Briefing to the
Tri-state Meeting of
Maine, New Hampshire and Vermont

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Transportation Research Center

• Founded in Fall 2006 (SAFETEA LU)
• One of 10 National Transportation Centers
• Theme: Sustainable Systems and Advanced Technologies for Northern Communities
• Multi-disciplinary research
• 21st Century Issues

French Hill, I-89 Vermont. Photo by Mike Sipe.
What is the UVM TRC?

- The TRC conducts research, education and outreach related to transportation.

- The TRC’s research collects and analyzes data related to the energy and environmental impacts of mobility in northern communities.

- In partnership with UVM’s academic Colleges, TRC education projects create new undergraduate and graduate courses and interdisciplinary certificates to better train future transportation professionals.

- TRC outreach hosts conferences, workshops, and seminars for both professionals and communities.
What makes the TRC unique?

1. Our theme -- sustainable transportation systems (energy and environment) for small cities and rural areas in northern climates
2. Campus-wide program
3. Cooperative project process
4. Interdisciplinary multi-year signature research projects
5. Unique data collection
6. Professional staff and faculty
TRC Research Projects

1. Signature Research Projects - Fall 2006 - 35 pre-proposals and four projects selected for collaborative development and peer review

2. Signature Research Projects - Spring 2007 - 5 proposals, one project selected

3. Faculty Small Grants - Spring 2007 - 9 proposals and 5 projects funded

4. Faculty Small Grants - Spring 2008 - 12 pre-proposals, 10 proposals and 6 projects funded (2 partnerships with VTrans)
TRC Faculty Research Grants

6 Grants awarded in 2007 and 6 in 2008

- Application of The Network Robustness Index to Identify Critical Road Network Links
- Pupil Transportation: Travel Behavior, Traffic Impacts and Potentials For Improvement
- Estimating An Incentive Elasticity of Demand
- Mechanical and Economic Performance of an Electric Car Utilizing the Zebra Battery Technology in Vermont
- Transportation Equity and Communities at Risk: Refugee Populations and Transportation Accessibility in Vermont
- Plug-In Hybrid Electric Vehicles and the Vermont Grid: A Scoping Analysis
- Modeling Plug-In Hybrid Electric Vehicle Impacts in Vermont from Empirical Vehicle/User Data
- Atmospheric Oxidative Chemistry of Organic Particulate Emissions from Fuel Combustion
- Optimal Design for Porous Concrete Pavement
- Designing Sustainable Porous Pavements for Northern Communities
- Facilitation of Behavior-Based Efficiency Opportunities in Vehicular Operations Through Retrofit Information Feedback Systems
- The Elements and Outcomes of Varying Financing Scenarios on the Overall Cost of Transportation Capital Programs
1. 30 events in 2007 with over 100 participants
2. Key Partners
   - Clean Cities (Dept. of Energy)
   - VTrans
   - VT LTAP
   - Continuing Education
3. Future Events
   - Bridge maintenance
   - CNG vehicles
   - Transportation Finance/Re-Authorization
   - Access management
1. Interdisciplinary Graduate Course “Critical Issues in Transportation for the 21st Century”

2. Honors College “Sustainable Transportation”

3. Graduate Fellowships (16 in ’08)(9 in ’09), Undergraduate Awards (2)

4. CUTC student of the year

5. Approximately 20 students work on transportation research projects

6. Workforce Development
TRC - Graduate Studies

• Research Assistantships
• Transportation Scholars
• DOT Research Fellow
New Model Components
- carbon footprint
- stormwater
- air quality
- security / robustness
- groundwater impact
- local freight
- plants
- energy costs

What will the transportation and land system look like in 20 years?

How accurate are existing models and how are they most effectively integrated?

Drs. Adel Sadek and Austin Troy
with Drs. Boumans, Bowden, Costanza, Danforth, Dodds, Jenkins, Lovell, Neher, Novak, Smith, Watzin and Yu
(Engineering, Natural Resources, Ecological Economics, Math, Plant Science, Business)
University Transportation Research Center Signature Research Project #2
Emissions and Performance of Alternative Vehicles in Northern Climates

• How do hybrid versus non-hybrid vehicle emissions and performance differ in the winter and in hilly terrain?

• How do tailpipe emissions vary with biodiesel fuel properties?

• How can emissions science be communicated to influence individual behavior and serve the public interest?

• Unique UVM focus: on-board sensors, particle number emissions, low-cost sensors and public communication.

Drs. Britt Holmén, Lynn Gregory, Jeff Frolik, Dryver Huston, Tom Streeter, Tom Macias, and Robert Jenkins
(Engineering, Communications, Sociology)

Partners: Vermont Agency of Natural Resources; Resource Systems Group (RSG), Inc.; Udall Foundation; UVM Parking and Transportation
Development of DOT traffic level of service measures for tourism areas.

Does green tourism increase economic and community benefits?

Do tourist travel experiences impact their routine travel choices?

What social and economic factors affect tourism travel demand?

Drs. Robert Manning, Kathleen Liang, Lisa Chase, Adel Sadek
(Natural Resources, Community Development and Applied Economics, UVM Extension, and Engineering)

Photo by Local Motion, Burlington, VT

Partners: Udall Foundation; Lamoille Valley Transportation
• How does the built environment impact mobility and quality of life, especially for rural residents and including unserved demand?

• How do climate and season impact walking and biking for both purposeful and recreational trips?

• Project connects transportation, quality of life and active living.
University Transportation Research Center Signature Research Project #5
Multi-Scale Model of the U.S. Transportation Energy Market for Policy Assessment

- Integrated scalable models of energy supply, distribution, and demand
- Network-based interactions include city-scale and nationwide agent-based approaches
- Includes variety of transportation energy decision makers
  - consumers
  - producers
  - distributors
  - vehicle manufacturers
  - policy-makers.

Drs. Margaret Eppstein, Jeff Marshall and Donna Rizzo
(Engineering, Computer Science and Law)

Partners: Vermont Law School (Michael Dworkin)
Plug-in Hybrid Vehicles, the Electric Grid and Emissions

- How many PHEV vehicles could be added in VT?
- What are the net emissions?
- How do travel patterns impact the electricity demand?
- What are the relative costs?

Project Team: TRC and Green Mountain College
External Partners: Central Vermont Public Service, Green Mountain Power and Burlington Electric
Other Research and Education Partnerships

- Summer Transportation Institute (VTrans and FHWA)
- TOD and VMT (Maine DOT)
- Four NETC projects
- Workforce Development (ME, NH and VT)
- Hydrogen Education
- Traffic Simulation (VTrans)
- Travel Demographics (VT RPC)
Workforce Development Project

- **Purpose**: Attract and retain skilled transportation workers
- **Partners**: Maine, Vermont, NH DOTs, VT & NH LTAP, AARP

Four Education Programs

- Transportation Systems Institute
- Community College Summit
- Second Careers in Transportation
- Transportation Systems Academy

![Source: Vermont Agency of Transportation](source_image)
Research, Education, Outreach

UVM Transportation Research Center

- Tailpipe emissions, including GHG and particles
- Land use patterns
- Hybrid electric vehicles
- Rural mobility and accessibility
- Biofuels
- Tourism

- Bicycle and pedestrian travel patterns
- Citizen participation, public involvement
- Safety
- Alternative energy
- Sustainable funding and alternatives to gas tax
Questions/Comments?