

Achieving San Francisco's Greenhouse Gas Reduction Goals in the Transportation Sector: What Will it Take?

TRB Annual Meeting

January 22, 2011

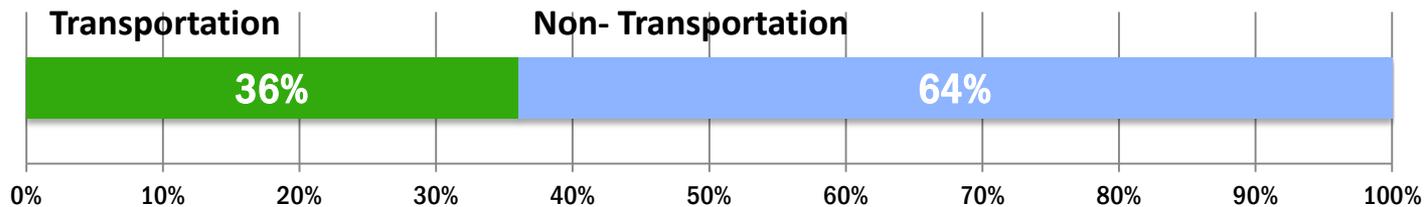
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Study Purpose

- ▶ San Francisco has a policy goal (Ordinance 81-08) to reduce GHG emissions to 80% below 1990 emissions by 2050
- ▶ 36% of San Francisco's GHG emissions come from transportation

San Francisco GHG Inventory, 2010



Source: SF Department of Environment, 2011

- ▶ SFCTA is developing a long-range plan that will guide transportation investment for 25 years, which includes goal to reduce GHGs



Study Purpose

We analyzed baseline GHG trends, and the effectiveness of 9 strategies

Research Questions

- 1. What are San Francisco's baseline GHG trends?**
- 2. How effective are strategies that can reduce transportation GHGs?**
- 3. How cost effective are they?**
- 4. If we implement all of them, will we achieve our goals?**



Agenda

Context

Baseline GHG Trends

Strategy Analysis

- ▶ Strategies Analyzed
- ▶ Methodology
- ▶ Effectiveness Results
- ▶ Cost-Effectiveness Results
- ▶ Cumulative Results

Policy Implications



Statutory Context – Assembly Bill 32

Reduce GHGs to 1990 levels by 2020 – 169 MMT reduction needed

Transportation Strategies

1. **Cleaner fuels**
 - ▶ Low Carbon Fuel Standard, 15 MMT reduction
2. **Cleaner vehicles –AB 1493/Pavley**
 - ▶ Light-duty vehicle greenhouse gas standards, 31.7 MMT reduction
3. **Less vehicle travel – SB 375**
 - ▶ Regional Land Use-Transportation Plans, 5 MMT reduction

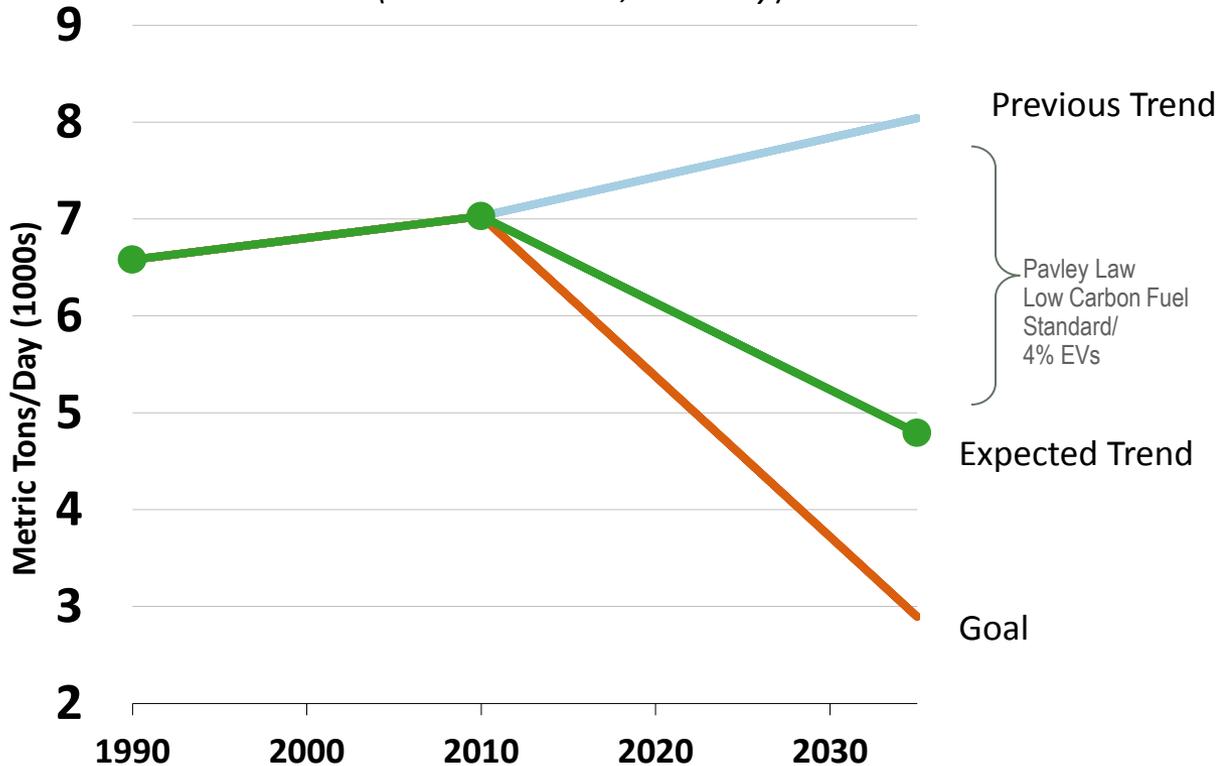
Cap and Trade

- ▶ Distributors of transportation fuels as a capped sector



San Francisco Baseline– Stringent State Technology Regs Improve Trend Dramatically

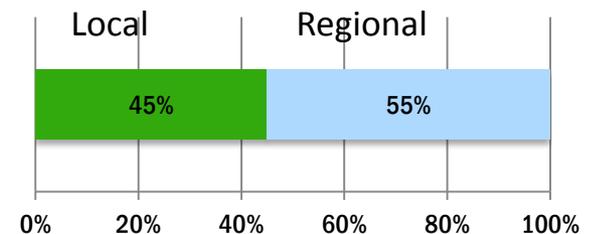
San Francisco GHG Emissions Trend vs. SF Goal
(on-road mobile, weekday)



What VMT to include in inventory?

- ▶ 100% of VMT for trips w/in SF
- ▶ 50% of VMT from trips to or from SF

On-Road Mobile GHG Inventory: Local vs. Regional



Brisson, Sall, Ang-Olson, 2011

Source: SF CHAMP 4.1 Draft SCS, SFCTA, 2011



San Francisco at a Glance

- ▶ ~800,000 population, 570,000 jobs in ~50 square mile area
- ▶ Located within a region of 7 million people, 3.5 million jobs, in 9-county region
- ▶ Auto mode share of ~60%
- ▶ Served by local and regional bus and rail service
 - Dense coverage
 - Trips take 1.8 times as long on transit than auto
 - Transit crowding, reliability, are issues
- ▶ Peak hour congestion
 - Takes about 1.7 times as long to make a trip during peak hours



Strategies Analyzed

Infrastructure

1. Transit Network Improvements
2. Bicycle Network Improvements

Demand Management

3. Residential Transportation Demand Management (TDM)- Transit Passes Required with Home Assoc. Fees
4. Employer TDM: Subsidized Transit Passes and Expanded Employer Outreach
5. School TDM: Outreach to Encourage Non-Motorized and “Schoolpool” Carpools
6. Personalized Travel Outreach
7. Local Roadway Pricing
8. Regional Roadway Pricing

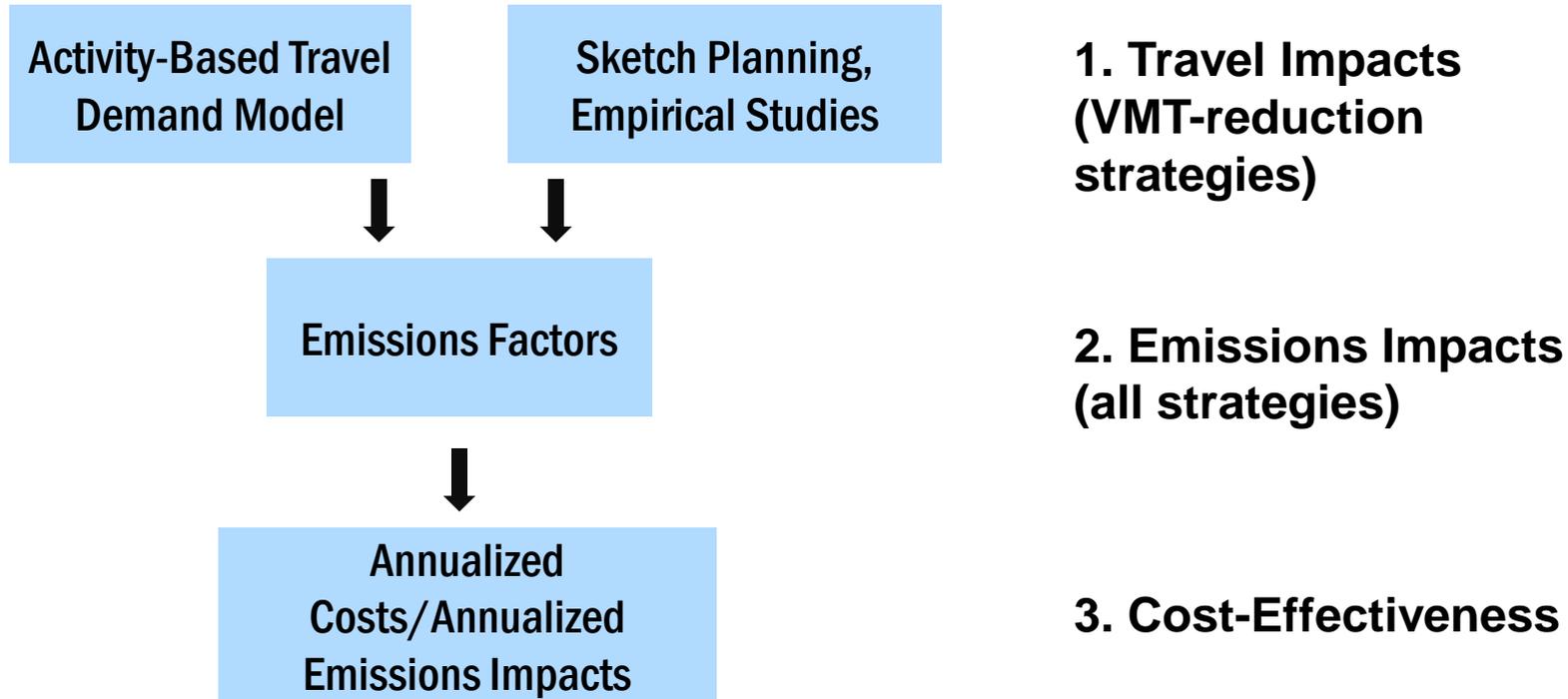
Technology

9. Acceleration of Electric Vehicle Penetration into Private Vehicle Fleet



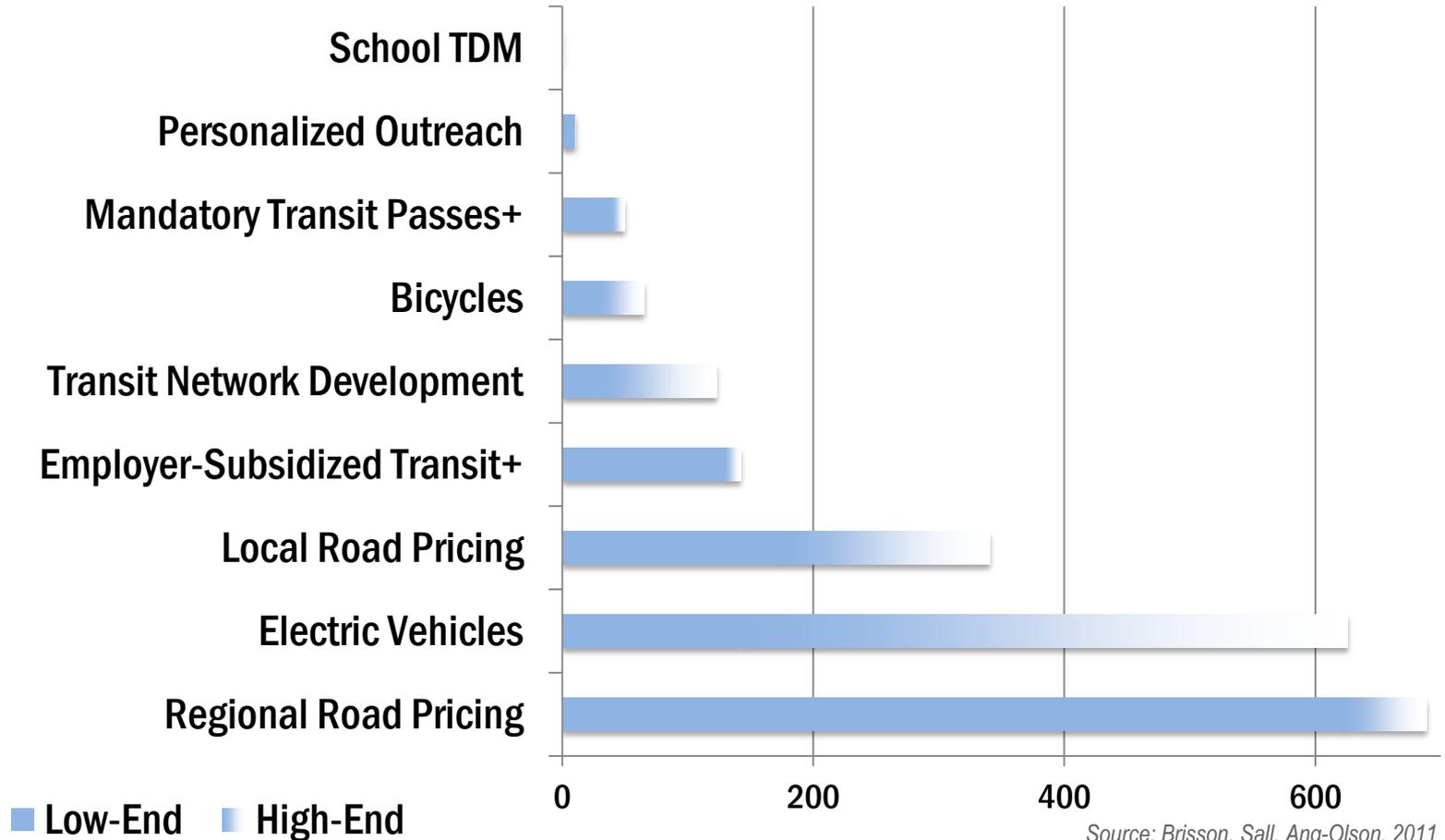
Analysis Tools/Methodology

Individual Strategy Analysis



Strategy Effectiveness Results: Pricing and Electric Vehicles Have Potential to Provide Greatest Reduction

Daily GHG reduction (weekday) - 1,890 metrics tons/day needed to achieve goal in 2035

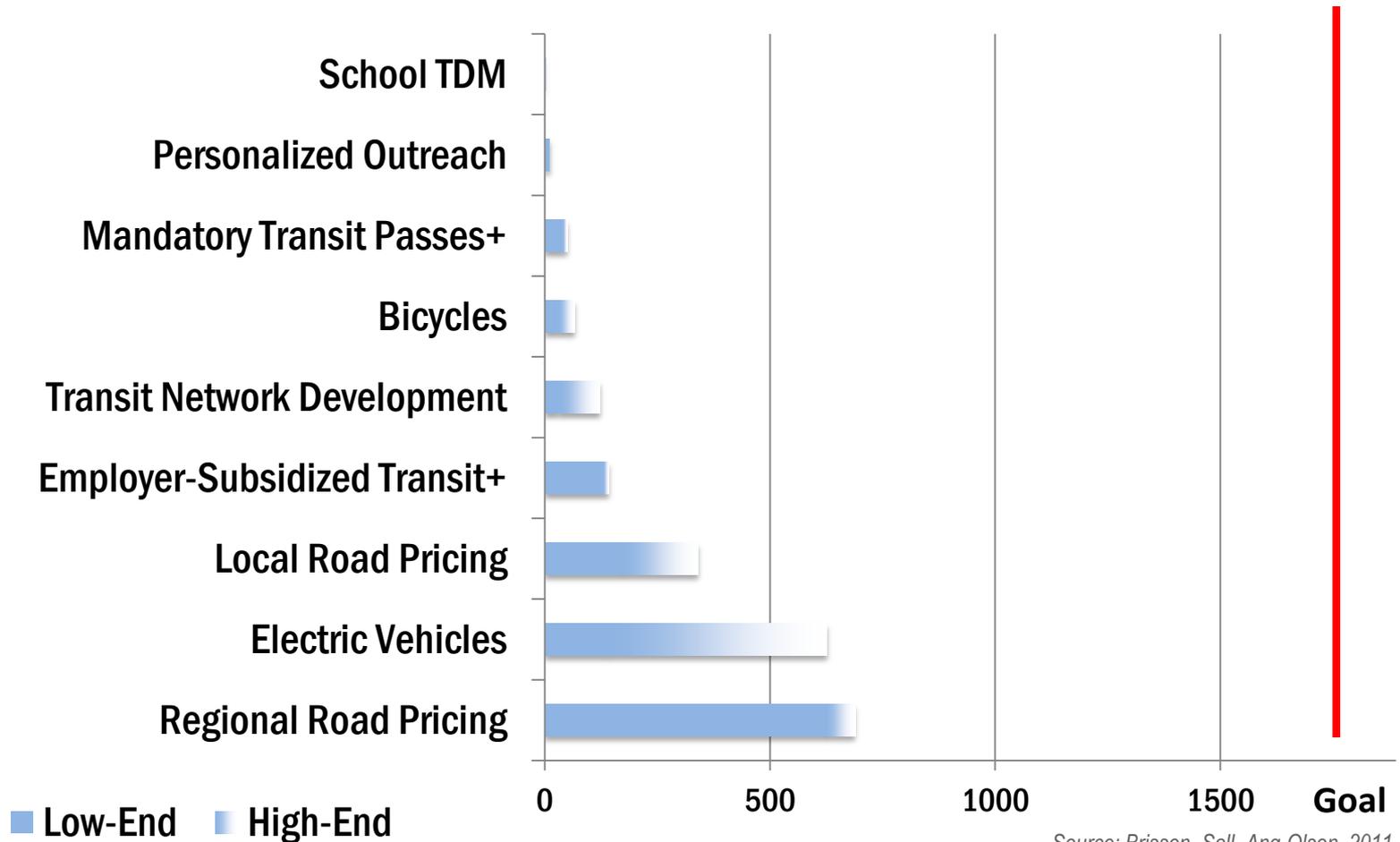


Source: Brisson, Sall, Ang-Olson, 2011



Strategy Effectiveness Results: Pricing and Electric Vehicles Have Potential to Provide Greatest Reduction

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Source: Brisson, Sall, Ang-Olson, 2011



Strategy Cost Effectiveness – Strategies that Share Costs are More Cost Effective for Local Gov't

Cost Effectiveness Rating	Strategies
Most Cost Effective (Revenue Neutral to Revenue Generating)	Regional Road Pricing Local Road Pricing Employer-Subsidized Transit + TDM Mandatory Transit Passes + TDM
Medium Cost Effectiveness (<\$200/ton reduced)	Bicycles Personalized Outreach
Least Cost Effective (>\$1,000/ton reduced)	School TDM Transit Improvements Electric Vehicles

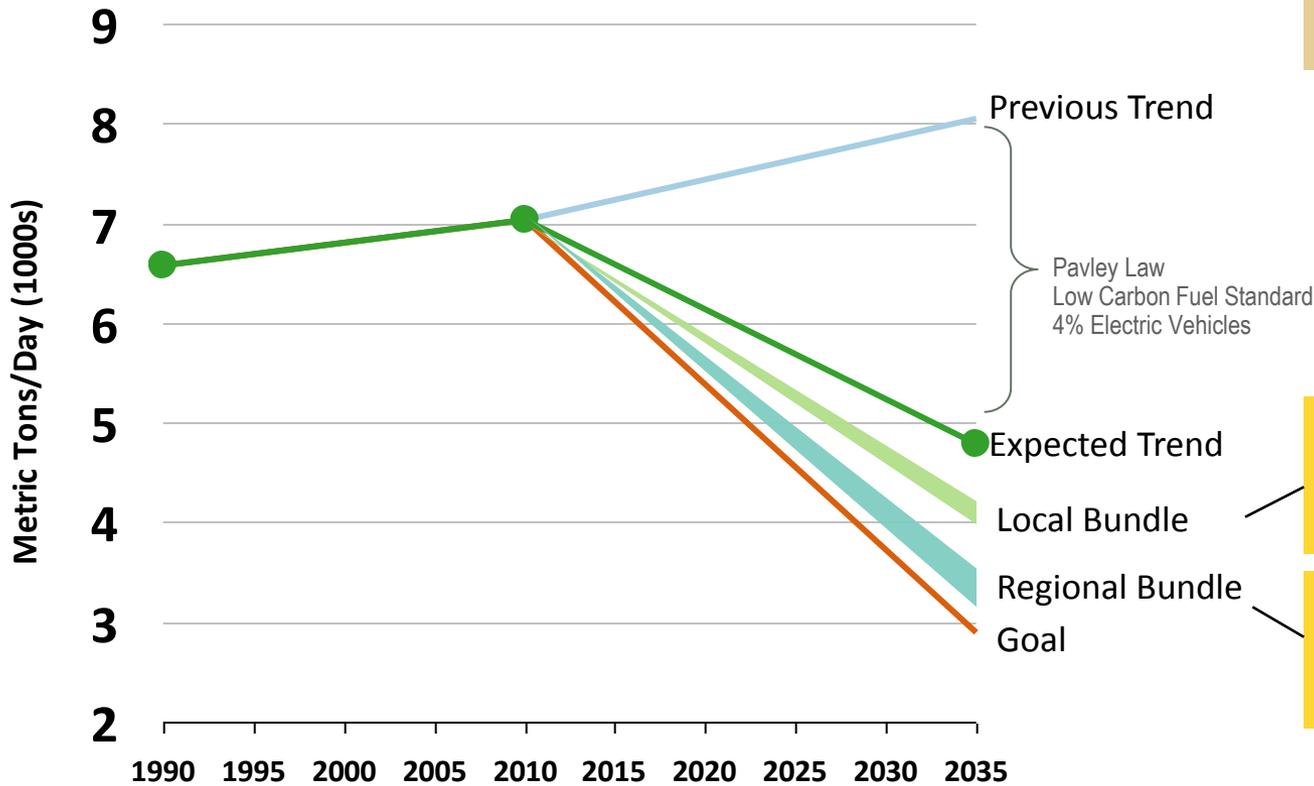
Source: Brisson, Sall, Ang-Olson, 2011



Cumulative Effectiveness

can only approach goal w/ aggressive policy change

San Francisco GHG Emissions Trend vs. Goal
(on-road mobile, weekday)



Costs, Bundle
 ~\$10B Total

- 9-16% EV penetration
- 30-40% reduction vs. trend
- 1.1-1.3 metric tons gap

- 9-25% EV penetration
- 65-85% reduction vs. trend
- 0.3-0.7 metric tons gap

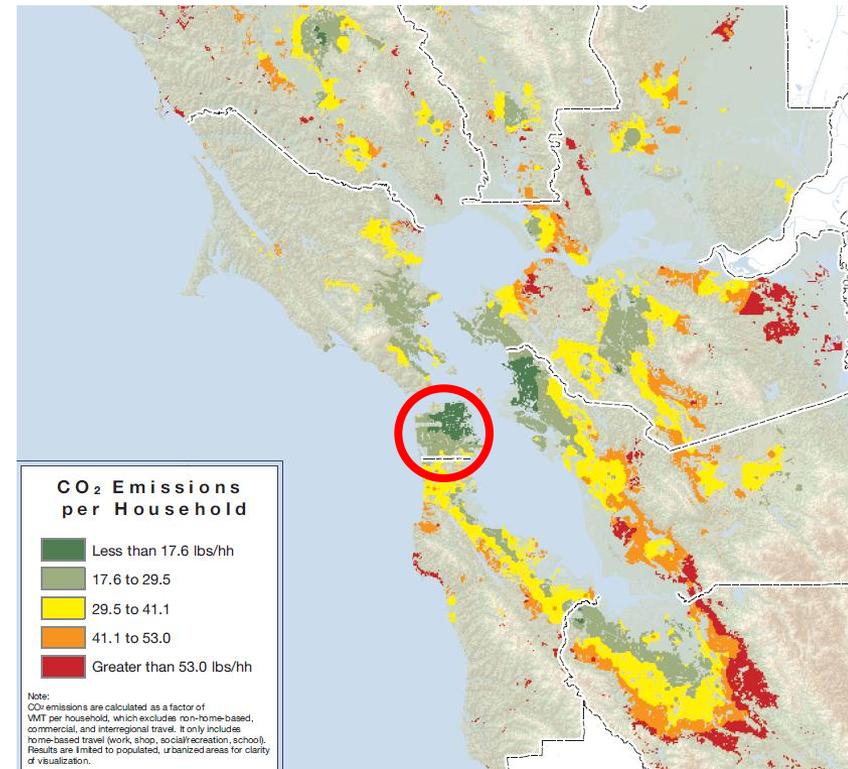
Source: SF CHAMP 4.1 Draft SCS, SFCTA, 2011
 Brisson, Sall, Ang-Olson, 2011



Did we set the right goal?

- ▶ On one hand, if we can't do it in SF, where can we do it?
- ▶ On other, SF is starting from a much lower base

Bay Area CO₂ per Household



Source: MTC, 2007



Road pricing and electric vehicle strategies have potential to provide greatest levels of GHG reduction, cost effectiveness differs dramatically



Strategies that share costs most promising (public, private, individual), in particular to fund infrastructure to provide mode shift



Strategies should be considered in context of co-benefits/impacts



Land use changes also have significant potential, although more relevant for other cities



Implementing local mitigation is important, but can not take the place of national and global policy framework



Thank you, Questions?

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