Chinese Transportation Energy and Emission Policies: A Drive or a Second Thought?

Michael Quanlu Wang
Systems Assessment Group
Energy Systems Division
Argonne National Laboratory

Asilomar Conference
August 8, 2013
Chinese Transportation Emission Control and Energy Conservation Policies

- Fuel quality and vehicle emission control started in mid-1990s
- Research, development, and deployment of alternative fuel vehicles started in mid-1990s
- Development of fuel consumption standards started in 2000

- But, the Good, the Bad, the Ugly?
The Good

- Increased mobility has been enjoyed across all income groups and geographic regions
- Vehicle emission standards are at EURO IV level, emission standard gaps between China and Europe/US will probably be closed in 2017-2020
- Fuel quality standards, especially with S content, are approaching European standards fast
- LDV Fuel consumption standards were ahead of US before US adopted 54.4 MPG standard
- HDV fuel consumption standards are based on vehicle chassis testing, not engine testing (though standards are weak)
- AFVs are wide-spread in selected cities and segments (LPG taxi in Guangzhou, CNG taxi in Chongqing, CNG vehicles in far Northwest)
- Public transportation still has a large share of urban transportation
The Bad

- Enforcement of vehicle emission and FC standards is weak; not sure compliance rates
- Fuel quality standards lags needed improvement for fast adoption of vehicle emission standards; fuel quality adultery is a major issue
- Passenger vehicle fleet is upsizing from increased personal income
- New energy vehicles (i.e., electric vehicles) are struggling to keep the enthusiasm and momentum
- Lack of coordination among agencies (NDRC, MIIT, MEP, MOST, MOF, etc.)
- Development of the auto industry as a economic pillar sector overshadowed environmental concerns
The Ugly

- Urban sprawl and forgotten public transportation for more than twenty years resulted in overgrowth of private cars in cities – a deal price to pay for decades
- Congestion
- Urban air pollution – PM2.5 is a household name
About the G/B/U List

- It is definitely subjective
- It is intended to “throw a brick to get a jade (抛砖引玉)”
Chinese Transportation Energy and Emission Policies: A Drive or a Second Thought?

- DGP growth vs. environmental protection
- Regional economic development vs. national energy and environmental goals
- For example, NEVs and AFVs rarely have emissions and efficiency performance requirements
- But grass-root environmental concerns are now a major social factor (Not in My Backyard, NIMBY)
Turf Fight and Bureaucracy Among Agencies for Vehicle/Fuel Regulations Are Real

Central Committee of the CCP

The State Council

National Development and Reform Commission (NDRC)

National Energy Administration (NEA)

M. Of Science and Technology (MOST)
- EDT R&D
- EV/AFV demo

M. Of Information and Industry Technology (MIIT)
- EV policies
- MPG standards

M. Of Environmental Protection (MEP)
- Emission standards
- Fuel quality standards

M. Of Finance (MOF)
- Incentives/subsidies of AFs/AFVs/fuel efficiency

M. Of Commerce (MOC)
- Imported vehicles

Other Ministries

National People’s Congress
New Energy Vehicles: the Glass Half Full or Half Empty?
China Provides Significant Subsidies for Electric Drive Technologies (New Energy Vehicles, NEVs) 
(1,000 RMB/Vehicle; $1=6.2 RMB)

From Gong et al. (2012)
Electric bikes: 30 M annual production (with on-road stock of 120-150 M)

Low-speed electric vehicles: 64 K annual production in Shangdong Province alone in 2011
The Half Empty Story

- NEV demonstration in 25 cities has been dismal, despite political and financial support

- NEV sales to private car owners does not happen (yet)
Emission Benefits of NEVs Depend on Cleaning Up the Power Sector

- The visionary M&M (not your favorable candy bar) renewable power scenarios are needed if NEVs are to contribute to the 2ºC scenario.
- Though I have not taken a stab at M&M with LCA, indirect effects, etc.
Electricity Generation Mixes in Different Countries: Implication for Transportation Electrification

From Wang et al. (2011)
Diesel Cars in China?

- Some auto makers have promoted hard
- Diesel/gasoline ratio is about 2
- Diesel shortage is a serious problem
- Diesel emissions are a concern
New Hopefuls

- Restriction of new vehicle registration in cities: Shanghai, Beijing, Guangzhou, Guiyang; they are just the starting point
- Gasoline price is increasing
- Parking is becoming expensive in downtown areas
- Public transportation is improving with significant government investments
- Congestion charges for systematically containing private transportation usage?
Concluding Remarks

- Personal mobility vs. motorized vehicles
- Overarching challenges
  - Inter-agency coordination vs. collaboration vs. competition
  - Synchronization of public and industry interests
  - Balance of economic development vs. environmental sustainability throughout government spectrum, especially at provincial and local level
  - Cross-board fiscal policies for environmental and energy policies
- Fuel economy standards
  - Need to catch up with EU, Japan and the U.S.
  - Implementation policies urgently needed