



# COLLECTIVE STRENGTH

**ARC**

ATLANTA REGIONAL COMMISSION



# **MAKE REMI YOUR OWN:**

## A Planning Perspective on Implementing REMI

ARC Model User's Group

August 26, 2016

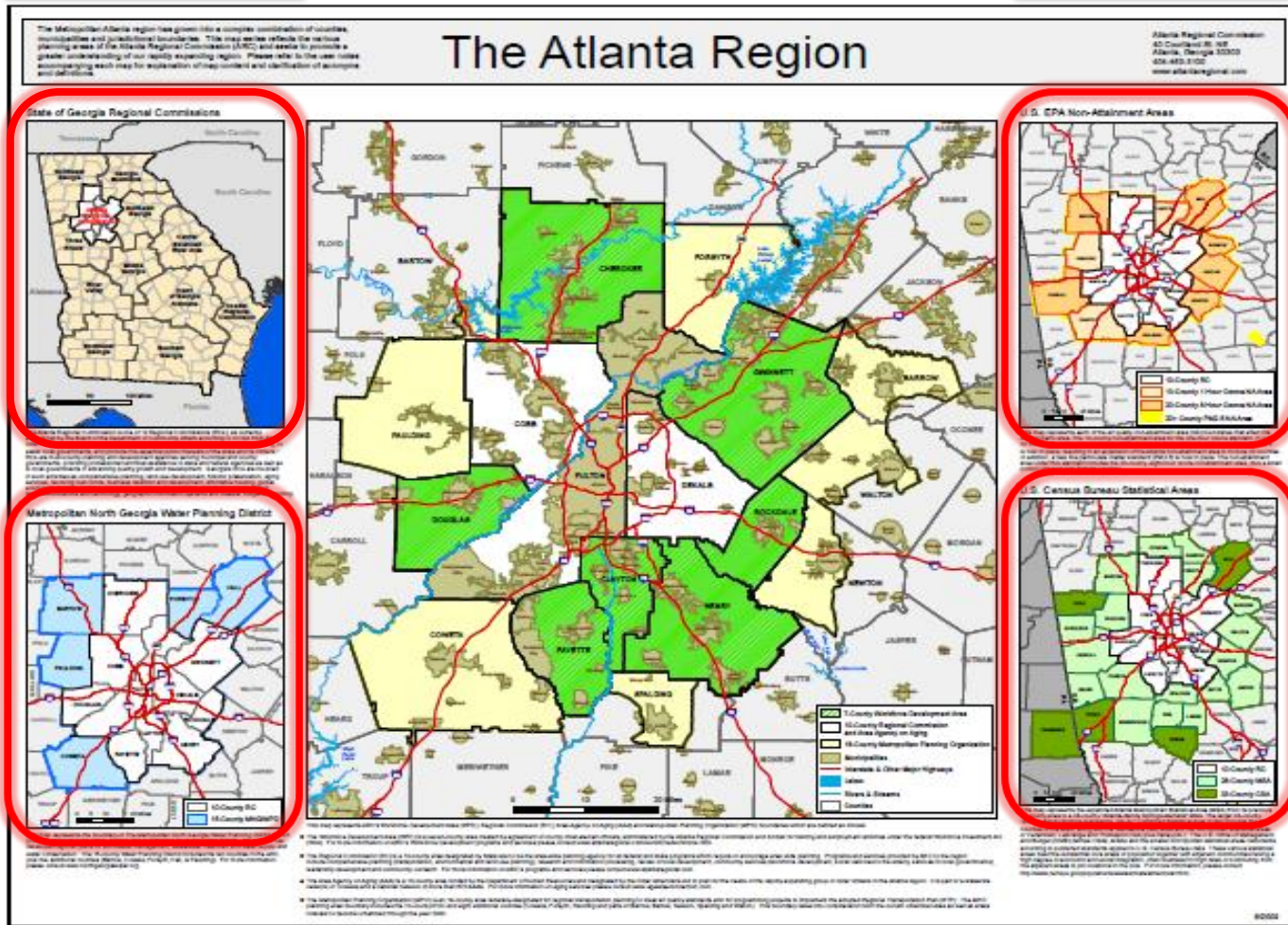
# What Is ARC?

- The Atlanta Regional Commission
- 1947 (Metropolitan Planning Commission)
- First in Nation (multijurisdictional public planning agency)
- Intergovernmental Coordination Agency
- “Conduit for innovation to support the growth and development of our local communities”

# REGIONAL FORECAST AREA

10-County RDC

20-County NA



15-County  
MNGWPD

33-County CMSA

COLLECTIVE  
STRENGTH

ARC  
ATLANTA REGIONAL COMMISSION

# OUTLINE

- Purpose
- Introduction to REMI PI+ and TranSight
- Model Uses for ARC
  - Linking models
  - General concepts
  - Model applications
- Model Demonstration

# ARC OBJECTIVES

- Purpose
  - Produce local long-range demographic, employment and economic forecasts for the 20-county ARC region
- Intent
  - Dedicated to informing public and private policy decisions
  - Focused on research based analysis
  - Orient stakeholders and decision makers on socio-economic and transportation impacts to our Region
- Goal
  - Continue to lead in regional economic forecasting and policy analysis
  - Provide economic development impact plans and assess travel demand changes to the region's transportation network



# INNOVATIVE APPROACH

- Collaborating and create linkages for model application and compatibility
- New methods for rebranding and financing our transportation system
- Bold decisions demand creative, sophisticated and robust tools capable of supporting these processes
- ARC engagement in performing scenario planning and economic analysis to consult, measure and capture specific impacts to our Region
  - Economic impact analysis to assist and inform benefits to investment endeavors
- Business relocation and major developments in the Region
  - Assess projects of regional impact

# MODEL DATA DEVELOPMENT OBJECTIVES

- Conduct potential project prioritization plans
  - Assist in developing a project list
- Perform sensitivity tests of the model and projects
  - Determine the model's effectiveness for further consideration
  - Measure the reasonableness of economic activity and transportation efficiencies of qualified projects
- Develop an economic impact study and analysis report on LPA projects; economic developments; projects selected for the TIP and RTP; and various regional market studies
  - Final documentation of findings and benefits of local and regional impact studies
- Produce small area control totals; SE data for TDM and regional long-range forecasts
- Produce data for inter-departmental work programs and external ARC counterparts



# REMI MODELS

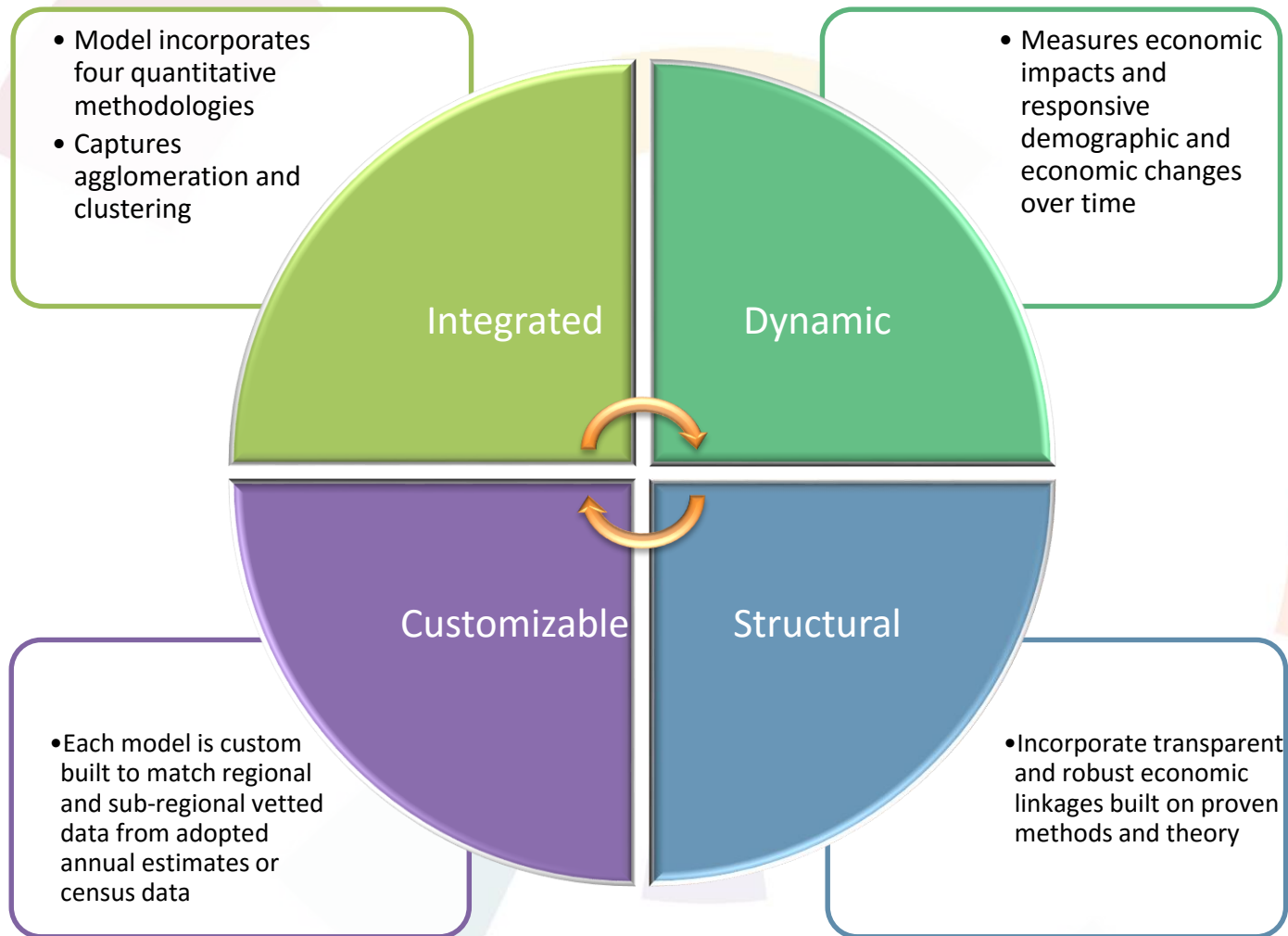


- The next generation Policy Insight® model
- Comprehensive modeling estimating economic and demographic effects
- Up to 169 industry sectors across 3,089 U.S. counties including 6,000+ fully adjustable policy variables updated yearly



- Comprehensive tool for evaluating the total economic effects of changes to transportation systems
- Integrates travel demand data, data on emissions, safety valuation factors, etc, and 3 additional transportation-related cost matrices with PI+

# MODEL FEATURES



# METHODOLOGIES

## I-O Tabulation

- Inter-industry behaviors: How much demand does the investment require

## Computer General Equilibrium

- Long-term effects to bring markets back to “new” normal: Market clearing point where supply meets demand

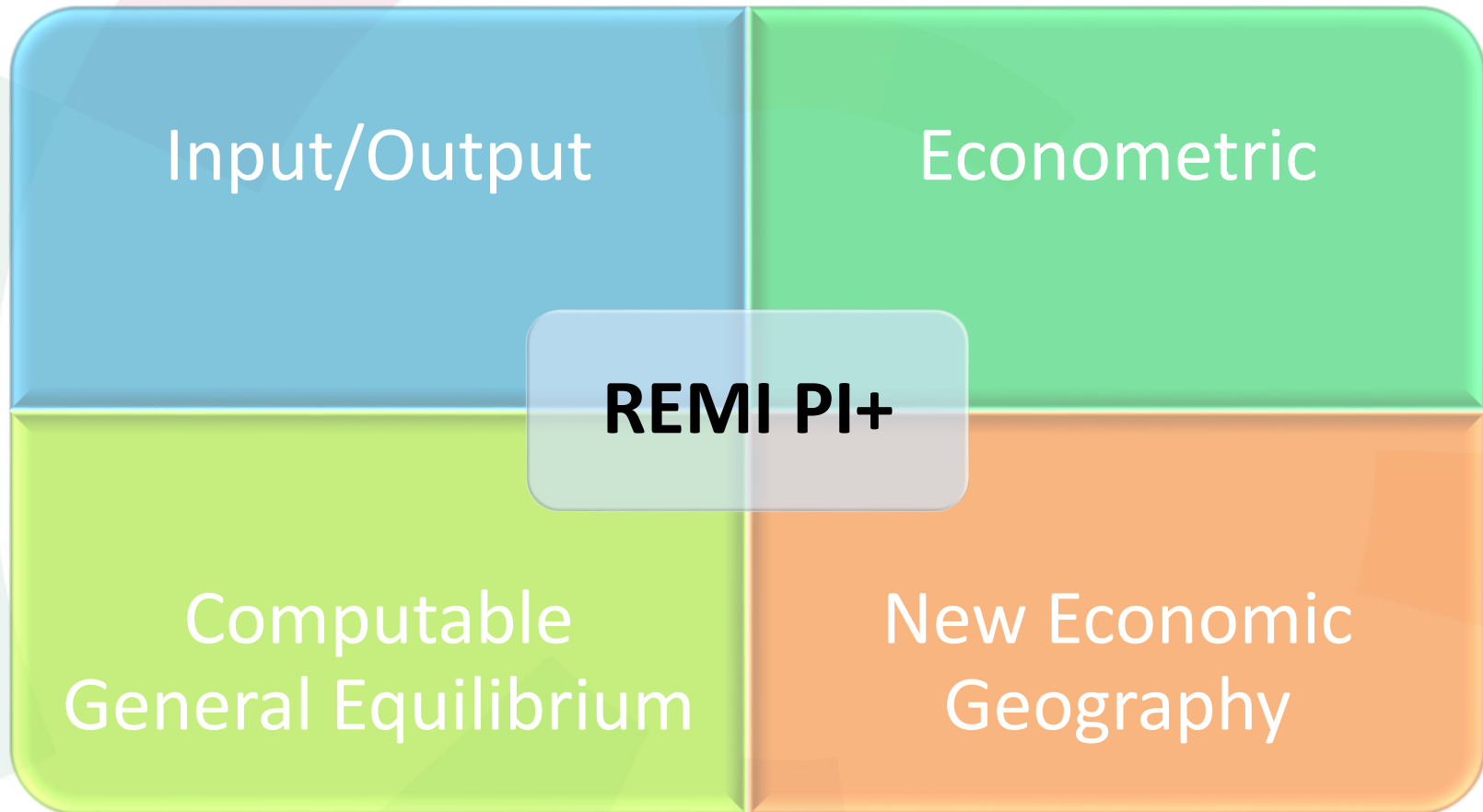
## Econometric

- Statistical parameters: Strength of responses from consumers; elasticity of demand & time lags for adjustments

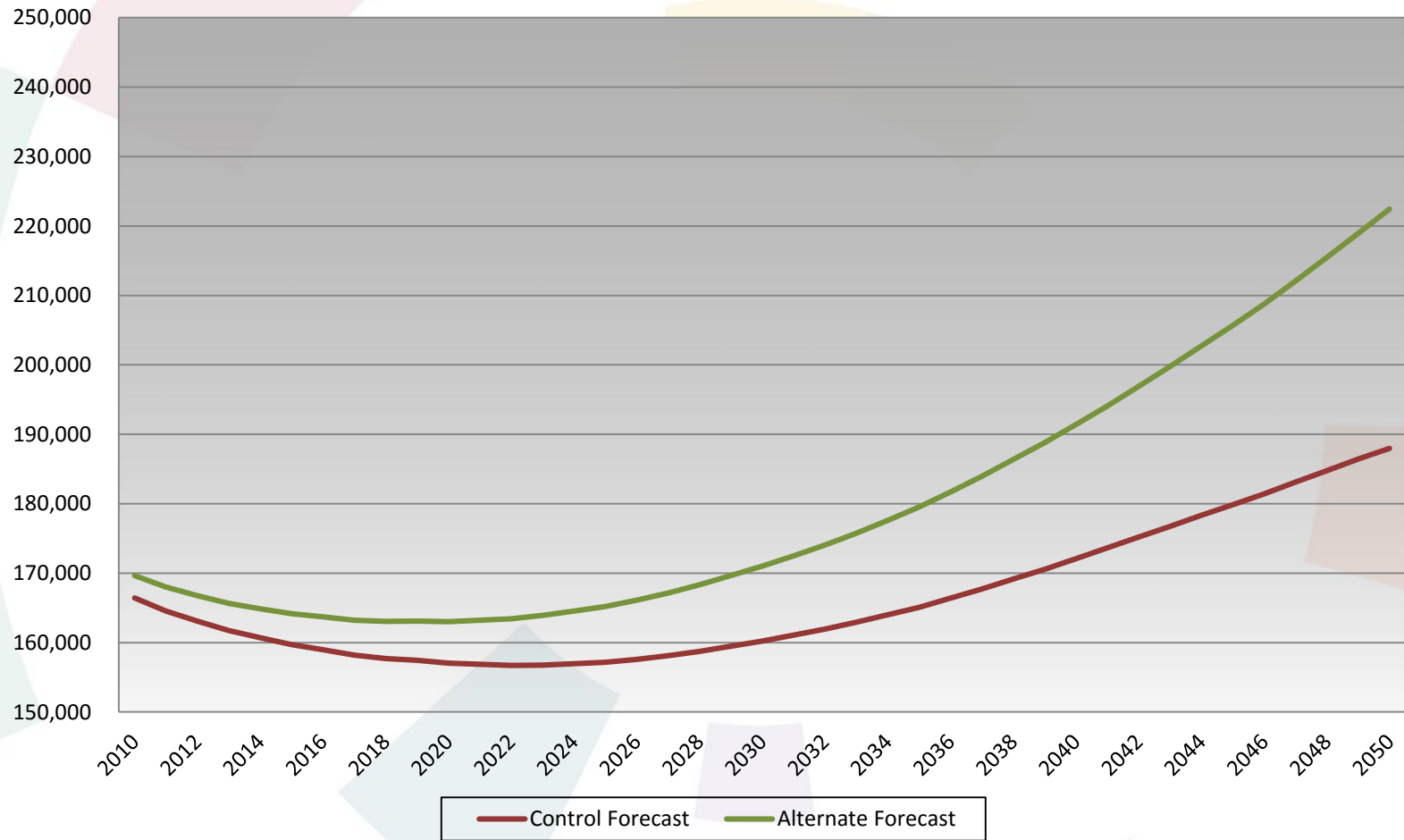
## New Economic Geography

- Measures regional benefits: Regional benefits from agglomeration due to economic activity in terms of supply chain and labor forces

# INTEGRATED MODEL

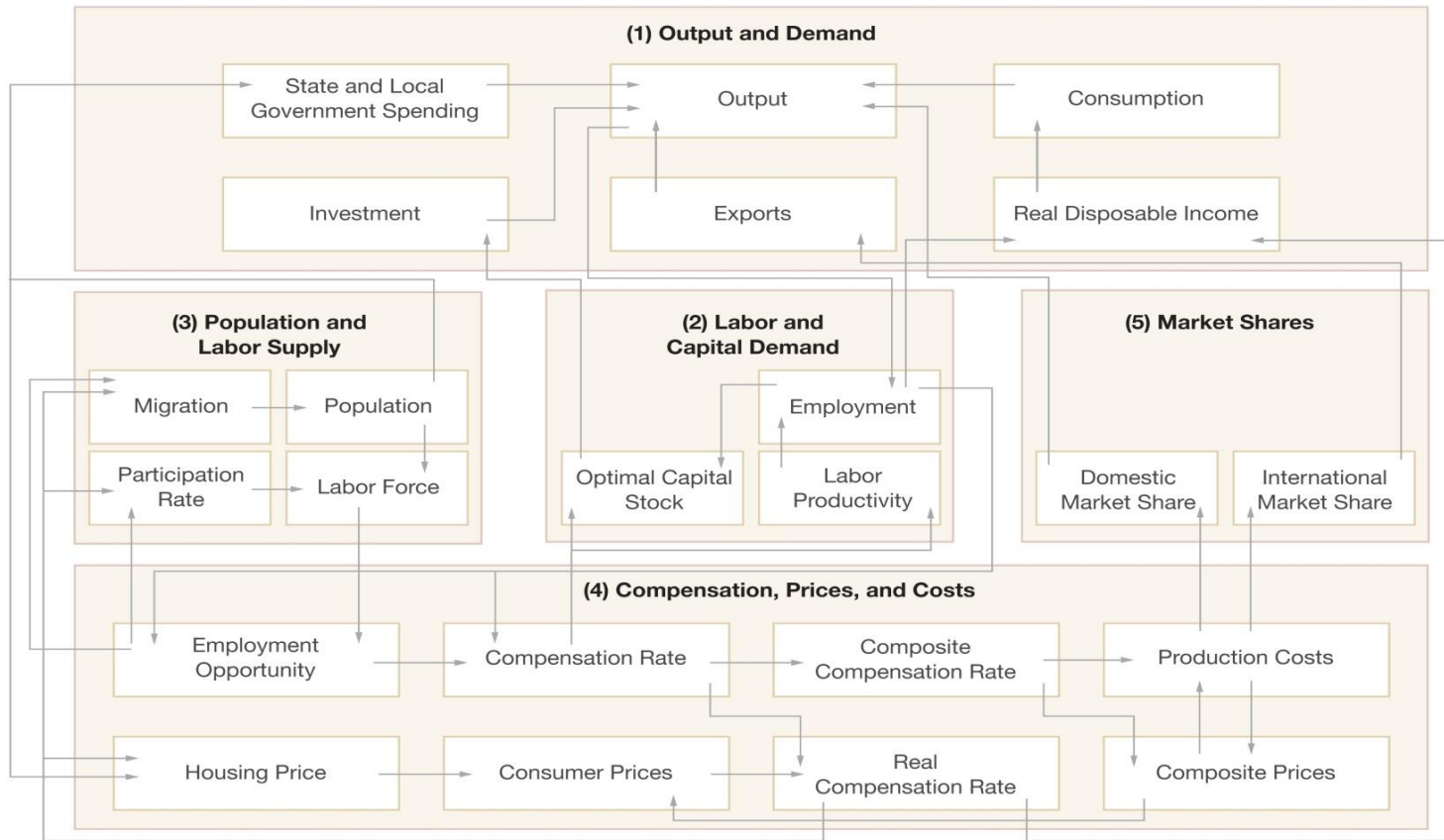


# DYNAMIC MODEL



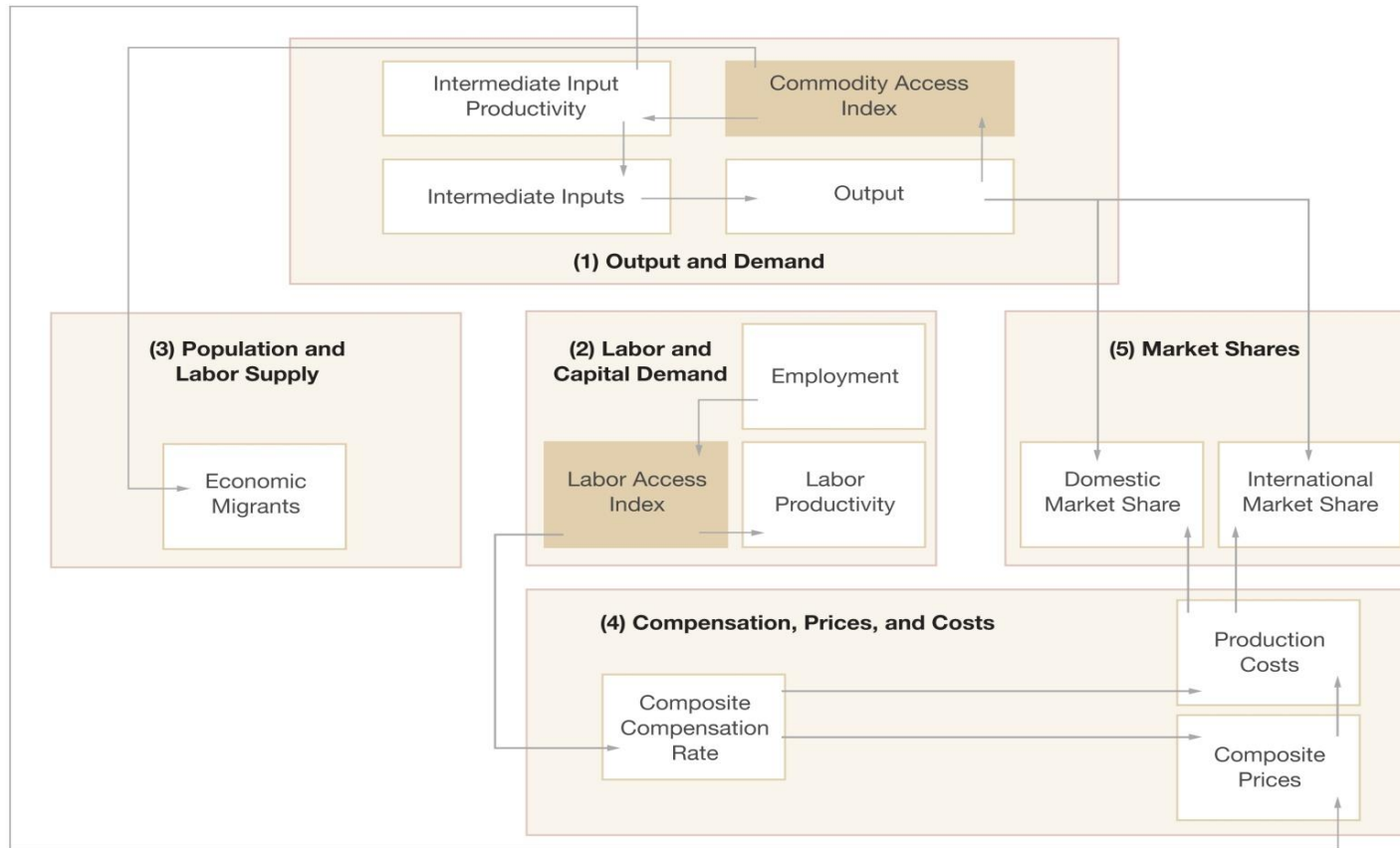
# STRUCTURAL MODEL

REMI Model Linkages (Excluding Economic Geography Linkages)



# ECONOMIC IMPACT MODEL

Economic Geography Linkages





# TRANSIGHT-SPECIFIC FEATURES [INPUTS]

- Travel demand data: Region-to-Region, VMT, VHT, and Trips
- Cost matrices: transportation, commuting, accessibility
- Simulation parameters:
  - Emissions (5 types)
  - Value of time
  - Government funding
  - Fuel efficiency (up to 79 MPH)
  - Safety (3 types)
  - Operating costs
  - Occupancy
- Multimodal

# MODEL INPUTS

Simulation Tools      Referendum - REMI TranSight v3.2

Home      Insert

Effective Distance   Multi-Modal   Highways   Blueprints   Scenarios   Topics   Model Blocks   Full List   Model Linkages   Calculator   Spreader   Import   Export

Transportation      General      Tools

Forecast Name:       Run to year:      

Baseline:

**Policy Variable Inputs**

Active	Edit	Category	Notes
<input type="checkbox"/>	<input type="checkbox"/>	Composite (290 PV-s)	Consumer Sales Tax (Revenue)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Composite (660 PV-s)	Business Sales Tax (Revenue)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Composite (10 PV-s)	TIA Sales Tax (Spending)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Composite (12 PV-s)	Travel Demand - Leisure Time 25% reduction
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Composite (290 PV-s)	Local Resident Consumer Sales Tax
<input type="checkbox"/>	<input type="checkbox"/>	Composite (10 PV-s)	Impact of Disp. Inc. to Taxes
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Imported (12 PV-s)	Travel Demand - Emissions
<input type="checkbox"/>	<input type="checkbox"/>	Imported (12 PV-s)	Travel Demand - Leisure Time
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Imported (12 PV-s)	Travel Demand - Safety Costs
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Imported (36 PV-s)	Travel Demand - Operating Costs
<input type="checkbox"/>	<input type="checkbox"/>	Transportation (0 PV-s)	Transportation Cost Matrix changes from Transight

# DATA INPUT SNAPSHOT

Regional Simulation GDP adj\_ARCne\_LFPR\_Migrant\_Hisp brates\_educ - REMI PI+ v1

Home Insert

Regional Simulation Regional Control National Simulation National Control Workbook Inputs Results Model Details REMI Online

Forecast Name: Regional Simulation GDP adj\_ARCne\_LFPR\_Migrant\_Hisp brates\_educ Run to year: 2050 Run Now

Baseline: Regional Control GDP adj

**Policy Variable Inputs** Tree View

Active Edit Category Notes

Composite (4 PV-s) Economic Migration Scenario

Active	Category	Detail	Region	Unit Code	Variable Number	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<input checked="" type="checkbox"/>	Economic Migration, White-NonH	Ages 0-64	ARC Counties	Thousanc	D10	23	22.625	22.25	21.875	21.5	21.125	20.75	20.375	20	19.28	18.56
<input checked="" type="checkbox"/>	Economic Migration, Black-NonH	Ages 0-64	ARC Counties	Thousanc	D10	39.5	39.5	39.5	39.5	39.5	39.5	39.5	37	35.8654	34.7308	33.5962
<input checked="" type="checkbox"/>	Economic Migration, Other-NonH	Ages 0-64	ARC Counties	Thousanc	D10	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
<input checked="" type="checkbox"/>	Economic Migration, Hispanic (nu	Ages 0-64	ARC Counties	Thousanc	D10	9	7.8	6.6	5.4	4.2	3	3.7	3.6741	3.6481	3.6222	3.5963

Composite (1 PV-s) Hispanic Birth rates Scenario

Active	Category	Detail	Region	Unit Code	Variable Number	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<input checked="" type="checkbox"/>	Birth Rate, All Ages, Hispanic (sh	Ages 10-49	ARC Counties	Percent	D42	0	0	0	0	0	0	0	0	-1	-3.4	-5.6

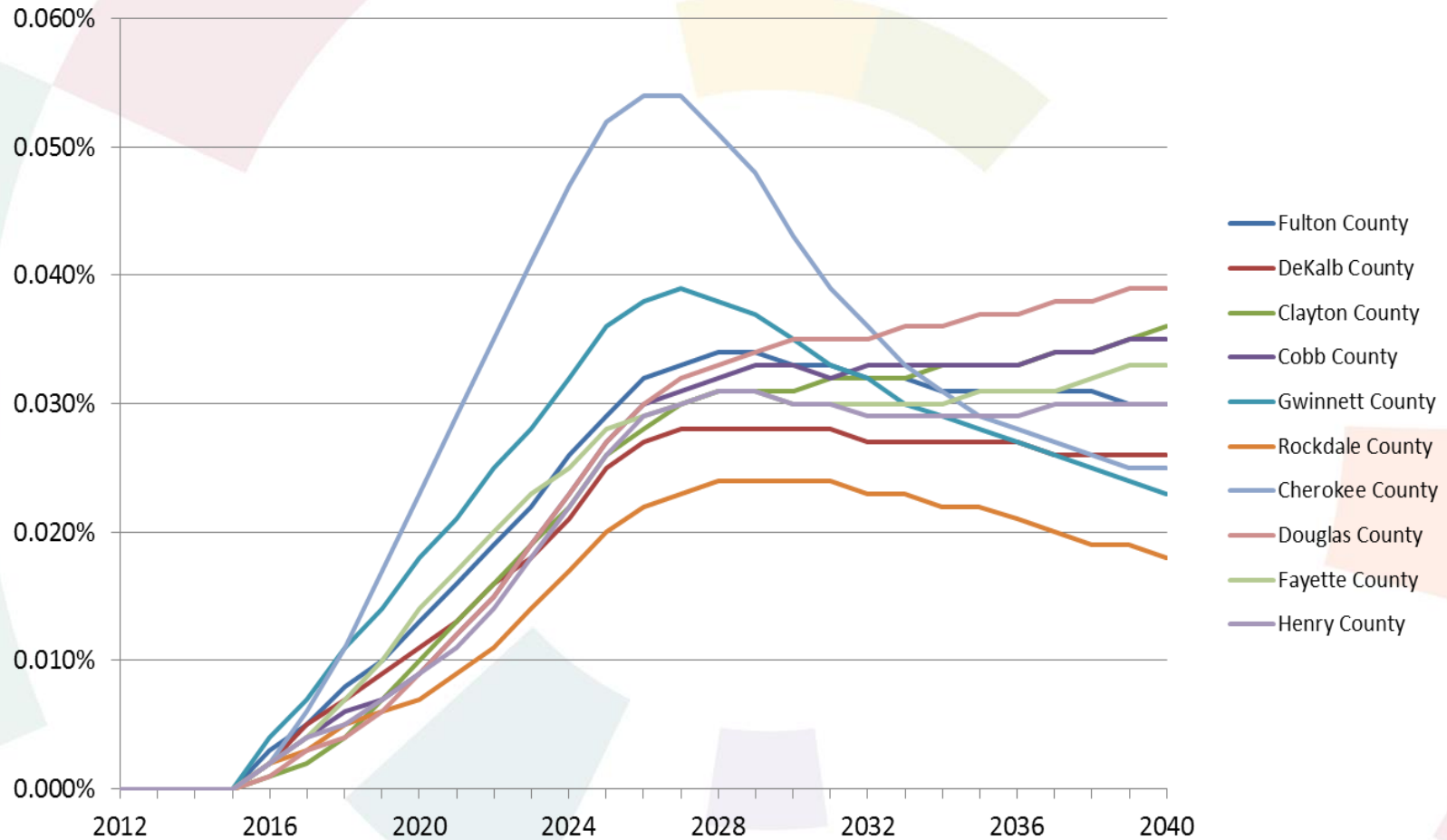
Composite (24 PV-s) ARC+NE Employment

Active	Category	Detail	Region	Unit Code	Variable Number	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<input checked="" type="checkbox"/>	Firm Employment (number)	Forestry, Fishing, Related A	ARC Counties	Thousanc	3601	-3.722	-3.722	-3.722	-3.722	-3.722	-3.722	-3.722	-3.722	-3.722	-3.573	-3
<input checked="" type="checkbox"/>	Firm Employment (number)	Mining	ARC Counties	Thousanc	3602	-1.713	-1.713	-1.713	-1.713	-1.713	-1.713	-1.713	-1.713	-1.713	-1.644	-1
<input checked="" type="checkbox"/>	Firm Employment (number)	Utilities	ARC Counties	Thousanc	3603	-1.143	-1.143	-1.143	-1.143	-1.143	-1.143	-1.143	-1.143	-1.143	-1.097	-1
<input checked="" type="checkbox"/>	Firm Employment (number)	Construction	ARC Counties	Thousanc	3604	-37.045	-37.045	-37.045	-37.045	-37.045	-37.045	-37.045	-37.045	-37.045	-35.563	-34
<input checked="" type="checkbox"/>	Firm Employment (number)	Manufacturing	ARC Counties	Thousanc	3605	-7.332	-7.332	-7.332	-7.332	-7.332	-7.332	-7.332	-7.332	-7.332	-7.039	-6
<input checked="" type="checkbox"/>	Firm Employment (number)	Wholesale Trade	ARC Counties	Thousanc	3606	-13.241	-13.241	-13.241	-13.241	-13.241	-13.241	-13.241	-13.241	-13.241	-12.711	-12
<input checked="" type="checkbox"/>	Firm Employment (number)	Retail Trade	ARC Counties	Thousanc	3607	-45.99	-45.99	-45.99	-45.99	-45.99	-45.99	-45.99	-45.99	-45.99	-44.15	-42
<input checked="" type="checkbox"/>	Firm Employment (number)	Transportation and Warehous	ARC Counties	Thousanc	3608	18.839	18.839	18.839	18.839	18.839	18.839	18.839	18.839	18.839	18.085	17
<input checked="" type="checkbox"/>	Firm Employment (number)	Information	ARC Counties	Thousanc	3609	-2.036	-2.036	-2.036	-2.036	-2.036	-2.036	-2.036	-2.036	-2.036	-1.955	-1
<input checked="" type="checkbox"/>	Firm Employment (number)	Finance and Insurance	ARC Counties	Thousanc	3610	-29.938	-29.938	-29.938	-29.938	-29.938	-29.938	-29.938	-29.938	-29.938	-28.74	-27
<input checked="" type="checkbox"/>	Firm Employment (number)	Real Estate and Rental and I	ARC Counties	Thousanc	3611	-79.131	-79.131	-79.131	-79.131	-79.131	-79.131	-79.131	-79.131	-79.131	-75.966	-72
<input checked="" type="checkbox"/>	Firm Employment (number)	Professional and Technical S	ARC Counties	Thousanc	3612	-40.632	-40.632	-40.632	-40.632	-40.632	-40.632	-40.632	-40.632	-40.632	-39.007	-37
<input checked="" type="checkbox"/>	Firm Employment (number)	Management of Companies i	ARC Counties	Thousanc	3613	-1.022	-1.022	-1.022	-1.022	-1.022	-1.022	-1.022	-1.022	-1.022	-0.981	-4
<input checked="" type="checkbox"/>	Firm Employment (number)	Administrative and Waste St	ARC Counties	Thousanc	3614	-41.688	-41.688	-41.688	-41.688	-41.688	-41.688	-41.688	-41.688	-41.688	-40.02	-38
<input checked="" type="checkbox"/>	Firm Employment (number)	Educational Services	ARC Counties	Thousanc	3615	138.83	138.83	138.83	138.83	138.83	138.83	138.83	138.83	138.83	138.83	13
<input checked="" type="checkbox"/>	Firm Employment (number)	Health Care and Social Assis	ARC Counties	Thousanc	3616	-4.437	-4.437	-4.437	-4.437	-4.437	-4.437	-4.437	-4.437	-4.437	-4.26	-4
<input checked="" type="checkbox"/>	Firm Employment (number)	Arts, Entertainment, and Re	ARC Counties	Thousanc	3617	-15.086	-15.086	-15.086	-15.086	-15.086	-15.086	-15.086	-15.086	-15.086	-14.483	-13
<input checked="" type="checkbox"/>	Firm Employment (number)	Accommodation and Food St	ARC Counties	Thousanc	3618	-18.339	-18.339	-18.339	-18.339	-18.339	-18.339	-18.339	-18.339	-18.339	-17.605	-16
<input checked="" type="checkbox"/>	Firm Employment (number)	Other Services, except Publ	ARC Counties	Thousanc	3619	-49.146	-49.146	-49.146	-49.146	-49.146	-49.146	-49.146	-49.146	-49.146	-47.18	-45

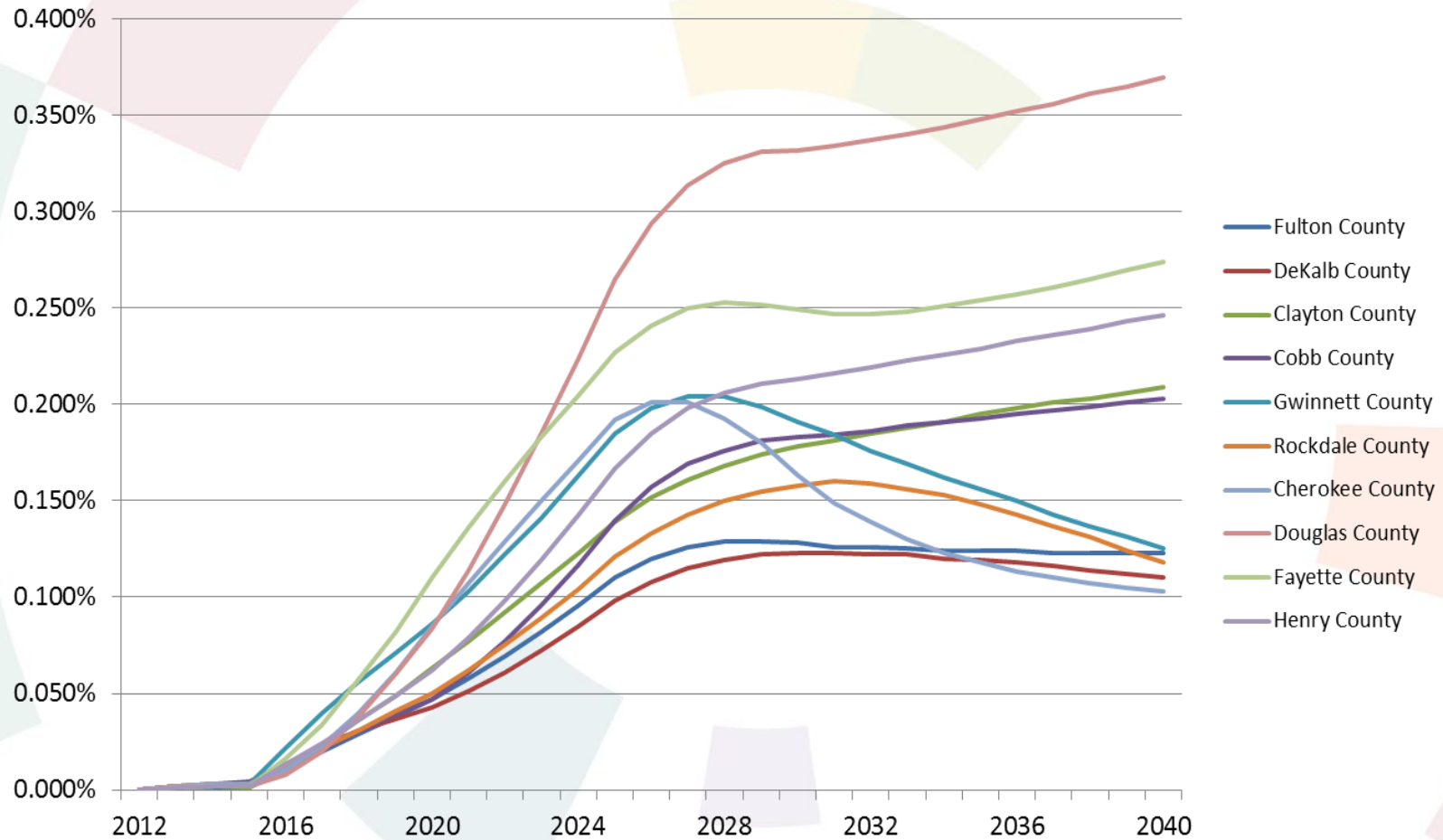
# TRANSIGHT-SPECIFIC FEATURES [OUTPUTS]

- Benefit-Cost Analysis:
  - Customizable
  - Use different Discount Rates
  - Evaluate in different years
- Transportation Summary:
  - Commodity and labor Access Indices
  - Relative cost factors
- Domestic Trade: Flows and Shares
- All Economic and Demographic Indicators:
  - all outputs (as well as inputs) from REMI PI+ built into model

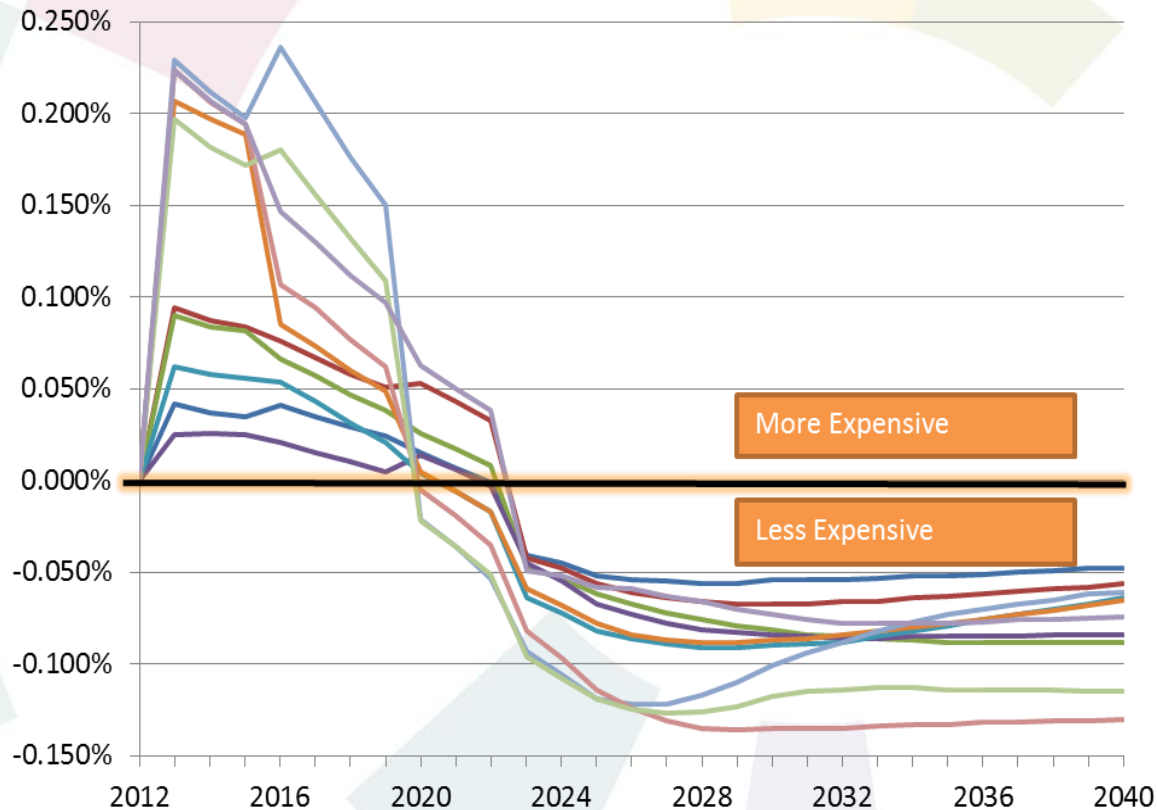
# COMMODITY ACCESS INDEX



# LABOR ACCESS INDEX



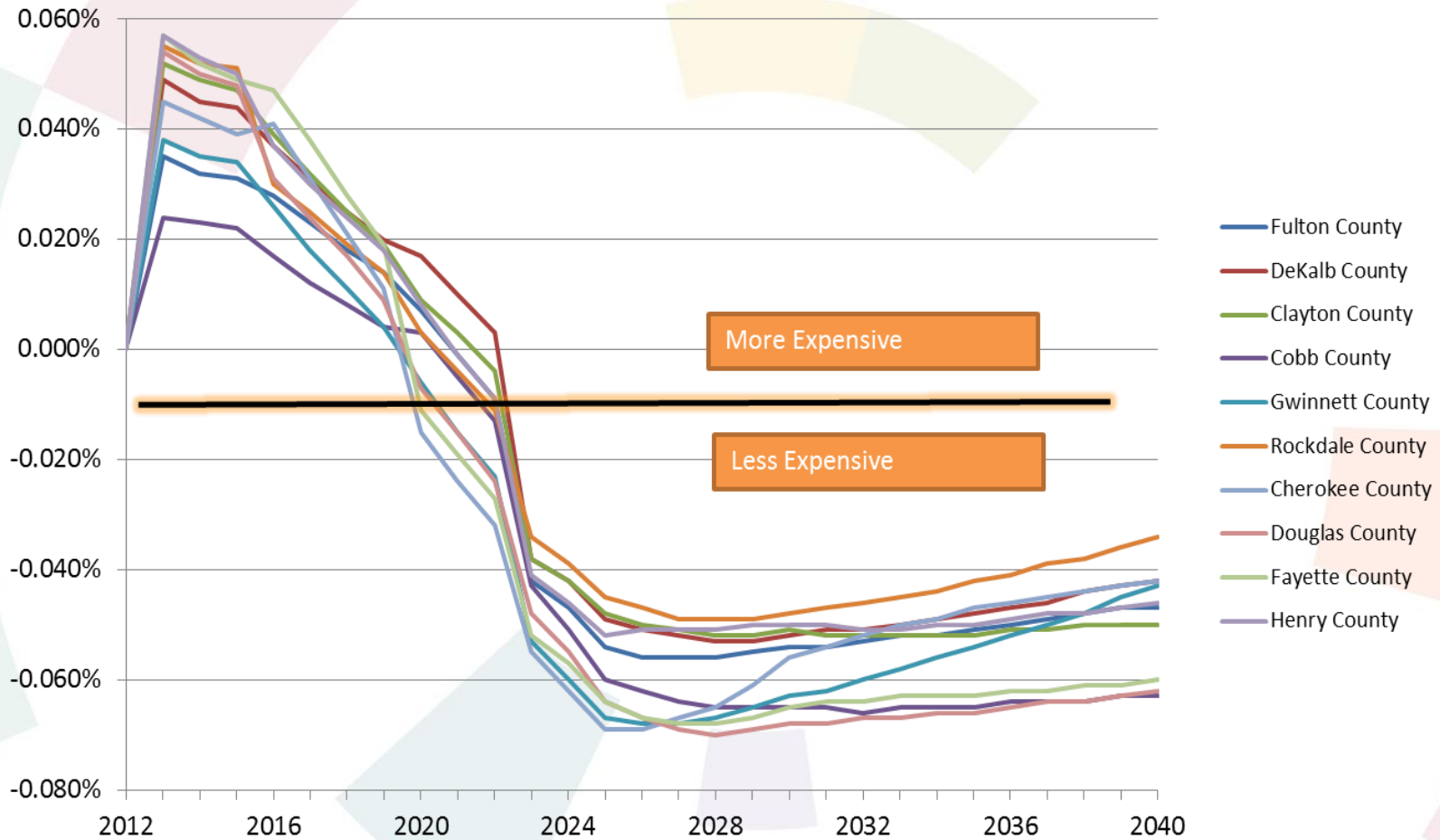
# RELATIVE COST OF PRODUCTION



- Fulton County
- DeKalb County
- Clayton County
- Cobb County
- Gwinnett County
- Rockdale County
- Cherokee County
- Douglas County
- Fayette County
- Henry County



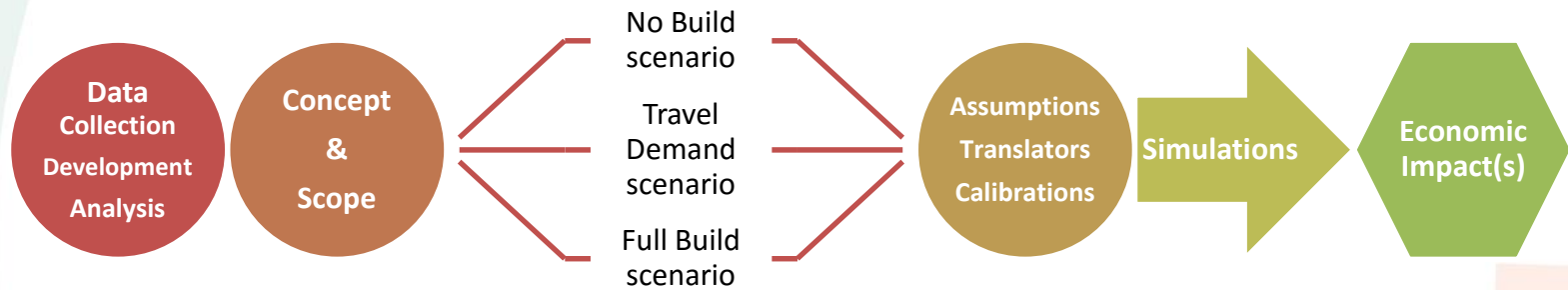
# RELATIVE DELIVERED PRICE



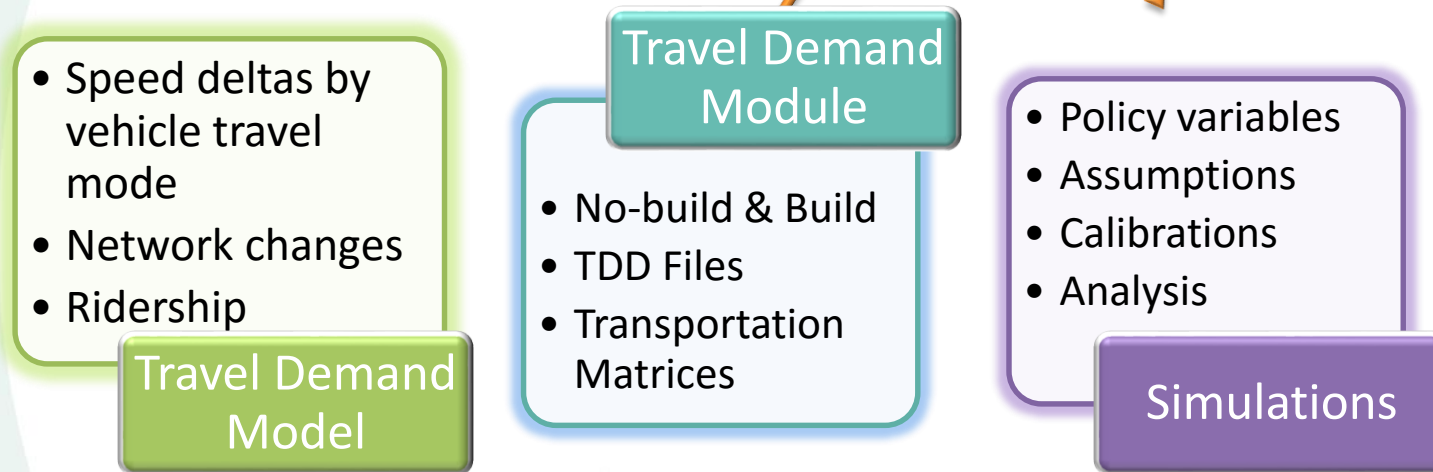
# THE NEED FOR DYNAMIC ECONOMIC ANALYSIS

- Economics and demographics of a region are changing over time
  - Projects effect today much differently than the future
- Scoring projects based on travel demand and economics as a complete system
- Every region's travel network and economy is different

# FRAMEWORK



# ARC MODEL LINKAGES



# MODEL APPLICATIONS

## Economic Development

- Potential population shifts, migration patterns & employment changes on future investment and housing stock; benefit-cost analysis

## Transportation

- Travel demand analysis; transportation improvements impact and mitigation strategies

## Environment

- Environmental Planning Department storm water analysis

## Health Care

- Health Care Reform Policy analysis

## Taxation

- Analysis of the Regional Transportation Referendum

## Tourism

- Visitors and out of region revenue impact/residential burden relief study

## Energy

- Georgia Power economic migration study for projected capital improvement study

# STUDY SPECIFICATIONS

- MARTA Mass Transit Investment
  - 2 Counties; 1 (10-County) Region
  - One cent sales tax collection by affected counties
  - 100% return
  - 3 regional projects
- Partnership Gwinnett Strategy Initiative
  - Target industry cluster analysis
  - Adding 7,000 high-paying jobs to the county
- Develop Douglas
  - Economic development study
  - Relocation of new beverage and tobacco manufacturing plant
  - \$27M capital investment and \$4.3B in sales added to the county and region
  - 10 year government abatement incentive on real and personal property

# SCENARIO TASKING

## New Custom Industry Policy Variable #1: Output / Sales

- Georgia Aquarium base year 2005 thru 2015 Revenue
- Assumed total revenue generated was consistent from opening day to current

## Georgia Aquarium Policy Variable #2: Construction detail demand

- Detailed industry sales / Exogenous production in fixed local dollars
- Assigned to Educational and vocational structures industry assuming best fit to describe development by NAICS assignment

## Tourism Policy Variable #3: Out of region spending

- Tourism spending by non-residents or visitors outside the local area [Atlanta MSA]
- Spending in fixed local dollars
- Assumed the general local GSA rate (\$270) for visitors traveling from out of the region

## Centennial Olympic Park Policy Variable #4: Additional development

- Assigned as Detailed industry sales / Exogenous production in fixed local dollars to account for additional activity between 2005 and 2015
- COP investment categorized as Commercial structures to account for other institutional, hotels & hotel renovations, commercial, entertainment and public improvements and assigned by year of development
- Investment aggregated and input on an annual basis



# SCENARIO TASKING

## Custom Accessibility

### Policy Variable #1: Transportation Matrix

- Monetize travel demand data deltas base year 2015 thru 2040 O-D table by mode by region
- Assumed travel changes generated was consistent from base year to project opening

## Project Scope

### Policy Variable #2: Construction detail demand

- Detailed industry sales / Exogenous production in fixed local dollars
- Assigned to Construction and PDE industry structures assuming best fit to describe design and development of project by NAICS assignment

## Investment

### Policy Variable #3: Revenue spending

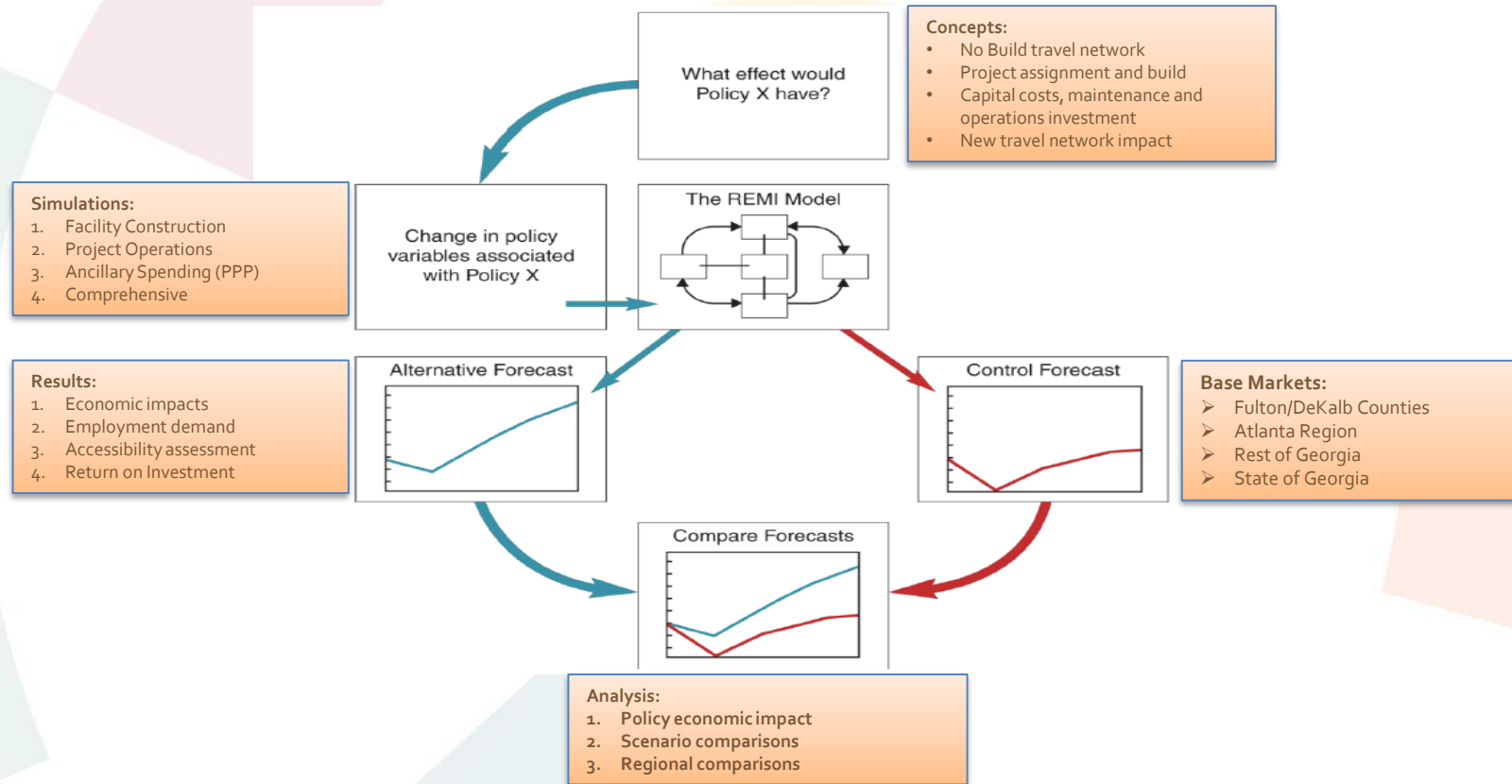
- Revenue collected from sales tax referendum and governmental funding mechanisms
- Spending in fixed local dollars
- Assumed the accrual and spending occurs for a ten-year period

## Economic Impact Assessment

### Policy Variable #4: Return on Investment

- Represented in terms of Gross Domestic Product (GDP) in fixed local dollars measuring additional activity between project construction and economic impact horizon
- Project investment stratified to account for pre-design, specialized jobs, right-of-way (ROW) acquisitions, infrastructure costs and other and public improvements and assigned by year of development
- Investment disaggregated and input on an annual basis

# ANALYSIS FRAMEWORK



# OUTCOMES

## Employment Demand

- Direct jobs
- Indirect jobs
- Induced jobs

## Socioeconomic changes

- Population
- Personal income
- Employment

## Economic Impact

## Transportation Summary

- Commodity access
- Labor access
- Relative cost of production
- Relative delivered pricing

## Return on Investment

- Output
- Gross Regional Product
- Benefit-Cost analysis
- Potential tax implications

# PUTTING IT ALL TOGETHER

- Compare the different model calibrations and visually explore the model results
- Examine components of the assumptions implemented to create an alternate control
- Review the objective for conducting this scenario work and our findings

# 2016 PRIORITIES

- **K-12 Transformation/Technical Education**
- **Workforce Alignment**
- **Knowledge Hub Capacity/Ecosystem**
- **Attracting/Retaining Millennials**
  - Transportation \$\$\$
  - Transit expansion/connectivity
  - Walk Ups
- **Servicing/Supporting Seniors**
- **Cultural Identity (i.e. “cool factor”)**
- **Long-term Water Security**

# 2016 PRIORITIES

- HB170 Funding & Priority Alignment
- Fulton & DeKalb TSPLOSTs support
- Regional Bicycle-Pedestrian Trail Plan
- Atlanta Aerotropolis Alliance
- Regional Economic Competitiveness Strategy
- Long Range Water Supply Plan
- Aging Services Network Adaptations
- Workforce Development Plan
- Homeland Security (UASI) Work

The background features a collection of abstract, colorful geometric shapes, primarily curved segments and triangles, in shades of teal, pink, yellow, and light blue, arranged in a circular pattern around the central text.

# [MODEL DEMONSTRATION]



# BENEFITS



# RECAP



# CONTACT INFORMATION

---

## About ARC

The Atlanta Regional Commission (ARC) is the regional planning and intergovernmental coordination agency for the 10-county area including Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry and Rockdale counties, as well as the City of Atlanta. For over 65 years, ARC and its predecessor agencies have helped to focus the region's leadership, attention and resources on key issues of regional consequence.

Learn more about us at [www.atlantaregional.com](http://www.atlantaregional.com).



**Colby Lancelin**  
Manager, Economic Analysis Program

[clancelin@atlantaregional.com](mailto:clancelin@atlantaregional.com)

404.463.3322

**Research and Analytics Division Manager:**

**Mike Carnathan**

[mcarnathan@atlantaregional.com](mailto:mcarnathan@atlantaregional.com)

---

**Follow Us  
for Regular  
Updates**



Twitter | [@AtlantaRegional](https://twitter.com/AtlantaRegional)



Facebook | [www.facebook.com/atlantaregionalcommission](https://www.facebook.com/atlantaregionalcommission)



LinkedIn | [www.linkedin.com/company/atlanta-regional-commission](https://www.linkedin.com/company/atlanta-regional-commission)



# COLLECTIVE STRENGTH

**ARC**

ATLANTA REGIONAL COMMISSION