

# Medium and Heavy Duty Vehicle Electrification: The role of investments

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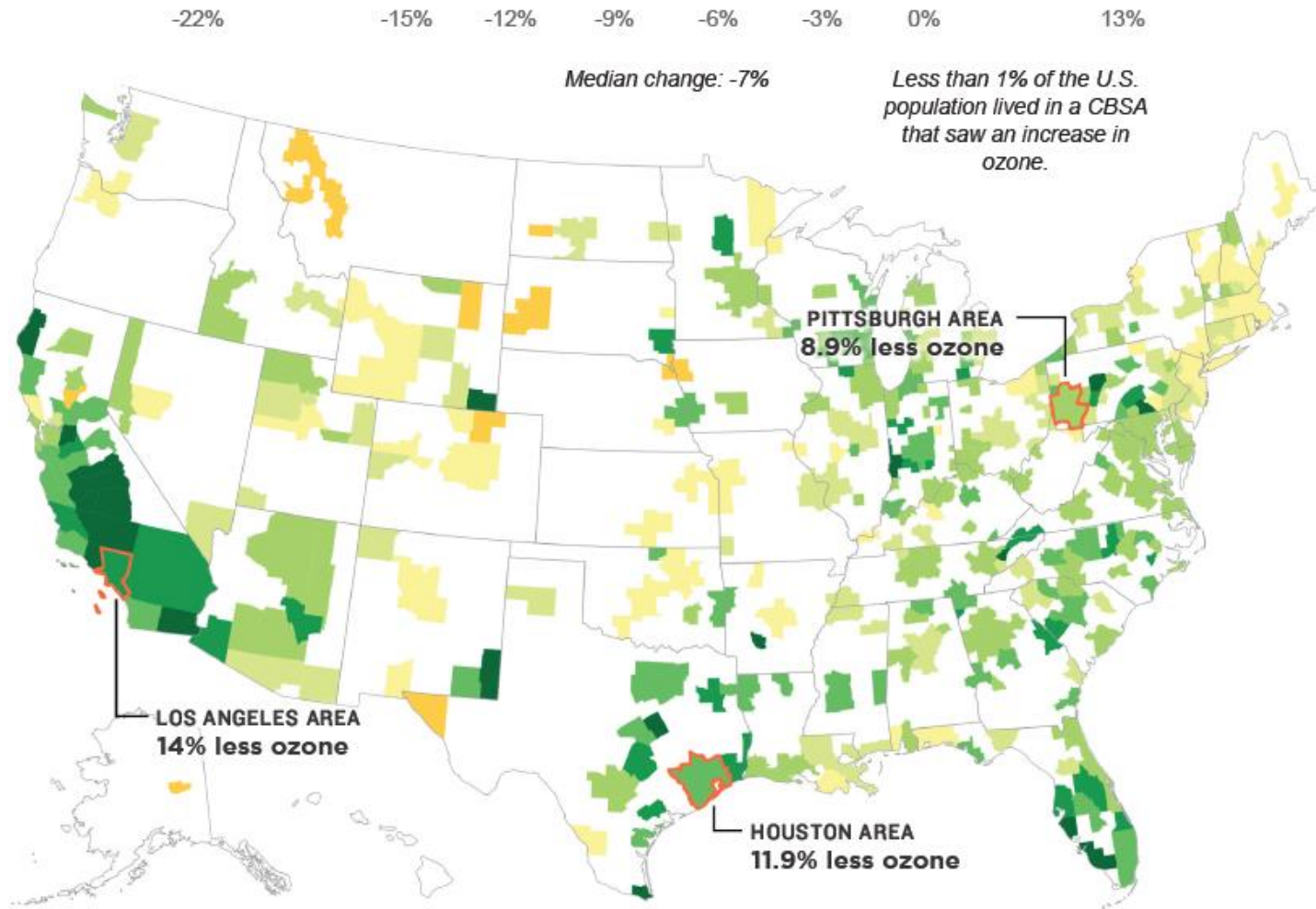
# MHD Electrification for Clean Air



Los Angeles, April 2020, rush hour. *Source: Chava Sanchez/LAist*)


# Ozone Still High Due to MHDVs

PERCENT CHANGE IN MEDIAN OZONE LEVELS, 2020 COMPARED WITH 2015-2019




Source: Daniel Wood/NPR, with data from [Environmental Protection Agency Air Quality System](#) and [AirNow](#)

# Challenges to Electrification

- Upfront cost of electric MHDVs can be up to 2.5x more than diesel counterparts
  - Charging stations can cost up to \$150,000 (350kW)
  - Cost of charging can be as high as diesel
  - Potential for large social/system costs associated with charging
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- Policies needed to accelerate adoption of these vehicles while maximizing their benefit
  - Large opportunity for Transportation & Climate Initiative (TCI) revenues to support this effort
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# **Approaches and Solutions to Electrification Challenges/Opportunities**

1. Focus on equitable outcomes
  2. Reduce cost of charging infrastructure
  3. Upfront vehicle purchase incentives
  4. Enabling vehicle-grid integration
  5. Standards and mandates
  6. Enhanced marketing, education and outreach
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# 1. Provisions for Front-Line Communities

- Equitable deployment of MHD EVs across all communities
- Existing local policies:
  - NYS Beneficiary Mitigation Plan (VW Funds); prioritize funding towards benefits in EJ communities
  - Congestion pricing in NYC used to electrify buses
- TCI revenues: target revenues towards investments which will first improve outcomes in front-line communities (e.g., replace diesel vehicles by order of polluted area)



## 2. Charging Infrastructure

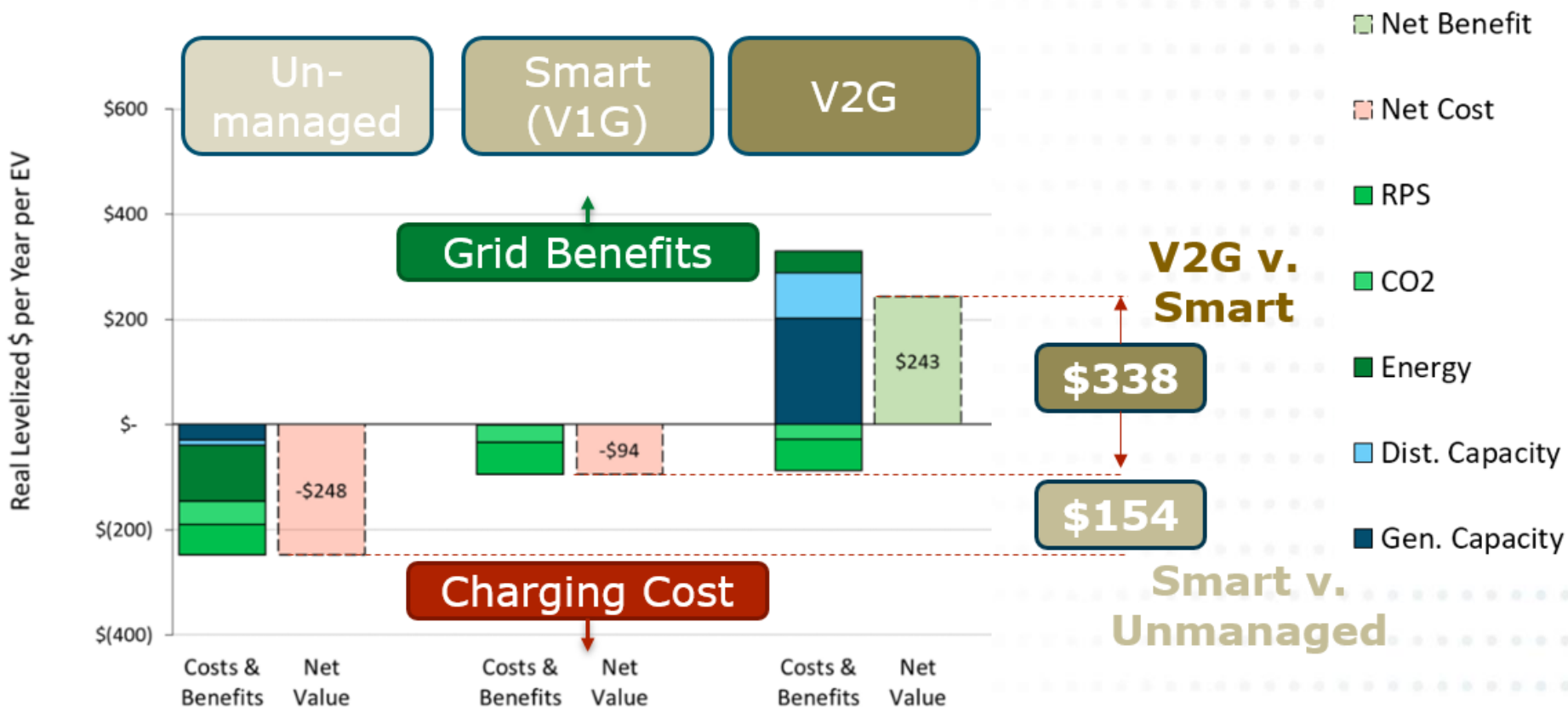
- Massive upfront cost of charging infrastructure is a barrier to EV adoption
- Existing local policies:
  - New York State Tax Credit for Public and Workplace Charging (commercial, \$5k)
  - Charge Ready NY (Level 2, \$4k rebate); NYSERDA
- TCI revenues could be used to subsidize purchase and installation of infrastructure, targeted first toward EJ communities

# 3. Purchase Incentives

- Upfront cost subsidies
- Existing local policies:
  - New York Truck Voucher Incentive Program (NYTVIP); NSERDA administers, money from NYSDOT and NYSDEC.
    - For fleets. Up to \$385k for transit buses.
  - New York City Clean Trucks Program (scrappage/replacement); NYCDOT.
    - For Industrial Business Zones. Up to \$185k for class 8.
- TCI revenues could be used to subsidize upfront purchase, with efforts to increase adoption in EJ communities



# 4. Vehicle-Grid Integration



Source: Eric Cutter, Energy & Environmental Economics, EPRI

# 4. Vehicle-Grid Integration

- Managed charging software
- Wholesale market participation; FERC 841-NYISO 2018 rules submitted
- TCI Revenues:
  - Subsidize purchase of or create incentives to use managed charging software, especially in EJ communities
  - Conduct pilots to test out V2G capabilities


# 5. Standards & Mandates

- Create some certainty in market for manufacturers, bring economies of scale
- May produce unexpected outcomes, leakage
- Local policies:
  - Advanced Clean Truck Rule, CA (60% of new MHDVs by 2035)
  - Multi-State MHD ZEV MOU (15 states + DC, new ZEV target- 30%/2030, 100%/2050)
- TCI revenues: Invest in R&D to ensure lower cost compliance with mandates

# 6. Enhanced Marketing, Education and Outreach

- How widely understood is the benefit of electrification?
- Range anxiety, performance concerns, etc. still exist, even if  $NPV > 0$
- Local policies:
  - Charge NY (NYSERDA)
- TCI revenues:
  - Can be passed through to cities, local communities groups/advocates, utilities to support MEO
  - Target EJ communities, multiple languages

# Conclusion

- The clean energy transformation of this sector presents many challenges and opportunities
    - Smart policies and thoughtful engagement can ensure we achieve the best outcomes
  - Research can help identify the policies which will have the largest benefit and help accelerate MHD EV adoption
  - Engagement with community groups is key for success in this space
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