"Who Killed the Electric Car?" Study Guide
Materials from:
http://www.sonyclassics.com/whokilledtheelectriccar/presskit.pdf

Timeline

The following are among the events documented in WHO KILLED THE ELECTRIC CAR?

1979

President Jimmy Carter resolves that the U.S. will never use more foreign oil than it imported in 1977.
1977 total U.S. oil imports (crude & refined): 8.8 million barrels/day
2005 total U.S. oil imports (crude & refined): 13.5 million barrels/day

1987

GM's one-of-a-kind solar powered electric "Sunraycer" wins the World Solar Challenge Race in Australia.

1988

September 1988: GM CEO (1981-1990) Roger Smith agrees to fund a prototype for a practical consumer electric car, engineered by the Sunraycer design team, AeroVironment.

1990

The Los Angeles basin (which includes LA, Orange, Riverside and San Bernardino counties) issues 41 stage-one smog alerts (a stage-one alert is called when ozone, one of the most health-damaging components of smog, exceeds .20 parts per million.)
January 1990: The GM Impact (re-named the EV1 before commercial release in 1996) is introduced as a concept car at the Los Angeles Auto Show.
September 1990: The California Air Resources Board (CARB) adopts the Zero Emission Vehicle (ZEV) mandate, requiring that automakers' California market share include 2% ZEVs in 1998, 5% ZEVs in 2001, and 10% ZEVs in 2003.

1995

March 1995: The American Automobile Manufacturing Association circulates a confidential proposal to launch a public relations "grassroots education campaign" to repeal the CARB ZEV program.

1996

March 1996: In response to auto industry pressure, CARB makes the ZEV mandate more flexible. A "Memorandum of Agreement" between 23
CARB and seven of the largest automakers states, in part, that the automakers will "promote and market ZEVs (zero-emission vehicles)" and build them in a "production capacity sufficient to meet market demand in California." The compromise frees automakers from meeting the 2% ZEV quota in 1998 but still requires that 10% of all new cars and light duty trucks in California be zero-emission, beginning in 2003.

December 1996: The GM EV1 production electric vehicle is made available for consumer lease at $400 - 500 a month.

1999

December 1999: GM finalizes its purchase of the Hummer-brand name from AM General Corporation.

2000

January 2000: Despite GM's claim that it was still committed to its electrical vehicle program, vice-chairman Harry Pearce says that "there is no particular need" to continue building electric vehicles. It also begins, in the coming months, to shift production from the EV1 to gasoline powered cars at its plant in Lansing, Michigan.

2001

October 2001: GM begins to lay off its EV1 sales team, starting with its most successful sales specialists.

2002

January 2002: GM, DaimlerChrysler, and seven San Joaquin Valley auto dealerships sue CARB in the U.S. District Court in Fresno to repeal the ZEV mandate.

October 2002: The U.S. Department of Justice files a "friend of the court brief" in support of GM and DaimlerChrysler's lawsuit against CARB, arguing that its ZEV mandate amounts to an attempt to regulate fuel economy standards, which only the federal government can do.

December 2002: Alan C. Lloyd, Ph.D., Chairman of the California Air Resources Board, is named the 2003 Chairman of the California Fuel Cell Partnership, an organization comprised of public agencies and private companies that promotes fuel cell vehicle technology and infrastructure growth.

2003

January 2003: President George W. Bush calls for research and development of hydrogen fuel cell vehicle technology in his State of the Union Address.

January 2003: Toyota announces that it would stop production on the RAV4 EV, citing poor sales. The RAV4 EV was the only commercial electric vehicle made by a major automaker that could be purchased ($42,000), in addition to being leased monthly.

April 2003: The California Air Resources Board, chaired by Alan C. Lloyd, Ph.D, modifies further the ZEV mandate, effectively dooming the electric car. Under the new revision, auto makers no longer have to make electric cars but instead are required to roll out a mix of fuel cell vehicles, gas-electric hybrids and PZEVs (partially zero emission vehicles) beginning in 2008. Dr. Lloyd had recently become Chairman of the California Fuel Cell Partnership promoting development of hydrogen fuel cell vehicles.

April 2003: Citing that it can no longer provide parts to repair the vehicles, GM announces that it will not renew EV1 leases. It intends to reclaim the vehicles by end of 2004 and tow trucks are dispatched to impound vehicles from customers unwilling to return their EV1s.

July 2003: Mock funeral for the EV1 is held in Los Angeles to draw press attention to GM pulling the EV1 off the road.

Ford, Honda, and Toyota also pull their fleets of leased electric vehicles off the road.

2004

December 2004: Following a tip that EV1s are being trucked to GM's Arizona proving grounds, Chris Paine (Director of WHO KILLED THE ELECTRIC CAR?) rents a helicopter. Scouting the vast proving ground, he spots and films piles of crushed EV1s.

2005

February 2005: The "Don't Crush" Campaign is launched. EV activists launch a 24-hour-a-day vigil at the GM Burbank facility to protest and monitor the fate of 78 impounded EV1s that are discovered in a lot behind a GM facility in Burbank, CA. Activists offer GM $1.9 Million to return the impounded fleet to willing buyers.

March 2005: EV activists learn that GM is loading EV1s held in the Burbank lot onto car-carrier trucks. Protestors block driveways and some are arrested by Burbank PD.

March 2005: In an interview with the filmmakers of "Who Killed the Electric Car?" GM spokesman Dave Barthmuss states that every part of the EV1s are being recycled, not simply crushed.

2006
March, 2006: Toyota and GM, the world's two largest automakers, end joint research on hydrogen-powered fuel cells because they could not agree on sharing intellectual property rights from their hydrogen fuel cell research.

Fact Sheet

The following are among the facts and discussions referenced in WHO KILLED THE ELECTRIC CAR?

1. CO_2 emissions

Every gallon of gasoline burned in a gas-engine automobile adds on average 19 lbs. of CO_2 to the atmosphere.

- Jim Kliesch, a research associate and author of "The Environmental Guide to Cars and Trucks"; also Dr. Janet Hopson, researcher with Oak Ridge National Lab in Tennessee, quoted in "WHEN STUCK IN TRAFFIC, TRY NOT TO THINK OF CARBON DIOXIDE", Miami Herald, 4/11/05
- "Liquefying one kg of hydrogen using electricity from the U.S. grid would by itself release some 18 to 21 pounds of carbon dioxide into the atmosphere, roughly equal to the carbon dioxide emitted by burning one gallon of gasoline", Dr. Joseph Romm, from Congressional Testimony - House Science Meeting, 3/3/04)

2. **Combined Profits of Exxon-Mobil, Chevron-Texaco, and Conoco-Phillips**

2003: $33 Billion
2004: $47 Billion
2005: $64 Billion

- Exxon Mobil, racked up $ 21.5 billion in profits for 2003… ConocoPhilllips, which made $ 4.7 billion during the year. ("EXPLORATION AND PRODUCTION; In times 32
of plenty, they don't flash cash; Energy giants plan no burst of drilling", Nelson Antosh, Houston Chronicle, 2/5/04)
- "Exxon Mobil earned a profit of $25.33 billion last year, 17.8 percent better than in 2003…Chevron Texaco earned a profit of $13.328 billion in 2004 to end in sixth place in the Fortune 500 list." ("Consumers continue pushing oil companies' profits higher", Rockford Register Star, 5/15/05)
- "ConocoPhillips donated $3 million (after an $8 billion profit in 2004)… Exxon Mobil isn't the only oil company to give money to Katrina relief. The second-largest oil company, Chevron, donated $5 million (after a $13.33 billion profit in 2004)" ("Oil companies could pump up charity" by Jimmy Greenfield, Chicago Tribune, 9/9/05)
- "ConocoPhillips (USA), oil concern, nearly doubled its profit to USD 8.13 bil in 2004" (" ConocoPhillips nearly doubled its profits in 2004", Access Czech Republic Business Bulletin, 1/24/05)
- "Exxon's profit for the year was the largest annual reported net income in U.S. history, according to Howard Silverblatt, a senior index analyst for Standard & Poor's. He said the previous high was Exxon's $25.3-billion profit in 2004. The third best performance belongs to Citigroup Inc., which posted net income of $24.64-billion in 2005…. Its $36.13-billion profit is bigger than the economies of 125 of the 184 countries ranked by the World Bank." ("Exxon's record profits: $36.13B", St. Petersburg Times, 1/31/06)
- "Exxon Mobil has announced eye-popping record profits fueled by record gas and oil prices. Fourth quarter profits total $10.7 billion. Income for the year: More than 36 billion. It's the highest annual profit ever reported by a US company" ("Exxon Mobil reports $10.7 billion fourth quarter earnings", Susan McGinnis, CBS

Morning News, 1/31/06)

- "Chevron's profit of $14.1 billion for the full year also was a company record. It has posted record annual profits in each of the past two years, earning a combined $27.4 billion." ("Chevron's profit at record $14.1 billion", Michael Liedtke, AP, 1/28/06)
- "Chevron Corp. yesterday reported the highest quarterly and annual profits in its 126-year history. Fourth-quarter earnings rose 20% to $4.14 billion US, the most it has made in any three-month period since its inception in 1879. Chevron's profit of $14.1 billion US for the full year was also a company record." ("RECORD CHEVRON PROFITS", Toronto Sun, 1/28/06)
- "ConocoPhillips's record profit of $13.5 billion for all of 2005 capped a year in which oil producers and refiners were the top performers in the Standard & Poor's 500 index" ("Net soars at U.S. oil companies; Conoco and Hess rise more than 50% onsurge in energy price", Jim Kennett & Joe Carroll, International Herald Tribune, 1/26/06)
- "ConocoPhillips, the third largest oil and gas group in the US, yesterday reported a 51 per cent rise in fourthquarter profit, cashing in on the high commodity prices that have rankled with a public struggling to cope with ever-growing fuel bills… For the full 2005 year, it reported net income of Dollars 13.5bn, or Dollars 9.55 a share, up from Dollars 8.1bn, or Dollars 5.80 a share, a year earlier. Total revenue was Dollars 183.4bn, up from Dollars 136.9bn." ("Conoco cashes in with 51% rise in profits", Sheila McNulty, Financial Times, 1/26/06)

3. **Coal Usage in America**

According to the Energy Information Administration, the "Electric Power Generation By Fuel Type" states that coal accounted for 50% of the electric power generation in '04.

4. **Average Hybrid Fuel Economy (City and Hwy)**

Japanese Hybrid Vehicles (2000-2006): 42 mpg
American Hybrid Vehicles (2000-2004): 25 mpg

5. **Federal Tax Credits for Vehicles**

2002: Maximum federal tax credit for electric vehicle: $4,000
2003: Maximum federal tax credit for vehicle weighing 6,000 lbs and greater: $100,000

6. **Bush Administration Links to Oil and Auto Industries**

- Vice-President Dick Cheney: former CEO of Halliburton Co. (1995-2000)
- Secretary of State Condoleeza Rice: Member, Board of Directors, Chevron Corp. (1991-2001)
- White House Chief of Staff (resigned March 28, 2006) Andrew H. Card Jr.: GM VP of Government Affairs (chief 34 lobbyist) (1999-2001), President and CEO of the American Automobile Manufacturers Association (1993-1998)
- Former Energy Secretary Spencer Abraham (resigned November 14, 2004) Before his stint as Energy Secretary, Spencer Abraham served briefly in the U.S. Senate, where he twice co-authored bills to open the Arctic National Wildlife Refuge for drilling and opposed raising corporate average fuel economy (CAFE) standards.

7. **Arctic National Wildlife Refuge**

It is estimated that oil extracted from the Arctic National Wildlife Refuge (ANWR) could meet US energy demands for roughly one year. Oil isn't expected to start flowing from ANWR until at least 2015, with peak production commencing around 2025. According to the National Resources Defense Council, raising mileage standards in American autos to 40 MPG (currently feasible with no major technology advances) in the next decade would save 76 billion barrels of oil by 2065—11 times the output of ANWR.

8. **"Long Tailpipe" Controversy Studied**

The "long tailpipe" theory argues that electric vehicles do not reallycreate zero emissions, because the electricity needed to charge the batteries is produced in power plants. In June 2001, the Argonne National Laboratory released a US Department of Energy-sponsored study that found that battery-powered electric vehicles result in a 35% reduction in greenhouse gases. This reduction was based upon electricity generation from the national grid, roughly half of which is derived from coal (According to the Energy Information Administration, the "Electric Power Generation By Fuel Type"

states that coal accounted for 50% of the electric power generation in '04).
In 2004, an analysis of data from the California Air Resources Board found that electric vehicles resulted in a 67% reduction in overall greenhouse gases in California, compared to a car powered exclusively by gasoline. Also in 2004, the Institute for Lifecycle Environmental Assessment compared battery electric vehicles to vehicles using hydrogen fuel cells, and found that the former technology was almost twice as efficient in its use of energy than current fuel cell technology. Electric vehicles also reduced nearly twice as much greenhouse gas emission than hydrogen fuel cell vehicles. Finally, some energy experts and utility analysts contend that millions of plug-in hybrid electric vehicles could be added to California's fleet without substantially impacting the state's current energy grid, since most of the charging for the plug-in hybrid electric vehicles could be done during off-peak hours, at night.

2004 CARB reference: information derived from CARB staff report – "Regulations to control greenhouse gas emissions from motor vehicles" (8/6/04) Argonne National Lab. Reference: "Development and Use of GREET 1.6 Fuel-Cycle Model for Transportation Fuels and Vehicle Technologies", by MQ Wang, Center for Transportation Research, Argonne National Laboratory, June 2001
"Carrying the Energy Future: comparing electricity and hydrogen for transmission, storage and transportation", Institute for Lifecycle Environmental Assessment, Patrick Mazza & Roel Hammerschlag, June 2004, p.25
phone conversation with Southern California Edison's Ed Kjaer, December, 2005

9. **Production Electric Vehicles Sold or Leased in U.S.**
General Motors EV1
Ford Ranger pickup
Ford Th!nk City
Ford Th!nk Neighbor
Honda EV Plus
Toyota RAV4 EV
Nissan Altra EV
GM Chevrolet S-10 compact pickup
Chrysler EPIC minivan

10. **Total Number of GM EV1s Leased 1996-2000:**
about 800

11. **Ratio of EV1 Waitlist Names to Committed Customers**

- According to GM, 4000 prospective EV1 customers on waitlists were contacted in 2001 about leasing an EV1, and only 50 were willing to sign a lease. EV1 supporters argue that GM discouraged prospects from signing up with the EV1 program.
- "Mr. Stewart acknowledged that more than 4,000 people had requested more information about the car. "Yet in 2001," he said, "when the company asked those people if they would sign a lease for a car should one become available, less than 50 people wanted to go to the extent of actually leasing." ("Leased and Abandoned: Revolt of the EV-1 Lovers", Chris Dixon, New York Times, 10/22/03)

12. **5 Conditions Required for a Viable Hydrogen Fuel-Cell Vehicle** (as mentioned in the film by Joseph J. Romm, Ph.D., author, *The Hype about Hydrogen)* **:**

- Price. Hydrogen fuel-cell vehicle currently costs 1 million dollars.
- Range. Normal-size vehicle can't carry enough hydrogen (H2) fuel to provide needed range.
- Fuel. H2 fuel is very expensive and is currently produced using non-renewable fuel sources.
- Infrastructure. A national H2 fueling stations must be built at enormous expense before H2 cars are commercially viable.
- Competition. By the time the other miracles are overcome, competing technologies will have improved.

APPENDIX E.2
U.S. Environmental Protection Agency Emission Rates and Fuel Consumed per Mile by Vehicle Type
(http://www.epa.gov/oms/consumer/f00013.htm)

These tables can be used to calculate emissions from automotive transportation per mile in comparison to zero emissions from bicycle transport for equal distance. *The figures presented in this document are averages only. Individual vehicles may differ in miles traveled and pollution emitted per mile than indicated here. Emission rates and fuel consumption totals may differ slightly from original sources due to rounding.*

Light Duty Truck:

Component	Emission Rate and Fuel Consumption per mile (mi)[1]	Calculation	Total Annual Pollution Emitted and Fuel Consumed[3]
Hydrocarbons	3.51 grams (g)	(3.51 g/mi) x (14,000 mi) x (1 lb/454 g)	**108 pounds of hydrocarbons**
Carbon Monoxide	27.7 grams	(27.7 g/mi) x (14,000 mi) x (1 lb/454g)	**854 pounds of carbon monoxide**
Oxides of Nitrogen	1.81 grams	(1.81 g/mi) x (14,000 mi) x (1 lb/454g)	**55.8 pounds of oxides of nitrogen**
Carbon Dioxide[2]	1.15 pounds (lb)	(1.15 lb/mi) x (14,000 mi)	**16,035 pounds of carbon dioxide**
Gasoline	0.0581 gallon	(.0.581 gallon/mi) x (14,000 mi)	**813 gallons of gasoline**

Passenger Car:

Component	Emission Rate and Fuel Consumption per mile (mi)[4]	Calculation	Total Annual Pollution Emitted and Fuel Consumed
Hydrocarbons	2.80 grams (g)	(2.80 g/mi) x (12,500 mi) x (1 lb/454 g)	**77.1 pounds of hydrocarbons**
Carbon Monoxide	20.9 grams	(20.9 g/mi) x (12,500 mi) x (1 lb/454g)	**575 pounds of carbon monoxide**
Oxides of Nitrogen	1.39 grams	(1.39 g/mi) x (12,500 mi) x (1 lb/454g)	**38.2 pounds of oxides of nitrogen**
Carbon Dioxide[2]	0.916 pound (lb)	(0.916 lb/mi) x (12,500)	**11,450 pounds of carbon dioxide**
Gasoline	0.0465 gallon	(0.0465 gallon/mi) x (12,500 mi)	**581 gallons of gasoline**