



Revolution Through Competition

Is 100 MPGe for Cars Achievable?
Driving Innovation via Incentive Prizes:
The Progressive Automotive X-Prize



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“Classic” Inducement Prizes

- Simple, specific definition of desired outcome
- Purse offered for achieving outcome
- Purse paid only if outcome achieved
- Anyone can try
- Fame and fortune for success, not for trying





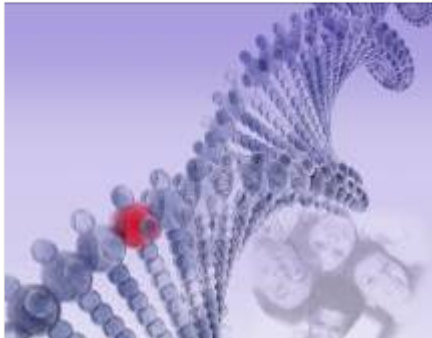
Historical Examples

- ❑ 1714 – Prize for device to measure longitude
 - Surprise and controversial winner: chronometer
 - Revolutionized navigation; saved lives
 - ❑ 1783 – Prize to obtain Soda Alkali from Sea Salt
 - Leblanc Process had major economic effects
 - Jump-started the chemical engineering profession
 - ❑ 1919 – Orteig Prize for trans-Atlantic flight
 - ❑ 1993 – Super-Efficient Refrigerator Prize
 - ❑ 1996 – Ansari X PRIZE for reusable private spacecraft
 - ❑ 2004 – DARPA Grand Challenge for autonomous vehicles
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1927 Orteig Prize: New York - Paris

- ❑ 1919 Raymond Orteig puts up a \$25,000 challenge.
- ❑ 9 Teams register to compete and spent \$400,000 to win the prize
- ❑ The underdog, 25 year old Charles Lindbergh wins the prize!
- ❑ Within 18 months of his flight:
 - Passenger traffic increased 30x
 - # of aircraft increased 4x
 - Aviation stocks soar





\$10,000,000

Launched: 10.04.06

Vertical: Life Sciences

Sequence 100 human genomes in 10 days; genomics.xprize.org



\$30,000,000

Launched: 09.13.07

Vertical: Exploration

Land a robot on the moon, rove 500 meters and send back images; space.xprize.org



\$10,000,000+

Launch: 03.20.08

Vertical: Energy & Environment

Build an affordable, desirable, production-capable 100 MPGe car www.progressiveautoxprize.org

Active X PRIZES





Hallmark Attributes of Large Incentive Prize Competitions

Donate to a non-profit:	Leverage 1:1	\$
Offer a matching gift:	Leverage 2:1	\$\$
Sponsor a Prize:	Leverage 50: 1	\$\$\$\$\$\$

- ❑ **High Leverage:** Teams spend roughly 10 - 50 times the value of the purse
- ❑ **Efficiency:** You only pay the winner... pay-for-performance
- ❑ **Encourage Industry Development:** Rather than give rise to a single solution, a prize gives rise to many solutions...



Important Attributes for Prizes

- ❑ Large Cash Purse (\$10M >)
- ❑ Clear objective & simple rules
- ❑ Target areas that are “stuck”
- ❑ Define a problem, not a solution
- ❑ Attract maverick thinkers from across disciplines (worldwide)
- ❑ Change the paradigm of what is possible





Important Attributes for Prizes

- ❑ Make heroes out of the teams
- ❑ Ideally are telegenic, friendly to media to drive PR engine
- ❑ Educate the public, get them excited and involved
- ❑ Dial “Degree of Difficulty” based on parameters... For an X PRIZE it is 3 to 8 years
- ❑ Encourage taking intelligent risk!





Progressive Insurance Automotive X PRIZE

- Special challenges:
 - ❑ Opposite of trying to change a huge existing industry; trying to jump-start a new industry
 - ❑ Industry very powerful economically and politically
 - ❑ Especially important to engage public and media
 - Public education a key goal
 - Help build market for high-efficiency vehicles
 - ❑ Value of the prize is the publicity, not the purse
 - Attract investors, partners, acquirers
 - 3rd-party validation to consumers





PIAXP Official Registered Teams Announced

□ 111 teams have been accepted

- 136 vehicles
- 14 fuel sources
- 11 foreign countries
- 25 states

□ Just Finished: Design Judging

- Business Plans
- Safety
- Emissions
- Viability

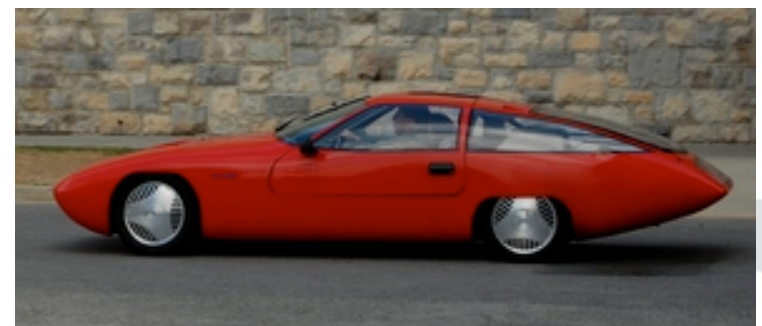
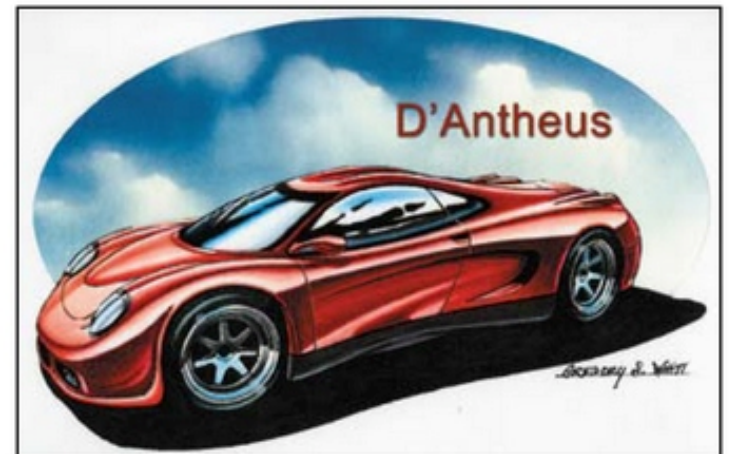
□ Cut field ~ 50%





Teams Challenged on Both Business and Technical Levels

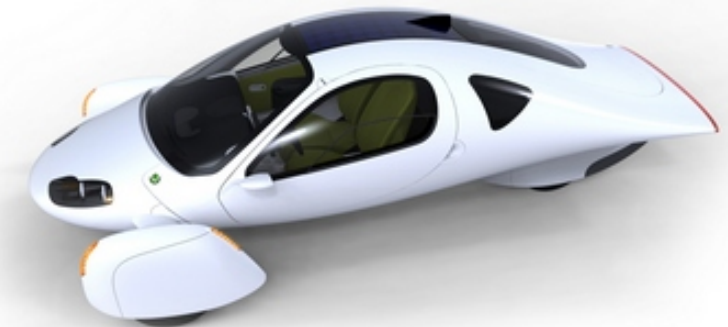
- ❑ Business plans in place to produce a minimum of 10,000/year
- ❑ Technical deliverables gauge how ready teams are to compete
- ❑ Some on-site inspections done
- ❑ Emissions testing provided – up to one week
- ❑ Specific safety consulting provided – up to two weeks
- ❑ On-road mileage accumulation demonstrated before coming to competition
- ❑ Minimum 50 MPGe certified prior to competition





Performance Targets Set to Ensure Realistic Vehicles

- ❑ Minimum range city/highway:
 - Mainstream Class = 320 km
 - Alternative Class = 160 km
 - ❑ Acceleration 0 to 96 kph
 - Mainstream Class = 15 s
 - Alternative Class = 18 s
 - ❑ Highway capable: 4% grade @ 105 kph
 - Mainstream Class = 30 minutes
 - Alternative Class = 15 minutes
 - ❑ Lateral acceleration = .7 G
 - ❑ Braking 96 kph to 0 < 52 meters
 - ❑ Drive-by noise < 75 dB (ISO 5130.2007)
 - ❑ Tier II, Bin 8 exhaust emissions
- Plus fastest to finish => 100 MPGe!**





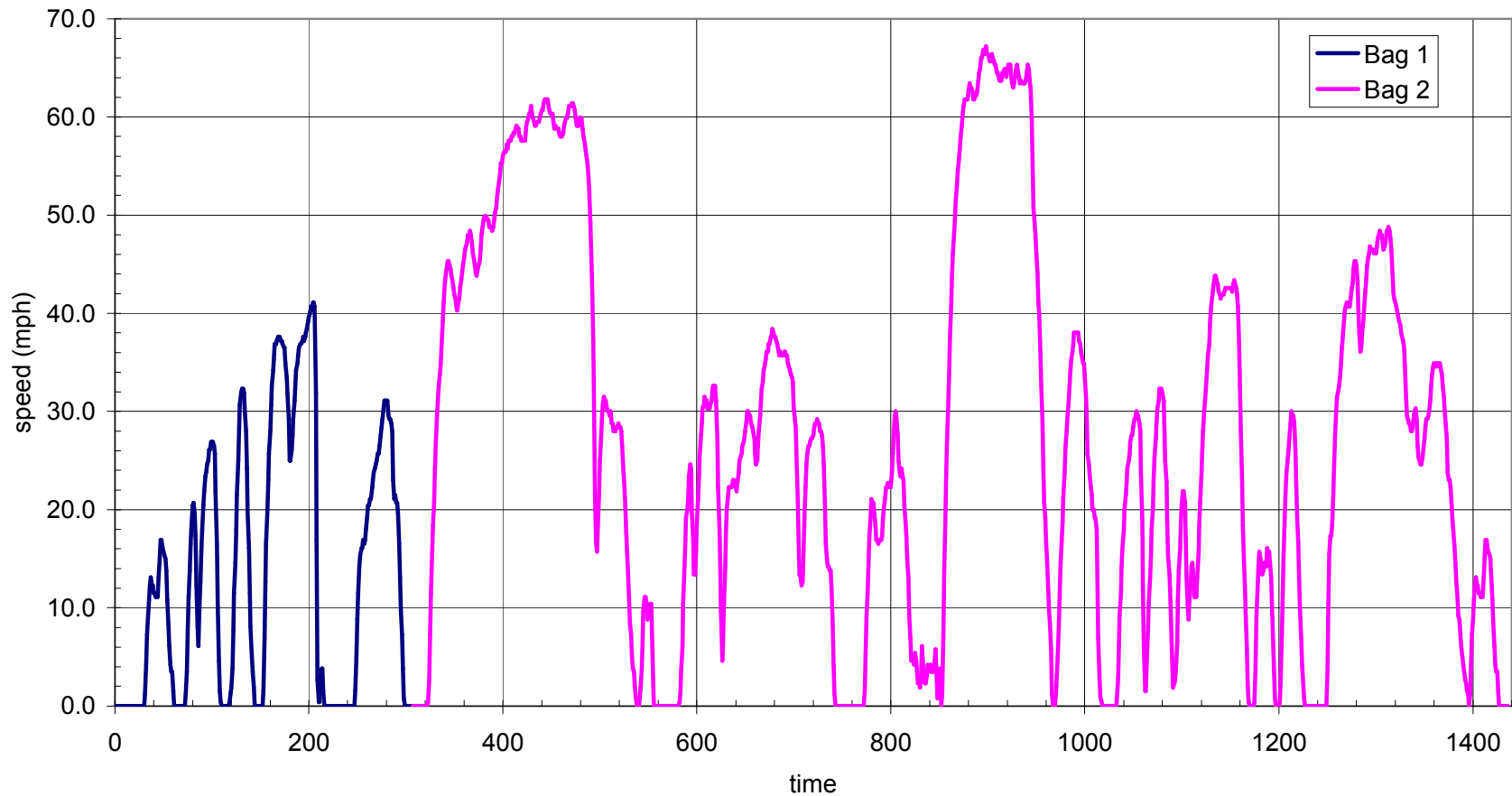
Race Events Begin in Spring 2010

- ❑ Safety + Tech Inspections
- ❑ Shakedown stages
- ❑ Knock-out Qualifier (67 MPGe, hot start Bin 10, 200/100 mile range test minimum) – field narrowed to 20 – 30 vehicles
- ❑ Race stages over typical trip length and speed pattern (LA 92) – *and time will count*
- ❑ Dynamometer testing – energy consumption, Bin 8 cold start
- ❑ Final results 50% on-road; 50% dynamometer results + speed
- ❑ Winners announced Sept. 2010



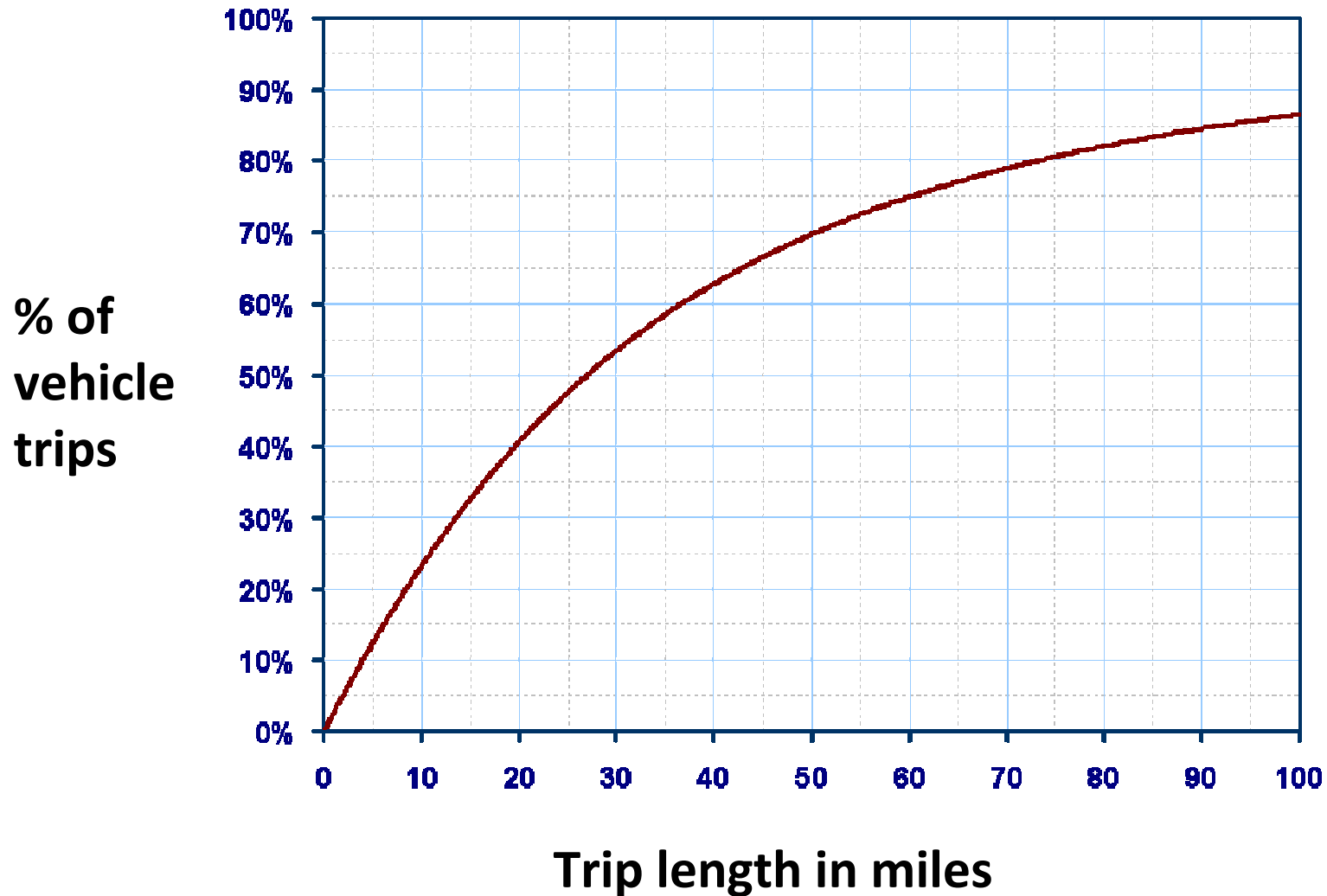


Unified California Cycle (LA-92) for On-Road Stage Speed Profiles





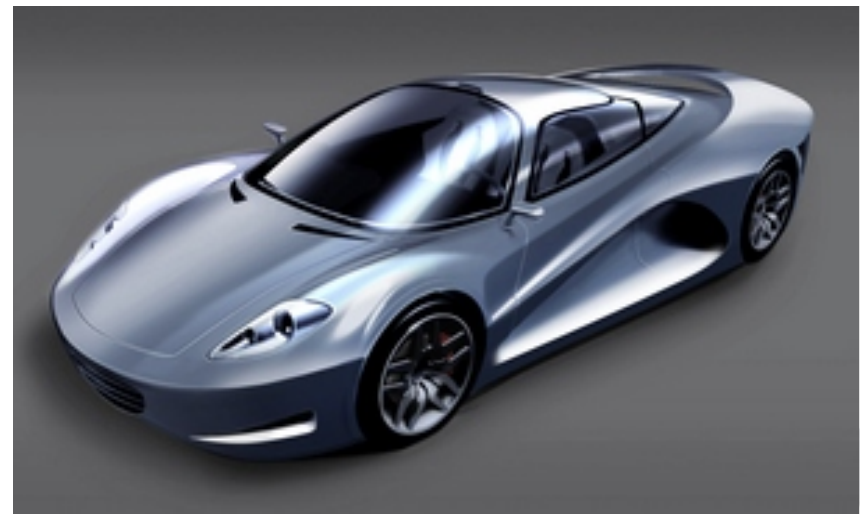
PIAXP Will Base On-Road Testing on Stage Distance Data from NHTS





Vehicle Specifics are Proprietary, but Trends to Reach 100 MPGe Are Clear

- ❑ Biofuels/Low Carbon Fuels
- ❑ Small, highly boosted engines
- ❑ Advanced transmissions
- ❑ Reduced internal friction
- ❑ Electrification
 - Peripherals, accessories
 - HEV – ~ 50% improvement
 - PHEV – AER ~ 20 to 60 km
 - BEV – urban vehicles
- ❑ Waste energy recovery
- ❑ Light weight – <1,000 kg
- ❑ Improved aerodynamics
- ❑ Lower rolling resistance
 - Bearings
 - Tires





Barriers to Ultra-Efficient Cars and Light Trucks Real But Falling

- Public Acceptance
- Cost
 - Components
 - Vehicles
 - Fuel
 - Infrastructure
- Rate of technology change at OE's limited
- Safety Concerns



Cultural Change Is Essential to Achieve Sustainability

- ❑ Need vision of future in sync with aspirations
- ❑ Good policy, incentives
- ❑ Inspired, impassioned leadership
- ❑ Innovation & competition
- ❑ Positive media exposure
- ❑ Local success stories





Believe Incentive Prizes Can Spur Imagination, Innovation

- ❑ PIAXP seeks to unleash creative response to critical needs
- ❑ Auto industry more open to change
- ❑ Your nation could tailor PIAXP approach to your needs
- ❑ Watch for PIAXP announcement of participating teams in NYC October 19

