Freight Transportation in the Midwest

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1.0 INTRODUCTION:

The National Energy and Transportation Sustainability, Cost, and Resiliency Research Project was developed to address future energy technologies, the transportation infrastructure, cost, sustainability, and resiliency and their interdependencies. This report will specifically address the Midwest transportation infrastructure. The Midwest is defined by MISO, The Midwest Independent Transmission System Operator, as eleven states found in the central region of the United States. These states are Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin. The majority of goods transported into or out of these states stay within the Midwest; therefore, this report will focus on the transportation of goods within these eleven states and not the Midwest interaction with the rest of the United States.

2.0 FREIGHT:

Every year 2,714 million tons of goods are transported into the Midwest states. Figures 1 and 2 shows the modes of transportation used to transport goods within the Midwest. This report will focus on truck and rail transportation because these two modes are most commonly used in the region.

![Figure 1: Mode of Transportation (Thousand Tons)](image)

Source: Commodity Flow Survey 2002
The sections labeled “Other” in Figures 1 and 2 are a combination of less frequently-used modes of transportation such as water, pipeline, air, and other (CFS 2002:Table 13). Table 1 shows the imports, by mode of transportation, into the Midwest (Thousand Tons) from Midwest states and imports from the entire United States (Thousand Tons) which includes the Midwest states. This table shows that 95% (2,595,640 of the 2,713,917 thousand tons) of goods coming into the Midwest states also originated within the eleven Midwest states. These statistics are also available in ton-miles.

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</table>

Source: Commodity Flow Survey 2002
2.1 US INTERSTATE (TRUCK):

There are 11,494 miles of interstate that connect the Midwestern States. The two main interstates are I-35 traveling north and south through Minnesota, Iowa, and Missouri; and I-80 traveling east and west through Ohio, Indiana, Illinois, Iowa, and Nebraska. According to the Commodity Flow Survey 2002 (Table 15), the average trip length for goods transported in the Midwest is only 393 miles. This means that most of the good that originate in one Midwest state will end up in another Midwest state.

2.2 RAILROAD:

There are 36,532 miles of Class I Railroad Tracks through the Midwestern states. This is over three times the number of miles of interstate in the same region. The average trip length noted above, of 393 miles, is an average across all modes of transportation and also applies to rail. There is only 8%, or 217,113 thousand tons, of goods moving on rail within the Midwest. With the miles of track running through the Midwest, this percentage was expected to be much higher.

2.3 COMMODITIES:

For the following commodity analysis of the Midwest the top five exported commodities for each of the eleven states were isolated. Then the top five commodities of these states were compiled to obtain the top 5 commodities for the Midwest. The results are shown in Figure 3.

![Figure 3: Top Five Exported Commodities for the Midwest (Thousand Tons)](source: Commodity Flow Survey 2002)
3.0 ENERGY CONSUMPTION:

It is estimated by the Energy Information Administration that by the year 2030, coal consumption will reach over 38 quadrillion Btu per year, and oil consumption will reach over 65 quadrillion Btu per year in the United States (Energy Information Administration). Compared to the consumption of renewable energy at 14.7 quadrillion Btu by 2030, these numbers are staggering. It is evident that renewable energy needs to make the necessary advancements to supply more than 10% of the United States energy consumption.

4.0 SCENARIOS:

Freight

Truck freight consumes a considerably higher amount of energy per ton of goods moved than rail, and yet 77% of freight transportation is by truck compared to 8% by rail. One scenario to reduce energy consumption due to freight movements would be to transfer some of the truck freight to rail. Through the Midwest, there is three times the miles of Class I Rail Trackage than there is US Interstate. This is one scenario that will need further investigation.

Technology

Technological advancements will reduce energy consumption in freight and passenger, rail and interstate transportation. Some of the technology has already been developed; it just needs to be integrated in the transportation infrastructure. Finding ways to incorporate Personal Hybrid Electric Vehicles (PHEV) into the current interstate system could reduce energy consumption through gasoline. High speed passenger rail exists in other countries and could be implemented in the Midwest to discourage personal vehicle use.

5.0 FUTURE RESEARCH

Further research is necessary to determine the options for reducing the overall energy consumed to transport both people and goods. Is it possible to convert truck freight to rail freight for more efficient transportation of goods? Would high speed rail in the Midwest, or Personal Electric Hybrid Vehicles (PHEV) reduce the overall energy consumption used to transport people? What would be the impact to the Midwest infrastructure if PHEVs were used?
6.0 REFERENCES:

Energy Information Administration
http://www.eia.doe.gov/
International Date Projections

Research and Innovative Technology Administration, Bureau of Transportation Statistics
Commodity Flow Survey 2002
http://www.bts.gov/publications/commodity_flow_survey/

Tables used:
- Table 3. Shipment Characteristics by Mode of Transportation and Distance Shipped for State of Origin: 2002
- Table 5a. Shipment Characteristics by Two-Digit Commodity for State of Origin: 2002
- Table 13. Shipment Characteristics by Destination and Mode of Transportation for State of Origin: 2002
- Table 19. Shipment Characteristics by Two-Digit Commodity and Distance Shipped for State of Origin: 2002