COMMONWEALTH of VIRGINIA

Commonwealth Transportation Board

Aubrey L. Layne, Jr.
Chairman

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Richmond, Virginia 23219

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COMMONWEALTH TRANSPORTATION BOARD
WORKSHOP AGENDA

The Boar's Head Inn
The Ball Room
200 Ednam Drive
Charlottesville, VA 22903

April 18, 2017
9:00 a.m.

1. Route 29 Update
   John Lynch, Virginia Department of Transportation

2. WMATA Governance and Funding Review
   John Porcari, WSP

3. Civil Rights Update and Toll Relief
   Grindly Johnson, Office of the Secretary of Transportation

4. Issuance of the Series 2017 Capital Projects Revenue Bonds
   John Lawson, Virginia Department of Transportation

5. Virginia Transportation Infrastructure Bank Advisory Panel Recommendation: I-395 Express Lanes Northern Extension Project
   Nick Donohue, Office of the Secretary of Transportation

6. VTRANS Scenario Planning
   Nick Donohue, Office of the Secretary of Transportation

7. VTRANS Performance Targets
   Nick Donohue, Office of the Secretary of Transportation

8. Commissioner's Items
   Charles Kilpatrick, Virginia Department of Transportation

9. Director's Items
   Jennifer Mitchell, Virginia Department of Rail & Public Transportation

10. Secretary's Items
Aubrey Layne, Secretary of Transportation

# # #

Route 29 **Solutions**

VDOT

Briefing to Commonwealth Transportation Board

April 18, 2017

John Lynch, P.E.
Culpeper District Engineer

Route 29 Solutions

VDOT

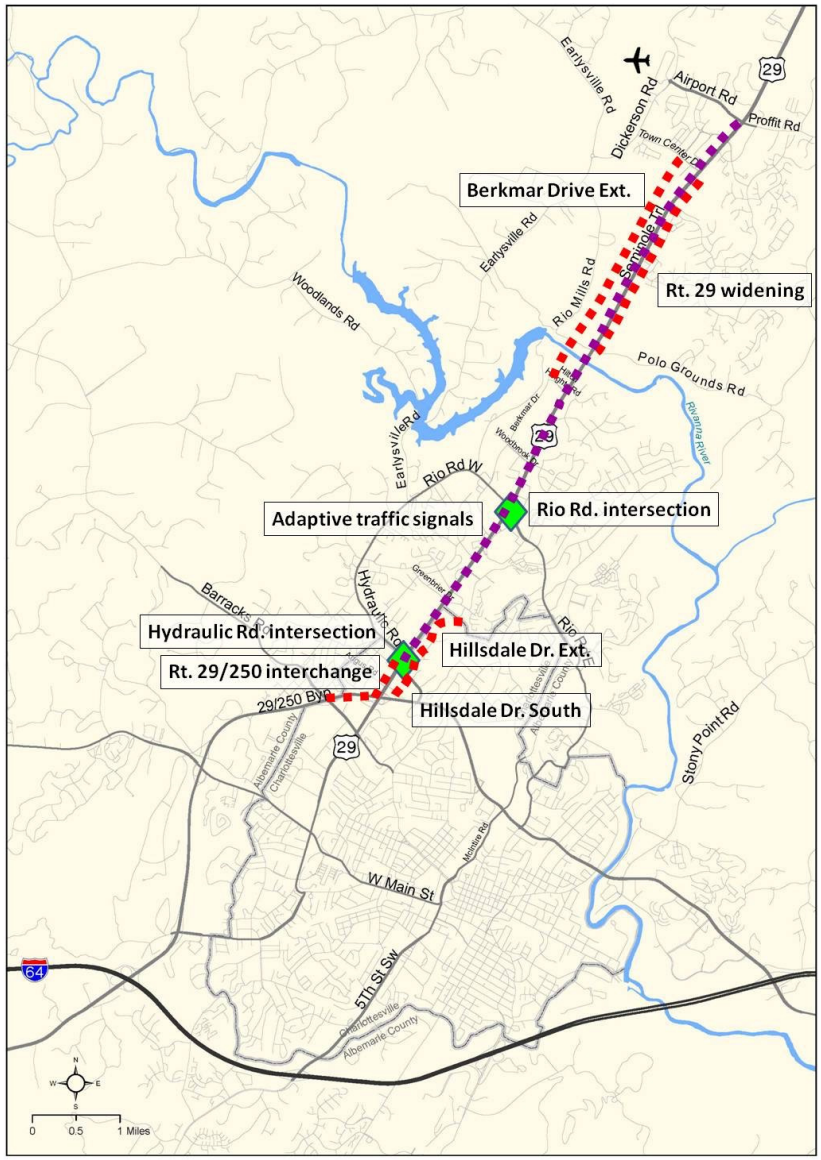
29 Solutions Package

A Multi-Modal Transportation Program

Eight highway projects:

- Route 29 Widening, Polo Grounds Road to Towncenter Drive
- Berkmar Drive Extension, Hilton Heights Road to Towncenter Drive
- Rio Road grade-separated intersection
- Route 29/250 Interchange improvements (“Best Buy ramp”)
- Hillsdale Drive Extended (City of Charlottesville)
- Adaptive Traffic Signal Technology
- Hydraulic Road intersection (study only)
- Hillsdale Drive South, Hydraulic Road to Holiday Drive (study only)

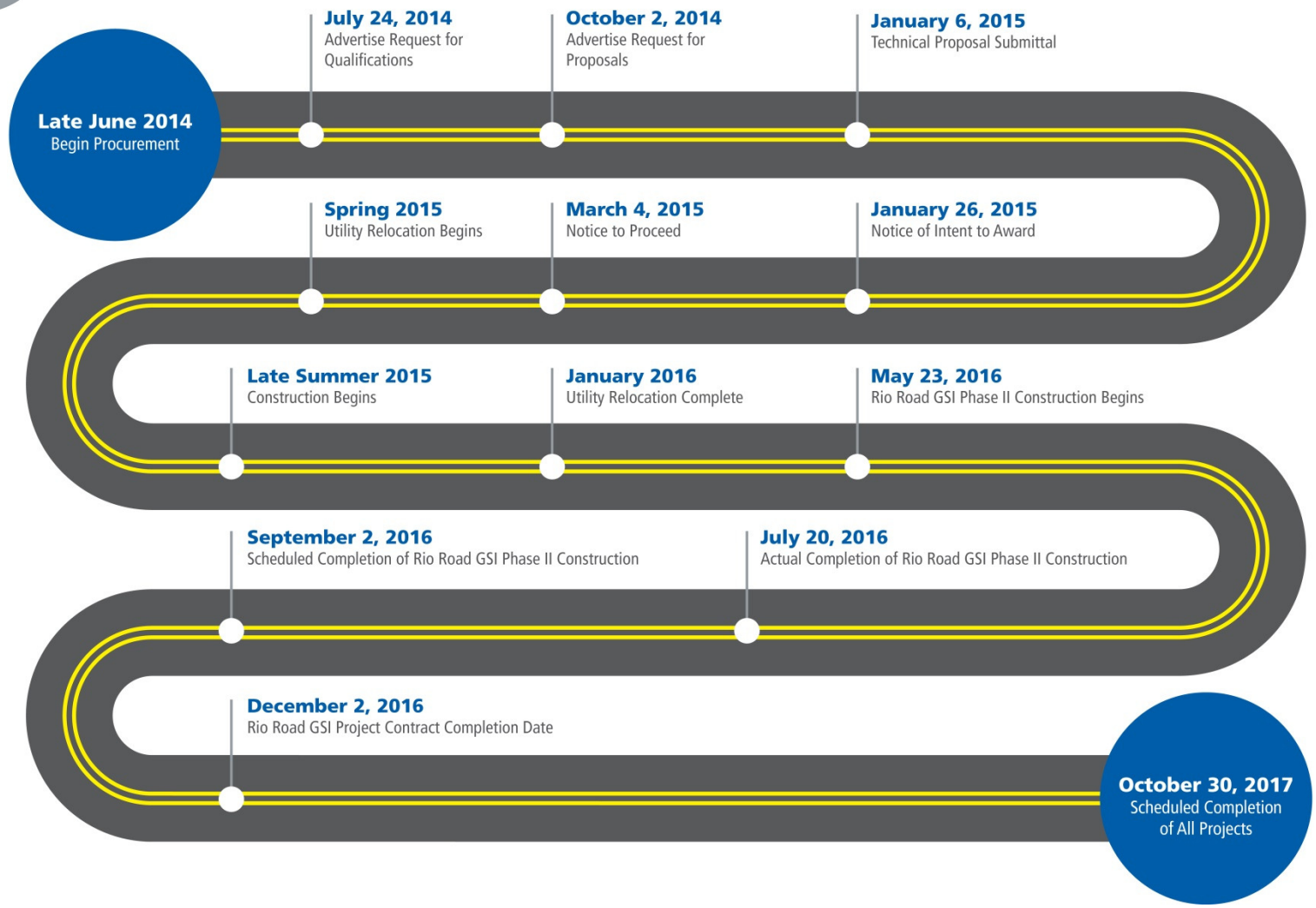
A second daily passenger train, Lynchburg to Washington, D.C.



Route 29 **Solutions**

VDOT

Design-Build Project Schedule



Route 29 **Solutions**

VDOT

29-250 Interchange Improvement Project

Route 29 **Solutions**

VDOT

29-250 Interchange Improvement Project

Route 29 **Solutions**

VDOT

Rio Road Grade-Separated Intersection

Route 29 **Solutions**

VDOT

Berkmar Drive Extended

Route 29 **Solutions**

VDOT

Berkmar Drive Extended

Route 29 **Solutions**

VDOT

Route 29 Widening

Route 29 **Solutions**

VDOT

Hillsdale Drive Extended

Route 29 **Solutions**

VDOT

Hillsdale Drive Extended

Route 29 Solutions

VDOT

Hydraulic Road Intersection Planning Study

Route 29 **Solutions**

VDOT

Rio Road GSI Project Team

WMATA Governance, Operations and Financial Review

April 2017

WMATA

- Nation's 5th largest transit system
- Formed via Interstate Compact between VA, MD and DC with Congressional approval
- Large backlog of deferred rail maintenance
- Ridership declines due to reduced reliability and SafeTrack service disruptions
  - (Ridership is also falling in other cities although not as much)
- Unlike other major transit systems, no dedicated non-federal funding source
- $150 million/year special federal capital funds since 2009; expires in 2018

VA Legislative Mandate

- *"objective review of the operating, governance and financial conditions at WMATA"*
  - Legal and organizational structure
  - Composition of board; qualifications of members; length of terms
  - Labor costs, including employee benefits
  - Options to lower costs and improve efficiency
- Compare WMATA to other transit systems at least 35 years old with 35 or more miles of rail
- Request participation of DC and Maryland
- MD legislature considering similar mandate; specific focus on dedicated funding

Review

- Gov. McAuliffe recruited former USDOT Sec. Ray LaHood to oversee review
- Benchmark WMATA against other large transit systems on costs, revenue, management, governance, etc
- LaHood will consult officials in the region to look for a path forward

Recommendations

- Sec. LaHood asked to make recommendations
- May involve changes to board, management, costs, funding
- Implementation of recommendations could be through changes to Interstate Compact or other means
- Changes to Compact require Act of Congress
- Legislative mandate to report back to VA General Assembly by November 15, 2017

Questions?

Civil Rights and Toll Relief Update

Grindly Johnson
Deputy Secretary of Transportation

DBE Certification Requirements

- ✓ 51% owned and controlled by one or more socially and economically disadvantaged individuals
- ✓ Small Business Administration
  - ✓ Annual gross receipts - $23.98 million
  - ✓ Personal net worth - not to exceed $1.32 million

Business Opportunity and Workforce Development Center (BOWD)

* **Established in 2007**

- ✓ **Empowers DBE firms with the tools to become self-sufficient and competitive**
  - ✓ Partnerships with diverse group that makes things happen
  - ✓ Provides business assessment tools
  - ✓ Marketing and web design
  - ✓ Targeted assistance with cash flow management, business plan development and work plan
  - ✓ Redesign to: increase the number of new DBEs; increase the number of DBEs to become prime contractors; increase the number of opportunities for partnership/mentoring/training from prime contractors; partner with industry associations to meet mutual goals

Transportation DBE Advisory Council (TDAC)

- **Provides recommendations to VDOT Commissioner, and appropriate divisions, on behalf of DBE firms**

  - ✓ **Meets quarterly around the state**

  - ✓ **VDOT/DBE Advisory Council – formed 2015**

    - ✓ Joint committee of upper and middle management at VDOT and the TDAC formed to improve business and operational functions for the DBE firms

Virginia Small Business Enterprise Program (VSBEP)

- Increase number of competitively awarded contracts to small businesses
- Maximize contract opportunities
- Minimize contract bundling
- Promote use of small business in VDOT contract and subcontract opportunities (Prime)

Meeting the Challenges

VDOT – Internal Processes for SWaM

- ✓ **Update policies, procedures and EWPs to reflect directives in EO20**
- ✓ **Improve SWaM subcontractor data collecting**
- ✓ **Add special provision to report SWaM subcontracting payments on construction contracts**

Meeting the Challenges for SWaM

VDOT – Goods, Services & Capital Outlay

- ✓ De-bundle maintenance service contracts – currently $40M annually, remove set-aside cap restriction
- ✓ Capital Outlay architectural design contracts – set aside for award to certified small businesses
- ✓ Small business subcontractor reporting requirements added to facility construction contracts

SWaM Expenditures – FY17
2nd Quarter

FY2017 Target	FY2016 EOY	SWaM FY17 Q2	SB	WB	MB
42%	39.75%	34.64%	25.81%	4.48%	4.36%
		$224,773,5841.25	$167,431,397.07	$29,039,570.93	$28,302,613.25

VDOT SWaM Percent Participation Comparison

Business Type	FY 06	FY 14	FY 15	FY 16
Small	6.16%	23.25%	26.95%	26.08%
Women	3.79%	2.94%	4.84%	6.24%
Minority	1.67%	3.30%	5.60%	7.44%
SWaM	**11.62%**	**29.48%**	**37.39%**	**39.75%**

P3 Project Expenditures

Project	Description	Contract Amount	DBE Goal	DBE Goal Amount	SWaM Goal	SWaM Goal Amount
395 Express Lanes Ext.	Eight-mile extension of the 95 Express Lanes from Edsall Road in Fairfax City to Eads Street in Arlington.	$336M	10%	$33.6M	19%	$68.84M
I-66	Outside the Beltway	N/A	15%	N/A	27%	N/A
I-66	Inside the Beltway (No Federal Funds)	N/A	0%	N/A	0%	N/A
I-495 Express Lane	Capital Beltway High Occupancy Toll (HOT) Lanes	$1.347B	15%	$202M	25%	$326M
I-95 Epress Lanes	High Occupancy Toll Lanes	$655M	10%	$65M	19%	$124M
Elizabeth River Tunnels	Rehabiltation of existing downtown and Midtown tunnels, the construction of a new parallel midtown tunnel, and the extension of the MLK Freeway	$897M	12%	$107M	23%	$202M

Toll Relief

Toll Relief

- ✓ The Toll Relief Program was developed to help ease the financial burden of Elizabeth River Tunnels tolls on Norfolk and Portsmouth residents most impacted

- ✓ The first program of its kind in the nation offers a 75-cent per trip refund to qualified Norfolk and Portsmouth residents who frequently travel through the Downtown and Midtown tunnels

Program Funding

- ✓ Elizabeth River Crossings, operators of the Elizabeth River Tunnels, will pay $500,000 a year for 10 years to help offset the cost of tolls on those users most financially stressed.

Toll Relief (continued)

To qualify for Toll Relief, participants must:

- ✓ **Reside in Norfolk or Portsmouth**
- ✓ **Earn $30,000 or less per year**
- ✓ **Have or open a Virginia E-ZPass account**

Once a participant's Virginia E-ZPass transponder has recorded eight or more trips through the Downtown or Midtown tunnels during a calendar month, a 75-cent per trip refund is credited to his or her Virginia E-ZPass account.

Toll Relief (continued)

2017 Toll Relief Application Period and Results

- ✓ The 2017 application period began Thursday, Dec. 1, 2016, and concluded Wednesday, Feb. 15, 2017
- ✓ 2094 people were approved
- ✓ Toll relief benefits began March 1, 2017

Civil Rights and Toll Relief Update

Grindly Johnson
Deputy Secretary of Transportation

Issuance of the Series 2017 Capital Projects Revenue Bonds

John W. Lawson
Chief Financial Officer
April 18, 2017

Authorization to Issue CPR Bonds

- **Chapter 896 (HB 3202) of the 2007 Virginia Acts of Assembly authorized the issuance of $3 billion of Commonwealth of Virginia Capital Projects Revenue Bonds (CPR).**
  - 20% dedicated to Transit Capital
  - 4.3% dedicated to Rail Capital
  - Balance to be used to provide for federal match, enhance the Revenue Sharing Program and Statewide and Regional Projects
  - Annual sales limited to $300 million, with carry over of unsold amount
- **Total authorization was increased in 2009 to $3.18 billion to replace $180 million of General Funds (GF) provided in 2007 and subsequently taken.**
- **The annual issuance amounts were accelerated in 2011 and 2012 by the Governor's Transportation Bill to allow for $1.8 billion in CPR bonds.**

CPR Authorization

- **To date, the Commonwealth Transportation Board has issued $2.293 billion of CPR bonds.**
- **Next sale of $284 million planned for June 2017, leaving a balance of $603 million.**

CPR Bond Authorization Summary	(in millions)
Authorized	$ 3,180
Less: Sold May 2010	493
Sold May 2011	600
Sold May 2012	600
Sold December 2014	300
Sold 2016	300
Planned sale June 2017	284
Remaining amount to be sold in future	$ 603

*Preliminary and Subject to Change

Use of the CPR Bonds

- CPR bonds have been allocated to the prescribed VDOT and DRPT programs each year since 2008.
- The planned use of the full $3.18 billion authorization is as follows:

CPR Bonds Use		Amount (in millions)	Percent Share
Transit Capital		$600.0	20.0%
Rail Capital		129.0	4.3%
Match Federal Funds		1,044.8	34.8%
Dulles Rail	125.0		
Metro Matters	500.0		
Construction Projects	419.8		
Revenue Sharing		70.0	2.3%
Project Funding		1,156.2	38.5%
Total 2007 Authorization		3,000.0	100.0%
2009 GF Replacement			
Transit / Rail		60.0	
VDOT		120.0	
Total GF Replacement		180.0	
Total		$3,180.0	

Use of the CPR Bonds

- The first sale in May 2010 was used to reimburse VDOT and DRPT for eligible project costs incurred prior to the sale and for DRPT transit and rail activity during FY 2011.
- The two $600 million sales in FY2011 and FY2012 provided proceeds to continue the transit and rail components overseen by DRPT and to fund the Governor's projects accelerated by the 2011 Transportation Bill.
- The FY 2014 and 2016 sales continued to accelerate the SYIP and the on-going transit and rail activities.
- The FY 2017 sale continues to support projects in the SYIP and the on-going transit and rail activities.

Debt Service Payments

- **The first use of the revenues dedicated to the Priority Transportation Fund (PTF) is the debt service on the CPR bonds.**
- **The PTF revenue is provided from:**
  - One-third of the taxes collected on insurance premiums;
  - A portion of the motor fuels tax – 4% of Sales and Use Taxes on Motor Fuel;
  - Interest earnings.

Projected Priority Transportation Fund Revenues
(in millions)

Fiscal Year Ending June 30:	2017	2018	2019	2020	2021	2022	**Total**
Insurance Tax	$163.1	$169.1	$174.7	$183.3	$ 192.5	$ 201.2	**$ 1,083.9**
Motor Fuel Tax	34.6	34.9	35.3	35.5	35.9	36.3	**212.5**
Investment Income	1.0	1.0	1.0	1.0	1.0	1.0	**6.0**
Total Projected PTF Revenues	$198.7	$205.0	$211.0	$219.8	$ 229.4	$ 238.5	**$ 1,302.4**

Debt Service Coverage and Planned Issuance

- The Code of Virginia requires the revenues of the PTF provide 100 percent of the annual debt service of the bonds.
- For planning and debt management purposes, maintain a 1.15x revenue to debt service coverage ratio.

Bond Issue	Target Proceeds	Anticipated Debt Service Coverage
Series 2010*	$ 492,665,000	
Series 2011*	600,000,000	
Series 2012*	600,000,000	
Series 2013*	-	
Series 2014*	300,000,000	
Series 2016	300,000,000	
Series 2017	284,100,000	1.20x
Series 2018	122,900,000	1.18x
Series 2019	-	1.24x
Series 2020	355,000,000	1.15x
Series 2021	125,335,000	1.16x
Total	$ 3,180,000,000	

*Actual Issuance

Commonwealth Transportation Board:
Capital Project Revenue Bonds, Series 2017

Summary Terms of Offering*	
Issuer	Commonwealth Transportation Board
Series	2017
Anticipated Ratings	AA+/Aa1/AA+
Sale Date	June 2017
Security	The Series 2017 bonds are payable from and secured by revenues (i) first, from revenues deposited into the PTF, (ii) legally available revenues from the TTF, and (iii) from any legally available funds of the General Fund.
Par (in millions)	$284.1
Structure	Fixed rate serial bonds maturing annually in 2018 - 2042
Final Maturity (years)	25

* Preliminary and subject to change

Next Steps

- Request CTB Approval (April)
- Treasury Board Approval (May)
- Rating Agency Requests (June)
- Competitive Sale (June)
- Planned Closing (July)

COMMONWEALTH *of* VIRGINIA

Office of the

SECRETARY *of* TRANSPORTATION

Virginia Transportation Infrastructure Bank Advisory Panel Recommendation 95 Express Lanes LLC I-395 Express Lanes Northern Extension

Commonwealth Transportation Board

Deputy Secretary Nick Donohue

April 18, 2017

95 Express Lanes LLC
I-395 Express Lanes Northern Extension
VTIB Application

- 95 Express Lanes submitted an application on January 13, 2017 requesting a loan of $45 million plus capitalized interest for up to 30 years following completion of construction

- The 395 Project extends the existing Interstate 95 Express Lanes by 8 miles starting at Turkeycock Run and ending just beyond the Pentagon

- The 395 Project also includes the widening of I-395 southbound general purpose lanes between Duke Street (Route 236) and Edsall Road (Route 648), as well as modifications to Duke Street and Edsall Road interchanges

- The requested VTIB loan will be secured by a subordinate pledge of net toll revenue

I-395 Express Lanes Northern Extension

I-395 Express Lanes Northern Extension
Additional Project Advancement

- **Construction and operation of the Interstate 395 Express Lanes will be structurally similar to the strategy utilized for the Interstate 95 Express Lanes (as reflected within the draft Amended and Restated Comprehensive Agreement (ARCA))**
- **Project has cleared NEPA Process**
- **Project to be Constructed Under Design-Build Contract**
  - **Design-Build Contract Awarded in February 2016**
  - **Actual construction expected to begin July 2017**
- **Construction expected to begin July 2017 and last approximately 3 years**
  - **Project costs estimated at approximately $342 million**
  - **The project would enhance overall safety and congestion within the corridor as well as provide additional economic enhancements, improve environmental quality and provide more efficient land use**

I-395 Express Lanes Northern Extension
Applicant Project Eligibility and Screening Criteria

- **The Application and 95 Express Lanes LLC Meet the Bank's Mandatory Criteria**
  - **95 Express Lanes LLC is an Eligible Borrower under the Act**
    - Meets respective definitions of a Private Entity
  - **The Project is a local and regional transportation priority**
    - Included within Atlantic Gateway Project, Transportation Improvement Plan 2015 – 2020, and Northern Capital Region Transportation Planning Board Constrained Long-Range Transportation Plan
- **Based on the VTIB Screening and Scoring Criteria, the 95 Express Lanes LLC's Application scored 23 Out of 30 Total Possible Points by VDOT and VRA Staff**
  - **VTIB loan assistance will represent less than 10% of total project funding**
  - **Project improves safety and enhances the state and federal transportation network**

I-395 Express Lanes Northern Extension
Sources of Funding

- **Senior Lien Revenue Bonds – Private Activity Bonds (PABS)**
- **VTIB Loan**
  - **$45 million plus capitalized interest**
  - **Subordinate to Senior Bonds**
- **Equity**
  - **$161.6 million in Equity Funding**
  - **Will include Equity Guarantee and Letter of Credit provision**

I-395 Express Lanes Northern Extension
VTIB Loan Structuring

- 3.60% fixed interest rate
- 6-Month Drawdown of Funds
  - Draws projected to occur from January 1, 2019 through June 30, 2019
  - Capitalized Interest through December 31, 2019
- Repayment
  - Interest payments begin June 2020
  - Principal payments begin December 2024
  - No Springing Lien in Event of Bankruptcy
- Requirements for annual total debt service coverage of 1.20x and loan life coverage ratio of 1.30x
- VTIB Loan Sinking Fund
  - Triggered if loan life coverage ratio falls below 1.30x

I-395 Express Lanes Northern Extension Advisory Panel Recommendations

- **The Advisory Panel recommends the CTB approve the loan request.**
- **VTIB Loan closing conditions**
  - **Subordinate Pledge of Net Total System Revenues**
    - Loan subordinate to Senior bonds
  - **Annual total debt service coverage of 1.20x and loan life coverage ratio of 1.30x**
  - **Execution of the Amended and Restated Comprehensive Agreement**
  - **Independent Audit of the Transurban Financial Model**
  - **Final Version of the Lender's T&R Report**
  - **Completion of the Lender's Technical Advisor Report**
  - **Final Investment Grade Ratings**
    - Includes requirement for an investment grade rating on the VTIB loan

I-395 Express Lanes Northern Extension
Risk Considerations

- **Construction Risk**
  - Payment and Performance Bonds and LOC to support Design-Build obligations
  - Equity contribution guarantee with LOC provision
  - Similar parties who participated in I-95 Express Lanes project
  - Independent Technical Advisor Review

- **Interest Rate Risk**
  - Level of interest rate risk sharing with VDOT

I-395 Express Lanes Northern Extension
Risk Considerations (Continued)

- **Revenues**
  - Could sustain substantial decrease in total system revenues and still pay total annual debt service
  - Above average performance to date and resiliency to stress case scenarios

- **Operations and Maintenance**
  - Same operator as existing I-95 and I-495 Express Lanes
  - Substantial insurance coverage
  - Independent Technical Advisor Review

Projected Status of VTIB

- **To date, VTIB has provided assistance to four projects:**
  - City of Chesapeake (Dominion Boulevard) - $151 million loan approved by the panel and CTB in January 2012 and closed on November 15, 2012
  - Loudoun County IDA (Pacific Boulevard Extension Project) - $36 million loan approved by the panel and CTB in April 2013 and closed on December 12, 2013
  - Chesapeake Bay Bridge Tunnel District (Parallel Thimble Shoal Tunnel Project) - $50 million loan approved by the panel and CTB in December 2015 and closed on November 10, 2016
  - City of Alexandria (Potomac Yard Metrorail Station) - $50 million loan approved by the panel and CTB in January 2015 and closed on December 21, 2016
- **Total capitalization to date including interest of $311.4 million.**
- **Assuming the 395 Project loan is approved, the Bank will have approximately $3 million available.**

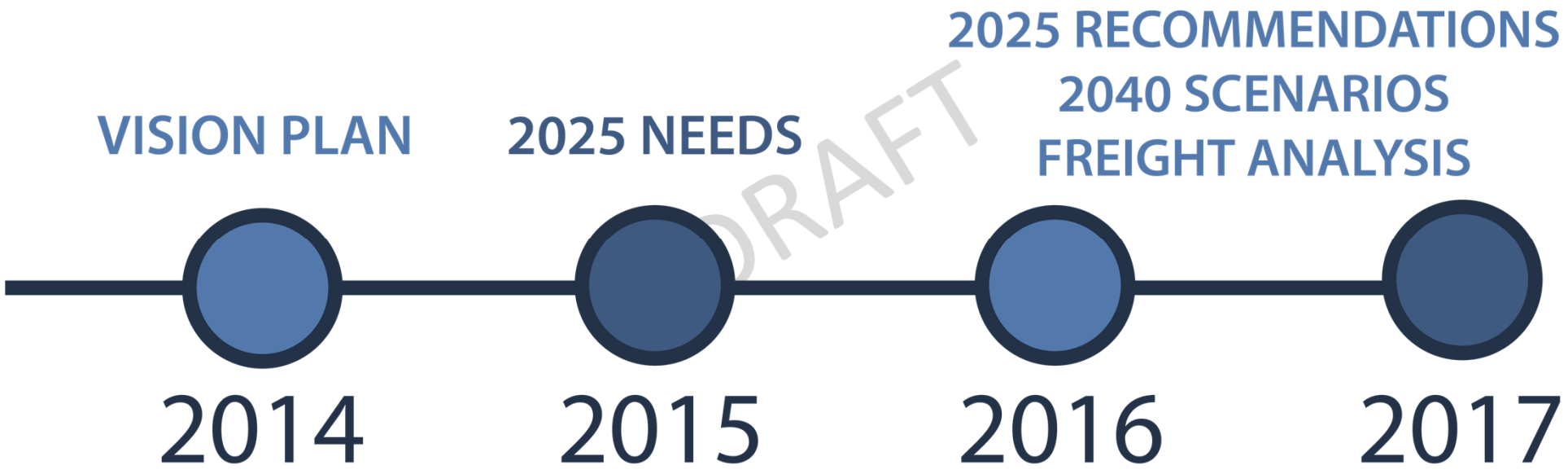
VTrans2040 Scenario Analysis

APRIL 18, 2017

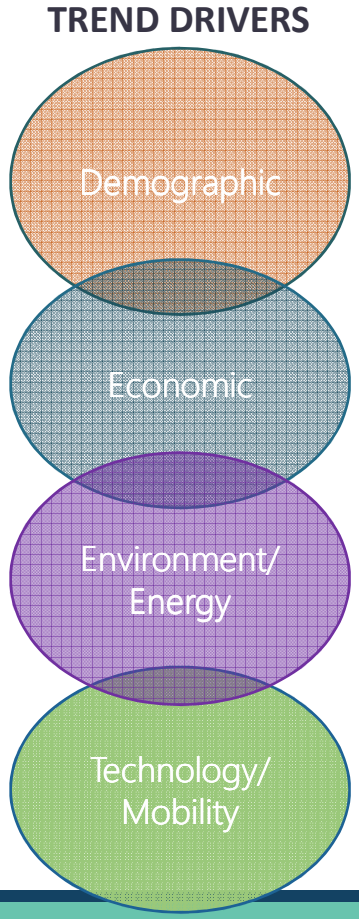
Office of INTERMODAL Planning and Investment

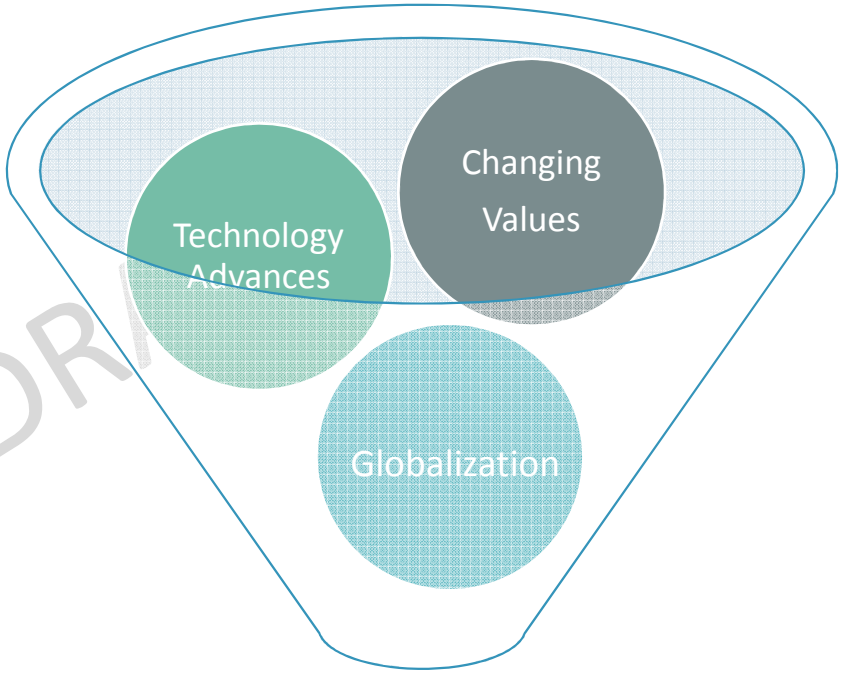
Michael Baker INTERNATIONAL

Timeline



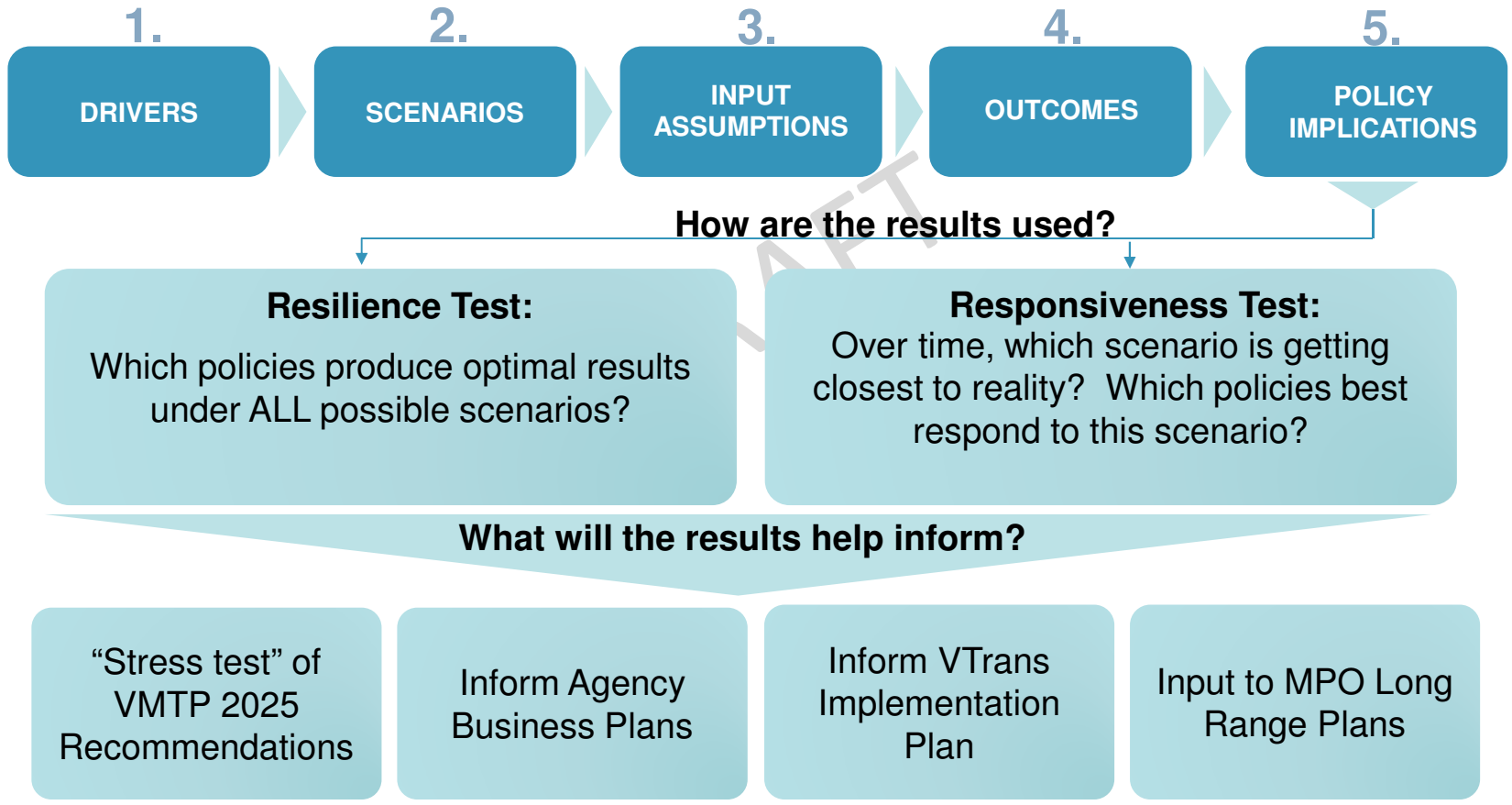
Why Examine 2040 Scenarios?





Uncertainty

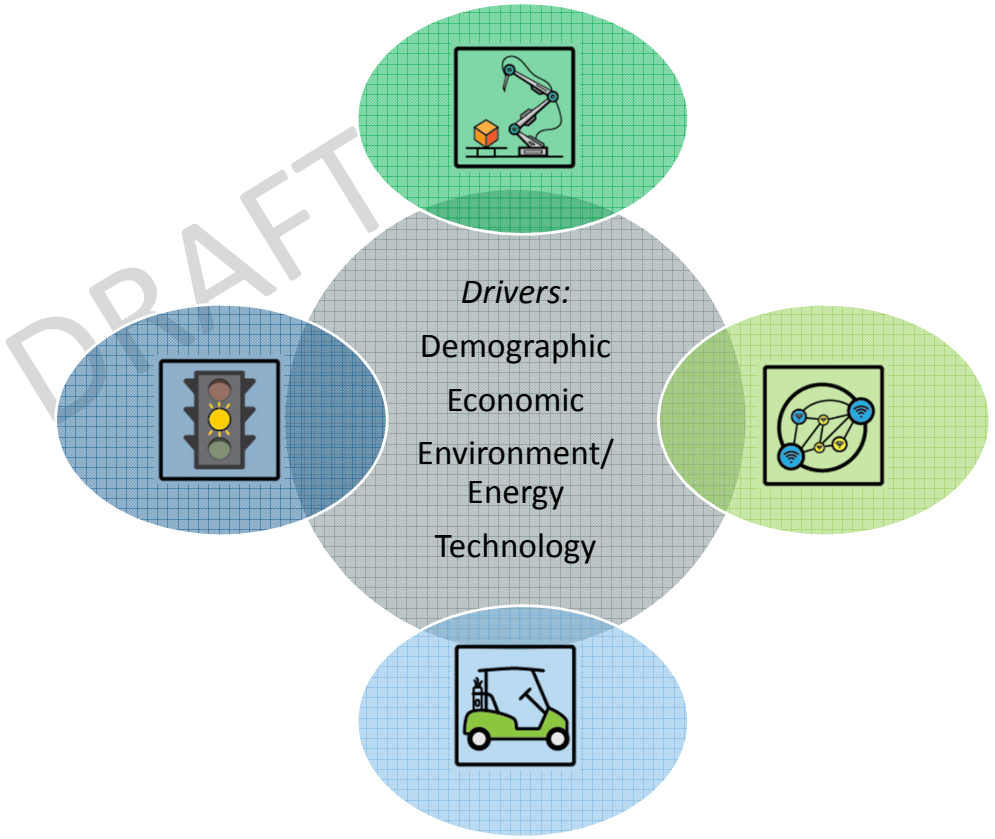
Why Examine 2040 Scenarios?



Exploratory Scenarios

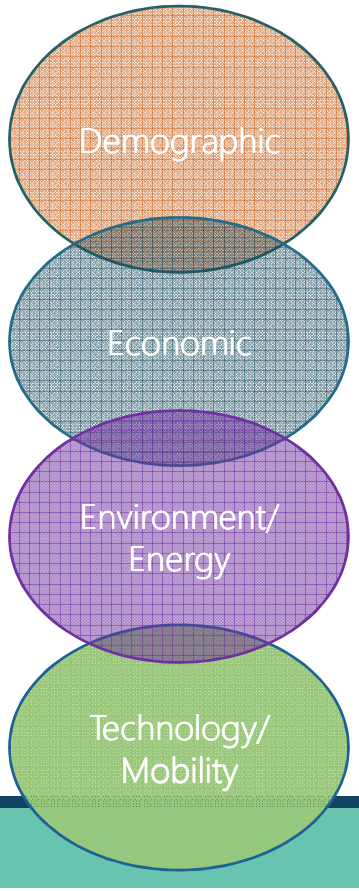
Ask “What Could Happen?” . . .
As opposed to, “What Should Happen?”

Not looking at What is Best, but rather, What to be Prepared for.



Scenario Planning Toolkit

DRIVERS



COMMUNITY TYPES

V6 – Multimodal Urban

V5 – High Density Suburban

V4 – Multimodal Suburban

V3 – Small Town/Suburban

V2 – Low-Density Suburban

V1 – Rural

GENERATIONS

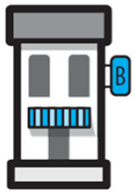
Baby Boomer

Generation X

Millenial

Generation Z

INDUSTRY MIX



Placetypes

Two Key Criteria

1

People + Jobs Per Acre (Density)

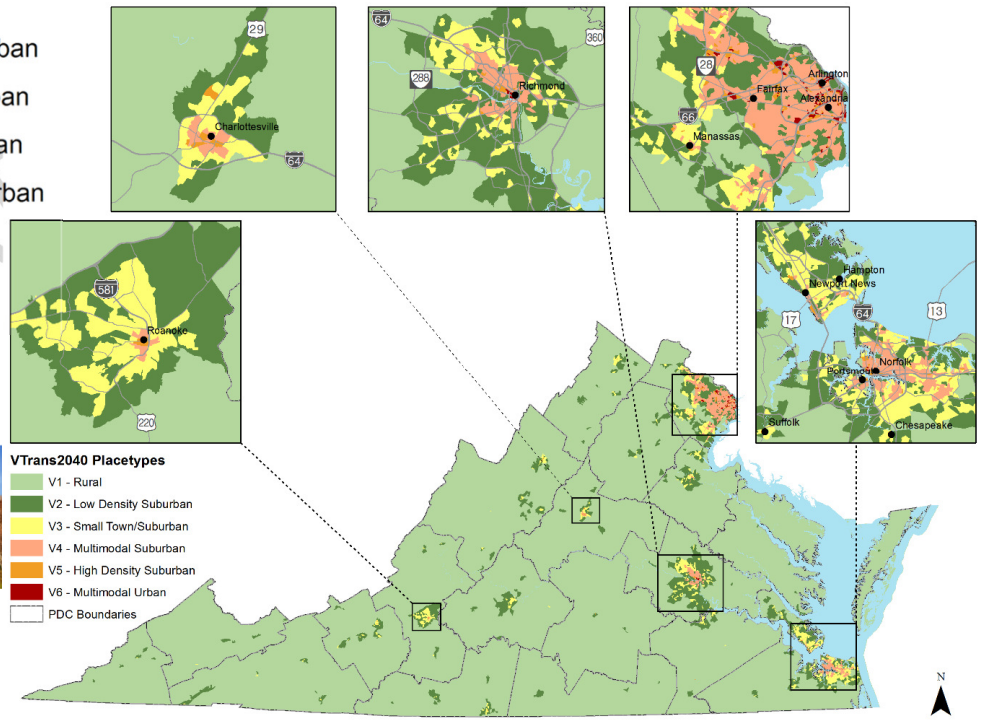
2

Transit Accessibility

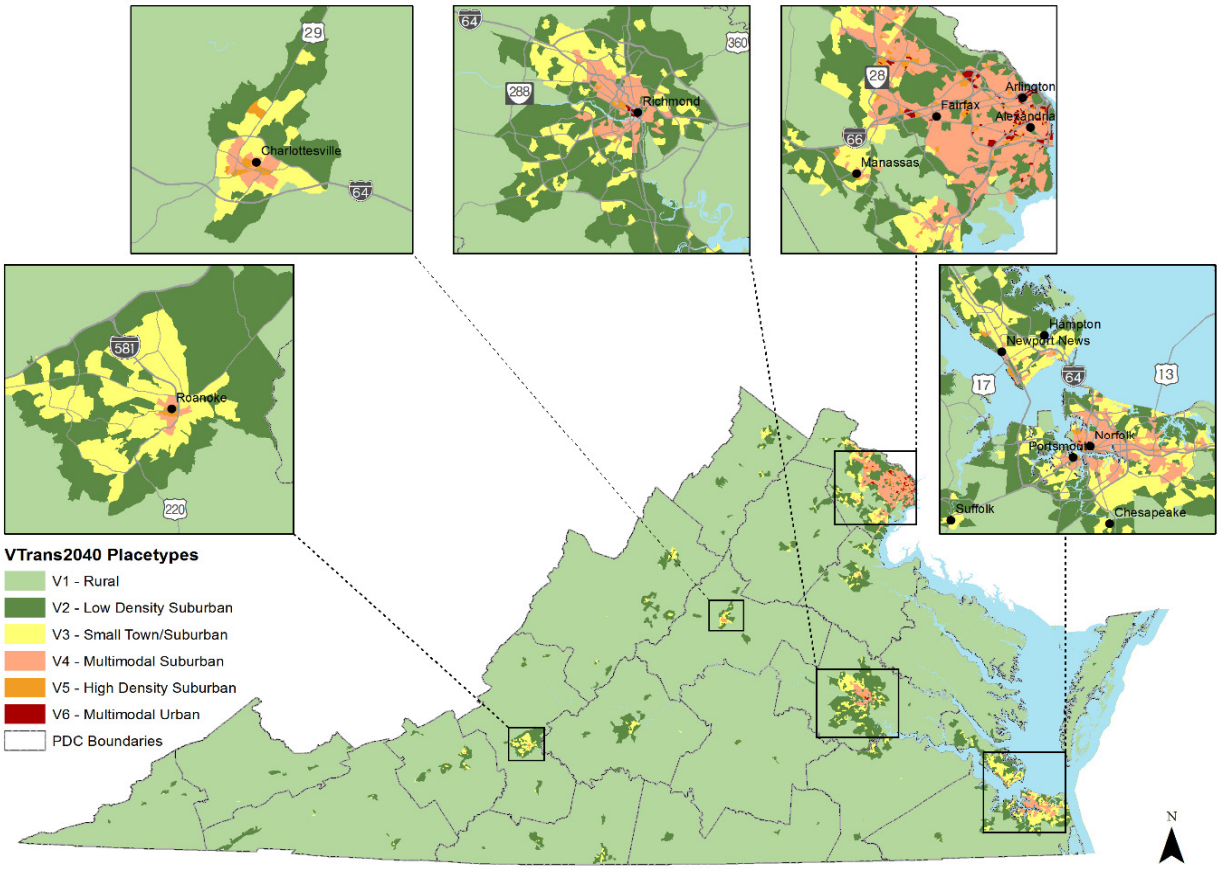
VTrans2040 Placetypes

- V1 - Rural
- V2 - Low Density Suburban
- V3 - Small Town/Suburban
- V4 - Multimodal Suburban
- V5 - High Density Suburban
- V6 - Multimodal Urban
- PDC Boundaries

V1 – Rural	V2 – Low-Density Suburban	V3 – Small Town/ Suburban	V4 – Multimodal Suburban	V5 – High Density Suburban	V6 – Multimodal Urban
~90% of the state's land area (2015)	Mechanicsville, Smithfield	Staunton, Danville	Sterling (Loudoun), Willow Lawn (Richmond)	Fan District (Richmond). Ghent (Norfolk)	Downtown Richmond, Clarendon (Arlington)



Placetypes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64
360
288
Richmond
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Arlington
Fairfax
Alexandria
66
Manassas
581
Roanoke
220
Hampton
Newport News
17
64
13
Norfolk
Portsmouth
Suffolk
Chesapeake
VTrans2040 Placetypes
V1 - Rural
V2 - Low Density Suburban
V3 - Small Town/Suburban
V4 - Multimodal Suburban
V5 - High Density Suburban
V6 - Multimodal Urban
PDC Boundaries
N

Baseline Scenario Assumptions for 2040

Where is population growth occurring?

- Across the state, but highest growth rates found in multimodal areas
- Increases in transit, biking, and telecommuting modes

What are the employment and industry trends?

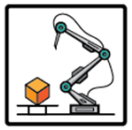
- Shift to online retail, home delivery

How advanced is transportation technology?

- High degree of AV and Mobility on Demand, varying by placetype

What are the environmental considerations?

- Baseline of predictions for high-heat days and severe storm days



Assumptions for Industrial Renaissance (High Growth Industry)

VTrans 2040 LOCAL • GLOBAL • MOBILE

Where is population growth occurring?

Similar distribution to 2015

Millennials ultimately move to suburbs

What are the employment and industry trends?

High tech manufacturing

How advanced is transportation technology?

High degree of AV and Mobility on Demand, varying by placetype (same as Baseline)

What are the environmental considerations?

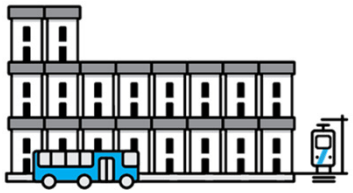
High end of predicted trends in high-heat days and severe storm days

Assumptions for Techtopia (High Growth Technology)

VTrans 2040 LOCAL • GLOBAL • MOBILE

Where is population growth occurring?

Strong growth in urban areas



What are the employment and industry trends?

Micro production, knowledge-based economic growth

How advanced is transportation technology?

AV and Mobility on Demand in "full effect"

Surge in telecommuting

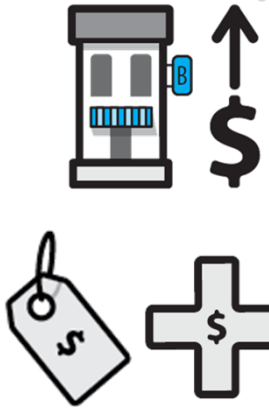
What are the environmental considerations?

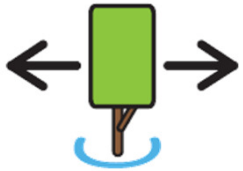
Low end of predicted trends in high-heat days and severe storm days

Assumptions for Silver Age (Moderate Growth)

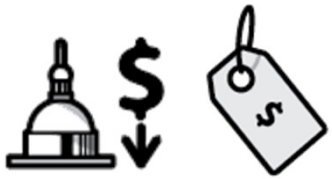
VTrans 2040 LOCAL • GLOBAL • MOBILE

Where is population growth occurring?	What are the employment and industry trends?	How advanced is transportation technology?	What are the environmental considerations?
Preference for smaller, walkable communities	Growth in small business, retail, and healthcare	AV is high, but Mobility on Demand is low	Virginia develops away from vulnerable areas





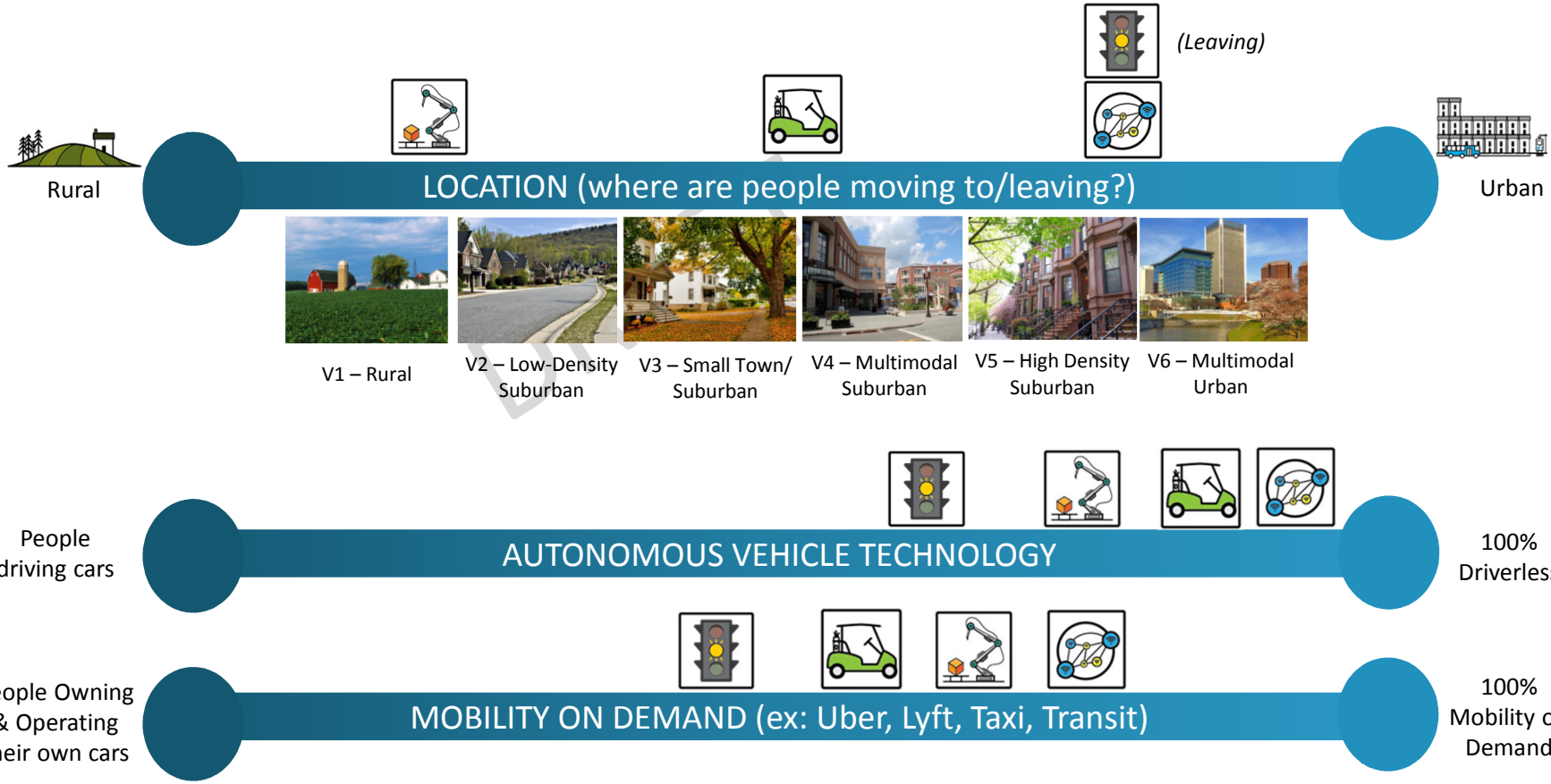
Assumptions for General Slowdown (Low Growth)

Where is population growth occurring?	What are the employment and industry trends?	How advanced is transportation technology?	What are the environmental considerations?
Sluggish population growth	Reduced military spending, economic slowdown	Delayed adoption of AV and Mobility on Demand relative to Baseline Scenario	Environment status quo, volatile global energy prices
Population decline in urban areas, fewer Millennials move to Virginia			

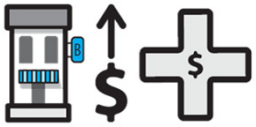
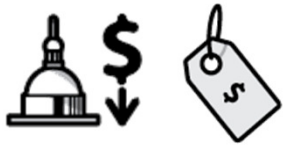
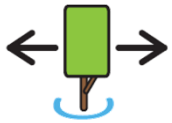
Key Trends by Scenario

VTrans2040 Scenarios

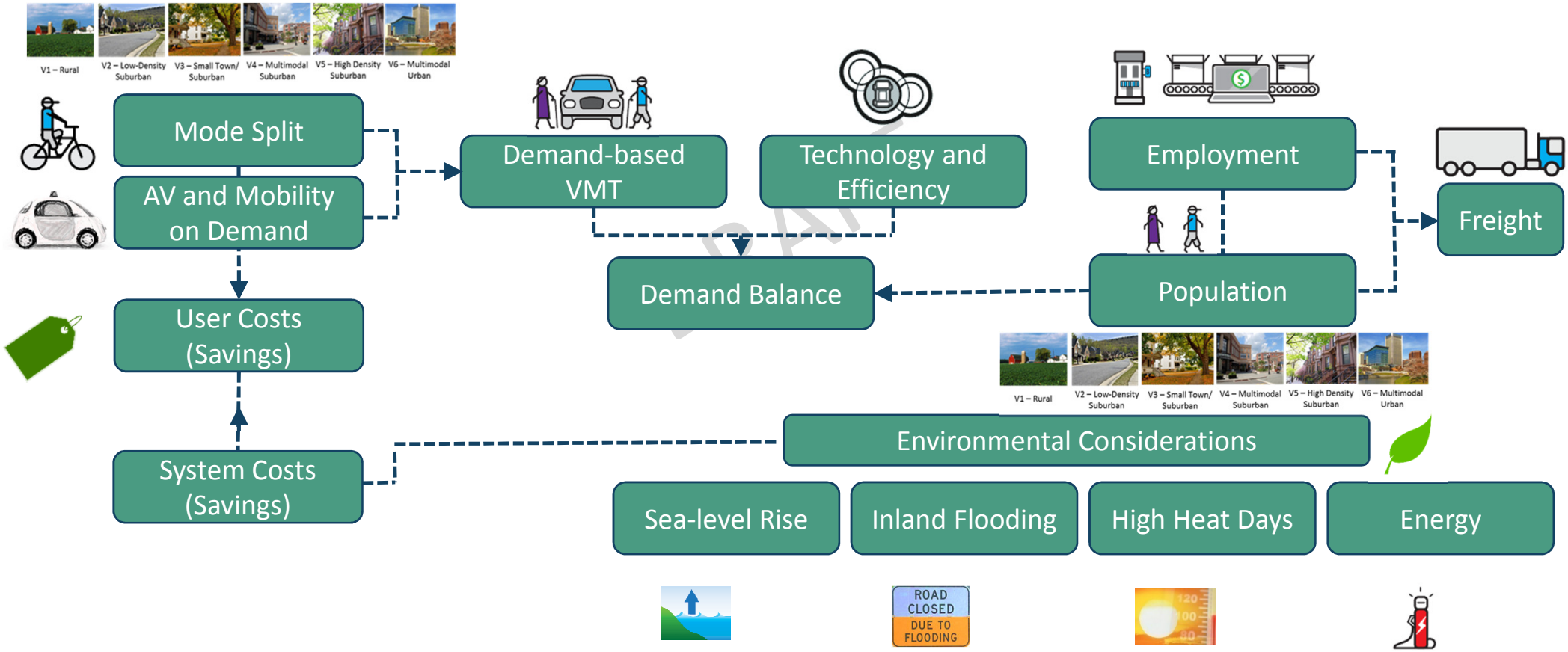
- Industrial Renaissance
- Techtopia
- Silver Age
- General Slowdown



Key Trends by Scenario (Cont.)

	Industrial Renaissance	Techtopia	Silver Age	General Slowdown
Change in Mode Share (from Baseline)				
Employment and Industry Trends	 Advanced production	 Creative class and microproduction	 Small business growth, healthcare	 Military and retail slowdown
Environmental Trends	 High end of predicted trends in high-heat days and severe storm days	 Low end of predicted trends in high-heat days and severe storm days	 Virginia develops away from vulnerable areas	 Environment status quo, volatile global energy prices

Scenario Components



Economic Drivers

Industrial Renaissance

Expansion of Creative Class

Advanced production

Growth in international trade

Techtopia

Microproduction

Expansion of Creative Class

Growth in international trade

Silver Age

Small Business Growth

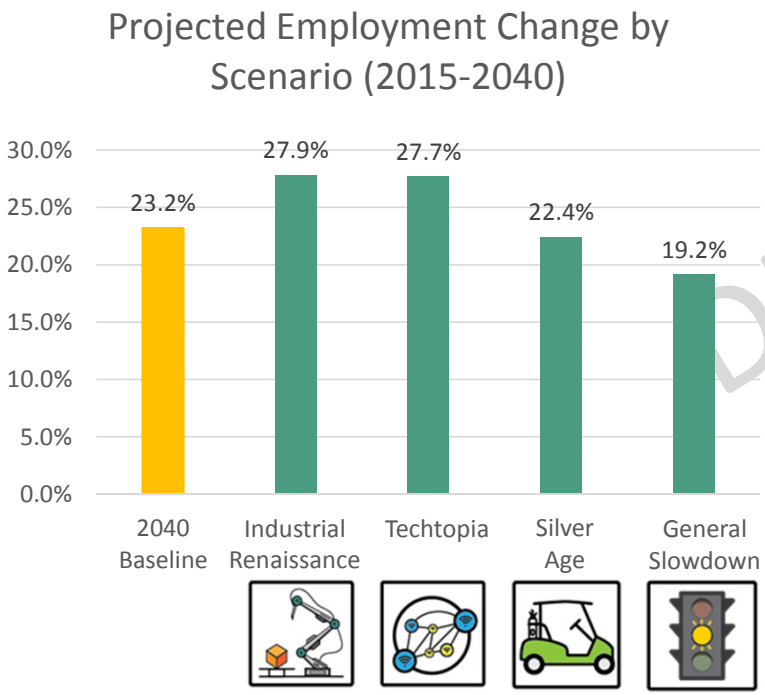
Healthcare

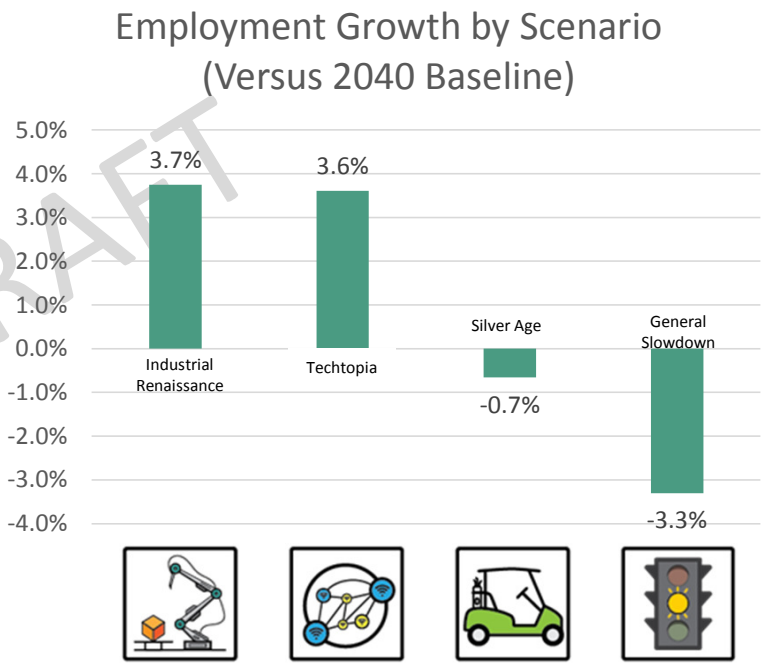
General Slowdown

Military Slowdown

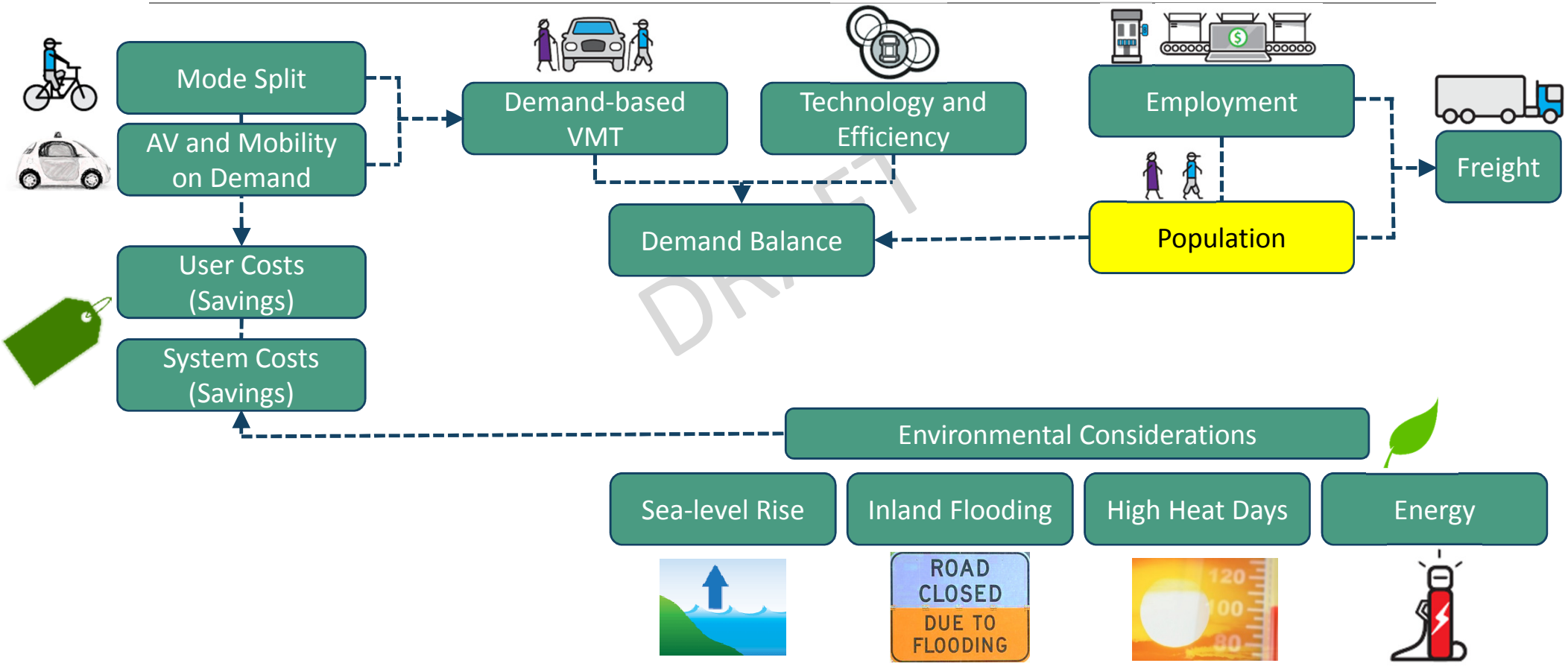
Retail Slowdown

Assumed Scenario Employment Adjustments



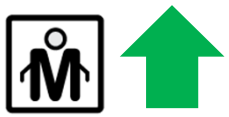


Population


Mode Split
AV and Mobility on Demand
User Costs (Savings)
System Costs (Savings)
Demand-based VMT
Technology and Efficiency
Demand Balance
Employment
Population
Freight
Environmental Considerations
Sea-level Rise
Inland Flooding
High Heat Days
Energy
ROAD CLOSED
DUE TO FLOODING
DRAFT

Population Drivers

Industrial Renaissance



Attract More Millennials

Attract More Boomers

Techtopia

Attract More Gen X

Attract More Gen Z

Silver Age

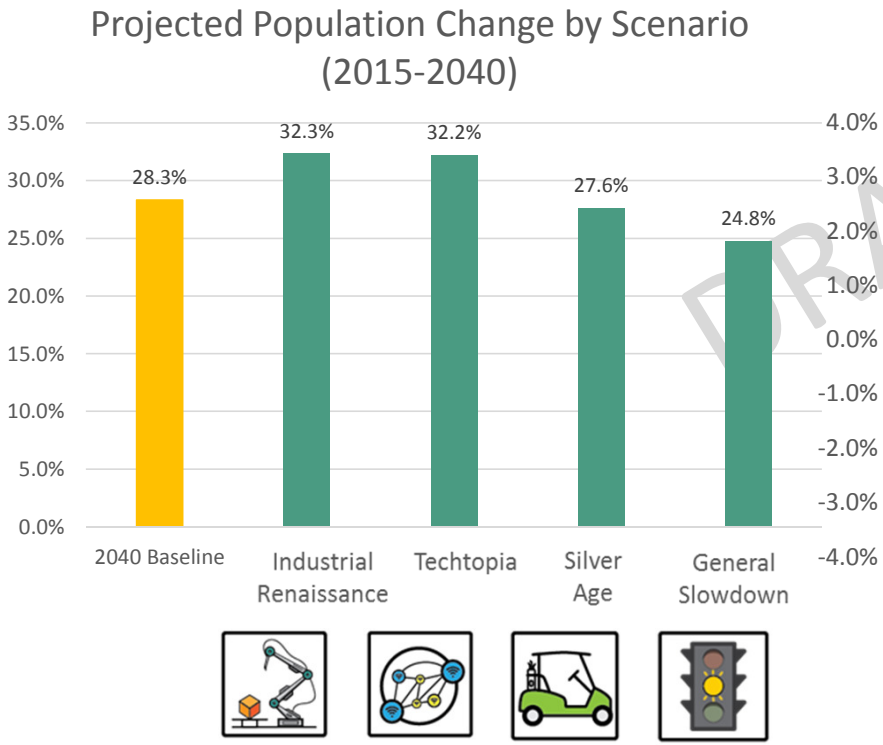
Attract More Gen X

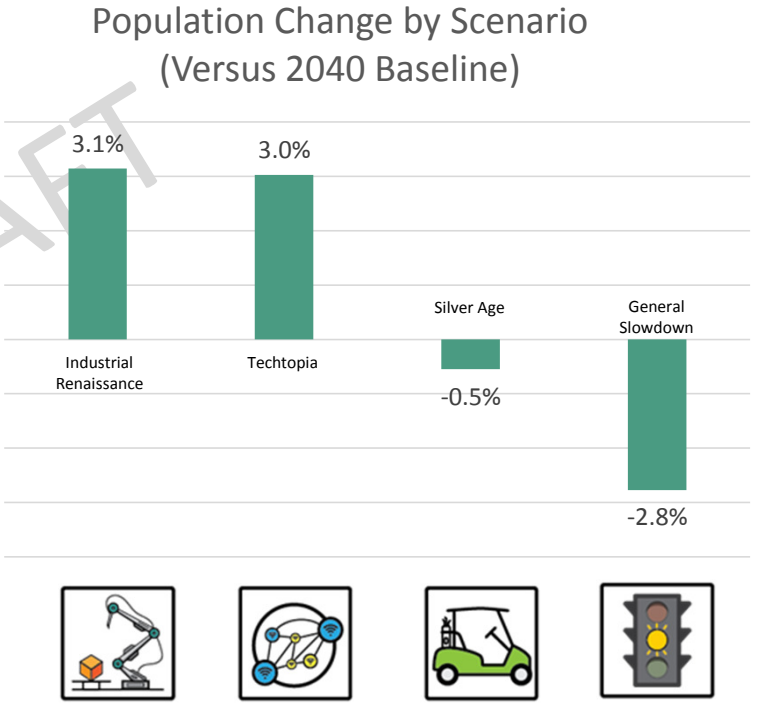
Attract Fewer Gen Z

General Slowdown

Attract Fewer Millennials

Assumed Scenario Population Adjustments





2040 Population Allocation by Placetype Assumptions


V1 – Rural


V2 – Low-Density Suburban


V3 – Small Town/Suburban


V4 – Multimodal Suburban


V5 – High Density Suburban


V6 – Multimodal Urban

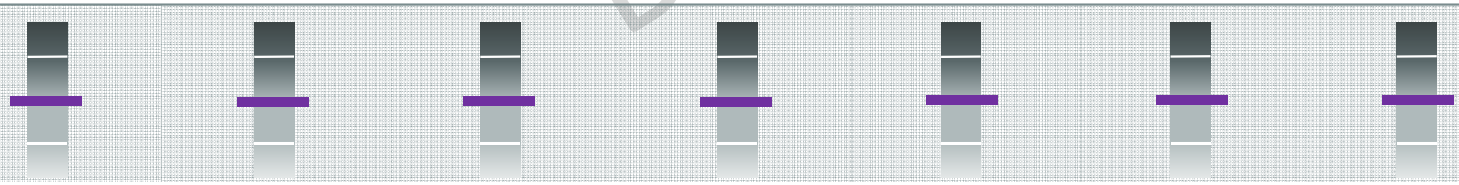

V7 – High Density Urban*

*V7- New Placetype introduced for Scenario 2, reflecting densities comparable to those in San Francisco, CA and Washington, DC

Industrial Renaissance


N/A

Techtopia



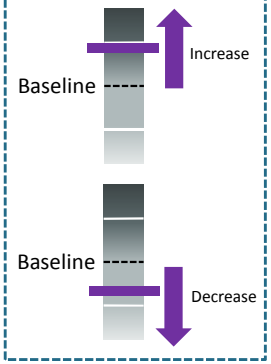
Silver Age


N/A

General Slowdown


N/A

Key:



2040 Population Allocation by Placetype Assumptions

*V7- New Placetype introduced for Scenario 2, reflecting densities comparable to those in San Francisco, CA and Washington, DC

2040 Population Assumptions by Placetype and by Scenario


V6 – Multimodal Urban


V7 – High Density Urban

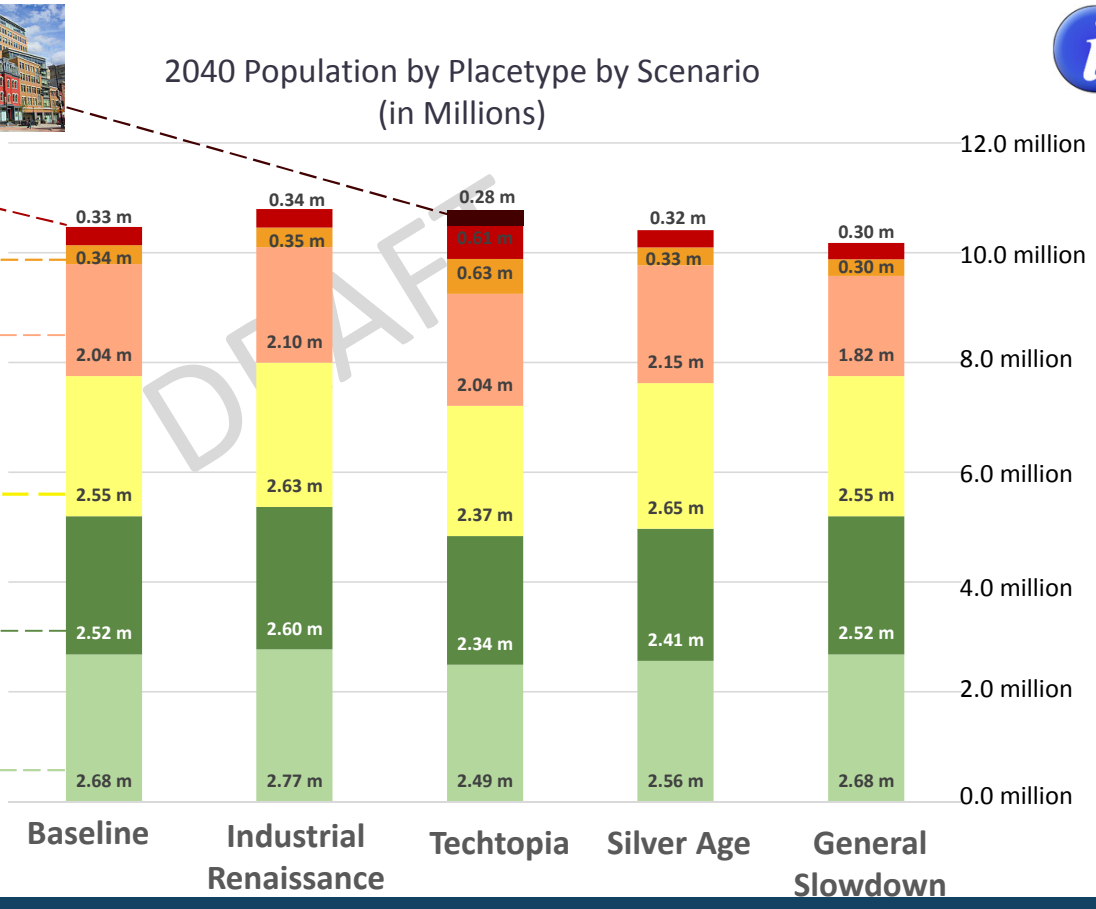

V5 – High Density Suburban


V4 – Multimodal Suburban


V3 – Small Town/Suburban


V2 – Low-Density Suburban

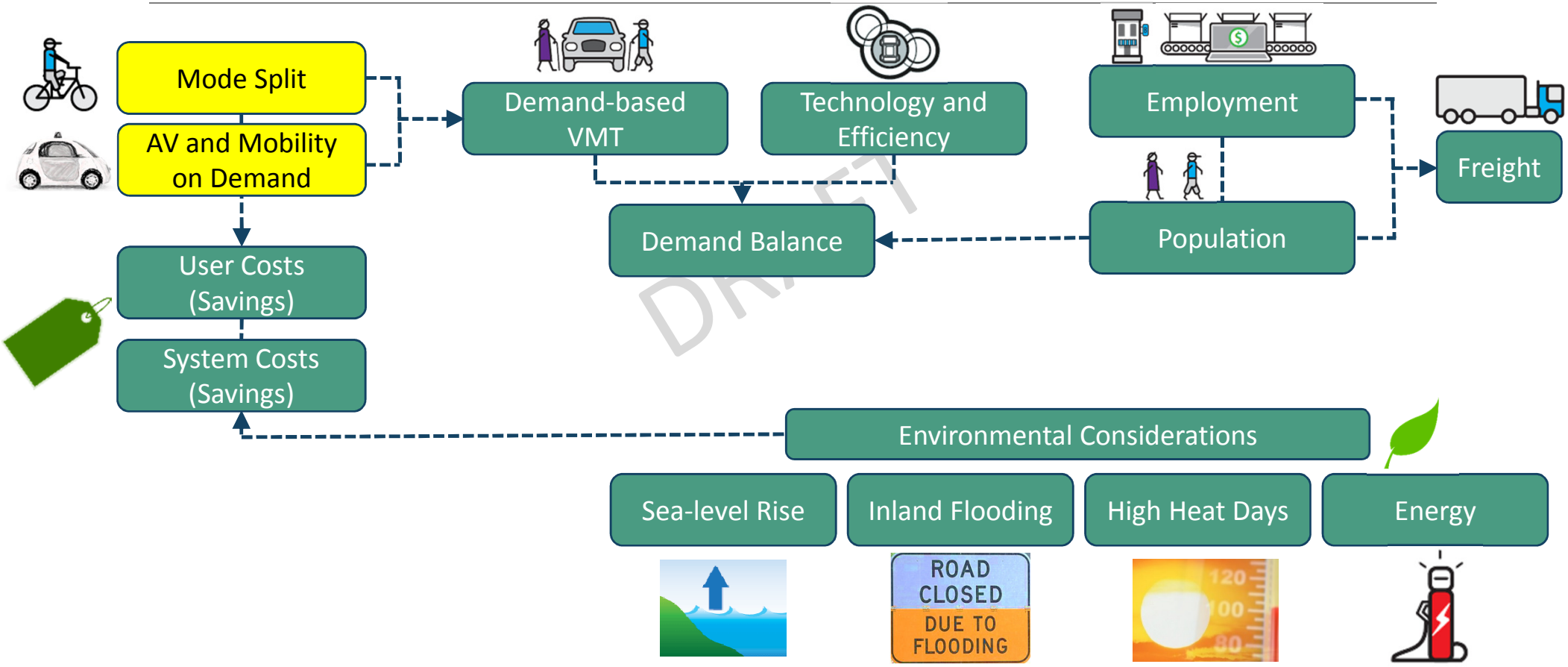

V1 – Rural



Over 600,000 more people live in Virginia in Scenarios 1 & 2 than in Scenario 4

Approx. 900,000 more people live in high density areas (V5, V6, V7) in Scenario 2 than in Scenario 4

Mode Split and Technology



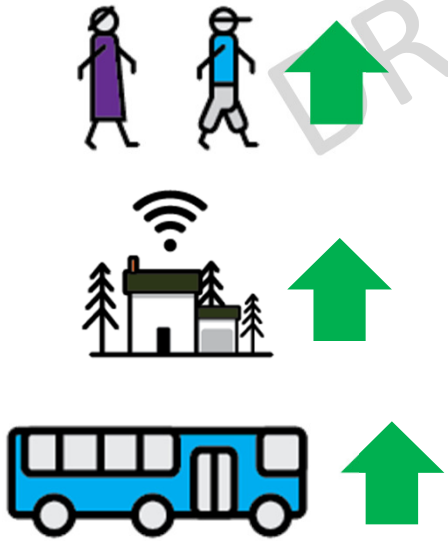
Transportation Mode Shift Assumptions by Scenario (Relative to Baseline) in 2040

VTrans 2040 LOCAL • GLOBAL • MOBILE

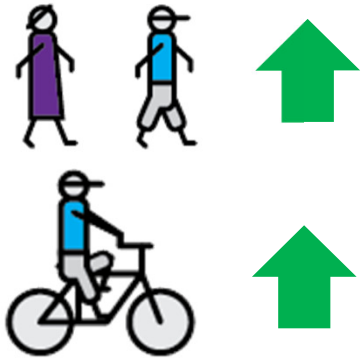
Industrial Renaissance

Same as Baseline

Techtopia



Silver Age



General Slowdown

Same as Baseline

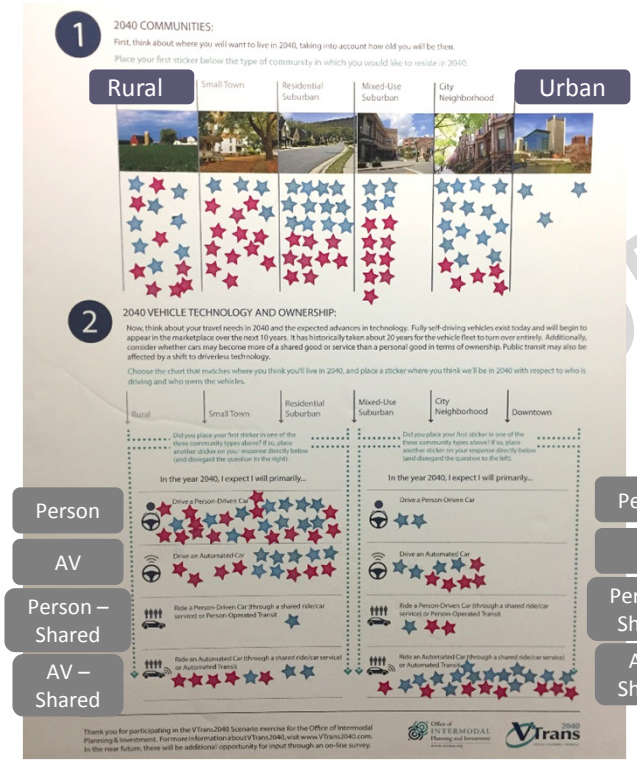
An increase in alternative transportation could help reduce Vehicle Miles of Travel (VMT) and decrease overall transportation costs

Input from Fall Meetings

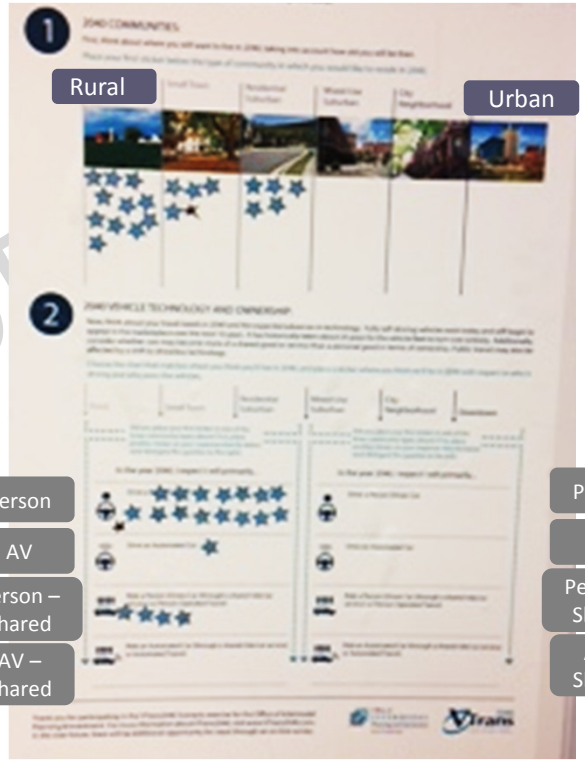
1 **Location:** Where do you want to live in 2040?

2 **Vehicle Travel**: how do you think you will get around in 2040?

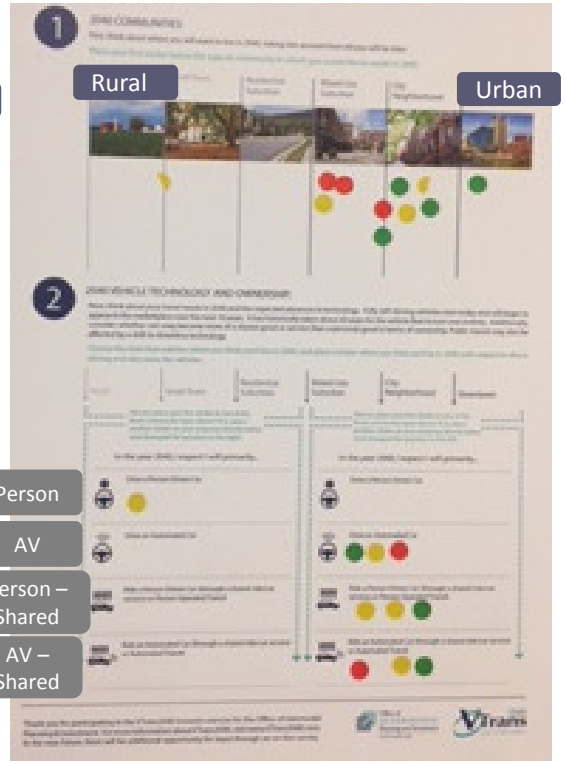
Governors Transportation Conference



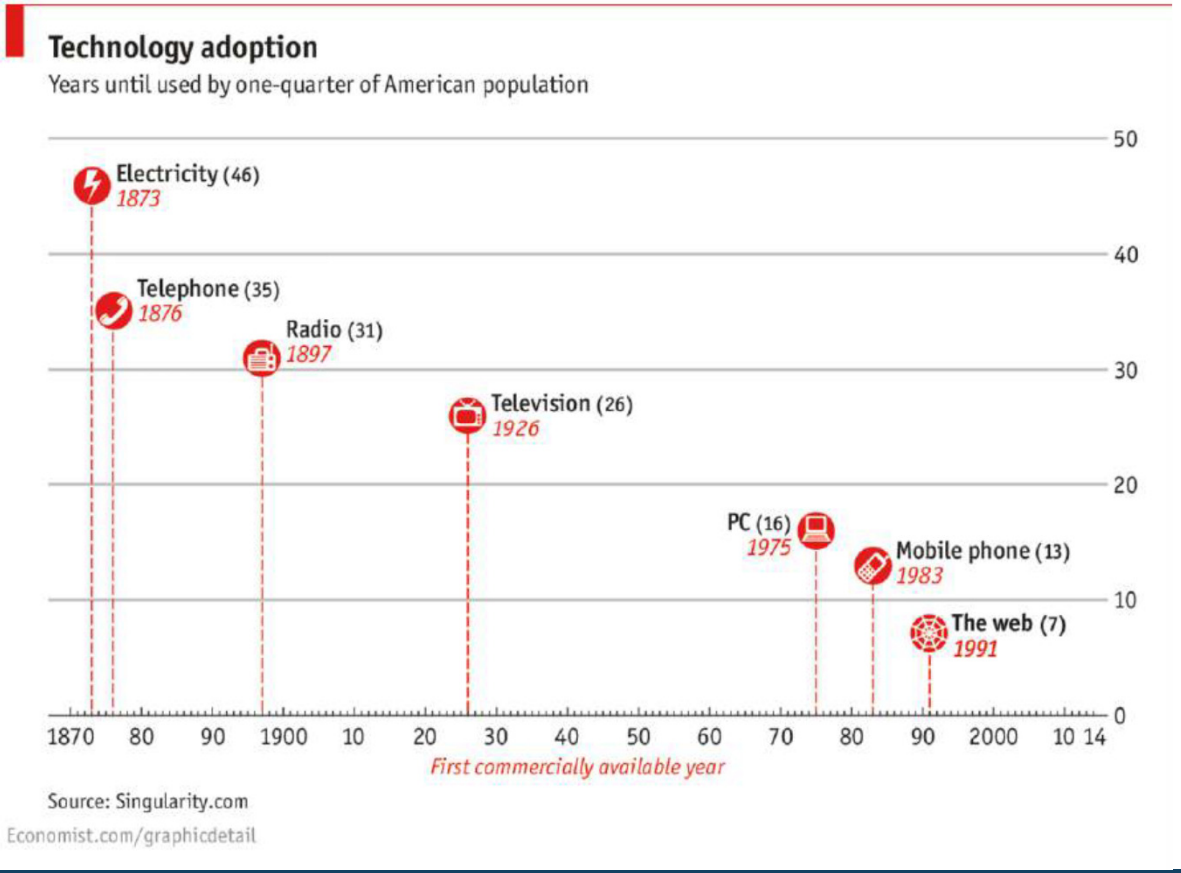
Bristol Fall Meeting



NOVA Fall Meeting

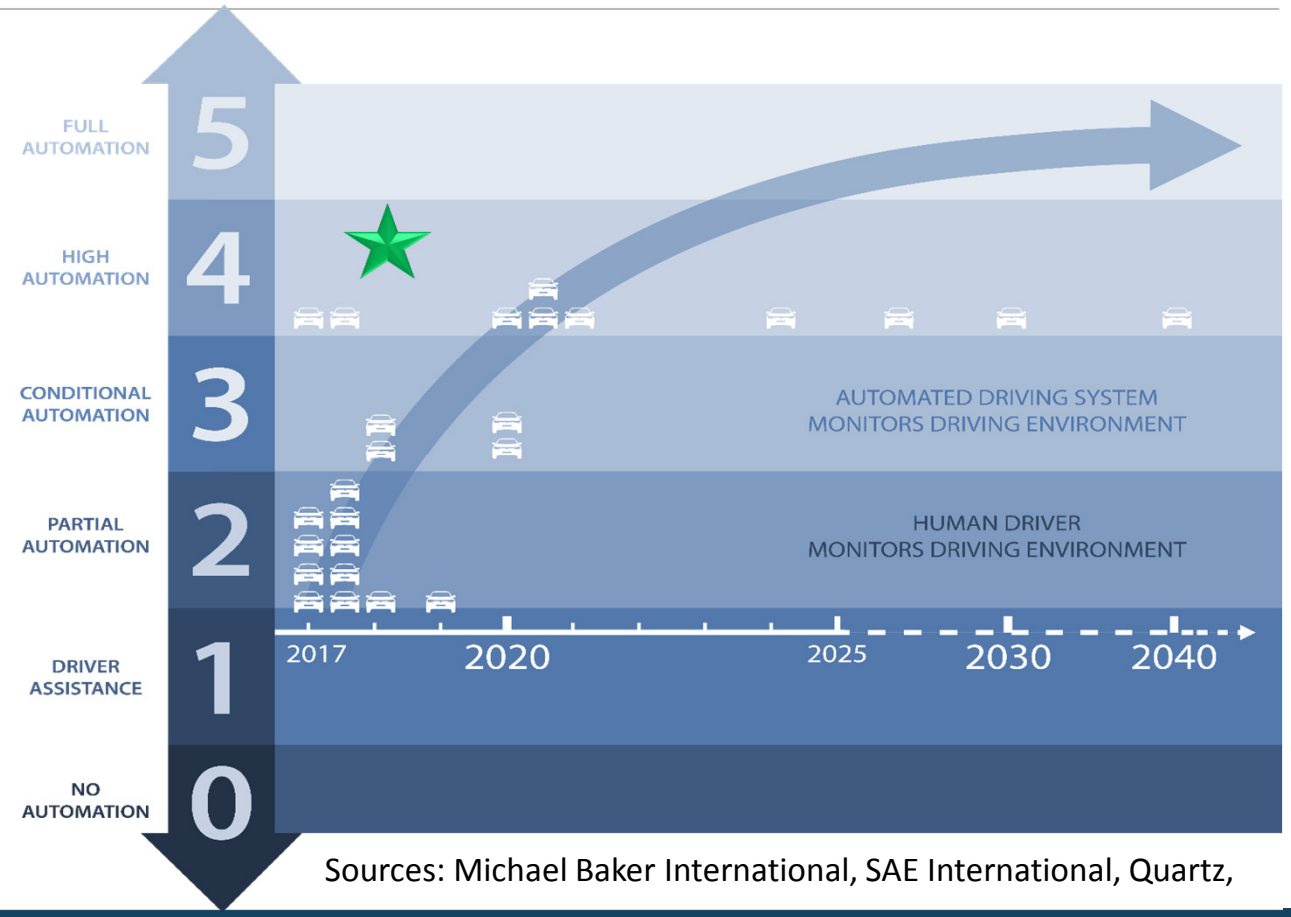


Rate of Change is Accelerating



Rate of Change is Accelerating

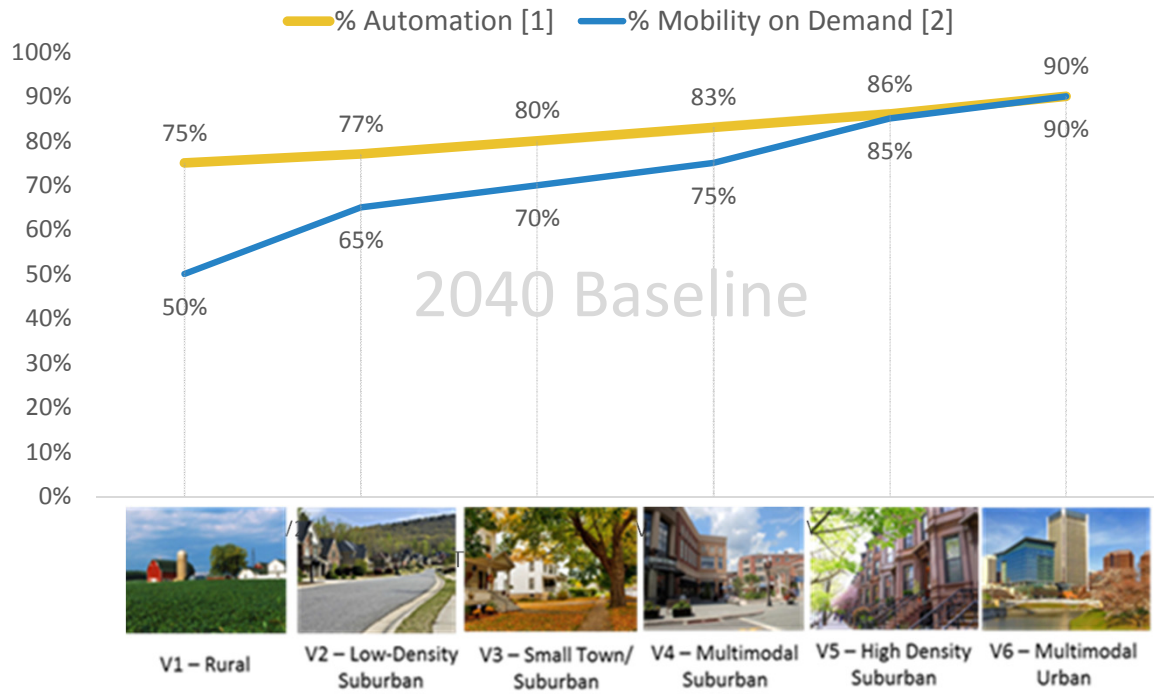
Tech companies are currently at automation level 4 and are driving the rapid adaptation or AV/CV technologies.



Sources: Michael Baker International, SAE International, Quartz,

Baseline Technology Assumptions

Percent passenger travel by autonomous vehicles and Mobility on Demand *in the 2040 Baseline*



By 2040…it is likely that autonomous vehicles and Mobility on Demand (ex: Uber and Lyft) will play a significant role in passenger travel, especially in urban areas.

Automation and Mobility on Demand assumptions vary across placetypes and by scenario.

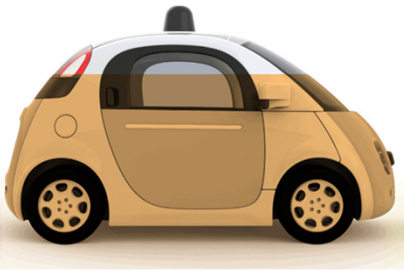
★ Information above was inspired by input received at fall meetings

Assumptions of Percent of Passenger Vehicle Travel Using Autonomous Vehicles in 2040

Percent AV Travel by Scenario

Anticipated range: 70% (low) to 90% (high)

Its is likely that AV technology will be extremely advanced by 2040, but it is uncertain whether our policies, infrastructure, and preferences will accommodate and welcome this monumental technological shift.

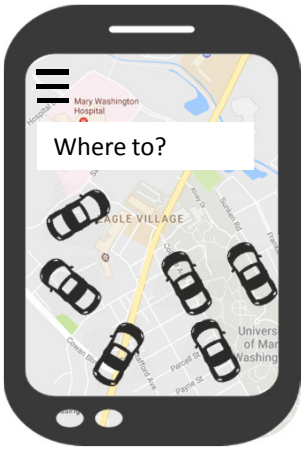
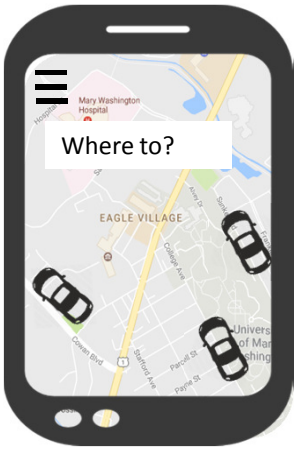
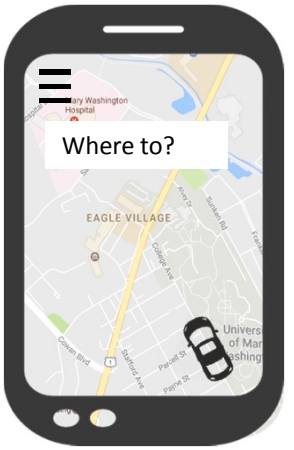
Baseline	Industrial Renaissance	Techtopia	Silver Age	General Slowdown
				
Med.	**Med.**	**High**	**Med.-High**	**Low**

Assumed Percent of Passenger Vehicle Travel Using Mobility on Demand in 2040

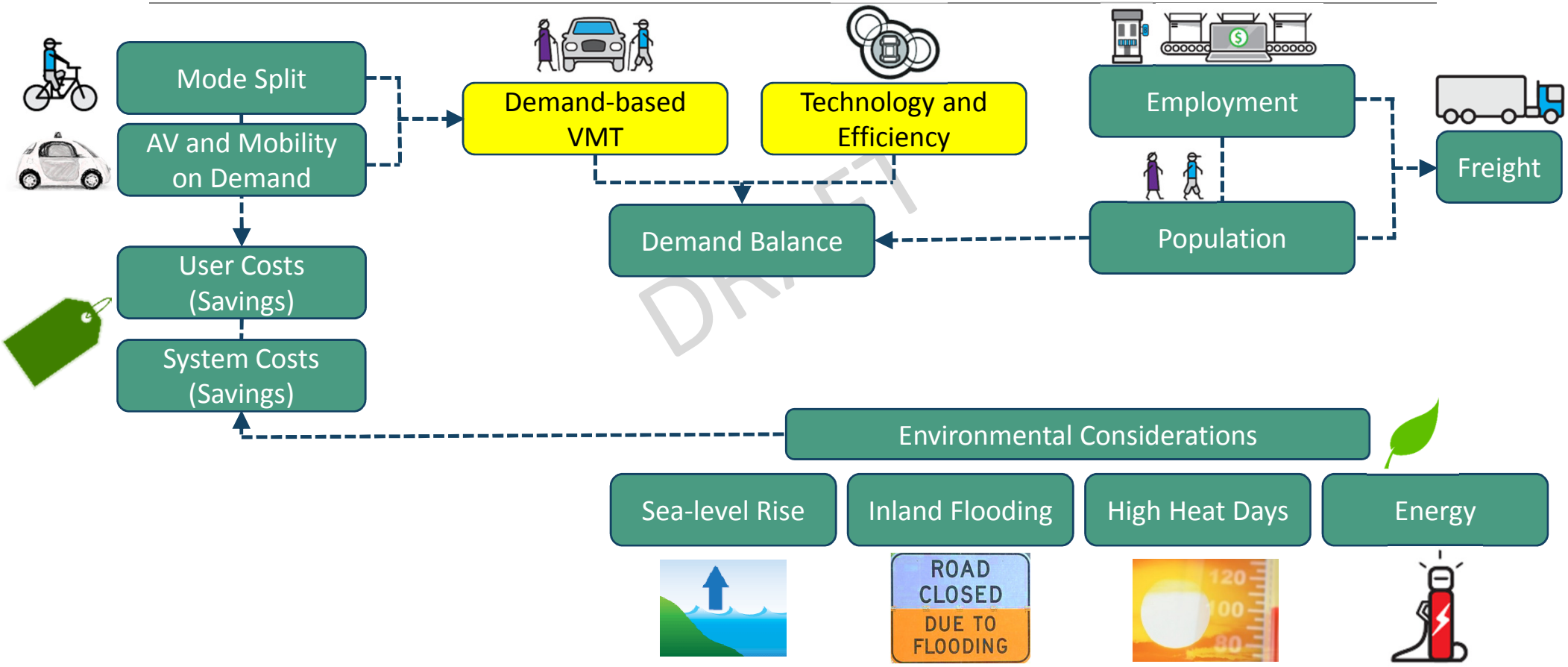
Percent Mobility on Demand by Scenario

Anticipated range: 50% (low) to 80% (high)

Mobility on Demand services, like Uber and Lyft, are expected to continue changing the way we travel, especially for short trips in urban areas.

Baseline	Industrial Renaissance	Techtopia	Silver Age	General Slowdown
				
Med.	Med.	High	Low-Med.	Low

Technology and Efficiency



What's Driving Demand in 2040?

Photo credits: Karagetv, familypedia, Rand Corp, CBS, Bloomberg, Cleveland Clinic, TechCrunch, Autocar

Transit in 2040

Transit could become more affordable, available and conventional as a result of:

- AV/CV technology
- Electric charging
- More streamlined/efficient network

Sion, Switzerland
Source: Swisspost

Autonomous transit is already being tested around the world

National Harbor, Maryland
Source: CBS Washington

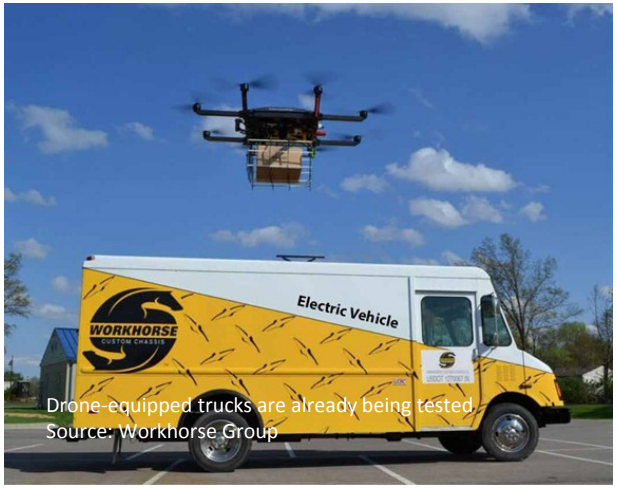
Las Vegas, Nevada
Source: vegasexperience.com

Helsinki, Finland
Source: New York Times

Freight in 2040

- Truck platooning
- Prompt delivery to homes and businesses
- Smaller delivery vans in urban and suburban areas
- Drone-equipped delivery vans and trucks

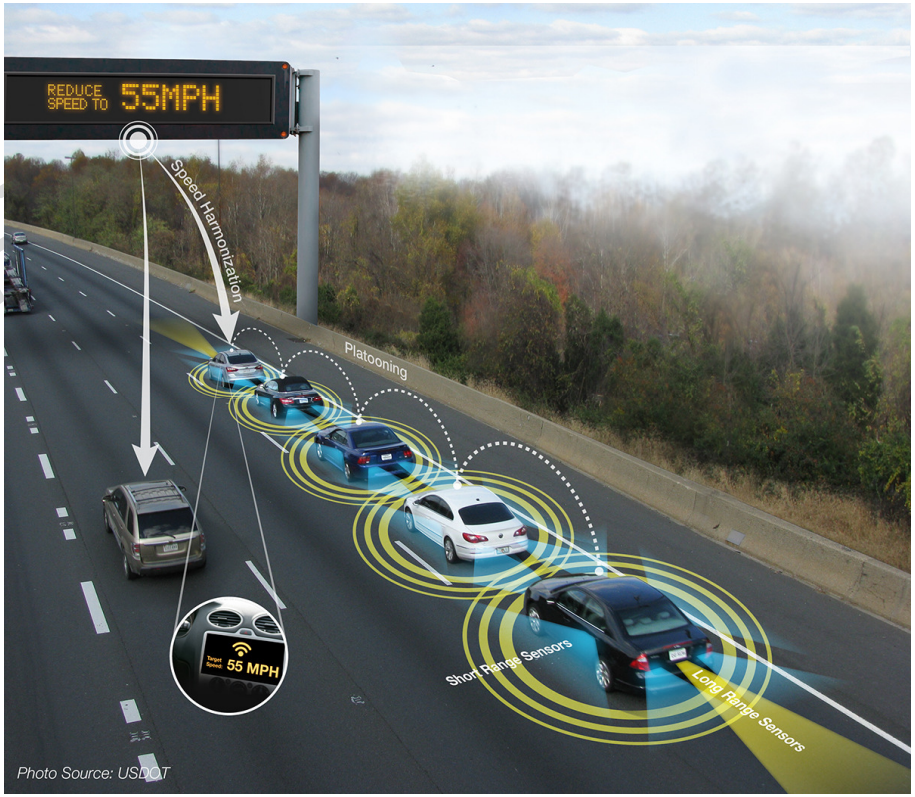
Autonomous truck testing on interstates
Source: Otto



Drone-equipped trucks are already being tested
Source: Workhorse Group

Small Mercedes delivery van with multiple drones and automated loading
Source: Mercedes

Technology and Efficiency



Roadway Safety

There are approximately 120,000 roadway crashes per year in Virginia, accounting for 700 fatalities per year[1]

These crashes account for over $15 billion in costs per year (more like $20 billion in 2040)

Driver error is responsible for 80-90% of all crashes

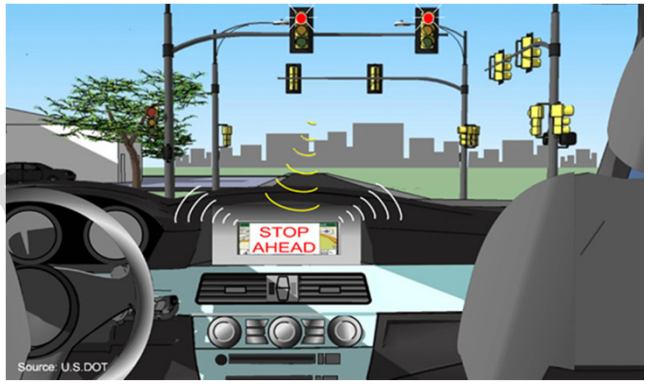
Crash reductions will save lives, reduce user costs, reduce congestion and improve system reliability

[1] Based on averages from 2011-2015 crashes

Travel Time Savings

The USDOT estimates that *Connected Vehicle* technology could help reduce travel times by up to 27 percent

When cooperative adaptive cruise control and speed harmonization applications are optimized for the environment, they can potentially reduce travel time on freeways by up to 42 percent



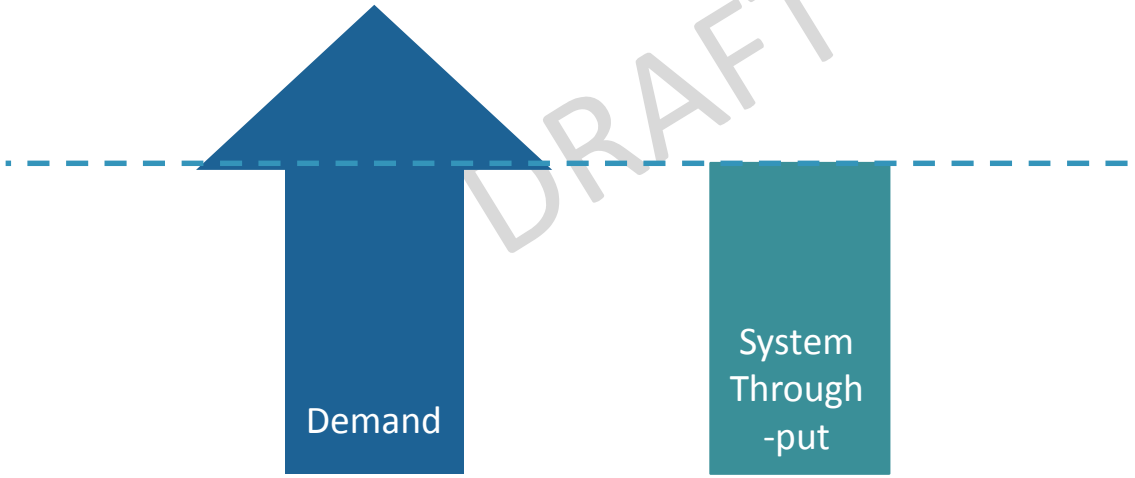
Example technologies:

- Intelligent Traffic Signal System
- Freight Signal Priority, Transit Signal Priority

As technology evolves, connected vehicle solutions can help mitigate the impact of rising travel demand

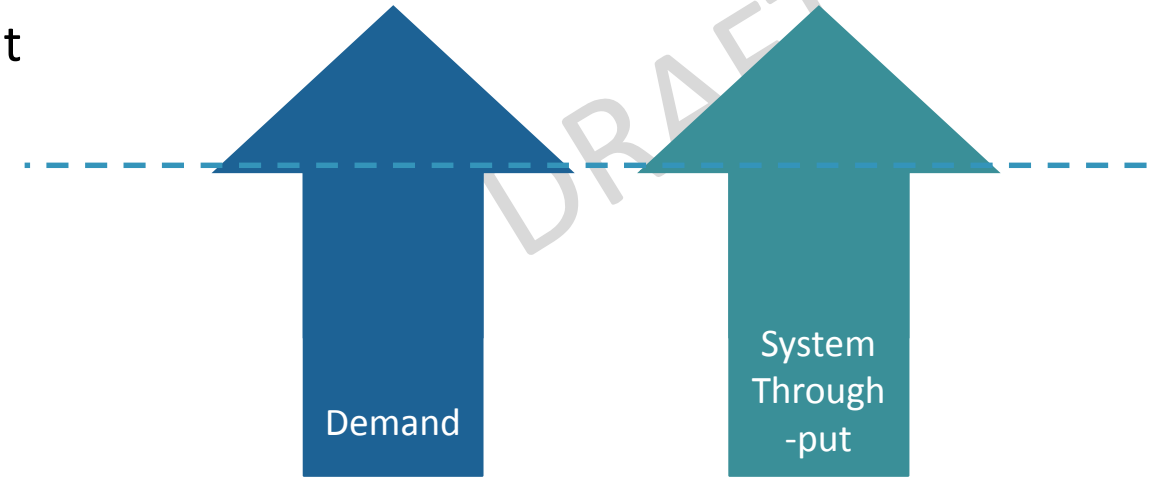
Demand and System Through-put

Possibility 1:
No Change in System Through-put



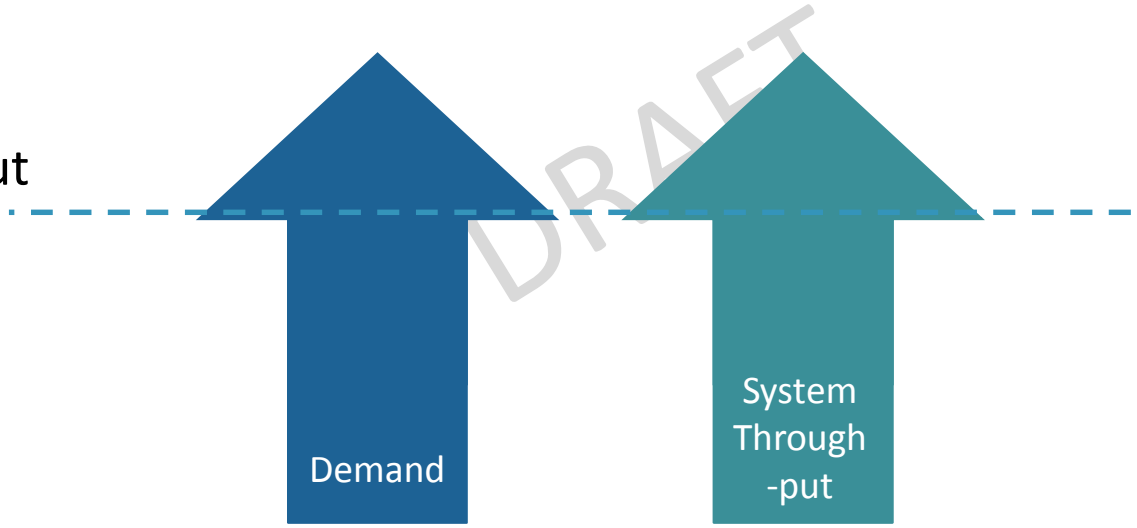
Demand and System Through-put

Possibility 2:
Slight increase in System Through-put



Demand and System Through-put

Possibility 3:
Matched increase in System Through-put



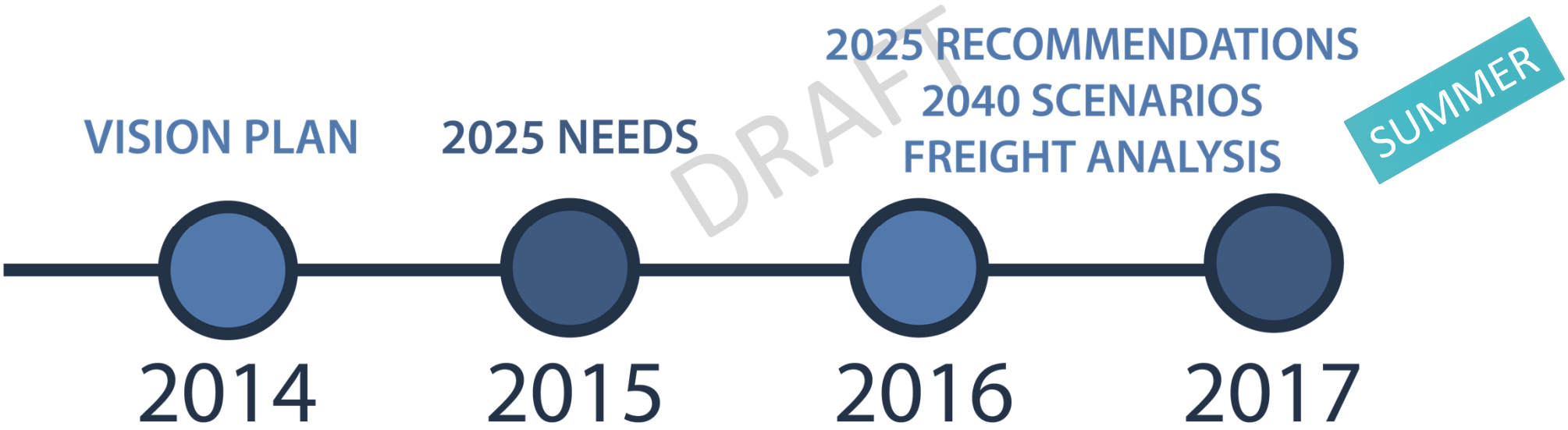
Points to Ponder

- How will mobility choices fundamentally change in urban/mixed use areas?
- How will mobility choices fundamentally change in rural and suburban areas?
- What are some of the key differences?
- Where in the state/transportation system do we have the greatest potential for induced demand?
- Where in the state/transportation system do we have the greatest potential for improving throughput via technology?
- How will the timing of the different aspects of AV/CV and Mobility on Demand affect the balance of system demand and system through-put?

Coming Up…

- Combining the assumptions, how will demand and throughput change by 2040?
  - Differences in placetypes
  - Differences in scenarios
- How do the scenarios affect freight demand?
- How do the scenarios affect user costs?
- How do the environmental drivers affect system costs?
- How do the technology drivers affect system costs?
- Implications for investment and policy-making
- Sustainability of VMTP 2025 Recommendations

Timeline


VISION PLAN
2025 NEEDS
2025 RECOMMENDATIONS
2040 SCENARIOS
FREIGHT ANALYSIS
SUMMER
DRAFT
2014
2015
2016
2017

COMMONWEALTH *of* VIRGINIA

Office of the

SECRETARY *of* TRANSPORTATION

VTrans Performance Targets

Nick Donohue

Deputy Secretary of Transportation

April 18, 2017

Measuring Performance

- Traditional DOT performance analyzes current conditions
- Limited state DOT work to set targets for future performance and track progress
- National emphasis on performance-based planning
- Now required by state code and federal legislation

Measuring Performance in Virginia

- Establish key objectives that will be measured
- Establish baseline conditions
- Evaluate recent trends
- Establish process for setting targets and measuring progress
  - Staff undertaking research on national best practices and will develop concepts for Board review

VTrans Performance

- **Board adopted VTrans2040 goals, objectives and guiding Principles in December 2015**
- **Office of Intermodal Planning and Investment developing initial Annual Performance Report**
  - **Establish baseline conditions and recent trends**
  - **Outline key actions to advance guiding principles**
- **Future reports will evaluate progress towards targets**

VTrans Performance Targets

Concepts under discussion

- Impact of VMTP 2025 Tier I Recommendations
- Impact of Board policies
  - Access management
  - Urban Development Area planning grants
- Process for identifying additional Board policies to advance progress toward performance targets

VTrans Guiding Principles

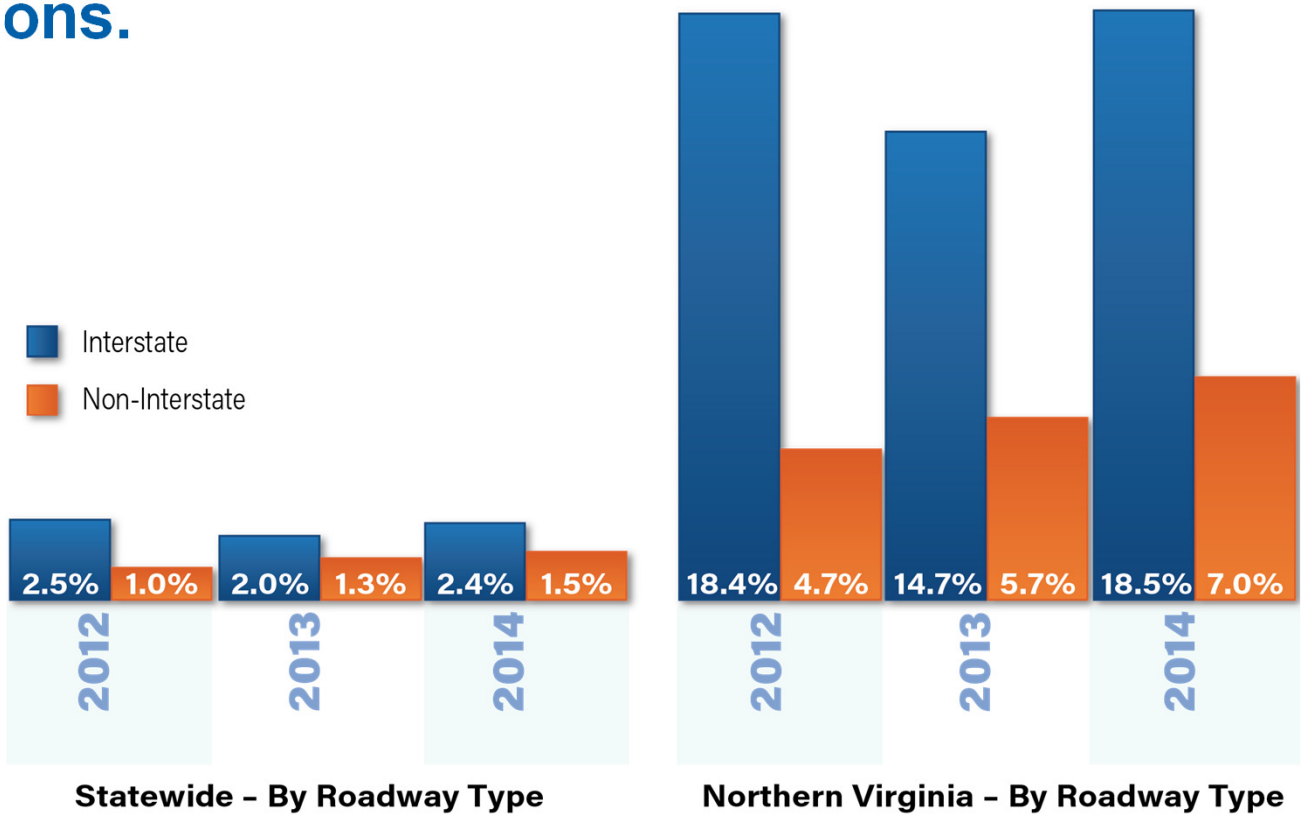
- Optimize return on investments
- Ensure safety, security and resiliency
- Efficiently deliver programs
- Consider operations improvements and demand management first
- Ensure transparency and accountability, and promote performance management
- Improve coordination between transportation and land use
- Ensure efficient intermodal connections

VTrans2040 GOAL: ECONOMIC COMPETITIVENESS and PROSPERITY

- **Objectives:**
  - **A.1: Reduce the amount of travel that takes place in severe congestion**
    - Percent peak hour VMT occurring in congested conditions.
  - **A.2: Reduce the number and severity of freight bottlenecks**
    - Number of highway bottlenecks with daily freight ton hours of delay per mile > 250,000.
  - **A. 3: Improve reliability on key corridors for all modes**
    - Roadway Buffer Time Index (BTI).
    - Rail/Transit On-Time Performance (OTP).

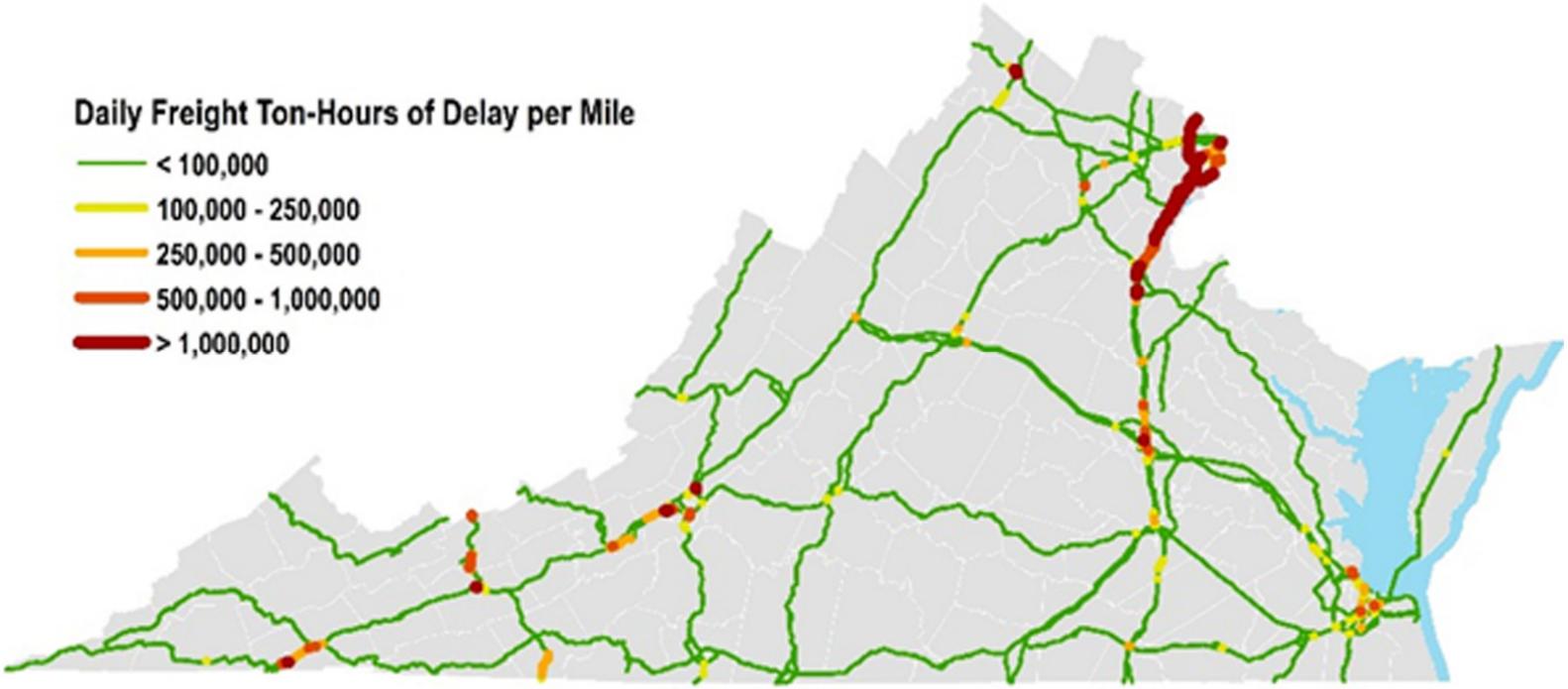
Example: A.1: Reduce the amount of travel that takes place in severe congestion

Percent peak hour VMT occurring in congested conditions.



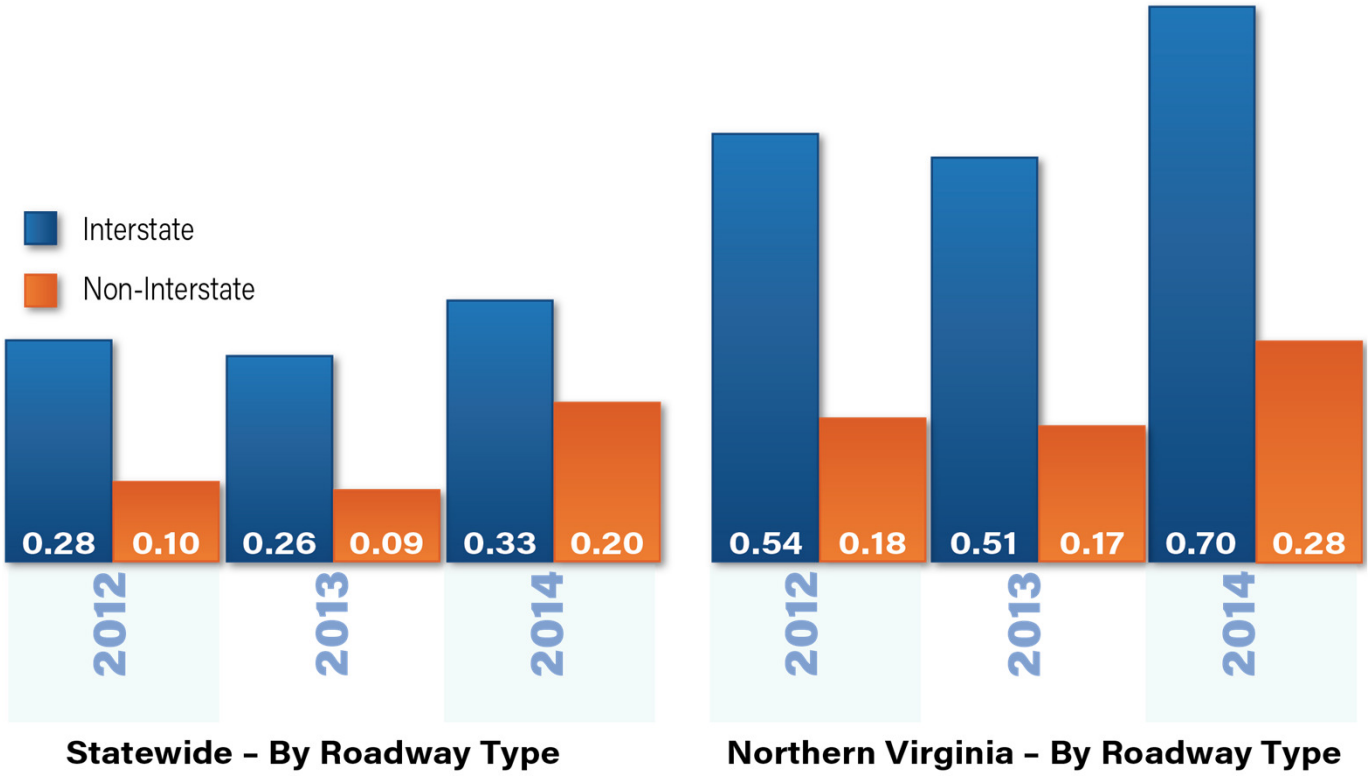
Example: A.2: Reduce the number and severity of freight bottlenecks

Number of highway bottlenecks with daily freight ton hours of delay per mile > 250,000.



Example: A. 3: Improve reliability on key corridors for all modes

Roadway Buffer Time Index (BTI).

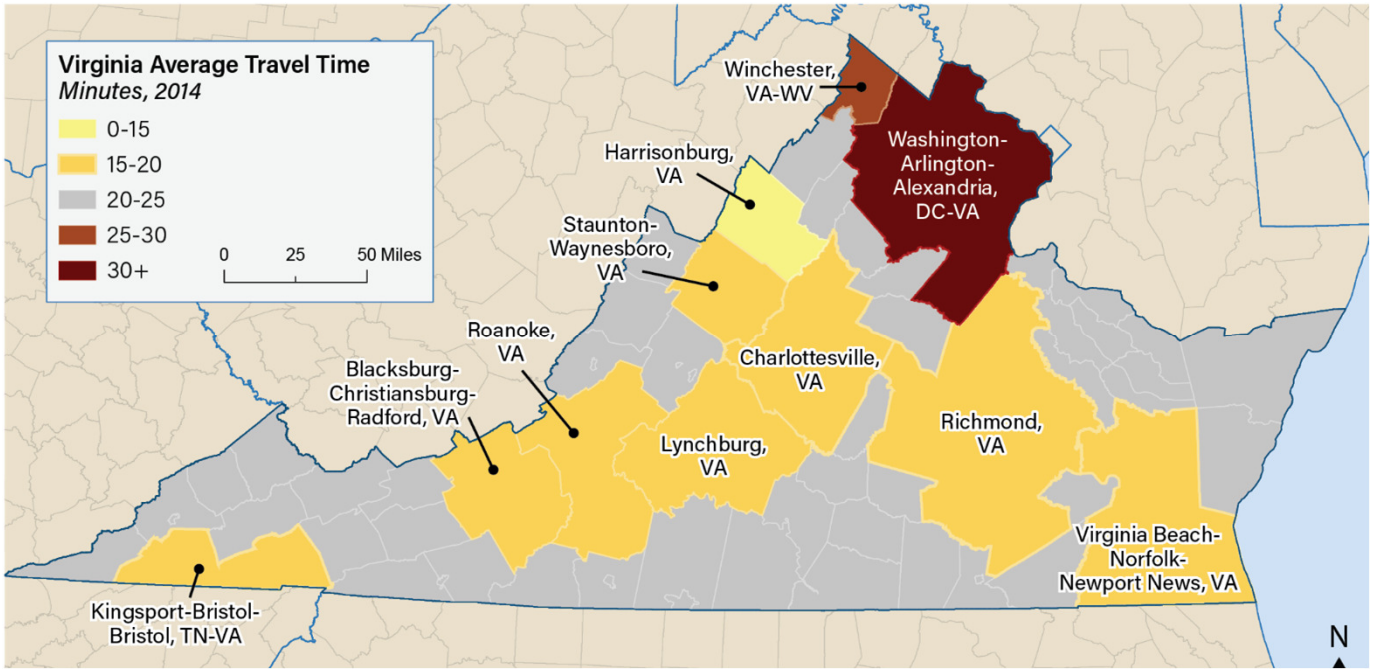


VTrans2040 GOAL: ACCESSIBLE and CONNECTED PLACES

- **Objectives:**
  - **B.1: Reduce average peak-period travel times in metropolitan areas**
    - Average commute time by metropolitan area.
  - **B.2: Reduce average daily trip lengths in metropolitan areas**
    - Average trip length by metropolitan area.
  - **B.3: Increase the accessibility to jobs via transit, walking and driving in metropolitan areas**
    - Number of jobs within 45 minutes of an average household within a metropolitan area by mode.

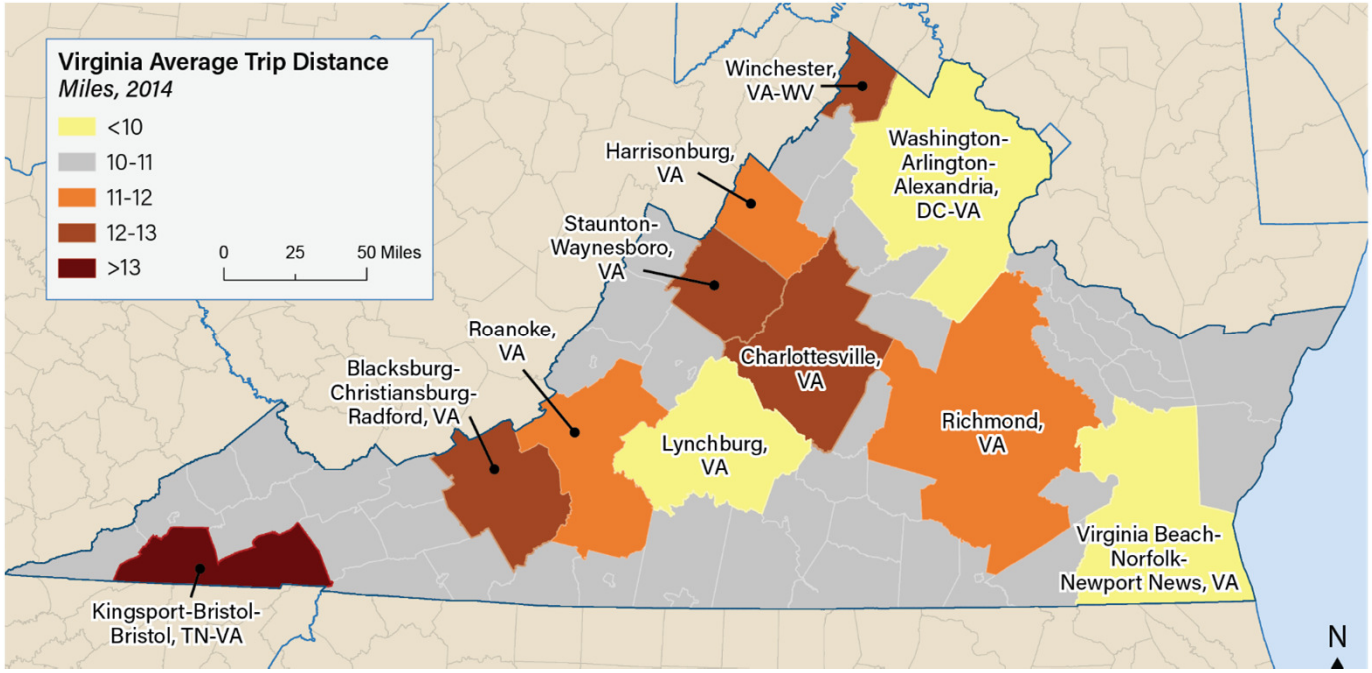
Example: B.1: Reduce average peak-period travel times in metropolitan areas

Average commute time by metropolitan area.



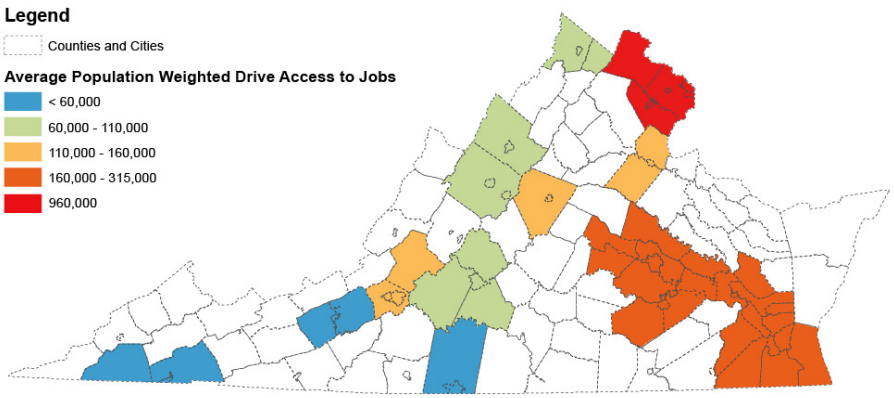
Example: B.2: Reduce average daily trip lengths in metropolitan areas

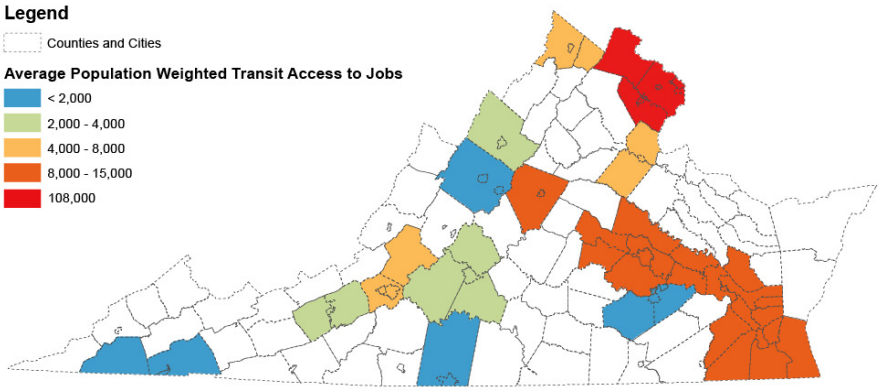
Average trip length by metropolitan area.

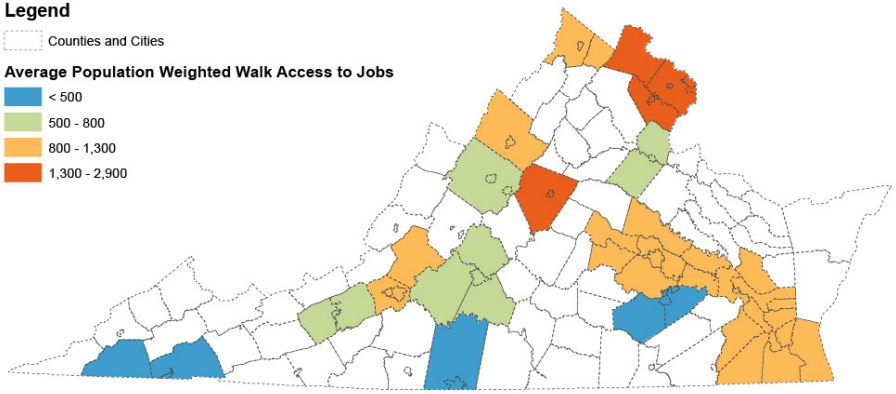


Example: B.3: Increase the accessibility to jobs via transit, walking and driving in metropolitan areas

Number of jobs within 45 minutes of an average household within a metropolitan area by mode.





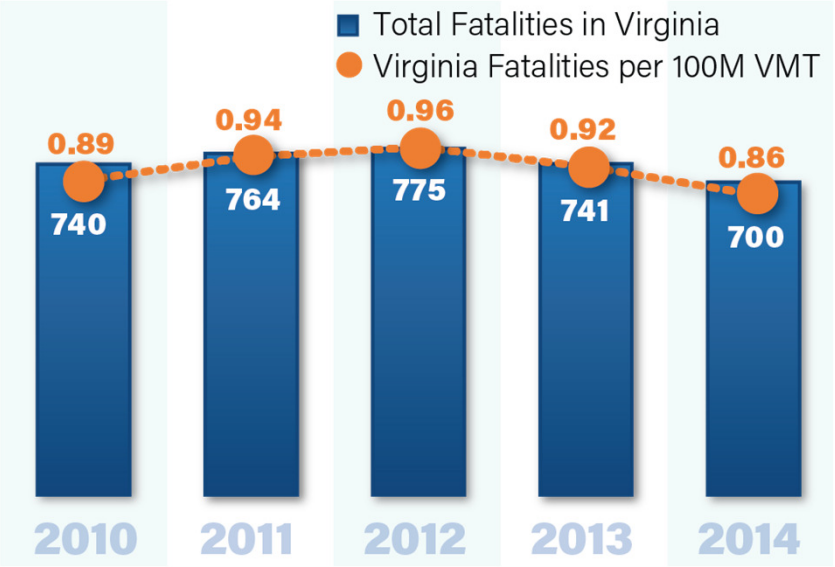


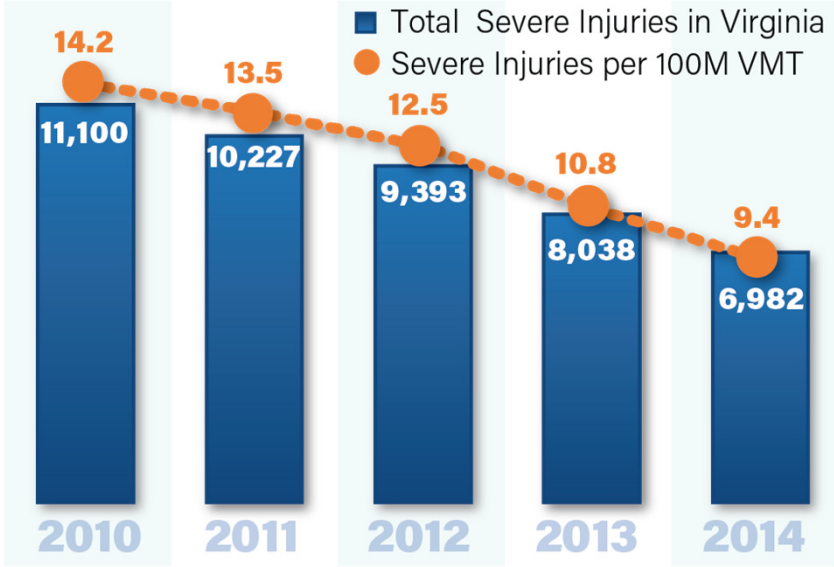
VTrans2040 GOAL: SAFETY FOR ALL USERS

- **Objectives:**
  - **C.1: Reduce the number and rate of motorized fatalities and severe injuries**
    - Total number of motorized fatalities and severe injuries
  - **C.2: Reduce the number of non-motorized fatalities and severe injuries**
    - Number of motorized fatalities and severe injuries per 100 million vehicle miles.
    - Total non-motorized fatalities and severe injuries.

Example: C.1: Reduce the number and rate of motorized fatalities and severe injuries

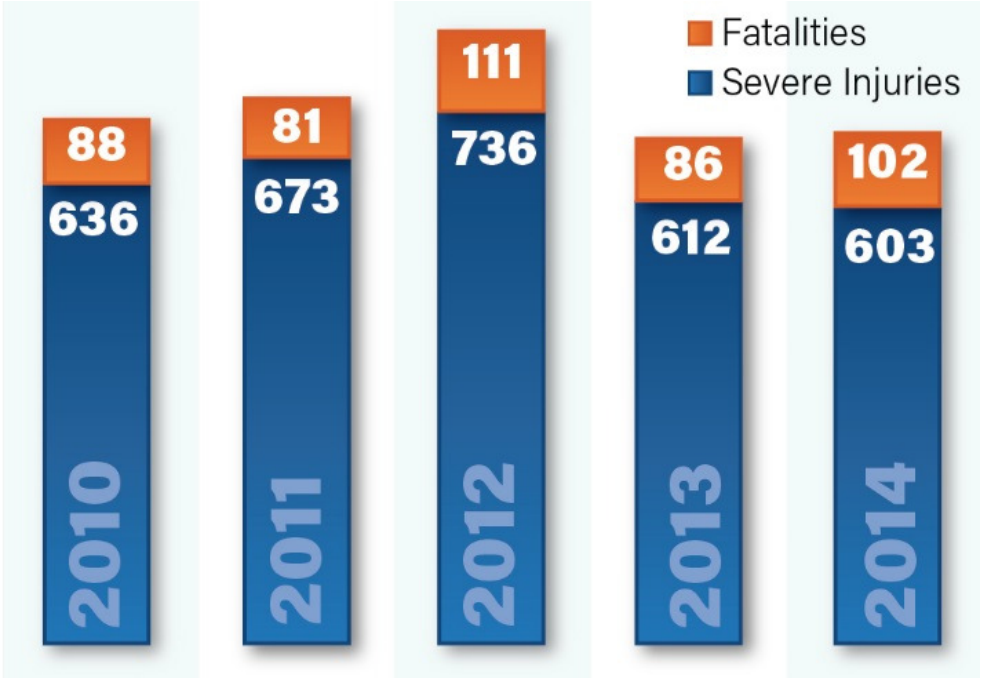
Total number of motorized fatalities and severe injuries





Example: C.1: Reduce the number and rate of non-motorized fatalities and severe injuries

Total number of non-motorized fatalities and severe injuries

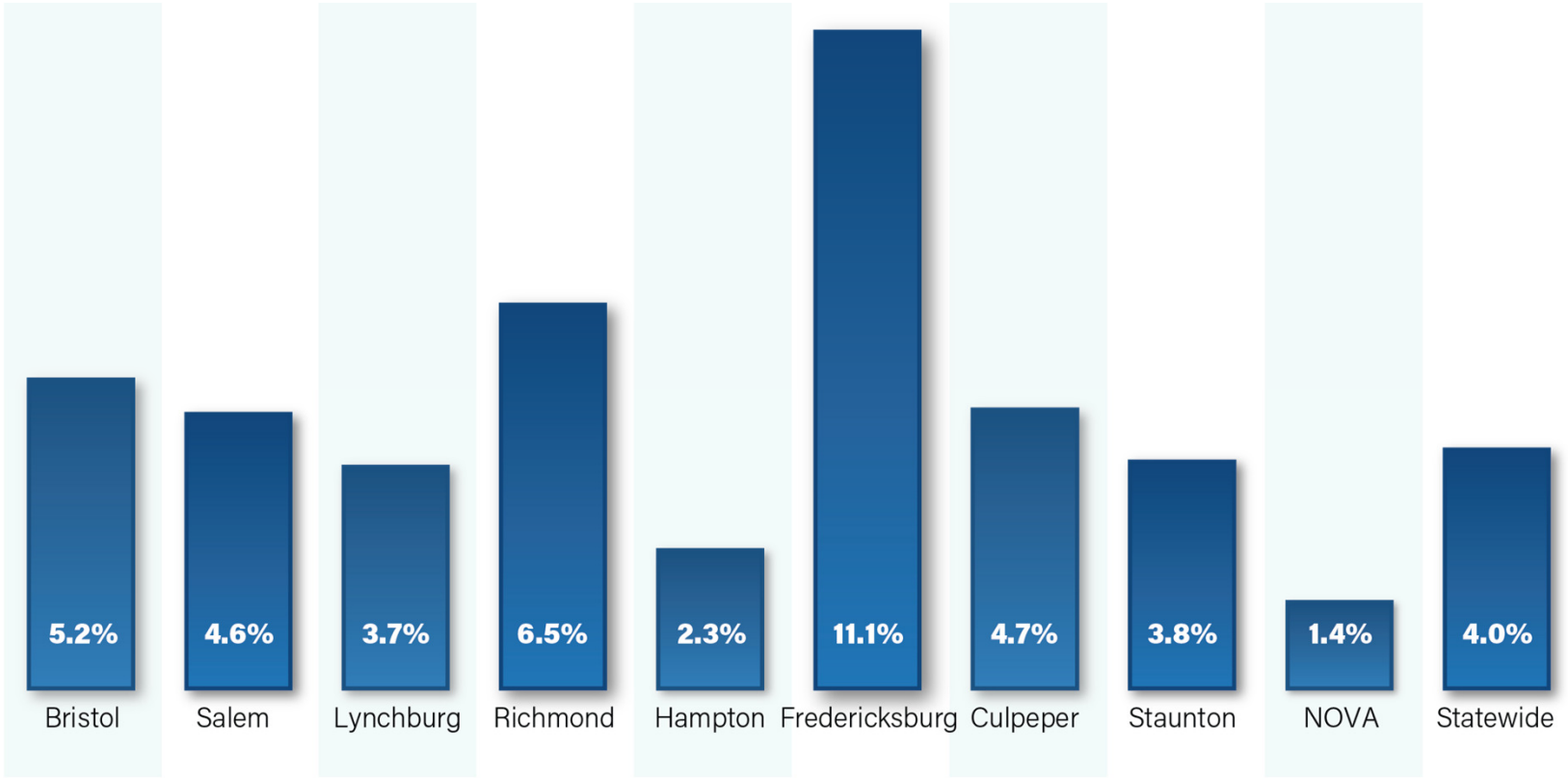


VTrans2040 GOAL: PROACTIVE SYSTEM MANAGEMENT

- **Objectives:**
  - **D.1: Improve the condition of all bridges based on deck area**
    - Percent of bridge area rated as structurally deficient.
  - **D.2: Increase the lane miles of pavement in good or fair condition**
    - Percent of lane miles of pavement in fair or better condition.
  - **D.3: Increase percent of transit vehicles and facilities in good or fair condition**
    - Percent of transit fleet under recommended maximum age.

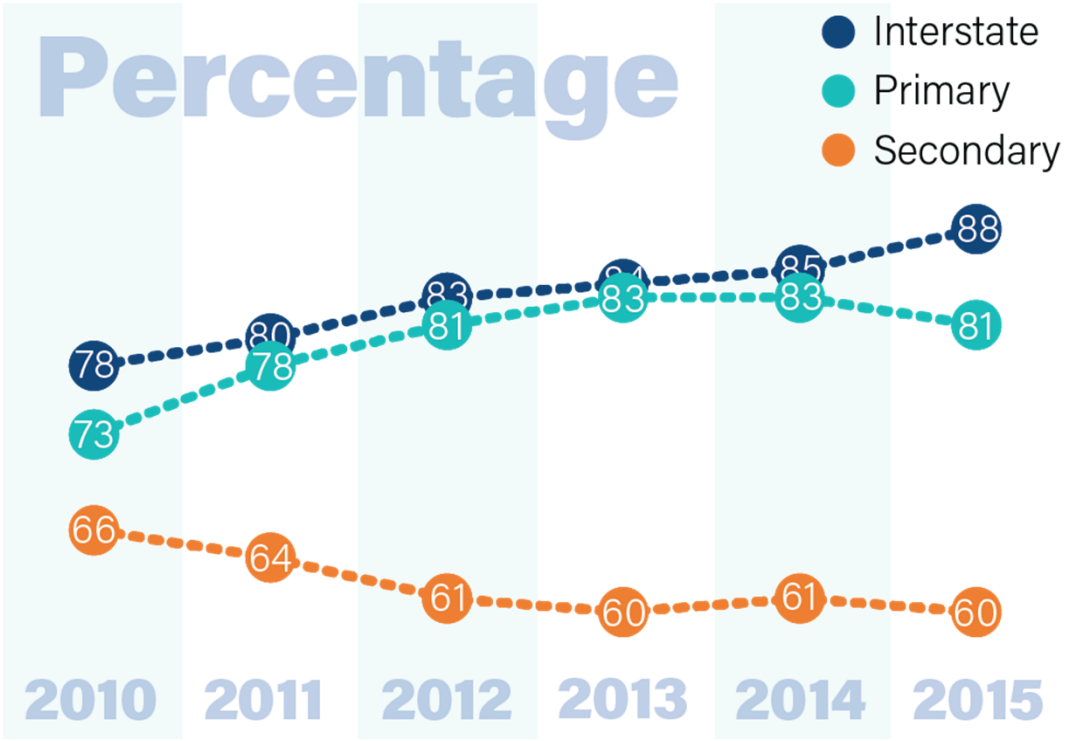
Example: D.1: Improve the condition of all bridges based on deck area

Percent of bridge area rated as structurally deficient.



Example: D2. Increase the lane miles of pavement in good or fair condition

Percent of lane miles of pavement in fair or better condition.

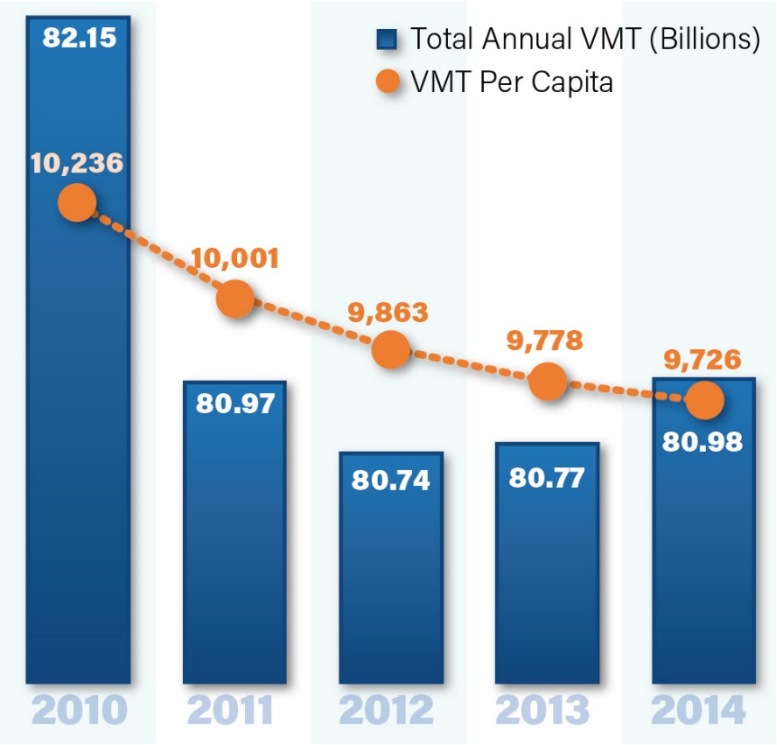


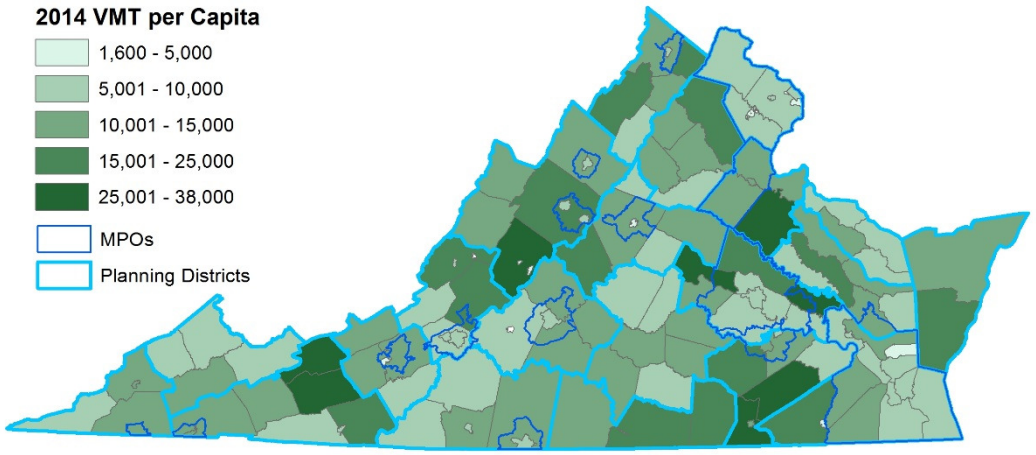
VTrans2040 GOAL: HEALTHY COMMUNITIES AND SUSTAINABLE TRANSPORTATION COMMUNITIES

- **Objectives:**
  - **E.1 Reduce per-capita vehicle miles traveled**
    - Vehicle miles traveled (VMT) per capita.
  - **E.2 Reduce transportation related criteria pollutant and greenhouse gas emissions**
    - Annual emissions of NOX, VOC, PM, and CO2 in tons.
  - **E.3 Increase the number of trips traveled by active transportation (bicycling and walking)**
    - Estimated active transportation (bicycling and walking) trips.

Example: E.1 Reduce per-capita vehicle miles traveled

Vehicle miles traveled (VMT) per capita.





NEXT STEPS

- Present initial Annual Performance Report to the Board at May meeting
- Finish research on target setting
- Work with Board to develop policy on target setting
- Adopt targets for objectives

COMMONWEALTH of VIRGINIA

Commonwealth Transportation Board

Aubrey L. Layne, Jr.
Chairman

1401 East Broad Street
Richmond, Virginia 23219

(804) 786-2701
Fax: (804) 786-2940

COMMONWEALTH TRANSPORTATION BOARD
WORKSHOP AGENDA

The Boar's Head Inn
The Ball Room
200 Ednam Drive
Charlottesville, VA 22903

April 18, 2017
9:00 a.m.

8. Commissioner's Items
   Charles Kilpatrick, Virginia Department of Transportation

   This item does not have a presentation associated with it but rather serves as an opportunity for the Commissioner to provide updates on various items.

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COMMONWEALTH TRANSPORTATION BOARD
WORKSHOP AGENDA

The Boar's Head Inn
The Ball Room
200 Ednam Drive
Charlottesville, VA 22903

April 18, 2017
9:00 a.m.

9. Director's Items
   Jennifer Mitchell, Virginia Department of Rail & Public Transportation

   This item does not have a presentation associated with it but rather serves as an opportunity for the Director to provide updates on various items.

COMMONWEALTH of VIRGINIA

Commonwealth Transportation Board

Aubrey L. Layne, Jr.
Chairman

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COMMONWEALTH TRANSPORTATION BOARD
WORKSHOP AGENDA

The Boar's Head Inn
The Ball Room
200 Ednam Drive
Charlottesville, VA 22903

April 18, 2017
9:00 a.m.

10. Secretary's Items
    Aubrey Layne, Secretary of Transportation

    This item does not have a presentation associated with it but rather serves as an opportunity for the Secretary to provide updates on various items.

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