# Request format

The API request must specify a period from the controlled value list in the table below; and a ending date for the period expressed in ISO8601 date/time format.

http://api.sundaya.com/hse/{period}/{ending}

e.g. http://api.sundaya.com/hse/week/20190209

|  |  |
| --- | --- |
| **period** |  |
| hour | hourly data (1 day), broken down by *minute* and *second* The *hour* dataset produces near-real-time monitoring data for troubleshooting and device reconfiguration by onsite field technicians.  The actual interval is based on the number of seconds currently configured as the monitoring interval on the device - which is therefore the minimum window size possible. |
| timeofday | Morning, Afternoon, Evening, Night: 6-hourly blocks of time commonly used to refer to time during the day. Data for this period covers one week, so that it can be superimposed on data returned by 'week' (2 requests needed). |
| day | daily data, broken down by *hour / time-of-day* (Morning, Afternoon, Evening, Night) and *minute* |
| week | weekly data, broken down by *day-of-week* and *hour / time-of-day* |
| month | monthly data, broken down by *week* and *day* |
| quarter | quarterly data, broken down by *month* and *week* |
| year | yearly data, broken down by *quarter* and *month* |
| 5year | 5yearly data, broken down by *year* and *quarter* |

The compressed version of ISO 8601 (without semi colons) is recommended for the {ending} parameter, with the time designator T preceding the time components of the representation.

This can be in UTC or local time as follows:

* In UTC expressed with a trailing Z

http://api.sundaya.com/week/YYYYMMDDThhmmssZ

e.g. http://api.sundaya.com/week/201902091830Z == 18:30 UTC

* In local time with time offset

http://api.sundaya.com/week/YYYYMMDDThhmmss±hhmm

e.g. http://api.sundaya.com/week/201902091500-0330 == 18:30 UTC

## HTTP request and response

The following example shows a sample HTTP request and response, and a snippet of the response collection which is described in the following section.

\*\*\* REQUEST \*\*\*

GET /hse/week/20190209/ HTTP/1.1

Host: api.sundaya.com

Accept: application/vnd.collection+json

\*\*\* RESPONSE \*\*\*

200 OK HTTP/1.1

Content-Type: application/vnd.collection+json

Content-Length: xxx

{ "collection" : {...}, ... }

# Response format

The HSE api response contains a data array for the requested period, for monitoring energy through the lifecycle represented by the following energy flows.

|  |
| --- |
| **energy-flows** |
| Harvest |
| Store |
| Enjoy |
| *Grid* |

The response data is provided in a two dimensional data grid which includes granular data for the ‘child’ and ‘grandchild’ of the requested period. For example a request for a 'week' period will respond with energy data for each day (child of week,) and hour (grandchild of week) as shown in the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **week** | 20/08/2018-26/08/2018 | |  |  |  |  |  |
| hour day | Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
| 1 | 54 | 3640 | 54 | 54 | 54 | 54 | 54 |
| 2 | 3640 | 3643 | 30 | 30 | 30 | 3520 | 30 |
| 3 | 33 | 33 | 33 | 33 | 3520 | 33 | 3520 |
| 4 | 23 | 23 | 23 | 3520 | 3640 | 2333 | 23 |
| 5 | 55 | 1233 | 2333 | 2000 | 2333 | 55 | 2000 |
| 6 | 44 | 44 | 3520 | 2000 | 44 | 44 | 44 |
| 7 | 54 | 3640 | 54 | 54 | 54 | 54 | 54 |
| 8 | 3640 | 3643 | 30 | 30 | 30 | 3520 | 30 |
| 9 | 33 | 33 | 33 | 33 | 3520 | 33 | 3520 |
| 10 | 23 | 23 | 23 | 3520 | 3640 | 2333 | 23 |
| 11 | 55 | 1233 | 2333 | 2000 | 2333 | 55 | 2000 |
| 12 | 44 | 44 | 3520 | 2000 | 44 | 44 | 44 |
| 13 | 54 | 3640 | 54 | 54 | 54 | 54 | 54 |
| 14 | 3640 | 3643 | 30 | 30 | 30 | 3520 | 30 |
| 15 | 33 | 33 | 33 | 33 | 3520 | 33 | 3520 |
| 16 | 23 | 23 | 23 | 3520 | 3640 | 2333 | 23 |
| 17 | 55 | 1233 | 2333 | 2000 | 2333 | 55 | 2000 |
| 18 | 44 | 44 | 3520 | 2000 | 44 | 44 | 44 |
| 19 | 54 | 3640 | 54 | 54 | 54 | 54 | 54 |
| 20 | 3640 | 3643 | 30 | 30 | 30 | 3520 | 30 |
| 21 | 33 | 33 | 33 | 33 | 3520 | 33 | 3520 |
| 22 | 23 | 23 | 23 | 3520 | 3640 | 2333 | 23 |
| 23 | 55 | 1233 | 2333 | 2000 | 2333 | 55 | 2000 |
| 24 | 44 | 44 | 3520 | 2000 | 44 | 44 | 44 |
| *total* | 15396 | 34464 | 23972 | 30548 | 38484 | 24156 | 22684 |

In this example data for a week period, each hour of each day is represented in a multivalued list as a data row, and data for each hour of the week (each subvalue in the datarow) represents a column.

{

"name": "harvest-data",

"value": "54 3640 33 23 55 44 54 3640 33 23 55 44 54 3640 33 23 55 44 54 3640 33 23 55 44",

"prompt": "Sunday"

},

{

"name": "harvest-total",

"value": "15396"

}

## Response periods

The response includes (href) links to the parent dataset and next-previous datasets, which allows developers and users to graph and visualise data through a single request, and to navigate hyperlinks to the next and previous dataset (next week or previous week); or to zoom out to the parent dataset (this month's data). The following table depicts the response data structures for each of the six periods described above in the **Request format** section.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| <period> |  | <-href=*next/prev*-> |  | hour |  | <-href=next/prev(*hour*)-> |  | timeofday |  | <-href=next/prev(*timeofday*)-> |
|  | <y dataset> [#] | href[]=<*child>* |  |  | second [60] | href[]=*minute* |  |  | timeofday [4] | href[]=*day* |
|  |  | <x dataset> [# elements] |  |  |  | minute [60] |  |  |  | day [7] |
| href=<*parent>* |  |  |  | href=*day* |  |  |  | href= |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| day |  | <-href=next/prev(*day*)-> |  | week |  | <-href=next/prev(*week*)-> |  | month |  | <-href=next/prev(*month*)-> |
|  | minute [60] | href[]=*hour* |  |  | hour [24] | href[]=*day* |  |  | day [7] | href[]=*week* |
|  |  | hour [24] |  |  |  | day [7] |  |  |  | week [4] |
| href=*week* |  |  |  | href=*month* |  |  |  | href=*quarter* |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| quarter |  | <-href=next/prev(*quarter*)-> |  | year |  | <-href=next/prev(*year*)-> |  | 5year |  | <-href=next/prev(*5year*)-> |
|  | week [4] | href[]=*month* |  |  | week [4] | href[]=*month* |  |  | month [12] | href[]=*year* |
|  |  | month [4] |  |  |  | month [12] |  |  |  | year [5] |
| href=*year* |  |  |  | href=*5year* |  |  |  | href= |  |  |

## JSON structure

The response data is formatted as anonymous objects, so that client apps can process and navigate through the response using generic hypermedia controls which support the based on Collection+JSON standard. The following describes the collection response data structure.

|  |  |  |  |
| --- | --- | --- | --- |
| version |  |  | The api version. Previous and deprecated endpoints will be hosted with a version as a base path prepended to the api path. For example http://v1.0/api.sundaya.com/hse/week/20190209 |
| href |  |  | Permanent link to the item (a self reference). For example:  http://api.sundaya.com/hse/week/20190209 represents hse data for the week ending 09-Feb-2019. |
| links |  |  | Array of links to resources related to the requested collection. Each links has the following properties to describe its function: |
|  | name |  | Contains the key name which is generally intended for presentation |
|  | rel |  | The link-to-collection relationship links descriptor can be one of the following as described in the rel property  **period** - the period classifier for this collection as indicated by the name property. The name property contains a classifier coresponding to the period specified in the original request. The name property should be presented to the user. The href property does not typically need to be presented for this link.  **interval** - the starting and ending time points for the period. The name property should be presented to the user. The href property does not typically need to be presented for this link.  **parent** - a link to the parent of the requested collection. For example: <http://api.sundaya.com/hse/week/20190202>  links to the previous week.  **next, previous** - a link to the next or previous sibling of this collection. For example: <http://api.sundaya.com/hse/week/20190202>  links to the previous week.  **itemdata-period** - the period classifier for each collection. The name property contains the period classifier of the data and totals in each data object.  **itemdata-headings** - the column headings for data and totals in the items collection. The name property contains column headings in ssv format for the data and totals in each data object.  **itemdata-subvalue-period** - the period classifier for each subvalue in the item data object. The name property contains the period classifier of the (ssv) subitems in each data object.  **itemdata-subvalue-headings** - the row headings for data subvalues in the items collection. The name property contains row headings in ssv format for the (ssv) subitems in each data object. |
|  | prompt |  | Documentation for this link, which may be used as tooltips in the presentation. |
|  | href |  | The URI of the related resource, and the link identifier. This property may used to search and iodentify a link through JSONpath |
|  | render |  | 'image' or 'text' if the link should be retrieved and embedded; or 'link' to display as-is. If the property is missing it indicates that the link does not need to be presented to the end-user. |
| items |  |  | Collection members, represented by an object with 3 predefined properties. |
|  | href |  | Permanent URI link to the item. |
|  | data |  | Array of key value pairs with 3 predefined properties, |
|  |  | name | The key name, which can be one of the following.  **harvest-data** - the value property contains row data and a total for each row.  **harvest-totals** - the value property contains the total for the harvest-data value.  The data element will contain a child element for each of the four **energy-flows** (Harvest, Store, Energy, Grid) similar to the two examples shown above for harvest. |
|  |  | value | The values for this item. Multiple values are provided in ssv format (as space separated values). |
|  |  | prompt | A description of the data item. |
|  | links |  | Array of links to resources related to this single item. Each links has the same properties as the collection links described above. This property is optional. |

## Data visualisation

The response data describe above must be visualised in the application as a stacked bar graph, based on the following colours for each of the four **energy-flow** datasetsreturnedinside thedata element.

|  |  |
| --- | --- |
|  | Grid |
|  | Harvest |
|  | Enjoy |
|  | Store |

The bar graph is shown in a ‘double entry’ format (the up and down bars are the same size), as shown in the following sample.



The above example shows the following behviour:

* in the 1st hour all enjoy energy came from the battery;
* in the 2nd hour half came from battery (store) and other half from grid.
* in the 3rd hour all came from grid.
* in the 4th hour the sun starts delivering (harvest)
* in the 10th hour harvest data is more than enjoy and the energy flows into store...

The following graphs shows a month period

It shows energy usage from the grid in the bottom tier, which indicates a need for the user to get more battery capacity. In general a graph with lot of black in it indicates that you need to do something about it.

