RETAIL ENERGY CODE

Tariff Interoperability (TI) API Technical Specification

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Technical Specification Document

TI API Technical Specification

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Change History

Version Number	Implementation Date	Reason for Change
0.1	N/A	Initial draft for TI industry consultation

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1 Introduction

1.1. The Tariff Interoperability (TI) Arrangements provide a centrally governed, standard mechanism for defining and sharing tariff information across the retail market. It enables Tariff Interoperability Users (TI Users) and Registered Tariff Interoperability Users (RTI Users) to request Public Tariff Data and RTI Users to request Account Specific Tariff Information.

1.2. This document describes the mechanisms enabling TI Users, RTI Users and TI Energy Suppliers to interact with the TI Arrangements. Interactions managed via the Consumer Consent Service (CCS) User Portal, CCS Directory, CCS Authorisation Server and CCS SSF Transmitter are defined in the CCS API Technical Specification and therefore not included in this document. This is a Category 2 Product that forms part of the REC Technical Specification.

1.3. TI Energy Suppliers provide API access to:

(a) Public Tariff Data which is available to TI Users and RTI Users; and

(b) Account Specific Tariff Information, which is limited to RTI Users.

1.4. The scope of this document is to describe:

(a) the mechanism for interacting with TI Energy Supplier endpoints and associated validation;

(b) the API operational characteristics including filtering, error handling and file compression;

(c) the mechanism for registering for and receiving TI SSF Notifications in accordance with the TI Shared Signals Framework (RTI Users only); and

(d) the error codes to be used when API validation fails.

1.5. This API Technical Specification should be read in conjunction with:

(a) the TI Arrangements Schedule, which defines the rights and obligations of TI Energy Suppliers, TI Users and RTI Users and the TI operational processes;

(b) the CCS Arrangements Schedule which defines the rights and obligations of CCS Users and the processes for managing Permission via the CCS;

(c) the CCS API Technical Specification, which defines the mechanism for exchanging data with the CCS;

(d) the Data Specification, which defines the Market Messages used for TI interactions and the associated Data Items; and

(e) the TI Developer Portal which includes machine-readable developer

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documentation.

2 Mechanism for Accessing Tariff Data

2.1. To support the request and provision of Tariff Data, four distinct API routes have been defined within the REC Developer Portal:

(a) Tariff Interoperability Supplier Tariffs – enabling TI Users and RTI Users to request Tariff Identifiers and Tariff Pricing Data

(b) Tariff Interoperability MPxN Details – enabling RTI Users to request MPxN specific tariff details;

(c) Tariff Interoperability Event Notification and Event Details – enabling TI Energy Suppliers to notify RTI Users that a change has been made to an Account Holder's tariff or account information; and

(d) Tariff Interoperability SSF Notification Registration and Verification – enabling RTI Users to establish a TI Shared Signals Framework stream. Further detail on the TI SSF is provided in Paragraph 3.

2.2. Under the Tariff Interoperability Supplier Tariffs route, a TI User or RTI User may request a list of TI Energy Supplier specific Tariff Identifiers using the Get Tariffs Request Market Message. Requests may be filtered by:

(a) *Payment Method*;

(b) f*uelType* (gas or electricity);

(c) *meteringPointEnergyFlow* (Import or Export);

(d) *LDZ Region*; or

(e) *GSP Group Id*.

2.3. Query parameters can be filtered by using a question mark (?) query parameter, with additional filters after an ampersand (&).

2.4. Where a TI User or RTI User requires Tariff Pricing Data for one or more specific Tariff Identifiers, it sends the required Tariff Identifier(s) to the Supplier Endpoint using the Get Tariff Details Request Market Message.

2.5. TI Energy Suppliers do not operate their own authorisation service. Authorisation for the provision of Account Specific Tariff Information is provided by the CCS.

2.6. Requests for Account Specific Tariff Information (via the get MPxN Tariff Details Request Market Message) must include a valid Access Token, presented as a bearer token, within the authorisation header. The Access Token is sender (RTI User) constrained to the RTI User's security certificates.

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2.7. RTI User security credentials are issued by the CCS on registration in the CCS Directory. TI Energy Suppliers shall validate RTI User details using private_key_jwt authentication method and mutual TLS (mTLS) and shall validate the Access Token in accordance with the CCS API Technical Specification.

2.8. For large response payloads, where requested by the TI User or RTI User, the TI Energy Supplier shall apply gzip compression. When compression is applied, the response includes the header Content-Encoding: gzip, and the compressed payload is transmitted over the network. TI Users and RTI Users that support gzip compression should indicate this using the request header Accept-Encoding: gzip.

2.9. TI Energy Suppliers shall provide ETag and Last-Modified HTTP response headers for GET requests returning Public Tariff Data. The ETag header identifies the specific representation returned by the TI Energy Supplier and may be used by a TI User or RTI User to determine whether the resource has changed. The Last-Modified header indicates the date and time at which the resource was last modified. Where a TI User or RTI User supplies an If-None-Match and/or If-Modified-Since request header and the resource has not changed, the TI Energy Supplier shall return 304 Not Modified with no response body. Where the resource has changed, the TI Energy Supplier shall return the current representation with the appropriate ETag and Last-Modified headers.

2.10. The Tariff Interoperability Event Notification and Event Details route is used:

(a) by TI Energy Suppliers to notify an RTI User that a TI event has occurred using the Notification of TI Event Market Message, which in turn acts as a trigger informing the RTI User to obtain a new Access Token from the CCS;

(b) by RTI Users to respond to the Notification of TI Event Market Message with a Get TI Event Details Request Market Message including the new Access Token; and

(c) by the TI Energy Supplier to issue the TI Event Notification to the RTI User using the Get TI Event Details Response Market Message.

2.11. The Notification of TI Event Market Message is issued in accordance with the TI Shared Signals Framework as further explained in Paragraph 3. The notification identifies the specific Permission using the CCS Grant Identifier and carries a timestamp. It does not identify the event type or the Registrable Measurement Point.

2.12. The RTI User calls the TI Energy Supplier with the Grant Identifier and receives details of every event impacting the Registrable Measurement Points under the Grant Identifier. The Access Token is included in the authorisation header and is not part of the payload. Where there are no outstanding events, an empty events array is returned.

3 TI Shared Signals Framework

3.1. The TI Shared Signals Framework (SSF) uses OpenID Shared Signals Framework 1.0

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(Final) and the underlying IETF Security Event Token standards (RFC 8417, RFC 9493, RFC 8935). The framework is used to notify RTI Users that something about the Account Specific Tariff Information has changed, as set out in Paragraph 2.10(a).

3.2. Under the TI SSF, all notifications will be delivered by push-based SET Delivery (RFC 8935). An RTI User (acting as a receiver) registers with each individual TI Energy Supplier (acting as a transmitter), the endpoint at which it will take delivery of TI SSF Notifications and establishes a stream with the TI Energy Supplier pointing to that endpoint. The TI Energy Supplier calls that endpoint directly with the TI SSF Notification and holds the notification details until the receiver acknowledges it.

3.3. TI SSF Notifications are delivered in the form of Security Event Tokens which are JSON Web Tokens (JWTs) signed by the TI Energy Supplier.

3.4. Each TI Energy Supplier, shall support the provisions specified for a 'transmitter' in the OpenID Shared Signals Framework 1.0, in particular its event delivery, transmitter configuration discovery and stream management clauses. In addition, it shall:

(a) authenticate all RTI User messages e.g. stream management, status and verification, by mTLS (RFC8705 pattern) based on the RTI User's identity and conformance class from the entity statement held in the CCS Directory;

(b) advertise mTLS, in accordance with RFC8705, as the stream authorisation scheme in its transmitter configuration;

(c) return an explicit error where an RTI User requests verification against a paused stream;

(d) support x-fapi-interaction-id on all TI SSF management API requests and echo it on responses;

(e) reject the creation of a stream, or a change to an existing stream where the delivery.endpoint.url does not exactly match an endpoint the receiver has registered in the CCS Directory.

(f) only rely on information in the CCS Directory regarding an RTI User for the period up to its expiry date;

(g) shall maintain a record of the metadata of each RTI User with which it has a current relationship;

(h) record the RTI User as inactive if its metadata cannot be verified; and

(i) where it receives a request to establish a TI SSF stream from an unknown RTI User, verify the RTI User's entity identifier against the CCS Directory.

3.5. Each RTI User, when acting as a receiver shall:

(a) support the provisions specified for a 'receiver' in the OpenID Shared Signals Framework 1.0, in particular its Security Event Token profile and event delivery

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clauses;

(b) validate the Security Event Token signature against the transmitter *CCS JWKS URI* (jwks_uri), independently of transport authentication.

(c) reject any Security Event Token whose JOSE typ is not secevent+jwt;

(d) validate that iss equals both the stream configuration iss and the discovery issuer, and that aud is the receiver's own entity identifier;

(e) process idempotently on jti;

(f) process, persist, then acknowledge, in that order;

(g) register the endpoint at which it takes push delivery in the CCS Directory, against its application, before creating a stream; and

(h) ensure its SSF delivery endpoint url is served on a certificate registered within the CCS Directory.

4 Errors and Response Codes

4.1. Where requests for Tariff Data fail validation, TI Energy Supplier shall return errors in a JSON response body, in accordance with RFC 6749. The response shall include an error parameter and may include an error_description parameter where additional information is required.

4.2. TI Users and RTI Users shall be capable of receiving and processing error responses returned by the TI Energy Supplier.

4.3. The following errors will be used:

Error type	**HTTP Response**	**Applicable Endpoints**	**Context**
not modified	304	/tariffs/{supplier_mpid} /tariff/{supplier_mpid}/{tariff_id} /tariff/{supplier_mpid}/mpxn/{mpxn}	Indicates there is no need to re-transmit requested resources.
bad request	400	/tariffs/{supplier_mpid} /tariff/{supplier_mpid}/{tariff_id} /ssf/stream	Malformed request, a missing or repeated required parameter, or a request object that fails to parse or verify.

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		/ssf/verify	
unauthorised	401	/.well-known/ssf-configuration /ssf/stream /ssf/verify /event-notification/{grant_id} /tariff/{supplier_mpid}/mpxn/{mpxn}	Access token is missing, expired or invalid or the sender cannot be verified.
not found	404	/ssf/verify /event-notifications/{grant_id} /tariff/{supplier_mpid}/mpxn/{mpxn}	No tariffs exist based on the filters applied, Permission cannot be validated under Account Specific Tariff Information arrangements, or the RTI User holds no stream with the given stream identifier.
too many requests	429	/tariffs/{supplier_mpid} /tariff/{supplier_mpid}/{tariff_id} /ssf/verify /event-notification/{grant-id} /tariff/{supplier_mpid}/mpxn/{mpxn}	The number of requests has exceeded the TI Energy Supplier rate limit or TI SSF verification was requested inside the stream's minimum verification interval.
forbidden	403	/ssf/stream	The authenticated RTI User is not permitted this operation, or the CCS Directory check did not confirm the RTI User is entitled to register a stream
conflict	409	/ssf/stream	No additional stream is allowed for this RTI User.

4.5. Successful responses shall use the HTTP responses set out below:

Success Type	**HTTP Response**	**Applicable Endpoints**	**Context**

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Success	200	/suppliers	Returns list of suppliers
		/tariffs/{supplier_mpid}	Successful response, for large payload responses, gzip compression may be applied
		/tariff/{supplier_mpid}/{tariff_id}	Successful response, for large payload responses, gzip compression may be applied
		/event-notifications/{grant_id}	Success, response returns changes for associated tariff Ids
		/ .well-known/ssf-configuration	TI SSF Transmitter Response
		/tariff/{supplier_mpid}/mpxn/{mpxn}	Get MPxN Tariff Details Response
Created	201	/ssf/stream	TI Event Notification Registration Response. The stream as created, including the properties the TI Supplier set.
No Content	204	/ssf/verify	The verification request was accepted. No body. The SSF TI Verification Response is not an HTTP response body; it is the verification event pushed on the stream.

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