GEH Presentation

Prepared by

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SkippingStone™

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Who is CLF and Why Are We Here

Conservation Law Foundation

- Oldest regional environmental nonprofit; focus on law, policy and Energy Markets
- NEPOOL Member since 2003

Competitive Energy Markets

- Leading Advocate for transition to Competitive Energy Markets
- Efficient use of resources and infrastructure

Who is Skipping Stone and Why Are We Here

Energy Market Consultants

- Principals have started and run Energy Marketing, Software, DR, and Automated Metering Companies since 1983
- Greg Lander - NAESB Board Member since 1997

Competitive Energy Markets

- Thought leaders supporting continued transition to Competitive Energy Markets

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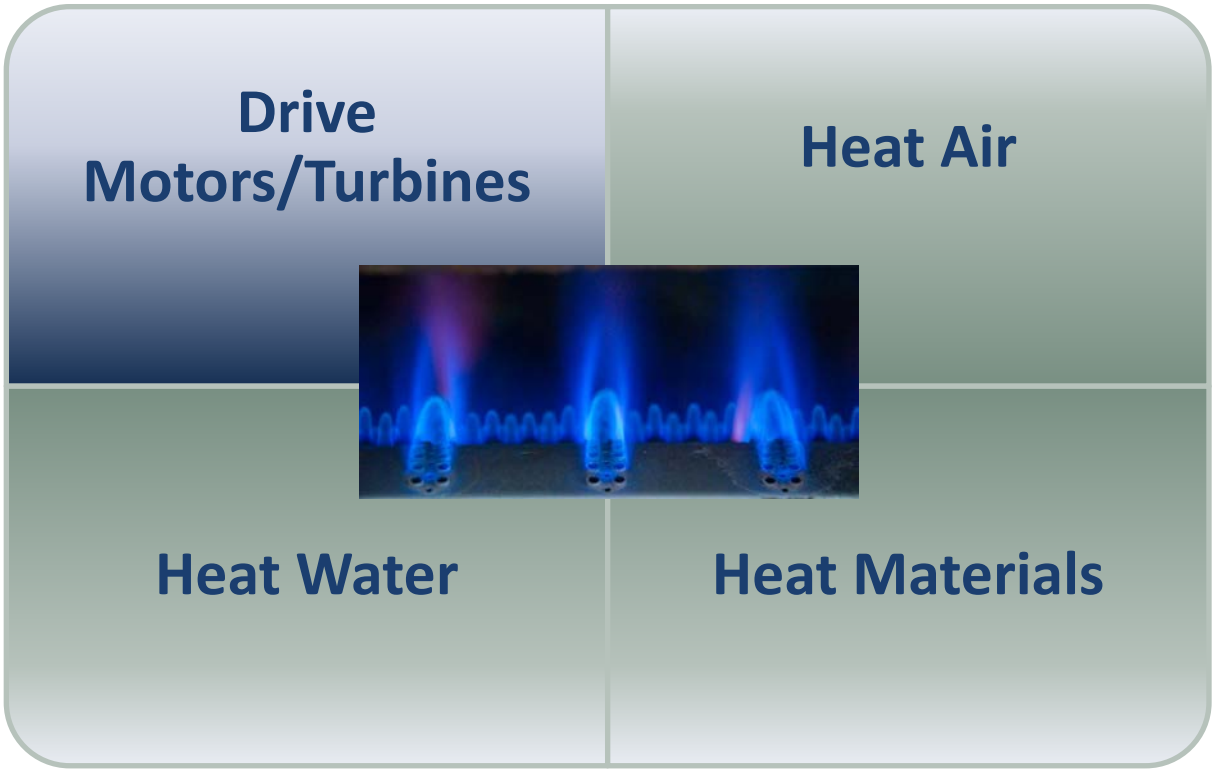
Choices Facing the Gas and Electric Industries

- Do nothing and go with what FERC has laid out
- Tweak around the edges and be back here in another 1-3 years
- Come up with a comprehensive coordination framework, work out the details, and solve harmonization for years to come

Starting Point - Background

For the most part <u>today</u>, North American Natural Gas can only "do" four major things:



What's Coming for No. American Gas

LNG exports to serve same four major purposes

Conversion of Nat Gas to other "Goods"

- GTLs
- Methanol
- Revival of North American Fertilizer Industry

Critical fast ramp capability to assure Electric Grid reliability in support of variable and intermittent generation resources

Bridge fuel for coal fired generation retirements

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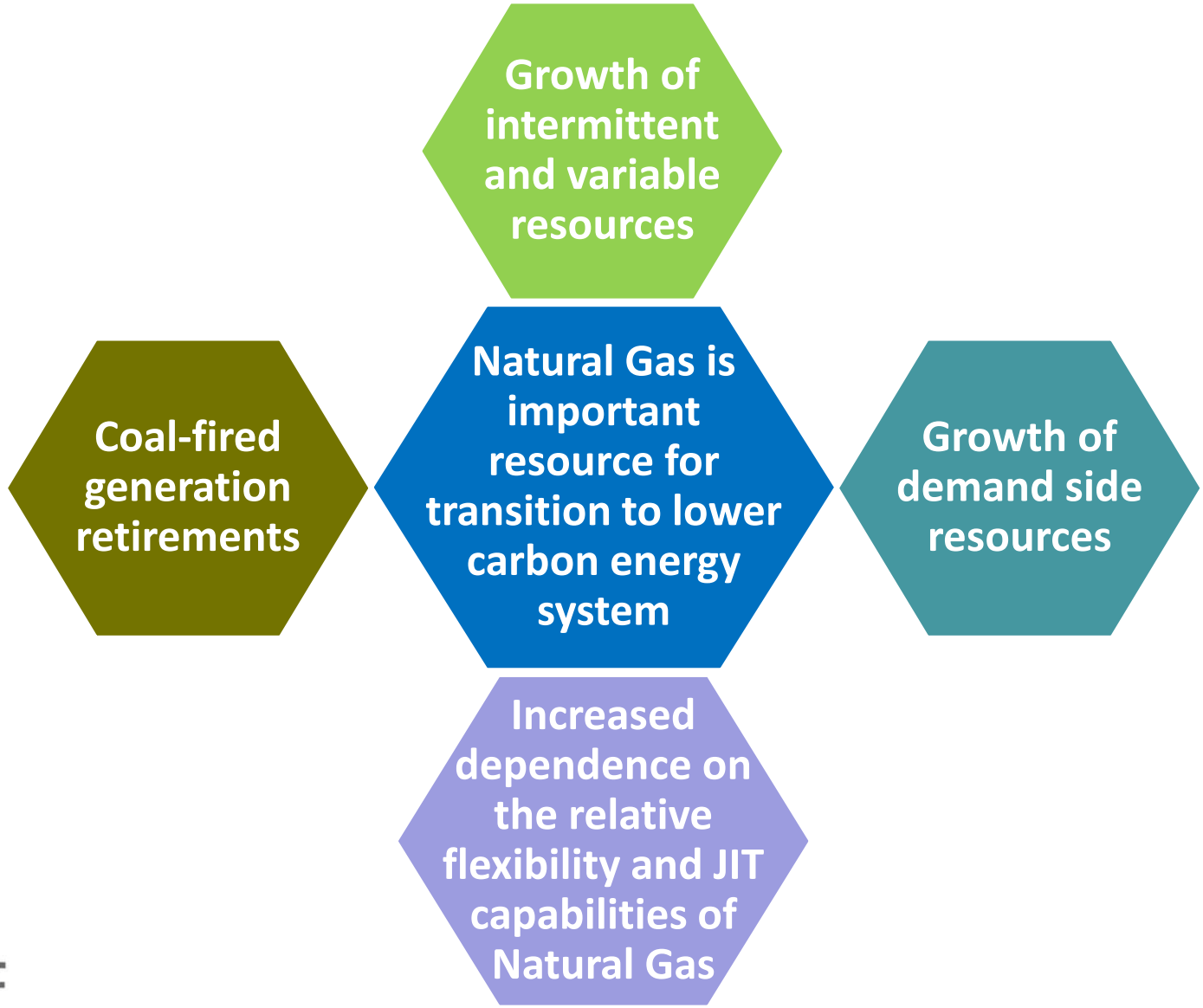
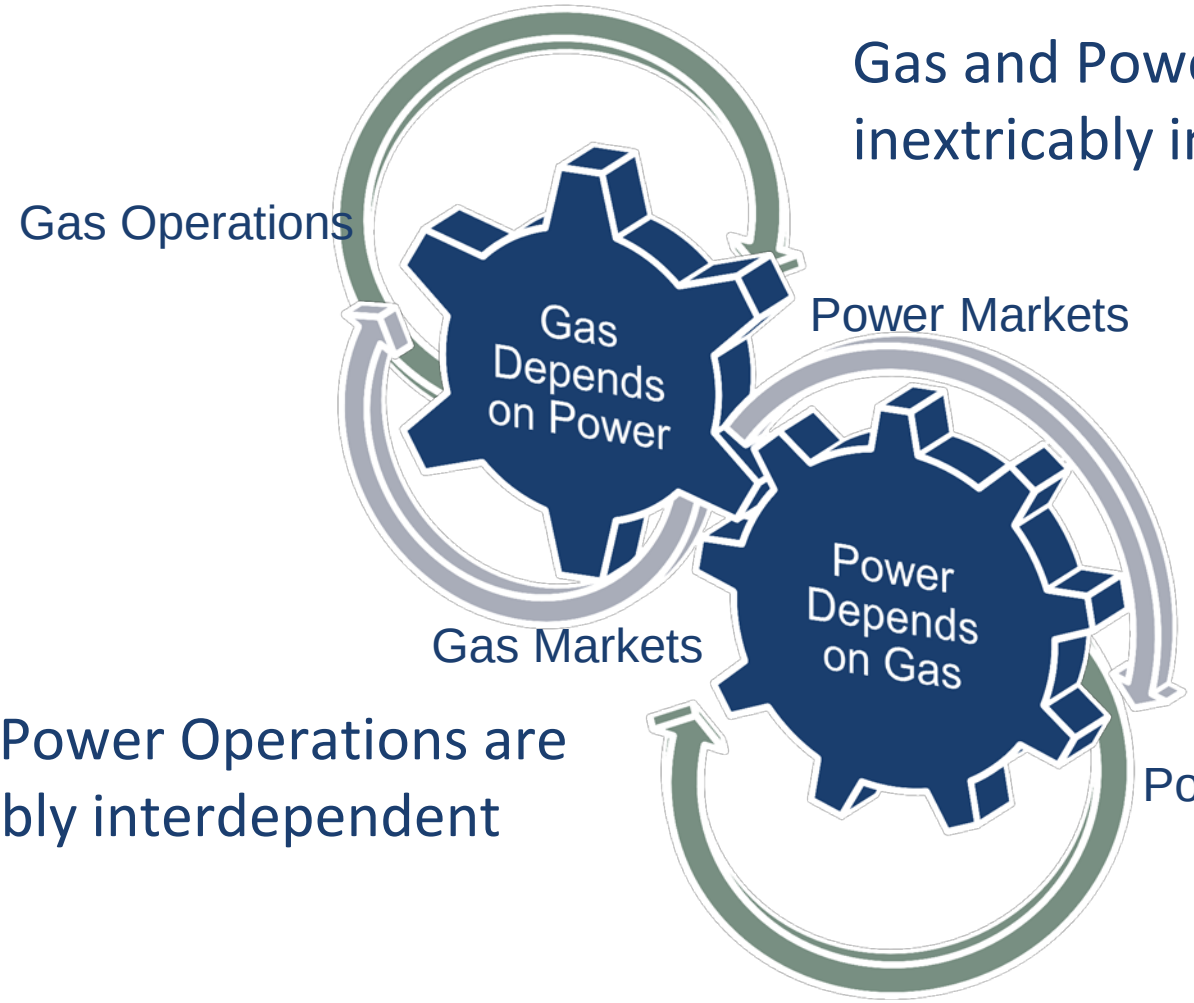
What's Coming for No. American Power



Some Practical Realities

Electricity can do every one of the four major things Natural Gas can do… and more

Gas and Power Markets are inextricably interdependent



Gas and Power Operations are inextricably interdependent

What This Means

Today, and increasingly in the future, neither industry can thrive without the other being healthy.

It makes sense to work with this reality and make the two markets send the right price signals to each other and, as importantly, send the right operational and reliability signals to each other.

In the past…

- *The power market* looked at gas as just a vendor of opportunistically priced fuel
- *The gas market* looked at gas-fired power as a place to put the gas when no one else would pay more for it.

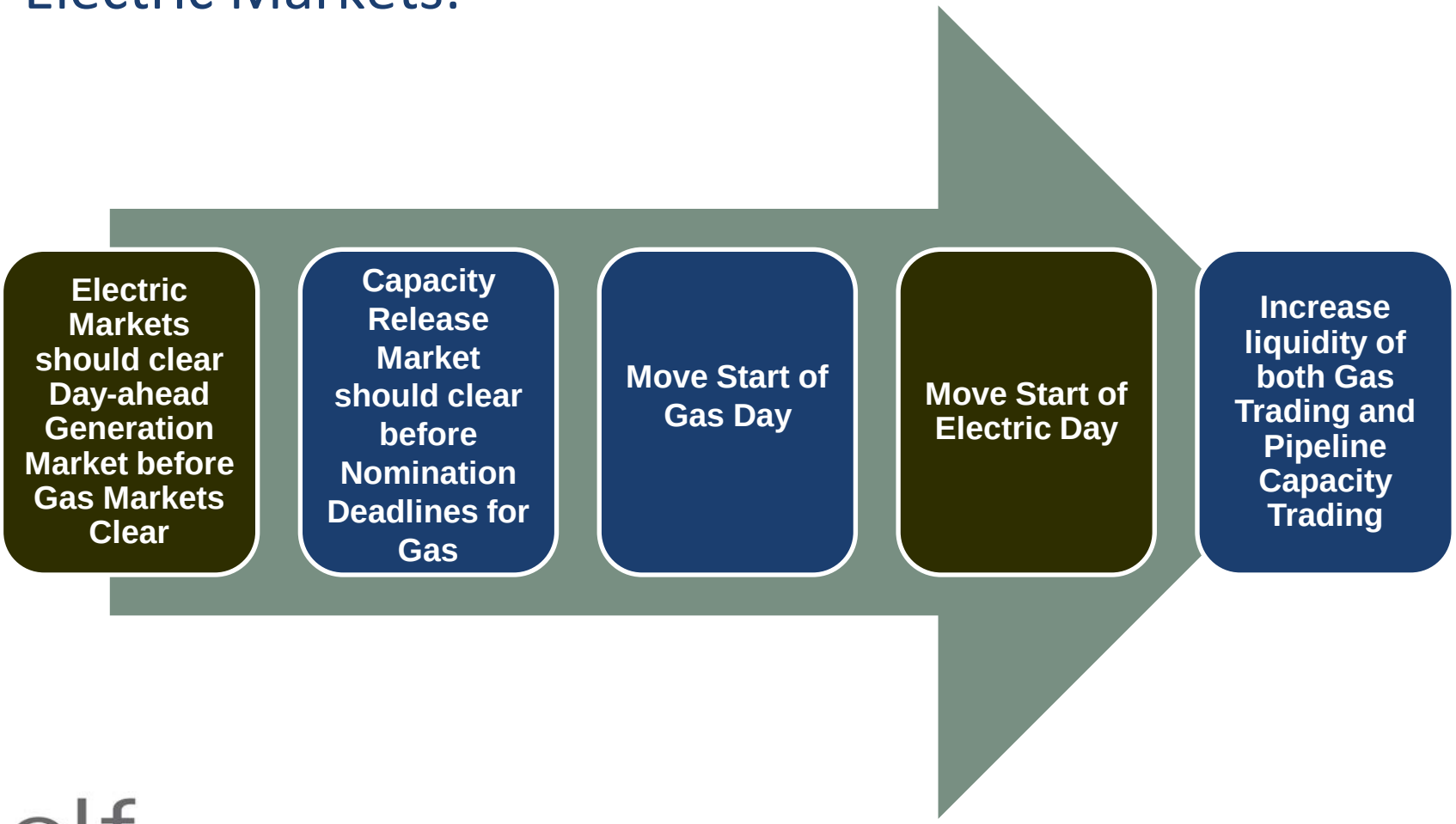
Neither remains true today…

The markets need each other and an opportunity exists to make the markets work in harmony – to the benefit of both.

Optimal Harmonization of these markets is critical to reliability and energy policy.

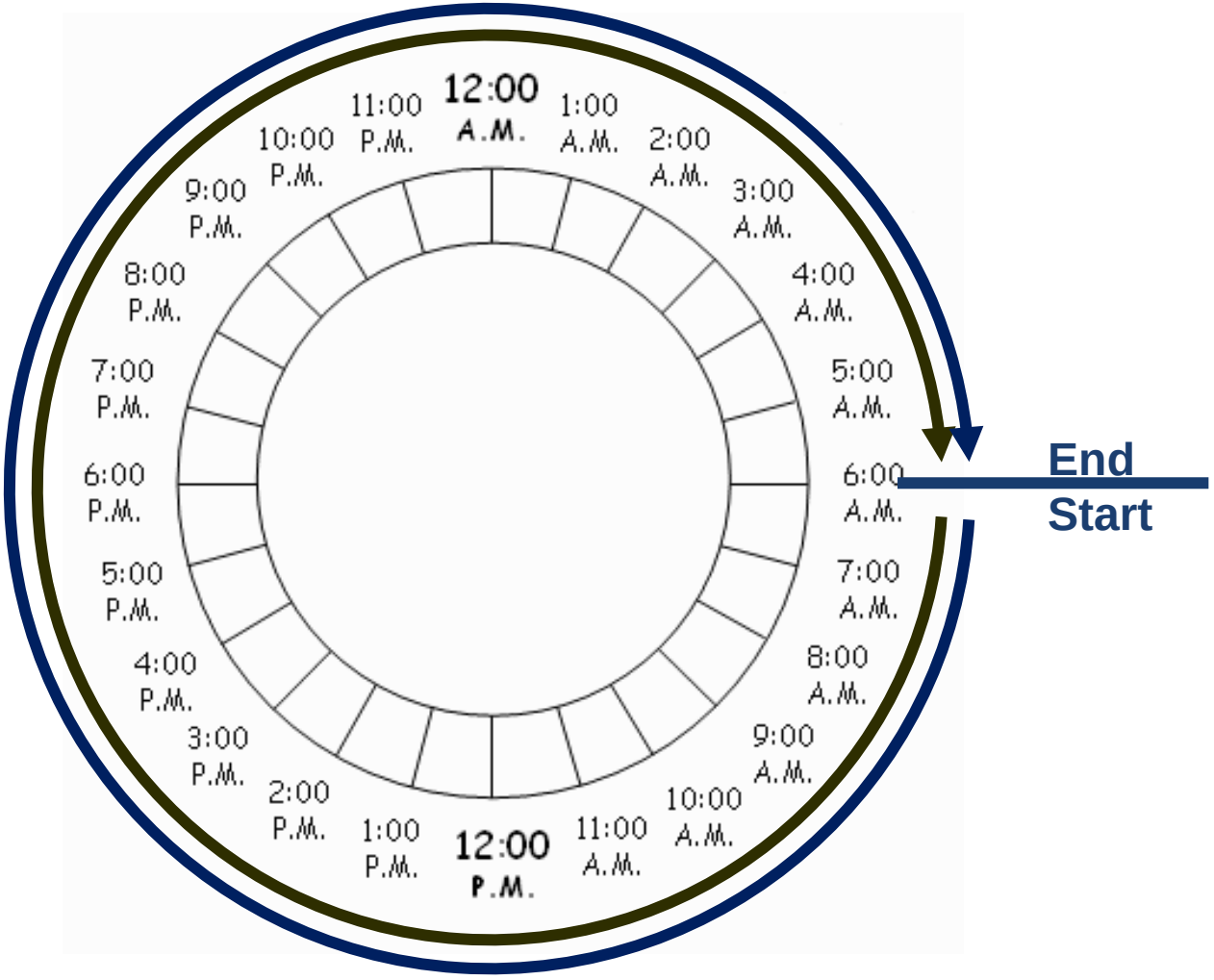
Going Forward Principles

Economic and Operational Coordination of Gas & Electric Markets:



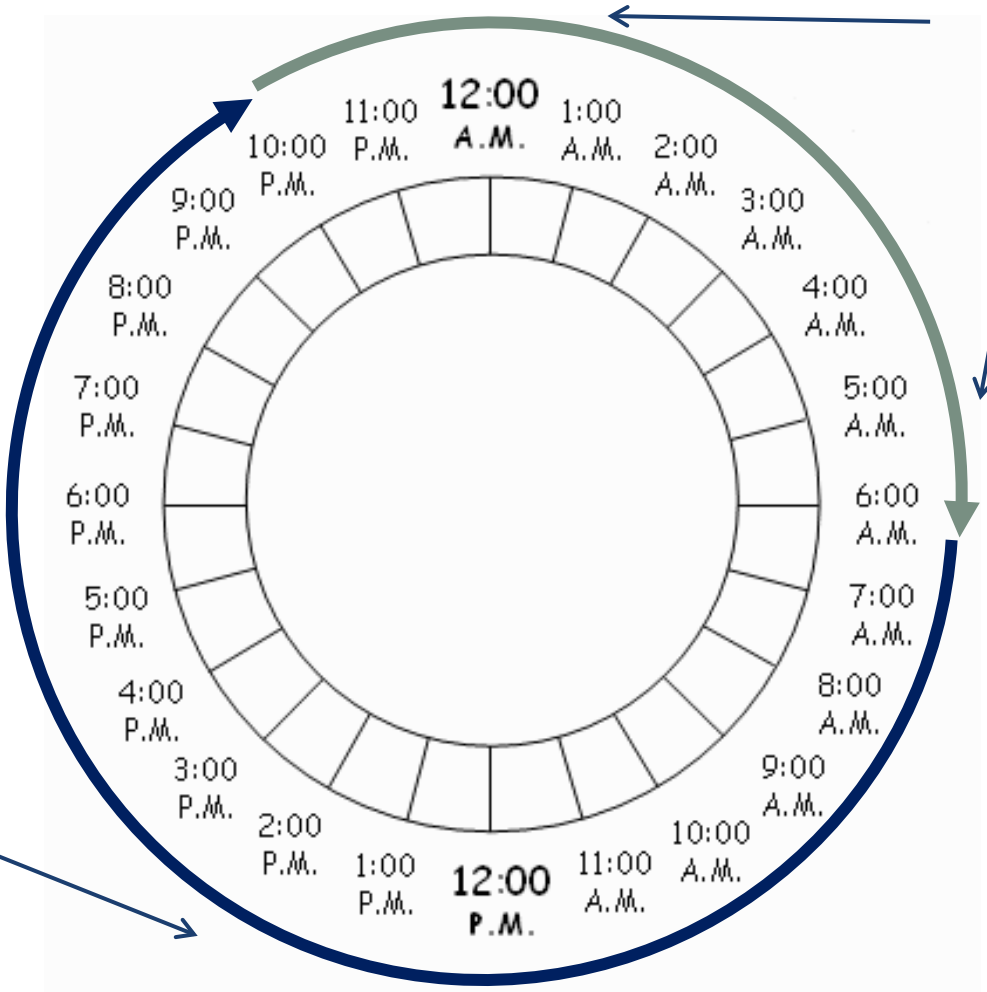
Proposed Energy Market Day

- Gas Day 6:00 AM to 6:00 AM
- Electric Day 6:00 AM to 6:00 AM



For Electric Markets

- A Standard On-Peak 16 Hours from 6:00 AM to 10:00 PM
- A Standard Off-Peak 8 hours from 10:00 PM to 6:00 AM



Day-ahead Gas & Electric Market Cycles

- Day-ahead Gas has two cycles, timely and evening, both for start of Energy Day (6:00 AM)
- Day-ahead Gas has Capacity Release Cycle 1
- Gas and Capacity Trading are liquid at times when it is important to serve both of the Gas and Power Markets' peak requirements
- Day-of Gas has 4 cycles – 2 within Power's "Peak", 1 for transition to Off-Peak and 1 half-way thru Power's "Off-Peak"
- The two markets' economic "Days" are synchronized
- The two markets' operational "Days" are synchronized

Day-ahead Gas & Electric Markets

Electric	Hours	Gas
Accepted Generator Bids Reported	11:00 AM	Capacity Release 1 Opens
	12:00 Noon	Capacity Release 1 Close
	12:30 PM	Capacity Release 1 Matches Close
	12:45 PM	Capacity Release 1 Contracts Done
	1:30 PM	Nominations 1 (Timely) Close
	2:30 PM	Confirmations 1 Close
	3:30 PM	Scheduled Quantities 1 Close
Reliability Assessments[1] Close	4:30 PM	
	5:30 PM	Nominations 2 (Evening) Close
	6:30 PM	Confirmations 2 Close
	7:30 PM	Scheduled Quantities 2 Close
Electric Day Starts	6:00 AM	Gas Day Starts
Flow Change	6:00 AM	Flow Start from Nom Cycles 1 & 2

[1] Where Electric Grid Operator deems needed

Day-of Gas & Electric Market & Flow Change Cycles

- Day-of Gas has Capacity Release Cycle 2
- Day-of Gas has four nom cycles and four flow changes
  - On-Peak Electric has Gas Flow changes at 12:00 Noon and 5:00 PM
  - On-Peak to Off-Peak transition has Gas Flow Change – at 10:00 PM
  - Off-Peak has Gas Flow Change midway through Off Peak – at 2:00 AM
- Day-of Electric (i.e., Real-Time) no changes proposed

Day-of Gas Market & Flow Cycles

Electric	Hours	Gas
Real-Time Market Operates	6:00 AM	Flow Start – for Nom Cycles 1&2
	6:00 AM	Capacity Release 2 Opens
	7:00 AM	Capacity Release 2 Close
	7:30 AM	Capacity Release Matches Close
	7:45 AM	Capacity Release Contracts Done
	8:00 AM	Nominations 3 Close
	9:00 AM	Confirmations 3 Close
	10:00 AM	Scheduled Quantities 3 Close
	12:00 Noon	Flow Change 1 – for Nom Cycle 3
	1:00 PM	Nominations 4 Close
	2:00 PM	Confirmations 4 Close
	3:00 PM	Scheduled Quantities 4 Close
	5:00 PM	Nominations 5 Close
	5:00 PM	Flow Change 2 – for Nom Cycle 4

Gas Cycles Day-of (continued)

Electric	Hours	Gas
Real-Time Market Operates	6:00 PM	Confirmations 5 Close
	7:00 PM	Scheduled Quantities 5 Close
	8:00 PM	Nominations 6 Close
	9:00 PM	Confirmations 6 Close
	10:00 PM	Flow Change 3 – for Nom Cycle 5
	10:30 PM	Scheduled Quantities 6 Close
	2:00 AM	Flow Change 4 – for Nom Cycle 6
	5:45 AM	
End of Electric Day	5:59:59 AM	Gas Day Ends

Benefits of Proposed Market Changes

Electric Market sends demand signals to Gas Market for both tomorrow (Day-ahead) and today (Day-of) in time for Gas and Capacity Trading timelines to respond

Gas Market has 2 chances to synch Flow Start with Electric Market before Energy Day starts

Electric Market has 4 chances to synch within day (Day-of) Gas Flow with Day-of changes

Gas Market is "Open" from 6:00 AM to at least 1:30 PM and to a lesser extent 5:00 PM – enabling day-long "price formation"

Benefits - Continued

A National On-Peak and Off-Peak Electric Market synchronized with the Gas Market (the Energy Day) promotes additional synchronize-able and transparent financial and risk management tools

The additional Capacity Release Cycle enables both within-day (Day-of) exchange of pipeline capacity and potential earlier acquisition of Day-ahead capacity – promoting even more efficient utilization of existing infrastructure, in addition to sending better price signals as to value of "peak-hours" pipeline capacity

This "peak-hours" price signal can inform both the Gas Market and the Electric Market, in particular, Energy Storage and Demand Response

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Other Business Rule Changes

The No-Bump Cycle – Gas Market

No-Bump on the last Cycle of the Standard Timeline. That is:

- If a pipeline supports only the Standard Timeline and has no hourly services, transactions that are scheduled at Cycle 5 cannot be bumped at Cycle 6.
- If a pipeline supports only the Standard Timeline and does have hourly services, transactions that are scheduled at Cycle 5 cannot be bumped at Cycle 6 except by hourly service contracts.
- If a pipeline supports a greater frequency than the Standard Timeline and has no hourly services, transactions that are scheduled at the pipeline's next to last Cycle cannot be bumped at that pipeline's last Cycle.
- If a pipeline supports a greater frequency than the Standard Timeline and does have hourly services, transactions that are scheduled at the next to last Cycle cannot be bumped at the last Cycle except by hourly service contracts.
- Confirmation and Scheduling of cross-pipeline transactions will continue to be governed by the lesser-of convention.

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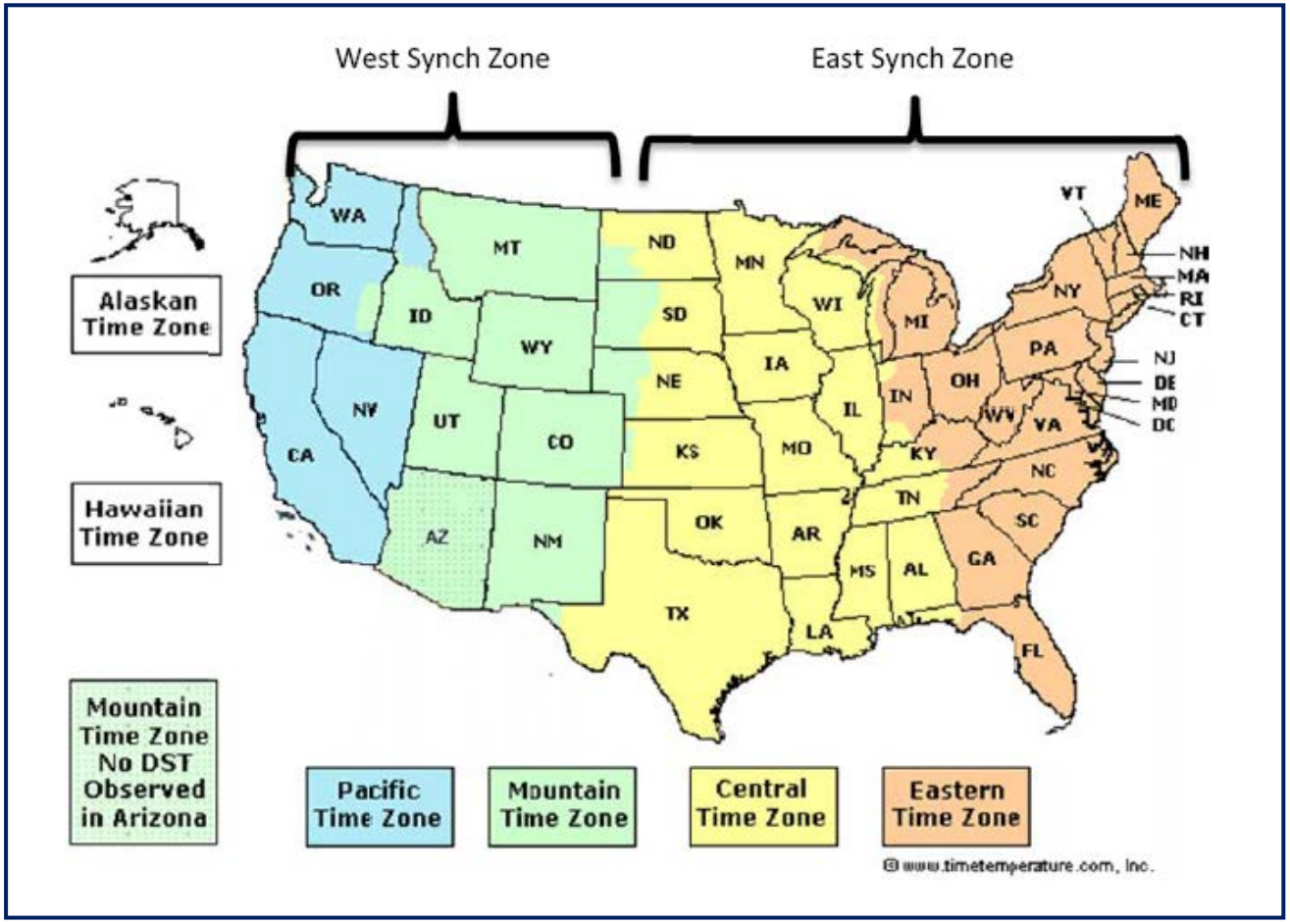
Should there be 1 or 2 North American Energy Days?

The Energy Industry could work with the plan outlined here for a single Energy Day – which some may see as fine and others may see as sub-optimal…

…or…

…should the Energy Industry could fully synch to their respective "Solar Days" and have two Energy Days – an Eastern Energy Day and a Western Energy Day.

2 North American Energy Days?



Under our Proposal, the 2 Energy Days would be:

- 6 to 6 Eastern (5 to 5 Central) and
- 6 to 6 Mountain (5 to 5 Pacific)

2 Energy Days?

What About the Pipelines?

- Of the more than 70 interstate pipelines, all but 7 pipelines fit nicely into these 2 Energy Days
- The 7 are El Paso, Transwestern, REX, Alliance, Tallgrass (fka Trailblazer), Northern Border and Cheyenne Plains
- Of these, El Paso, Transwestern, Northern Border and Alliance are most likely to be driven by the time zone of their respective market areas
- The other 3 pipelines spanning 3 time zones will decide whether they are driven by their market or supply time zones

Cross-Pipeline Coordination with 2-ED's

How do pipelines in one Energy Day (ED) coordinate with pipelines in the other Energy Day?

Where that is a reality, it should be remembered that for more than 30 years, before there was one Gas Day, pipelines had to coordinate between their different individual gas days. Today, OBAs adjust to differing within-day flow rates and can be used to adjust to differing cross-day flow rates.

Optimal Harmony is the Goal

Whether or not we have two Energy Days to better synch the Gas and Electric industries' economic and operational days with the "Solar Day"…

…at least synching the two industries to the same Energy Day allows their interdependency to be better synchronized and hopefully harmonized.

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Optimal Harmony is the Goal

Questions and Discussion….