Personal Sustainability

START Hack Challenge 2023 – Deep Dive

Google

Who are we?

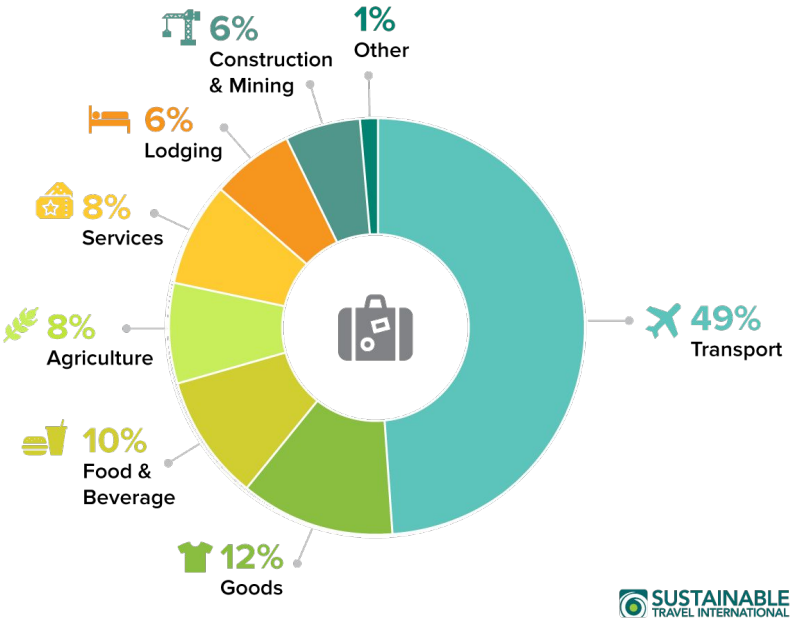
Tourism generates **8% of global CO2 emissions** of which transportation is the largest contributor (49%)

Transport Sustainability team tries to help users understand and reduce these emissions.

Oli
Sustainable Decisions

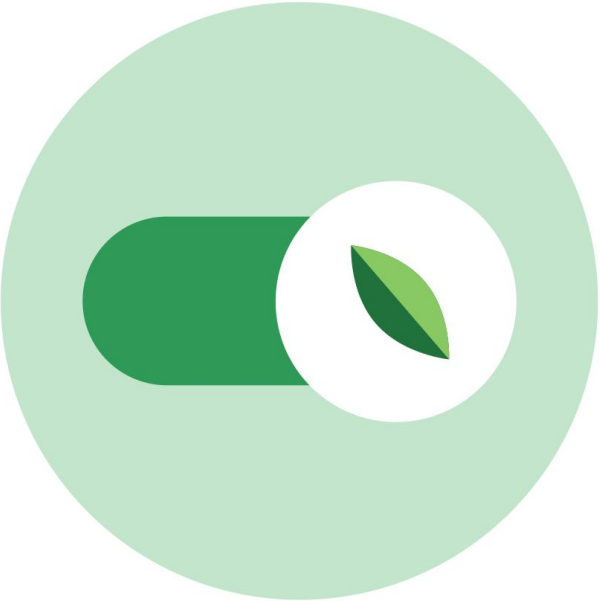
Max
Train & Flight Emissions

Carbon Footprint of Global Tourism

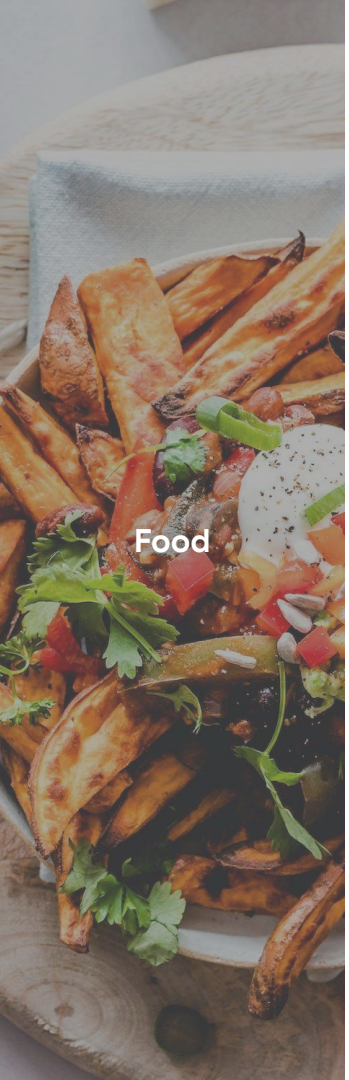


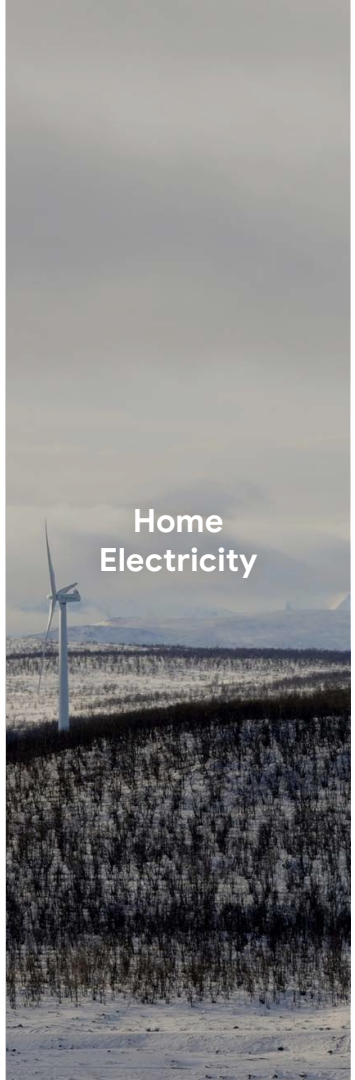
Enabling everyone

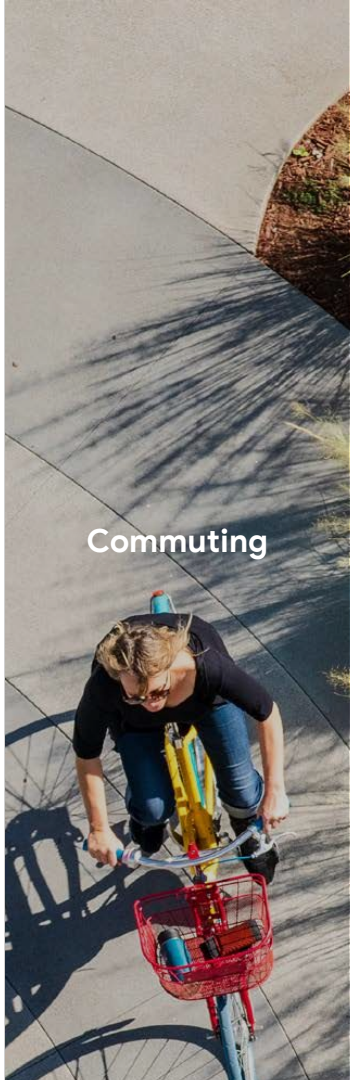
Help individuals **understand** their personal impact on climate change and/or **enable** them to **act** to reduce personal emissions

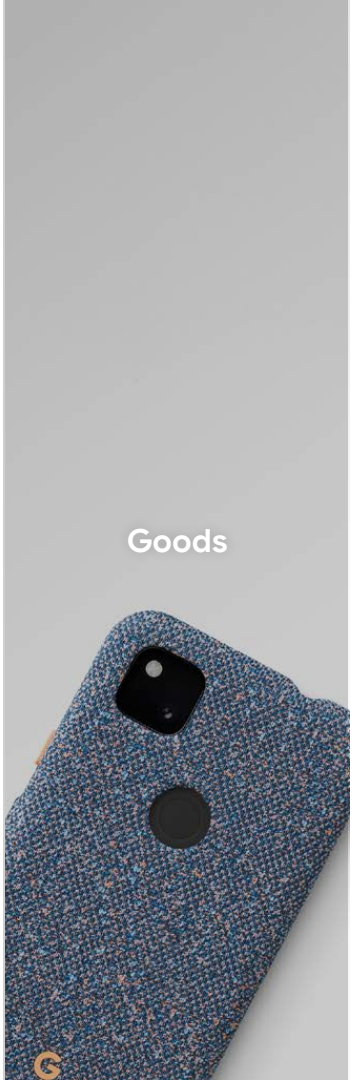


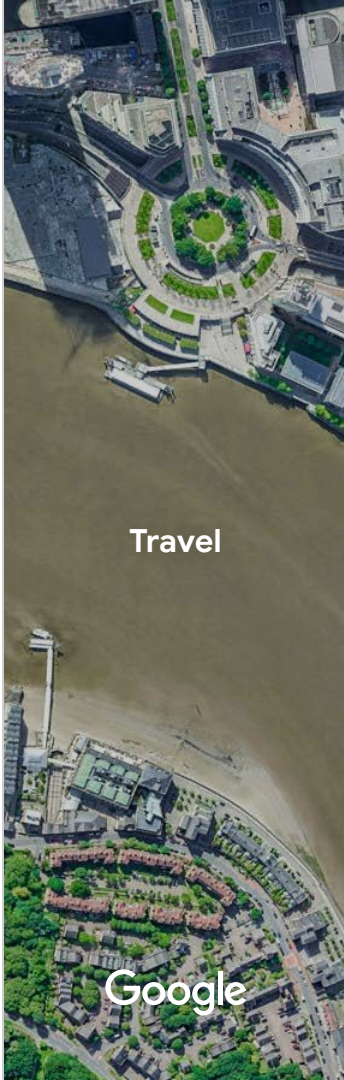
Example Use Cases


Food


Home
Electricity


Commuting


Goods


Travel
Google

Save energy at home

Much of our electricity and heat are powered by coal, oil and gas. Use less energy by lowering your heating and cooling, switching to LED light bulbs and energy-efficient electric appliances, washing your laundry with cold water, or hanging things to dry instead of using a dryer. Improving your home's energy efficiency, through better insulation for instance, or replacing your oil or gas furnace with an electric heat pump can reduce your carbon footprint by up to 900 kilograms of CO2e per year.

Walk, bike, or take public transport

The world's roadways are clogged with vehicles, most of them burning diesel or gasoline. Walking or riding a bike instead of driving will reduce greenhouse gas emissions -- and help your health and fitness. For longer distances, consider taking a train or bus. And carpool whenever possible. Living car-free can reduce your carbon footprint by up to 2 tons of CO2e per year compared to a lifestyle using a car.

Eat more vegetables

Eating more vegetables, fruits, whole grains, legumes, nuts, and seeds, and less meat and dairy, can significantly lower your environmental impact. Producing plant-based foods generally results in fewer greenhouse gas emissions and requires less energy, land, and water. Switching from a mixed to a vegetarian diet can reduce your carbon footprint by up to 500 kilograms of CO2e per year (or up to 900 kilograms for a vegan diet).

Round trip | 1 | Economy

Zürich | London | e, Apr 11

All filters | Stops | Airlines | Bags | Price | Time | Duration

Track prices | Apr 7 – 11 | Any dates | Price graph

Higher emissions

This flight	82 kg CO_2
Typical for this route	70 kg CO_2
17% higher	+12 kg CO_2

Emissions are calculated for 1 passenger in your selected seating class. A flight's climate impact is made up of emissions and non-CO2 effects. Learn more

View low emissions options

Best departing flights

Ranked based on price and convenience | Prices include required taxes + fees for 1 adult. O | info. | Sort by:

easyJet	9:30 PM – 10:10 PM easyJet	1 hr 40 min ZRH–LGW	No		CHF 264 round trip
	7:15 PM – 8:05 PM British Airways	1 hr 50 min ZRH–LHR	Nonstop	82 kg CO_2 +17% emissions	CHF 283 round trip
	5:10 PM – 5:55 PM SWISS	1 hr 45 min ZRH–LHR	Nonstop	62 kg CO_2 -11% emissions	CHF 299 round trip

Example Data Sources

API Overview

The Travel Impact Model API exposes emission estimates computed according to the Travel Impact Model. These emission estimates are also shown on Google Flights.

The API is public and free of charge.

For authentication, you will need an API key.

Emission estimates model Overview

The Travel Impact Model is a state of the art emission estimation model for flights.

The methodology is published on GitHub.

Flight emission estimates data

This API supports worldwide commercial flights that depart in the next 11 months.

Charter flights, private flights and cargo flights are not supported. Past flights are not supported. Please get in contact with us (see the Support page) if you have inquiries and feature requests.

The data exposed by this API is under the CC BY-SA 4.0 license.

Call the API example

```
curl https://travelimpactmodel.googleapis.com/v1/flights:computeFlightEmissions
  -H "Content-Type: application/json" -d \
  '{
    "flights": [
      {
        "origin": "ZRH",
        "destination": "CDG",
        "operating_carrier_code": "AF",
        "flight_number": 1115,
        "departure_date": {"year": 2023, "month": 11, "day": 1}
      },
      {
        "origin": "CDG",
        "destination": "BOS",
        "operating_carrier_code": "AF",
        "flight_number": 334,
        "departure_date": {"year": 2023, "month": 11, "day": 1}
```

```
{
  "flightEmissions": [
    {
      "flight": {
        "origin": "ZRH",
        "destination": "CDG",
        "operatingCarrierCode": "AF",
        "flightNumber": 1115,
        "departureDate": {
          "year": 2023,
          "month": 11,
          "day": 1
        }
      },
      "emissionsGramsPerPax": {
        "first": 94647,
        "business": 94647,
```

CO_2 and Greenhouse Gas Emissions
CO2 and Greenhouse Gas Emissions Country Profiles
Why do greenhouse gas emissions matter?
How are greenhouse gas emissions and concentrations changing?
Atmospheric concentrations of CO2 continue to rise
Global emissions have not yet peaked
Current climate policies will reduce emissions, but not quickly enough to reach international targets
Which countries have set net-zero emissions targets?
Can we make progress in reducing emissions?
How do we make progress in reducing emissions?
Endnotes
Licence
Citation

How do we make progress in reducing emissions?

To make progress in reducing greenhouse gas emissions, there are two fundamental areas we need to focus on: **energy** (this encapsulates electricity, heat, transport, and industrial activities) and **food and agriculture** (which includes agriculture and land use change, since agriculture dominates global land use).

Below we've listed some of the key actions we need to make progress in each area. At a very basic level they can be summarised by two core concepts: **improving efficiency** (using less energy to produce a given output; and using less land, fertilizer, and other inputs for food production, and reducing food waste); and **transitioning to low-carbon alternatives** (in energy, this means shifting to renewables and nuclear; for food, this means substituting carbon-intensive products for those with a lower carbon footprint).

How can we decarbonize our energy systems?

1. **Shift towards low-carbon electricity (reduce carbon intensity – carbon per unit energy)**
   – Renewables
   – Nuclear energy
   – Shift from coal to gas (which emits less CO_2 per unit of energy) as an interim step
   → **Explore our work** on energy.
   → **Explore our data** on CO2 emissions by fuel type.
2. Shift sectors such as transport, towards electricity. Some energy sectors are harder to decarbonize – for example, transport. We, therefore, need to shift these forms

ourworldindata.org

Open Data Portal Anwendungen Werkstatt Datensätze suchen...

Stadt Zürich
Open Data

Startseite Datensätze Kategorien Showcases

Kategorien > Umwelt

Kategorie

Umwelt

212 Datensätze

Tags

geodaten (180)

Suchen

Suchen nach:

Sortieren nach:

Relevanz

Zurücksetzen Suchen

Suchergebnis: 212 Treffer

Daten der Verkehrszählung zum motorisierten Individualverkehr (Stundenwerte),...

Die hier verfügbaren Datensätze beinhalten die täglich aktualisierten Messwerte zum motorisierten Individualverkehr (MIV) in der Stadt Zürich, welche von den zahlreichen...

csv pdf zip

data.stadt-zuerich.ch

Filter

Compute a route matrix
Request route polylines
Configure waypoints
Configure route options
Configure preferences for quality vs latency
Route two-wheeled vehicles
Calculate toll fees
Configure route modifiers
Request alternative routes
Configure eco-friendly routes

Best practices
Web services best practices

Billing and monitoring
Usage and billing
Reporting and monitoring

Policies and terms
Policies
Terms of Service

Configure eco-friendly routes

This product or feature is in Preview (pre-GA). Pre-GA products and features might have limited support, and changes to pre-GA products and features might not be compatible with other pre-GA versions. Pre-GA Offerings are covered by the Google Maps Platform Service Specific Terms. For more information, see the launch stage descriptions.

Note: Eco-friendly routes are not supported by the Compute Route Matrix feature of the Routes API.

By default, the Routes API returns the *default* route, meaning a route without factoring in fuel or energy-efficiency. When you enable *eco-friendly routing*, you still get the default route in the response. In addition, you also get back an eco-friendly route showing the most fuel- or energy-efficient route based on your vehicle's engine type.

The eco-friendly route returned by the Routes API is optimized for lower fuel consumption over the entire route. The API uses your vehicle's engine type along with other factors such as real-time traffic and road conditions to choose the eco-friendly route. The more fuel or energy-efficient the route, the lower your car's fuel/energy usage and CO2 emissions.

For example, a diesel vehicle's relative fuel economy advantage is generally greatest in highway driving. Hybrid and electric vehicles tend to provide progressively greater efficiency in stop-and-go city driving and hilly driving environments where they can extensively use and benefit from regenerative braking.

You can also request that the API returns the *estimated fuel consumption* for the entire route. Use the fuel consumption estimates as a way to compare different routes, not as explicit fuel usage estimates for your exact vehicle

On this page
How Google Maps estimates fuel efficiency
Prerequisites
Billing
Request an eco-friendly route
Example eco-friendly request
Example eco-friendly response
Estimate fuel usage for the route
Supported regions

Recommended for you
Cloud-based maps styling
Updated 13 Mar 2023
Add a map to your website (JavaScript)
Updated 7 Nov 2022
Method: spreadsheets.values.update
Updated 19 Dec 2022

An official website of the United States government Here's how you know

State

State of Washington

There is no description for this organization

Topics

Local Government

Publisher

data.wa.gov

Contact

Department of Licensing

Share on Social Sites

Twitter

This is a Non-Federal dataset covered by different Terms of Use than Data.gov.

Electric Vehicle Population Data

Metadata Updated: March 18, 2023

This dataset shows the Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) that are currently registered through Washington State Department of Licensing (DOL).

Access & Use Information

Public: This dataset is intended for public access and use.

Non-Federal: This dataset is covered by different Terms of Use than Data.gov.

License: See this page for license information.

Downloads & Resources

Comma Separated Values File 112 views

Download

RDF File

Download

Live carbon intensity

This endpoint retrieves the last known carbon intensity (in gCO2eq/kWh) of electricity consumed in an area. It can either be queried by zone identifier or by geolocation.

HTTP Request

`GET https://api.electricitymap.org/v3/carbon-intensity/latest`

Query Parameters

Parameter	Description
zone	A string representing the zone identifier
lon	Longitude (if querying with a geolocation)
lat	Latitude (if querying with a geolocation)
emissionFactorType	(optional) type of emission factors used for computing the carbon intensity
disableEstimations	(optional) boolean (if estimated data should be disabled)

```
curl 'https://api.electricitymap.org/v3/carbon-intensity/latest?zone=DE' \
  -H 'auth-token: myapitoken'
```

The above command returns a JSON with units in gCO2eq/kWh:


```
{
  "zone": "DE",
  "carbonIntensity": 302,
  "datetime": "2018-04-25T18:07:00.350Z",
  "updatedAt": "2018-04-25T18:07:01.000Z",
  "emissionFactorType": "lifecycle",
  "isEstimated": true,
  "estimationMethod": "TIME_SLICER_AVERAGE"
}
```


Live power breakdown

This endpoint retrieves the last known data about the origin of electricity in an area.

- "powerProduction" (in MW) represents the electricity produced in the zone, broken down by production type
- "powerConsumption" (in MW) represents the electricity consumed in the zone, after taking into account imports and exports, and broken down by production type.
- "powerExport" and "Power import" (in MW) represent the physical electricity flows at the zone border
- "renewablePercentage" and "fossilFreePercentage" refers to the % of the power consumption breakdown coming from renewables or fossil-free power plants (renewables and nuclear) It can either be queried by zone identifier or by geolocation.

HTTP Request

`GET https://api.electricitymap.org/v3/power-breakdown/latest`

Query Parameters

```
curl 'https://api.electricitymap.org/v3/power-breakdown/latest?lat=48.8566&lon=2.3522' \
  -H 'auth-token: myapitoken'
```

The above command returns JSON with units in % and MW:


```
{
  "zone": "FR",
  "datetime": "2022-04-20T09:00:00.000Z",
  "updatedAt": "2022-04-20T06:40:32.246Z",
  "createdAt": "2022-04-14T17:30:23.620Z",
  "powerConsumptionBreakdown": {
    "nuclear": 31479,
    "geothermal": 0
```

FREE FOR NON-COMMERCIAL USE

Use electricity when its carbon footprint is lowest

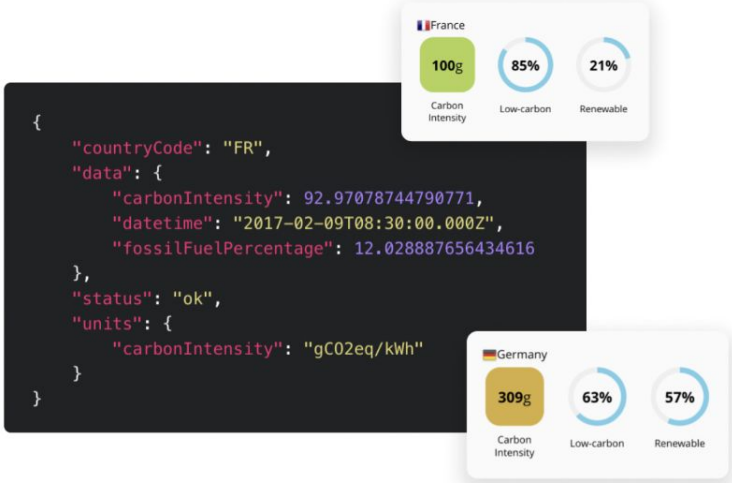
The CO2signal API gives you access to where the electricity in a specific region comes from, how it was produced and how much carbon was emitted to produce it. All free for non-commercial use.

Enter your email GET FREE API KEY

☐ I accept that Electricity Maps is allowed to send the CO2signal API and other relevant information to this email. Learn more about our Privacy Policy. It is possible to unsubscribe at any time.

Free for individual users and developers. Competitive offers for companies.

Already signed up but did not receive your API key?



Show the carbon intensity

Get the most recent carbon intensity numbers for any country on Electricity

Help the world

Using electricity when the wind blows or the sun shines helps integrating

Free for developers

Free for individual users and developers. Competitive offers for

RESTful API

One single API for all countries covered. No need to use several API's for your

Made by ELECTRICITY MAPS

Scoring & Prizes

Scoring

Potential climate impact **40%**:

- Can this solution achieve Incremental improvements for many people or major improvements for few people?
- How well does this solution solve your scoped problem?

Creativity & innovation of solution **20%**:

- How original are these ideas?

Technical sophistication & feasibility **40%**:

- Is this solution backed properly by different data sources or does it only use hardcoded demo data?
- How generalized is this technical solution? Does it only work in certain demo cases?
- Are there fundamental issues preventing a real implementation?
- We fully understand the time constraints of the Hackathon. Prototypical code and lack of automated tests is acceptable.

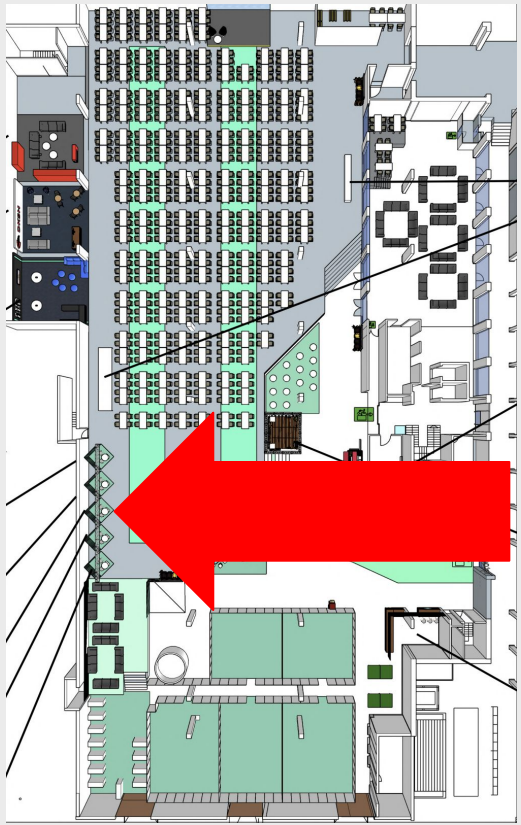
Please note: Even though this is a Google sponsored hack case your solution DOES NOT need to use Google APIs or be hosted on Google Cloud or be directly connected to Google in any way.

Prizes

Nest Hubs

Meet & Greet & Lunch
with the Google Travel Sustainability Team

Questions?



Google