

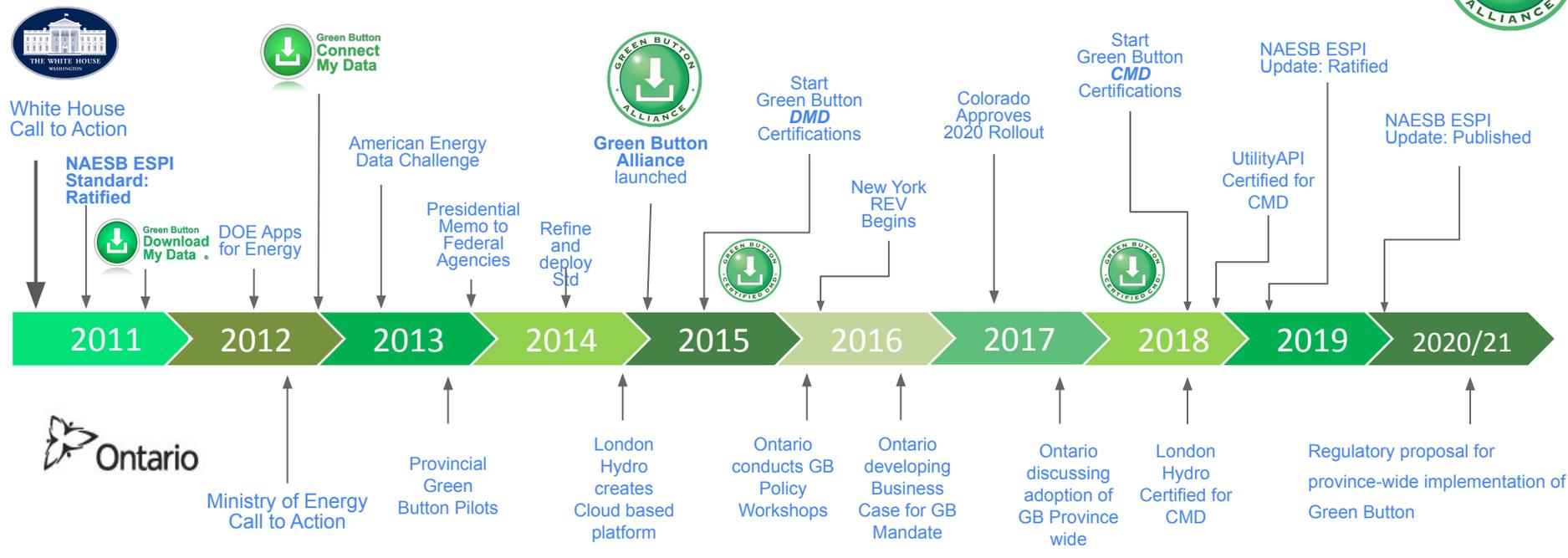


London Hydro

Green Button Update

OEB Green Button Implementation Task Force
July 27, 2021

Green Button Roadmap



0 Customers (DMD)	12 M Customer Accounts*	26 M Customer Accounts*	~ 60 M Customer Accounts*	~ 100 M Customer Accounts*
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**~36 Million
GBA CMD**

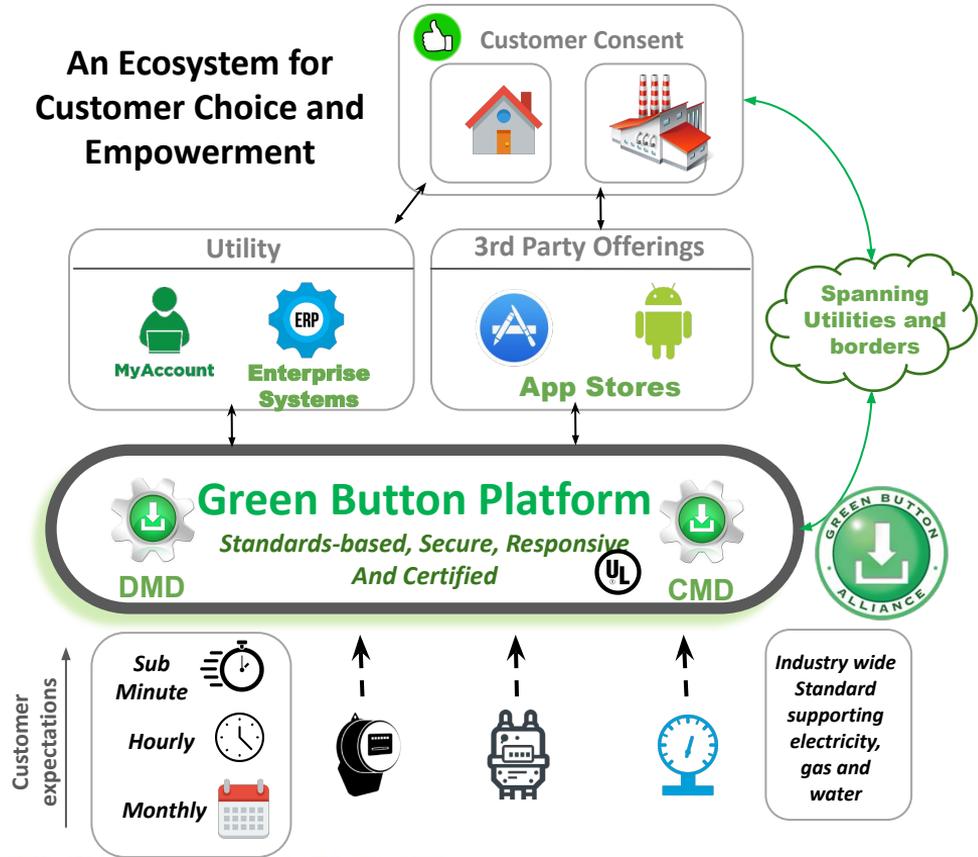
* Represents Estimated Customer Accounts with Access to Green Button Data in USA and Canada; primarily DMD but numbers include DMD & CMD; Actual Customer download numbers are not available.

What is the Green Button Initiative ?

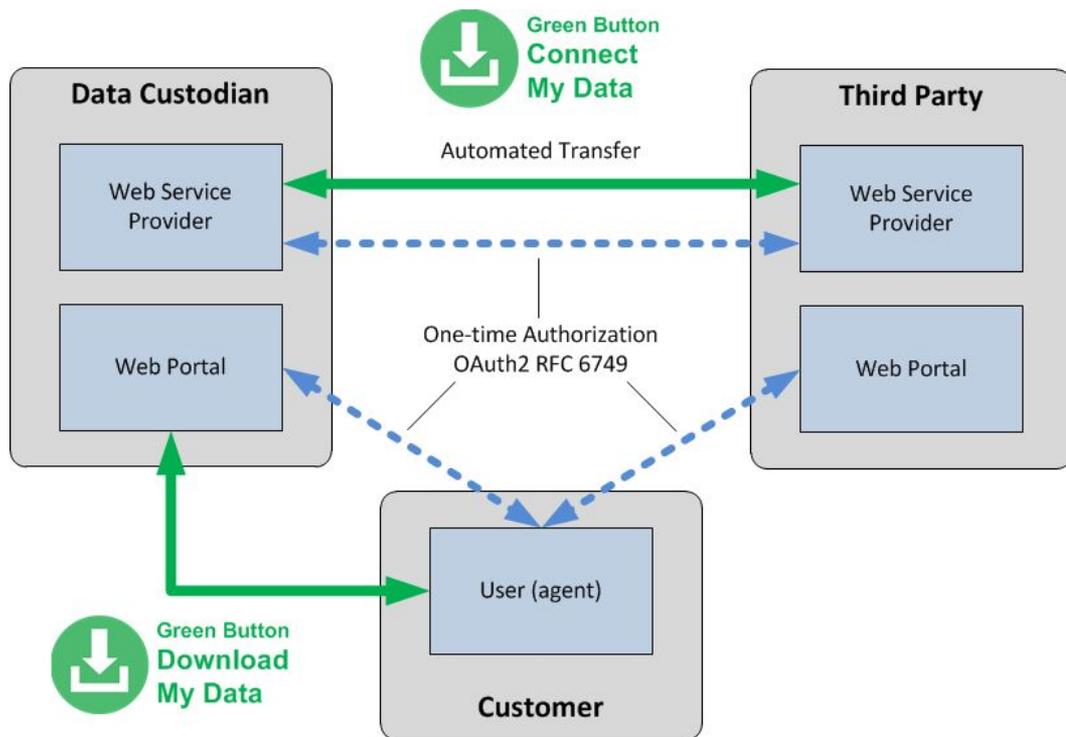
The Green Button Initiative is an industry-led effort to:

- A. Enables Customer Choice of Energy Management Software Solutions, Services and Apps
- B. Enables Easy and Secure Access to Energy Usage Information in a consumer/computer friendly format
- C. All 3 types of Data: Electricity, Gas and Water Usage
- D. Ensures Customer Data Privacy & Secure Transmission of Data

Enables utility customers gain better control over energy usage, reduce consumption, and reduce their costs



Green Button Standard Core Blocks

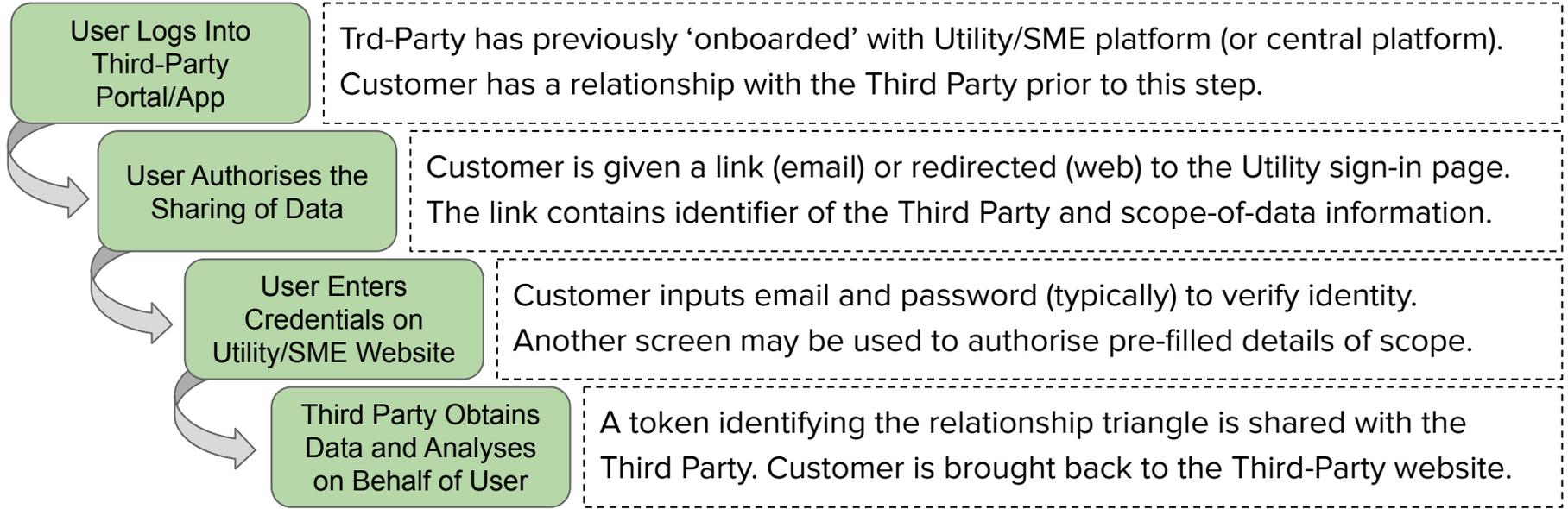


- Standard agreed format for energy data, or really anything with a time series
- Industry standard security framework and authorization
- Open data enabling technology - provides customers with choice in how their energy data can be utilized
- Supports privacy by design



CMD / GBC Workflow: detail

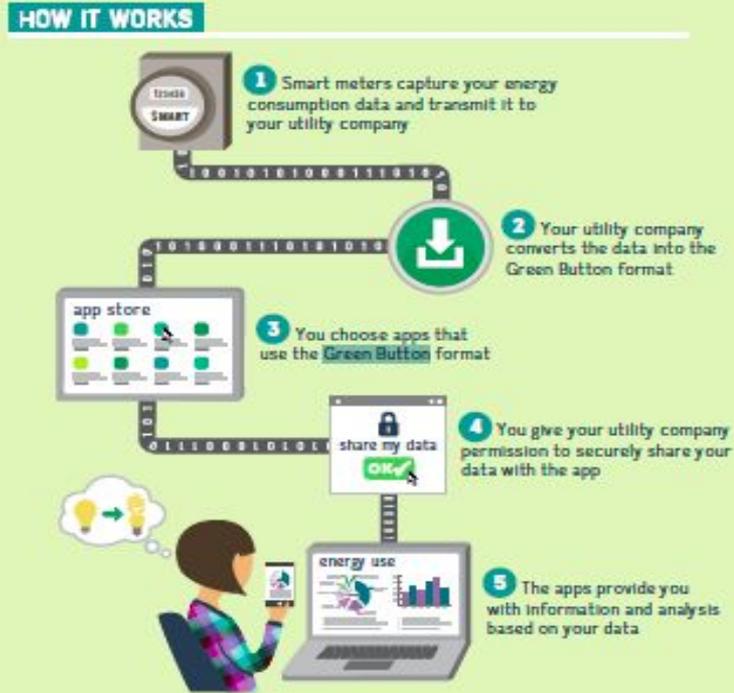
GB CMD (GBC)



Green Button Connect My Data Refresher

1. Utility Converts and makes meter/utility data available in Green Button Format
2. Customer Selects App of their choice and creates relationship based on their terms and conditions.
3. Customer Authorizes data sharing using Green Button
4. Customer has a choice to revoke access at any time.

Figure 28: The Green Button Initiative



BENEFITS

Energy consumption data can be used to:

<p>Track and analyze your energy use to conserve energy and save money</p>	<p>Assist with retrofit planning to increase the energy efficiency of your home</p>	<p>Optimize the size and cost-effectiveness of rooftop solar panels</p>
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Green Button Implementation



Lessons Learned

- Consistent and Integrated User Experience
- Customer Identity Management Integration
- Data Provisioning Process/Syncing
- Enterprise System Isolation & Security

Green Button Data Intake

Residential

C&I

Hourly kWh

5 minute/15 minute kWh, kVAh and kVArh

Hourly Cost (TOU/TIER)

Retail Customer Schema

Account #

Address

Global Elements

```

=====
Global Elements
=====
-->
<<xs:element name="ApplicationInformation" type="ApplicationInformation"/>
<<xs:element name="Authorization" type="Authorization"/>
<<xs:element name="IntervalBlock" type="IntervalBlock"/>
<<xs:element name="IntervalReading" type="IntervalReading"/>
<<xs:element name="MeterReading" type="MeterReading"/>
<<xs:element name="ReadingQuality" type="ReadingQuality"/>
<<xs:element name="ReadingType" type="ReadingType"/>
<<xs:element name="IdentifiedObject" type="IdentifiedObject"/>
<<xs:element name="UsagePoint" type="UsagePoint"/>
<<xs:element name="ElectricPowerQualitySummary" type="ElectricPowerQualitySummary"/>
<<xs:element name="ElectricPowerUsageSummary" type="ElectricPowerUsageSummary"/>
<<xs:element name="UsageSummary" type="UsageSummary"/>
<<xs:element name="DateTimeInterval" type="DateTimeInterval"/>
<<xs:element name="SummaryMeasurement" type="SummaryMeasurement"/>
<<xs:element name="BatchItemInfo" type="BatchItemInfo"/>
<<xs:element name="Object" type="Object"/>
<<xs:element name="ServiceStatus" type="ServiceStatus"/>
<<xs:element name="LocalTimeParameters" type="TimeConfiguration"/>
<<xs:element name="ProgramIdMappings" type="ProgramIdMappings"/>
<<xs:element name="BatchList" type="BatchListType"/>
</xs:schema>
    
```

```

=====
Global Elements
=====
-->
<<xs:element name="AcceptanceTest" type="AcceptanceTest"/>
<<xs:element name="AccountNotification" type="AccountNotification"/>
<<xs:element name="Agreement" type="Agreement"/>
<<xs:element name="Asset" type="Asset"/>
<<xs:element name="AssetContainer" type="AssetContainer"/>
<<xs:element name="BatchItemInfo" type="BatchItemInfo"/>
<<xs:element name="BatchList" type="BatchListType"/>
<<xs:element name="Customer" type="Customer"/>
<<xs:element name="CustomerAccount" type="CustomerAccount"/>
<<xs:element name="CustomerAgreement" type="CustomerAgreement"/>
<<xs:element name="DateTimeInterval" type="DateTimeInterval"/>
<<xs:element name="DemandResponseProgram" type="DemandResponseProgram"/>
<<xs:element name="Document" type="Document"/>
<<xs:element name="ElectronicAddress" type="ElectronicAddress"/>
<<xs:element name="EndDevice" type="EndDevice"/>
<<xs:element name="IdentifiedObject" type="IdentifiedObject"/>
<<xs:element name="LifecycleDate" type="LifecycleDate"/>
<<xs:element name="LocalTimeParameters" type="TimeConfiguration"/>
<<xs:element name="Location" type="Location"/>
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<<xs:element name="PricingStructure" type="PricingStructure"/>
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<<xs:element name="ProgramDate" type="ProgramDate"/>
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<<xs:element name="ProgramDateIdMappings" type="ProgramDateIdMappings"/>
<<xs:element name="ServiceLocation" type="ServiceLocation"/>
<<xs:element name="ServiceSupplier" type="ServiceSupplier"/>
<<xs:element name="Status" type="Status"/>
<<xs:element name="StreetAddress" type="StreetAddress"/>
<<xs:element name="StreetDetail" type="StreetDetail"/>
<<xs:element name="SummaryMeasurement" type="SummaryMeasurement"/>
<<xs:element name="TelephoneNumber" type="TelephoneNumber"/>
<<xs:element name="TimeConfiguration" type="TimeConfiguration"/>
<<xs:element name="TownDetail" type="TownDetail"/>
<<xs:element name="UsagePoint" type="UsagePoint"/>
<<xs:element name="UsagePoints" type="UsagePoints"/>
<<xs:element name="WorkLocation" type="WorkLocation"/>
    
```

Green Button Platform Implementation Components



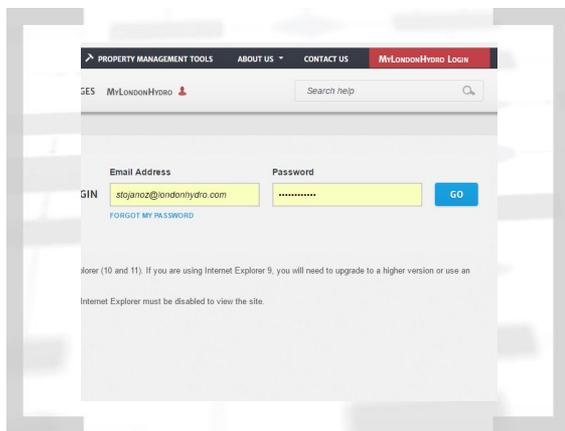
CMD Data Custodian Requirements

- Third party registration;
- Authorization processes;
- Synchronous data transfer;
- Data store implementation;
- Operationalized Processes;
- Notification;
- All non-functional requirements like Logging, Exception Handling, Audit Trail etc.;
- Test Lab site implementation
- DMD and CMD Certification
- Retail Schema Implementation
- Ongoing Modernization and hardening leveraging Cloud Partner Solutions
- Data enhancements (nRT, IoT)

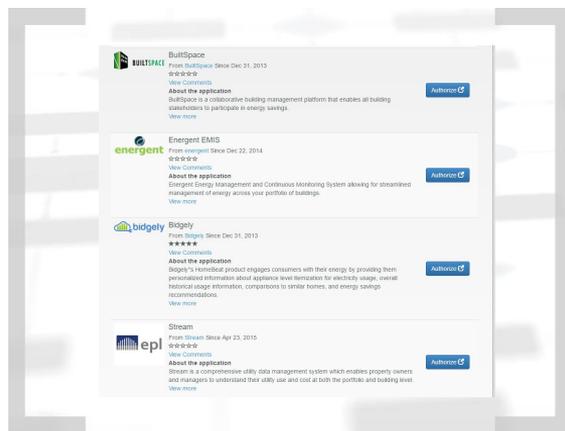


Customer Experience Highlights

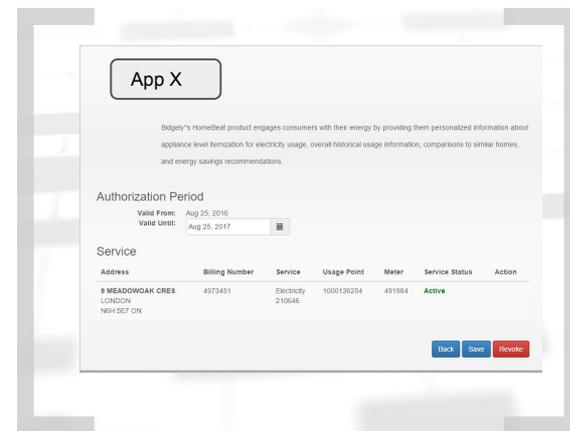
1. Login to Utility Portal



2. Select the Solution



3. Authorize Data Flow



CMD Certification Steps

Green Button *Connect My Data (CMD)* Testing

Green Button *Connect My Data (CMD)* is the industry standard for accessing and securely sharing energy- and water-usage data. Utilities developing customer data access-and-sharing implementations can now obtain the Green Button CMD mark to show that their implementation is Green Button standards-compliant and that it will enable secure customer data-access; customer-authorized, automatic and secure transmission of data to third-party solutions; and will ensure customer privacy. Green Button Testing verifies for the utility, its customers, and third-party solution

providers, that the standard has been properly implemented. Testing also speeds reliable and compatible solutions to market.

“Green Button Connect My Data (CMD)

Apply for Green Button CMD Test

Note: Our Green Button CMD Verification for Third Party vendors will be available

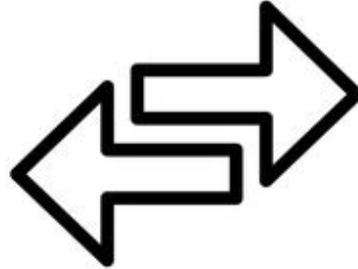


Green Button Data Custodian Connect My Data (CMD) Certification Application

v1.0

Certification Function Blocks	
Function Block tests highlighted in YELLOW are not currently available.	
* - Mandatory Function Blocks +- Must select at least one Interval Metering Type	
Data Custodian Connect My Data (CMD)	
<input checked="" type="checkbox"/>	*[FB_01] Common
<input checked="" type="checkbox"/>	*[FB_03] Connect My Data
<input checked="" type="checkbox"/>	*[FB_04] Interval Metering
<input type="checkbox"/>	+[FB_05] Electricity Interval Metering
<input type="checkbox"/>	[FB_06] Demand Electricity Metering
<input type="checkbox"/>	[FB_07] Net Metering
<input type="checkbox"/>	[FB_08] Forward and Reverse Metering
<input type="checkbox"/>	[FB_09] Register Values
<input type="checkbox"/>	+[FB_10] Gas Interval Metering
<input type="checkbox"/>	+[FB_11] Water Interval Metering
<input type="checkbox"/>	[FB_12] Cost of Interval Data
<input checked="" type="checkbox"/>	*[FB_13] Security and Privacy Classes
<input checked="" type="checkbox"/>	*[FB_14] Authorization and Authentication w/ Pre-Negotiated Scope
<input type="checkbox"/>	[FB_15] Usage Summary
<input type="checkbox"/>	[FB_16] Usage Summary with Cost
<input type="checkbox"/>	[FB_17] Power Quality Summary
<input type="checkbox"/>	[FB_18] Multiple Usage Points

Certification Resources



- [Green Button Data Custodian Connect My Data \(CMD\) Certification Application](#)
- [Green Button Data Custodian Connect My Data Test Data Sheet](#)
- [Green Button Data Conformance Testing Specification](#)
- [Green Button ITCA Scheme Policies and Procedures](#)
- [Green Button Certified Marks License Agreement](#)
- [Green Button Certified Marks Style Guide](#)
- [Green Button Conformance Blocks](#)
- [Green Button Test Cases](#)

LONDON HYDRO GB CMD TEST LAB



WEB SERVICES & API TESTING

SOAPUI

Green Button Resources



- **GB Alliance Benefits and Certification:** <http://www.greenbuttonalliance.org/>
- **GB Github:** <https://github.com/GreenButtonAlliance>
- **Developer and Customer Resources:** <http://www.greenbuttondata.org/>
- **Mission Data: “Energy Data: Unlocking Innovation with Smart Policy”:**
<https://static1.squarespace.com/static/52d5c817e4b062861277ea97/t/5a3a8c66c8302509260492b2/1513786475950/Energy-data-unlocking-innovation-with-smart-policy.pdf>
- **GBA Webinar: LH, PG&E, SDG&E Educate on Green Button Benefits to their Utilities & Customers:**
https://www.youtube.com/watch?time_continue=2&v=GO1c1NttZKQ
- **SOAP UI:** <https://www.soapui.org/>