

Avoiding Clean Congestion: Sources & Assumptions

- **Transportation GHG reduction goal**
 - 60% < 1990 by 2040
 - consistent with [California goals](#): 40% < 1990 by 2030, 80% < 1990 by 2050 (economy wide)
- **VMT**
 - Historic: [BTS](#), [FHWA](#) Highway Statistics
 - Reference forecast: 0.9%/yr, avg of: EIA, [Annual Energy Outlook 2019](#) and [FHWA](#) 2018
 - Reduction: Green Resilience Strategies calculation (-23%)
 - Consistent with [California](#) scenario (25% < 2005, CARB Scoping plan, p. 75)
 - AVs impact: [Stephens et al](#) 2016, [UCS](#) 2019
- **MPG**
 - Historic: [Transportation Energy Data Book](#)
 - Reference: [AEO 2019](#)
 - MPG, new LDVs: 33 mpg, fleet: 23 mpg
 - EV case: MPG: New LDVs: 60 mpg; fleet: 49 mpg (based on [CARB](#))
- **EVs**
 - Reference: 1% of sales in 2017, 14% in 2040 (includes plug-ins)
 - EVs: 55% of new sales, 33% of fleet by 2040 ([Bloomberg](#) 2018)
 - Electricity carbon intensity : -75% CO₂/kWh (2017-2040)
 - informed by California goal: 100% zero-carbon by 2045
- **Other Travel Data**
 - FHWA 2018: [Summary of Travel Trends](#)
 - McGuckin 2018: [Dynamics of Change: Long-Term Trends in Personal Travel](#)
- **GDP**
 - [Federal Reserve of St. Louis](#)
- **Policy**
 - [Transportation for America](#)

Images from the Noun Project

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|----------------------|-------------------|----------------|----------------|
| • Car (side): | Ersin | • Bicycle: | Yorlmar Campos |
| • Road: | Deb Minch | • Arrow: | Kitty_Keks |
| • Electric vehicle: | Nicholas DeForest | • AV: | Luis Prado |
| • Green electricity: | Vectors Market | • Heartbreak: | Ali Coşkun |
| • Arrow: | Kitty_Keks | • Scooter: | Sketch Icon |
| • Pedestrian: | ProSymbols | • Car (front): | Cho Nix |
| • Bus: | Dolly Holmes | • AV (front): | Effach |
| • Metro train: | b farias | | |

Other Images

- Houston maps: <https://kinder.rice.edu/2018/05/28/interactive-how-houstons-highways-spurred-growth-sprawl>
- Sprawl image: <https://austin.com/event/a-false-prosperity-the-hidden-cost-of-suburban-sprawl/>
- TOD neighborhood: City Lab, Felipe Targa
- Heaven & Hell: Robin Chase, [The Future of Autonomous Vehicles](#)