

# *Natural Gas Transportation Considerations*

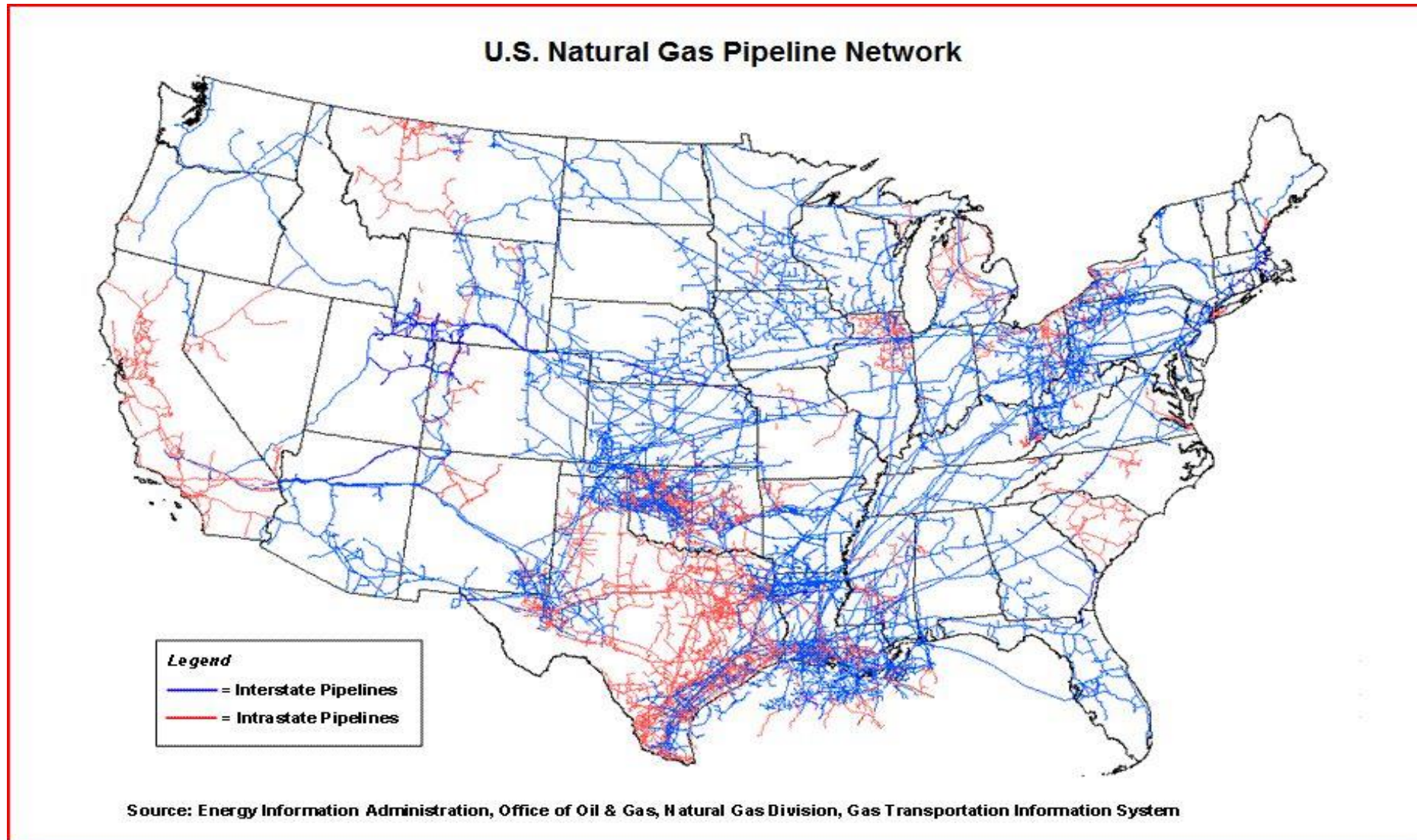
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*EUCI Conference May 6, 2014*

# Infrastructure Overview

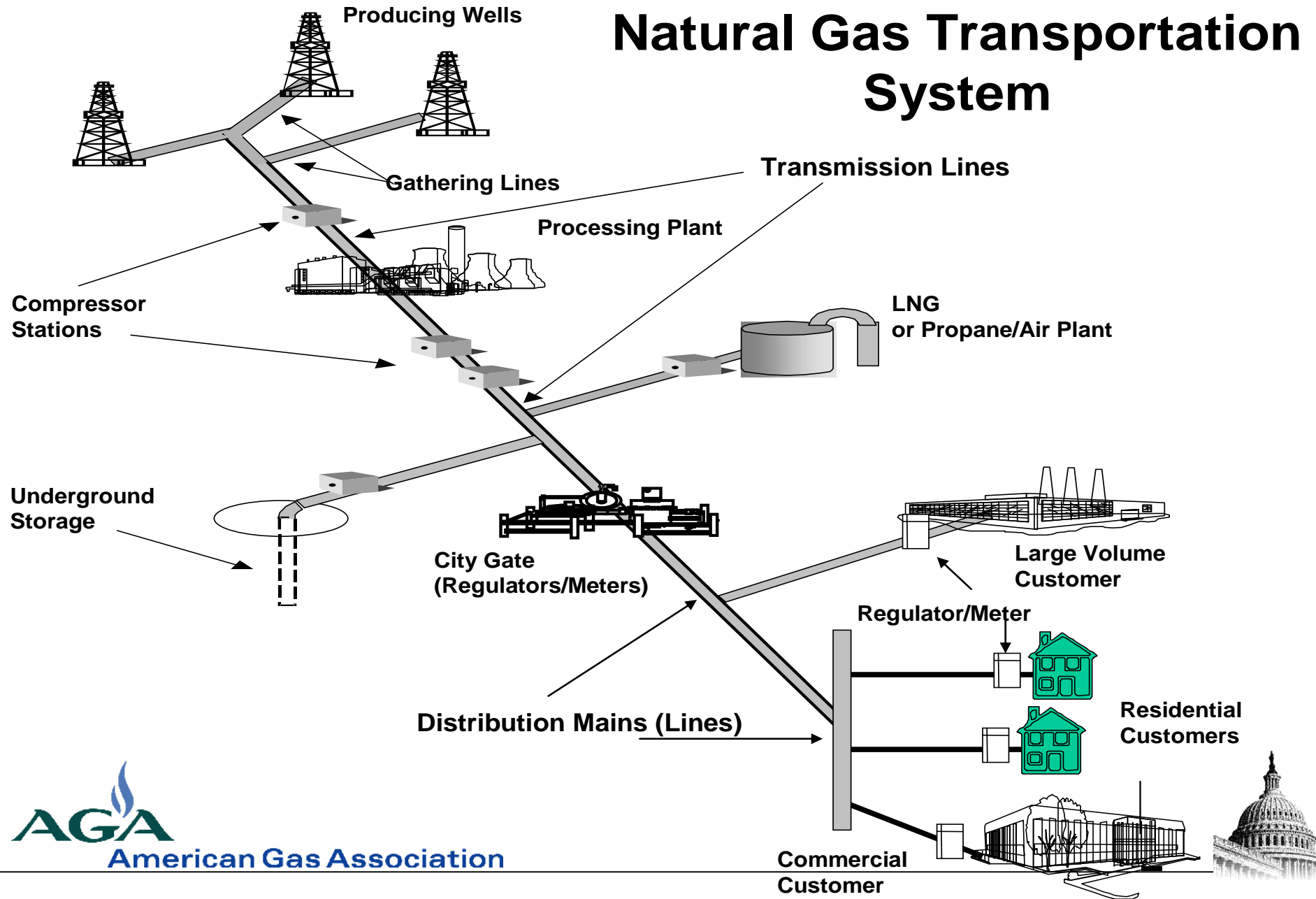


## *General Gas-Electric Transmission System Considerations*

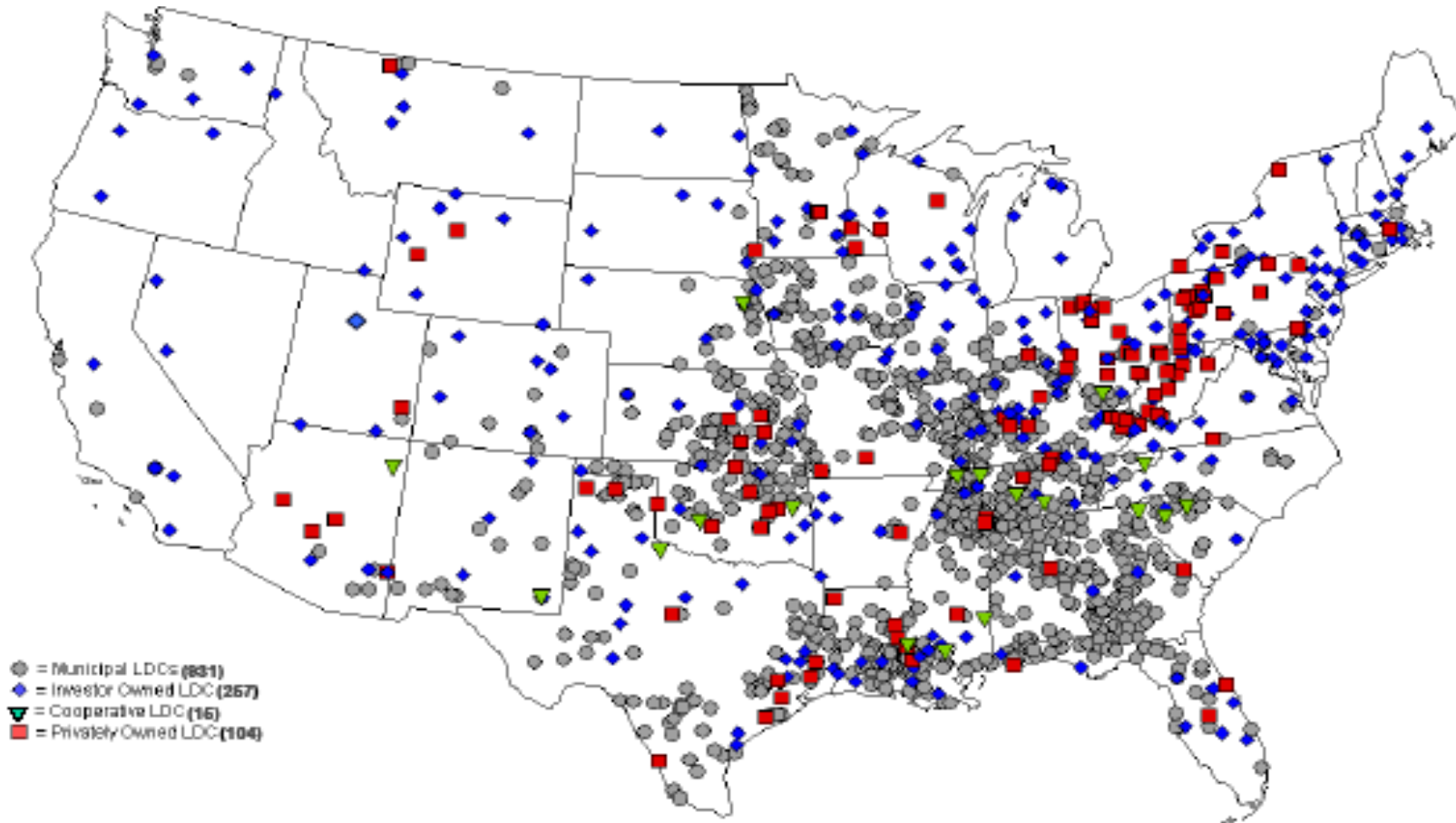
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- Pipelines are all uniquely configured;
- Operations vary from system to system;
- Pipeline assets vary considerably, i.e. storage availability;
- Pipeline may cross many time zones and ISOs;
- Each ISO has its own Day Ahead scheduling considerations;

# Natural Gas Transportation System



## *LDCs by Type*



LDC = Local distribution company.

Note: Each symbol location is relative and does not reflect the size or area covered by the respective LDC service territories.

Source: Energy Information Administration (EIA), Office of Oil and Gas.

# *Distribution Infrastructures*

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- Same types of physical infrastructures as a pipeline only on smaller scale and more orientation to consumer safety from end-use perspective.
- These include areas of operating, engineering and technological aspects of producing, gathering, transporting, storing, distributing, measuring and utilizing natural gas.
- LDC's objectives focus on operating safely, efficiently, and reliably while continuing to serve the best interests of the customer and general public. (the regulatory compact).

# *Electric Grid vs. Gas Pipeline Network*

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- Interstate pipelines:
  - Are funded directly from the contracts signed by shippers (customers) for service on the pipeline;
  - Shippers must be willing to sign contracts for several reasons:
    - Need firm natural gas to support firm load at the delivery point;
    - Price spreads between a receipt and delivery point are large enough to justify the cost of the firm contract.
- Unbundling of gas industry did not slow infrastructure development because pipelines continued to earn a return on investment through shipper contracts.
- Pipeline infrastructure remains efficient and reliable, which provides for a competitive gas market.

# *Electric Grid vs. Gas Pipeline Network*

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- Electric Transmission:
  - can take a decade to build so long range planning has been
  - required to keep up with growth and costs tend to be shared;
  - model future growth & requirements.
- Localized pipeline improvements can usually be made within 1 to 3 years and FERC has a long history of approving projects that customers are willing to pay for.
- For electric and gas utilities:
  - cost of these pipeline contracts are usually fully recoverable through fuel recovery clauses regulated by state regulators

## *Pipeline Operational Impacts*

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- FERC stated that a pipeline seeking an interconnection with another pipeline must satisfy five conditions:
  - 1) The party seeking the interconnection must be willing to bear the cost of the construction if the pipeline performs that task. In the alternative, the party seeking the interconnection could construct the facilities itself in compliance with the pipeline's technical requirements;
  - 2) The proposed interconnection must not adversely affect the pipeline's operations; (continued)

## *Pipeline Operational Impacts (Continued)*

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- 3) The proposed interconnection and any resulting transportation must not diminish service to the pipeline's existing customers;
- 4) The proposed interconnection must not cause the pipeline to be in violation of any applicable environmental or safety laws or regulations with respect to the facilities;
- 5) The proposed interconnection must not cause the pipeline to be in violation of its right-of-way agreements or any other contractual obligations with respect to interconnection facilities.

## *PHMSA Issues*

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- On January 10, 2011, the Pipeline and Hazardous Materials Safety Administration (PHMSA) issued Advisory Bulletin 11-01 that advised operators of gas and hazardous liquid pipelines to review their records to determine whether they provided adequate support for the current operating parameters and conditions on their pipelines or if additional testing is needed to confirm that the pipelines are operating at a safe pressure.
- On May 7, 2012, PHMSA issued an Advisory Bulletin to clarify the record verification requirements for establishing Maximum Operating Pressure (MOP) for hazardous liquid pipelines and Maximum Allowable Operating Pressure (MAOP) for natural gas pipelines.
- The impetus for two bulletins was the 2010 Pacific Gas & Electric Company pipeline rupture and fire. New information required in future reporting cycles.
- These actions emphasize the concerns over pipeline safety, maintenance, record keeping and possible consequences of the need to reduce pressure on lines found lacking and the potential for capacity “derating” parts of systems.

# *Interstate Pipelines Respond to Supply Basin Infrastructures*

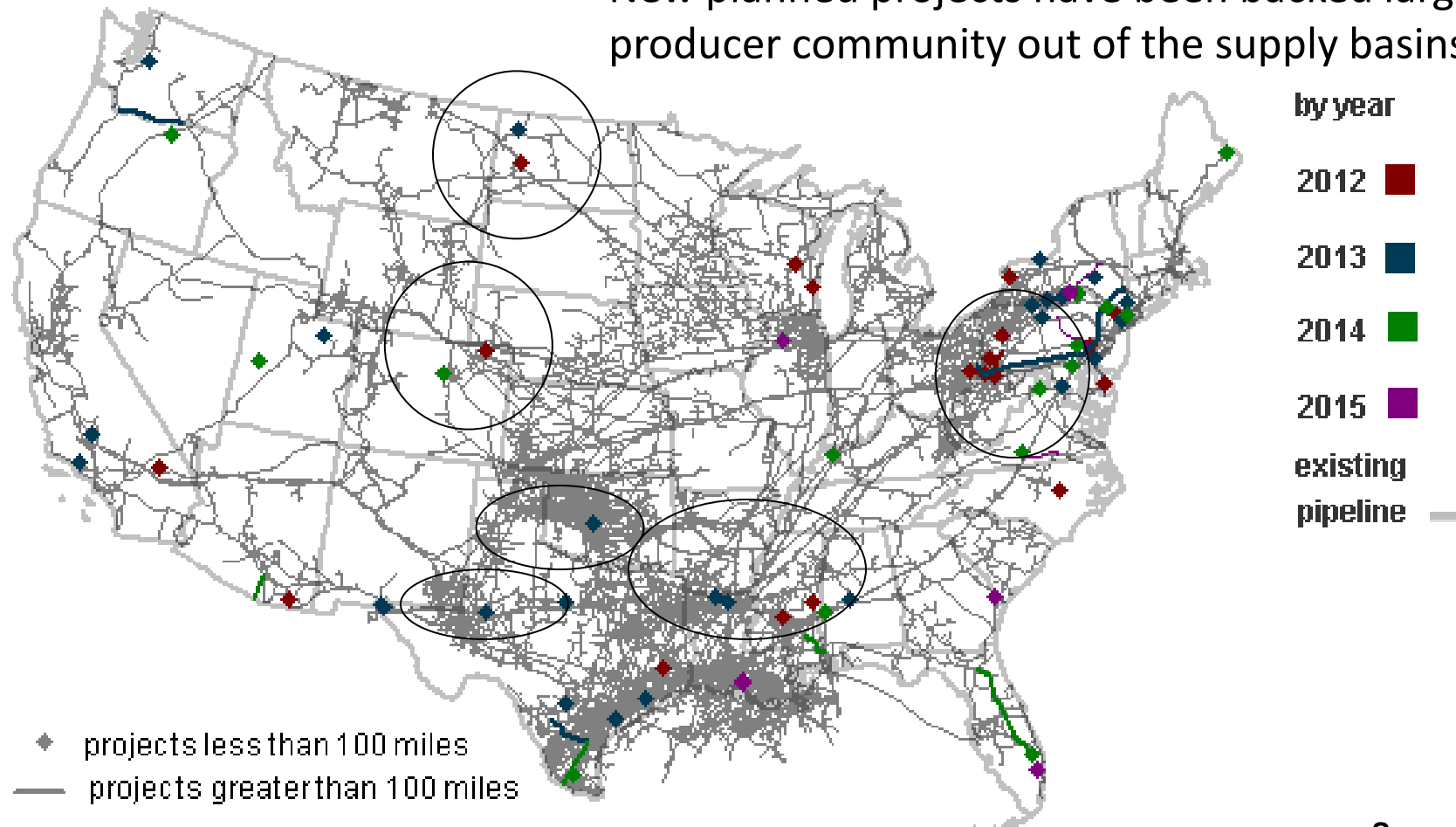
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- Shale gas developments have created a major paradigm shift and domino-effect of altering traditional North American natural gas market flow patterns.
- Traditional south to north pipeline capacity (Gulf and southwest gas) and north to south pipeline flows (Canadian gas) has been altered by the Rockies Express Pipeline (“REX”) and shale basin pipeline outlet market developments **with West to East and East to West flow patterns.**
- Pipeline infrastructure projects in response to shale gas developments are transforming the interstate system into a very large “Grid” system.
- The term “reticulation” and “interconnectivity” will become more commonly used as the pipeline industry physically restructures to support new supply sources in ever-developing locations.

# Developing U.S. Pipeline Grid to Support Shale Gas Developments

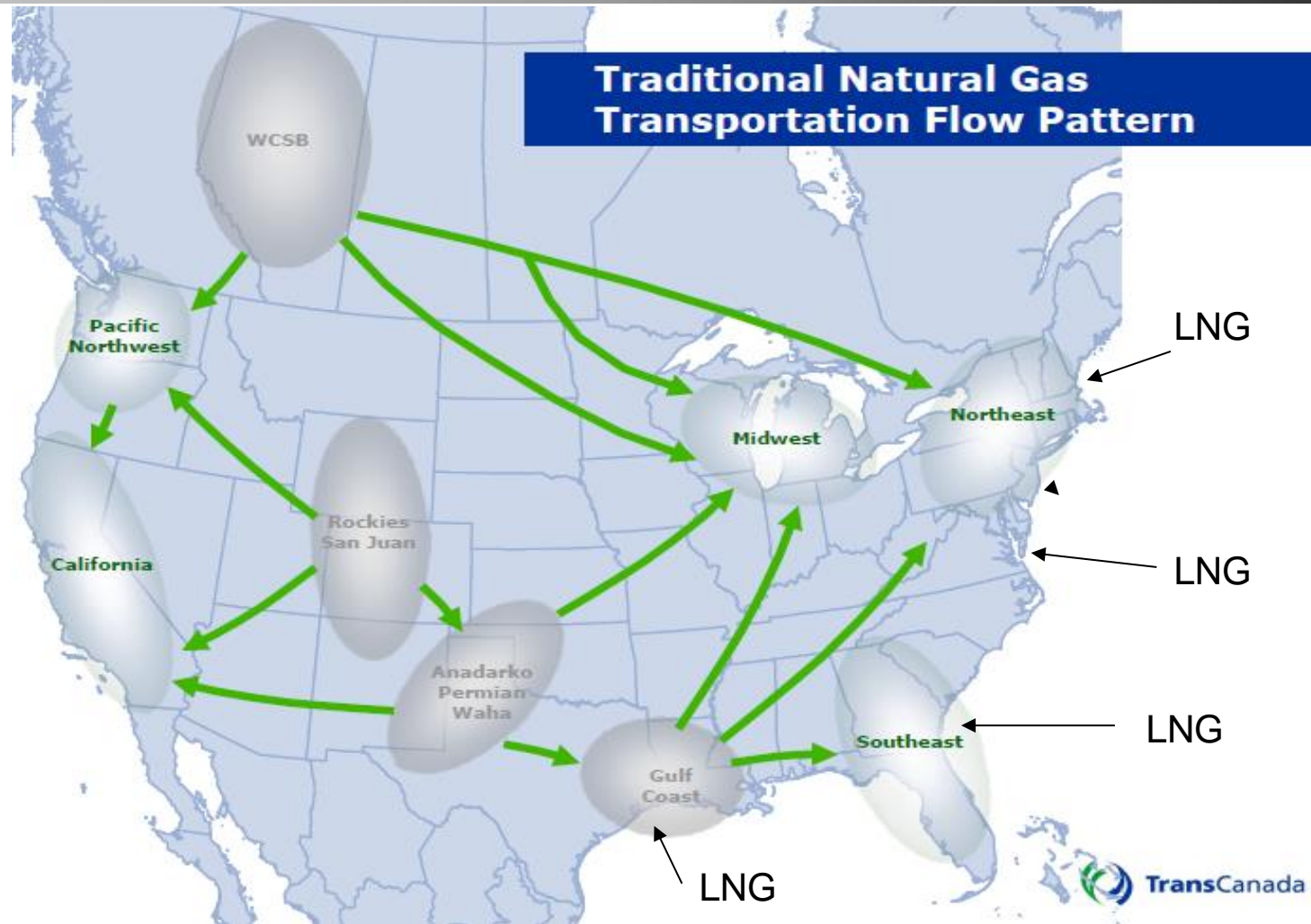
## Natural gas pipeline projects

New planned projects have been backed largely by the producer community out of the supply basins.

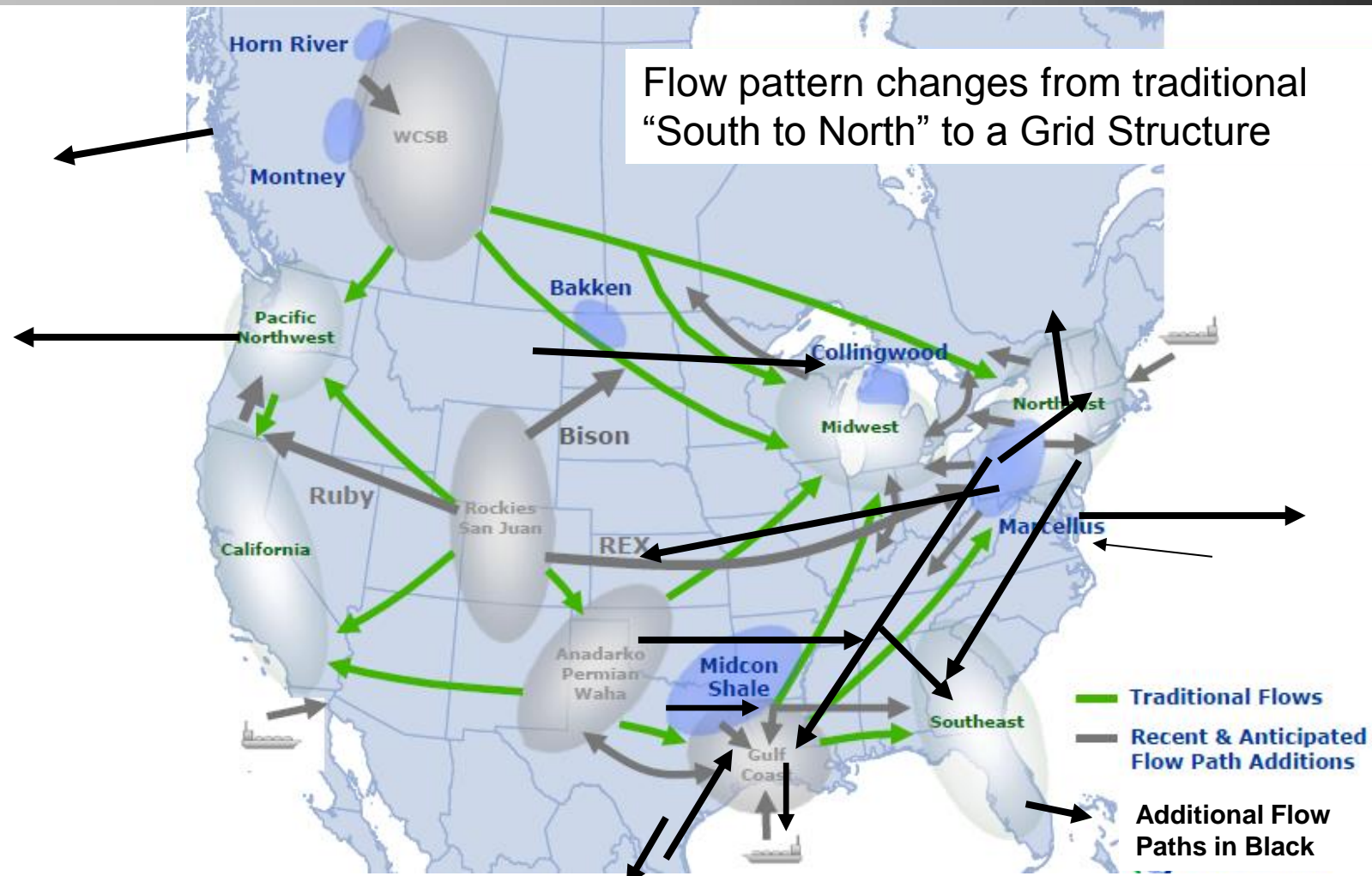


Source: EIA

# Historic “Longitudinal” Flow Patterns



# Today's Developing "Grid" Flow Patterns



## *Pipeline Utilization and Cost Recovery Issues*

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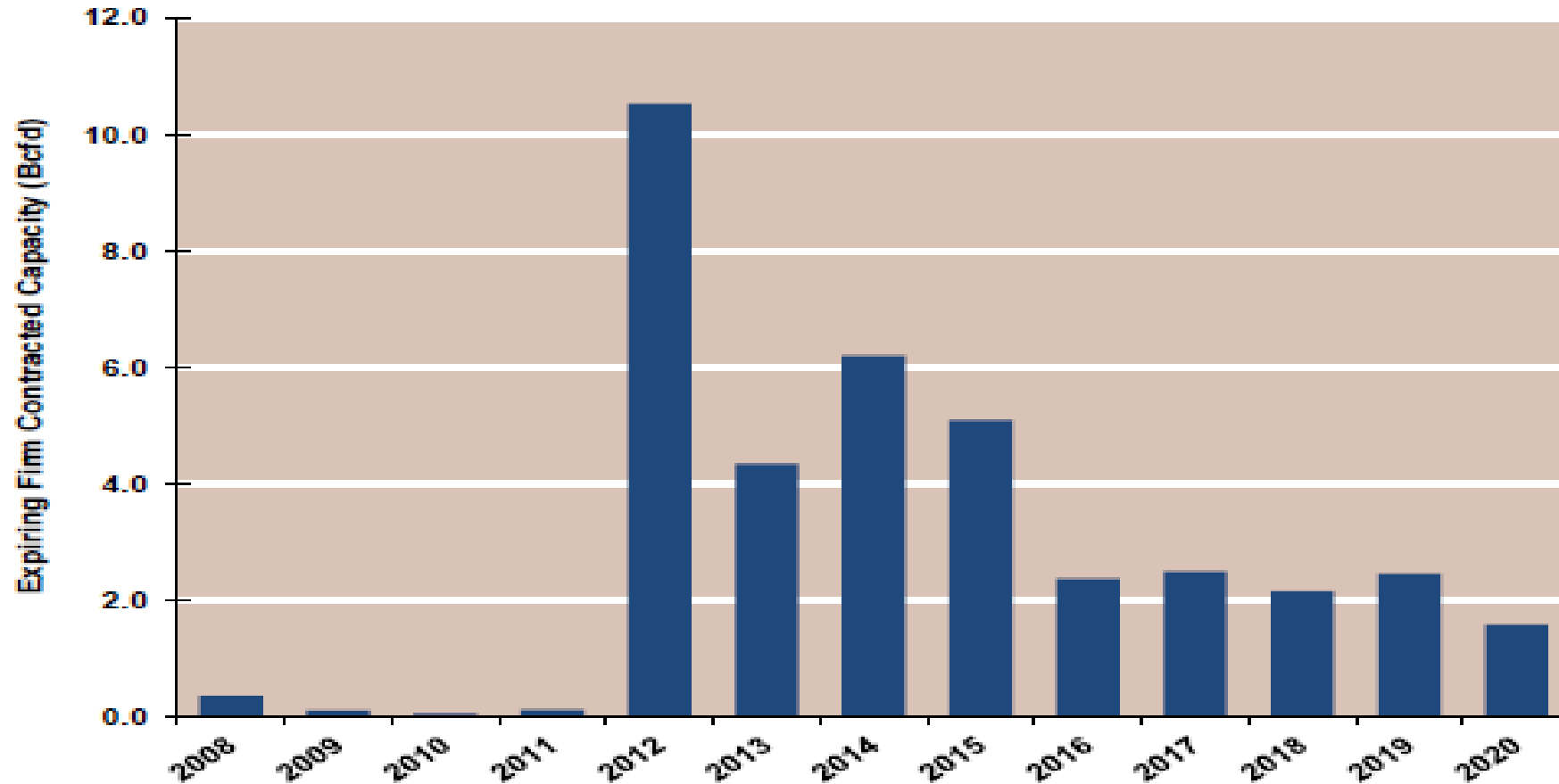
- Declines in pipeline utilization and changing customer needs pose financial risks to long-haul pipelines. More than 10 Bcfd of long-term capacity contracts on U.S. natural gas pipelines expired during 2012. Cumulatively, almost 26 Bcfd of long-term capacity contracts are due to expire by 2015.
- In cases where customers re-contracted, it was generally for shorter durations and smaller volumes.
- The new natural gas flow patterns raised the possibility that some pipelines may be unable to find buyers for long-term capacity once their contracts expire.
- As a result of declining utilization, some pipeline companies are converting or considering converting natural gas pipelines to transport crude oil or natural gas liquids – ***“re-purposing”***.

# *Gas Transportation Contract Issues*

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- IOU (gas and electric) concerns about “prudent” contracting;
- LDCs enter into short-term (one year or less) and up to 3 year gas supply contracts; and, have 3 – 5 or so year firm (FT) transportation agreements;
- The general majority of pipeline contracts with current LDC shippers are set to expire in the 2014 – 2015 time frame, but Right of First Refusal (ROFR) terms dictate capacity availability;
- Producers/Marketers generally have been “anchor shippers” for new projects and are faced with languishing margins and low gas prices; Anchor contracts are long term up to 10+ years, and;
- Demand-pull shippers must “step-up” to also support and build new capacity.

## *Quantity of Natural Gas Pipeline Firm Transportation Contracted Capacity Expiring by Year*



Source: Derived from Velocity Suite data based on FERC Form No. 549 B - Index of Customers data and FERC 2012 State of the Markets Report

## *Economic/Rate Worries of LDCs*

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- How do we promote the efficient use of natural gas through rate design?
- How do we develop rates to minimize the utility financial and customer billing impacts of weather variability?
- How do we minimize through rate design the impact of declining use per customer on a utility's financial condition, and on the stability of customers' bills?
- How should varying levels of bad debts be accommodated through rate design?
- How do we recover costs associated with aging infrastructure and enhanced system reliability?

## *Increasing Pipeline Reticulation*

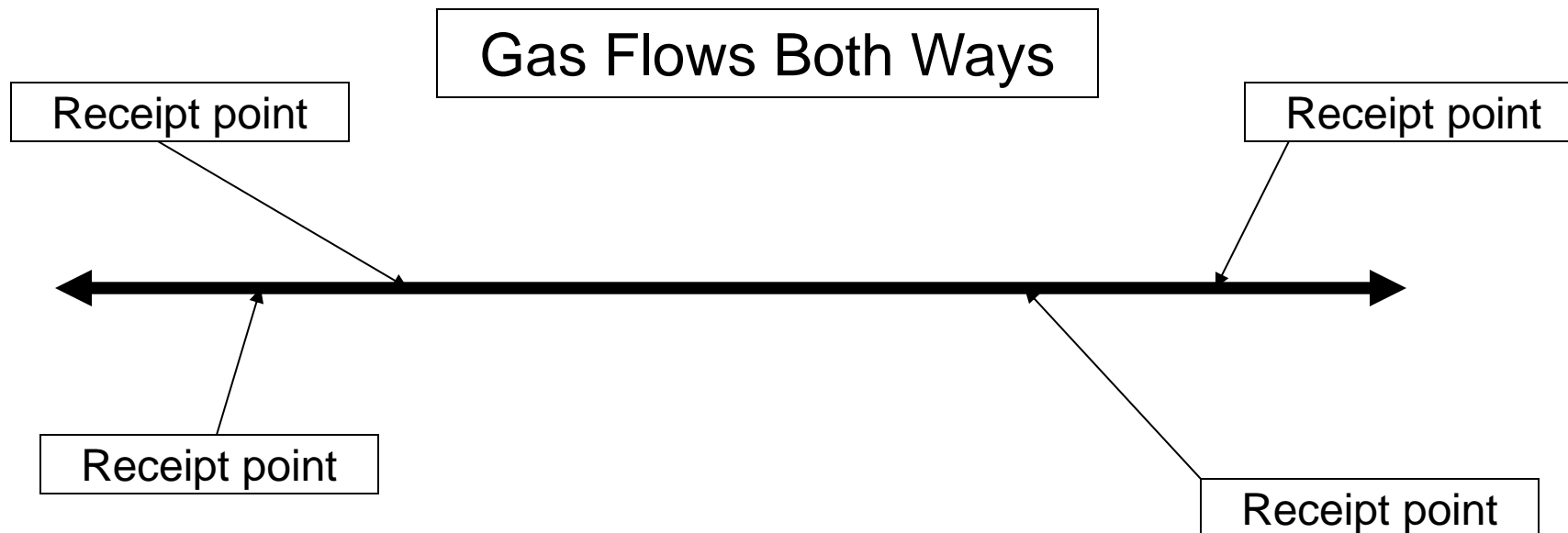
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- Reticulation of natural gas infrastructure is the process of becoming more grid-like or forming a network.
- Natural gas pipeline build-out from developing shale basins is interconnecting the traditional long-line (south to north and north to south) pipelines and the Bakken, Rockies and Appalachian-based pipeline systems, with Rockies Express (REX) as a developing “header balancing system”.
- This interweaving of pipelines is forming a more interconnected network or grid.
- Will indecisive “political will” allow fringe environmentalists with financial and political power to have the ability to shut down transportation and export of natural gas (and coal) to kill domestic production of natural resources?

## *Increasing Bi-Directionality*

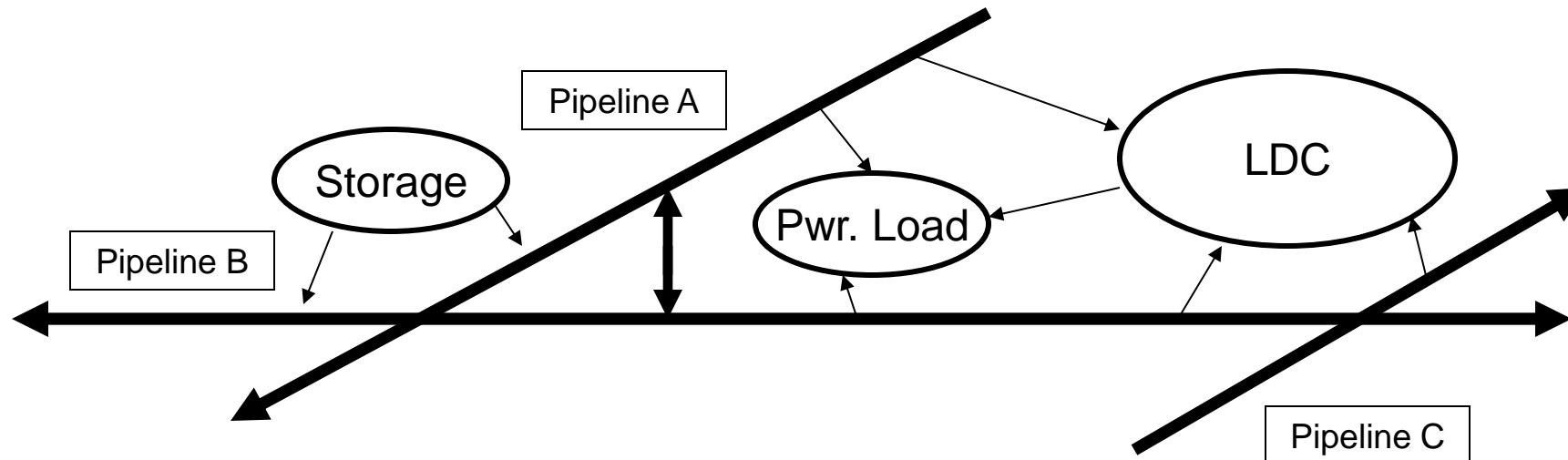
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- When a pipeline begins looping and installing compression to be able to physically move gas in both directions, it is fully bi-directional.



## Improved Interconnectivity

- **Interconnectivity** describes how each pipeline or Local Distribution Company (LDC) or some combination of these entities operationally work together to improve delivery reliability and capacity availability and overall flexibility on LDC and interstate pipelines.
- A **System Interconnect** is a connection between two utilities, pipelines or LDCs, and pipeline systems, permitting the transfer of gas in either direction.



## *Challenges to Moving Forward*

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- Cost allocation, who pays and how are the costs recovered;
- Changing regulatory policy creates cost recovery uncertainty;
- Cost to power customers will be determined based on the level of retirements as well as the location of the new gas-fired power plants;
- Costs are allocated to mainline pipeline development with complex cost recovery mechanisms and to lateral pipelines which are generally the responsibility of the power plant owner.
- Gas infrastructure and contractual timing to meet power EPA resource adequacy requirements – the responsibility is with power.
- Will indecisive “political will” and uncoordinated, multi-jurisdictional regulatory policies and actions balkanize and hinder infrastructure build-out and business operations?

## *Think...Analyze...Apply*

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- If you have any questions, please feel free to contact me:
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- ***Greg Peters, President, Envision Energy Solutions***