied on Impacts 2050 without prior experience with the tool for significant modeling needs. Ultimately, Impacts 2050 was not useful for this modeling application. As ARC continues to carry out scenario work in the future, the technical teams will look to additional sketch planning tools and more thoroughly research potential shortfalls of models before investing significant resources in a model lacking proper documentation.

5. Full Foresight Remains Elusive

The evolving nature of technology and demographic changes necessitate an adaptive planning process. While the scenario development process undertaken during SHRP2 looks at the year 2050, predicting the future 30+ years from now is exceedingly difficult. Rather than aspiring to plan for 20-30 years, future planning efforts may gain traction with elected officials and the public by focusin on the short-term (5 to 10 years) to ensure relevant and implementable projects.

Scenario Visualization Tool

The vision development process is just the beginning; the crucial next step is integrating the findings from this process with *The Atlanta Region's Plan* to begin future plan development. To begin the public engagement conversation around scenario planning, ARC will release a scenario development visualization tool to the public in order to foster conversations around the alternate futures and possible relevant policies. The scenario visualization tool aims to engage policy makers and the general public in the planning process while educating them on the nine drivers of change, the four alternate futures, and the impacts of a few policy alternatives shown through the RSPM modeling results. Much of the tool mirrors the scenario development process itself. Screen captures from the tool are presented in *Appendix A: Online Scenario Visualization Tool.*

Broadly speaking, the tool begins with the user examining the nine drivers of change. For each driver, the user selects the outcome they believe is most likely to happen and least likely to happen. At this stage, the tool is similar to the scenario development card exercise executed by staff during the development process. The screen shot shows where the user selects their outcomes. Then, using an algorithm, the tool tells the user which of ARC's four scenarios most closely aligns with the future they predict.

After each user discovers the alternate future they believe is most likely to happen, they are able to toggle between the other alternate futures. Within the tool, they will be able to see some of key policy inputs that shape each of the four scenarios alongside the outputs. The feature allows the progressing users to consider the benefits and consequences of each scenario and to begin to formulate a 2050 they would like to see. The tool invites the user to manipulate four policy/

technology inputs (road expansion, transit growth, congestion pricing, and autonomous vehicle adoption). As the user manipulates those inputs to low, medium, and high levels, they can create their own scenarios and see how their policy choices may impact the Atlanta region depending on which of the scenarios becomes our 2050 reality. By evaluating each alternative future and tinkering with policy inputs, users can see output metrics ranging from social cost of vehicle ownership to VMT to carbon dioxide emissions. Choosing from 324 possible futures built on the four scenarios and different levels of policy inputs, the visualization tool allows residents and policy makers to create a region they want by exploring a variety of policy paths that could help to achieve their desired 2050.

The tool is unique in its ability to both simulate the scenario development process and to engage outside users. Using the tool and the data it collects from users on the futures they believe are most likely to occur, ARC will kick off the next plan update in earnest. In that process, staff will continue to emphasize the importance of iterative planning every day rather than every four years and will cultivate conversations around the metrics and narratives developed during the scenario development process. This will ultimately clarify the goals and objectives identified in *The Atlanta Region's Plan* and help to focus the region's priorities during the next plan update.

The tool is not currently accessible to the general public as it undergoes final review and testing. In addition to ensuring that it functions properly, ARC continues to strategize on precisely how the results will be used. While there is value simply in spurring conversation among stakeholders about drivers of change and alternate futures, we would be remiss if the findings were not used to directly feed into policy considerations. In addition to presenting the tool as fun and interesting, the release strategy must also communicate that it has an important purpose and should be taken seriously. And that ARC will be taking the results seriously as well.

Once the tool is officially launched in conjunction with the initiation of the next major update of *The Atlanta Region's Plan*, the code will be available for download by any interested individual, agency or organization on the GitHub site described in *C08 Volume 3: Scenario Testing Procedures and Results.*

Continuing the Conversation

As work under the SHRP2 award comes to a close, ARC possesses a strong desire to build on the momentum this work has prompted. The level of engagement and interest from committee members and other stakeholders related to drivers of change and alternate futures is at a level rarely seen around any initiative undertaken by the agency. We consider submittal of final SHRP2 documentation to USDOT to be a point of transition, not a conclusion, on our work in these areas.

While many questions remain on how to best proceed and where those paths may ultimately lead, there are numerous opportunities available to us moving forward. A few in which the conversation is already underway are described in this section.

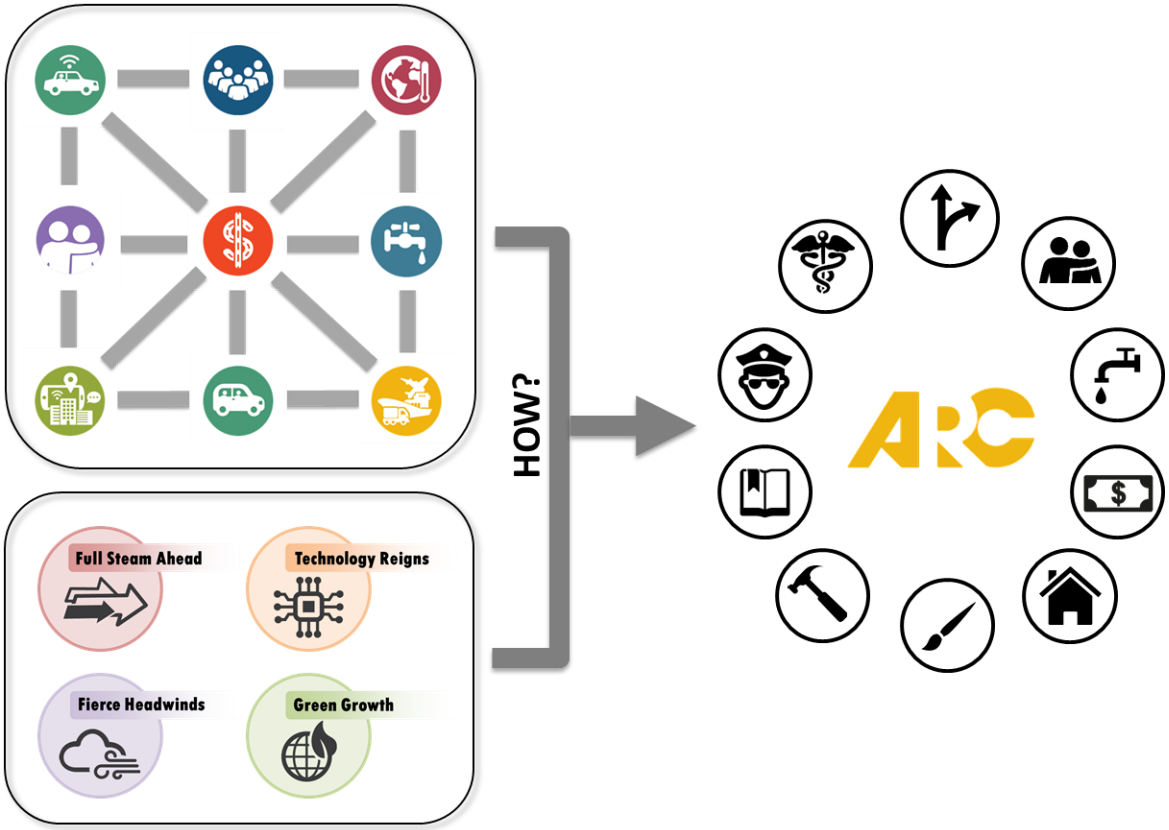
ARC Work Program

On April 6, 2017, ARC staff from each of the agency's major divisions convened for a full-day workshop to learn about the SHRP2 work and discuss how it could be leveraged in future efforts.

While there was a general level of awareness of the effort throughout the agency, several divisions outside of Transportation Access and Mobility Division had not been substantively involved due to the technical nature of the work. As we begin the transition to a more policy oriented discussion, the timing was right to bring key staff across a broad spectrum of disciplines up to speed and identify opportunities for collaboration.

The morning began with an overview presentation of the SHRP2 process and deliverables, with a focus on the nine key drivers of change and the four alternate futures described in *C08 Volume 2: Scenario Development Process.* This was followed by a round robin discussion in which each division was asked to describe a current initiative and identify the uncertainties they face in addressing needs and issues under that initiative. ARC's consultants then offered their thoughts on what ARC's next steps could be by comparing and contrasting our scenario planning work with other agencies around the country. The afternoon involved a facilitated group discussion among ARC staff which tied together all the information presented that morning, with conversation focused around key questions such as:

- What is your reaction to the alternate futures?
- Could they be helpful in your division's planning efforts and initiatives?
- What about exploratory planning in general?
- What drivers of change are most relevant to your work?
- How much control or influence do we actually have over the drivers of change?
- What policies could help/hinder achieving your division's goals?
- How should this work be integrated into *The Atlanta Region's Plan*?

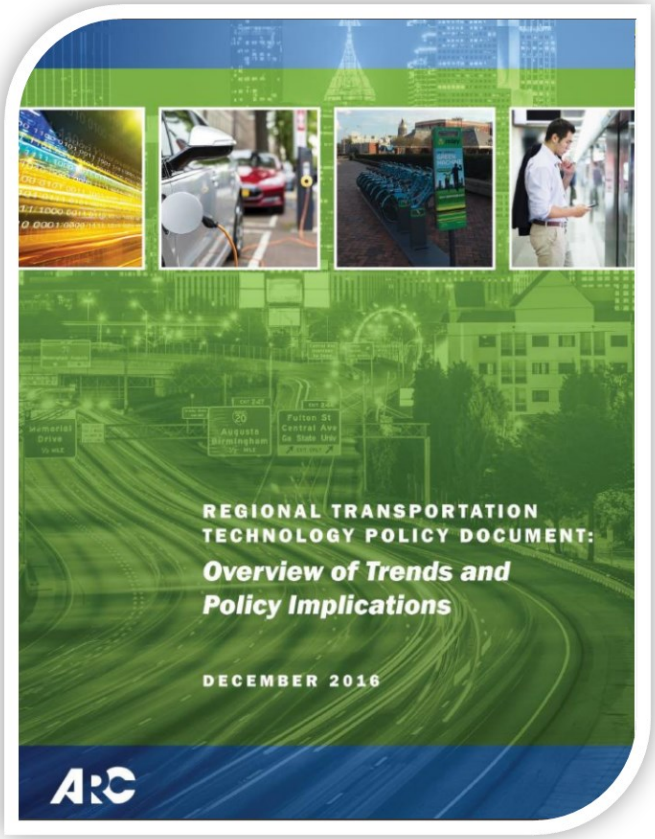


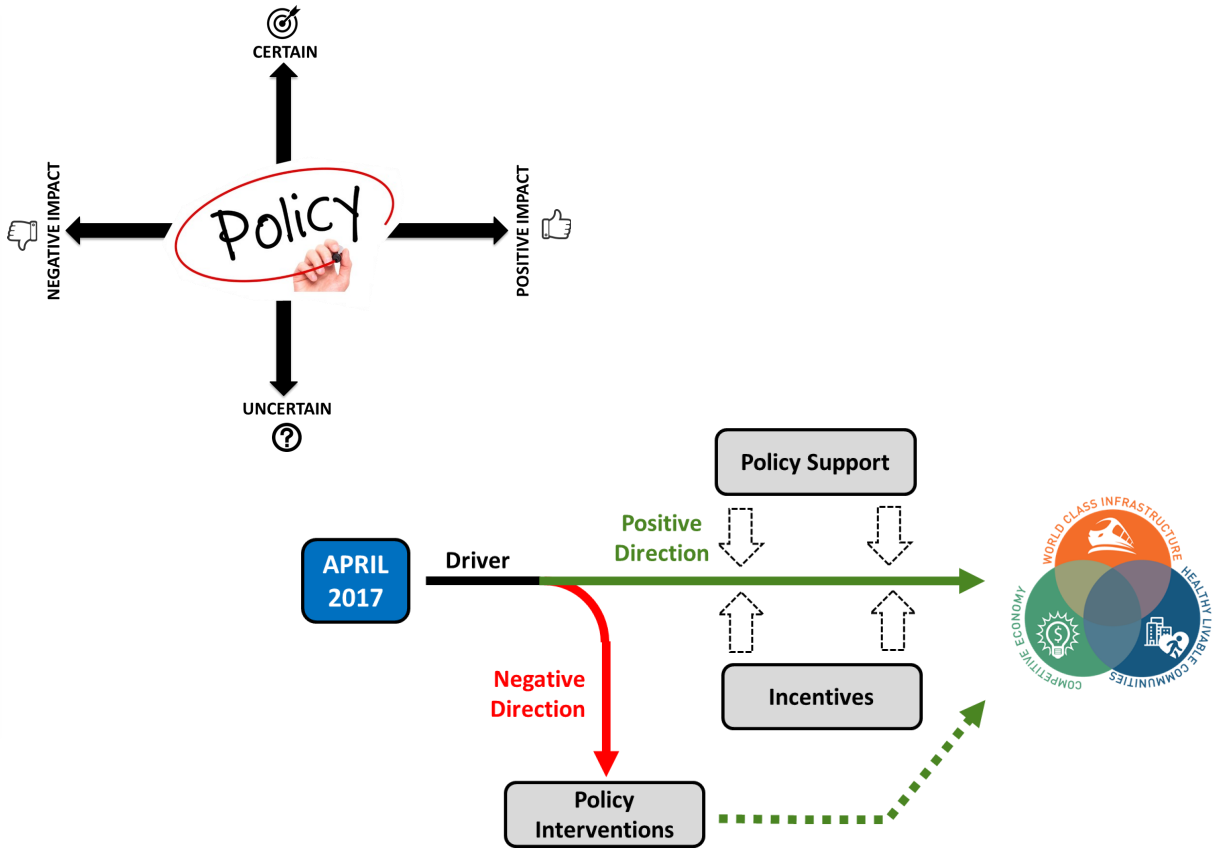
There was great energy and interest from participants throughout the day, with a general consensus emerging that the SHRP2 work could be leveraged across the agency in multiple ways. There was, however, a recognition that the workshop was just a first step in a much longer internal coordination process which will stretch over the next several months, if not years.

Materials from the workshop are contained in a series of appendices to this document, including the agenda (*Appendix B*), two presentations (*Appendix C* and *Appendix D*) and summary notes (*Appendix E*).

Transportation Technology Policy Plan

This report, completed in late 2016, builds on the SHRP2 work by identifying and exploring transportation technology trends, their potential impacts, and their policy implications, both generally and those specific to the Atlanta region. The result is intended to help support the Atlanta region in developing a regional transportation technology program to prepare for and take advantage of technology innovations in support of the region's goals. An analysis framework was developed that addressed two key issues: the direction of impact (positive or negative), and level of certainty of impact (from highly certain to highly uncertain). Potential policies were also presented for consideration. By identifying measures associated with key drivers of change and then tracking those metrics over time, ARC can then determine which policies to implement, whether the intent is to encourage/support a positive trend or arrest/reverse a negative trend.





Transit Vision Update

ARC is currently updating the transit vision for the Atlanta region, encompassing physical infrastructure, rolling stock, services, policy, and technological infrastructure. The three main objectives are 1) establishment of a clear decision-making process for key transit decisions (between ARC, regional transit agencies, and other stakeholders), 2) connection of the steps in the decision-making process with software for automation when possible, and 3) creation of a plan document as a result of this process with physical infrastructure, rolling stock, services, policy, and technological infrastructure components.

Transportation and transit options are subject to rapid changes in the near future as new modes and approaches come into the mobility picture. Some of the questions being considered in the transit vision update highlight how transit providers might respond as these trends unfold:

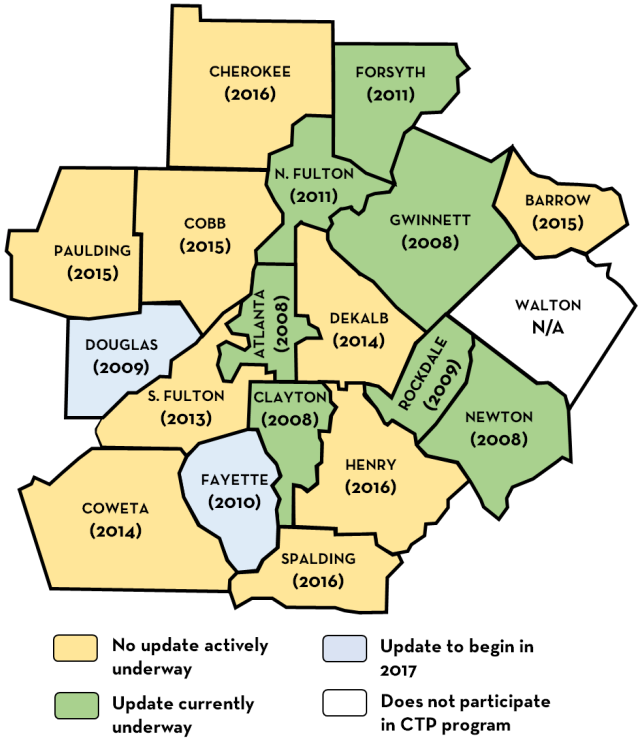
- How can transit operators act as "integrators of mobility," facilitating connectivity between fixed route and many other non-single occupancy vehicle options?
- How can a focus on the "total journey experience", encompassing online information, wayfinding on the street, payment processes, and transfers between transit providers or with other non-SOV modes, improve the transit offering?
- How can transit agencies balance their role in the changing mobility landscape with broader societal needs for social equity, environmental protection, and economic development? Should we clearly define and/or reach general consensus of our role?
- How can transit operators invest funding most effectively, partner with others, and adopt technology in such a way that the region's overall

mobility will be enhanced? How can we continue to gain/gather support for transit in the region from the general public?

- What might the mobility landscape be like in 5, 10, or 20 years? How can transit agencies be active participants in changes over time? How can they look into the future to see trends and interpret what the future holds for passenger service?

These questions have a direct relationship to those posed through the SHRP2 process. In a recent meeting with the consultants selected to assist ARC in conducting the transit vision update, a robust discussion occurred on the key drivers of changes and alternate futures. Participants agreed on the need for the transit vision to be flexible enough to respond to various future scenarios. Some services might be most effective only under certain conditions, which means that the long range transit vision cannot be a single "static" set of recommendations.

County Transportation Planning Program



Since 2005, ARC has made federal funding available to assist counties and cities in developing joint long-range transportation plans. These plans serve as the foundational building blocks of regional transportation planning efforts and are updated on a five to seven year rotating cycle. While participation in the program is voluntary, most of the region's jurisdictions are active participants and have found the program to be a valuable resource in understanding their needs, identifying solutions, establishing priorities, and defining a course of action to get much-needed projects funded and built. For future CTPs, ARC will be working with local governments to determine how drivers of change and alternate futures might impact the plan development process and the outcomes of individual plans.

At least two counties with CTP updates actively underway as of April 2017 are already considering how autonomous and connected vehicles could factor into their recommendations.

Livable Centers Initiative

Capitalizing on the region-wide momentum generated through more than a decade of support for livable communities and tighter integration of transportation and land-use planning, *The Atlanta Region's Plan* continues efforts to focus growth in established communities. A primary way it does this is through the LCI program. Grants and technical assistance have been made available for over 15 years to assist local jurisdictions with developing the planning and regulatory framework to create connected, mixed-use centers and corridors that foster a jobs-housing balance and support transit, biking and walking trips. One unique aspect of the program is the award of federal funding for LCI transportation projects to those communities that have demonstrated implementation of their plans. As the LCI program has matured and ARC undertakes an assessment of how the program can remain relevant and vital for the next 15+ years, an emphasis on transportation technology and its potential land use impacts has emerged as a leading topic of discussion. We expect the SHRP2 work and its findings to inform that decision making process.

Conferences, Peer Exchanges and Other Information Sharing Opportunities

ARC's experience can provide valuable direction to other communities, regions and states considering undertaking a visioning process of their own. Even before the conclusion of the SHRP2 contract, ARC staff had served in an "expert advisory" capacity at statewide peer exchange and a regional transportation summit, been invited to participate in two other peer exchanges and a national conference over the next few months, and submitted proposals for consideration at two additional national conferences scheduled for later this year. We expect the pace of such opportunities to continue to accelerate and hope to maintain and build upon our newly found role as a nationally recognized "thought leader" on drivers of changes and exploratory scenario planning.

Appendix A

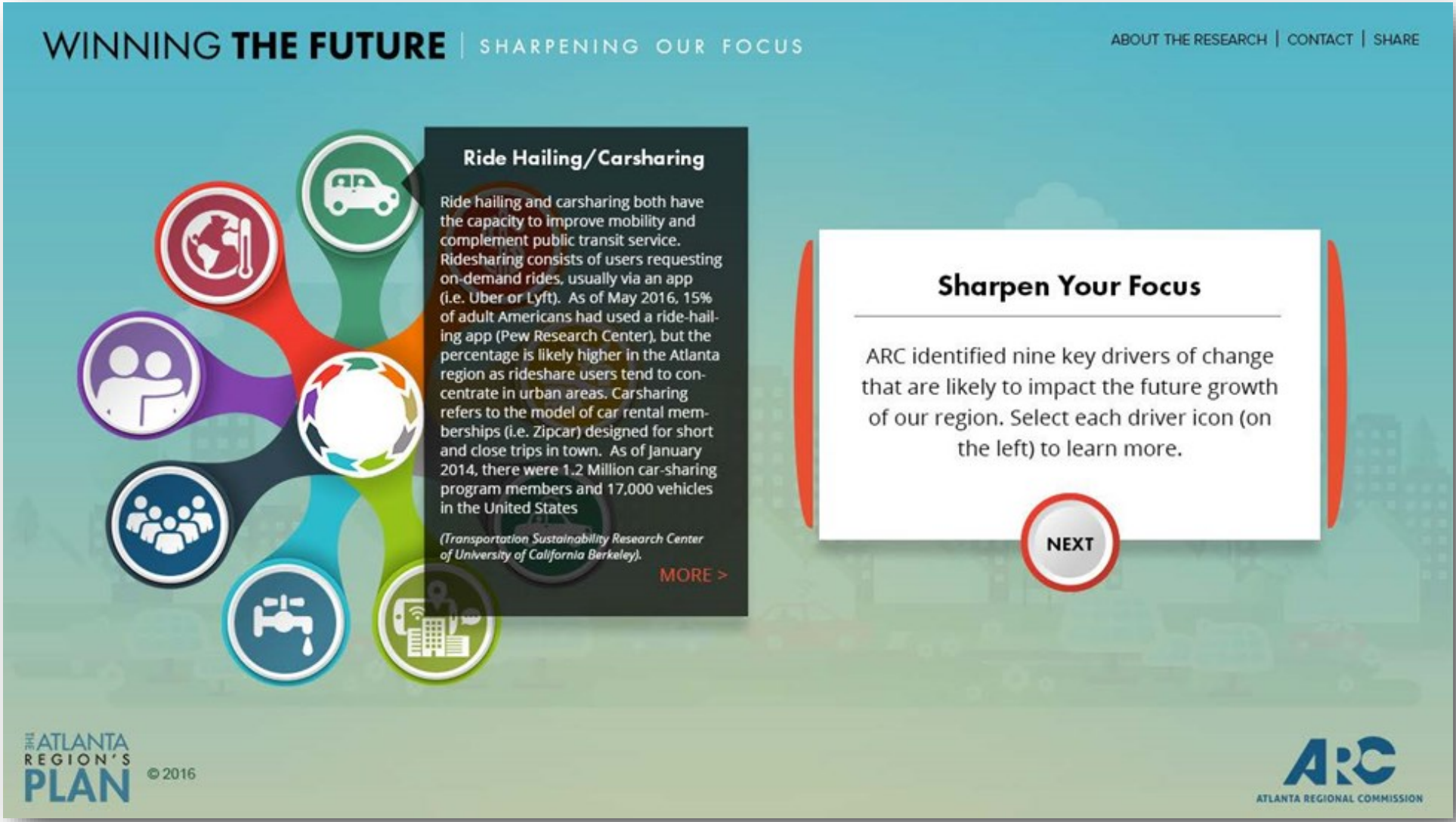
ONLINE SCENARIO VISUALIZATION TOOL

Opening Screen

Visitors to scenarios.atlantaregional.com (subdomain within ARC's website) will be directed to the opening page, which is animated. Once a user clicks on the opening screen, the visualization activity begins.

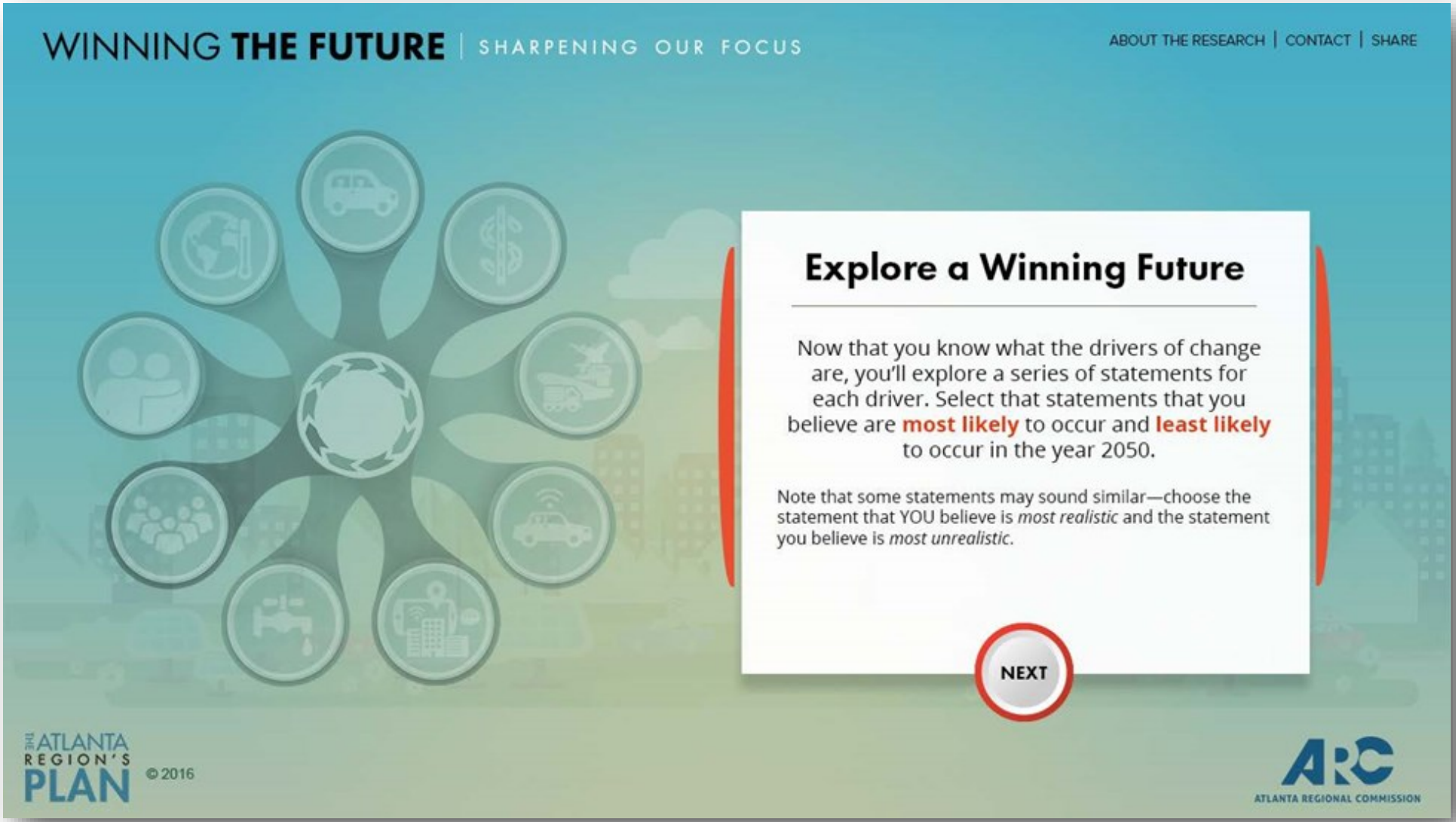
Instructions

As an introduction to the scenario visualization tool and the SHRP2 effort, users are given high-level information on the aim of the tool. If more information is desired, users are able to select from the options in the top, right hand corner for additional information about SHRP2 and scenario planning.



Exploring the Drivers

Users are now able to hover over each of the nine selected drivers of change to discover background research on the topic that may inform their choices as they continue through the tool. This background research will be accessible throughout the tool.

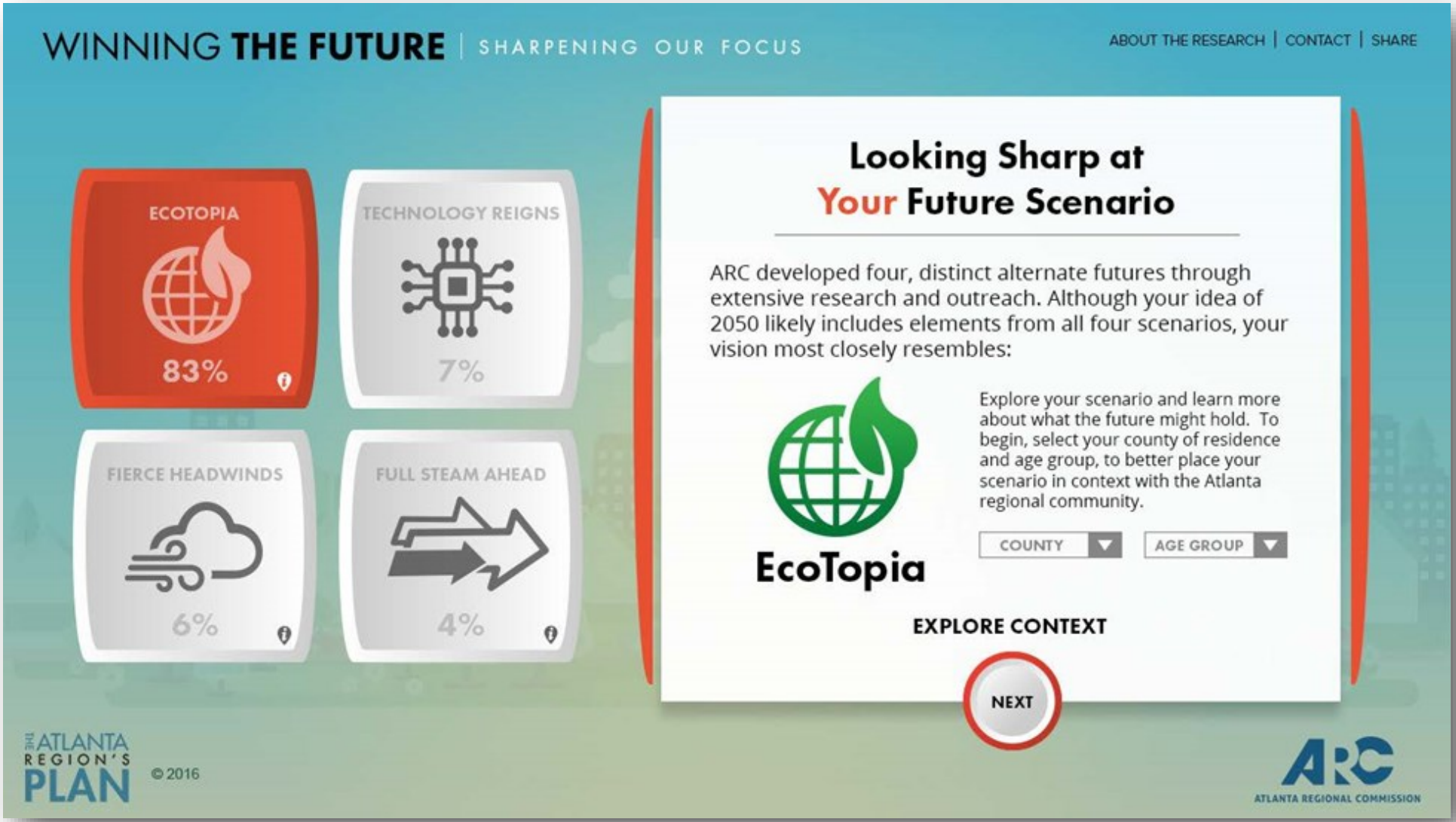


About the Scenario Tool

This page now explains what users will be doing with each of those nine drivers. As users go through the tool, they will be presented with four potential outcomes for each driver and asked to choose which outcome they believe is "most likely" and which outcome they believe is "least likely" to occur in 2050. The following pages allow users to simulate the same decision making process conducted by the Project Steering Committee.

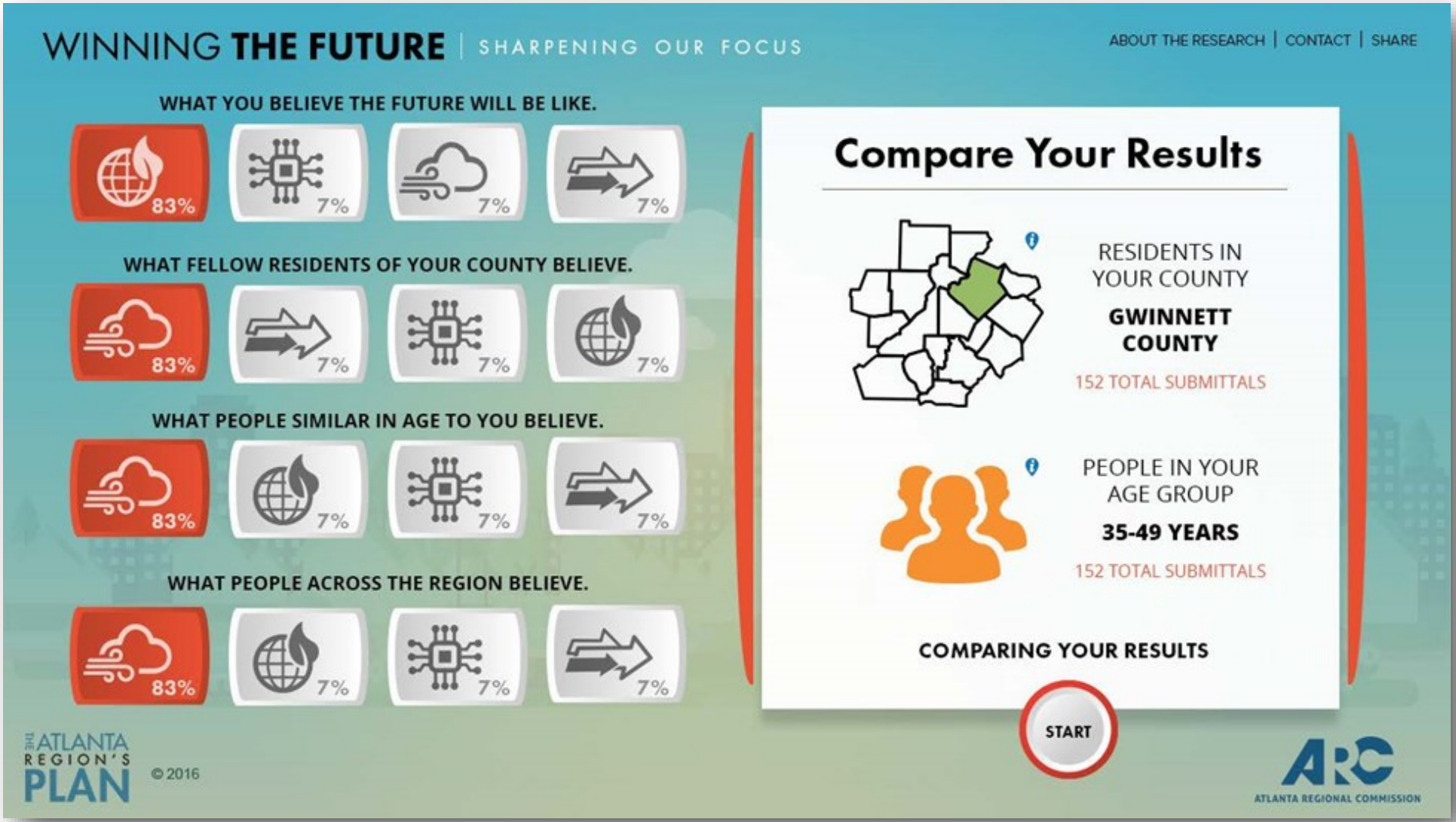
Choosing Outcomes

This is the first in a serious of nine slides (one per driver) that ask the use to choose which outcome they believe is "most likely" and which outcome they believe is "least likely" to occur in 2050. Users can hover over the driver icons at any time to see additional information. As users move through all nine of the drivers, they can view their progress on the pinwheel. The drivers are randomized to ensure that ARC captures results from all nine drivers regardless of user attrition rates.



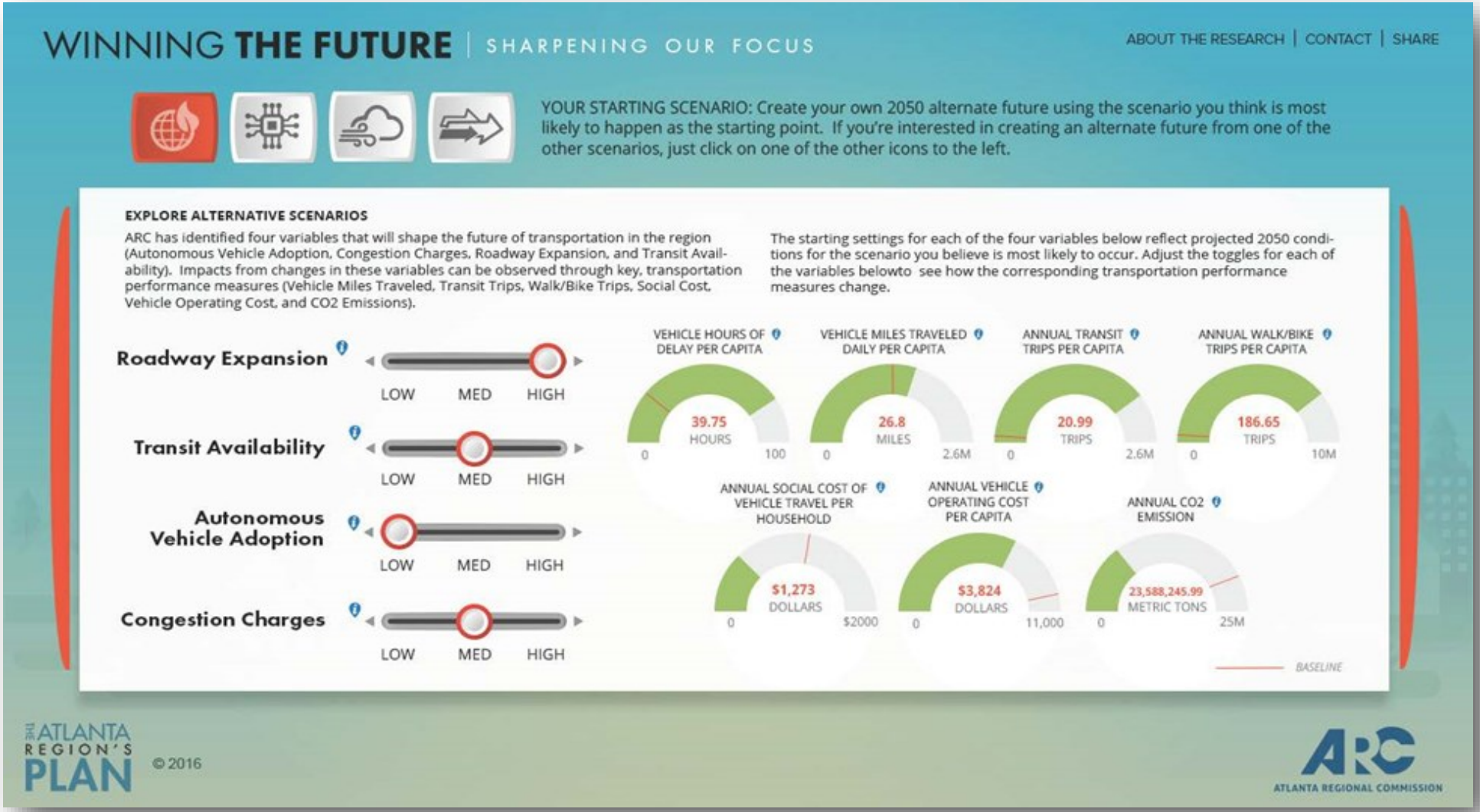
Discovering Your Scenario

Using an algorithm, the tool tells each use which of the four scenarios they most closely align with based on their driver inputs. It also provides a percentage breakdown by scenario. By hovering of the "I" on each scenario, users can find out more about each of the four options. This page also asks the user to input their county and age group to assist ARC in aggregating the data for the next plan.



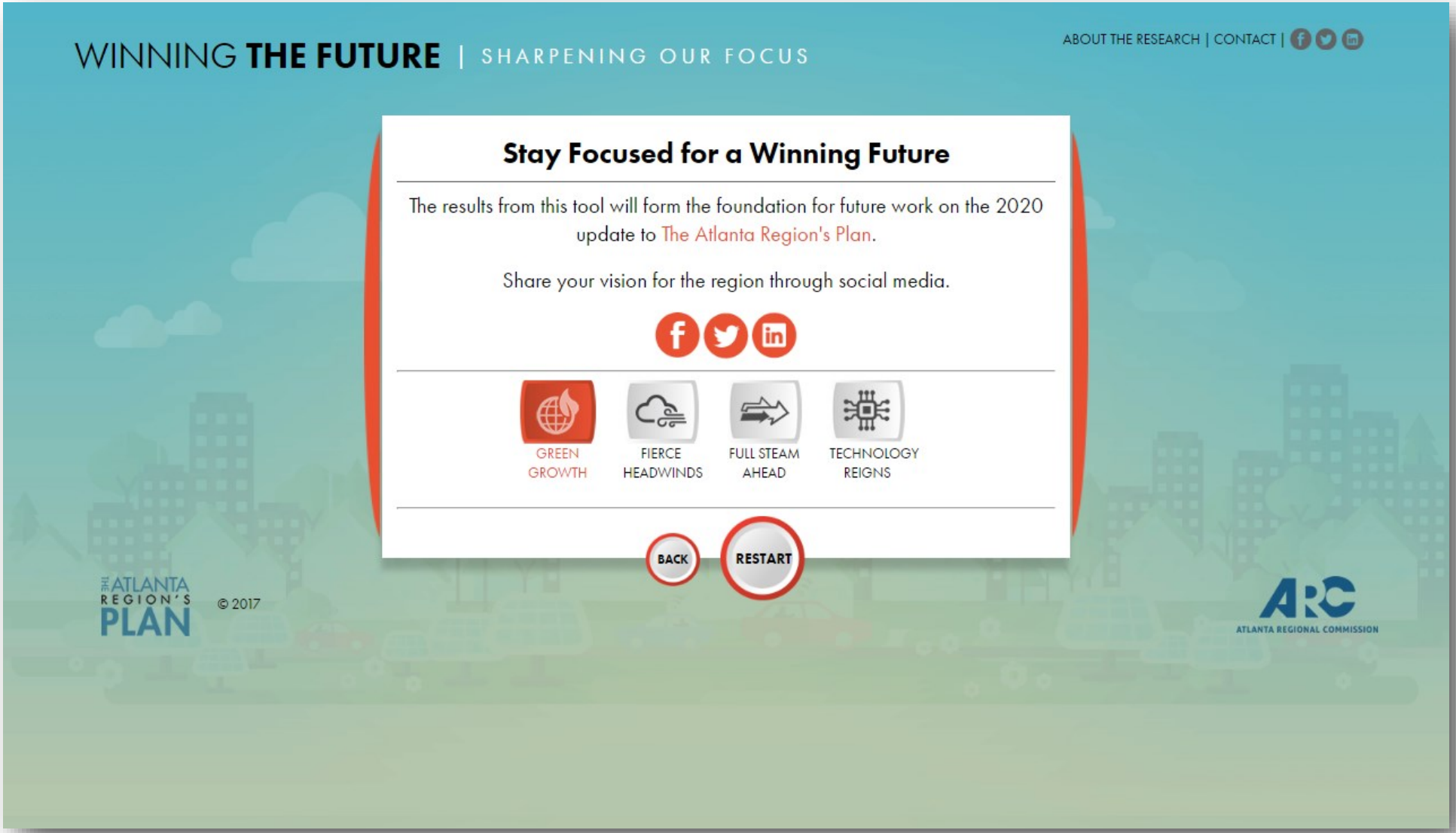
Compare Your Scenario

This page gives users the opportunity to compare their results across the region, across their county, and across their age bracket.



Explore Alternate Scenarios

This page gives users the opportunity to adjust four potential policy inputs (roadway expansion, transit availability, autonomous vehicle adoption, and congestion charges) for each of the four scenarios. The page automatically pre-loads with the scenario the user most closely aligns with, including the policy assumptions made in the initial model. The user then has the opportunity to set the four variables to low, medium, or high and watch the seven metrics on the right hand side of the page respond. This can be done across the four scenarios. In total, 324 different scenarios (all modeled in RSPM) can be created from this tool.



Share Your Results

This page gives users the ability to share their results on social media. The hope is that by allowing users to share the scenario they most closely align with, others will be inspired to try the tool as well.

Appendix B

STAFF WORKSHOP AGENDA

Sharpening Our Focus
SHRP2 Implementation Assistance Grant Program

Working Session
April 6, 2017
Harry West A Conference Room, ARC Offices

Agenda

9:00	Welcome and Introductions	Haley Berry/Liz Sanford, ARC
9:15	SHRP2 Process Overview	David Haynes, ARC
9:45	Discussion- reactions of the scenarios and outcomes	ALL
10:15	BREAK	
10:30	Division Presentations	ALL
Noon	LUNCH	
12:30	Where do we go from here	Consultant Team
1:00	Discussion	ALL
2:00	BREAK	
2:15	Continue Discussion	ALL
2:45	Wrap up and Adjourn	Haley Berry/Liz Sanford, ARC

Appendix C

STAFF WORKSHOP PRESENTATION (ARC)

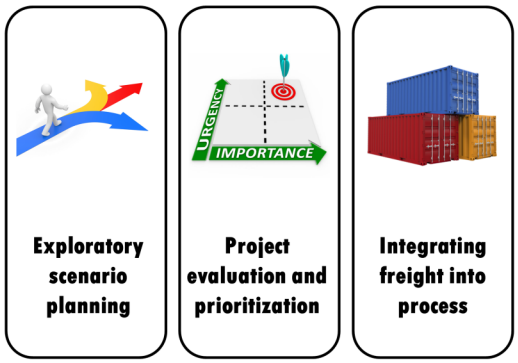
The Region's success rests on our ability to achieve three related outcomes

Atlanta is one of the world's most dynamic metropolitan areas, competing globally on the strength of our diverse population, robust economy, myriad cultural assets and attractive lifestyles. We will "win the future" through intensive collaboration that honors and leverages the uniqueness of our communities.

Atlanta Region's Plan Policy Framework
August 2015

SHRP2 scenario planning project

$300,000 grant to refine the "Winning the Future" vision for the Atlanta Region



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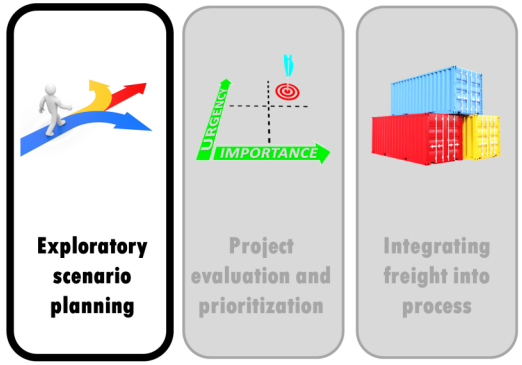
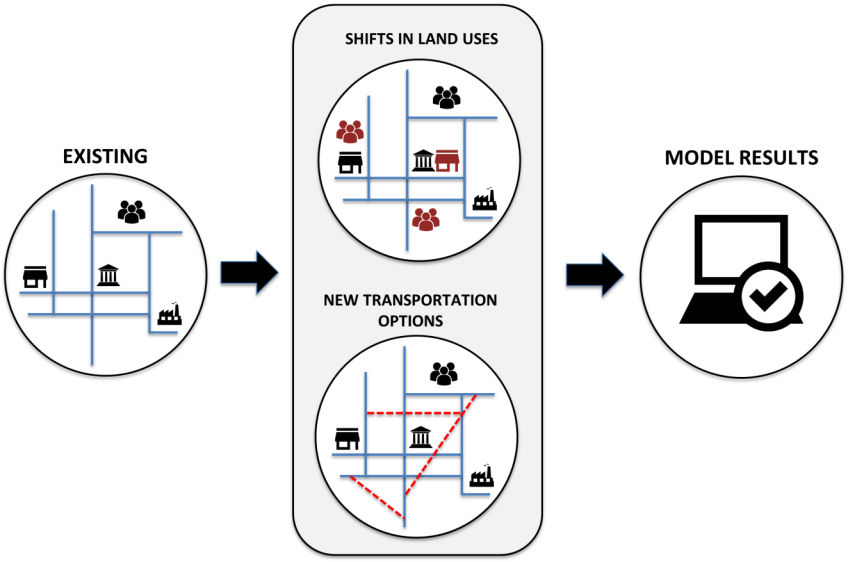


Focus of today's workshop

ARC's exploratory scenario work

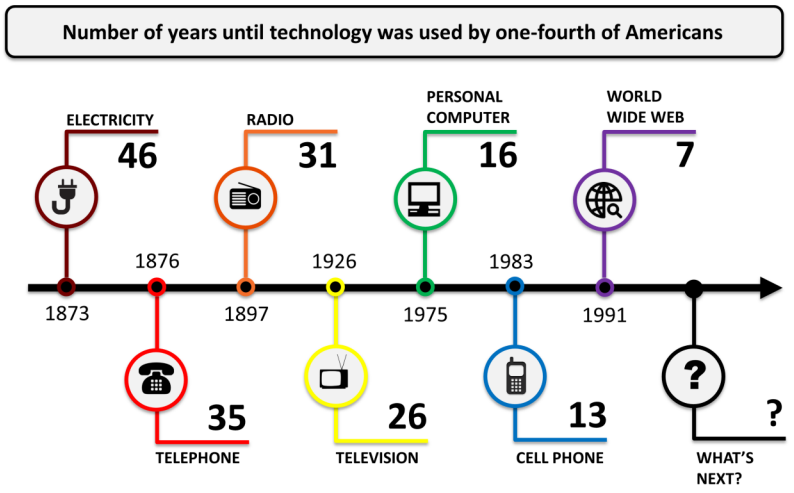
"Normative" scenario development process



The value of exploratory scenario planning

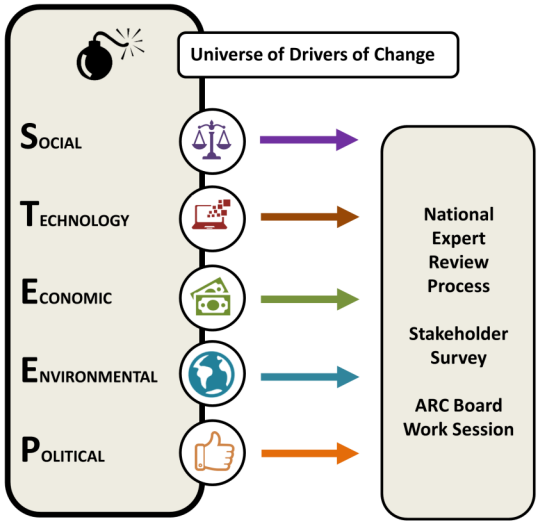
Allows us to look at current and projected issues from multiple perspectives so our plans are dynamic and resilient.

The pace of change is accelerating



Credit: NCHRP Report 750 Series – Informing Transportation's Future

Identifying our region's key drivers of hange



Key drivers of change for the Atlanta Region

- Autonomous Vehicles
- Spatial, Racial and Economic Equity
- Climate Change Regulations
- Aging of the Population
- Transportation Finance Structure
- Water Supply
- Intelligent Infrastructure & Technology
- Ridehailing Services
- Port Traffic

How do the drivers fit together?

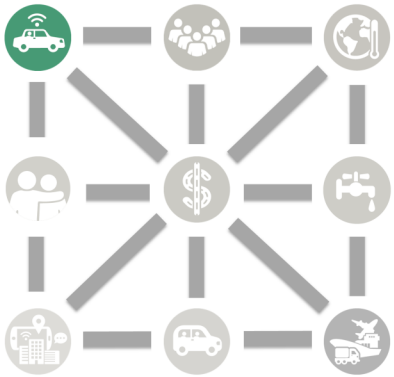
Plausibility is the key to building alternate futures

plau·si·ble
/ˈplôzəb(ə)l/

adjective

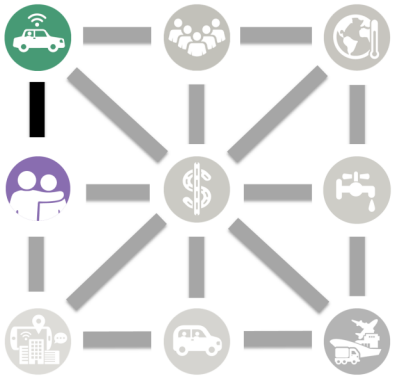
(of an argument or statement) seeming reasonable or probable.
"a plausible explanation"
synonyms: credible, reasonable, believable, likely, feasible, tenable, possible, conceivable, imaginable; convincing, persuasive, cogent, sound, rational, logical, thinkable
"a plausible explanation"

Identifying plausible relationships between drivers



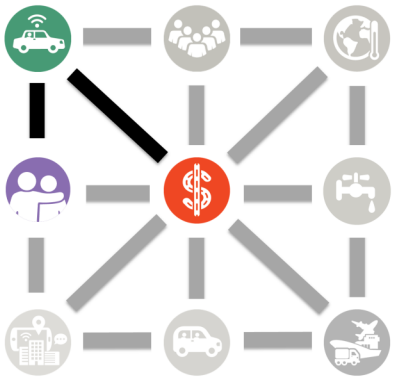
If the potential of autonomous vehicles matches the hype and they become commercially viable and readily available within the foreseeable future....

Identifying plausible relationships between drivers



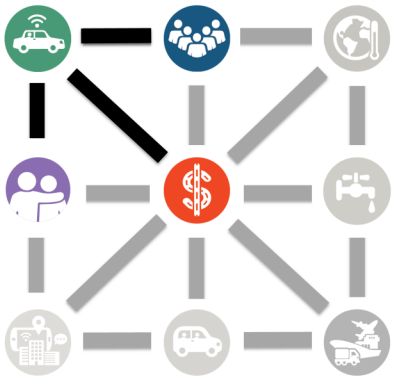
Will older adults be early adopters of this new form of transportation which allows them to maintain their personal independence? Or will they be intimidated by the technology?

Identifying plausible relationships between drivers



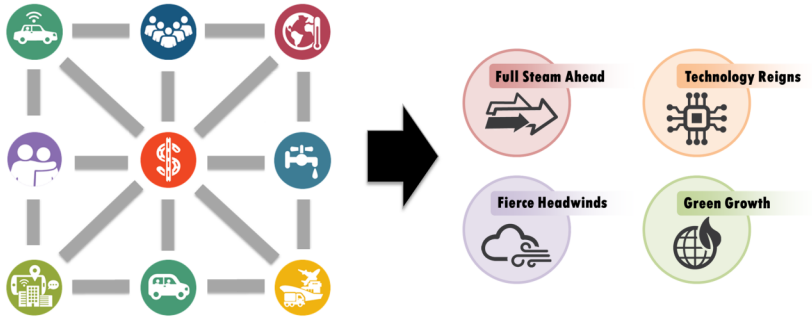
If an autonomous fleet is available "on call", will people need to own their own vehicle? How would this change our spending habits? What happens to local governments with budgets that depend on traffic violations as a major source of revenue?

Identifying plausible relationships between drivers

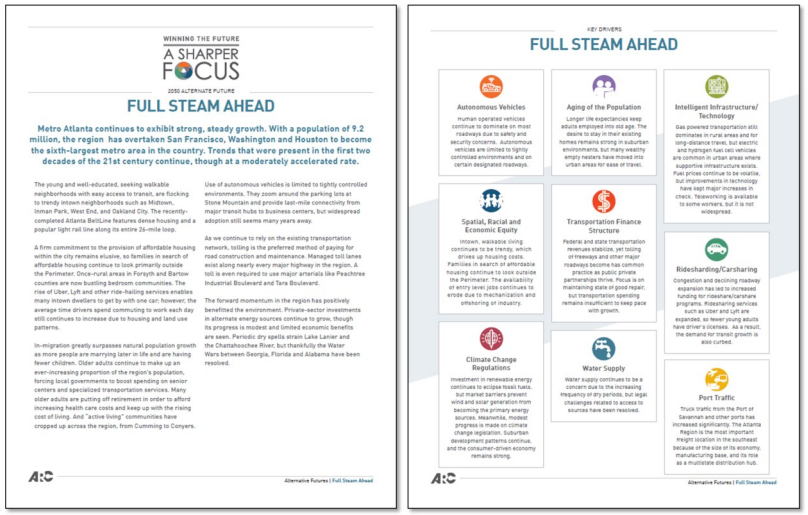


Would an autonomous vehicle fleet drive traditional transit services out of business? Or would it serve a much needed "last mile" connectivity function? Will lower income individuals be able afford access to the fleet?

Developing alternate futures



Sample alternate future narrative



WINNING THE FUTURE

A SHARPER FOCUS

2050 ALTERNATE FUTURE

FULL STEAM AHEAD

Metro Atlanta continues to exhibit strong, steady growth. With a population of 9.2 million, the region has overtaken San Francisco, Washington and Houston to become the sixth-largest metro area in the country. Trends that were present in the first two decades of the 21st century continue, though at a moderately accelerated rate.

The young and well-educated, seeking walkable neighborhoods with easy access to transit, are flocking to trendy intown neighborhoods such as Midtown, Inman Park, West End, and Oakland City. The recently-completed Atlanta BeltLine features dense housing and a popular light rail line along its entire 26-mile loop.

A firm commitment to the provision of affordable housing within the city remains elusive, so families in search of affordable housing continue to look primarily outside the Perimeter. Once-rural areas in Forsyth and Bartow counties are now bustling bedroom communities. The rise of Uber, Lyft and other ride-hailing services enables many intown dwellers to get by with one car; however, the average time drivers spend commuting to work each day still continues to increase due to housing and land use patterns.

In-migration greatly surpasses natural population growth as more people are marrying later in life and are having fewer children. Older adults continue to make up an ever-increasing proportion of the region's population, forcing local governments to boost spending on senior centers and specialized transportation services. Many older adults are putting off retirement in order to afford increasing health care costs and keep up with the rising cost of living. And "active living" communities have cropped up across the region, from Cumming to Conyers.

Use of autonomous vehicles is limited to tightly controlled environments. They zoom around the parking lots at Stone Mountain and provide last-mile connectivity from major transit hubs to business centers, but widespread adoption still seems many years away.

As we continue to rely on the existing transportation network, tolling is the preferred method of paying for road construction and maintenance. Managed toll lanes exist along nearly every major highway in the region. A toll is even required to use major arterials like Peachtree Industrial Boulevard and Tara Boulevard.

The forward momentum in the region has positively benefitted the environment. Private-sector investments in alternate energy sources continue to grow, though its progress is modest and limited economic benefits are seen. Periodic dry spells strain Lake Lanier and the Chattahoochee River, but thankfully the Water Wars between Georgia, Florida and Alabama have been resolved.

Alternative Futures | Full Steam Ahead

KEY DRIVERS

FULL STEAM AHEAD

Autonomous Vehicles
Human-operated vehicles continue to dominate on most roadways due to safety and security concerns. Autonomous vehicles are limited to tightly controlled environments and on certain designated roadways.

Aging of the Population
Longer life expectancies keep adults employed into old age. The desire to stay in their existing homes remains strong in suburban environments, but many wealthy empty nesters have moved into urban areas for ease of travel.

Intelligent Infrastructure/ Technology
Gas powered transportation still dominates in rural areas and for long-distance travel, but electric and hydrogen fuel cell vehicles are common in urban areas where supportive infrastructure exists. Fuel prices continue to be volatile, but improvements in technology have kept major increases in check. Telecommuting is available to some workers, but it is not widespread.

Spatial, Racial and Economic Equity
Intown, walkable living continues to be trendy, which drives up housing costs. Families in search of affordable housing continue to look outside the Perimeter. The availability of entry level jobs continues to erode due to mechanization and offshoring of industry.

Transportation Finance Structure
Federal and state transportation revenues stabilize, yet tolling of freeways and other major roadways become has common practice as public private partnerships thrive. Focus is on maintaining state of good repair, but transportation spending remains insufficient to keep pace with growth.

Ridesharing/Carsharing
Congestion and declining roadway expansion has led to increased funding for ridesharing/carshare programs. Ridesharing services such as Uber and Lyft are expanded, so fewer young adults have driver's licenses. As a result, the demand for transit growth is also curbed.

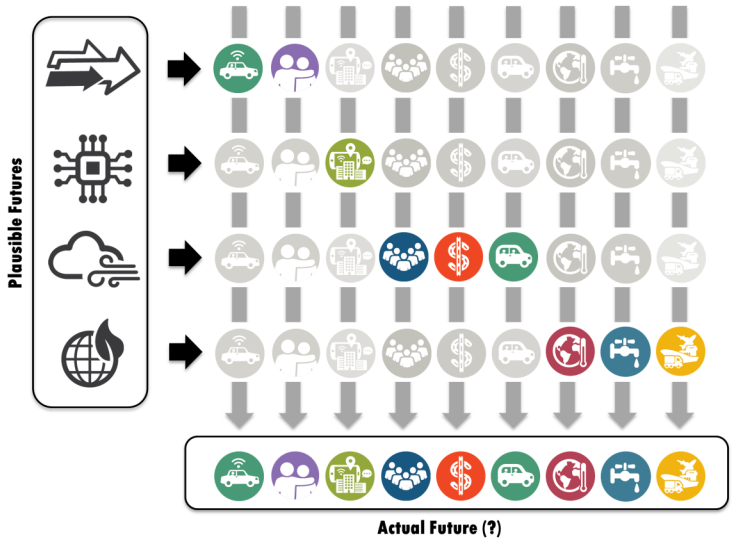
Climate Change Regulations
Investment in renewable energy continues to eclipse fossil fuels, but market barriers prevent wind and solar generation from becoming the primary energy sources. Meanwhile, modest progress is made on climate change legislation. Suburban development patterns continue, and the consumer-driven economy remains strong.

Water Supply
Water supply continues to be a concern due to the increasing frequency or dry periods, but legal challenges related to access to sources have been resolved.

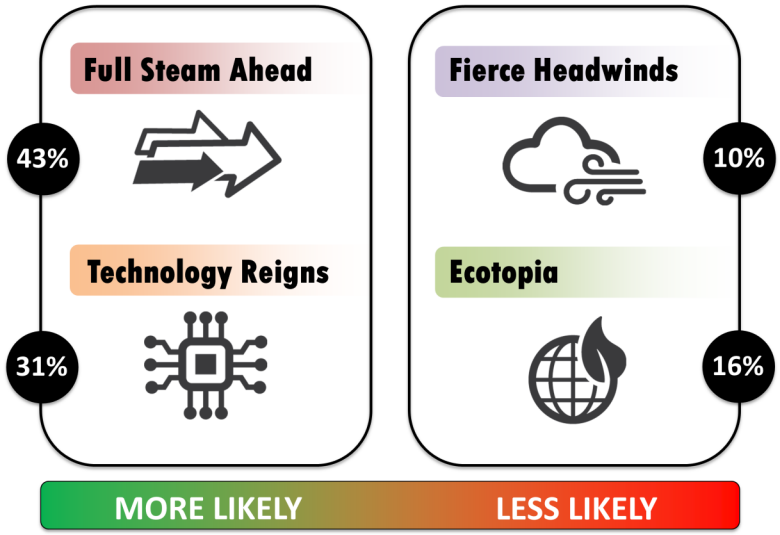
Port Traffic
Truck traffic from the Port of Savannah and other ports has increased significantly. The Atlanta Region is the most important freight location in the southeast because of the size of its economy, manufacturing base, and its role as a multistate distribution hub.

Alternative Futures | Full Steam Ahead

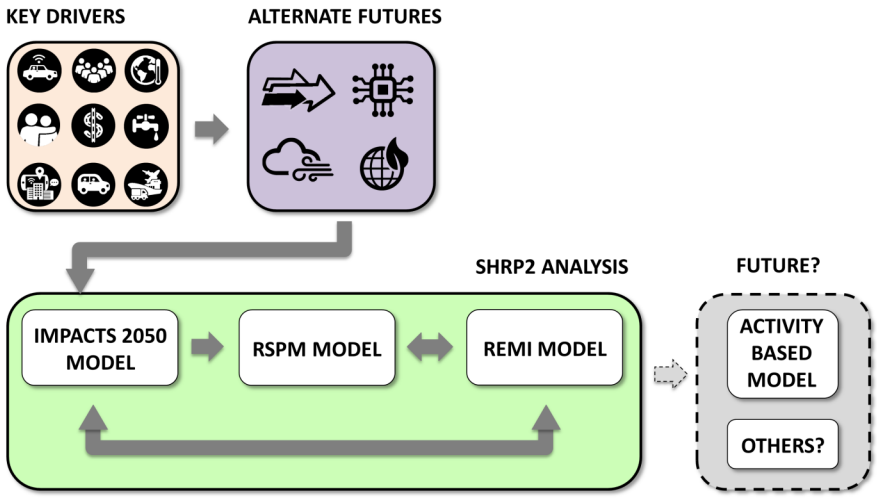
The actual future? Nobody knows.



Results of beta tests with committees



Modeling the alternate futures



Alternate futures analyzed in RSPM

4 **Baseline alternate futures**

4 **Key variables**

- Arterial lane miles
- Transit service
- Autonomous vehicles and car service use
- Congestion charges

3 **Settings per variable**

- High
- Medium
- Low

324

Variations on our four base alternate futures

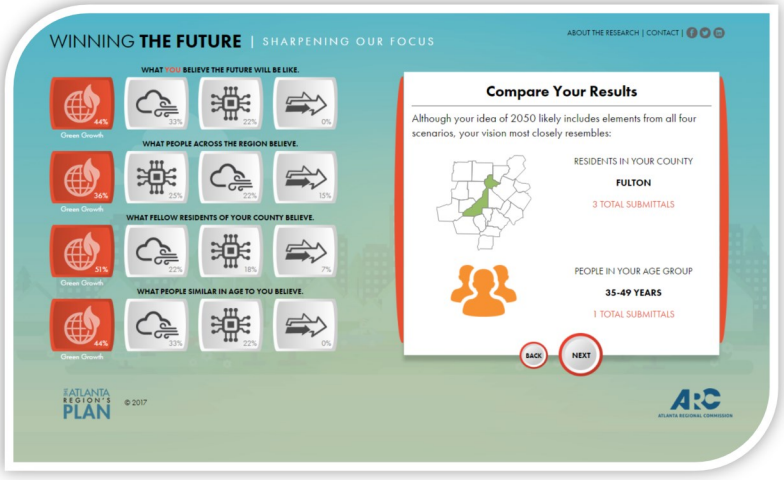
Online alternate future exploration tool

Learn about the drivers of change

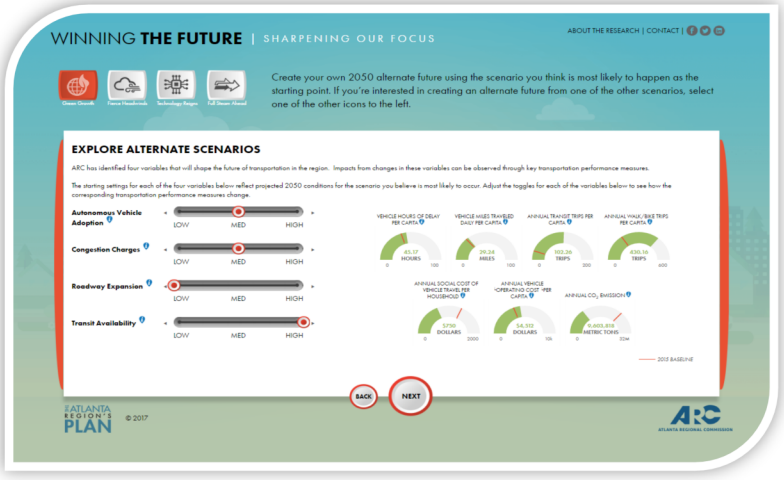
Select likely outcomes

Discover what future you believe is most likely

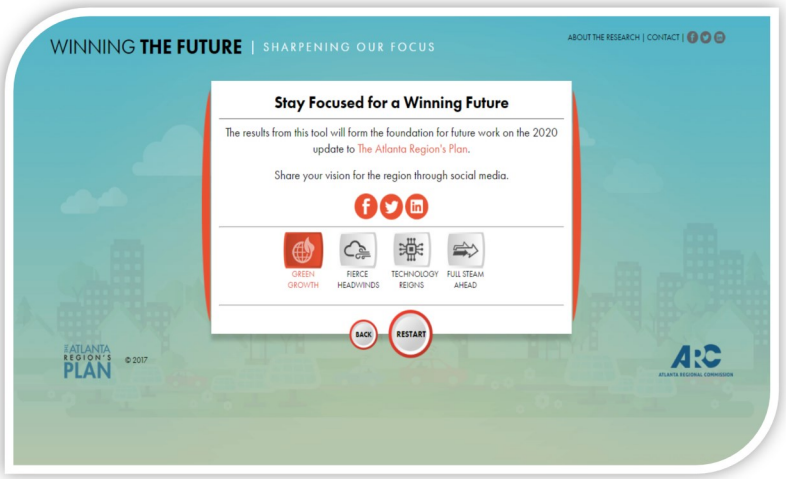
Compare your prediction with other participants



Create your own future

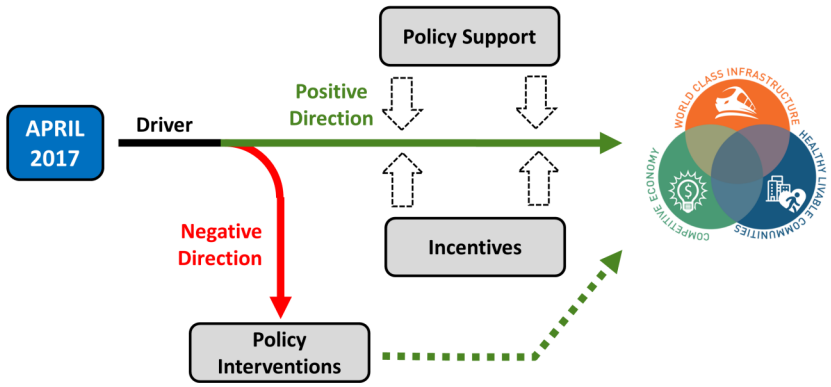


Share your results

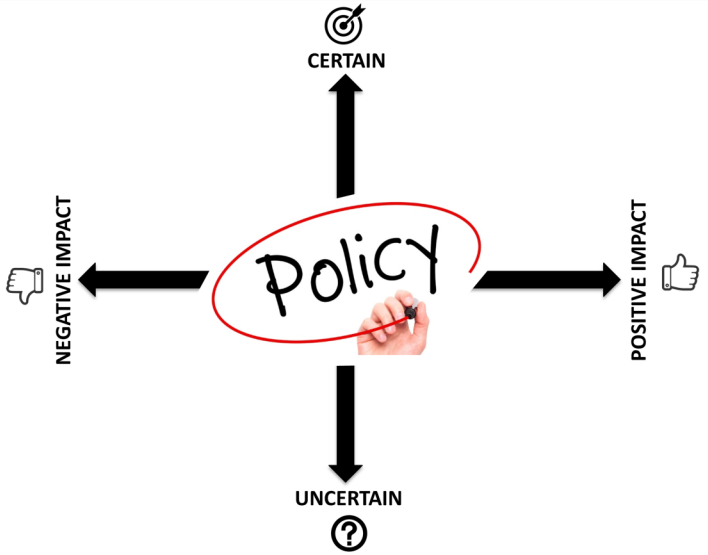


What now?

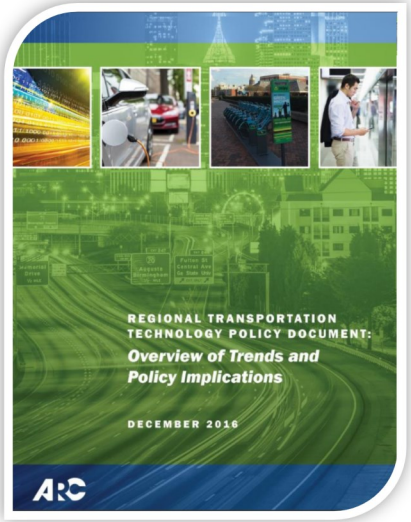
Developing policy direction



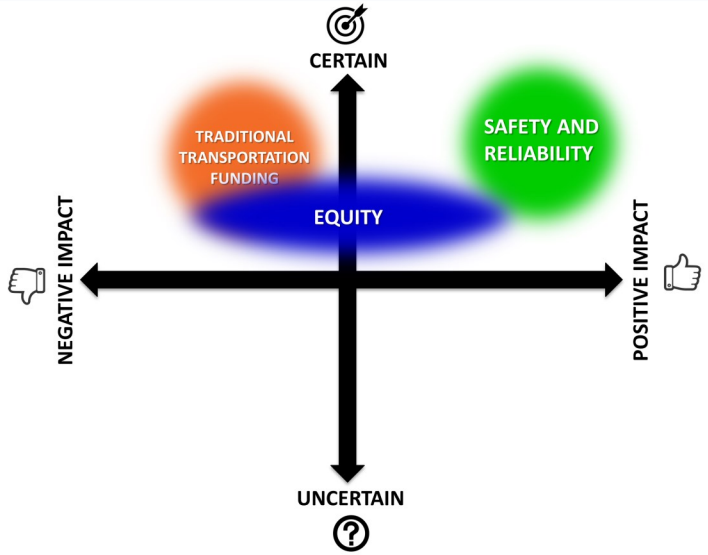
Policy actions must weigh the likelihood and potential direction and magnitude of impacts



Regional Transportation Technology Policy Document



The certainty and magnitude of impacts created by transportation technology vary significantly



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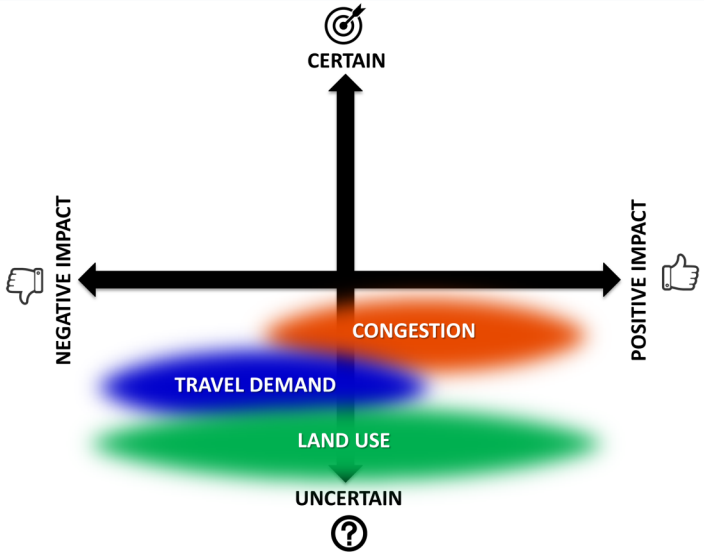


Teeing up the conversation

- What is your reaction to the alternate futures?
- Could they be helpful in your division's planning efforts and initiatives?
- What about exploratory planning in general?
- What drivers of change are most relevant to your work?
- How much control or influence do we actually have over the drivers of change?
- What other disruptions may help/hinder achieving your division's goals?
- How should this work be integrated into the Atlanta Region's Plan?

Appendix D

STAFF WORKSHOP PRESENTATION (CONSULTANTS)

KAM
Knaap Avin Moore

ARC Scenarios, SHRP2, and the Regional Plan… Thoughts on Next Steps

April 6, 2017

KAM
Knaap Avin Moore

Our Presentation Sequence

1. ARC Scenarios and SHRP2 Overall assessment relative to best practices
   a. Final touches: tie scenarios to strategies/plans
   b. Expanded use of scenarios in ARC
2. Beyond SHRP2: Can the scenarios help with a regional plan for Atlanta?

a. Best practices in regional plans: a continuum

Discussion (1 hour)

b. The Plan must have performance measures for decisions: best practices

Discussion (1 hour)

KAM
Knaap Avin Moore

1. ARC Scenarios and SHRP2

a. Overall assessment relative to best practices

KAM
Knaap Avin Moore

Similar Themes in recent Exploratory Scenarios

Scenario Themes

	Ecotopia	Fierce Headwinds	Tech Reigns	Free Agent Economy	Regional Cooperation	US Energy prices	Climate Change	Economy transforms	Smart growth	Strong regulation	Engaged public	Resource Utilization	Dev . capacity	Mode shift	Political will	Quality rec. amenities
ARC (2016)	●	●	●													
DVRPC (2015)	●	●	●	●		●										
CMAP (2016)	●	●	●				●	●								
MARC (2017)			●				●	●								
W'ton 2050 (2008)	●	●	●		●			●								
I-2050 (2014)	●	●	●													
NCSG (2015)	●	●	●	●		●										
Upper Verde W'shed (2014)							●		●	●	●	●				
SWCCOG (2015)						●	●									
Col. Water/Growth (2016)								●	●							
Denver City/County (2016)													●	●	●	
Sahuarita Gen. Plan (2014)								●					●		●	●

1. ARC Scenarios and SHRP2

b. Final touches: tie scenarios to strategies/plans

Policy Implications need to be uncovered….

Next steps for ARC on visioning

SHRP2 SOLUTIONS — Final deliverables due Spring 2017

- Explore narratives for each alternate future in more depth
- Discuss policy implications
  - Where do **likely** outcomes and **desirable** outcomes differ?
  - What can we control or influence at the local, regional and state levels?
  - How do we encourage/discourage certain outcomes?
- Present technical analysis findings
- Complete and launch online scenario exploration tool
- Advisory committee briefing in November 2016

THE ATLANTA REGION'S PLAN — Next update due Early 2020

- Ongoing ARC Board and committee engagement

Comparing DVRPC and ARC Scenarios

		ARC Scenarios
ENDURING URBANISM	Millennials and empty nesters moving back to walkable urban centers are the start of a long-term trend, as future generations show an even stronger desire for city living and walking, biking, and transit.	Similar to Ecotopia
THE FREE AGENT ECONOMY	Individuals must create their own economic opportunities and contribute more to their healthcare and retirement, as labor efficiency and the rising cost of full-time employees cause large companies to continue to reduce their workforces.	
SEVERE CLIMATE	Increasing atmospheric carbon levels, due to continued global use of fossil fuels, lead to significant disruptions from climate change. The region must prepare for hotter and wetter weather, more frequent and intense storms, and rising sea levels.	Similar to Fierce headwinds
TRANSPORTATION ON DEMAND	Smartphones, apps, and real-time information help people get around using a multimodal network of car sharing, taxis, ride sharing, transit, biking, bike sharing, walking, and new modes such as on-demand micro transit bus service and ride sourcing, where a vehicle is e-hailed for a point-to-point trip.	Similar to Tech Reigns
THE U.S. ENERGY BOOM	The region's economy grows with domestic natural gas extraction and distribution, and renewed manufacturing. An abundance of domestically produced energy keeps the cost of energy low and helps the region and the nation become more energy independent.	

DVRPC: Analyzing Interactions Between the Scenarios

Table 3. Potential Interactions Between the Future Forces

Force 1	Force 2	Relationship	Interactions Between Them
Enduring Urbanism (+)	The Free Agent Economy (+)	Strengthens Both	■ The Free Agent Economy may be a cause of Enduring Urbanism. Together, they may strengthen the region's agglomeration economy.
Enduring Urbanism (+)	Severe Climate (0)	Mixed Impacts	■ Severe Climate may reinforce Enduring Urbanism, though it could restrict development of desirable riverfront areas, and add risk to growing development centers. ■ Enduring Urbanism could reduce the risk of Severe Climate.
Enduring Urbanism (+)	Transportation on Demand (0)	Mixed Impacts	■ Transportation on Demand provides more travel options that do not require car ownership, which is being sought by some individuals interested in Enduring Urbanism lifestyles. ■ The ability to be car-free or car-lite in more suburban settings could weaken the desire for Enduring Urbanism. ■ Conversely, Enduring Urbanism preferences for walking and biking could reduce growth in Transportation on Demand.
Enduring Urbanism (-)	The U.S. Energy Boom (-)	Weakens Both	■ The U.S. Energy Boom could worsen air quality and environmental conditions, and low-cost energy generally encourages lower-density development. In sum, this potentially detracts individuals interested in Enduring Urbanism lifestyles, making it less likely to happen. ■ Ongoing weakness in the energy market combined with ongoing interest in living in walkable centers could strengthen regional movements against increasing regional energy distribution.

DVRPC Universal Actions

Knaap Avin Moore

Universal Actions

- ☐ Update zoning codes to allow for mixed-use infill development.
- ☐ Build lifelong communities that facilitate aging in place.
- ☐ Encourage immigrant-friendly policies.
- ☐ Implement universal pre-kindergarten and other programs to improve k-12 educational outcomes.
- ☐ Use green infrastructure and stream buffer ordinances to improve water quality and livability.
- ☐ Promote megaregional collaboration and cooperation.
- ☐ Create regional or local big data team(s) to centralize and analyze datasets, guide decision making, and enhance government actions.
- ☐ Expand regional broadband infrastructure; and internet access and training for low-income individuals.
- ☐ Develop the impact economy, which uses a profit motive, public-private partnerships, and nonprofits to address economic, environmental, and social issues.
- ☐ Create a modern multimodal transportation system and a regional funding source to help pay for it.
- ☐ Enhance freight and goods movement.
- ☐ Carry out Vision Zero plans, which set a goal of no roadway fatalities.
- ☐ Improve infrastructure resiliency.

DVRPC Contingent Actions

Knaap Avin Moore

Contingent Regional Actions

ENDURING URBANISM

- ☐ (Re)develop without displacing existing households, allow for more multi-family housing.
- ☐ Thoroughly implement Complete Streets to accommodate all users, including goods movement, along with protected bike lanes, pedestrian-only areas, and shared space/living streets concepts that prioritize bike and pedestrian use, particularly in the region's centers.
- ☐ Expand and increase service frequency throughout the transit system.
- ☐ Retrofit office parks and commercial districts into dense mixed-use communities, update design guidelines with form-based zoning, and relax parking requirements.
- ☐ Protect industrial zones.

THE FREE AGENT ECONOMY

- ☐ Expand and support regional business incubators and accelerators, and small business and entrepreneurial training programs.
- ☐ Simplify business tax collection, licensing, and permitting, and ensure regulations do not unnecessarily restrict the pop-up economy.
- ☐ Increase transit service during off-peak hours and improve intra-suburban service and service to suburban office parks.
- ☐ Update zoning codes to allow for shared office space and mixed-use buildings.
- ☐ Build more middle-class housing units in urban areas, and foster regional cooperation for reducing poverty and homelessness.

SEVERE CLIMATE

- ☐ Increase interagency and intergovernmental coordination around climate change issues.
- ☐ Pursue climate change adaptation strategies, such as identifying and protecting vulnerable assets, updating building codes and floodplain ordinances for more extreme weather, building levees to protect key development areas, preserving and extending wetlands, increasing water storage, improving emergency preparedness, and developing a flood detour system for freight routes.
- ☐ Continue to reduce greenhouse gas emissions at the regional, local, firm, and household level.
- ☐ Preserve agricultural land and take other measures to increase regional food production.
- ☐ Continue to invest in, and make the region into an alternative energy and clean-technology hub, and accerate the move to lower-carbon electricity production.

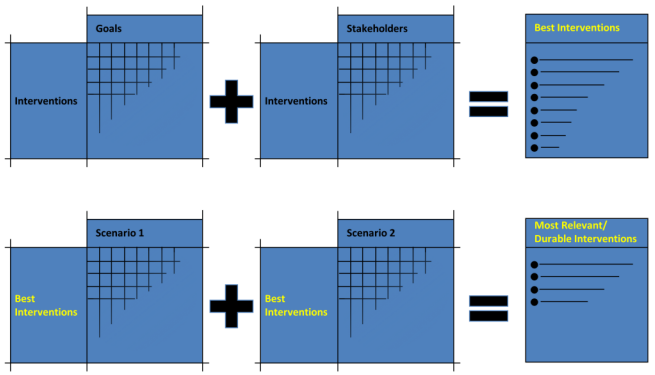
DVRPC Technical Report TOC

Knaap Avin Moore

FUTURE FORCES. TABLE OF CONTENTS

Going from Scenarios to Strategies/Plans – where many such efforts break down

Knaap Avin Moore



An approach Interventions/strategies to achieve the Plan

	Stakeholder Values			Impact		Feasibility	
	All agree	2 agree	1 agrees	Big impact	Mod. impact	Very feasible	Less feasible
Most obvious	X			X		X	
Most ambitious	X	X	X	X	X	X	X
Moderately ambitious	X	X		X	X	X	
Most incremental	X				X	X	

1. Beyond SHRP2: Can the scenarios help with a regional plan for Atlanta?

c. Expanded use of scenarios in ARC

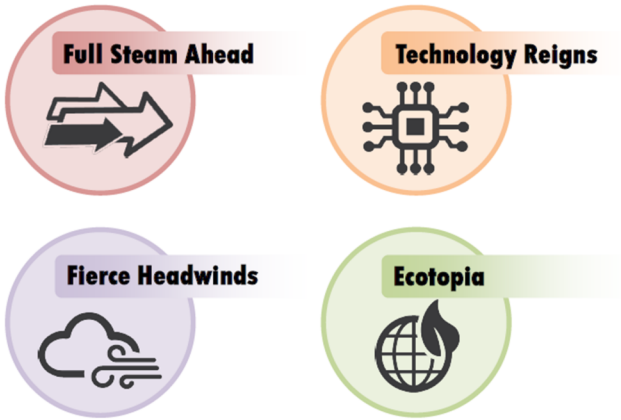
Drivers Adequate for other Divisions?

THE ATLANTA REGION'S PLAN — Key drivers of change for the Atlanta Region

- Autonomous Vehicles
- Spatial, Racial and Economic Equity
- Climate Change Regulations
- Aging of the Population
- Transportation Finance Structure
- Water Supply
- Intelligent Infrastructure & Technology
- Ridehailing Services
- Port Traffic

How do the Scenarios affect the other Divisions?

THE ATLANTA REGION'S PLAN — Four plausible alternate futures for our region



KAM — Sample shorthand description of a scenario

Knaap Avin Moore

THE ATLANTA REGION'S PLAN — **Four plausible alternate futures for our region**

Technology Reigns

Technological advances vastly improve the quality of life for the metro Atlanta residents who have the means to take advantage of new innovations. Autonomous vehicles, renewable energy, and reliable robots abound. However, the pace of change has yielded negative consequences for some of the region's more marginalized communities as the digital divide grows and automatization replaces jobs for unskilled workers.

KAM — The scenario impacts are measured in very limited ways – what to add?

Knaap Avin Moore

THE ATLANTA REGION'S PLAN — **Comparing Scenarios**

	Full Steam Ahead	Fierce Headwinds	Tech Reigns	Ecotopia
VMT/Capita	21%	17%	29%	9%
Walk/Bike Trips/ Capita	19%	36%	24%	130%
Transit Trips/ Capita	2%	32%	8%	387%
VHD/Capita	89%	71%	32%	14%
CO2 Emissions/ Capita	-64%	-58%	-66%	-72%
Vehicle Operating Cost/Capita	-1.5%	38%	-2%	18%

KAM — How ARC planning currently happens

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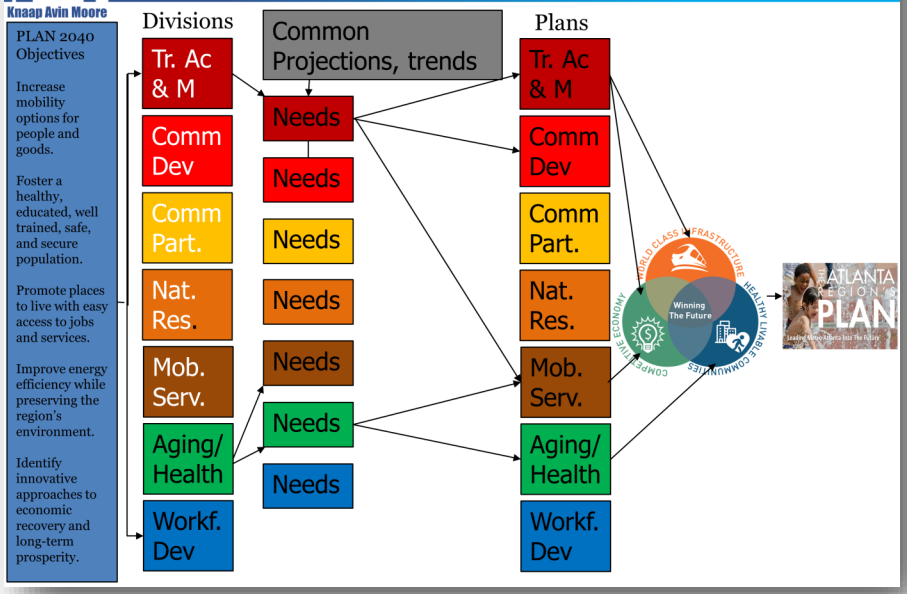

KAM — Effects of using Scenarios for Transportation

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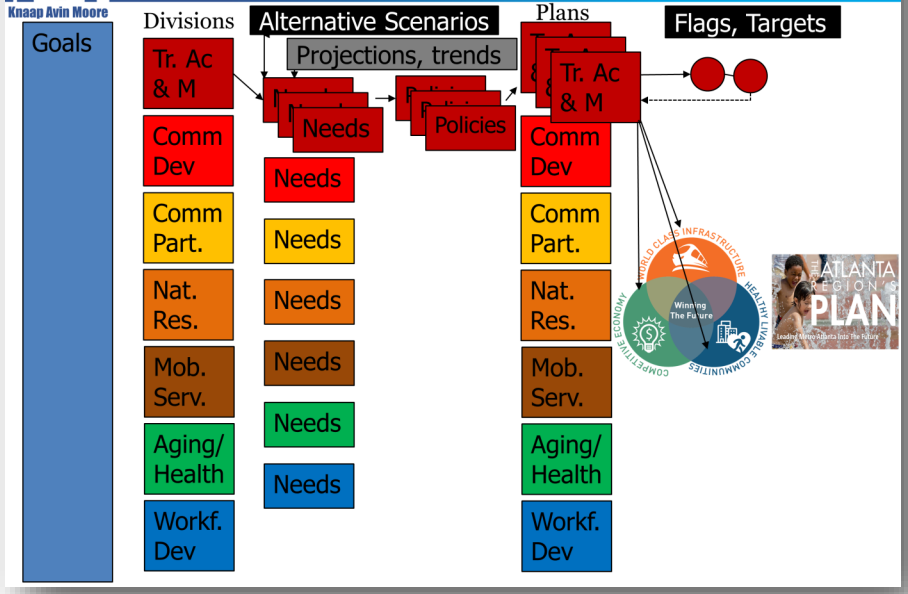
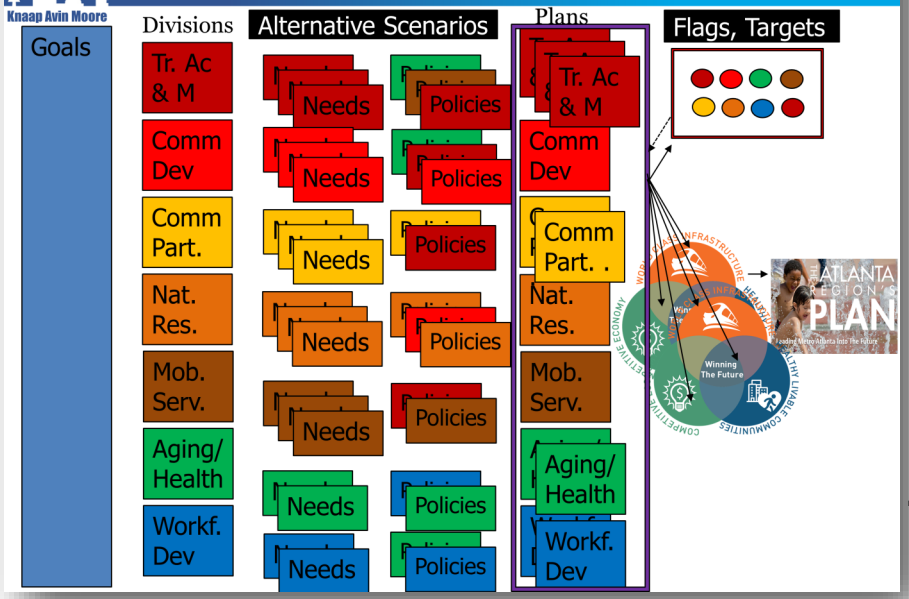


Effects of all Divisions using Scenarios



Summary on Scenarios

- **ARC re Best Practices**: with a few others at the top of pack
- **Left to Finish SHRP2**: explore policy implications. Policies that are (1) linked to multiple objectives, (2) resilient, (3) universal vs. contingent
- **Application to Atlanta Regional Plan**: (1) work better for some goals/divisions than others; (2) more work; (3) is it worth the effort?

2. Beyond SHRP2: Can the scenarios help with a regional plan for Atlanta?

a. Best practices for regional plans: a continuum

New PAS Report (Jan., 2017) also includes best practice examples of Plans

- Broad coverage of trends
- Five regions singled out for case studies as exemplars of integrated, multi-dimensional plans
- We present them on a continuum from most to least prescriptive

KAM Features of Best Practice Integrated Regional Plans (All but one used normative scenarios in process)

Region	Policies & Tools Used	Special Features	Legislation/Authority	Urban Growth Boundary
Puget Sound Area (Seattle)	Regional Council certifies transportation provisions in local plans and designates regional centers Regionally managed funds directed to regionally designated centers	*VISION 2040* *Regional Sustainability Strategy* Growing Transit Communities Program *Regional Economic Strategy* *Regional Design Strategy*	Washington State Growth Management Act (Chapter 36.70A, Revised Code of Washington)	Yes, per state Growth Management Act
San Francisco Bay Area	Greenhouse gas emissions reduction target Integration of regional transportation and housing plans Direction of regional funds to designated growth zones	*Sustainable Communities Strategy* One Bay Area Grant Program	Global Warming Solutions Act (Assembly Bill 32) Sustainable Communities and Climate Protection Act (Senate Bill 375)	Some counties and communities within the region have voluntarily adopted urban growth boundaries or urban service areas
Denver	Regional centers self-designated by local jurisdictions	*Metro Vision* long-range growth management and transportation strategy FasTracks high-capacity rail system "Boomer Bond" assessment tool for older population	Mile-High Compact voluntary interlocal agreement	Yes, voluntary; local jurisdictions can designate either urban growth areas or urban growth boundaries
Minneapolis–Saint Paul	Systems approach to regional plans with local conformance required	*Thrive MSP 2040* 30-year planning framework with cross-cutting outcomes including sustainability	1976 Metropolitan Land Planning Act	No
North Central Texas (Dallas–Fort Worth)	Voluntary public-private-academic partnership Preferred land-use scenario includes mixed use centers	*North Texas 2050* regional vision and action plan Sustainable Development Funding Program	None	No

KAM PSRC Vision 2040 (2008)

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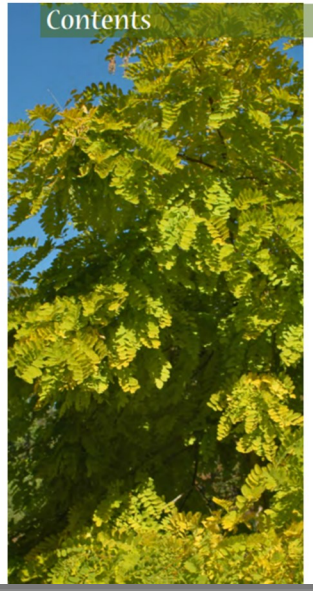
Regional, County, Implementation, Structure



Contents

KAM MTC/ABAG Plan Bay Area (2013)

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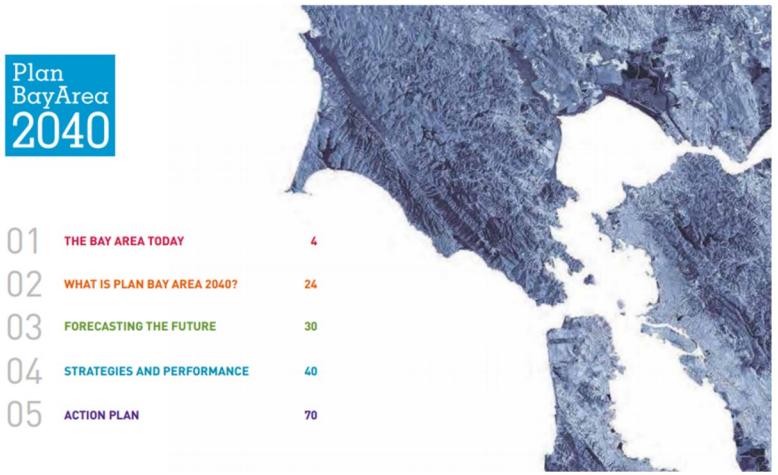
Strong on strategies, performance and actions because of California mandates



KAM DRCOG Metro Vision Update(2016)

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Structured by the 5 Metro Vision goals and outcomes sought under each; each section includes performance measures

Thrive MSP 2040 (2014)

Under state law, the Council prepares a long-range plan for the Twin Cities region every 10 years. Thrive MSP 2040 sets **the policy foundations for systems and policy plans** developed by the Council:

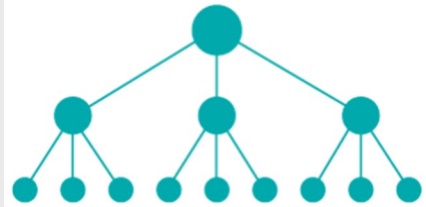
- Transportation Policy Plan
- Water Resources Policy Plan
- Regional Parks Policy Plan
- Housing Policy Plan

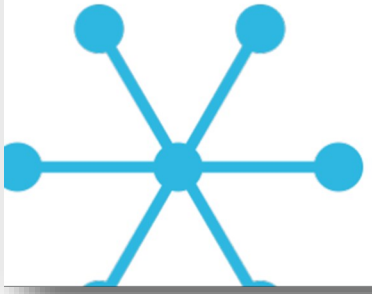
Short on Implementation; long document

Vision North Texas 2050 (2010)

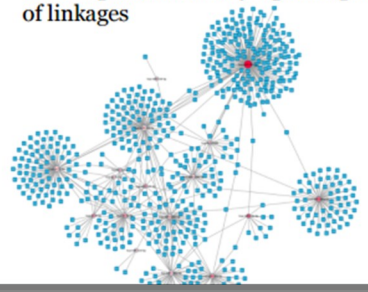
More traditional tr/lu effort; Strong actions section

Transportation Plans in a System of Plans





The plans of a particular agency or region can be thought of as a system of plans. For MPO's the transportation plan is sometimes conceived as the top of a hierarchy or at the center of a top to which all other plans are connected. In practice the transportation plan is one node in a complex system with many nodes of differing sizes and varying strengths of linkages



Summary on Atlanta Plan

- **Theoretical Ideal (Emerging Trends)**
  - Integrated (across goals, geography, agencies)
  - Top-down; formal
  - More work: technical and political
- **Practical Approximation ("System of Plans")**
  - Bottom-up: individual divisions or organizations create plans to address specific regional issues
  - Cross-reference for coordination and integration

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Discussion

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2. Beyond SHRP2: Can the scenarios help with a regional plan for Atlanta?

b. Whatever the option, must have performance measures for decisions: best practices

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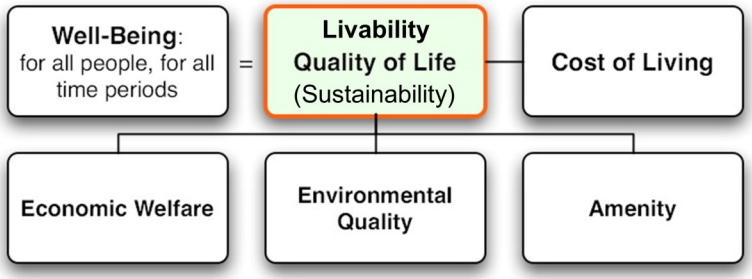
Framework for Regional Policy



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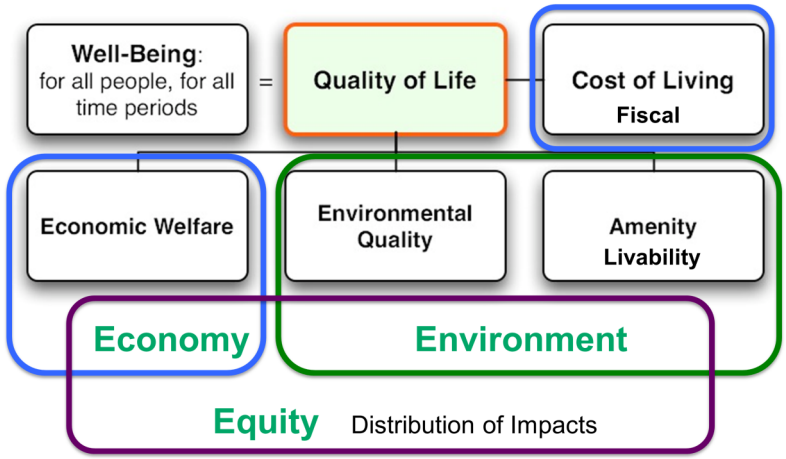
Sustainability / Triple Bottom Line



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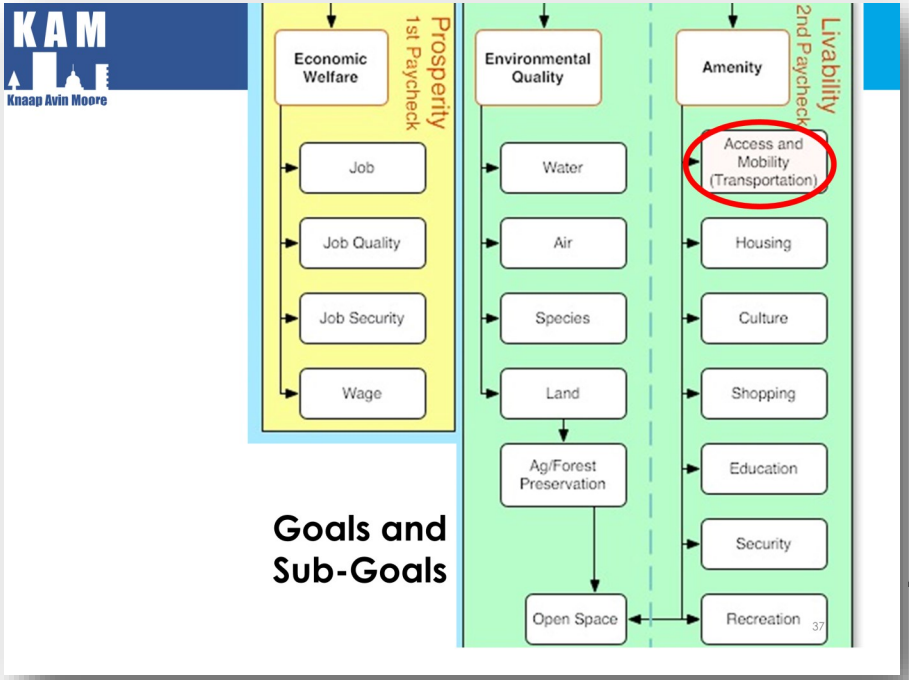

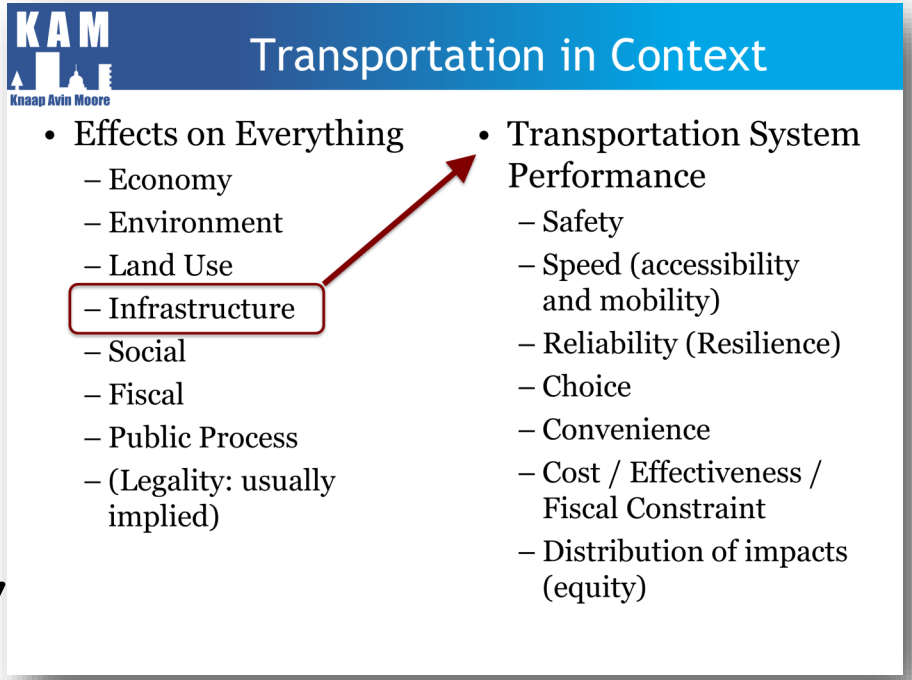

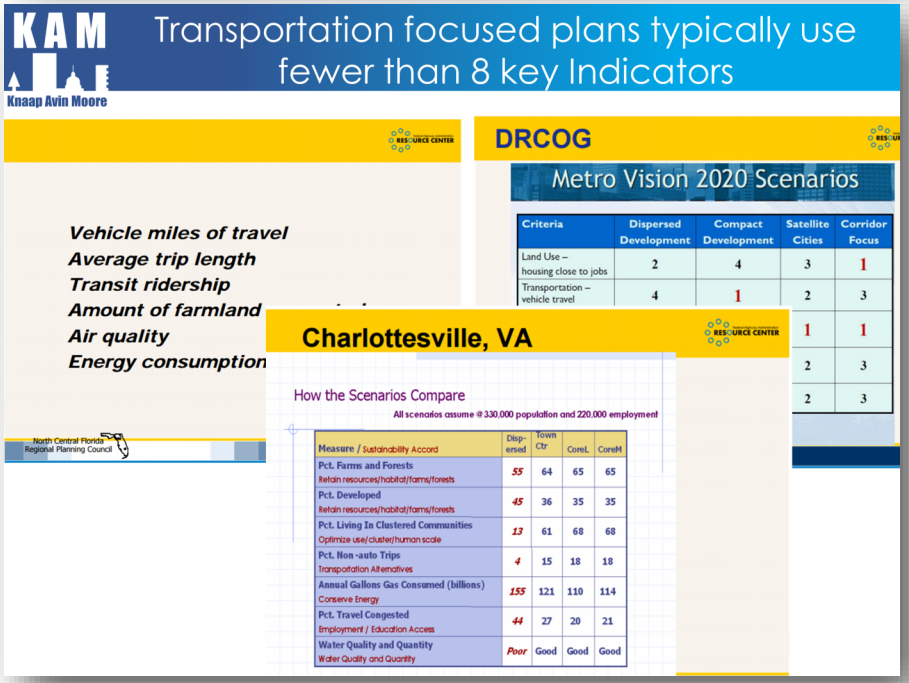

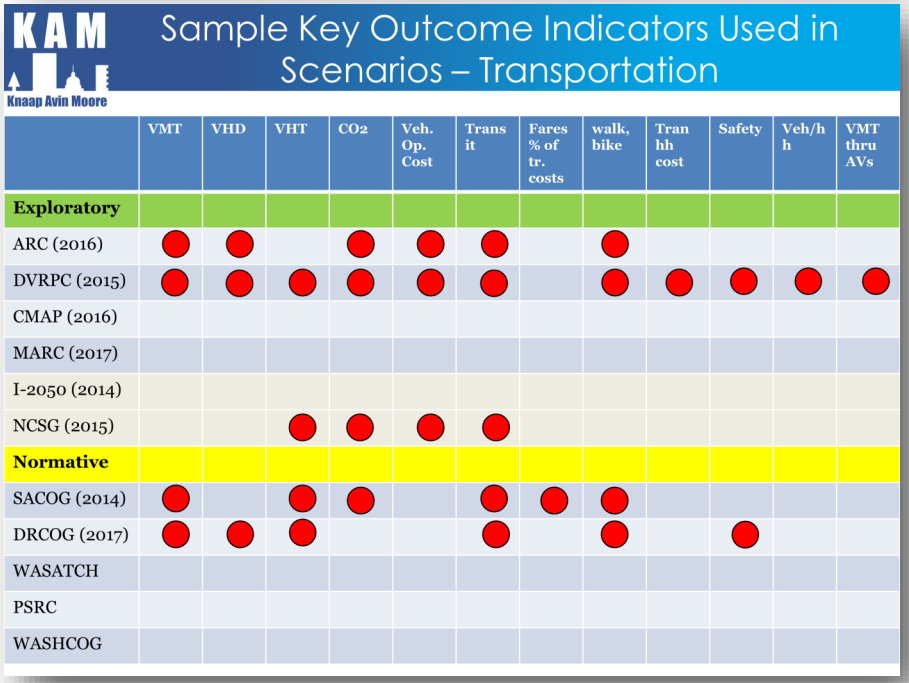

	VMT	VHD	VHT	CO2	Veh. Op. Cost	Transit	Fares % of tr. costs	walk, bike	Tran hh cost	Safety	Veh/hh	VMT thru AVs
Exploratory												
ARC (2016)	●	●		●	●	●		●				
DVRPC (2015)	●	●	●	●	●	●		●	●	●	●	●
CMAP (2016)												
MARC (2017)												
I-2050 (2014)												
NCSG (2015)			●	●	●	●						
Normative												
SACOG (2014)	●		●	●		●	●	●				
DRCOG (2017)	●	●	●			●		●		●		
WASATCH												
PSRC												
WASHCOG												

KAM Sample Key Outcome Indicators Used in Scenarios – Environment, Land Use

	Bike walk to job gtrs	VMT to job ctrs	Jobsin 20 min drive of ctrs	Housing density in UGB	Vernal pools	GHG bldg	Farm land used	Forest used	Comm. Acres used	Res. Acres used	Centers pop,emp	Air quality	N load P load	Protected open space
Exploratory														
ARC (2016)														
DVRPC (2015)									●	●	●			
CMAP (2016)														
MARC (2017)														
I-2050 (2014)														
NCSG (2015)						●	●	●				●	●	●
Normative														
SACOG	●	●	●		●		●							
DRCOG				●							●	●		●
WASATCH														
PSRC														
WASHCOG														

KAM Sample Key Outcome Indicators Used in Scenarios – Equity

	Regional emp.	Tran costs as % income	New MF units	% new jobs near good tr.	% new hh near good tr.	% hh in EJ areas near good tr.	Av. Annual res. Energy costs	% pop. emp. in high risk areas	% pop w/aff. H+T costs
Exploratory									
ARC (2016)									
DVRPC (2015)			●				●		
CMAP (2016)									
MARC (2017)									
I-2050 (2014)									
NCSG (2015)			●	●					
Normative									
SACOG (2014)				●	●	●			
DRCOG (2017)		●		●	●			●	●
WASATCH									
PSRC									
WASHCOG									

KAM DRCOG Sets targets for the Future

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13 indicators
- 4 environment/land use
- 5 transportation
- 4 equity

Measure	Where are we today? (Baseline)	Where do we want to be? (2040 Target)	Related Theme
Share of the region's housing and employment located in urban centers	Housing: 10.0 percent (2014)	Housing: 25.0 percent	DP
	Employment: 36.3 percent (2014)	Employment: 50.0 percent	
Housing density within the Urban Growth Boundary/Area (UGB/A)	1,200 units per square mile (2014)	25 percent increase from 2014	DP
Non-single-occupancy vehicle (Non-SOV) mode share to work	25.1 percent (2014)	35.0 percent	CMR
Daily vehicle miles traveled (VMT) per capita	25.5 daily VMT per capita (2010)	10 percent decrease from 2010	CMR
Average travel time variation (TTV) (peak vs. off-peak)	1.22 (2014)	Less than 1.30	CMR
Daily person delay per capita	6 minutes (2014)	Less than 10 minutes	CMR
Number of traffic fatalities	185 (2014)	Fewer than 100 annually	CMR
Surface transportation-related greenhouse gas emissions per capita	26.8 pounds per capita (2010)	60 percent decrease from 2010	NBE
Protected open space	1,841 square miles (2014)	2,100 square miles	NBE
Share of the region's housing and employment in high risk areas	Housing: 1.2 percent (2014)	Less than 1.0 percent	NBE
	Employment: 2.9 percent (2014)	Less than 2.5 percent	
Share of the region's population living in areas with housing and transportation (H+T) costs affordable to the typical household in the region	41 percent (2013)	50 percent	LC
Regional employment	1.8 million (2014)	2.6 million (1 to 1.5 percent annual growth)	RE
Share of the region's housing and employment near high-frequency transit	Housing: 29.7 percent (2014)	35.0 percent	RE
	Employment: 48.4 percent (2014)	60.0 percent	

KAM *Vibrant NEO Scenarios*

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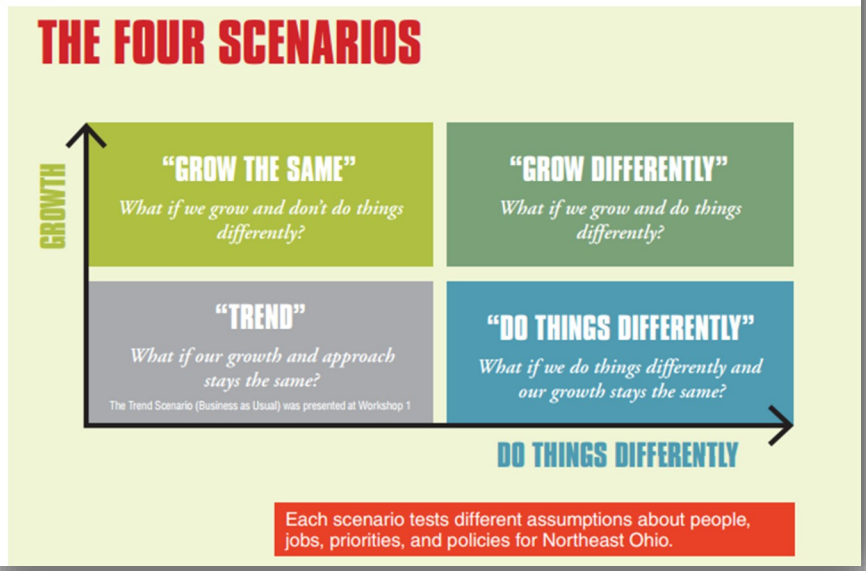

KAM Vibrant NEO targets

Knaap Avin Moore

13 indicators
-4 environment/land use
-4 transportation
-5 equity

INDICATOR	TARGET
Development Location	At least 81% of new housing development and 91% of new jobs should be located with urbanized and urbanizing areas.
VMT	New road infrastructure should be capped at 2.75 lane miles per projected 1,000 additional persons for a maximum of 2,400 lane miles throughout the region. Each lane mile of new road must be accompanied by investments in bicycle and pedestrian infrastructure. VMT per capita should decrease, even if population and employment increase.
Urban & Multifamily Housing	The percentage of urban and multifamily homes in the region should remain at least 45% of the housing supply.
Housing Vacancy	No more than 7% of housing units should be vacant.
H+T Costs	By 2040, all Northeast Ohio residents should spend less than 30% of their income on housing. By 2040, fewer than 65% of residents should spend more than 45% of their income on combined housing and transportation costs.
Transit Proximity	• By 2020, at least 55% of jobs should be near transit. • By 2030, at least 60% of jobs should be near transit. • By 2040, at least 65% of jobs should be near transit. • By 2020, at least 38% of residents should live near transit. • By 2030, at least 44% of residents should live near transit. • By 2040, at least 50% of residents should live near transit.
Roadway Investment Balance	For every new vehicle lane mile built, there will be at least the same number of bicycle lane miles built. For every new vehicle lane mile constructed, there will be at least 10 times the linear miles of sidewalks (5-foot minimum width) built or repaired in the region.
Commute – Mode Share	By 2020, reduce region-wide drive alone commute trips to less than 79%. By 2040, reduce region-wide drive alone commute trips to less than 67%.
Existing Road Infrastructure Maintenance	All roads should achieve at least a "Good" rating on the Ohio Department of Public Works evaluation standard.
Open Space Conservation	Conserve at least 10,700 new acres per year, for a total of 15% of the 12-county region conserved by 2040.
Riparian Corridor Protection	Conserve at least 1,100 new acres of riparian corridors each year, for a total of 30,300 new acres by 2040.
Clean Water	**Aquatic Life Use** • 100% full aquatic life use attainment on all Ohio large rivers by 2020 • 80% full aquatic life use attainment on Ohio's principal streams and small rivers by 2020 • Identify more high quality waters • Maintain adequate monitoring coverage on Ohio's principal and small rivers **Human Health Use** • More fish from Ohio's waters will be safe to eat by 2020 **Public drinking water supply use** • All drinking water sources will obtain water quality standards by 2020 • All drinking water sources will be assessed (nitrate and atrazine) by 2020 **Recreation Use** • Ohio beaches and canoeing streams will be safe for swimming (meet WQS) by 2020 • Maintain adequate monitoring coverage on Ohio's watersheds, large rivers and beaches
Clean Air	By 2040, every county should achieve full attainment of National Ambient Air Quality Standards (NAAQS) for all pollutants.

KAM Thrive MSP Indicators Modeled

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Nice sequence of indicators tied to concepts tied to goals (strong and weak connections)

Table I: Indicators that can be modeled to evaluate alternative policy scenarios

ID	Proposed indicators	Key concepts addressed	Goal areas[1]: Land Use and Efficient Use of Infrastructure	Natural resources	Transportation choices / access	Housing choices	Public health and parks	Equity (Principle)
I-1	Share of households who live near high-frequency transit	Is household growth – particularly transit-oriented development – bringing new households close to high-frequency transit? Is the availability of high-frequency transit expanding to serve more households?	◉		◉	⊙	⊙	
I-2	Share of jobs near high-frequency transit	Is employment growth – particularly in transit-oriented development – bringing new jobs close to high-frequency transit? Is the availability of high-frequency transit expanding to serve more employment centers?	◉		◉			
I-3	Share of the population that resides within ½ mile of a local park or 1 mile of a regional park, regional trail or state park	Do residents have good access to recreational opportunities and open space?	⊙	⊙			◉	
I-4	Share of the region's population living in tracts identified as Racially Concentrated Areas of Poverty (RCAPs)	Do residents have access to housing choices outside of segregated impoverished neighborhoods?				◉	⊙	◉
I-5	Household and employment growth in zones considered to be at risk of aquifer impairment, groundwater recharge areas, or regionally-significant ecological areas	Is new development occurring in areas where natural resources should be protected?	⊙	◉			⊙	
I-6	Acres of agricultural and undeveloped land converted to developed uses	Are land use decisions – including compact development patterns and infill and	◉	◉				

[1] ◉ = a strong connection to a goal
⊙ = a weak connection to a goal

KAM Thrive MSP Indicators **not** Modeled

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Good way to highlight key items not modeled but important

Table II: Indicators that cannot be modeled to forecast policy outcomes

ID	Proposed indicators	Key concepts addressed	Goal areas[2]: Land Use and Efficient Use of Infrastructure	Natural resources	Transportation choices / access	Housing choices	Public health and parks	Equity (Principle)
II-1	Net migration of 18- to 34-year-olds into the region	Are individuals in the most geographically mobile age cohort moving to the region or leaving the region for economic opportunity elsewhere?	Connects to economic prosperity					
II-2	Share of workers who could commute to work with a 30-minutes-or-less transit trip	Does transit serve people where they live and work? Are households locating in transit-accessible areas? Are jobs locating in transit-accessible areas? Are jobs and households locating in areas that are accessible by non-automobile modes?	⊙		◉		⊙	
II-3	Share of low- and moderate-income households (earning less than $50,000 /year) who are experiencing housing cost burden (housing costs exceed 30 percent of income)	Do low- and moderate-income households have access to affordable housing choices? Is the supply of affordable housing keeping up with changes in household income?				◉		◉
II-4	Disparity between average commute time for the white population and the population of color	Does the transportation system support populations of color as well as white residents? Are populations of color more likely to experience longer commute times because of spatial mismatch in job locations?			⊙	⊙		◉
II-5	General local government debt to income ratio	Are the region's local governments economically and fiscally resilient?	Connects to economic prosperity					
II-6	Number of days with elevated air quality risk indices	Is air quality negatively affected by activity of industrial, households and transportation sectors?			⊙		◉	

[2] ◉ = a strong connection to a goal
⊙ = a weak connection to a goal

KAM Regional Equity Approaches

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	Equity Atlases	Opportunity Maps	Indicator Projects
What it is	Equity atlases provide an analytical tool for analyzing how well different neighborhoods and populations are able to access key resources and opportunities.	Opportunity maps identify where the high and low opportunity neighborhoods are located within a metropolitan area and how this relates to demographic patterns.	Indicator projects track summary level data over time to measure progress toward community-wide benchmarks.
Purpose	Identify disparities, analyze the relationships between demographic patterns and access to resources and opportunities, identify the places where targeted investments or policy changes will have the greatest impact.	Identify where opportunity-rich communities exist, assess who has access to these communities, and identify what needs to be remedied in opportunity-poor communities.	Establish and track key benchmarks that show where the region is successful and where it is lagging behind to encourage coordinated action for better results.
Data	A wide range of indicators are mapped at a high level of spatial resolution (usually point, block, neighborhood or census tract).	A discrete number of priority indicators are mapped by census tract and rolled up into a summary score that measures the level of opportunity in each census tract.	A discrete number of priority indicators are tracked using summary level data (usually at a county level) and displayed via charts, graphs, and tables.
Examples	Regional Equity Atlas 2.0 www.equityatlas.org	Kirwan Institute kirwaninstitute.osu.edu/opportunity-communities/mapping/	Greater Portland Pulse http://www.portlandpulse.org/

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Equity Atlas

Regional Equity Atlas

The Portland Metro Region's Geography of Opportunity

Maps and Analysis

These pages include several dozen key Equity Atlas maps along with an initial analysis in each of the issue areas listed below. **How to Read the Atlas Maps** provides important context for understanding the maps and scoring system that may be helpful as you view the maps.

Population

- **Demographics**: Population Density, Populations of Color, Race, Income, Age, Household Composition, Immigrants

Health

- **Health Care**: Prenatal Care, Well-Child Visits, Lack of Preventative Care
- **Health Outcomes**: Healthy Eating Active Living, Obesity, Asthma, Cardiovascular Disease, Diabetes

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Opportunity Mapping

Regional Equity Atlas

The Portland Metro Region's Geography of Opportunity

Access to Opportunity

- **Community**: Proximity to Community Amenities, Proximity to Social and Cultural Institutions
- **Democratic Participation**: Voter Registration and Participation
- **Economic Opportunity**: Transit Access to Family Wage Jobs, Transportation Access to Jobs
- **Education**: Public Schools, School Achievement Levels, Graduation Rates
- **Food**: Proximity to Supermarkets, Grocery Stores and Fresh Food, Proximity to Supplemental Food Programs, Proximity to Unhealthy Food Sources, Community Gardens
- **Healthy Environment**: Air Quality
- **Housing**: Housing Affordability, Minority Home Ownership Gap, Gentrification and Displacement, Housing Accessibility, Access to Home Loans, Housing Tenure
- **Parks and Natural Areas**: Proximity to Parks and Natural Areas, Proximity to Greenspace and Outdoor Recreation, Proximity to Greenspace and Outdoor Recreation in Relationship to Demographic Patterns
- **Services and Amenities**: Proximity to Financial and Retail Services, Proximity to Public and Human Services
- **Transportation**: Transit Access, Walkability, Bikability, Pedestrian Composite (Walkability + Transit Access)

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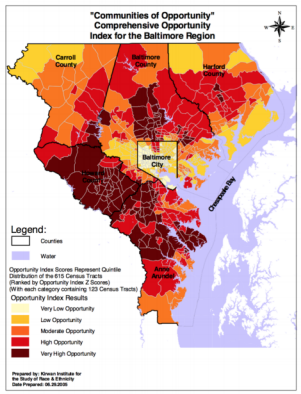
Opportunity Mapping

The Standard Approach



A Better Approach

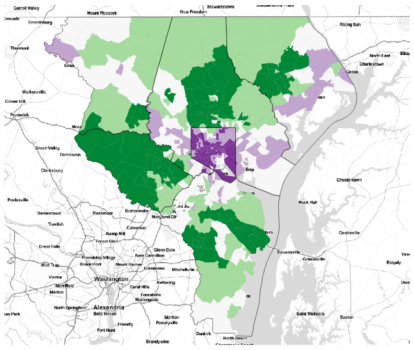


Figure 6: Composite Map

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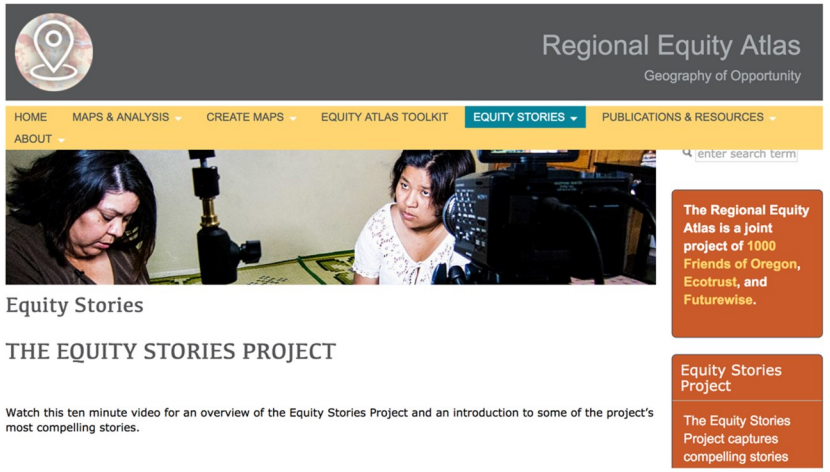
Telling the Stories

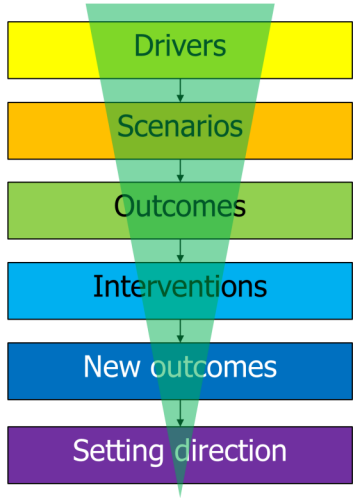


Summary of Performance Measures

- Fractals and Exponentials
  - Several goals, many sub-goals, dozens of possible numerators and denominators, dozens of sub-areas or sub-groups
  - Problem: can't say no
- Consolidating measures (weighting)
- (Partial) solution
  - Know that in advance and design for it
  - Hierarchy that "rolls up" to a conclusion
  - A dozen key measures hitting multiple objectives

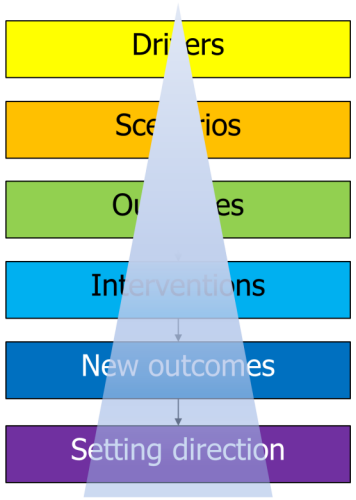
The Process

Focusing on the up front tasks



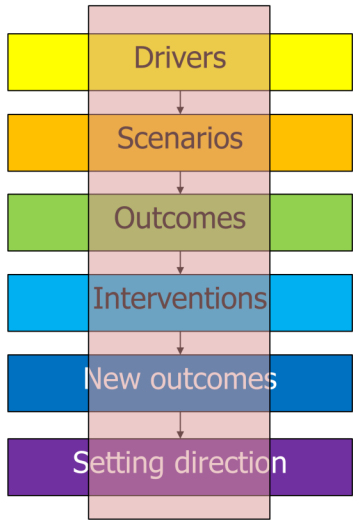
The Planning Process

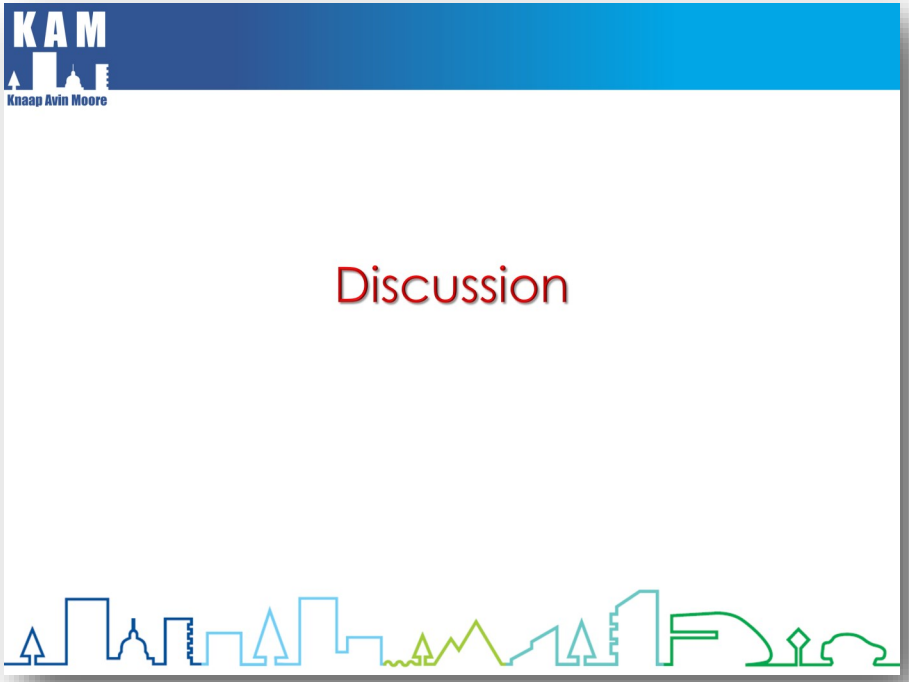
Focusing on the end stages



The Process

Do all stages equally

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Discussion

Appendix E

STAFF WORKSHOP NOTES

Vision Presentation & Discussion

- Regional competitiveness strategy may use futures; could inform framing of data
- Impacts 2050 requires too specific of inputs, essentially defining the future from inputs rather than outputs
- Community Development may not commit to existing futures, but the inputs/drivers are the detailed issues. They still seem transportation focused and would need additional community development based drivers before committing. But can the 4 futures be used as a frame across agency? It's important to make a larger tent for the drivers. If we do that, exploratory planning could work.
- how do we deal with the different paces between government and technology development?
- can we broaden the existing drivers to reach the entire agency? Maybe it's just in the nomenclature
- Community engagement—who is the tool targeted towards? What's the tool for? How will we use it?
- Technical advisory group through R&A will help to target questions appropriately for the region

Divisional Presentations

<u>Aging & Health</u>

- Connecting consumers with rides
  - ADRC, Simply Get There, partnerships (travel training, Rides to Wellness, TNC pilots—Fulton, Cobb and Gwinnett)
  - Uncertainties/challenges:
    - How can operators embrace technology to increase capacity? Is it funding technical capacity?
    - Also workforce changes; the caregiver population is likely to shrink
    - As people live longer, are we seeing more years of people unable to drive?
    - Are we seeing a change in the way that older people want to live? Most would like to live independently but may downsize. Lack of public funding to help people stay in their homes with support.
  - Measuring: trips, purpose of ride, cost analysis, length of ride

Natural Resources

- Water plans for 15 county area; currently wrapping the second update. Tried to integrate with the Atlanta Region's Plan.
    - Challenge - Understanding land use & water demand infrastructure
        - Use ARC overall population projections but not TAZ level population data.
        - Also hoping to aggregate data from jurisdictions to gain more insight.
        - Using data to help jurisdictions understand scheduling pitfalls (ex. Where are endangered species?)

Community Engagement

- Global Voices
    - Perspective on inclusion?

Transportation

- TIP Project Prioritization--equity measures
    - What qualitative data can we lay on top of modeling data that speaks to people?
- Resiliency Plan
    - Climate change regulations has the potential to have a major impact; the longer we wait, the higher the cost.
    - With limited government buy-in right now, ARC's focus is on planning a resilient transportation system.

Mobility Services

- Transportation Technology Document
    - Developing policies based on the likelihood of certain impacts

Research and Analytics

- Technical Advisory Group help to refine scenarios

Where do we go from here?

- What are the resiliency strategies that need to be implemented?
    - Universal and contingent actions/scenario (DVRPC example)
        - Our WTF is similar to the universal scenarios. But can we be more specific and focused?
        - We need to monitor and measure certain indicators and then apply contingent actions.
        - How do we reconcile the actions with the modeling results?
    - How do we check the box on the federally mandated RTP while also being flexible, resilient and inclusive? Providing the fiscally constrained project list while embracing exploratory planning is difficult
        - Trickling down into modal plans
- Best Practices
    - APA's PAS Report- Emerging Trends in Regional Planning
        - DRCOG, Vision North Texas, Denver, San Francisco, MSP (normative scenario planning processes)
- More connected nodes than a hierarchy
- How do we leverage the SHRP2 work so that other divisions can use it for their own purposes?
    - Every plan doesn't have to address is every scenario
    - Would using the scenarios lead to effective outcomes?
    - Nesting it into the federal or state plan requirements is difficult
    - Top down focus on disruptors/drivers, maybe more than scenarios
    - Creating flexible plans
    - How much should we collaborate? What level of the scenarios are relevant and what amount of cross-referencing needs to be done?
    - Integrated document versus a system of plans (not a tight hierarchy but cross-reference of plans- find where there are linkages and connections between the plans).
    - Idea- give scenarios to each division- ask them to write down how the scenarios may impact their work and what they would do about it. Look for areas to cross-reference between the plans and division work.
    - Question- what are the things we are doing now that gives us flexibility as things play out? -- able then to develop more robust/flexible strategies.
    - Potential presentation to Board and ARC Leadership- What cross-referencing between divisions has already taking place and where are the opportunities for more to take place?

- Key indicators/metrics
    - Standard practice moves beyond transit indicators in plans now
    - Equity
        - # new multifamily units, avg. annual residential energy cost
        - Share of hh near high frequency transit, is it expanding?
        - Opportunity Mapping
        - Story Mapping- how individuals are functioning when compared to the impacts of where they live.
        - Drivers -> scenarios -> outcomes -> interventions ->new outcomes ->setting direction
            * Focus most on creating a big tent under the drivers
            * OR accept the scenarios as valid and then use the indicators based on the 4 scenarios
            * Not interested in revisiting high level goals. Would rather look at specific policy directions to operationalize how those policies get measured. Keep current scenarios in this situation.
            * Could take our four scenarios as a base to share with other divisions. Have them add their drivers and potential effects.
            * Maybe RDP & RTP cross reference for 2020 as a first try at incorporation. Slowly iterate and add additional plans.
            * Where are the overlaps in metrics across divisions? i.e. health metrics that can cross into transportation.


ATLANTA REGIONAL COMMISSION
regional impact + local relevance