



# Design and development of a U.S. logistics models for residential and commercial biomass pellets

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# About Us

## **Biomass-Energy and Pellet Characterization Service Center**

The work conducted in the biomass-bioenergy and pellet characterization center include:

- ✓ The evaluation of woody biomass materials.
- ✓ Assessment of solid fuels such as pellets and briquettes.
- ✓ Market and logistics studies.
- ✓ Particle preparation, material compaction and product testing such as proximate and ultimate analyses and trace element quantification.
- ✓ Tools include: debarker, splitter, grinder, hammermill, pellet mill, briquetter, furnace and moisture meters.

# Wood Pellets

- Pellet fuel is a renewable, clean-burning and cost stable home heating alternative
- There are approximately 1,000,000 homes in the U.S. using wood pellets for heat
- Pellets are available at fireplace dealers, nurseries, building supply stores, feed and garden supply stores and some discount merchandisers



[http://blog.mlive.com/grpress/business\\_impact/2008/09/large\\_pellets.jpg](http://blog.mlive.com/grpress/business_impact/2008/09/large_pellets.jpg)

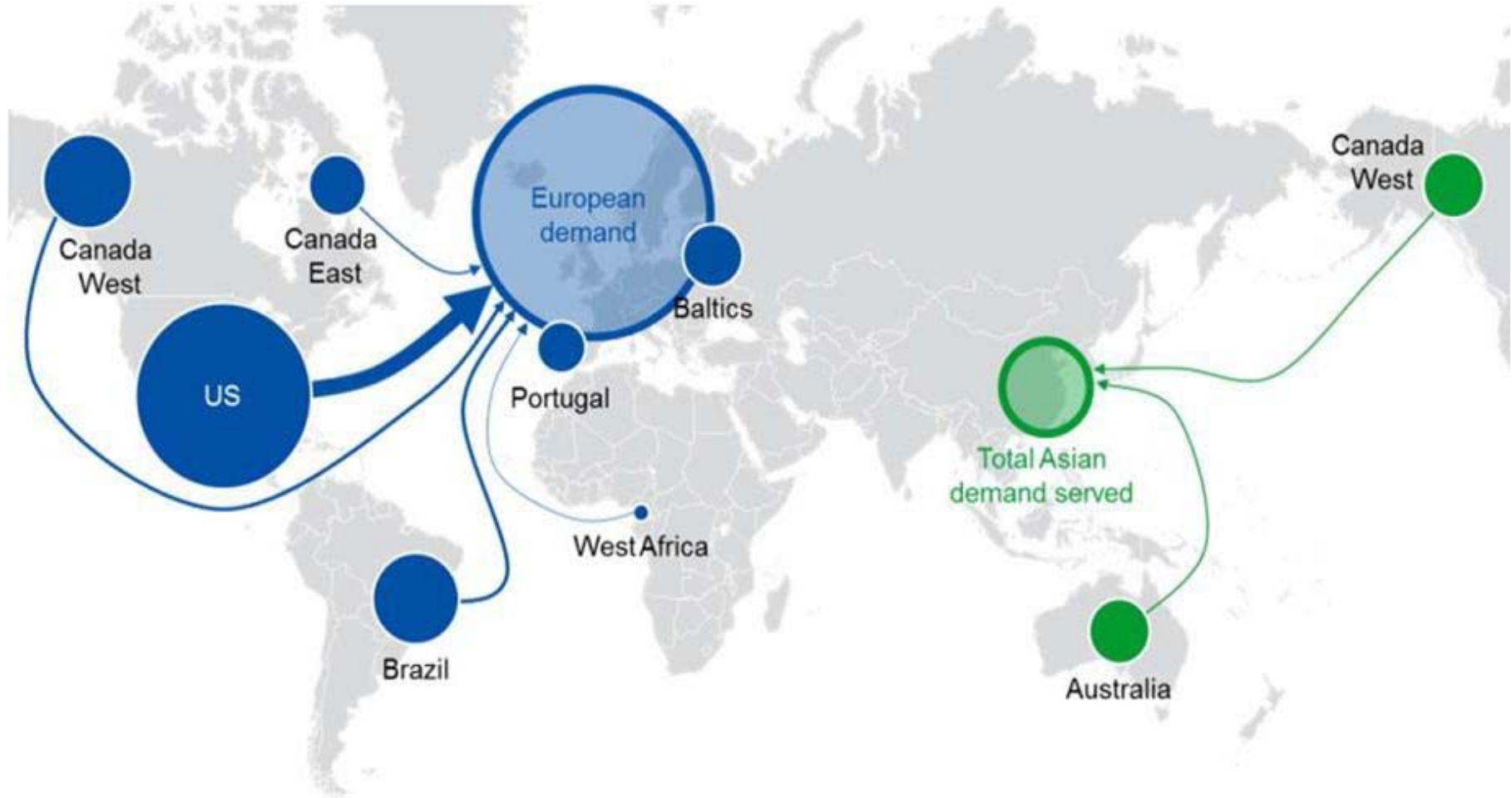


<http://www.colourbox.com/preview/2086212-859210-alternative-fuel-wood-pellets-burning-in-a-fireplace.jpg>

# Why not simply burn biomass?

- The moisture content of pellets is substantially lower (4% to 8% water—compared to 20% to 60% for raw biomass)
- The density of pellet fuel is substantially higher than raw biomass (40 lbs. per cubic foot verses 10-25 lbs. per cubic foot in raw material form)
- Pellets are more easily and predictably handled.

# Pellet supply chain

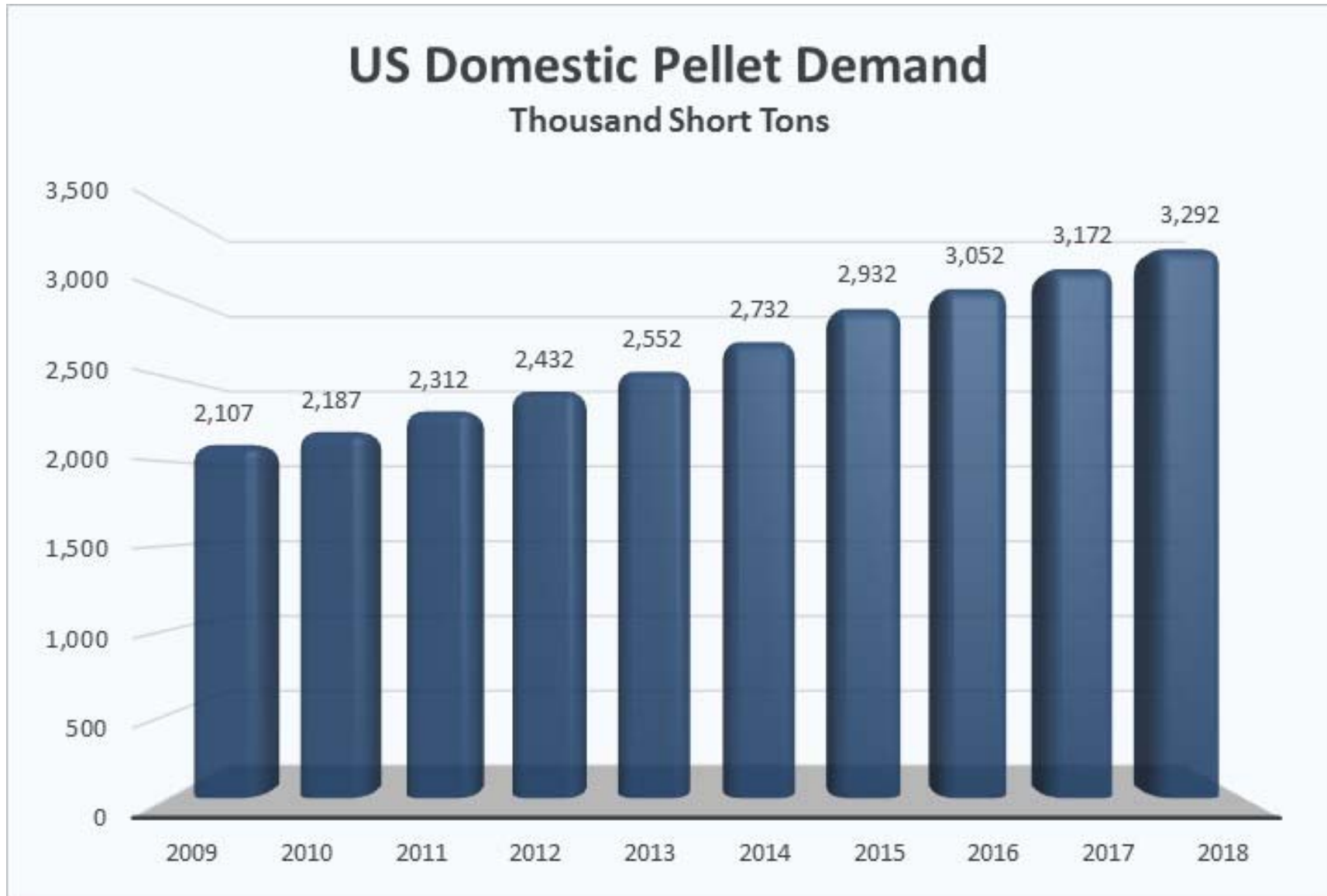


U.S.





# Domestic Pellet Market

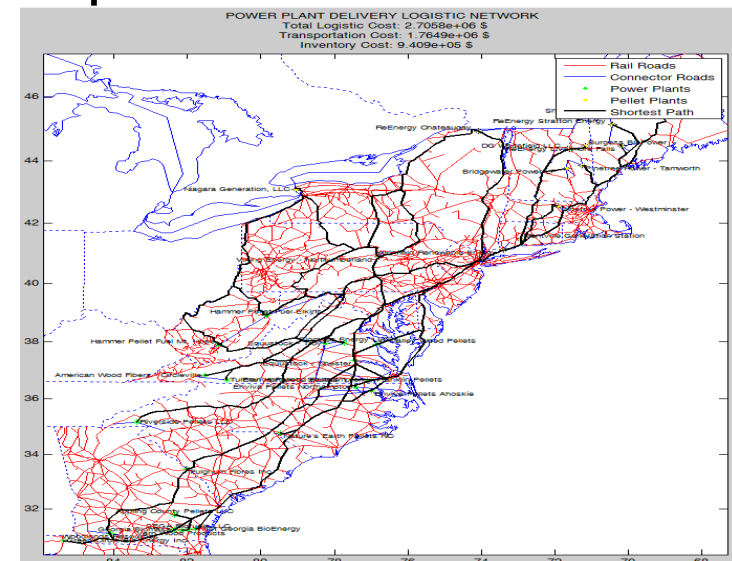
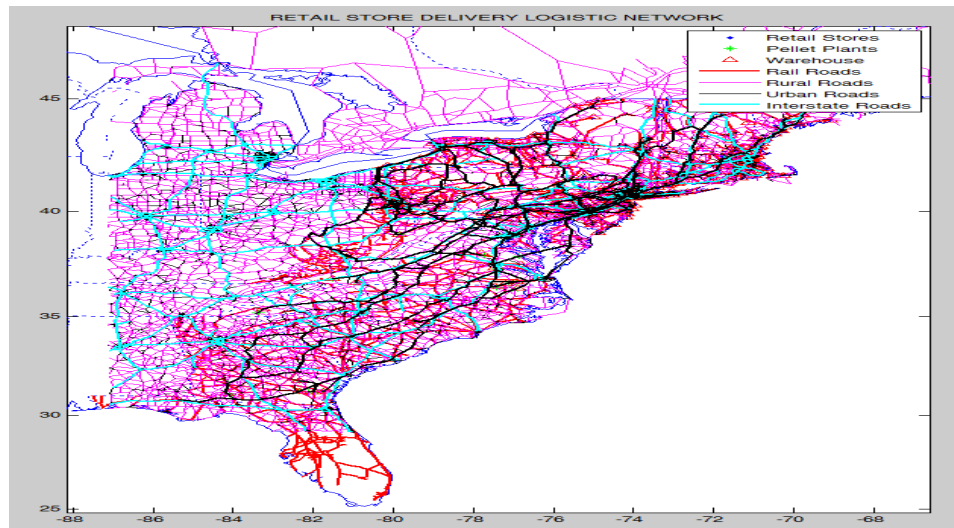


Source: Walker, Seth.. 2013. North American Wood Pellet Market.. RISI

# Model Development

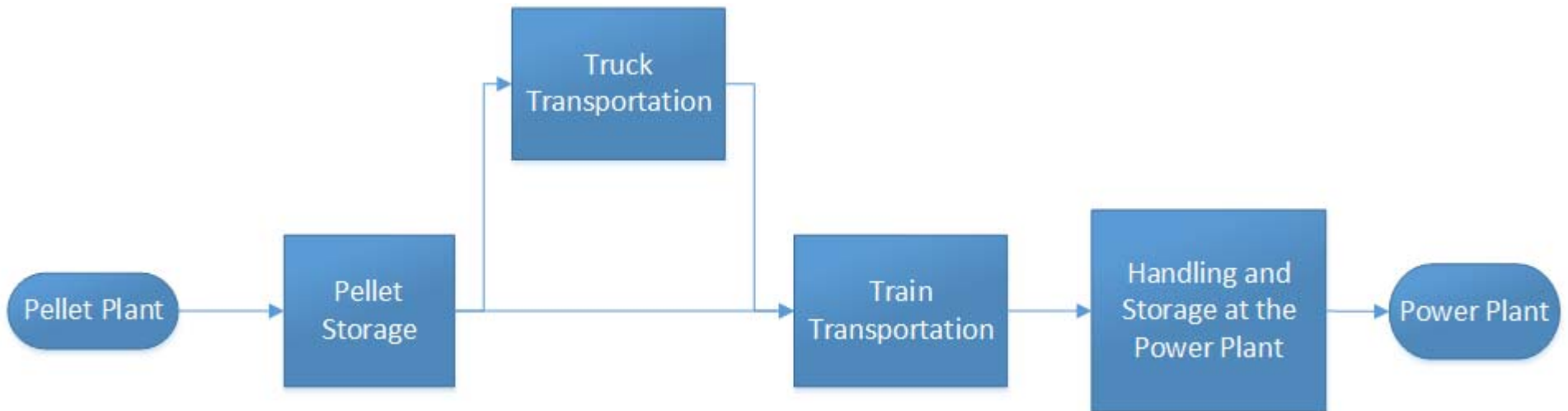
**Objective:** Design a logistics network to supply wood pellets to customers at least cost possible providing the desired level of service

- The design problem includes the need to select the best location for the DCs in the network.
- Selecting the best mode of transportation
- Frequency and quantity of each shipment



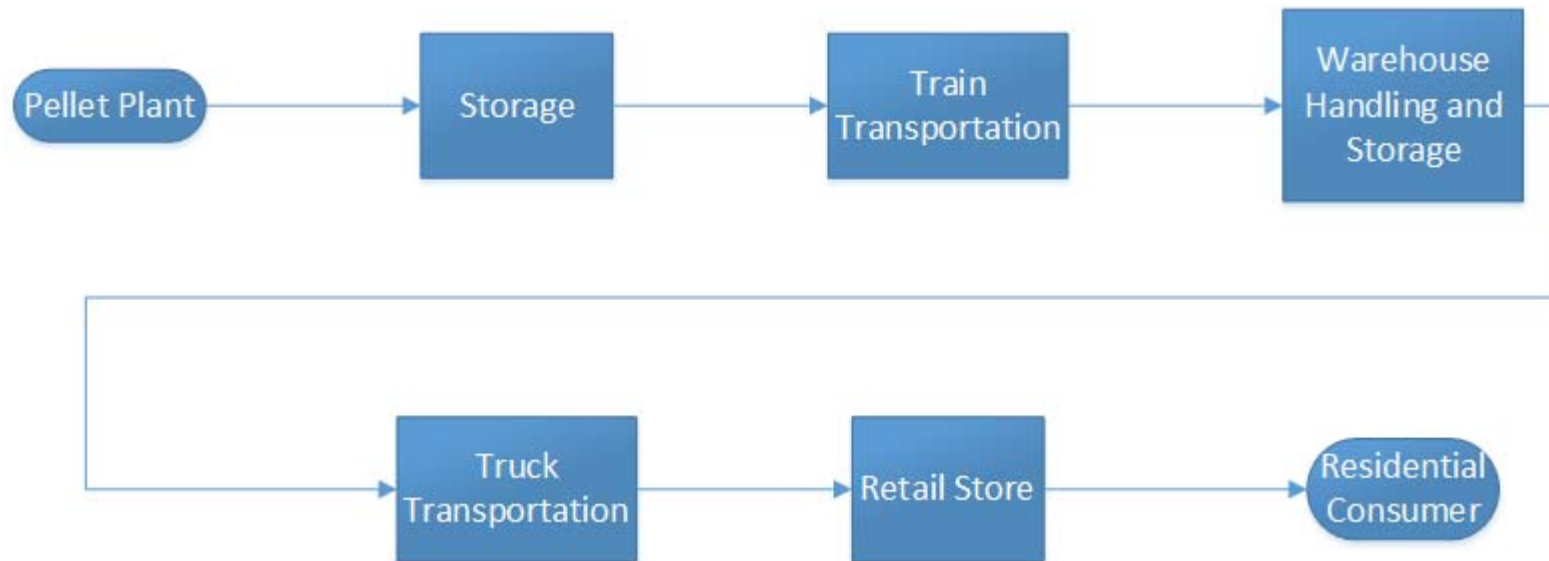


# Bulk for power plants

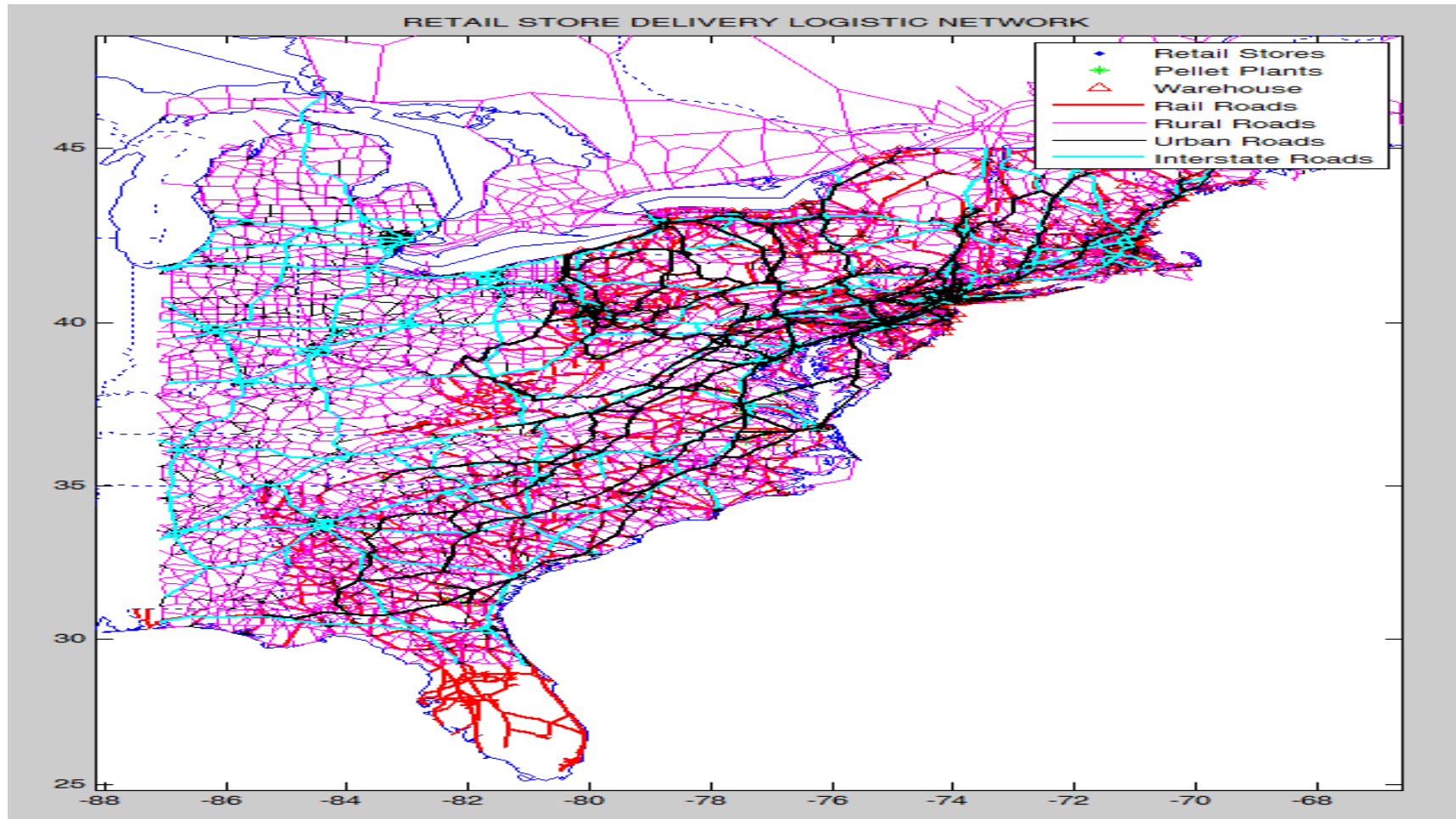




# Bagged for residential



# Bagged for residential



# Ocean shipments

Legislations issues a 90-year-old law, called the Jones Act.

Every time you want to send something from one US port to another:

- the cargo must travel on a ship built in the US
- staffed by mostly Americans
- flying the American flag



# Models



Essentially, all models are wrong, but some are useful.

(George E. P. Box)

Source: IZquotes



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