

Climate solutions in the digital sector: *An avoided emissions case study*

Technology company Google is enabling rooftop solar PV development by building data into critical system design and customer education tools for solar installers.

→ **~1.3 million
tCO₂e avoided
emissions**

from 5 GW of installed rooftop solar PV capacity enabled by Solar API in the United States in 2025.



**680,000
installations**

**enabled* by
Solar API from
2023-2025.**

*as a contributor in a value chain including solar panel manufacturers, installers, and building owners.

Capturing avoided emissions

— assessment details

- **Functional unit (FU):** 1 kWh of electricity generated.
- **Impact:** ~0.2 kgCO₂e avoided emissions per kWh generated
- **Time period:** Year-on-year (2025).
- **Scope:** Solar PV electricity displacing grid electricity in the United States, for installed capacity enabled by Solar API from 2023-2025.
- **System boundaries:** Cradle-to-grave emissions for solar PV and grid electricity production, using hourly- and location-matched grid average data, including Solar API compute in the solution scenario (less than 0.3% total system impact).

Use this document to support your understanding of real-life avoided emissions use cases. Learn more in the WBCSD Guidance on Avoided Emissions, available at:



The reference scenario

- Installing rooftop solar requires information, decisions, and coordination across building owners, manufacturers, installers, software providers – each plays a critical role in the system.
- Without the successful interplay of the system components to enable the installation, buildings continue to use grid electricity.
- A key step to transition to rooftop solar is a site survey.
- Onsite measurements to inform installations can be used instead of or in addition to digital tools.

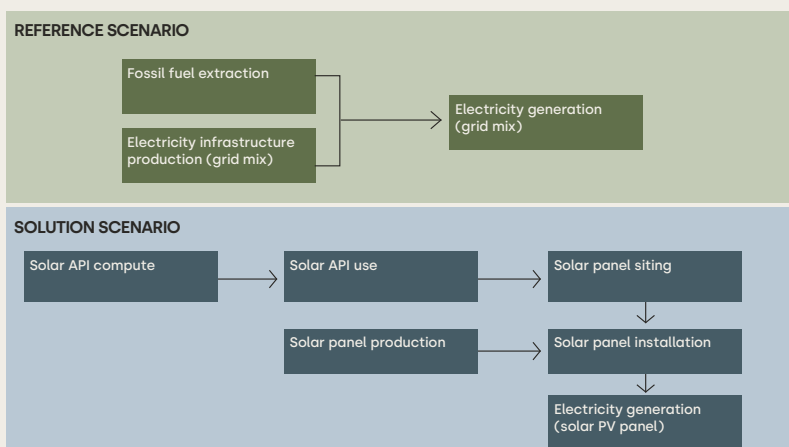
The low-carbon scenario

- Solar API combines aerial and satellite imagery, 3D rooftop models, and site data to enable technicians to quickly and cost-effectively assess solar potential, design systems and create customer proposals.
- Customer statements, side-by-side studies, and its adoption as an enterprise tool indicate that Solar API has played a substantial role in supporting solar installations.
- Customers report that proposal-installation-permit cycles are shortened and conversion rates go up when using Solar API. This case study includes sites where an API call preceded permit issuance by six months or less.
- Using electricity from rooftop solar PV reduces emissions associated with end users' electricity consumption compared to the grid mix.
- The scenario captures the total avoided emissions of the solar rollout. Google acknowledges the many partners who play a substantial role.



Source: Google

How it works



WBCSD Avoided Emissions Eligibility Gates

- ☒ Gate 1: Climate Action Credibility ☒ Gate 2: Climate Science Alignment ☒ Gate 3: Contribution Legitimacy

Context of this use case

Solar API represents minimal share of Google's carbon footprint: 3,600 tCO₂e from 2023-2025.

Environmental and social side effects

Households with rooftop solar may increase electricity consumption as a typical rebound effect; this can be mitigated by promoting energy efficiency and aligning consumption with solar production, for example through smart home recommendations.

Third-party verification

None. The assessment was conducted in line with Google's [Enabled emissions reduction principles](#).