

# PV/EV = Solar Power + Electric Vehicles

Sherry Boschert

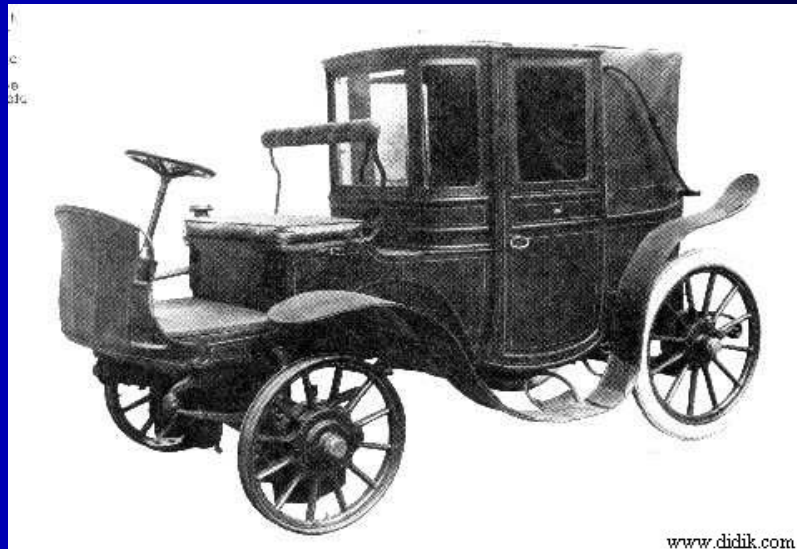
San Francisco Electric Vehicle Association

[sfeva@sfeva.org](mailto:sfeva@sfeva.org)

[www.sfeva.org](http://www.sfeva.org)

# History of EVs

- In the late 1890s, EVs out-sold gas cars 10 to 1.



# Conversions

- 1973 Arab Oil Embargo prompts EV conversions and a few electric car companies.

- Right: 1980 VW Rabbit hatchback





# Fossil fuel costs



Explosion at a BP oil refinery in Texas killed at least 14 people and injured more than 100.

- Extracting, transporting, refining and burning oil has bad consequences for human health and the environment.



# California takes the lead

- Largest U.S. car market
- Cost of lung cancer in CA: \$5 billion/year (1990)
- CARB sets mandate:
  - 2% ZEVs by 1998
  - 10% ZEVs by 2003

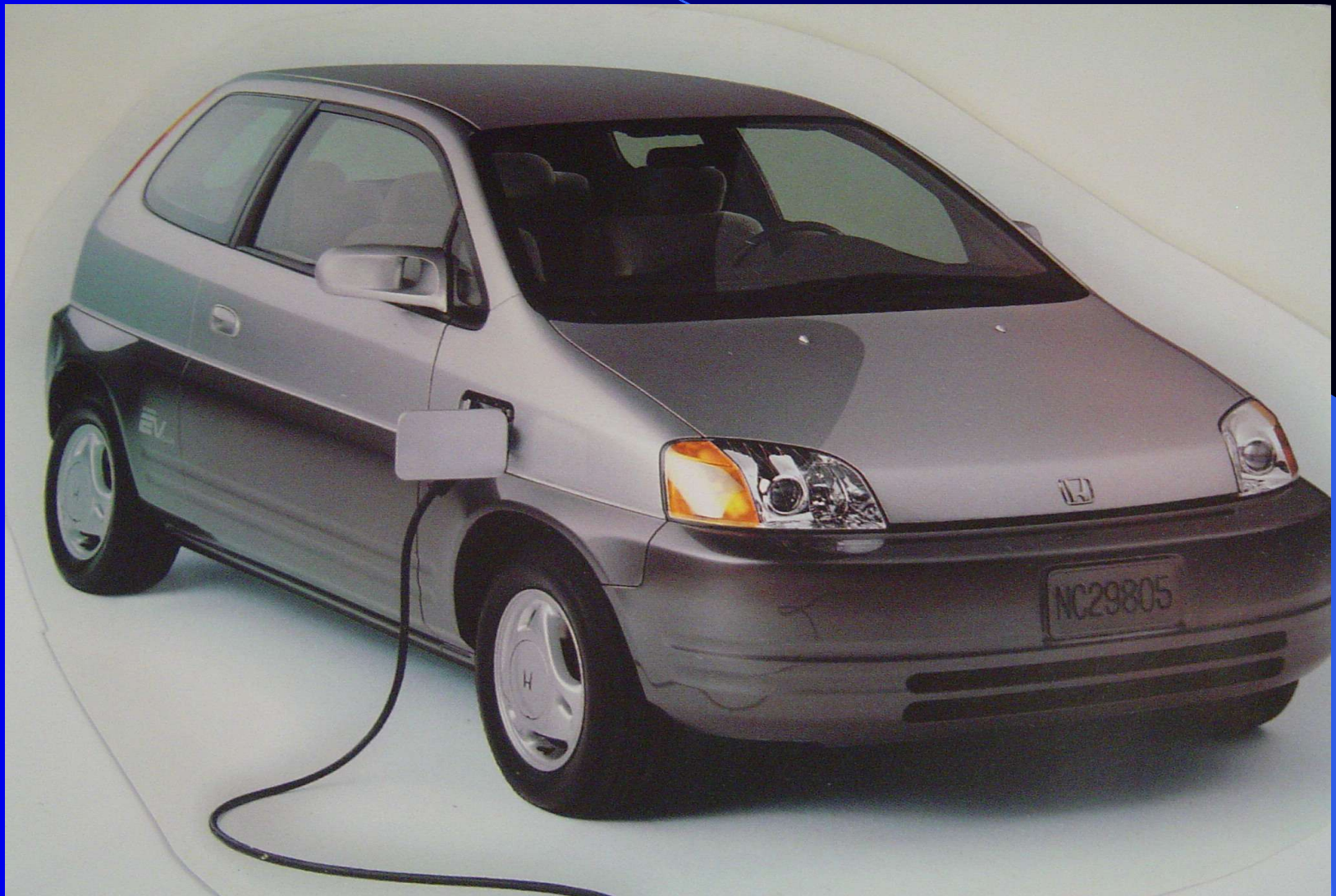


# GM EV-1



[www.sfeva.org](http://www.sfeva.org)

# Honda EV +



# High cost, but big demand:

- Pricy leases: \$350-450/month, 3-years.
- Low gas prices at the time.
- Yet all models were snapped up.
- State money went to automakers:
  - Millions in research & development funds
  - \$9,000 per lease rebate



# Ford Th!nkCity



# Nissan Altra EV



ALTRA EV™

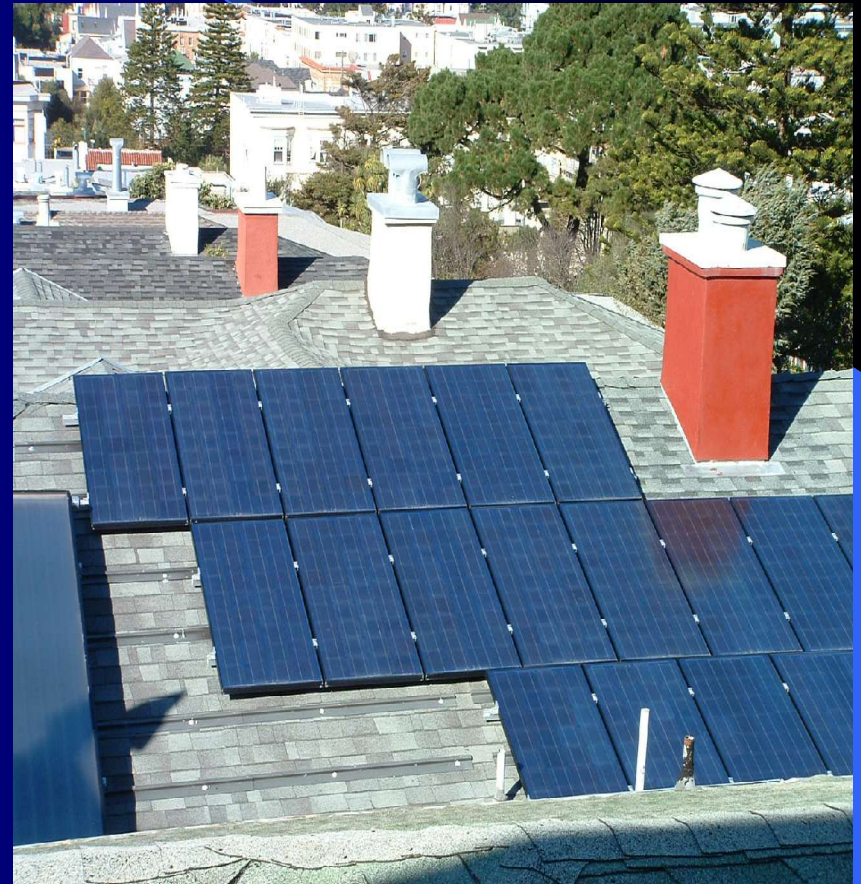
[www.sfeva.org](http://www.sfeva.org)

# Toyota RAV-4 EV



# PV + EV

- Annual true-up billing: summer offsets winter.
- Time-of-use metering: charge at 5 cents/kWh, sell at 30 cents/kWh.
- Never buy gas.



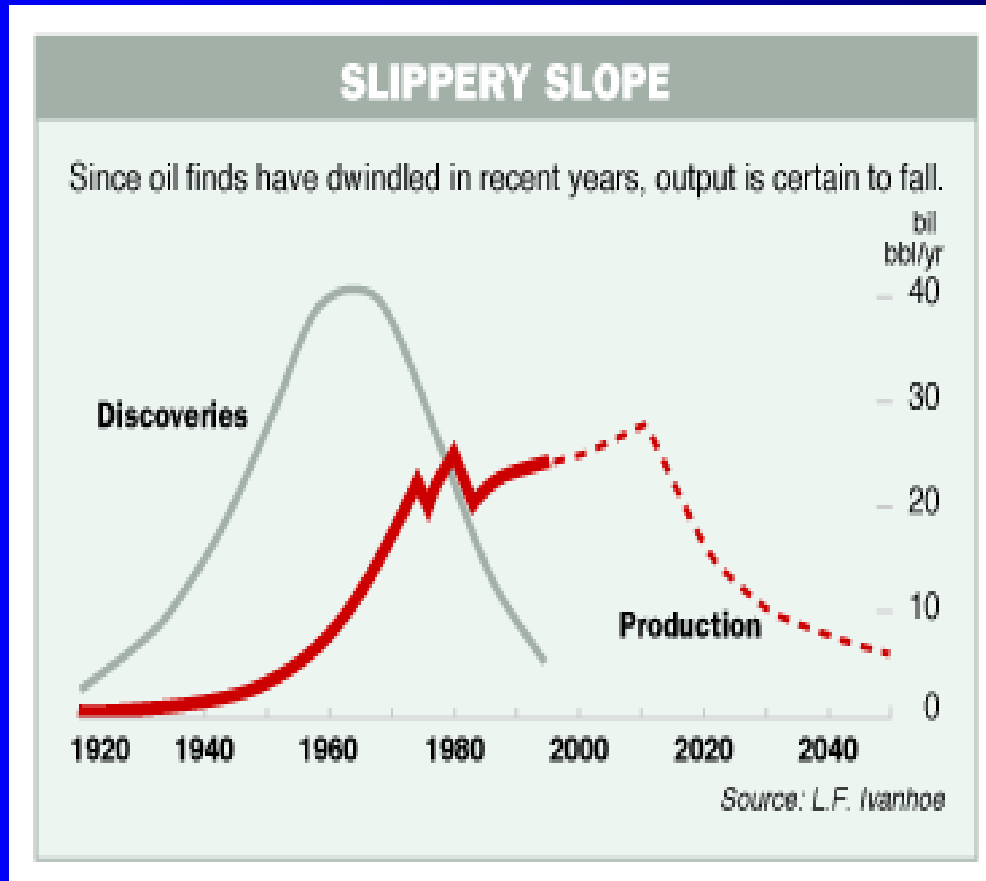
# PV/EV – How much?

- Off-peak charging:
  - 1 or 2 cents/mile to power EV, vs.
  - 13 cents/mile for gasoline (at \$2.50 gallon)
- Panels needed to charge RAV4-EV:
  - 2-3 panels (185 W ea.) to zero-out cost, or
  - 12-16 panels to balance energy generation

# 2003: Mandate eviscerated



# Limited fossil fuels



- Oil is not forever.
- Demand is increasing everywhere.
- We don't have domestic reserves to meet our current, excessive demand.

# National security risks



- U.S. oil dependency poses a continual threat to our national security.
- “...this dependence on foreign oil is a matter of national security. To put it bluntly, sometimes we rely on energy sources from countries that don’t particularly like us.”
- --2002 Pres. George W. Bush



# Wars for oil

- Increasing political intrigue and military conflict over oil as supplies dwindle, demand keeps growing.



# There are more important uses for oil than cars.

1. Aviation
2. Petrochemicals
3. Maritime shipping
4. Defense

Choose: A heart valve for your great, great grandson,  
or a drive to the store in a Hummer today?

- U.S. imports 55% of its oil.
- Cars & trucks use more than 2/3 of all petroleum in U.S. and 1/3 of all energy.
- Emissions from cars & trucks cause 75% of smog in the Bay Area.

(Bay Area Air Quality Management Board)



# California tries again

- Greenhouse gas emissions limits .
- Automakers sue again.
- EV drivers become activists.



[www.dontcrush.com](http://www.dontcrush.com)

The Campaign to Save Electric Cars



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# The Campaign to Save Electric Cars



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# Campaign to Save Electric Cars



# Toyota: Don't Crush Linda's Car!

Meet Howard Stein & the RAV4 EV Toyota sold him.

Howard loves his electric car. Why? Because he doesn't pay oil companies, foreign dictators or terrorists just to get to work.

Howard has driven his electric car 30,000 miles and never stopped once for gas or an oil change. That's because it's 100% electric.

It's never had a smog test either, because the RAV4 EV doesn't even have a tailpipe. It is a zero-emission vehicle.

Howard leased the car, but he liked it so much, he bought out the lease. He is now the proud owner of his RAV4 EV.



Meet Linda Nicholes & the RAV4 EV Toyota refuses to sell her.

Linda drives a RAV4 EV obtained through a commercial lease. She wants to buy it, just like her husband, Howard, bought his individual-lease RAV4 EV. But Toyota has said, "No." It plans to destroy her car and hundreds of other people's RAV4 EVs. In fact, Toyota has already begun destroying them.

Linda feels great knowing that her family fuels both cars with clean solar energy from the panels on their home.

But even though everyone agrees we must import less oil, Toyota wants Linda to go back to gasoline. It just doesn't seem right.

Toyota should be fair to all its satisfied RAV4 EV customers and let all leaseholders purchase their vehicles.

**Ask Toyota to stop crushing the zero-emission, zero-gasoline RAV4 EVs. In the spirit of Kyoto, let Linda and all RAV4 EV leaseholders buy their cars.**

Write: Yukitoshi Funo-sama  
U.S. Corporate President  
Toyota Motor Corporation  
U.S.A.  
P.O. Box 2991  
Torrance, CA 90509

Email: [yuki\\_funo@toyota.com](mailto:yuki_funo@toyota.com)  
Phone: 800-331-4331

## DontCrush.com

This appeal is paid for by DontCrush.com. DontCrush.com is a group of RAV4 EV drivers, ex-EV1, EV4 and Think City lessees, and electric car advocates. It is supported by the Electric Auto Association, Rainforest Action Network, Global Exchange, and Earth Resource Foundation. To find out how you can help save these clean cars, visit our website: [www.dontcrush.com](http://www.dontcrush.com). Write to us at [info@dontcrush.com](mailto:info@dontcrush.com).

**TOYOTA** moving backward ◀



# Cleaner Transportation Options

- Walk and bike more:
  - San Francisco Bicycle Coalition,  
[www.sfbc.org](http://www.sfbc.org)
  - Walk San Francisco,  
[www.walksf.org](http://www.walksf.org)
- City CarShare: [www.citycarshare.com](http://www.citycarshare.com)
- Take public transit: lots of electric!

# Electric bikes & scooters

- 2 shops in SF with both:
  - Noe Valley Cyclery
  - Avenue Cyclery (Haight)



# Put a deposit on a Tango

## MEET THE TANGO

INTRODUCING THE WORLD'S FASTEST  
URBAN TRANSPORTATION



The revolutionary  
commuter vehicle that  
combines the speed and  
agility of a motorcycle  
with the security and  
comfort of a luxury car.

# Tango: [www.commutercars.org](http://www.commutercars.org)



Every crowded parking area has spaces perfect for Tangos and motorcycles.

- \$500 deposit:  
\$18,700 car  
Range: 60-80 miles
- \$1,000 deposit:  
\$39,900 car  
Range: 100+ miles
- \$10,000 deposit:  
\$85,000 car  
Range: even longer

# Buy or make a conversion



# Cloud Electric conversions: [www.cloudelectric.com](http://www.cloudelectric.com)



- Geo Metro  
1994 or later
- Range: 45-60 miles
- Speed: 75+ mph
- \$13,000 plus shell

# EV Bones:

<http://www.evbones.com/>

- Chevrolet S-10 EV trucks (refurbished)
- 877-898-1195
- Lead-acid or NiMH batteries, recharge in 2-4 hours on average



# Sparrow

- Myers Motors:  
[www.myersmotors.com](http://www.myersmotors.com)  
1-866-693-7778
- Used from Cloud Electric, others





# EV community resources



- See [www.sfeva.org](http://www.sfeva.org) for listservs
- Mike Gaylord in SF:  
[mikegaylord@hotmail.com](mailto:mikegaylord@hotmail.com)
- Lawrence Rhodes:  
[bassoon@jps.net](mailto:bassoon@jps.net)  
\$3,500 VW conversions,  
range 15-20 miles

# Buy a used RAV4 EV



- \$30,000-\$42,000

- Listserv at:

<http://five.pairlist.net/mailman/listinfo/rav4-ev>

# Neighborhood Electric Vehicles (NEVs)



- Top speed: 25-35 mph
- GEM: \$7,000-\$9,000  
Global Electric Motorcars  
(Daimler-Chrysler)
- See [www.sfeva.org](http://www.sfeva.org) for others & links

# Non-EV options

- Biodiesel: more Nitric Oxide than ICEs
- Alcohol fuel: damage the engine?

- The Hydrogen Hypeway:

Institute for Lifecycle Environmental Assessment:

<http://www.ilea.org/downloads/MazzaHammerschlag.pdf>

EVs go twice as far on same amount of energy.

- Fossil fuels or nukes to make the hydrogen; or
- 4x as many solar panels, 60% more windmills

# Upstream EV issues



-Power plant pollution:  
a common  
misconception

-Battery components  
(mining, transport)

-Battery recycling:  
>90% recycled

# Well-To-Wheel Emissions

## Smokestacks:

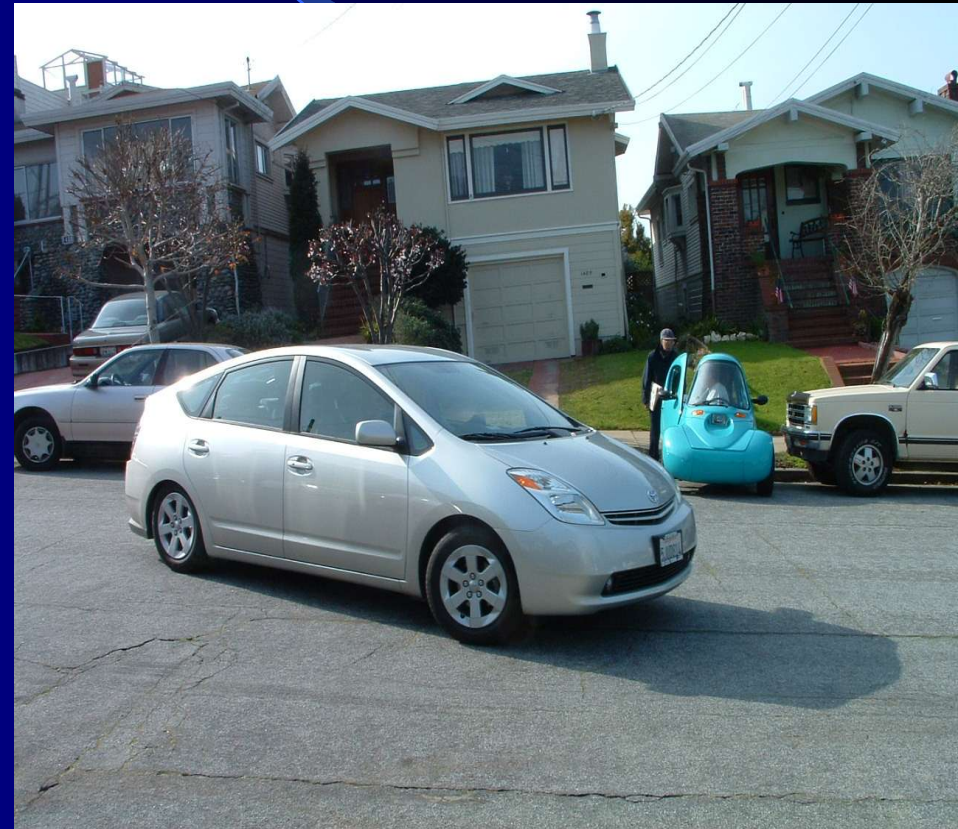
- Pollution produced for 100,000 miles of driving:
  - EVs: <100 pounds
  - ICEs: 3,000 pounds(L.A. Dept. of Water & Power)

## Greenhouse gases:

- Even if the electricity comes from fossil fuels, EVs cut greenhouse gases by 70%
- (Union of Concerned Scientists)

# The future: Plug-in hybrids

- California Cars Initiative: Prius Plus  
<http://www.calcars.org/>
- All-electric in city;  
100+ mpg overall
- Write BAAQMD





## What you can do:

- Join SFEVA [www.sfeva.org](http://www.sfeva.org) or your local EAA chapter [www.eaaev.org](http://www.eaaev.org)
- Tell the car companies what you want (clean cars) and don't want (their suit against Calif.)
- Let politicians know too!
- Support [www.dontcrush.com](http://www.dontcrush.com)
- Support [www.calcars.org](http://www.calcars.org)





## What you can do:

- In San Francisco, support Community Choice Aggregation (see letter in handout).
- Urge the mayor and city supervisors to implement Proposition H (Solar Bonds), passed by voters in 2001!

# A few of my favorite links...

- California Energy Commission's Clean Power Estimator:  
<http://www.consumerenergycenter.org/renev>
- Darrell Dickey's pages on EV and PV: <http://darelldd.com/ev/>
- EV charging sites:  
[www.evchargernews.com](http://www.evchargernews.com)

**HOLD THE DATE:**

**October 1, 2005**

**Solar Tour of San Francisco**