

# POTENTIAL CRUDE PETROLEUM NATIONAL TRANSPORTATION NETWORK "BOOM" LEADING INDICATOR METHODOLOGY

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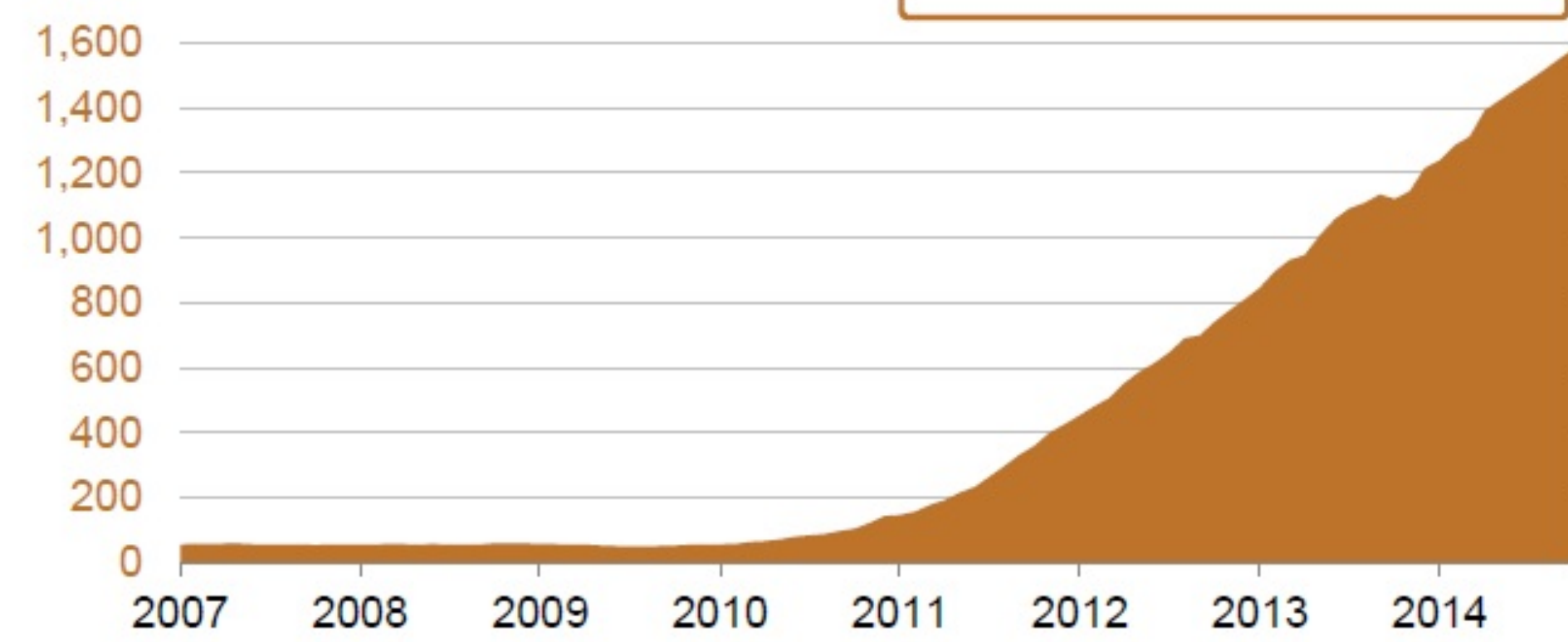
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## Eagle Ford Region Oil production

thousand barrels/day



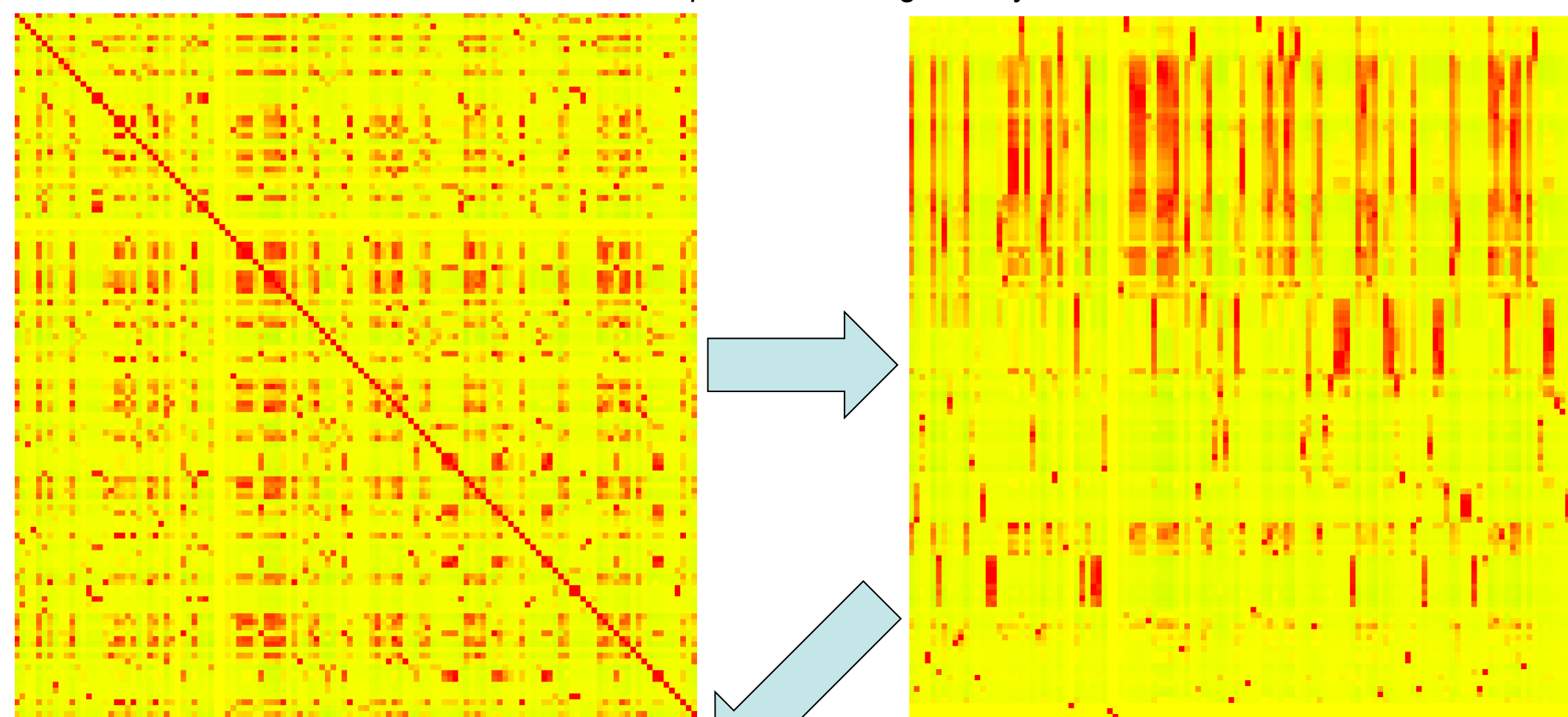
U. S. Energy Information Administration | Drilling Productivity Report

## Preliminary Analysis

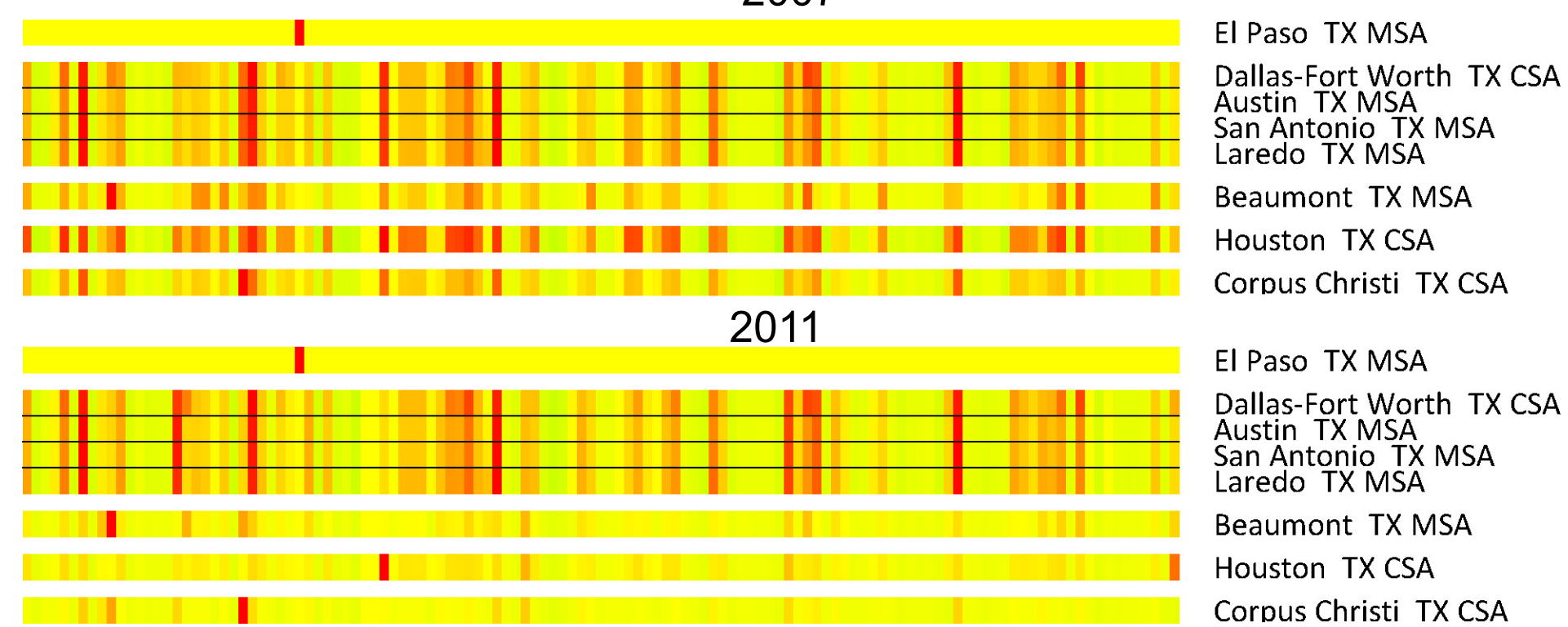
- Similar Patterns Indicate Similarity In Zone Export Networks
- El Paso Is A Refiner But Not A Significant Producer
- Beaumont, Houston, and Corpus Christi (Largest Refiners) Experienced Greatest Longitudinal Change
  - Intra-Zonal & External Production Flooded Capacity
  - Refining Capacity Increased/Changed

## 2011 PATTERN CLUSTER SORT (SPECTRAL) ALGORITHM

Each Row and Each Column represents a Freight Analysis Framework Zone



2007/2011 EAGLE FORD REGION CORRELATION/CLUSTER COMPARISON



## Background

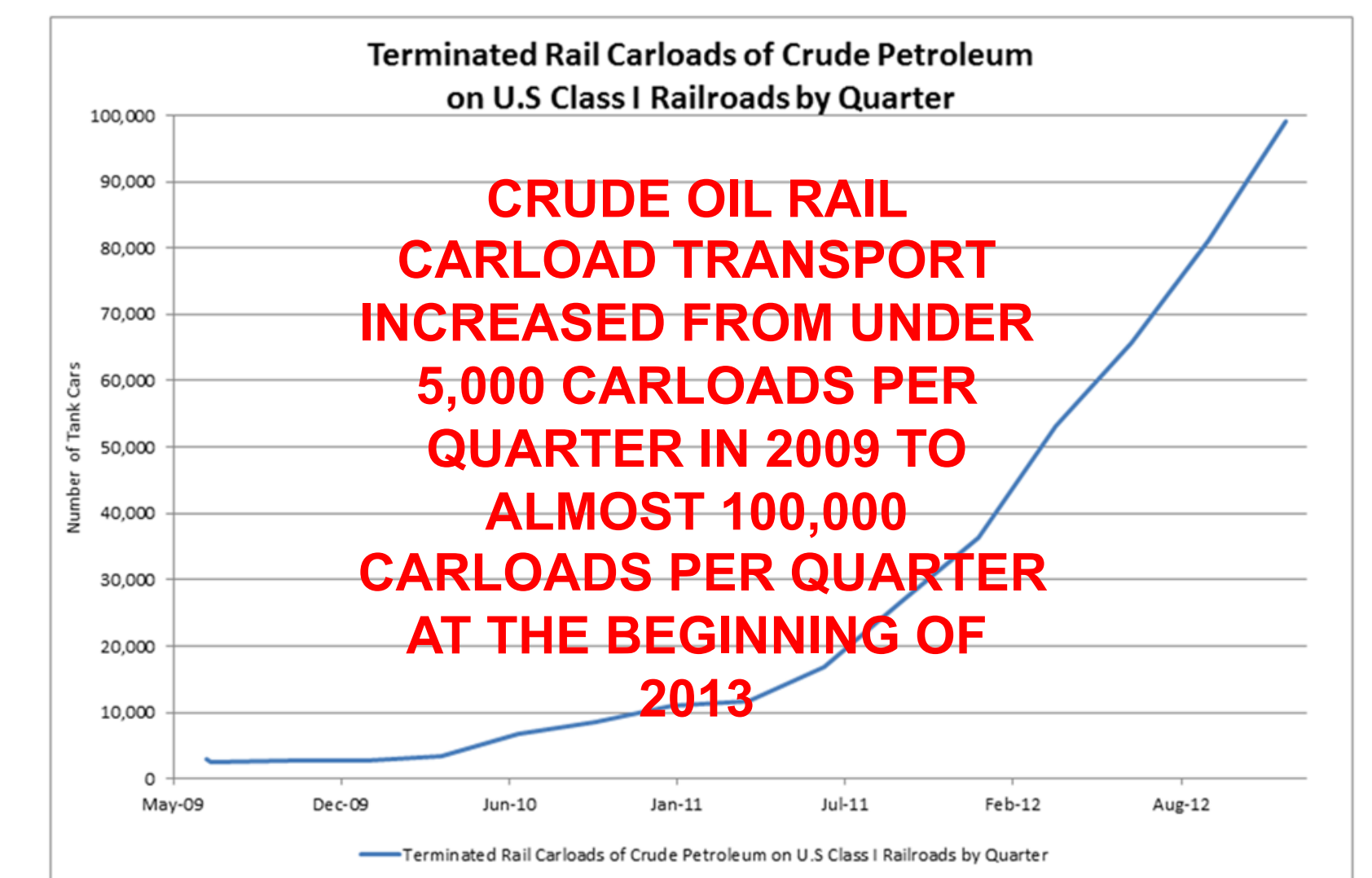
- Tight Oil Boom Created New Transportation Networks Between 2009 and 2013
- Rail Cars/Quarter: 5,000 (2009) To 100,000 (2013)
- Government, Academia, And The Public Were Blind-sided By This Development
  - Peak Oil Was Thought To Be Past Tense
  - 2011 iea Projected Crude Increase: 1 Million BBLs/Day
  - 2013 iea Projection: 3.9 Million BBLs /Day
  - Possible U.S. Energy Independence

## Resources And Methods

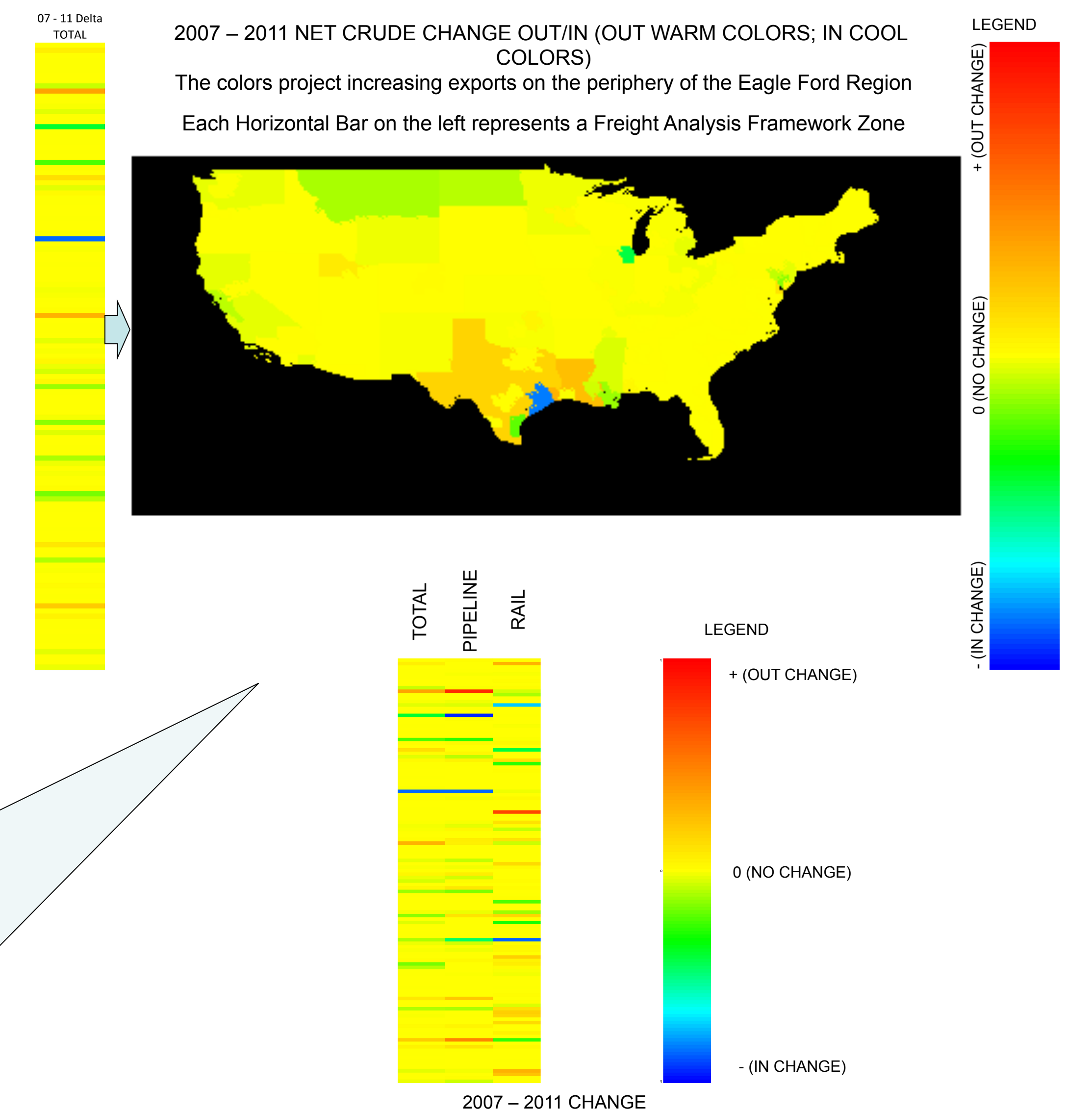
- Freight Analysis Framework (FAF)
  - 2007
  - 2011(Provisional)
  - 2012(Provisional)
- Methods:
  - Spectral Pattern Recognition Algorithms
  - Zonal, Modal, and Volume Pattern Evaluations
  - Abstract indices and visual, graphical representations

## Preliminary Analysis

- Pipeline Network Flow Change Follows Total Change (Correlation 0.8401)
- Rail Network Flow Change Does Not Follow Total Change (Correlation -0.0173)
- New Rail Flows Appear To Come From New Locations
- Excesses Appear To Be Picked Up By The Rail Network (Substantiated By Graph At Upper Right)
- Permian Basin (TX) And The Periphery Of The Eagle Ford Regions (TX) Are Changing Most Rapidly
- **The Above Right And At Left Could Have Been Projected In 2011**



Source: Association of American Railroads Statistics



## References:

- Association of American Railroads. (May, 2013). *Moving Crude Oil by Rail*. Accessed 19 September, 2013, from Association of American Railroads Web Site: <https://www.aar.org/keyissues/Documents/Background-Papers/Crude-oil-by-rail.pdf>
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- U. S. Energy Information Administration. (September, 2014) *Drilling Productivity Report*. Accessed 6 October, 2014, from the U. S. Energy Information Administration Web Site: <http://www.eia.gov/petroleum/drilling/pdf/eagleford.pdf>