em6: API Integration Guide

19 April 2022

Vers. 1.9

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Document History

Version	Date	Status	Edited By	Revision Description
0.1	01 July 2020	Draft	EMS	Initial Draft of APIs built to date and em6 permissions design
0.3	14 August 2020	Draft	E Oosterbaan	API documentation
0.4	19 August 2020	Draft	E Oosterbaan	Additional csv APIs and dashboard 24 hours APIs
0.5	19 September 2020	Draft	E Oosterbaan	Em6 permissions update
0.6	19 October 2020	Draft	E Oosterbaan	To/from for Reserves
0.7	22 October 2020	Draft	E Oosterbaan	Dashboard Timestamps
0.9	28 October 2020	Draft	E Oosterbaan	Permissions and API updates – ISO date format, updated csv headers, generation type by NZ
1.0	13 November 2020	Draft	E Oosterbaan	Add MW change to recent load and RT APIs
1.1	14 November 2020	Final	E Oosterbaan	Authorisation
1.2	8 December 2020	Final	E Oosterbaan	Change non-responsive schedule to non-response and Recent Generation API
1.3	18 February 2021	Final	E Oosterbaan	New Carbon Intensity APIs and update to generation_type API Update to auth flow for UAT auth URL and clarification on username and password
1.4	8 March 2021	Final	E Oosterbaan	Small correction to TRUS restricted node type
1.5	8 July 2021	Final	E Oosterbaan	Update for new carbon APIs
1.6	2 August 2021	Final	E Oosterbaan	Update for new carbon APIs, and free dashboard [regional price, price 24rs]
1.7	2 December 2021	Final	E Oosterbaan	Price API corrections, carbon emissions and generation weighted average prices, update restricted datasets to Manawa Energy
1.8	20 February 2022	Final	E Oosterbaan	New Reserve amount and source report APIs. Update API descriptions for reserves, SCADA, price and Arc Flows
1.9	19 April 2022	Final	E Oosterbaan	Change to recent load / 10 min SCADA APIs. Remove 12 months stats, and add trading_date

Em6 API Integration Guide

Background

The APIs available as part of the em6 service are used to power the em6 webapp (the frontend) as well as business to business APIs.

The APIs are split amongst various features that participants must subscribe to gain access to a service.

Em6 URLs

The base API URL will be referred to as **{EM6_URL}** for the remainder of this guide.

UAT Endpoint:	**{EM6_URL} =** https://uat-api.em6.co.nz/ords/em6/data_api/
PROD Endpoint:	**{EM6_URL}** = https://api.em6.co.nz/ords/em6/data_api/

Reference Nodes

There are three reference price nodes referred to in the em6 application. None of these price nodes have load associated to them.

OTA2201	Otahuhu
HAY2201	Haywards
BEN2201	Benmore

Default Price Nodes

There are 15 default price nodes referred to in the em6 application. Some of these price nodes have load associated to them as indicated below:

Grid Zone	NODE ID	Pricing Node?	Load Node?
1	BRB0331	YES	YES
2	OTA2201	YES	
3	HAM2201	YES	
4	WKM2201	YES	YES
5	RDF2201	YES	
5	TUI1101	YES	YES
6	SFD2201	YES	
7	BPE2201	YES	
8	HAY2201	YES	
9	KIK2201	YES	
10	ISL2201	YES	
12	DOB0661	YES	
13	BEN2201	YES	
14	INV2201	YES	
14	HWB2201	YES	

Default Load Nodes

There are 15 default load nodes referred to in the em6 application:

Grid Zone	NODE ID	Pricing Node?	Load Node?
1	MPE1101	YES	YES
2	PEN0331	YES	YES
3	HAM0331	YES	YES
4	EDG0331	YES	YES
5	RDF0331	YES	YES
5	TUI1101	YES	YES
6	SFD0331	YES	YES
7	BPE0331	YES	YES
8	CPK0331	YES	YES
9	STK0331	YES	YES
10	ISL0661	YES	YES
12	GYM0661	YES	YES
13	OAM0331	YES	YES
14	INV0331	YES	YES
14	HWB0331	YES	YES

Authorisation

Authentication overview

Authentication for the EM6 APIs is handled by User Pools configured within AWS Cognito. Each user within Cognito will have groups assigned to them which help to control what data is returned and which APIs they are allowed to access. The API is served by AWS API Gateway, which checks the user provided token is valid, authenticated and was issued by the correct User Pool. Once API Gateway has validated the token with Cognito to make sure it is correct, it then passes the token back to the API Backend.

The Authorisation and filtering logic for the data to be returned is controlled by the backend. The Cognito tokens that are passed back are in a JWT encrypted format, so they include information about what groups the user belongs to and other user specific attributes like email. Once the backend has filtered the returned data based on the information in the token, the request is passed back through the API Gateway and back to the user.

Authentication process

Step one: Authenticate to AWS Cognito

The first step in the authentication flow is for the end user to authenticate to AWS Cognito with a valid username and password to retrieve a token to pass to API Gateway. In order to authenticate to Cognito, you will need:

- A valid Application Client ID from the userpool
- A valid username and password from the userpool
- The User Pool ID that is used for authentication

There are two different broad methods of authentication to Cognito. You can either use one of the AWS SDKs or you can use authenticate based on standard OAuth2 authentication. We recommend wherever possible that the AWS SDK should be used, as this makes the process a lot easier. Cognito tokens, by default, are valid for 60 minutes. There are a number of JWT libraries that can be used to help manage expiry and refresh of tokens as required.

Authenticating via AWS SDK

In order to authenticate with the AWS SDK, you will need to integrate that with your code base. AWS SDKs are developed for the majority of programming languages, and most languages will have sample apps available (i.e. Java and .NET). You will need to call Initiate_auth (Name may change depending on SDK language) method which should take a username and password as input and output a JSON payload containing a series of tokens (IdToken, AccessToken and RefreshToken). The method should not require admin, or IAM, credentials (There's normally options for both admin and normal - in this case, we want normal). Authentication flow should be 'USER_PASSWORD_AUTH' unless you are choosing to use 'USER_SRP_AUTH' - we support both.

For example (but not limited to);

```
import com.amazonaws.services.cognitoidp.AWSCognitoIdentityProvider;
import
com.amazonaws.services.cognitoidp.AWSCognitoIdentityProviderClientBuilder;
import com.amazonaws.services.cognitoidp.model.*;
import java.util.HashMap;
import java.util.Map;
public class DemoApplication {
public AWSCognitoIdentityProvider getAmazonCognitoIdentityClient() {
return AWSCognitoIdentityProviderClientBuilder.standard()
.withRegion( "ap-southeast-2" )
.build();
}
public void authenticate() {
final Map<String, String> authParams = new HashMap<>();
authParams.put( "USERNAME" , "UsernameHere" );
authParams.put( "PASSWORD" , "PasswordGoesHere" );
final InitiateAuthRequest authRequest = new InitiateAuthRequest();
authRequest.withAuthFlow(AuthFlowType.USER_PASSWORD_AUTH)
.withClientId( "2psmqhb*****************6b2q2" )
.withAuthParameters(authParams);
InitiateAuthResult initiateAuthResult =
getAmazonCognitoIdentityClient().initiateAuth(authRequest);
System.out.println( "Authenticate result: " + initiateAuthResult);
}
public static void main(String[] args) {
DemoApplication demoApplication = new DemoApplication();
demoApplication.authenticate();
}
}
```

Authentication for B2B without SDK

You can authenticate with the Cognito service without using the SDK using the following technique.

Request format and instructions

Endpoint:	https://api.em6.co.nz/auth or in UAT https://uat-api.em6.co.nz/auth
Method:	POST
Example Payload	

```
{
"AuthParameters":
{"USERNAME":"usernamePlaceholder","PASSWORD":
"passwordPlaceholder"},
"AuthFlow":"USER_PASSWORD_AUTH",
"ClientId":"clientIdPlaceholder"
}
```

usernamePlaceholder = email address used to authenticate to the webapp
passwordPlaceholder = password created on account setup
clientIdPlaceholder provided by EMS

Successful response format

HTTP Code: 200

```
{
"AuthenticationResult":{
"AccessToken":"xyz",
"ExpiresIn":3600,
"IdToken":"xyz",
"RefreshToken":"xyz",
"TokenType":"Bearer"
},
"ChallengeParameters":{ }
}
```

All 3 tokens (Access, ID and Refresh) are in JWT encoded format. The 'IdToken' is the one you need to supply to API Gateway as below. 'ExpiresIn' is the time, in seconds, that the token is valid for.

Error response format

HTTP Code: 400

```
{
"__type": "Exception type"
"message": "Exception message"
}
Example:
{
"__type": "NotAuthorizedException"
"message": "Incorrect username or password"
}
```

Curl example

```
curl -X POST --data @auth-data.json https://api.em6.co.nz/auth
```

Where auth-data.json is the following;

```
{
"AuthParameters" :
{ "USERNAME" : "yourusername@example.com", "PASSWORD" : "yourpassword" },
"AuthFlow" : "USER_PASSWORD_AUTH",
"ClientId" : "AFDG......................."
}
```

Step two: Authenticate to API Gateway

Using the Identity Token (IdToken), we can now authenticate to API Gateway. Simply append the body of the identity IdToken to 'Authorization' header to all your requests. API Gateway will validate with Cognito that the token is valid, not expired and that the token was issued by the correct User Pool. Once this is done, the request will be passed to the backend and data returned (based on what the authenticated Cognito user has access.

Node API

Description: API to return node metadata, including coordinates for plotting on a map.

URL:	**{EM6_URL}/node/**[node_id] [site_id] [pricing_node] [load_node] [generation_node] [generation_type_id] [grid_zone_id]
Method:	GET
Query parameters:	
Node_id	**HAY0111** [CSV] - *Optional blank for all*
Site_id	**HAY** – *Optional blank for all*
Pricing_node	**TRUE, FALSE** – *Optional blank for all*
Load_node	**TRUE, FALSE** – *Optional blank for all*
Generation_node	**TRUE, FALSE** – *Optional blank for all*
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*
Grid_zone_id	**8** – *Optional blank for all*

Examples:

1. {em6_url}/nodes/?generation_node=TRUE
2. {em6_url}/nodes/?load_node=TRUE
3. {em6_url}/nodes/?site_id=HAY
4. {em6_url}/nodes/?grid_zone_id=8&generation_node=TRUE
5. {em6_url}/nodes/OTA2201,BEN2201,HAY2201

Example Node API Response: {em6_url}/nodes/OTA2201,BEN2201


```
{
    "items": [
        {
            "site_id": "BEN",
            "site_name": "Benmore",
            "node_id": "BEN2201",
            "node_name": "Benmore",
            "grid_zone_id": 13,
            "grid_zone_name": "Otago",
            "pricing_node": "TRUE",
            "load_node": "FALSE",
            "conforming_load": "FALSE",
            "network_id": null,
            "network_description": null,
            "generation_node": "FALSE",
            "generation_type_id": null,
            "generation_type_name": null,
            "generation_capacity_mw": null,
            "generator_id": null,
            "generator_description": null,
            "lattitude": -44.566414786999985,
            "longitude": 170.19463940900005
        },
        {
            "site_id": "OTA",
            "site_name": "Otahuhu A",
            "node_id": "OTA2201",
            "node_name": "Otahuhu",
            "grid_zone_id": 2,
            "grid_zone_name": "Auckland",
            "pricing_node": "TRUE",
            "load_node": "FALSE",
            "conforming_load": "FALSE",
            "network_id": null,
            "network_description": null,
            "generation_node": "FALSE",
            "generation_type_id": null,
            "generation_type_name": null,
            "generation_capacity_mw": null,
            "generator_id": null,
            "generator_description": null,
            "lattitude": -36.95519481599996,
            "longitude": 174.86269900600007
        }
```

Current Price API

Description: API to return the six most recent 5 minute pricing intervals for requested nodes

URL:	**{EM6_URL}/price/**[node_id] [site_id] [grid_zone_id]
Method:	GET
Query parameters:	
Node_id	**HAY0111** [CSV] – *Optional blank for all*
Site_id	**HAY** – *Optional blank for all*
Grid_zone_id	**8** – *Optional blank for all*

Examples:

1. {em6_url}/price/WIL0331,HAY2201
2. {em6_url}/price/?site_id=ALB
3. {em6_url}/price/?grid_zone_id=8

Truncated Current Price Example Response: {em6_url}/price/?site_id=GOR


```
{
    "items": [
        {
            "trading_date": "2020-08-13T12:00:00Z",
            "trading_period": 24,
            "time_stamp": "11:50",
            "node_id": "GOR0331",
            "node_name": "Gore",
            "price": 114.31,
            "price_change": null,
            "price_tp_average": 114,
            "max_7_day": 243.47,
            "min_7_day": 48.56
        },
        {
            "trading_date": "2020-08-13T12:00:00Z",
            "trading_period": 24,
            "time_stamp": "11:55",
            "node_id": "GOR0331",
            "node_name": "Gore",
            "price": 113.69,
            "price_change": -0.62,
            "price_tp_average": 114,
            "max_7_day": 243.47,
            "min_7_day": 48.56
        },
        {
            "trading_date": "2020-08-13T12:00:00Z",
            "trading_period": 25,
            "time_stamp": "12:00",
            "node_id": "GOR0331",
            "node_name": "Gore",
            "price": 117.3,
            "price_change": 3.61,
            "price_tp_average": 115.555,
            "max_7_day": 243.47,
            "min_7_day": 48.56
        },
3 MORE TRADING PERIODS
```

Current Regional Price API

Description: API to return the 5 min average price for each region

URL:	**{EM6_URL}/region/price/**[grid_zone_id]
Method:	GET
Query parameters:	
Grid_zone_id	**8** [csv]– *Optional blank for all*

Examples:

1. {em6_url}/region/price/
2. {em6_url}/region/price/?grid_zone_id=2
3. {em6_url}/region/price/?grid_zone_id=4,5,9

Truncated Current Regional Price Example Response:
{em6_url}/region/price/?grid_zone_id=2,4,8


```
{
    "items": [
        {
            "timestamp": "2021-08-01T21:30:00Z",
            "trading_period": 20,
            "grid_zone_id": 2,
            "grid_zone_name": "Auckland",
            "price": 177.41
        },
        {
            "timestamp": "2021-08-01T21:30:00Z",
            "trading_period": 20,
            "grid_zone_id": 4,
            "grid_zone_name": "Edgecumbe",
            "price": 164.51
        },
        {
            "timestamp": "2021-08-01T21:30:00Z",
            "trading_period": 20,
            "grid_zone_id": 8,
            "grid_zone_name": "Wellington",
            "price": 158.68
        }
    ],
```

Price last 24 hrs API

Description: API to return the price last 24hrs by node. This is derived from 5 min price averages per trading period, or a Provisional or Interim Price if available.

URL:	**{EM6_URL}/price/24hrs/**[node_id]
Method:	GET
Query parameters:	
Node_id	**HAY0111** [CSV] – *Required*

Examples:

1. {em6_url}/price/24hrs/WIL0331,HAY2201

Truncated Price last 24hrs Example Response: {em6_url}/price/24hrs/OTA2201,BEN2201


```
{
    "items": [
        {
            "timestamp": "2021-07-31T20:30:00Z",
            "trading_period": 18,
            "node_id": "BEN2201",
            "price": 144.46
        },
        {
            "timestamp": "2021-07-31T20:30:00Z",
            "trading_period": 18,
            "node_id": "OTA2201",
            "price": 160.94
        },
        {
            "timestamp": "2021-07-31T21:00:00Z",
            "trading_period": 19,
            "node_id": "BEN2201",
            "price": 144.48
        },
        {
            "timestamp": "2021-07-31T21:00:00Z",
            "trading_period": 19,
            "node_id": "OTA2201",
            "price": 162.03
        },
        {
            "timestamp": "2021-07-31T21:30:00Z",
            "trading_period": 20,
            "node_id": "BEN2201",
            "price": 144.46
        },
        {
            "timestamp": "2021-07-31T21:30:00Z",
            "trading_period": 20,
            "node_id": "OTA2201",
            "price": 162.02
        },
```

RCPD API last 48hrs

Description: API to return 30 minute RCPD load data for YESTERDAY and TODAY plus existing MAX, MIN AVG peaks by RCPD region.

URL:	**{EM6_URL}/rcpd_load/[region]**
Method:	GET
Query parameters:	
Region	**UNI** - *Required*

Example:

1. {em6_url}/rcpd_load/?region=UNI

Truncated RCPD Load Example Response: {em6_url}/rcpd_load/?region=UNI


```
{
    "region_totals": [
        {
            "rcpd_region_id": "UNI",
            "max_peak": 1920.19,
            "avg_peak": 1803.92,
            "min_peak": 1729.85
        }
    ],
    "today": [
        {
            "timestamp": "2020-11-19T11:51:00Z",
            "trading_period": 1,
            "scada_mw": 947.541,
            "revenue_mw": null
        },
        {
            "timestamp": "2020-11-19T12:21:00Z",
            "trading_period": 2,
            "scada_mw": 913.049,
            "revenue_mw": null
        },
        {
            "timestamp": "2020-11-19T12:51:00Z",
            "trading_period": 3,
            "scada_mw": 877.26,
            "revenue_mw": null
        },
```


TODAY followed by YESTERDAY's data including revenue_mw

RCPD API last 48hrs csv

Description: API to return a csv download of the 30 minute RCPD load data for YESTERDAY and TODAY plus existing MAX, MIN AVG peaks by RCPD region.

URL:	**{EM6_URL}/rcpd_load_csv/[region]**
Method:	GET
Query parameters:	
Region	**UNI** - *Required*

Example:

1. {em6_url}/rcpd_load_csv/?region=UNI

Truncated RCPD Example csv Response: {em6_url}/rcpd_load/?region=LSI

```
RCPD Region,Max Peak,Average Peak,Min Peak
LSI,1056.62,997.27,974.46
Trading Date,Trading Period,RCPD MW,RCPD Revenue MW
19/11/2020,  1,878.164,877.91
19/11/2020,  2,869.167,869.286
19/11/2020,  3,859.754,859.706
19/11/2020,  4,850.523,850.69
19/11/2020,  5,846.817,846.786
19/11/2020,  6,850.23,850.172
19/11/2020,  7,851.073,851.454
19/11/2020,  8,856.038,856.518
19/11/2020,  9,854.376,854.94
19/11/2020, 10,868.328,868.954
19/11/2020, 11,889.105,889.496
19/11/2020, 12,910.426,910.468
19/11/2020, 13,941.858,941.968
19/11/2020, 14,979.491,979.462
19/11/2020, 15,1013.679,1013.62
19/11/2020, 16,1040.258,1039.852
19/11/2020, 17,1040.011,1039.596
19/11/2020, 18,1029.095,1028.752
19/11/2020, 19,1018.152,1017.63
19/11/2020, 20,1003.235,1002.158
19/11/2020, 21,990.301,989.822
19/11/2020, 22,981.23,980.89
19/11/2020, 23,978.39,978.026
19/11/2020, 24,974.011,973.954
19/11/2020, 25,967.872,967.686
19/11/2020, 26,961.605,961.772
19/11/2020, 27,954.3,954.22
19/11/2020, 28,950.446,950.56
19/11/2020, 29,955.276,955.43
19/11/2020, 30,961.36,961.202
19/11/2020, 31,968.014,967.984
19/11/2020, 32,971.168,971.046
19/11/2020, 33,977.745,977.636
19/11/2020, 34,988.891,988.844
19/11/2020, 35,982.586,982.34
19/11/2020, 36,979.682,979.714
19/11/2020, 37,977.598,977.622
19/11/2020, 38,968,968.124
19/11/2020, 39,964.554,964.706
19/11/2020, 40,967.649,967.766
19/11/2020, 41,959.596,959.812
19/11/2020, 42,958.433,958.748
19/11/2020, 43,961.805,962.338
19/11/2020, 44,958.328,958.49
19/11/2020, 45,942.274,942.39
19/11/2020, 46,914.605,914.498
19/11/2020, 47,897.358,897.308
19/11/2020, 48,874.729,874.76
20/11/2020,  1,864.648,
20/11/2020,  2,848.98,
20/11/2020,  3,844.804,
20/11/2020,  4,842.357,
20/11/2020,  5,840.992,
20/11/2020,  6,839.399,
20/11/2020,  7,833.383,
20/11/2020,  8,829.064,
20/11/2020,  9,834.547,
20/11/2020, 10,848.289,
20/11/2020, 11,871.383,
```

RCPD API last 2hrs

Description: API to return a rolling 2 hour window of near real time RCPD load by RCPD region and

URL:	**{EM6_URL}/rcpd_1min/[region]**
Method:	GET
Query parameters:	
Region	**UNI** - *Required*

Example:

1. {em6_url}/rcpd_1min/?region=UNI

Truncated RCPD 1min Example Response: {em6_url}/rcpd_1min/?region=UNI


```
{
    "period_data": [
        {
            "timestamp": "2020-08-14T00:42:00Z",
            "trading_period": 26,
            "rcpd_1_mw": 1367.62
        },
        {
            "timestamp": "2020-08-14T00:43:00Z",
            "trading_period": 26,
            "rcpd_1_mw": 1376.94
        },
        {
            "timestamp": "2020-08-14T00:44:00Z",
            "trading_period": 26,
            "rcpd_1_mw": 1377.14
        },
        {
            "timestamp": "2020-08-14T00:46:03Z",
            "trading_period": 26,
            "rcpd_1_mw": 1375.36
        },
        {
            "timestamp": "2020-08-14T00:46:21Z",
            "trading_period": 26,
            "rcpd_1_mw": 1375.18
        }
    ],
    "region_peaks": [
        {
            "rcpd_region_id": "UNI",
            "min_peak": 1845.08,
            "current_tp_avg": 1365.81
        }
    ]
}
```

RCPD API Current Peaks

Description: API to return the current 100 peaks for a requested region and capacity measurement year

URL:	**{EM6_URL}/rcpd_peaks/[region][cm_year]**
Method:	GET
Query parameters:	
Region	**UNI** - *Required*
CM_year	**2019-2020** – *Required*

Example:

1. {em6_url}/rcpd_peaks/?region=UNI&cm_year=2019-2020

Truncated RCPD Peaks Example Response:
{em6_url}/rcpd_peaks/?region=UNI&cm_year=2019-2020


```
{
    "items": [
        {
            "ranking": 1,
            "source": "M",
            "trading_date": "2020-06-29T12:00:00Z",
            "trading_period": 36,
            "mw": 1990.632
        },
        {
            "ranking": 2,
            "source": "M",
            "trading_date": "2020-06-29T12:00:00Z",
            "trading_period": 37,
            "mw": 1990.104
        },
        {
            "ranking": 3,
            "source": "D",
            "trading_date": "2020-07-21T12:00:00Z",
            "trading_period": 37,
            "mw": 1988.442
        },
        {
            "ranking": 4,
            "source": "M",
            "trading_date": "2020-06-28T12:00:00Z",
            "trading_period": 36,
            "mw": 1987.228
        },
```

RCPD API Current Peaks csv

Description: API to return a csv download of the current 100 peaks for a requested region and capacity measurement year

URL:	**{EM6_URL}/rcpd_peaks_csv/[region][cm_year]**
Method:	GET
Query parameters:	
Region	**UNI** - *Required*
CM_year	**2019-2020** – *Required*

Example:

1. {em6_url}/rcpd_peaks_csv/?region=UNI&cm_year=2019-2020

Truncated RCPD Peaks Example csv Response:
{em6_url}/rcpd_peaks_csv/?region=UNI&cm_year=2019-2020

```
Ranking,Source,Trading Date,Trading Period,MW
1,M,30/06/2020, 36,1990.632
2,M,30/06/2020, 37,1990.104
3,D,22/07/2020, 37,1988.442
4,M,29/06/2020, 36,1987.228
5,M,29/06/2020, 37,1985.49
6,D,22/07/2020, 41,1983.604
7,D,22/07/2020, 39,1980.498
8,M,30/06/2020, 38,1979.43
9,D,22/07/2020, 40,1978.16
10,M,29/06/2020, 38,1976.874
11,M,30/06/2020, 39,1972.106
12,M,29/06/2020, 39,1970.686
13,D,22/07/2020, 38,1969.052
14,D,22/07/2020, 36,1964.114
15,M,29/06/2020, 35,1963.286
16,M,29/06/2020, 40,1962.138
17,M,30/06/2020, 40,1958.372
18,M,15/06/2020, 36,1955.984
19,M,15/06/2020, 37,1954.106
20,D,17/08/2020, 38,1945.498
21,D,27/07/2020, 17,1944.066
22,D,17/08/2020, 37,1942.932
23,M,16/06/2020, 36,1941.948
24,M,16/06/2020, 37,1933.66
25,D,27/07/2020, 16,1933.65
26,D,27/07/2020, 37,1926.268
27,M,16/06/2020, 38,1923.076
28,D,27/07/2020, 38,1922.876
29,M,15/06/2020, 38,1922.396
30,D,30/07/2020, 37,1922.08
31,D,27/07/2020, 39,1922.068
32,D,30/07/2020, 38,1917.086
33,D,22/07/2020, 35,1913.638
34,M,08/06/2020, 37,1913.224
35,M,08/06/2020, 36,1912.052
36,D,27/07/2020, 40,1911.212
37,D,30/07/2020, 36,1909.614
38,D,27/07/2020, 18,1909.394
39,D,17/08/2020, 39,1904.224
40,D,27/07/2020, 36,1903.676
41,M,24/06/2020, 36,1902.718
42,D,27/07/2020, 19,1901.962
```

Aggregated Reserves API

Description: API to return the aggregated reserves for New Zealand by reserve type/s. This is an unrestricted report of the Non-Response Schedule (NRS) results for total MW cleared and total MW offered by island and type I, T, P, Fast or Slow.

URL:	**{EM6_URL}/reserves_agg/[from_trading_date][to_trading_date][island][power_type][reserve_type]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** - *Required*
to_trading_date	**21/07/2020** - *Required*
Island	**NI**, **SI** – *Optional blank for all*
Power_type	Interruptible **I**, Partly Loaded Spinning Reserve **P**, Tail Water Depressed Reserve **T** – *Optional blank for all*
Reserve_type	fast **F**, sustained **S** - *Optional blank for all*

Examples:

1. {em6_url}/reserves_agg/?from_trading_date=02/08/2020&to_trading_date=02/08/2020
2. {em6_url}/reserves_agg/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI
3. {em6_url}/reserves_agg/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&power_type=P
4. {em6_url}/reserves_agg/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&reserve_type=S

Truncated Aggregated Reserves Example Response: {em6_url}/reserves_agg/?from_trading_date=13/08/2020&to_trading_date=13/08/2020&island=NI&power_type=P


```
{
    "items": [
        {
            "trading_date": "2020-08-12T12:00:00Z",
            "trading_period": 1,
            "islandid": "NI",
            "power_type": "P",
            "reserve_type": "F",
            "mwcleared": 153.949,
            "mwoffered": 696.328
        },
        {
            "trading_date": "2020-08-12T12:00:00Z",
            "trading_period": 1,
            "islandid": "NI",
            "power_type": "P",
            "reserve_type": "S",
            "mwcleared": 206.04,
            "mwoffered": 823.028
        },
        {
            "trading_date": "2020-08-12T12:00:00Z",
            "trading_period": 2,
            "islandid": "NI",
            "power_type": "P",
            "reserve_type": "F",
            "mwcleared": 127.571,
            "mwoffered": 676.332
        },
        {
            "trading_date": "2020-08-12T12:00:00Z",
            "trading_period": 2,
            "islandid": "NI",
            "power_type": "P",
            "reserve_type": "S",
            "mwcleared": 159.104,
            "mwoffered": 793.032
        },
        {
            "trading_date": "2020-08-12T12:00:00Z",
            "trading_period": 3,
            "islandid": "NI",
            "power_type": "P",
            "reserve_type": "F",
            "mwcleared": 127.135,
            "mwoffered": 673.332
        },
```

Aggregated Reserves API csv

Description: API to return a csv download of the aggregated reserves for New Zealand by reserve type/s.

URL:	**{EM6_URL}/reserves_agg_csv/[from_trading_date][to_trading_date][island][power_type][reserve_type]**
Method:	GET
Query parameters:	
From_trading_date	**21/07/2020** - *Required*
to_trading_date	**21/07/2020** - *Required*
Island	**NI**, **SI** – *Optional blank for all*
Power_type	Interruptible **I**, Partly Loaded Spinning Reserve **P**, Tail Water Depressed Reserve **T** – *Optional blank for all*
Reserve_type	fast **F**, sustained **S** - *Optional blank for all*

Examples:

1. {em6_url}/reserves_agg_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020
2. {em6_url}/reserves_agg_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI
3. {em6_url}/reserves_agg_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020 &island=NI&power_type=P
4. {em6_url}/reserves_agg_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&reserve_type=S

Truncated Aggregated Reserves Example csv Response:

{em6_url}/reserves_agg_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI

```
Trading Date,Trading Period,Island,Power Type,Reserve Type,Total MW
Cleared,Total MW Offered
02/08/2020,  1,NI,I,F,239.501,274.506
02/08/2020,  1,NI,I,S,301.975,312.379
02/08/2020,  1,NI,P,F,127.992,641.133
02/08/2020,  1,NI,P,S,132.624,746.133
02/08/2020,  1,NI,T,F,0,98.2
02/08/2020,  1,NI,T,S,5.318,307.4
02/08/2020,  2,NI,I,F,245.899,272.505
02/08/2020,  2,NI,I,S,295.687,306.068
02/08/2020,  2,NI,P,F,121.71,619.133
02/08/2020,  2,NI,P,S,131.624,742.133
02/08/2020,  2,NI,T,F,0,98.2
02/08/2020,  2,NI,T,S,15.608,307.4
02/08/2020,  3,NI,I,F,250.716,274.685
02/08/2020,  3,NI,I,S,295.248,304.8
02/08/2020,  3,NI,P,F,98.18,607.133
02/08/2020,  3,NI,P,S,108.712,732.133
02/08/2020,  3,NI,T,F,0,98.2
02/08/2020,  3,NI,T,S,18.548,307.4
02/08/2020,  4,NI,I,F,207.46,273.829
02/08/2020,  4,NI,I,S,265.86,300.962
02/08/2020,  4,NI,P,F,97.822,571.133
02/08/2020,  4,NI,P,S,105.051,728.133
02/08/2020,  4,NI,T,F,0,98.2
02/08/2020,  4,NI,T,S,0,307.4
02/08/2020,  5,NI,I,F,212.375,273.445
02/08/2020,  5,NI,I,S,261.152,294.543
02/08/2020,  5,NI,P,F,110.426,569.133
02/08/2020,  5,NI,P,S,115.861,728.133
02/08/2020,  5,NI,T,F,0,98.2
02/08/2020,  5,NI,T,S,0,307.4
02/08/2020,  6,NI,I,F,206.005,273.534
02/08/2020,  6,NI,I,S,260.96,292.459
02/08/2020,  6,NI,P,F,103.526,581.133
02/08/2020,  6,NI,P,S,114.841,728.133
02/08/2020,  6,NI,T,F,0,98.2
02/08/2020,  6,NI,T,S,0,307.4
02/08/2020,  7,NI,I,F,197.25,273.197
02/08/2020,  7,NI,I,S,251.25,290.856
02/08/2020,  7,NI,P,F,110.982,547.133
02/08/2020,  7,NI,P,S,115.861,691.133
02/08/2020,  7,NI,T,F,0,98.2
02/08/2020,  7,NI,T,S,0,307.4
02/08/2020,  8,NI,I,F,123.054,215.1
02/08/2020,  8,NI,I,S,140.08,232.94
02/08/2020,  8,NI,P,F,77.439,571.133
02/08/2020,  8,NI,P,S,102.413,735.133
02/08/2020,  8,NI,T,F,0,98.2
02/08/2020,  8,NI,T,S,0,307.4
02/08/2020,  9,NI,I,F,157.033,212.833
02/08/2020,  9,NI,I,S,213.052,231.269
```

Restricted Reserves Amount by Source API

Description: API to return the restricted reserves amount by source for specific participants by reserve type/s. This is a restricted report that provides quantity and price - amount to be paid to each participant. This report is made available after System Operator processing within 8 business days following month end. As the processing of data requires the availability of other inputs i.e. pricing data, monthly data may occasionally be delayed.

URL:	**{EM6_URL}/res_amount_source/[from_trading_date][to_trading_date][island][reserve_class][power_type]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** - *Required*
to_trading_date	**21/07/2020** - *Required*
Island	**NI**, **SI** – *Optional blank for all*
Power_type	Interruptible Load **I**, Reserve **R** – *Optional blank for all*
Reserve_class	fast **F**, sustained **S** - *Optional blank for all*

Examples:

1. {em6_url}/res_amount_source/?from_trading_date=02/08/2020&to_trading_date=02/08/2020
2. {em6_url}/res_amount_source/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI
3. {em6_url}/res_amount_source/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&power_type=R
4. {em6_url}/res_amount_source/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&reserve_class=F

Truncated Reserve by Source Example Response:
{{em6_url}}/res_amount_source/?from_trading_date=01/12/2021&to_trading_date=01/12/2021


```
{
    "items": [
        {
            "partyid": "ABCD",
            "price_type": "F",
            "trading_date": "01/12/2021",
            "trading_period": 1,
            "islandid": "NI",
            "blockid": "XY2",
            "marketnodeid": "XY2",
            "power_type": "I",
            "sched_dispatch_type": "D",
            "reserve_class": "F",
            "reserve_qty": 2.3,
            "reserve_price": 0.89,
            "reserve_amount": 0.1035
        },
        {
            "partyid": "ABCD",
            "price_type": "F",
            "trading_date": "01/12/2021",
            "trading_period": 1,
            "islandid": "NI",
            "blockid": "XY2",
            "marketnodeid": "XY2",
            "power_type": "I",
            "sched_dispatch_type": "D",
            "reserve_class": "S",
            "reserve_qty": 5.4,
            "reserve_price": 0.23,
            "reserve_amount": 1.431
        },
        {
            "partyid": "ABCD",
            "price_type": "F",
            "trading_date": "01/12/2021",
            "trading_period": 1,
            "islandid": "SI",
            "blockid": "CLU",
            "marketnodeid": "CLU",
            "power_type": "R",
            "sched_dispatch_type": "D",
            "reserve_class": "S",
            "reserve_qty": 37,
            "reserve_price": 0.9,
            "reserve_amount": 19.25
        },
        {
            "partyid": "ABCD",
            "price_type": "F",
            "trading_date": "01/12/2021",
            "trading_period": 2,
            "islandid": "NI",
            "blockid": "XY2",
            "marketnodeid": "XY2",
            "power_type": "I",
            "sched_dispatch_type": "D",
            "reserve_class": "F",
            "reserve_qty": 1.3,
            "reserve_price": 0.11,
            "reserve_amount": 0.0715
        },
```

Restricted Reserves Amount by Source API csv

Description: API to return a csv download of the restricted reserves amount by source for specific participants by reserve type/s.

URL:	**{EM6_URL}/res_amount_source_csv/[from_trading_date][to_trading_date][island][reserve_class][power_type]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** - *Required*
to_trading_date	**21/07/2020** - *Required*
Island	**NI**, **SI** – *Optional blank for all*
Power_type	Interruptible Load **I**, Reserve **R** – *Optional blank for all*
Reserve_class	fast **F**, sustained **S** - *Optional blank for all*

Examples:

1. {em6_url}/res_amount_source_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020
2. {em6_url}/res_amount_source_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI
3. {em6_url}/res_amount_source_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&power_type=R
4. {em6_url}/res_amount_source_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&reserve_class=F

Truncated Reserve by Source Example csv Response:

{{em6_url}}/res_amount_source_csv/?from_trading_date=01/12/2021&to_trading_date=01/12/2021

```
Party,Trading Date,Trading Period,Island,Block,Market Node,Power Type,Quantity Type,Price Type,Reserve Class,Reserve Quantity (MW),Reserve Price ($/MWh),Reserve Amount(MWh*$/MWh)
ABCD,01/12/2021,1,NI,HR2,HR2,I,D,F,F,2.3,.09,.1035
ABCD,01/12/2021,1,NI,HR2,HR2,I,D,F,S,5.4,.53,1.431
ABCD,01/12/2021,1,SI,HRT,HRT,R,D,F,S,37,.5,9.25
ABCD,01/12/2021,10,NI,HR2,HR2,I,D,F,F,4,.09,.18
ABCD,01/12/2021,10,NI,HR2,HR2,I,D,F,S,5.4,.52,1.404
ABCD,01/12/2021,10,SI,HRT,HRT,R,D,F,S,34.2,.5,8.55
ABCD,01/12/2021,11,NI,HR2,HR2,I,D,F,F,3.2,.13,.208
ABCD,01/12/2021,11,NI,HR2,HR2,I,D,F,S,5.4,2.01,5.427
ABCD,01/12/2021,11,SI,HRT,HRT,R,D,F,S,34.5,1.94,33.465
ABCD,01/12/2021,12,NI,HR2,HR2,I,D,F,F,.1,.09,.0045
ABCD,01/12/2021,12,NI,HR2,HR2,I,D,F,S,5.3,.98,2.597
ABCD,01/12/2021,12,SI,HRT,HRT,R,D,F,F,.2,.07,.007
ABCD,01/12/2021,12,SI,HRT,HRT,R,D,F,S,28.9,.95,13.7275
ABCD,01/12/2021,13,NI,HR2,HR2,I,D,F,F,7.4,2.03,7.511
ABCD,01/12/2021,13,NI,HR2,HR2,I,D,F,S,5.3,.52,1.378
ABCD,01/12/2021,13,SI,HRT,HRT,R,D,F,F,26.2,1.57,20.567
ABCD,01/12/2021,13,SI,HRT,HRT,R,D,F,S,29,.5,7.25
ABCD,01/12/2021,14,NI,HR2,HR2,I,D,F,F,7.6,2.03,7.714
ABCD,01/12/2021,14,NI,HR2,HR2,I,D,F,S,5.6,2.01,5.628
ABCD,01/12/2021,14,SI,HRT,HRT,R,D,F,F,41.8,1.53,31.977
ABCD,01/12/2021,14,SI,HRT,HRT,R,D,F,S,44.8,1.89,42.336
ABCD,01/12/2021,15,NI,HR2,HR2,I,D,F,F,8.2,4.5,18.45
ABCD,01/12/2021,15,NI,HR2,HR2,I,D,F,S,6,2.01,6.03
ABCD,01/12/2021,15,SI,HRT,HRT,R,D,F,F,22,3.38,37.18
ABCD,01/12/2021,15,SI,HRT,HRT,R,D,F,S,22,1.89,20.79
ABCD,01/12/2021,16,NI,HR2,HR2,I,D,F,F,8.2,4.5,18.45
ABCD,01/12/2021,16,NI,HR2,HR2,I,D,F,S,5.9,2.01,5.9295
ABCD,01/12/2021,16,SI,HRT,HRT,R,D,F,F,22,3.38,37.18
ABCD,01/12/2021,16,SI,HRT,HRT,R,D,F,S,22,1.89,20.79
ABCD,01/12/2021,17,NI,HR2,HR2,I,D,F,F,8.2,4.5,18.45
ABCD,01/12/2021,17,NI,HR2,HR2,I,D,F,S,6,2.01,6.03
ABCD,01/12/2021,17,SI,HRT,HRT,R,D,F,F,22,3.38,37.18
ABCD,01/12/2021,17,SI,HRT,HRT,R,D,F,S,22,1.89,20.79
ABCD,01/12/2021,18,NI,HR2,HR2,I,D,F,F,11,5.06,27.83
ABCD,01/12/2021,18,NI,HR2,HR2,I,D,F,S,8.2,2.01,8.241
ABCD,01/12/2021,18,SI,HRT,HRT,R,D,F,F,22,3.81,41.91
ABCD,01/12/2021,18,SI,HRT,HRT,R,D,F,S,22,1.89,20.79
ABCD,01/12/2021,19,NI,HR2,HR2,I,D,F,F,11,5.06,27.83
ABCD,01/12/2021,19,NI,HR2,HR2,I,D,F,S,8.2,5.06,20.746
ABCD,01/12/2021,19,SI,HRT,HRT,R,D,F,F,22,3.81,41.91
ABCD,01/12/2021,19,SI,HRT,HRT,R,D,F,S,22,4.76,52.36
ABCD,01/12/2021,2,NI,HR2,HR2,I,D,F,F,1.3,.11,.0715
ABCD,01/12/2021,2,NI,HR2,HR2,I,D,F,S,5.9,1.55,4.5725
ABCD,01/12/2021,2,SI,HRT,HRT,R,D,F,S,37,1.46,27.01
ABCD,01/12/2021,20,NI,HR2,HR2,I,D,F,F,11.2,5.06,28.336
ABCD,01/12/2021,20,NI,HR2,HR2,I,D,F,S,8.3,5.06,20.999
ABCD,01/12/2021,20,SI,HRT,HRT,R,D,F,F,22,3.81,41.91
ABCD,01/12/2021,20,SI,HRT,HRT,R,D,F,S,22,4.76,52.36
ABCD,01/12/2021,21,NI,HR2,HR2,I,D,F,F,11.2,4.5,25.2
ABCD,01/12/2021,21,NI,HR2,HR2,I,D,F,S,8.3,5.06,20.999
```

Restricted Reserves Extract API

Description: API to return the restricted reserves extract by source for specific participants by reserve type/s.

URL:	**{EM6_URL}/reserves_extract/[from_trading_date][to_trading_date] [island][reserve_class][power_type]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** - *Required*
to_trading_date	**21/07/2020** - *Required*
Island	**NI**, **SI** – *Optional blank for all*
Power_type	Interruptible Load **I**, Reserve **R** – *Optional blank for all*
Reserve_class	fast **F**, sustained **S** - *Optional blank for all*

Examples:

1. {em6_url}/reserves_extract/?from_trading_date=02/08/2020&to_trading_date=02/08/2020
2. {em6_url}/reserves_extract/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI
3. {em6_url}/reserves_extract/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&power_type=R
4. {em6_url}/reserves_extract/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&reserve_class=F

Truncated Reserve Extract Example Response:

{{em6_url}}/reserves_extract/?from_trading_date=01/12/2021&to_trading_date=01/12/2021&island=NI&power_type=I&reserve_class=S


```
{
    "items": [
        {
            "partyid": "ABCD",
            "blockid": "CE1",
            "price_type": "F",
            "trading_date": "01/12/2021",
            "trading_period": 1,
            "power_type": "I",
            "reserve_class": "S",
            "islandid": "NI",
            "reserve_qty": 5.4,
            "reserve_price": 0.53,
            "reserve_amount": 1.431
        },
        {
            "partyid": "ABCD",
            "blockid": "CE1",
            "price_type": "F",
            "trading_date": "01/12/2021",
            "trading_period": 2,
            "power_type": "I",
            "reserve_class": "S",
            "islandid": "NI",
            "reserve_qty": 5.9,
            "reserve_price": 1.55,
            "reserve_amount": 4.5725
        },
        {
            "partyid": "ABCD",
            "blockid": "CE1",
            "price_type": "F",
            "trading_date": "01/12/2021",
            "trading_period": 3,
            "power_type": "I",
            "reserve_class": "S",
            "islandid": "NI",
            "reserve_qty": 5.9,
            "reserve_price": 2.01,
            "reserve_amount": 5.9295
        },
```

Restricted Reserves Extract API csv

Description: API to return a csv download of the restricted reserves extract for specific participants by reserve type/s. This is a restricted report of the quantities and final prices, by reserve type and class. This report is made available after System Operator processing within 8 business days following month end. As the processing of data requires the availability of other inputs i.e. pricing data, monthly data may occasionally be delayed

URL:	**{EM6_URL}/reserves_extract_csv/[from_trading_date][to_trading_date][island][reserve_class][power_type]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** - *Required*
to_trading_date	**21/07/2020** - *Required*
Island	**NI**, **SI** – *Optional blank for all*
Power_type	Interruptible Load **I**, Reserve **R** – *Optional blank for all*
Reserve_class	fast **F**, sustained **S** - *Optional blank for all*

Examples:

1. {em6_url}/reserves_extract_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020
2. {em6_url}/reserves_extract_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI
3. {em6_url}/reserves_extract_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&power_type=R
4. {em6_url}/reserves_extract_csv/?from_trading_date=02/08/2020&to_trading_date=02/08/2020&island=NI&reserve_class=F

Truncated Reserve Extract Example csv Response: {{em6_url}}/reserves_extract_csv/?from_trading_date=01/12/2021&to_trading_date=01/12/2021&island=NI&power_type=I&reserve_class=F

```
Party,Block,Pricing Run Type,Trading Date,Trading Period,Power Type,Reserve Class,Island,Averaged Quantity (MW),Price ($/MWh),Amount ($)
ABCD,CE1,F,01/12/2021,1,I,F,NI,2.3,0.09,0.1035
ABCD,CE1,F,01/12/2021,10,I,F,NI,4,0.09,0.1800
ABCD,CE1,F,01/12/2021,11,I,F,NI,3.2,0.13,0.2080
ABCD,CE1,F,01/12/2021,12,I,F,NI,.1,0.09,0.0045
ABCD,CE1,F,01/12/2021,13,I,F,NI,7.4,2.03,7.5110
ABCD,CE1,F,01/12/2021,14,I,F,NI,7.6,2.03,7.7140
ABCD,CE1,F,01/12/2021,15,I,F,NI,8.2,4.50,18.4500
ABCD,CE1,F,01/12/2021,16,I,F,NI,8.2,4.50,18.4500
ABCD,CE1,F,01/12/2021,17,I,F,NI,8.2,4.50,18.4500
ABCD,CE1,F,01/12/2021,18,I,F,NI,11,5.06,27.8300
ABCD,CE1,F,01/12/2021,19,I,F,NI,11,5.06,27.8300
ABCD,CE1,F,01/12/2021,2,I,F,NI,1.3,0.11,0.0715
ABCD,CE1,F,01/12/2021,20,I,F,NI,11.2,5.06,28.3360
ABCD,CE1,F,01/12/2021,21,I,F,NI,11.2,4.50,25.2000
ABCD,CE1,F,01/12/2021,22,I,F,NI,11.2,4.50,25.2000
ABCD,CE1,F,01/12/2021,23,I,F,NI,11.1,4.50,24.9750
ABCD,CE1,F,01/12/2021,24,I,F,NI,11.1,4.50,24.9750
ABCD,CE1,F,01/12/2021,25,I,F,NI,11.6,4.50,26.1000
ABCD,CE1,F,01/12/2021,26,I,F,NI,11.6,4.50,26.1000
ABCD,CE1,F,01/12/2021,27,I,F,NI,10.8,4.50,24.3000
ABCD,CE1,F,01/12/2021,28,I,F,NI,10.8,10.06,54.3240
ABCD,CE1,F,01/12/2021,29,I,F,NI,10.8,4.50,24.3000
ABCD,CE1,F,01/12/2021,3,I,F,NI,7,0.11,0.3850
ABCD,CE1,F,01/12/2021,30,I,F,NI,11.2,4.50,25.2000
ABCD,CE1,F,01/12/2021,31,I,F,NI,11.2,4.50,25.2000
ABCD,CE1,F,01/12/2021,32,I,F,NI,11.2,4.50,25.2000
ABCD,CE1,F,01/12/2021,33,I,F,NI,11,10.06,55.3300
ABCD,CE1,F,01/12/2021,34,I,F,NI,11,11.00,60.5000
ABCD,CE1,F,01/12/2021,35,I,F,NI,11,11.00,60.5000
ABCD,CE1,F,01/12/2021,36,I,F,NI,11.1,4.50,24.9750
ABCD,CE1,F,01/12/2021,37,I,F,NI,11.1,4.50,24.9750
ABCD,CE1,F,01/12/2021,38,I,F,NI,11.1,4.50,24.9750
ABCD,CE1,F,01/12/2021,39,I,F,NI,11.1,4.50,24.9750
ABCD,CE1,F,01/12/2021,4,I,F,NI,8.2,0.13,0.5330
ABCD,CE1,F,01/12/2021,40,I,F,NI,11.1,4.50,24.9750
ABCD,CE1,F,01/12/2021,41,I,F,NI,11,4.50,24.7500
ABCD,CE1,F,01/12/2021,42,I,F,NI,11,4.50,24.7500
ABCD,CE1,F,01/12/2021,43,I,F,NI,11,5.06,27.8300
ABCD,CE1,F,01/12/2021,44,I,F,NI,11.3,4.50,25.4250
ABCD,CE1,F,01/12/2021,45,I,F,NI,11.2,4.50,25.2000
ABCD,CE1,F,01/12/2021,46,I,F,NI,11.2,4.50,25.2000
ABCD,CE1,F,01/12/2021,47,I,F,NI,10.9,6.65,36.2425
ABCD,CE1,F,01/12/2021,48,I,F,NI,10.9,4.50,24.5250
ABCD,CE1,F,01/12/2021,5,I,F,NI,8.2,0.65,2.6650
ABCD,CE1,F,01/12/2021,6,I,F,NI,7.8,0.65,2.5350
ABCD,CE1,F,01/12/2021,7,I,F,NI,7.3,0.65,2.3725
ABCD,CE1,F,01/12/2021,8,I,F,NI,7.3,0.65,2.3725
ABCD,CE1,F,01/12/2021,9,I,F,NI,7.2,0.65,2.3400
```

Arc Flows API

Description: API to return the MW flows scheduled along an arc in the transmission network created by the Transpower SPD application for a single trading date.

URL:	**{EM6_URL}/arc_flows/[trading_date] [run_type] [arc_id]**
Method:	GET
Query parameters:	
Trading_date	**21/07/2020** - *Required*
Run_type	Provisional **V,** Interim **T,** Final **F** – *Optional blank for most recent run type*
Arc_id	Text search for ARC_ID: **ALB_HEN1.1** or **ALB_HEN** or **ALB** – *Optional blank for all*

Examples:

1. {em6_url}/arc_flows/?trading_date=02/03/2020
2. {em6_url}/arc_flows/?trading_date=02/03/2020&run_type=T
3. {em6_url}/arc_flows/?trading_date=02/03/2020&run_type=F
4. {em6_url}/arc_flows/?trading_date=02/03/2020&run_type=F&arc_id=ALB

Truncated Arc Flow Example Response:

{em6_url}/arc_flows/?trading_date=02/03/2018&run_type=F&arc_id=ALB


```
{
    "items": [
        {
            "arc_id": "ALB_HEN1.1",
            "trading_date": "2018-03-01T11:00:00Z",
            "trading_period": 1,
            "run_type": "F",
            "flow_into_arc": 2.677,
            "flow_out_of_arc": 2.669,
            "shadow_price": 0,
            "run_time": "2018-03-02T18:37:24Z",
            "mwmax": 105.08
        },
        {
            "arc_id": "ALB_HEN1.1",
            "trading_date": "2018-03-01T11:00:00Z",
            "trading_period": 2,
            "run_type": "F",
            "flow_into_arc": 2.269,
            "flow_out_of_arc": 2.263,
            "shadow_price": 0,
            "run_time": "2018-03-02T18:37:24Z",
            "mwmax": 105.08
        },
        {
            "arc_id": "ALB_HEN1.1",
            "trading_date": "2018-03-01T11:00:00Z",
            "trading_period": 3,
            "run_type": "F",
            "flow_into_arc": 2.33,
            "flow_out_of_arc": 2.324,
            "shadow_price": 0,
            "run_time": "2018-03-02T18:37:24Z",
            "mwmax": 105.08
        },
        {
            "arc_id": "ALB_HEN1.1",
            "trading_date": "2018-03-01T11:00:00Z",
            "trading_period": 4,
            "run_type": "F",
            "flow_into_arc": 2.18,
            "flow_out_of_arc": 2.175,
            "shadow_price": 0,
            "run_time": "2018-03-02T18:37:24Z",
            "mwmax": 105.08
        },
```

Arc Flows API csv

Description: API to return a csv download of the MW flows scheduled along an arc in the transmission network created by the Transpower SPD application for a single trading date. This service describes the MW flow scheduled along an arc in the transmission network.

This information is created by the market system and transferred to em6, once a Final or Provisional schedule has resolved the day after each market day. This data will be available at end of every final and provisional pricing schedule.

URL:	**{EM6_URL}/arc_flows_csv/[trading_date] [run_type] [arc_id]**
Method:	GET
Query parameters:	
Trading_date	**21/07/2020** - *Required*
Run_type	Provisional **V,** Interim **T,** Final **F** – *Optional blank for most recent run type*
Arc_id	Text search for ARC_ID: **ALB_HEN1.1** or **ALB_HEN** or **ALB** – *Optional blank for all*

Examples:

1. {em6_url}/arc_flows_csv/?trading_date=02/03/2020
2. {em6_url}/ arc_flows_csv/?trading_date=02/03/2020&run_type=T
3. {em6_url}/ arc_flows_csv/?trading_date=02/03/2020&run_type=F
4. {em6_url}/ arc_flows_csv/?trading_date=02/03/2020&run_type=F&arc_id=ALB

Truncated Arc Flow Example csv Response:

{em6_url}/arc_flows_csv/?trading_date=29/03/2018&run_type=T

```
Arc ID,Trading Date,Trading Period,Run Type,Flow In,Flow Out,Shadow Price,Run
Time,MW Max
ABY_MXT1.MXT1,22/06/2020,  1,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  2,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  3,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  4,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  5,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  6,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  7,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  8,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020,  9,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 10,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 11,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 12,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 13,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 14,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 15,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 16,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 17,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 18,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 19,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 20,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 21,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 22,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 23,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 24,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 25,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 26,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 27,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 28,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 29,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 30,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 31,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 32,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 33,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 34,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 35,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 36,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 37,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 38,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 39,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 40,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 41,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 42,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 43,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 44,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 45,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 46,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 47,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_MXT1.MXT1,22/06/2020, 48,F,0,0,0,26/06/2020 11:35:42,17.61
ABY_T2.T2,22/06/2020,  1,F,2.56,2.554,0,26/06/2020 11:35:42,11.29
ABY_T2.T2,22/06/2020,  2,F,2.383,2.377,0,26/06/2020 11:35:42,11.29
ABY_T2.T2,22/06/2020,  3,F,2.311,2.305,0,26/06/2020 11:35:42,11.29
```

SCADA Load API

Description: API to return the 30 minute SCADA load by node. The MW load of SCADA data at each node in the transmission network as captured by the Remote Terminal Units and transmitted to the em6 application.

The 10 min is the most recent of the three SCADA readings taken each half hour. The SCADA load data is the average of these three 10 min readings.

URL:	**{EM6_URL}/scada_load/[node_id][from_trading_date] [to_trading_date] [site_id] [grid_zone_id]**
Method:	GET
Query parameters:	
Node_id	**HAY0111** [CSV] - *Optional blank for all load nodes*
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Site_id	**HAY** – *Optional blank for all*
Grid_zone_id	**7** – *Optional blank for all*

Examples:

1. {em6_url}/scada_load/?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/scada_load/HAY0111?from_trading_date=30/07/2020&to_trading_date=30/07/2020
3. {em6_url}/scada_load/HAY0111,CPK0331,ALB0331?from_trading_date=30/07/2020&to_trading_date=30/07/2020
4. {em6_url}/scada_load/?grid_zone=7&from_trading_date=30/07/2020&to_trading_date=30/07/2020
5. {em6_url}/scada_load/?site_id=PEN&from_trading_date=30/07/2020&to_trading_date=30/07/2020

Truncated SCADA Load Example Response:

{em6_url}/scada_load/HAY0111?from_trading_date=30/07/2020&to_trading_date=30/07/2020


```
{
    "items": [
        {
            "country": "NZ",
            "island": "NI",
            "node_id": "HAY0111",
            "node_name": "Haywards",
            "trading_date": "30/07/2020",
            "mean_energy_mw": 11.1458,
            "daily_energy_mw": 267.499,
            "tp1_mw": 8.401,
            "tp2_mw": 8.016,
            "tp3_mw": 7.711,
            "tp4_mw": 7.489,
            "tp5_mw": 7.426,
            "tp6_mw": 7.382,
            "tp7_mw": 7.447,
            "tp8_mw": 7.62,
            "tp9_mw": 7.642,
            "tp10_mw": 7.92,
            "tp11_mw": 8.474,
            "tp12_mw": 9.477,
            "tp13_mw": 11.139,
            "tp14_mw": 12.921,
            "tp15_mw": 14.278,
            "tp16_mw": 15.212,
            "tp17_mw": 15.257,
            "tp18_mw": 14.287,
            "tp19_mw": 13.33,
            "tp20_mw": 12.669,
            "tp21_mw": 11.71,
            "tp22_mw": 11.428,
            "tp23_mw": 10.943,
            "tp24_mw": 10.397,
            "tp25_mw": 9.881,
            "tp26_mw": 9.538,
            "tp27_mw": 8.953,
            "tp28_mw": 8.537,
            "tp29_mw": 8.459,
            "tp30_mw": 8.756,
            "tp31_mw": 9.462,
            "tp32_mw": 9.902,
            "tp33_mw": 10.678,
            "tp34_mw": 11.762,
            "tp35_mw": 13.411,
            "tp36_mw": 15.591,
            "tp37_mw": 16.037,
            "tp38_mw": 16.122,
            "tp39_mw": 15.912,
            "tp40_mw": 15.668,
            "tp41_mw": 15.319,
            "tp42_mw": 14.377,
            "tp43_mw": 13.802,
            "tp44_mw": 12.728,
            "tp45_mw": 11.681,
            "tp46_mw": 10.648,
            "tp47_mw": 10.02,
            "tp48_mw": 9.178,
            "tp49_mw": null,
            "tp50_mw": null
        }
    ],
```

SCADA Load API csv

Description: API to return a csv download of the 30 minute SCADA load by node.

URL:	**{EM6_URL}/scada_load_csv/[node_id][from_trading_date] [to_trading_date] [site_id] [grid_zone_id]**
Method:	GET
Query parameters:	
Node_id	**HAY0111** [CSV] - *Optional blank for all load nodes*
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Site_id	**HAY** – *Optional blank for all*
Grid_zone_id	**7** – *Optional blank for all*

Examples:

1. {em6_url}/scada_load_csv/?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/scada_load_csv /HAY0111?from_trading_date=30/07/2020&to_trading_date=30/07/2020
3. {em6_url}/scada_load_csv /HAY0111,CPK0331,ALB0331?from_trading_date=30/07/2020&to_trading_date=30/07/2020
4. {em6_url}/scada_load_csv /?grid_zone=7&from_trading_date=30/07/2020&to_trading_date=30/07/2020
5. {em6_url}/scada_load_csv /?site_id=PEN&from_trading_date=30/07/2020&to_trading_date=30/07/2020

Truncated SCADA Load Example csv Response:

{em6_url}/scada_load_csv/HAY0111,GOR0331?from_trading_date=30/07/2020&to_trading_date=30/07/2020

```
Country,Island,Node Id,Node Name,Trading Date,MEAN Energy,Daily
ENERGY,TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15,TP
16,TP17,TP18,TP19,TP20,TP21,TP22,TP23,TP24,TP25,TP26,TP27,TP28,TP29,TP30,TP
31,TP32,TP33,TP34,TP35,TP36,TP37,TP38,TP39,TP40,TP41,TP42,TP43,TP44,TP45,TP
46,TP47,TP48,TP49,TP50
NZ,NI,HAY0111,Haywards,30/07/2020,11.1458,267.499,8.401,8.016,7.711,7.489,7
.426,7.382,7.447,7.62,7.642,7.92,8.474,9.477,11.139,12.921,14.278,15.212,15
.257,14.287,13.33,12.669,11.71,11.428,10.943,10.397,9.881,9.538,8.953,8.537
,8.459,8.756,9.462,9.902,10.678,11.762,13.411,15.591,16.037,16.122,15.912,1
5.668,15.319,14.377,13.802,12.728,11.681,10.648,10.02,9.178,,
NZ,SI,GOR0331,Gore,30/07/2020,19.6041,470.4995,16.838,16.287,15.589,14.91,1
4.338,13.747,13.542,13.34,13.507,13.398,14.1,15.132,16.569,18.612,20.777,22
.787,24.18,23.911,23.064,22.593,22.12,22.133,21.673,21.88,21.858,21.418,21.
917,21.452,21.069,20.16,20.218,20.756,20.809,21.787,22.603,24.192,24.487,23
.937,23.482,22.853,21.9,21.218,19.947,18.956,17.922,16.351,18.838,17.842,,
```

SCADA Generation API

Description: API to return the 30 minute SCADA generation by node. This API does not contain restricted TRUSTPOWER LIMITED generation nodes.

The MW generation of SCADA data at each node in the transmission network as captured by the Remote Terminal Units and transmitted to the em6 application.

The 10 min is the most recent of the three SCADA readings taken each half hour. The SCADA generation data is the average of these three 10 min readings.

URL:	**{EM6_URL}/scada_generation/[node_id][from_trading_date] [to_trading_date] [site_id] [grid_zone_id] [generation_type_id]**
Method:	GET
Query parameters:	
Node_id	**WIL0331 MCK0** [CSV] - *Optional blank for all generation nodes*
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Site_id	**WIL** – *Optional blank for all*
Grid_zone_id	**7** – *Optional blank for all*
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*

Examples:

1. {em6_url}/scada_ generation/?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/scada_ generation/HAY0111?from_trading_date=30/07/2020&to_trading_date=30/07/2020
3. {em6_url}/scada_generation/WIL0331 MCK0?from_trading_date=30/07/2020&to_trading_date=30/07/2020
4. {em6_url}/scada_generation/?grid_zone=7&from_trading_date=30/07/2020&to_trading_date=30/07/2020
5. {em6_url}/scada_generation/?site_id=BEN&from_trading_date=30/07/2020&to_trading_date=30/07/2020
6. {em6_url}/scada_generation/?generation_type_id=HYD&from_trading_date=30/07/2020&to_trading_date=30/07/2020

Truncated SCADA Generation Example Response: {em6_url}/scada_generation/WIL0331 MCK0?from_trading_date=4/08/2020&to_trading_date=4/08/2020


```
{
    "items": [
        {
            "country": "NZ",
            "island": "NI",
            "node_id": "WIL0331 MCK0",
            "node_name": "Mill Creek",
            "trading_date": "04/08/2020",
            "mean_energy_mw": 42.6991,
            "daily_energy_mw": 1024.7775,
            "tp1_mw": 33.174,
            "tp2_mw": 34.515,
            "tp3_mw": 34.535,
            "tp4_mw": 38.817,
            "tp5_mw": 41.827,
            "tp6_mw": 41.34,
            "tp7_mw": 44.101,
            "tp8_mw": 44.646,
            "tp9_mw": 42.413,
            "tp10_mw": 39.998,
            "tp11_mw": 39.741,
            "tp12_mw": 46.742,
            "tp13_mw": 50.866,
            "tp14_mw": 45.629,
            "tp15_mw": 47.042,
            "tp16_mw": 44.139,
            "tp17_mw": 41.419,
            "tp18_mw": 40.498,
            "tp19_mw": 42.058,
            "tp20_mw": 46.199,
            "tp21_mw": 40.208,
            "tp22_mw": 41.911,
            "tp23_mw": 42.629,
            "tp24_mw": 35.94,
            "tp25_mw": 37.807,
            "tp26_mw": 45.753,
            "tp27_mw": 47.172,
            "tp28_mw": 45.864,
            "tp29_mw": 45.24,
            "tp30_mw": 45.154,
            "tp31_mw": 47.603,
            "tp32_mw": 50.729,
            "tp33_mw": 50.618,
            "tp34_mw": 45.927,
            "tp35_mw": 46.974,
            "tp36_mw": 45.576,
            "tp37_mw": 46.858,
            "tp38_mw": 46.997,
            "tp39_mw": 41.41,
            "tp40_mw": 41.569,
            "tp41_mw": 46.372,
            "tp42_mw": 43.59,
            "tp43_mw": 35.071,
            "tp44_mw": 31.806,
            "tp45_mw": 34.466,
            "tp46_mw": 37.507,
            "tp47_mw": 42.265,
            "tp48_mw": 46.84,
            "tp49_mw": null,
            "tp50_mw": null
        }
    ],
```

Restricted SCADA Generation API

Description: API to return the 30 minute SCADA generation by node that includes restricted MANAWA ENERGY LIMITED (previously TRUSTPOWER LIMITED) generation nodes.

URL:	**{EM6_URL}/scada_generation/[node_id][from_trading_date] [to_trading_date] [site_id] [grid_zone_id] [generation_type_id][party_id]**
Method:	GET
Query parameters:	
Node_id	**WIL0331 MCK0** [CSV] – *Optional blank for all generation nodes*
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Site_id	**WIL** – *Optional blank for all*
Grid_zone_id	**7** – *Optional blank for all*
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*
Party_id	**TRUS –** *Optional only Trustpower can request this. If other generators became restricted, the same method would apply*

Examples:

1. {em6_url}/scada_ generation/?from_trading_date=30/07/2020&to_trading_date=30/07/2020&party_id=TRUS
2. {em6_url}/scada_generation/?generation_type_id=WIN&from_trading_date=30/07/2020&to_ trading_date=30/07/2020&party_id=TRUS

Restricted MANAWA ENERGY LIMITED (previously TRUSTPOWER LIMITED) generation nodes:

BPE0331 TWF0	Tararua Wind Farm II	Wind
HWB0331 MAH0	Waipori B	Wind
KUM0661 KUM0	Kumara	Hydro
LTN0331 TWF0	Tararua I	Wind
NSY0331 PAE0	Paerau	Hydro
TGA0331 KMI0	Kaimai 5	Hydro
TWC2201 TWF0	Tararua III	Wind

Truncated **Restricted** SCADA Generation Example Response: {em6_url}/scada_generation/BPE0331TWF0?from_trading_date=30/07/2020&to_trading_date=30/07/2020&party_id=TRUS


```
{
    "items": [
        {
            "country": "NZ",
            "island": "NI",
            "node_id": "BPE0331 TWF0",
            "node_name": "Tararua Wind Farm 2",
            "trading_date": "13/08/2020",
            "mean_energy_mw": 0.8139,
            "daily_energy_mw": 19.5345,
            "tp1_mw": 0.573,
            "tp2_mw": 0.216,
            "tp3_mw": 0.03,
            "tp4_mw": 0,
            "tp5_mw": 0,
            "tp6_mw": 0,
            "tp7_mw": 0,
            "tp8_mw": 0,
            "tp9_mw": 0,
            "tp10_mw": 0,
            "tp11_mw": 0.005,
            "tp12_mw": 0.021,
            "tp13_mw": 0.139,
            "tp14_mw": 0.063,
            "tp15_mw": 1.086,
            "tp16_mw": 2.035,
            "tp17_mw": 2.438,
            "tp18_mw": 1.699,
            "tp19_mw": 2.596,
            "tp20_mw": 0.584,
            "tp21_mw": 0.013,
            "tp22_mw": 0.138,
            "tp23_mw": 0.68,
            "tp24_mw": 2.136,
            "tp25_mw": 3.509,
            "tp26_mw": 1.775,
            "tp27_mw": 1.923,
            "tp28_mw": 2.002,
            "tp29_mw": 2.307,
            "tp30_mw": 1.952,
            "tp31_mw": 1.74,
            "tp32_mw": 0.78,
            "tp33_mw": 0.731,
            "tp34_mw": 0.03,
            "tp35_mw": 0.022,
            "tp36_mw": 0.008,
            "tp37_mw": 0.01,
            "tp38_mw": 0.01,
            "tp39_mw": 0.01,
            "tp40_mw": 0.01,
            "tp41_mw": 0.01,
            "tp42_mw": 0.01,
            "tp43_mw": 0.025,
            "tp44_mw": 0.405,
            "tp45_mw": 1.696,
            "tp46_mw": 1.651,
            "tp47_mw": 2.085,
            "tp48_mw": 1.916,
            "tp49_mw": null,
            "tp50_mw": null
        }
    ],
```

SCADA Generation API csv

Description: API to return a csv download of the 30 minute SCADA generation by node. This API does not contain restricted TRUSTPOWER LIMITED generation nodes.

URL:	**{EM6_URL}/scada_generation_csv/[node_id][from_trading_date] [to_trading_date] [site_id] [grid_zone_id] [generation_type_id]**
Method:	GET
Query parameters:	
Node_id	**WIL0331 MCK0** [CSV] - *Optional blank for all generation nodes*
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Site_id	**WIL** – *Optional blank for all*
Grid_zone_id	**7** – *Optional blank for all*
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*

Examples:

1. {em6_url}/scada_ generation_csv/?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/scada_ generation_csv /HAY0111?from_trading_date=30/07/2020&to_trading_date=30/07/2020
3. {em6_url}/scada_generation_csv /WIL0331 MCK0?from_trading_date=30/07/2020&to_trading_date=30/07/2020
4. {em6_url}/scada_generation_csv /?grid_zone=7&from_trading_date=30/07/2020&to_trading_date=30/07/2020
5. {em6_url}/scada_generation_csv /?site_id=BEN&from_trading_date=30/07/2020&to_trading_date=30/07/2020
6. {em6_url}/scada_generation_csv /?generation_type_id=HYD&from_trading_date=30/07/2020&to_trading_date=30/07/2020

Truncated SCADA Generation Example csv Response: {em6_url}/scada_generation/WIL0331 MCK0?from_trading_date=4/08/2020&to_trading_date=4/08/2020

```
Country,Island,Node Id,Node Name,Trading Date,MEAN Energy,Daily
ENERGY,TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15,TP16,T
P17,TP18,TP19,TP20,TP21,TP22,TP23,TP24,TP25,TP26,TP27,TP28,TP29,TP30,TP31,TP32,
TP33,TP34,TP35,TP36,TP37,TP38,TP39,TP40,TP41,TP42,TP43,TP44,TP45,TP46,TP47,TP48
,TP49,TP50
NZ,NI,WIL0331 MCK0,Mill
Creek,04/08/2020,42.6991,1024.7775,33.174,34.515,34.535,38.817,41.827,41.34,44.
101,44.646,42.413,39.998,39.741,46.742,50.866,45.629,47.042,44.139,41.419,40.49
8,42.058,46.199,40.208,41.911,42.629,35.94,37.807,45.753,47.172,45.864,45.24,45
.154,47.603,50.729,50.618,45.927,46.974,45.576,46.858,46.997,41.41,41.569,46.37
2,43.59,35.071,31.806,34.466,37.507,42.265,46.84,,
```

SCADA HVDC API

Description: API to return the 30 minute SCADA HVDC flows. The MW HVDC of SCADA data at each HVDC node in the transmission network as captured by the Remote Terminal Units and transmitted to the em6 application.

The 10 min is the most recent of the three SCADA readings taken each half hour. The SCADA HVDC data is the average of these three 10 min readings.

URL:	**{EM6_URL}/scada_hvdc/[from_trading_date] [to_trading_date][net_flow_nodes]**
Method:	GET
Query parameters:	
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Net_flow_nodes	**DCN3501, DCS3501 –** *Optional nodes used to request net flow only*

Examples:

1. {em6_url}/scada_ hvdc/?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/scada_ hvdc/?from_trading_date=25/07/2020&to_trading_date=30/07/2020
3. {em6_url}/scada_ hvdc/DCN3501,DCS3501?from_trading_date=25/07/2020&to_trading_date=30/07/2020

Truncated SCADA HVDC Example Response:

{em6_url}/scada_hvdc/?from_trading_date=23/07/2020&to_trading_date=23/07/2020


```
{
    "items": [
        {
            "country": "NZ",
            "island": "NI",
            "node_id": "DCN3502",
            "node_name": "Haywards Pole 2",
            "trading_date": "23/07/2020",
            "mean_energy_mw": -36.774,
            "daily_energy_mw": -882.576,
            "tp1_mw": 157.84,
        },
        {
            "country": "NZ",
            "island": "NI",
            "node_id": "DCN3503",
            "node_name": "Haywards Pole 3",
            "trading_date": "23/07/2020",
            "mean_energy_mw": -65.5103,
            "daily_energy_mw": -1572.2475,
            "tp1_mw": 32.894,
            "tp2_mw": 131.847,
        },
        {
            "country": "NZ",
            "island": "NI",
            "node_id": "HVDCN",
            "node_name": "Haywards Net Flow",
            "trading_date": "23/07/2020",
            "mean_energy_mw": 102.2843,
            "daily_energy_mw": 2454.822,
            "tp1_mw": -190.734,
            "tp2_mw": -259.642,
        },
        {
            "country": "NZ",
            "island": "SI",
            "node_id": "DCS3502",
            "node_name": "Benmore Pole 2",
            "trading_date": "23/07/2020",
            "mean_energy_mw": 38.3263,
            "daily_energy_mw": 919.831,
            "tp1_mw": -155.069,
            "tp2_mw": -125.982,
        },
        {
            "country": "NZ",
            "island": "SI",
            "node_id": "DCS3503",
            "node_name": "Benmore Pole 3",
            "trading_date": "23/07/2020",
            "mean_energy_mw": 67.536,
            "daily_energy_mw": 1620.8645,
            "tp1_mw": -32.638,
            "tp2_mw": -131.069,
        },
        {
            "country": "NZ",
            "island": "SI",
            "node_id": "HVDCS",
            "node_name": "Benmore Net Flow",
            "trading_date": "23/07/2020",
            "mean_energy_mw": -105.8623,
            "daily_energy_mw": -2540.6945,
            "tp1_mw": 187.707,
            "tp2_mw": 257.051,

        }
    ],
```

SCADA HVDC API csv

Description: API to return a csv download of the 30 minute SCADA HVDC flows.

URL:	**{EM6_URL}/scada_hvdc_csv/[from_trading_date] [to_trading_date][net_flow_nodes]**
Method:	GET
Query parameters:	
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Net_flow_nodes	**DCN3501, DCS3501 –** *Optional nodes used to request net flow only*

Examples:

1. {em6_url}/scada_ hvdc_**csv** /?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/scada_ hvdc_**csv** /?from_trading_date=25/07/2020&to_trading_date=30/07/2020
3. {em6_url}/scada_ hvdc_**csv** /DCN3501,DCS3501?from_trading_date=25/07/2020&to_trading_date=30/07/2020

Truncated SCADA HVDC Example csv Response:

{em6_url}/scada_hvdc_csv/?from_trading_date=23/07/2020&to_trading_date=23/07/2020

```
Country,Island,Node Id,Node Name,Trading Date,MEAN Energy,Daily
ENERGY,TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15,TP16,T
P17,TP18,TP19,TP20,TP21,TP22,TP23,TP24,TP25,TP26,TP27,TP28,TP29,TP30,TP31,TP32,
TP33,TP34,TP35,TP36,TP37,TP38,TP39,TP40,TP41,TP42,TP43,TP44,TP45,TP46,TP47,TP48
,TP49,TP50
NZ,NI,DCN3502,Haywards Pole 2,23/07/2020,-36.774,-
882.576,157.84,127.794,156.038,147.459,156.236,149.99,150.097,162.892,146.863,1
31.441,132.891,144.432,65.922,10.047,-76.729,-149.353,-187.968,-187.551,-
155.646,-145.831,-146.836,-158.938,-153.185,-154.794,-159.287,-156.247,-
130.671,-123.049,-119.504,-115.913,-112.386,-123.643,-57.6,-.002,-54.574,-
159.777,-158.91,-145.097,-133.28,-125.57,-130.055,-117.536,-99.024,-.015,-
.015,10.809,58.168,64.915,,
NZ,NI,DCN3503,Haywards Pole 3,23/07/2020,-65.5103,-
1572.2475,32.894,131.847,160.685,151.808,160.688,154.379,154.62,167.539,151.086
,135.492,80.075,.045,-18.923,-77.448,-136.252,-147.724,-185.941,-185.66,-
153.774,-143.882,-144.702,-156.893,-151.454,-152.935,-157.357,-154.405,-
128.999,-121.478,-117.859,-114.398,-110.81,-121.97,-149.17,-175.131,-156.624,-
158.012,-157.153,-143.24,-131.583,-123.866,-128.208,-115.926,-121.254,-
165.424,-117.008,-61.3,-35.805,-3.085,,
NZ,NI,HVDCN,Haywards Net Flow,23/07/2020,102.2843,2454.822,-190.734,-259.642,-
316.723,-299.268,-316.924,-304.369,-304.717,-330.431,-297.949,-266.933,-
212.966,-144.478,-
46.999,67.401,212.981,297.078,373.909,373.21,309.42,289.713,291.538,315.832,304
.638,307.729,316.644,310.652,259.67,244.528,237.363,230.311,223.197,245.613,206
.77,175.132,211.198,317.789,316.063,288.337,264.863,249.436,258.263,233.462,220
.277,165.439,117.023,50.491,-22.363,-61.83,,
NZ,SI,DCS3502,Benmore Pole 2,23/07/2020,38.3263,919.831,-155.069,-125.982,-
153.581,-145.231,-153.758,-147.698,-147.753,-160.211,-144.432,-129.406,-
130.672,-142.117,-65.03,-
9.907,77.493,151.393,191.131,190.553,157.666,147.627,148.669,161.066,155.242,15
6.847,161.547,158.364,132.217,124.216,120.702,116.984,113.252,124.83,58.033,.05
6,54.26,161.856,160.993,146.621,134.586,126.676,131.397,118.516,99.762,.018,.01
8,-10.593,-57.438,-64.051,,
NZ,SI,DCS3503,Benmore Pole 3,23/07/2020,67.536,1620.8645,-32.638,-131.069,-
159.308,-150.499,-159.18,-153.071,-153.23,-165.984,-149.76,-134.464,-79.659,-
.099,19.017,78.411,138.829,150.508,190.078,189.643,156.604,146.515,147.333,160.
174,154.329,155.888,160.689,157.476,131.417,123.538,119.945,116.308,112.484,123
.999,152.192,179.126,160.651,161.049,160.124,145.811,133.695,125.589,130.332,11
7.61,123.061,168.674,118.812,61.625,36.085,3.069,,
NZ,SI,HVDCS,Benmore Net Flow,23/07/2020,-105.8623,-
2540.6945,187.707,257.051,312.89,295.73,312.939,300.769,300.983,326.196,294.192
,263.87,210.332,142.216,46.013,-68.503,-216.323,-301.901,-381.209,-380.196,-
314.27,-294.142,-296.003,-321.24,-309.57,-312.735,-322.236,-315.84,-263.635,-
247.754,-240.647,-233.291,-225.736,-248.829,-210.225,-179.182,-214.91,-
322.905,-321.117,-292.432,-268.282,-252.265,-261.729,-236.126,-222.824,-
168.692,-118.831,-51.032,21.353,60.982,,
```

Market Price API

Description: API to return market prices by run type and pricing node.

URL:	**{EM6_URL}/market_price/[run_type][trading_date] [from_trading_period] [to_trading_period][node_id]**
Method:	GET
Query parameters:	
Run_type	Provisional **– V,** Interim **– T,** Final **– F,** Price Responsive **- PR** (most recent PRSS or PRSL), Non Response **- NR** (most recent NRSS or NRSL)
Trading_date	**21/07/2020** *- Required*
from_trading_period	**1 –** *Optional blank returns a full trading date*
to_trading_period	**48 -** *Optional blank returns a full trading date*
Node_id	**OTA2201 –** *Optional blank for all price nodes*

Examples:

1. {em6_url}/market_price/BEN2201?run_type=PR&trading_date=05/08/2020
2. {em6_url}/market_price/BEN2201?run_type=F&trading_date=05/08/2020
3. {em6_url}/market_price/BEN2201,OTA2201?run_type=F&trading_date=05/08/2020&from_trading_period=20&to_trading_period=25

Truncated Market Price Example Response:
{em6_url}/market_price/BEN2201?run_type=PR&trading_date=05/08/2020


```
{
    "items": [
        {
            "trading_date": "2020-08-04T12:00:00Z",
            "trading_period": 1,
            "node_id": "BEN2201",
            "run_time": "05/08/2020 00:03:02",
            "run_type": "A",
            "price": 174.31
        },
        {
            "trading_date": "2020-08-04T12:00:00Z",
            "trading_period": 2,
            "node_id": "BEN2201",
            "run_time": "05/08/2020 00:33:02",
            "run_type": "A",
            "price": 133.5
        },
        {
            "trading_date": "2020-08-04T12:00:00Z",
            "trading_period": 3,
            "node_id": "BEN2201",
            "run_time": "05/08/2020 01:03:02",
            "run_type": "A",
            "price": 126.91
        },
        {
            "trading_date": "2020-08-04T12:00:00Z",
            "trading_period": 4,
            "node_id": "BEN2201",
            "run_time": "05/08/2020 01:33:03",
            "run_type": "A",
            "price": 128.24
        },
        {
            "trading_date": "2020-08-04T12:00:00Z",
            "trading_period": 5,
            "node_id": "BEN2201",
            "run_time": "05/08/2020 02:03:02",
            "run_type": "A",
            "price": 126.37
        },
        {
            "trading_date": "2020-08-04T12:00:00Z",
            "trading_period": 6,
            "node_id": "BEN2201",
            "run_time": "05/08/2020 02:33:02",
            "run_type": "A",
            "price": 126.48
        },
        {
            "trading_date": "2020-08-04T12:00:00Z",
            "trading_period": 7,
            "node_id": "BEN2201",
            "run_time": "05/08/2020 03:03:03",
            "run_type": "A",
            "price": 109.82
        },
```

Market Price API csv

Description: API to return market prices by run type and pricing node.

Market prices are calculated for every commercial node (i.e. grid injection or grid exit point) for every trading period. They are produced for the NRS, PRS, Provisional and Final Price schedule types. Final and Provisional prices are created daily.

URL:	**{EM6_URL}/market_price_csv/[run_type][trading_date] [from_trading_period] [to_trading_period][node_id]**
Method:	GET
Query parameters:	
Run_type	Provisional **– V,** Interim **– T,** Final **– F,** Price Responsive **- PR** (most recent PRSS or PRSL), Non Response **- NR** (most recent NRSS or NRSL)
Trading_date	**21/07/2020** *- Required*
from_trading_period	**1 –** *Optional blank returns a full trading date*
to_trading_period	**48 -** *Optional blank returns a full trading date*
Node_id	**OTA2201 –** *Optional blank for all price nodes*

Examples:

1. {em6_url}/market_price_csv/BEN2201?run_type=PR&trading_date=05/08/2020
2. {em6_url}/market_price_csv/BEN2201?run_type=F&trading_date=05/08/2020
3. {em6_url}/market_price_csv/BEN2201,OTA2201?run_type=F&trading_date=05/08/2020 &from_trading_period=20&to_trading_period=25

Truncated Market Price Example csv Response:

{em6_url}/market_price_csv/BEN2201?run_type=F&trading_date=14/08/2020

```
Trading Date,Trading Period,Node,Run Time,Run Type,Price
14/08/2020,  1,BEN2201,15/08/2020 07:35:56,F,93.22
14/08/2020,  2,BEN2201,15/08/2020 07:35:56,F,96.06
14/08/2020,  3,BEN2201,15/08/2020 07:35:56,F,89.76
14/08/2020,  4,BEN2201,15/08/2020 07:35:56,F,88.28
14/08/2020,  5,BEN2201,15/08/2020 07:35:56,F,88.32
14/08/2020,  6,BEN2201,15/08/2020 07:35:56,F,88.49
14/08/2020,  7,BEN2201,15/08/2020 07:35:56,F,85.59
14/08/2020,  8,BEN2201,15/08/2020 07:35:56,F,84.7
14/08/2020,  9,BEN2201,15/08/2020 07:35:56,F,78.21
14/08/2020, 10,BEN2201,15/08/2020 07:35:56,F,77.99
14/08/2020, 11,BEN2201,15/08/2020 07:35:56,F,84.42
14/08/2020, 12,BEN2201,15/08/2020 07:35:56,F,85.32
14/08/2020, 13,BEN2201,15/08/2020 07:35:56,F,85
14/08/2020, 14,BEN2201,15/08/2020 07:35:56,F,112.57
14/08/2020, 15,BEN2201,15/08/2020 07:35:56,F,109.88
14/08/2020, 16,BEN2201,15/08/2020 07:35:56,F,118.54
14/08/2020, 17,BEN2201,15/08/2020 07:35:56,F,119.97
14/08/2020, 18,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 19,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 20,BEN2201,15/08/2020 07:35:56,F,141.42
14/08/2020, 21,BEN2201,15/08/2020 07:35:56,F,144.14
14/08/2020, 22,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 23,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 24,BEN2201,15/08/2020 07:35:56,F,114.55
14/08/2020, 25,BEN2201,15/08/2020 07:35:56,F,115.39
14/08/2020, 26,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 27,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 28,BEN2201,15/08/2020 07:35:56,F,129.79
14/08/2020, 29,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 30,BEN2201,15/08/2020 07:35:56,F,116.44
14/08/2020, 31,BEN2201,15/08/2020 07:35:56,F,117.43
14/08/2020, 32,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 33,BEN2201,15/08/2020 07:35:56,F,118.05
14/08/2020, 34,BEN2201,15/08/2020 07:35:56,F,120.3
14/08/2020, 35,BEN2201,15/08/2020 07:35:56,F,120
14/08/2020, 36,BEN2201,15/08/2020 07:35:56,F,94.71
14/08/2020, 37,BEN2201,15/08/2020 07:35:56,F,120.42
14/08/2020, 38,BEN2201,15/08/2020 07:35:56,F,173.71
```

Average Price API

Description: API to return average prices by most recent available run type and pricing node.

The Average Price report contains an average of available prices per node and trading period. To differentiate between final, interim and provisional price types the Run Type field contains V (for provisional), T (for Interim) and F (for final).

In addition to the price data, the report also contains:

- Periods requested - trading periods from date and trading period selection criteria;
- Periods returned - trading periods returned in report;
- Periods provisional - trading periods with provisional (V) run type in report;
- Periods provisional - trading periods with interim (T) run type in report;
- Periods provisional - trading periods with final (F) run type in report; and
- Node average (for each requested node) - the average for all prices for selected nodes for periods returned

URL:	**{EM6_URL}/average_price/[node_id][from_trading_date] [to_trading_date]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** *- Required*
to_trading_date	**21/07/2020** *- Required*
Node_id	**OTA2201 –** *Optional blank for all price nodes*

Examples:

1. {em6_url}/average_price/OTA2201?from_trading_date=05/08/2020&to_trading_date=05/08/2020

Truncated Average Price Example Response:
{em6_url}/average_price/BEN2201?from_trading_date=01/10/2020&to_trading_date=01/10/2020


```
{
    "all_totals": [
        {
            "periods requested": "96",
            "periods returned": "96",
            "periods provisional": "0",
            "periods interim": "0",
            "periods final": "96"
        }
    ],
    "node_prices": [
        {
            "node_id": "BEN2201",
            "run_type": "F",
            "trading_date": "01/10/2020",
            "trading_period": "  1",
            "run_time": "02/10/2020 07:31:12",
            "price": "    148.79"
        },
        {
            "node_id": "BEN2201",
            "run_type": "F",
            "trading_date": "01/10/2020",
            "trading_period": "  2",
            "run_time": "02/10/2020 07:31:12",
            "price": "    149.06"
        },
        {
            "node_id": "BEN2201",
            "run_type": "F",
            "trading_date": "01/10/2020",
            "trading_period": "  3",
            "run_time": "02/10/2020 07:31:12",
            "price": "    126.72"
        },
        {
            "node_id": "BEN2201",
            "run_type": "F",
            "trading_date": "01/10/2020",
            "trading_period": "  4",
            "run_time": "02/10/2020 07:31:12",
            "price": "    148.79"
        },
        {
            "node_id": "BEN2201",
            "run_type": "F",
            "trading_date": "01/10/2020",
            "trading_period": "  5",
            "run_time": "02/10/2020 07:31:12",
            "price": "    127.07"
        },
```

Average Price API csv

Description: API to return average prices by most recent available run type and pricing node.

URL:	**{EM6_URL}/average_price_csv/[from_trading_date] [to_trading_date][node_id]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** *- Required*
to_trading_date	**21/07/2020** *- Required*
Node_id	**OTA2201 –** *Optional blank for all price nodes*

Examples:

1. {em6_url}/average_price_csv/OTA2201?from_trading_date=05/08/2020&to_trading_date=05/08/2020

Truncated Average Price Example csv Response:

{em6_url}/average_price_csv/HAY2201,BEN2201?from_trading_date=01/10/2020&to_trading_date=01/10/2020

```
Periods Requested,48,,,,
Periods Returned,48,,,,
Periods Provisional,0,,,,
Periods Interim,0,,,,
Periods Final,48,,,,
BEN2201,average,179.44,,,
HAY2201,average,190.69,,,
,,,,,
Node Id,Run Type,Trading Day,Trading Period,Run Time,Price
BEN2201,F,01/10/2020,  1,02/10/2020 07:31:12,    148.79
BEN2201,F,01/10/2020,  2,02/10/2020 07:31:12,    149.06
BEN2201,F,01/10/2020,  3,02/10/2020 07:31:12,    126.72
BEN2201,F,01/10/2020,  4,02/10/2020 07:31:12,    148.79
BEN2201,F,01/10/2020,  5,02/10/2020 07:31:12,    127.07
BEN2201,F,01/10/2020,  6,02/10/2020 07:31:12,    130.00
BEN2201,F,01/10/2020,  7,02/10/2020 07:31:12,    116.47
BEN2201,F,01/10/2020,  8,02/10/2020 07:31:12,    134.97
BEN2201,F,01/10/2020,  9,02/10/2020 07:31:12,    265.64
BEN2201,F,01/10/2020, 10,02/10/2020 07:31:12,    144.46
BEN2201,F,01/10/2020, 11,02/10/2020 07:31:12,    259.15
BEN2201,F,01/10/2020, 12,02/10/2020 07:31:12,    260.04
BEN2201,F,01/10/2020, 13,02/10/2020 07:31:12,    398.67
BEN2201,F,01/10/2020, 14,02/10/2020 07:31:12,    378.37
BEN2201,F,01/10/2020, 15,02/10/2020 07:31:12,    389.86
BEN2201,F,01/10/2020, 16,02/10/2020 07:31:12,    369.60
BEN2201,F,01/10/2020, 17,02/10/2020 07:31:12,    417.83
BEN2201,F,01/10/2020, 18,02/10/2020 07:31:12,    416.75
BEN2201,F,01/10/2020, 19,02/10/2020 07:31:12,    205.75
BEN2201,F,01/10/2020, 20,02/10/2020 07:31:12,    130.29
BEN2201,F,01/10/2020, 21,02/10/2020 07:31:12,    130.25
BEN2201,F,01/10/2020, 22,02/10/2020 07:31:12,    130.23
BEN2201,F,01/10/2020, 23,02/10/2020 07:31:12,    130.19
BEN2201,F,01/10/2020, 24,02/10/2020 07:31:12,    130.22
BEN2201,F,01/10/2020, 25,02/10/2020 07:31:12,    130.80
BEN2201,F,01/10/2020, 26,02/10/2020 07:31:12,    130.50
BEN2201,F,01/10/2020, 27,02/10/2020 07:31:12,    133.36
BEN2201,F,01/10/2020, 28,02/10/2020 07:31:12,    130.80
BEN2201,F,01/10/2020, 29,02/10/2020 07:31:12,    130.64
BEN2201,F,01/10/2020, 30,02/10/2020 07:31:12,    130.39
BEN2201,F,01/10/2020, 31,02/10/2020 07:31:12,    130.00
BEN2201,F,01/10/2020, 32,02/10/2020 07:31:12,    130.66
BEN2201,F,01/10/2020, 33,02/10/2020 07:31:12,    130.80
BEN2201,F,01/10/2020, 34,02/10/2020 07:31:12,    146.46
BEN2201,F,01/10/2020, 35,02/10/2020 07:31:12,    130.68
BEN2201,F,01/10/2020, 36,02/10/2020 07:31:12,    130.00
BEN2201,F,01/10/2020, 37,02/10/2020 07:31:12,    124.41
BEN2201,F,01/10/2020, 38,02/10/2020 07:31:12,    102.27
BEN2201,F,01/10/2020, 39,02/10/2020 07:31:12,    109.23
BEN2201,F,01/10/2020, 40,02/10/2020 07:31:12,    130.00
BEN2201,F,01/10/2020, 41,02/10/2020 07:31:12,    130.49
BEN2201,F,01/10/2020, 42,02/10/2020 07:31:12,    138.39
BEN2201,F,01/10/2020, 43,02/10/2020 07:31:12,    184.66
BEN2201,F,01/10/2020, 44,02/10/2020 07:31:12,    182.22
BEN2201,F,01/10/2020, 45,02/10/2020 07:31:12,    195.45
BEN2201,F,01/10/2020, 46,02/10/2020 07:31:12,    160.11
BEN2201,F,01/10/2020, 47,02/10/2020 07:31:12,    174.48
BEN2201,F,01/10/2020, 48,02/10/2020 07:31:12,    157.05
HAY2201,F,01/10/2020,  1,02/10/2020 07:31:12,    154.42
HAY2201,F,01/10/2020,  2,02/10/2020 07:31:12,    154.70
HAY2201,F,01/10/2020,  3,02/10/2020 07:31:12,    131.52
```

Generation Type API

Description: API to return the last 24 hours of NZ generation information aggregated by generation type. Eg: Hydro and the associated carbon output for each generation type and all of NZ in tonnes.

URL:	**{EM6_URL}/generation_type/24hrs/[generation_type_id]**
Method:	GET
Query parameters:	
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*

Examples:

1. {em6_url}/generation_type/24hrs/
2. {em6_url}/generation_type/24hrs/?generation_type_id=WIN

Truncated Generation Type Example Response: {em6_url}/generation_type/24hrs/


```
{
    "items": [
        {
            "timestamp": "2021-07-18T00:30:00Z",
            "trading_period": 26,
            "generation_type": [
                {
                    "generation_type_name": "Battery",
                    "generation_mw": -0.177,
                    "generation_capacity_mw": 1,
                    "generation_carbon_t": null
                },
                {
                    "generation_type_name": "Co-Gen",
                    "generation_mw": 143.068,
                    "generation_capacity_mw": 216,
                    "generation_carbon_t": 31.95
                },
                {
                    "generation_type_name": "Coal",
                    "generation_mw": 0,
                    "generation_capacity_mw": 750,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Gas",
                    "generation_mw": 531.186,
                    "generation_capacity_mw": 1280,
                    "generation_carbon_t": 110.8
                },
                {
                    "generation_type_name": "Geothermal",
                    "generation_mw": 818.721,
                    "generation_capacity_mw": 1061.5,
                    "generation_carbon_t": 29.06
                },
                {
                    "generation_type_name": "Hydro",
                    "generation_mw": 2990.239,
                    "generation_capacity_mw": 5414.5,
                    "generation_carbon_t": null
                },
                {
                    "generation_type_name": "Liquid",
                    "generation_mw": 0,
                    "generation_capacity_mw": 156,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Wind",
                    "generation_mw": 432.356,
                    "generation_capacity_mw": 1040,
                    "generation_carbon_t": null
                },
                {
                    "generation_type_name": "NZ",
                    "generation_mw": 4915.393,
                    "generation_capacity_mw": 9919,
                    "generation_carbon_t": 171.81
                }
            ]
        },
        {
            "timestamp": "2021-07-18T01:00:00Z",
            "trading_period": 27,
            "generation_type": [
                {
                    "generation_type_name": "Battery",
                    "generation_mw": -0.173,
                    "generation_capacity_mw": 1,
                    "generation_carbon_t": null
                },
```

Historic Generation Type API

Description: API to return historic NZ generation information aggregated by generation type. Eg: Hydro and the associated carbon output for each generation type and all of NZ in tonnes

URL:	**{EM6_URL}/historic_generation_type/[generation_type_id][From_trading_date][to_trading_date][interval]**
Method:	GET
Query parameters:	
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*
Interval	**30minute, daily or monthly** (required)

Examples:

1. {em6_url}/historic_generation_type/?from_trading_date=05/08/2020&to_trading_date=05/08/2020&interval=30minute
2. {em6_url}/historic_generation_type/?from_trading_date=05/01/2020&to_trading_date=05/08/2020&generation_type_id=WIN&interval=30minute
3. {em6_url}/historic_generation_type/?from_trading_date=01/01/2020&to_trading_date=01/08/2020&generation_type_id=WIN&interval=monthly
4. {em6_url}/historic_generation_type/?from_trading_date=01/01/2020&to_trading_date=01/02/2020&generation_type_id=WIN&interval=daily

Truncated Historic Gen Type Example Response:

historic_generation_type/?from_trading_date=01/01/2022&to_trading_date=02/01/2022&interval=daily


```
{
    "daily_gen": [
        {
            "trading_date": "2021-12-31T11:00:00Z",
            "generation_type": [
                {
                    "generation_type_name": "Battery",
                    "generation_mw": -7.487,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Co-Gen",
                    "generation_mw": 3075.108,
                    "generation_carbon_t": 1176.62
                },
                {
                    "generation_type_name": "Coal",
                    "generation_mw": 0,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Gas",
                    "generation_mw": 10611.143,
                    "generation_carbon_t": 2148.39
                },
                {
                    "generation_type_name": "Geothermal",
                    "generation_mw": 42272.75,
                    "generation_carbon_t": 1678.67
                },
                {
                    "generation_type_name": "Hydro",
                    "generation_mw": 118313.918,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Liquid",
                    "generation_mw": 0,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Wind",
                    "generation_mw": 11907.021,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "NZ",
                    "generation_mw": 186172.453,
                    "generation_carbon_t": 5003.68
                }
            ]
        },
        {
            "trading_date": "2022-01-01T11:00:00Z",
            "generation_type": [
                {
                    "generation_type_name": "Battery",
                    "generation_mw": -9.149,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Co-Gen",
                    "generation_mw": 5587.508,
                    "generation_carbon_t": 1339.1
                },
                {
                    "generation_type_name": "Coal",
                    "generation_mw": 0,
                    "generation_carbon_t": 0
                },
                {
                    "generation_type_name": "Gas",
                    "generation_mw": 10863.658,
                    "generation_carbon_t": 2199.57
                },
                {
                    "generation_type_name": "Geothermal",
                    "generation_mw": 42311.027,
                    "generation_carbon_t": 1673.69
                },
```

Historic Generation Type API csv

Description: API to return historic NZ generation information aggregated by generation type. Eg: Hydro and the associated carbon output for each generation type and all of NZ in tonnes in csv format

URL:	**{EM6_URL}/historic_generation_type_csv/[generation_type_id] [From_trading_date][to_trading_date]**
Method:	GET
Query parameters:	
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*
From_trading_date	**21/07/2020** - *Required*
To_trading_date	**21/07/2020** - *Required*

Examples:

1. {em6_url}/historic_generation_type_csv/?from_trading_date=05/08/2020&to_trading_date=05/08/2020
2. {em6_url}/historic_generation_type_csv/?from_trading_date=05/01/2020&to_trading_date=05/08/2020&generation_type_id=WIN

Truncated Historic Gen Type Example csv Response:

historic_generation_type_csv/?from_trading_date=01/07/2021&to_trading_date=01/07/2021

```
Trading Date,Trading Period,Generation Type,MW,Carbon Tonnes
01/07/2021,1,Battery,-1.2,0
01/07/2021,1,Co-Gen,88.075,9.89
01/07/2021,1,Coal,463.451,230.68
01/07/2021,1,Gas,516.048,108.34
01/07/2021,1,Geothermal,854.359,31
01/07/2021,1,Hydro,2344.753,0
01/07/2021,1,Liquid,0,0
01/07/2021,1,Wind,245.194,0
01/07/2021,1,NZ,4510.68,379.92
01/07/2021,2,Battery,-1.21,0
01/07/2021,2,Co-Gen,88.529,9.96
01/07/2021,2,Coal,445.791,221.89
01/07/2021,2,Gas,477.31,100.13
01/07/2021,2,Geothermal,855.082,31.06
01/07/2021,2,Hydro,2261.635,0
01/07/2021,2,Liquid,0,0
01/07/2021,2,Wind,229.424,0
01/07/2021,2,NZ,4356.561,363.04
01/07/2021,3,Battery,-1.212,0
01/07/2021,3,Co-Gen,88.041,9.74
01/07/2021,3,Coal,416.136,207.13
01/07/2021,3,Gas,441.285,89.22
01/07/2021,3,Geothermal,856.076,31.1
01/07/2021,3,Hydro,2199.045,0
01/07/2021,3,Liquid,0,0
01/07/2021,3,Wind,233.559,0
01/07/2021,3,NZ,4232.93,337.19
01/07/2021,4,Battery,-.811,0
01/07/2021,4,Co-Gen,88.817,9.8
01/07/2021,4,Coal,376.116,187.21
01/07/2021,4,Gas,435.752,87.7
01/07/2021,4,Geothermal,855.52,31.09
01/07/2021,4,Hydro,2150.404,0
01/07/2021,4,Liquid,0,0
01/07/2021,4,Wind,230.42,0
01/07/2021,4,NZ,4136.218,315.79
01/07/2021,5,Battery,-.268,0
01/07/2021,5,Co-Gen,80.077,10.11
01/07/2021,5,Coal,378.071,188.18
01/07/2021,5,Gas,435.297,87.6
01/07/2021,5,Geothermal,856.216,31.19
01/07/2021,5,Hydro,2101.673,0
01/07/2021,5,Liquid,0,0
01/07/2021,5,Wind,215.773,0
01/07/2021,5,NZ,4066.839,317.09
01/07/2021,6,Battery,-.226,0
01/07/2021,6,Co-Gen,74.8,10.38
01/07/2021,6,Coal,369.276,183.81
01/07/2021,6,Gas,434.411,87.43
01/07/2021,6,Geothermal,855.187,31.07
01/07/2021,6,Hydro,2074.427,0
01/07/2021,6,Liquid,0,0
01/07/2021,6,Wind,211.062,0
01/07/2021,6,NZ,4018.937,312.68
01/07/2021,7,Battery,-.236,0
01/07/2021,7,Co-Gen,73.877,9.92
01/07/2021,7,Coal,353.064,175.74
01/07/2021,7,Gas,440.027,88.56
```

HVDC Last 24hrs API

Description: API to return the last 24 hours of HVDC flow information.

URL:	**{EM6_URL}/hvdc/24hrs/**
Method:	GET
Query parameters:	*None*

Examples:

1. {em6_url}/hvdc/24hrs/

Truncated HVDC 24hr Example Response: {em6_url}/hvdc/24hrs/


```
{
    "items": [
        {
            "timestamp": "2020-11-04T02:21:00Z",
            "trading_period": 30,
            "dcn_flow": 463.911,
            "dcs_flow": 0,
            "direction": "NORTH",
            "north_limit_mw": 1200,
            "south_limit_mw": -750
        },
        {
            "timestamp": "2020-11-04T02:51:00Z",
            "trading_period": 31,
            "dcn_flow": 491.419,
            "dcs_flow": 0,
            "direction": "NORTH",
            "north_limit_mw": 1200,
            "south_limit_mw": -750
        },
        {
            "timestamp": "2020-11-04T03:21:00Z",
            "trading_period": 32,
            "dcn_flow": 521.525,
            "dcs_flow": 0,
            "direction": "NORTH",
            "north_limit_mw": 1200,
            "south_limit_mw": -750
        },
        {
            "timestamp": "2020-11-04T03:51:00Z",
            "trading_period": 33,
            "dcn_flow": 504.943,
            "dcs_flow": 0,
            "direction": "NORTH",
            "north_limit_mw": 1200,
            "south_limit_mw": -750
        },
        {
            "timestamp": "2020-11-04T04:21:00Z",
            "trading_period": 34,
            "dcn_flow": 523.794,
            "dcs_flow": 0,
            "direction": "NORTH",
            "north_limit_mw": 1200,
            "south_limit_mw": -750
        },
        {
            "timestamp": "2020-11-04T04:51:00Z",
            "trading_period": 35,
            "dcn_flow": 589.203,
            "dcs_flow": 0,
            "direction": "NORTH",
            "north_limit_mw": 1200,
            "south_limit_mw": -750
        },
```

NZ Reserves Last 24hrs API

Description: API to return the last 24 hours of aggregated NZ reserve information.

URL:	**{EM6_URL}/resrves_nz/24hrs/**
Method:	GET
Query parameters:	*None*

Examples:

1. {em6_url}/reserves_nz/24hrs/

Truncated Reserves 24hr Example Response: {em6_url}/reserves_nz/24hrs/


```
{
    "items": [
        {
            "timestamp": "2020-11-18T21:00:00Z",
            "trading_period": 20,
            "islandid": "NI",
            "mwcleared": 673.975,
            "mwoffered": 1450.151
        },
        {
            "timestamp": "2020-11-18T21:00:00Z",
            "trading_period": 20,
            "islandid": "SI",
            "mwcleared": 199.973,
            "mwoffered": 431.995
        },
        {
            "timestamp": "2020-11-18T21:30:00Z",
            "trading_period": 21,
            "islandid": "NI",
            "mwcleared": 653.888,
            "mwoffered": 1646.59
        },
        {
            "timestamp": "2020-11-18T21:30:00Z",
            "trading_period": 21,
            "islandid": "SI",
            "mwcleared": 216.167,
            "mwoffered": 431.995
        },
        {
            "timestamp": "2020-11-18T22:00:00Z",
            "trading_period": 22,
            "islandid": "NI",
            "mwcleared": 660.645,
            "mwoffered": 1624.333
        },
        {
            "timestamp": "2020-11-18T22:00:00Z",
            "trading_period": 22,
            "islandid": "SI",
            "mwcleared": 189.019,
            "mwoffered": 424.995
        },
        {
            "timestamp": "2020-11-18T22:30:00Z",
            "trading_period": 23,
            "islandid": "NI",
            "mwcleared": 645.186,
            "mwoffered": 1643.288
        },
```

NZ Summary Last 24hrs API

Description: API to return the last 24 hours of aggregated NZ load information.

URL:	**{EM6_URL}/nz/24hrs/**
Method:	GET
Query parameters:	*None*

Examples:

1. {em6_url}/nz/24hrs/

Truncated NZ 24hr Example Response: {em6_url}/nz/24hrs/


```
{
    "items": [
        {
            "timestamp": "2020-11-04T02:51:00Z",
            "trading_period": 31,
            "ni_mw": 3149.9,
            "si_mw": 1834.3,
            "ni_7_day_max": 3171.7,
            "si_7_day_max": 1898.7,
            "ni_7_day_min": 2550.4,
            "si_7_day_min": 1591.4,
            "ni_mw_1wk": 3164.1,
            "si_mw_1wk": 1722
        },
        {
            "timestamp": "2020-11-04T03:21:00Z",
            "trading_period": 32,
            "ni_mw": 3203.2,
            "si_mw": 1851.2,
            "ni_7_day_max": 3233.1,
            "si_7_day_max": 1913.2,
            "ni_7_day_min": 2583.9,
            "si_7_day_min": 1603.1,
            "ni_mw_1wk": 3208,
            "si_mw_1wk": 1735.2
        },
        {
            "timestamp": "2020-11-04T03:51:00Z",
            "trading_period": 33,
            "ni_mw": 3225.1,
            "si_mw": 1857.7,
            "ni_7_day_max": 3269.5,
            "si_7_day_max": 1932.7,
            "ni_7_day_min": 2619.4,
            "si_7_day_min": 1635.9,
            "ni_mw_1wk": 3250.2,
            "si_mw_1wk": 1740.5
        },
        {
            "timestamp": "2020-11-04T04:21:00Z",
            "trading_period": 34,
            "ni_mw": 3242,
            "si_mw": 1862.9,
            "ni_7_day_max": 3313.2,
            "si_7_day_max": 1955.4,
            "ni_7_day_min": 2673.9,
            "si_7_day_min": 1664.1,
            "ni_mw_1wk": 3289.1,
            "si_mw_1wk": 1742.2
        },
        {
            "timestamp": "2020-11-04T04:51:00Z",
            "trading_period": 35,
            "ni_mw": 3254.5,
            "si_mw": 1859.3,
            "ni_7_day_max": 3336.2,
            "si_7_day_max": 1955.9,
            "ni_7_day_min": 2727.6,
            "si_7_day_min": 1692.8,
            "ni_mw_1wk": 3316.7,
            "si_mw_1wk": 1759.9
        },
```

Recent Load API

Description: API to return the recent load by node id.

	Info	**Example**
Max_7_day:	Maximum half hourly load in the previous 7 days	97.848
Scada_mw_current:	The latest SCADA load value	80.272
Mw_change:	The MW difference between the **scada_mw_current** and the previous value. Is the load increasing or decreasing?	-0.329
Pct_7_day	The current load relative to the 7-day rolling peak, expressed as a percentage	82.04

URL:	**{EM6_URL}/recent_load/[node_id]**
Method:	GET
Query parameters:	
Node_id	**HAY0111** [CSV] – *Optional blank for all*

Examples:

1. {em6_url}/recent_load/
2. {em6_url}/recent_load/HAY0111
3. {em6_url}/recent_load/HAY0111,CPK0331

Recent Load Example Response:
{em6_url}/recent_load/CPK0331,WIL0331,ALB0331,PEN0331,ISL0661


```
{
    "items": [
        {
            "node_id": "ALB0331",
            "max_7_day": 97.848,
            "scada_mw_current": 80.272,
            "mw_change": -0.329,
            "pct_7_day": 82.04,
            "timestamp": "2022-04-20T01:21:00Z",
            "trading_period": 26,
            "trading_date": "20/04/2022"
        },
        {
            "node_id": "CPK0331",
            "max_7_day": 84.823,
            "scada_mw_current": 81.36,
            "mw_change": -0.852,
            "pct_7_day": 95.92,
            "timestamp": "2022-04-20T01:21:00Z",
            "trading_period": 26,
            "trading_date": "20/04/2022"
        },
        {
            "node_id": "ISL0661",
            "max_7_day": 253.818,
            "scada_mw_current": 253.818,
            "mw_change": 0.19,
            "pct_7_day": 100,
            "timestamp": "2022-04-20T01:21:00Z",
            "trading_period": 26,
            "trading_date": "20/04/2022"
        },
        {
            "node_id": "PEN0331",
            "max_7_day": 183.124,
            "scada_mw_current": 182.683,
            "mw_change": 0.396,
            "pct_7_day": 99.76,
            "timestamp": "2022-04-20T01:21:00Z",
            "trading_period": 26,
            "trading_date": "20/04/2022"
        },
        {
            "node_id": "WIL0331",
            "max_7_day": 28.507,
            "scada_mw_current": 26.908,
            "mw_change": 0.07,
            "pct_7_day": 94.39,
            "timestamp": "2022-04-20T01:21:00Z",
            "trading_period": 26,
            "trading_date": "20/04/2022"
        }
```

Recent Generation API

Description: API to return the recent generation by node id.

	Info	Example
Max_7_day:	Maximum half hourly generation in the previous 7 days	443.128
Scada_mw_current:	The latest SCADA generation value	382.565
Mw_change:	The MW difference between the **scada_mw_current** and the previous value. Is the generator increasing or decreasing?	-15.361
Pct_7_day	The current generation relative to the 7-day rolling peak generation output expressed as a percentage.	86.33
Pct_capacity	The current generation output relative to the unit nameplate capacity expressed as a percentage.	70.85

URL:	**{EM6_URL}/recent_generation/[node_id]**
Method:	GET
Query parameters:	
Node_id	**WIL0331 MCK0** [CSV] – *Optional blank for all*

Examples:

1. {em6_url}/recent_generation/
2. {em6_url}/recent_generation/WIL0331 MCK0
3. {em6_url}/recent_generation/WIL0331 MCK0,HLY2201 HLY5

Recent Generation Example Response: {em6_url}/recent_generation/BEN2202 BEN0,HLY2201 HLY5,WIL0331 MCK0,WWD1103 WWD0


```
{
    "items": [
        {
            "node_id": "BEN2202 BEN0",
            "max_7_day": 443.128,
            "scada_mw_current": 382.565,
            "mw_change": -15.361,
            "pct_7_day": 86.33,
            "pct_capacity": 70.85,
            "timestamp": "2022-04-20T01:31:00Z",
            "trading_period": 27,
            "trading_date": "20/04/2022"
        },
        {
            "node_id": "HLY2201 HLY5",
            "max_7_day": 385.389,
            "scada_mw_current": 375.777,
            "mw_change": -1.787,
            "pct_7_day": 97.51,
            "pct_capacity": 93.24,
            "timestamp": "2022-04-20T01:31:00Z",
            "trading_period": 27,
            "trading_date": "20/04/2022"
        },
        {
            "node_id": "WIL0331 MCK0",
            "max_7_day": 56.836,
            "scada_mw_current": 17.225,
            "mw_change": -1.302,
            "pct_7_day": 30.31,
            "pct_capacity": 28.71,
            "timestamp": "2022-04-20T01:31:00Z",
            "trading_period": 27,
            "trading_date": "20/04/2022"
        },
        {
            "node_id": "WWD1103 WWD0",
            "max_7_day": 62.572,
            "scada_mw_current": 25.834,
            "mw_change": -0.299,
            "pct_7_day": 41.29,
            "pct_capacity": 32.29,
            "timestamp": "2022-04-20T01:31:00Z",
            "trading_period": 27,
            "trading_date": "20/04/2022"
        }
    ],
```

Real Time Load API

Description: API to return the latest 1 min Load value by node.

URL:	**{EM6_URL}/current_load/[node_id]**
Method:	GET
Query parameters:	
Node_id	**HAY0111** [CSV] – *Optional blank for all*

Examples:

1. {em6_url}/current_load/
2. {em6_url}/current_load/HAY0111
3. {em6_url}/current_load/HAY0111,CPK0331

Real Time Load Example Response:
{em6_url}/current_load/CPK0331,WIL0331,ALB0331,PEN0331


```
{
    "items": [
        {
            "node_id": "ALB0331",
            "scada_mw_current": 85.5,
            "current_tp_avg": 60.7,
            "timestamp": "2020-11-18T23:53:10Z",
            "trading_period": 26
        },
        {
            "node_id": "CPK0331",
            "scada_mw_current": 86.1,
            "current_tp_avg": 83.3,
            "timestamp": "2020-11-18T23:53:10Z",
            "trading_period": 26
        },
        {
            "node_id": "PEN0331",
            "scada_mw_current": 176.201,
            "current_tp_avg": 167.8,
            "timestamp": "2020-11-18T23:53:10Z",
            "trading_period": 26
        },
        {
            "node_id": "WIL0331",
            "scada_mw_current": 27.76,
            "current_tp_avg": 26.5,
            "timestamp": "2020-11-18T23:53:10Z",
            "trading_period": 26
        }
```

Real Time Generation API

Description: API to return the latest 1 min Generation value by node.

URL:	**{EM6_URL}/current_generation/[node_id]**
Method:	GET
Query parameters:	
Node_id	**WIL0331 MCK0** [CSV] – *Optional blank for all*

Examples:

4. {em6_url}/current_generation/
5. {em6_url}/current_ generation/WIL0331 MCK0
6. {em6_url}/current_ generation/WIL0331 MCK0,HLY2201 HLY5

Real Time Generation Example Response: {em6_url}/current_ generation/WIL0331 MCK0,HLY2201 HLY5,ARA2201 ARA0


```
{
    "items": [
        {
            "node_id": "ARA2201 ARA0",
            "scada_mw_current": 46.48,
            "current_tp_avg": 30.6,
            "timestamp": "2020-11-19T00:01:10Z",
            "trading_period": 27
        },
        {
            "node_id": "HLY2201 HLY5",
            "scada_mw_current": 346.431,
            "current_tp_avg": 292.4,
            "timestamp": "2020-11-19T00:01:10Z",
            "trading_period": 27
        },
        {
            "node_id": "WIL0331 MCK0",
            "scada_mw_current": 55.94,
            "current_tp_avg": 47.6,
            "timestamp": "2020-11-19T00:01:10Z",
            "trading_period": 27
        }
    ],
```

Real Time HVDC API

Description: API to return the latest 1 min HVDC load value by Pole and Net flow.

URL:	**{EM6_URL}/current_hvdc/[node_id]**
Method:	GET
Query parameters:	
Node_id – HVDC pole values	**DCN3502, DCS3502, DCN3503, DCS3503** [CSV] – *Optional blank for all including net flow*

Examples:

1. {em6_url}/current_hvdc/
2. {em6_url}/current_hvdc/DCN3503
3. {em6_url}/current_hvdc/DCN3502,DCS3502

Real Time HVDC Example Response: {em6_url}/current_hvdc/


```
{
    "hvdc_flow": [
        {
            "timestamp": "2021-08-19T00:05:45Z",
            "trading_period": 25,
            "dcn_flow": 390.129,
            "dcs_flow": 0,
            "direction": "NORTH"
        }
    ],
    "hvdc_nodes": [
        {
            "islandid": "NI",
            "node_id": "DCN3502",
            "node_name": "Haywards Pole 2",
            "scada_mw_current": -0.039,
            "current_tp_avg": 0,
            "timestamp": "2021-08-19T00:05:45Z",
            "trading_period": 25
        },
        {
            "islandid": "NI",
            "node_id": "DCN3503",
            "node_name": "Haywards Pole 3",
            "scada_mw_current": -390.09,
            "current_tp_avg": -394,
            "timestamp": "2021-08-19T00:05:45Z",
            "trading_period": 25
        },
        {
            "islandid": "SI",
            "node_id": "DCS3502",
            "node_name": "Benmore Pole 2",
            "scada_mw_current": 0.046,
            "current_tp_avg": 0,
            "timestamp": "2021-08-19T00:05:45Z",
            "trading_period": 25
        },
        {
            "islandid": "SI",
            "node_id": "DCS3503",
            "node_name": "Benmore Pole 3",
            "scada_mw_current": 407.929,
            "current_tp_avg": 411.8,
            "timestamp": "2021-08-19T00:05:45Z",
            "trading_period": 25
        }
    ]
}
```

Current Carbon Intensity API

Description: API to return the aggregated recent carbon intensity for NZ in the last 3 trading periods, including the following:

	Info	**Example**
nz_carbon_t:	Total Tonnes of CO2 produced in the trading period	459.95
nz_carbon_gkwh:	Grams of CO2 produced per kWh generated	171.34
nz_carbon_change_gkwh:	Change in grams of CO2 produced per kWh generated from the previous trading period	5.23
nz_renewable:	Percentage of NZ generation that is 'renewable'	76.52
max_24hrs_gkwh:	The **max** Grams of CO2 produced per kWh in the last 24hrs	205.74
min_24hrs_gkwh:	The **min** Grams of CO2 produced per kWh in the last 24hrs	163.89
current_month_avg_gkwh:	The average Grams of CO2 produced per kWh generated in the current month	78.38
current_year_avg_gkwh:	The average Grams of CO2 produced per kWh generated in the current year	71.17
Pct_current_year_gkwh:	The current Carbon output as a percentage of the rolling **12 month max** output	83.28

URL:	**{EM6_URL}/current_carbon_intensity/**
Method:	GET
Query parameters:	none

Examples:

1. {em6_url}/current_carbon_intensity

Current Carbon Intensity Example Response: {em6_url}/current_carbon_intensity


```
{
    "items": [
        {
            "trading_date": "2022-01-09T11:00:00Z",
            "trading_period": 27,
            "timestamp": "2022-01-10T00:00:00Z",
            "nz_carbon_t": 246.12,
            "nz_carbon_gkwh": 93.49,
            "nz_carbon_gkwh_prev": 92.14,
            "nz_carbon_change_gkwh": 1.35,
            "nz_renewable": 84.73,
            "max_24hrs_gkwh": 103.36,
            "min_24hrs_gkwh": 59.06,
            "current_month_avg_gkwh": 54.57,
            "current_year_avg_gkwh": 122.25,
            "pct_current_year_gkwh": 33.44
        },
        {
            "trading_date": "2022-01-09T11:00:00Z",
            "trading_period": 26,
            "timestamp": "2022-01-09T23:30:00Z",
            "nz_carbon_t": 242.58,
            "nz_carbon_gkwh": 92.14,
            "nz_carbon_gkwh_prev": 95.3,
            "nz_carbon_change_gkwh": -3.16,
            "nz_renewable": 85.08,
            "max_24hrs_gkwh": 103.36,
            "min_24hrs_gkwh": 59.06,
            "current_month_avg_gkwh": 54.57,
            "current_year_avg_gkwh": 122.25,
            "pct_current_year_gkwh": 32.96
        },
        {
            "trading_date": "2022-01-09T11:00:00Z",
            "trading_period": 25,
            "timestamp": "2022-01-09T23:00:00Z",
            "nz_carbon_t": 252.85,
            "nz_carbon_gkwh": 95.3,
            "nz_carbon_gkwh_prev": 95.94,
            "nz_carbon_change_gkwh": -0.64,
            "nz_renewable": 85.03,
            "max_24hrs_gkwh": 103.36,
            "min_24hrs_gkwh": 59.06,
            "current_month_avg_gkwh": 54.57,
            "current_year_avg_gkwh": 122.25,
            "pct_current_year_gkwh": 34.09
        }
```

Historic Carbon Intensity API

Description: API to return the aggregated carbon intensity for NZ by trading date:

	Info	**Example**
nz_carbon_t:	Total Tonnes of CO2 produced in the trading period	184.03
nz_carbon_gkwh:	Grams of CO2 produced per kWh generated	22.95
nz_renewable:	Percentage of NZ generation that is 'renewable'	81.23

URL:	**{EM6_URL}/carbon_intensity/[from_trading_date] [to_trading_date]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** *- Required*
to_trading_date	**21/07/2020** *- Required*

Examples:

1. {em6_url}/carbon_intensity/?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/carbon_intensity/?from_trading_date=01/07/2020&to_trading_date=30/08/2020

Historic Carbon Intensity Example Response: {em6_url}/carbon_intensity ?from_trading_date=01/01/2022&to_trading_date=10/01/2022


```
{
    "items": [
        {
            "trading_date": "2021-12-31T11:00:00Z",
            "trading_period": 1,
            "timestamp": "00:00",
            "nz_carbon_t": 101.74,
            "nz_carbon_gkwh": 56.77,
            "nz_renewable": 92.42
        },
        {
            "trading_date": "2021-12-31T11:00:00Z",
            "trading_period": 2,
            "timestamp": "00:30",
            "nz_carbon_t": 102.95,
            "nz_carbon_gkwh": 58.92,
            "nz_renewable": 92.04
        },
        {
            "trading_date": "2021-12-31T11:00:00Z",
            "trading_period": 3,
            "timestamp": "01:00",
            "nz_carbon_t": 101.61,
            "nz_carbon_gkwh": 59.88,
            "nz_renewable": 91.98
        },
        {
            "trading_date": "2021-12-31T11:00:00Z",
            "trading_period": 4,
            "timestamp": "01:30",
            "nz_carbon_t": 101.55,
            "nz_carbon_gkwh": 61.59,
            "nz_renewable": 91.8
        },
        {
            "trading_date": "2021-12-31T11:00:00Z",
            "trading_period": 5,
            "timestamp": "02:00",
            "nz_carbon_t": 102.43,
            "nz_carbon_gkwh": 63.33,
            "nz_renewable": 91.52
        },
```

Historic Carbon Intensity API csv

Description: API to return the aggregated carbon intensity for NZ by trading date in a csv file:

	Info	**Example**
nz_carbon_t:	Total Tonnes of CO2 produced in the trading period	184.03
nz_carbon_gkwh:	Grams of CO2 produced per kWh generated	22.95
nz_renewable:	Percentage of NZ generation that is 'renewable'	81.23

URL:	**{EM6_URL}/carbon_intensity_csv/[from_trading_date] [to_trading_date]**
Method:	GET
Query parameters:	
from_trading_date	**21/07/2020** *- Required*
to_trading_date	**21/07/2020** *- Required*

Examples:

1. {em6_url}/carbon_intensity_csv/?from_trading_date=30/07/2020&to_trading_date=30/07/2020
2. {em6_url}/carbon_intensity_csv/?from_trading_date=01/07/2020&to_trading_date=30/08/2020

Historic Carbon Intensity Example csv Response: {em6_url}/carbon_intensity_csv ?from_trading_date=01/01/2022&to_trading_date=10/01/2022

```
Trading Date,Trading Period,Time Stamp,NZ Carbon Tonnes,NZ Carbon gkWh,NZ
Renewable
01/01/2022,1,00:00,101.74,56.77,92.42
01/01/2022,2,00:30,102.95,58.92,92.04
01/01/2022,3,01:00,101.61,59.88,91.98
01/01/2022,4,01:30,101.55,61.59,91.80
01/01/2022,5,02:00,102.43,63.33,91.52
01/01/2022,6,02:30,104.35,65.56,91.11
01/01/2022,7,03:00,101.87,64.55,91.37
01/01/2022,8,03:30,102.78,65.58,91.15
01/01/2022,9,04:00,104.11,66.58,90.87
01/01/2022,10,04:30,104.49,66.55,90.82
01/01/2022,11,05:00,102.43,63.53,91.46
01/01/2022,12,05:30,100.21,60.76,91.99
01/01/2022,13,06:00,101.03,60.11,91.98
01/01/2022,14,06:30,102.25,59.65,91.98
01/01/2022,15,07:00,103.23,58.26,92.09
01/01/2022,16,07:30,101.47,55.84,92.56
01/01/2022,17,08:00,103.22,54.67,92.55
01/01/2022,18,08:30,101.89,51.93,93.02
01/01/2022,19,09:00,101.01,49.66,93.29
01/01/2022,20,09:30,100.79,48.71,93.46
01/01/2022,21,10:00,103.21,49.37,93.36
01/01/2022,22,10:30,103.01,49.08,93.42
01/01/2022,23,11:00,102.14,48.69,93.47
01/01/2022,24,11:30,102.08,48.79,93.47
01/01/2022,25,12:00,102.13,48.90,93.42
01/01/2022,26,12:30,100.74,48.86,93.45
01/01/2022,27,13:00,101.19,49.49,93.39
01/01/2022,28,13:30,108.46,53.43,92.35
01/01/2022,29,14:00,108.92,53.59,92.32
01/01/2022,30,14:30,102.53,50.04,93.13
01/01/2022,31,15:00,102.80,49.77,93.11
01/01/2022,32,15:30,102.61,49.12,93.24
01/01/2022,33,16:00,102.40,48.49,93.30
01/01/2022,34,16:30,108.11,50.38,92.74
01/01/2022,35,17:00,107.28,49.00,92.91
01/01/2022,36,17:30,107.16,48.10,93.04
01/01/2022,37,18:00,106.31,47.56,93.24
01/01/2022,38,18:30,108.51,48.56,93.00
01/01/2022,39,19:00,109.89,49.89,92.84
01/01/2022,40,19:30,107.33,49.64,93.12
01/01/2022,41,20:00,105.54,50.17,93.12
01/01/2022,42,20:30,109.03,51.87,92.76
01/01/2022,43,21:00,109.76,51.65,92.79
01/01/2022,44,21:30,111.70,52.77,92.61
01/01/2022,45,22:00,110.38,53.68,92.58
01/01/2022,46,22:30,105.43,53.42,92.98
01/01/2022,47,23:00,106.64,55.41,92.62
01/01/2022,48,23:30,104.24,56.45,92.51
02/01/2022,1,00:00,103.60,58.33,92.26
02/01/2022,2,00:30,104.94,61.27,91.86
02/01/2022,3,01:00,105.97,63.63,91.57
02/01/2022,4,01:30,105.82,64.75,91.43
02/01/2022,5,02:00,106.61,66.46,91.18
02/01/2022,6,02:30,106.19,66.82,90.91
02/01/2022,7,03:00,106.33,67.64,90.43
02/01/2022,8,03:30,106.27,67.63,89.95
02/01/2022,9,04:00,106.04,67.07,89.51
```

Generation Weighted Average Price API

Description: API to return the generation weighted average price (GWAP) by region and generation type:

URL:	**{EM6_URL}/gen_region_price/[interval][grid_zone_id][generation_type_id][from_trading_date][to_trading_date]**
Method:	GET
Query parameters:	
interval	**30minute, daily, monthly -** *Required*
Grid_zone_id	1-14 – 14 Grid Zones in NZ
Generation_type_id	Hydro **HYD,** Coal/Gas **CG,** Gas **GAS,** Wind **WIN,** Cogen **COG,** Battery **BAT,** Liquid **LIQ,** Geothermal **GEO** – *Optional blank for all*
from_trading_date	**21/02/2021** - *Required*
to_trading_date	**21/02/2021** - *Required*

Examples:

1. {em6_url}/gen_region_price/?interval=30minute&generation_type_id=HYD&from_trading_date=28/04/2021&to_trading_date=28/04/2021
2. {em6_url}/gen_region_price/?interval=daily &from_trading_date=01/04/2021&to_trading_date=28/04/2021
3. {em6_url}/gen_region_price/?interval=monthly&generation_type_id=HYD&from_trading_date=01/01/2021&to_trading_date=30/04/2021
4. {em6_url}/gen_region_price/?interval=30minute&grid_zone_id=7&from_trading_date=28/04/2021&to_trading_date=28/04/2021

GWAP 30min Example Response:

{em6_url}/gen_region_price/?interval=30minute&generation_type_id=HYD&from_trading_date=28/04/2021&to_trading_date=28/04/2021


```
{
    "TP_gwap": [
        {
            "trading_date": "2021-04-27T12:00:00Z",
            "totals": [
                [
                    {
                        "unit": "WAP",
                        "generation_type": "HYD",
                        "value": 266.73
                    },
                    {
                        "unit": "MW",
                        "generation_type": "HYD",
                        "value": 1712.28
                    }
                ]
            ],
            "locations": [
                [
                    {
                        "location_name": "NZ",
                        "generation_type": [
                            [
                                {
                                    "unit": "WAP",
                                    "generation_type": "HYD",
                                    "value": 266.73
                                },
                                {
                                    "unit": "MW",
                                    "generation_type": "HYD",
                                    "value": 1712.28
                                }
                            ]
                        ]
                    }
                ]
            ]
        },
        {
            "trading_date": "2021-04-27T12:30:00Z",
            "totals": [
                [
                    {
                        "unit": "WAP",
                        "generation_type": "HYD",
                        "value": 268.65
                    },
                    {
                        "unit": "MW",
                        "generation_type": "HYD",
                        "value": 1638.35
                    }
                ]
            ],
            "locations": [
                [
                    {
                        "location_name": "NZ",
                        "generation_type": [
                            [
                                {
                                    "unit": "WAP",
                                    "generation_type": "HYD",
                                    "value": 268.65
                                },
                                {
                                    "unit": "MW",
                                    "generation_type": "HYD",
                                    "value": 1638.35
                                }
                            ]
```

GWAP Daily Example Response:

{em6_url}/gen_region_price/?interval=daily&generation_type_id=HYD&from_trading_date=01/04/2021&to_trading_date=03/04/2021


```
{
    "daily_gwap": [
        {
            "trading_date": "2021-03-31T11:00:00Z",
            "totals": [
                [
                    {
                        "unit": "WAP",
                        "generation_type": "HYD",
                        "value": 238.15
                    },
                    {
                        "unit": "MW",
                        "generation_type": "HYD",
                        "value": 110139.89
                    }
                ]
            ],
            "locations": [
                [
                    {
                        "location_name": "NZ",
                        "generation_type": [
                            [
                                {
                                    "unit": "WAP",
                                    "generation_type": "HYD",
                                    "value": 238.15
                                },
                                {
                                    "unit": "MW",
                                    "generation_type": "HYD",
                                    "value": 110139.89
                                }
                            ]
                        ]
                    }
                ]
            ]
        },
        {
            "trading_date": "2021-04-01T11:00:00Z",
            "totals": [
                [
                    {
                        "unit": "WAP",
                        "generation_type": "HYD",
                        "value": 230.99
                    },
                    {
                        "unit": "MW",
                        "generation_type": "HYD",
                        "value": 95098.94
                    }
                ]
            ],
            "locations": [
                [
                    {
                        "location_name": "NZ",
                        "generation_type": [
                            [
                                {
                                    "unit": "WAP",
                                    "generation_type": "HYD",
                                    "value": 230.99
                                },
                                {
                                    "unit": "MW",
                                    "generation_type": "HYD",
                                    "value": 95098.94
                                }
                            ]
                        ]
                    }
                ]
```

GWAP Monthly Example Response:

{em6_url}/gen_region_price/?grid_zone_id=7&from_trading_date=01/03/2021&to_trading_date=30/04/2021&interval=monthly


```
{
    "monthly_gwap": [
        {
            "trading_date": "2021-02-28T11:00:00Z",
            "totals": [
                [
                    {
                        "unit": "WAP",
                        "generation_type": "HYD",
                        "value": 256.05
                    },
                    {
                        "unit": "MW",
                        "generation_type": "HYD",
                        "value": 69091.72
                    }
                ],
                [
                    {
                        "unit": "WAP",
                        "generation_type": "WIN",
                        "value": 197.55
                    },
                    {
                        "unit": "MW",
                        "generation_type": "WIN",
                        "value": 92282.78
                    }
                ]
            ],
            "locations": [
                [
                    {
                        "location_name": "Bunnythorpe",
                        "generation_type": [
                            [
                                {
                                    "unit": "WAP",
                                    "generation_type": "HYD",
                                    "value": 256.05
                                },
                                {
                                    "unit": "MW",
                                    "generation_type": "HYD",
                                    "value": 69091.72
                                }
                            ],
                            [
                                {
                                    "unit": "WAP",
                                    "generation_type": "WIN",
                                    "value": 197.55
                                },
                                {
                                    "unit": "MW",
                                    "generation_type": "WIN",
                                    "value": 92282.78
                                }
                            ]
```

Generation Weighted Average Price and Energy Summary API

Description: API to return the average generation weighted average price (GWAP) and energy generated in Gwh summary by date range and generation type:

URL:	**{EM6_URL}/gen_region_price/summary/[from_trading_date][to_trading_date]**
Method:	GET
Query parameters:	
from_trading_date	**21/02/2021** *- Required*
to_trading_date	**21/02/2021** *- Required*

Examples:

1. {em6_url}/gen_region_price/summary/?from_trading_date=28/04/2021&to_trading_date=28/04/2021
2. {em6_url}/gen_region_price/summary/?from_trading_date=01/04/2021&to_trading_date=28/04/2021

GWAP Energy Summary Example Response:

{em6_url}/gen_region_price/summary/?from_trading_date=01/01/2021&to_trading_date=01/01/2022


```
{
    "items": [
        {
            "start_date": "01/01/2021",
            "end_date": "01/01/2022",
            "generation_type": [
                {
                    "bat_gwap": 226.68,
                    "bat_gwh": 0.77,
                    "bat_pct": 0
                },
                {
                    "cg_gwap": 245.9,
                    "cg_gwh": 2525.77,
                    "cg_pct": 6.06
                },
                {
                    "cog_gwap": 174.17,
                    "cog_gwh": 1255.72,
                    "cog_pct": 3.01
                },
                {
                    "gas_gwap": 200.86,
                    "gas_gwh": 3652.04,
                    "gas_pct": 8.76
                },
                {
                    "geo_gwap": 165.84,
                    "geo_gwh": 7971.27,
                    "geo_pct": 19.12
                },
                {
                    "hyd_gwap": 162.69,
                    "hyd_gwh": 23671.64,
                    "hyd_pct": 56.79
                },
                {
                    "liq_gwap": 483.65,
                    "liq_gwh": 18.03,
                    "liq_pct": 0.04
                },
                {
                    "win_gwap": 141.05,
                    "win_gwh": 2591.02,
                    "win_pct": 6.22
                }
```