Rapport de la firme Guidehouse
FERC Standards of Conduct

FERC Standards of Conduct

Prepared for:

Hydro Québec.

Submitted by:

Craig Sabine, Director
Paul Moran, Associate Director
Laura Manz, Director

Guidehouse Inc.
First Canadian Place,
100 King St W Suite 4950, Toronto, ON M5X 1B1, Canada
Telephone +1 416-777-2440

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1. Executive Summary

Guidehouse Canada Ltd. (Guidehouse)[1] was retained by Hydro-Québec to review the currently proposed and documented Standards of Conduct (SoC) and the organizational design of Hydro-Québec. The review is meant to understand the current state of the SoC, its procedural intent and system of controls and determine its alignment with the regulatory requirements of FERC Order 717.

Guidehouse's approach consisted of an examination of the newly developed transmission provider Standards of Conduct (SoC) that Hydro-Québec has prepared to determine if the principles identified in FERC Order 717 are addressed in a consistent and comprehensive manner. This approach validated that the provisions in Order 717 that address the requirement to offer fair and equitable treatment of all transmission customers are considered and included in the Hydro Québec proposed SoC. FERC's Standards of Conduct for Transmission Providers cover three key areas:

1) Independent performance of the transmission function from the marketing function so employees operate independently of each other

2) No-conduit with prohibitions related to passing non-public transmission function information to employees within marketing functions

3) Transparency requirements for equal disclosure of non-public transmission function information, such as through an Open Access Sametime Information System (OASIS) that does not unduly preference any market participant.

Together these standards support the provision of equal and open access to the transmission grid. The assessment and peer review carried out by Guidehouse found that HQT's overall proposed SoC aligns well with the principles and intent of FERC order 717 and that evidence demonstrates that the organizational SoC and procedures are consistent with comparable utility standard practices.

Guidehouse examined the SoC of a peer set of transmission providers across Canada and the U.S., consisting of non-FERC regulated utilities that have opted-in to acknowledge FERC Order 717, but are not FERC regulated. The Canadian peer set includes New Brunswick Power, Nova Scotia Power, Manitoba Hydro, SaskPower and BC Hydro, which represent the utilities in Canadian provinces with wholesale-only markets and that have adopted FERC Order 717. In the U.S., the peer set includes Bonneville Power Authority and the Tennessee Valley Authority, who are also non-FERC regulated. This peer set is analogous to Hydro Québec, which is also non-FERC regulated. It is our finding that the proposed SoC of Hydro Quebec is consistent, in

[1] Guidehouse was formerly Navigant Consulting Ltd.

all material respects, with the SoC of the peer set, from the perspective of organization and content.

Guidehouse conducted an examination of the approaches to compliance with FERC Order 717 of the peer set with an emphasis on a set of key disclosures mandated by the FERC, specifically, the designation of a chief compliance officer, disclosure of marketing affiliates and disclosure of transmission function and marketing function employees. Guidehouse observes that the approach of Hydro Québec to these disclosures is generally aligned with common industry practices as observed in the peer set.

2. Scope of Engagement

Guidehouse was engaged by Hydro-Québec to address the following undertakings:

1. Conduct a Current State Review: Document Guidehouse's review of HQ's proposed SoC and organizational design to understand the status of the SoC, its procedural intent and system of controls.
2. Provide expert opinion of Hydro-Québec's proposed SoC and consistency with FERC pro-forma (CFR-2011 – Title 18 – Vol. 1 – Part 358)
3. Conduct a Benchmarking Analysis and Comparative Analysis describing the approaches of how peer utilities such as TVA, Bonneville Power and BC Hydro, in the United States and Canada fulfill SoC obligations and align to the intent and principle of FERC Order 717.

3. Review of HQT Proposed Standards of Conduct

3.1 Background

Hydro Québec will be proposing new Transmission Standards of Conduct and has requested for the replacement of the following documents:

- Transmission Provider Code of Conduct
- Transmission Reliability Coordinator Code of Conduct

The Standards of Conduct for Transmission Providers include three primary rules

1. The "independent functioning rule," which requires transmission function and marketing function employees to operate independently of each other.
2. The "no-conduit rule," which prohibits passing non-public transmission function information to marketing function employees.
3. The "transparency rule," which imposes posting requirements to help detect any instances of undue preference due to the improper disclosure of non-public transmission function information.

3.2 Guidehouse Review of Hydro Québec Proposed Standards of Conduct

In this section, Guidehouse provides its opinion of the consistency of the proposed Hydro Québec Standards of Conduct to the FERC 717 Standards of Conduct as codified in Title 18 Part 358 of the U.S. Code of Federal Regulations (CFR)[2].

Guidehouse observes that there are three key questions to be addressed as part of the review of an electric utility's Transmission Standards of Conduct. These questions are:

1. What is the level of alignment with the content and format of the proposed Standards of Conduct in comparison to the FERC 717 Principles?
2. Is the document organized in such way that there is a clear relationship between the FERC 717 Principles and the sections of the proposed Standards of Conduct?
3. Are the proposed Standards of Conduct comprehensive and inclusive of the central principles embodied in FERC 717 and do they address each component of FERC 717 in a thorough manner?

[2] FERC Order 717 as codified in Title 18 Part 358 of the U.S. Code of Federal Regulations (CFR).

To conduct this review and address these questions, Guidehouse performed the following activities:

1. Conducted a review of the overall alignment and organization of the proposed Hydro Québec Standards of Conduct the Guidehouse
2. Conducted a comparison of the provisions in the Hydro Québec proposed Standards of Conduct to the specific requirements of FERC 717 as codified in Title 18 Part 358 of the U.S. Code of Federal Regulations (CFR).

Overall Alignment and Organization

To conduct the review of the overall alignment and organization of the proposed SoC, Guidehouse examined the structure of the document, including the Table of Contents, to assess how well aligned organization of the document is to the Federal code and evaluate the level of clarity and accessibility.

Guidehouse observes that the FERC 717 Principles, as codified in Title 18 Part 358 of the U.S. Code of Regulations, contains 8 chapters as shown below in Table 3-1.

Table 3-1: Comparison of U.S. Federal Code Title 18 Part 358 with HQT Proposed SoC

U.S. Federal Code Title 18 Part 358	Hydro Québec Table of Contents
§ 358.1 Applicability.	**Chapter 1 – Definitions**
§ 358.2 General principles.	**Chapter 2 – General principles**
§ 358.3 Definitions.	
§ 358.4 Non-discrimination requirements.	**Chapter 3 – Non-discrimination requirements**
§ 358.5 Independent functioning rule	**Chapter 4 – Independent functioning rule**
§ 358.6 No conduit rule	**Chapter 5 – No conduit rule**
§ 358.7 Transparency rule	**Chapter 6 – Transparency rule**
	Chapter 7 – Reliability Coordinator appointed by the Régie
.	**Chapter 8 – Financial information**
§ 358.8 Implementation requirements	**Chapter 9 – Implementation and specifics**

Guidehouse observes that Title 18 Part 358 of the U.S. Federal Code contains eight chapters and that these chapters are well aligned with the Table of Contents in the proposed Hydro

Québec SoC. In addition, due to Hydro Québec's role as Reliability Coordinator in the Province of Québec, Chapter 7 in the proposed SoC of Hydro Québec describes the governance of activities of any HQT personnel under the authority of the Reliability Coordinator appointed by the Régie and the applicability of FERC Order 717 to these personnel. Guidehouse observes that it is appropriate to designate employees performing reliability coordinator functions as transmission function employees. This is described further in Chapter 6: Role of the Reliability Coordinator and Relationship with FERC Standards of Conduct.

Comparison of Key Provisions for Content and Comprehensive

To conduct a comparison of the key provisions in FERC Order 717 to the proposed Standards of Conduct, Guidehouse carried out a thorough, line by line, evaluation to identify the level of consistency of the FERC provisions with the proposed Standards of Conduct. This evaluation is summarized in Table 3-2 below.

Table 3-2 Comparison of HQT Proposed Standards of Conduct with FERC Order 717

FERC Code	HQ Proposed SoC	Guidehouse Observations
18 CFR § 358.1 – Applicability This part applies to any public utility that owns, operates, or controls facilities used for the transmission of electric energy in interstate commerce and conducts transmission transactions with an affiliate that engages in marketing functions.	These Standards of Conduct apply to the Corporation, that owns, operates or controls facilities used for the transmission of electric energy in commerce with other provinces or the United States and conducts transmission transactions with an affiliate that engages in wholesale marketing functions.	HQT SoC appropriately addresses the key provisions of 18 CFR § 358.1 **High Consistency**

FERC Code	HQ Proposed SoC	Guidehouse Observations
18 CFR § 358.4 - Non-discrimination requirements As more fully described and implemented in subsequent sections of this part, a transmission provider must treat all transmission customers, affiliated and non-affiliated, on a not unduly discriminatory basis, and must not make or grant any undue preference or advantage to any person or subject any person to any undue prejudice or disadvantage with respect to any transportation of natural gas or transmission of electric energy in interstate commerce, or with respect to the wholesale sale of natural gas or of electric energy in interstate commerce.	In accordance with the following sections, the Transmission Provider must treat all transmission customers, affiliated and non-affiliated, on a not unduly discriminatory basis, and must not grant any undue preference or advantage to any person with respect to electric energy transmission services.	HQT SoC appropriately addresses the key provisions of 18 CFR § 358.4 **High Consistency**
18 CFR § 358.5 - Independent functioning rule As more fully described and implemented in subsequent sections of this part, a transmission provider's transmission function employees must function independently from its marketing function employees, except as permitted in this part or otherwise permitted by Commission order.	In accordance with the following sections, transmission function employees must function independently from wholesale marketing function employees, except as permitted in these Standards or subject to an authorization granted by a decision of the Régie de l'énergie.	HQT SoC appropriately addresses the key provisions of 18 CFR § 358.5 **High Consistency**

FERC Code	HQ Proposed SoC	Guidehouse Observations
18 CFR § 358.6 - No conduit rule As more fully described and implemented in subsequent sections of this part, a transmission provider and its employees, contractors, consultants, and agents are prohibited from disclosing, or using a conduit to disclose, non-public transmission function information to the transmission provider's marketing function employees.	In accordance with the following sections, the Transmission Provider and its employees or any agent are prohibited from disclosing, or using a conduit to disclose, non-public transmission function information to wholesale marketing function employees.	HQT SoC appropriately addresses the key provisions of 18 CFR § 358.6 **High Consistency**
18 CFR § 358.7 - Transparency rule As more fully described and implemented in subsequent sections of this part, a transmission provider must provide equal access to non-public transmission function information disclosed to marketing function employees to all its transmission customers, affiliated and non-affiliated, except as permitted in this part or otherwise permitted by Commission order.	In accordance with the following sections, the Transmission Provider must provide equal access to all non-public transmission function information disclosed to wholesale marketing function employees to all its transmission customers, affiliated and non-affiliated, except in cases permitted by these Standards and subject to other authorizations granted by the Régie de l'énergie.	HQT SoC appropriately addresses the key provisions of 18 CFR § 358.7 **High Consistency**

Guidehouse observes that the proposed Standards of Conduct are highly consistent with FERC Order 717. Each of the FERC 717 principles is addressed appropriately and in a comprehensive fashion.

4. Review of Approaches of How Peer Utilities Fulfill SoC Obligations and Align to the Intent and Principles of the FERC Order

In addition to reviewing the proposed Standards of Conduct and conducting a comparison in relation to FERC 717, Guidehouse also conducted a peer review benchmarking evaluation in order to understand how other utilities approach the obligations of FERC 717 and demonstrate their intent to fulfill the principles of FERC 717. Guidehouse selected a set of Canadian and U.S. electric transmission providers who are not FERC-regulated, but opt-in to the abide by the FERC Standards of Conduct. This peer set is analogous to Hydro Québec, which is also non-FERC regulated.

The peer set includes the following utilities

1. New Brunswick Power
2. BC Hydro
3. Manitoba Power
4. SaskPower
5. Nova Scotia Power
6. Bonneville Power Authority (BPA)
7. Tennessee Valley Authority (TVA)

In this section, Guidehouse provides an analysis of the standards of conduct of Canadian utilities and their alignment with FERC Order 717. Additionally, key elements are identified in the benchmarking study, such as background facts, reasons for switching and any other information to help understand the landscape surrounding the respective Standards of Conduct.

4.1.1 New Brunswick Power

New Brunswick's Electricity Act (the "Act") which was proclaimed on October 1, 201, established the amalgamation of the New Brunswick System Operator (NBSO) with New Brunswick Power Corporation ("NB Power"). The government stated that the amalgamation would lead to establishing a separation of functions and compliant Standards of Conduct which would allow

an integrated company to meet both NERC and FERC requirements.[3]

The Act also requires NB Power to adopt a Standard of Conduct compliance program, and to apply to the Energy and Utilities Board for approval of same. The intent of NB Power is to implement Standards of Conduct ("SoC") governing itself and its affiliate (New Brunswick Energy Marketing Corporation, referred to as "Energy Marketing") which substantially conform to those required by the U.S. Federal Energy Regulatory Commission ("FERC"). The ultimate purpose of the SoC is to satisfy FERC requirements in order to preserve access to FERC jurisdictional transmission systems, and to preserve the Market Based Rate Authorization ("MBRA") issued by FERC and held by Energy Marketing.[4]

These written procedures implement the SoC and apply to interactions and communications between transmission function employees, marketing function employees, or any other employees likely to become privy to transmission function information in performing their roles and responsibilities. Accordingly, this document will be distributed to these employees and any new employees that fall within these categories and posted on the Internet website. Table 4-1 below shows a summary of the regulatory context and marketing affiliate information for NB Power.

Table 4-1 NB Power Regulatory Context and Marketing Affiliate Information

Code of Conduct	Marketing Affiliate	Regulatory Authority	Chief Compliance Officer for SoC
Based on FERC Order No. 717 since 2013	New Brunswick Energy Marketing Corporation	New Brunswick Energy and Utilities Board	Chief Financial Officer & Senior Vice President Corporate Services New Brunswick Power Corporation

4.1.2 BC Hydro

In 2010, (in accordance with the Clean Energy Act[5]) BC Hydro became the operator of the transmission system and responsible for the administration of the Open Access Transmission Tariff (OATT). The OATT requires that BC Hydro follow British Columbia Utilities Commission

[3] Énergie NB Power. *Transmission & System Operator*.

[4] Énergie NB Power. *Standards of Conduct*.

[5] Sections 21 to 33 of the Clean Energy Act.

(BCUC) polices and the Federal Energy Regulatory Commission's (FERC) reciprocal access standards in operating the transmission system (Standards of Conduct or SoC). New SoC were approved by the BCUC and became effective on July 5, 2010.

The new SoC refocus the rules on the areas in which there is the greatest potential for abuse and eliminate barriers to the free flow of information that does not have material potential for abuse. These written procedures implement the SoC and apply to interactions and communications between transmission function employees, marketing function employees, or any other employees likely to become privy to transmission function information in performing their roles and responsibilities.[6]

The SoC document is distributed to these employees and any new employees that fall within these categories and posted on the Internet website. Table 4-2 below shows a summary of the regulatory context and marketing affiliate information for BC Hydro.

Table 4-2 BC Hydro Regulatory Context and Marketing Affiliate Information

Code of Conduct	Marketing Affiliate	Regulatory Authority	Chief Compliance Officer for SoC
Based on FERC Order No. 717 since 2010	Powerex Corp	British Columbia Utilities Commission (BCUC)	Executive Vice President, People, Customer & Corporate Affairs

4.1.3 Manitoba Hydro

In 2010 and 2014, Manitoba Hydro issued revisions of its Standards of Conduct for Providing Open Access Transmission and Interconnection Service (Standards of Conduct) to coordinate with Order 717[7]. The general principles of the Standards of Conduct require that Manitoba Hydro's employees engaged in transmission system operations, function independently from employee's engaged in marketing and sales, and that Manitoba Hydro treat all transmission customers on a non-discriminatory basis. The Standards of Conduct also require that Manitoba Hydro post on its Open Access Same-time Information System (OASIS) or its Internet Website, current written procedures for implementing the Standards of Conduct in such detail as will enable customers to determine that Manitoba Hydro is in compliance with the requirements of

[6] BC Hydro. Standards of Conduct (Transmission).

[7] Manitoba Hydro Standards of Conduct

the Standards of Conduct. These Standards of Conduct for Providing Open Access Transmission and Interconnection Service Implementation Procedures (Implementation Procedures) are intended to identify the key processes and procedures necessary to maximize the likelihood of compliance with the Standards of Conduct, as well as, to allow Manitoba Hydro to manage compliance risk. Table 4-3 below shows a summary of the regulatory context and marketing affiliate information for Manitoba Hydro.[8]

Table 4-3 MB Hydro Regulatory Context and Marketing Affiliate Information

Code of Conduct	Marketing Affiliate	Regulatory Authority	Chief Compliance Officer for SoC
Based on FERC Order No. 717 since 2010 and 2014	Manitoba Hydro Wholesale Power Marketing	Public Utilities Board	Manitoba Hydro General Counsel & Corporate Secretary.

4.1.4 SaskPower

SaskPower renewed their Standards of Conduct (SoC) Policy in 2013. The Standards of Conduct Policy ensures that all Transmission Customers, affiliated and non-affiliated, are treated on a non-discriminatory basis and that SaskPower cannot operate its Transmission System to preferentially benefit its Marketing Function Employees or any non-affiliated Transmission Customers. The Standards of Conduct Policy also ensures that Transmission Function Employees function independently from SaskPower's Marketing Function Employees.[9] Table 4-4 below shows a summary of the regulatory context and marketing affiliate information for SaskPower.

Table 4-4 SaskPower Regulatory Context and Marketing Affiliate Information

Code of Conduct	Marketing Affiliate	Regulatory Authority	Chief Compliance Officer for SoC
Based on FERC Order No. 717 since 2013	North Point Energy Solutions	Saskatchewan Rate Review Panel	Vice-President Supply Chain

[8] Manitoba Hydro. *OE Docket No. EA-281-C.*

[9] SaskPower. *Standards of Conduct*.

4.1.5 Nova Scotia Power

The Standards of Conduct are applicable to Nova Scotia Power and its employees and the employees of its Affiliates. The Standards of Conduct Order[10]. govern Nova Scotia Power's relationships with its transmission customers and potential customers, including employees of Nova Scotia Power and its Affiliates. Table 4-5 below shows the regulatory context and marketing affiliate information for Nova Scotia Power.

Table 4-5 Nova Scotia Power Regulatory Context and Marketing Affiliate Information

Code of Conduct	Marketing Affiliate	Regulatory Authority	Chief Compliance Officer for SoC
Based on FERC Order since 2004	Nova Scotia Power Fuels, Energy and Risk Management	Nova Scotia Utility and Review Board (UARB)	Chief Compliance Officer

4.1.6 Bonneville Power Authority

FERC Standards of Conduct (Order 717) require transmission providers to provide non-discriminatory, and not unduly preferential access to transmission service or transmission system information to all of its transmission customers, and without preference to its own affiliated Marketing Function Employees (MFEs).[11]

To ensure open and fair transmission markets so that customers have equal access to transmission, the SoC includes three basic principles:

- The Independent Functioning Rule requires Transmission Function Employees and Marketing Function Employees to operate independently of each other.
- The No Conduit Rule prohibits the passing of SoC restricted transmission information to Marketing Function Employees.
- The Transparency Rule imposes posting requirements to help detect any instances of undue preference.

[10] NS Power. *Standards of Conduct*.

[11] BPA. *Standards of Conduct.* .

Table 4-6 Bonneville Power Regulatory Context and Marketing Affiliate Information

Code of Conduct	Marketing Affiliate	Regulatory Authority	Chief Compliance Officer for SoC
Based on FERC Order 717	Power Services	Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC), Western Electricity Coordinating Council (WECC)	Chief Compliance Officer Agency Compliance & Governance

4.1.7 Tennessee Valley Authority (TVA)

TVA is not a public utility under Section 201(e) of the Federal Power Act and, thus, is not directly subject to the requirements of Federal Energy Regulatory Commission (FERC) Orders No. 888, 889, 2004, 717, and other FERC orders related to the Standards of Conduct. TVA has elected, however, to comply voluntarily with these FERC orders and the associated regulations, to the extent they are consistent with TVA's responsibilities under the TVA Act and other applicable law[12].

Table 4-7 TVA Regulatory Context and Marketing Affiliate Information

Code of Conduct	Marketing Affiliate	Regulatory Authority	Chief Compliance Officer for SoC
Based on FERC Order 717	TVA Marketing and Sale Unit (integrated division)	Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC),	Chief Compliance Officer

[12] TVA. *Standards of Conduct*.

4.2 Comparative Summary

In addition to conducting a review of the Hydro Quebec proposed Standards of Conduct to evaluate alignment and consistency with the FERC 717 Principles, Guidehouse conducted a comparative analysis of a set of peer utilities to understand how these companies apply their Standards of Conduct.

Table 4-8 below describes how the SoC for transmission providers are applied internally for peer utilities; who is responsible for enforcing them; who is responsible for compliance management as well as training, standard interpretations, and compliance culture. The table below also specifies the oversight mechanisms for the transmission service provider as well as the functions of the reliability coordinator.

Table 4-8 Summary of Comparative Analysis for Peer Utilities

Utility Name	Alignment of SoC to FERC	SoC Enforcement	Compliance Management	Oversight Mechanisms for Transmission Service Provider	Reliability Coordinator Functions
NB Power	Adheres to FERC order 717.	SoC is distributed to all employees including newly hired employees and is also posted on the internet website.	NB Power is required (by Electricity Act, S.N.B. 2013) to adopt a Standard of Conduct compliance program.	Written procedures implement the SoC and apply to interactions between transmission and marketing employees. Additionally, the transmission provider is required to public disclose any voluntary consent or information provided to marketing employees.	The Transmission and System Operator (T&SO) is responsible for overseeing the reliable operation of the Maritimes Area. The T&SO works at coordinating all users of the power system, directs the generator to balance the supply and demand of electricity and flow across the high voltage transmission lines.

Utility Name	Alignment of SoC to FERC	SoC Enforcement	Compliance Management	Oversight Mechanisms for Transmission Service Provider	Reliability Coordinator Functions
BC Hydro	Adheres to FERC order 717.	SoC is distributed to all employees including newly hired employees and is also posted on the internet website	BC Hydro has a Chief Compliance Officer who is responsible for the oversight and management of the Standards of Conduct.	A list of job titles and descriptions of transmission employees are posted on BC Hydro's website. Additionally, there are posting requirements for the identification of affiliate information, voluntary consent to disclose information, shared facilities and transfer of employees, contemporaneous disclosure and potential merger partners.	The RC functions are governed by three basic principles: **Independence** – RC Employees must operate independently of Marketing Function Employees **Priority to reliability** – RC Employees will treat all system users equally. **Emergency actions** – In an emergency circumstance that could jeopardize operational reliability, the RC may take whatever steps are necessary to maintain the reliability of the electric power transmission system.
MB Hydro	Adheres to FERC order 717.	SoC is posted on website.	Manitoba Hydro promotes a culture of compliance throughout the organization and has a designated Compliance Officer who reviews the SoC changes Initiated by MB Hydro or the FERC.	Transmission employees are restricted from exchanging information with marketing employees. In the event information is exchanged, the incident must be immediately reported to the compliance officer. If information is exchanged intentionally, an individual may be subject to disciplinary action.	The reliability coordinator is responsible for aligning power generation and transmission among multiple utilities to serve demand within the integrated regional wholesale market. One of the principal functions of the RC is to schedule adequate generating and reserve capacity.

Utility Name	Alignment of SoC to FERC	SoC Enforcement	Compliance Management	Oversight Mechanisms for Transmission Service Provider	Reliability Coordinator Functions
SaskPower	Adheres to FERC order 717.	Provide SoC training to all employees and provide written guidelines to all employees as well as post on website.	Designated Chief Compliance Officer who is responsible for the oversight and management of SoC.	Written procedures implement the SoC and apply to interactions between transmission and marketing employees. Additionally, the transmission provider is required to public disclose any voluntary consent or information provided to marketing employees.	The SaskPower RC functions associated with power supply reliability include review and approval of planned transmission facility line outages, planned generation outages, monitoring of real-time loading conditions, loading relief procedures, generation re-dispatch, reliability evaluations of the integrated transmission and generation systems and coordination/communication with other Reliability Coordinators. SaskPower RC procedures and policies are consistent with those of NERC.
NS Power	Adheres to FERC order 717.	SoC and written implementation procedure.	Designated Chief Compliance Officer who is responsible for the management of compliance procures in reference to SoC.	Written procedures implement the SoC and apply to interactions between transmission and marketing employees. Additionally, the transmission provider is required to public disclose any voluntary consent or information provided to marketing employees.	The reliability coordinator is responsible for providing services according to the reliability rules of the Northeast Power Coordinating Council which involves coordinating all users of the power system.

Utility Name	Alignment of SoC to FERC	SoC Enforcement	Compliance Management	Oversight Mechanisms for Transmission Service Provider	Reliability Coordinator Functions
Bonneville Power Authority	Adheres to FERC order 717.	The SoC office is responsible for the distribution of the SoCs and the written implementation procedure.	Designated Chief Compliance Officer is responsible for management of compliance procures in reference to SoC.	Written procedures implement the SoC and apply to interactions between transmission and marketing employees. Additionally, the transmission provider is required to public disclose any voluntary consent or information provided to marketing employees.	The reliability coordinator is responsible for ensuring that each member operates with a focus on reliability, particularly across the transitions, or seams, from one area of responsibility to the next. To accomplish this task, the reliability coordinator receives real-time data from the various entities within its geographic span and models those systems to ensure the stability and reliability of the grid. RC West is the reliability coordinator of Bonneville Power Authority.
Tennessee Valley Authority (TVA)	Adheres to FERC order 717.	The SoC is made available online and communicated to all employees.	Designated Chief Compliance Officer is responsible for management of compliance procures.	Written procedures implement the SoC and apply to interactions between transmission and marketing employees. Additionally, the transmission provider is required to public disclose any voluntary consent or information provided to marketing employees.	The TVA RC is responsible for verifying the results, coordinating with TO's and BAs in reviewing and/or modifying the preliminary action plan, and issuing an approved action plan to mitigate the exceedances in the TVA RC Area.

4.2.1 Transmission Function Employees Job Descriptions

Under the transparency provision (18 C.F.R. 358.7(f)(1)), A transmission provider must post on its internet website the job titles and job descriptions of its transmission function employees. All peer utilities reviewed in this study post the job descriptions of their TFEs on their respective websites thereby aligning with the intent of the transparency rule under the FERC 717 Order.

The job titles and organization of departments vary from utility to utility and is therefore not comparable on a one to one basis. However, in general most utilities have the following departments in which their TFEs belong to[13]:

1. System Control Department
2. Program Development
3. Emergency Operations
4. Network Resources Management
5. System/Grid Operations
6. Tariff and Interconnection Services Unit

All utilities in the peer set effectively identify the separation of the roles and duties of transmission function employees versus marketing function employees. The documents published online for all peer utilities clearly describe the difference in roles and responsibilities for the two entities leaving no grey areas or room for confusion on the responsibilities of each employee.

Guidehouse observes that transmission providers have to exercise judgement in determining which employees are transmission function employees. The FERC, in Order 717 defines a transmission function employee and transmission functions as follows:

1. Transmission function employee means an employee, contractor, consultant or agent of a transmission provider who actively and personally engages on a day-to-day basis in transmission functions[14]

2. Transmission function means the planning, directing, organizing or carrying out of day-to-day transmission operations, including granting and denying transmission service requests[15].

Guidehouse notes that it is common industry practice to classify employees that have the ability to effect a change in the topology of the transmission system as transmission function employees. In addition, Guidehouse observes that it is common industry practice to classify

[13] BC Hydro TFEs, MB Hydro TFEs, NS Power TFEs, NB Power TFEs, SaskPower TFEs, BPA TFEs, TVA FTE

[14] FERC Order 717, Issued October 16, 2008 Paragraph 41

[15] FERC Order 717, Issued October 16, 2008 Paragraph 37

Information Technology (IT) support staff who directly provide support or maintain the computer systems that enable real-time operations, such as SCADA or Transmission Energy Management systems as transmission function employees.

Guidehouse conducted a review of the proposed transmission function employee and marketing function employee roles and responsibilities provided by Hydro Québec. Guidehouse observes that the defined roles and responsibilities as proposed by Hydro Québec are aligned with observed common industry practices.

5. Implementation Summary

Guidehouse conducted a review of the implementation procedures of the peer utilities to understand their approaches to implementing their Standards of Conduct. Below in Table 5-1, we provide a high-level summary of the implementation practices of peer utilities. Guidehouse observes that it is common industry practice to be descriptive of the approach to implementation to indicate how the transmission provider is upholding the FERC 717. For example, to demonstrate the approach to compliance with the Non-Discrimination Requirement, each of the peer utilities describes the implementation practices in a specific manner.

Table 5-1 Key Implementation Practices of Peer Utilities

Key Takeaway /Implementation Practice	NB Power	BC Hydro	MB Hydro	SaskPower	Nova Scotia Power	Bonneville Power Authority	Tennessee Valley Authority (TVA)
Non-discrimination Requirement							
Strictly enforce all guidelines provisions to the sale or purchase of open access transmission service.	✔	✔	✔	✔	✔	✔	✔
Apply all provisions in a fair and impartial manner	✔	✔	✔	✔	✔	✔	✔
Process all requests similarly within the same time period.	✔	✔	✔	✔	✔	✔	✔
Independent Functioning Rule							
Transmission functions and marketing functions must have physical separations.	✔	✔	✔	✔	✔	✔	✔

Key Takeaway /Implementation Practice	NB Power	BC Hydro	MB Hydro	SaskPower	Nova Scotia Power	Bonneville Power Authority	Tennessee Valley Authority (TVA)
Transmission functions and marketing functions must have access restrictions.	✔	✔	✔	✔	✔	✔	✔
Joint meetings and interactions between transmission and marketing employees is generally prohibited.	✔	✔	✔	✔	✔	✔	✔
No Conduit Rule							
Transmission provider shall not use anyone as a conduit for the disclosure of non-public transmission function information to its marketing function employees	✔	✔	✔	✔	✔	✔	✔
All employees, contractors, consultants, or agents are prohibited from disclosing non-public transmission function information to any marketing function employees.	✔	✔	✔	✔	✔	✔	✔
Transparency Rule							
Voluntary consent provision.	✔	✔	✔	✔	✔	✔	✔
Posting written procedures on the internet.	✔	✔	✔	✔	✔	✔	✔
Identification of employee information publicly on website.	✔	✔	✔	✔	✔	✔	✔

Key Takeaway /Implementation Practice	NB Power	BC Hydro	MB Hydro	SaskPower	Nova Scotia Power	Bonneville Power Authority	Tennessee Valley Authority (TVA)
Enforce contemporaneous disclosure.	✔	✔	✔	✔	✔ [16]	✔	✔

[16] In 2009 temporary exemption from part of the Standards of Conduct was permitted for designated NSPI employees to have access to non-public transmission related information for the purposes of completing an update to the NSPI Integrated Resource Planning. Link.

6. Role of the Reliability Coordinator and Relationship with FERC Standards of Conduct

The mission of the North American Electric Reliability Corporation (NERC) is to assure the effective and efficient reduction of risks to the reliability and security of the bulk electric transmission grid in North America, including Canada, Mexico and the United States. NERC is subject to oversight by provincial government authorities in Canada and by the FERC in the United States.

NERC has established the role of Reliability Coordinators to continuously assess transmission reliability and coordinate emergency operations among the operating entities within a specific region. The responsibilities and authorities of the Reliability Coordinator are governed by NERC Standard IRO-001: Reliability Coordination. [17]

NERC Standard IRO-001 states that reliability Coordinators must have the authority, plans, and agreements in place to immediately direct reliability entities within their Reliability Coordinator Areas to re-dispatch generation, reconfigure transmission, or reduce load to mitigate critical conditions to return the system to a reliable state.

If a Reliability Coordinator delegates tasks to others, the Reliability Coordinator retains its responsibilities for compliance with NERC and regional standards. Standards of conduct are necessary to ensure the Reliability Coordinator does not act in a manner that favors one market participant over another.

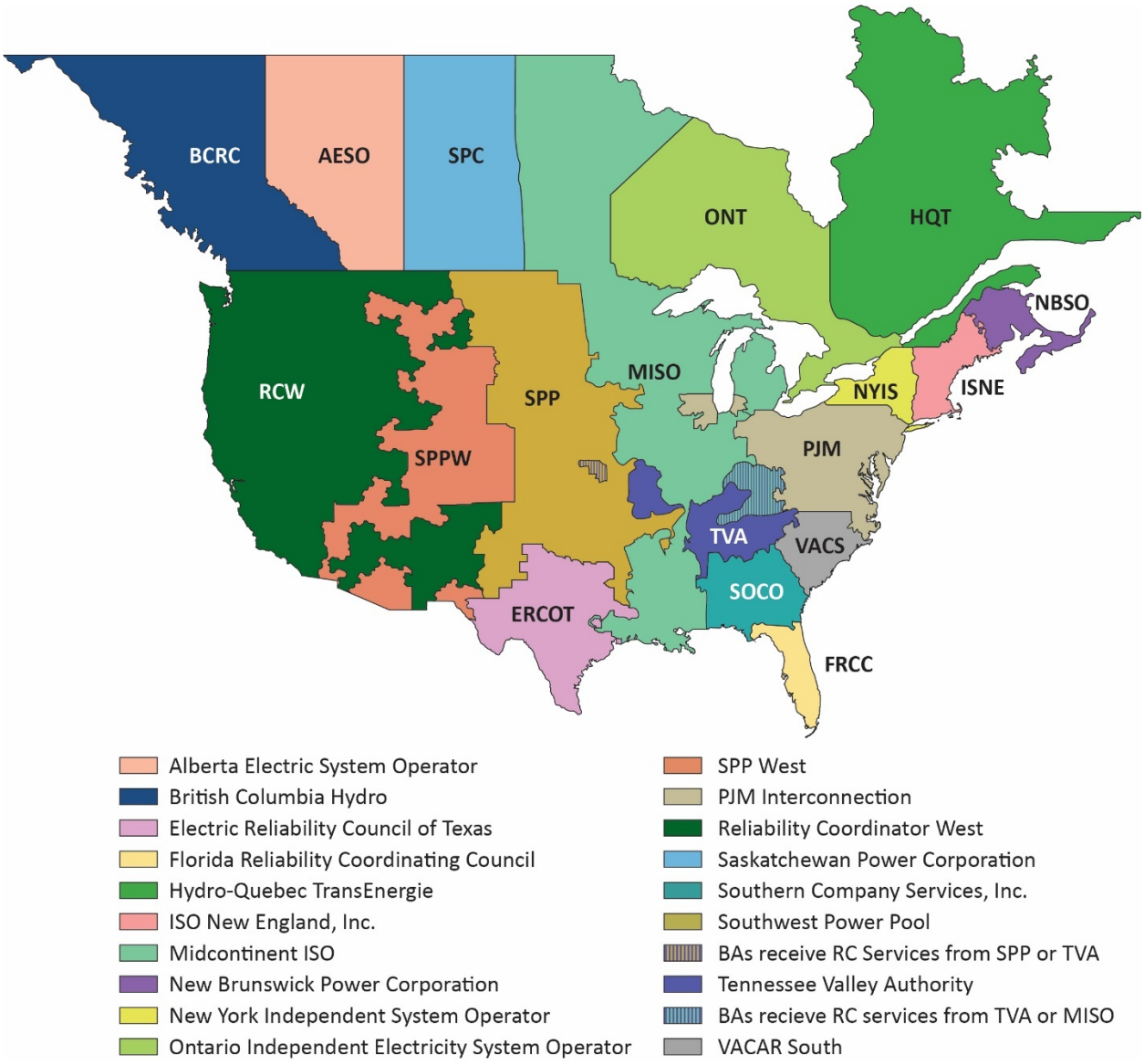
6.1 Relationship of Reliability Coordinator Standards of Conduct and the FERC Standards of Conduct

In this section, Guidehouse discusses the relationship between the NERC Reliability Standards of Conduct and the FERC Standards of Conduct.

Across North America, the responsibilities of the Reliability Coordinator (RC) are typically executed by regional entities that are separate organizations from the regional transmission providers. For example, the California Independent System Operator (CAISO) manages the transmission system for the majority of California, including the RC role, while regional transmission providers are separate organizational entities. The exceptions to this status, include the Canadian provinces of British Columbia, New Brunswick, Saskatchewan and Québec, as well as the Tennessee Valley Authority (TVA) and Southern Company in the U.S., as shown in Figure 6-1 below. In these cases, the roles of the transmission service operator and the reliability coordinator are conducted by separate organizations within one entity.

[17] NERC Standard IRO-001

Figure 6-1: NERC Reliability Coordinators



In situations where the Transmission Provider is performing RC functions, Guidehouse observes that staff performing reliability coordinator functions are subject to the FERC Standards of Conduct and are considered transmission function employees specifically to protect the independence of performing the reliability coordinator roles and responsibilities.

Moreover, in situations where one entity is both the transmission service provider and reliability coordinator, it is typical for persons providing RC functions to be subject to the FERC Standards of Conduct and to be considered Transmission Function Employees.

To determine standard and accepted industry practice, Guidehouse reviewed NERC Standard IRO-001 compliance procedure and the Transmission Function Employee Roles and Responsibilities of BC Hydro, New Brunswick Power, Saskatchewan Power Corporation (SaskPower), Southern Company and TVA that describe how the employees with reliability coordinator responsibilities at these utilities are classified as Transmission Function Employees.

6.2 Implications for Hydro Québec

In Québec, the Régie de l'énergie (Régie) is responsible for the reliability of the power transmission system in Québec and issues mandates to various organizations to help it perform this duty. The Régie has designated a subsidiary of Hydro Québec, DPCMEER (Direction Principale – Contrôle des Mouvements d'Énergie et Exploitation du Réseau [system control and operation]), as the Reliability Coordinator.

The mandate from the Régie to DPCMEER to perform the Reliability Coordinator functions include setting of reliability standards and maintaining transmission system reliability. The mandates of the RC are described below.

1. Set reliability standards:
    a. File with the Régie, the standards proposed by the organization mandated to develop reliability standards, and an assessment of the relevance and impact of these standards
    b. File with the Régie, the Registry of entities subject to the reliability standards it has adopted
    c. Submit to the Régie a guide for assessing sanctions to be adopted if standards are violated
2. Maintain transmission system reliability:
    a. Perform the reliability coordination duties set out in the adopted standards, including issue operating instructions

Hydro Québec has several subsidiaries with different roles and responsibilities, that work together to operate the electric transmission grid in Québec. In addition to the roles of the reliability coordinator and transmission operator, performed by DPCMEER, the transmission service provider is Hydro Québec TransÉnergie (HQT).

The activities of these groups, e.g., the transmission service provider, the reliability coordinator, and marketing activities within Hydro Québec are governed by the FERC Standards of Conduct, as outlined in this report. In addition, NERC has established standards that govern the specific responsibilities of the Reliability Coordinator. Activities that are expressly prohibited for Reliability Coordinators as set forth by NERC include the following:

1. **Conducting Marketing functions:** Similar to Transmission Function Employee, Reliability Coordinators are not permitted to perform marketing functions.
2. **Access to control facilities:** Allowing access for marketing function employees to the system control center or similar facilities used for reliability coordinator functions that differs in any way from the access available to non-affiliated system users.
3. **Disclosing non-public transmission function information:** It is not permitted to disclose to any marketing function employee's non-public information relating to the planning, directing, organizing or carrying out of day-to-day transmission operations, including the granting and denying of transmission service requests.
4. **Transparency:** If a reliability coordinator employee discloses information in a manner contrary to the requirements of this subparagraph, the reliability coordinator must, as soon as practicable, post such information on its web site and inform the affected Transmission Provider to post such information on its OASIS.
5. **Sharing market information:** It is not permitted for Reliability Coordinator employees to share market information acquired from non-affiliated System Users or potential non-affiliated system users or developed in the course of performing reliability coordinator functions, with any marketing function employees.

To ensure compliance with NERC and FERC rules, Hydro Québec has developed a Reliability Coordinator Code of Conduct that prohibits any form of preferential treatment in favor of other Hydro-Québec units or other system users, which was approved in 2007 by the Régie. In addition, Hydro Quebec has designated staff with reliability coordinator responsibilities as transmission function employees.

As the reliability coordinator, DPCMEER is responsible for adapting the NERC standards to Hydro Québec, as well as considering any provincial adjustments to be made in order to specifically adapt the standards with consideration of requirements in Québec. This is an important role of the DPCMEER, as it is the Régie that has to adopt the standards in order to make them mandatory in Québec.

As identified in 6.1, Guidehouse observes that it is common industry practice for staff performing RC functions to be considered transmission function employees.

Guidehouse observes that transmission providers have to exercise judgement in determining which employees are transmission function employees. the FERC, in Order 717 defines a transmission function employee and transmission functions as follows:

> 1. Transmission function employee means an employee, contractor, consultant or agent of a transmission provider who

actively and personally engages on a day-to-day basis in transmission functions[18]

2. Transmission function means the planning, directing, organizing or carrying out of day-to-day transmission operations, including granting and denying transmission service requests[19].

HQT's approach is consistent with the intent and principles for FERC and consistent with the approaches of comparable transmission services organizations to identify TFEs where RC functions are being delivered. It is Guidehouse's determination that this compliance approach is aligned with the FERC and NERC principles, as well as aligned with the approaches of similarly situated transmission providers with reliability coordination responsibilities.

[18] FERC Order 717, Issued October 16, 2008

[19] FERC Order 717, Issued October 16, 2008

7. Guidehouse Assertion and Key Findings

To conduct this review and analysis Guidehouse carried out the following evaluations to demonstrate its key findings:

Table 7-1 Guidehouse Key Findings

Test	Guidehouse Comment
Conducted a review of the HQT proposed SoC and comparatively assessed the SoC against the FERC 717 provisions in CFR 358	
Is the proposed HQT SoC aligned and consistent with the FERC 717 provisions and intent– Is the document organized in such way that there is a clear relationship between the sections of the Standards of Conduct and the FERC 717 core Principles?	**Yes** – the proposed HQT SoC is well aligned with the FERC 717 provisions and the document is organized in a way to illustrate a clear relationship between the sections of the SoC and the FERC 717 principles.
Is the proposed HQT SoC complete and comprehensive – does it address every provision? Is the HQT definition of transmission function employees (TFEs) and marketing function employees (MFEs) aligned with the definitions included in CFR 358?	**Yes** – the proposed HQT SoC addresses every provision and the HQT definitions of TFEs and MFEs are aligned with the definitions of CFR 358.
Conducted a comparative review of a Peer Set of non-FERC regulated transmission providers	
Is there evidence that peers have been deemed compliant with FERC 717	**Yes** – there is evidence for all peer utilities, through regulatory decision or consultation, that they are compliant with FERC 717.
Are the SoCs of the peer set clearly aligned and consistent with FERC 717 provisions, with substantive evidence	**Yes** – there is substantive body of evidence to suggest that the peer set is clearly aligned with all FERC 717 provisions.

Are the implementation procedures of the peers aligned with FERC	**Yes** – the implementation procedures of the peer set are aligned with FERC 717 in all cases.
Are the peer's disclosures, specifically identification of Chief Compliance Officer, Identification of TFEs and Identification of Affiliates, aligned with the FERC mandated disclosure provisions and evidence requirements? i. Chief Compliance Officer ii. Written Procedures iii. Transmission Function Employees iv. Identification of Affiliate Information	**Yes** – the peer's disclosures to the items (Chief Compliance Officer, Written Procedures, Transmission Function Employees, Identification of Affiliate Information) are aligned with the FERC mandated disclosure provisions and evidence requirements.
Conducted a comparison of the Peer Set approaches to SoC implementation with the proposed approach of HQT	
Is the HQT definition of TFE roles and responsibilities substantively and comprehensively similar to the TFE roles and responsibilities posted by the peers?	**Yes** – the HQT definition of TFE roles and responsibilities are substantively similar to the TFE roles and responsibilities posted by the peers.
Is the proposed identification of Chief Compliance Officer, Identification of TFEs and Identification of Affiliates similar to the approaches of the peer set?	**Yes** – the proposed identification of Chief Compliance Officer, Identification of TFEs and Identification of Affiliates is similar to the approaches of the peer set.
Given that subsidiaries of HQT, the DPCMEER, are the Balancing Authority (BA) and Reliability Coordinator (RC) within Québec, how do the FERC Standards of Conduct apply to the HQT Reliability Coordinator functions?	Guidehouse observes that is common industry practice for BA and RC employees to be designated as transmission function employees.

7.1 Guidehouse Assertion

Consistency of Hydro-Québec's proposed SoC to FERC Order 717, as codified in FERC pro-forma (CFR-2011 – Title 18 – Vol. 1 – Part 358)

Guidehouse finds that HQT's proposed Standards of Conduct appropriately address the principles and intent of FERC Order 717. The document is aligned with the provisions of FERC Order 717 and the organization of the document demonstrates a clear relationship between the FERC 717 Principles and the sections of the Standards of Conduct. In addition, the document is complete and comprehensive. It directly addresses and is inclusive of all of the central principles embodied in FERC 717. For example, Guidehouse observes that the chapters of the Hydro Québec proposed standards of conduct addresses each of the eight chapters of Title 18 Part 358 of the U.S. Federal Code.

Consistency of Hydro-Québec's Proposed SoC with Peer Utility SoC

Guidehouse observes that the Hydro Québec proposed SoC is consistent with comparable utility common practices. As discussed in Section 4 of this report, the format, content and organization of the HQT proposed SoC is aligned with the SoCs of the peer utilities.

Benchmarking Analysis and Comparative Analysis of Peer Set Approaches to Fulfilling SoC obligations and Alignment to the Intent and Principle of FERC Order 717

Guidehouse's examination of the approaches to compliance with FERC Order 717 of Hydro Québec is aligned with the approaches of the peer set, particularly the designation of a chief compliance offer, disclosure of marketing affiliates and disclosure of transmission function and marketing function employees. It is common industry practice to have a chief compliance officer who is responsible for ensuring that the FERC SoC is appropriately implemented and observed. In addition, it is common industry practice to designate a single chief compliance office for both the FERC SoC as well as the code of conduct that governs the activities of the reliability coordinator, particularly when the reliability coordinator function is integrated within the corporate entity that is also the transmission service provider.

The proposed categorization of marketing function employees by Hydro Québec is aligned with common industry practices. Guidehouse observes that it is common industry practice to designate as transmission function employees all employees who have the ability to effect a change in the topology of the transmission system. In regard to the designation of transmission function employees, the approach of Hydro Quebec is aligned with observed common industry practice.

Appendix A. Guidehouse Resumes

Paul Moran

Craig Sabine

Laura Manz

Craig Sabine
Director

craig.sabine@navigant.com
Toronto, ON
Direct: 416.777.2444

Professional Summary

Craig Sabine is a Director in the Energy Practice at Navigant and focuses on strategic market and regulatory issues of electricity generators, utilities and other energy companies. Craig is a seasoned expert in the analysis of energy markets, supporting regulatory affairs, policy development, corporate planning initiatives, investment strategies and operational effectiveness. Across Canada, Mr. Sabine is a respected expert on integrated utility planning, operations and innovation and often testifies in support of his analyses and recommendations before regulatory bodies and the courts.

Areas of Expertise

Providing advisory services and analytic expertise, Craig supports his clients in a number of key business areas, including:

- Policy design
- Regulatory economics
- Sustainability strategy and emissions management
- Portfolio assessment
- Cost-benefit analysis

Professional Experience

- **Energy and Utilities – Climate Change Regulatory. Ontario Energy Board Cap and Trade Regulatory Framework** – Craig is currently serving as the special advisor to the OEB as the Ontario Government develops a Cap and Trade program. Craig is responsible for assisting the OEB to develop and aligned regulatory framework for natural gas utilities who will be covered entities and ensure that the OEB's jurisdiction supports the utilities' compliance with the program at reasonable and prudent costs for rate payers.
- **Nitric Acid Plant GHG Verification** – On behalf of Alberta Environment, Craig led a third party verification of GHG reductions from Orica's Carseland Nitric Acid Plant in 2015. The project emission baseline was reviewed and all emissions destroyed through chemical abatement processes was verified to ensure compliance with the Alberta SGER regulation and ISO 14064 audit standard.
- **Energy and Utilities – Climate Change. SaskPower Emissions Strategy Discussion Document** – Craig managed development of an options paper for SaskPower that determined their current and future position relative to firm and expected emissions regulations that could impact SaskPower's strategic direction.

Craig Sabine
Director

- **OEB 2010/14 Natural Gas Supply Markets Review** - For the OEB, Craig and a team of gas markets experts developed a review and forecast of the changing nature of natural gas supplies in North America and the impacts on the Ontario utility market. Evidence was presented before the Board and stakeholders in a quasi-hearing/consultation setting.

Work History

- Director, Navigant
- Environment Canada
- ICF International
- MNP LLP

Testimony

- Gazifere 2017 Cost of Service, TBD March 2016
- Coffin and Lowry v. Atlantic Power Corporation. 2015
- ENMAX General Rate Application Hearing, AUC. July 2014
- Natural Gas Markets Review Consultative Hearing, OEB. 2014
- Manitoba Hydro NFAT Hearing, MPUB. April 2014
- Natural Gas Markets Review Consultative Hearing, OEB. 2010

Education

- MBA Executive Program, Queen's School of Business, Kingston, ON, Canada
- BES, Environmental and Resource Studies. Minor, Biology University of Waterloo, ON, Canada

Paul Moran
Associate Director

paul.moran@guidehouse.com
Houston, TX
Direct: +1 (713) 447.7093

Professional Summary

Paul Moran is Associate Director in Guidehouse's Energy, Sustainability and Infrastructure practice and is responsible for leading engagements for clients in the energy sector including electric and gas utilities, power generators, pipeline and midstream companies, gas storage operators, and LNG export project developers.

Paul is an accomplished electric and gas utility professional with extensive background in the power and gas sectors including electric transmission and distribution, natural gas pipelines and distribution in addition to emerging energy technology, including Smart Grid technology assessments and evaluations. He has led several client engagements focused on the design, development and execution of innovative product and service offerings by electric and gas utilities for residential and commercial customers.

His 18 years of energy industry experience include providing subject matter expertise related to corporate strategic planning, power and natural gas market analysis and forecasting, business process improvement, organizational design and change management.

Professional Experience

Integrated Resource Planning and Natural Gas Supply Planning

- For a large US Midwestern gas and electric utility, developed a long-term integrated resource plan which included a risk assessment to consider critical uncertainties including fuel prices, energy demand, technological changes in generation, including coal, natural gas, wind and solar, capital costs for new generation units, and wind output. In evaluating the various portfolio options, the analysis examined the tradeoffs between cost, risk, and environmental stewardship.

- For a major US gas distribution company, assisted in the design, implementation and monitoring of demand-side management programs to reduce natural gas consumption by improving the energy efficiency of buildings, space heating systems, water heating, and other gas appliances. Programs included conservation improvement programs designed at providing residential and commercial building developers and end-users with incentives to deploy more efficient heating systems and appliances.

- Managed a cross-functional team to evaluate a software system replacement for gas supply, transportation, trading and risk management including documentation of business and technical requirements, vendor selection, user acceptance training, change management, process redesign and system implementation.

Professional Experience

Strategic Planning

Paul Moran
Associate Director

» Developed a robust financial planning tool for a non-regulated subsidiary of a Fortune 1000 U.S. energy company to forecast market capitalization, earnings, credit rating and debt capacity to evaluate the impact on major strategic acquisition and development initiatives and changes in market conditions on its financial position. Conducted workshops with members of the company's senior management team to facilitate all aspects of the strategic planning process.

» Led client strategic planning engagements for IPPs, electric and gas utilities, midstream and pipeline companies and provided subject matter expertise for client engagements related to Corporate Strategic and Business Plans, energy system transformation, generation resource plans, business process improvement, organizational design, change management and performance monitoring.

» Developed and led the annual strategic planning process for a large Fortune 500 energy company across its pipeline, field services, natural gas distribution and electric business units. Facilitated senior executive strategic planning workshops on scenario analysis, market outlook, enterprise risk management and competitive intelligence.

» Evaluated potential mergers, acquisitions and divestitures of pipelines, storage assets, gas trading books, electric utilities and gas distribution companies and conducted asset valuation, due diligence and financial analysis to support business cases. Delivered recommendations to senior executive management.

» Designed and implemented a performance measurement and risk management process to measure and track key performance indicators to improve operating results and enhance financial performance.

New Business Development and Market Assessments

» For a large Midwest utility, led an engagement to analyze the market potential for several Value-Added Products and Services from within the regulated utility. The analysis identified business development opportunities that are aligned with industry market trends and positioned the utility to develop new product and service offerings that can increase earnings on a sustainable basis in addition to improving the customer experience.

» Developed business strategy for creation and execution of a $20 million tax equity fund to participate in solar ventures. Negotiated lease terms with host sites. Negotiated strategic alliance with EPC contractor.

» For a large electric and gas utility, led the evaluation and business case development for a new service offering to provide residential home appliance repair and warranty services.

» Managed the evaluation of an entry into the retail electricity market including economic evaluation, market analysis, business case development and market-entry strategy which was approved by executive management and the Board of Directors.

Professional Experience

Paul Moran
Associate Director

Electric and Natural Gas Market Analysis and Forecasting

» Led a study to evaluate a comprehensive, long-term natural gas and transportation strategy for a U.S. based developer of two U.S. Gulf Coast LNG export facilities. Assessed natural gas market fundamentals and developed a long-term price forecast. Prepared and delivered recommendations to the executive management of the Company.

» For a large natural gas distribution company, managed an RFP process to procure natural gas storage services. Developed evaluation criteria, evaluated RFP responses and prepared final selection recommendations.

» Performed multiple assessments of North American electric and natural gas markets and developed long-term forecasts of supply and demand, electricity and natural gas prices to examine the impacts of market trends, i.e., coal retirements, clean power plan, renewable integration and transmission and pipeline expansions, on power and gas market markets using proprietary models in addition to the GPCM® natural gas forecasting model and PROMOD electricity market modeling software.

» Assessed market fundamentals and economics of emerging supply basins to evaluate the competitive position of producer reserves in addition to developing growth and acquisition strategies for producers, pipelines and midstream/storage companies.

» Provided an analysis of key regulatory developments and power market and natural gas market trends including projections of production, demand and natural gas prices and basis for a gas storage operator in Texas.

» Conducted several strategic market assessment and valuations of major interstate natural gas pipelines in support of acquisitions. Developed models to evaluate multiple supply and demand scenarios, forecast pipeline flows and project re-contracting volumes and rates to assess the competitive position and projected performance of the pipelines.

» Prepared a competitive assessment of LNG and steam coal procurement options in support of a fuel supply strategy for a power plant developer in Chile.

» Developed a natural gas fuel supply and transportation strategy to source U.S. natural gas production for a power project in Mexico.

» Advised in the screening, valuation and detailed due diligence of several LNG export facilities and natural gas midstream assets, throughout the U.S. on behalf of equity investors and lenders.

» Performed strategic advisory services for a client interested in developing small-scale LNG liquefaction terminals in the U.S. Responsibilities included development of a model to analyze the investment strategy under different supply growth scenarios and capital constraints.

Paul Moran
Associate Director

Professional Experience

Regulatory and Compliance

» For a large Canadian gas and electric utility, prepared a white paper on natural gas system resiliency and developed a framework to inform utility regulator decision-making on the critical capabilities needed for resiliency and established the criteria by which to consider the reasonableness of FEI's approach to determining recommendations on duration. Delivered expert witness testimony in support of the utility's application for a Certificate of Public Convenience and Necessity.

» For the American Gas Foundation, served as key author and project manager to prepare a white paper entitled: Building a Resilient Energy Future: How the Gas System Contributes to US Energy System Resilience

» Prepared and delivered expert witness testimony in support of gas pipeline business risk and tariff design before several regulatory commissions, including the Ontario Energy Board.

» Developed a comprehensive review of the natural gas hedging program for a large electric utility in Canada. The scope of the review was to validate the program objectives and review the long-term approach in the context of changing natural gas market fundamentals. In addition, the review identified opportunities for improvement and recommendations on enhancements to strengthen the hedging program.

» Managed a comprehensive review and assessment of a large electric utility's current regulatory compliance program and processes across operations, engineering, finance, risk management, customer service and regulatory reporting. Developed recommendations to improve and enhance the effectiveness of the program and implemented a multi-stage program to facilitate improved regulatory reporting and strengthen alignment between the regulatory affairs group and the business units

» Conducted an independent review of a 3rd Party audit of a large electric utility's fuel adjustment mechanism that was commissioned by the public utility commission. Reviewed certain assertions related to organization, staffing and controls, and provided insights and perspective related to the organization and staffing of the fuel purchasing and risk management functions. In addition, provided expert witness testimony and evidence related to the report.

» For a large, multi-year Advanced Metering and Smart Grid deployment, developed and managed a program to ensure compliance with regulatory reporting to U.S. Federal agencies and State public utility commissions.

» Developed and implemented a regulatory compliance program for a U.S. electric retailer to ensure timely and accurate preparation of regulatory filings and compliance with requirements.

» Managed financial analysis, review and development of regulatory filings and rate cases for a U.S. electric transmission and distribution and gas distribution company.

Paul Moran
Associate Director

» Prepared strategic reviews of gas procurement supply plans, commodity hedging programs and risk management strategies for gas utilities and electric power generators in addition to designing gas hedging programs for market participants.

Work History

Associate Director, Guidehouse (formerly Navigant)	2015 – Present
Principal, Wood Mackenzie	2013 – 2015
Director, Pace Global (a Siemens Company)	2011 – 2013
Director of Strategic Planning, CenterPoint Energy	2006 – 2011
Lead Analyst, CenterPoint Energy	2003 – 2006

Education

B.A., Political Science	Providence College
MBA, Strategy & Finance	Indiana University

Laura Manz

Director

laura.manz@guidehouse.com
Folsom, CA
Direct: 858.354.8333

Professional Summary

Laura brings more than 30 years of executive and field experience in electric and natural gas utilities. Her areas of expertise encompass electricity restructuring, transmission development, grid planning and operations, rates and ratemaking, distributed energy, and advanced technologies. She was formerly Vice President – Infrastructure and Market Development with the CAISO with responsibility for grid planning, market design, regulatory policy, and compliance. She was instrumental in restructuring power grid operations, markets and planning in the Mid-Atlantic (PJM), California (CAISO), and Texas (ERCOT) and served as an expert witness in these. Laura has deep experience in transmission development and interconnections.

Laura's demonstrated ability to creatively resolve complex initiatives has resulted in innovative approaches such as California's Renewable Energy Transmission Initiative (RETI) to develop over $6 billion of transmission in California. She began her career at Public Service Electric and Gas in New Jersey before leading CAISO and Regulatory Affairs for Sempra Energy's regulated businesses, SDG&E and Southern California Gas Company, one of the nation's largest gas distributors. Her distributed energy experience includes Senior Vice President for Viridity Energy, Senior Fellow with California's More Than Smart and an Engagement Group Facilitator with New York REV.

Professional Experience

- **As a Director with Guidehouse,** Laura brings thought leadership and expertise to the transmission services practice leveraging her experience in transmission operations and planning, advanced technology due diligence, reliability and regulatory compliance, generator interconnections, renewable and distributed energy integration, and market design. She has advised clients on innovative approaches to rates and ratemaking in a changing energy usage environment. She continues to work with clients in regulatory proceedings related to wholesale price formation, alignment with distribution system impacts, and ultimately customer impacts. Leading the technical studies team, her projects include advice on infrastructure expansion for both supply, delivery, and customer load management options.
- **As Principal with L J Manz Consulting,** developed strategic plans, performance indicators, and best practices for reliability coordinators and utilities. Developed transmission strategies and roadmaps, including a Fortune 200 utility. Advised on transmission interconnection and siting, distributed energy resource development, energy alignment plans, and asset optimizations. Completed tech-to-market roadmaps for Department of Energy advanced technology grant recipients. Perform due diligence for finance companies in advanced transmission and distribution technologies. Delivered risk assessments including municipalities, grid operators, and private developers in restructured electricity markets. Led Tres Amigas Transmission Superstation development activities in the Western Interconnection and served as the Western Electricity Coordinating Council primary point of contact. Advised distributed energy customers regarding rates, tariffs, interconnections, energy management, and power purchase agreements.

Laura Manz
Director

- **As Sr. Vice President with Viridity Energy, Inc.,** led the Western Interconnection and ERCOT region activities for Viridity Energy, a leading-edge smart grid technology company that optimizes distributed energy resources to create virtual power plants.
- **As Vice President with CAISO**, provided strategic oversight and department consolidation for transmission planning and electricity market development for California's 50,000 MW grid. Oversaw transmission planning, grid expansion, market design, resource interconnections, and regulatory policy. Implemented California's restructured electricity market in April 2009, bringing nearly 50,000 MW in alignment with international best practices. Held responsibility for ongoing market improvement and grid expansion and the related regulatory policies. Issued the first Renewable Energy Transmission Initiative (RETI) plan for the state of California pursuant to an Executive Order from Governor Schwarzenegger and spearheaded coordinated planning processes to satisfy reliability, economic, and policy mandates collaboratively among California's public and private transmission owners. Positioned organization for 100% compliance with Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC), Western Electricity Coordinating Council (WECC), and California Public Utilities Commission (CPUC) infrastructure planning and maintenance requirements.
- **As a Director with SDG&E and Southern California Gas Company,** led regulatory policy development and deployment. Oversaw organization's interactions with FERC, CAISO, and CPUC on wholesale electric and natural gas policy and advocacy. Launched NERC reliability standards compliance team.
- **As a Director with Public Service Electric & Gas (PSE&G),** oversaw federal, regional, and state electricity policy across PSEG's multiple lines of business related to energy markets, gas and electric rates, reliability compliance, and tariffs for PSEG's portfolio of businesses. Served as an expert witness and subject matter expert to FERC, Independent System Operators, Public Utility Commissions, and representatives of international governments on electricity market design, electric grid operations, transmission planning, and other critical power grid functions. Directed planning, expansion, and connecting new generation to the regional electric grid. Served as the corporate and regional representative to NERC on reliability matters. Responsible for $1.5 billion in transactions and implementation of retail choice for PSE&G's two million electricity customers including settlements, credit, and risk management issues. As part of "The Supporting Companies," transformed the PJM power pool into an Independent System Operator resulting in the most liquid electricity market in the world. Established rules for an electricity spot market based on locational marginal pricing and financial transmission rights. Part of the team that designed, negotiated and implemented New Jersey's Basic Generation Service and retail choice program that has successfully operated since 1999.

Work History

- Director, Guidehouse
- Principal, L J Manz Consulting
- Sr. Vice President, Viridity Energy
- Vice President, CAISO

Laura Manz
Director

- Director, SDG&E and Southern California Gas Company
- Director, PSE&G

Certifications, Memberships, and Awards

- Institute of Electrical and Electronics Engineers (Senior Member)
- Cleantech San Diego – Education and Outreach Committee

Education

- MBA, Drexel University
- BS, Electrical Engineering, Lafayette College