

## Implementation Considerations for On-Road Transportation Greenhouse Gas Emissions Reduction Strategies



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Item #8



# Study Purpose and Approach

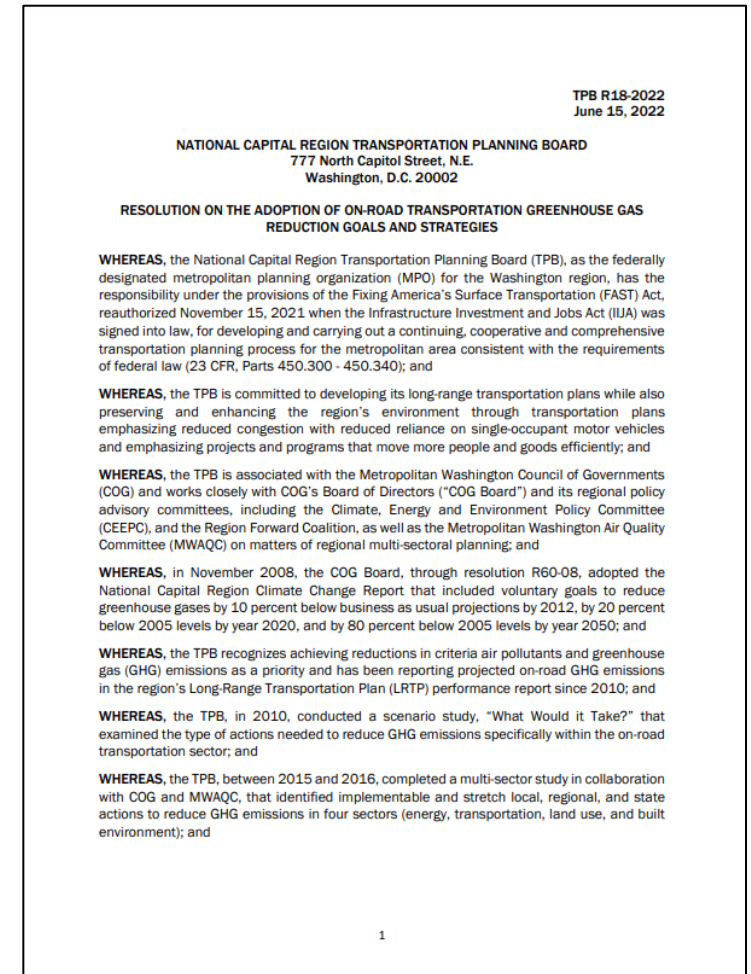
# Study Focus

## Resolution on the Adoption of On-Road GHG Reduction Goals and Strategies (R18-2022):

- Set aspirational GHG reduction targets
- Adopted 7 priority reduction strategies
- Identified 7 additional strategies for further exploration

## This study examines implementation considerations related to the 7 strategies identified for further exploration, plus 9 additional strategies based on TPB Technical Committee input and ICF's review of:

- Carbon Reduction Strategies of the District of Columbia, Maryland, and Virginia among other states (e.g., Minnesota, Oregon, Pennsylvania)
- Climate Action Plans of COG member jurisdictions (e.g., Arlington County, Fairfax County, Montgomery County, Prince George's County)
- National-level documents (e.g., NCHRP Reducing Greenhouse Gas Emissions: A Guide for State DOTs)



# TPB-Identified Strategies

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1. Take action to shift growth in jobs and housing from locations currently forecast to locations near TPB-identified high-capacity transit stations and in COG's Regional Activity Centers to improve the jobs-housing balance locally.
2. Make all public bus transportation in the region fare-free by 2030.
3. Make all public rail transportation in the region fare-free by 2030.
4. Price workplace parking for employees – only in Activity Centers by 2030 and everywhere by 2050.
5. Convert a higher proportion of daily work trips to telework by 2030 and beyond.
6. Charge a new fee per vehicle mile of travel (VMT) by motorized, private, passenger vehicles in addition to the prevailing transportation fees and fuel taxes [mileage-based user fee].
7. Charge a “cordon fee” (Commuter tax) per motorized vehicle trip for all vehicles entering Activity Centers, by 2030.

# Additional Strategies Explored

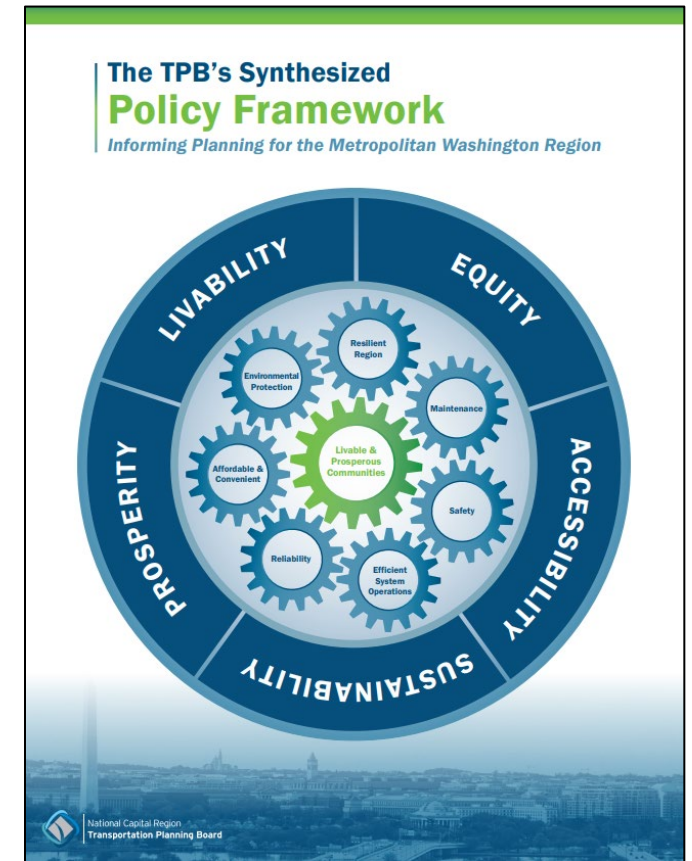
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8. Implement a carbon pricing program or increase in fuel taxes.
9. Implement pay-as-you-drive (PAYD) insurance requirements.
10. Implement employer-based parking cash-out program requirements.
11. Reduce VMT associated with school-based trips.
12. Incentivize electric bicycle (e-bike) adoption.
13. Disincentivize parking through parking reforms.
14. Convert existing highway lanes to high-occupancy toll (HOT) lanes.
15. Expand microtransit / first mile-last mile service in the region.
16. Expand programs to incentivize carpooling and vanpooling.

# Implementation Considerations

Each of the strategies is assessed in relation to implementation issues that are important for state and local governments to consider:

- Relative effectiveness in reducing GHG emissions
- Implementing organizations, legislative authority, & enabling actions
- Costs associated with implementation
- Implications for regional goals & priorities:
  - Accessibility & Affordability
  - Environmental Quality
  - Equity
  - Infrastructure Condition
  - Livability & Prosperity
  - Reliability & Efficiency
  - Resiliency
  - Safety

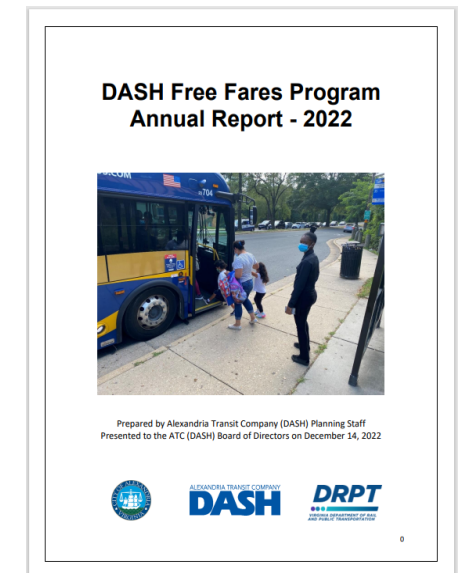
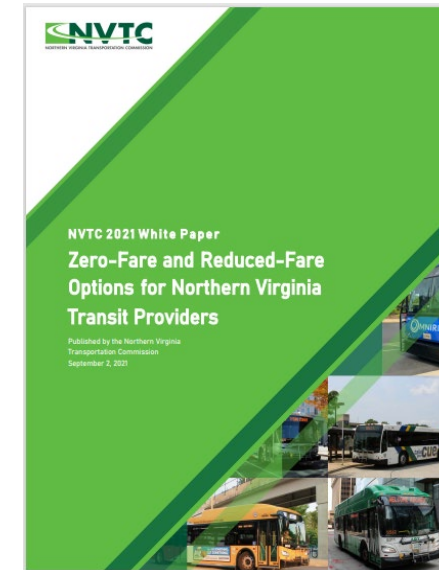
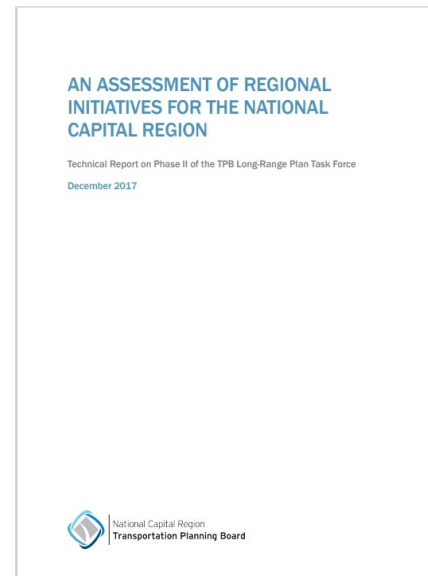


# Methodology

The implementation considerations of were qualitatively assessed and reflect the ICF team's professional judgement; no emissions modeling or scenario analysis was conducted.

ICF drew from various sources:

- Previous research for COG/TPB for the Long-Range Plan Task Force (LRPTF) and the Climate Change Mitigation Study (CCMS)
- Other studies conducted by COG/TPB and member jurisdictions
- Relevant legislation, news articles, academic literature, case studies, program evaluations, and other reports
- Data from the Federal Transit Administration and Bureau of Labor Statistics





# Summary of Findings



# GHG Reduction Potential

Many of the strategies that could have the largest impact at reducing GHG emissions in the near-term involve increasing the price of vehicle travel, which can be challenging politically and raise concerns in terms of equity and affordability.

- Shifting development to high-capacity transit stations and Regional Activity Centers could have relatively large impacts but also takes a longer time for benefits to manifest.
- The GHG emissions effects of the strategies depend heavily on how the strategies are implemented (i.e., level of pricing) and how much incremental changes can be achieved (i.e., effects beyond existing policies).

| Strategy |                            | GHG Reduction |           |
|----------|----------------------------|---------------|-----------|
|          |                            | Impact        | Timeframe |
| 1        | TOD                        | ●             | 🕒🕒🕒       |
| 2        | Fare-Free Bus              | 🕒             | 🕒         |
| 3        | Fare-Free Rail             | 🕒             | 🕒         |
| 4        | Work Parking Pricing       | 🕒             | 🕒🕒        |
| 5        | Telework                   | 🕒             | 🕒         |
| 6        | VMT Fee                    | ●             | 🕒🕒        |
| 7        | Cordon Fee                 | ●             | 🕒🕒        |
| 8        | Carbon Pricing             | ●             | 🕒🕒        |
| 9        | PAYD Insurance             | 🕒             | 🕒🕒        |
| 10       | Parking Cash-out           | 🕒             | 🕒         |
| 11       | School-Based VMT           | 🕒             | 🕒         |
| 12       | E-Bike Incentive           | 🕒             | 🕒         |
| 13       | Parking Reform             | 🕒             | 🕒         |
| 14       | Convert to HOT Lanes       | 🕒             | 🕒🕒        |
| 15       | Microtransit               | 🕒             | 🕒         |
| 16       | Carpool/Vanpool Incentives | 🕒             | 🕒         |

Relative Impact: 🕒 Low   🕒 Medium   ● High  
 Relative Timeframe: 🕒 Short   🕒🕒 Medium   🕒🕒🕒 Long

# GHG Reduction & Role of Public Agencies

Although public agencies can implement policies or regulations to advance these strategies, the GHG impacts of many strategies depend heavily on factors outside public agency control.

- Some strategies with high potential effectiveness may be limited by the effectiveness of government policies or actions to achieve desired outcomes (due to market forces and role of private sector decisions related to land development, parking, insurance, and employee benefits).
- Although the strategies are generally implementable at the state or local scales, to be most effective, many require considerable coordination across state and regional partners.
- Even strategies that in theory could be implemented quickly often require considerable planning, public processes, and interagency coordination needs.

| Strategy |                            | GHG Reduction |           |
|----------|----------------------------|---------------|-----------|
|          |                            | Impact        | Timeframe |
| 1        | TOD                        | ●             | 🕒🕒🕒       |
| 2        | Fare-Free Bus              | 🕒             | 🕒         |
| 3        | Fare-Free Rail             | 🕒             | 🕒         |
| 4        | Work Parking Pricing       | 🕒             | 🕒🕒        |
| 5        | Telework                   | 🕒             | 🕒         |
| 6        | VMT Fee                    | ●             | 🕒🕒        |
| 7        | Cordon Fee                 | ●             | 🕒🕒        |
| 8        | Carbon Pricing             | ●             | 🕒🕒        |
| 9        | PAYD Insurance             | 🕒             | 🕒🕒        |
| 10       | Parking Cash-out           | 🕒             | 🕒         |
| 11       | School-Based VMT           | 🕒             | 🕒         |
| 12       | E-Bike Incentive           | 🕒             | 🕒         |
| 13       | Parking Reform             | 🕒             | 🕒         |
| 14       | Convert to HOT Lanes       | 🕒             | 🕒🕒        |
| 15       | Microtransit               | 🕒             | 🕒         |
| 16       | Carpool/Vanpool Incentives | 🕒             | 🕒         |

Relative Impact: 🕒 Low 🕒 Medium ● High  
 Relative Timeframe: 🕒 Short 🕒🕒 Medium 🕒🕒🕒 Long

# Revenues & Expenditures

Costs of implementation vary, with some strategies creating significant fiscal impacts on public agencies while others are net revenue generators.

- **Public Sector:** The costliest strategies would likely be fare-free bus and rail (Strategies 2, 3) due to the loss of farebox revenue. In contrast, the strategies that involve pricing (Strategies 6, 7, 8, 14) would be net revenue generators.
- **Private Sector:** Most of the strategies would pose either mixed/uncertain or negligible costs.
- **Households/Individuals:** Pricing policies generally add direct costs onto households, although overall impact depends on program design. In general, policies would result in benefits to society, since a reduction in VMT would likely result in reductions in the associated externalities (e.g., air pollution, noise, injuries due to accidents, etc.).

| Strategy  |                            | Revenues & Expenditures |                |                        |
|---|----------------------------|-------------------------|----------------|------------------------|
|   |                            | Public Sector           | Private Sector | Households/Individuals |
| 1   | TOD                        | -                       | -              | \$                     |
| 2   | Fare-Free Bus              | (\$\$\$)                | -              | \$                     |
| 3   | Fare-Free Rail             | (\$\$\$)                | -              | \$                     |
| 4   | Work Parking Pricing       | (\$)                    | \$             | (\$\$)                 |
| 5   | Telework                   | (\$)                    | -              | \$                     |
| 6   | VMT Fee                    | \$\$\$                  | (\$)           | (\$\$)                 |
| 7   | Cordon Fee                 | \$\$                    | (\$\$)         | (\$)                   |
| 8   | Carbon Pricing             | \$\$\$                  | (\$\$)         | (\$\$\$)               |
| 9   | PAYD Insurance             | (\$)                    | -              | \$                     |
| 10  | Parking Cash-out           | (\$)                    | (\$)           | \$                     |
| 11  | School-Based VMT           | (\$)                    | -              | (\$)                   |
| 12  | E-Bike Incentive           | (\$)                    | -              | \$                     |
| 13  | Parking Reform             | \$                      | -              | -                      |
| 14  | Convert to HOT Lanes       | \$\$                    | -              | (\$\$)                 |
| 15  | Microtransit               | (\$\$)                  | -              | \$                     |
| 16  | Carpool/Vanpool Incentives | (\$\$)                  | -              | \$                     |
| Relative Cost: (\$) Low (\$\$) Medium (\$\$\$) High<br>Revenue Generation/Savings: \$ Low \$\$ Medium \$\$\$ High |                            |                         |                |                        |

# Regional Goals & Priorities

The impacts of strategies on regional goals depends heavily on how strategies are implemented.

- For instance, pricing strategies raise potential equity concerns in relation to the ability of low-income persons to pay. However, the programs can be structured to enhance equity.
- By reducing VMT, strategies should have beneficial impacts on air quality and public health (although some uncertainty regarding conversion of lanes due to traffic congestion and diversion).
- Strategies also generally will have beneficial effects on other goals such as safety, reliability, and efficiency. However, these impacts are relatively small or uncertain, with a few notable exceptions.

| Strategy |                            | Regional Goals & Priorities   |                       |        |                          |                         |                          |            |        |
|----------|----------------------------|-------------------------------|-----------------------|--------|--------------------------|-------------------------|--------------------------|------------|--------|
|          |                            | Accessibility & Affordability | Environmental Quality | Equity | Infrastructure Condition | Livability & Prosperity | Reliability & Efficiency | Resiliency | Safety |
| 1        | TOD                        | ⊕                             | ⊕                     | ⊕      | ⊖                        | ⊕                       | ⊕                        | ⊕          | ⊕      |
| 2        | Fare-Free Bus              | ⊕                             | ⊕                     | ⊕      | ○                        | ⊕                       | ○                        | ○          | ⊖      |
| 3        | Fare-Free Rail             | ⊕                             | ⊕                     | ⊕      | ⊖                        | ⊕                       | ○                        | ○          | ⊖      |
| 4        | Work Parking Pricing       | ⊖                             | ⊕                     | ⊖      | ○                        | ⊖                       | ⊖                        | ○          | ○      |
| 5        | Telework                   | ⊕                             | ⊕                     | ⊖      | ○                        | ⊖                       | ⊖                        | ⊕          | ○      |
| 6        | VMT Fee                    | ⊖                             | ⊕                     | ⊖      | ⊕                        | ⊖                       | ⊕                        | ○          | ○      |
| 7        | Cordon Fee                 | ⊖                             | ⊕                     | ⊖      | ⊖                        | ⊖                       | ⊕                        | ○          | ○      |
| 8        | Carbon Pricing             | ⊖                             | ⊕                     | ⊖      | ⊕                        | ○                       | ⊕                        | ○          | ○      |
| 9        | PAYD Insurance             | ⊕                             | ⊕                     | ⊕      | ○                        | ○                       | ○                        | ○          | ○      |
| 10       | Parking Cash-out           | ⊕                             | ⊕                     | ⊕      | ○                        | ○                       | ○                        | ○          | ○      |
| 11       | School-Based VMT           | ⊖                             | ⊕                     | ⊖      | ○                        | ○                       | ⊖                        | ○          | ⊖      |
| 12       | E-Bike Incentive           | ⊕                             | ⊕                     | ⊕      | ○                        | ○                       | ○                        | ⊕          | ⊖      |
| 13       | Parking Reform             | ⊕                             | ⊕                     | ⊖      | ○                        | ⊕                       | ○                        | ○          | ○      |
| 14       | Convert to HOT Lanes       | ⊖                             | ⊖                     | ⊖      | ⊕                        | ⊖                       | ⊕                        | ○          | ⊖      |
| 15       | Microtransit               | ⊕                             | ⊕                     | ⊕      | ○                        | ⊕                       | ○                        | ○          | ○      |
| 16       | Carpool/Vanpool Incentives | ⊕                             | ⊕                     | ⊖      | ○                        | ○                       | ○                        | ○          | ○      |

Impact on Goals: ⊕ Positive ⊖ Negative ⊖ Mixed / Uncertain ○ Negligible

# Several strategies would work best if paired together

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- While some strategies may have counteracting effects, the most effective approach would pair “sticks” (strategies that disincentivize driving) with “carrots” (strategies that expand, enhance, or incentivize using transit, ridesharing, bicycling, walking, or telework).
- This could provide synergistic effects by providing the public with viable options and alternatives to driving, while addressing affordability and equity concerns and likely leading to more public support.





Questions?