NARUC

Winter Committee Meetings

Staff Subcommittee On Gas

Know All There is About Electric Utility Natural Gas Conversion? *Sure about That?*

NARUC 2017 Winter Committee Meetings
Subcommittee on Natural Gas
Sunday, Feb. 12, 2017
Washington, D. C.

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Experience

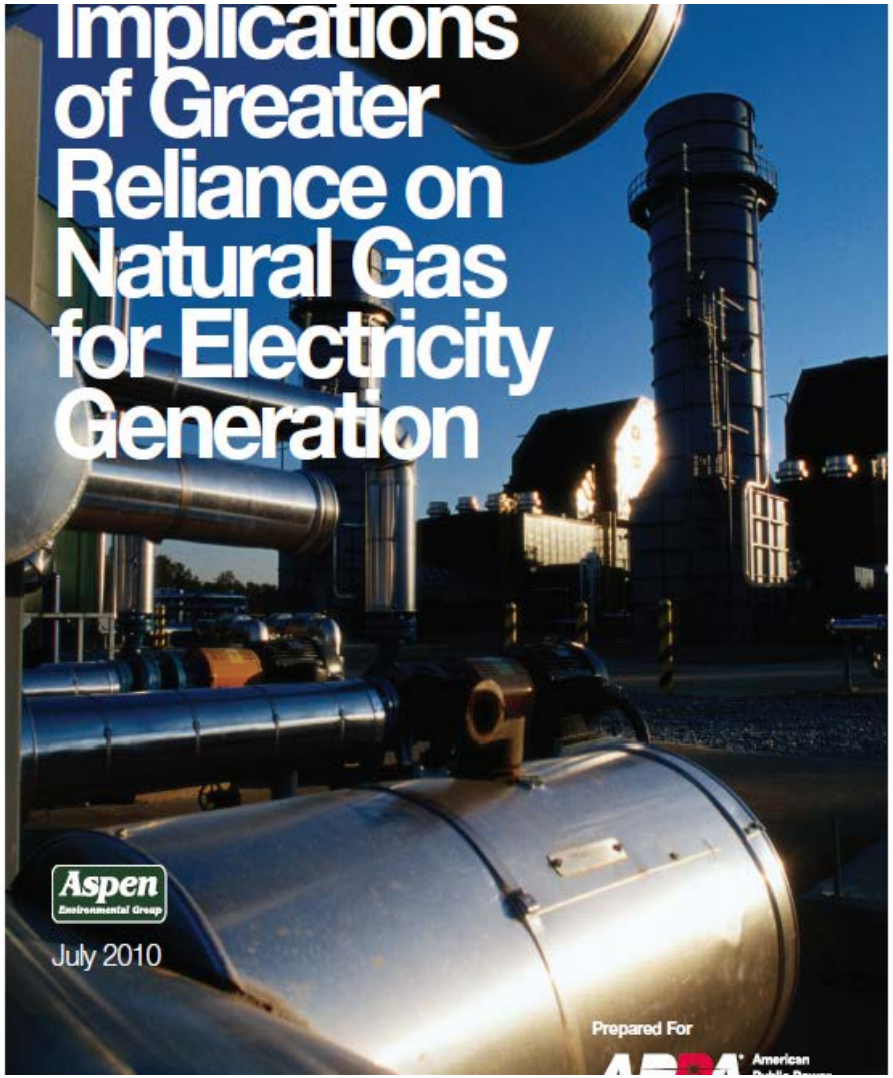
13 years electric utility sector

7 years oil/gas and pipeline sector

11 years in manufacturing

Designed and wrote part of 2010's APPA study—still relevant (load analysis done by Katie Elder of Aspen)

http://www.publicpower.org/files/PDFs/ImplicationsOfGreaterRelianceOnNGforElectricityGeneration.pdf



Why Natural Gas Conversion Matters to PUCs & Electric Utilities

- Reliability & service disruptions;
- Cost: Many new maintenance costs & rate re-openers;
- Opposition at hearings includes health issues & property value loss);
- Opposition to emerge at state agencies under revised NSPS Section 111 (d) if CPP is withdrawn and states implement new regulations and
- How will rating agencies score NGCC projects if there are infrastructure issues?

Fewer Environmental Regulations Than Coal Generation But…

- New PHMSA safety and methane pipeline repair regulations force pipelines offline to fix leaks with possible localized gas service disruptions;
- Growing public opposition from homeowners, NIMBY, NOPE & environmentalists;
- Pipeline, compressor station & storage service disruptions not yet studied regionally;
- Gas storage issues across US; and
- Opposition campaigns supports Renewable Energy over NGCC or gas infrastructure.

Why EPA's Compressor Station NSPS (Leak Repair) Matters to Utilities

- OOOOa rule: Must fix all methane leaks <30 days except in extreme circumstances regardless of leak size, season, weather, demand/load or costs (EPA's NSPS for new sources, all pipelines & compressor stations built after Sept. 18, 2015);
- Not eligible for Congressional Review Act disapproval vote- published June 3, 2016;
- Some flanges, hatches & valves take a week, month or occasionally a year to repair;
- Pipeline/compressor station—no service during repair time unless they have secondary routing for methane gas (rare); and
- Many power plants won't have access to multiple pipelines unless in oil/gas producing state; and
- Many pipelines serving power sector don't have secondary routing.

New Technologies Will Matter in Permitting NGCCs

- EDF and Universities have their own studies about methane and will use them;
- Google/EDF Drive By data used at power plant hearings &
- Expect citizen activists to wear monitors that display methane, CO_2 and NOx emissions (Illinois ordered 4,000 monitors for citizens for ozone precursors)

Fixing Fugitive Leaks at Compressor Stations Might Affect Utility Gas Supply & Cost

- Compressor stations located approximately *every* 80 miles;
- Each compressor station has an average of 1,500 parts that can leak;
- Typical leak repairs require **1 day, rare 1 week or 1 month;**
- Evacuate gas on up to 5 miles of pipeline in all directions of most compressor stations;
- A few compressor station leaks compressor require up to **1 year** for replacing valves

Transition team:

1. Fix OOOOa NSPS rule for more reasonable repair time.
2. If EPA proposes Existing source rule in 2017 --give reasonable time for compressor station repairs—during scheduled outages or "shoulder season".
3. States should consider gas infrastructure when looking at life of plant & feasibility for 111(d) NSPS sector if state environmental agencies proposed rules.

Noise & Smell Issues in Permitting

- Address concerns about noise
- Find out about secondary routing of methane to avoid service disruptions for power plant
- Will methane smell like mercaptan? Does your community want that smell for safety signal or find it offensive (don't make assumptions)

See/Hear YouTube video at:

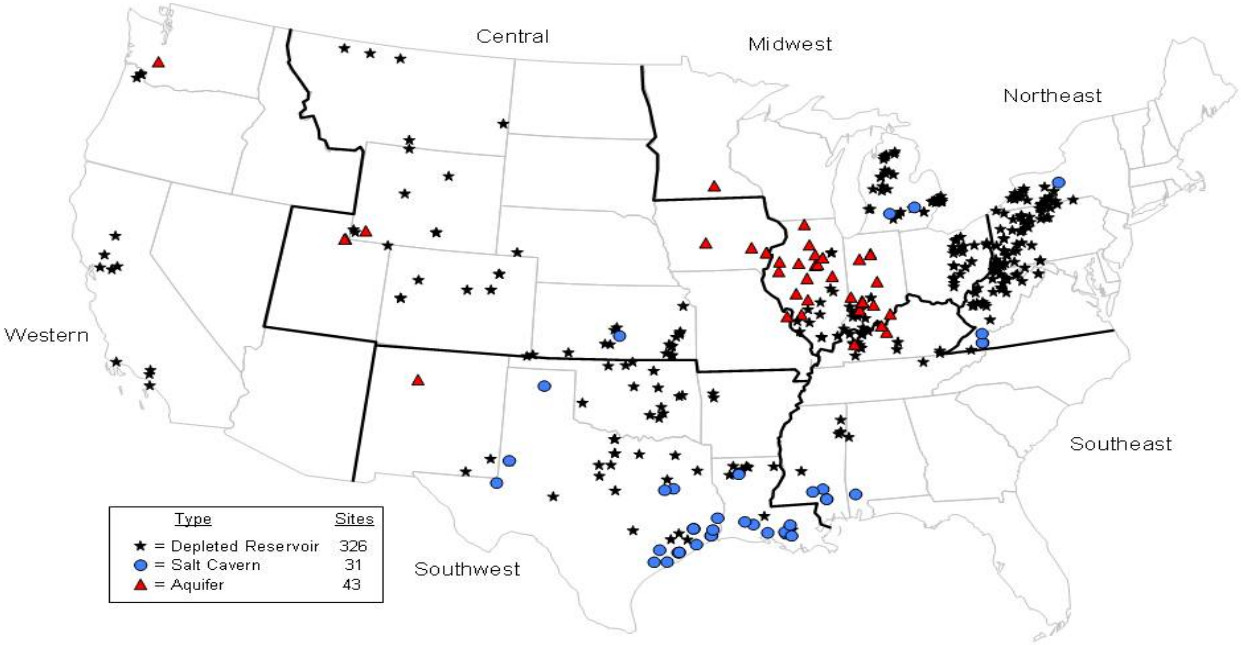
https://www.youtube.com/watch?v=WtSH5V1YQvQ

Yellow arrow is a line of residential housing close to pipeline station

Readiness for Power Sector's Gas Switch Depends Upon Infrastructure Readiness

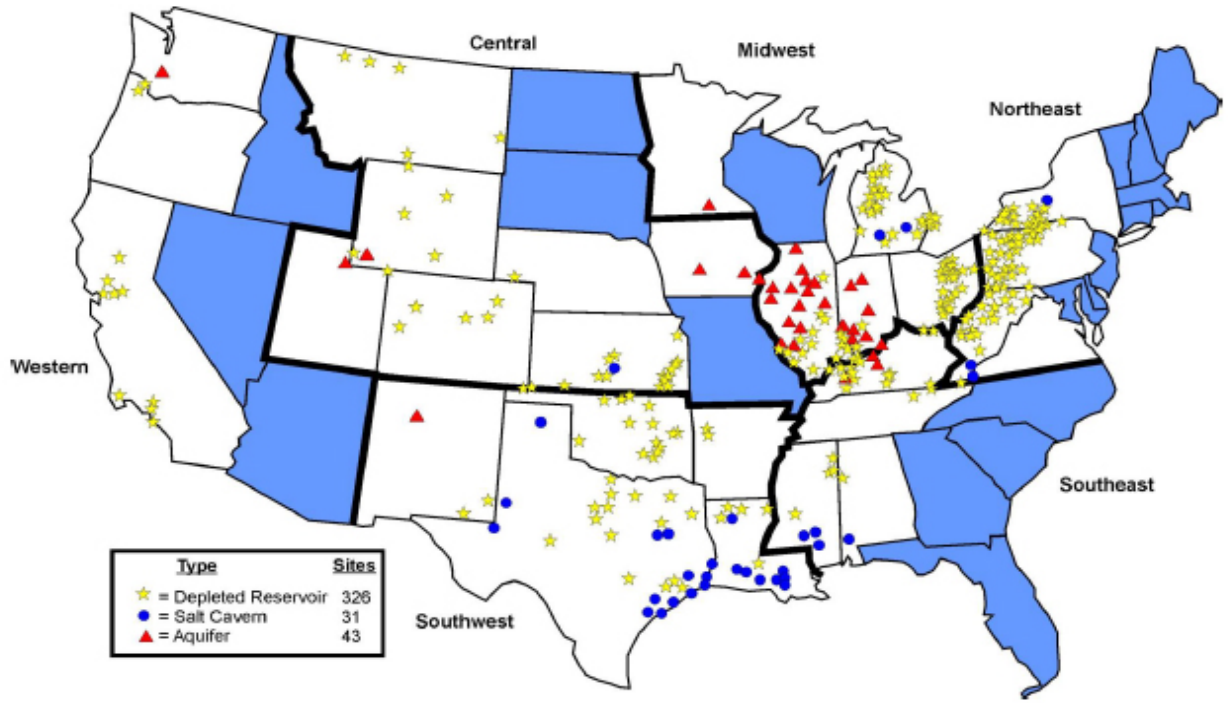
- Most new pipelines built for upstream, gathering and not to power plants;
- New compressor stations and NGCC units must pass air dispersion or AERMOD models-don't make assumptions about lower NGCC stacks!
- Gas pipelines taking 8-10 years for approval and build out;
- Existing natural gas storage wells getting more safety questions after California Aliso Canyon leak (and smaller leak at PG&E's McDonald Island facility). Safety tests at each storage location can take a month long!
- PHMSA Interim Final Rule requires gas storage upgrades in 1 year;
- Possible 2017 U. S. DOT/PHMSA regulations following PIPES Act & DOE Report;
- So. California decreased natural gas demand by 20% in 5 months to prevent black outs. Hats off to DSM, renewables, hydro & LADWP burned OIL to achieve this! **Could all states avoid curtailments if they had a storage field out of service for three months? Six months?**

Natural Gas Storage is Essential



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division Gas, Gas Transportation Information System, December 2008.

- **Pipelines cannot be line packed adequately for power plants**
- **Gas moves 25-35 miles per HOUR**
- **Many states have geology unsuitable for gas storage**
- **Dec. 2016 DOE Report suggested storage facilities were old and needed massive updates—power sector to plan for dual fuel**



SOLID BLUE STATES INDICATE STATES WHERE SUBSURFACE STORAGE IS NOT POSSIBLE DUE TO GEOLOGY

SOURCE: ASPEN ENVIRONMENTAL

DOE October 2016 Storage Report Following Aliso Canyon Leak Is Significant

"Power system planners and operators need to better understand the risks that potential gas storage disruptions create for the electric system". Sec. Ernest Moniz, DOE, October 2016;

- *44 Policy Recommendations and suggestions for new PHMSA regulations;*
- *DOE report recommended Dual Fuel for power sector until storage facilities have been retrofitted and meet many dozens of new requirements; and*
- *Associations for natural gas industry stated that they needed more than 1 year for storage facilities to meet PHMSA's new safety regulations effective Jan. 2017.*

HOW LONG DO THEY NEED? WHAT DO UTILITIES DO IN THE MEANTIME?

Looking Ahead

- Utilities should plan for space for steel catalysts on NGCC plants (formaldehyde MACT);
- Gas chromatographs for watching for variances in gas quality if infrastructure options are limited (similar to coal blending);
- Load from electrification of pipeline compressor station motors (replace gas motors) in ozone nonattainment areas to meet 70 ppm standard might be tricky; and
- FERC and State PUCs to hear cost recovery requests for pipelines for all new costs– can re-open existing firm contracts.

Dual Fuel Sounds Like a Silver Bullet But Isn't

- Dual fuel limited by Clean Air Act often to <10 percent of total year;
- Dual fuel (oil) rarely allowed during summer ozone season
- Some Title V permits only allow dual fuel (oil) when Governor issues emergency orders (flooding, tornado, hurricane, ice storms)
- Some "dual fuel" units were permitted that way thirty years ago but have not maintained ability to run them and
- Electric utilities need special permits or variances for force majeure due to natural gas infrastructure issues.

Gas Conversion Challenges Are Not Insurmountable

- Natural gas infrastructure permitting process is far slower than five years ago with considerable public opposition
- Infrastructure opposition ranges from property value losses, smell, noise, and public health.
- Natural gas is a preferable fuel source when contemplating CO_2.
- Dual fuel may require special state air pollution agency approvals for use during natural gas force majeure events;
- Natural gas compressor station repairs mean station out of service for 5-21 plus days—more issue if no natural gas storage nearby;
- Natural gas storage repairs & downtime;
- Cost of natural gas affected by operational issues; and
- Reliability concerns are localized & perhaps short term

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