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Emerging Trends: Transportation Needs for Biofuels, Bioproducts, and the Bioeconomy

by

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Current Status of Transportation and Logistics-August 06':

- Trucking which includes TL, LTL, Contract, Dedicated, and Specialized carriers are at an ALL TIME RECORD Demand to provide service.

- Current pool of drivers that are eligible to provide service is inadequate and is trending over the next 5-7 years to continue to shrink.

- Because of the two above factors, transportation carriers have had to "entice" drivers while having fuel expenses, capital utilization rates, and operating expenses increase.

- In addition, new driver regulations have removed driving hours capacity from the system and increased training requirements from Hazmat, safety, and insurance carriers have reduced driving hours by as much as 20%

- Carriers with over 30MM in revenue have experienced a driver turnover rate of 116% (Source: American Trucking Association, 2005)

Current Status (continued)

- Current rail system is unable to handle any new capacity
- Rail has been efficient at handling capacity between major rail hubs
- Barge transportation has traditionally been an economical alternative for large volumes of commodity products, but remains economically unviable due to difficult access, prohibitive transportation to sites and current barge infrastructure
- Logistical support systems, I.E. warehousing, brokerages, freight forwarders, and third party packaging and support services have seen increased demand for their services
- Ironically the same economic circumstances that have fostered the growth of biofuels and their coproducts is also at work in limiting the distance to shipping raw materials and finished goods

Trucking which includes TL, LTL, Contract, Dedicated, and Specialized carriers are at an ALL TIME RECORD Demand to provide service.

- Dozens of major carriers have gone bankrupt or been merged since the late 90’s.The include familiar names like Consolidated Freightways, ABF, Roadway, and American to name a few

- Deregulation in 1980 consolidated approx 200 motor carriers that comprised 95+% of the U.S. market down to approx 60 carriers.

- The economy has grown substantially throughout the 80’s, 90’ and the first part of the 21st century while capacity has flattened and is rapidly approaching a “ negative capacity” situation.

- Demand for transportation needs for the Bioeconomy coupled with the increased need for import container traffic is still in it’s infancy

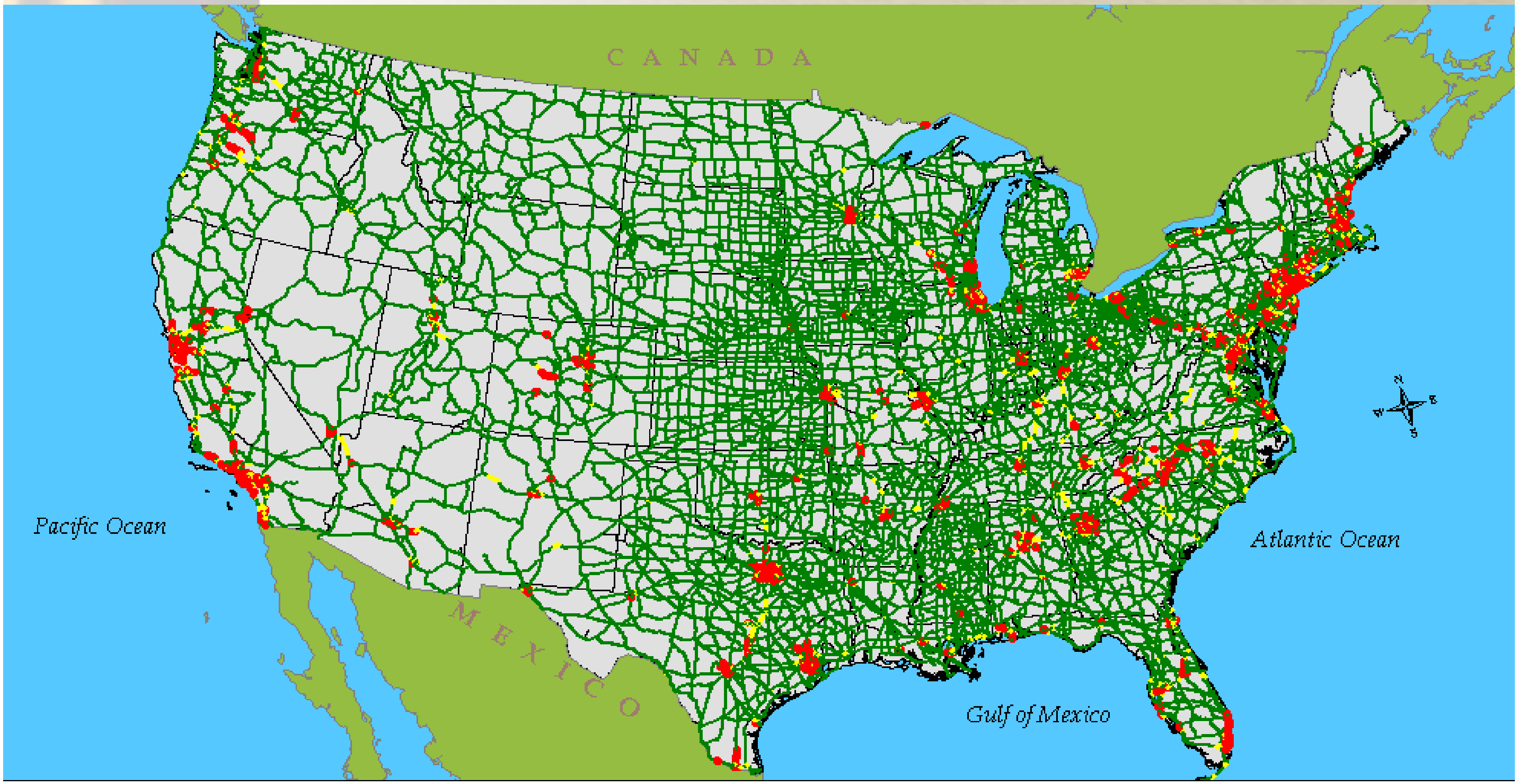
The current pool of drivers that are eligible to provide service is inadequate and is trending over the next 7 years to continue to shrink and transportation carriers have had to "entice" drivers while having fuel expenses, capital utilization rates, and operating expenses increase.

- Current age for truck drivers in 2002 was 43.2 years of age. It is projected at the end of 2006 to be 45.3 years (Source: Global Insight Data May 2005)
- The economy has grown substantially throughout the 80's, 90' and the first part of the 21st century while capacity has not followed in unison
- In 2011, the number of drivers needed to fill this demand will be at 1.53 million drivers vs. 1.35 million in 2006. (Source: Global Insight Data May 2005)
- Meanwhile the "industry" along with business and consumers never expected a doubling of fuel rates, 17 raises in interest rates and healthcare, workman's compensation, and insurance rates to increase to current status

Current rail system is unable to handle any new capacity and was designed over 100 years ago. The system was designed to efficiently handle capacity between major rail hubs

- Rail has traditionally been a low cost service provider for large volume, unitized, consistent raw materials and bulk commodity finished goods
- Due to the “infancy” sate of our burgeoning bioeconomy, the transportation and logistical requirements have not met the railroads desired business model.
- Some local railroads have shown interest and are looking to take a proactive stance. This will require cooperation across multiple rail providers.
- Rail can be a vital component to an integrated transportation model, but in the new bioeconomy there will need to intermodal collaboration.

Congestion Hotspots - Freight Analysis Framework (FAF) Highways 1998

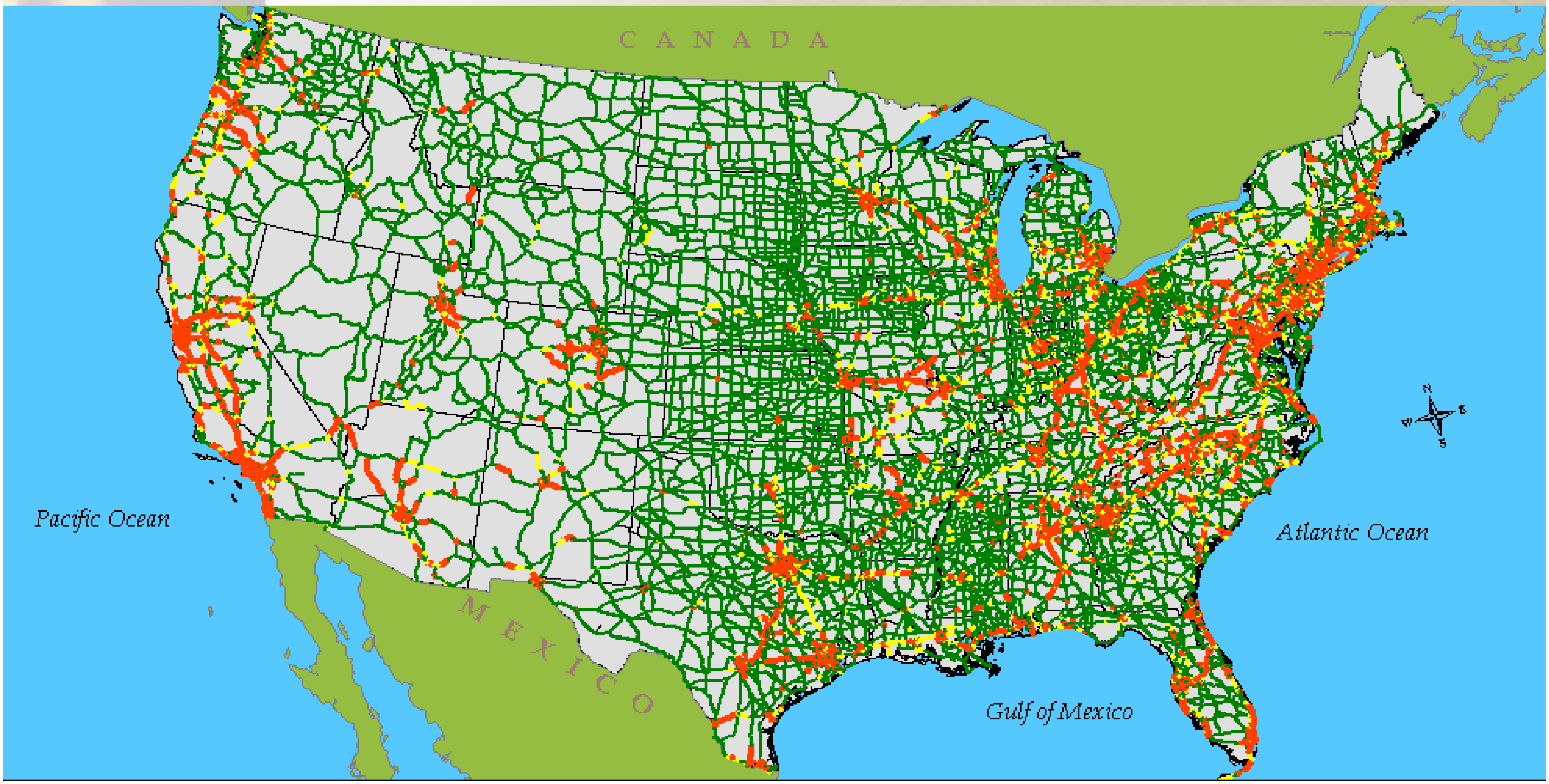


US Department of Transportation
Federal Highway Administration
Office of Freight Management and Operation
Operation Core Bussiness Unit

FAF Network Congestion - 1998

FAF Network
- Below Capacity
- Approaching Capacity
- Exceeding Capacity

By 2020, It Only Gets Worse In Every Section of the Country…



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FAF Network
Congestion - 2020

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What does all this mean to the emerging Biobased Economy?

- Additional needs for transportation are going to be driven by Biofuels (raw materials and finished product), Byproducts or co-products, and other biobased components
- There are no immediate expansions planned to the bulging transportation pipeline
- Since most this is occurring in Iowa and across the Midwest, it makes sense to shift the vision away into a bioeconomy that is agriculturally driven and embrace the existing infrastructure that is currently in place
- Value added processing, distribution, and logistics will allow for horizontal integration of Bioeconomy components to reach their markets economically and consistently

Strategies to assist in the emerging Bioeconomy

- Focus on each component of the biofuels, co-products, and other biobased components
- Because of the agricultural nature of the new bioeconomy, extra attention needs to be paid to transportation and logistical needs before the “birth” of the biofuel, co-product or biobased component
- Of particular note is the large amount of co-product that will be entering the pipeline in the way of glycerin, DDG’s, and other products that will impact other current streams from competing markets.
- Look for third parties to provide pooling of resources. Economies of scale and direct access to established relationships will be critical as the Bioeconomy “root system” develops
- An intermodal system with a central location and access to multiple carrier modes can provide a regional, national, and global platform to launch the bioeconomy (if desired) to the next level

Strategies- (Cont.)

- Learning curves within the new Bioeconomy will be very steep on the processing and operational side of the business model. Expect similar curves when it comes to a transportation and logistics model
- Consider outside the box thinking for your main and secondary co-product marketing strategies…I.E. export containers, co-mingling with other biobased products, multiple channel distribution.
- Bulk storage of both inbound raw materials and finished goods may flatten out commodity cycles.
- Second tier customers may come into a play with a less than bulk strategy for your finished goods coupled with a transportation pool model

Final Thoughts

- The transportation system has not changed much in 30 years in the U.S. as well as Canada and Mexico. Logistical synergies and value added logistics have to be reviewed in order to maximize the new biobased economy and establish the necessary “root system” that will allow biobased initiatives to feed their needs for raw materials and carry their products to the end user.

- Collaboration with industry experts will be critical to flattening the learning curve and to bring knowledge and assets to the fledgling bioeconomy infrastructure.

Companies to contact:

- Agri-Pak LLC, located in Boone, Iowa. Agri-Pak is a solutions driven company that provides packaging, value-added services, warehousing and logistical services to some of the world's leading agricultural and animal feed companies. Agri-Pak is located 35 miles from the crossroads of I-80 and I-35. Their website can be found at www.agri-pak.com

- PDM Distribution Services Inc.. PDM provides, transportation, warehousing, logistical services, and state of the art food grade packaging solutions. PDM's has created numerous solution based business models to provide a competitive advantage when it comes to transportation, logistics, and storage. With over 1.2 MM sq. feet of space throughout the Midwest, PDM's entrepreneurial spirit has assisted dozens of companies in providing integrated solutions. Their website can be found at www.pdmcos.com