

Fuel/Vehicle Pathways to a Low-C World: What Kind of Policies are Needed?

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Insights from Scenarios

- Meeting long term (2050) goals of 50-80% GHG emissions reduction will be extremely challenging
- Transportation is important. Deep cuts in Carbon require radical changes in transportation
- Need portfolio approach (efficiency, de-carbonized primary source for fuels, VMT reduction)
- Light Duty Sector will likely involve significant use of electric vehicles by 2050 (Battery EVs and/or FCVs)
- Given long lead time for radical change, need to start now to achieve major market share/fleet penetration by 2050.

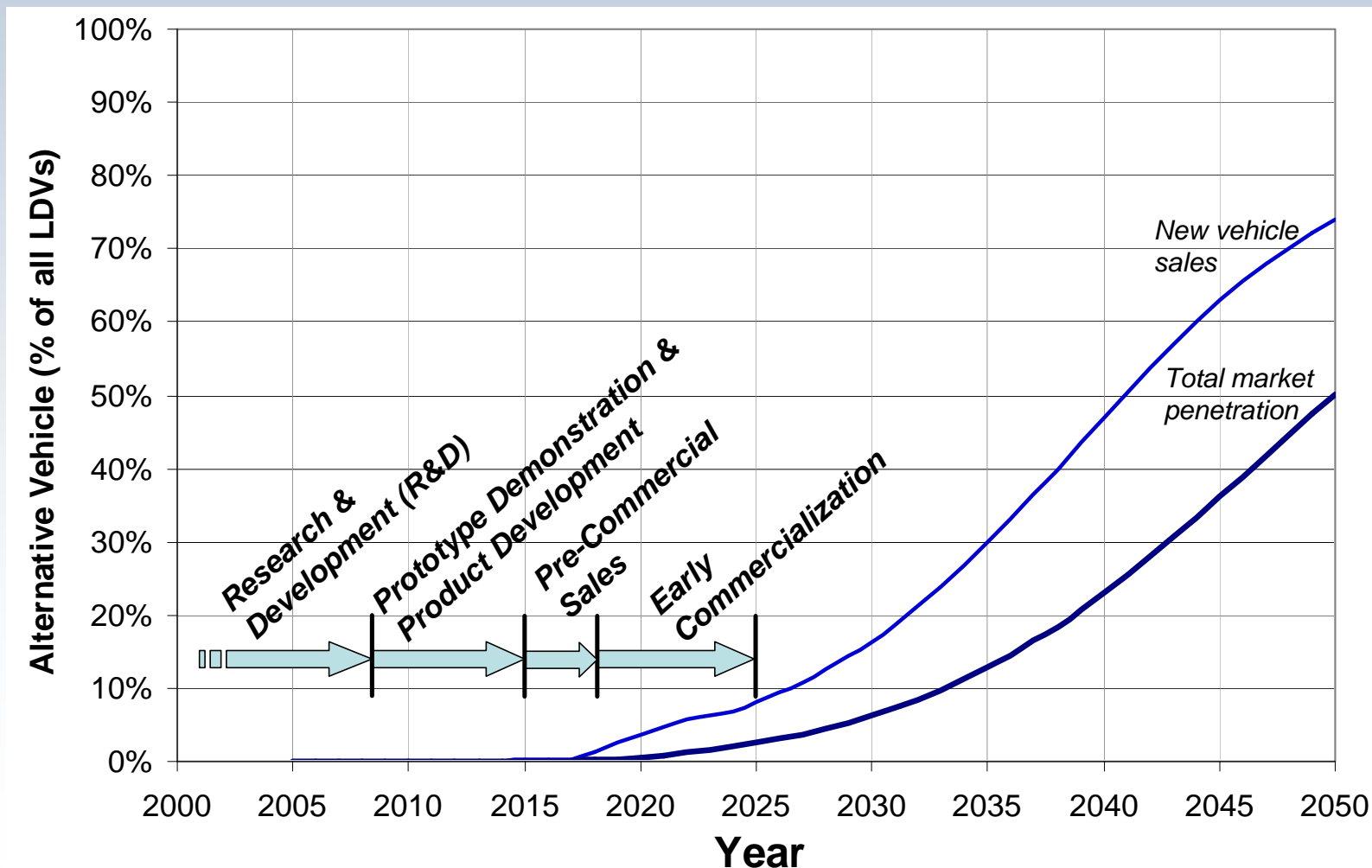
We are looking for a revolution, but...

- Revolutionary technologies face market entry barriers that can't be probably surmounted with economy-wide measures like carbon tax/C&T
 - ♣ High initial cost
 - ♣ Uncertainty (tech and policy)
 - ♣ Need for new structures of cooperation among stakeholders
 - ♣ Long time frame to commercialization

Commercialization Stages Of New Vehicle Tech:

When does gov't hand off to private sector?

- Picking winners v. missing opportunities?



How far should tech specific policies go into the “Valley of Death”?

- Given the multi-decade time frame to major market penetration, need to keep innovation process moving
- Support multiple “networked demos” to launch revolutionary technologies, e.g
 - ♣ 1000 PHEVs in a city with a smart grid
 - ♣ 1000 FCVs in a city with 20 H2 stations
 - ♣ Pilot scale cellulosic ethanol
 - ♣ Pilot scale CCS
- This costs some real \$! (\$10-100s millions per case) . But still tiny compared to \$ flows in energy system.

Breaking the “fuel du jour” paradigm

- Be willing to have some tech fail, but don't abandon too soon.
- Embrace the long time constants inherent in the energy system. Public sector may have to stick with a portfolio of options longer than before, and spend more \$.