

# API Pipeline Conference

## Panel on Biofuels

### Ethanol Opportunities and Challenges

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# What's All the Buzz About?

- Ethanol production and consumption has tripled since 2000
- Energy Bill of 2007 Includes Major Renewable Fuels Provisions
- Implications
  - 4.8% of gasoline pool in 2007
  - 6% of gasoline pool in 2008
  - 10+% of gasoline pool in 2012
  - 20+% of gasoline pool in 2020

# What does this have to do with Pipelines? Pipelines don't move Ethanol

- Exactly!
  - Pipelines don't move ethanol = lost business
  - Pipelines don't move ethanol = inefficient, less safe operation

# Opportunity / Challenge

- As domestic and international ethanol production continue to increase, the economic viability of domestic pipeline shipments increases as well
  - Introduction of ethanol into the pipeline system presents challenges and opportunities
    - Opportunity is related to new commercial opportunities, for ethanol and ethanol blends
    - Challenge is related to the potential incompatibility of fuel grade ethanol with existing pipeline infrastructure and operating practices

# U.S. Ethanol Industry Today

- 122 Biorefineries
  - 75% of production in 6 states
- 7.2 bgy capacity today
- 74 Ethanol Biorefineries under construction
- 7 Ethanol Biorefineries under expansion
- 12 bgy at end of 2009

# What About Consumption?

- How will the automobile / gasoline industry meet the quotas?
  - Biodiesel?
  - E10 → E15 → E20 for everybody?
  - E85 for some?
    - Current and expected near term car fleet has relatively few flexible fuel vehicles and little E85 infrastructure exists
  - ???

# A Little Closer Look

Supply Profile

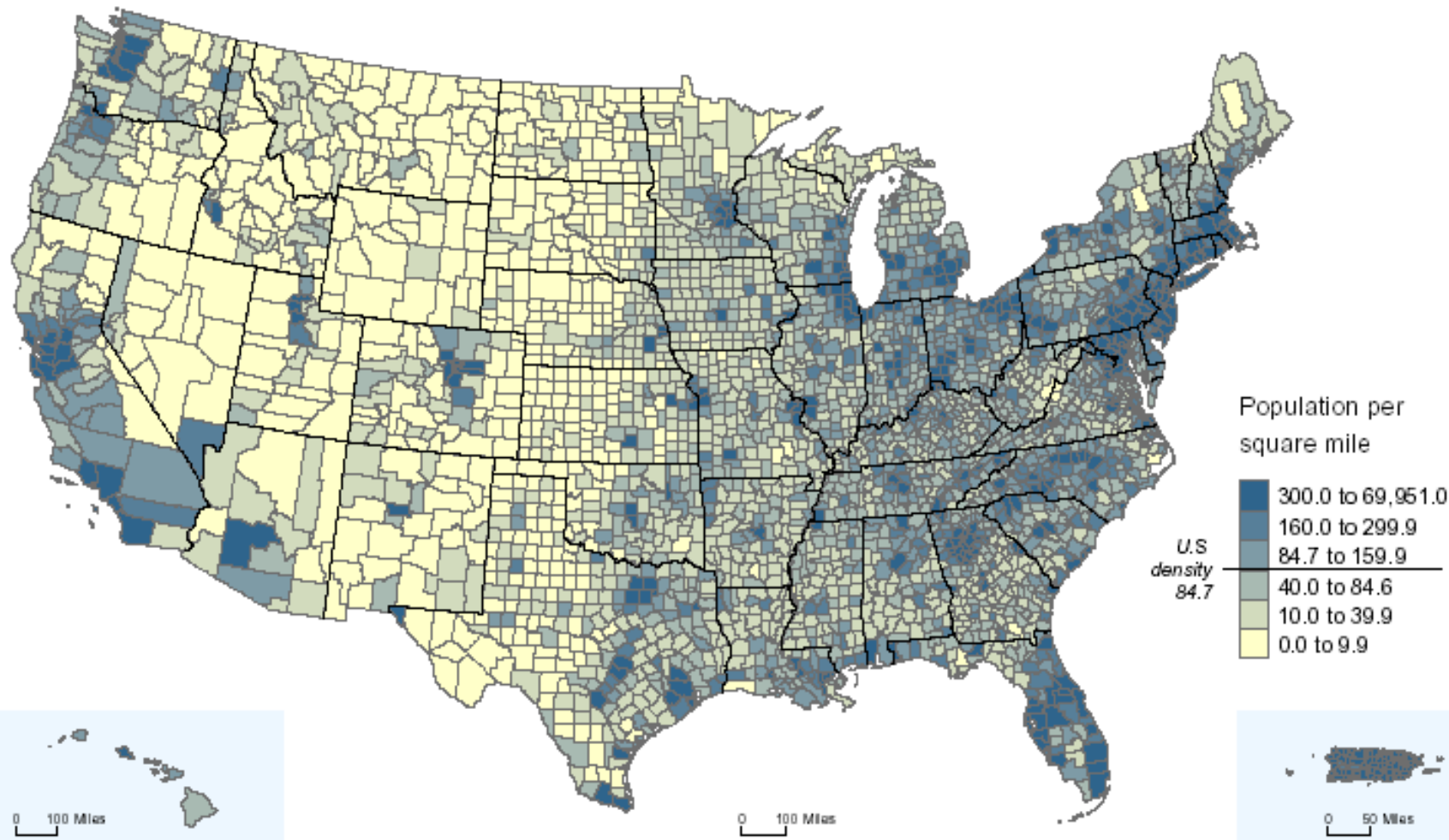
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Demand Profile

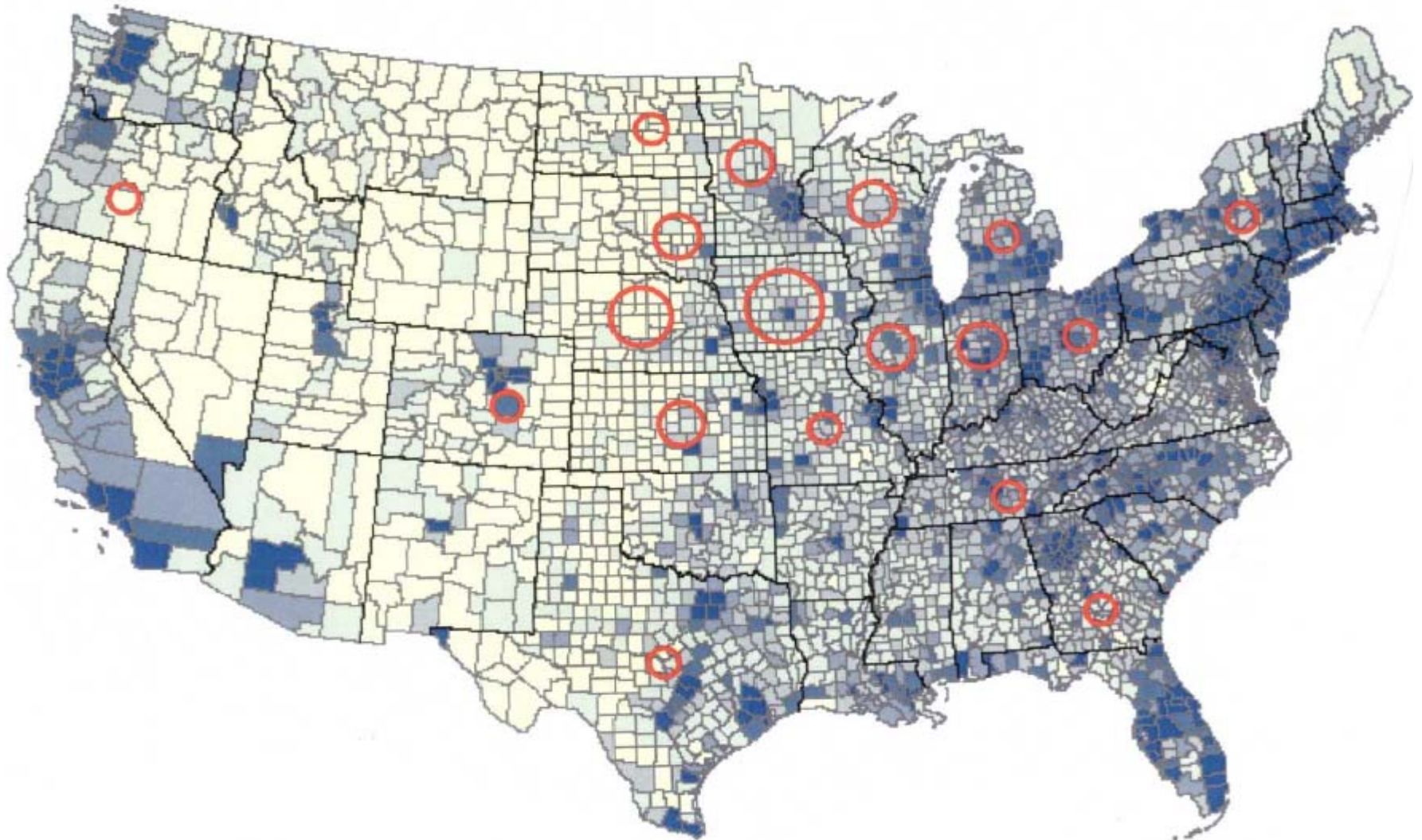
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# Population Density for Counties and Puerto Rico Municipios: July 1, 2006



# States with 100 mm gal/year Production



# Setting the Stage

Supply Profile

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Demand Profile

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Opportunity for Pipeline Solutions

# What are the Opportunities?

- Moving ethanol blended gasoline
  - i.e., replace the missing component
- Batching ethanol in products lines
- Moving ethanol in short dedicated lines
- Moving ethanol long distances in dedicated lines

# What are the Challenges?

- Technical challenges to pipeline transportation of ethanol
  - Moisture (product quality)
    - Test batches
  - Materials compatibility (steels and elastometers)
  - Stress Corrosion Cracking (SCC)
- SCC is one of the most critical technical issues to overcome
  - Significant research and development program is underway
    - » (more on this to come)

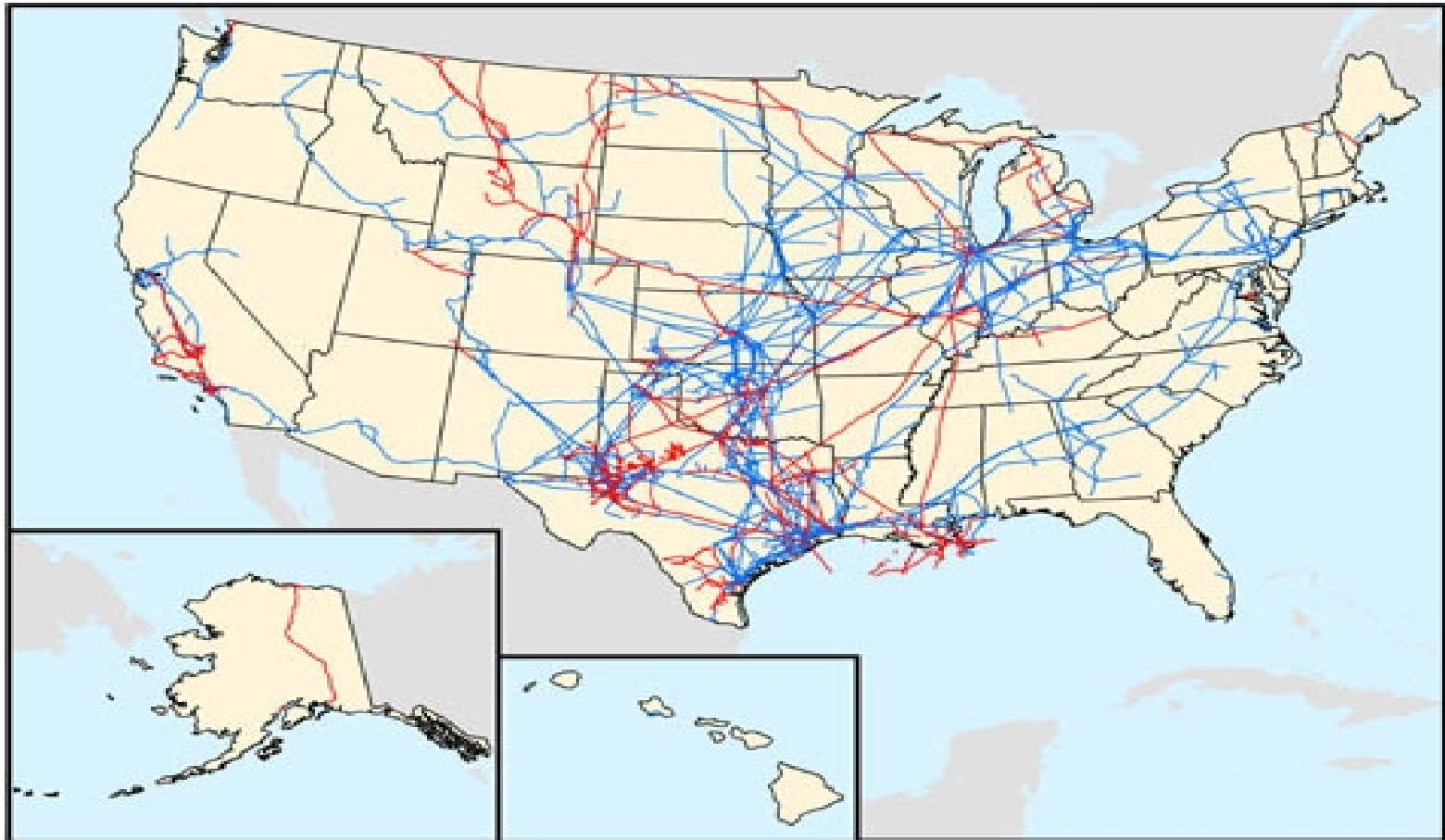
# Other Challenges

- Economics
  - A pipeline from the Midwest to any large population center would be a multi-billion dollar project
  - Ability to obtain long-term shipper commitments
  - Pipeline rates must be competitive with current transportation modes
- Logistics
  - Individual production facilities relative to volumes necessary to support a pipeline
  - Need for gathering infrastructure to support interstate pipeline transportation
- Regulatory Authority
  - Need for clarity of federal guidelines on safety and economic aspects of pipeline transportation of ethanol

# Discussion of One Opportunity

- Moving ethanol blended gasoline
  - i.e., replace the missing component
- Batching ethanol in products lines
- Moving ethanol in short dedicated lines
- Moving ethanol long distances
  - Specifically, moving ethanol from major production areas to the East Coast population centers

# U.S. Crude Oil and Refined Products Pipelines



# Let's Zero in on Available Infrastructure

Products Pipelines  $\geq$  20" Diameter

# Let's Zero in on Available Infrastructure



Products Pipelines  $\geq 20''$  Diameter

# Opportunity

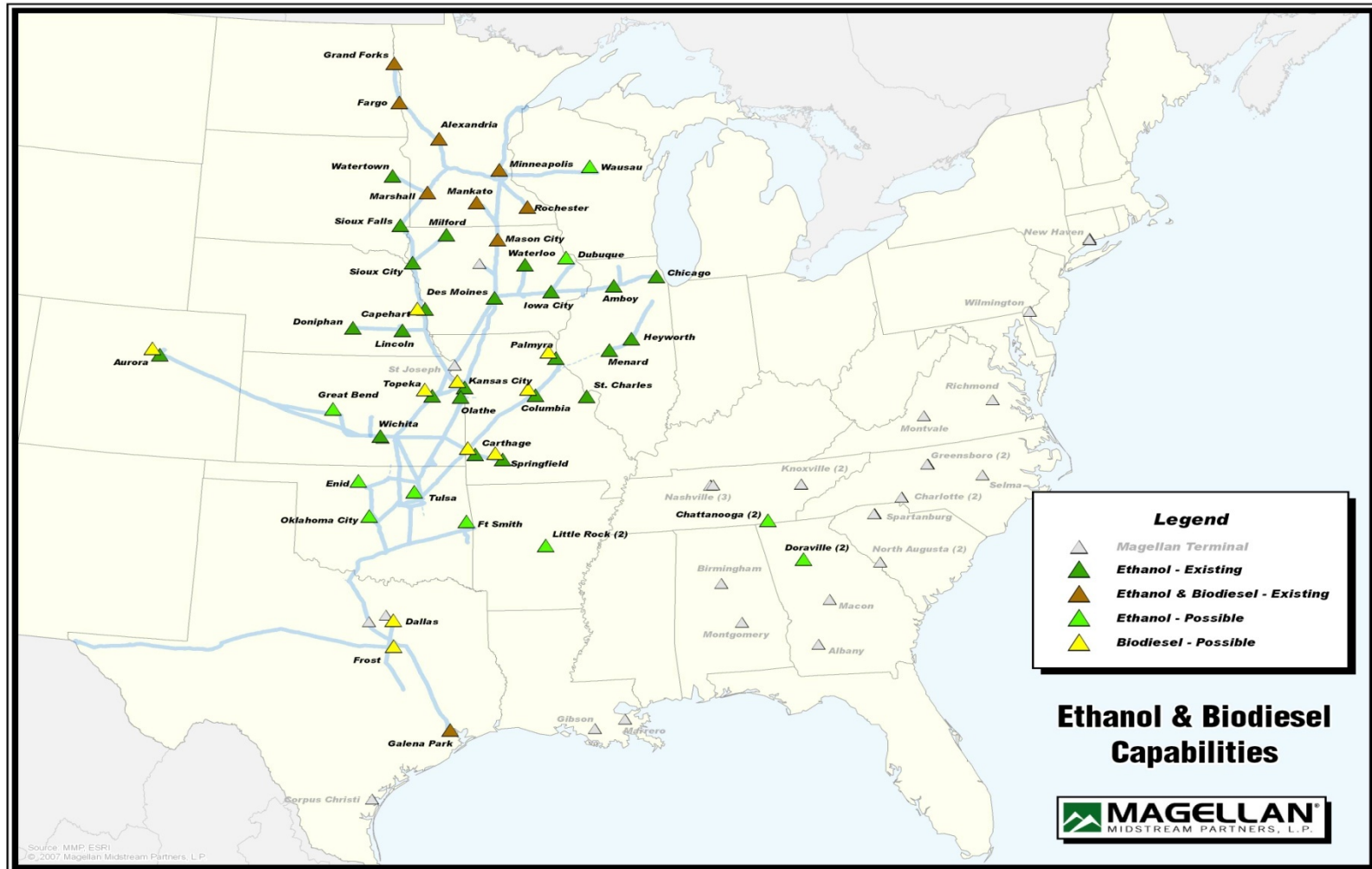
- Let's just build a new 20" or 24" Pipeline
- Sure.....but
  - Where?
  - Who?

# Let's Zero in on Available Infrastructure



Products Pipelines  $\geq$  20" Diameter  
Plus Buckeye Right-of-Way

# Magellan Pipeline and Terminal Assets



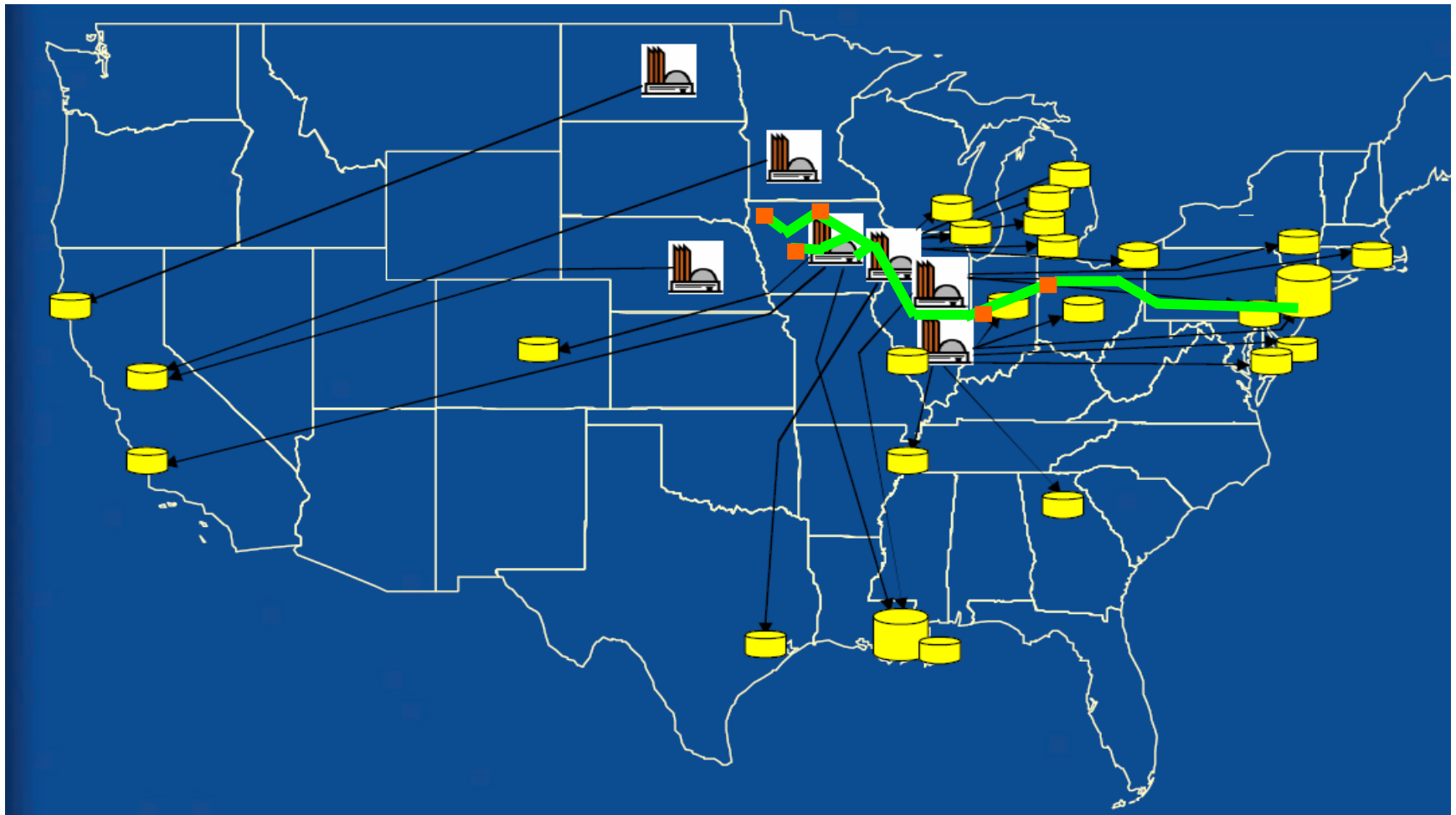
# Opportunity

- Let's just build a new 20" or 24" Pipeline
- Sure.....but
  - Where?
  - Who?
  - Cost? Who pays?
  - How to make sure it is safe?
  - How would it operate?

# Feasibility Study

- Buckeye Partners, L.P. and Magellan Midstream Partners, L.P. are jointly exploring the prospects for a grassroots ethanol pipeline project
- As currently envisioned, the pipeline:
  - would transport neat ethanol from production facilities in the U.S. Midwest (IA, MN, IL) to the U.S. Northeast (PA, NY, NJ)
  - would require about 1,700 miles of pipeline
  - will have an ultimate capacity of over 4.6 billion gallons per year
  - is expected to cost \$2.5 - \$3.0 billion dollars
  - segments could be operational in 2010/2011
  - will provide a safe, efficient, cost effective augmentation to rail car transportation

# Ethanol Pipeline



— Independence Pipeline  
■ Truck Receipt Locations



Supply



Demand

# Reality Check

- Strong government support is vital to the health of the ethanol industry, particularly in its formative years.
- Buckeye and Magellan believe that neither they nor other pipeline transporters will proceed with the huge capital outlays required for a project such as a dedicated ethanol pipeline without assurance that the government is fully committed to the long term development of the U.S. ethanol industry.

# Headlines and Blogs

- **Science magazine declares ethanol worse for the Earth than fossil fuels**
- Posted Feb 21st 2008 8:02PM by [Jonathon Ramsey](#)
- Jon Markman at MSN Money doesn't hold back when he says "Corn-based ethanol production is sure to go down as one of the greatest mistakes ever in U.S. energy policy." It's even more provoking when he writes "replacing fossil fuels with corn-based ethanol would double greenhouse gas emissions over the next three decades. The studies show that switchgrass, an alternative to ethanol that's more weed than plant, would boost emissions by 50%."

# Conclusion

- Pipelines remain the most reliable, safe and economic mode to transport large volumes of liquid fuels.
- With continued increases in domestic and international ethanol production, pipelines may provide an economic method of transporting ethanol.
- Technical challenges have to be overcome, primarily SCC.
- Investors need assurance that ethanol will be a major component of gasoline in the United States long enough to provide an acceptable return on their investment.