DRIVING THE FUTURE
Making the South Bay Sustainable

Battery Electric Vehicle Project
South Bay Cities Council of Governments
Board of Directors, September, 2015
SBCCOG
Research & Demonstration Program

• Neighborhood research project, 2004-2009 (funded by SCAG)
• Sustainable South Bay Strategy (SSBS), 2010 (funded by Metro)
• SSBS adopted by SBCCOG Board, 2010
• SSBS “proof of concept” 2011 (SCAG)
• SSBS “limits of concept” 2013 (SCAG)
SBCCOG R&D Program

• **Neighborhood Electric Vehicle Demonstration**, 2010 – 2013 (funded by AQMD)

• **Battery Electric Vehicle Demonstration**, 2012 – 2015 (funded by AQMD)

• **Going forward**
  – Multi-family EVCS demonstration, 2014-2016 (funded by CEC)
  – Land Use and Transportation chapters of city and sub-regional CAP, 2014 – 2017 (funded by SGC)
BEV Demonstration

- AQMD invested in both this and the NEV demonstration to **accelerate ZEV markets** and reduce pollutants from burning fossil fuels
- 2015 remains part of the **Pioneer Days**
- 49 households selected from several hundred applicants
  - Geographic and income balance
  - Data collected from GPS on all HH vehicles, interviews, surveys and focus groups
Is reducing petroleum consumption relevant to South Bay cities? – **YES!**

- **Carrots**
  - $1 billion annual gasoline cost to consumers
  - Cap and trade pool of money available to reduce carbon emissions; plus regional funds for “sustainable” projects

- **Sticks**
  - Federal and state EV mandates
  - State could require General Plans to conform to the regional SCS
Where we are VS the 1.5 million vehicle target

South Bay
Jerry Brown Target

[Graph showing the comparison between South Bay and Jerry Brown's target over the years from 2010 to 2025.]
Data collected and analyzed

- Ping every 30 seconds = over 1 million data points
- Destinations by fuel type, distance from home
- Routes, speeds, dwell times
- Charging locations and times

- VMT per HH before and after BEV, by building type and driver age
- Hot spots
- BEV vs NEV vs ICE
- Emissions reductions
- New vehicle registrations by ZIP
- OEM price and performance data
The Good

- BEVs were used as a complete substitute for ICE
# Emissions Reductions

<table>
<thead>
<tr>
<th>Emission Type</th>
<th>Average % of HH Reductions</th>
<th>Total Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide</td>
<td>40%</td>
<td>175Kg</td>
</tr>
<tr>
<td>Nitrogen Oxide</td>
<td>40%</td>
<td>17.9Kg</td>
</tr>
<tr>
<td>Particulate Matter 10</td>
<td>44%</td>
<td>1.8Kg</td>
</tr>
<tr>
<td>Particulate Matter 2.5</td>
<td>40%</td>
<td>.9Kg</td>
</tr>
<tr>
<td>Sodium Oxide</td>
<td>46%</td>
<td>.2Kg</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>40%</td>
<td>18.5 Tons</td>
</tr>
<tr>
<td>Total Organic Gases (TOGs)</td>
<td>40%</td>
<td>10Kg</td>
</tr>
<tr>
<td>Methane</td>
<td>40%</td>
<td>1.3Kg</td>
</tr>
<tr>
<td>GHG (CO₂ equivalent)</td>
<td>40%</td>
<td>18.5 Tons</td>
</tr>
<tr>
<td>Gasoline Consumption</td>
<td>38%</td>
<td>2,181 Gallons</td>
</tr>
</tbody>
</table>
More Good

• **Average HH VMT around 42**, almost 20 VMT driven in a BEV

• **Charging – Level 1 (110v) at home is adequate**

• **Public charging with a mix of L1 and L2 at work sites and schools**; some at malls and entertainment centers
The Bad

• **Relatively expensive**, even with the state subsidy and federal rebate

• **Range and speed conflict**
  – Travelling on freeways without congestion will reduce the range by 20% to 25%

• “**Fuel gauge**” (remaining charge) **not always accurate**
  – anxiety on way home, especially PVP
The Ugly

- Expectations were a problem – for both NEV and BEV

- The GEM looks different and generated lower expectations with resulting greater satisfaction
More Ugly (& really difficult)

- Household averages but no average households
- No patterns in driving volumes – not age or location
- Driver personality matters
  - equivocate
  - engage
  - Embrace
- No one understands what they need
One cause of congestion - Dispersed destinations

• Walking requires large number of businesses and broad range of business types at one compact location
Beach and Inland Hot Spot 1
Hottest of all hot spots
PVP, Beach and Inland 1 and 2
Neighborhood Development Model

- Intersections serve the commercial needs of their neighborhoods
- Commercial along corridors converts to residential further supporting intersections
- Potential to achieve 25 walking neighborhoods
- Investment focused throughout grid as opposed to along one corridor
- Supportive of local use vehicles (LUV) – destinations within 4 miles
What South Bay Cities Can Do

• Success is related to the private market, but cities can play a significant support role
  – Disseminate PEV information
  – Strategically deploy public charging stations
  – Become PEV ready – electric permits, policies on remodels and new construction
  – Electrify municipal fleets
More for cities…

- Use parking policies to support PEVs
- Facilitate network transportation services
- Promote multi-modal options, for example develop multi-modal routes for slow speed vehicles
- Adopt and implement the land use and transportation chapters of the Climate Action Plans (LUTCAP) when completed
Role for SBCCCOG

• Provide information and other resources to South Bay cities; in general, help facilitate city roles
• Continue to acquire and analyze PEV market data
• Continue to pursue grants for projects of strategic importance to South Bay cities
• Adopt and implement the land use and transportation chapters of the sub-regional CAP
Role for SCAG

- Continue to purchase PEV market data
- Recognize the SSBS on same basis as transit-density strategy
  - Incorporate PEVs into the SCS since land use must be compact enough to support range-limited vehicles
- Support PEV projects through the sustainability grant programs
- Share the NEV and BEV findings with policy committees
R1 Fund strategic initiatives

• Develop and demonstrate an **online decision tool**.
  – Help households assess their actual mobility needs
  – guide them through a set of scenarios by which those needs could be met
  – connect them with vendors who can deliver the vehicles and services identified in the chosen scenario

• Conduct increasingly more high profile demonstration projects
  – 1,000 NEVs, MSEV, neighborhood oriented development
R2 Improve the value proposition of BEVs – real and perceived

- **Industry** -- OEMs are working to increase range; reducing cost may be better idea (7 Honda Civics less than $20,000)

- **State** -- Increase subsidies offered through the Clean Vehicle Rebate Program ($2,500 for largest batteries today)

- **Industry and State** -- Characterize home fueling as a significant convenience and a benefit by reducing dependence on gasoline and its price instability. It’s not a burden.
R3 Expand markets for BEVs

- Provide subsidies for used BEVs
- Provide subsidies to middle and low income consumers
- Develop new types of consumers – community based organizations can purchase and share vehicles; large apartment complexes can do the same
R4 Increase BEV Options

• Is the current vehicle the right product?
• OEMs and consumers alike want a PEV to replicate the ICE to avoid change
  – This attitude fails to take advantage of compact development pattern of a mature suburban region
• Add medium speed electric vehicles (MSEV) to mix of vehicle options
Take-Aways

• Environmental and economic future is in the hands of consumers

• South Bay Trips are too long to walk, too short for transit and perfect for NEVs and range-limited BEVs

• Existing land use and travel patterns mean that the SB vehicle fleet can be 100% electric with minimal changes in travel behavior
Derek Steele
Post-Participation Thoughts