

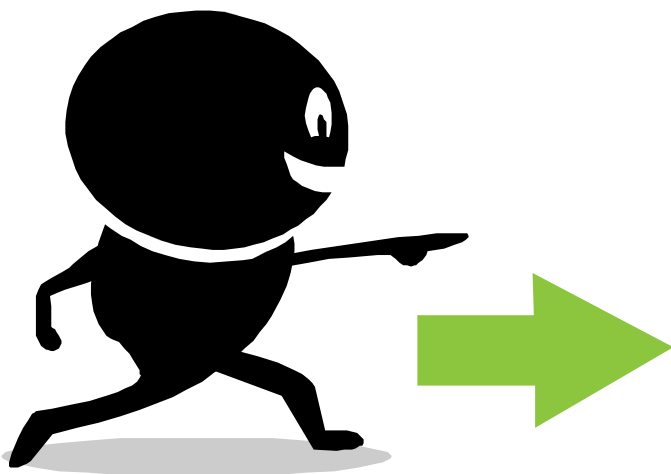
Gas Pipeline Management of Power and Pricing Structures

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Summary of topics to be discussed...

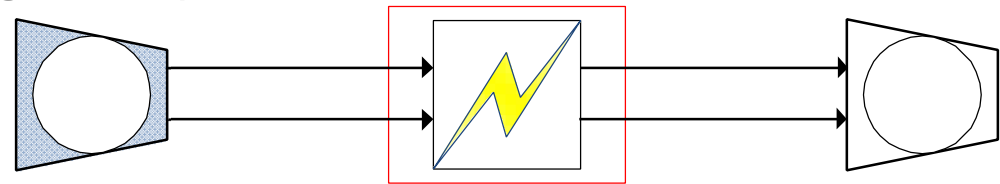
- Characteristics of desirable electric compressor rate structures depending on how electric compressors are utilized.
- Considerations of operating gas versus electric compression based on real time energy prices.
- Benefits of electric service riders.
- Need for varieties of electric rate structures depending on pipeline business models.



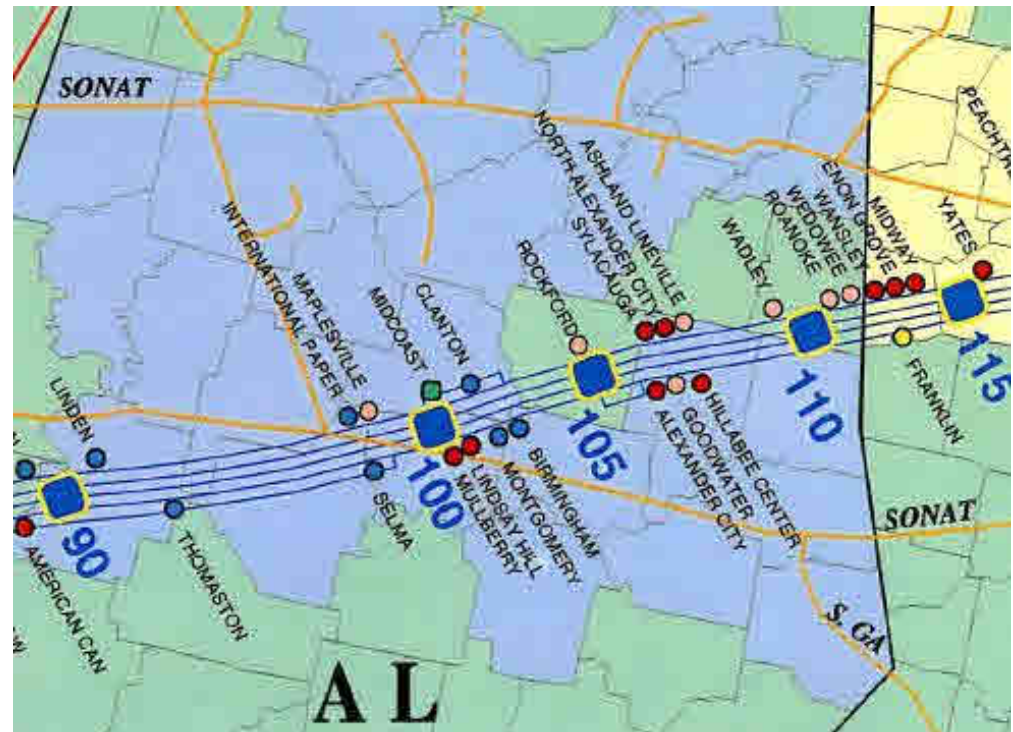
Mainline Station Electric Compression Rate Summary

- Example Transco Station 100 in Billingsley, AL served by Alabama Power

- Electric compressor station with gas compressor stations upstream and downstream
- 14,000 HP
- 11,000 peak kW

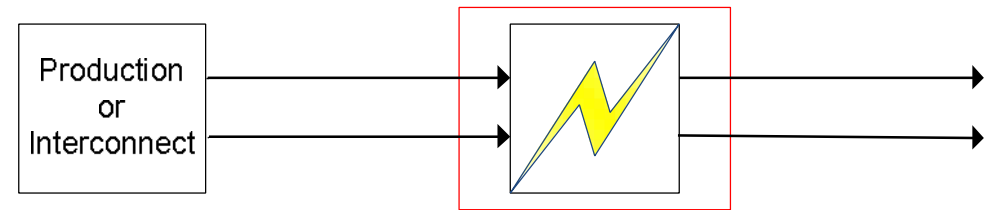


- Best profile for index price contracts if energy can be reduced by increasing gas compression elsewhere during peak pricing periods.
- Best profile for fixed price contracts if energy cannot be reduced during peak pricing periods.



Booster Station Electric Compression Profiles

- Example Station 35 in Houston, TX
 - 10,000 HP
 - 7,800 peak kW
- Best profile for real time price contracts when compression can be reduced during peak hours or the pipeline can handle increased linepack swings caused by slowing down and speeding up compression in one segment.
- Best for fixed price contracts when compression tends to operate mainly during peak hours or there is no ability to reduce energy by increasing compression elsewhere.



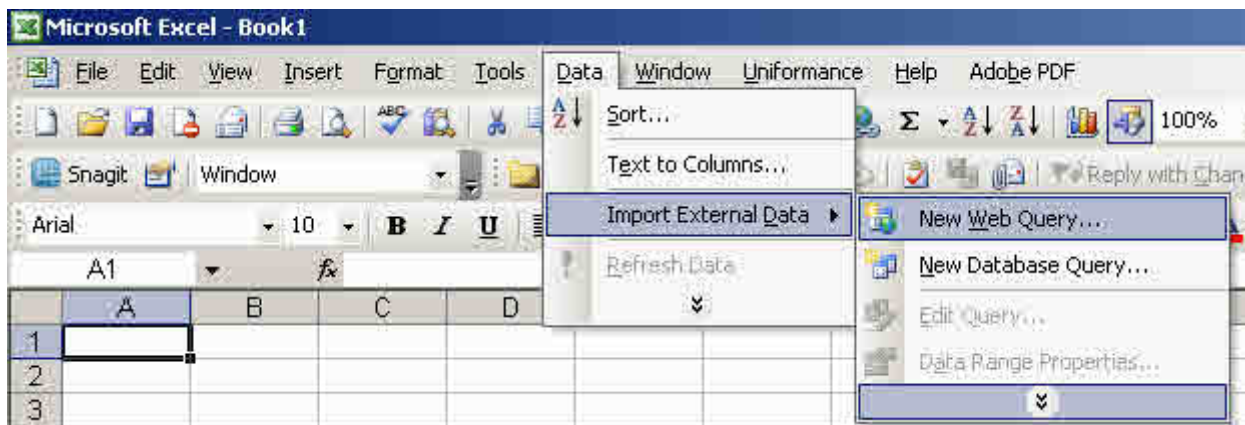
Favorable Rate Schedules

- Fixed price and time of use contracts:
 - Mainline stations that **are not** flexible to operate.
 - Booster stations that are required to run during peak periods.
- Index pricing contracts
 - Mainline stations that **are** flexible to operate.
 - Booster stations that can run with more horsepower during off peak periods.



Electric Compression Real Time Rate Monitoring

- Excel can be used to monitor and alert controllers to high fluctuations in real time prices.



- Enter in the URL:
http://mospublic.ercot.com/ercot/jsp/balancing_services_mcp.jsp
- The excel data can be automatically refreshed every 15 minutes and a macro can be written to alert gas controller team leaders via email of high electric prices that are above a user defined threshold.

- Contracts that utilize day ahead pricing have energy prices available 24 hours in advance.
 - Examine day ahead prices in daily planning sessions when pipeline operation is flexible enough to allow choices in which compression to operate.
 - Many energy providers offer automated pricing reports via email distribution or via a web interface. Often these services are freely available upon request, but sometimes require a monthly fee.
- Contracts with demand charges coincident with grid utilization or peak generation
 - There is no good way for a customer to know when an electric providers peak occurs.
 - Notifications can be delivered when an electric provider projects that a peak day may occur. To avoid hefty annual demand charges, compression should be curtailed during these days peak hours.

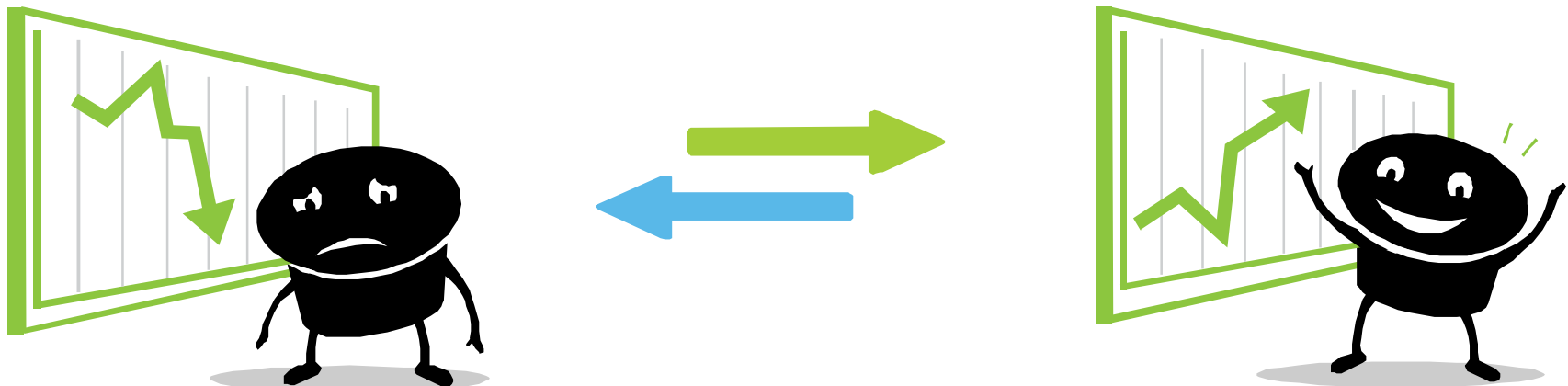
- Improve electric rates with gas compressor station backup generators
 - If backup generators are available, check to see if your electric service provider offers any type of load curtailment program.
 - Consider automated activation of backup generation from your electric service provider.

- Improve electric rates by varying electric compressor operation when generation or grid capacity is fully utilized
 - Consider enrolling in Emergency Interruptible Load programs if compression can be backed off for an eight hour period.
 - Be sure to consider any consequences of shutting down electric compression for the maximum contract period.



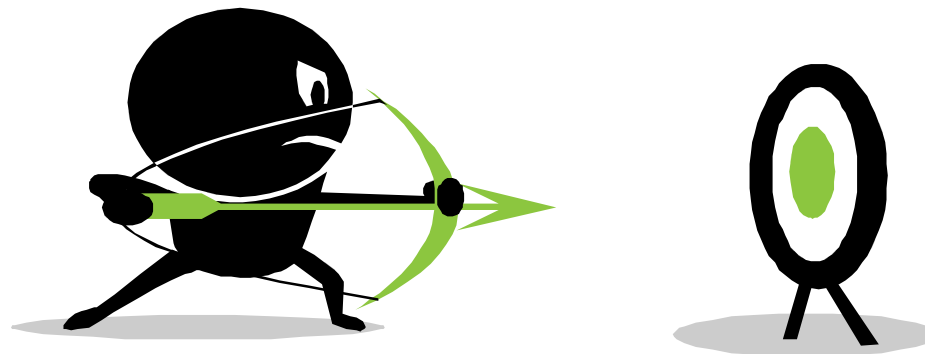
Need for varieties of rate structures

- When pipeline capacity is expanded by adding compression, electric service rate structures can impact the decision to install gas or electric compression.
- For at risk business models, the pipeline company pays for both fuel and electricity used to compress natural gas.
 - The total electric charge matters. It makes no difference if charges are demand or commodity based. The pipeline company should choose the best contract that suits their projected energy usage.
 - Pricing contracts need to be periodically evaluated as compression load factors change. Annual contracts are recommended to remain flexible in adapting to changing energy usage profiles.



Need for varieties of rate structures

- For In-Kind business models, pipeline's customers pay for both fuel and electricity used to compress natural gas.
 - Price of transportation = demand + commodity
 - Demand costs are distributed over 365 days a year at a customer's maximum volume.
 - Commodity costs are distributed based on a customer's actual use.
 - Electric service structures that have a larger demand and lower commodity cost, while still maintaining the same total cost, can result in lower costs of gas transportation. The total cost of transportation can influence a decision to install new gas or electric compression.



Any questions or
comments?

