

# Is The Dulles Corridor Metrorail Project the answer?

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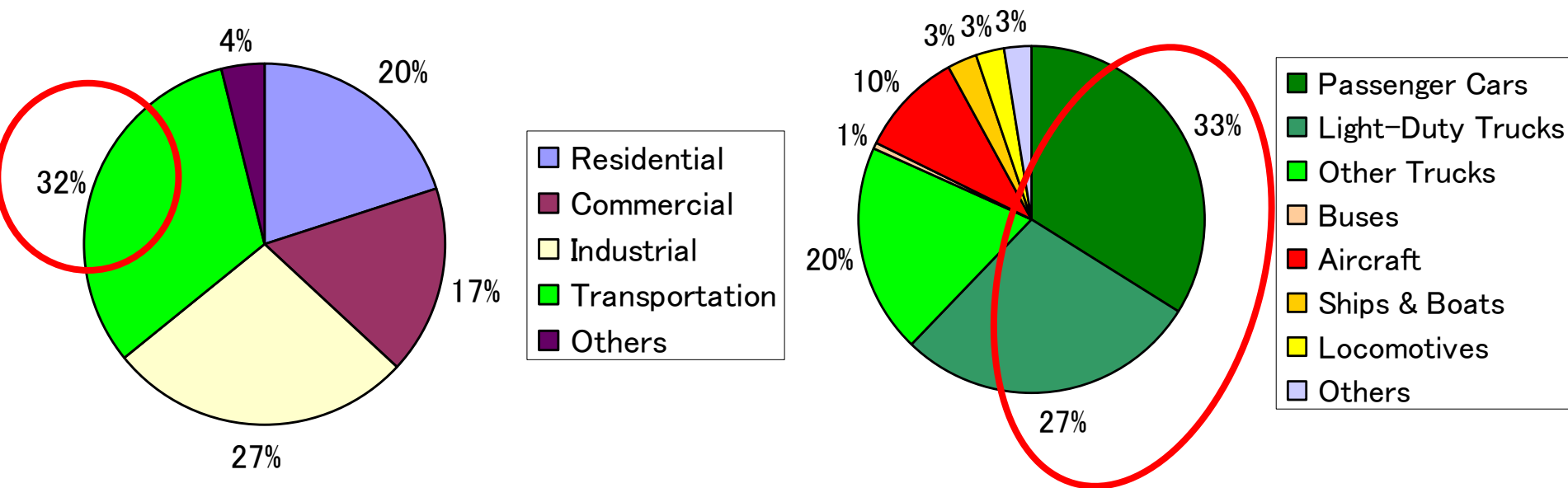
Japan International Transport Institute

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# CO2 emissions in the transportation sector (2004)

- Transportation accounts for one third of total CO2 emissions from energy use in the U.S.
- Passenger cars and light duty trucks account more than half of total transportation emissions.



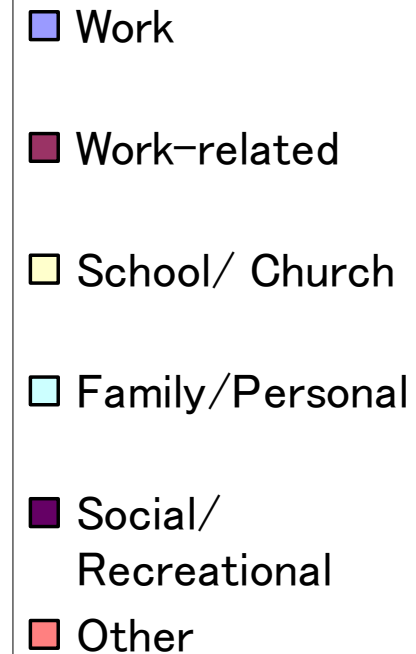
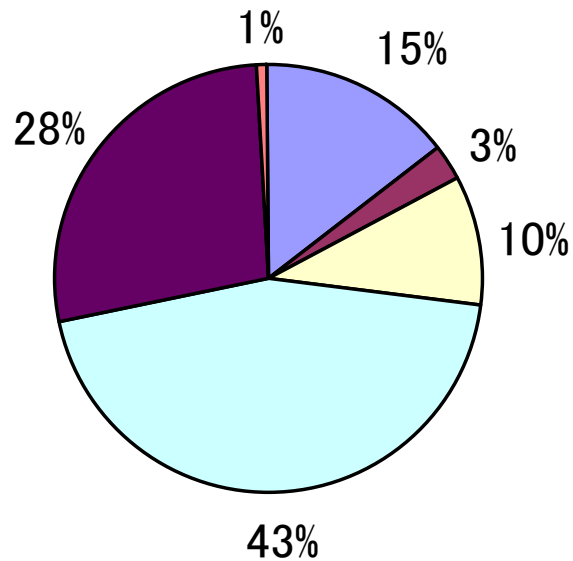
*Where there is a way, there is a car.*

(Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks:1990-2004 (EPA))

# Why do people go out?

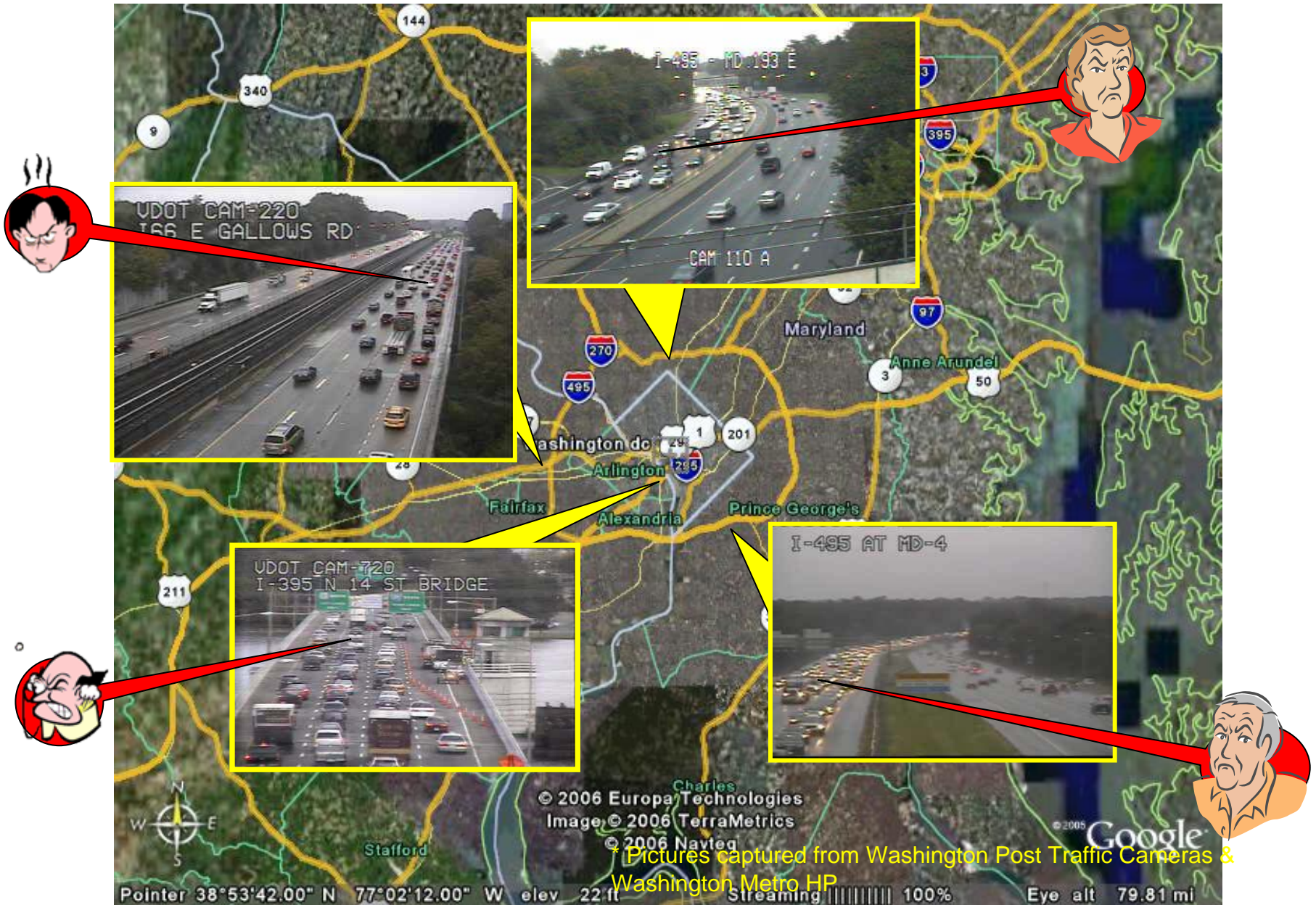
- People take daily trips for a variety of reasons.
- One fourth of the trips are regularly taken.

Distribution of Trips by Trip Purposes



(Source: U.S. DOT 2001 National Household Travel Survey)

# How are we commuting everyday?

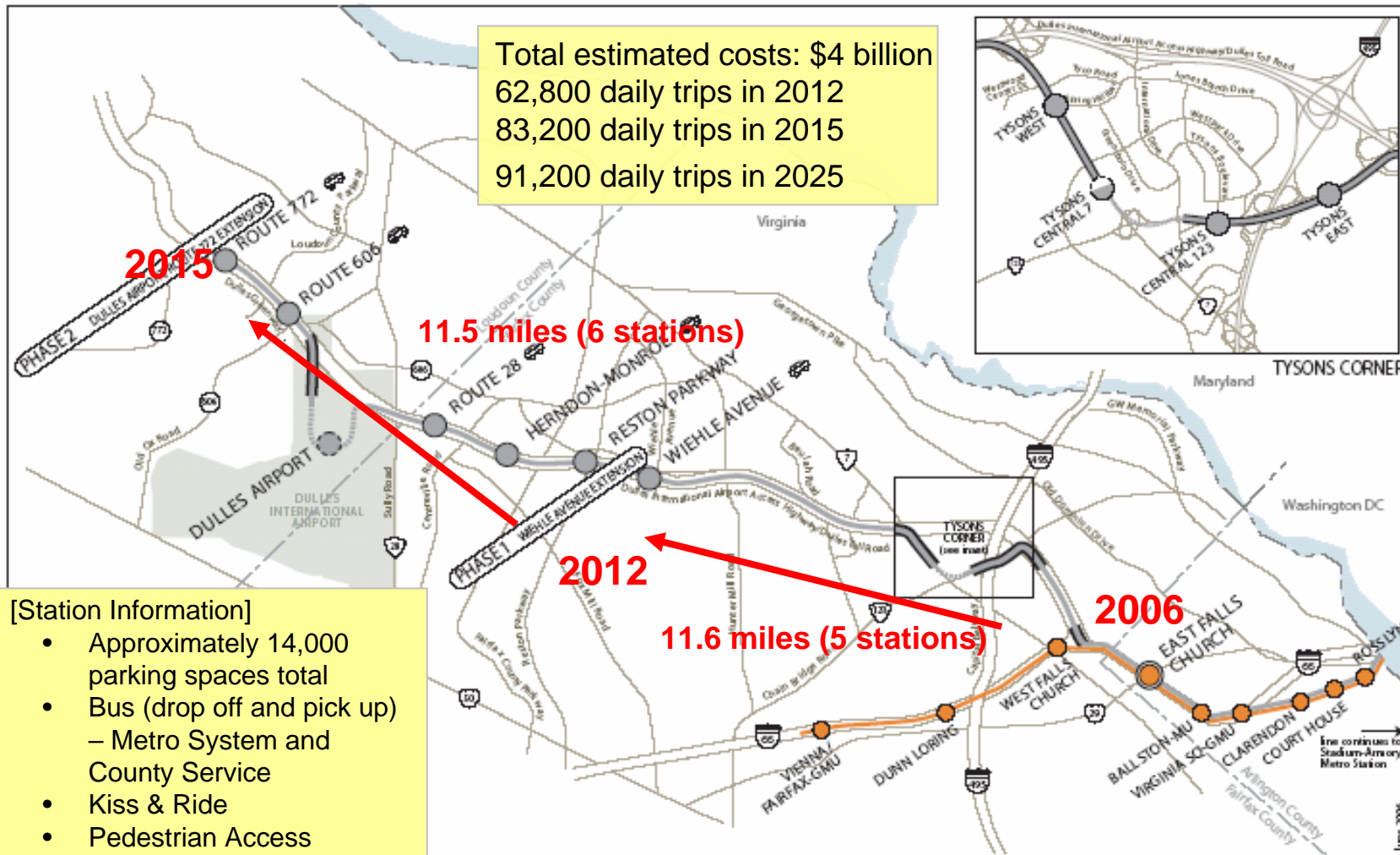


# How environmentally friendly are we in commuting?

		Car, truck, or van — drove alone	Public transportati on (excluding taxicab)	Mean travel time to work (minutes) for workers who did not work at home
<b>National</b>		77.0%	4.7%	25.1
<b>DC</b>		37.5%	37.7%	29.3
<b>Maryland</b>	State	73.6%	8.5%	30.8
	Montgomery Co.	66.9%	14.9%	33.2
	Prince George's Co.	63.7%	17.4%	35.7
	Howard Co.	80.3%	3.9%	30.2
	Frederick Co.	79.1%	2.2%	32.9
	Charles Co.	78.7%	5.2%	36.2
	Calvert Co.	78.0%	2.3%	39.4
	Anne Arundel Co.	80.1%	2.5%	27.8
<b>Virginia</b>	State	78.4%	3.7%	27.0
	Alexandria City	64.9%	17.9%	28.3
	Arlington Co.	54.6%	23.8%	25.9
	Fairfax Co.	72.9%	8.7%	31.2
	Loudon Co.	78.5%	2.4%	31.5
	Prince William Co.	70.5%	5.5%	40.5

(Source: 2005 U.S. Census American Community Survey)

# Dulles Corridor Metrorail Project Overview



Total estimated costs: \$4 billion  
 62,800 daily trips in 2012  
 83,200 daily trips in 2015  
 91,200 daily trips in 2025

- [Station Information]
- Approximately 14,000 parking spaces total
  - Bus (drop off and pick up) – Metro System and County Service
  - Kiss & Ride
  - Pedestrian Access

LEGEND		
	Existing Orange Line Track and Station	
	New Station	
	Transfer Station	
	Parking	
	Partially Below Surface Station	
	Underground Station	
		Underground Track

www.dullesmetro.com  
 703.288.7000



June 2006

# Dulles Corridor Metrorail Project Phase 1

- Tysons Corner
  - 10<sup>th</sup> Largest Shopping Mall in the USA (largest in DC area)
  - 115,000+ Jobs
  - 45 Million Square Feet of Commercial Real Estate



# Dulles Corridor Metrorail Project Phase 2

- Reston/Herndon
  - 75,000+ Jobs
  - 29 Million Square Feet of Commercial Real Estate



- Dulles Airport
  - 22 Million Passengers in 2004, Projected to 55 Million by 2025
  - Approximately 45 Airlines (passenger and cargo)
  - 18,000+ employees



## Dulles Corridor Metrorail Project Phase 2

- Loudoun County
  - Fastest Growing County in the Commonwealth of Virginia
  - Fastest Growing County in the USA from 2000 to 2005
  - Population:
    - 169,599 – December 2000
    - 255,518 – July of 2005 (50%) increase
    - Projected to increase 150% by 2025 (conservative)
  - 100,000+ Jobs
  - 28 Million Square Feet of Office and Industrial Space

# Current Traffic Situation

Mostly cars and light trucks run on the roads along the planned metro extension route.

- Daily Traffic Data
  - Route 7: ~84,000 vehicles w/ 97% passenger cars/light trucks
  - Dulles Toll Road: ~44,000 vehicles w/ 99% passenger cars/light trucks
  - Route 28: ~100,000 vehicles w/ 96% passenger cars/light trucks
- Traffic Fatality Rate (Virginia)
  - ~950 Annual
  - ~12.5 deaths/100,000 population
  - ~1.1 deaths/ 100 million miles
  - ~1/3 of deaths occur in Northern VA

## National Safety Statistics (1)

- Fatality Rate: ~1.5/ 100 million miles
- Injury Rate: ~100/million miles
- Total Annual Crash Costs: ~\$250 billion

## National Safety Statistics (2)

- Annual Bus Fatalities: ~40
- Annual Bus Injuries: ~12,000
- Annual Transit Rail Fatalities: ~15
- Annual Transit Rail Injuries: ~600

# Emissions Criteria

- CO<sub>2</sub> (Carbon Dioxide)
  - No direct effects to human health. Most prevalent GHG
- CO (Carbon Monoxide)
  - Degrades ability of blood to carry O<sub>2</sub>
- NO<sub>x</sub> (Oxides of Nitrogen)
  - Precursor to lung infections, exacerbates asthma
- HC (Hydrocarbons)
  - Irritates eyes, increases respiratory problems

# Example Calculation



- 1993 Toyota Land Cruiser

per mile in pounds

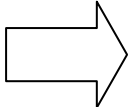
- CO<sub>2</sub>: 1.8654
- CO: 0.05815
- NO<sub>x</sub>: 0.00707
- HC: 0.00413
  
- Fuel Consumed  
0.077 gallons/mile



- 2004 Toyota Prius  
per mile in pounds

- CO<sub>2</sub>: 0.3490
- CO: 0.01667
- NO<sub>x</sub>: 0.00058
- HC: 0.00044
  
- Fuel Consumed  
0.018 gallons/mile

## Model Description

- Passenger Forecast by Dulles Corridor Metrorail Project
- Actual Fleet Profile in Northern Virginia  
     Per Mile Emission Factor
- Estimated Trip Distances to/from Proposed Stations (How far people would have to go to get on trains.)

# Projected Benefits

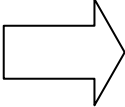
Gas savings worth 80 million dollars annually in 2025

Annual CO2 reduction equivalent to planting 169 sq miles of trees in 2025.

	Phase 1	Phase 2	2025
	62,800 trips/day	83,200 trips/day	91,200 trips/day
Fuel	30,500 gallons/day	82,000 gallons/day	88,000 gallons/day
CO <sub>2</sub>	590,000 pounds/day	1,600,000 pounds/day	1,700,000 pounds/day
CO	20,500 pounds/day	55,000 pounds/day	60,500 pounds/day
NO <sub>x</sub>	1,600 pounds/day	4,300 pounds/day	4,700 pounds/day
HC	1,400 pounds/day	3,800 pounds/day	4,100 pounds/day

⌘ In 2025, fatal crashes could be reduced by 1/year (+/-) and crashes resulting in injury could be reduced by 30+/year.

# Revised Model

- Passenger Forecast by Dulles Corridor Metrorail Project
- Actual Fleet Profile in Northern Virginia  
     Average Fuel Economy
- Estimated Trip Distances to/from Proposed Stations (How far people would have to go to get on trains.)
- Electricity Use by Trains
- Switch-over Rate

# Revised Estimate

Even at a 50% switch-over rate, gas savings worth 34 million dollars and CO2 emission reduction equivalent to planting 71 sq miles of trees will be achieved annually in 2025.

## [Revised Estimate in 2025]

Switch-over Rate	100%	80%	60%	50%
Fuel Saved (gallon/day)	81,000	64,000	46,000	37,000
CO2 Reduction (pound/day)	1,580,000	1,240,000	890,000	720,000

# Conclusion

- Dulles Corridor Metrorail Project is an answer. Metrorail is an environmentally friendly and safe mode of transportation.
- Public transportation should be an integral & central part of city planning. A city should be built around Metrorail, a mixed-use city where people live, work, learn and shop without taking long trips.
- Metrorail-centered policy to maximize the number of those who switch over from automobiles is essential. (Commuter benefits, Parking policies etc.)