Ontario Green Button Initiative:

Function Blocks and their applications to Ontario

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Last updated: July 29, 2021

Notes: This document is an attempt to map the Function Blocks (FB), as they are defined by the Green Button Alliance (GBA), into two buckets: FBs which are applicable to Ontario's Green Button Connect My Data (CMD) initiative, and FBs which are currently certifiable by the GBA. Some FBs are "works in progress" and do not yet have certification tests. You can think of FBs as a grocery list of various functionality. Some are logically grouped together; some are essential to today's CMD functionality; are some are under development for the future.

FBs should not be confused with the *scope* of an authorization request. Nevertheless, the most common authorization requests from third parties will ask utilities for the following FB numbers:

4 – interval metering

16 – usage summary with costs (energy usage, cost info)

51 – core retail customer (account details, service address, etc.)

Mission:data recommendation	Function Block	Currently certifiable? Y/N[1]	Green Button name (as it appears in the standard)	Detail
Include	1	Yes	Common	Initial prerequisites: software loads in the test suite, HTTP server is alive, sample customer token is readable, applicant has purchased the NAESB standard, etc.
Include	2	Yes	Download My Data	Ensures DMD is available and conforms to the standard
Include	3	Yes	Connect My Data	Basic, prerequisite functionality for CMD: third parties receive proper authorization tokens upon registering with utilities; HTTP server acknowledges such tokens; etc.
Include	4	Yes	Interval metering	Utility server responds with properly-formatted interval usage data file (this does not

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[1] In other words, has the Green Button Alliance issued certification tests for this functionality? This information is believed to be current as of July 29, 2021.

				contain PII). This is a prerequisite for any commodity (electric, gas, water, etc.). Detailed FBs for individual commodities are below (5 for interval electric, 10 for gas, 11 for water).
Include	5	Yes	Interval Electricity Metering	Supports interval electricity usage data.
Include	6	Yes	Demand electricity metering	This supports instances in which utilities bill for peak demand (i.e. kW) instead of energy usage (kWh).
Include	7	Yes	Net metering	Supports net metering (e.g. solar) by clearly marking kWh readings as "net" values
Include	8	Yes	Forward and reverse metering	Supports individual meters as being marked for "forward" or "reverse" flow. For example, a utility might meter the gross output of a solar array (rather than the net), and this would be denoted "reverse" flow. It makes downstream mathematical calculations more accurate.
Include	9	Yes	Register values	These are the values on the face of the meter, like a car's odometer. This is important for visual inspections and matching up billed volumetric values.
Include	10	Yes	Gas	This supports gas readings (monthly or interval). <u>Mission:data recommends ENERGY require **both** energy and volumetric units because the certification test only requires one or the other, not both.</u>
Exclude	11	Yes	Water	Supports water readings (monthly or interval). Not part of ENERGY's mandate at this time.
Include	12	Yes	Cost of interval data	Supports costs of individual usage intervals. For example,

				5 kWh used from 2:00pm-3:00pm would be marked as "$0.75"
Include	13	Yes	Security and privacy classes	Ensures HTTPS (i.e. encryption) for all communications, including the highest level of Transport Layer Security available. Also ensures tokens and ID numbers are randomized to prevent certain attacks.
Exclude	14 (deprecated)	n/a	Authorization and Authentication	Deprecated by the Green Button Alliance. Incorporated into FB 31. (Note: This may appear as FB14 in the GBA testing document dated 2/5/20.
Include	15	Yes	Usage Summary	Provides summary information for a billing period, such as consumption, quality of reading(s), the applicable rate or tariff,
Include	16	Yes	Usage summary with cost	Similar to FB 15 above but includes cost items. Mission:data recommends that ENERGY require line items, which is supported by the standard by not required for certification under FB 16.
Exclude	17	Yes	Power quality summary	Ensures valid values for power quality readings (kVAR, mains voltage, etc.). Originally intended for grid operations and not used by DERs. Mission:data recommends that ENERGY require that power quality values be provided via FB 16 line items if they are a particular customer's billing determinant(s). In other words, if a commercial customer is billed based on power factor, then the utility should provide power factor via a FB 16 line item entry.

Include	18	No	Multiple usage points	Provides for buildings with multiple utility meters.
Exclude	19	No	Partial update data	This appears to support "bulk" re-transmissions over SFTP if a previous transfer is interrupted. Given that it is not well-defined and no tests exist, <u>Mission:data recommends against inclusion at this time</u>.
	20-26	*n/a*	*(unspecified)*	
Exclude	27	Yes	Usage Summary with Demands and Previous Day Attributes	Provides the previous day's usage summary with peak demand, if applicable, since the last bill was issued. This is generally unused because bill-to-date usage info can be gathered from FB 12, so Mission:data recommends excluding this from the requirements.
Exclude	28	Yes	Usage Summary Costs for Current Billing Period	Provides "bill to date" information. This is generally unused because billing systems don't produce "expected" bills, they produce final bills. Also bill-to-date usage info can be gathered from FB 12, so Mission:data recommends excluding this from the requirements.
Exclude	29	Yes	Temperature	Provides outdoor air temperature information over time.
Include	31	No	Authorization and Authentication w/ Pre-Negotiated Scope	Ensures that authorization scope parameters are properly handled; that correct tokens are issued by a utility following a customer authorization; and that token management procedures are correctly followed to ensure security. Note: This is still marked as FB 14 in some GBA documents.

Exclude	34	Yes	SFTP for bulk	Supports SFTP instead of HTTP for larger datasets (i.e. multiple years of 15-minute historical interval data). Mission:data believes this should be optional, because it is less important than FB 35 below.
Include	35	Yes	REST for bulk	Supports RESTful API over HTTP for bulk transmittal of files (e.g., large interval usage histories).
	38	*No*	*(unknown)*	
Include	37	Yes	Query parameters	Allows the third party to request only a specific range of data. For example, a customer may have authorized 24 months of historical usage plus ongoing usage, and the third party might want to request the past 60 days of usage.
Include	39	Yes	PUSH model	This is basic functionality in which the utility sends a notification to the third party that says "Your data is ready for download, here is the URL to get it."
Include	40	Yes	Offline authorizations	This is the ability for a utility to process authorizations from customers in offline fashions, such as over the telephone or by hardcopy or faxed request. Since paper authorizations are sometimes used by commercial customers in our experience, Mission:data recommends this be included.
Exclude	41	No	Authorized PUT/DELETE ApplicationInformation Resource	This is an API for modifying the third party's name and URL as it appears in the customer authorization form. It is unnecessary because this functionality is typically managed by the

				utility's web portal or third parties.
	42-43	*No*	*(unknown)*	
Include	44	Yes	PUT/DELETE Authorization Resource	This allows a third party to delete one of its own authorizations. This is useful if, for example, a customer is unresponsive and the third party does not wish to continue their relationship.
	45	*No*	*(unknown)*	
	~~46~~	No	~~Core Retail Customer~~	Deprecated and replaced by FB 51
	~~47~~	No	~~REST for Retail Customer bulk~~	Deprecated and replaced by FB 67
	~~48~~	No	~~SFTP for Retail Customer bulk~~	Deprecated and replaced by FB 66
Include	49	No	Retail Customer Management REST	
Include	50	No	Retail Customer Resource Level REST	
Include	51	No	Retail Customer Common	Mission:data recommends that ENERGY specify minimum data fields for retail customer information.[2] This recommendation applies to retail customer FBs 51-62.
Include	52	No	Retail Customer Download My Data	
Include	53	No	Retail Customer Connect My Data	
Include	54	No	Retail Customer Basic Information	
Include	55	No	Retail Customer Demographic Information	Customer contact information
Include	56	No	Retail Customer Billing Information	
Include	57	No	Retail Customer AccountAgreement Information	

[2] For a list of all data types supported by the standard, see retailcustomer.xsd:
https://github.com/GreenButtonAlliance/OpenESPI-Common-java/blob/master/etc/retailcustomer.xsd

Include	58	No	Retail Customer ServiceLocation Information	
Include	59	No	Retail Customer ServiceSupplier Information	
Include	60	No	Retail Customer Meter Information	
Include	61	No	Retail Customer EndDevice Information	
Include	62	No	Retail Customer ProgramDateIdMappings Information	
	63	*No*	*(unknown)*	
Include	64	No	Retail Customer Security and Privacy	
Include	65		Retail Customer Authorization and Authentication w/o Pre-Negotiated Scope	
Exclude	66	No	SFTP for Retail Customer Bulk	Recommend against inclusion for the same reason as FB 34.
Include	67	No	REST for Retail Customer Bulk	Similar to FB 35, but for retail customer data (e.g., account info).
Include	68	No	Retail Customer Query Parameters	Similar to FB 37, but for retail customer data.
Include	69	No	Retail Customer PUSH Model	Similar to FB 39, but for retail customer data.
Include	70	No	Retail Customer Offline Authorization	Similar to FB 40, but for retail customer data.