Industry-Led Working Group (IWG) for Green Button Implementation in Ontario

The IWG is an industry group of volunteers from various organizations throughout Ontario and North America that have been brought together to help guide the implementation of Green Button deployments in Ontario.

Publication Information

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Statement

The information contained herein is public and may be used, reproduced, or disclosed to others. The information in this document is provided as a public document and is not owned by any party. We wish to thank the parties involved in the IWG and the sub-working groups for their volunteer activities and we commend everyone for providing their insight.

Some Terms were used with permission from:

- the "*Green Button Connect My Data Reference Architecture for Ontario*", Version 1.0, 23 August 2013, Ontario Ministry of Energy.
- North American Energy Standards Board, REQ.21 Energy Services Provider Interface Model Business Practices, Version 3.3 (revised 20 March 2020). Available at https://www.naesb.org.
- the "*Green Button Procurement Specification Guide*", Version 1.0, June 2022, Green Button Alliance.

See **Appendix D: Terms** for detail.

Contents

Introduction

In the past, when electricity and natural-gas meters were read manually, the information was only collected monthly or even less often. However, with advanced metering infrastructure rolled out, or being rolled out, it's possible to meter and collect usage data on intervals of daily, hourly, by minute, and even by partial minutes in some cases. With standardized access to usage data through the Internet, consumers of those resources would be able to obtain their usage information sooner and more-readily than awaiting a monthly bill.

Where the consumers were once at the end of the "sales cycle" of a resource—able only to reflect on past usage—today, they are able to be participants in the energy industry with greater granularity: acting to stress on the networks, to shift consumption patterns, or to reduce overall consumption. The inclusion of the customer-as-participant through Ontario regulation has advantages for the transmission and distribution networks, generation supplies, the consumer's own pocket, and even the environment.

Green Button data-access and -sharing solutions

The Ontario Government has been engaged in a public-private initiative to make electricity- and natural gas-usage data available to the consumers of those resources—whether residential, commercial, industrial, or governmental—in a standardized format and with a standardized method to allow the consumers greater insight to their usage and impacts as well as to allow them to be a part of the next generation of grid solutions.

"Green Button" is a data-access and -sharing initiative with roots back to the early 2000s, coming out of efforts between Utilities, governments, standards organisations, and Third-Party providers of services (like solar installation and energy efficiency). Initially an effort to allow consumers to press a virtual green button on their Utility's website to download their electricity-usage data in a common format, it grew to include natural gas and has the ability to handle other resources as well. Further, it expanded to include a way to allow those Third-Party providers of services to obtain the data on behalf of the consumer directly from the Utility; with the consumer retaining full control over revocation and duration of the arrangement.

Background of the OEB Industry Effort

The Ontario Ministry of Energy issued a call-to-action for Green Button for the province in 2012 to begin looking at the return on investment and the value of Green Button data-sharing to consumers of electricity, natural gas, and water. Their conclusions supported the idea of moving forward with

formalizing the sharing of electricity and natural-gas -usage data in the province and they culminated in final consultations with industry in early 2021 and regulation to ensure the rollout of solutions by the end of October 2023.

The Ministry of Energy requested the help of the Ontario Energy Board (OEB) to support the energy sector in preparing for implementation of Green Button solutions. Through task-force meetings that ran from July through September 2021, feedback was solicited from the industry on the guidance and direction required from the OEB to support them: identification of the types of information to be shared through Green Button platforms, a desire to understand the experiences of other jurisdictions having implemented Green Button solutions, and a review of Ontario Regulation 633/21 "ENERGY DATA" and how to meet it.

During the task-force meetings, it was suggested that an industry-led working group would benefit the parties needing to implement the Green Button standard. Such a group could discuss/resolve:

- how to handle Ontario-specific data that might not be in the Green Button standard,
- the establishment of metrics related to the user experience (UX) that might impact access to the data, and
- to ensure the Green Button solution in Ontario meets the needs of the industry and the consumers as the sector continues to innovate and evolve.

The OEB noted in November 2021 that it would facilitate the establishment of a Green Button industry-led working group (IWG) as suggested.

Green Button Industry-led Working Group (IWG)

The IWG is a forum for Distributors and other interested stakeholders to address issues that arise as Distributors go through the process of implementing Green Button standards during the two-year implementation window. To ensure interested parties can access information related to the work of the IWG, the OEB hosts documents related to the IWG on their website.

The main **Industry-led Working Group (IWG)** comprises all parties that wish to take part in the IWG. This diverse group reviewed and approved IWG activities. This group has three co-chairs: a GB standards expert, a Utility expert and an Ontario-market expert.

The IWG further comprises three sub-groups:

1. **Independent User-Experience Working Group (IUXWG)**: a sub-working group, it comprises all parties that wish to take part in the user-experience aspects of the IWG. The participants reviewed and approved user-experience discussions, needs and concerns. This group has two co-chairs who jointly managed the group: a Green Button user-experience expert and a large user of disperse (multi-geography) energy data in Ontario.

2. **Independent Utility Working Group (IUWG)**: a sub-working group, it comprises Utilities only (no affiliates or external influencers). This group is Utility-focused, providing a single voice to the IWG as they reviewed and approved Utility discussions, needs and concerns. This group has three co-chairs who jointly managed the group: one Ontario Utility Cooperative and 2 separate Utilities.

3. **Independent Technical Working Group (ITWG)**: a sub-working group, it comprises all parties that wish to take part in the technical-related activities of the IWG. This group is composed of technical and non-technical participants who reviewed and approved discussions, needs and concerns of a technical nature. The group has two co-chairs who jointly managed the group: a Green Button standards expert and a technical expert from an Ontario Utility.

Figure 1 demonstrates the communications between the OEB, the IWG co-leads, and the three subgroups. It was used to allow questions from individual participants to be handled in the most-efficient manner and to reduce duplication while ensuring cohesiveness for any questions or concerns that were cross-topic.

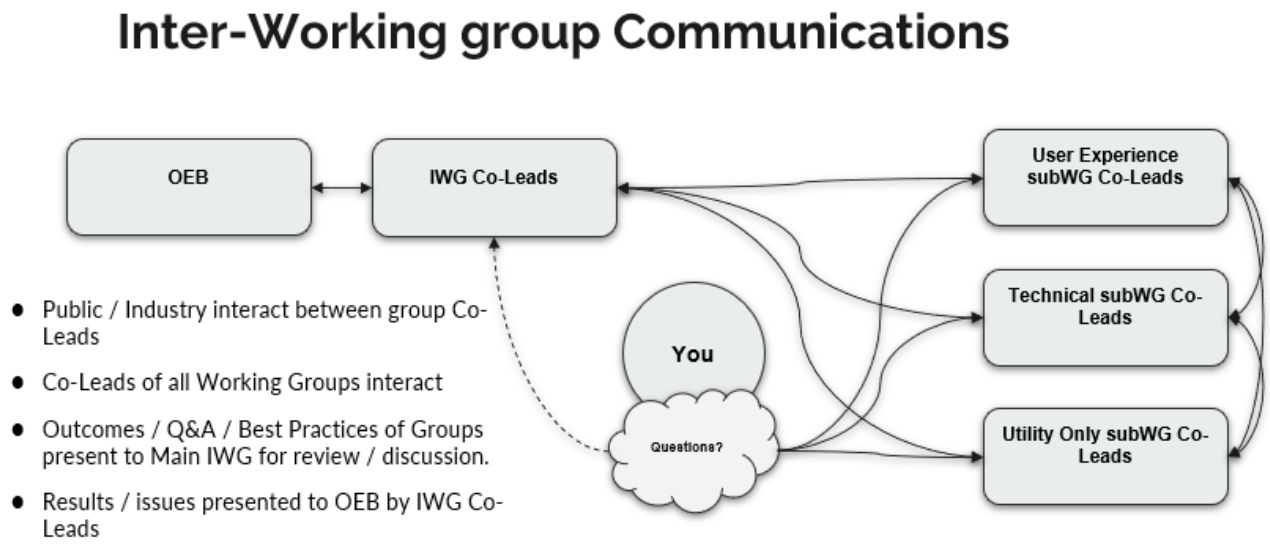


Figure 1 – Inter-Working group Communications

List of IWG Members

The Industry-Led Working Group (IWG) would like to thank its many participants for their assistance and volunteer efforts along with the OEB for their effort to work towards a common, standardized Green Button implementation. The IWG's efforts will help all customers in the province securely share their utility data—usage, billing, and account information—with energy-management products and services.

The following is the IWG Participation List:

Alectra Utilities Corporation

Building Owners and Managers Association

Canadian Niagara Power / FortisOntario Inc.

Centre Wellington Hydro Ltd.

Comsatec Inc.

Cornerstone Hydro-Electric Concepts

Day5 Analytics Inc.

Electricity Distributors Association

Elexicon Energy Inc.

Enbridge Gas Inc.

Energy+ Inc. / GrandBridge Energy Inc.

Entegrus Powerlines Inc.

ENWIN Utilities Limited

EPCOR Ontario

ERTH Corporation

Essex Powerlines Corporation

Green Button Alliance, Inc.

Hollyburn Properties Limited

Hydro Hawkesbury Inc.

Hydro One Networks Inc.

Hydro Ottawa Limited

Independent Energy System Operator

Independent Energy System Operator - Smart Metering Entity (observer)

Jupiter Energy Advisors Inc.

Kitchener Utilities

London Hydro Inc.

Ministry of Education

Ministry of Energy (observer)

Mission:data Coalition

Natural Resources Canada

Newmarket-Tay Power Distribution Ltd.

NorthStar Utilities Solutions

Ontario Energy Association

Ontario Energy Board (facilitator)

OPEN Technologies

Oshawa Power

Rodan Energy

Savage Data Systems

School Energy Coalition

Screaming Power

Smart Energy Water

Toronto Hydro-Electric System Limited

Utilismart Corporation

Utilities Kingston

UtilityAPI

Westario Power Inc.

Yardi Systems Inc.

Major Contributors of the IWG

Working Group Co-Chairs

We would like to acknowledge the volunteer work provide by the Chairs of the all the sub-working groups, as they have spent many hours working through the complexities of creating an effective rollout of the Green Button Initiative for Ontario.

Managing the meetings and the work required to gain understanding and consensus among conflicting opinions was not a trivial task. It needs to be stated that this is the first endeavour of its kind and their dedication to this has resulted in a concerted effort to create a rollout that will benefit all Ontarians.

Working Group	Name	Company	Contribution
IWG	Gary Michor	Screaming Power Inc.	Co-Chair of the IWG, industry expert, meeting and material facilitator
IWG	Eddie Augusto	Alectra Utilities Corporation	Co-Chair of the IWG, Utility expert, meeting and material facilitator
IWG	Jeremy J. Roberts	Green Button Alliance, Inc.	Co-Chair of the IWG, Green Button expert, meeting and material facilitator

IUWG	Steve White	Cornerstone Hydro Electric Concepts (CHEC)	Co-Chair of the IUWG, Utility expert, meeting and material facilitator
IUWG	Carrie Lawlor	Centre Wellington Hydro Ltd.	Co-Chair of the IUWG, Utility expert, meeting and material facilitator
IUWG	Warwick Tichbon	Toronto Hydro-Electric System Limited	Co-Chair of the IUWG, Utility expert, meeting and material facilitator
ITWG	Ryan Harris	Hydro One Networks Inc.	Co-Chair of the ITWG, Utility expert, meeting and material facilitator
ITWG	Donald F. Coffin	Green Button Alliance, Inc.	Co-Chair of the ITWG, Green Button expert, meeting and material facilitator
IUXWG	Michael Murray	Mission:data Coalition	Co-Chair of the IUXWG, policy expert, meeting and material facilitator
IUXWG	Karen Carter	Ontario Ministry of Education	Co-Chair of the IUXWG, end-user expert, meeting and material facilitator

Special Contributions

We would like to acknowledge the particular contributions of a set of active, volunteer workers within the sub-working groups for the many hours of dedication they provided to process and for the creation of material found in this Report:

Working Group	Name	Company	Contribution
ITWG	Tim Sinclair	Savage Data Systems	Ontario Green Button Billing Standard Descriptions; Sample Energy Usage XML file; Sample Retail Customer XML file
ITWG	Ryan Harris	Hydro One	Ontario Green Button Billing Standard Descriptions
ITWG	Zoran Stojanovic	London Hydro	Green Button Energy Usage / Retail Customer CMD/DMD Certification Data Element Function Block Requirements

Frequently Asked Questions

Prior to the Ontario ENERGY DATA regulation, many parties in Ontario were not aware of the complexity of this type of implementation; thus, there was a large learning curve within our sub-working groups. Ontario had no other jurisdiction to look to for best practices that fit our market conditions across such a large number of Utilities. Through participation by subject-matter experts from various areas of the energy industry, the IWG addressed implementation details and answered many questions on its own.

Below are the Industry-Led Working Group's Frequently Asked Questions (FAQs) and their associated answers. All FAQs listed have been approved by the IWG and have evolved out of discussions within the IWG or the sub-working groups.

For an ordered listing of the Frequently Asked Questions, see **Alphabetical Index of FAQs and Best Practices**.

Q1- Do I need to buy the standard?

- If you are an Ontario Electric or Natural Gas Utility or a vendor using the standard, yes. Also see NAESB Copyright: https://www.naesb.org/copyright.asp

Q2 - Where can I find the Ontario Regulation 633/21 "ENERGY DATA"?

- https://www.ontario.ca/laws/regulation/r21633

Q3 - Where can I find OEB staff guidance related to Green Button implementation in Ontario?

- https://www.oeb.ca/consultations-and-projects/policy-initiatives-and-consultations/green-button-implementation

Q4 - Can we do bulk registration?

- For a single Utility, yes; as this is GB-related. Across multiple Utilities, no. Section 3 (1) of the Regulation sets out that it is the account holder that may authorize the Utility to share data with a Third Party. The Utility must be able to identify that it is the actual account holder that is making the request.

Q5 - When do the Utilities have to have their systems operational and Certified by GBA?

- Regulation states November 1st, 2023.

Q6 - Does the ESPI (Green Button) standard handle Line Losses?

- Yes, there are fields for Line Losses.

Q7 - Who needs to get Certified by the Green Button Alliance?

- All Ontario Utilities within the Regulation; completed by November 1, 2023.

Q8 - How many options are there for Reading Quality (for the metered intervals)?

- There are 14 options and more can be proposed, if needed.

Q9 - Are historical data required for former customers of a Utility?

- Utilities are not required to pass data on to previous customers even if they move within the Utility.

Q10 - How many times do I as a Utility need to Certify?

- If they are separate platforms or tested separately you will have to pay separately (same time and using the same engine).

Q11 - What is the cost of GBA Certification?

- DMD Cert+Test is US$3,000.
- CMD Cert+Test is US$3,200.
- The cost of DMD+CMD Cert+Cert+Test is US$3,700. (Both CMD and DMD Certification must occur during the same Certification testing session).

Q11a - What is involved in GBA Certification testing?

- Look on the GBA website https://www.greenbuttonalliance.org/testing for more information. It is part of Ontario's regulation requirement.

Q12 - What consumption data will be made available by Utilities through Green Button methods: e.g. unadjusted (metered) or adjusted (after application of Total Loss factor)?

- The standard does hold these data sets. Each Utility is required to determine what data are available.

Q13 - Is DMD different than existing Green Button download available to customers right now?

- Most legacy Ontario Green Button DMD platforms were not Certified by Green Button Alliance. Likely, it will not be complaint. Reminder: the Ontario Government requires version 3.3 of NAESB REQ.21 ESPI.

Q14 - How much time do Utilities have before sending responses to a Third Party for the request of data?

- The IWG is setting out Best Practices. These will be worked on through industry engagement and activities through sub-working groups.

Q15 - Can a Utility deny a Third Party because they don't meet the requirements of the Utility's Terms and Conditions?

- Yes. However, if T&C were overly restrictive or unduly punitive, Third Parties can escalate to OEB through the Industry Relations Enquiry (IRE) system: IndustryRelations@oeb.ca.

Q16 - What happens if Utility 'A' accepts a Third Party and Utility 'B' rejects them?

- If the Third Party has concern of a Utility rejecting them, they can go through the Industry Relations Enquiry (IRE) system, IndustryRelations@oeb.ca, to engage the OEB.

Q17 - Should the UUID be something common for all Utilities?

- Universally Unique Identifier (UUID) values are used to maintain anonymity and MUST comply with [RFC 4122] version-3 or version-5 formatting requirements. Each ESPI resource (UsagePoint, ReadingType, Customer, etc.) is assigned a UUID value, which must always remain the same so vendors can match datasets.

Q18 - Will we get handholding to understand the ESPI standard?

- Yes. It is the intent of the Technical Working Group to assist in understanding the ESPI standard.

Q19 - Files we received are .xsd files. How can they be opened?

- XML Schema Definition (.xsd) files can be viewed using a browser or open-source XML file viewing tool (Notepad++, Code Browser, Microsoft XML Notepad, XmlPad).

Q20 - Is there a privacy concern regarding Third Parties having access to whether a customer is on OESP as presented on the bill? Does it need explicit consent?

- This should be addressed by the Utility's privacy policy and explained as part of the authorization process.

Q21 - Do we need only the REQ.21 standard or the entire 3.3 version?

- Version 3.3 refers to the latest available version of the NAESB REQ.21 ESPI (i.e., Green Button) standard.

Q22 - What are we looking to solve in these meetings when we're mostly going to be engaging Third Parties to implement Green Button technology?

- As the Utility, you should understand the technical elements of the standard such that if your implementation vendor has questions, you can help clarify the requirement.

Q23 - How do we report loss adjusted data?

- The NAESB ESPI standard provides a means to report loss adjusted data. The Technical Subgroup will provide guidance.

Q24 - Must Utilities include deposit information on-hand on the bill?

- Not unless it is commonly provided to the customer on the bill or online portals. See Best Practices section for more details.

Q25 - For bundled charges on the bill, the regulation states that we may provide a breakout where possible. Do we have to provide this or just provide what is on the bill (summed up)?

- The breakout is not a requirement unless the Distributor provides this information today in the normal course of business. If you can supply it, the standard supports it. See Best Practices section for more details.

Q26 - How far back in time do we need to provide historical data?

- Utilities should provide 24 months' data from the time of request, or as much account and usage history is available at time of request if less than 24 months.

Q27 - For bundled charges on the bill, do Utilities have to provide this or just provide what is on the bill (summed up)?

- Breakout is not a requirement unless the Utility provides this information today in the normal course of business. Providing the breakout in any one-off discussion with a customer, is not considered normal course of business.

Q28 - How do we deal with privacy and cybersecurity as a Utility?

- The standard is capable of managing interaction between the Utility and the Green Button User. Utilities still take on responsibilities as normally required.

Q29 - How do we deal with privacy and cybersecurity as a Vendor or Third Party?

- The standard is capable of managing interaction between the Utility and the Green Button User. Utilities still take on responsibilities as normally required.

Q30 – Can Vendors be GBA Certified?

- The GBA certification process is for Utilities. A Vendor to a Utility can be GBA Certified but Utilities using their products must still get Certified.

Q31 - Where can I get Best Practices for Ontario Green Button implementation?

- The IWG is setting out Best Practices. These will be worked on through industry engagement and activities through sub-working groups.

Q32 - When can Utilities become GBA Certified?

- Utility implementations can enter the queue now; testing is live and being performed to ESPI v.3.3 with both Usage and Retail Customer Data components.

Q33 - Besides Utilities and Vendors to Utilities, what's NAESB's rule on when to obtain the standard?

- "*The NAESB copyright most definitely extends to Third Parties/vendors that would need access to the standard to produce Green Button / ESPI streams or files. We have segments in each of our quadrants for service companies and many member service companies that provide support [to] the utilities, transmission providers, pipelines, local distribution companies, etc.*
"*At the very least, if a company/ individual is offering a 'product/service' that conforms to the standard, then we expect the company/individual to have valid legal access to the standard.*"
— Jonathan Booe, North American Energy Standards Board

Q34 - How will market-wide "Best Practices" be produced and managed?

- The standard is capable of managing interaction between the Utility and the Green Button User. Utilities still take on responsibilities as normally required.

Q35 - Would it be helpful to have a centralized authorization/ authentication solution, where there is a single place for all Utility customers / Third Parties in Ontario?

- It is not part of the existing implementation and is not a requirement under the regulation.

Q36 – Which Function Block(s) or objects does Gas Usage and Utility Bill refer to in the ESPI Retail Customer schema?

- Function Blocks 4, 10 and 15 for Usage Summary. Function Blocks 51-63 for Account Information.

Q37 - How is BR scope parameter used (real example)?

- No real use case has been defined for the use of the BR scope parameter.

Best Practices

What Are Best Practices Approved by the IWG?

A Best Practice is defined as a guideline that is known (as shown by research and/or experience) to produce good or optimal outcomes if followed. A Best Practice is a course of action that represents the most efficient or prudent course of action in a given business situation.

As this is the first iteration of Green Button standards in Ontario, these best practices draw from previous experience with similar systems or lessons learned from other jurisdictions.

The IWG recommends the implementation of these best practices where Distributors can do so without undue burden or interfering with their other regulative/regulatory responsibilities, or where it does not contradict other Utility best practices.

The following are Best Practices recommended by the IWG or its sub-working groups, decided by consensus publicly at the IWG meetings. See **Appendix A**: Non-Consensus Best Practices Items for other considerations discussed.

For an ordered listing of the Best Practices, see **Alphabetical Index of FAQs and Best Practices**.

Best Practices Submitted by the Independent Utility Working Group (IUWG)

Utility Grid Work / Service Outage Information

Recommendation: Utility Grid work / Service Outage information Requirements is not within scope of the Ontario Green Button implementation.

Why?

- Outage information varies from one Utility to the next, and not all Utilities have software systems dedicated to the automated management of outage notifications.
- Outage information is provided to customers via existing channels, for example My Account customer portals and through social media.
- Outage information is not identified within the NAESB ESPI standard.

Providing Weather Data in Green Button format for Electric or Gas Utilities

Recommendation: Providing Weather Data in Green Button format for Electric or Gas Utilities is not within scope of the Ontario Green Button implementation.

Why?

- Weather data is provided on some customer portals, but the Utility is not the source of this data, and it is not stored in the Utility systems. It is generally a real time API interface with Pelmorex (The Weather Network).
- Providing weather data would add complexity and cost to the Green Button solution.

Providing TOU to Tiered Comparison in Green Button Format

Recommendation: Providing TOU to Tiered comparison in Green Button format is not within scope of the Ontario Green Button implementation.

Why?

- Bill comparison between Tiered and TOU rates is a complex data analysis process. The algorithm calculates the cost differential based on a customer's historical usage at the current Tiered and TOU rates.
- Green Button data being provided will allow a Third Party to develop the same features in their application if this were something that would add value to their product.
- Consumers have existing tools to see a bill comparison, through the OEB rate comparison tool, or via existing Utility customer portals.

Regulation Requirement for Energy and Account Holder Information

Recommendation: Under the Green Button Regulation, Distributors are required to make energy usage and account holder information available in Green Button format. As a general principle, the information to be made available is information identified in the NAESB ESPI standard, and where the Utility is the authoritative source of the data that is collected and made available to its customers in the normal course of its operations.

Why?

- Data requirements that are outside of the scope of Green Button standards could necessitate a Utility having to make changes to their operational practices, with limited or no cost recovery.
- Data that is not identified in the NAESB ESPI standard, cannot be provided within the context of the NAESB standard XML schemas.
- Aside from commodity costs that Distributors bill and collect from consumers on behalf of Electricity Retailers, providing any Third-Party charges that appear on the bill but do not originate from the Utility should not be considered within scope of the Ontario Green Button implementation.

Maintenance Windows

Recommendation: Maintenance windows. Utilities should make best efforts to notify external parties of regularly scheduled maintenance windows, that would impact the ability of apps to retrieve data. Unscheduled emergency maintenance is not included in the notification process.

Why?

- Will allow Third Parties to schedule routine maintenance to coincide with Utility maintenance windows, minimizing impact to consumers.
- Third party vendors can communicate with consumers if the schedule is known in advance.
- The priority during emergency outages or outages outside of the Utility's control is on returning systems to normal operations.

Real Time Account Balance

Recommendation: Real-time account balance information is not within scope of the Ontario Green Button Implementation.

Why?

- Utility CIS systems do not store a running account balance. The customer's current balance is calculated 'on the fly'.
- It is sufficient to provide the information that shows on the last published bill, i.e., Amount Owing.

Best Practices Submitted by the Independent User Experience Working Group (IUXWG)

Customer Notifications

Recommendation: Customer Notifications. Where the account holder has provided a valid email address, Utilities should send an initial authorization confirmation by email, but thereafter are not required to send periodic reminders to customers about the Third Parties they have authorized.

Why?

- The authorization form should advise the customer that Third Parties will have access to their data until such time as the customer revokes the authorization and advise the customer that they can revoke the authorization at any time.
- Customers should receive a confirmation by email after a successful authentication and authorization. This communication will allow the customer to review and validate their actions.
- Customers should be able to see which Third Parties they have authorized via the existing online customer portal, with links to documentation on how to amend or rescind an authorization.
- Notifications should align with Utility current best practices to avoid customer confusion.

Customer Experience Begins at the Third Party's Website

Recommendation: In Green Button Connect My Data, the customer experience begins at the Third Party's website. Then the user is redirected to the Utility. If the customer is not already logged in to the Utility, the customer must first authenticate, using the Utility's standard procedure(s). Once authentication is successful, then the authorization screen should be one web page. Finally, the user is redirected to the Third Party's website to complete the transaction.

Why?

- In other jurisdictions, Utilities designed very different user journeys without standardization.
- Failing to be specific at the outset about the customer "flow" can result in customer confusion and wasted effort.

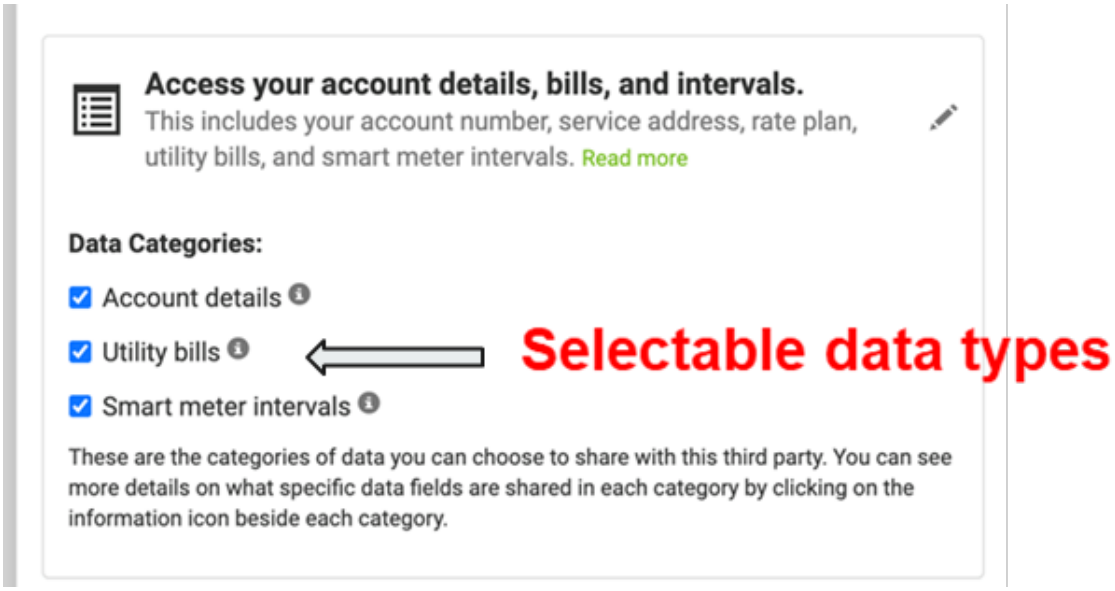
- The latest Green Button CMD method of the standard requires that customers begin the journey on the Third-Party site.

Customer Take it or Leave it

Recommendation: General description: Distributors should support the concept of "take it or leave it" scopes of authorization that are presented to customers. Data types should be selectable or unselect able by the customer depending upon the Third Party's dynamic selection. (Note: This would not apply to meter/service selection, which must always be chosen by the customer.) See examples in previous Best Practice recommendation.

Technical description: Distributors should support "noedit" as a parameter in "AdditionalScope." The Third Party may or may not include "AdditionalScope" in its authorization request, but if included, Distributors should honour it, making the data types fixed and unchangeable by the customer.

Option #1



Option #2 – Take it or Leave it

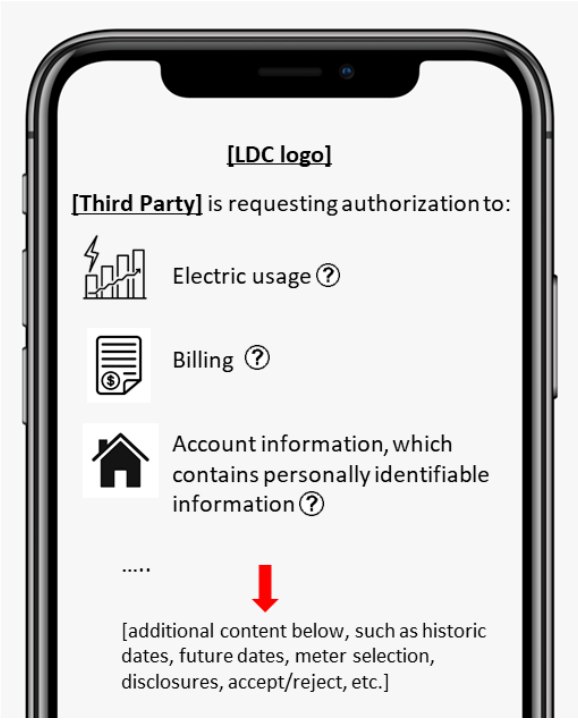
Why?

- If a Third Party requires, for example, 24 months of usage history to deliver their product, it doesn't make sense for the customer to unknowingly reduce the history to 3 months, rendering the product non-functional. (Note: if the customer moved in only 2 weeks ago, then only 2 weeks of history will be provided regardless.)
- A frustrating user experience would result in a back-and-forth between Distributor and Third Party if the authorized scope is not sufficient for a particular product being offered.
- Other jurisdictions (California, New York) have adopted "noedit" as a best practice for this reason.

Vocabulary of Scope Selection

Recommendation: The presentation of data elements included in the customer authorization screen should be consolidated and standardized into the following categories:

Example of electric-only utility:



- "Electric usage"
- "Gas usage"
- "Billing"
- "Account information, which contains personally identifiable information"

Additional explanation should be available with an ? icon, beside each item named above, with a more detail.

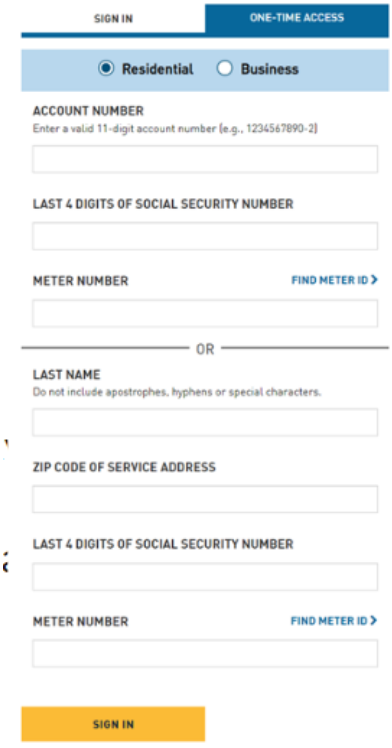
Note: Only the categories requested by the Third Party will appear. E.g., if "Billing" is not requested, it will not appear.

Why?

- Reflects identified best practices in other jurisdictions.
- This will allow standardization in terminology between different Utilities across the province.
- Provides clear, concise, consistent verbiage for customer authorization process in defining the data being shared.

Alternative Digital Process

Recommendation: The Utility should provide an alternative digital process wherein a customer visiting the website will have the ability to identify themselves without requiring creation of an online account in the Utility's customer portal. The personal information required to establish identity should be consistent with the Utility's standard practices.



Example of PG&E's one-time access.
This is just an example.

Why?

- Some customers who wish to share their data in Green Button format with a Third Party will not have an online account (My Account portal), nor a desire to register for one.
- Digital processes can be designed to accommodate an accountholder sharing their data via a "one-time login" or something similar.
- Establishing identity in this manner should not be more onerous than establishing identity in creating a "My Account," i.e., the personal information required should be consistent between these two methods.

Customer Without Internet Access

Recommendation: For customers without internet access, the Utility should establish both telephone and/or paper form-based processes whereby a customer can grant a data-sharing authorization (or revocation). For technical implementation of this recommendation, OAuth2.0 standards shall be followed, consistent with ITWG guidance. * In the case of telephone authorizations, Utility staff should assist the customer to meet the authentication and authorization requirements. (The intent of this recommendations is not to resolve or address the mechanism of bulk authorizations.)

* Telephone or paper methods will be available based on customer type following standard Utility practices. For example, Utilities may prescribe paper forms for large commercial customers but support telephone authorizations for residential customers.

Why?

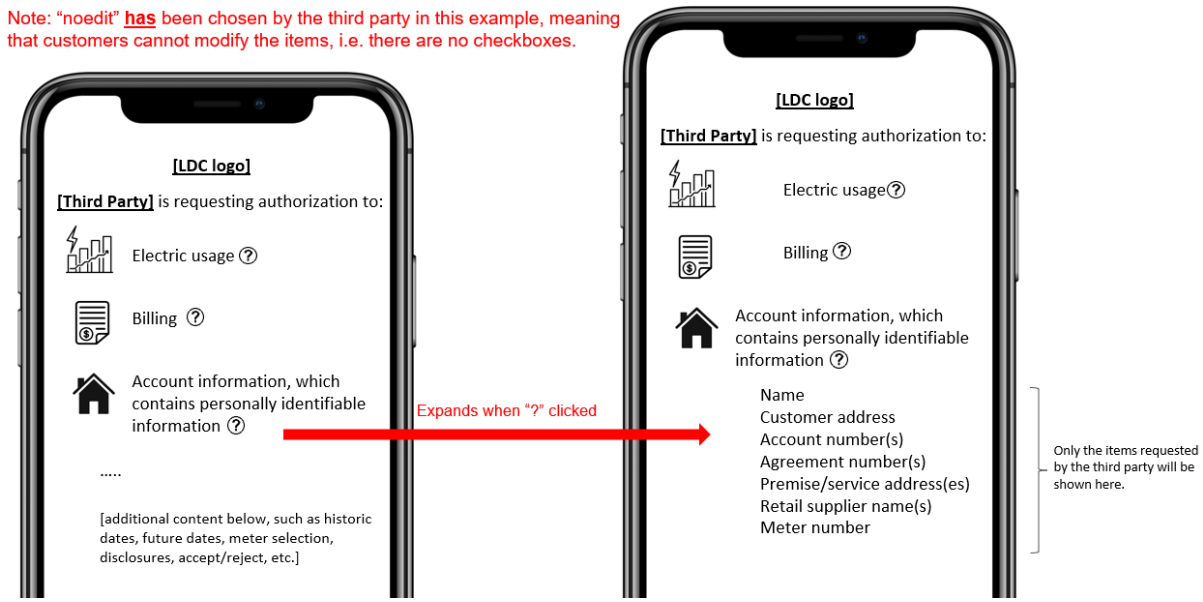
- Green Button implementations are digital tools; however, we anticipate a small number of customers who do not have Internet access, will want to share their data with Third Parties. To ensure confidentiality and accountability in a telephone call, this is best handled by the Utility staff, who have access to the customer's information.
- Business customers may want to use paper forms to ensure that internal approvals are correctly obtained.

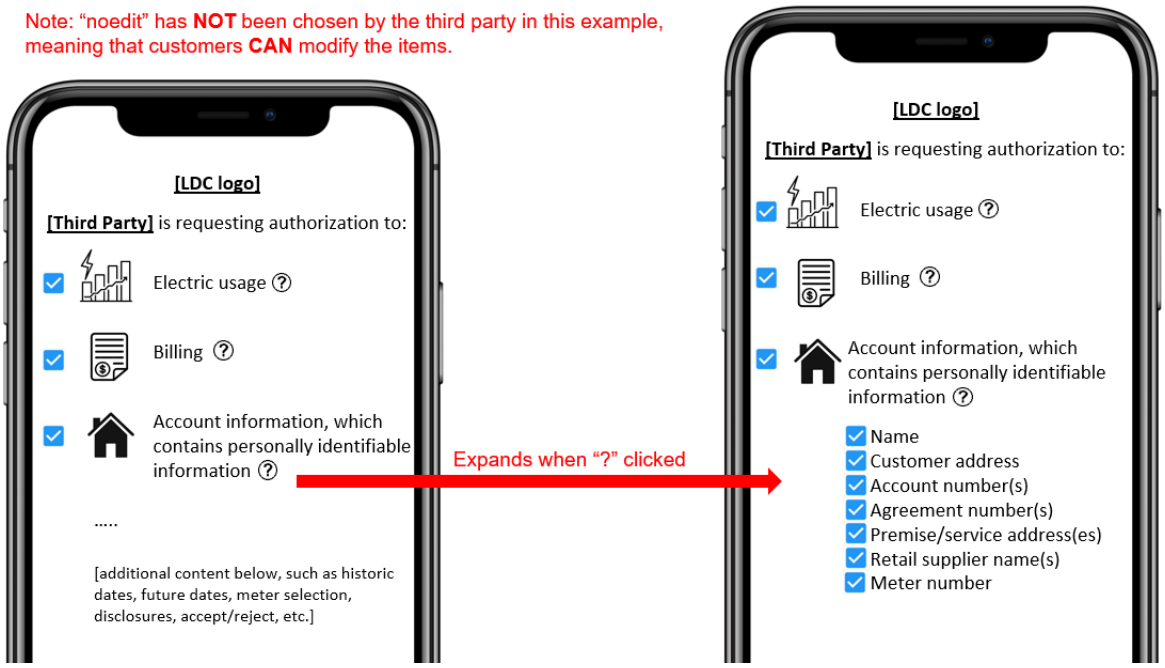
Detailed Handling of Account Information Selection During Authorization Process

Recommendation: The customer authorization screen should indicate to the customer the type of Account Information the Third-Party application is requesting, as each scope parameter Function Block value requests different types of customer information. See examples below.

Why?

- Since the Third Party may only be interested in some of the customer's Account Information, the customer should be aware of the type of Account Information being requested before they authorize the Third-Party application access.
- The customer may not want to provide the Third-Party application with access to some Account Information being requested and should be able to selectively deny access based on the type of Account Information being requested by the Third-Party application (note: if "noedit" is not selected by the Third Party).





Best Practices Submitted by the Independent Technical Working Group (ITWG)

Electric Consumption in IntervalBlocks

Recommendation: Electric consumption in IntervalBlocks should be reported as per the definition in the Retail Settlement Code, section 11.3.

Why?

- This will provide consistency for all users of the data and ensure they do not have to adjust different periods of time or between data sets.
- It will ensure consistency in how data is supplied by Green Button solutions as compared to EBT purposes.

Data-Request Performance

Recommendation: With respect to data-request performance, the consensus is that "Historical Requests" would be processed by Utilities as soon as possible based on current processing load. This means that it is expected that requests would be fulfilled near real-time or within a few hours if the request came at a peak time (precluding outage windows).

Why?

- There is a mechanism to alert Third Parties to new data being available from a Utility; therefore, it is expected that large data requests are not needed on a regular basis.
- Most Utility systems utilize a batch cycle process, which means that data does not change, or is not made available on a continuous basis and therefore, does not require real-time response.
- Data integration methods for some Utilities may be predicated on other Third Parties (e.g., IESO MDM/R).

Pre-printed/Pre-formatted Information

Recommendation: Pre-printed/pre-formatted information that is supplied as part of the utility bill but is static or mandatory in nature (e.g., HST registrant number, bill terminology definitions, E&OE terms, etc.) does not have to be supplied within the Green Button data loads.

Why?

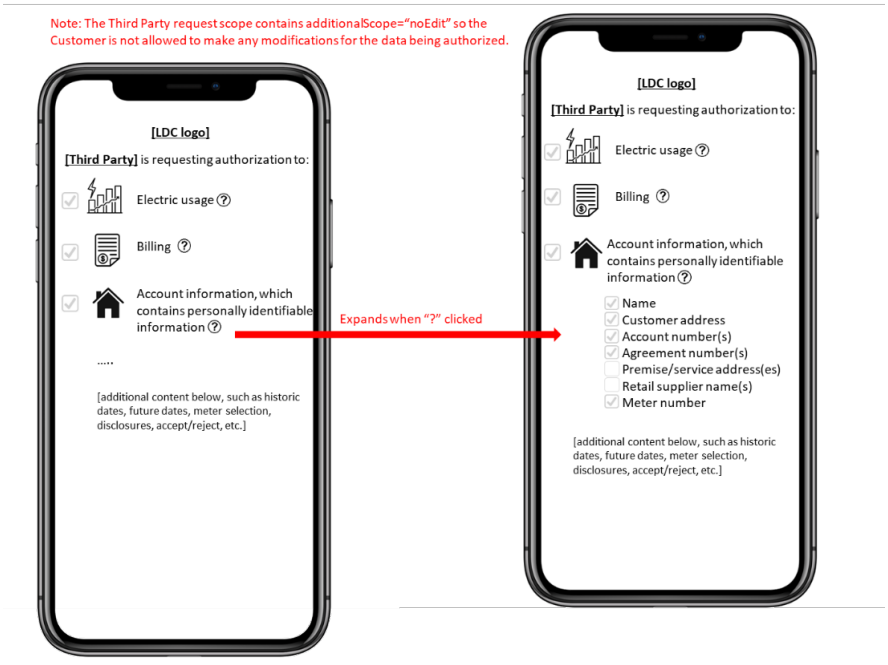
- This information is standard for all the customers in a given Utility and may not be in electronic form (e.g., may be on pre-printed paper stock or pre-formatted design templates for e-bills).
- The information is not specific to each customer's account or energy usage.
- The information is not relevant to Third Parties consuming energy or account data for analytics purposes.
- The information is available publicly through other means (e.g., "What does my bill mean" examples on Utility websites) or to the customer directly through their regular bill.

Detailed Handling of Authorization Consent Form Rendering with Use of noEdit AdditionalScope Parameter

Recommendation: If the OAuth 2.0 Authorization Server Authorize Endpoint request contains a scope parameter 'additionalScope=noEdit' element the customer should only be allowed to Deny or Authorize the request. They should not be able to make any modifications to the request on the Authorization screen. See diagram example below.

Why?

- The use of the 'additionalScope=noEdit' element in the scope parameter indicates the data being requested is required by the Third-Party application to function properly.
- Any additional data the customer Authorizes violates the OAuth 2.0 access token standard by granting the Third Party more authorization than they have requested.
- Any additional data the customer Authorizes the Third Party beyond what they are requesting will not be used by the Third-Party application and may cause software issues.
- Any reduction of the requested data by the customer likely will limit or prevent the Third-Party application from properly functioning.



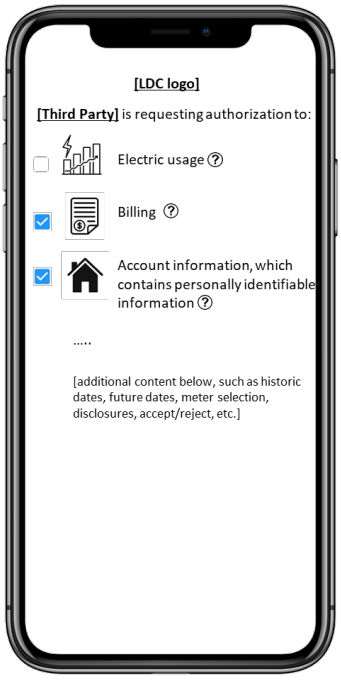
Detailed Handling of Appearance of Energy Usage on Authorization OAuth Authorization Form

Recommendation: If the OAuth 2.0 Authorization Server Authorize Endpoint request contains a scope parameter without an Energy Usage Function Block (e.g., 1, 3-12, 29, 34-40) element, the customer's Authorization screen should not allow them to access the Energy Usage checkbox. See diagram example below.

Why?

- The lack of Energy Usage Function Block elements in the scope parameter indicates the Third Party is not interested in Energy Usage information.
- Addition of Energy Usage by the customer violates the OAuth 2.0 access token standard by granting the Third Party more authorization than they have requested.
- Addition of Energy Usage Information by the customer provides additional data the Third-Party application will not use and may cause software issues.

Note: The Third Party request Scope does NOT contain Energy Usage Information Function Blocks (FB_1, FB_3 – FB_12, FB_29, FB_34 – FB_40) which means the customer is NOT allowed to access the Energy Usage Checkbox



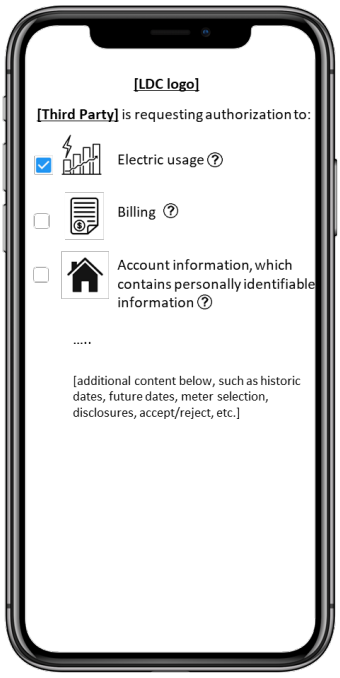
Detailed Handling of Appearance of Billing Information on OAuth Authorization Form

Recommendation: If the OAuth 2.0 Authorization Server Authorize Endpoint request does not contain a scope parameter with a Billing Information Function Blocks (e.g., FB_15, FB_16, FB_27, FB_28 element present, the customer's Authorization screen should not allow them to access the Billing Information checkbox. See diagram example below.

Why?

- The lack of any billing information function blocks in the scope parameter indicates the Third Party is not interested in Billing Information.
- Addition of Billing Information by the customer violates the OAuth 2.0 access token standard by granting the Third Party more authorization than they have requested.
- Addition of Billing Information by the customer provides additional data the Third-Party application will not use and may cause software issues.

Note: The Third Party request Scope does NOT contain Billing Information Function Blocks (FB_15, FB_16, FB_27, FB_28) which means the customer is NOT allowed to access the Billing Checkbox



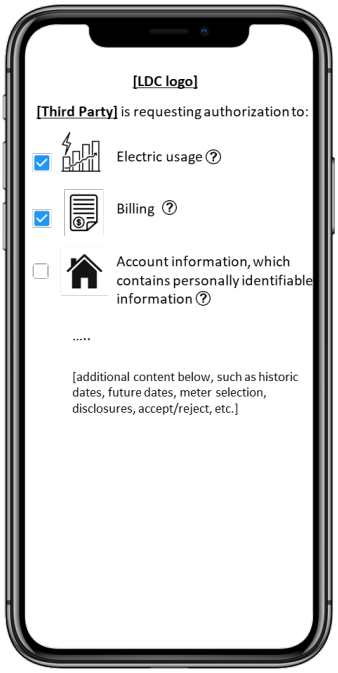
Detailed Handling of Appearance of Account Information on Authorization Consent Form

Recommendation: If the OAuth 2.0 Authorization Server Authorize Endpoint request contains a scope parameter without a Retail Customer Function Block (e.g., FB_51, FB_53 – FB_70) element, the customer's Authorization screen should not allow them to access the Account Information checkbox. See diagram example below.

Why?

- The lack of Retail Customer Function Block elements in the scope parameter indicates the Third Party is not interested in Account Information.
- Addition of Account Information by the customer violates the OAuth 2.0 access token standard by granting the Third Party more authorization than they have requested.
- Addition of Account Information by the customer provides additional data the Third-Party application will not use and may cause software issues.

Note: The Third Party request Scope does NOT contain Account Information Function Blocks (FB_51, FB_53 – FB_70) which means the customer is NOT allowed to access the Account Information Checkbox

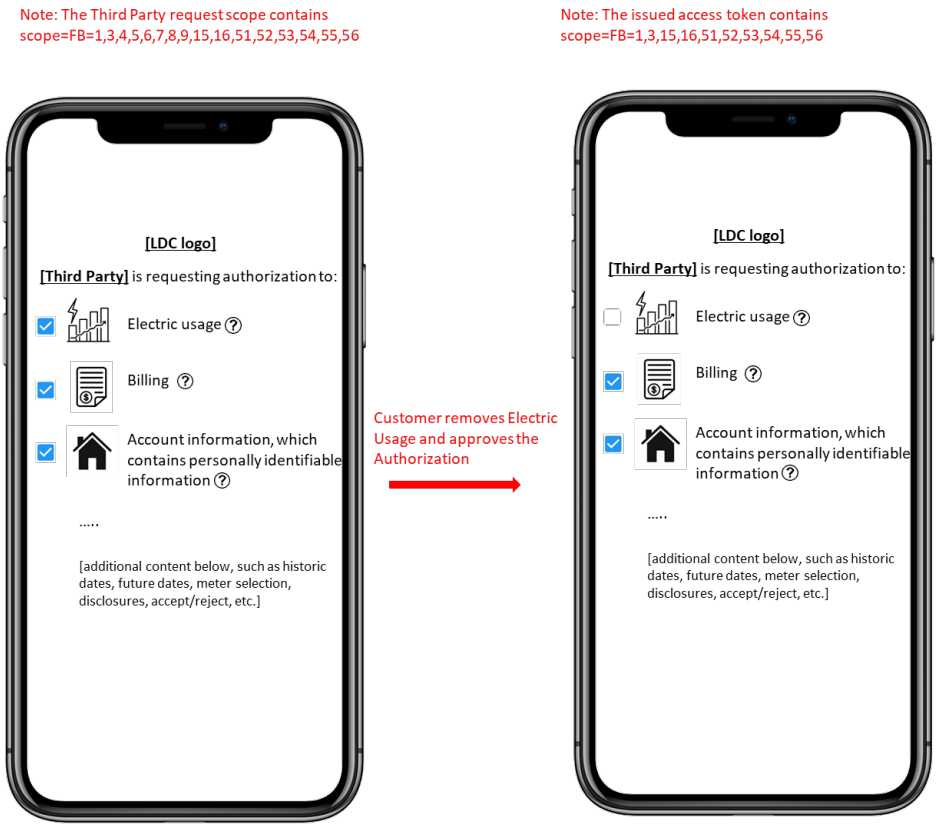


Detailed Handling of "Energy Usage" Selection During Authorization Process

Recommendation: If the Customer removes Energy Usage from the Authorization screen before Authorizing access to the Third Party, the response from the Authorization Server Token Endpoint should not contain any Energy Usage Function Block values (FB_1, FB_3 – FB_12, FB_29, FB_34 – FB40) in the returned scope parameter, nor include a resourceURI element. See diagram example below.

Why?

- The presence of a resourceURI element in the access token response provides the Third-Party application greater authorization than indicated by the Customer.
- The presence of Energy Usage Function Block values in the returned scope parameter provides the Third-Party application greater authorization than indicated by the Customer.

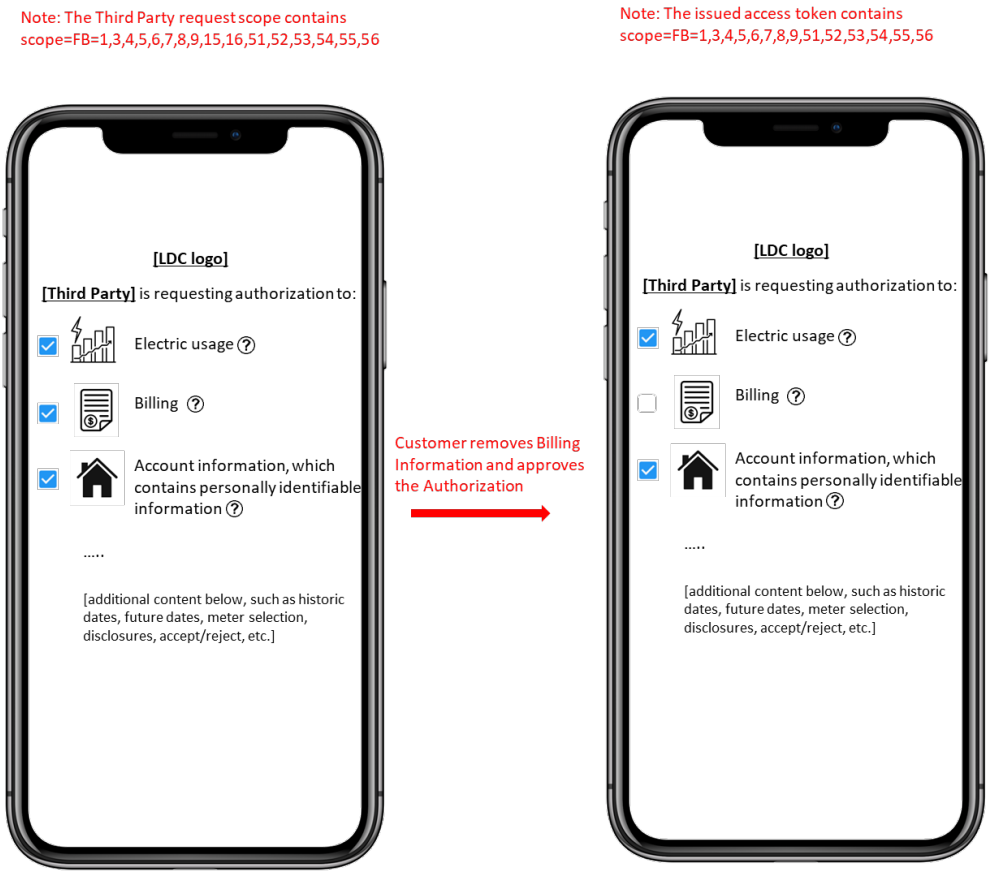


Detailed Handling of Billing Information Selection During Authorization Process

Recommendation: If the Customer removes Utility Billing from the Authorization screen before Authorizing access to the Third Party, the response from the Authorization Server Token Endpoint should not contain Function Block 15, 16, 27 and 28 (i.e., billing information function blocks) values in the returned scope. See diagram example below.

Why?

- The presence of billing information function block values in the returned scope parameter provides the Third-Party application greater authorization than indicated by the Customer.

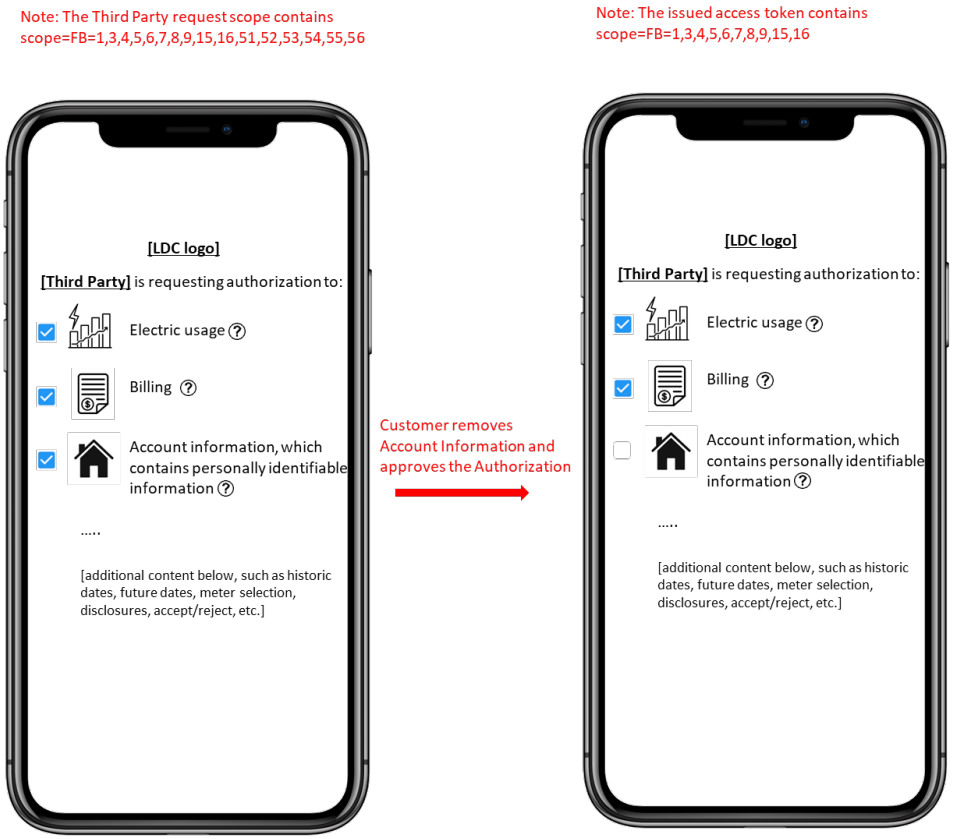


Detailed Handling of Account Information Selection During Authorization Process

Recommendation: If the Customer removes Account Information from the Authorization screen before Authorizing access to the Third Party, the response from the Authorization Server Token Endpoint should not contain any Retail Customer Function Block values (FB_51, FB_53 – FB_70) in the returned scope parameter, nor include a customerResourceURI element. See diagram example below.

Why?

- The presence of a customerResourceURI element in the access token response provides the Third-Party application greater authorization than indicated by the Customer.
- The presence of Retail Customer Function Block values in the returned scope parameter provides the Third-Party application greater authorization than indicated by the Customer.



Alphabetical Index of FAQs and Best Practices

Technical Considerations

The Independent Technical Working Group (ITWG) was responsible for working with the other independent sub-working groups to provide technical assistance and support to ensure the Ontario implementation of the NAESB REQ.21 ESPI version 3.3 (i.e., "Green Button") standard implementations met the Ontario Green Button requirements.

The group discussed the following topics:

- Use of the Ontario ENERGY DATA regulation and Utility bills to understand what data a Utility must supply using the Green Button standard
- Gain group understanding and consensus on the Green Button data structure and application to each Utility's internal dataset
- Understand the Green Button data content (e.g., units of measure) and how to properly report it using the Green Button data format requirements
- Discuss and confirm the group's understanding of the difference between a customer's authentication and data authorization
- Discuss and understand the process and data requirements of Utility onboarding Third Party applications
- Discuss and understand the proper application of the Atom Publishing Standard (RFC 4287)
- Discuss and understand the Data Element Function Block requirements of the Green Button CMD Certification program

As part of the above objectives the ITWG developed two sets of documentation to assist Utilities during their implementation planning and process: the *Utility Billing Mapping* and the *Green Button Certification Data-Element Function Blocks*. See **Appendix B: Technical Material** Overview for detail.

###

Appendix A: Non-Consensus Best Practices Items

Although the IWG strived for unanimous consensus for Best Practices, the IWG is a diverse group of companies and people, and not everyone was always in agreement. When there was Non-Consensus, the working group / sub-working group that submitted the Best Practice had the option to submit a Best Practice without full consensus to be identified appropriately. Those are detailed here with Non-Consensus reasons provided.

Distributors to Prevent Inadvertent Termination of Data Flows

Submitted by: IUXWG

Non-Consensus – IWG

Recommendation: A best practice is for Distributors to prevent inadvertent termination of data flows due to meter changeouts and "legitimate" account number changes (e.g., CIS upgrades).

Why?

- In the past, some commercial customers with hundreds/thousands of meters have experienced revocations of data-sharing without their knowledge.
- Several Distributors are planning imminent upgrades to their CIS, and customers want to ensure their data-sharing is as seamless as possible.

Non-Consensus Reason:

- Green Button data users also want the best practice to apply to Utility mergers. Their rationale is that the administrative burden of ensuring continuity of consumption data should be the Distributor's responsibility, not the customers'.
- Distributors disagreed, saying it is not always technically possible.
- IUXWG requests OEB guidance with additional input from all interested parties.

Bad Actors & Notifications

Submitted by: IUXWG
Non-Consensus – IWG

Background on Issue: This issue focuses not on the enforcement procedures involving Third Parties that have breached Utility terms and conditions and become "bad actors." Rather, this issue is focused on the question of what notifications to various parties should be triggered in various cases:

- What is the notification mechanism when a Third Party is deemed a bad actor?
- What is the notification mechanism when a bad actor has been "reformed"?

Below is a helpful escalation model from other jurisdictions:

Recommendation: For this recommendation, the following terms apply: (1) "Suspicion" means a Utility gains a reasonable suspicion that a Third Party has violated the terms between Utility and Third Party. (2) "Suspension" means a Utility temporarily halts some or all data transmission to a Third Party due to verified term violations or an imminent potential violation. (3) "Termination" means a Utility halts all ongoing data transmission to a Third Party due to a final determination of a terms violation.

A- ***Suspicion*** should not result in customer notifications.

B- ***Suspension*** should trigger prompt notification to Third Party.

C- ***Termination*** triggers notifications to affected customers and the Third Party.

- A "redeemed" Third Party should trigger notifications to the Third Party and customers who had active authorizations at the time of suspension or termination.
- Utilities can contact OEB about any of the above as needed.
- Utilities should provide an optional mechanism for non-residential customers to receive notifications if their Third Party is suspended.

* The processes of "suspension," "termination" and "redeeming" a Third Party are not prescribed by this recommendation.

Why?

- Uniform expectations for notification procedures across Utilities are helpful to everyone.
- Third party business reputations could be unfairly damaged by notifying customers of suspected, but not verified, wrongdoing.

Non-Consensus Reason:

- Per the Green Button Implementation – Draft OEB Staff Guidance letter sent on October 12, 2021, OEB staff notes it would generally not be a Distributor's role to monitor the behaviour of a Third Party once the customer agrees to share their data with the Third Party. Rather, it is the Third Party's responsibility to manage the data under its own privacy policies and legal or regulatory requirements.
- While not required to monitor the behaviour of Third Parties, Utilities understand the importance of protecting their internal systems, their customers and the Green Button data, and may terminate the authorization for a given Third Party if there has been a significant violation of the terms and conditions under which access to the energy data was provided.
- The proposed steps (suspicion, suspension, termination) seem logical, but Utilities need flexibility to establish their own process based on their legal advice and operating procedures, for actions they would take in cases where a Third Party is in violation of the Utility Terms and Conditions.
- Utilities feel strongly that the business relationship is between the customer and the Third Party. Third party organizations have a responsibility to communicate with their customers on all matters related to their business.
- Some form of notification to the OEB makes sense. As the Regulator, they should be aware of potential risks to Ontario consumers, and the steps being taken to protect them. Notification of other Utilities would not be appropriate. The OEB has stated that Utilities can accept or reject a Third Party based on their individual terms and conditions. If a Third Party violates one Utility's Terms and Conditions, that doesn't mean they would be in violation of another Utility's Terms and Conditions. A concern is that communicating your actions to other Utilities could lead to legal action by the Third Party.

- We do not agree that Utilities should be required to notify customers about the suspension or termination of a Third Party. The Third Party is responsible for doing this. This would be a significant increase in in scope from what is documented in the Regulation and OEB guidance. Green Button solutions and/or CIS systems would require customization to support this, which adds complexity, time and cost to the Utility's Green Button implementation. Utilities are committed to meeting the implementation timeline, but we need to move forward with implementation to do so.

Standardized Letter of Authorization

Submitted by: IUXWG

Non-Consensus – IWG

Recommendation: In order to support large, multi-site customers, Distributors should accept a standardized letter of authorization (LOA) so that customers can fill out a single form and send it to multiple Utilities for processing.

Why?

A standardized form provides (i) significant administrative efficiencies to larger customers spanning multiple Utilities and (ii) consistency across Ontario's electricity providers.

Non-Consensus Reason:

- Utilities believe manual authorization forms should only be supported for customers without internet access, and a large volume of LOAs will become unmanageable and distracting from the core web-based Green Button solution.

- Utilities believe it is impractical to standardize the form given that each Utility may have unique authentication requirements and legal terms and conditions.

###

Appendix B: Technical Material Overview

Utility Billing Mapping

Since the Ontario ENERGY DATA regulation requires a Utility to provide Customer billing information as part of the Green Button exported data, a request was made to review utility bills to determine if a consensus could be reached defining the billing line-item description to be used when transmitting the billing information using the Green Button standard. Sample bills were submitted by Alectra Utilities Corporation, Centre Wellington Hydro Ltd., Elexicon Energy Inc., Enbridge Gas Inc., Energy+ (GrandBridge Energy Inc.), Entegrus Powerlines Inc., ERTH Corporation, FortisOntario Inc., Halton Hills Hydro, Hydro One Networks Inc., Hydro Ottawa Limited, Kitchener Utilities, Toronto Hydro-Electric System Limited, and Utilities Kingston to the ITWG that were then analyzed. Each source supplied 3 to 10 sample billing statements.

The mapping process consisted of reviewing Electricity and Gas consumer bills, establishing standard terminology for items that are the same but worded differently depending on the Electric or Gas Distribution company, and assigning numeric annotations to each item on the bill. The annotation was then used as the item's identifier on the developed table of "Ontario Green Button Billing Standard Descriptions."

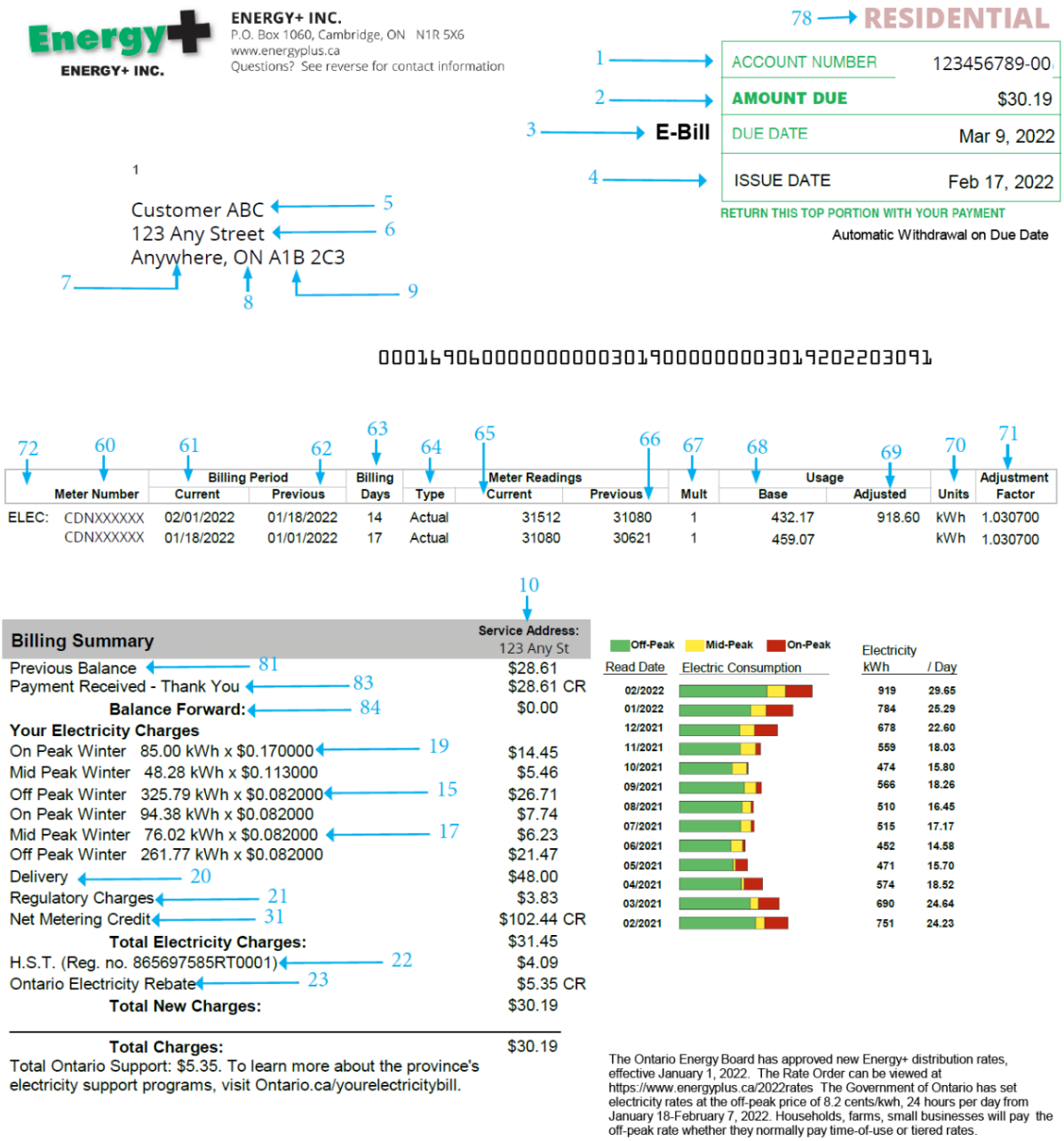
The "Ontario Green Button Billing Standard Descriptions" was done with the intent of supporting Third Parties in consuming billing data from Utilities using the Green Button standard: to ensure they could understand common elements if they use this information to recompose a bill or align the data they receive using Green Button in comparing them to a Utility-printed bill.

It is incumbent on all Utilities to examine their bills and decide which elements fall into the standard description. The ITWG has attempted to map as many common descriptions as possible, but we understand there will be exceptions based on individual approved rate orders and bill layouts.

Utility Billing Mapped Sample Bills

The following section shows two examples of consumer bills that have been marked with the annotations described above. Figure 2 is a Distributor Sample Bill. Figure 3 is a Redacted Residential Sample.

The “Figure 2 - Distributor Sample Bill” from Energy+ shows how the sample bills were annotated. The annotations match the “Item” Number column of the Ontario Green Button Billing Standard Descriptions in the next section.



72	60	61		62	63	64	65		66	67	68		69	70	71
	Meter Number	Billing Period Current		Previous	Billing Days	Type	Meter Readings Current		Previous	Mult	Usage Base		Adjusted	Units	Adjustment Factor
ELEC:	CDNXXXXXX	02/01/2022		01/18/2022	14	Actual	31512		31080	1	432.17		918.60	kWh	1.030700
	CDNXXXXXX	01/18/2022		01/01/2022	17	Actual	31080		30621	1	459.07			kWh	1.030700

Figure 2 - Distributor Sample Bill

The “Figure 3 - Redacted Residential Sample” is a mocked-up example of a utility bill using Ontario Green Button Billing Standard Descriptions. The XML samples included in the next section are based on the mocked-up Distributor Billing statement.

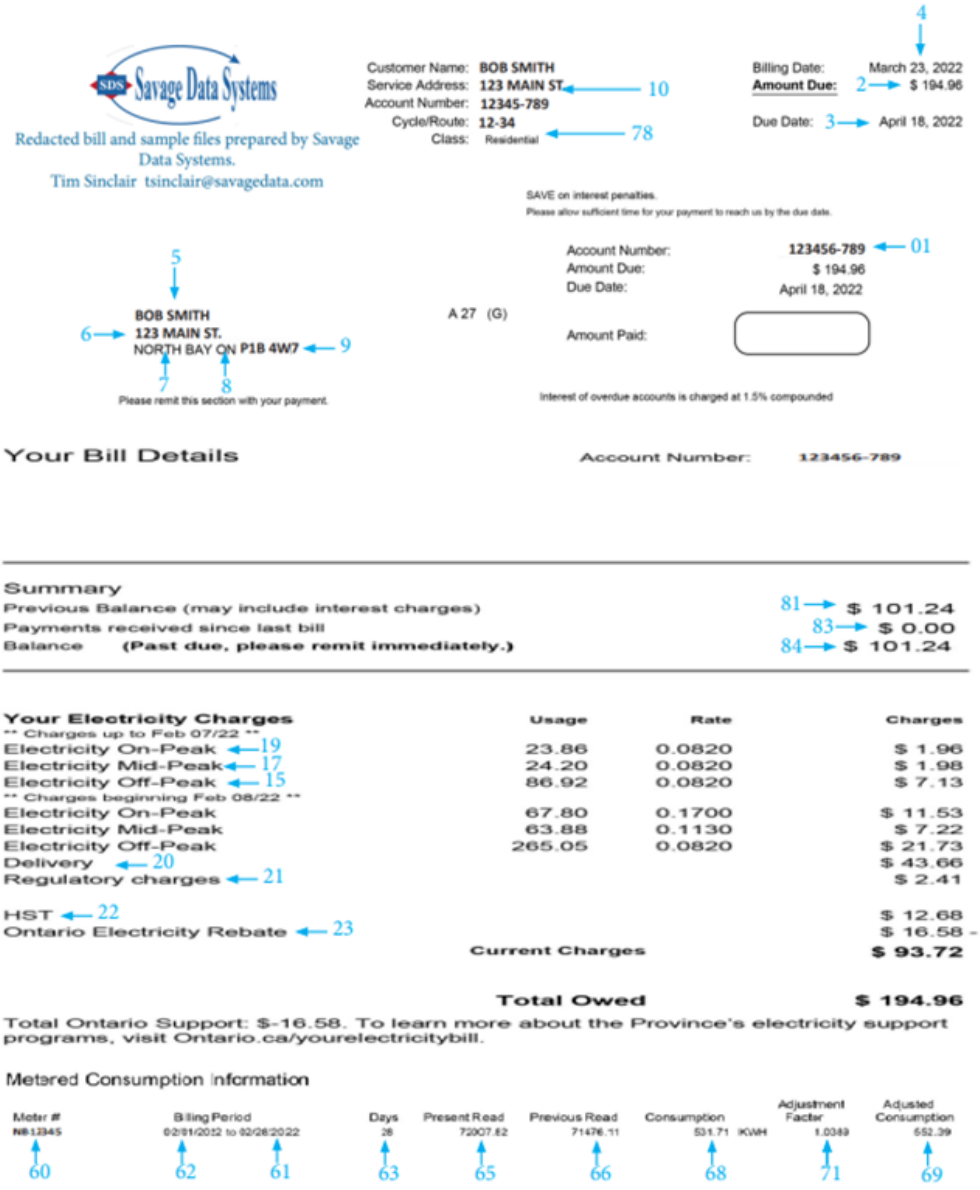


Figure 3 - Redacted Residential Sample

Ontario Green Button Billing Standard Descriptions

If a Utility has multiple line items that contain the same Ontario Green Button Billing Standard description, they may supply multiple line items or group the values into a single entry.

The following tables contain the Billing Statement line-item descriptions developed by the Independent Technical Working Group. The descriptions have been grouped into sub-groups of common, electricity, natural gas, and water billing line-item descriptions. The common descriptions are used by all Distributor bills regardless of the energy type being billed. The other descriptions are specific to the energy type the Utility is billing.

The following describes the contents of each column of the Ontario Green Button Billing Standard Description table.

- **Item** – This is the item identifier assigned to the annotated sample bills. Use this value on the sample annotated bill to locate the line-item description to be used when transmitting Billing Information using the Green Button XML data format.
- **Green Button Standard Description** – This is the line-item description value to be used when transmitting Billing Information using the Green Button XML data format
- **Required(R)/Optional(O)** – This indicates if the line-item standard description is Required or Optional. Required indicates if the Distributor provides the item on the consumer's bill, then the item is to be included in the Green Button Billing XML data. Optional indicates the item does not have to be included in the Green Button Billing XML data (subject to Ministry/OEB direction). Note: The Green Button Alliance has not confirmed the values shown in this column meet the Green Button CMD Certification requirements.
- **Energy Usage (EU)/Retail Customer (RC)** – This indicates if the data is transmitted using the Green Button Energy Usage or Retail Customer data XML formats
- **Bill File** – This list the name of the Utility who supplied the sample billing statement. It is a partial list of all the samples we received.
- **Line-Item Description** – This list the line-item description on the Utility-provided sample billing statement.
- **Notes for Green Button XML** – This section provides comments on the possible values that can be entered.

Ontario Common Green Button Billing Descriptions

Prepared by: Tim Sinclair & Ryan Harris, with bill contributions from the named Utilities and discussions in the ITWG.

tsinclair@savagedata.com / ryan.harris@hydroone.com

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
1	Account Number	R	RC	EnergyPlus	Account Number	
				ERTH Power	Account Number	
				Alectra - Residential	Account Number	
				Alectra - Commercial	Account Number	
				Hydro One Networks	Your Account Number	
				Kitchener Wilmot Hydro	Account Number	
2	Amount Due	R	EU	EnergyPlus - Residential	Amount Due	
				ERTH Power -	Amount Due	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Residential Time-of-Use		
				Alectra - Residential	Amount Due	
				Alectra - Commercial	Amount Due	
				Kitchener Utility Gas	Total Due	
				ERTH Power - MicroFIT Customer	Pre-Authorized Amount	
				Kitchener Wilmot Hydro - Commercial	What Do I Owe ?	
3	Due Date	R	EU	EnergyPlus - Residential	Due Date	
				ERTH Power - Residential Time-of-Use	Due Date	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Alectra - Residential	Due Date	
				Alectra - Commercial	Due Date	
				ERTH Power - MicroFIT Customer	Withdrawal Date	
				Kitchener Wilmot Hydro - Commercial	When is My Payment Due ?	
4	Bill Date	R	EU	EnergyPlus - Residential	Issue Date	
				ERTH Power - Residential Time-of-Use	Bill Date	
				Alectra - Residential	Statement Date	
				Alectra - Commercial	Statement Date	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Kitchener Utility Gas	Issue Date	
				Kitchener Wilmot Hydro - Commercial	Invoice Date	
5	Mailing Name	R	RC	EnergyPlus - Residential		
				ERTH Power - Residential Time-of-Use		
6	Mailing Street address 1	R	RC	EnergyPlus - Residential		
				ERTH Power - Residential Time-of-Use		
14	Mailing Street address 2	R	RC	ERTH Power - Residential Time-of-Use		
7	Mailing Town/City	R	RC	EnergyPlus - Residential		

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				ERTH Power - Residential Time-of-Use		
8	Mailing Prov/State	R	RC	EnergyPlus - Residential		
				ERTH Power - Residential Time-of-Use		
16	Mailing Country	R	RC	ERTH Power - Residential Time-of-Use		
9	Mailing Postal Code / Zip Code	R	RC	EnergyPlus - Residential		
				ERTH Power - Residential Time-of-Use		
10	Service Address line 1	R	RC	ERTH Power - Residential Time-of-Use	Service Address	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Alectra - Residential	Service Location	
				Kitchener Wilmot Hydro - Commercial	Service Address	
128	Service Address line 2	R	RC			
129	Service Address Town/City	R	RC			
143	Service Address Province	R	RC			
130	Service Address Postal Code	R	RC			
11	Premise Number	R	RC	Alectra - Residential	Premise #	
				Kitchener Wilmot Hydro - Commercial	Premise ID	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				EPCOR Gas Residential	Location Number	
12	Bill Number	O	EU	Alectra - Residential	Bill #	
				Kitchener Wilmot Hydro (GS>50)	Invoice Number	
22	HST	R	EU	EnergyPlus - Residential	H.S.T.	
				ERTH Power - Residential Time-of-Use	H.S.T.	
				Alectra - Residential	H.S.T.	
				Kitchener Wilmot Hydro - Commercial	HST	
60	Meter Number	R	RC	EnergyPlus - Residential	Meter Number	
				Kitchener Wilmot	Meter #	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Hydro - Commercial		
61	Billing Period - Current Read Date	R	EU	EnergyPlus - Residential	Billing Period Current	
				Kitchener Wilmot Hydro - Commercial	Billing Period	
62	Billing Period - Previous Read Date	R	EU	EnergyPlus - Residential	Billing Period Previous	
				Kitchener Wilmot Hydro - Commercial	Billing Period	
63	Number of days in bill period	R	EU	EnergyPlus - Residential	Billing Days	
				Kitchener Wilmot Hydro - Commercial	Number of Days	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
64	Current Meter Read Type	R	EU	EnergyPlus - Residential	Meter Readings Type	0 = Actual, 1 = Estimate, 2 = Interval
				Kitchener Wilmot Hydro - Commercial	Reading Type	
65	Current Meter Read	R	EU	EnergyPlus - Residential	Meter Readings - Current	
66	Previous Meter Read	R	EU	EnergyPlus - Residential	Meter Readings - Previous	
67	Multiplier	R	EU	EnergyPlus - Residential	Mult	
68	Usage (unadjusted)	R	EU	EnergyPlus - Residential	Usage - Base	
				Kitchener Wilmot Hydro - Commercial	Measured Consumption kWh	
69	Usage (adjusted for DLF)	O	EU	EnergyPlus - Residential	Usage - Adjusted	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Kitchener Wilmot Hydro - Commercial	Adjusted Consumption kWh	
70	Unit of Measure for Usage	R	EU	EnergyPlus - Residential	Units (e.g., kWh)	0=kWh, 1=m3, 2=GAL, 3=KWHR
71	Distributor Loss Factor	R	EU	EnergyPlus - Residential	Adjustment Factor	
				Kitchener Wilmot Hydro - Commercial	Adjustment Factor	
72	Service Type	R	EU	Alectra - Commercial	Service	1 = Electricity, 3 = Water, 2 = Gas, 4 = Interval
78	Account Rate Class	R	EU	Kitchener Wilmot Hydro - Commercial	Account Type	1 = Residential 2 = General Service Less Than 50Kw 3 = General Service Greater Than 50Kw 4 = General Service Greater Than 500Kw

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
						5 = General Service Greater Than 5000Kw 6 = Unmetered Scattered Load 7 = Sentinel Light Service 8 = Street Light Service 9 = microFIT Service 10 = Gas Residential 11 = Gas Small Commercial 12 = Gas Large User
81	Previous Balance	O	EU	Kitchener Wilmot Hydro - Commercial	Previous Balance	
				Enbridge - Residential and Small Business	Balance from Previous Bill	
				Alectra - Residential	Amount of Last Bill	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
82	Adjustments	O	EU	Kitchener Wilmot Hydro - Commercial	Adjustments	
83	Payments Received	O	EU	Kitchener Wilmot Hydro - Commercial	Payments Received	
84	Balance Forward	R	EU	Kitchener Wilmot Hydro - Commercial	Balance Forward	
104	Interest Charge	O	EU	ERTH Power - Residential	Overdue Interest Charge	
				Elexicon	Interest Charge on Overdue Amount	
106	Total Charges	O	EU	Kitchener Wilmot Hydro	Charges this Period	
				Enbridge - Residential	Total Charges for Natural Gas	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				and Small Business		

Ontario Electricity Green Button Billing Descriptions

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
15	Off-Peak	R	EU	EnergyPlus - Residential	Off Peak Winter	
				ERTH Power -Residential Time-of-Use	Off Peak - Winter	
				Alectra - Residential	Winter Off-Peak	
				EnergyPlus - NET METERED	Off Peak Winter - Net Metering	
				Hydro One Networks Summary Billing Statement	Off-Peak	
17	Mid-Peak	R	EU	EnergyPlus - Residential	Mid Peak Winter	
				ERTH Power -Residential Time-of-Use	Mid Peak - Winter	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Alectra - Residential	Winter Mid-Peak	
				EnergyPlus - NET METERED	Mid Peak Winter Net Metering	
				Hydro One Networks Summary Billing Statement	Mid-Peak	
19	On-Peak	R	EU	EnergyPlus - Residential	On Peak Winter	
				ERTH Power -Residential Time-of-Use	On Peak - Winter	
				Alectra - Residential	Winter On-Peak	
				EnergyPlus - NET METERED	On Peak Winter - Net Metering	
				Hydro One Networks Summary	On-Peak	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Billing Statement		
20	Delivery charge	R	EU	EnergyPlus - Residential	Delivery	
				ERTH Power -Residential Time-of-Use	Delivery	
				Alectra - Residential	Delivery	
21	Regulatory charge	R	EU	EnergyPlus - Residential	Regulatory Charges	
				ERTH Power -Residential Time-of-Use	Regulatory Charges	
				Alectra - Residential	Regulatory Charges	
23	Ontario Electricity Rebate	R	EU	EnergyPlus - Residential	Ontario Electricity Rebate	
				ERTH Power -Residential Time-of-Use	Ontario Electricity Rebate	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Alectra - Residential	Ontario Electricity Rebate	
				Kitchener Wilmot Hydro - Commercial	Ontario Electricity Rebate	
25	Spot-Market Charge	R	EU	EnergyPlus - Commercial	Electricity at Market Prices	
				ERTH Power - Commercial	Cost of Power	
				Alectra - Commercial	no label, just: kWh @ rate	
26	Global Adjustment Charge	R	EU	EnergyPlus - GreaterThan50	Global Adjustment	
				ERTH Power - Commercial	Global Adjustment	
				Alectra - Commercial	Global Adjustment	
27	Tiered RPP - tier 1	R	EU	EnergyPlus - Unmetered	Electricity - Block 1 (Winter)	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Scattered Load		
				ERTH Power - Sentinel Light	Block 1 - Winter	
				Alectra - Unmetered Scattered Load	no label, just: 'kWh @ rate '	
28	Tiered RPP - tier 2	R	EU			
31	Generation Credit	R	EU	EnergyPlus - General Service	FIT Solar	
				EnergyPlus - Residential	Net Metering Credit	
32	DCB Retailer Charge	R	EU	ERTH Power - Industrial	Electricity provided by RETAILER NAME	
				Alectra - Retailer	Supply by RETAILER NAME	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
33	Global Adjustment Class A	R	EU	ERTH Power - Industrial	Global Adjustment Class A	
				Kitchener Wilmot Hydro - Commercial	Global Adjustment - Class A	
34	Distributor Fixed Charge	R	EU	ERTH Power - Industrial	Monthly Service Charge	
				ERTH Power - Commercial	Monthly Service Charge	
				Alectra - Commercial	Customer Charge	
				Kitchener Wilmot Hydro - Commercial	Monthly Service Charge	
35	Distributor Variable Charge	R	EU	ERTH Power - Industrial	Distribution	
				ERTH Power - Commercial	Distribution	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Alectra - Commercial	Distribution	
				Kitchener Wilmot Hydro - Commercial	Distribution Charge	
36	Transmission Connection Charge	R	EU	ERTH Power - Industrial	Transmission Connection	
				ERTH Power - Commercial	Transmission Connection	
				Alectra - Commercial	Transmission Connection Charge	
				Kitchener Wilmot Hydro - Commercial	Transmission Connection	
37	Transmission Network Charge	R	EU	ERTH Power - Industrial	Transmission Network	
				ERTH Power - Commercial	Transmission Network	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Alectra - Commercial	Transmission Network Charge	
				Kitchener Wilmot Hydro - Commercial	Transmission Network	
38	Wholesale Market Service Charge	R	EU	ERTH Power - Industrial	Wholesale Market Service	
				ERTH Power - Commercial	Wholesale Market Service	
				Alectra - Commercial	Wholesale Market Service Charge	
				Kitchener Wilmot Hydro - Commercial	Wholesale Market Services	
39	SSS Administration Charge	R	EU	ERTH Power - Commercial	SSS Administratio n Charge	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Alectra - Commercial	Standard Supply Service - Administrative Charge	
40	Generator - Contract Charge	R	EU	ERTH Power - MicroFIT Customer	OPA Contract	
41	Generator - Service Charge	R	EU	ERTH Power - MicroFIT Customer	Monthly Service Charge	
				Enbridge - Residential and Small Business	Federal Carbon Charge	
				EPCOR Gas - Residential	Federal Carbon Charge	
56	Transformer Allowance Credit	R	EU	ERTH Power - Industrial	Transformer Allowance	
				Kitchener Wilmot Hydro - Commercial	Customer Owned Transformer Allowance	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
57	Miscellaneous Credit	R	EU	Kitchener Wilmot Hydro - Commercial	Total Ontario Support	
				FortisOntario	First Nation Delivery Credit	
73	Metered Peak kW 7am-7pm	R	EU	Alectra - Commercial	Peak kW7-7	
74	Metered Demand kW	R	EU	Alectra - Commercial	Demand kW	
				Kitchener Wilmot Hydro - Commercial	Demand kW	
75	Metered Demand kVA	R	EU	Alectra - Commercial	Demand Kva	
				Kitchener Wilmot Hydro - Commercial	Demand KVA	
76	Metered Peak kVA 7-7	R	EU	Alectra - Commercial	Demand KVA7-7	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Kitchener Wilmot Hydro - Commercial	Demand 90% Kva	
77	Power Factor	R	EU	Alectra - Commercial	Power Factor	
				Kitchener Wilmot Hydro - Commercial	Power Factor for This Period	
79	Commodity Pricing Method	R	EU	Kitchener Wilmot Hydro - Commercial	Pricing Method	1 = Retail (account with Retailer, paying Retailer contract price) 2 = TOU (Time-of-Use) 3 = Tiered RPP 4 = Actual Cost of Power (Spot-Market + Global Adjustment) 5 = Generation contract price

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
80	Energy Service Provider	O	RC	Kitchener Wilmot Hydro - Commercial	Energy Service Provider	
85	Capacity Based Recovery (CBR) Charge	O	EU	Kitchener Wilmot Hydro - Commercial	Capacity Based Recovery (CBR)	
94	Primary Metered Consumption	R	EU	Kitchener Wilmot Hydro - Industrial	Primary Metered Consumption	
95	Peak Demand Factor Class A	R	EU	Kitchener Wilmot Hydro - Industrial	Peak Demand Factor 'Class A'	
96	Global Adjustment Class A Pool Amount	O	EU	Kitchener Wilmot Hydro - Industrial	Global Adjustment Class A Base Amt.	
97	Billing Demand	R	EU	Kitchener Wilmot Hydro - Industrial	Billing Demand	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
98	7am to 7pm Billing Demand	R	EU	Kitchener Wilmot Hydro - Industrial	Transmission Network 7am-7pm Peak Demand	
99	Disposition of Global Adjustment	R	EU	Kitchener Wilmot Hydro - Industrial	Disposition of Global Adjustment	
101	Number of declared RPP eligible units	O	EU			
102	Demand 90% Kva	O	EU	Kitchener Wilmot Hydro - Industrial	Demand 90% Kva	
103	7am to 7pm Power Factor	O	EU	ERTH Power - Commercial		
104	Interest Charge	O	EU	ERTH Power - Residential	Overdue Interest Charge	
				Elexicon	Interest Charge on Overdue Amount	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
105	Total Electricity Charges	O	EU	Kitchener Wilmot Hydro	Total Electricity Charges	
110	Line Loss Adjustment Charge	R	EU	Kitchener Wilmot Hydro - Industrial	Line Loss Adjustment	
111	Sentinel Light Rental	O	EU	Hydro One Networks - Residential Medium Density	Sentinel light rental	
112	Sentinel Light Flat	O	EU			
124	Billing Cycle	O	EU	ERTH Power		
125	Other Rental Charges	O	EU	ERTH Power		
126	Other Misc. Charges	R	EU	ERTH Power		
131	Adj. Peak Kw 7-7	O	EU	Toronto Hydro - Commercial	Adjusted by Primary Metering factor (item 134)	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
132	Adj. Kw	O	EU	Toronto Hydro - Commercial	Adjusted by Primary Metering factor (item 134)	
133	Adj. KVA	O	EU	Toronto Hydro - Commercial	Adjusted by Primary Metering factor (item 134)	
134	Metering Adj.	O	EU	Toronto Hydro - Commercial	Primary Metering factor (1 or .99)	
135	Unit Self-Contained	O	EU	Toronto Hydro - Commercial		
142	Cell Meter Charge B	O	EU	Alectra - Commercial	Cell Meter Charge B	
146	Standby Charge	O	EU	FortisOntario	Standby Charge	
147	Standby Credit	O	EU	FortisOntario	Standby Credit	

Ontario Natural Gas Green Button Billing Descriptions

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
45	Gas Supply Charge	R	EU	Kitchener Utility Gas	Gas Supply	
				Enbridge - Residential and Small Business	Gas Supply Charge	
				EPCOR Gas - Residential	Gas Commodity 'consumption' @ 'rate'	
				Kingston Utilities	Commodity Chg	
46	Gas Delivery Fixed Charge	R	EU	Kitchener Utility Gas	Gas Fixed Delivery Charge	
				Enbridge - Residential and Small Business	Customer Charge	
				EPCOR Gas - Residential	Monthly Charge	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Kingston Utilities	GS Monthly Serv Chg	
47	Gas Delivery Variable Charge	R	EU	Kitchener Utility Gas	Gas Variable Delivery	
				Enbridge - Residential and Small Business	Delivery to You	
				EPCOR Gas - Residential	Delivery to You 'consumption' @ 'rate'	
				Kingston Utilities	Delivery	
48	Gas Federal Carbon Charge	R	EU	Kitchener Utility Gas	Federal Carbon Charge	
				Enbridge - Residential and Small Business	Federal Carbon Charge	
				EPCOR Gas - Residential	Federal Carbon Charge	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
49	Gas Water Heater Rental Charge	O	EU	Kitchener Utility Gas	Water Heater Rental	
50	Gas Mixing Valve Rental Charge	O	EU	Kitchener Utility Gas	Mixing Valve Rental	
86	Gas Transportation Charge	R	EU	Enbridge - Residential and Small Business	Transportation to Enbridge	
				EPCOR Gas - Residential	Upstream Transportation	
				Kingston Utilities	Transportation Chg	
87	Gas Cost Adjustment	R	EU	Enbridge - Residential and Small Business	Cost Adjustment	
88	Charges from Other Companies	R	EU	Enbridge - Residential and Small Business	Charges from Other Companies	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
89	Gas Service Provider	R	RC	Enbridge - Residential and Small Business	Vendor Name	Retail Block: 'Service Supplier'
				Kitchener Utilities Gas	Supplier	
90	Gas Service Provider Admin Fee	R	EU	Enbridge - Residential and Small Business	Vendor Admin. Fee	
91	Gas Service Provider Supply Charge	R	EU	Enbridge - Residential and Small Business	Gas Supply Charge	
92	Gas Rate Recovery	R	EU	EPCOR Gas - Residential	Rates Recovery	
93	Gas Upstream Recovery Charge	R	EU	EPCOR Gas - Residential	Upstream Recovery Charge	
107	Total Gas Charges	O	EU	Enbridge - Residential and Small Business	Charges for Natural Gas	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Kitchener Utilities Gas	Gas Charges	
108	Other Gas Charge	O	EU	Enbridge - Residential and Small Business	Other Enbridge Charges	
113	Adjustment Factor (atmospheric)	R	EU	EPCOR Gas Residential	Factor	
114	Conversion Factor (unit of measure)	R	EU	EPCOR Gas Residential	Conversion Factor	
115	Converted Usage	R	EU	EPCOR Gas Residential	Usage	
116	Amount Due after Due Date	O	EU	EPCOR Gas Residential	Total Amount Due After	
117	PGTVA Rate Rider	O	EU	EPCOR Gas - Aylmer - Residential	PGTVA Rate Rider	
118	Rate Rider	O	EU	EPCOR Gas -	Rate Rider	

Item	Green Button Billing Standard Description	Required (R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Aylmer - Residential		
122	Total Gas and Water Charges	O	EU	Kitchener Utility Gas	Total Gas & Water Charges	
144	Reversal of Previously billed charges	R	EU	Enbridge - Residential Revised Bill	Reversal of Prev Billed Charges	

Ontario Water Green Button Billing Standard Descriptions

Item	Green Button Billing Standard Description	Required(R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
42	Water Charge	O	EU	Kitchener Utility Gas	Water	
				Alectra - Residential	Water Charges	
				ERTH Power - Residential	Water Charges	
43	Stormwater Charge	O	EU	Kitchener Utility Gas	Stormwater Charge	
44	Wastewater Charge	O	EU	Alectra - Residential	Wastewater Charges	
				ERTH Power - Residential	Wastewater Charges	
51	Water - Fire Line Charge	O	EU	Alectra - Water	Fire Line Charge	
52	Water - Fixed Charge	O	EU	Alectra - Water	Water Fixed Charge	
				Alectra - Residential	Water Fixed Charge	

Item	Green Button Billing Standard Description	Required(R) / Optional (O)	Energy Usage (EU) / Retail Customer (RC)	Bill File	Label	Notes for GB XML
				Kingston Utilities	WT Monthly Serv Chg	
53	Wastewater/Storm Fixed Charge	O	EU	Alectra - Water	Wastewater/Storm Fixed Charge	
54	Water - Tier 1 Charge	O	EU	Alectra - Residential	Consumption Block 1	
55	Water - Tier 2 Charge	O	EU	Alectra - Residential	Consumption Block 2	
109	Total Water Charges	O	EU	Kitchener Utilities Gas	Water Charges	
138	Distribution & Treatment	O	EU	Kingston Utilities	Distribution & Treatment	
139	Sewer Fixed Charge	O	EU	Kingston Utilities	SW Monthly Serv Chg	
140	Sewer Collection & Treatment	O	EU	Kingston Utilities	Collection & Treatment	
141	Total Sewer Charges	O	EU	Kingston Utilities	Total Sewer Charges	

Green Button Energy Usage (UsageSummary) Example

The following Green Button Energy Usage UsageSummary extract demonstrates how the Ontario Green Button Billing Standard Descriptions will appear when transmitted to a Third Party by a Utility.

```
<?xml-stylesheet type='text/xsl' href='GreenButtonDataStyleSheet.xslt'?>

<feed xmlns:schemaLocation="http://naesb.org/copyright/espi.xsd"
xmlns="http://www.w3.org/2005/Atom">

   <id>urn:uuid:3f3dad6b-d8d2-5761-9d6a-873f36a84156</id>

   <title />

   <updated>2022-07-29T15:52:14Z</updated>



   <entry>

      <content>

         <espi:LocalTimeParameters xmlns="http://naesb.org/espi"
xmlns:espi="http://naesb.org/espi">

            <espi:dstEndRule>B40E2000</espi:dstEndRule>

            <espi:dstOffset>3600</espi:dstOffset>

            <espi:dstStartRule>360E2000</espi:dstStartRule>

            <espi:tzOffset>-18000</espi:tzOffset>

         </espi:LocalTimeParameters>

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      <id>urn:uuid:d97f25c4-1a9e-5762-a0f7-3d0672ac5c40</id>

      <title>DST For North America</title>
```

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href="https://localhost:44392/espi/1_1/resource/LocalTimeParameters/000001" type="espi-
entry/LocalTimeParameters" />

      <link rel="up" href="https://localhost:44392/espi/1_1/resource/LocalTimeParameters"
type="espi-feed/LocalTimeParameters" />

   </entry>

   <entry>

      <content>

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            <espi:ServiceCategory>

               <espi:kind>0</espi:kind>

            </espi:ServiceCategory>

         </espi:UsagePoint>

      </content>

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      <title>Meter: Electricity Hourly Usage</title>

      <published>2022-07-29T15:52:13Z</published>

      <updated>2022-07-29T15:52:13Z</updated>

      <link rel="self" href="https://localhost:44392/espi/1_1/resource/Subscription/69d6ccd0-9cef-
571f-bcea-3e63af6875dc/UsagePoint/4c1e8822-609a-5a0e-8bd4-3129a01523f5" type="espi-
entry/UsagePoint" />
```

```
    <link rel="up" href="https://localhost:44392/espi/1_1/resource/Subscription/69d6ccd0-9cef-571f-bcea-3e63af6875dc/UsagePoint" type="espi-feed/UsagePoint" />

    <link rel="related" href="https://localhost:44392/espi/1_1/resource/LocalTimeParameters/000001" type="espi-entry/LocalTimeParameters" />

    <link rel="related" href="https://localhost:44392/espi/1_1/resource/Subscription/69d6ccd0-9cef-571f-bcea-3e63af6875dc/UsagePoint/4c1e8822-609a-5a0e-8bd4-3129a01523f5/MeterReading" type="espi-feed/MeterReading" />

    <link rel="related" href="https://localhost:44392/espi/1_1/resource/Subscription/69d6ccd0-9cef-571f-bcea-3e63af6875dc/UsagePoint/4c1e8822-609a-5a0e-8bd4-3129a01523f5/UsageSummary" type="espi-feed/UsageSummary" />

  </entry>

  <entry>

    <content>

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        </espi:billingPeriod>

        <espi:costAdditionalDetailLastPeriod>

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          <espi:note>Previous Balance</espi:note>

          <espi:measurement>

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          <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
          <espi:uom>80</espi:uom>
        </espi:measurement>
        <espi:itemKind>4</espi:itemKind>
      </espi:costAdditionalDetailLastPeriod>
      <espi:costAdditionalDetailLastPeriod>
        <espi:amount>2410</espi:amount>
        <espi:note>Regulatory charge</espi:note>
        <espi:measurement>
          <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
          <espi:uom>80</espi:uom>
        </espi:measurement>
        <espi:itemKind>4</espi:itemKind>
      </espi:costAdditionalDetailLastPeriod>
      <espi:costAdditionalDetailLastPeriod>
        <espi:amount>12680</espi:amount>
        <espi:note>HST</espi:note>
        <espi:measurement>
          <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
```

```
            <espi:uom>80</espi:uom>
        </espi:measurement>
        <espi:itemKind>5</espi:itemKind>
    </espi:costAdditionalDetailLastPeriod>
    <espi:costAdditionalDetailLastPeriod>
        <espi:amount>12680</espi:amount>
        <espi:note>Ontario Electricity Rebate</espi:note>
        <espi:measurement>
            <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
            <espi:uom>80</espi:uom>
        </espi:measurement>
        <espi:itemKind>8</espi:itemKind>
    </espi:costAdditionalDetailLastPeriod>
    <espi:costAdditionalDetailLastPeriod>
        <espi:amount>194960</espi:amount>
        <espi:note>Amount Due</espi:note>
        <espi:measurement>
            <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
            <espi:uom>80</espi:uom>
        </espi:measurement>
        <espi:itemKind>10</espi:itemKind>
```

```
        </espi:costAdditionalDetailLastPeriod>
        <espi:costAdditionalDetailLastPeriod>
          <espi:note>Number of days in bill period</espi:note>
          <espi:measurement>
            <espi:powerOfTenMultiplier>0</espi:powerOfTenMultiplier>
            <espi:uom>114</espi:uom>
            <espi:value>28</espi:value>
          </espi:measurement>
          <espi:itemKind>10</espi:itemKind>
        </espi:costAdditionalDetailLastPeriod>
        <espi:costAdditionalDetailLastPeriod>
          <espi:note>Current Meter Read</espi:note>
          <espi:measurement>
            <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
            <espi:uom>72</espi:uom>
            <espi:value>72007820</espi:value>
          </espi:measurement>
          <espi:itemKind>10</espi:itemKind>
        </espi:costAdditionalDetailLastPeriod>
        <espi:costAdditionalDetailLastPeriod>
          <espi:note>Previous Meter Read</espi:note>
```

```
            <espi:measurement>
               <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
               <espi:uom>72</espi:uom>
               <espi:value>71476110</espi:value>
            </espi:measurement>
            <espi:itemKind>10</espi:itemKind>
         </espi:costAdditionalDetailLastPeriod>
         <espi:costAdditionalDetailLastPeriod>
            <espi:note>Usage (unadjusted)</espi:note>
            <espi:measurement>
               <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
               <espi:uom>72</espi:uom>
               <espi:value>531710</espi:value>
            </espi:measurement>
            <espi:itemKind>10</espi:itemKind>
         </espi:costAdditionalDetailLastPeriod>
         <espi:costAdditionalDetailLastPeriod>
            <espi:note>Distributor Loss Factor</espi:note>
            <espi:measurement>
               <espi:powerOfTenMultiplier>-6</espi:powerOfTenMultiplier>
               <espi:uom>72</espi:uom>
```

```
            <espi:value>1038900</espi:value>
        </espi:measurement>
        <espi:itemKind>10</espi:itemKind>
    </espi:costAdditionalDetailLastPeriod>
    <espi:costAdditionalDetailLastPeriod>
        <espi:note>Usage (adjusted for DLF)</espi:note>
        <espi:measurement>
            <espi:powerOfTenMultiplier>-3</espi:powerOfTenMultiplier>
            <espi:uom>72</espi:uom>
            <espi:value>552390</espi:value>
        </espi:measurement>
        <espi:itemKind>10</espi:itemKind>
    </espi:costAdditionalDetailLastPeriod>
    <espi:costAdditionalDetailLastPeriod>
        <espi:note>Bill Date</espi:note>
        <espi:measurement>
            <espi:powerOfTenMultiplier>0</espi:powerOfTenMultiplier>
            <espi:uom>27</espi:uom>
            <espi:value>1648008000</espi:value>
        </espi:measurement>
        <espi:itemKind>10</espi:itemKind>
```

```
        </espi:costAdditionalDetailLastPeriod>
        <espi:costAdditionalDetailLastPeriod>
          <espi:note>Due Date</espi:note>
          <espi:measurement>
            <espi:powerOfTenMultiplier>0</espi:powerOfTenMultiplier>
            <espi:uom>27</espi:uom>
            <espi:value>1650254400</espi:value>
          </espi:measurement>
          <espi:itemKind>10</espi:itemKind>
        </espi:costAdditionalDetailLastPeriod>
        <espi:costAdditionalDetailLastPeriod>
          <espi:note>Account Rate Class</espi:note>
          <espi:measurement>
            <espi:powerOfTenMultiplier>0</espi:powerOfTenMultiplier>
            <espi:uom>114</espi:uom>
            <espi:value>1</espi:value>
          </espi:measurement>
          <espi:itemKind>10</espi:itemKind>
        </espi:costAdditionalDetailLastPeriod>
        <espi:costAdditionalDetailLastPeriod>
          <espi:note>Commodity Pricing Method</espi:note>
```

```
            <espi:measurement>
               <espi:powerOfTenMultiplier>0</espi:powerOfTenMultiplier>
               <espi:uom>114</espi:uom>
               <espi:value>1</espi:value>
            </espi:measurement>
            <espi:itemKind>10</espi:itemKind>
         </espi:costAdditionalDetailLastPeriod>
         <espi:qualityOfReading>19</espi:qualityOfReading>
         <espi:statusTimeStamp>1643691600</espi:statusTimeStamp>
      </espi:UsageSummary>
   </content>
   <id>urn:uuid:3e9871f3-56bf-5d2f-a3a8-5617896077be</id>
   <title>Usage Summary</title>
   <published>2022-02-01T05:00:00Z</published>
   <updated>2022-02-01T05:00:00Z</updated>
   <link rel="self" href="https://localhost:44392/espi/1_1/resource/Subscription/69d6ccd0-9cef-571f-bcea-3e63af6875dc/UsagePoint/4c1e8822-609a-5a0e-8bd4-3129a01523f5/UsageSummary/000001" type="espi-entry/UsageSummary" />
   <link rel="up" href="https://localhost:44392/espi/1_1/resource/Subscription/69d6ccd0-9cef-571f-bcea-3e63af6875dc/UsagePoint/4c1e8822-609a-5a0e-8bd4-3129a01523f5/UsageSummary" type="espi-feed/UsageSummary" />
   <link rel="related" href="https://localhost:44392/espi/1_1/resource/Subscription/69d6ccd0-9cef-571f-bcea-3e63af6875dc/UsagePoint/4c1e8822-609a-5a0e-8bd4-3129a01523f5" type="espi-entry/UsagePoint" />
```

```
    </entry>
</feed>
```

Green Button Retail Customer Example

The following Green Button Retail Customer file demonstrates the associated Retail Customer file that contains the Personal Identifiable Information elements of the sample Billing statement.

```
<?xml-stylesheet type='text/xsl' href='GreenButtonDataStyleSheet.xslt'?>

<feed xmlns:schemaLocation="http://naesb.org/copyright/customer.xsd"
xmlns="http://www.w3.org/2005/Atom">

   <id>urn:uuid:d72647fb-3446-5cb4-9041-817769530bc4</id>

   <title>Customer Feed</title>

   <updated>2022-07-22T13:48:15Z</updated>

   <entry>

      <content>

         <LocalTimeParameters xmlns="http://naesb.org/espi/customer"
xmlns:espi="http://naesb.org/espi">

            <dstEndRule>B40E2000</dstEndRule>

            <dstOffset>3600</dstOffset>

            <dstStartRule>360E2000</dstStartRule>

            <tzOffset>-18000</tzOffset>

         </LocalTimeParameters>

      </content>

      <id>urn:uuid:d97f25c4-1a9e-5762-a0f7-3d0672ac5c40</id>

      <title>DST For North America</title>

      <published>2022-07-22T13:48:15Z</published>
```

```
    <updated>2022-07-22T13:48:15Z</updated>

    <link rel="self"
href="https://greenengine.savagedata.com/espi/1_1/resource/LocalTimeParameters/000001"
type="cust-entry/LocalTimeParameters" />

    <link rel="up"
href="https://greenengine.savagedata.com/espi/1_1/resource/LocalTimeParameters" type="cust-
feed/LocalTimeParameters" />

    <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/Customer/77a3f5c1-1265-5529-b119-
b5bb88880376" type="cust-entry/Customer" />

    <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceLocation/7ccf9a10-8ad0-5e2a-
9cc1-15794ff7d7b1" type="cust-entry/ServiceLocation" />

  </entry>

  <entry>

    <content>

      <Customer xmlns="http://naesb.org/espi/customer" xmlns:espi="http://naesb.org/espi">

        <Organisation>

          <streetAddress>

            <streetDetail>

              <addressGeneral>123 Main St.</addressGeneral>

            </streetDetail>

            <townDetail>

              <name>North Bay</name>

              <stateOrProvince>ON</stateOrProvince>
```

```
            </townDetail>
            <postalCode>P1B 4W7</postalCode>
          </streetAddress>
          <postalAddress>
            <streetDetail />
            <townDetail>
              <name>North Bay</name>
              <stateOrProvince>ON</stateOrProvince>
            </townDetail>
            <postalCode>P1B 4W7</postalCode>
          </postalAddress>
        </Organisation>
        <customerName>Bob Smith</customerName>
      </Customer>
    </content>
    <id>urn:uuid:2c74523b-0b70-556a-a539-afe757433d55</id>
    <title>Bob Smith</title>
    <published>2022-07-22T13:48:15Z</published>
    <updated>2022-07-22T13:48:15Z</updated>
    <link rel="self" href="https://greenengine.savagedata.com/espi/1_1/resource/Customer/77a3f5c1-1265-5529-b119-b5bb88880376" type="cust-entry/Customer" />
    <link rel="up" href="https://greenengine.savagedata.com/espi/1_1/resource/Customer" type="cust-feed/Customer" />
```

```
      <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAccount/12345-789"
type="cust-entry/CustomerAccount" />

      <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/LocalTimeParameters/000001"
type="cust-entry/LocalTimeParameters" />

   </entry>

   <entry>

      <content>

         <CustomerAccount xmlns="http://naesb.org/espi/customer"
xmlns:espi="http://naesb.org/espi">

            <contactInfo>

               <streetAddress>

                  <streetDetail>

                     <addressGeneral>123 Main St.</addressGeneral>

                  </streetDetail>

                  <townDetail>

                     <name>North Bay</name>

                     <stateOrProvince>ON</stateOrProvince>

                  </townDetail>

                  <postalCode>P1B 4W7</postalCode>

               </streetAddress>

               <postalAddress>

                  <streetDetail />
```

<townDetail />

</postalAddress>

</contactInfo>

<accountId>12345-789</accountId>

</CustomerAccount>

</content>

<id>urn:uuid:0acf58e7-891e-5dcc-9e7b-4dfcd324b569</id>

<title>Bob Smith Account</title>

<published>2022-07-22T13:48:15Z</published>

<updated>2022-07-22T13:48:15Z</updated>

<link rel="self" href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAccount/12345-789" type="cust-entry/CustomerAccount" />

<link rel="up" href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAccount" type="cust-feed/CustomerAccount" />

<link rel="related" href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAgreement/12345-789" type="cust-entry/CustomerAgreement" />

<link rel="related" href="https://greenengine.savagedata.com/espi/1_1/resource/Customer/77a3f5c1-1265-5529-b119-b5bb88880376" type="cust-entry/Customer" />

</entry>

<entry>

<content>

<CustomerAgreement xmlns="http://naesb.org/espi/customer" xmlns:espi="http://naesb.org/espi">

<agreementId>12345-789</agreementId>

</CustomerAgreement>

</content>

<id>urn:uuid:85557b14-2808-5d9c-a236-fa3f946e2b80</id>

<title>Bob Smith agreement</title>

<published>2022-07-22T13:48:15Z</published>

<updated>2022-07-22T13:48:15Z</updated>

<link rel="self" href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAgreement/12345-789" type="cust-entry/CustomerAgreement" />

<link rel="up" href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAgreement" type="cust-feed/CustomerAgreement" />

<link rel="related" href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAccount/12345-789" type="cust-entry/CustomerAccount" />

<link rel="related" href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceLocation/7ccf9a10-8ad0-5e2a-9cc1-15794ff7d7b1" type="cust-entry/ServiceLocation" />

<link rel="related" href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceSupplier/197ea45a-d987-55c7-b297-455dbae293bb" type="cust-entry/ServiceSupplier" />

<link rel="related" href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAccount/12345-789" type="cust-entry/CustomerAccount" />

</entry>

<entry>
<content>
<ServiceLocation xmlns="http://naesb.org/espi/customer" xmlns:espi="http://naesb.org/espi">
<mainAddress>
<streetDetail>
<addressGeneral>123 Main St.</addressGeneral>
</streetDetail>
<townDetail>
<name>North Bay</name>
<stateOrProvince>ON</stateOrProvince>
</townDetail>
<postalCode>P1B 4W7</postalCode>
</mainAddress>
<UsagePoints>

<UsagePoint>https://greenengine.savagedata.com/espi/1_1/resource/Subscription/ca7e17f3-9359-57ef-82c4-96e699fb309d/UsagePoint/337e6e42-3c25-54a5-92fb-345afcd46612</UsagePoint>

</UsagePoints>
</ServiceLocation>
</content>
<id>urn:uuid:ddcea0ec-92d0-5973-a4c0-864212099339</id>
<title>Service Location</title>
<published>2022-07-22T13:48:15Z</published>

```
    <updated>2022-07-22T13:48:15Z</updated>

    <link rel="self"
href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceLocation/7ccf9a10-8ad0-5e2a-
9cc1-15794ff7d7b1" type="cust-entry/ServiceLocation" />

    <link rel="up" href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceLocation"
type="cust-feed/ServiceLocation" />

    <link rel="related" href="https://greenengine.savagedata.com/espi/1_1/resource/Meter/NB12345"
type="cust-entry/Meter" />

    <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/LocalTimeParameters/000001"
type="cust-entry/LocalTimeParameters" />

    <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAgreement/12345-789"
type="cust-entry/CustomerAgreement" />

  </entry>

  <entry>

    <content>

      <ServiceSupplier xmlns="http://naesb.org/espi/customer" xmlns:espi="http://naesb.org/espi">

        <Organisation>

          <organisationName>Savage Data Systems (example)</organisationName>

        </Organisation>

      </ServiceSupplier>

    </content>

    <id>urn:uuid:d111343a-a80d-5cb2-9eba-852241d258f9</id>

    <title>Service Supplier</title>
```

```
    <published>2022-07-22T13:48:15Z</published>

    <updated>2022-07-22T13:48:15Z</updated>

    <link rel="self"
href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceSupplier/197ea45a-d987-55c7-
b297-455dbae293bb" type="cust-entry/ServiceSupplier" />

    <link rel="up" href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceSupplier"
type="cust-feed/ServiceSupplier" />

    <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/CustomerAgreement/12345-789"
type="cust-entry/CustomerAgreement" />

  </entry>

  <entry>

    <content>

      <Meter xmlns="http://naesb.org/espi/customer" xmlns:espi="http://naesb.org/espi">

        <serialNumber>NB12345</serialNumber>

      </Meter>

    </content>

    <id>urn:uuid:9fdcc054-70e2-52ac-83f4-95d3182a78d6</id>

    <title>Meter</title>

    <published>2022-07-22T13:48:15Z</published>

    <updated>2022-07-22T13:48:15Z</updated>

    <link rel="self" href="https://greenengine.savagedata.com/espi/1_1/resource/Meter/NB12345"
type="cust-entry/Meter" />

    <link rel="up" href="https://greenengine.savagedata.com/espi/1_1/resource/Meter" type="cust-
feed/Meter" />
```

```
    <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceLocation/7ccf9a10-8ad0-5e2a-
9cc1-15794ff7d7b1" type="cust-entry/ServiceLocation" />

  </entry>

  <entry>

    <content>

      <EndDevice p1:type="Meter" xmlns:p1="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://naesb.org/espi/customer" xmlns:espi="http://naesb.org/espi">

        <serialNumber>NB12345</serialNumber>

      </EndDevice>

    </content>

    <id>urn:uuid:327f4f51-5b62-55f1-9818-68c04ce317af</id>

    <title>End Device</title>

    <published>2022-07-22T13:48:15Z</published>

    <updated>2022-07-22T13:48:15Z</updated>

    <link rel="self"
href="https://greenengine.savagedata.com/espi/1_1/resource/EndDevice/NB12345" type="cust-
entry/EndDevice" />

    <link rel="up" href="https://greenengine.savagedata.com/espi/1_1/resource/EndDevice"
type="cust-feed/EndDevice" />

    <link rel="related"
href="https://greenengine.savagedata.com/espi/1_1/resource/ServiceLocation/7ccf9a10-8ad0-5e2a-
9cc1-15794ff7d7b1" type="cust-entry/ServiceLocation" />

  </entry>

</feed>
```

Green Button Certification Data-Element Function Blocks

The Ontario ENERGY DATA regulation requires Utilities implementing the NAESB REQ.21 ESPI version 3.3 (i.e., Green Button) standard to successfully complete the Green Button *Connect My Data* (CMD) and *Download My Data* (DMD) Certification process to ensure proper compliance with the regulation.

To aid Utilities in completing the Green Button CMD and DMD Certification Applications, the Independent Technical Working Group reviewed the following Green Button CMD/DMD Certification Data Element Requirements:

A- Green Button *Connect My Data* (CMD) / *Download My Data* (DMD) Energy-Usage Function Blocks

B- Green Button *Connect My Data* (CMD) / *Download My Data* (DMD) Retail-Customer Function Blocks

The purpose of the Data-Element Function Blocks is to verify an implementation of the Green Button CMD and DMD standard properly supplies Energy-Usage and Retail-Customer data in the correct XML element as defined by the Energy Usage and Retail Customer schema files. The CMD and DMD Certification platforms also certify proper implementation of Security and Privacy requirements; but these are procedural in nature and are not typically areas that create confusion for Utility implementation teams.

The following describes the contents of each column of the Green Button Certification Data-Element Requirements tables:

- **Function Block** – This column shows the name of the CMD/DMD Function Block as it appears on the Green Button CMD/DMD Certification Application. It also indicates if the Function Block is mandatory or optional. Note: The current mandatory / optional requirements shown are the Green Button Alliance's generic requirements for CMD/DMD Certification and may not meet additional requirements of the Ontario ENERGY DATA regulation.

- **Test ID** – The column shows the name of the test being performed. This appears on both the Green Button Alliance DMD Validator website results and the Green Button CMD Certification Platform Script log.

- **XML Data Element Tested** – This column shows the XML Data Elements being tested as part of the Data-Element Function Block being described

- **Expected Results** – This column shows the expected results of the test defined in the XML Data Element Tested column
- **Data Type Being Tested** – This column provides a clarification of the data being tested

Green Button Energy Usage CMD / DMD Certification Data Element Requirements

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
[FB_01] Common The data meets the minimum content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB requirement for Energy Usage certification.**	EU_FB01_DE_001	<atom:feed>	Verify there is a <atom:feed> entry	
The data meets the minimum content	EU_FB01_DE_002	feed <atom:id>	Verify the feed entry contains an ID entry Verify the feed ID entry is a valid UUID type 3 or 5	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB requirement for Energy Usage certification.**	EU_FB01_DE_003	feed <atom:title>	Verify the feed entry contains a <atom:title> entry	
	EU_FB01_DE_004	feed <atom:updated>	Verify the feed entry contains a <atom:updated> entry	
	EU_FB01_DE_005	<atom:id>	Verify all ID entry values are unique	All IDs in the data
	EU_FB01_DE_006	<espi:UsagePoint>	Verify there is a UsagePoint entry	
	EU_FB01_DE_007	UsagePoint <atom:id>	Verify the UsagePoint entry contains an ID entry Verify the UsagePoint ID entry is a valid UUID type 3 or 5	UsagePoint ID
	EU_FB01_DE_008	UsagePoint <atom:title>	Verify the UsagePoint entry contains a title entry	
	EU_FB01_DE_009	UsagePoint <atom:link rel='self' href=>	Verify the UsagePoint entry contains a "self" link entry Verify the UsagePoint "self" link entry references a UsagePoint Verify the UsagePoint "self" link entry contains a valid Identifier	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB01_DE_010	UsagePoint <atom:link rel='self' href=>	Verify the UsagePoint "self" link entry href= value is unique	
	EU_FB01_DE_011	UsagePoint <atom:link rel='up' href=>	Verify the UsagePoint entry contains a "up" link entry Verify the UsagePoint "up" link references a UsagePoint Verify the UsagePoint "up" link does NOT contain an Identifier	
	EU_FB01_DE_012	UsagePoint <atom:link rel='related' href=>	Verify the UsagePoint entry contains a "related" link entry referencing a MeterReading entry	
	EU_FB01_DE_013	UsagePoint <atom:link rel='related' href=>	Verify the UsagePoint entry contains a "related" link entry referencing a LocalTimeParameters entry	
	EU_FB01_DE_014	<espi:UsagePoint/espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry ServiceCategory element contains a kind value element	Type of service provided
	EU_FB01_DE_015	UsagePoint <atom:published>	Verify the UsagePoint entry contains a published entry	
	EU_FB01_DE_016	UsagePoint <atom:updated>	Verify the UsagePoint entry contains an updated entry	
	EU_FB01_DE_017	<espi:LocalTimeParameters>	Verify there is a LocalTimeParameters entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB01_DE_018	LocalTimeParameters <atom:id>	Verify the LocalTimeParameters entry contains an ID entry Verify the LocalTimeParameters ID entry is a valid UUID type 3 or 5	LocalTimeParameters ID
	EU_FB01_DE_019	LocalTimeParameters <atom:title>	Verify the LocalTimeParameters entry contains a title entry	
	EU_FB01_DE_020	LocalTimeParameters <atom:link rel='self' href=>	Verify the LocalTimeParameters entry contains a "self" link entry Verify the LocalTimeParameters "self" link entry references a LocalTimeParameters Verify the LocalTimeParameters "self" link entry contains a valid Identifier	
	EU_FB01_DE_021	LocalTimeParameters <atom:link rel='self' href=>	Verify the LocalTimeParameters "self" link href= entry is unique	
	EU_FB01_DE_022	LocalTimeParameters <atom:link rel='up' href=>	Verify the LocalTimeParameters entry contains a "up" link entry Verify the LocalTimeParameters "up" link references a LocalTimeParameters Verify the LocalTimeParameters "up" link does NOT contain an Identifier	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB01_DE_023	LocalTimeParameters <atom:link rel='related' href=>	Verify the LocalTimeParameters entry contains a "related" link entry referencing at least one UsagePoint entry	
	EU_FB01_DE_024	LocalTimeParameters <atom:published>	Verify the LocalTimeParameters entry contains a published entry	
	EU_FB01_DE_025	LocalTimeParameters <atom:updated>	Verify the LocalTimeParameters entry contains an updated entry	
[FB_04] Interval Metering The data meets the minimum Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB**	EU_FB04_DE_001	<espi:MeterReading>	Verify there is a MeterReading entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
requirement for Energy Usage certification.				
The data meets the minimum Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB requirement for Energy Usage certification.**	EU_FB04_DE_002	MeterReading <atom:id>	Verify the MeterReading entry contains an ID entry Verify the MeterReading ID entry is a valid UUID type 3 or 5	MeterReading ID
	EU_FB04_DE_003	MeterReading <atom:title>	Verify the MeterReading entry contains a title entry	
	EU_FB04_DE_004	MeterReading <atom:link rel='self' href=>	Verify the MeterReading entry contains a "self" link entry Verify the MeterReading "self" link entry references a MeterReading Verify the MeterReading "self" link entry contains a valid Identifier	
	EU_FB04_DE_005	MeterReading <atom:link rel='self' href=>	Verify the MeterReading "self" link entry href= value is unique	
	EU_FB04_DE_006	MeterReading <atom:link rel='up' href=>	Verify the MeterReading entry contains a "up" link entry Verify the MeterReading "up" link references a MeterReading Verify the MeterReading "up" link does NOT contain an Identifier	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB04_DE_007	MeterReading <atom:link rel='related' href=>	Verify the MeterReading entry contains only one "up" link entry referencing a UsagePoint entry	
	EU_FB04_DE_008	MeterReading <atom:link rel='related' href=>	Verify the MeterReading entry contains only one "related" link entry referencing a ReadingType entry	
	EU_FB04_DE_009	MeterReading <atom:link rel='related' href=>	Verify the MeterReading entry has associated IntervalBlock entries	
	EU_FB04_DE_010	MeterReading associated "load profiles" have associated Interval Block entries	Verify the MeterReading entry "load profile" meter reading (espi:ReadingType/espi:accumulatedBehavior) value of 4 (deltaData) has associated IntervalBlock entries	
	EU_FB04_DE_011	MeterReading Interval Block/Interval Readings/ are all unique (by start time)	Verify all MeterReading "related" IntervalBlocks are unique by verifying the start times (espi:IntervalReading/espi:timePeriod/espi:start)	
	EU_FB04_DE_012	MeterReading Interval Blocks are all unique (by start time)	Verify all MeterReading IntervalBlocks are unique by verifying the start times (espi:IntervalReading/espi:timePeriod/espi:start)	
	EU_FB04_DE_013	MeterReading published	Verify the MeterReading entry contains a published entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB04_DE_014	MeterReading updated	Verify the MeterReading entry contains an updated entry	
	EU_FB04_DE_015	<espi:IntervalBlock>	Verify there is a IntervalBlock entry	
	EU_FB04_DE_016	IntervalBlock <atom:id>	Verify the IntervalBlock entry contains an ID entry Verify the IntervalBlock ID entry is a valid UUID type 3 or 5	IntervalBlock ID
	EU_FB04_DE_017	IntervalBlock <atom:title>	Verify the IntervalBlock entry contains a title entry	
	EU_FB04_DE_018	IntervalBlock <atom:link rel='self' href=>	Verify the IntervalBlock entry contains a "self" link entry Verify the IntervalBlock "self" link entry references a IntervalBlock Verify the IntervalBlock "self" link entry contains a valid Identifier	
	EU_FB04_DE_019	IntervalBlock <atom:link rel='self' href=>	Verify the IntervalBlock "self" link entry href= value is unique	
	EU_FB04_DE_020	IntervalBlock <atom:link rel='up' href=>	Verify the IntervalBlock entry contains a "up" link entry Verify the IntervalBlock "up" link references a IntervalBlock Verify the IntervalBlock "up"	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
			link does NOT contain an Identifier	
	EU_FB04_DE_021	IntervalBlock <atom:link rel='up' href=>	Verify the IntervalBlock "related" link entry only references one MeterReading entry	
	EU_FB04_DE_022	IntervalBlock <espi:interval/espi:duration>	Verify the IntervalBlock entry contains a espi:Interval/espi:duration entry	IntervalBlock duration Length in seconds of the reading period
	EU_FB04_DE_023	IntervalBlock <espi:interval/espi:start>	Verify the IntervalBlock entry contains a espi:Interval/espi:start entry	IntervalBlock start UTC epoch timestamp
	EU_FB04_DE_024	IntervalBlock <espi:interval/espi:start> and <espi:IntervalReading/espi:timePeriod/espi:start>	Verify the IntervalBlock entry espi:interval/espi:start value matches the first IntervalReading entry espi:timePeriod/espi:start value	IntervalBlock start equals 1st IntervalBlock timePeriod:start value
	EU_FB04_DE_025	IntervalBlock <espi:IntervalReading/espi:timePeriod/espi:duration>	Verify the IntervalBlock entry contains a espi:IntervalReading/espi:timePeriod/espi:duration entry	IntervalBlock/ IntervalReading/timePeriod:duration
	EU_FB04_DE_026	IntervalBlock <espi:IntervalReading/espi:timePeriod/espi:start>	Verify the IntervalBlock entry contains a espi:IntervalReading/espi:timePeriod/espi:start entry	IntervalBlock/ IntervalReading/timePeriod:start

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB04_DE_027	IntervalBlock <espi:IntervalReading/espi:value>	Verify the IntervalBlock entry contains a espi:IntervalReading/espi:value entry	IntervalBlock/ IntervalReading/value
	EU_FB04_DE_028	IntervalBlock <atom:published>	Verify the IntervalBlock entry contains a published entry	
	EU_FB04_DE_029	IntervalBlock <atom:updated>	Verify the IntervalBlock entry contains an updated entry	
	EU_FB04_DE_030	<espi:ReadingType>	Verify there is a ReadingType entry	
	EU_FB04_DE_031	ReadingType <atom:id>	Verify the ReadingType entry contains an ID entry Verify the ReadingType ID entry is a valid UUID type 3 or 5	ReadingType ID
	EU_FB04_DE_032	ReadingType <atom:title>	Verify the ReadingType entry contains a title entry	
	EU_FB04_DE_033	ReadingType <atom:link rel='self' href=>	Verify the ReadingType entry contains a "self" link entry Verify the ReadingType "self" link entry references a ReadingType Verify the ReadingType "self" link entry contains a valid Identifier	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB04_DE_034	ReadingType <atom:link rel='self' href=>	Verify the ReadingType "self" link entry href= value is unique	
	EU_FB04_DE_035	ReadingType <atom:link rel='up' href=>	Verify the ReadingType entry contains a "up" link entry Verify the ReadingType "up" link references a ReadingType Verify the ReadingType "up" link does NOT contain an Identifier	
	EU_FB04_DE_036	MeterReading <atom:link rel='up' href=>	Verify each MeterReading entry contains a "related" link entry for a ReadingType entry	
	EU_FB04_DE_037	ReadingType <espi:intervalLength>	Verify the ReadingType entry contains a espi:intervalLength entry	ReadingType intervalLength
	EU_FB04_DE_038	ReadingType <espi:kind>	Verify the ReadingType entry contains a espi:kind entry	ReadingType kind
	EU_FB04_DE_039	ReadingType <espi:powerOfTenMultiplier>	Verify the ReadingType entry contains a espi:powerOfTenMultiplier entry	ReadingType powerOfTenMultiplier
	EU_FB04_DE_040	ReadingType <espi:uom>	Verify the ReadingType entry contains a espi:uom entry	ReadingType uom
	EU_FB04_DE_041	ReadingType <atom:published>	Verify the ReadingType entry contains a published entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB04_DE_042	ReadingType <atom:updated>	Verify the ReadingType entry contains an updated entry	
[FB_05] Electricity Interval Metering The data meets the minimum Electricity Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB requirement for Energy Usage certification.**	EU_FB05_DE_001	ReadingType <espi:commodity> and <espi:phase>	Verify the ReadingType entry contains a electricity (espi:commodity = 1) entry value and a espi:phase entry	ReadingType commodity and phase

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
The data meets the minimum Electricity Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB requirement for Energy Usage certification.**	EU_FB05_DE_002	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents electricity (value is 0) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "deltaData" (value is 4), espi:commodity value represents "electricity secondaryMetered" (value is 1), espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "energy" (value is 12), espi:uom value represents "Wh" (value is 72)	UsagePoint ServiceCategory/kind MeterReading accumulationBehavior, commodity, flowDirection, kind, and uom
[FB_06] Demand Electricity Metering The data meets the minimum Demand Electricity Interval data content	EU_FB06_DE_001	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint	Verify the UsagePoint entry espi:kind value represents electricity (value is 0) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "instantaneous" (value is 12), espi:commodity value represents "electricity secondaryMetered" (value is 1),	UsagePoint ServiceCategory/kind MeterReading accumulationBehavior, commodity, flowDirection, kind, and uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional FB requirement for Electricity Energy Usage certification.**		<espi:ServiceCategory/espi:kind>	espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "energy" (value is 37), espi:uom value represents "W" (value is 38)	
	EU_FB06_DE_002	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents electricity (value is 0) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "instantaneous" (value is 12), espi:commodity value represents "electricity secondaryMetered" (value is 1), espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "energy" (value is 12), espi:uom value represents "VA" (value is 61)	UsagePoint espi:kind MeterReading espi:accumulationBehavior, espi:commodity, espi:flowDirection, espi:kind, and espi:uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB06_DE_003	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents electricity (value is 0) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "instantaneous" (value is 12), espi:commodity value represents "electricity secondaryMetered" (value is 1), espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "energy" (value is 12), espi:uom value represents "VAr" (value is 63)	UsagePoint ServiceCategory/kind MeterReading accumulationBehavior, commodity, flowDirection, kind, and uom
FB_07] Net Electricity Metering The data meets the minimum Net Electricity Interval data content requirements to qualify as a certified implementor of the NAESB	EU_FB07_DE_001	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents electricity (value is 0) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "deltaData" (value is 4), espi:commodity value represents "electricity secondaryMetered" (value is 1), espi:flowDirection value represents "net" (value is 4), espi:kind value represents "energy" (value is 12),	UsagePoint ServiceCategory/kind MeterReading accumulationBehavior, commodity, flowDirection, kind, and uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
REQ.21 ESPI Energy Usage standard. **Note: This is an optional FB requirement for Electricity Energy Usage certification.**			espi:uom value represents "Wh" (value is 72)	
[FB_08] Forward and Reverse Electricity Metering The data meets the minimum Forward and Reverse Electricity Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy	EU_FB08_DE_001	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents electricity (value is 0) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "deltaData" (value is 4), espi:commodity value represents "electricity secondaryMetered" (value is 1), espi:flowDirection value represents "reverse" (value is 19), espi:kind value represents "energy" (value is 12), espi:uom value represents "Wh" (value is 72)	UsagePoint ServiceCategory/kind MeterReading accumulationBehavior, commodity, flowDirection, kind, and uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
Usage standard. **Note: This is an optional FB requirement for Electricity Energy Usage certification.**				
[FB_09] Register Values Electricity Metering The data meets the minimum Register Values Electricity Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard.	EU_FB09_DE_001	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents electricity (value is 0) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "bulkQuantity" (value is 1), espi:commodity value represents "electricity secondaryMetered" (value is 1), espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "energy" (value is 12), espi:uom value represents "Wh" (value is 72)	UsagePoint ServiceCategory/kind MeterReading accumulationBehavior, commodity, flowDirection, kind, and uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
Note: This is an optional FB requirement for Electricity Energy Usage certification.				
[FB_10] Natural Gas Interval Metering The data meets the minimum Natural Gas Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB requirement for Natural**	EU_FB10_DE_001	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents natural gas (value is 1) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "deltaData" (value is 4), espi:commodity value represents "natural gas" (value is 7), espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "energy" (value is 12), espi:uom value represents "joule" (value is 31) or "btu" (value is 132) or "therm" (value is 169) or its "related" ReadingType entry contains espi:accumulationBehavior value represents "deltaData" (value is 4),	UsagePoint ServiceCategory/kind MeterReading accumulationBehavior, commodity, flowDirection, kind, and uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
Gas Energy Usage certification.			espi:commodity value represents "natural gas" (value is 7), espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "volume" (value is 58), espi:uom value represents "cubic meter" (value is 42) or "cubic feet" (value is 119)	
[FB_11] Water Interval Metering The data meets the minimum Water Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI standard. **Note: This is a mandatory**	EU_FB11_DE_001	ReadingType <espi:accumulationBehavior>, <espi:commodity>, <espi:flowDirection>, <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind value represents water (value is 2) and its "related" ReadingType entry contains espi:accumulationBehavior value represents "deltaData" (value is 4), espi:commodity value represents "drinkable water" (value is 9), espi:flowDirection value represents "forward" (value is 1), espi:kind value represents "energy" (value is 58), espi:uom value represents "US gallon" (value is 128) or "cubic feet" (value is 119) or "cubic meter" (value is 42)	UsagePoint espi:kind MeterReading espi:accumulationBehavior, espi:commodity, espi:flowDirection, espi:kind, and espi:uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
FB requirement for Water certification.				
[FB_12] Cost of Interval Data The data meets the Cost of Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional FB requirement for Electricity,**	EU_FB12_DE_001	IntervalBlock <espi:ReadingType/ espi:cost>	Verify all IntervalBlock entry espi:ReadingType elements contain a espi:cost entry	IntervalBlock IntervalReading/cost

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
Natural Gas, and Water Energy Usage certification.				
The data meets the Cost of Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.**	EU_FB12_DE_002	IntervalBlock <espi:ReadingType/ espi:currency>	Verify all IntervalBlock entry espi:ReadingType elements contain a espi:currency entry	IntervalBlock IntervalReading/currency

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
[FB_15] Usage Summary The data meets the UsageSummary content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.**	EU_FB15_DE_001	<espi:UsageSummary>	Verify there is a UsageSummary entry	
The data meets the UsageSumm	EU_FB15_DE_002	UsageSummary <atom:id>	Verify the UsageSummary entry contains an ID entry	UsageSummary ID

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
ary content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.**			Verify the UsageSummary ID entry is a valid UUID type 3 or 5	
	EU_FB15_DE_003	UsageSummary <atom:title>	Verify the UsageSummary entry contains a title entry	
	EU_FB15_DE_004	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary entry contains a "self" link entry Verify the UsageSummary "self" link entry references a UsageSummary Verify the UsageSummary "self" link entry contains a valid Identifier	
	EU_FB15_DE_005	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary "self" link entry href= value is unique	
	EU_FB15_DE_006	UsageSummary <atom:link rel='up' href=>	Verify the UsageSummary entry contains a "up" link entry Verify the UsageSummary "up" link references a UsageSummary Verify the UsageSummary "up" link does NOT contain an Identifier	
	EU_FB15_DE_007	UsageSummary <atom:link rel='related' href=>	Verify the UsageSummary entry contains a "related" link entry referencing a single UsagePoint entry	
	EU_FB15_DE_008	UsageSummary <espi:billingPeriod/ espi:duration>	Verify the UsageSummary entry contains a	UsageSummary

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
			<espi:billingPeriod/espi:duration> entry	billingPeriod/duration
	EU_FB15_DE_009	UsageSummary <espi:billingPeriod/espi:start>	Verify the UsageSummary entry contains a <espi:billingPeriod/espi:start> entry	UsageSummary billingPeriod/start
	EU_FB15_DE_010	UsageSummary <espi:overallConsumptionLastPeriod/espi:powerOfTenMultiplier>	Verify the UsageSummary entry contains a <espi:overallConsumptionLastPeriod/espi:powerOfTenMultiplier> entry	UsageSummary overallConsumptionLastPeriod/powerOfTenMultiplier
	EU_FB15_DE_011	UsageSummary <espi:overallConsumptionLastPeriod/espi:timeStamp>	Verify the UsageSummary entry contains a <espi:overallConsumptionLastPeriod/espi:timeStamp> entry	UsageSummary overallConsumptionLastPeriod/timeStamp
	EU_FB15_DE_012	UsageSummary <espi:overallConsumptionLastPeriod/espi:uom>	Verify the UsageSummary entry contains a <espi:overallConsumptionLastPeriod/espi:uom> entry	UsageSummary overallConsumptionLastPeriod/uom
	EU_FB15_DE_013	UsageSummary <espi:overallConsumptionLastPeriod/espi:value>	Verify the UsageSummary entry contains a <espi:overallConsumptionLastPeriod/espi:value> entry	UsageSummary overallConsumptionLastPeriod/value
	EU_FB15_DE_014	UsageSummary <espi:currentBillingPeriodOverAllCons	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverr	UsageSummary currentBillingPeriodOverrAl

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
		umption/espi:powerOfTenMultiplier>	AllConsumption/espi:powerOfTenMultiplier> entry	lConsumption/powerOfTenMultiplier
	EU_FB15_DE_015	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:timeStamp>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp> entry	UsageSummary espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp
	EU_FB15_DE_016	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:uom>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:uom> entry	UsageSummary currentBillingPeriodOverrAllConsumption/uom
	EU_FB15_DE_017	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:value>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:value> entry	UsageSummary currentBillingPeriodOverrAllConsumption/value
	EU_FB15_DE_018	UsageSummary <espi:qualityOfReading>	Verify the UsageSummary entry contains a <espi:qualityOfReading> entry	UsageSummary qualityOfReading
	EU_FB15_DE_019	UsageSummary <espi:statusTimeStamp>	Verify the UsageSummary entry contains a <espi:statusTimeStamp> entry	UsageSummary statusTimeStamp

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB15_DE_020	UsageSummary <atom:published>	Verify the UsageSummary entry contains a published entry	
	EU_FB15_DE_021	UsageSummary <atom:updated>	Verify the UsageSummary entry contains an updated entry	
[FB_16] Usage Summary with Cost The data meets the UsageSummary with cost content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy usage standard. **Note: This is an optional FB requirement for Electricity,**	EU_FB16_DE_001	<espi:UsageSummary>	Verify there is a UsageSummary entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
Natural Gas, and Water Energy Usage certification.				
The data meets the UsageSummary with cost content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy usage standard. **Note: This is an optional FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.**	EU_FB16_DE_002	UsageSummary <atom:id>	Verify the UsageSummary entry contains an ID entry Verify the UsageSummary ID entry is a valid UUID type 3 or 5	UsageSummary ID
	EU_FB16_DE_003	UsageSummary <atom:title>	Verify the UsageSummary entry contains a title entry	
	EU_FB16_DE_004	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary entry contains a "self" link entry Verify the UsageSummary "self" link entry references a UsageSummary Verify the UsageSummary "self" link entry contains a valid Identifier	
	EU_FB16_DE_005	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary "self" link entry href= value is unique	
	EU_FB16_DE_006	UsageSummary <atom:link rel='up' href=>	Verify the UsageSummary entry contains a "up" link entry Verify the UsageSummary "up" link references a UsageSummary Verify the UsageSummary "up" link does NOT contain an Identifier	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB16_DE_007	UsageSummary <atom:link rel='related' href=>	Verify the UsageSummary entry contains a "related" link entry referencing a single UsagePoint entry	
	EU_FB16_DE_008	UsageSummary <espi:billingPeriod/espi:duration>	Verify the UsageSummary entry contains a <espi:billingPeriod/espi:duration> entry	UsageSummary billingPeriod/duration
	EU_FB16_DE_009	UsageSummary <espi:billingPeriod/espi:start>	Verify the UsageSummary entry contains a <espi:billingPeriod/espi:start> entry	UsageSummary billingPeriod/start
	EU_FB16_DE_010	UsageSummary <espi:billLastPeriod>	Verify the UsageSummary entry contains a <espi:billLastPeriod> entry	UsageSummary billLastPeriod
	EU_FB16_DE_011	UsageSummary <espi:costAdditionalLastPeriod>	Verify the UsageSummary entry contains a <espi:costAdditionalLastPeriod> entry	UsageSummary costAdditionalLastPeriod
	EU_FB16_DE_012	UsageSummary <espi:currency>	Verify the UsageSummary entry contains a <espi:currency> entry	UsageSummary currency
	EU_FB16_DE_013	UsageSummary <espi:overallConsumptionLastPeriod>	Verify the UsageSummary entry contains a <espi:overallConsumptionLastPeriod> entry	UsageSummary overallConsumptionLastPeriod

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB16_DE_014	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:powerOfTenMultiplier>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:powerOfTenMultiplier> entry	UsageSummary currentBillingPeriodOverrAllConsumption/powerOfTenMultiplier
	EU_FB16_DE_015	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:timeStamp>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp> entry	UsageSummary espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp
	EU_FB16_DE_016	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:uom>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:uom> entry	UsageSummary currentBillingPeriodOverrAllConsumption/uom
	EU_FB16_DE_017	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:value>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:value> entry	UsageSummary currentBillingPeriodOverrAllConsumption/value
	EU_FB16_DE_018	UsageSummary <espi:qualityOfReading>	Verify the UsageSummary entry contains a <espi:qualityOfReading> entry	UsageSummary qualityOfReading

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB16_DE_019	UsageSummary <espi:statusTimeStamp>	Verify the UsageSummary entry contains a <espi:statusTimeStamp> entry	UsageSummary statusTimeStamp
	EU_FB16_DE_020	UsageSummary <atom:published>	Verify the UsageSummary entry contains a published entry	
	EU_FB16_DE_021	UsageSummary <atom:updated>	Verify the UsageSummary entry contains an updated entry	
[FB_17] Electricity Power Quality Summary The data meets the Electricity Power Quality Summary content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage	EU_FB17_DE_001	<espi:ElectricPowerQualitySummary>		

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
standard. **Note: This is an optional FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.**				
The data meets the Electricity Power Quality Summary content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional FB**	EU_FB17_DE_002	ElectricPowerQualitySummary<atom:id>	Verify the ElectricPowerQualitySummary entry contains an ID entry Verify the ElectricPowerQualitySummary ID entry is a valid UUID type 3 or 5	ElectricPowerQualitySummary ID
	EU_FB17_DE_003	ElectricPowerQualitySummary<atom:title>	Verify the ElectricPowerQualitySummary entry contains a title entry	
	EU_FB17_DE_004	ElectricPowerQualitySummary<atom:link rel='self' href=>	Verify the ElectricPowerQualitySummary entry contains a "self" link entry Verify the ElectricPowerQualitySummary "self" link entry references a ElectricPowerQualitySummary Verify the ElectricPowerQualitySummary	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
requirement for Electricity, Natural Gas, and Water Energy Usage certification.			"self" link entry contains a valid Identifier	
	EU_FB17_DE_005	ElectricPowerQualitySummary<atom:link rel='self' href=>	Verify the ElectricPowerQualitySummary "self" link entry href= value is unique	
	EU_FB17_DE_006	UsageSummary <atom:link rel='up' href=>	Verify the ElectricPowerQualitySummary entry contains a "up" link entry Verify the ElectricPowerQualitySummary "up" link references a ElectricPowerQualitySummary Verify the ElectricPowerQualitySummary "up" link does NOT contain an Identifier	
	EU_FB16_DE_007	ElectricPowerQualitySummary<atom:link rel='related' href=>	Verify the ElectricPowerQualitySummary entry contains a "related" link entry referencing a single UsagePoint entry	
	EU_FB17_DE_008	ElectricPowerQualitySummary <espi:flickerPlt>	Verify the ElectricPowerQualitySummary entry contains a <espi:flickerPlt> entry	ElectricPowerQualitySummary flickerPlt
	EU_FB17_DE_009	ElectricPowerQualitySummary <espi:flickerPst>	Verify the ElectricPowerQualitySummary entry contains a <espi:flickerPst> entry	ElectricPowerQualitySummary flickerPst

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB17_DE_010	ElectricPowerQualitySummary <espi:harmonicVoltage>	Verify the ElectricPowerQualitySummary entry contains a <espi:harmonicVoltage> entry	ElectricPowerQualitySummary harmonicVoltage
	EU_FB17_DE_011	ElectricPowerQualitySummary <espi:longInterruptions>	Verify the ElectricPowerQualitySummary entry contains a <espi:longInterruptions> entry	ElectricPowerQualitySummary longInterruptions
	EU_FB17_DE_012	ElectricPowerQualitySummary <espi:mainsVoltage>	Verify the ElectricPowerQualitySummary entry contains a <espi:mainsVoltage> entry	ElectricPowerQualitySummary mainsVoltage
	EU_FB17_DE_013	ElectricPowerQualitySummary <espi:powerFrequency>	Verify the ElectricPowerQualitySummary entry contains a <espi:powerFrequency> entry	ElectricPowerQualitySummary powerFrequency
	EU_FB17_DE_014	ElectricPowerQualitySummary <espi:rapidVoltageChanges>	Verify the ElectricPowerQualitySummary entry contains a <espi:rapidVoltageChanges> entry	ElectricPowerQualitySummary rapidVoltageChanges
	EU_FB17_DE_015	ElectricPowerQualitySummary <espi:shortInterruptions>	Verify the ElectricPowerQualitySummary entry contains a <espi:shortInterruptions> entry	ElectricPowerQualitySummary shortInterruptions

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB17_DE_016	ElectricPowerQualitySummary <espi:summaryInterval>	Verify the ElectricPowerQualitySummary entry contains a <espi:summaryInterval> entry	ElectricPowerQualitySummary summaryInterval
	EU_FB17_DE_017	ElectricPowerQualitySummary <espi:summaryInterval/espi:duration> and <espi:summaryInterval/espi:start>	Verify the ElectricPowerQualitySummary entry contains a <espi:summaryInterval/espi:duration> entry and <espi:summaryInterval/espi:start> entry	ElectricPowerQualitySummary summaryInterval/duration and summaryInterval/start
	EU_FB17_DE_018	ElectricPowerQualitySummary <espi:supplyVoltageDips>	Verify the ElectricPowerQualitySummary entry contains a <espi:supplyVoltageDips> entry	ElectricPowerQualitySummary supplyVoltageDips
	EU_FB17_DE_019	ElectricPowerQualitySummary <espi:supplyVoltageImbalance>	Verify the ElectricPowerQualitySummary entry contains a <espi:supplyVoltageImbalance> entry	ElectricPowerQualitySummary supplyVoltageImbalance
	EU_FB17_DE_020	ElectricPowerQualitySummary <espi:supplyVoltageVariations>	Verify the ElectricPowerQualitySummary entry contains a <espi:supplyVoltageVariations> entry	ElectricPowerQualitySummary supplyVoltageVariations
	EU_FB17_DE_021	ElectricPowerQualitySummary	Verify the ElectricPowerQualitySummary	ElectricPowerQualitySummary

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
		<espi:tempOvervoltage>	entry contains a <espi:tempOvervoltage> entry	tempOvervoltage
	EU_FB17_DE_022	ElectricPowerQualitySummary <atom:published>	Verify the ElectricPowerQualitySummary entry contains a published entry	
	EU_FB17_DE_023	ElectricPowerQualitySummary <atom:updated>	Verify the ElectricPowerQualitySummary entry contains an updated entry	
[FB_27] Usage Summary with Demands and Previous Day Attribute The data meets the Usage Summary with Demands and Previous Day Attribute content requirements to qualify as a certified implementor of the NAESB REQ.21	EU_FB27_DE_001	<espi:UsageSummary>	Verify there is a UsageSummary entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
ESPI Energy Usage standard. **Note: This is an optional FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.**				
The data meets the Usage Summary with Demands and Previous Day Attribute content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional**	EU_FB27_DE_002	UsageSummary <atom:id>	Verify the UsageSummary entry contains an ID entry Verify the UsageSummary ID entry is a valid UUID type 3 or 5	UsageSummary ID
	EU_FB27_DE_003	UsageSummary <atom:title>	Verify the UsageSummary entry contains a title entry	
	EU_FB27_DE_004	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary entry contains a "self" link entry Verify the UsageSummary "self" link entry references a UsageSummary Verify the UsageSummary "self" link entry contains a valid Identifier	
	EU_FB27_DE_005	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary "self" link entry href= value is unique	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.	EU_FB27_DE_006	UsageSummary <atom:link rel='up' href=>	Verify the UsageSummary entry contains a "up" link entry Verify the UsageSummary "up" link references a UsageSummary Verify the UsageSummary "up" link does NOT contain an Identifier	
	EU_FB27_DE_007	UsageSummary <atom:link rel='related' href=>	Verify the UsageSummary entry contains a "related" link entry referencing a single UsagePoint entry	
	EU_FB27_DE_008	UsageSummary <espi:billingPeriod/espi:duration>	Verify the UsageSummary entry contains a <espi:billingPeriod/espi:duration> entry	UsageSummary billingPeriod/duration
	EU_FB27_DE_009	UsageSummary <espi:billingPeriod/espi:start>	Verify the UsageSummary entry contains a <espi:billingPeriod/espi:start> entry	UsageSummary billingPeriod/start
	EU_FB27_DE_010	UsageSummary <espi:overallConsumptionLastPeriod>	Verify the UsageSummary entry contains a <espi:overallConsumptionLastPeriod> entry	UsageSummary overallConsumptionLastPeriod
	EU_FB27_DE_011	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:powerOfTenMultiplier>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:powerOfTenMultiplier> entry	UsageSummary currentBillingPeriodOverrAllConsumption/powerOfTenMultiplier

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB27_DE_012	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:timeStamp>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp> entry	UsageSummary espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp
	EU_FB27_DE_013	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:uom>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:uom> entry	UsageSummary currentBillingPeriodOverrAllConsumption/uom
	EU_FB27_DE_014	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:value>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:value> entry	UsageSummary currentBillingPeriodOverrAllConsumption/value
	EU_FB27_DE_015	UsageSummary <espi:currentDayOverallConsumption/espi:powerOfTenMultiplier> and <espi:currentDayOverallConsumption/espi:uom>	Verify the UsageSummary entry contains a <espi:currentDayOverallConsumption/espi:powerOfTenMultiplier> entry and <espi:currentDayOverallConsumption/espi:uom> entry	UsageSummary currentDayOverallConsumption/powerOfTenMultiplier and currentDayOverallConsumption/uom
	EU_FB27_DE_016	UsageSummary <espi:currentDayOverallConsumption/es	Verify the UsageSummary entry contains a <espi:currentDayOverallConsum	UsageSummary currentDayOv

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
		pi:powerOfTenMultiplier>	ption/espi:powerOfTenMultiplier> entry	erallConsumption/powerOfTenMultiplier
	EU_FB27_DE_017	UsageSummary <espi:peakDemand>	Verify the UsageSummary entry contains a <espi:peakDemand> entry	UsageSummary peakDemand
	EU_FB27_DE_018	UsageSummary <espi:peakDemand/espi:powerOfTenMultiplier> and <espi:peakDemand/espi:uom>	Verify the UsageSummary entry contains a <espi:peakDemand/espi:powerOfTenMultiplier> entry and <espi:peakDemand/espi:uom> entry	UsageSummary peakDemand/powerOfTenMultiplier and peakDemand/uom
	EU_FB27_DE_019	UsageSummary <espi:previousDayOverallConsumption/espi:powerOfTenMultiplier> and <espi:previousDayOverallConsumption/espi:uom>	Verify the UsageSummary entry contains a <espi:previousDayOverallConsumption/espi:powerOfTenMultiplier> entry and <espi:previousDayOverallConsumption/espi:uom> entry	UsageSummary previousDayOverallConsumption/powerOfTenMultiplier and previousDayOverallConsumption/uom
	EU_FB27_DE_020	UsageSummary <espi:previousDayOverallConsumption/espi:powerOfTenMultiplier>	Verify the UsageSummary entry contains a <espi:previousDayOverallConsumption/espi:powerOfTenMultiplier> entry	UsageSummary previousDayOverallConsumption/powerOfTenMultiplier

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB27_DE_021	UsageSummary <espi:qualityOfReading>	Verify the UsageSummary entry contains a <espi:qualityOfReading> entry	UsageSummary qualityOfReading
	EU_FB27_DE_022	UsageSummary <espi:ratchetDemand>	Verify the UsageSummary entry contains a <espi:ratchetDemand> entry	UsageSummary ratchetDemand
	EU_FB27_DE_023	UsageSummary <espi:ratchetDemand/espi:powerOfTenMultiplier> and <espi:ratchetDemand/espi:uom>	Verify the UsageSummary entry contains a <espi:ratchetDemand/espi:powerOfTenMultiplier> entry and <espi:ratchetDemand/espi:uom> entry	UsageSummary ratchetDemand/powerOfTenMultiplier and ratchetDemand/uom
	EU_FB27_DE_024	UsageSummary <espi:ratchetDemandPeriod>	Verify the UsageSummary entry contains a <espi:ratchetDemandPeriod> entry	UsageSummary ratchetDemandPeriod
	EU_FB27_DE_025	UsageSummary <espi:ratchetDemandPeriod/espi:duration> and <espi:ratchetDemandPeriod/espi:start>	Verify the UsageSummary entry contains a <espi:ratchetDemandPeriod/espi:duration> entry and <espi:ratchetDemandPeriod/espi:start> entry	UsageSummary ratchetDemandPeriod/duration and ratchetDemandPeriod/start
	EU_FB27_DE_026	UsageSummary <espi:statusTimeStamp>	Verify the UsageSummary entry contains a <espi:statusTimeStamp> entry	UsageSummary statusTimeStamp

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB27_DE_027	UsageSummary <atom:published>	Verify the UsageSummary entry contains a published entry	
	EU_FB27_DE_028	UsageSummary <atom:updated>	Verify the UsageSummary entry contains an updated entry	
[FB_28] Usage Summary Costs for Current Billing Period The data meets the Usage Summary Costs for Current Billing Period content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage	EU_FB28_DE_001	<espi:UsageSummary>	Verify there is a UsageSummary entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
standard. **Note: This is an optional FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.**				
The data meets the Usage Summary Costs for Current Billing Period content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is an optional**	EU_FB28_DE_002	UsageSummary <atom:id>	Verify the UsageSummary entry contains an ID entry Verify the UsageSummary ID entry is a valid UUID type 3 or 5	UsageSummary ID
	EU_FB28_DE_003	UsageSummary <atom:title>	Verify the UsageSummary entry contains a title entry	
	EU_FB28_DE_004	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary entry contains a "self" link entry Verify the UsageSummary "self" link entry references a UsageSummary Verify the UsageSummary "self" link entry contains a valid Identifier	
	EU_FB28_DE_005	UsageSummary <atom:link rel='self' href=>	Verify the UsageSummary "self" link entry href= value is unique	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
FB requirement for Electricity, Natural Gas, and Water Energy Usage certification.	EU_FB28_DE_006	UsageSummary <atom:link rel='up' href=>	Verify the UsageSummary entry contains a "up" link entry Verify the UsageSummary "up" link references a UsageSummary Verify the UsageSummary "up" link does NOT contain an Identifier	
	EU_FB28_DE_007	UsageSummary <atom:link rel='related' href=>	Verify the UsageSummary entry contains a "related" link entry referencing a single UsagePoint entry	
	EU_FB28_DE_008	UsageSummary <espi:billingPeriod/espi:duration>	Verify the UsageSummary entry contains a <espi:billingPeriod/espi:duration> entry	UsageSummary billingPeriod/duration
	EU_FB28_DE_009	UsageSummary <espi:billingPeriod/espi:start>	Verify the UsageSummary entry contains a <espi:billingPeriod/espi:start> entry	UsageSummary billingPeriod/start
	EU_FB28_DE_010	UsageSummary <espi:billToDate>	Verify the UsageSummary entry contains a <espi:billToDate> entry	UsageSummary billToDate
	EU_FB28_DE_011	UsageSummary <espi:overallConsumptionLastPeriod>	Verify the UsageSummary entry contains a <espi:overallConsumptionLastPeriod> entry	UsageSummary overallConsumptionLastPeriod
	EU_FB28_DE_012	UsageSummary <espi:currentBillingPeriodOverAllCons	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverr	UsageSummary currentBillingPeriodOverrAl

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
		umption/espi:powerOfTenMultiplier>	AllConsumption/espi:powerOfTenMultiplier> entry	lConsumption/powerOfTenMultiplier
	EU_FB28_DE_013	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:timeStamp>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp> entry	UsageSummary espi:currentBillingPeriodOverrAllConsumption/espi:timeStamp
	EU_FB28_DE_014	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:uom>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:uom> entry	UsageSummary currentBillingPeriodOverrAllConsumption/uom
	EU_FB28_DE_015	UsageSummary <espi:currentBillingPeriodOverAllConsumption/espi:value>	Verify the UsageSummary entry contains a <espi:currentBillingPeriodOverrAllConsumption/espi:value> entry	UsageSummary currentBillingPeriodOverrAllConsumption/value
	EU_FB28_DE_016	UsageSummary <espi:qualityOfReading>	Verify the UsageSummary entry contains a <espi:qualityOfReading> entry	UsageSummary qualityOfReading
	EU_FB28_DE_017	UsageSummary <espi:statusTimeStamp>	Verify the UsageSummary entry contains a <espi:statusTimeStamp> entry	UsageSummary statusTimeStamp

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	EU_FB28_DE_018	UsageSummary <atom:published>	Verify the UsageSummary entry contains a published entry	
	EU_FB28_DE_019	UsageSummary <atom:updated>	Verify the UsageSummary entry contains an updated entry	
[FB_29] Temperature Interval Metering The data meets the minimum Temperature Interval data content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Energy Usage standard. **Note: This is a mandatory FB requirement for Temperature Energy**	EU_FB29_DE_001	ReadingType <espi:kind>, <espi:uom> UsagePoint <espi:ServiceCategory/espi:kind>	Verify the UsagePoint entry espi:kind represents weather (value is 10) and its "related" MeterReading entry espi:kind value represents "temperature" (value is 46), espi:uom value represents "kelvin" (value is 6)	UsagePoint ServiceCategory/kind MeterReading kind, and uom

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
Usage certification.				

Green Button Retail Customer CMD / DMD Certification Data Element Requirements

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
[FB_51] Common The data meets the minimum content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a mandatory FB requirement for Retail Customer certification**.	RC_FB51_DE_001	<atom:feed>	Verify there is a <atom:feed> entry	
	RC_FB51_DE_002	feed <atom:id>	Verify the feed entry contains an ID entry Verify the feed ID entry is a valid UUID type 3 or 5	
	RC_FB51_DE_003	feed <atom:title>	Verify the feed entry contains a <atom:title> entry	
	RC_FB51_DE_004	feed <atom:updated>	Verify the feed entry contains a <atom:updated> entry	
	RC_FB51_DE_005	<atom:id>	Verify all ID entry values are unique	All IDs in the data
	RC_FB51_DE_006	<cust:LocalTimeParameters>	Verify there is a LocalTimeParameters entry	
	RC_FB51_DE_007	LocalTimeParameters <atom:id>	Verify the LocalTimeParameters entry contains an ID entry Verify the LocalTimeParameters ID entry is a valid UUID type 3 or 5	LocalTimeParameters ID
	RC_FB51_DE_008	LocalTimeParameters <atom:title>	Verify the LocalTimeParameters entry contains a title entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB51_DE_009	LocalTimeParameters <atom:link rel='self' href=>	Verify the LocalTimeParameters entry contains a "self" link entry Verify the LocalTimeParameters "self" link entry references a LocalTimeParameters Verify the LocalTimeParameters "self" link entry contains a valid Identifier	
	RC_FB51_DE_010	LocalTimeParameters <atom:link rel='self' href=>	Verify the LocalTimeParameters "self" link href= entry is unique	
	RC_FB51_DE_011	LocalTimeParameters <atom:link rel='up' href=>	Verify the LocalTimeParameters entry contains a "up" link entry Verify the LocalTimeParameters "up" link references a LocalTimeParameters Verify the LocalTimeParameters "up" link does NOT contain an Identifier	
	RC_FB51_DE_012	LocalTimeParameters <atom:link rel='related' href=>	Verify the LocalTimeParameters entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB51_DE_013	LocalTimeParameters <atom:published>	Verify the LocalTimeParameters entry contains a published entry	
	RC_FB51_DE_014	LocalTimeParameters <atom:updated>	Verify the LocalTimeParameters entry contains an updated entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB51_DE_015	<cust:Customer>	Verify there is a Customer entry	
	RC_FB51_DE_016	Customer <atom:id>	Verify the Customer entry contains an ID entry Verify the Customer ID entry is a valid UUID type 3 or 5	Customer ID
	RC_FB51_DE_017	Customer <atom:title>	Verify the Customer entry contains a title entry	
	RC_FB51_DE_018	Customer <atom:link rel='self' href=>	Verify the Customer entry contains a "self" link entry Verify the Customer "self" link entry references a Customer Verify the Customer "self" link entry contains a valid Identifier	
	RC_FB51_DE_019	Customer <atom:link rel='self' href=>	Verify the Customer "self" link href= entry is unique	
	RC_FB51_DE_020	Customer <atom:link rel='up' href=>	Verify the Customer entry contains a "up" link entry Verify the Customer "up" link references a Customer Verify the Customer "up" link does NOT contain an Identifier	
	RC_FB51_DE_021	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing only one LocalTimeParameters entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB51_DE_022	Customer <atom:published>	Verify the Customer entry contains a published entry	
	RC_FB51_DE_023	Customer <atom:updated>	Verify the Customer entry contains an updated entry	
[FB_54] Basic Retail Customer Information The data meets the minimum Retail Customer Informaton content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail Customer**	RC_FB54_DE_001	Customer <cust:customerName>	Verify the Customer entry contains a customerName entry	Customer customerName

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
certification.				
[FB_55] Retail Customer Demographic Information The data meets the minimum Retail Customer Demographic Informaton content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement**	RC_FB55_DE_001	Customer <cust:Organisation/cust:streetAddress/cust:streetDetail/cust:addressGeneral> or <cust:Organisation/cust:streetAddress/cust:poBox>	Verify the Customer entry contains a streetAddress or poBox entry	Customer Organisation/streetAddress/streetDetail/addressGeneral or Organisation/streetAddress/poBox
	RC_FB55_DE_002	Customer <cust:Organisation/cust:streetAddress/cust:townDetail/cust:name>	Verify the Customer entry contains a city entry	Customer Organisation/streetAddress/townDetail/name
	RC_FB55_DE_003	Customer <cust:Organisation/cust:streetAddress/cust:townDetail/cust:stateOrProvince>	Verify the Customer entry contains a state or province entry	Customer Organisation/streetAddress/townDetail/stateOrProvince

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
for Retail Customer certification.				
[FB_56] Retail Customer Billing Information The data meets the minimum Retail Customer Billing Informaton content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail**	RC_FB56_DE_001	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB56_DE_002	<cust:CustomerAccount>	Verify there is a CustomerAccount entry	
	RC_FB56_DE_003	CustomerAccount <atom:id>	Verify the CustomerAccount entry contains an ID entry Verify the CustomerAccount ID entry is a valid UUID type 3 or 5	CustomerAccount ID
	RC_FB56_DE_004	CustomerAccount <atom:title>	Verify the CustomerAccount entry contains a title entry	
	RC_FB56_DE_005	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount entry contains a "self" link entry Verify the CustomerAccount "self" link entry references a CustomerAccount Verify the CustomerAccount "self" link entry contains a valid Identifier	
	RC_FB56_DE_006	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount "self" link href= entry is unique	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
Customer certification.	RC_FB56_DE_007	CustomerAccount <atom:link rel='up' href=>	Verify the CustomerAccount entry contains a "up" link entry Verify the CustomerAccount "up" link references a CustomerAccount Verify the CustomerAccount "up" link does NOT contain an Identifier	
	RC_FB56_DE_008	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB56_DE_009	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry references only one Customer entry	
	RC_FB56_DE_010	CustomerAccount <cust:accountId>	Verify the CustomerAccount entry contains a <cust:accountId> entry	CustomerAccount accountId
	RC_FB56_DE_011	CustomerAccount <cust:contactInfo/cust:streetAddress/cust:streetDetail/cust:addressGeneral> or <cust:contactInfo/cust:streetAddress/cust:poBox>	Verify the CustomerAccount entry contains a streetAddress or poBox entry	CustomerAccount contactInfo/streetAddress/streetDetail/addressGeneral or contactInfo/streetAddress/poBox
	RC_FB56_DE_012	CustomerAccount <cust:contactInfo/cust:streetAddress/c	Verify the CustomerAccount entry contains a city entry	CustomerAccount contactInfo/streetAddress/to

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
		ust:townDetail/cust:name>		wnDetail/name
	RC_FB56_DE_013	CustomerAccount <cust:contactInfo/cust:streetAddress/cust:townDetail/cust:stateOrProvince>	Verify the CustomerAccount entry contains a state or province entry	CustomerAccount contactInfo/streetAddress/townDetail/stateOrProvince
	RC_FB56_DE_014	CustomerAccount <atom:published>	Verify the CustomerAccount entry contains a published entry	
	RC_FB56_DE_015	CustomerAccount <atom:updated>	Verify the CustomerAccount entry contains an updated entry	
[FB_57] Retail Customer AccountAgreement Information The data meets the minimum Retail Customer AccountAgreement Informaton content requirements	RC_FB57_DE_001	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB57_DE_002	<cust:CustomerAccount>	Verify there is a CustomerAccount entry	
	RC_FB57_DE_003	CustomerAccount <atom:id>	Verify the CustomerAccount entry contains an ID entry Verify the CustomerAccount ID entry is a valid UUID type 3 or 5	CustomerAccount ID
	RC_FB57_DE_004	CustomerAccount <atom:title>	Verify the CustomerAccount entry contains a title entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
to qualify as a certified implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail Customer certification .**	RC_FB57_DE_005	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount entry contains a "self" link entry Verify the CustomerAccount "self" link entry references a CustomerAccount Verify the CustomerAccount "self" link entry contains a valid Identifier	
	RC_FB57_DE_006	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount "self" link href= entry is unique	
	RC_FB57_DE_007	CustomerAccount <atom:link rel='up' href=>	Verify the CustomerAccount entry contains a "up" link entry Verify the CustomerAccount "up" link references a CustomerAccount Verify the CustomerAccount "up" link does NOT contain an Identifier	
	RC_FB57_DE_008	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB57_DE_009	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry references only one Customer entry	
	RC_FB57_DE_010	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one CustomerAgreement entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB57_DE_011	CustomerAccount <atom:published>	Verify the CustomerAccount entry contains a published entry	
	RC_FB57_DE_012	CustomerAccount <atom:updated>	Verify the CustomerAccount entry contains an updated entry	
	RC_FB57_DE_013	<cust:CustomerAgreement>	Verify there is a CustomerAgreement entry	
	RC_FB57_DE_014	CustomerAgreement <atom:id>	Verify the CustomerAgreement entry contains an ID entry Verify the CustomerAgreement ID entry is a valid UUID type 3 or 5	CustomerAgreement ID
	RC_FB57_DE_015	CustomerAgreement <atom:title>	Verify the CustomerAgreement entry contains a title entry	
	RC_FB57_DE_016	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement entry contains a "self" link entry Verify the CustomerAgreement "self" link entry references a CustomerAgreement Verify the CustomerAgreement "self" link entry contains a valid Identifier	
	RC_FB57_DE_017	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement "self" link href= entry is unique	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB57_DE_018	CustomerAgreement <atom:link rel='up' href=>	Verify the CustomerAgreement entry contains a "up" link entry Verify the CustomerAgreement "up" link references a CustomerAgreement Verify the CustomerAgreement "up" link does NOT contain an Identifier	
	RC_FB57_DE_019	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB57_DE_020	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one CustomerAccount entry	
	RC_FB57_DE_021	CustomerAgreement <cust:agreementId>	Verify the CustomerAgreement entry contains a <cust:agreementId> entry	CustomerAgreement agreementId
	RC_FB57_DE_022	CustomerAgreement <atom:published>	Verify the CustomerAgreement entry contains a published entry	
	RC_FB57_DE_023	CustomerAgreement <atom:updated>	Verify the CustomerAgreement entry contains an updated entry	
[FB_58] Retail Customer ServiceLocat	RC_FB58_DE_001	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing at least one CustomerAccount entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
ion Information The data meets the minimum Retail Customer ServiceLocation Informaton content requirements to qualify as a certified implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail Customer certification.**	RC_FB58_DE_002	<cust:CustomerAccount>	Verify there is a CustomerAccount entry	
	RC_FB58_DE_003	CustomerAccount <atom:id>	Verify the CustomerAccount entry contains an ID entry Verify the CustomerAccount ID entry is a valid UUID type 3 or 5	CustomerAccount ID
	RC_FB58_DE_004	CustomerAccount <atom:title>	Verify the CustomerAccount entry contains a title entry	
	RC_FB58_DE_005	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount entry contains a "self" link entry Verify the CustomerAccount "self" link entry references a CustomerAccount Verify the CustomerAccount "self" link entry contains a valid Identifier	
	RC_FB58_DE_006	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount "self" link href= entry is unique	
	RC_FB58_DE_007	CustomerAccount <atom:link rel='up' href=>	Verify the CustomerAccount entry contains a "up" link entry Verify the CustomerAccount "up" link references a CustomerAccount Verify the CustomerAccount "up" link does NOT contain an Identifier	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB58_DE_008	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB58_DE_009	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry references only one Customer entry	
	RC_FB58_DE_010	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one CustomerAgreement entry	
	RC_FB58_DE_011	CustomerAccount <atom:published>	Verify the CustomerAccount entry contains a published entry	
	RC_FB58_DE_012	CustomerAccount <atom:updated>	Verify the CustomerAccount entry contains an updated entry	
	RC_FB58_DE_013	<cust:CustomerAgreement>	Verify there is a CustomerAgreement entry	
	RC_FB58_DE_014	CustomerAgreement <atom:id>	Verify the CustomerAgreement entry contains an ID entry Verify the CustomerAgreement ID entry is a valid UUID type 3 or 5	CustomerAgreement ID
	RC_FB58_DE_015	CustomerAgreement <atom:title>	Verify the CustomerAgreement entry contains a title entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB58_DE_016	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement entry contains a "self" link entry Verify the CustomerAgreement "self" link entry references a CustomerAgreement Verify the CustomerAgreement "self" link entry contains a valid Identifier	
	RC_FB58_DE_017	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement "self" link href= entry is unique	
	RC_FB58_DE_018	CustomerAgreement <atom:link rel='up' href=>	Verify the CustomerAgreement entry contains a "up" link entry Verify the CustomerAgreement "up" link references a CustomerAgreement Verify the CustomerAgreement "up" link does NOT contain an Identifier	
	RC_FB58_DE_019	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB58_DE_020	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one CustomerAccount entry	
	RC_FB58_DE_021	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one ServiceLocation entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB58_DE_022	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one ServiceLocation entry	
	RC_FB58_DE_023	CustomerAgreement <atom:published>	Verify the CustomerAgreement entry contains a published entry	
	RC_FB58_DE_024	CustomerAgreement <atom:updated>	Verify the CustomerAgreement entry contains an updated entry	
	RC_FB58_DE_025	LocalTimeParameters <atom:link rel='related' href=>	Verify the LocalTimeParameters entry contains a "related" link entry referencing at least one ServiceLocation entry	
	RC_FB58_DE_026	<cust:ServiceLocation>	Verify there is a ServiceLocation entry	
	RC_FB58_DE_027	ServiceLocation <atom:id>	Verify the ServiceLocation entry contains an ID entry Verify the ServiceLocation ID entry is a valid UUID type 3 or 5	ServiceLocation ID
	RC_FB58_DE_028	ServiceLocation <atom:title>	Verify the ServiceLocation entry contains a title entry	
	RC_FB58_DE_029	ServiceLocation <atom:link rel='self' href=>	Verify the ServiceLocation entry contains a "self" link entry Verify the ServiceLocation "self" link entry references a ServiceLocation Verify the ServiceLocation "self"	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
			link entry contains a valid Identifier	
	RC_FB58_DE_030	ServiceLocation <atom:link rel='self' href=>	Verify the ServiceLocation "self" link href= entry is unique	
	RC_FB58_DE_031	ServiceLocation <atom:link rel='up' href=>	Verify the ServiceLocation entry contains a "up" link entry Verify the ServiceLocation "up" link references a ServiceLocation Verify the ServiceLocation "up" link does NOT contain an Identifier	
	RC_FB58_DE_032	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one CustomerAgreement entry	
	RC_FB58_DE_033	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry references only one CustomerAgreement entry	
	RC_FB58_DE_034	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one LocalTimeParameters entry	
	RC_FB58_DE_035	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry references only one LocalTimeParameters entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB58_DE_036	ServiceLocation <cust:UsagePoints/ cust:UsagePoint>	Verify the ServiceLocation entry contains at least one UsagePoint entry	ServiceLocation UsagePoints/UsagePoint
	RC_FB58_DE_037	ServiceLocation <atom:published>	Verify the ServiceLocation entry contains a published entry	
	RC_FB58_DE_038	ServiceLocation <atom:updated>	Verify the ServiceLocation entry contains an updated entry	
[FB_59] Retail Customer ServiceSupplier Information The data meets the minimum Retail Customer ServiceSupplier Informaton content requirements to qualify as a certified implementor of the NAESB REQ.21	RC_FB59_DE_001	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB59_DE_002	<cust:CustomerAccount>	Verify there is a CustomerAccount entry	
	RC_FB59_DE_003	CustomerAccount <atom:id>	Verify the CustomerAccount entry contains an ID entry Verify the CustomerAccount ID entry is a valid UUID type 3 or 5	CustomerAccount ID
	RC_FB59_DE_004	CustomerAccount <atom:title>	Verify the CustomerAccount entry contains a title entry	
	RC_FB59_DE_005	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount entry contains a "self" link entry Verify the CustomerAccount "self" link entry references a CustomerAccount Verify the CustomerAccount	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail Customer certification .**			"self" link entry contains a valid Identifier	
	RC_FB59_DE_006	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount "self" link href= entry is unique	
	RC_FB59_DE_007	CustomerAccount <atom:link rel='up' href=>	Verify the CustomerAccount entry contains a "up" link entry Verify the CustomerAccount "up" link references a CustomerAccount Verify the CustomerAccount "up" link does NOT contain an Identifier	
	RC_FB59_DE_008	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB59_DE_009	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry references only one Customer entry	
	RC_FB59_DE_010	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one CustomerAgreement entry	
	RC_FB59_DE_011	CustomerAccount <atom:published>	Verify the CustomerAccount entry contains a published entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB59_DE_012	CustomerAccount <atom:updated>	Verify the CustomerAccount entry contains an updated entry	
	RC_FB59_DE_013	<cust:CustomerAgreement>	Verify there is a CustomerAgreement entry	
	RC_FB59_DE_014	CustomerAgreement <atom:id>	Verify the CustomerAgreement entry contains an ID entry Verify the CustomerAgreement ID entry is a valid UUID type 3 or 5	CustomerAgreement ID
	RC_FB59_DE_015	CustomerAgreement <atom:title>	Verify the CustomerAgreement entry contains a title entry	
	RC_FB59_DE_016	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement entry contains a "self" link entry Verify the CustomerAgreement "self" link entry references a CustomerAgreement Verify the CustomerAgreement "self" link entry contains a valid Identifier	
	RC_FB59_DE_017	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement "self" link href= entry is unique	
	RC_FB59_DE_018	CustomerAgreement <atom:link rel='up' href=>	Verify the CustomerAgreement entry contains a "up" link entry Verify the CustomerAgreement "up" link references a CustomerAgreement Verify the CustomerAgreement	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
			"up" link does NOT contain an Identifier	
	RC_FB5 9_DE_01 9	CustomerAgreeme nt <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB5 9_DE_02 0	CustomerAgreeme nt <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one CustomerAccount entry	
	RC_FB5 9_DE_02 1	CustomerAgreeme nt <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one ServiceSupplier entry	
	RC_FB5 9_DE_02 2	CustomerAgreeme nt <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one ServiceSupplier entry	
	RC_FB5 9_DE_02 3	CustomerAgreeme nt <atom:published>	Verify the CustomerAgreement entry contains a published entry	
	RC_FB5 9_DE_02 4	CustomerAgreeme nt <atom:updated>	Verify the CustomerAgreement entry contains an updated entry	
	RC_FB5 9_DE_02 5	<cust:ServiceSuppl ier>	Verify there is a ServiceSupplier entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB59_DE_026	ServiceSupplier <atom:id>	Verify the ServiceSupplier entry contains an ID entry Verify the ServiceSupplier ID entry is a valid UUID type 3 or 5	ServiceSupplier ID
	RC_FB59_DE_027	ServiceSupplier <atom:title>	Verify the ServiceSupplier entry contains a title entry	
	RC_FB59_DE_028	ServiceSupplier <atom:link rel='self' href=>	Verify the ServiceSupplier entry contains a "self" link entry Verify the ServiceSupplier "self" link entry references a ServiceSupplier Verify the ServiceSupplier "self" link entry contains a valid Identifier	
	RC_FB59_DE_029	ServiceSupplier <atom:link rel='self' href=>	Verify the ServiceSupplier "self" link href= entry is unique	
	RC_FB59_DE_030	ServiceSupplier <atom:link rel='up' href=>	Verify the ServiceSupplier entry contains a "up" link entry Verify the ServiceSupplier "up" link references a ServiceSupplier Verify the ServiceSupplier "up" link does NOT contain an Identifier	
	RC_FB59_DE_031	ServiceSupplier <atom:link rel='related' href=>	Verify the ServiceSupplier entry contains a "related" link entry referencing at least one CustomerAgreement entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB59_DE_032	ServiceSupplier <atom:link rel='related' href=>	Verify the ServiceSupplier entry contains a "related" link entry references only one CustomerAgreement entry	
	RC_FB59_DE_033	ServiceSupplier <cust:UsagePoints/ cust:UsagePoint>	Verify the ServiceSupplier entry contains a <cust:Organisation/cust:organisationName> entry	ServiceSupplier Organisation/organisationName
	RC_FB59_DE_034	ServiceSupplier <atom:published>	Verify the ServiceSupplier entry contains a published entry	
	RC_FB59_DE_035	ServiceSupplier <atom:updated>	Verify the ServiceSupplier entry contains an updated entry	
[FB_60] Retail Customer Meter Information The data meets the minimum Retail Customer Meter Informaton content requirements to qualify as a certified	RC_FB60_DE_001	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB60_DE_002	<cust:CustomerAccount>	Verify there is a CustomerAccount entry	
	RC_FB60_DE_003	CustomerAccount <atom:id>	Verify the CustomerAccount entry contains an ID entry Verify the CustomerAccount ID entry is a valid UUID type 3 or 5	CustomerAccount ID
	RC_FB60_DE_004	CustomerAccount <atom:title>	Verify the CustomerAccount entry contains a title entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail Customer certification.**	RC_FB60_DE_005	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount entry contains a "self" link entry Verify the CustomerAccount "self" link entry references a CustomerAccount Verify the CustomerAccount "self" link entry contains a valid Identifier	
	RC_FB60_DE_006	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount "self" link href= entry is unique	
	RC_FB60_DE_007	CustomerAccount <atom:link rel='up' href=>	Verify the CustomerAccount entry contains a "up" link entry Verify the CustomerAccount "up" link references a CustomerAccount Verify the CustomerAccount "up" link does NOT contain an Identifier	
	RC_FB60_DE_008	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB60_DE_009	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry references only one Customer entry	
	RC_FB60_DE_010	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one CustomerAgreement entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB60_DE_011	CustomerAccount <atom:published>	Verify the CustomerAccount entry contains a published entry	
	RC_FB60_DE_012	CustomerAccount <atom:updated>	Verify the CustomerAccount entry contains an updated entry	
	RC_FB60_DE_013	<cust:CustomerAgreement>	Verify there is a CustomerAgreement entry	
	RC_FB60_DE_014	CustomerAgreement <atom:id>	Verify the CustomerAgreement entry contains an ID entry Verify the CustomerAgreement ID entry is a valid UUID type 3 or 5	CustomerAgreement ID
	RC_FB60_DE_015	CustomerAgreement <atom:title>	Verify the CustomerAgreement entry contains a title entry	
	RC_FB60_DE_016	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement entry contains a "self" link entry Verify the CustomerAgreement "self" link entry references a CustomerAgreement Verify the CustomerAgreement "self" link entry contains a valid Identifier	
	RC_FB60_DE_017	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement "self" link href= entry is unique	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB60_DE_018	CustomerAgreement <atom:link rel='up' href=>	Verify the CustomerAgreement entry contains a "up" link entry Verify the CustomerAgreement "up" link references a CustomerAgreement Verify the CustomerAgreement "up" link does NOT contain an Identifier	
	RC_FB60_DE_019	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB60_DE_020	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one CustomerAccount entry	
	RC_FB60_DE_021	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one ServiceLocation entry	
	RC_FB60_DE_022	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one ServiceLocation entry	
	RC_FB60_DE_023	CustomerAgreement <atom:published>	Verify the CustomerAgreement entry contains a published entry	
	RC_FB60_DE_024	CustomerAgreement <atom:updated>	Verify the CustomerAgreement entry contains an updated entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB60_DE_025	LocalTimeParameters <atom:link rel='related' href=>	Verify the LocalTimeParameters entry contains a "related" link entry referencing at least one ServiceLocation entry	
	RC_FB60_DE_026	<cust:ServiceLocation>	Verify there is a ServiceLocation entry	
	RC_FB60_DE_027	ServiceLocation <atom:id>	Verify the ServiceLocation entry contains an ID entry Verify the ServiceLocation ID entry is a valid UUID type 3 or 5	ServiceLocation ID
	RC_FB60_DE_028	ServiceLocation <atom:title>	Verify the ServiceLocation entry contains a title entry	
	RC_FB60_DE_029	ServiceLocation <atom:link rel='self' href=>	Verify the ServiceLocation entry contains a "self" link entry Verify the ServiceLocation "self" link entry references a ServiceLocation Verify the ServiceLocation "self" link entry contains a valid Identifier	
	RC_FB60_DE_030	ServiceLocation <atom:link rel='self' href=>	Verify the ServiceLocation "self" link href= entry is unique	
	RC_FB60_DE_031	ServiceLocation <atom:link rel='up' href=>	Verify the ServiceLocation entry contains a "up" link entry Verify the ServiceLocation "up" link references a ServiceLocation Verify the ServiceLocation "up"	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
			link does NOT contain an Identifier	
	RC_FB60_DE_032	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one CustomerAgreement entry	
	RC_FB60_DE_033	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry references only one CustomerAgreement entry	
	RC_FB60_DE_034	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one LocalTimeParameters entry	
	RC_FB60_DE_035	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry references only one LocalTimeParameters entry	
	RC_FB60_DE_036	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one Meter entry	
	RC_FB60_DE_037	ServiceLocation <atom:published>	Verify the ServiceLocation entry contains a published entry	
	RC_FB60_DE_038	ServiceLocation <atom:updated>	Verify the ServiceLocation entry contains an updated entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB60_DE_039	<cust:Meter>	Verify there is a Meter entry	
	RC_FB60_DE_040	Meter <atom:id>	Verify the Meter entry contains an ID entry Verify the Meter ID entry is a valid UUID type 3 or 5	Meter ID
	RC_FB60_DE_041	Meter <atom:title>	Verify the Meter entry contains a title entry	
	RC_FB60_DE_042	Meter <atom:link rel='self' href=>	Verify the Meter entry contains a "self" link entry Verify the Meter "self" link entry references a Meter Verify the Meter "self" link entry contains a valid Identifier	
	RC_FB60_DE_043	Meter <atom:link rel='self' href=>	Verify the Meter "self" link href= entry is unique	
	RC_FB60_DE_044	Meter <atom:link rel='up' href=>	Verify the Meter entry contains a "up" link entry Verify the Meter "up" link references a Meter Verify the Meter "up" link does NOT contain an Identifier	
	RC_FB60_DE_045	Meter <atom:link rel='related' href=>	Verify the Meter entry contains a "related" link entry referencing at least one ServiceLocation entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB60_DE_046	Meter <atom:link rel='related' href=>	Verify the Meter entry contains a "related" link entry references only one ServiceLocation entry	
	RC_FB60_DE_047	Meter <cust:serialNumber>	Verify the Meter entry contains a <cust:serialNumber> entry	Meter serialNumber
	RC_FB60_DE_048	Meter <atom:published>	Verify the Meter entry contains a published entry	
	RC_FB60_DE_049	Meter <atom:updated>	Verify the Meter entry contains an updated entry	
[FB_61] Retail Customer EndDevice Information The data meets the minimum Retail Customer EndDevice Informaton content requirements to qualify as a certified	RC_FB61_DE_001	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB61_DE_002	<cust:CustomerAccount>	Verify there is a CustomerAccount entry	
	RC_FB61_DE_003	CustomerAccount <atom:id>	Verify the CustomerAccount entry contains an ID entry Verify the CustomerAccount ID entry is a valid UUID type 3 or 5	CustomerAccount ID
	RC_FB61_DE_004	CustomerAccount <atom:title>	Verify the CustomerAccount entry contains a title entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail Customer certification.**	RC_FB61_DE_005	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount entry contains a "self" link entry Verify the CustomerAccount "self" link entry references a CustomerAccount Verify the CustomerAccount "self" link entry contains a valid Identifier	
	RC_FB61_DE_006	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount "self" link href= entry is unique	
	RC_FB61_DE_007	CustomerAccount <atom:link rel='up' href=>	Verify the CustomerAccount entry contains a "up" link entry Verify the CustomerAccount "up" link references a CustomerAccount Verify the CustomerAccount "up" link does NOT contain an Identifier	
	RC_FB61_DE_008	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB61_DE_009	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry references only one Customer entry	
	RC_FB61_DE_010	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one CustomerAgreement entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB61_DE_011	CustomerAccount <atom:published>	Verify the CustomerAccount entry contains a published entry	
	RC_FB61_DE_012	CustomerAccount <atom:updated>	Verify the CustomerAccount entry contains an updated entry	
	RC_FB61_DE_013	<cust:CustomerAgreement>	Verify there is a CustomerAgreement entry	
	RC_FB61_DE_014	CustomerAgreement <atom:id>	Verify the CustomerAgreement entry contains an ID entry Verify the CustomerAgreement ID entry is a valid UUID type 3 or 5	CustomerAgreement ID
	RC_FB61_DE_015	CustomerAgreement <atom:title>	Verify the CustomerAgreement entry contains a title entry	
	RC_FB61_DE_016	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement entry contains a "self" link entry Verify the CustomerAgreement "self" link entry references a CustomerAgreement Verify the CustomerAgreement "self" link entry contains a valid Identifier	
	RC_FB61_DE_017	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement "self" link href= entry is unique	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB61_DE_018	CustomerAgreement <atom:link rel='up' href=>	Verify the CustomerAgreement entry contains a "up" link entry Verify the CustomerAgreement "up" link references a CustomerAgreement Verify the CustomerAgreement "up" link does NOT contain an Identifier	
	RC_FB61_DE_019	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB61_DE_020	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one CustomerAccount entry	
	RC_FB61_DE_021	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one ServiceLocation entry	
	RC_FB61_DE_022	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one ServiceLocation entry	
	RC_FB61_DE_023	CustomerAgreement <atom:published>	Verify the CustomerAgreement entry contains a published entry	
	RC_FB61_DE_024	CustomerAgreement <atom:updated>	Verify the CustomerAgreement entry contains an updated entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB61_DE_025	LocalTimeParameters <atom:link rel='related' href=>	Verify the LocalTimeParameters entry contains a "related" link entry referencing at least one ServiceLocation entry	
	RC_FB61_DE_026	<cust:ServiceLocation>	Verify there is a ServiceLocation entry	
	RC_FB61_DE_027	ServiceLocation <atom:id>	Verify the ServiceLocation entry contains an ID entry Verify the ServiceLocation ID entry is a valid UUID type 3 or 5	ServiceLocation ID
	RC_FB61_DE_028	ServiceLocation <atom:title>	Verify the ServiceLocation entry contains a title entry	
	RC_FB61_DE_029	ServiceLocation <atom:link rel='self' href=>	Verify the ServiceLocation entry contains a "self" link entry Verify the ServiceLocation "self" link entry references a ServiceLocation Verify the ServiceLocation "self" link entry contains a valid Identifier	
	RC_FB61_DE_030	ServiceLocation <atom:link rel='self' href=>	Verify the ServiceLocation "self" link href= entry is unique	
	RC_FB61_DE_031	ServiceLocation <atom:link rel='up' href=>	Verify the ServiceLocation entry contains a "up" link entry Verify the ServiceLocation "up" link references a ServiceLocation Verify the ServiceLocation "up"	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
			link does NOT contain an Identifier	
	RC_FB61_DE_032	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one CustomerAgreement entry	
	RC_FB61_DE_033	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry references only one CustomerAgreement entry	
	RC_FB61_DE_034	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one LocalTimeParameters entry	
	RC_FB61_DE_035	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry references only one LocalTimeParameters entry	
	RC_FB61_DE_036	ServiceLocation <atom:link rel='related' href=>	Verify the ServiceLocation entry contains a "related" link entry referencing at least one EndDevice entry	
	RC_FB61_DE_037	ServiceLocation <atom:published>	Verify the ServiceLocation entry contains a published entry	
	RC_FB61_DE_038	ServiceLocation <atom:updated>	Verify the ServiceLocation entry contains an updated entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB61_DE_039	<cust:EndDevice>	Verify there is a EndDevice entry	
	RC_FB61_DE_040	EndDevice <atom:id>	Verify the EndDevice entry contains an ID entry Verify the EndDevice ID entry is a valid UUID type 3 or 5	EndDevice ID
	RC_FB61_DE_041	EndDevice <atom:title>	Verify the EndDevice entry contains a title entry	
	RC_FB61_DE_042	EndDevice <atom:link rel='self' href=>	Verify the EndDevice entry contains a "self" link entry Verify the EndDevice "self" link entry references a EndDevice Verify the EndDevice "self" link entry contains a valid Identifier	
	RC_FB61_DE_043	EndDevice <atom:link rel='self' href=>	Verify the EndDevice "self" link href= entry is unique	
	RC_FB61_DE_044	EndDevice <atom:link rel='up' href=>	Verify the EndDevice entry contains a "up" link entry Verify the EndDevice "up" link references a EndDevice Verify the EndDevice "up" link does NOT contain an Identifier	
	RC_FB61_DE_045	EndDevice <atom:link rel='related' href=>	Verify the EndDevice entry contains a "related" link entry referencing at least one ServiceLocation entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB61_DE_046	EndDevice <atom:link rel='related' href=>	Verify the EndDevice entry contains a "related" link entry references only one ServiceLocation entry	
	RC_FB61_DE_047	EndDevice <cust:serialNumber>	Verify the EndDevice entry contains a <cust:serialNumber> entry	EndDevice serialNumber
	RC_FB61_DE_048	EndDevice <atom:published>	Verify the EndDevice entry contains a published entry	
	RC_FB61_DE_049	EndDevice <atom:updated>	Verify the EndDevice entry contains an updated entry	
[FB_62] Retail Customer ProgramDate IdMappings Information The data meets the minimum Retail Customer ProgramDate IdMappings Informaton content requirements	RC_FB62_DE_001	Customer <atom:link rel='related' href=>	Verify the Customer entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB62_DE_002	<cust:CustomerAccount>	Verify there is a CustomerAccount entry	
	RC_FB62_DE_003	CustomerAccount <atom:id>	Verify the CustomerAccount entry contains an ID entry Verify the CustomerAccount ID entry is a valid UUID type 3 or 5	CustomerAccount ID
	RC_FB62_DE_004	CustomerAccount <atom:title>	Verify the CustomerAccount entry contains a title entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
to qualify as a certified implementor of the NAESB REQ.21 ESPI Retail Customer standard. **Note: This is a optional FB requirement for Retail Customer certification .**	RC_FB62_DE_005	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount entry contains a "self" link entry Verify the CustomerAccount "self" link entry references a CustomerAccount Verify the CustomerAccount "self" link entry contains a valid Identifier	
	RC_FB62_DE_006	CustomerAccount <atom:link rel='self' href=>	Verify the CustomerAccount "self" link href= entry is unique	
	RC_FB62_DE_007	CustomerAccount <atom:link rel='up' href=>	Verify the CustomerAccount entry contains a "up" link entry Verify the CustomerAccount "up" link references a CustomerAccount Verify the CustomerAccount "up" link does NOT contain an Identifier	
	RC_FB62_DE_008	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one Customer entry	
	RC_FB62_DE_009	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry references only one Customer entry	
	RC_FB62_DE_010	CustomerAccount <atom:link rel='related' href=>	Verify the CustomerAccount entry contains a "related" link entry referencing at least one CustomerAgreement entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB62_DE_011	CustomerAccount <atom:published>	Verify the CustomerAccount entry contains a published entry	
	RC_FB62_DE_012	CustomerAccount <atom:updated>	Verify the CustomerAccount entry contains an updated entry	
	RC_FB62_DE_013	<cust:CustomerAgreement>	Verify there is a CustomerAgreement entry	
	RC_FB62_DE_014	CustomerAgreement <atom:id>	Verify the CustomerAgreement entry contains an ID entry Verify the CustomerAgreement ID entry is a valid UUID type 3 or 5	CustomerAgreement ID
	RC_FB62_DE_015	CustomerAgreement <atom:title>	Verify the CustomerAgreement entry contains a title entry	
	RC_FB62_DE_016	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement entry contains a "self" link entry Verify the CustomerAgreement "self" link entry references a CustomerAgreement Verify the CustomerAgreement "self" link entry contains a valid Identifier	
	RC_FB62_DE_017	CustomerAgreement <atom:link rel='self' href=>	Verify the CustomerAgreement "self" link href= entry is unique	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB62_DE_018	CustomerAgreement <atom:link rel='up' href=>	Verify the CustomerAgreement entry contains a "up" link entry Verify the CustomerAgreement "up" link references a CustomerAgreement Verify the CustomerAgreement "up" link does NOT contain an Identifier	
	RC_FB62_DE_019	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one CustomerAccount entry	
	RC_FB62_DE_020	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry references only one CustomerAccount entry	
	RC_FB62_DE_021	CustomerAgreement <atom:link rel='related' href=>	Verify the CustomerAgreement entry contains a "related" link entry referencing at least one ProgramDateIdMappings entry	
	RC_FB62_DE_022	CustomerAgreement <atom:published>	Verify the CustomerAgreement entry contains a published entry	
	RC_FB62_DE_023	CustomerAgreement <atom:updated>	Verify the CustomerAgreement entry contains an updated entry	
	RC_FB62_DE_024	<cust:ProgramDateIdMappings>	Verify there is a ProgramDateIdMappings entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB62_DE_025	ProgramDateIdMappings <atom:id>	Verify the ProgramDateIdMappings entry contains an ID entry Verify the ProgramDateIdMappings ID entry is a valid UUID type 3 or 5	ProgramDateIdMappings ID
	RC_FB62_DE_026	ProgramDateIdMappings <atom:title>	Verify the ProgramDateIdMappings entry contains a title entry	
	RC_FB62_DE_027	ProgramDateIdMappings <atom:link rel='self' href=>	Verify the ProgramDateIdMappings entry contains a "self" link entry Verify the ProgramDateIdMappings "self" link entry references a ProgramDateIdMappings Verify the ProgramDateIdMappings "self" link entry contains a valid Identifier	
	RC_FB62_DE_028	ProgramDateIdMappings <atom:link rel='self' href=>	Verify the ProgramDateIdMappings "self" link href= entry is unique	
	RC_FB62_DE_029	ProgramDateIdMappings <atom:link rel='up' href=>	Verify the ProgramDateIdMappings entry contains a "up" link entry Verify the ProgramDateIdMappings "up" link references a ProgramDateIdMappings Verify the ProgramDateIdMappings "up"	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
			link does NOT contain an Identifier	
	RC_FB62_DE_030	ProgramDateIdMappings <atom:link rel='related' href=>	Verify the ProgramDateIdMappings entry contains a "related" link entry referencing at least one CustomerAgreement entry	
	RC_FB62_DE_031	ProgramDateIdMappings <atom:link rel='related' href=>	Verify the ProgramDateIdMappings entry contains a "related" link entry references only one CustomerAgreement entry	
	RC_FB62_DE_032	ProgramDateIdMappings <cust:programDateIdMapping/cust:programDateType>	Verify the ProgramDateIdMappings entry contains a valid <cust:programDateIdMapping/cust:programDateType> entry	ProgramDateIdMappings programDateIdMapping/programDateType
	RC_FB62_DE_033	ProgramDateIdMappings <cust:programDateIdMapping/cust:code>	Verify the ProgramDateIdMappings entry contains a <cust:programDateIdMapping/cust:code> entry	ProgramDateIdMappings programDateIdMapping/code
	RC_FB62_DE_034	ProgramDateIdMappings <cust:programDateIdMapping/cust:name>	Verify the ProgramDateIdMappings entry contains a <cust:programDateIdMapping/cust:namee> entry	ProgramDateIdMappings programDateIdMapping/name
	RC_FB62_DE_035	ProgramDateIdMappings <atom:published>	Verify the ProgramDateIdMappings entry contains a published entry	

Function Block	Test ID	XML Data Element Tested	Expected Results	Data Type Being Tested
	RC_FB62_DE_036	ProgramDateIdMappings <atom:updated>	Verify the ProgramDateIdMappings entry contains an updated entry	

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Appendix C: Future Considerations

The subgroups that composed the specialized work of the IWG considered what was required to meet the Regulation, what would serve as best practices for the industry, and what may still require more rumination. The latter is summarized below. See **Green Button Industry-led Working Group (IWG)** for more detail about each subgroup and their roles.

Since the beginning of 2022, the IWG has spent approximately 100 hours in joint IWG or subgroup meetings focused specifically on the regulatory requirements. We acknowledge there is still work to be completed to ensure that the market-wide deadline is achieved. The Ontario industry will need to manage live implementations and data issues, and coordinate efforts across Utilities, competitors, and end users to meet both the letter and the spirit of the regulation.

An effort as large as this requires coordination, planning and vision from the Government, many stakeholders, legacy vendors, and implementors. The IWG wishes the Government to continue to support coordination and standardisation efforts going forward. It makes sense that this effort is coordinated with other Ontario market changes and challenges (e.g., the rollout of distributed generation) and industry efforts (e.g., Ontario's cyber security guidelines) to ensure the implementation is cohesive with the market and industry standards and policies. While our volunteer group has not had the bandwidth to look outside our immediate, regulation-driven goals, we look for the support of stakeholders and the Government in expanding the IWG's coordination efforts in the future after the implementation deadline passes.

IUWG Comments for Future Considerations

Distributors appreciated the opportunity to provide feedback and recommendations to support standardization of the Ontario Green Button implementation. For Green Button to be successful in the long term, we recommend that the OEB continue to play an active role to support coordination and standardization efforts going forward. It makes sense that this effort, and any future regulatory enhancements or guidance be coordinated with other Ontario market changes and challenges (e.g., market renewal and the rollout of distributed generation). As Distributors work towards completing their Green Button implementation by November 2023, we envision that continued collaboration will greatly assist all parties in their efforts.

IUXWG Comments for Future Considerations

For Green Button to be successful in the long term, we recommend that the OEB continue to play an active liaison role between Utilities on one hand, and customers/Third Parties on the other. Experience in other jurisdictions, where Green Button was implemented, has shown that managing computer systems for interoperability between market actors requires continuous attention. Disputes may arise regarding inconsistencies, technical support issues, allegations of terms violations, etc., which may require ongoing facilitation to resolve.

Also, within the IUXWG there were two distinct perspectives: large multi-site customers and Utilities. While common ground was found for many issues, there are two areas that require further attention or consideration for efficiencies:

- "Bulk" Authorizations
    - Business requirement for large, multi-site organizations (e.g., banks, school boards, retail chains, etc.) with hundreds or thousands of meters which have a vested interest in tracking energy consumption/performance
    - Regulatory requirement (O. Reg 507-18 and O. Reg 506-18) that requires Broader Public Sector (BPS) organization and large property owners (50'000+ ft^2) respectively, to annually report on each facility's consumption by utility
- Standardized Letter of Authorization
    - The group could not reach consensus on the Standardized Letter of Authorization.
    - It is an administrative challenge for large organizations with sites across the province when each Utility has its own unique approach to documentation.

These two issues should be addressed if Green Button is to be adopted to large organizations which need to efficiently execute data-sharing transactions.

ITWG Comments for Future Considerations

For a successful implementation of the Green Button standard, we agree with the IUXWG recommendation that the OEB continue to play an active role. The Independent Technical Working Group has addressed only a part of the technical issues it defined. The following tasks require more attention by the group to ensure future efficiencies of a Green Button platform implementation:

- A standardized Third-Party onboarding process

    - This is an area that experience has shown can be a challenge for both Distributors and Third Parties. In addition to the business aspect of onboarding, there are several technical requirements both the Distributor and Third Party must meet to ensure the Distributors implementation meets the Ontario ENERGY DATA regulation's certification requirements.

    - Defining a standard method for Distributors to perform onboarding of Third Parties will aid in the growth of the Third-Party Green Button ecosystem in Ontario.

- A complete review of the Ontario ENERGY DATA regulation and the Green Button certification requirements.

    - The ITWG has completed mapping of the current customer billing system and how to deploy it using the Green Button XML definitions, but the group has not had the time to complete a thorough cross review of the identified data elements and the ability of the Green Button Connect My Data Certification platform to verify proper implementation.

    - Several of the IUXWG recommendations are not currently tested by the Green Button Connect My Data Certification platform

        - The introduction of a standardized "aggregated" authorization screen, while simplifying the user's Authorization process, creates the potential for improper authorization to data the customer does not want authorized.

- An agreed upon technical implementation for the Alternate Authorization process recommended by the IUXWG has not been defined. Therefore, the ITWG has not been able to develop a recommendation on how this should be technically implemented.

- An agreed upon technical implementation for the IUXWG "Suspension" recommendation has not been defined. Therefore, the ITWG has not been able to develop a recommendation on how this should be technically implemented.

The above is a list of work the ITWG was not completed before submission to the IWG for approval.

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Appendix D: Terms

Access Token – As defined by NAESB (REQ.21.6.1.2.2) "An authorization-specific access token used to enable access to the resources shared between Retail Customer, Data Custodian, and Third Party."

Atom - A "syndication format" standard defined by the IETF RFC 4287 Document for representing links (internal to a Green Button file/stream and external-but-related resources) for unique sets of data that allow Green Button files/stream to provide a relational database capability rather than being a flat file. The Green Button Alliance provides an implementation of the Atom Extensible Markup Language (XML) Schema Definition (XSD) file: https://www.greenbuttondata.org/xsd/release/atom.xsd

Authentication - In the sense of Green Button data sharing, it is the act and process of ensuring that a bona fide Retail Customer is the one Authorizing the sharing of their data. The Green Button standard (NAESB REQ.21 ESPI) does not define Authentication and therefore leaves this act and process to either the Utility, or the jurisdiction in which the Utility provides services, to define.

Authorized Third Party – As defined by NAESB (REQ.21.2.2t) "A Third Party that is permitted to receive EUI and PII in accordance with applicable law, regulation, the Governing Documents and any requirements of the Applicable Regulatory Authority and has met the requirements of the Applicable Regulatory Authority and Governing Documents to utilize the Energy Services Provider Interface."

Authorization - As defined by NAESB (RXQ. 0.2.213): "The result of a process by which the Retail Customer provides informed consent in a manner consistent with the Governing Documents and any requirements of the Applicable Regulatory Authority." The act and process of a Retail Customer granting a Third-Party access on a one-time, or recurring basis, to their Energy or Personal information without additional interaction by the Retail Customer.

Certification Identifier – A universally unique identifier (UUID) that is issued to Green Button implementations that have undergone Certification testing. It is included in output files and streams of Certified implementations as a uniform resource locator (URL) to allow interested parties to verify Certification and to learn more about the capabilities of the implementation.

Client Access Token – As defined by NAESB (REQ.21.6.1.2.2) "A specific access token used by a Third Party to access collections of individually authorized resources via 'Bulk Transfer' and to access Authorization resources held by the ThirdParty with the corresponding DataCustodian."

Data Custodian - As defined by NAESB (RXQ.0.2.273): "A Distribution Company or other authorized Entity that holds Retail Customer Information to be shared with Market Participants or Retail Customer Representatives." This refers to (1) a retail distribution Utility, (2) another customer-facing billing entity with direct relationship to the Retail Customer like a resource-service provider, (3) an aggregator of Green Button data, or (4) another entity providing Green Button data to Third Parties and Retail Customers.

Energy Service Provider Interface – As defined by NAESB (REQ.21.2.3t) "A standardized machine-to machine interface that permits a Data Custodian to share, at the Retail Customer's request or direction, a broad set of that Retail Customer's Energy Usage Information and Personable Identifiable Information held by that Data Custodian with Authorized Third Parties."

Function Block - A term used to describe specific collections of testable components that either stand alone to be tested in-addition-to the mandatory Function Blocks (*e.g.*, inclusion of "[FB_29] Temperature Interval Metering" in a compliant implementation) or stand as a collection of components that are tested together (*e.g.*, "Electricity Metering," which would include "[FB_4] Interval Metering" and "[FB_5] Electricity Interval Metering" along-with other mandatory Function Blocks).

IntervalBlock - As defined by Section REQ.21.4.2.1.1.5 of the NAESB REQ.21 ESPI standard: "Time sequence of Readings of the same ReadingType." This is the Green Button element that reports the individual UsagePoint meter readings that consist of a start time and duration as well as cost, reading quality, value in units specified by the associated ReadingType, and billing consumption tier or TOU/CPP bucket. UsagePoint, MeterReading, ReadingType, and IntervalBlock are the major components of the NAESB REQ.21 ESPI (Green Button) data-reporting system. Other elements provide additional information that enables additional usage (*e.g.*, overall cost analysis & billing replication).

NAESB - "North American Energy Standards Board": the publisher of the REQ.21 ESPI ("Energy Services Provider Interface") standard that is at the core of Green Button implementations.

OAuth - The IETF RFC 6749 specification and the IETF RFC 6750 specification (and potentially any errata for those RFCs) used to define Green Button Authorization process and OAuth access token format. Only certain Authorization methods defined by the OAuth 2.0 standard are acceptable for Green Button implementations and those are specified in the NAESB REQ.21 ESPI standard.

Registration Access Token – As defined by NAESB(REQ.21.6.1.2.2) A specific access token obtained during Third Party registration with the Data Custodian to enable access to the ApplicationInformation resource."

Refresh Token – As defined by NAESB (REQ.21.6.1.2.2) “"A specific access token used to obtain a new access token when the previous access token expires.”

Retail Customer - As defined by NAESB (RXQ.0.2.207): “Any Entity that takes or is applying to take gas and/or electric service for its own consumption.” The Green Button Alliance expands this definition to include water service. A Retail Customer is not restricted to any one category of residential, commercial, industrial, or public/governmental agency.

Third Party - As defined by NAESB (REQ.21.2.1t): “An Entity which provides some service to a Retail Customer based on Energy Usage Information for the Retail Customer to which it does not have direct access and over which it has no direct authority other than the Data Custodian and its contracted agents, the Applicable Regulatory Authority, ISOs or other regional entities.” This typically refers to a vendor, application provider, or service provider acting as a representative of the Retail Customer for the purpose of analyzing the Customer’s Energy-Usage Information data but could also be the Customer itself acting in this capacity.

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