



COMMONWEALTH *of* VIRGINIA
Office of the
SECRETARY *of* TRANSPORTATION

**Assessing Performance Of Completed
SMART SCALE Projects (April 21, 2026)**

Margie Ray
Office of Intermodal Planning and
Investment

Laura Schewel
Deputy Secretary of
Transportation



Presentation Overview

Background

- Purpose / Context

Results

- SMART SCALE Post-Implementation Evaluation Process
- Project Performance
- Example Projects
- Observations – Potential Process & Policy Improvements to SMART SCALE

Next Steps

- Addressing Challenges and Improving the Post-Implementation Evaluation Process

Q & A

Purpose of Presentation: Inform CTB of Strategic Action Progress



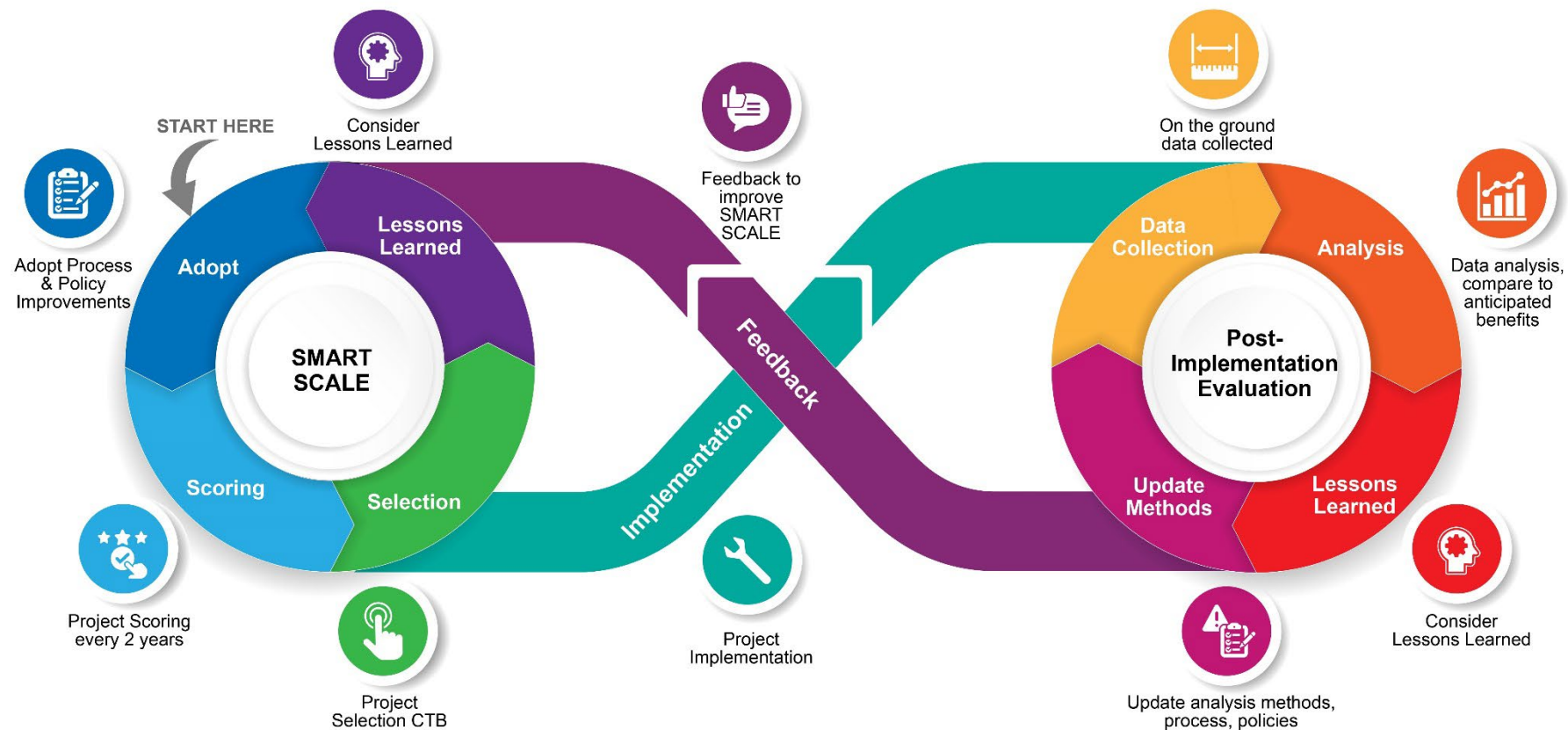
- In 2021, the Board directed SOT to study the impact of projects of key funding programs, starting with Smart Scale.
- In this presentation we will:
 - Review the goals of Post-Implementation Evaluations
 - Update on national industry trends for such studies
 - Share the progress made thus far on Post-Implementation Evaluations, and the next steps
 - Answer questions
- This is the start of a long body of work >>> We will not give grand conclusions that X type of project works well, and Y type of projections aren't accurate
- The goal is to inform CTB members and the public, get input, and answer any questions.

The Overarching Goal is Continuous Process Improvement and Accountability



Project Optimization – Picking the Right Projects

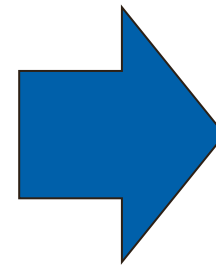
- All processes have potential to improve
- We analyze past performance to understand where improvements are needed
- No one has a crystal ball - we do not criticize past decisions, we do learn from the past



Post-Implementation Evaluations are Not the Norm in the Industry

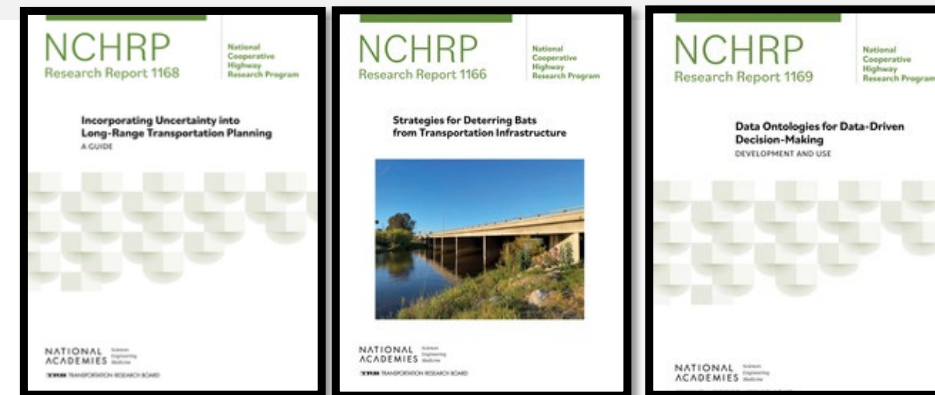


"It is still rare for any ex-post analysis of large transportation infrastructure projects to be conducted to better learn if the benefits predicted did indeed come to fruition. What has not been well-researched or understood is how to measure the impact of project-level evaluation for operational and economic outcome type measures as well as program-level evaluation of completed projects."



- NCHRP 08-170 is complete, final report pending.
- Its goal is to provide a clear, actionable framework for evaluations.
- We are participants in the study and use preliminary guidance in this work.

AASHTO/NCHRP Problem Statement No. 2023-B-12, *"Ex Post Project Evaluation: Frameworks, Guidance and Tools to Support Post-Implementation Evaluation of Transportation Projects"* (National Cooperative Highway Research Program, FY2023)



Virginia is Taking a Leadership Position by Doing this Work



Concerns Raised about Post-Implementation Evaluations



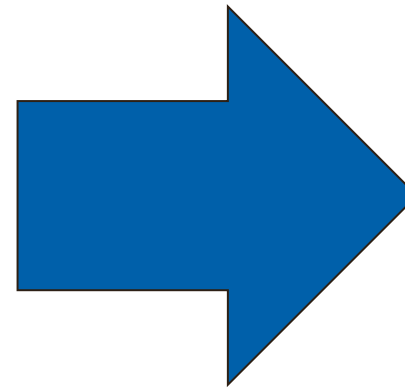
Resource and staffing limitation.



Fear of exposing poor results.



Complexity of analysis.



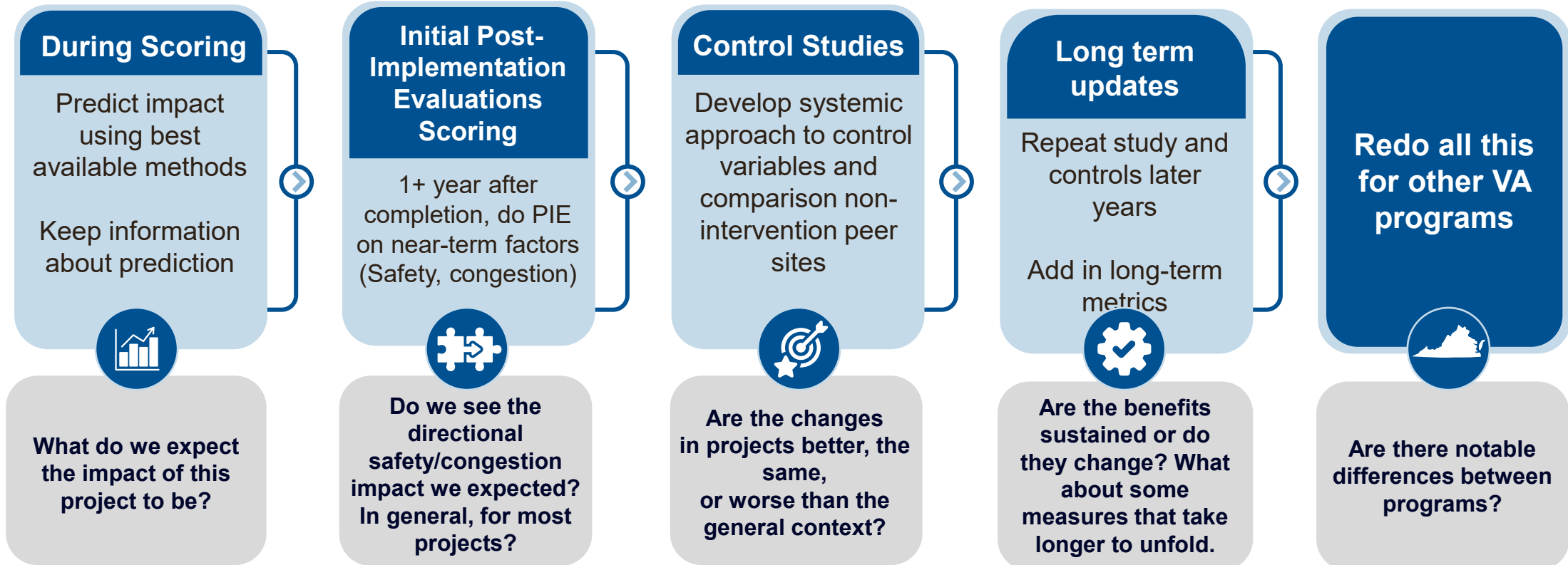
How do we mitigate these concerns?

Extracts from NCHRP Project 08-170 – Closing the Loop: Post-Implementation Evaluation of Transportation Projects - July 2025

Ongoing Vision for Performance Analytics



Phase
Activities
Questions we seek to answer



What have we learned that we can use to make our prioritization process better?

Overarching Caveat – Direct, Isolated Causation is Not Perfectly Knowable

Given this, what is our approach?



Analyze as many projects as feasible

High sample size can enable trend analysis which can be a much stronger indication of correlation and help understand variable outcomes.



Look at context / controls

Is the change reasonable to affiliate with the project itself? Does the change at the project differ than the change in the vicinity / at a paired control site?



Work with imperfect knowledge

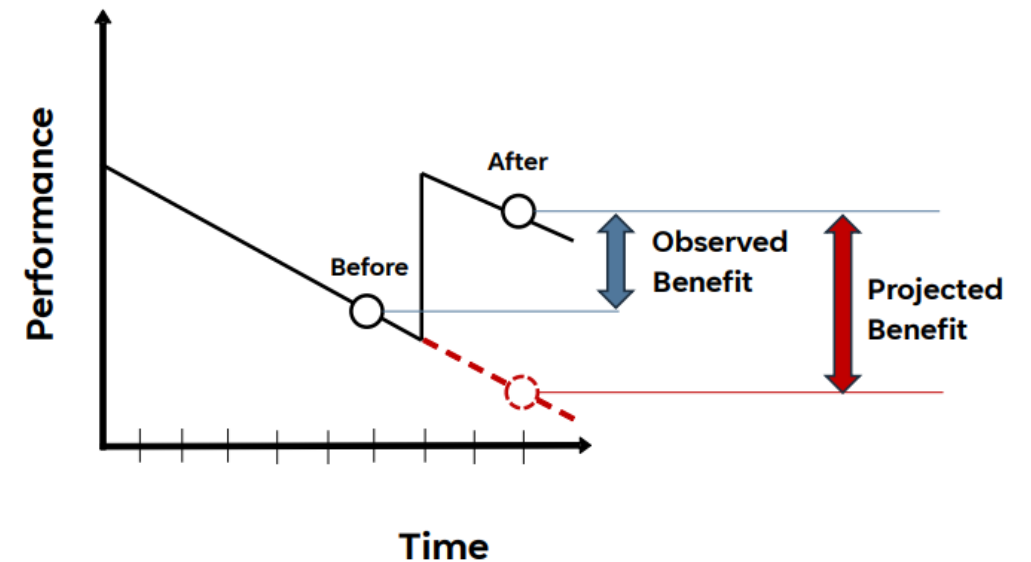
We will never have all the knowledge we want. But incremental knowledge is useful. And reactions should be incremental. We don't wait till we know everything to share and make improvements.

What does a "good" outcome look like?

An ongoing discussion



- **We should not expect 100% of projects to perform exactly as predicted. (Ditto 0%)**
- **Preliminary definition of success**
 - **Per project** - directional alignment with intention. (If goal was to improve congestion, did it improve congestion?)
 - If not, do we believe that factor is better than it would have been? Do we understand other explanatory factors?
 - **For a cohort** – Overall success means:
 - Are more than [XX%] of projects achieving their primary intent (updated over repeat studies)?
 - Are more than [XX%] of projects approximately correct in their forecasts' magnitude?
 - Can we have confidence that [XX%+] of projects did not have a negative impact?



Note – we looked for national benchmarks. None are readily apparent.

Source: Beyond the Build: Evaluating Transportation Project Outcomes, TPM Webinar 27, July 16, 2025

Presentation Overview



Background

- Purpose / Context

Results

- SMART SCALE Post-Implementation Evaluation Process
- Project Performance
- Example Projects
- Observations – Potential Process & Policy Improvements to SMART SCALE

Next Steps

- Addressing Challenges and Improving the Post-Implementation Evaluation Process

Q & A

SMART SCALE PIE Summary and Analysis



- 175 projects analyzed. 16 had data gaps.
- Projects had to be completed by September 2023 to ensure at least one year of post-implementation data.
- Actual performance period varies by project.
- Reminder – there was a pandemic in this time frame with big impacts.

PROJECT APPLICATIONS	FY 2017 ROUND 1	FY 2018 ROUND 2	FY 2020 ROUND 3	FY 2022 ROUND 4	FY 2024 ROUND 5	FY 2026 ROUND 6	TOTAL
Funded	163	147	134	167	164	53	829
Total Funding Allocated	\$1.7B	\$1.1B	\$0.9B	\$1.4B	\$1.6B	\$1.0B	\$7.6
Implemented Projects (as of July 2025)	129	79	21	4	1	---	\$15.7
Analyzed Projects	116	51	8	---	---	---	175

Glossary



- **Analysis Metric** – a measure used to assess performance over time
- **Anticipated Benefits** – for each proposed project, the SMART SCALE program forecasts benefits using measures associated with six Factors areas
- **Factors** – SMART SCALE factor areas: Safety, Congestion Mitigation, Accessibility, Land Use, Environment and Economic Development
- **Project Intent** – defines the problem that the project intends to solve (i.e., improve safety, improve congestion)

Analysis Metrics: Not all SMART SCALE Factor Areas Can be Assessed in this Time Frame



Identified metrics within SMART SCALE factor areas that can be measured within this time frame. As we improve our process, we hope to add more to this list.

SMART SCALE Intent	Pre- and Post-Implementation Metrics Analyzed to Date**
Improve Safety	Changes in fatality and all injury crashes
Reduce Congestion	Changes in travel delay
Promote Econ Dev., Improve Access.	Change in access to jobs within 45 minutes

*R1 and R2 projects Smart Scale predicts congestion benefit 10 years out from build. These years have not yet elapsed for all projects and so congestion prediction accuracy assessments will be updated.

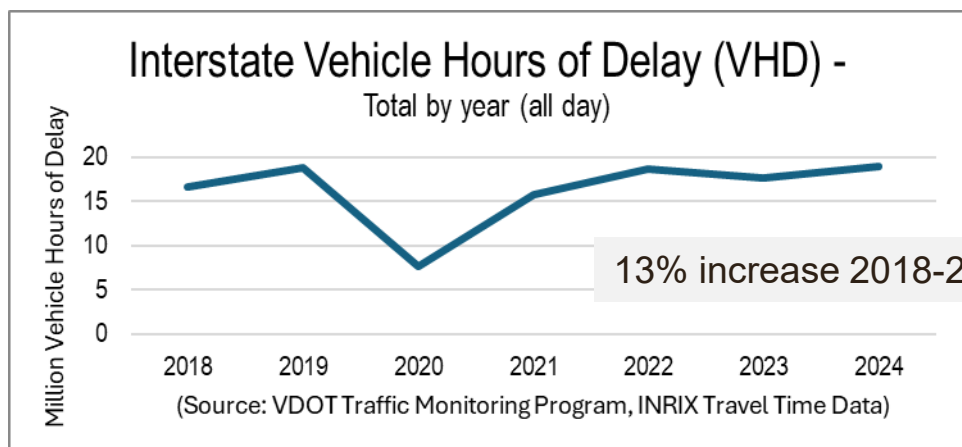
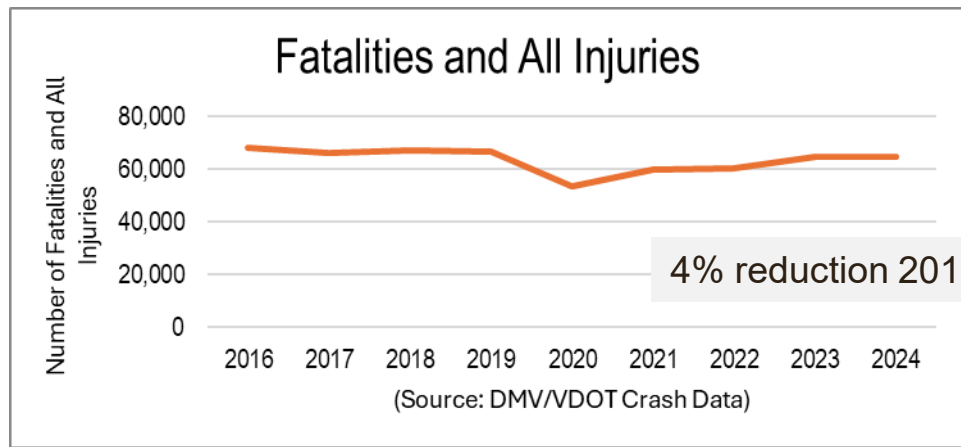
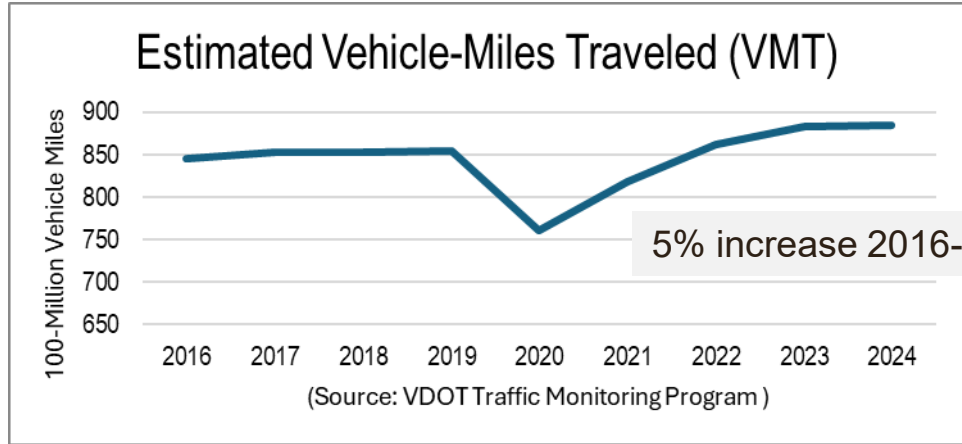
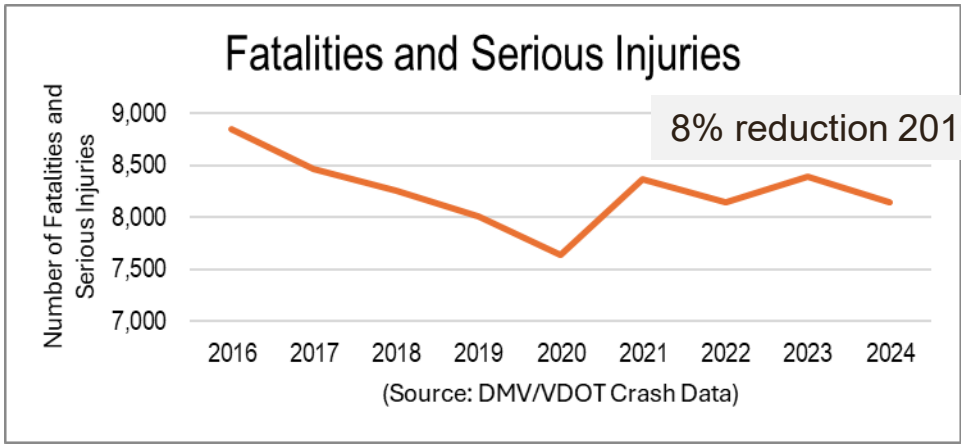
**Sample size – note, not all projects had available data for each metric. Thus, sample size analyzed may differ from metric to metric.

Analysis Process and Focus



- Analyzed each project for performance pre- and post-implementation using established metrics (trying to use several years pre and post, avoiding the pandemic years).
- Collected additional data to further project understanding (e.g., bicycle and pedestrian counts, park and ride counts and transit surveys)
- **Utilizing results, analyzed to assess if:**
 - General Project Intent was *achieved*
 - Observed performance was *consistent* with the SMART SCALE anticipated benefits
 - Trends were observable in the group

Reminder – VA-wide Contextual Trends



What trends do we observe about projects that didn't achieve their intent?

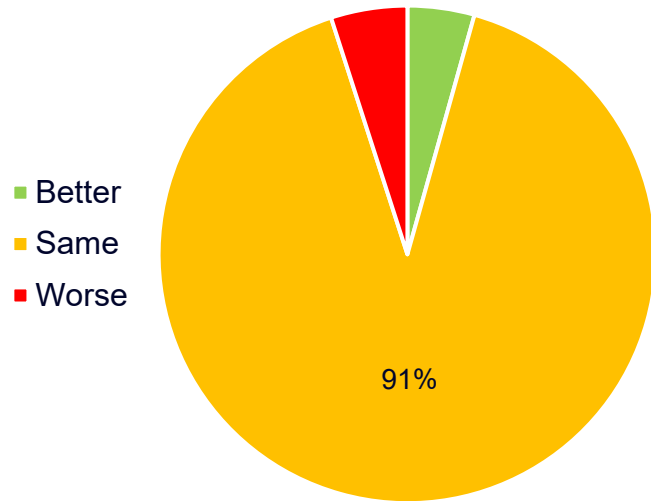


- **Projects where safety worsened:**
 - Some were not intended to improve safety – changes may be due to external factors
 - Recorded crash or crashes were unrelated to the project/improvement made – e.g. behavioral decisions
 - Fatal or severe injury post-construction tended to skew results if there was no fatal or severe injury pre-construction, or the number of crashes was small (inherent challenge on safety)
- **Projects where congestion worsened:**
 - Not intended to improve congestion (tradeoff - most likely a safety project)
 - No congestion in “Before” period – so any mild congestion makes it look “worse”
 - Nearby land use changes or other construction projects may have impacted performance
 - Volume Growth (from induced demand or external factors)
- **Projects where accessibility worsened:**
 - May reflect job loss during the pandemic in certain areas and rising congestion
 - Measure is heavily influenced by COVID impacts

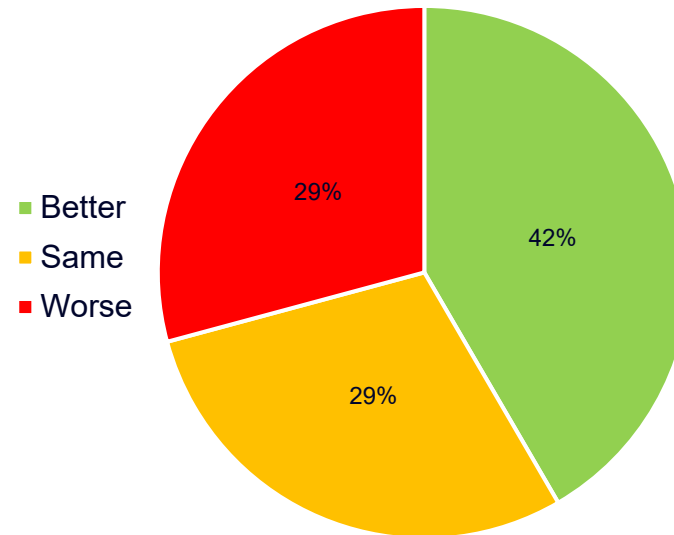
Results – Project Performance – Safety Measure is Weighted Crashes



Safety Outcomes – “Same” is Less than 1 Fatal or Serious Injury Equivalent Change



Safety Outcomes – “Same” is Less than 1 minor injury Crash Equivalent Change



Notes

- There was no large difference between projects with stated intent to improve safety or not → most projects state that their intent is to improve safety. Only two projects predicted that safety would be worse in the cohort.
- No significant difference between R1 and R2. Too few R3 to assess yet.
- For the 5% that got more than 1 Fatal or Serious Injury worse – see later discussion and example. This is impacted by the statistical rareness of serious crashes and should not be over interpreted.

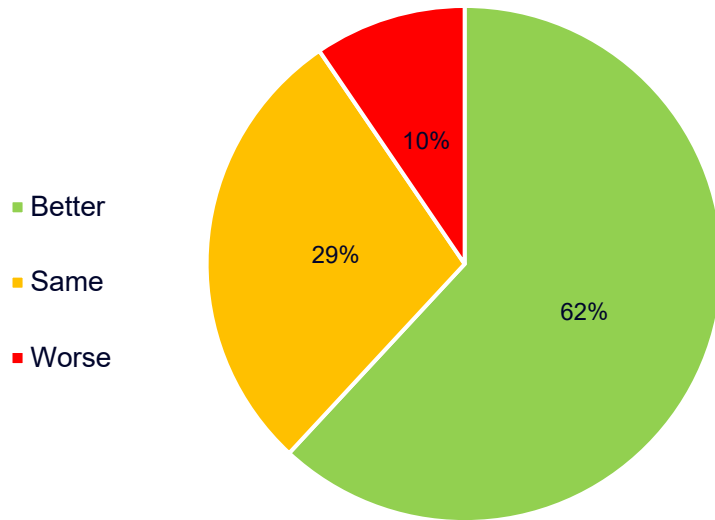
Because serious safety events are rare, looking at 1+ Fatal and Serious Injury change is not very informative.

Measured at a minor injury-level crash – 71% of projects have same or better safety outcomes. This is a positive indicator.

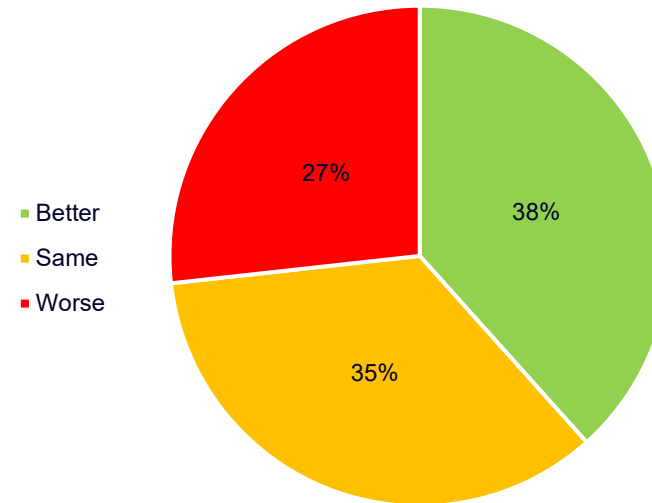
Results – Project Performance – Congestion Measured as Delay in Seconds / Vehicle



Congestion Performance where Congestion was the Intent (n = 42)



Congestion Performance where Congestion was NOT the Intent (n = 86)



Congestion only got worse in 10% of projects where it was intended to get better.

Congestion intent projects out-perform those where it was not the intent, which is good.

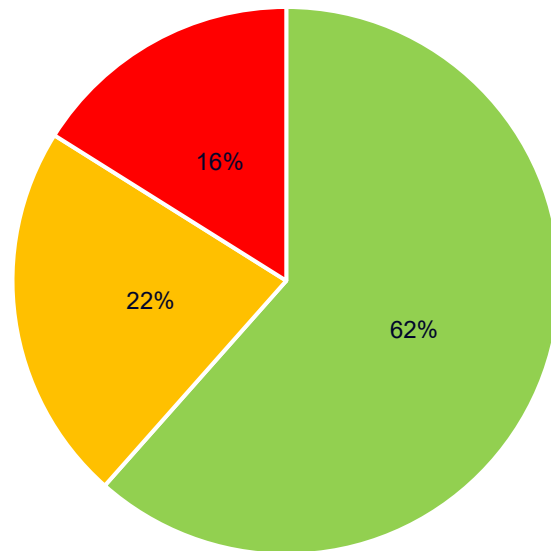
Notes

- “Same” is measured as within 1.5 seconds for the average vehicle for the linear extent of the project.
- No real difference between R1 and R2 (too few for R3 to conclude)
- For the 4 projects that got worse where the intent was to improve congestion, VMT increase was often the cause (see upcoming slide).
- This result is critical to revisit as projects mature since it was predicted 10 years out post construction and for most projects, this time hasn’t elapsed.

Results – Project Performance - Accessibility Measured as Jobs Accessible to a Worker in 45 Min.



Change in Jobs Accessible per Worker in 45
Minutes (n=143).



■ Better ■ Same ■ Worse

Notes:

- Same means +/- 5% change of the number of jobs accessible per worker in 45 minutes.
- For the “worse” performers – the reason is most often changes in the number of jobs (not the ease of getting to them).
 - Official jobs data lags other sources – we are using 2022 figures, thus they are still heavily impacted by the Pandemic.
 - 25% of Area D projects got “worse” on this metric, again affiliated with reduction in number of nearby jobs.
- **This issue illustrates the importance of the control phase – controlling for number of jobs will yield more useful results.**

I-64 Capacity Improvements – Segment III



Project Description: Widen I-64 from 4 lanes to 6 lanes with a 12-foot shoulder in the existing median space from 1.05 miles west of Humelsine Parkway/Marquis Center Parkway (Exit 242) to Route 199 west of Williamsburg (Exit 234).

Primary Intent: Improve congestion, improve reliability

Total Project Expenditures: \$208M (~half from Smart Scale)

Before/After Analysis Results

- Ranked #1 for congestion in SMART SCALE, Ranked #1 in Before/After
- Eliminated delay (100% reduction) and improved reliability (41% improvement) between 2016-2023
- 10% Average Annual Severity-Weighted Crash reduction estimated, 55% reduction observed
- Before 2016, After 2023-2024. Construction complete 2021.



I-81 Southbound Safety Improvements MM167.4 to MM169.5



Project Description: Apply high-friction surface treatment on southbound I-81 between MM 167.4 and MM 169.5. Close the southbound I-81 off-ramp at Exit 167. Widen the inside shoulders and improve superelevation within two curves on I-81 southbound.

Intent: Improve highway safety

Total Project Expenditures: \$4.4M

Before/After Analysis Results

- Big footprint, low cost, high impact
- 100% reduction in fatal and serious injury crashes
- 11% Average Annual Severity-Weighted Crash reduction estimated, 90% reduction observed
- Before 2015-2019, After 2022-2024



Route 419 (Electric Road) & US 221 (Brambleton Avenue) Adaptive Traffic Control



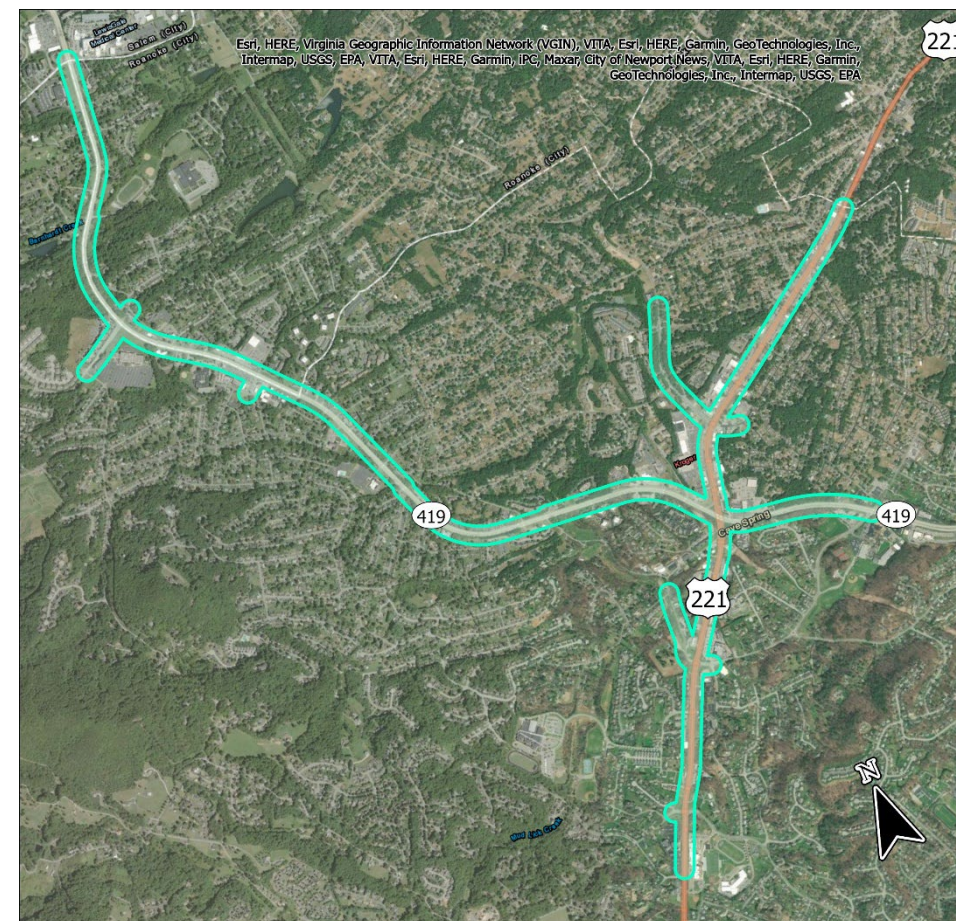
Project Description: Install adaptive traffic control on seven existing traffic signals on Route 419 (Electric Road). Install adaptive traffic control on four existing traffic signals on US 221 (Brambleton Avenue).

Intent: Improve Congestion

Total Project Expenditure: \$640k

Before/After Analysis Results

- Reduced delay (65% reduction) and improved reliability (38% improvement) between 2017-2022
- Reduction in fatal and serious injury crashes by 42%
- 2% Average Annual Severity-Weighted Crash reduction estimated, 29% reduction observed
- Before 2013-2017, After 2021-2024



10th Street Reconstruction



Project Description: Reconstruct 10th Street between US 11 (Williamson Road) and Andrews Road to provide bike lanes, curb and gutter, and sidewalk in both directions. Construct northbound and southbound left-turn lanes at 10th Street and Hunt Avenue. Install crosswalks and pedestrian signals at 10th Street and US 11 and at 10th Street and Hunt Avenue.

Intent: Improve Safety and Multimodal Access

Total Project Expenditures: \$17.1M

Before/After Analysis Results

- 20% Average Annual Severity-Weighted Crash reduction estimated, 146% increase observed – (crashes unrelated to improvement)
- Increased Delay – 231% from 2016-2022 (VMT increased by 80+%! Hypothesis is induced demand)
- Before 2011-2015, After 2021-2024



Presentation Overview



Background

- Purpose / Context
- Background

Results

- SMART SCALE Post-Implementation Evaluation Process
- Project Performance
- Example Projects
- Observations – Potential Process & Policy Improvements to SMART SCALE

Next Steps

- Addressing Challenges and Improving the Post-Implementation Evaluation Process

Q & A

Next Steps for These Results



1. Incorporate feedback from this presentation.
2. Get feedback on our draft format for individual Project Performance Report Cards from community.
3. Share Project Performance Report Cards
4. Continued analysis of data from this round, and sharing of findings
5. Methodology improvements (see last slide)

PROJECT REPORT CARD

Example Project

Project Description

Project Information	
App ID	9999
SMART SCALE Rnd	X
Area Type	X
Primary Improv Type	XX
UPC	999999
Final Cost	\$99,999,999
Construction District	XXX
Construction Begin	00/00/0000
Construction End	00/00/0000
Jurisdiction	XX County
Road System	XX
Project Category	XX

Change in VMT (Vehicle Miles Traveled) During peak period (4-7 pm)

390 lower *

Change in weighted annual Equivalent Property Damage Only (EPDO) of crashes involving fatalities and/or injuries

16 lower †

Change in Proportion of Jobs Accessible to Workers

395 higher ✓

Change in Average Delay hours per 1000 vehicles During peak period (4-7 pm)

1.6 higher ✗

Change in Crash Rate EPDO per 100M VMT (Vehicle Miles Traveled) of crashes involving fatalities and/or injuries

56 lower *† ✓

Average Change in Planning Time Index (PTI) During peak period (4-7 pm)

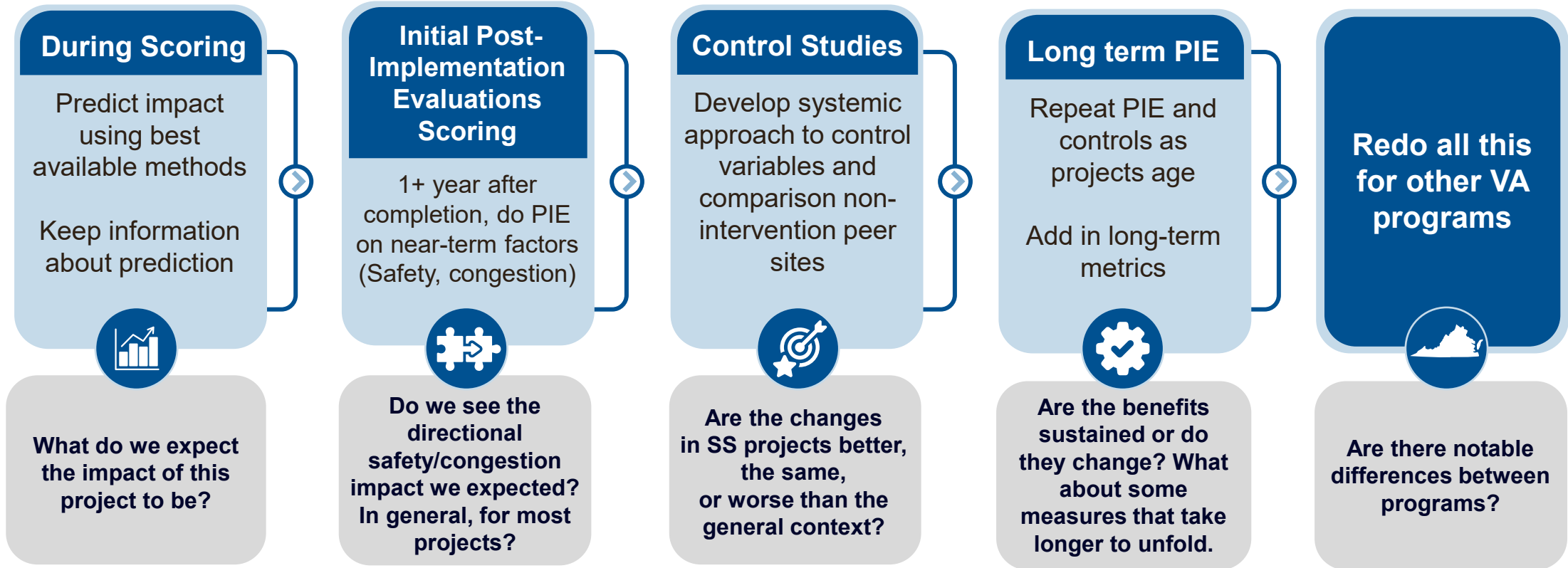
.43 higher ✗

Notes

Notes

Next Steps – Move into Next Phases

Phase
Activities
Questions we seek to answer



What have we learned that we can use to make our prioritization process better?

What has the first phase of this work taught us?



- Staff process improvements put in place
 - Application form should simplify the statement of the project's primary intent → this makes it easier to know if it was achieved.
 - We are updating our default park and ride occupancy rates, and bike/ped factor assumptions in congestion scoring, and revising the crash factors used in turn-lane extension safety scoring based on findings.
- Discussions that will be elevated next – approaches to incorporate uncertainty from data sources into statistical approach, adding additional measures, measure effectiveness “per dollar”, how to measure jobs impact with jobs data delays
- This work is challenging, but possible and important. We need to continue consistent data capture and collaboration with state agencies, researchers, and federal NCHRP to constantly improve methods.
- This is a great start.