Green Transportation
ED 662 Green Economic Development

INSTITUTE FOR TRADE AND TRANSPORTATION STUDIES
Outline

- Logistics and Freight Movement overview
- Congestion and its implications for freight movement
- Green Transportation Overview
- Closing Thoughts on Transportation, Economic Development and the Environment
Why Move Stuff?

• Every company has logistics concerns
  • A firm gathers, transforms, distributes goods and services
• Traditional sale between economic agents
  • Grain train from elevator to ocean terminal
  • Distribution, Warehouse (intermediate goods)
  • Producer to Manufacturer/Processor (primary goods)
  • Retail sales
• Vertically Integrated shipments
  • Poultry industry
  • Best Buy, Wal-Mart
  • Military Deployments
  • Reverse Logistics
Evolution of Logistics
Infrastructure, Information Shaped Today’s World

1950’s- Focus on Developing U.S. National Transportation Infrastructure
1960’s- Start of Asian Import Trade
1970’s - Logistics Revolution, containerization
1980’s – Quality Management, Fax Machines, Deregulation, Intermodalism, Global Financial Market Integration
1990’s - Just in Time/Time Certain Delivery, Internet, Technology productivity gains, collaboration, urban congestion
21st Century – Global Supply Chain Management Networks, mass customization, integration, security, Global Competitiveness
Operations - Traditional Push Supply Chain Framework

Supplier — Supplier — Supplier

Manufacturer — Distributor — Customer

“PUSH” METHODS OF CONTROL (relative importance)

Inventory

Transport System

Information System
Operations - Modern Push Supply Chain Framework

- Supplier
- Supplier
- Supplier
- Supplier
- Supplier
- Supplier
- Supplier
- Supplier
- 3PL

- Designer
- Manufacturer
- Marketer
- Distributor
- Customer

- Recycled products
- Point-of-sale data
- Inventory
- Information System
- Transport System

"PULL" METHODS OF CONTROL (relative importance)
The Implications of Movement

**Good**
- Access to better jobs or services
- Lifestyle choices
- Travel choice flexibility
- Access to markets

**Bad**
- Congestion
- Emissions
- Safety
- Free Rider problem
- Who really bears costs of transportation
How Do Businesses Respond to Congestion?

- Move away from distribution facilities away from urban centers
- Locate in areas that have access to multiple modes
- Align operations to minimize congestion and manage fuel costs
- Site Selection magazine – 2nd tier cities doing well for attracting new businesses
Congestion leads to lost wages, increased emissions, increased travel times, etc.
Comparison of Peak Period Congestion – 2002 - 2035
What Kind of Transportation System Do We Want? Now? Or In 30 years?

Safe, Secure, Environmental Responsible, Efficient/Reliable

- Common theme across Modal Agencies, USACE, US DOT, State DOT’s, etc.

Customers (Shippers/Carriers/Public) assume this plus

- cost effectiveness and accessibility to various modes and facilities, and ultimately markets
Challenges Placed on Infrastructure

- **Shippers**
  - Responding to changing markets, demographic shifts
  - Focus is short to medium term

- **Transportation Providers**
  - Respond to changing service requirements

- **Infrastructure Providers**
  - Responding to changing markets, demographic shifts
  - Focus is medium-long term

Control of Cargo routing → Investment Decisions
Is There an Emerging National Will on Transportation Policy/Planning?

- Accessible transportation system that:
  - Maintains America’s competitiveness,
  - Reduces environmental degradation,
  - Maintains or improves our quality of life,
  - In a safe and secure world.
What Is The Future of Transportation and the Green Economy?

- Operations
- Planning
- Modal choice
- Behavioral changes
- Alternative Energy
- Sustainability and policy goals
- World Markets
Operations

- Truck Stop electrification
- Reduce empty transportation movements
- Hybrid technologies and new engine standards
- Staging vehicles to avoid delays in urban areas
- Cold Ironing of Vessels
- California Gate operations at Ports
- California Fees on truck drayage operations
- Higher Engine Standards for new equipment
The boom in shipping trade

Forecast of US Freight Transportation by Mode, 2002 to 2035 (millions of tons)
Forecast of US Freight Transportation by Mode, 2002 to 2035 (billions of tons)
Planning - Changing Perceptions?

...This would protect us from over-development...

...But nobody will let us build it in their neighborhood...
What Happens After A Project Is Developed?

- Improved Operations (no change in fleet or routing, but per movement costs decline and/or reliability improves),
- Change in Routings (realignment of services with existing equipment already in trade),
- Change in the Capacity and Economies of Scale (larger equipment),
- Induced Service or Calls (new equipment enter service)
- Decline in use.

Only improved operations are easy to quantify before the project is built, but the changing in capacity is expected to generate other benefits normally not quantified in base feasibility study.
Design and Site Development

- Firms locating big facilities with access to transportation infrastructure, not people
- Potential access to alternative energy is discussed (wind, water, solar)
- Understanding vehicle counts and emissions
- Truck Generation numbers not readily accepted for most project considerations
- Green Building Standards - California is lead here
- Freight Villages
- Brownfield – Greenfield development
- Gentrification of freight facilities
- Connectors Status
National Environmental Policy Act (NEPA)

- Designed to ensure local and regional needs are met in protecting environment
- Move Environmental review earlier into planning process
- SAFETEA-LU worked to improve disconnect by:
  - Plans must be developed with land use management, natural resources, environmental protection, conservation, and historic preservation,
  - Discuss environmental mitigation activities,
  - Promote “consistency between transportation improvements and state and local planned growth and economic development patterns."
- Process still takes a long time, and may be a disincentive for strategic investment in new facilities
- Greensburg, Kansas
Other Environmental Issues Related to Site Development

- Wetland restoration
- Dredge disposal management
- Noise – air pollution
- Storm water runoff and design standards
Emissions Vary By Truck Speed - Mobile 6 Speed Correction Formula

![Graph showing emissions correction factors for CO, NOx, and NMHC vs. average speed.](image)
Air Quality Is Now Longer Confirmed To NE And California Areas

Nonattainment and Maintenance Areas in the U. S.
8-hour Ozone Standard

- **Brown**: Nonattainment Areas (405 entire counties)
- **Yellow**: Nonattainment Areas (37 partial counties)
- **Green**: Maintenance Areas (32 entire or partial counties)

Partial counties, those with part of the county designated nonattainment and part attainment, are shown as full counties on the map.
EPA Non Attainment Areas Are Also Spreading Across The U.S.
Modal Choice To Reduce Truck Emissions

- Use other modes to alleviate highway congestion
- Trucks are the last mile
- European policy directives – Marco Polo
- Marine Highway Program
- Funding options – TIFIA, CMAQ
- Performance Measures and Competitive tradeoff analysis
- Life Cycle of asset should to be considered
- Distance Travel taxes – “recoupling” use with financing
## Emissions - Grams Per Ton-mile

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Marad Report On Cargo Capacity

Units Needed to Carry Approximately
1750 Short Tons of Dry Cargo

- Semi-Tractor/Trailer: 70
- Railcar: 16
- Barge: 1

Units Needed to Carry Approximately
27,500 BBL of Liquid Cargo

- Semi-Tractor/Trailer: 144
- Railcar: 46
- Barge: 1
Behavioral Changes - Balancing Transportation And Environmental Needs

- Changing nature of work
  - Telecommuters, knowledge community
  - The social contract between employee and employer is changing
- Changing expectations journey to work – high fuel costs led to increased demand for public transit but also less funding for infrastructure
- Changing expectations on discretionary travel
- Shop local – sustainable agriculture
Corporate Accountability

- Triple Bottom Line - economic, ecological and social
  - Fair Trade Goods, Sustainability
  - Avoid bad press
- ISO 14000 Standards
  - Internally – control processes and demonstrate value to workers
  - Externality – mitigate claims about policies and actions, conformity to expectations and regulations
Fuel Use by Mode – BTS Statistics
Alternative Energy

- Not a question of “is it needed”, but urgency
  - Fuel prices, investment, adaptation
  - Rising prices changing logistics/warehousing needs
- Paradox of tradeoffs
  - Wind turbines – bird strikes, sustainable wind speeds
  - Hydropower – migratory fish, turbidity, navigation access
  - Nuclear – disposal
  - Solar – storage and access to grid
  - Electrical Grid needs reinvestment
Sustainability and Policy Goals

- What is sustainable?
- GM and the Bailout –
  - Hummers sold to Chinese firm
  - CAFE Standards
- Moral Hazards
  - Fair Trade and Developing Markets
  - Promotion abuses
  - Corporate welfare
  - Cap and Trade policies
Studies on Climate Change

- TRB – Potential Impacts of Climate Change on U.S. Transportation
- FHWA – Climate Change Initiative
  - Improve system and operational efficiencies
  - Reduce growth of vehicle miles traveled (VMT)
  - Switch to lower GHG fuels
  - Improve vehicle technologies
- Leopold Center Marketing and Food Systems Initiative – Glossary on Climate Change definitions
Coastal Louisiana

1956

2050 ?
Changes in Global Markets

- China – “Insourcing”
- Near Sourcing to Latin America
- Future of dollar for exports
- Port development issues
- Panama Canal expansion
- Free Trade negotiations
- Security risks and asymmetric disruptions
- Price of fuel
- International Energy standards
How will we delivery the goods of this city?
Some Basic Research Questions for Systems and Green Transportation

- Evaluation of externalities in current project approval process
- Relationship of multimodal trade off analysis in environmental stewardship discussions
- Data and planning guidelines that are cross agency and modally transparent
- Improve understanding of spatial markets and realignment in response to transportation projects and risks
- Encouraging determination on boundaries related to non-monetary public goals (risks, health, etc.)
- Expanding geographic corridors into a more integrated framework
- Coordinating multiuse or multipurpose planning options
- How to implement any recommendations?
Freight Transportation And The Environment – A New Beginning?

- Improving transportation different from past years
- System’s use not fully understood or appreciated
- Modal Choice will be more important in future for policy, not operational, goals
- Congestion and funding will limit response for State DOT’s to support strategic investments in economic development
- Private sector participants will be more engaged in debate, but activism by States will be limited beyond Federal leadership
- Policy directives will remain in conflict between the environment and transportation
- System optimization may make some corridors more attractive for growth than other regions, especially considering land use and transportation access and energy availability
- New institutional approaches needed to “relink” transportation to economic growth
- Economic development = people development
Thank you

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