DOT Biofuels Activities

Biomass Research & Development Technical Advisory Committee
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Research & Innovative Technology Administration, USDOT
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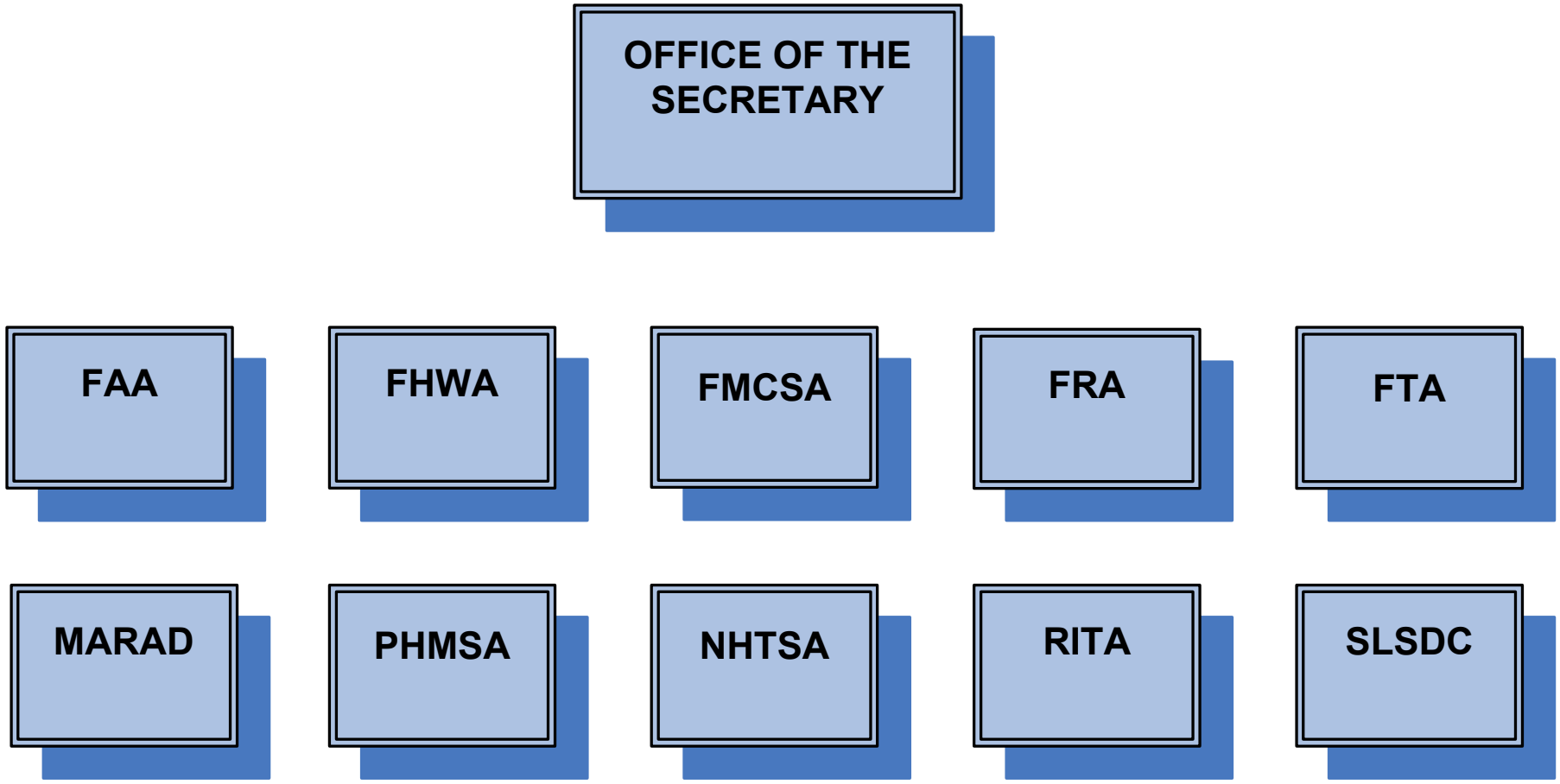
OVERVIEW

- **DOT MISSION & AGENCIES**
- **RITA ACTIVITIES**
  - University Research
  - University Transportation Centers
  - Volpe Center
- **PHMSA ACTIVITIES**
- **FTA ACTIVITIES**

DEPARTMENT OF TRANSPORTATION



RITA - UNIVERSITY RESEARCH GRANTS

The bulk of biofuels work occurs in RITA through directed grants to eight universities and a national trade association. Over the past five years, roughly $56M has been awarded.

The largest – the Biofuels Research Program – is financing $43.5M in projects competitively selected by the Sun Grant Initiative and National Biodiesel Board. The remaining $12.5M funds various research projects at:

- University of Kansas, Lawrence, KS
- University of Vermont, Burlington, Vermont
- Rochester Institute of Technology, Rochester, N Y

RITA - UNIVERSITY RESEARCH GRANTS

The Sun Grant Initiative selects projects through regional competitions. Its regional centers are based at:

- Cornell University, Ithaca, NY
- Oklahoma State University, Stillwater, OK
- Oregon State University, Corvallis, OR
- South Dakota State University, Billings, SD
- University of Tennessee, Knoxville, TN

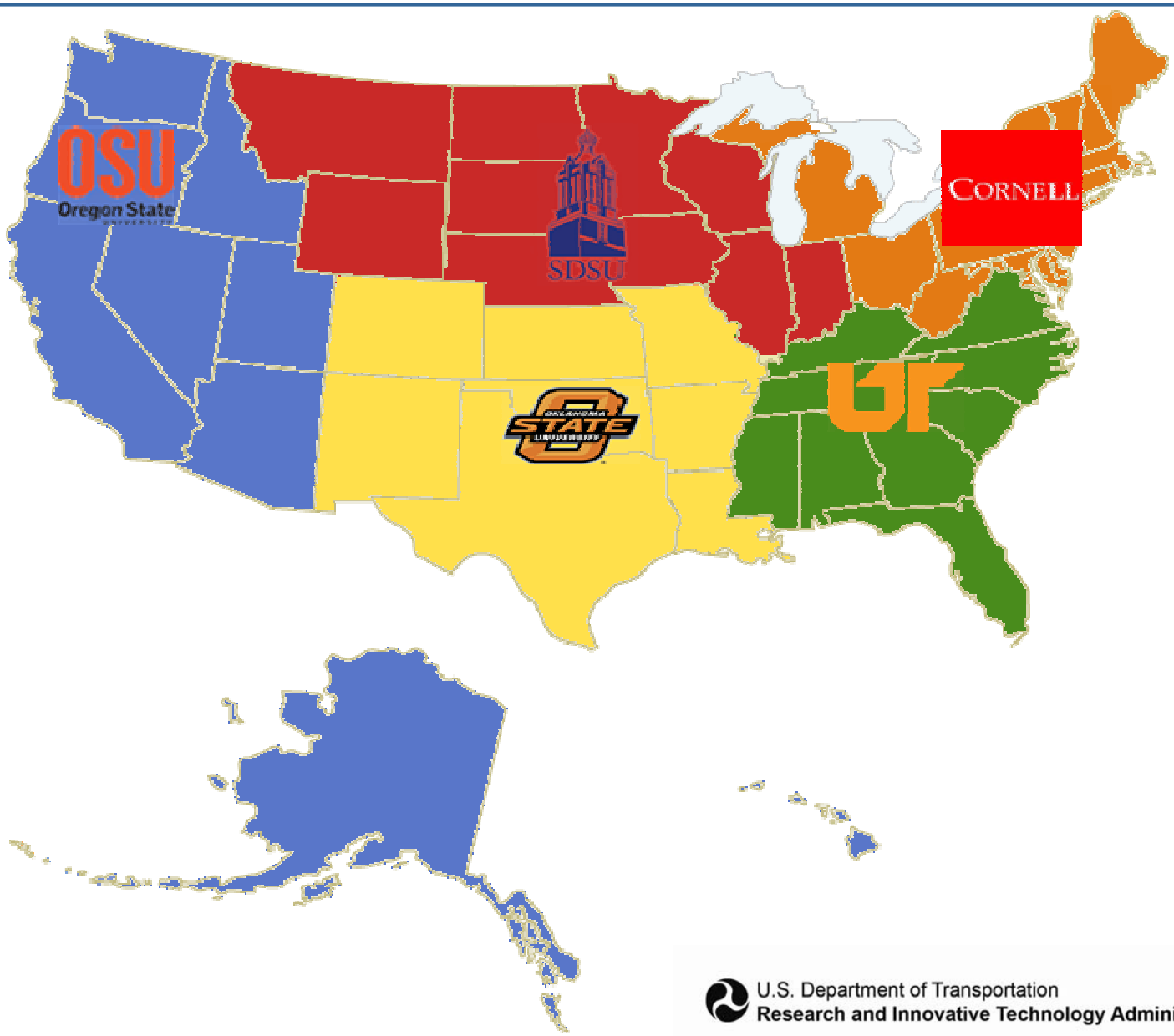
http://bioweb.sungrant.org/

The National Biodiesel Board is in St. Joseph, MO

http://www.biodiesel.org/

Since 2007, about 200 biobased research projects have been funded.

SUN GRANT REGIONAL CENTERS

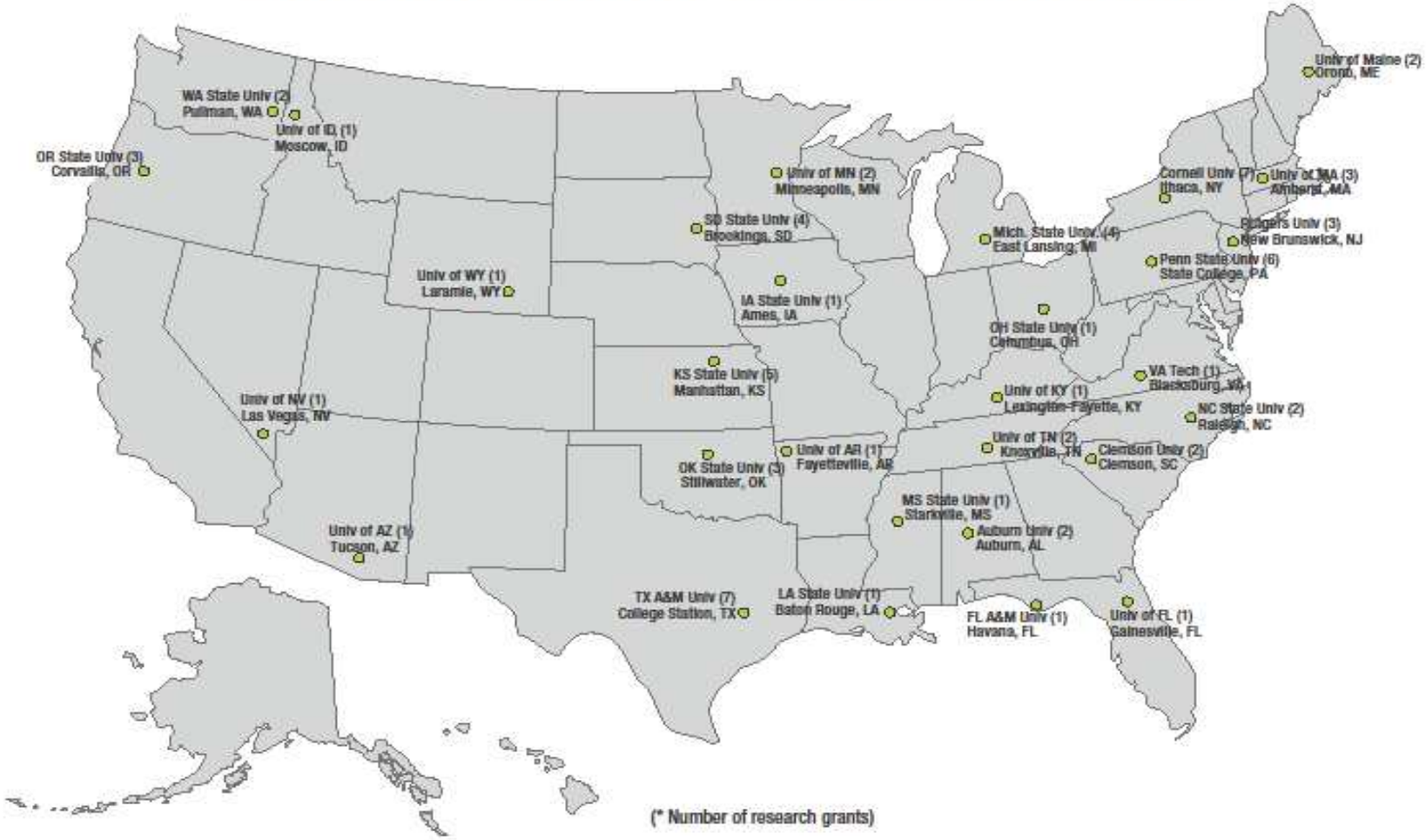


RITA - UNIVERSITY RESEARCH GRANTS

These projects include:

- developing biofuels from crops, grasses, trees and algae
- identifying & exploring new markets for after products
- developing codes, standards & public awareness
- developing and deploying emergency response trainings

Sun Grant Initiative DOT Research Grants



(* Number of research grants)

RITA - UNIVERSITY TRANSPORTATION CENTERS

DOT's UTC program provides $80M annually to address a wide variety of transportation issues. While the program does not have a specific biofuels mission, it is doing important work including

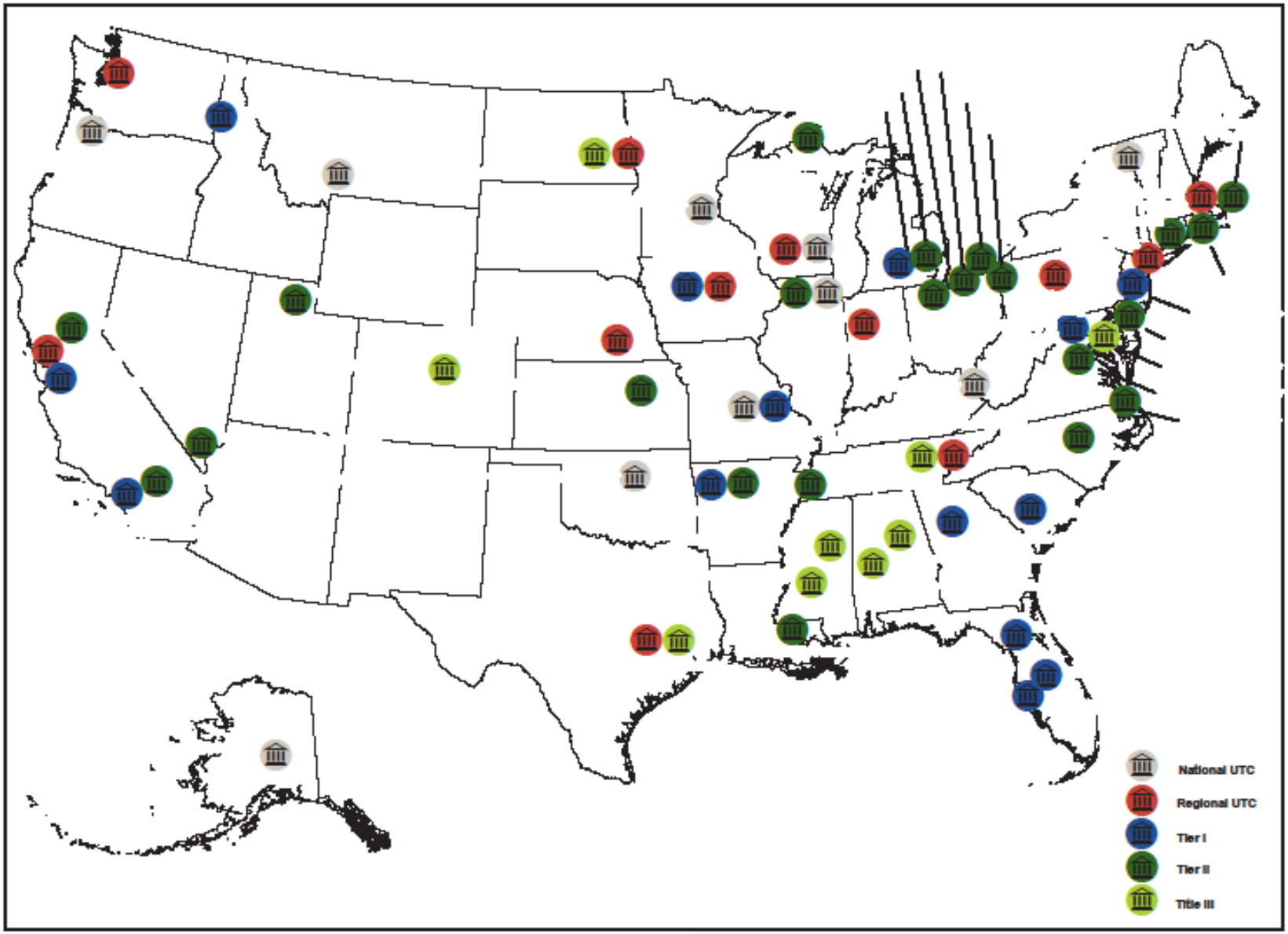
- Bio and Alternative Fuels for Texas A Guidebook to Innovative New Fueling Options http://rip.trb.org/browse/dproject.asp?n=19299
- Bio-Fuels Energy Policy and Grain Transportation Flows: Implications for Inland Waterways and Short Sea Shipping http://rip.trb.org/browse/dproject.asp?n=17079
- Analyzing the Impact of Intermodal Facilities to the Design of Supply Chains for Biorefineries http://rip.trb.org/browse/dproject.asp?n=16751

RITA - UNIVERSITY TRANSPORTATION CENTERS

- Signature Project 5: Multi-Scale Model of the U.S. Transportation Energy Market for Policy Assessment http://rip.trb.org/browse/dproject.asp?n=15276
- Mitigating the Social and Environmental Impacts of Multimodal Freight Transportation Corridor Operations http://rip.trb.org/browse/dproject.asp?n=15179
- SIGNATURE PROJECT 2 - Emissions & Performance of Alternative Vehicles in Northern Climates http://rip.trb.org/browse/dproject.asp?n=14746
- Biofuels for Texas Workshop http://rip.trb.org/browse/dproject.asp?n=14642

In addition, the UTC program and the National Academies's Transportation Research Board next year will be hosting a *Transportation and the Environment* spotlight conference in DC.

University Transportation Centers
FY 2006 - FY 2009



RITA - VOLPE CENTER

The Volpe Center assembled and led the Federal Biofuels Distribution Infrastructure Interagency Working Group (DI-IWG) in accordance with the Biomass R&D Board's National Biofuels Action Plan (NBAP).

NBAP charged the DI-IWG with making recommendations to the Board on:

- the feasibility of using pipeline for biofuels transport, including facilitation of the necessary interagency collaboration on standards development.
- liquid fuel flows over infrastructure, including pipelines, rail, barge and truck transportation to identify short and long-term infrastructure bottlenecks that will inhibit biofuels development.
- the integration of geographic information system (GIS) based tools house at agencies such as DOT, USDA, EPA, and DOE in order to begin to link transportation infrastructure, demand, feedstock location, as well as water and other resources.

RITA - VOLPE CENTER

The DI-IWG, including members from the Volpe Center, DOT/PHMSA, DOE, USDA and EPA developed three draft reports responding to the NBAP:

- *Pipeline Feasibility Study*
- *Multimodal Infrastructure Analysis*
- *GIS-Based Tools Inventory*

The Volpe Center is also conducting research on upstream biofuel supply chain transportation issues, specifically focusing on:

- transportation system demands associated with the transport logistics of various advanced (second and third generation) raw biofuel feedstock materials from point of origin to point of processing.

- assessing the transportation impacts and demands that potential feedstock scenarios will have on subsequent biofuels distribution to storage sites and end users.

FEDERAL AVIATION ADMINISTRATION

The FAA has sponsored work on alternative fuels through:

- Commercial Aviation Alternative Fuels Initiative (CAAFI), in collaboration with Airports Council International, Air Transport Association and AIA.
- The Partnership for AiR Transportation Noise and Emissions Reduction (Partner) Research Program.

CAAFI's goal is energy security & environmental sustainability for aviation. It encompasses 250 sponsor/Stakeholders from five continents and all supply chain functions.

FEDERAL AVIATION ADMINISTRATION

Recent accomplishments include:

- *First certification of synthetic jet fuels through the American Society of Testing and Materials (ASTM D7566), which allows bio-derived F-T jet fuel to be certified and used.*
- *Development of roadmaps for Certification, Economics, R&D, and Environment components of aviation alternative fuels development and deployment.*
- *Sponsoring of life cycle analysis research through MIT/PARTNER program.*
- *Sharing of best practices within the aviation community at the national and international level (e.g., the upcoming ICAO Commercial Aviation Alternative Fuels Conference in November 2009)*
- *Hydrotreated renewable jet test flights (Boeing aircraft, Jan 2009).*

FEDERAL TRANSIT ADMINISTRATION

FTA is working with its stakeholders such as Southern Florida Regional Transportation Authority (Tri-Rail) and Palm Beach County's Palm Trans in transitioning their fleets to biodiesel. Tri-Rail will be using 99 percent palm or soy oil for fuel.

In addition, the agency has issued:

- Issued *Biofuels Management Best Practices for Transit* www.fta.dot.gov/documents/Biodiesel_Fuel_Management_Best_Practices_Report.pdf - 2007-12-05

- Issued *Environmental Benefits of Alternative Fuels and Advanced Technology for Transit* www.fta.dot.gov/documents/FTA-AlternativeFuelsInPublicTransit.pdf - 2007-08-13

FEDERAL RAILROAD ADMINISTRATION

- FRA Office of Research and Development Alternative Fuel Research Effort
  - Sub-program of FRA Rail Energy, Efficiency and Environment Research Program
    - Demonstration of alternative fuels in rail vehicles
      - Fuel Efficiency
      - Engine Emissions

FEDERAL RAILROAD ADMINISTRATION

- Biodiesel Revenue Service Test in an Inter-City Passenger Train
  - Collaborative research effort to establish the feasibility of using B20 Biodiesel Fuel in Passenger Train
  - Amtrak Heartland Flyer Train
  - Daily round-trip from Fort Worth, TX to Oklahoma City, OK (410 miles)
  - 12 month test period
- Establish the fuel consumption, emissions and wear of the locomotive engine running on B20 Biodiesel fuel
  - Measure, record and compare the fuel consumption of the engine on B20
  - Measure the engine emissions at the end of the 12 month test period
  - Baseline and measure two locomotive engine power assembly, following the test period
- Research Partners
  - Amtrak
  - Oklahoma Department of Transportation
  - GE Transportation Services
  - Chevron-Oronite, Inc

FEDERAL RAILROAD ADMINISTRATION

- Measurement and Evaluation of Fuels and Technologies for Passenger Rail Service
  - Measurement of locomotive engine emissions running on B20 Biodiesel (B20) and Ultra Low Sulfur Diesel (ULSD)
    - Using Portable Emissions Measurement System (PEMS)
  - Rail yard and over the road tests using PEMS
- Optimize rebuilt locomotive engines to utilize alternative fuels
  - Reconfigure the engine to more efficiently burn ULSD and B20
- Establish an alternative method for measuring locomotive emissions
  - Railroad industry has limited options for measuring locomotive engine emissions
    - Southwest Research Institute (SwRI)
  - PEMS will allow rail operators to measure and possible certify their equipment without taking the vehicle out of service for long periods
    - Emissions measurement can be done in the rail yard and over the rails
- Research Partners
  - North Carolina Department of Transportation
  - North Carolina State University
  - US EPA

PIPELINE & HAZARDOUS MATERIALS SAFETY ADMINISTRATION

Helped lead *Biofuel Pipeline Feasibility Study* assessing the feasibility of pipeline use for biofuels transport Is cooperating with industry partners on batch testing to quantify challenges to maintaining product quality in handling both ethanol and biodiesel

Has a comprehensive/collaborative research strategy that is bringing solutions to ethanol pipeline challenges. This strategy is addressing pipeline safety and integrity threats and will drive new knowledge into industry best practices and consensus standards

- Research to date has already proven E10 will not cause Stress Corrosion Cracking (SCC) in pipelines and that oxygen and chloride at high concentrations initiate the SCC threat.

Is cooperating with industry partners on batch testing to quantify challenges to maintaining product quality in handling both ethanol and biodiesel.

- Kinder Morgan Energy Partners is now in commercial pipeline transportation of E95 batched with gasoline in an existing pipeline in Florida.

- Magellan Midstream Partners and Buckeye Partners are considering the development of a cross country pipeline project to transport E95 from the corn belt to the U.S. East Coast

Questions?