

HADDINGTON VENTURES – ENERGY STORAGE VALUATION

EAC June 2013 Meeting – Storage Valuation Panel

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Firm Overview

Deep, Tenured Team

- Founding partners operating and investing together since 1984 (average of 20 years)
 - 165+ combined years of energy experience
 - 9 investment professionals and 8 member Industry Advisory Board
 - Based in Houston, TX
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Strong Midstream Track Record

- **TPC Corporation:** Midstream operating company
 - Co-founded in 1984, grew to \$700MM in revenues, NYSE IPO
 - \$450MM sale to PacifiCorp in 1997
 - **Haddington:** Midstream energy & infrastructure development funds
 - Over \$650MM under management as of 12/31/12
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Hydrocarbon Storage Expertise

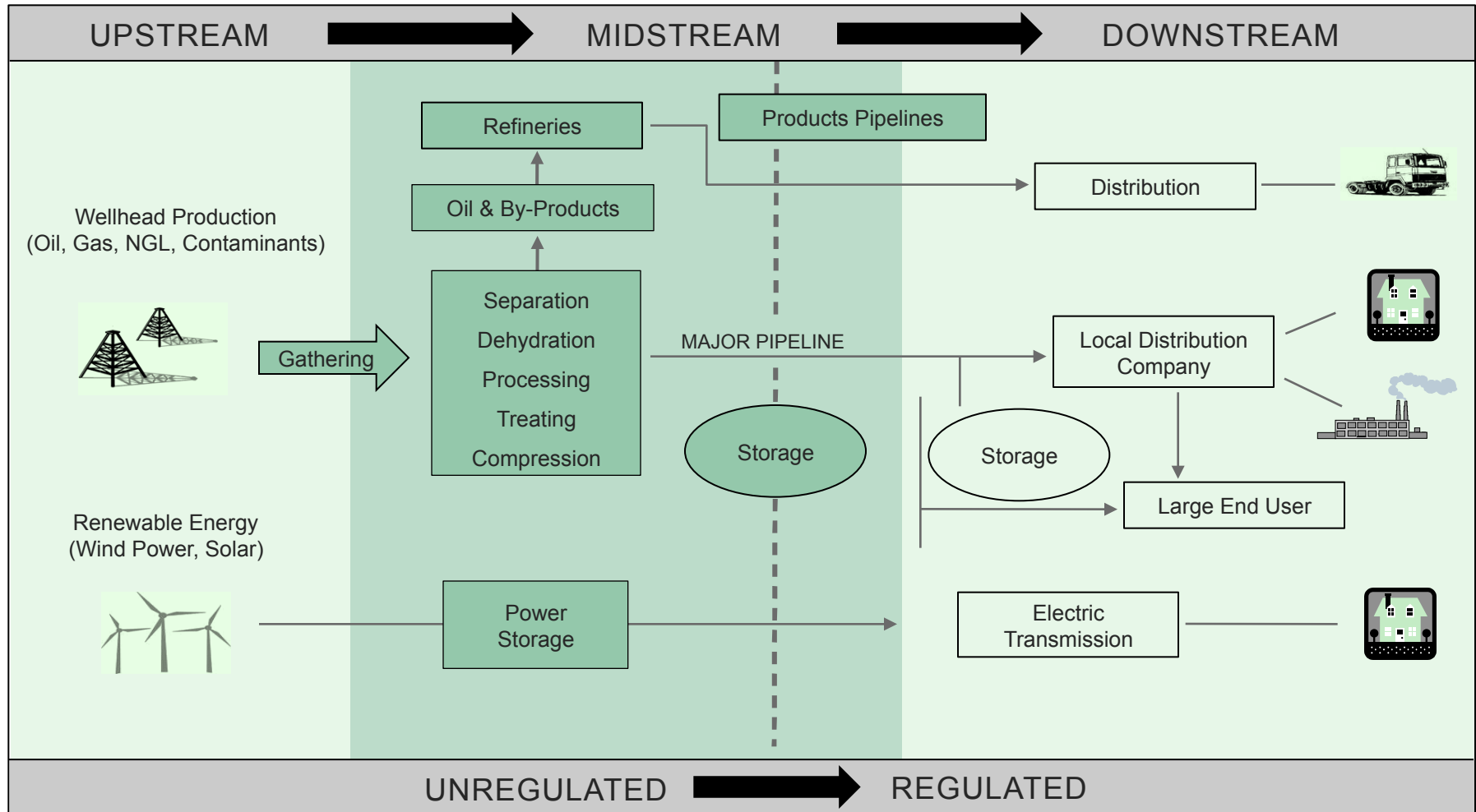
- Moss Bluff Gas Storage (TX)
 - Egan Gas Storage (LA)
 - Lodi Gas Storage (CA)
 - Bobcat Gas Storage (LA)
 - Magnum NGL Storage (UT)
 - Zechstein Gas Storage (Germany)
 - Fairway Oil Storage (TX)
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Power Storage Projects

- Magnum Energy Storage (UT)
- Norton Energy Storage (OH)
- Apex CAES (TX)

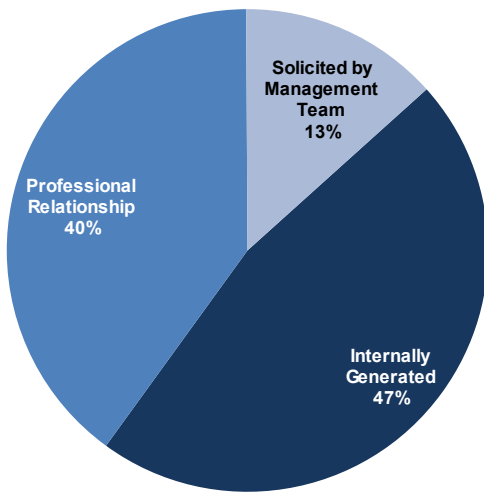


WHAT IS MIDSTREAM INFRASTRUCTURE?

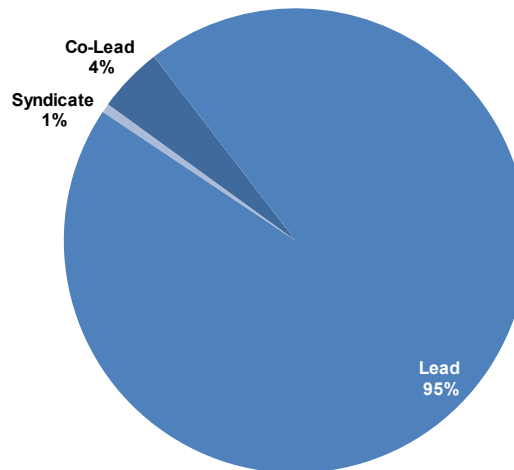


Aggregate Haddington Portfolio Composition⁽¹⁾

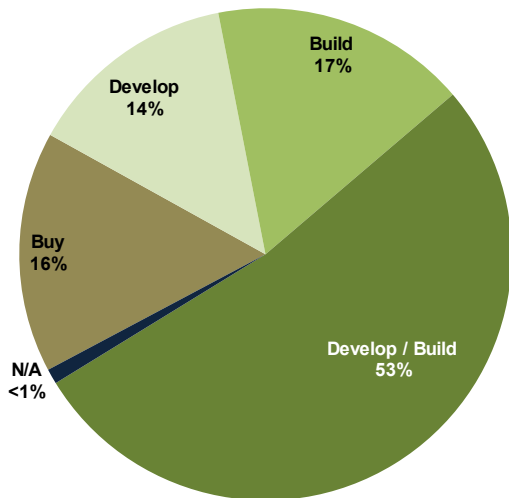
Investment Source



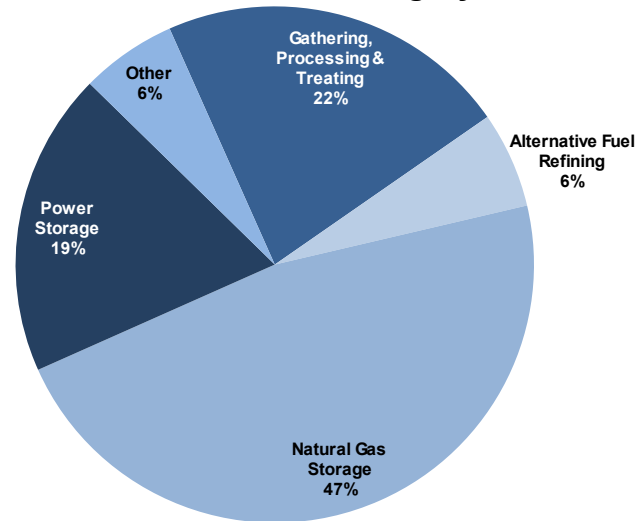
Investment Role



Investment Type



Investment Sub Category



⁽¹⁾ All calculations based on cost of investments, through June 2012



THE NATURAL GAS “ANALOGY”

Pre-natural-gas deregulation (1986) and FERC Order 636 (1994) very little gas storage existed and most of it controlled by interstate pipelines or local distribution companies (LDC)

- All of these LDC storage facilities were in the “rate base” and either low annual cycle or peaking facilities (LNG storage)
- This storage allowed LDCs to smooth seasonal demand and meet demand spikes, as the LDC controlled the system, sometimes back to the resource in the ground.

With wellhead decontrol, unbundling of regulated services, and peakier load shape, different types and owners of natural gas storage evolved.

- Transparency in gas volatility and price gave rise to increased option value, now exacerbated by “lumpy” supply from LNG terminals.
- Option value drove “higher turn” storage service to meet the increased fluctuations in supply and demand as well as capitalize on price volatility.
- Independent and merchant developers of storage identified the trends in physical and financial markets and provided the assets needed to keep the natural gas system flowing well.

Electricity storage should follow a similar value path to natural gas storage.



ENERGY STORAGE VALUE

- Like natural gas and other commodities, the ability to store power allows the commodity owners to produce at will, store the commodity and sell the commodity forward for a higher price in the financial market.
 - “*Intrinsic Value*” – In natural gas storage, inject in the summer and withdraw in the winter.
 - “*Intrinsic Value*” – In power storage, inject in the off-peak and withdraw on-peak.

- Also like natural gas and other commodities, the ability to store power enables the holder of that storage capacity to profit from volatility in the commodity price.
 - “*Extrinsic Value*” – In gas storage, a rolling position to buy or sell in the cash market and offset that position with a sale or purchase in the forward market as the markets move around.
 - “*Extrinsic Value*” – In power storage includes not just one but two (day ahead and real time) cash markets to arbitrage against the forward market.

- Energy Hub Value
 - “*Hub Services*” – In natural gas storage, buy or sell intra-month deliveries with offsetting physical amounts, both across time as well as across pipelines.
 - “*Hub Services*” – In power storage, buy or sell intra-day, intra-week and intra-month in either day-ahead or real-time and offset those positions across time and possible delivery markets (MISO and PJM).



GAS/ELECTRIC COROLLARY: ANCILLARY SERVICES

Natural Gas

- High deliverability, high injection storage demand, inventory drawdown
- Gas parking, line packing
- Local pressure regulation
- Emergency exchange and supply balancing
- Scheduling, system control and dispatch service
- Lost/unaccounted for gas
- Gas quality control

Electricity

- Regulation, frequency response (load following)
- Energy imbalance services
- Reactive power supply, voltage control
- Operating reserve
- Scheduling, system control and dispatch service
- Real power losses
- Frequency regulation



WHY CAES IN TEXAS?

ERCOT secular trends

Wind saturation

- Extension of PTC/ITC for wind developers plus renewable portfolio standards supports new installations
- Increased intermittent generation in “island” market
- “Price taker” that suppresses offpeak pricing

PUCT/ERCOT implementing market rules intended to increase scarcity pricing

- Raised energy price cap from \$3,000/MWh to \$9,000/MWh by June 2015
- Added price floors during emergency conditions when Responsive or Non-spinning Reserves are deployed

Robust and transparent ancillary services market

- 5,200 MW average 7x24 demand
- 12-year track record

Defined rules by PUCT/ERCOT for energy storage

- Electric load used for storage is treated as wholesale not retail purchase
- Storage load is not subject to retail load fees and charges

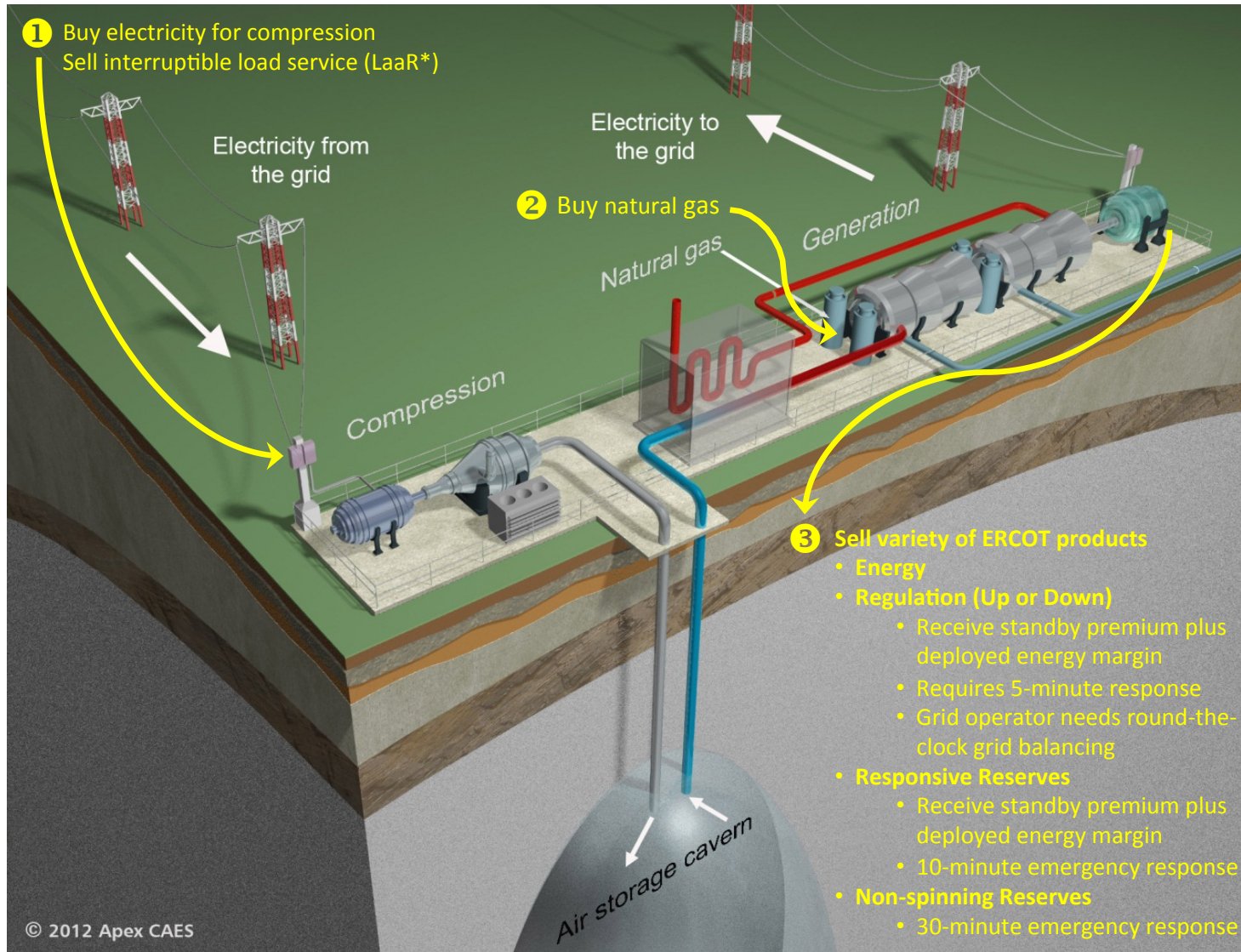
ERCOT cyclical trends

Tight electric supply vs. demand

Improving natural gas prices



CAES IN ERCOT MARGIN MODEL



* Load acting as a Resource program provides payment from ERCOT for the right to interrupt in cases of system emergency

