North American Energy Standards Board

Digital Committee Inaugural Report

*Presented to the NAESB Board of Directors on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

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1. **Executive Summary**

*This section will include a summary of how we started, our recommendations to the board, concerns and possible next directions for the committee.*

1. **Background and Creation of the Committee**

*This section will include how and why we started, the board meetings in which the decisions were made and the charge given to the committee and how we were assembled. This section should address:*

* *High level description of efforts of other groups that have undertaken similar efforts and how those efforts could be applicable to us*
* *Note that the committee will not recommend actions that would duplicate other efforts, and that recommendations for board consideration possibly leading to action by NAESB are only offered if they are perceived as having a high degree of success and could provide long term benefits.*
1. **Process Followed by the Committee**

*This section will include: (a) how the committee makes decisions, (b) how we vote, (c) how we include non-committee members and non-NAESB members, (d) how we support transparency, and (e)how we report any recommendations to the board. It would also include a description of the delineation between the board and executive committees regarding standards development. We could also note how we work as compared to other board committees and other NAESB groups. We should also note how we communicate externally and who can act as our spokespersons.*

1. **Goals of the Digital Committee**

*This section will include our committee goals and will lean heavily on the work products of other organizations that have digital groups, but with our emphasis on energy markets. Some notes that could be included in this section are:*

* *to inform the board of industry activities pertaining to the application of digitalization methods, tools and techniques that would support the development of business practices*
* *to provide analysis and recommendations for board consideration on a periodic basis*
* *to respond to board requests regarding digital efforts*
1. **Areas of Investigation**

*This section would identify and describe areas that we reviewed. If there are areas that are self-evident to the scope of a digital committee that we did not review, then we should say why we did not review those areas. If there are areas that are premature for our review now, but may be pertinent later, we should describe those.*

***Introduction***

* *Describe “Digitalization”: Digital technologies and advanced analytics will drive better performance, increase productivity and support better strategic decision making. From Blockchain to smart drilling to cloud computing to AI, these digital technologies will transform the energy industry. For these reasons, NAESB has initiated…*
* *Describe the benefits on a global scale and specific to the energy industry as provided in other reports concerning “digitalization”*
* *Describe current investment areas and estimates on a global scale and specific to the energy industry as provided in other reports concerning “digitalization”*

***Areas of Evaluation***

* *Provide a high-level description of the 10 areas identified by the Committee and included in the report.*
	+ *Distributed ledger technology (some standards efforts already underway at NAESB)*
	+ *Cybersecurity – very broad and pervasive throughout all areas*
	+ *Cloud computing –hosting, data processing, data transit and data storage requirements*
	+ *5G Technologies and Implementation*
	+ *Energy Usage Data – how it is managed, provided and the privacy issues that are necessarily to be addressed*
	+ *Data Governance Requirements – Everything may be in this grouping*
	+ *Distributed Energy Resources – focused on communication protocols*
	+ *Renewable energy certificate/credit tracking and related data.*
	+ *Internet of Things - needs boundaries – very broad*
	+ *Data analytics*
* *Explain how each is area is to be viewed through the lens of digitalization.*
* *Describe the methodology for evaluation*
	+ 1. *Energy Use Case / Business Case*
		2. *Benefits to the Energy Markets*
		3. *Issues & Concerns*
		4. *Existing Standards and Efforts*
		5. *Recommendation – Relevancy and Urgency*

***Categorization / Relationship of Areas***

* *Describe relationship between the 10 areas identified by the Committee*
	+ *Areas Enabled by Digitalization or Digital Technology*
		- *These technology areas are a benefit of OR an integral part of the digitalization process. They may be broad and impact many markets but need to be shaped to suit our specific energy market needs*
	+ *Areas Impacted by Digitalization*
		- *These are market functions that define our energy transactions and could benefit from digitalization or are already digitalized*
	+ *Areas that Impact Digitalization*
		- *These areas are broad and impact many markets but need to be shaped to suit our specific energy market needs*
* *Describe the Relevancy of the Area to NAESB Activities and the Urgency of Standards Development*

*Relevancy to NAESB Activities*

* + *1 – Not relevant to the processes/transactions that NAESB standards currently address or may address in the future.*
	+ *2 – Relevant to processes/transactions that NAESB standards may address in the future*
	+ *3 –* *Relevant to processes/transactions that NAESB standards currently address*

*Urgency of Standards Development*

* + *1 – Standards to support the area are not needed for the energy industry*
	+ *2 – Standards currently exist that adequately address the area for the energy industry*
	+ *3 – Standards in the area would be helpful and are currently emerging for the energy industry*
	+ *4 – Standards in the area would be helpful and are not currently emerging for the energy industry*

***Evaluation***

* *Areas Enabled by Digitalization or Digital Technology*
	1. *Distributed Ledger Technology - Responses concerning the definition of Distributed Ledger Technology were varied, and it was noted by one respondent that a universal definition concerning the technology does not exist, but the central theme regarding the technologies attributes - a common database shared across distributed networks – was included in most responses.*
		+ *Energy Use Case / Business Case - A larger number of potential use cases for the technology were provided by the respondents. These included energy trading and settlement, carbon and renewable energy credit accounting, distributed energy resource management, retail market settlements and basically any transaction requiring a permissioned network.*
		+ *Benefits to the Energy Markets - Similar benefits were identified in the responses: security, efficiency, transparency, cost and speed. Respondents also noted that the technology could reduce transaction errors and eliminate a single point of failure for transactive processes.*
		+ *Issues & Concerns - In addition to listing security as a benefit of the technology, several respondents noted it as a concern; specifically, related to confidentiality. Additionally, the* *lack of standards, regulations and legal certainty related to the technology were listed as concerns, which are all attributes of an emerging or immature technology.*
		+ *Existing Standards and Efforts -* *Based upon the responses, many standards development activities related to distributed ledger technology are underway. Specifically, efforts by EEA, Linux, NIST, IEEE, ANSI, ISO, W3C, IRTF, ITU, EPRI, EWF and OASIS were noted by the respondents.*
		+ *Recommendation – Relevancy and Urgency*
	2. *Internet of Things - Definitions provided by respondents were varied, but centered around communication and connection.*
		+ *Energy Use Case / Business Case – Most of the use cases provided by respondents were generalized and cited maintenance and operations/situational awareness. One specific use case provided was monitoring and sensing for distributed energy resources.*
		+ *Benefits to the Energy Markets – The benefits described by the respondents were largely similar and included asset optimization, better decision making resulting from enhanced situational awareness, cost savings and efficiency.*
		+ *Issues & Concerns – Similar to the responses provided regarding distributed ledger technology, a lack of standards, regulations and legal certainty were identified, but all respondents identified concerns about the security of the technology. This was one of the most uniform responses received in the entire survey.*
		+ *Existing Standards and Efforts – Again, similar to distributed ledger technology, may standards development activities are underway. Identified activities included NIST, NREL, DHS, FERC, NERC, IETF, IEEE, ISO/IEC, IoTC, IIC, OCF and 3GPP.*
		+ *Recommendation – Relevancy and Urgency*
	3. *Data Analytics [Improved] – Several definitions for data analytics as applied to digital technology were provided - The ability to manage, selectively process and visualize actionable data using new tools and technology that facilitate faster decisions, transactions and visibility in support of descriptive and predictive reporting.*
		+ *Energy Use Case / Business Case – Respondents noted that many use cases for improved data analytics created by digitalization have been identified within their companies and are underway. Specific use cases submitted by respondents included pipeline flow dynamics, time/price trading strategies, and natural gas storage optimization. Additionally, it was noted that the security, storage and movement of data used for analytics create ancillary use cases.*
		+ *Benefits to the Energy Markets – Respondents stated that improved data analytics would support asset optimization, improved trade performance, efficiency, predictability and modeling*
		+ *Issues & Concerns – Concerns included data storage and usage costs and a lack of expertise or resources to undertake the advanced modeling provided by the increase in available data*
		+ *Existing Standards and Efforts – No standards efforts were identified, but DHS undertook multiple studies into best practices*
		+ *Recommendation – Relevancy and Urgency*
* *Areas Impacted by Digitalization*
1. *Renewable Energy Certificate Tracking/Accounting – Reliance on purely digital systems to produce, store, track and transmit RECs in a secure fashion.*
	* + *Energy Use Case / Business Case – Specific use cases identified by respondents included data integrity, storage and handling to support efficiency, transparency and auditing.*
		+ *Benefits to the Energy Markets – It was noted that digital tracking/ accounting would to support efficiency, transparency and auditing. It was also noted that it would better enable renewable DER as it evolves.*
		+ *Issues & Concerns – Respondents noted concerns with the costs and the potential unknowns with immature technology.*
		+ *Existing Standards and Efforts – No standards activities were identified, but a study by NREL was identified.*
		+ *Recommendation – Relevancy and Urgency*
2. *Distributed Energy Resource Communication Protocols*
	* + *Energy Use Case / Business Case – A main business use case to control DER systems as needed to support grid reliability and safety was identified, but it was also noted that uses cases for tracking, managing and reporting performance exist.*
		+ *Benefits to the Energy Markets – The benefits identified by respondents were precise command and control and situational awareness for grid operations and reliability. Also, a standardized and consistent communication protocol across the distribution grid would beneficial in areas such as the TVA footprint.*
		+ *Issues & Concerns – None were submitted*
		+ *Existing Standards and Efforts – Two specific protocols were identified by respondents - IEEE 1547-2018 and IEEE 2030.5. Also, California PUC Resolution E-5000 – July 11, 2019 was noted.*
		+ *Recommendation – Relevancy and Urgency*
* *Areas that Impact Digitalization*
1. *Cybersecurity*
	* + *Energy Use Case / Business Case – Generalized responses were provided concerning data communications; however, it was noted that a verification process of software objects prior to installation would be beneficial*
		+ *Benefits to the Energy Markets*
		+ *Issues & Concerns – All respondents identified the costs associated with the cybersecurity of digital technologies as a primary concern.*
		+ *Existing Standards and Efforts – No specific efforts were identified, but activities by NIST and standards by IEEE were noted.*
		+ *Recommendation – Relevancy and Urgency*
2. *Data Governance*
	* + *Energy Use Case / Business Case – Generalized use cases to support data searching, quality management and protection of propriety data were identified by the respondents.*
		+ *Benefits to the Energy Markets*
		+ *Issues & Concerns – Respondents identified costs of data governance as a concern and noted that significant exposures to risk exist if inappropriate governance policies are adopted.*
		+ *Existing Standards and Efforts – Guidelines provided by NIST and FIPS were identified by the respondents.*
		+ *Recommendation – Relevancy and Urgency*
3. *Cloud Computing*
	* + *Energy Use Case / Business Case – It was noted by the respondents that the use case for cloud computing may be the implementation of distributed ledger technology and IoT technology.*
		+ *Benefits to the Energy Markets*
		+ *Issues & Concerns – Issues concerning the capital costs and service costs were identified by the respondents, in addition to security and reliability.*
		+ *Existing Standards and Efforts – It was noted by a respondent that standards efforts around machine learning and artificial intelligence may impact aspects of cloud computing.*
		+ *Recommendation – Relevancy and Urgency*
4. *Energy Usage Data Management/Communication*
	* + *Energy Use Case / Business Case – Generalized use cases including energy resource planning, retail energy usage/offerings and energy conservation were submitted. Also, it was noted that the assignment of a value/criticality of specific data being stored or transmitted could help support protection and handling of that specific data.*
		+ *Benefits to the Energy Markets – Benefits identified by respondents were reduced energy costs, conservation, more accurate and faster decision-making capabilities and more profitable energy purchasing/trading.*
		+ *Issues & Concerns – Respondents noted that jurisdictions define energy usage data and its ownership differently.*
		+ *Existing Standards and Efforts – Other than the Green Button, no other standards efforts were identified.*
		+ *Recommendation – Relevancy and Urgency*
5. *5G Implementation*
	* + *Energy Use Case / Business Case – Specific use cases related to the technology were not identified by the respondents, but questions regarding how it would be implemented were noted. Specifically, questions about the backup requirements, data privacy protections and carrier requirements regarding stability were noted.*
		+ *Benefits to the Energy Markets – The obvious benefit identified by the respondents was speed and resulting benefits.*
		+ *Issues & Concerns – The issues identified by the respondents were range, reliability, availability and stability.*
		+ *Existing Standards and Efforts – No standards efforts were identified – only a review by the Senate Judiciary Committee.*
		+ *Recommendation – Relevancy and Urgency*

***Matrix***

 ***Relevance***

***Urgency***

***Considerations of Tools, Services or Certification***

* *Vendor certifications (vendor due diligence) as much of the energy industry may be relying on outside services and software applications.*
* *Strong take away – will need some way to secure access to third party software and services, to avoid introduction of risks.*
1. **Possible Action for Board Consideration**

*Based on the results of reviews and investigations of the areas above, if there are any areas that make sense for standards development, we should so explain and include examples of how those standards development activities would being value to the energy markets within NAESB’s scope. For recommendations that may lead to standards development, we could provide the following information for board consideration:*

* *Markets impacted*
* *Existing business practices impacted*
* *Expected benefits*
* *Possible integration issues*
* *Possible urgency*
1. **Concerns and Limitations**

*As the reviews in Section V are completed and the goals are identified and described in Section IV, discussions will highlight concerns and limitations. They should be noted here. A clear limitation is that we not run outside of our scope as an organization, and a concern would be that any recommendation formulated for board consideration has the expectation that we would have a high degree of confidence that standards could be developed and that those standards would be beneficial to the industry.*

*Conversely, we are aware that standards, tools or methods that apply to the energy industry should be defined by the energy industry.*

*Some notes are:*

* + *For concerns, make sure that we recommend items that have a high degree of success, don’t choose winners and losers on technologies, don’t box in future innovations, ensure though that companies are provided with the assurances of safety of the data, expectations of performance. Keep in mind reality – risk/benefit.*
* *Don’t duplicate other efforts, but if an existing standardization effort focuses on business practices for the energy industry and particularly if the standards require coordination with or consistency with our standards, pursue partnerships*
* *Don’t recommend directions that have short lived benefits.*
* *Consider including lessons learned from other industries developing and applying digital standards that could be relevant to the energy markets specific to standards development.*
1. **Conclusion & Next Steps**

*This section would be a formulation of the recommendations, with justifications for action or inaction, and proposals or alternatives for next steps.*

**Appendices A. References**

*Listing of sources used and hyperlinks to documents*

 **B. List of Committee Members and Participants**

*Listing of committee members and participants with their organizations.*

 **C. List of Meetings**

*Listing of meetings and conference calls, with brief synopsis of meeting, and links to agendas, work papers and minutes.*

 **D. Comments and Contributions from Committee Members**

*Comments of and work papers created by committee members and submitted for inclusion in the report.*

 **E. Comments and Contributions from Participants**

*Comments of and work papers created by committee members and submitted for inclusion in the report.*

 **F. Applicable Analogies and Examples**

*Brief descriptions of efforts that could be applicable to NAESB, and from which we may benefit from their “lessons learned.”*