Engaging the International Community: Research on ITS Applications to Improve Environmental Performance

Steven E. Shladover, Sc.D.
California PATH Program
University of California, Berkeley
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Outline

• Background behind project creation
• Energy ITS Program in Japan
• European Commission projects
• Contrasts between U.S. and overseas situations
• Recommendations for AERIS activity
Project Background

- Japan’s Energy ITS Program initiated outreach to Europe and U.S. for research coordination and collaboration on ITS for environment and energy
  - Tokyo, March 2009
  - Stockholm, September 2009
  - Amsterdam, March 2010
  - Tokyo/Busan, October/November 2010
  - Vienna, June 2011
- European Commission funded ECOSTAND project as a “coordinating action”, at €735 K for two years
- U.S. participation has been ad-hoc until now
- With higher levels of activity in the other countries, we need to become more engaged
Japan’s Energy ITS Program

- Ministry of Economy, Trade and Industry (METI), funded at $12 M per year, 5 years (now at 3.5 years)
  - 90% for automated truck platooning
  - **10% for modeling effects that ITS can have on reducing transportation CO$_2$**

- Six working groups, seeking international participants from Europe and U.S.:
  1. Defining ITS applications that can reduce CO$_2$
  2. Traffic simulation modeling
  3. Emissions modeling
  4. Probe vehicle monitoring
  5. Model verification and validation methodology
  6. International traffic data warehouse
Most Relevant Current EC Projects

- **eCoMove - €22.5 M from 2010 – 2013**
  - Direct successor to CVIS and SAFESPOT
  - Diverse cooperative vehicle-related ITS services, for testing on 4 cars and 2 trucks:
    - Eco-driving, freight logistics, route guidance, adaptive cruise control, transmission shifting control
    - Both arterial and freeway traffic control

- **In-Time - €4.5 M from 2009-2012**
  - Multi-modal traffic and traveler information, to encourage mode shifts

- **Freilot - €4 M from 2009 -2011**
  - Freight movement efficiency through eco-driving, logistics, and improved green wave signal control
Newer EC Initiatives on ITS for the Environment

• CO₂ reduction is now the dominant motivation for ITS projects, ahead of safety and mobility

• €50 M this year for new proposals on low-carbon freight and multi-modal mobility

• €40 M next year for new proposals on:
  – Cooperative systems for low-carbon multi-modal mobility
  – European-Wide Service Platform for cooperative systems enabled services

• N.B.: “Green Car” initiative has already provided €60 M on Information and Communication Technologies (ICT) for the Fully Electric Vehicle
Activities in China on ITS for the Environment

• Increasing urgency now that China is the leading CO₂ emitter
  – 2020 goal to reduce CO₂ by 40-45% per unit GDP from 2005 level

• Policies for low carbon transportation
  – Major urban and inter-urban rapid transit expansions
  – Subsidies for retiring older high emission vehicles

• ITS research in Ministry of Science and Technology, with indirect link to environment issues
  – Information sharing and connectivity
  – Multi-modal efficiency improvements
  – Advanced traffic management
Overseas Perspectives

- Other industrialized countries ratified Kyoto and take its CO₂ reduction goals seriously
  - Drastic changes needed by 2050
  - Nobody has a solution to meet those goals

- CO₂ reduction becoming the dominant factor in transport policy, then reflected in transportation research priorities

- Others investing much more heavily in this than the U.S.

- Primarily research funding from agencies responsible for industrial competitiveness rather than transportation
Immediate Imperatives Relative to Japan’s Energy ITS Initiative

• Japan wants to define the evaluation metrics and procedures now, so everybody knows how ITS products will be evaluated for CO₂ savings (METI initiative)
  – Their approach has serious technical limitations, where we could help

• Japan has invited Europe and the U.S. to collaborate, but we have been slow to respond

• U.S. needs to get engaged in this, building on our strengths in transportation planning and operations and emissions modeling
Broader Implications for AERIS

- Japan and EC investments in developing target systems dwarf the AERIS budget, making it hard to be competitive

- Modeling effects of ITS on energy, CO$_2$ and criteria pollutants is a pre-competitive topic area where we could collaborate and benefit greatly
  - These models are needed to facilitate domestic ITS deployments anyway
  - The technical challenges are large enough to need the best international experts
  - ITS has already suffered from lack of adequate models (“Moving Cooler”)
  - Data needed from real deployments
Model Development and Validation Needs

- Separate approaches, depending on the effects of ITS:
  - Reducing demand for vehicle travel → regional transportation planning and travel demand models
  - Improving vehicle operational efficiency → microscopic models, with results extrapolated to regional and national levels
  - Improving infrastructure operational efficiency → newer integrated models needed, incorporating driver behavior and traffic phenomena

- Separate short-term latent demand effects from long-term induced demand effects, based on real data rather than ideology