

# PLANNING DATA SUMMIT

## DOT&PF 2023

# Virginia's Data Driven Performance-based Planning and Programming Processes

Role of Data in Statewide Planning

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# Overview – Virginia’s Transportation System

- Virginia - 8.65 million population
- Virginia Department of Transportation (VDOT) – 3rd Largest DOT
  - 9 construction districts
  - 15 MPOs,
  - 24 PDCs,
  - 95 Counties
- Intermodal Planning and Investment (OIP) leads the Plan – Develop – Invest – Manage cycle.
  - Work closely with the VDOT and DRPT, as well as other agencies under the transportation secretariat.



# Outline - Planning

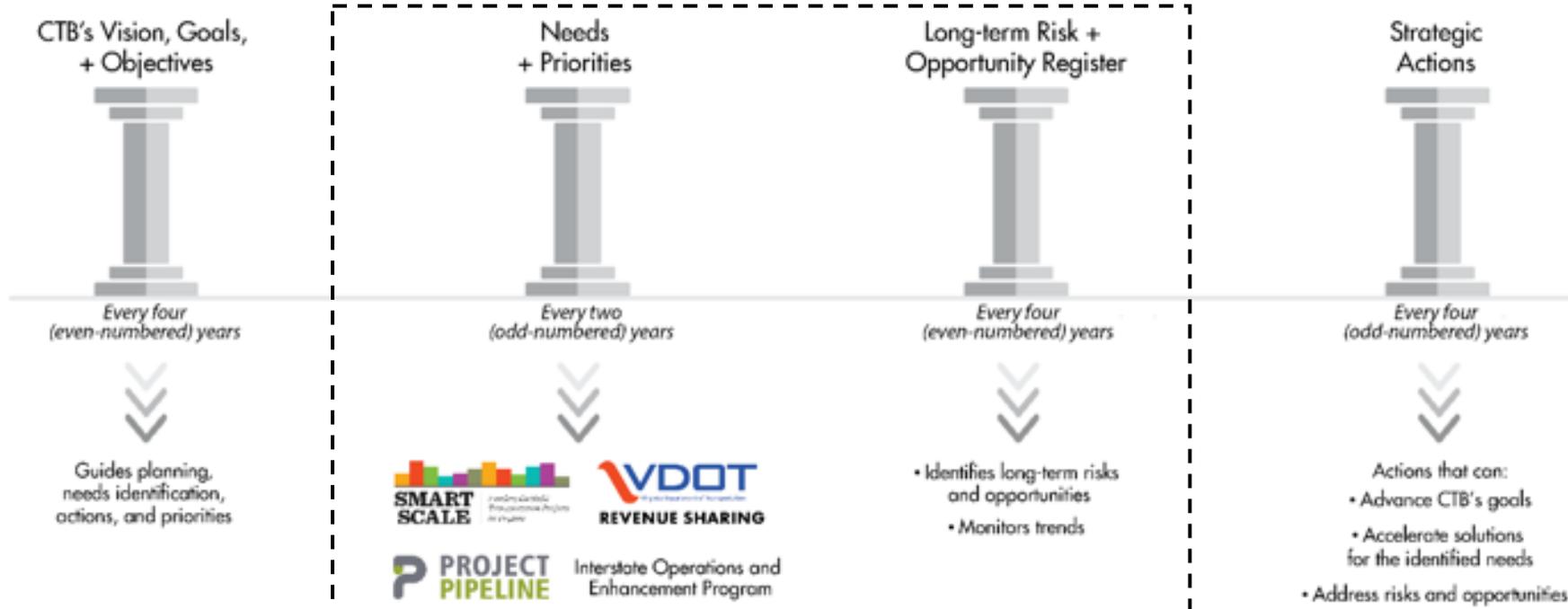
- Context and Overview
- Role of Data in Planning in Virginia
- Approach to Data and Planning
- Key Takeaways



# Context and Overview

- VTrans is Virginia's Surface Transportation Plan.

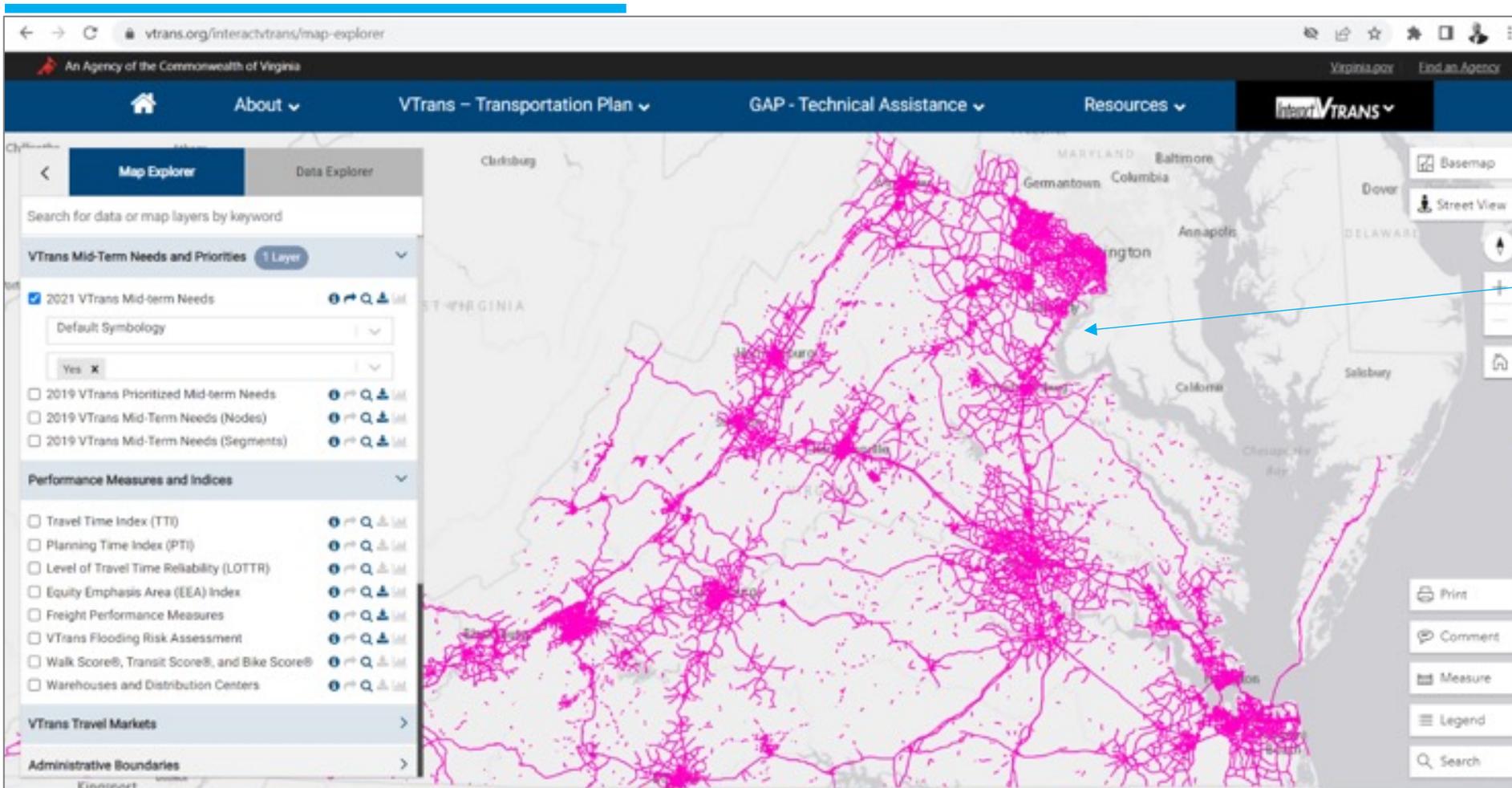
## VTrans Focus Areas



The focus of this presentation



# Context and Overview: Transportation Needs



Over 200 million data points are compiled and analyzed.

The result is a segment-specific assessment.

These transportation needs guide over **\$500 million in annual transportation funds.**

Resource: [Weblink](#)



# Context and Overview: Transportation Needs

The screenshot shows the VTrans Map Explorer interface. The main map displays a network of roads in Washington, VA, with a pink overlay indicating transportation needs. The interface includes a search bar, a list of data layers, and a table of needs for I-395N.

2021 VTrans Mid-Term Needs: I-395N	
Need - Improved Reliability (CoSS)	YES
Need - Rail On-time Performance (CoSS)	YES
Need - Capacity Preservation (CoSS)	NO
Need - Transportation Demand Management (Limited Access CoSS)	YES
Need - Transportation Demand Management (non-limited Access CoSS)	NO
Need - Safety Improvement (CoSS Segment)	YES
Need - Safety Improvement (CoSS Intersection)	NO
Need - Congestion Mitigation (RN)	YES
Need - Improved Reliability (RN)	YES
Need - Capacity Preservation (RN)	NO
Need - Transportation Demand Management (Limited Access RN)	NO

Every directional roadway segment is analyzed.

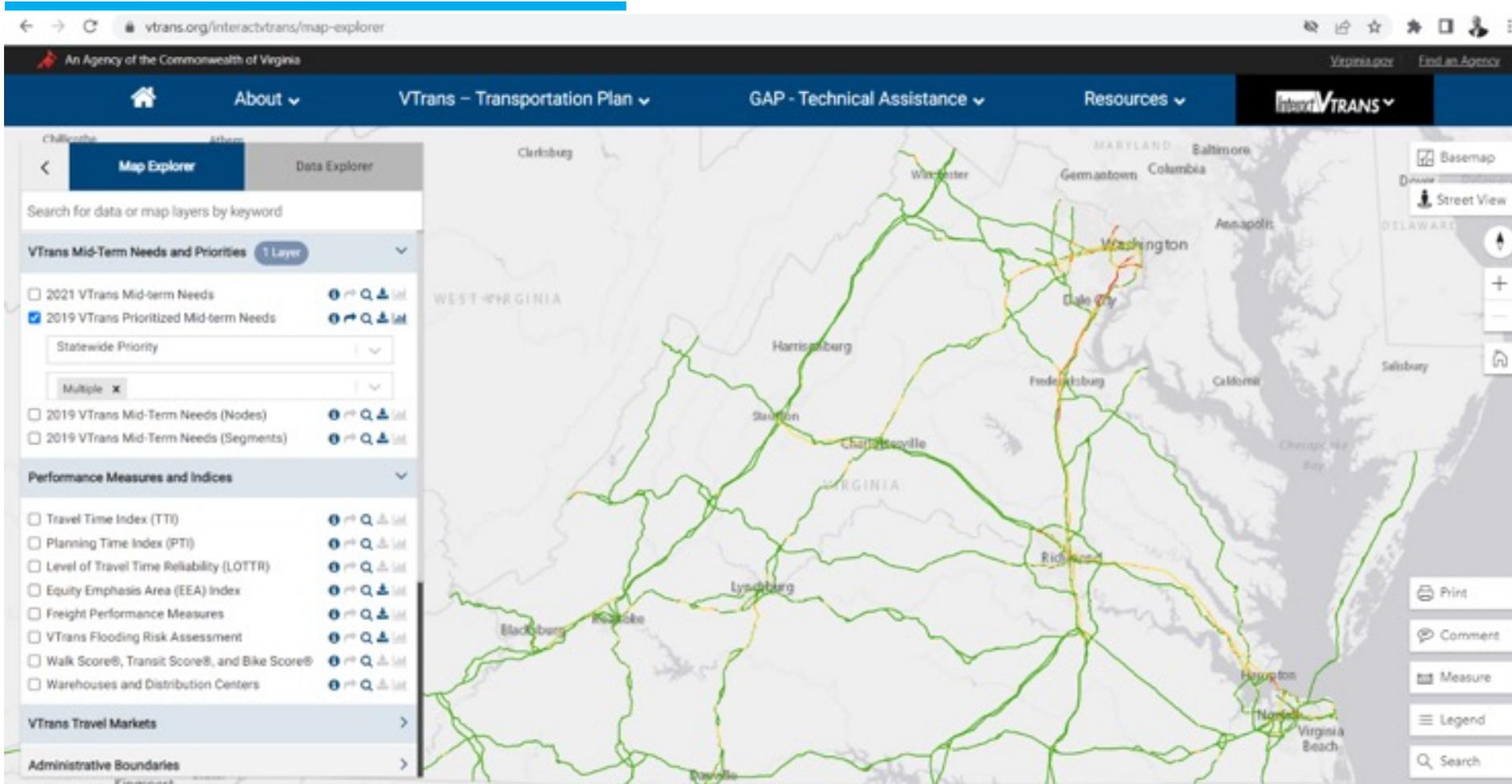
Transportation needs, if present, are shown.

Need categories are based on the Board-adopted goals and objectives.

Resource: [Weblink](#)



# Context and Overview: Transportation Priority Locations



Transportation needs are utilized to establish:

Statewide Priority Locations (shown here)

Construction District Priority Locations.

## 2019 VTrans Prioritized Mid-term Needs

- Statewide Priority
- Priority 1
  - Priority 2
  - Priority 3
  - Priority 4

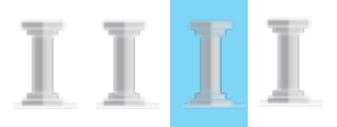
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# Context and Overview: Transportation Needs

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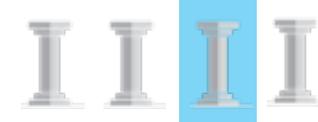
- **Benefits:** VTrans provides answers to the following questions (and numerous others):
  - What are Virginia's Congestion Needs?
  - Is there a transportation safety need on Route I-95 at mile marker X in the northbound direction?
  - What are the transit access needs for equity emphasis areas?
  - What are Virginia's priority locations?
  - What are Bristol Construction Districts' priority locations?



# Context and Overview: Long-term Planning

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- VTrans identifies the impacts of external factors on Virginia's transportation system by relying on reputable sources.
  - We **do not** utilize traditional travel demand models.
  - The traditional data analysis/forecasting tools, such as travel demand models, are less relevant in the context of external factors.



# Context and Overview: Long-term Planning

MEGATREND

## CLIMATE



MACROTREND



Increase in Flooding Risk

- Sea-level Rise
- Storm Surge
- Inland/Riverine Flooding



## TECHNOLOGICAL ADVANCEMENTS



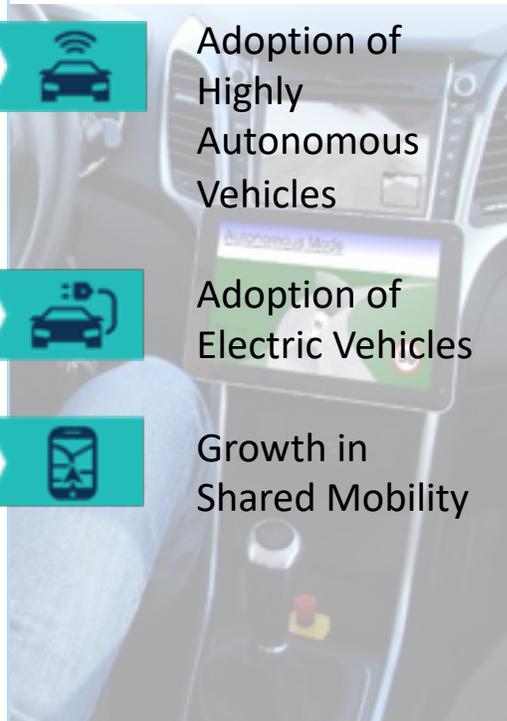
Adoption of Highly Autonomous Vehicles



Adoption of Electric Vehicles



Growth in Shared Mobility



## CHANGE IN CONSUMPTION PATTERNS



Growth in E-commerce



Greater Automation of Production and Services



## SOCIO-DEMOGRAPHIC CHANGES



Increase in Workplace Flexibility



Growth of Professional Service Industry



Growth of the 65+ Cohort

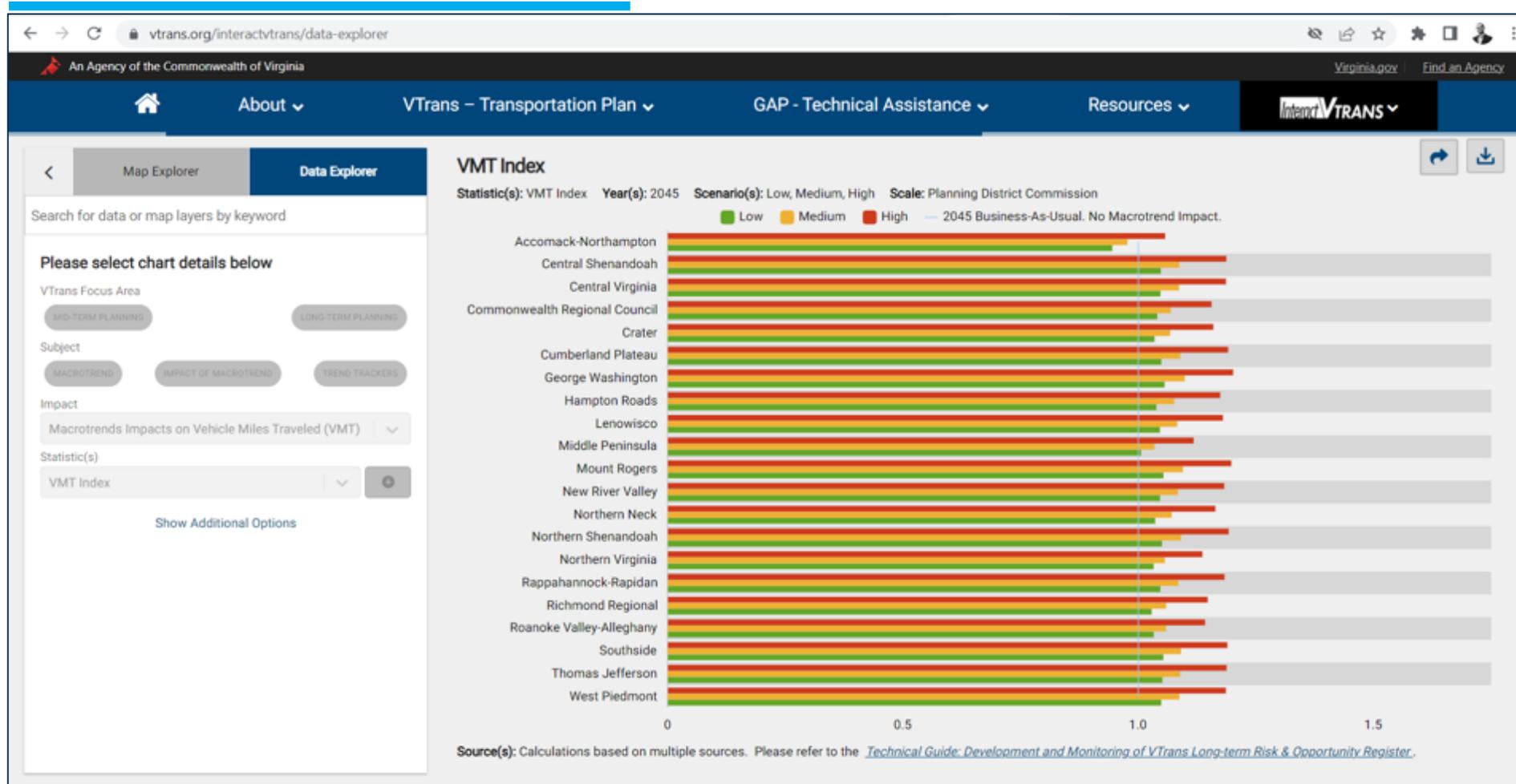


Population and Employment Shift





# Context and Overview: Long-term Planning



Forecasts related to all Macrotrends and their impacts are made available for different geographies (state, MPOs, localities, etc.).

There are three forecasts, one for each scenario.



# Context and Overview: Long-term Planning

- **Benefits:** VTrans provides answers to the following questions (and numerous others):
  - How will automated vehicles impact the Board's transportation congestion or safety goals?
  - What will the change in consumption pattern impact the Board's accessibility goals?

# Role of Data in Planning

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- **Data informs**, not drives, the decisions. The Board makes the decisions related to the utilization of data in the form of policies.
  - VTrans Inputs: VTrans utilizes over **200 million data points**.
  - VTrans Outputs: It **produces over 100 data points** that are utilized by **different funding programs** (e.g., SMART SCALE) and **different users** (e.g., MPOs, localities, and advocacy groups).
  - VTrans Delivery method: Data are delivered not in the form of reports but via an interactive application called InteractVTrans, which has two modules:
    - InteractVTrans MapExplorer: A mapping application
    - InteractVTrans DataExplorer: A non-spatial application (infographics)

# Role of Data in Planning

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- **Pre-2010:** Utilization of data (e.g., traffic and pedestrian counts, onboard surveys, forecasts) and planning tools (e.g., macro simulation models, forecasting tools, ridership estimates) in planning has existed since the very early days of planning.
- **Post-2010:**
  - Data: Spatial and temporal resolution, frequency, precision, sources, collection techniques, and cost of obtaining data have changed.
  - Data analysis: Barriers to analyzing data have reduced significantly (e.g. anyone can see real-time congestion conditions on Google Maps). One does not need to know travel demand modeling or microsimulation.
- Arguably, approaches or decision-making frameworks for analyzing data, business processes, and pace of delivery have not kept pace.

# Key Takeaways

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- **Primary Need for Performance-based Planning**

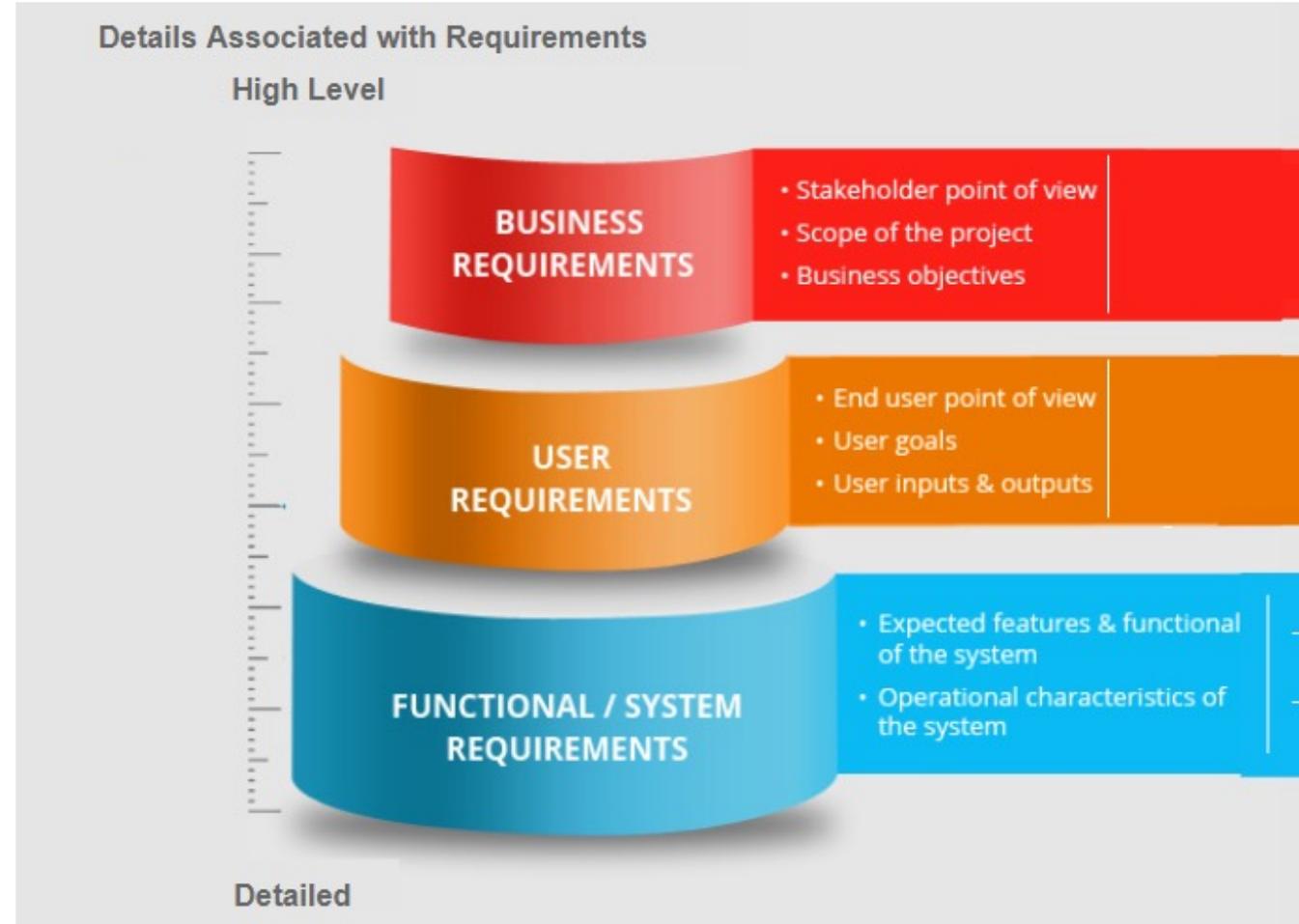
- Arguably, creativity to utilize data and analytical power, not the availability of data or skills to analyze them, is the primary barrier.
- There is greater value in conceptualizing and developing new decision-making frameworks that maximize the power of available data and tools.

- **Conceptualization of the Problem**

- Applications and solutions that originate from specific business needs, instead of “best practices,” will provide more lasting value.
- Arguably, the management-level public agency staff, not the consultants, business analysts, or data scientists, are the best positioned to develop decision-making frameworks. Consultants and data scientists can help you execute those frameworks.

# Key Takeaways

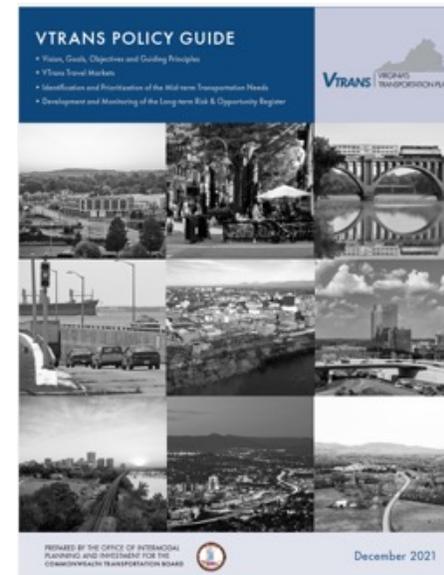
- **Change in Business Processes**
  - User-focus: Before starting our process, we conducted a requirement gathering exercise to understand who is utilizing our planning outputs and how we can serve them better.
    - This approach is often utilized in software or application design and delivery.



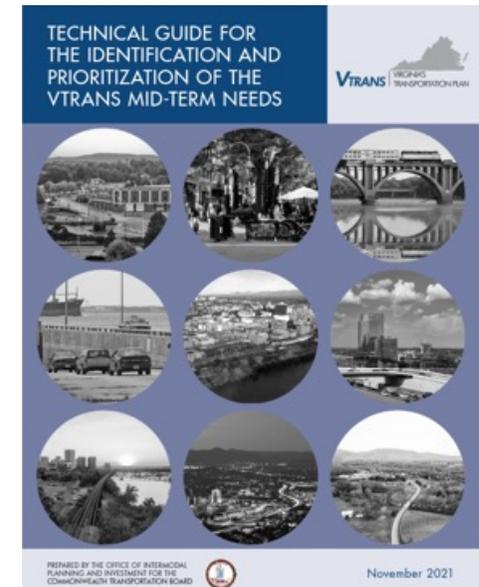
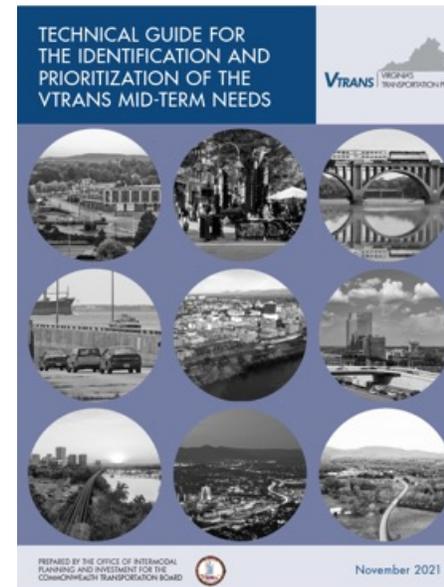
# Key Takeaways

- **Change in Business Processes**

- Outputs: There is great value in reimagining the role of planning.
- We have moved away from product-based planning (e.g., reports) to process-based planning (e.g., updated datasets at established intervals).
- We produce technical guides (how-to) and develop detailed metadata for every dataset.
- Delivery methods: Delivery methods need to maximize available spatial and temporal resolutions. Reports do not do justice.
  - Our FHWA submission to FHWA did not include a single map. Instead, we provided references to [InteractVTrans](#).



Policy guide for policy makers. It documents four key policy decisions that form the basis of all VTrans outputs.



Technical guides for practitioners so that they can review and replicate results.