

# Green Upgrade Calculator API Documentation

This service is to help users of the Green Upgrade Calculator to efficiently analyze the cost and climate impacts of common residential decarbonization solutions.

Current Version: 2.0

## Table of Contents

- 1. API Access .....2**
  - API Keys .....2*
  - Rate Limits.....2*
  - Attribution .....2*
  
- 2. Sending API Requests.....2**
  - Request Parameters .....2*
  - Request Mandatory and Optional Inputs.....2*
  - Request Example.....2*
  - Request Errors .....4*
  
- 3. Receiving API Results .....4**
  - Response Fields .....4*
  - Interpreting Results.....4*

# 1. API Access

## API Keys

Users should first request access by emailing [greenup@rmi.org](mailto:greenup@rmi.org).

After confirming the account as a free or paid user, users will be given a unique API key. This 32-character string:

- Uniquely identifies you.
- Gives you access to GUC's Web services.
- Should be kept private and should not be shared.

## API Request Limits

User accounts will be set as free or paid. Free accounts can send up to 50 requests per month. For a higher usage paid account, please contact our team to understand our standard paid subscription offerings and request limits.

## Attribution

Regardless of user account as free or paid, users are requested to cite the Green Upgrade Calculator API usage on their platform, such as “Powered by RMI’s Green Upgrade Calculator.”

# 2. Sending API Requests

## Request Parameters

These are the following parameters when sending POST requests to <https://greenup-api.rmi.org/guc>.

PARAMETER	REQUIRED	VALUE	DESCRIPTION
<b>format</b>	Yes	<b>Type:</b> string <b>Default:</b> json	The output response format.
<b>api_key</b>	Yes	<b>Type:</b> string <b>Default:</b> None	The unique developer API key.
<b>data</b>	Yes	<b>Type:</b> collection <b>Default:</b> None	The mandatory or optional input(s) to send.

## Request Mandatory and Optional Inputs

Users must enter mandatory inputs for each request and can also enter additional optional inputs. For the full list of inputs and their identification, grouping, descriptions, and format, please refer to this [Green Upgrade Calculator API Inputs and Output Details](#).

## Request Example

The following example shows the Python script to analyze the cost and climate impact of a rooftop solar installation for a specific single-family home.

```
import requests
import json
import pandas as pd

url = https://greenup-api.rmi.org/guc
list_output = ['net_cost_upfront', 'net_cost_1st_year', 'net_cost_lifetime',
               'net_emissions_upfront', 'net_emissions_1st_year', 'net_emissions_lifetime']

data = {
    "mode": "Home",
    "zipcode": "80304",
    "hometype": "Single-Family Detached Home",
    "homeyr": "pre-1980",
    "homearea": "2500",
    "solar": "Yes",
    "ac_current": "Ducted Central AC",
    "spaceheat_current": "Natural Gas Furnace",
    "wh_current": "Tank Natural Gas Water Heater",
    "cooking_current": "Natural Gas Range",
}

payload = json.dumps({
    "data": data,
    "api_key": API_KEY,
    "format": "json"
})

headers = {
    "Content-Type": "application/json"
}

response = requests.request("POST", url, headers = headers, data = payload)
response.raise_for_status()

json_data = response.json()

df = pd.DataFrame.from_dict(json_data, orient='index')
outputs = df.loc[list_output]
```

## Request Errors

All response codes are returned in the status code of the https response header. These are the most common response codes:

- 200: Request was processed.
- 400: Bad request. One of the requested parameters is not valid.
- 404: One of the requested elements was not found.

## 3. Receiving API Results

### Response Fields

The response is composed of service-related informational fields and the results of the data query.

FIELD	VALUE	DESCRIPTION
<b>inputs</b>	<b>Type:</b> collection	The input parameters received in the request
<b>errors</b>	<b>Type:</b> array of strings	Any error messages resulting from the request.
<b>warnings</b>	<b>Type:</b> array of strings	Any warning messages resulting from the request.
<b>metadata</b>	<b>Type:</b> collection	Any metadata associated with the request (sources, etc.)
<b>outputs</b>	<b>Type:</b> collection	The data outputs from the request.

### Interpreting Results

For a description of the result values, please refer to this [Green Upgrade Calculator API Inputs and Output Details](#).