

NEPOOL GIS External Interface Specification

Version 2.2



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1. Revision History

Revision	Date	Description	Updated By
1.0	8/03/2016	<ul style="list-style-type: none"> Initial Version 	Adam Barrett
1.1	08/09/2016	<ul style="list-style-type: none"> Made updates to the Authentication Protocol Section 	John Shewchuk
1.2	11/07/2016	<ul style="list-style-type: none"> Add "Previous Owner" to Get Transferable Positions request (7.2, 7.2.2) Add "Certificate Serial Number", "Jurisdiction" and "Date Initiated" to Get Pending Transfers request (7.3, 7.3.2) Add "Jurisdiction" to Get Inter-Account Transfer Report request (7.5, 7.5.2) Add "City" and "Status" to Get Generator Information request (7.4, 7.4.2) Add all generators associated with an account to the Get Generator Information request (7.4) 	Devon Walton
1.3	12/07/2016	<ul style="list-style-type: none"> Added API status codes for Get Generator information to Appendix C 	Adam Barrett
1.4	5/10/2017	<ul style="list-style-type: none"> Add VT Tier I and VT Tier II Programs Add Marine Thermal fuel type 	James Webb
2.0	12/17/2018	<ul style="list-style-type: none"> Adding Reserve and Retail SubAccount transfer types Aligning terminology and field names with Swagger definitions Fixing representation of response codes / structure Adding support for a single login to be used to access the API of multiple GIS accounts Added new CT Class I FERC and MA CES state eligibilities to Appendix A 	Andrew Thornton
2.1	12/28/2018	<ul style="list-style-type: none"> Added support for new optional fields to be included on certificate transfers: <ul style="list-style-type: none"> <i>notes</i> <i>pricePerCertificate</i> Added the new NH Class I Biodiesel Producer state eligibility to Appendix A 	Joel O'Neil
2.2	4/15/2021	<ul style="list-style-type: none"> Formatting Updates 	Joe Varnas Jr

2. Summary

This document describes the programmatic interfaces (APIs) for the NEPOOL-GIS Registry from a business user perspective. This document will explain how to create an API Login for your account, the rules governing the use of the API, the performance expectations, and validations that occur on incoming data and request parameters.

This document also contains basic instructions on how to use Swagger to get the technical details for each API, including all input parameters and output data set structures.

3. Creating an API Login

NEPOOL-GIS Accounts will have dedicated logins for accessing the APIs. Regular user logins will not be able to authenticate through the API.

API Logins can be created by the designated Account Manager through the NEPOOL-GIS Interface.

3.1 API Login Creation Interface

1. Account Manager logs in to GIS website.
2. In the Account Management module on the left-hand side, click the link for “API Management.” This will take the user to the APX Management interface.
3. Enter a Login Name and Password, and Confirm Password, then click the “Save” button. At this point the API Login will be saved, but not activated. The GIS Administrator will be notified and will proceed with the activation process.
 - Passwords must be at least 6 characters long, contain at least one alphabetic character, one numeric character, and one special character. The following special characters are allowed:
@ + - \$ * # % ~ = _ !
 - Login name conforms to formatting rules and is available (not already in use).
4. Account Holders must submit IP Addresses and Subnet Masks for the machines which will be accessing the API. Account Holder may enter up to 10 IP Addresses, but these must be approved by the GIS Administrator before the machines may access the API. The GIS Administrator is notified when IP Addresses are added.
 - IP Address and Subnet Mask support IPv4 and IPv6. Inputs must be correctly formatted for one of those versions.

4. General API Information

4.1 Authentication

The API user will authenticate using the API Login Name and Password created in the API Management screen that is part of the Account Management module on the dashboard of the registry web application.

Client API consumers will authenticate against an OAuth2 endpoint exposed by the client API (see endpoint URLs below). The OAuth2 endpoint acts as the authorization server for your client and will provide the granted credentials for access to the API Endpoints. This Authorization API POST request will return a short-lived JSON Web Token that will be provided in calls to the application endpoints exposed by the API.

Production Authentication Endpoint: <https://apxjwtauthprod.apx.com/oauth/token>

UAT Authentication Endpoint: <https://apxjwtauthuat.apx.com/oauth/token>

4.1.1 Headers

Key	Value	Description
Authorization	Basic TkVQT09MLUNsaWVudC1BUeK6cFleQ0FxSHVQeiZiN3oILXNlSnAyPVF6M3EhV0FXWC10QnUmUGNwQQ==	This identifies you as a NEPOOL GIS client to the authorization server

4.1.2 Parameters

Field	Description
Username	Client API Service User Name
Password	Client API Service Password
grant_type	Value: password This is associated with the OAuth2 password credentials scenario

4.1.3 Results

Field	Description
access_token	This is the token to be used in the “bearer” value of the HTTP Authorization header
token_type	The type of the token to be used in the API Requests. This value returned will be “Bearer”
expires_in	Duration in which the token will expire and a subsequent authentication request will need to be made if time expires.

Attempts to call application endpoints without a valid token will result in an HTTP error message being returned.

4.1.4 Status Codes

HTTP Status Code	Status	Status Message
200	SUCCESS	Successfully authenticated
401	ERROR	Bad Request Invalid Login ID or Password

4.2 Get / Post Security

Present the authorization header below to call into the APIs.

4.2.1 Headers

Key	Value	Description
Authorization	Bearer {access_token}	The access_token that is returned from the authentication request will be inserted into the value field.

4.3 Acceptable Use

The initial Acceptable Use Policy will be four calls per endpoint per IP Address per minute. Endpoints are Get Positions, Get Transfers (pending), Get Generators, Get Transfer Logs, Post Transfers, and Post Transfer Actions. Violation of the acceptable use policy will result in an error being returned to API caller (HTTP 429) indicating that the acceptable use policy has been violated.

4.4 Auxiliary/Reference Data

Some of the data sent and received through the API uses codes to represent certain field values. These codes and what they represent must be communicated to API users.

- **Account IDs** – Available through the “GIS Account Holders” public report
- **SubAccount IDs** – Available in the “Subaccounts Summary” section of the Account Status module
- **NEPOOL GIS Programs** – [Appendix A](#)
- **Fuel Type Codes** – [Appendix B](#)
- **NEPOOL Project Status** – [Appendix C](#)

4.5 Automated Emails

Accounts with an active API login will not receive email notifications for transfers/actions that they initiate.

The current email behavior for actions initiated by a counterparty will not change. Currently, counterparty actions (transfers/confirm/rejects/withdraws), generate one email per action. When a user takes any single action that involves multiple blocks of instruments, the Registry sends a single email associated with the action, and not individual emails for the constituent instrument blocks. This will also be the case for accounts that use the API.

4.6 Event Logging

Event Logging for user actions performed through the API should be the same as performing those actions through the User Interface.

Specifically, initiating Transfers and acting on Transfers (Confirming, Rejecting, Withdrawing) will be logged and will be accessible to the User in My Event Log.

4.7 User Acceptance Testing (UAT) and Production Base URLs

To call a specific API, append “*api/method name*” to the following base URLs

User Acceptance Testing (UAT) -> <https://gis-app-uat01.apx.com/clientapi2/>

Production -> <https://www1.nepoolgis.com/clientapi2/>

5. Swagger Technical API Specification

NEPOOL GIS uses the Swagger specification to describe the integration API endpoints available to consumers. A swagger.json file is provided (available on registry website; see links below) that contains the definitions of the endpoints that will allow you to become familiar with the requests and responses provided. You can follow the steps outlined below to get started. There is also a Swagger UI page available through the registry website (see links below)

Swagger.json file: [Production](#) | [UAT](#)

Swagger UI Page: [Production](#) | [UAT](#)

5.1 View GIS APIs on Swagger

1. Go to [Swagger website](#). This site is the community site that describes the swagger specification and has demonstrations and downloads available
2. Go to the “[demo](#)” area. This will take you to a hosted solution where you can view the definitions and generate servers and clients in many mainstream languages. You will need to create the client code for consumption of the endpoints. The server generated code can be used to create stubs to simulate interactions with the live endpoint.
3. Upload the GIS_Swagger_API.json file (see links, above) to the swagger editor
 - a. Go to “File” menu item
 - b. Go to the “Import File” menu item
 - c. Navigate to the file location
 - d. Upload the file
4. You can now view the GIS API definitions in the right-hand pane. (The “Warnings” can be ignored as they are alerting you to a non-standard description field that is generated)

5.2 Generate Client for GIS APIs

1. Perform the “View GIS APIs” as described above.
2. Select the “Generate Client” menu item.
3. Select your language of choice and download the SDK
 - a. This will download an SDK in your language of choice. Please note that you may need to make modifications to the toolkit (e.g. Username / Passwords, Endpoint URL changes, et al).
 - b. This can serve as a starting point to setting up your code to consume the APIs.

5.3 Generate Server for GIS APIs

1. Perform the “View GIS APIs” as described above.
2. Select the “Generate Server” menu item.
3. Select your language of choice.
 - a. This will download an SDK in your language of choice. Please note that you may need to make modifications to the toolkit (e.g. Username / Passwords, Endpoint URL changes, et al).
 - b. This can serve as a starting point to setting up the server API stubs.

6. Get APIs

6.1 General GET API Behavior

- If no data is found for request, empty dataset is returned AND a Success code (HTTP 200).
- Result sets/Responses limited to 60,000 lines. If over 60k, an error will be returned (HTTP 400).

6.1.1 Response Codes

HTTP Status Code	Status	Status Message
200	SUCCESS	
400	ERROR	Invalid parameter(s)
401	ERROR	Unauthorized access
500	ERROR	An unexpected error has occurred

6.1.2 Error Results

If the request fails validation, then the following structure will be returned. This will correspond to an HTTP Status Code = 400, 401, or 500. That return set includes the following:

Field	Description	Data Type
errors	Container for errors	N/A
errors {corelationId}	NULL for Get methods	String
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. <i>See the individual Get methods for context specific errors.</i>	String
errors {parameterName}	The field name of the parameter that failed	String
operationId	GUID associated with system logging. Provide when requiring APX support.	String

6.2 Get Transferable Positions (api/Position)

A request to retrieve the list of certificate blocks that are eligible for transfer. This includes all of the certificates belonging to the API user that are Transferable, Banked, or on the Bulletin Board.

6.2.1 Parameters

Parameter	Description	Data Type	Required?
year	[YYYY]	Int	No (Required if Vintage Month is provided)
month	[MM]	Int	No (Required if Vintage Year is provided)
ahlds**	GIS Account ID	Int	No

*If no Vintage parameters are provided, all vintages will be returned.

**Multiple Account IDs can be provided. If no Account ID(s) are provided then information for all accounts will be returned.

6.2.2 Success Results

Field	Description	Data Type
ahld	GIS Account ID	Int
unitId	GIS Unit ID	String
generatorName	Concatenation of "Plant Name" + " - " + "Unit Name", e.g. "Plant1 – Unit4"	String
jurisdiction	State or Province, e.g. "MA", "CT"	String
fuelType	Code for fuel type (See Appendix B)	String
vintage {year}	YYYY	Int
vintage {month}	MM	Int
certificateSerialNumberRange	Serial Number sequence created by GIS, e.g. "599730 - 1 to 100"	String
quantity	Quantity of Certificates	Int
eligibilities	Delimited list of programs for which the certificate(s) are eligible (see list in Appendix A)	String
previousOwner	Account ID of previous Certificate owner	Int

6.2.3 Error Results

If the request fails validation, then the following structure will be returned. This will correspond to an HTTP Status Code = 400. That return set includes the following:

Field	Description	Data Type
errors {Message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> Results exceed 60,000 records Vintage Year/Vintage Month improperly formatted 	String

	<ul style="list-style-type: none"> • Vintage Month not provided with Vintage Year • Vintage Year not provided with Vintage Month 	
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6.3 Get Pending Transfers (api/Transfers)

A request to retrieve all pending certificate transfers, both incoming and/or outgoing. These are the transfers initiated by a counterparty (incoming) or account holder (outgoing) that are waiting on the account holder to confirm, reject, or withdraw. *This method only applies to Another Account Holder transfers since other types of transfers are synchronously completed and don't require an "action".*

6.3.1 Parameters

Parameter	Description	Data Type	Required?
ahIds*	GIS Account IDs	INT	No
direction**	"I" or "O" for incoming or outgoing	String (1)	No

*Multiple Account IDs can be provided. If no Account ID(s) are provided then information for all accounts will be returned.

**If no Direction input parameter is provided, both Incoming and Outgoing Transfers will be returned.

6.3.2 Success Results

Field	Description	Data Type
ahId	GIS Account ID	Int
certificateSerialNumberRanges	Serial Number sequence of pending Certificates, e.g. "599730 - 1 to 100"	String
dateInitiated	Date and time the pending transfer was initiated, e.g. "6/5/2008 17:53"	Datetime
direction	"I" for incoming pending transactions or "O" for outgoing pending transactions.	String
eligibilities	Delimited list of programs for which the certificate(s) are eligible (see list in Appendix A)	String
fuelType	Code for fuel type (See Appendix B)	String
generatorName	Concatenation of "Plant Name" + " - " + "Unit Name", e.g. "Plant1 - Unit4"	String
jurisdiction	State or Province, e.g. "MA", "CT"	String
notes	Optional text field that allows the user to enter additional transfer details	String
pricePerCertificate	Optional field for the user to enter the price associated with the certificates in a single transaction	Number
quantity	Quantity of Certificates	Int
transfereeld	Transferee Account ID	Int
transferId	System-generated ID for the transfer	String
transferorId	Transferor Account ID	Int
unitId	GIS Unit ID	String

vintage {month}	MM	Int
vintage {year}	YYYY	Int

6.3.3 Error Results

If the request fails validation, then the following structure will be returned. This will correspond to an HTTP Status Code = 400. That return set includes the following:

Field	Description	Data Type
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> Results exceed 60,000 records Invalid direction input 	String

6.4 Get Generator Information (api/Generators)

A request to retrieve data for all generators associated with the account, regardless of a project's status.

6.4.1 Parameters

Parameter	Description	Data Type	Required?
ahIds*	GIS Account IDs	Int	No
unitIds**	GIS Unit IDs	String	No

*Multiple Account IDs can be provided. If no Account ID(s) are provided then information for all accounts will be returned.

**Multiple Unit IDs may be provided. If no input parameters are provided, information for all generators will be returned.

6.4.2 Success Results

Field	Description	Data Type
ahId	GIS Account ID	Int
city	City	String
eligibilities	Delimited list of programs for which the generator is eligible (see list in Appendix A)	String
fuelType	Code for fuel type (See Appendix B)	String
generatorName	Concatenation of "Plant Name" + " - " + "Unit Name", e.g. "Plant1 - Unit4"	String
gisRegistrationDate	MM/DD/YYYY HH:mm	Datetime
jurisdiction	State or Province, e.g. "MA", "CT"	String
nameplateCapacity	Unit's name plate capacity	Decimal
status	Current status of the Generator (See Appendix C)	String
unitId	GIS Unit ID	String
vintage {month}	MM	Int
vintage {year}	YYYY	Int

6.4.3 Error Results

If the request fails validation, then the following structure will be returned. This will correspond to an HTTP Status Code = 400. That return set includes the following:

Field	Description	Data Type
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> Results exceed 60,000 records Invalid Unit ID passed 	String

6.5 Get Transfer Information (api/TransferLogs)

A request to retrieve the Transfer information.

6.5.1 Parameters

Parameter	Description	Data Type	Required?
ahIds*	GIS Account IDs	Int	No
fromDate	From Activity Date [YYYY-MM-DD]	Date	Yes
toDate	To Activity Date [YYYY-MM-DD]	Date	Yes
transferType**	anotherAccountHolder, reserve, retailSubAccount	String (32)	No
action**	Transfer, Confirm, Reject, Withdraw	String (10)	No

*Multiple Account IDs can be provided. If no Account ID(s) are provided then information for all accounts will be returned.

**Only one Transfer Type parameter may be provided. When no Transfer Type is provided, all transfer types within the activity dates will be returned.

***Only one Action parameter may be provided. When no Action parameter is provided, all actions within the activity dates will be returned. All Reserve and Retail SubAccount will have an action of "Confirm".

6.5.2 Success Results

Returns data for transfers that occurred within the date range specified in the request. Transfer data includes information on transfer initiation, as well as when transfers are Confirmed/Rejected/Withdrawn. As such, Confirmed/Rejected/Withdrawn transfers will have multiple rows of data.

The following information will be provided in the request response:

Field	Description	Data Type
action	Type of Transfer Action: <ul style="list-style-type: none"> confirm reject transfer withdraw 	String

actionTime	Date and time that transfer was executed, e.g. "6/5/2008 17:53"	Datetime
ahId	GIS Account ID	Int
certificateSerialNumberRanges	Serial Numbers of transferred certificates, e.g. "599730 - 1 to 100".	String
eligibilities	Delimited list of programs for which the generator is eligible (see list in Appendix A)	String
fuelType	Code for fuel type (See Appendix B)	String
generatorName	Concatenation of "Plant Name" + " - " + "Unit Name", e.g. "HOOSAC - HOOSAC WIND" ("HOOSAC"=Plant Name, "HOOSAC WIND"=Unit Name)	String
jurisdiction	State or Province, e.g. "MA", "CT"	String
loginName	Login name of user that took the action, e.g. "ptoomey". May be an Account Holder user, or a counterparty user	String
notes	Optional text field that allows the user to enter additional transfer details	String
pricePerCertificate	Optional field for the user to enter the price associated with the certificates in a single transaction	Number
quantity	Quantity of Certificates	Int
reason	The reason, or on whose behalf, the Reserve Transfer was performed N/A for Another Account Holder and Retail SubAccount transfers	String
reserveVoluntary	Whether or not the Reserve Transfer was for voluntary purposes N/A for Another Account Holder and Retail SubAccount transfers	Bit
retailSubAccountId	SubAccount destination for Retail SubAccount transfers. N/A for Another Account Holder and Reserve transfers	Int
retirementState	The NEPOOL Member state in which the Reserve or Retail SubAccount transfer is effective N/A for Another Account Holder transfers	String
transfereeld	Account ID of Buying Account N/A for Reserve and Retail SubAccount transfers	String
transferID	System-generated ID for the transfer N/A for Reserve and Retail SubAccount transfers	String
transferorId	Account ID of Selling Account N/A for Reserve and Retail SubAccount transfers	String
transferType	Type of Transfer: <ul style="list-style-type: none"> • anotherAccountHolder, reserve, retailSubAccount 	String
unitID	GIS Unit ID	String
vintage {month}	MM	Int
vintage {year}	YYYY	Int

6.5.3 Error Results

If the request fails validation, then the following structure will be returned. This will correspond to an HTTP Status Code = 400. That return set includes the following:

Field	Description	Data Type
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> • Results exceed 60,000 records • Invalid status passed • Both FromDate and ToDate must be passed • ToDate must be greater than or equal to FromDate 	String

7. Post APIs

7.1 General POST API Behavior

- If any data within a post data set fails validation, the entire file will be rejected.
- Posts limited to 20,000 lines; post over that threshold will be rejected.

7.1.1 Response Codes

HTTP Status Code	Status	Status Message
200	SUCCESS	
400	ERROR	Invalid parameter(s)
401	ERROR	Unauthorized access
413	ERROR	Request entity too large
500	ERROR	An unexpected error has occurred

7.1.2 Error Results

If the request fails request validation, then the following structure will be returned. This will correspond to an HTTP Status Code = 400, 401, 413, or 500. That return set includes the following:

Field	Description	Data Type
errors	Container for errors	N/A
errors {corellationId}	The row number corresponding to the error message	String
errors {message}	String corresponding to the specific error encountered for the corresponding correlation ID. <i>See the individual Post methods for context specific errors.</i>	String
errors {parameterName}	The field name of the parameter that failed	String
operationId	GUID associated with system logging. Provide when requiring APX support.	String

7.2 Post Transfer Requests (api/TransferRequests)

This API is for initiating Another Account Holder Transfers of certificates that are Transferable, Banked, or on the Bulletin Board.

7.2.1 Parameters

Parameter	Description	Data Type	Required?
ahId*	GIS Account ID	Int	No

*Only a single Account ID can be provided. If no Account ID is provided then the primary account (i.e. GIS account that created the API credentials) is assumed.

7.2.2 Post Contents

Parameter	Description	Data Type	Required?
buyerAccountId	Buyer Account ID	Int	No
certificateSerialNumberRange	Serial Number sequence created by GIS, e.g. "599730 - 1 to 100". User may not consolidate adjacent certificate serial numbers—If there are two Certificate blocks with consecutive serial numbers, they must be submitted as separate rows.	String	Yes
notes	Optional text field that allows the user to enter additional transfer details	String	No
pricePerCertificate	Optional field for the user to enter the price associated with the certificates in a single transaction	Number	No
quantity	Quantity of Certificates. Must be within the range of Serial Numbers	Int	Yes
requestCorrelationId	External ID provided by the user, to be used when returning the method results to identifying specific Transfers (“collections”). Will not persist with data.	String	Yes

Note: The Certificate Serial Number Range is not something that can be manipulated by the API user. Only serial number ranges provided by the API should be used by the API user when communicating transfer instructions.

7.2.3 Success Results

If all rows pass validation, then the transfers are completed and a result set will be returned that includes the following:

Field	Description	Data Type
requestCorrelationId	External ID provided by the user when submitting	String
resultCodes	NULL	String
transferId	System-generated ID for the transfer	String

remainingCertificateSerialNumberRange	Certificate Serial Numbers for the holding included in the transfer that remain in the user's account after the transfer. If the same serial numbers are submitted for multiple transfers in a single batch, this field should reflect the remaining serial numbers after all transfers in the batch are completed. This field will be empty if no certificates for the serial numbers used in the transfer remain.	String
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7.2.4 Error Results

If one of the rows in the request fails business validation then no transfers are initiated within the system, and a dataset is returned with all rows that failed validation. This will correspond to an HTTP Status Code = 400. That return set may include the following error messages:

Field	Description	Data Type
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> • Missing/invalid Row Identifier • Missing/incorrect Certificate Serial Numbers • Missing/invalid quantity • Quantity greater than available certificates • Sum of quantity greater than available certificates • Missing/incorrect Buyer Account ID • Certificates invalid for transfer 	String

7.3 Post Reserve Transfer Requests (api/ReserveRequests)

This API is for initiating Reserve Transfers of certificates that are Transferable, Banked, or on the Bulletin Board.

7.3.1 Parameters

Parameter	Description	Data Type	Required?
ahId*	GIS Account ID	Int	No

*Only a single Account ID can be provided. If no Account ID is provided then the primary account (i.e. GIS account that created the API credentials) is assumed.

7.3.2 Post Contents

Parameter	Description	Data Type	Required?
requestCorrelationId	External ID provided by the user, to be used when returning the method results to identifying specific Transfers ("collections"). Will not persist with data.	String	Yes
certificateSerialNumberRange	Serial Number sequence created by GIS, e.g. "599730 - 1 to 100". User may not consolidate adjacent certificate serial numbers—If	String	Yes

	there are two Certificate blocks with consecutive serial numbers, they must be submitted as separate rows.		
quantity	Quantity of Certificates. Must be within the range of Serial Numbers	Int	Yes
reason	The reason, or on whose behalf, associated with the Reserve Transfer	String	Yes
reserveVoluntary	Whether or not the Reserve Transfer was for voluntary purposes	Bit	Yes
retirementState	The NEPOOL Member state in which the retirement is effective	String	No

Note: The Certificate Serial Number Range is not something that can be manipulated by the API user. Only serial number ranges provided by the API should be used by the API user when communicating transfer instructions.

7.3.3 Success Results

If all rows pass validation, then the transfers are completed and a result set will be returned that includes the following:

Field	Description	Data Type
requestCorrelationId	External ID provided by the user when submitting	String
resultCodes	NULL	String
transferId	System-generated ID for the transfer	String
remainingCertificateSerialNumberRange	Certificate Serial Numbers for the holding included in the transfer that remain in the user's account after the transfer. If the same serial numbers are submitted for multiple transfers in a single batch, this field should reflect the remaining serial numbers after all transfers in the batch are completed. This field will be empty if no certificates for the serial numbers used in the transfer remain.	String

7.3.4 Error Results

If one of the rows in the request fails business validation then no transfers are initiated within the system, and a dataset is returned with all rows that failed validation. This will correspond to an HTTP Status Code = 400. That return set may include the following error messages:

Field	Description	Data Type
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> • Missing/invalid Row Identifier • Missing/incorrect Certificate Serial Numbers • Missing/invalid quantity • Quantity greater than available certificates • Sum of quantity greater than available certificates • Missing/invalid Reason attribute • Missing/invalid Voluntary attribute • Missing/invalid State attribute 	String

	<ul style="list-style-type: none"> • Certificates invalid for transfer 	
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7.4 Post Retail Transfer Requests (api/RetailRequests)

This API is for initiating Retail SubAccount Transfers of certificates that are Transferable, Banked, or on the Bulletin Board.

7.4.1 Parameters

Parameter	Description	Data Type	Required?
AhId*	GIS Account ID	Int	No

*Only a single Account ID can be provided. If no Account ID is provided then the primary account (i.e. GIS account that created the API credentials) is assumed.

7.4.2 Post Contents

Parameter	Description	Data Type	Required?
requestCorrelationId	External ID provided by the user, to be used when returning the method results to identifying specific Transfers (“collections”). Will not persist with data.	String	Yes
certificateSerialNumberRange	Serial Number sequence created by GIS, e.g. "599730 - 1 to 100". User may not consolidate adjacent certificate serial numbers—If there are two Certificate blocks with consecutive serial numbers, they must be submitted as separate rows.	String	Yes
quantity	Quantity of Certificates. Must be within the range of Serial Numbers	Int	Yes
retailSubAccountId	SubAccount destination for Retail SubAccount transfers.	Int	Yes

Note: The Certificate Serial Number Range is not something that can be manipulated by the API user. Only serial number ranges provided by the API should be used by the API user when communicating transfer instructions.

7.4.3 Success Results

If all rows pass validation, then the transfers are completed and a result set will be returned that includes the following:

Field	Description	Data Type
requestCorrelationId	External ID provided by the user when submitting	String
resultCodes	NULL	String
transferId	System-generated ID for the transfer	String
remainingCertificateSerialNumberRange	Certificate Serial Numbers for the holding included in the transfer that remain in the user’s account after the transfer. If the same serial numbers are submitted for multiple transfers in a single batch, this field should reflect the remaining serial numbers after all transfers in the batch are completed. This field will be empty if no	String

	certificates for the serial numbers used in the transfer remain.	
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7.4.4 Error Results

If one of the rows in the request fails business validation then no transfers are initiated within the system, and a dataset is returned with all rows that failed validation. This will correspond to an HTTP Status Code = 400. That return set may include the following error messages:

Field	Description	Data Type
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> • Missing/invalid Row Identifier • Missing/incorrect Certificate Serial Numbers • Missing/invalid quantity • Quantity greater than available certificates • Sum of quantity greater than available certificates • Missing/invalid Retail SubAccount ID • Certificates invalid for transfer 	String

7.5 Post Transfer Actions (api/TransferActions)

This API is for acting on Certificates in a Pending state (either incoming or outgoing). Note that actions for incoming and outgoing transfers can be included in the same submission. *This method only applies to Another Account Holder transfers since other types of transfers are synchronously completed and don't require an "action".*

7.5.1 Parameters

Parameter	Description	Data Type	Required?
ahId*	GIS Account ID	Int	No

*Only a single Account ID can be provided. If no Account ID is provided then the primary account (i.e. GIS account that created the API credentials) is assumed.

7.5.2 Post Contents

Parameter	Description	Data Type	Required?
transferId	System-generated ID for the transfer	String	Yes
action	Action to take on the Transaction: <ul style="list-style-type: none"> • Withdraw (Outgoing transfers only) • Confirm (Incoming transfers only) • Reject (Incoming transfers only) 	String	Yes

7.5.3 Success Results

If all rows pass validation, then the transfer actions are completed and a result set will be returned that includes the following:

Field	Description	Data Type
transferId	System-generated ID for the transfer	String
resultCodes	NULL	String

7.5.4 Error Results

If one of the rows in the request fails business validation then no transfer actions are initiated within the system, and a dataset is returned with all rows that failed validation. This will correspond to an HTTP Status Code = 400. That return set may include the following error messages:

Field	Description	Data Type
errors {message}	String corresponding to the specific error encountered for the corresponding Row ID. Possible validation errors include: <ul style="list-style-type: none"> • Missing/invalid Transfer ID • Invalid Action • Invalid Action for Transfer ID • Duplicate Transfer ID passed 	String

8. Appendix A: NEPOOL GIS Programs

The following programs are currently returned as columns when running reports for Transferable and Pending Certificate Transfers. These may be represented in the API by programs codes.

Program Name	Program Code
CT CEO	CTCEO
CT Class I	CTClassI
CT Class I FERC*	CTClassIFERC
CT Class II	CTClassII
CT Class III	CTClassIII
CT LREC	CTLREC
Eligible MA NOx Allowances	MARenewableNOx
Green-E	GreenE
Low Impact Hydro Institute	LIHI
MA APS Alternative Generation Unit	MAApsAlternative
MA Auction Solar Carve-Out I Unit	MAAuctionSolarCarveOutI
MA Auction Solar Carve-Out II Unit	MAAuctionSolarCarveOutII
MA CES*	MACES
MA RPS Class I Renewable Generation Unit	MANewRenewable
MA RPS Class II Renewable Generation Unit	MARPSClassIIRenewable
MA RPS Class II Waste Energy Generation Unit	MARPSClassIIWasteEnergy
MA Solar Carve-Out I Unit	MASolarCarveOutI
MA Solar Carve-Out II Unit	MASolarCarveOut2
MA Solar Carve-Out II Unit	MASolarCarveOutII
ME Class I	MEClassI
ME Class II	MEClassII
ME CO2 Netting	MECO2Netting
ME Community Based Renewable Energy	MECommunityBasedRenewableEnergy
ME Ren/Eff Energy Source	MERenEffSource
NH Class I	NHClassI
NH Class I Thermal	NHClassIThermal
NH Class II	NHClassII
NH Class I Biodiesel Producer*	NHBiodieselProducer
NH Class III	NHClassIII
NH Class IV	NHClassIV
RI Existing Renewable Resource	RIExistingRenewable
RI New Renewable Resource	RINewRenewable
VT Tier I	VTTierI
VT Tier II	VTTierII

*To be added by January 2019

9. Appendix B: Fuel Type Codes

Fuel Type Code	Short Description	Description
BO1	Biodiesel1	100% neat
BO2	Biodiesel2	Less than 100% neat
CO1	Coal	Coal
CP1	Composite	Composite
DI1	Diesel	Diesel
DG1	Digester gas	Digester gas
ER1	Efficient Resource (Maine)	Efficient Resource (Maine)
ET1	Ethanol	Ethanol
GE1	Geothermal	Geothermal
JET	Jet	Jet
LG1	Landfill gas	Landfill gas
MT1	Methanol	Methanol
NG1	Natural Gas	Natural Gas
NU1	Nuclear	Nuclear
OC1	Ocean Thermal	Thermal
OC2	Ocean Wave	Wave
OC3	Ocean Tidal	Tidal
OIL	Oil	Oil
PS1	Pumped Storage	Pumped Storage
SO1	Solar Thermal	Thermal
SO2	Solar Photovoltaic	Photovoltaic
TE1	Trash-to-energy	Trash-to-energy
WO1	Waste Oil	Waste Oil
WND	Wind	Wind
WOD	Wood	Wood
BIM	Biomass	Biomass
FLC	Fuel cell	Fuel cell
H2O	Hydroelectric/Hydropower	Hydroelectric/Hydropower
MSW	Municipal solid waste	Municipal solid waste
LEC	Low Emission (Connecticut)	Low emission advanced renewable energy conversion technologies
CLM	CLM	Conservation and Load Management
DRP	DRP	Curtailment-based Demand Response
OC4	Ocean1	Movement or the latent heat of the ocean

OC5	Ocean2	Ocean Current
GA1	Gasification	Gasification
EN1	Energy Efficient Steam	Energy Efficient Steam
EN2	Energy Storage	Energy Storage
HY1	Hydrokinetic	Hydrokinetic
PA1	Paper-derived	Paper-derived
WA1	Waste Energy	Waste Energy
ASH	Air-source heat pump	Air-source heat pump
GWH	Ground- and Water-source heat pump	Ground- and Water-source heat pump
DGH	Deep geothermal heat exchange	Deep geothermal heat exchange
BIG	Biogas	Biogas
LBL	Liquid biofuels	Liquid biofuels

10. Appendix C: Project Status Names

API Status Code	Status Name
ACT	Approved
INA	Inactive
NIN	Need Info
PEN	Pending
REJ	Rejected