

William W. Hay Railroad Engineering Seminar

“Global Lessons in High-Speed Rail and Their Relevance for North America”



Dr. Anthony Perl
Professor
Urban Studies and Political Science
Simon Fraser University

Simon Fraser University Vancouver



Date: Friday, December 06, 2013 at Noon
Time: Lunch Available 11:45, Seminar Begins 12:15
Location: Newmark Lab, Yeh Center, Room 2311
University of Illinois at Urbana-Champaign

Sponsored by _____



Global lessons in High-Speed Rail and their relevance for North America

Anthony Perl

Simon Fraser University Vancouver



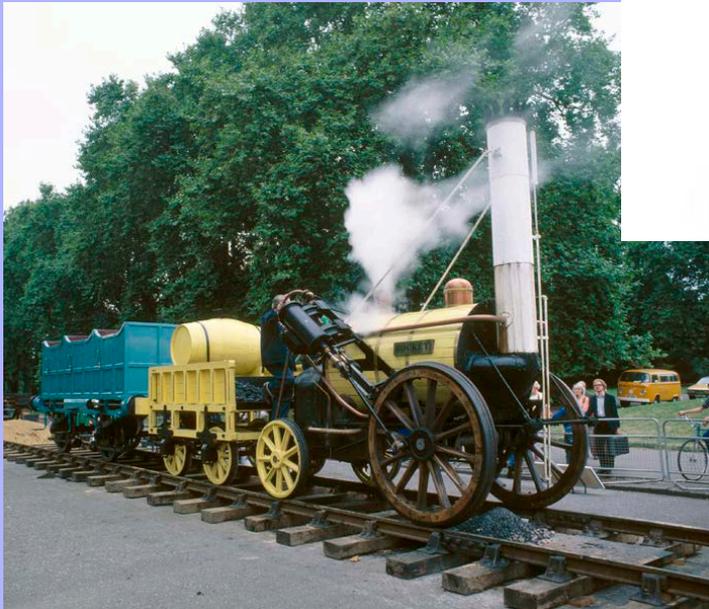
aperl@sfu.ca

Americans have been early adopters of transportation technology that was invented elsewhere

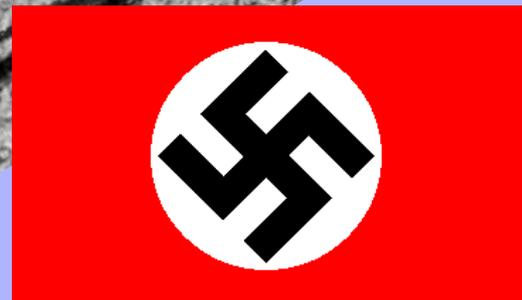
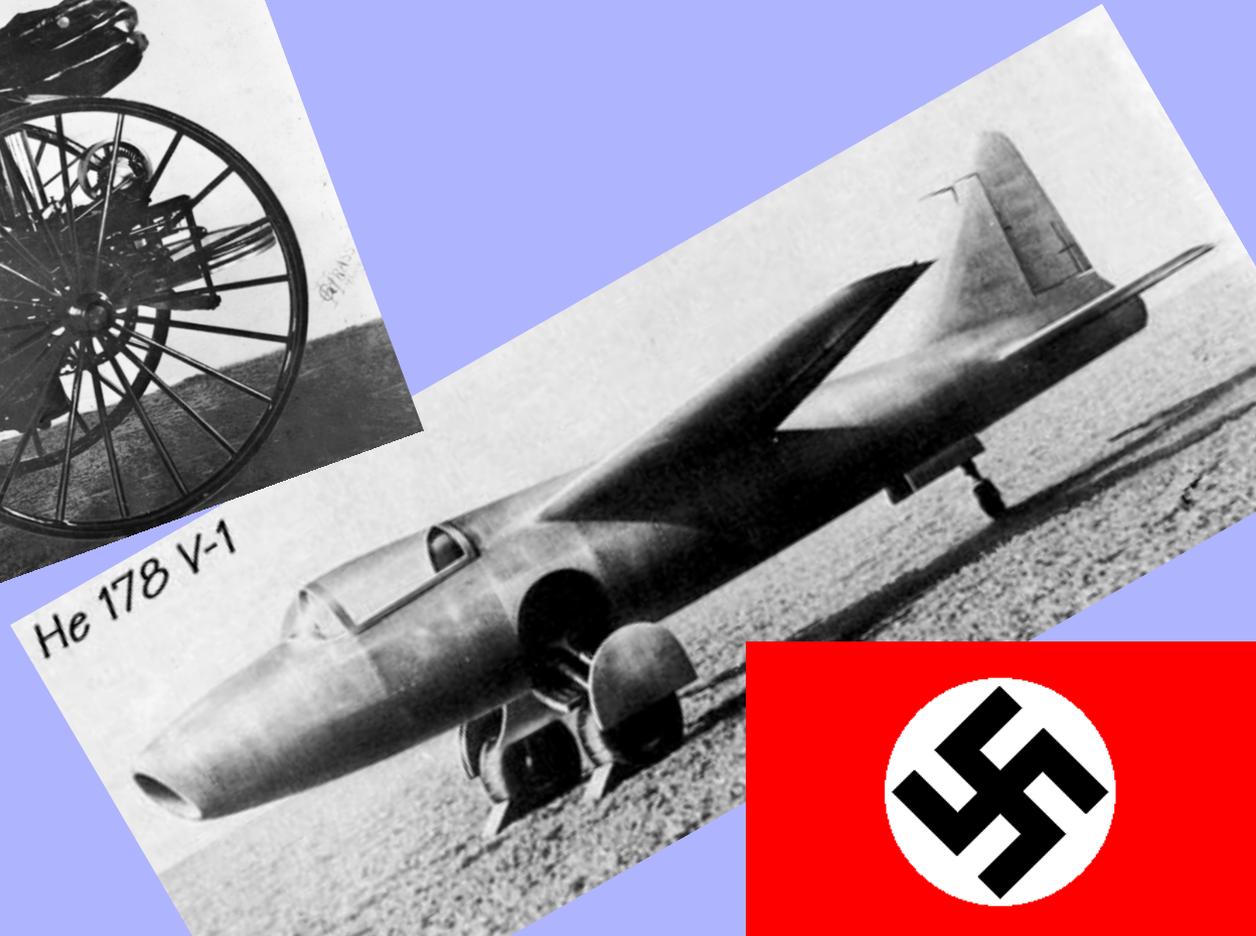
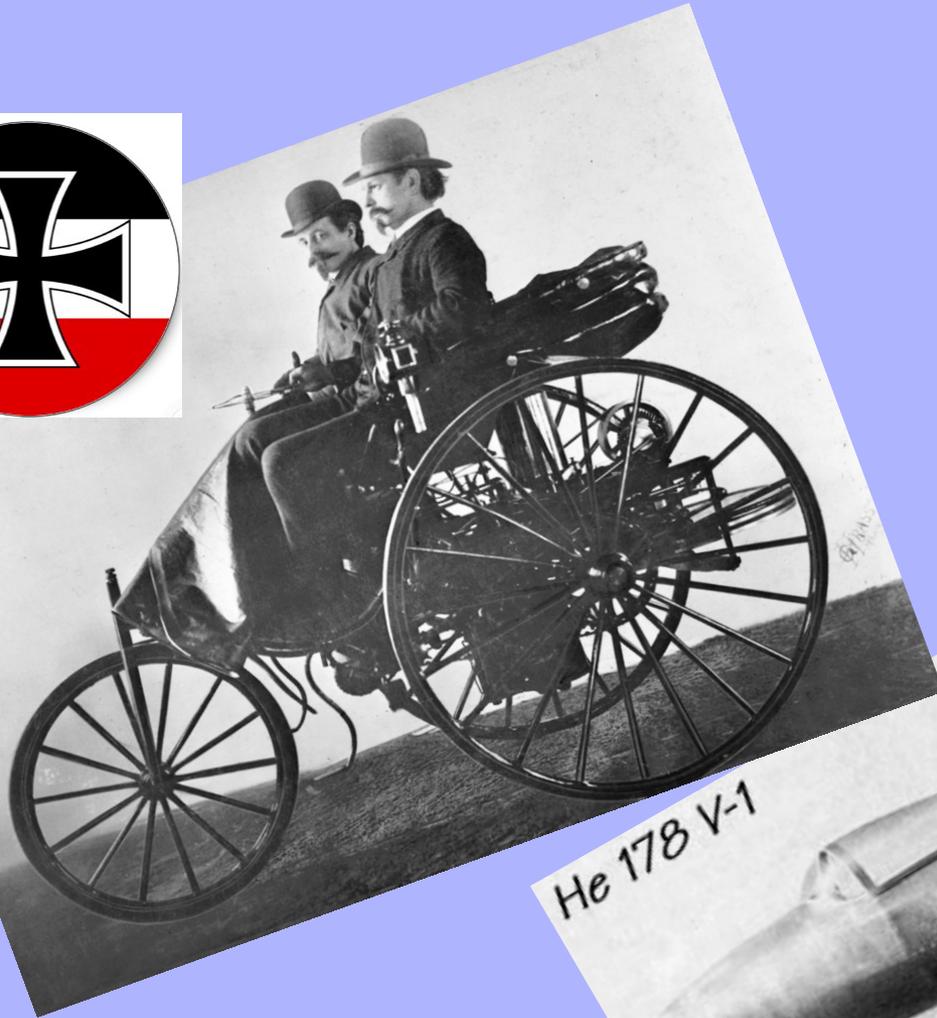
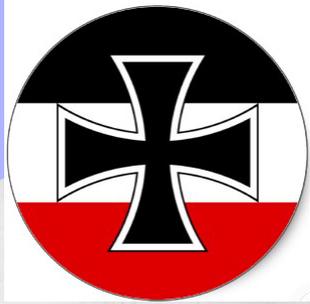
1829 →



→ 1830



Auto and jet aircraft technology were both launched in Germany, before taking off in the U.S.



Where America excelled was in re-imagining autos and aviation as mass transport modes



U.S. has long embraced mobility as a means to advance opportunity



- Travel and trade enable Americans to pursue a better life.
- Social mobility increased when the U.S. has introduced new transport technology.

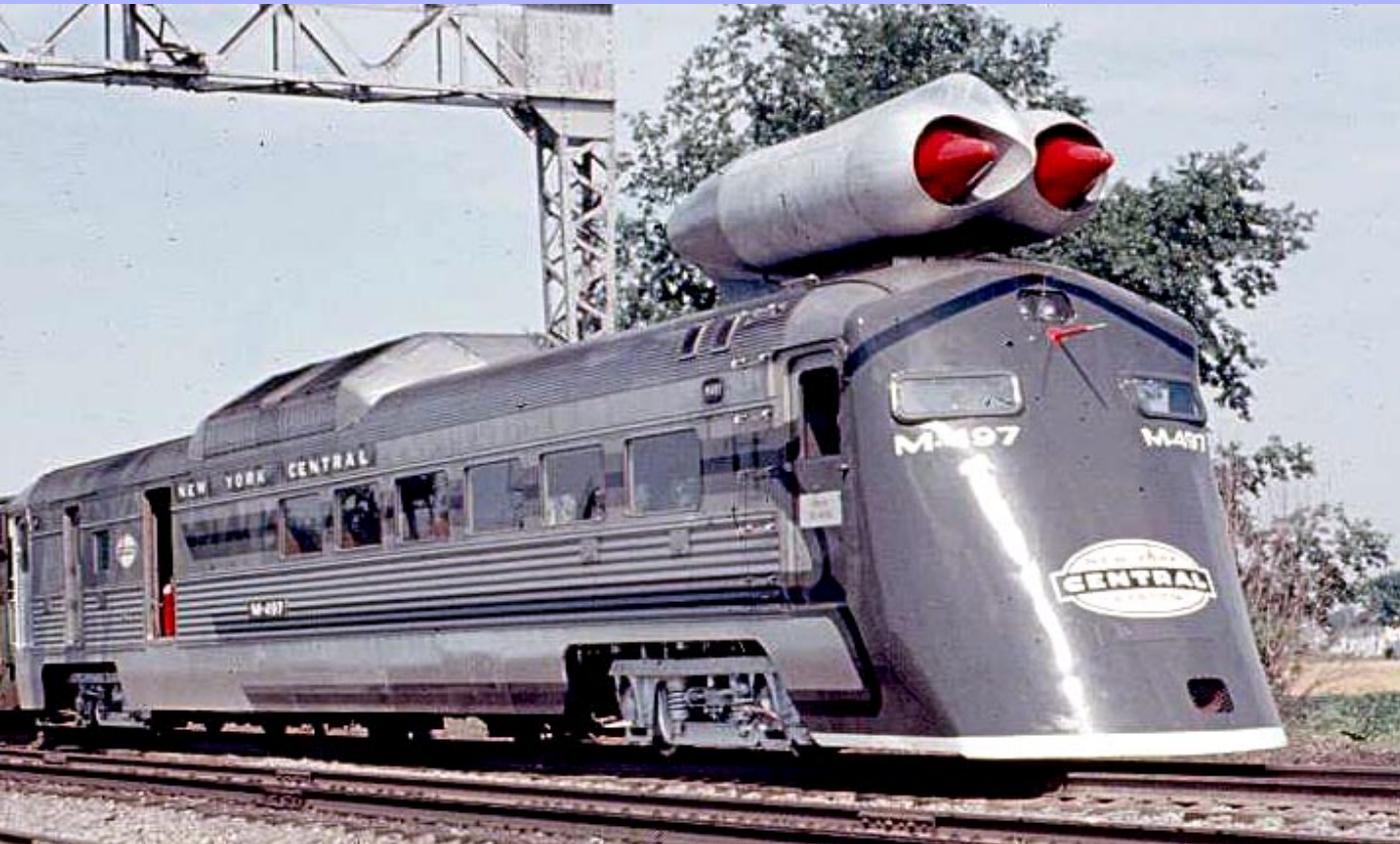
After Japan launched the *Shinkansen*,
America took the first steps to adapt
and adopt HSR technology



President Lyndon Johnson signed the High Speed Ground Transportation Act in 1965



Americans quickly built a *train* that could reach very high speeds



New York Central M-497 set the still standing U.S. speed record on rails - 183.85 mph, on...

July 23, 1966!

Fast(er) trains entered commercial service in 1968



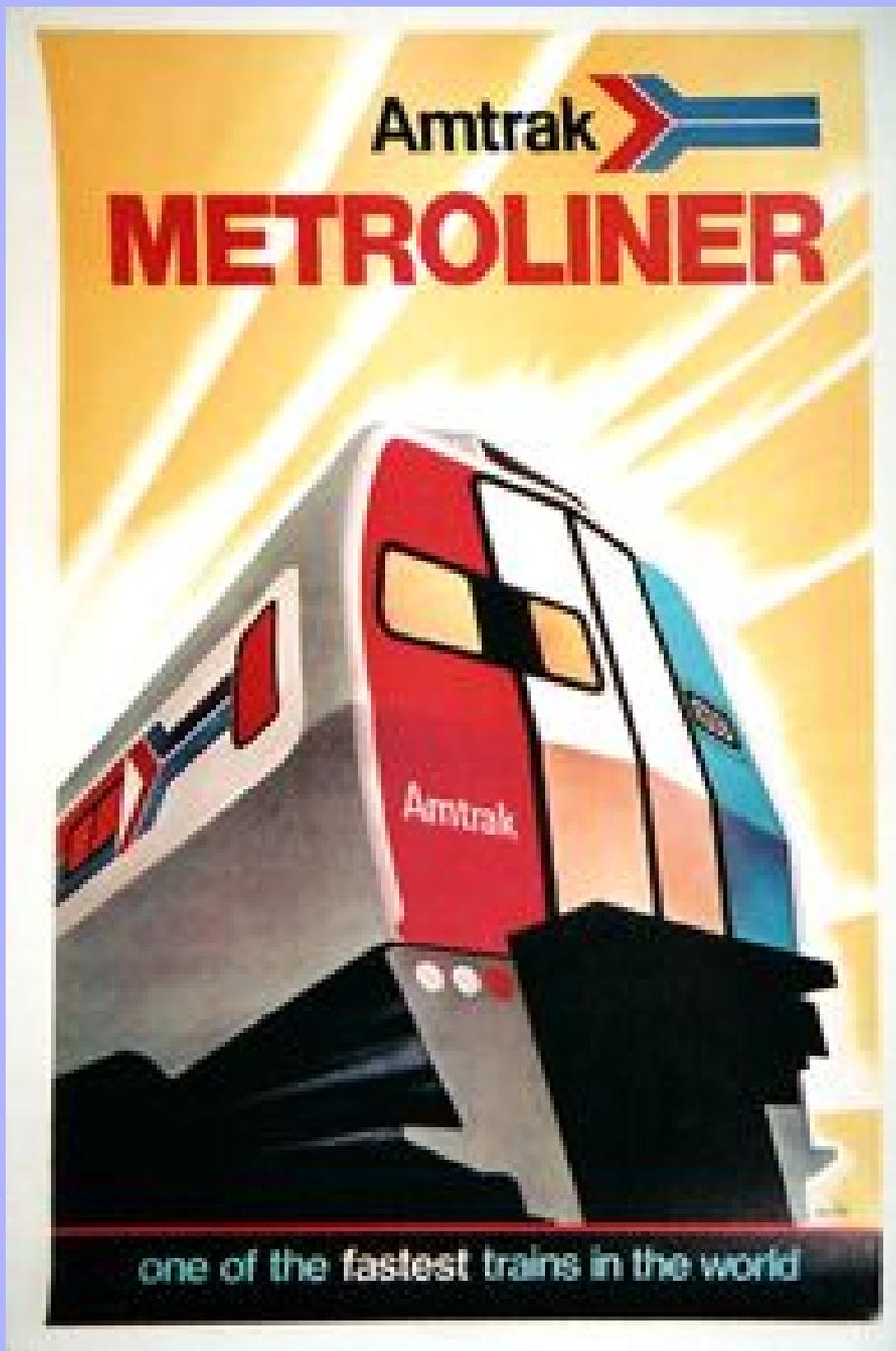
TurboTrain operated NY - Boston, until 1976. Schedule equaled today's *Acela*. Reached 170 mph in tests.

Public-private partnership built America's first high-speed EMU



- NY - DC *Metroliner* was product of a “public-private partnership”
- \$12.9 million in federal funds leveraged \$60 million from PRR, Budd, GE, & Westinghouse.





In the 1970s,
Amtrak could
boast that a
3 hour trip time
from NY to DC
made their train
“one of the
fastest in the
world”

When Amtrak experienced many problems during its early years, *Metroliner* was the only train to consistently cover its operating costs



America's fastest trains have been stymied by the tracks they need to operate effectively



Even in the Northeast Corridor today,
tracks exact a heavy toll on *Acela*



The 'breadbox'

9 Presidents and 24 sessions of Congress after 1965 ...



... the U.S. holds the world record for time elapsed between launching HSR development and building tracks that are needed to operate it.

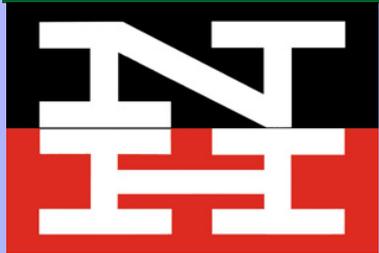
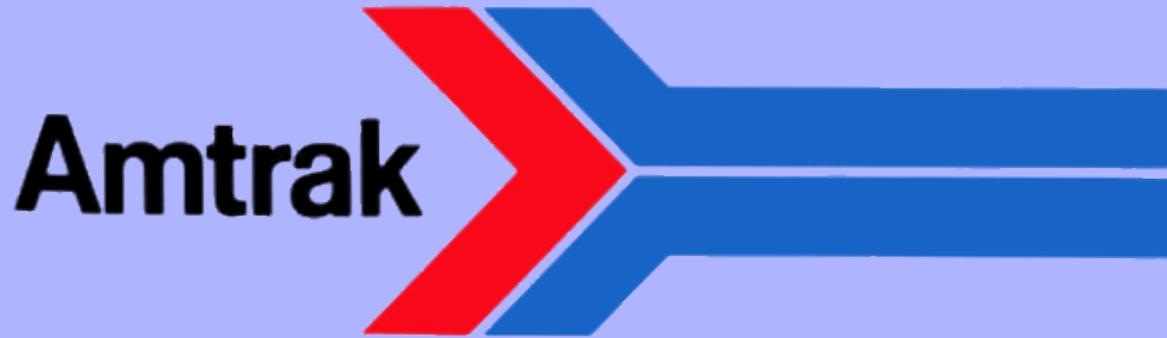
Why has HSR moved so slowly?



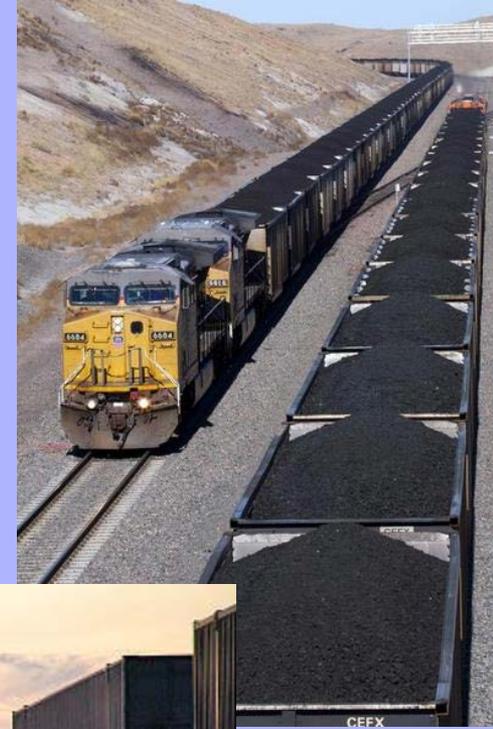
When HSR was gaining momentum in Asia and Europe, many U.S. railroads went through a near death experience



Billions went into bailing out bankrupt carriers when Uncle Sam got into running freight and passenger railroads



Railroads no longer had to serve everyone, they could focus on profitable market niches



Downsizing to carry profitable traffic led to reduced track capacity



Some rights of way have potential capacity;
20,000 miles of railroad got converted to trails



While Asia and Europe perfected HSR...

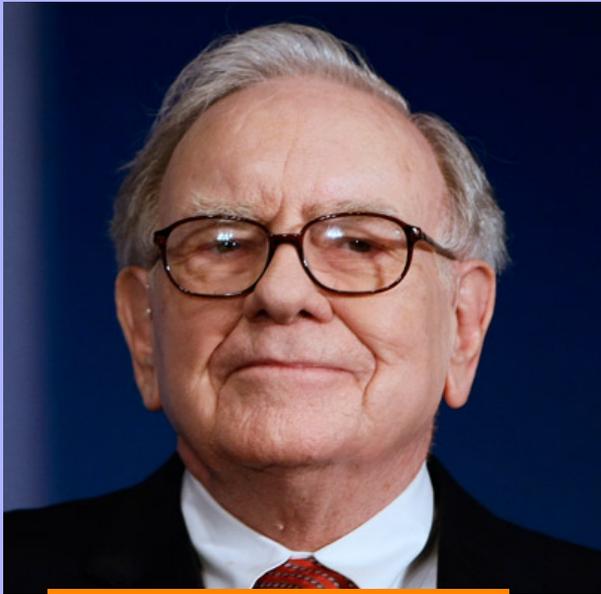
the United States reinvented ways to move moving freight profitably by rail

This strategy worked!



U.S. railroads have been the only transport mode to post consistent profits since 2001

Smart money from big investors has moved into U.S. railroads



The infrastructure gap between North American freight rail innovation and Asian and European HSR development has widened



So what's the matter with the U.S., Europe and Asia going their separate ways in reinventing railroads?



Climate and energy vulnerability
are global problems that rail offers part of
the solution to



Amanda Braus

Growing climate & energy risks are likely to drive future mobility changes



U.S. dependence on oil has gone up since the 1973 OPEC Embargo



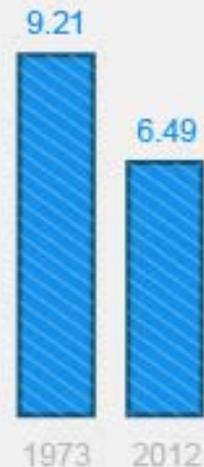
U.S. oil reserves

Barrels in billions



U.S. crude oil production

Barrels in millions per day



Total U.S. consumption of crude oil and petroleum

Barrels in millions per day



Price of oil per barrel

\$3.89¹

1973

\$111.63²

2012



Price of regular gasoline

Per gallon

\$0.36³

1973

\$3.62⁴

2012



Overall fuel efficiency

MPG: Light-duty vehicles (cars, vans, pickups, and SUVs)

12.9⁵

1973

24.7⁵

2013

vehicles



How much crude oil did we import?

Barrels in millions per day

3.24

1973

8.53

2012

Source: *USA Today*, Sept. 19, 2013

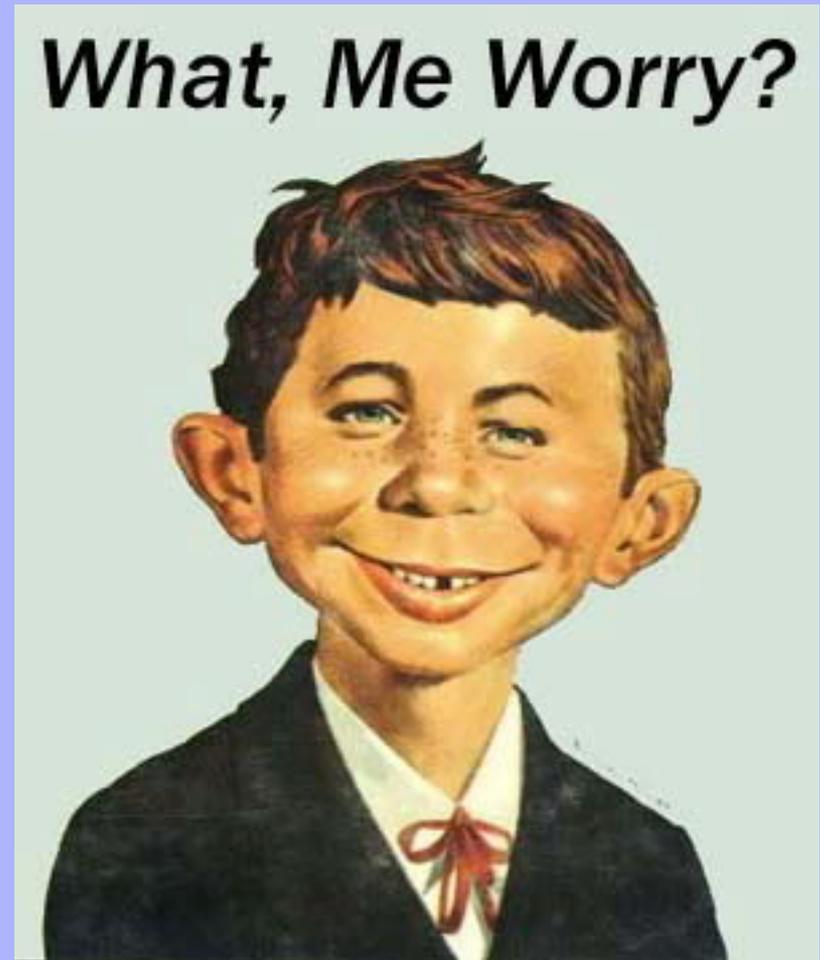
U.S. economy depends on vehicles that don't work well without oil



HSR offers proven technology for moving people without oil for travel up to 1,000 miles



Conventional wisdom: the mid-point of the world's oil reserves gives plenty of time to plan adjustments



The oil we'll burn tomorrow is *physically different* from the oil we've already used

Athabasca Oil Sands Project

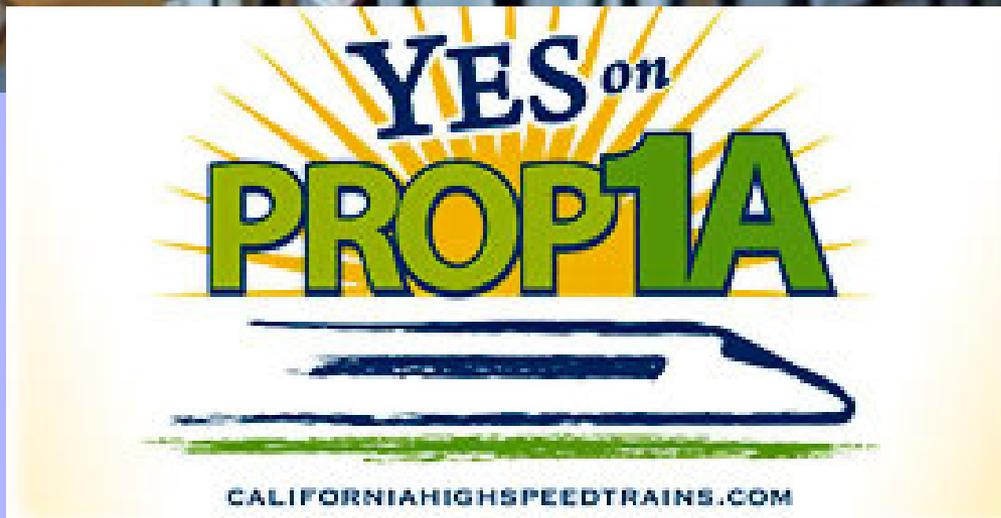
Currently one of the largest construction projects on the planet, the Athabasca Oil Sands Project is the first new fully integrated oil sands project in 25 years.



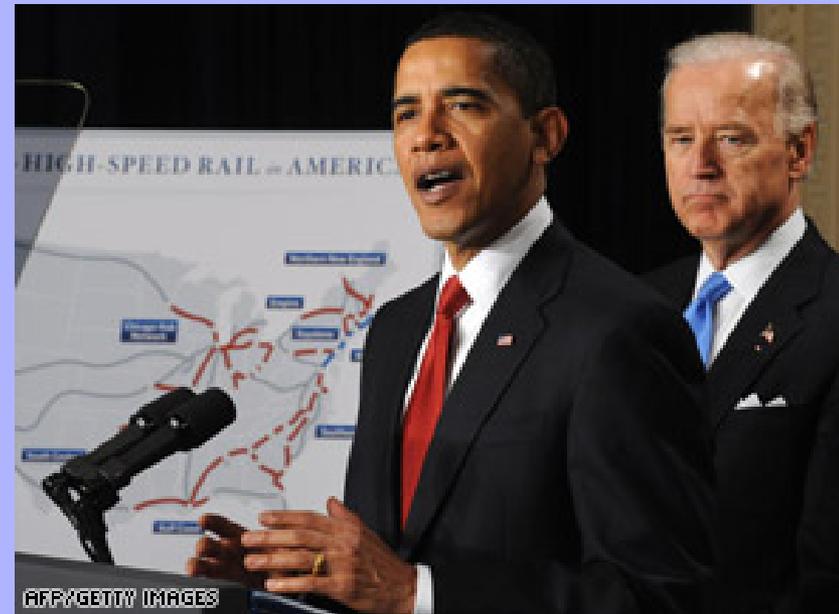
Do we invest a trillion plus into new oil infrastructure or billions in transportation infrastructure that doesn't need oil?



New mandates to restart HSR development given by the 2008 election

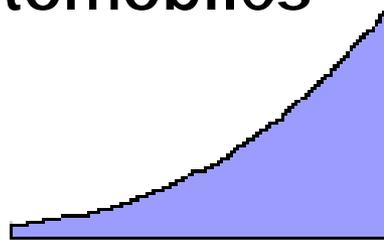


2008 election provided both Washington and state governments a mandate to invest in rail infrastructure

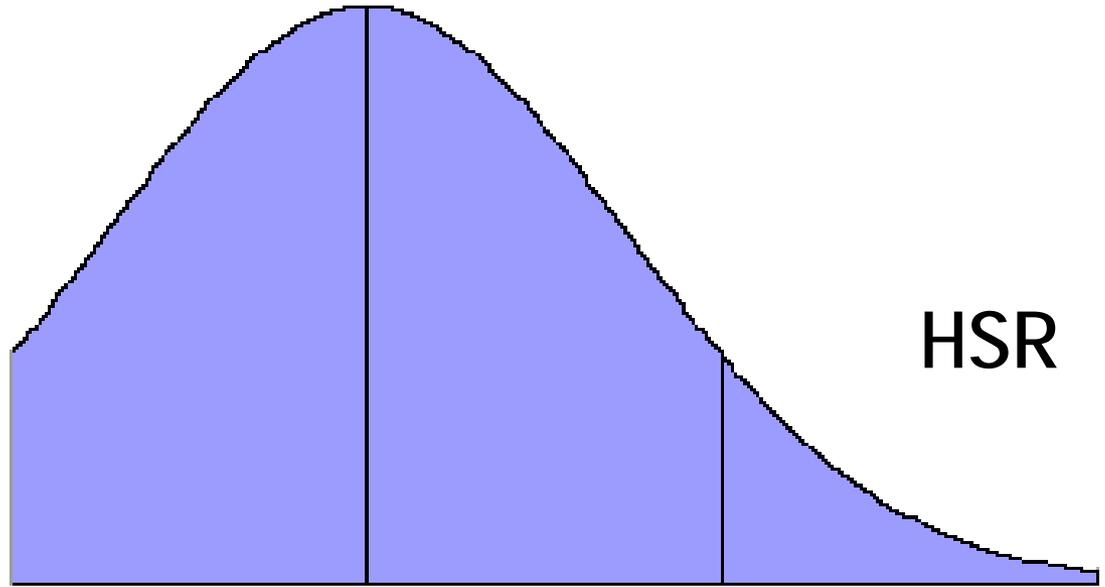


Taking full advantage of America's lag in adopting HSR technology will pay dividends

Trains,
planes, and
automobiles



**Early
Adopters**



Pragmatists

Conservatives

Laggards

HSR

3 models of HSR have emerged, each with their own strategic orientation

- 1. Exclusive Corridors: linking mega-cities**
- 2. Hybrid networks: blending new and conventional rail to extend HSR reach**
- 3. Comprehensive National Networks: Making HSR a backbone of intercity mobility**

Exclusive Corridors: linking mega-cities



Hybrid networks: blending new and conventional rail to extend HSR reach



Comprehensive National Network: Making HSR a backbone of intercity mobility



California is now the HSR design laboratory for the U.S.



No need to reinvent the know-how for exclusive corridors; this is the place for global partnerships



Global knowledge can support local experience in sharing tracks among intercity and regional rail passenger operators



Sharing tracks will be essential to getting HSR into mega-cities like Los Angeles and San Francisco



Sharing rights of way with freight railroads will require innovations that are unique to the USA



Climate and energy challenges will affect freight railroads too

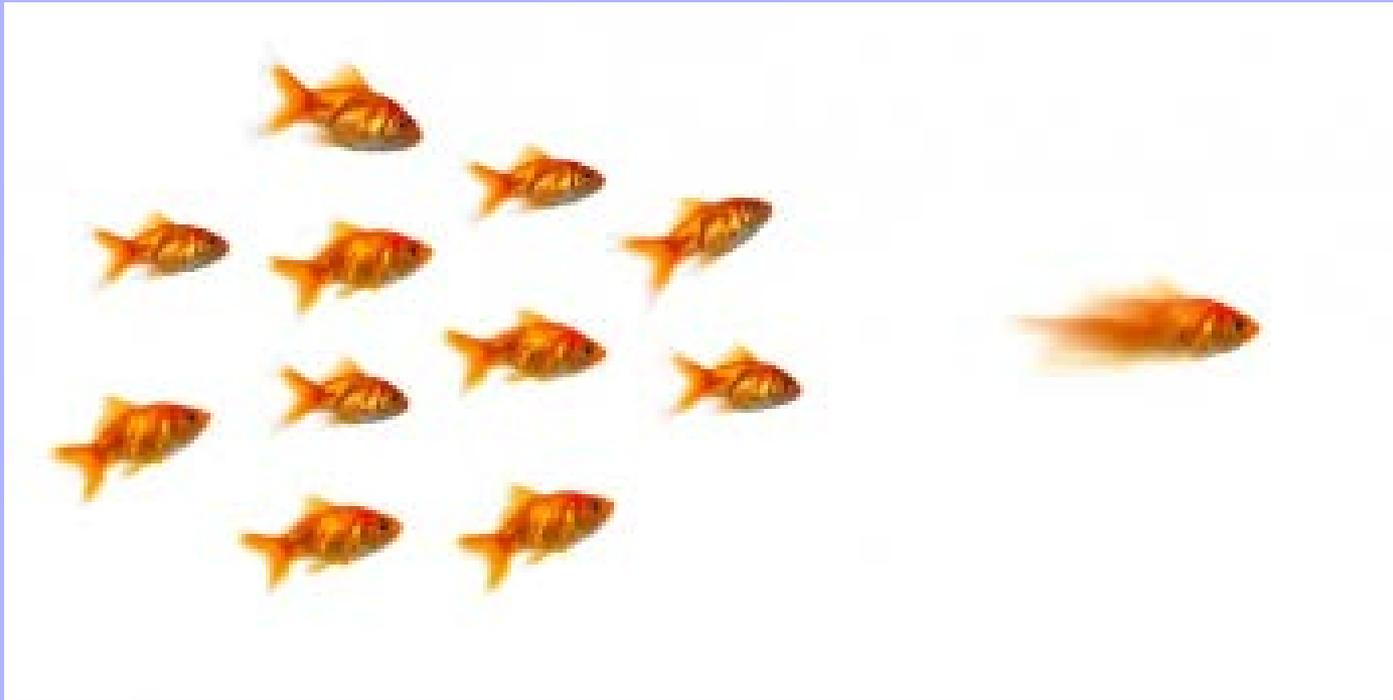


What will freight railroads need from government to adapt their business model in the decade ahead?

Building America's first new rail infrastructure to move people between cities in over 100 years will advance essential capacities



Innovation will attract states looking to add rail to their intercity mobility mix



**Institutionalizing that know-how could
bring rail an exciting new role
of moving more people and freight
across the U.S.**

