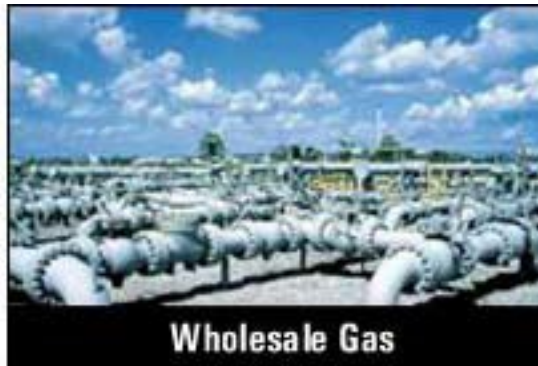


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North American Energy Standards Board
Gas Electric Harmonization Forum Report
July 28, 2023



North American Energy Standards Board

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The participants of the NAESB Gas-Electric Harmonization Forum comprise a broad cross section of natural gas and electric markets – state and federal regulators, pipelines, generators, producers, distribution, marketing, transmission, end users, independent system operators and technology experts. Any interested party was welcome to participate in the NAESB Gas-Electric Harmonization Forum.

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I. Foreword from the Chairs of the NAESB GEH Forum

The following represents the views exclusively of the Chairs of this Forum in their individual capacities, and should not be attributed to the North American Energy Standards Board, its leadership, or its members.

“HOUSTON, WE HAVE A PROBLEM.”

-- Astronaut Jack Swigert to Mission Control at the Johnson Space Center in Houston in reporting that Apollo 13 had experienced a near catastrophic explosion on the spacecraft. (April 19, 1970)

Paraphrasing Astronaut Jack Swigert, and with the same sense of understated urgency, we believe our country has a problem.

Over the last century, two great industries have arisen – electricity networks and natural gas production and delivery – and together have become an absolutely critical foundation for our dependence upon an uninterrupted supply of reliable, safe, and affordable energy. We simply cannot keep the lights on or heat our buildings if both systems do not operate synchronously.

At one time, it was believed that the United States was on the verge of depleting most of its proven reserves of natural gas, so much so that its use for power generation was federally restricted by law in 1978. This sentiment persisted for three decades, with the US Secretary of Energy even attesting in 2006 that “using natural gas to generate electricity is like washing your dishes in fine scotch.”

However, today the electricity industry’s need for and reliance on natural gas is vastly different. Owing to historic breakthroughs in turbine technology, seismic imagery for exploration, and horizontal drilling and hydraulic fracturing, domestic natural gas supply has grown exponentially, along with the power sector’s reliance on it. In the last two decades, natural gas’ fuel share for power generation has doubled: today it represents almost 40 percent of total resources. Both sectors of the American energy system have become highly interdependent economically and technically: natural gas represents the largest fuel resource for power generation, while power generation is the largest consumer of natural gas.

From a physical and operational standpoint, the electric utility network is highly dependent upon the uninterrupted performance of the gas production and delivery network. Without the latter, the former cannot meet its own performance requirements. Customers of both gas and electricity systems can suffer when this happens, as demonstrated by the natural gas sector’s failure to perform for power generation during the most recent two winters (2021’s Winter Storm Uri and 2022’s Winter Storm Elliott). Because both systems were not designed originally to function as an integrated whole, risk of failure is asymmetrical and not equally shared. During Uri, gas needed for power generation vanished during periods of peak winter demand for both gas and electricity, tragically resulting in excess of 240 lives lost and economic damage estimated as high as \$130 billion. Although some producers suffered from not being able to sell their production, because shortages caused natural gas spot prices to skyrocket, gas purchasers – primarily electric generators and gas utilities – were handed bills in the magnitude of a thousand times greater than customary, resulting in financial insolvency or ratepayer subsidization for decades to come. During Elliott, gas accounted for 72 percent of outages attributable to fuel.

We were asked to co-chair this forum, and we assumed our responsibilities with an open mind, weighing seriously the questions directed by the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC). We endeavored to find solutions to address the systemic weaknesses now made evident in the natural gas/electric network nexus. We listened to stakeholders. We used our experience in regulating both industries, and our knowledge of how they interact. This eventually resulted in our setting forth 20 Proposed Recommendations that we solicited for comment, followed by a vote of the Forum participants to gauge support. All of these Recommendations involve technical issues; some involve policy considerations. Some involved short-term solutions; others will require longer to remedy.



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After having reviewed the voting on the 20 Recommendations, we draw the following conclusions contrasting and comparing the perspectives of the natural gas and electric industries on the critical path forward:

- Several of our recommendations received strong support from both industry sectors, such as:
 - **Recommendation 8** (alignment of the timelines between the Power Day and/or the day-ahead scheduling timelines with the gas day) – high 80 percent support.
 - **Recommendation 9** (adoption of multiday unit commitment processes) – 90 percent support.
 - **Recommendation 10** (state PUCs encouragement of natural gas and electricity demand response programs) – 90 percent support.
 - **Recommendation 11** (state PUCs encouragement of voluntary conservation public service announcements) – 90 percent support.

- However, on many critical recommendations, the natural gas and electric industries hold widely divergent opinions:
 - **Recommendation 1** (FERC’s directing NAESB to revise its business practice standards related to the timely reporting of natural gas pipeline informational website posting data) – 85 percent support by electric wholesale, versus 46 percent support by gas wholesale.
 - **Recommendation 3** (expanding the Argonne National Laboratory NGInsight tool to improve situational awareness and communication between (a) owners and operators of natural gas production and processing facilities and (b) Bulk Electric System operators) -- 80 percent support by electric wholesale, versus 57 percent support by gas wholesale.
 - **Recommendation 7** (encouraging State public utility commissions and applicable state authorities in states with competitive energy markets to engage with producers, marketers and intrastate pipelines to ensure that such parties’ operations are fully functioning on a 24/7 basis in preparation for and during events in which extreme weather is forecasted) -- 87 percent support by electric wholesale, versus 41 percent support by gas wholesale.
 - **Recommendation 15** (encouraging state authorities to consider establishing informational posting requirements for intrastate natural gas pipelines regarding operational capacity data, similar to the reporting and posting requirements mandated by the FERC for interstate natural gas pipelines) – 91 percent support by electric wholesale, versus 57.5 percent support by gas wholesale.
 - **Recommendation 16** (encouraging state authorities to consider the development of weatherization guidelines appropriate for their region/jurisdiction) – 92 percent support by electric wholesale, versus 55 percent support by gas wholesale.

As much as we are heartened by the strong support for some recommendations, the divergence of support between the two sectors on others is profoundly disturbing: it reflects a fundamental lack of agreement regarding the lessons learned from these past two winters and the challenges ahead in ensuring that outages no longer occur owing to a failure between these two systems.

At the time we closed our live Forum meetings, we urged stakeholders to take control of their destiny as failure to do so could result ultimately in less favorable outcomes dictated by others in the event that we experience another weather event with deadly and far-reaching consequences. We did not regard any of our 20 recommendations to be so burdensome or so profoundly altering that they would engender strong opposition. Rather, a close reading demonstrates that they were couched in terms of simply requesting entities such as federal or state authorities to consider taking remedial steps. Yet they still drew stout opposition from some.

Specifically, activity on the pending NAESB standards development request to consider modifications to the *force majeure* language of the NAESB Base Contract to encourage weatherization actions underscores the difficulty in relying on consensual solutions. This standards request, made on May 3, 2023, was singled out as significant in our **Recommendation 4** where we stated the following: “The NAESB Gas-Electric Harmonization (GEH) Forum endorses this evaluation and encourages the NAESB Wholesale Gas Quadrant to act with utmost expediency to address this request on a timely basis.” This recommendation was supported by 91 percent of the Wholesale Electric



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Quadrant, but only by 51 percent in the Wholesale Gas Quadrant. Some commenters opined that it was inappropriate for the GEH Forum to even mention this pending standards modification matter in our recommendations.

Just this week, at the kick-off meeting for the Wholesale Gas Quadrant to consider this standards modification request, gas producers unanimously urged summary dismissal of this request, effectively negating further consideration and discussion. This is illustrative of the difficulty of relying on a voluntary, consensual process to find solutions for the issues we endeavored to address. We regard an act like this to be both disappointing and counterproductive.

The last serious endeavor to address the failure to harmonize or coordinate the relationship between these two industries occurred in 2012 following a winter storm outage in 2011. At that time, FERC was asked to take curative steps to synchronize the electric and gas markets. Except for modest changes, it declined to do so. The consequences of that decision continue to linger in the face of the crises that emerged these past two winters.

Excuses can no longer substitute for sound planning and judgment. If voluntary measures fall short owing to staunch opposition by some, it is time for the national regulator to consider more direct measures to ensure that both industries under its purview perform in tandem to ensure energy reliability and assurance for our country. Through our workshops, market participants worked with us to address the discrete issues identified by NERC and FERC. Twenty recommendations that follow were identified because we thought them achievable most readily either through a consensual process or through federal or state regulatory action, without need for legislative recourse. However, the sharp differences in opinion between the electric and gas sectors expressed in response to those recommendations, and the discord experienced during the opening discussion of **Recommendation 4** in the standards setting process, have prompted our rethinking of that more limited course. We have thus pivoted to a measure that, although discussed during the Forum but not included among our recommendations, requires Congressional enactment, recognizing that this represents an even more challenging pathway.

After a year of work through this process, combined with our own extensive experience, we recommend a more significant, structural solution that, if enacted, would accelerate the harmonization of the natural gas and electric power industries to the benefit of the country: **a natural gas reliability organization akin to the one currently responsible for electric reliability, NERC.** We know that others – including the National Academies of Sciences, Engineering and Medicine’s Committee on the Future of Electric Power in the U.S. (2021) – have concluded that the close interdependencies of the gas and electric industries and their importance to the nation’s economy necessitate stronger reliability standards in the gas industry, along the lines of those that Congress determined (in 2005) were needed in the electric industry. With such an organization in place, we believe the balanced solutions discussed in this report would find home at an institutional forum empowered to more timely address these and other related matters on an ongoing basis. Pending its creation, however, the following GEH recommendations should be expeditiously addressed on an individual basis, as set forth below. Although our work on this project is completed, resolution of these issues is only beginning.

We indeed have a problem, and it’s time to get it fixed.

Robert W. Gee

Dr. Susan Tierney

Pat Wood, III



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II. Executive Summary & Recommendations

The North American Energy Standards Board (NAESB) has a long history of convening energy industry participants to collaborate on measures that can be taken to improve coordination between the natural gas and electric markets. Since its transition from the Gas Industry Standards Board (GISB) to NAESB in 2002, the organization has been actively developing standards intended to improve the efficiency and reliability of the interactions between the two markets. These endeavors have become more critical over the last twenty years as reliance on natural gas as a fuel source for electric generation has intensified and the interdependencies of the two markets have continued to grow. As part of its latest efforts, NAESB reconvened its Gas Electric Harmonization (GEH) Forum to address the July 29, 2022 request¹ of Richard Glick, Chairman of the FERC, and Jim Robb, President of the North American Electric Reliability Corporation (NERC), to establish a forum to address the activities described in Key Recommendation 7 of the FERC, NERC, and Regional Entity Staff Report on the February 2021 Cold Weather Outages in Texas and the South Central United States (November 2021 Report).² Specifically, Key Recommendation 7 purposed that the forum “identify concrete actions (consistent with forum participants’ jurisdiction) to improve the reliability of the natural gas infrastructure system necessary to support the Bulk Electric System.” Specific topic areas for consideration by the forum were provided through the November 2021 Report and were further defined by FERC and NERC staff at the onset of the effort; however, FERC and NERC staff encouraged the forum to explore other areas and actions that could be taken to achieve the goals articulated in the report.

This report describes the activities of the NAESB GEH Forum from August 30, 2022 to July 20, 2023 to respond to the request and provides twenty recommendations for action that the industry, the FERC, the National Association of Regulatory Utility Commissioners (NARUC), state public utility commissions, and/or applicable state authorities, and the U.S. Department of Energy (DoE) could take to address the recurring challenges stemming from natural gas-electric infrastructure interdependency. The virtual meetings held by the NAESB GEH Forum to develop the recommendations were open to the public and included the participation of seven-hundred and forty-one individuals representing more than three-hundred and seventy companies from all segments of the wholesale and retail natural gas and electric markets. Additionally, those that were unable to attend the virtual meetings, were given an opportunity to provide comments for consideration by GEH Forum participants through several open comment periods, which resulted in the submission of one-hundred and forty-five sets of comments from sixty-eight different entities.

As with all NAESB activities, a full and transparent record has been created that should aid the parties identified in the recommendations to initiate actions as they evaluate any next steps. Although a process was not established to define consensus positions of the GEH Forum, each recommendation included in this report was distributed for vote to the GEH Forum participants and all votes have been tallied utilizing the Balanced Voting Procedure developed under the NAESB American National Standards Institute (ANSI) accredited consensus-based process, which ensures that all interests are equally balanced across market sectors.³ Ideally, utilizing NAESB’s Balanced Voting Procedure will provide the reader with a deeper understanding of the various industry segments perspectives regarding the action proposed in each recommendation and illustrate the industry’s overall support or opposition to a particular recommendation, as represented through the GEH Forum.

The following twenty recommendations were formulated through an evaluation of the GEH Forum record, encompassing the written and oral comments that were offered during and between the fourteen meetings held by NAESB over the last eleven months. A summary of the record supporting each recommendation and the above described voting results of the GEH Forum participants can be found in Section V of this report.

Recommendation 1: The FERC should direct NAESB to revise its business practice standards related to the timely reporting of natural gas pipeline informational website posting data (such as operationally available capacity, total scheduled quantity, and any other data necessary to assist regional operators in maintaining system reliability) to

¹ July 29, 2022 - Joint FERC-NERC Letter to NAESB: https://naesb.org/pdf4/FERC_NERC_Letter_072922_to_NAESB.pdf

² November 16, 2021 - FERC, NERC, and Regional Entity Staff Report - The February 2021 Cold Weather Outages in Texas and the South Central United States: https://naesb.org/pdf4/ferc_nerc_regional_entity_staff_report_Feb2021_cold_weather_outages_111621.pdf

³ A description of the NAESB quadrants and segments and the NAESB balanced voting procedure can be found through the following hyperlink: https://www.naesb.org/pdf4/geh_balanced_voting_quadrant_segment_descriptions.doc



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enable the data and any subsequent amendments to become routinely accessible to Bulk Electric System operators as soon as such data are reported and available.

Recommendation 2: The FERC should take steps to facilitate the expansion of the Argonne National Laboratory NGInsight tool, with funding from a federal governmental agency, such as the Department of Energy, to improve situational awareness and communication between the natural gas pipeline system and Bulk Electric System operators. Access to and use of this tool should include appropriate security protocols and market protections.

Recommendation 3: The FERC should take steps to facilitate the expansion of the Argonne National Laboratory NGInsight tool, with funding from a federal governmental agency, such as the Department of Energy, to improve situational awareness and communication between owners and operators of natural gas production and processing facilities and Bulk Electric System operators. Such communication could include aggregated volume data or confirmed scheduled quantities for key upstream receipt points. Access to and use of the tool should include appropriate security protocols and market protections.

Recommendation 4: On May 3, 2023, a request for standards development was submitted to NAESB to consider modifications to the force majeure language of the NAESB Base Contract for Sale and Purchase of Natural Gas to, among other things, encourage weatherization actions. The NAESB Gas-Electric Harmonization (GEH) Forum endorses this evaluation and encourages the NAESB Wholesale Gas Quadrant to act with utmost expediency to address this request on a timely basis.

Recommendation 5: The FERC should direct the natural gas and electric industries to find ways to encourage more frequent use of capacity release or asset management arrangements (AMAs) and more timely release of unutilized interstate pipeline capacity that does not impact the reliability of the firm capacity holder. Further, the FERC should direct NAESB to revise its business practice standards to standardize the necessary transactional informational posting, timeliness and transparency requirements for these capacity releases.

Recommendation 6: The FERC should consider policy modifications necessary to better facilitate advanced agreements between end users and remove barriers to the release of capacity, similar to those adopted as part of FERC Order No. 712 (to support the use of asset management agreements).

Recommendation 7: State public utility commissions and applicable state authorities in states with competitive energy markets should engage with producers, marketers and intrastate pipelines to ensure that such parties' operations are fully functioning on a 24/7 basis in preparation for and during events in which extreme weather is forecasted to cause demand to rise sharply for both electricity and natural gas, including during weekends and holidays. (States could consider the approaches adopted in FERC regulations affecting the interstate pipelines.) In instances where state authorities lack enabling authority to take such actions, the FERC should adopt regulations to achieve identical outcomes within its authority.

Recommendation 8: The FERC should direct Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) or electric transmission owners/operators, where no ISO or RTO exists, to conduct and report to FERC the results of analyses of actions that better align the timelines of the Power Day and/or the day-ahead scheduling timelines with the gas day, including earlier notification of successful bids, to ensure that schedules are known and made available to allow natural gas-fired generators to procure natural gas and pipeline capacity in periods when the market is most liquid.

Recommendation 9: If not already under consideration through stakeholder processes, ISOs and RTOs or the FERC should conduct proceedings and adopt multiday unit commitment processes to better enable the industry to prepare for and provide reliable service during events in which weather is forecasted to cause demand to rise sharply for both electricity and natural gas.

Recommendation 10: State public utility commissions should encourage local distribution companies within their jurisdictions to structure incentives for the development of natural gas and electric demand-response programs in preparation for and during events in which demand is expected to rise sharply for both electricity and natural gas.

Recommendation 11: State public utility commissions should encourage local distribution companies within their jurisdictions to provide voluntary conservation public service announcements for residential, commercial and industrial customers in preparation for and during events in which demand is expected to rise sharply for both electricity and natural gas.



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Recommendation 12: Joint and cross-market, long-term planning should be expanded by relevant gas and electric market parties with an increased focus on fuel adequacy. FERC should encourage this planning coordination using its oversight roles for interstate pipelines, regulated RTO/ISO interstate transmission, and Electric Reliability Organization (ERO)-related Planning Authorities and collaborate with state public utility commissions and applicable state authorities.

Recommendation 13: The FERC, state public utility commissions, and applicable state authorities in states with competitive energy markets should consider whether market mechanisms are adequate to ensure that jurisdictional generators have the necessary arrangements for secure firm transportation and supply service and/or storage to avoid and/or mitigate natural gas supply shortfalls during extreme cold weather events, and if not, (a) determine whether non-market solutions are warranted, including funding mechanisms borne or shared by customers and (b) if warranted, adopt such non-market solutions.

Recommendation 14: Applicable state authorities should consider the adoption of legislation or regulations or other actions to create a secondary market for unutilized intrastate natural gas pipeline capacity, including a requirement for intrastate pipelines to offer some minimum level of firm service and/or support bilateral agreements between end users. In instances where state authorities lack enabling authority to take such actions, the FERC should adopt regulations to achieve identical outcomes within its authority.

Recommendation 15: Applicable state authorities should consider establishing informational posting requirements for intrastate natural gas pipelines to enhance transparency for intrastate natural gas market participants regarding operational capacity data, similar to the reporting and posting requirements mandated by the FERC for interstate natural gas pipelines as part of 18 CFR §284.13. In instances where state authorities lack enabling authority to take such actions, the FERC should adopt regulations to achieve identical outcomes within its authority.

Recommendation 16: Applicable state authorities should consider the development of weatherization guidelines appropriate for their region/jurisdiction to support the protection and continued operation of natural gas production and processing and gathering system facilities during extreme weather events, and require public disclosure concerning weatherization efforts of jurisdictional entities.

Recommendation 17: Many generalized recommendations for resource adequacy and accreditation and market reforms to bolster reliability were offered throughout the NAESB GEH Forum activities; we understand, however, based upon information provided by representatives from the ISO and RTO segment, that steps are being taken within the organized markets to consider such reforms through their stakeholder processes. The GEH Forum endorses this evaluation of resource adequacy and accreditation requirements by all ISOs and RTOs and encourages the review of the Forum record.

Recommendation 18: FERC and NARUC should collaborate to conduct, fund, and/or direct efforts to study whether market-incentivized investments in strategic natural gas storage facilities are sufficient to address natural gas supply shortfalls during extreme cold weather events, and if the level of investment is sufficient to preserve such facilities for use during extreme cold weather events. The study should also explore whether public sources of funding are needed for investment to secure sufficient storage.

Recommendation 19: FERC and NARUC should collaborate to conduct, fund, and/or direct efforts to study whether additional financial incentives for the natural gas infrastructure system, including infrastructure to provide additional firm transportation capacity, would help to address natural gas supply shortfalls during such events, and further support the Bulk Electric System's performance during extreme cold weather events.

Recommendation 20: The U.S. Department of Energy or FERC should conduct, fund, and/or direct efforts to study, by region, whether there is adequate natural gas infrastructure in place to support new gas usage patterns affected by flexible gas generation resource requirements as the latter resources are increasingly called upon for more frequent and/or steeper ramping to balance the increased use of variable energy resources. This study should be conducted in conjunction with an industry advisory group made up of diverse interests to ensure broad engagement and support for study results that are credible and unbiased. Currently, there are no comprehensive regional assessments that examine whether regions have sufficient natural gas infrastructure to support new usage patterns of gas generators, yet this information is essential for policymakers to have so that they can make informed policy decisions and take steps to avoid any potential reliability and resilience risks that accompany the transition to a lower emissions energy future.