The Sun Powered Electric Car!

Electric Vehicles
&
Home Solar Charging

Rick Corcoran
Rick & Kathy – Proud owners
Chevy Volt & Nissan Leaf
Solar Panels & PG&E Meters

Solar for House

Solar for EVs

Meter for House: 3.5 kW

Meter for EVs: 1.8 kW

Dual Solar Panel Systems
Dual Meters
and Independent
Time of Use metering
Our Home Fueling Station

“We fill our Cars with Sunshine”
Source of Average American's Carbon Emissions

- Transportation: 28%
- Stuff You Buy: 26%
- Home Heating & Cooling: 17%
- Other Home Energy Use: 15%
- Food: 14%

Net Zero Home: 17%
Electric Vehicles: 28%
Carbon Emissions Cut: 60%

Union of Concerned Scientists
Ucsusa.org
Topics

- Types of EVs
- Cost of EVs
- Solar Power Costs
- Benefits of EVs
Vehicle Type Comparison

- Conventional Gas Engine (ICE)  
  i.e. Average Passenger Car in America
  $ 30,000
  MPG 25

- Hybrid (HEV) - Toyota Prius
  $ 25,000
  MPG 50

- Plug In Hybrid (PHEV) – Chevy Volt
  $ 35,000
  MPG 100

- Battery Electric Vehicle (BEV) – Nissan Leaf
  $ FREE!!! (stick around – I’ll show you)
  MPG Infinity!!
Hybrid Electric Vehicle (HEV)

- **Combustion Engine**
- **Regenerative Braking**
- **Electric Motor**
- **Batteries**
- **Gasoline**

Small Battery

Courtesy Electric Drive Transportation Association
Plug-In Hybrid Electric Vehicle (PHEV)

Note: Plug

Medium Sized Battery

Courtesy Electric Drive Transportation Association
Plug-In Hybrid Electric Vehicle (PHEV)

Chevrolet: VOLT

Toyota: PRIUS PLUG-IN

Honda: ACCORD PLUG-IN

Ford: C-MAX ENERGI
Battery Electric Vehicle (BEV)

No Gas Engine

Large Battery

Note: Plug

BEVs

Batteries

Electric Motor

Regenerative Braking

Courtesy Electric Drive Transportation Association
Battery Electric Vehicles (BEV)

Nissan: LEAF

Ford: FOCUS EV

Tesla S

Toyota: RAV 4 EV
Future Electric Vehicles

BMW: i3 (BEV, PHEV)

BMW: i8 (PHEV)

Smart: ED (BEV)

Tesla X SUV (BEV)
Plug In Hybrid Electric Vehicle (PHEV)  
Representative Vehicle: Chevy Volt

- First 40 miles by battery only
- Next 300 miles on gasoline
- 100 MPG Average
Battery Electric Vehicle (BEV)
Representative Vehicle: Nissan LEAF

- Electric motor only
  No gasoline
- Battery much larger than Chevy Volt
- 80 mile range
Battery Electric Vehicle (BEV)  
Representative Vehicle: Tesla S

- Electric motor only  
  No gasoline  
- Battery much larger than Nissan Leaf
- **265 Mile Range!!**
But you said the Leaf costs nothing?!!!
Nissan LEAF: All Electric: 80 Miles

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nissan LEAF MSRP base model</td>
<td>$29,650</td>
</tr>
<tr>
<td>8 % Sales Tax</td>
<td>2,372</td>
</tr>
<tr>
<td>License &amp; Registration</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total paid to Dealer</strong></td>
<td><strong>$32,500</strong></td>
</tr>
<tr>
<td>California Rebate</td>
<td>2,500</td>
</tr>
<tr>
<td>Federal Tax Credit</td>
<td>7,500</td>
</tr>
<tr>
<td><strong>Cost after Rebate and Credit</strong></td>
<td><strong>$22,500</strong></td>
</tr>
<tr>
<td>Solar Panels (4 panels = 1,000 w)</td>
<td>4,000</td>
</tr>
<tr>
<td>Charging Station</td>
<td>2,000</td>
</tr>
<tr>
<td><strong>Total out of pocket</strong></td>
<td><strong>$28,500</strong></td>
</tr>
</tbody>
</table>

That’s right! Nothing. Free. Zero!
Let’s do some calculating!

<table>
<thead>
<tr>
<th>Item</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average American Car</td>
<td></td>
</tr>
<tr>
<td>25 mpg</td>
<td>Gas Mileage</td>
</tr>
<tr>
<td>1,000 mi</td>
<td><strong>Monthly</strong> Driving Distance</td>
</tr>
<tr>
<td>12,000 mi</td>
<td>So… This is the distance driven in a <strong>Year</strong></td>
</tr>
<tr>
<td>480 gallons</td>
<td>Gas needed for 12,000 mi. per year</td>
</tr>
<tr>
<td>$ 2,400</td>
<td>Cost of 480 gallons of gas @ $5.00 per gallon</td>
</tr>
<tr>
<td></td>
<td>(average price paid over the next 8 years)</td>
</tr>
<tr>
<td>$ 100</td>
<td>2 - 3 oil changes per year</td>
</tr>
<tr>
<td><strong>$ 2,500</strong></td>
<td>Amount of money saved per year driving a LEAF</td>
</tr>
<tr>
<td><strong>X 8 years</strong></td>
<td></td>
</tr>
<tr>
<td><strong>$20,000</strong></td>
<td><strong>$$ MONEY $$</strong> saved after 8 years, 100,000 miles</td>
</tr>
<tr>
<td></td>
<td>Battery Warrantee: 8 years, 100,000 miles</td>
</tr>
<tr>
<td>Amount</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>$ 28,500</td>
<td>Total out of Pocket to buy the Leaf, Solar Panels and Charger</td>
</tr>
<tr>
<td>$ 20,000</td>
<td>Total Money saved driving the Leaf</td>
</tr>
<tr>
<td>______</td>
<td></td>
</tr>
<tr>
<td>$ 8,500</td>
<td>Total cost of car after 8 years</td>
</tr>
<tr>
<td>$ 8,500</td>
<td>Resale value of the LEAF after 8 years (based on 8 year old 2004 Toyota Prius with 100,000 miles)</td>
</tr>
<tr>
<td>______</td>
<td></td>
</tr>
<tr>
<td>$ FREE</td>
<td>Total out of pocket cost of LEAF after 8 years WITH Solar Panels</td>
</tr>
</tbody>
</table>

PLUS: You also added **$6,000** to the value of your house with the Solar Panels and Charging Station.
ITS A NO-BRAINER !!

I hope I’ve convinced you that EVERYONE’s 2nd car should be a LEAF
Home Charging

Level 1
120 Volt AC

Level 2
240 Volt AC
Public Charging

Level 2
240 Volt AC

Level 3
480 volt DC Fast Charger
CHAdeMO Compliant EV connector
Full Charge in 30 minutes!
Yearly Cost of Electricity with 2 Meters

- $6 per month for the House meter
- $11 per month for the EV Car meter
- $200 per year to be connected to the Grid
- $100 per year extra electrical expense on House
- $0 per year extra electrical expense for EV cars

~ $300 per year total electrical bill for Home and Cars!
Why Electric Cars?

- Dramatically improve the fuel efficiency of our transportation system. i.e. increase MPG
- Reduces dependence on foreign oil
- National Security (wars)
- Reduces pollution
- Very quick and very quiet
- Saves us money!
Gas Car Parts and Systems Removed in an Electric Vehicle

- No Exhaust system
- No Fuel tank, fuel pump and fuel injector
- No Spark Plugs, Air Filter, and Oil changes
- No Transmission
- No NOISE

- Brakes last twice as long due to regenerative braking

- The only maintenance is rotate the tires ever 7,500 miles!
Plug-in Electric Vehicle Convenience

- Quiet
- Low maintenance
- Fueled at home
- High performance
PG&E’s 2011 Electric Power Mix Delivered to Retail Customers
San Jose Historical Gas Prices

Highly Erratic Prices; Trend Line is $0.25 per year increase. However demand is likely to outpace production in the coming decades.
California's Generation Mix (2008)

Figure 1.1. 2010 U.S. ELECTRICITY GRID MIX

- Coal: 45%
- Natural Gas: 24%
- Nuclear: 20%
- Hydro: 6%
- Wind, Solar, Geothermal: 3%
- Biomass: 1%
- Oil: 1%

Notes: Estimates are based on calendar year 2010 data available from the U.S. Energy Information Administration (EIA 2011a).
Benchmarking
Greenhouse Gas Emissions
(Pounds of CO₂ per MWh)

<table>
<thead>
<tr>
<th></th>
<th>U.S. Average*</th>
<th>California’s Average*</th>
<th>PG&amp;E**</th>
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<tbody>
<tr>
<td></td>
<td>1,329</td>
<td>724</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td>636</td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td>456</td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
<td>489</td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
<td>566</td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td></td>
<td>620</td>
</tr>
</tbody>
</table>


** PG&E’s emissions rates for delivered electricity were independently verified and registered with the California Climate Action Registry. Given that a portion of the electricity that PG&E delivers comes from unspecified generation sources, the company’s total emissions, and associated emissions rates, may vary from registered figures.