



# TESLA MOTORS

**California ARB ZEV Symposium**

26 September 2006  
Martin Eberhard



# Agenda

- Tesla Motors Introduction
- Tesla Motors Status
- Charging Standard
- Technology Comparison





# Tesla Motors Introduction

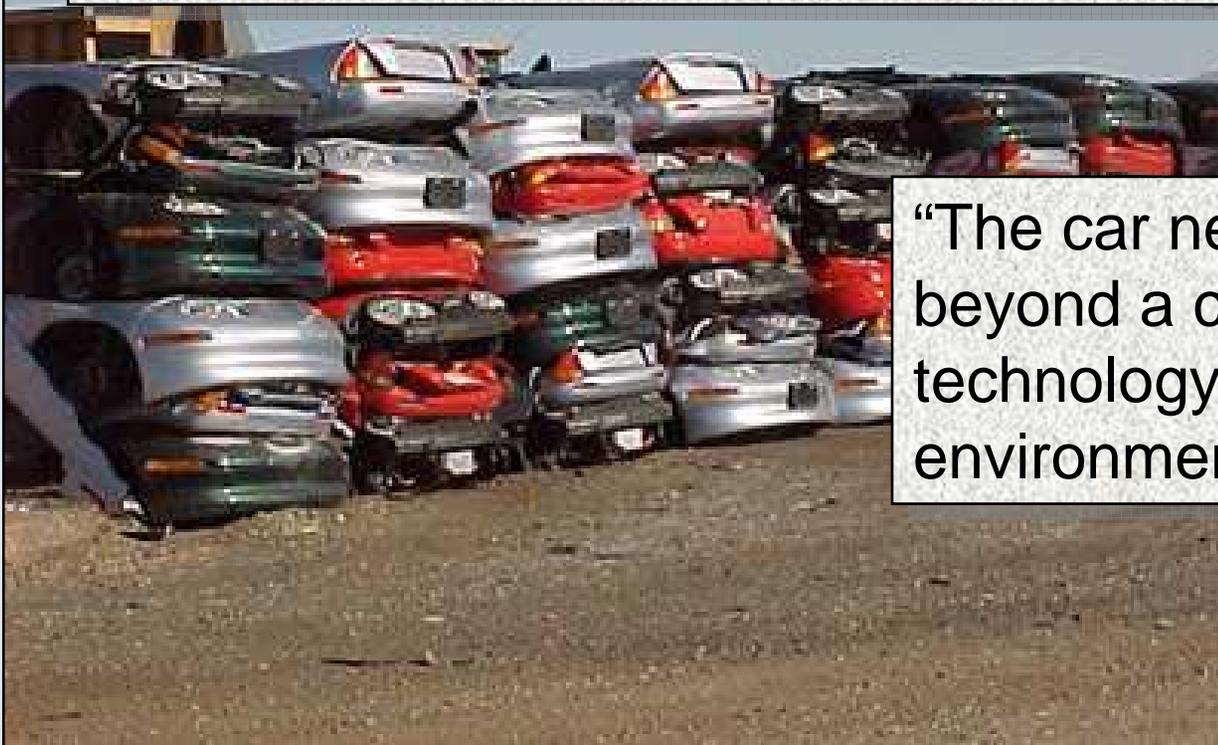




## A Brief History of EVs

"There simply weren't enough [EV-1 customers] at any given time to make a viable business proposition for GM to pursue long-term."

-GM spokesman Dave Barthmuss, Washington Post, 3/10/05

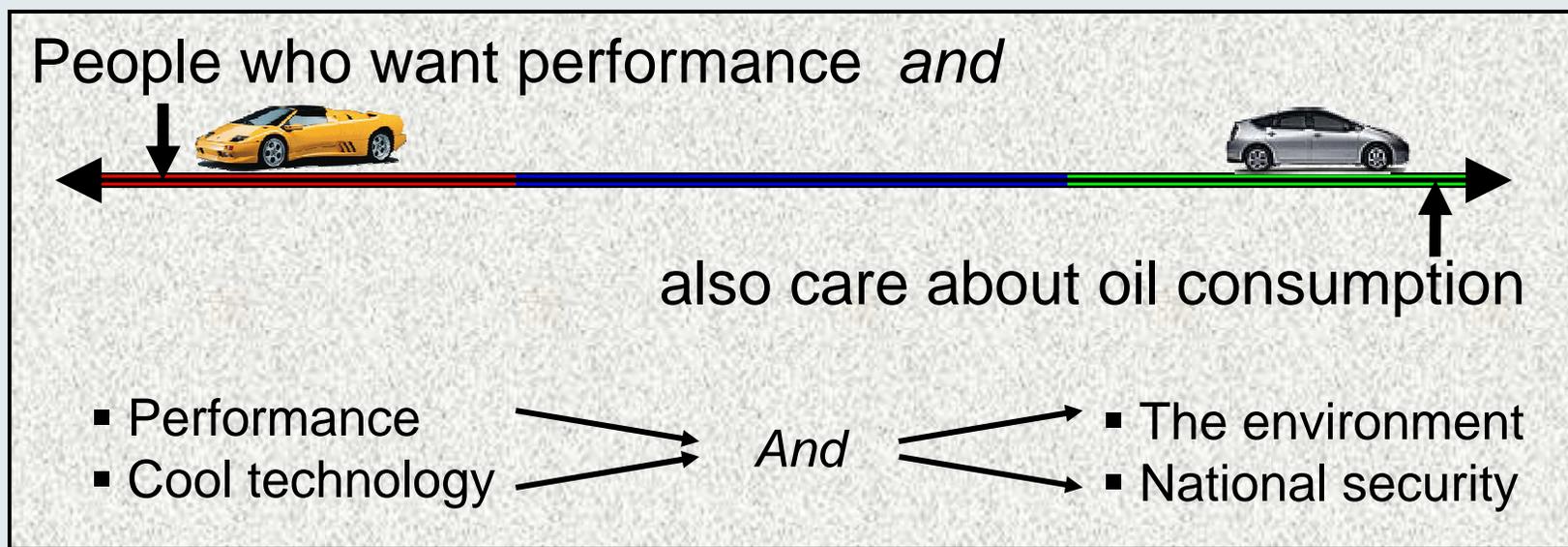


"The car never had appeal beyond a core group of technology enthusiasts and environmentalists."



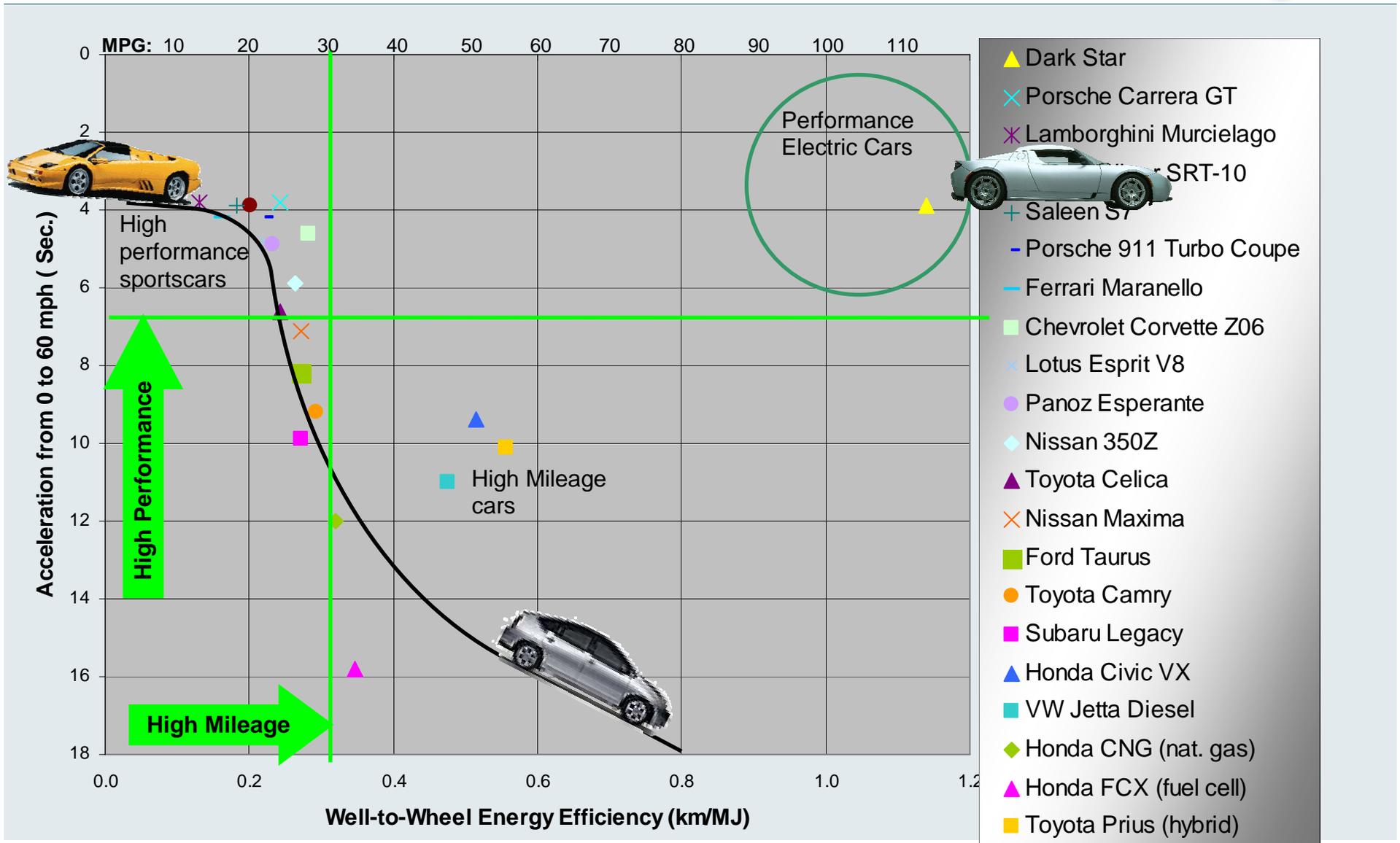
# Performance Electric Cars

## Tesla's Customers





# Tesla's Performance Electric Cars





## The Tesla Roadster

*The definition of a Performance Electric Car*

Tesla Motors designed:

- 50 kWh lithium ion battery pack
- 185 kW AC induction motor
- Power Electronics Module
- Carbon fiber body
- Bonded, extruded aluminum chassis

0-60 mph acceleration: <4 seconds

EPA highway driving range: >250 mi.

Well-to-wheel efficiency: >135 mpg equivalent

Driving cost: About 1 penny per mile

Charging infrastructure: existing electric service



# Project White Star

## Tesla's Sport Sedan

### Target Performance

- 0-60 mph acceleration: <6 seconds
- Well-wheel efficiency: >110 mpg equivalent
- EPA highway driving range: >250 mi.
- Base model < \$50,000

Low mass

Car	0-60 Time	Gas Mileage
Mercedes E55 AMG	4.5 Sec 😊	17 mpg 😞
BMW 545i	5.7 Sec 😊	20 mpg 😞
Lexus GS 430	5.9 Sec 😊	20 mpg 😞
Toyota Prius	10.4 Sec 😞	55 mpg 😊
White Star	5.7 Sec 😊	~110 mpg 😊

from

Dark Star drivetrain



# Tesla Motors Status



# Tesla Motors Status

- Founded July, 2003
- Raised \$60M through individuals and Venture Capital firms
- 120 employees worldwide (and hiring!)



Tesla Motors Inc.  
1050 Bing St.  
San Carlos, California

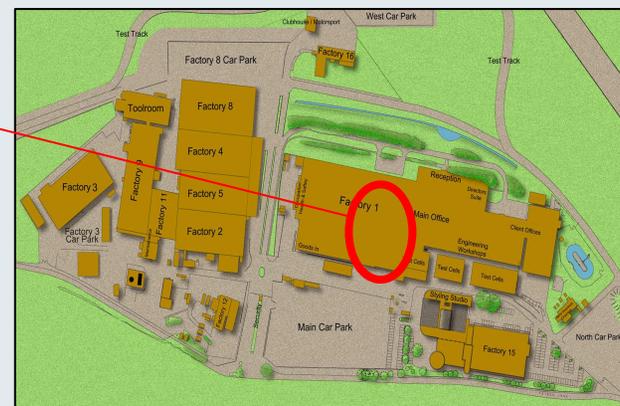
Tesla Motors Customer Center  
Santa Monica Blvd  
Los Angeles, California  
(3 more coming soon)



Tesla Motors Ltd.  
Hethel  
Norfolk, UK



Tesla Motors Taiwan Ltd.  
San Chung City  
Taiwan





## Roadster Status

Currently in engineering prototype phase

- FMVSS Collision testing
- Durability testing
- Performance testing
- Supplier qualification

Validation phase scheduled for early '07





## Roadster Status

Production scheduled for Q2 '07

- Motor assembly by Tesla in Taiwan
- Battery assembly by Tesla in Thailand (!)
- Component suppliers from around the world
- Final assembly by Lotus Cars in the UK





## Roadster Status

Pre-sales started: 19 July 2006

- \$100K for fully-optioned cars
- 100% deposit for most; 75% deposit for later cars
- Approximately 170 cars sold already
- Model Year 2007 almost sold out





## White Star Status

- Vehicle technical specification complete
- Feasibility study complete
- Preliminary vehicle architecture complete
- Chassis and body technologies chosen
- USA factory site location study underway
- Production anticipated for first half of 2009

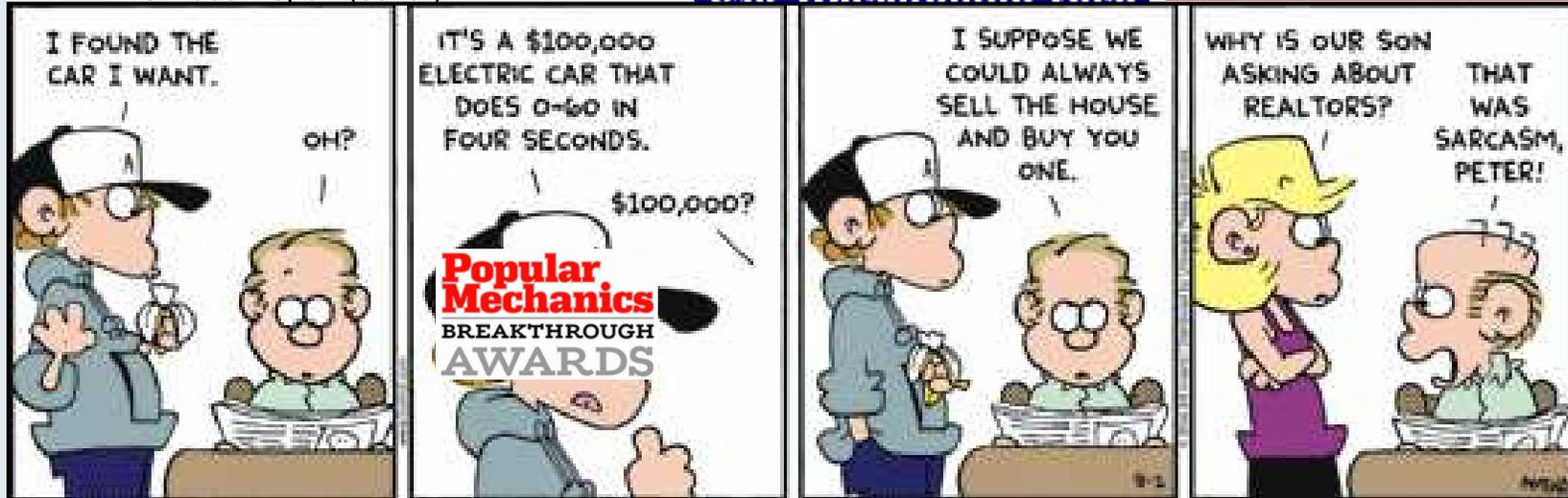




# Tesla Motors Status

## Wide press coverage

- Wired Magazine
- The Economist
- The Robb Report (cover)



- Road and Track Magazine
- Car and Driver Magazine
- NPR Marketplace
- CBS Evening News
- msm Autos
- CNBC
- BBC Radio 4
- The Guardian
- Jalopnik





# Charging Standard



## ACE Charging System



- License-free, open standard
- Designed for safety, durability, and ease of use
- NRTL approval through CSA; listed product
- Based on SAE 1772 AC charging protocol
- Conductive charging: efficient, low-cost equipment
- 70-amp 110 – 240 volt charging for quick (17 kW) charges
- Connector based on sturdy Amphenol military connector
- Hard-wired EVSE and mobile charging modes
- Connector cost: about \$40 per side

Contact Tesla Motors for information



# Technology Comparison



## Right Questions

Q: What is the net resource consumption per mile?

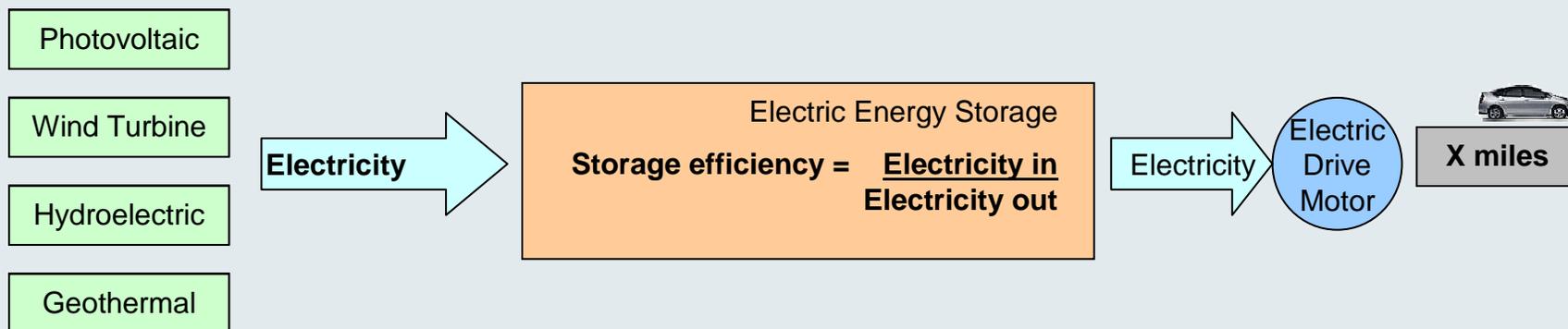
Q: What are the carbon emissions per mile?

Q: What is the net reduction of petroleum usage?



# What about Fuel Cells?

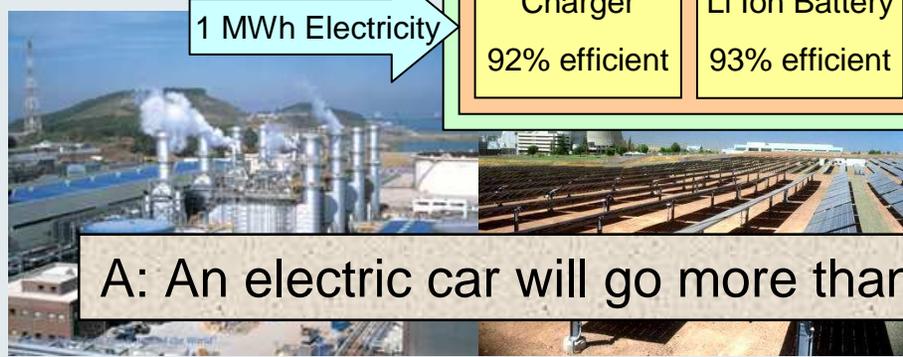
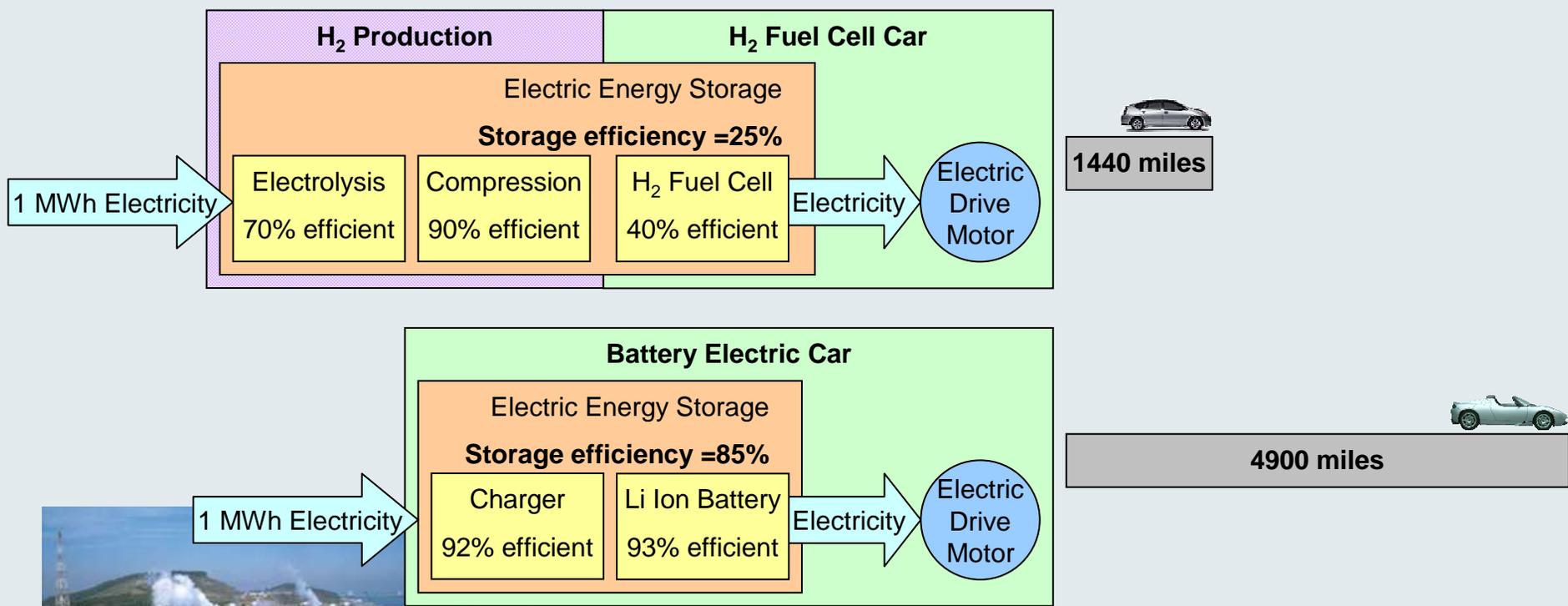
Q: How many miles will one unit of electricity power a car?





# What about Fuel Cells?

Q: How many miles will one unit of electricity power a car?

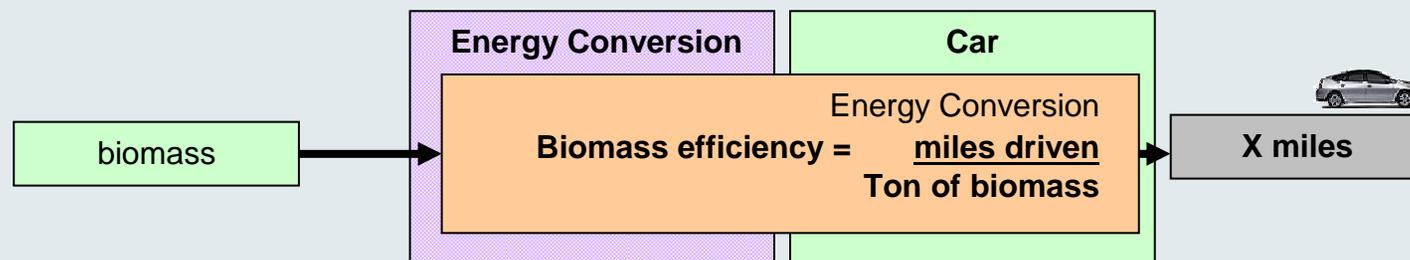


A: An electric car will go more than 3 times as far as a fuel cell car



## What about Ethanol?

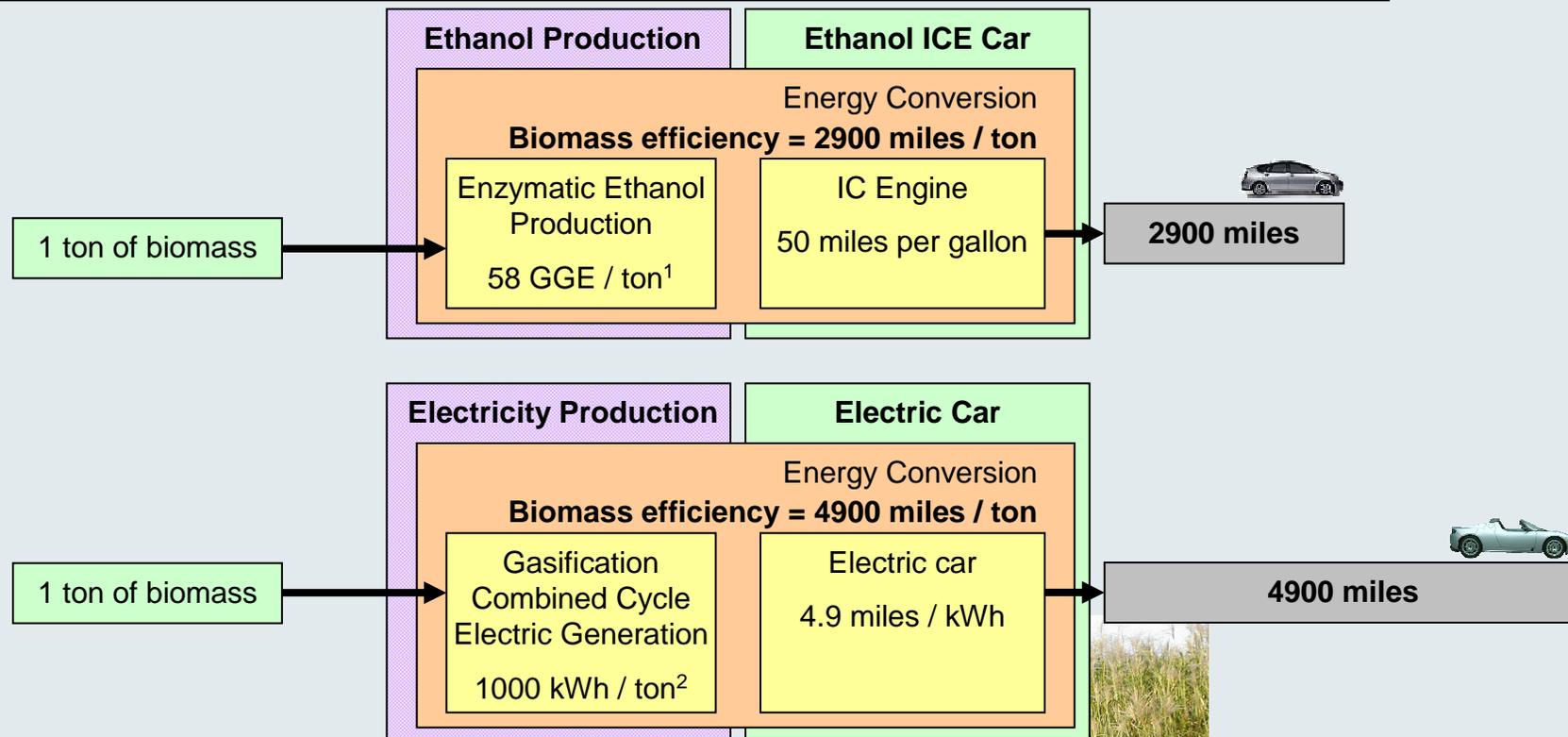
Q: How many miles will one unit of biomass power a car?





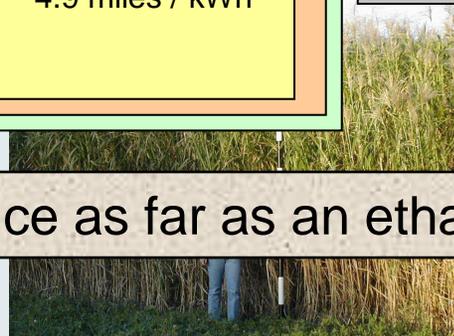
## What about Ethanol?

Q: How many miles will one unit of biomass power a car?



A: An electric car will go almost twice as far as an ethanol car

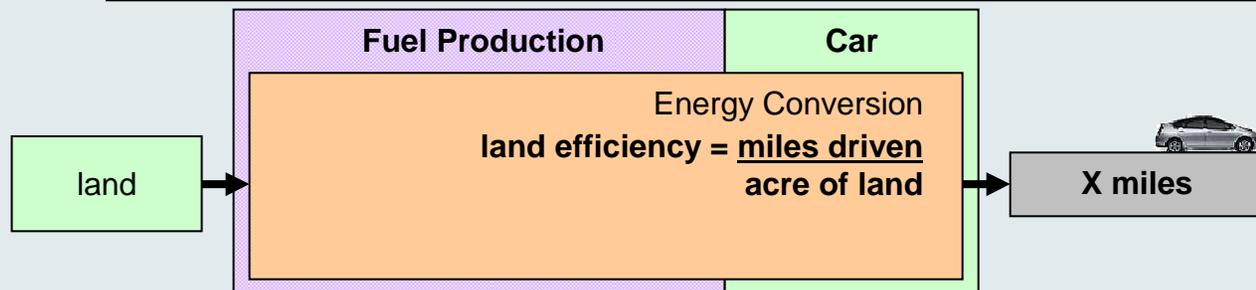
1. Iogen enzymatic process, gallons of gasoline equivalent
2. Southern Company Services





## What about Ethanol?

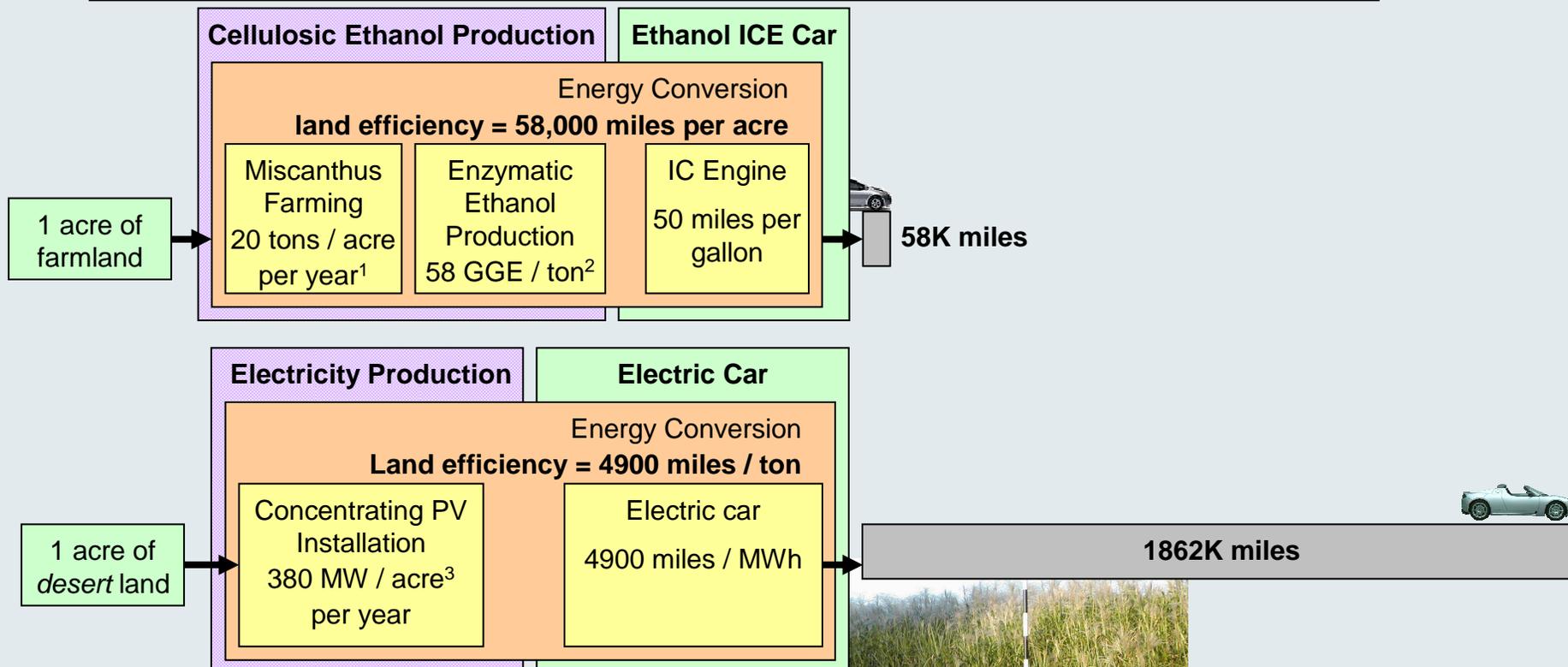
Q: How many miles will one unit of land power a car per year?





# What about Ethanol?

Q: How many miles will one unit of land power a car per year?



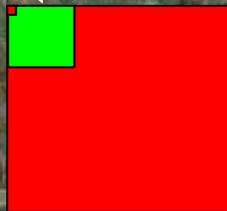
A: An electric car will go 32 times as far as an ethanol car

1. Vinod Khosla
2. logen enzymatic process, gallons of gasoline equivalent
3. Pinnacle West Capital Corporation

Best-Case Cellulosic Ethanol

Today's Corn-based Ethanol

Photovoltaic



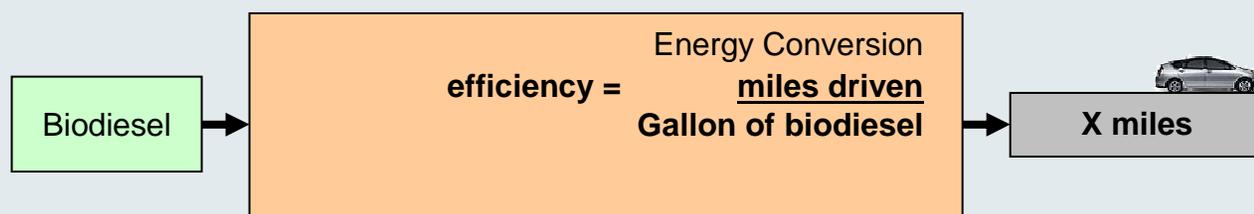
What area is required to offset 50% of miles driven in US (2001)?





## What about Biodiesel?

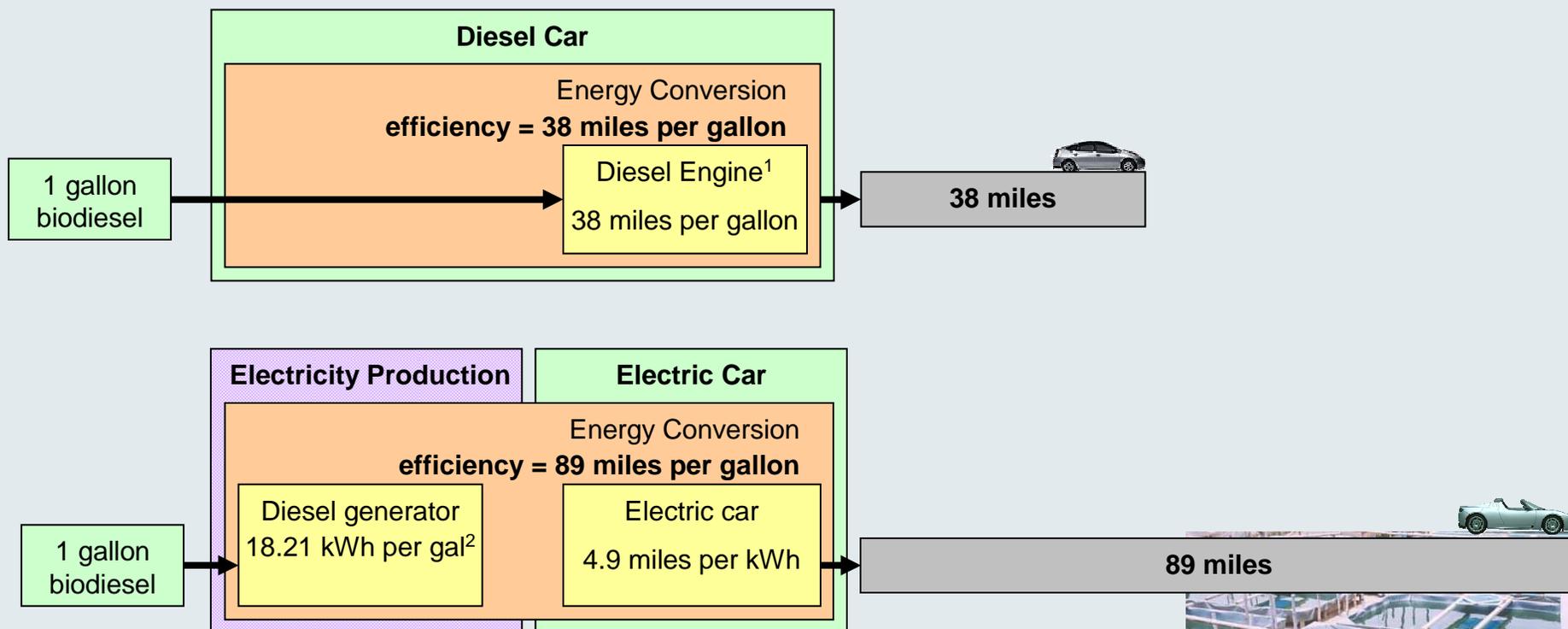
Q: How many miles will one gallon of biodiesel power a car?





## What about Biodiesel?

Q: How many miles will one gallon of biodiesel power a car?



A: An electric car will go more than twice as far as a diesel ICE car

1. 2006 Diesel Beetle
2. e.g. Anguilla Electric Company, 2001 average



## Conclusion

Whatever the resource, we must use it as efficiently as possible

- Fossil fuel
- Green electricity
- Biomass
- Land



"The best way to predict the future is to invent it."

- Alan Kay

