



MILKEN INSTITUTE

THE WALL STREET JOURNAL.

GM Collapses Into Government's Arms
-June 2, 2009



SATURDAY, NOVEMBER 14, 2009
BARRON'S

"Investors, grab this bargain while you can."
-Nov. 14, 2009



Israel: World's largest EV charging network

Commercial/Public Parking



Single Family Residence



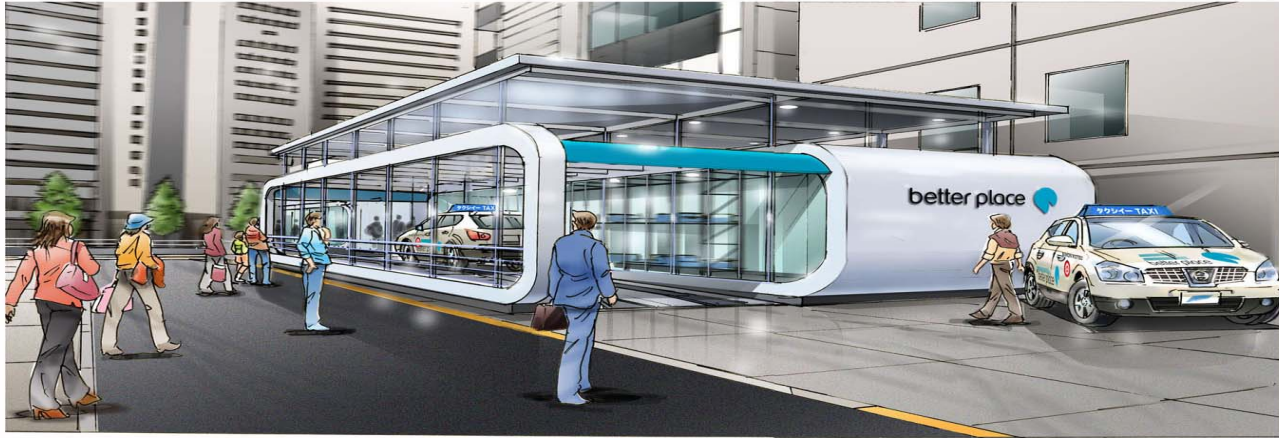
Street-Side Parking



Parking Garage



Tokyo Taxi Demo



EV Customer Services



MILKEN INSTITUTE



Customer Charging

- SLA based services for enrolled users
- “Plug & charge” with automated billing
- Roamers supported by toll free service enrollment, credit card billing



Customer Support

- Instant messaging
- Alerts & charge plan override
- 24x7 Call Center



Customer Services

- Road-side assistance
- Trip planning
- Charge scheduling
- Battery switch scheduling



Israel Visitor Center



MILKEN INSTITUTE



PHEV vs. HEV

TECHNOLOGY

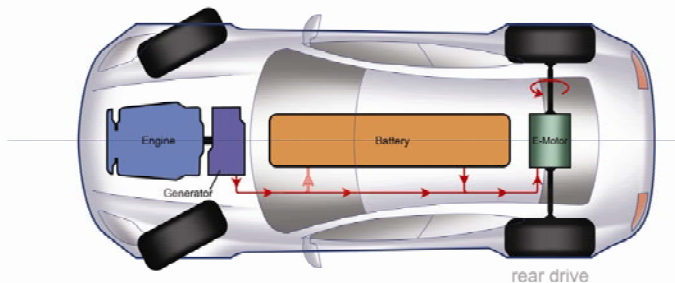


MILKEN INSTITUTE

Series Plug-in Electric Hybrid

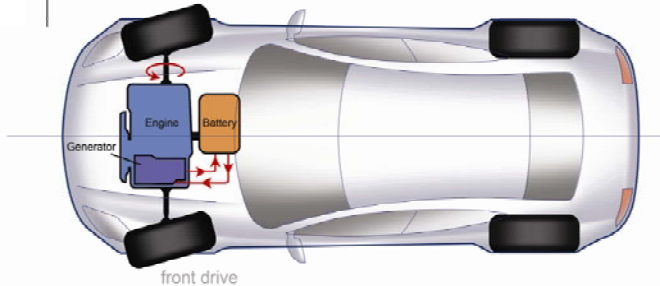
Karma

50 mi electric-only range: possible
+ 250 mi with gasoline / generator: possible



Parallel Hybrid

no electric-only range



Fisker Design: Re-igniting Passion

DESIGN



MILKEN INSTITUTE





MILKEN INSTITUTE

Lead the Future...



Plug-in Hybrid = Ultimate Range = Ultimate Freedom

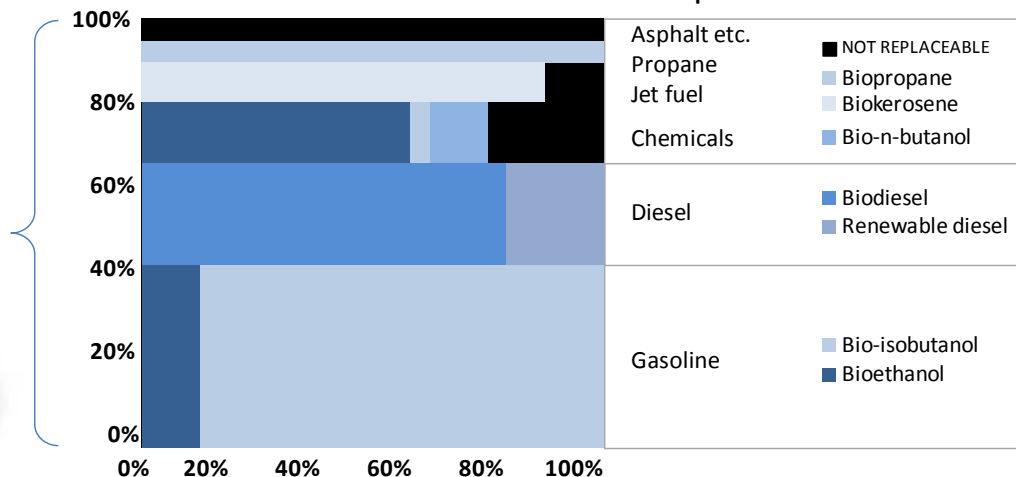
We can make it...



MILKEN INSTITUTE



% of petroleum use



Substitution Potential

Source:

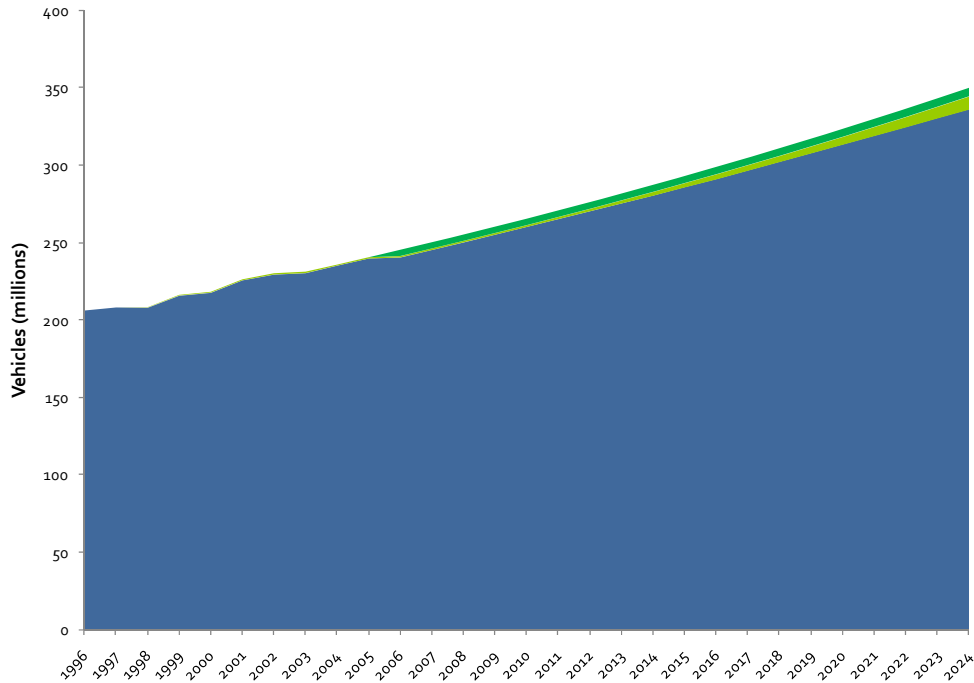


luxresearch

...but we can't use it



MILKEN INSTITUTE



...and it takes a lot of space



MILKEN INSTITUTE



1 BARREL OIL



SUN

annual output of
26m² solar panel



LAND

annual production
of 1000m²



MASS

1 ton
dry biomass

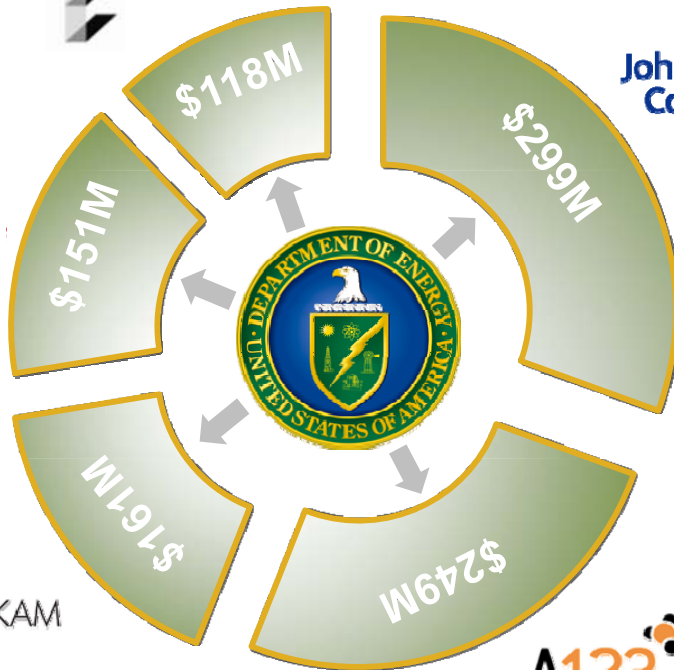




MILKEN INSTITUTE



MILKEN INSTITUTE





MILKEN INSTITUTE

REVOLT |
TECHNOLOGY

A123
SYSTEMS




amprius

amperics

CFX Battery.

ActaCell

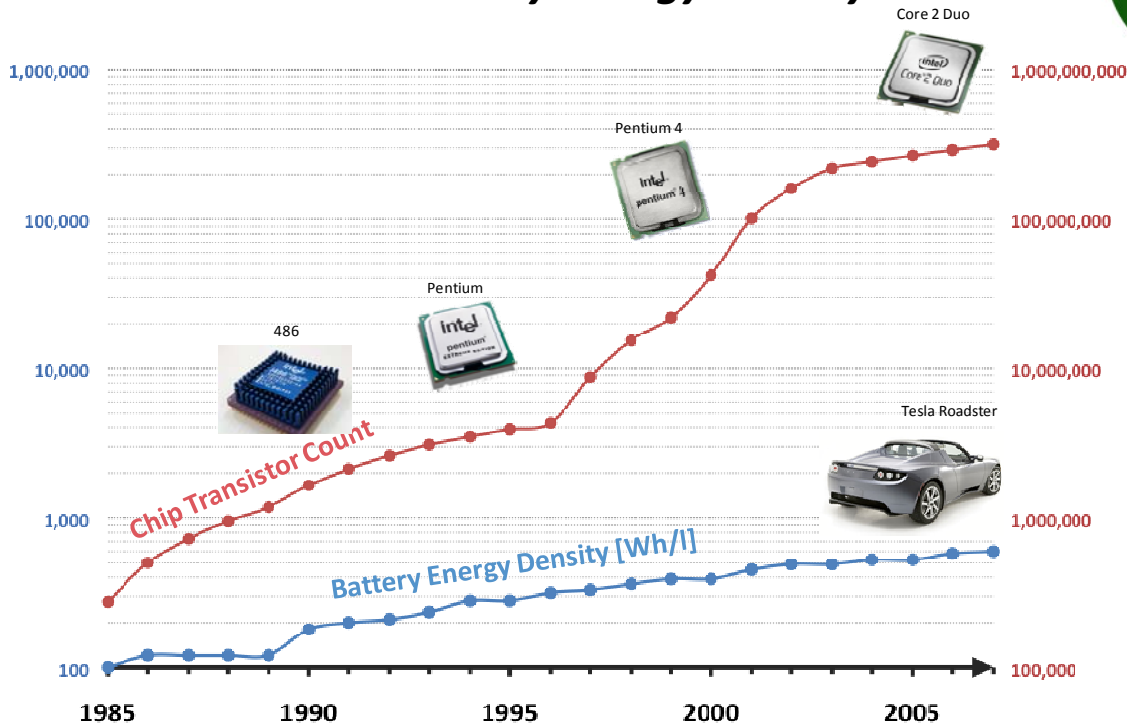

Infinite Power Solutions


ENVIA
SYSTEMS

Moore's Law vs. Battery Energy Density



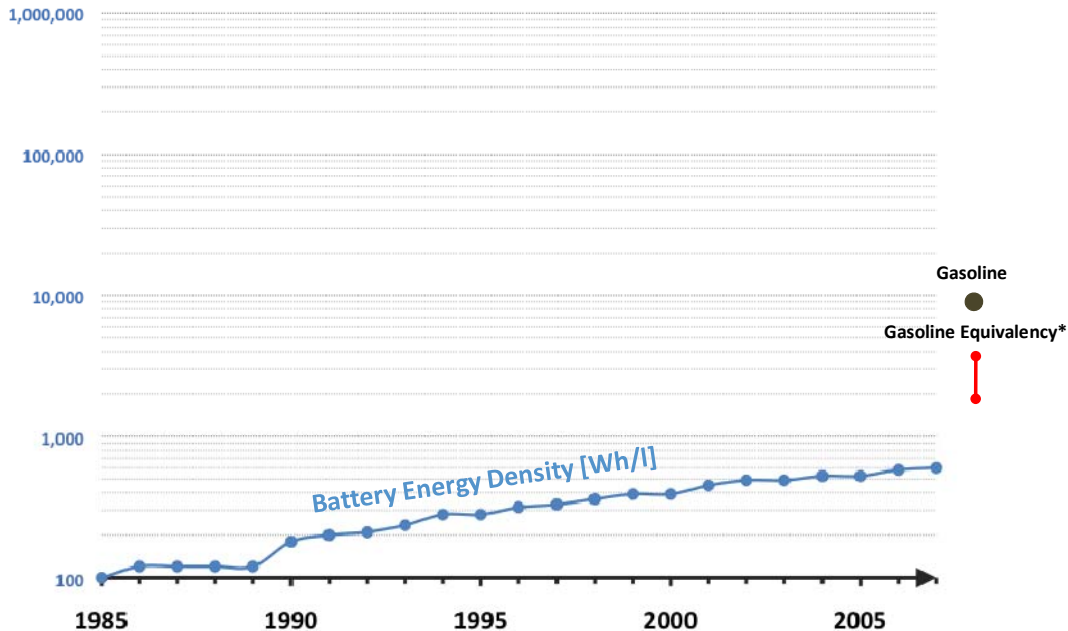
MILKEN INSTITUTE



Where we need to go...



MILKEN INSTITUTE

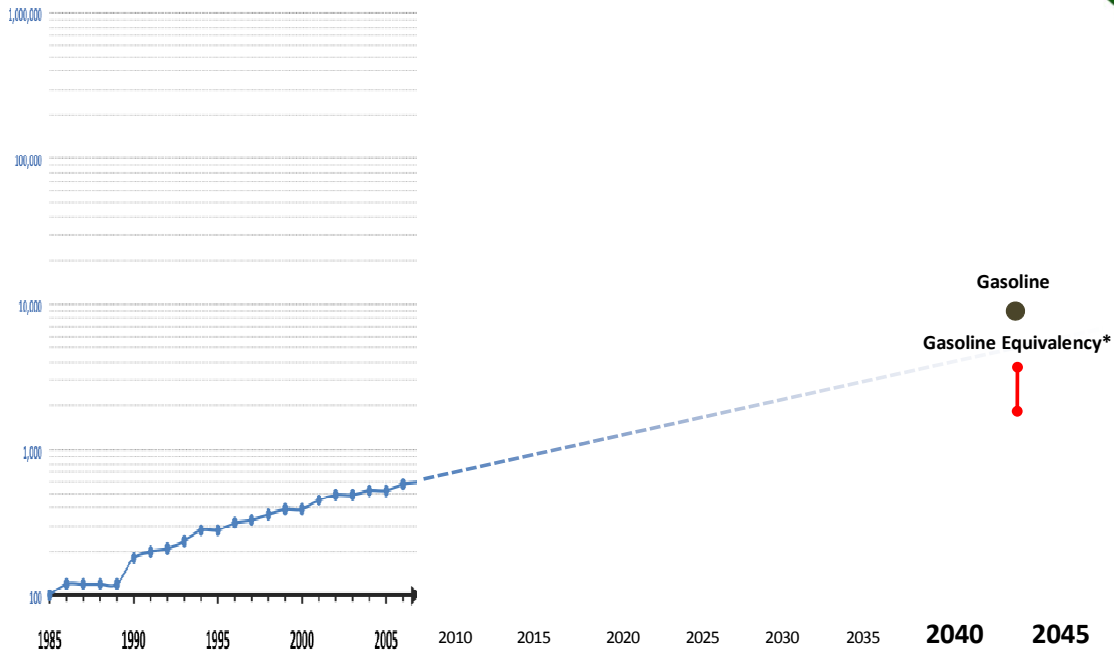


* Accounts for efficiency difference between electric & combustion drivetrain

How long...?



MILKEN INSTITUTE



** Accounts for efficiency difference between electric & combustion drivetrain*

TANDY

COMPAQ

 MILKEN INSTITUTE



 **TEXAS
INSTRUMENTS**



Digital Logic \approx Digital Power

Sustainability Strategy – Technology Migration Plan

2007

2011

2020

2030

Near Term

Begin migration to advanced technology

Mid Term

Full implementation of known technology

Long Term

Continue leverage of Hybrid technologies and deployment of alternative energy sources

Near Term

- Significant number of vehicles with EcoBoost engines
- Electric power steering – begin global migration
- Dual clutch and 6 speed transmissions replace 4 & 5 speeds
- Flex Fuel Vehicles
- Add Hybrid applications
- Increased unibody applications
- Introduction of additional small vehicles
- Battery management systems – begin global migration
- Aero improvements
- Stop/Start systems (micro hybrids) introduced
- CNG/LPG Prep Engines available where select markets demand

Mid Term

- EcoBoost engines available in nearly all vehicles
- Electric power steering - High volume
- Six speed transmissions - High volume
- Weight reduction of 250 – 750 lbs
- Engine displacement reduction aligned with weight save
- Additional Aero improvements
- Increased use of Hybrid Technologies
- Introduction of PHEV and BEV
- Vehicle capability to fully leverage available renewable fuels*
- Diesel use as market demands
- Increased application of Stop/Start

Long Term

- Percentage of Internal combustion engines dependent on renewable fuels
- Volume expansion of Hybrid technologies
- Continued leverage of PHEV, BEV
- Introduction of fuel cell vehicles
- Clean electric / hydrogen fuels
- Continued weight reduction actions via advanced materials

Electrification Strategy – Family of Electrified Vehicles



MILKEN INSTITUTE

Electric Powered Vehicles by 2012 Include:

- Full Battery Electric Transit Connect Commercial Van in 2010
- Full Battery Electric Focus in 2011
- All New Hybrid Vehicles Including Plug-In Version in 2012

Transit Connect BEV 2010



Focus BEV 2011