

Presentation of

# Active Energy Management

Ahead of the meter and behind the meter

*Presented by*

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# Our Goals

- ◆ **Energy Background**
  - MICRO
  - MACRO
- ◆ **Energy Supply Management**
  - THE PLAYERS
  - 7 STEPS & TECHNOLOGY
  - VISIBILITY
- ◆ **Sustainable Energy Community**
- ◆ **Questions**

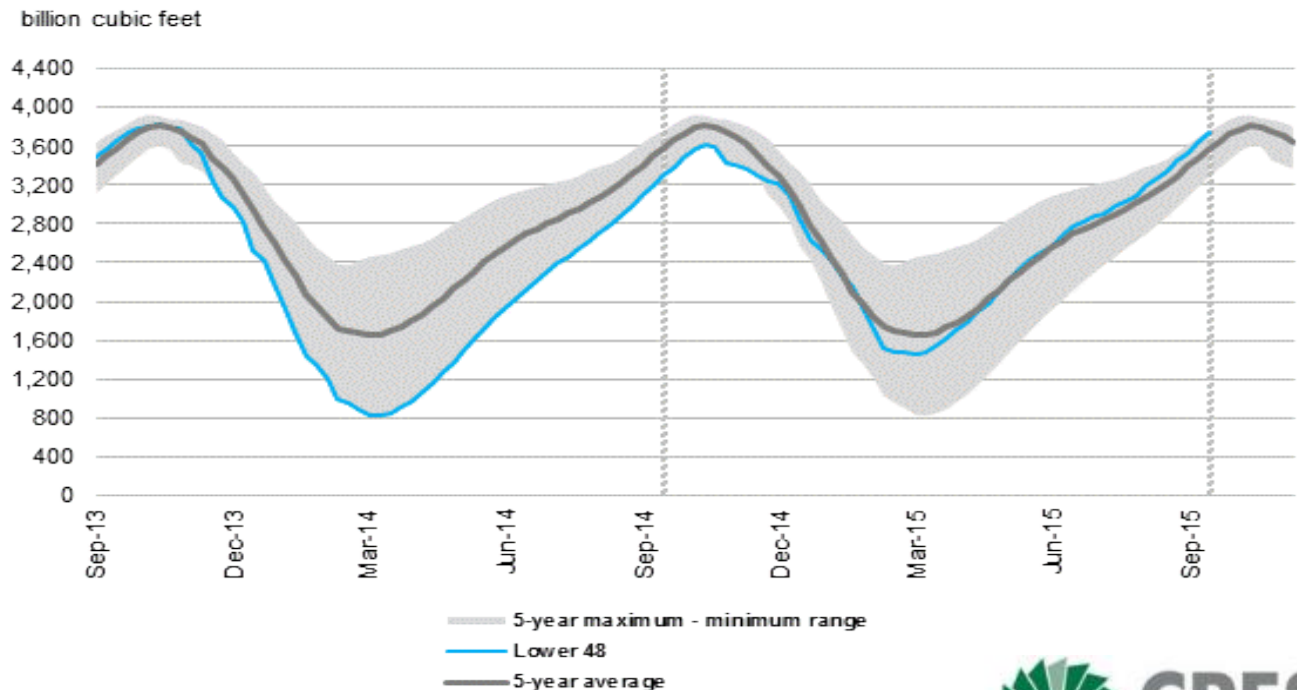


# Energy – Micro Discussion



# Projected Natural Gas Storage

Working gas in underground storage compared with the 5-year maximum and minimum



Source: U.S. Energy Information Administration

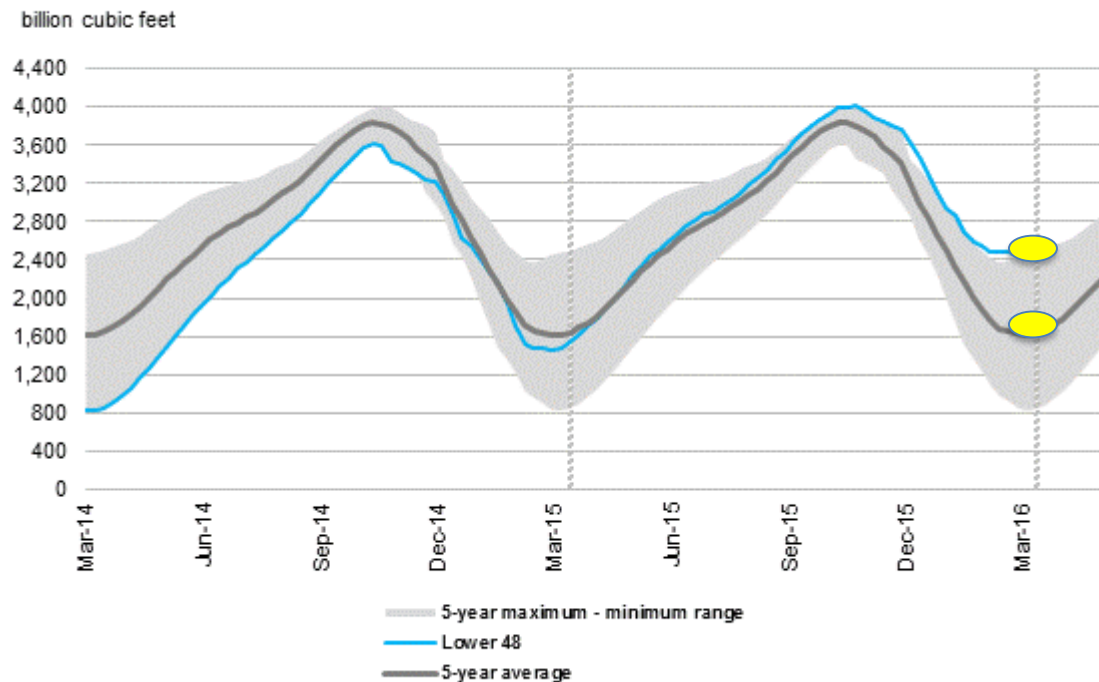


**CPES**  
Connecticut Power  
and Energy Society



# YTD Storage Position

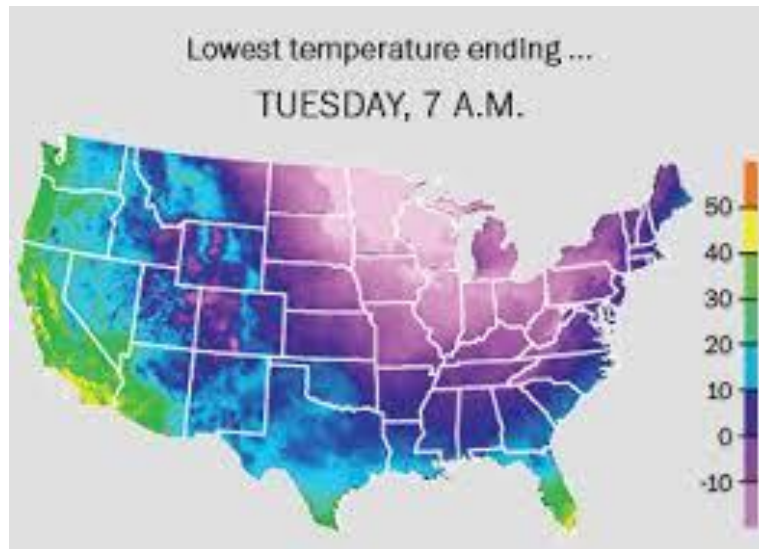
Working gas in underground storage compared with the 5-year maximum and minimum



Source: U.S. Energy Information Administration

# Extreme Weather Recovery

|      | BCF  | BCF  | Weeks |
|------|------|------|-------|
| 2012 | 2478 | 3876 | 34    |
| 2013 | 1705 | 3834 | 31    |
| 2014 | 824  | 3611 | 33    |
| 2015 | 1461 | 4009 | 35    |



Source: EIA

# Transmission Cost Impact

- ◆ Capacity
- ◆ Transmission
- ◆ Obsolete Asset Cost Recovery

Figure 2. Example of New York Capacity Tag for Two Customers on the Peak System Demand Day

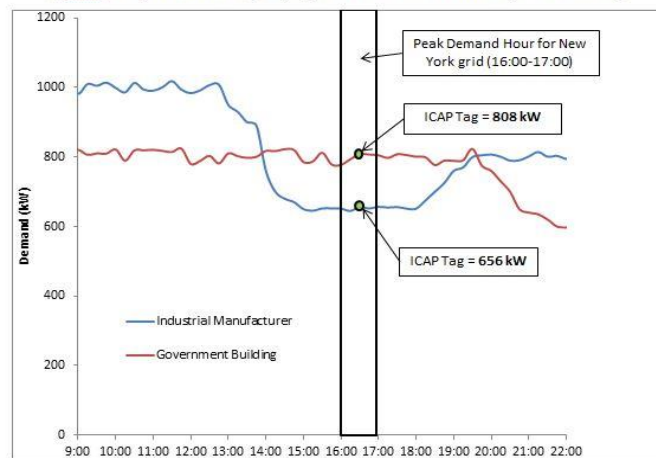


Figure 2: Even though the Industrial manufacturer has a higher peak demand than the government building for the day, it has a more flexible load schedule and can reduce load during the grid's peak hour in response to a Capacity Tag alert. Thus, it is able to reduce its ICAP tag below that of the government building, which has a more fixed consumption level during the day.

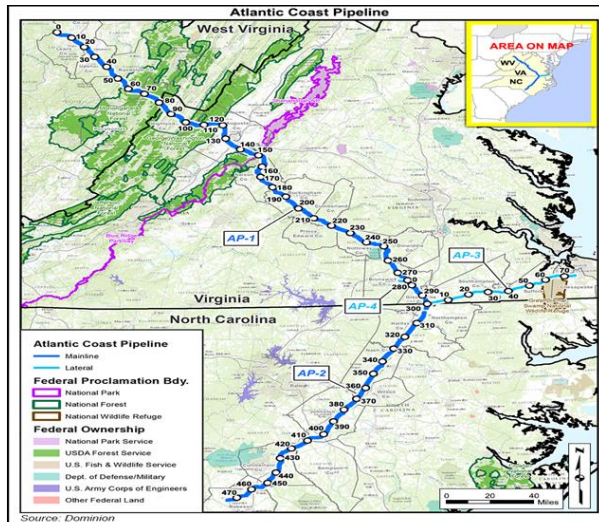


# Energy – Macro Discussion



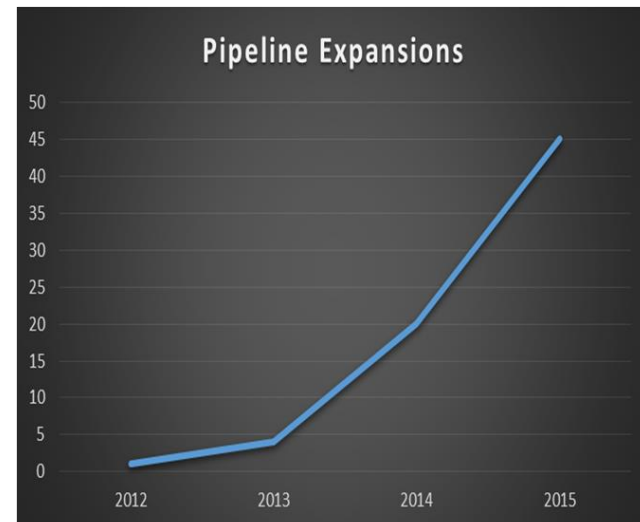


# Pipeline Gas Expansion



1,500,000 Dths/day

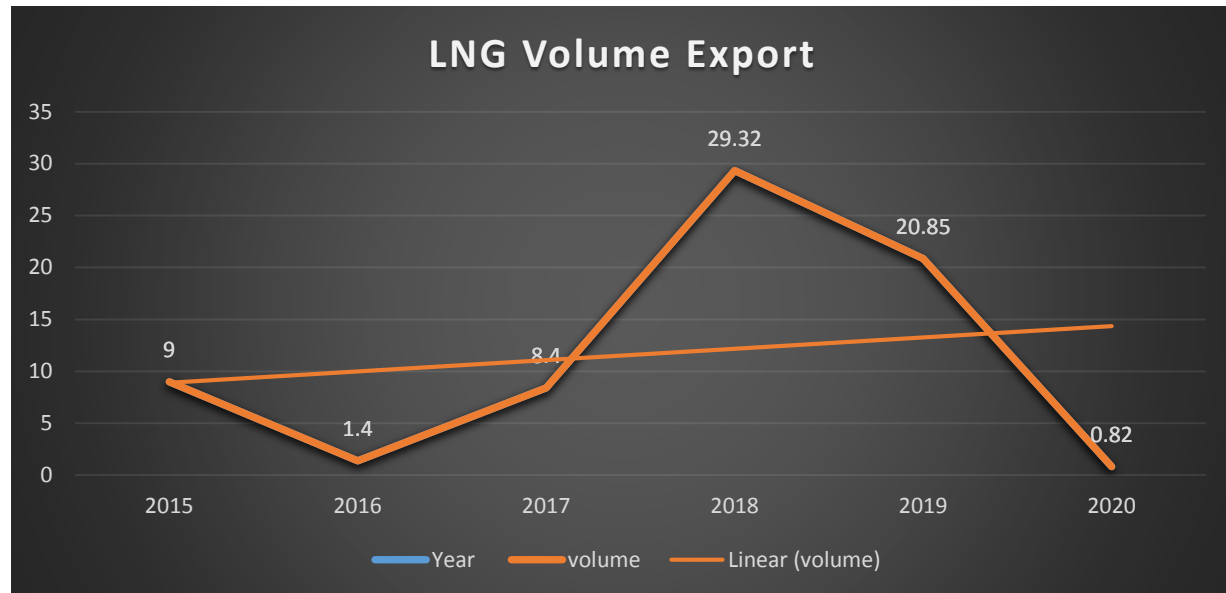
Source: Dominion Transmission



The Trend

Source: Bloomberg Energy

# LNG Impact



## LNG Export volume 2015 - 2020

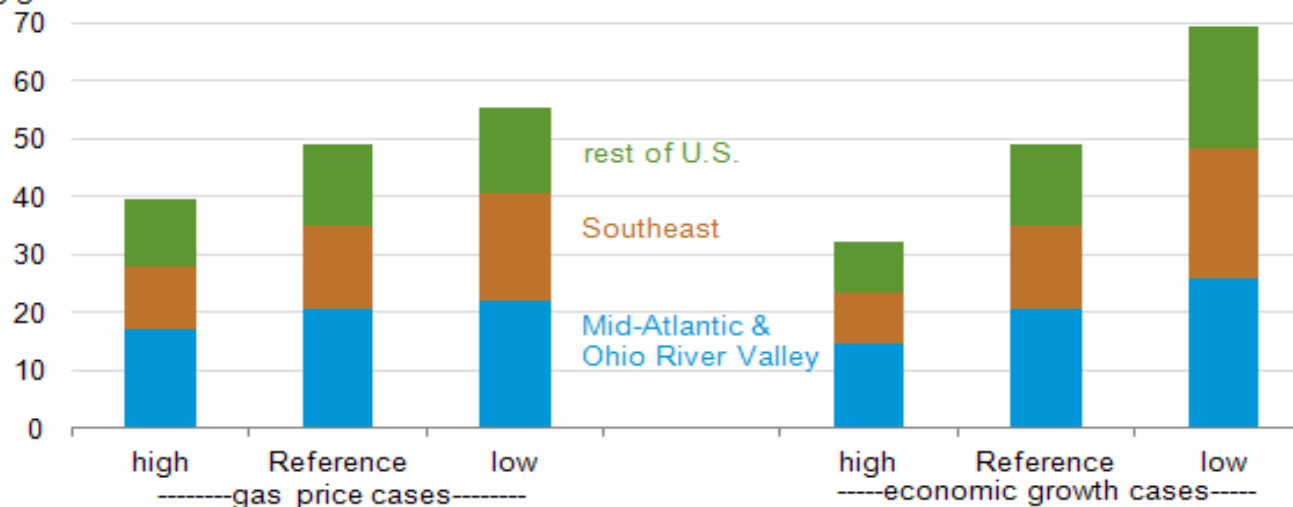
Significant increase in export volumes beginning in 2018 and by 2019, US will become the 3<sup>rd</sup> largest exporter of LNG in the world, behind Qatar and Australia

Source: EIA

# Coal Retirement

Projected retirements of coal-fired generators through 2020

gigawatts

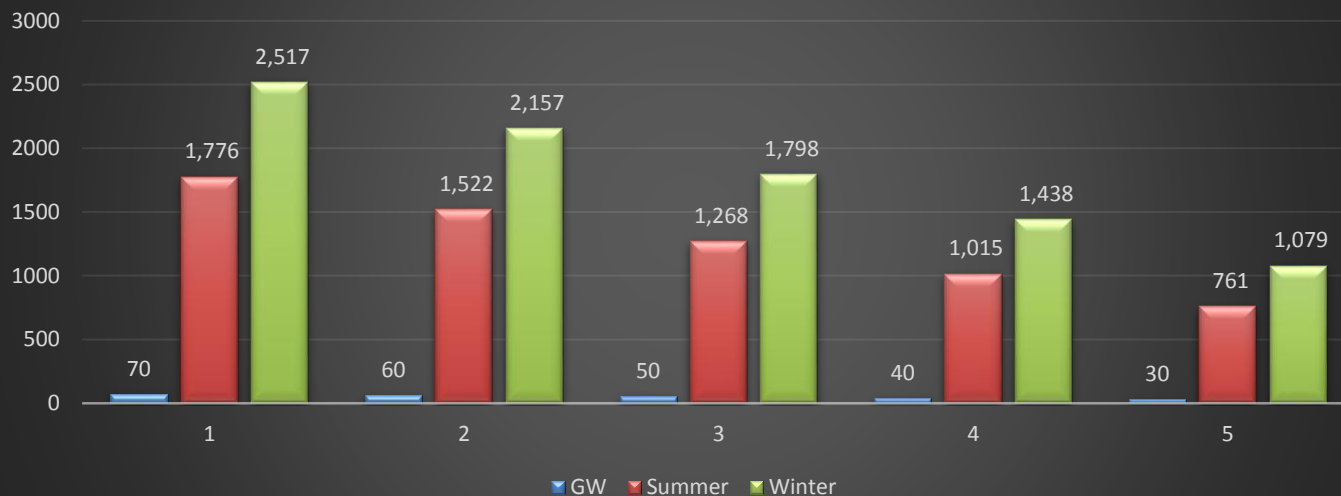


Between 30 – 70 Gigawatts

Projected retirements

Source: EIA

## Summer / Winter Storage Impact

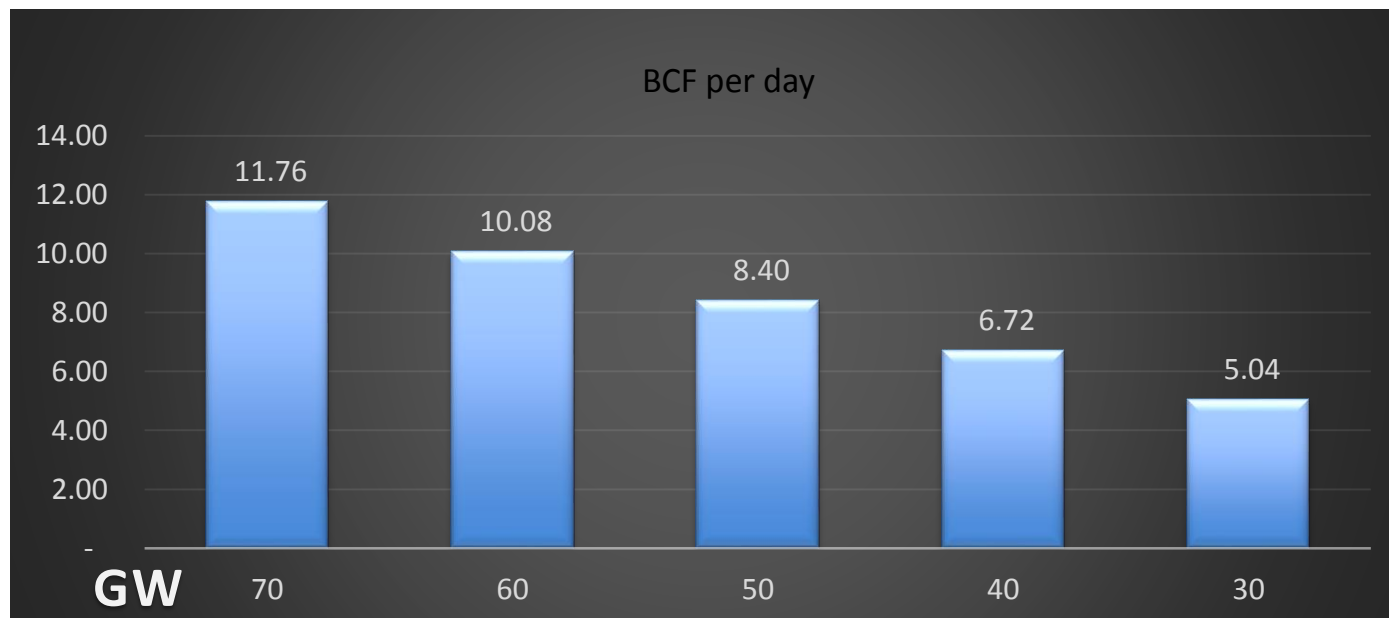


## Coal Retirement BCF Impact Winter Summer

Fundamental impact to natural gas market

Source: EIA

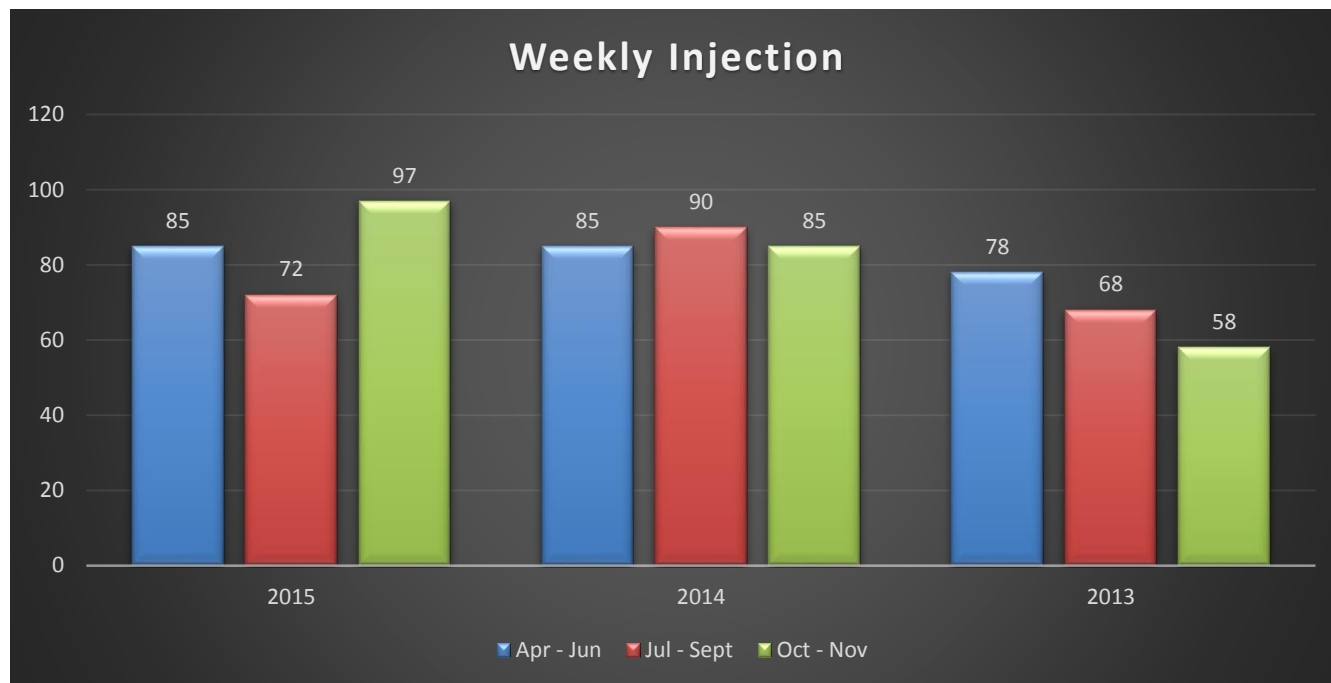




## Daily Usage in BCF

Significant impact to pipeline operations and storage

Source: EIA



## Summer Injection Last three years

Fundamental impact to natural gas market

Source: EIA

# Energy Supply Management



# Procurement Players and Strategies

- ◆ **Suppliers**
  - Fixed
  - Floating with Index/Fixed Components
  - Pricing advice is a conflict of interest
- ◆ **Traditional Brokers**
  - Point in Time
  - Dependent on Suppliers for pricing
  - Emotional

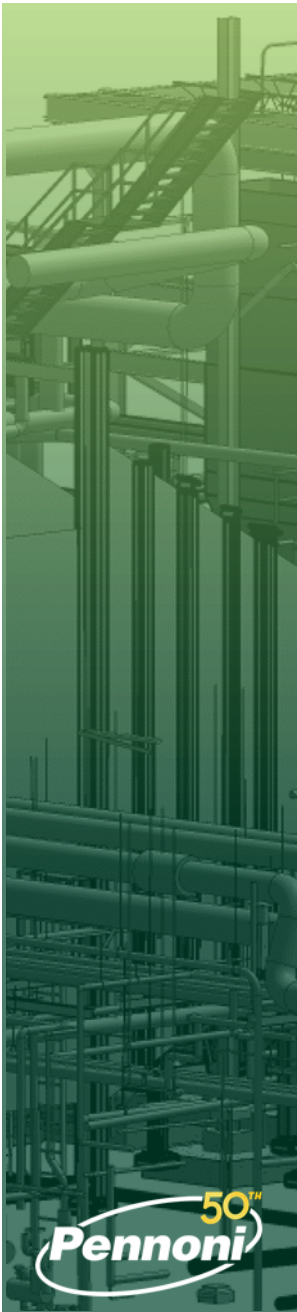
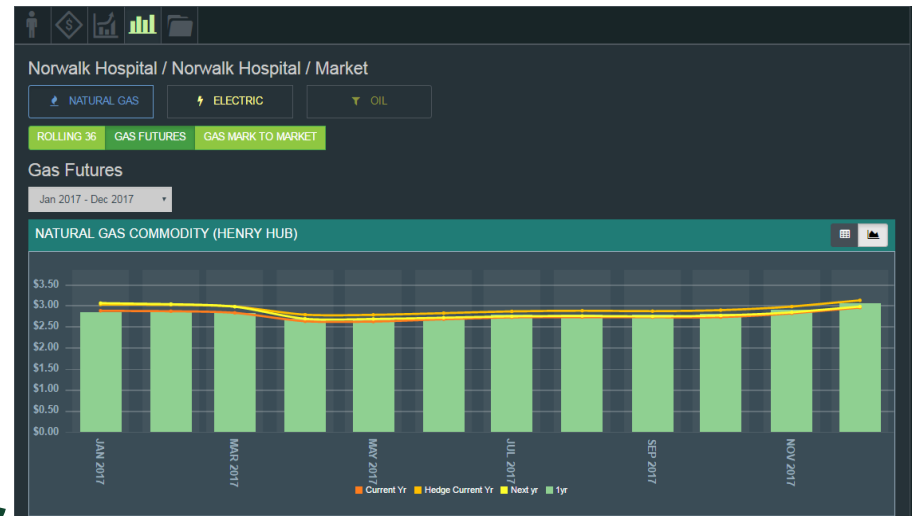




# Consultancy Plus Technology

## An Active Energy Management Strategy

- ◆ Risk Tolerance
- ◆ Benchmarking
- ◆ Contract Structure
- ◆ Supplier Selection
- ◆ Market Indicators
  - ❖ Define Buys
  - ❖ Hedge Process
  - ❖ Budget Setting & Tracking
- ◆ Execution
- ◆ Reporting & Greenhouse Gas Emissions



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# Visibility

## ◆ Market

- Commodities
- Trend Analysis
- Understanding Market Structure



Source: Bloomberg Energy

# Visibility Leads to Feasibility

- ◆ Access to quality data reduces cost
- ◆ Speeds up the process
- ◆ Proper financial evaluation is easier



# Sustainable Energy Community

- ◆ A “Sustainable” technology is one which is:
  - ❖ Environmentally friendly
  - ❖ Economically viable
  - ❖ Beneficial to Society
- ◆ A “Sustainable” Energy Community is one which is:
  - ❖ No longer depends on natural gas utility or interstate pipeline
  - ❖ No longer depends on power utility or grid
  - ❖ Has continuous energy production and generation





# Problem Statement

- ◆ 3 billion tires in landfills and storage sites in the US
- ◆ U.S. and Canada generate 300 million scrap tires annually
- ◆ Current reuses
  - ❖ Relocate tire materials
    - ✧ *Rubber mulch, crumb rubber for play fields/ground(now being banned), sandals...etc*
  - ❖ Produce CO2
    - ✧ *Burning or incineration*



# Previous Technology Failures

## ◆ Types

- ❖ Incineration
- ❖ Plasma-thermal oxidation
- ❖ Gasification
- ❖ Digestion

## ◆ Issues

- ❖ Toxic waste & CO<sub>2</sub>
- ❖ Maintenance
- ❖ High costs



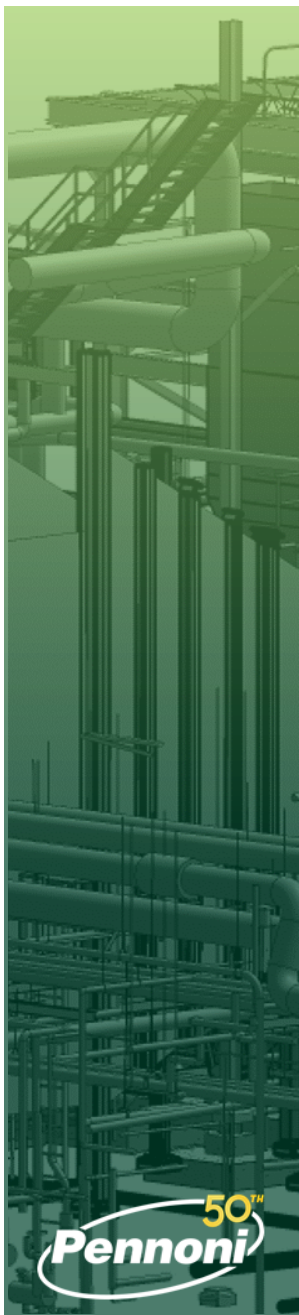
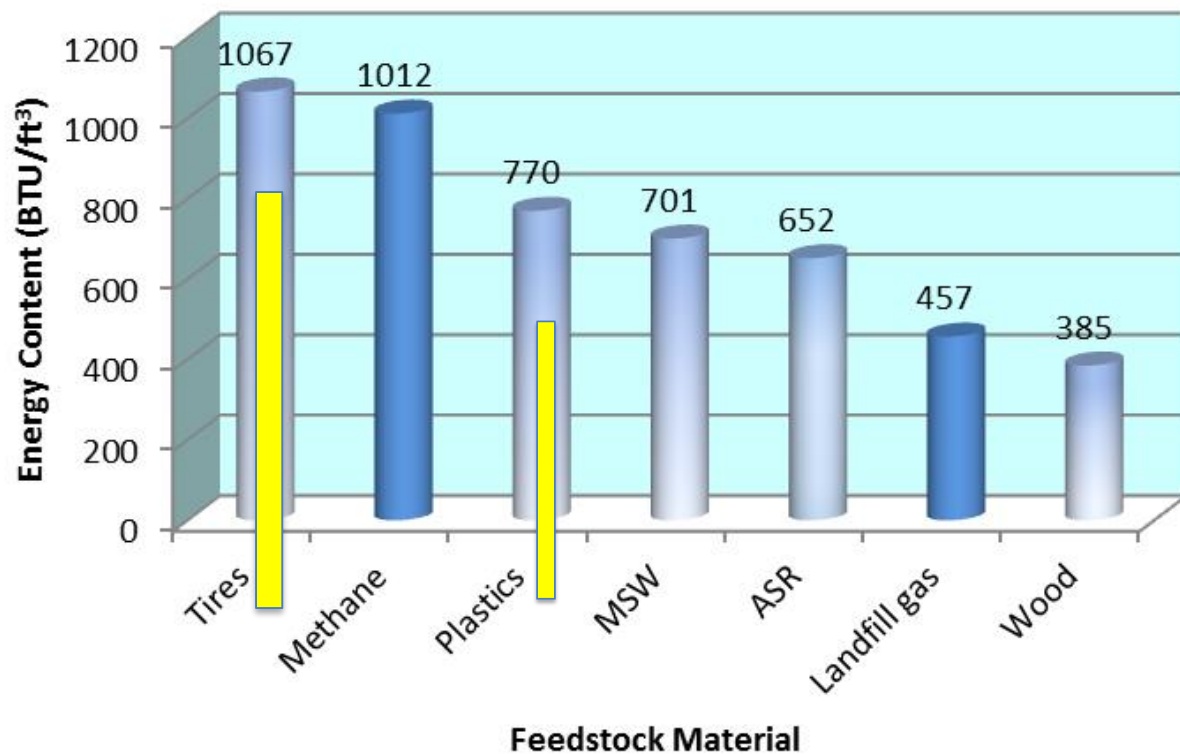
# Thermolyzer

- ◆ Continuous energy
  - ❖ Natural gas
  - ❖ Hot water
  - ❖ Steam
  - ❖ Chilled-water
  - ❖ Electricity





# Heating Value





# Why

- ◆ Cleaner than natural gas
- ◆ CO<sub>2</sub> benefit
- ◆ Behind the meter
  - ❖ Avoid utility distribution and grid transmission costs - \$\$\$ Savings
  - ❖ Self-funded projects > avoid energy costs
- ◆ Solves an environmental issue
- ◆ Removes dependency of utility and grid infrastructure for gas and power



A detailed photograph of an industrial power plant or refinery, featuring a complex network of pipes, metal walkways, and large cylindrical storage tanks. The entire image is overlaid with a semi-transparent green filter.

# Questions?



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