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October 23, 2019

Heather King, AICP
Air Pollution Specialist, Sustainable Transportation and Communities Division
California Air Resources Board

Subject: Supplemental Documentation for AB 900 Application

Dear Ms. King:

Google LLC is seeking AB900 Environmental Leadership Development Program (ELDP) certification for the planned Mixed Use development in Downtown West San Jose. The AB900 application was submitted on August 26, 2019 and posted on the Office of Planning and Research (OPR) website on September 3, 2019. Public review of the document closed on October 3, 2019.

On September 25, 2019, Google, its consultants, and California Air Resources Board (CARB) discussed the greenhouse gas (GHG) methodology used in the AB900 application and how to establish an upper and lower bound range related to GHG emissions. Due to the size and scope of the project, multiple project elements are still in flux at this time. Therefore, Google has developed a lower bound for the GHG emission and transportation efficiency calculations to accompany the previously provided upper bound in order to adequately describe a range of potential outcomes. Trip and vehicle miles travelled calculations, emission calculations, and procurement of carbon offsets are further described in the following attached documents:

- Technical Memorandum
- Attachment A, Lower bound retail trip generation rate supplemental methodology
- Attachment B, Supplement to the Analysis of GHG Impacts for the Downtown West Mixed-Use Plan
- Attachment C, Google's Carbon Offsets: Collaboration and Due Diligence
- Attachment D, Downtown West San José Mixed Use Plan: City Commitment to Enforce AB 900 Requirements Letter

We appreciate the time that CARB staff has spent reviewing the AB900 application and hope this supplemental documentation answers the questions raised at the September meeting.

Sincerely,

Heidi Rous

Heidi Rous
Director

CC: Jeannie Lee, AICP, Senior Counsel, Governor's Office of Planning and Research
Natalie Kuffel, JD, Land Use Counsel, Governor's Office of Planning and Research
Rosalynn Hughey, Director, Department of Planning, Building, and Code Enforcement, City of San Jose
Dr. Robert Manford, Deputy Director, Department of Planning, Building, and Code Enforcement, City of San Jose

Technical Memorandum

date	October 23, 2019
to	Heather King, AICP
from	Heidi Rous, Director
subject	Supplemental Submittal for the AB 900 Application for the Downtown West San José Mixed-Use Plan (9/3/2019)

In response to meeting with the California Air Resources Board (CARB) on September 25, 2019, Google LLC has prepared additional documentation to supplement the AB 900 Application for the Downtown West San José Mixed-Use Plan. This memorandum includes justification for the 30-year project lifetime by phase, quantification of greenhouse gas (GHG)-reducing project elements, and Google's policy for obtaining high-quality carbon offsets.

30-Year Project Lifetime

The 30-year project lifetime is an established standard used by multiple public agencies to quantify a project's GHG emissions. The proposed project uses a 30-year project lifetime in a phased approach as construction is slated to occur in three phases over a 10-year period. As such, operational emissions would sunset 30 years after construction completes by phase. The 30-year lifetime is considered reasonably foreseeable and a realistic operating period for a building. This method for quantification is supported by CARB, the Bay Area Air Quality Management District (BAAQMD), and the Office of Environmental Health Hazard Assessment.[1] As a result, it has been used in multiple California Environmental Quality Act documents and approved AB 900 applications. In particular, CARB has issued guidance to use the 30-year project lifetime in its GHG Quantification Methodology for the Affordable Housing and Sustainable Communities program. The methodology explicitly states that California Emissions Estimator Model (CalEEMod) projects must use a 30-year project lifetime to complete this methodology.[2] Therefore, the proposed project will continue to use the 30-year project lifetime in the GHG emissions calculations as supported by the aforementioned documents and agencies.

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1 BAAQMD. Air Toxics NSR Program Health Risk Assessment Guidelines. December 2016. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf?la=en

2 CARB. Greenhouse Gas Quantification Methodology for the Strategic Growth Council Affordable Housing and Sustainable Communities Program. March 17, 2015. Available at: https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/sgcahsc_quantificationmethodsv2track.pdf

Quantification of GHG-Reducing Project Elements

Through further evaluation of the land uses, the team was able to calculate a less conservative estimate for mobile emissions, energy emissions, and water emissions. For mobile emissions, a lower bound was developed by assigning a potential distribution of retail land uses with lower trip generation rates (**Attachment A**, *Lower Bound Retail Trip Generation Rate Supplemental Methodology*). Institute of Transportation Engineers trip rates were then determined for each specified land use, consistent with the City of San José Traffic Impact Analysis Handbook, and combined to formulate a weighted average. The lower bound of retail trip generation improved the transportation efficiency in all three phases of the proposed project. While AB 900 requires a minimum trip reduction of 15 percent from a comparable project, the proposed project achieves a lower bound of 20.3 percent to 23.2 percent reduction with this refinement. (The proposed project previously achieved an upper bound of 17.8 percent to 21.2 percent reduction.) In addition to the reduction in mobile trips and emissions, building emissions were also re-evaluated to identify areas of improvement.

Building energy emissions were reduced through advanced energy models that incorporated energy efficiencies and limited energy waste that met or exceeded ASHRAE 2019 in line with the LEED Gold commitment. Similarly, water demand factors were reduced from CalEEMod defaults to more appropriate site-specific factors that account for recycled water use from on-site wastewater collection. On-site solar photovoltaic generation, which had been previously been considered but not quantified, has now been included in the lower bound calculations. Combined, the refined project results in a lower bound of a gross 1.9 million metric tons of carbon dioxide equivalent (MTCO2e) including both construction and operation. This lower bound saves over half a million MTCO2e compared to the more conservative analysis, or upper bound estimate, over the project's lifetime. The emission reductions are discussed in further detail in **Attachment B**, *Supplement to the Analysis of GHG Impacts for the Downtown West Mixed-Use Plan*.

High-Quality Carbon Offsets

In 2007, Google made a commitment to be a carbon neutral company. The strategy was based on three pillars: (1) to be as efficient as possible and do more with less; (2) to source clean energy for our operations; and (3) to buy high-quality carbon offsets as a temporary solution to neutralize any remaining emissions.

As described in **Attachment C**, *Google's Carbon Offsets: Collaboration and Due Diligence White Paper*, Google has a long history of working with carbon offset projects and producers. As part of their standard practice, all carbon offset projects are verified by third-party investigators using published public standards. Once a project is verified as creating a credible reduction in GHGs, a carbon registry issues a carbon credit for each metric ton of carbon dioxide (or equivalent) reduced. Google has demonstrated a proactive approach in pursuing high-quality offset projects through direct interaction with project developers, owners, marketers, and brokers. Google performs its due diligence through documentation review, in-person site visits, and verification reports. For the proposed project, the procurement of such carbon offsets or renewable energy certificates (RECs) would be

binding and enforceable by the lead agency (**Attachment D**, *Downtown West San José Mixed Use Plan: City Commitment to Enforce AB 900 Requirements Letter*). Typically, Google allows for a 3-year window between the carbon footprint year and year of reduction given the uncertainty of the exact number of metric tons required to offset a project once implemented.

Attachment A

Lower Bound Retail Trip Generation Rate Supplemental Methodology

MEMORANDUM

To: Alexa Arena, Google LLC

From: Nelson\Nygaard Consulting Associates

Date: October 23, 2019

Subject: Lower Bound Retail Trip Generation Rate Supplemental Methodology

This memorandum provides information supplemental to the AB 900 Transportation Assessment dated August 2019 to capture the reasonably foreseeable lower bound of transportation impacts. After the discussion with the California Air Resources Board, the transportation team analyzed the average retail trip generation rate based on the potential retail breakdown to provide a more granular estimation of what the actual transportation activity could be. This resulted in a lower bound retail trip generation rate and lower vehicle-miles traveled.

As outlined in the original application, the project will include up to 500,000 sq. ft. of active ground-floor uses collectively defined as retail to support the office and residential land uses. An average retail trip generation of 120 daily trips per 1,000 sq. ft. was applied to the total projected retail area was used to calculate a conservative upper bound limit of possible project-related trips generated. In an effort to refine the analysis, Google provided a breakdown of a reasonably foreseeable distribution of this active ground-floor space, which allowed Nelson\Nygaard to provide a lower bound retail trip generation rate.

The previous 120-retail trip generation rate used was obtained from the City of San José Traffic Impact Analysis Handbook (San José TIA).[1] The San José TIA establishes that trip generation rates may be obtained from:

- The Institute of Transportation Engineers (ITE)
- The San Diego Association of Governments (SANDAG)
- The City of San José

To develop the lower bound retail trip generation, the specific anticipated active floor uses were matched with a corresponding ITE trip generation land use and its trip generation rate. Then each of the ITE trip generation rates were weighted (multiplied) by the percentage area from each proposed retail use of the total retail area. Lastly, the weighted rates were added to obtain a weighted retail trip generation rate of 74. Table 1 shows the project's anticipated retail uses, the ITE trip generation rate, and the weighted trip generation rates.

[1] City of San Jose. 2009. Traffic Impact Analysis Handbook, volume 1 Methodologies and Requirements. Available at: https://www.sanjoseca.gov/DocumentCenter/View/4366 (Accessed on October 2019)

Table 1
Trip Generation Rates for Specific Retail Land Uses

Project's potential retail land uses	Percent of total retail area	ITE trip rate* (trips per 1,000 sq. ft.)	Weighted rate by % of sq. ft.
Neighborhood Retail	35%	38	13
Food and Beverage	40%	131	52
Co-working Space	4%	10	1
Entertainment	5%	78	4
Education - Learning	10%	20	2
Fitness Center	6%	39	2
Total retail area	100%	Final weighted retail trip generation rate	74

*ITE trip generation land uses used in order: shopping center, average for food and beverage, general office building, movie theater, average for education, health/fitness club

The lower bound retail trip generation rate (74 trips per 1,000 sq. ft.) is approximately 40% lower than the previous retail rate of 120 trips per 1,000 sq. ft. The lower bound retail rate was developed by assigning specific land uses for the project's retail area that capture the scale and diversity of active floor uses. Because the ITE trip generation rates are obtained from standalone and mostly suburban land uses, some categories in the active floor area of the proposed project do not have an exact match with the ITE categories. The transportation team prioritized the selection of ITE land uses that were as similar as possible to the proposed active floor uses. For the land uses where a single category did not provide an adequate fit, an average rate of ITE categories was developed to ensure that the assigned rate includes a wide range of rates and does not underestimate the potential trip generation, this was the case for the following two land uses:

- The food and beverage land use had a wide range of ITE trip generation rates. This is because there are notable differences in the potential type of food and beverage establishments (high-turnover, fast casual, drinking place, etc.), and therefore in the resulting trip generation rates. All potential individual ITE trip generation rates for this type of land use were used to obtain an average retail rate for this active floor use (see Table 2).
- The education - learning land use proposed in the project is in part expected to be a space for training courses and short-term classes for local workers and nearby residents. ITE trip generation land uses do not have a category similar to this and most of the land uses are related to more formal education institutions. As a conservative proxy an average of the trip generation rate for those education institutions was used for this active floor use (see Table 3). Even if the resulting average trip rate for the education - learning land use might be higher than expected, the impact on the weighted retail rate and overall total trips and vehicles miles traveled (VMT) should be minimal since this space is planned for up to 10% of the total retail area.

Table 2
ITE Trip Generation Rates for Food and Beverage Land Uses
(used for evaluation purposes only)

ITE category	Trip generation rate
Drinking Place	11
High-Turnover (Sit-Down) Restaurant	112
Fast Casual Restaurant	315
Quality Restaurant	84
Average trip generation rate for food and beverage	131

Table 3
ITE Trip Generation Rates for Education - Learning Land Uses
(used for evaluation purposes only)

ITE category	Trip generation rate
Elementary school	20
Middle School/Junior High School	20
High School	15
Junior/Community College	20
University/College	26
Average trip generation rate for education	20

The retail generation trip rate was applied to the total 500,000 sq. ft. reflecting the project's lower bound transportation efficiency. Table 4 shows the supplemental results and a comparison with the transportation efficiency change in the original application. It can be observed that the lower bound retail trip generation has improved the transportation efficiency in all phases of the proposed project.

Table 4
Supplemental Transportation Efficiency by Phase

Project	Phase 1 Transportation Efficiency	Phase 2 Transportation Efficiency	Phase 3 Transportation Efficiency
Variant A[2]	0.434	0.442	0.428
Variant A Comparable	0.565	0.554	0.548
Reduction from Comparable Project (lower bound weighted retail trip generation rate = 74)	23.2%	20.3%	22.0%
Reduction from Comparable Project (upper bound general retail trip generation rate = 120)	21.2%	17.8%	19.5%

[2] Google, LLC. (August 2019). *Figure 5: Table of Land Uses by Phase*. Appendix A, AB 900 Transportation Assessment for San José Downtown West Mixed-Use Plan, Environmental Leadership Document Project Application: Downtown West Mixed Use Plan.

Attachment B

Supplement to the Analysis of GHG Impacts for the Downtown West Mixed-Use Plan

Google

Supplement to the Analysis of GHG Impacts for the Downtown West Mixed-Use Plan

October 2019

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Appendix A: Supporting Tables

1 Introduction

The following document is submitted as a supplement to the report titled *Analysis of GHG Impacts for the Downtown West Mixed-Use Plan* submitted as part of the AB900 application in August 2019. This document shows results for the same project with more efficiency measures in place, representing a lower bound that reflects strategies currently being investigated for the project. Note that emissions from the following categories have not been changed from the original application:

- Municipal Solid Waste
- Landscaping/ Area Sources
- Carbon Sequestration

2 Lower Bound Mobile Emissions Results

As outlined in the original application, the project will include up to 500,000 sq. ft. of active, ground-floor uses collectively defined as retail to support the office and residential land uses. An average retail trip generation of 120 daily trips per 1,000 sq. ft. floor area was applied to the total projected retail area as a conservative approach to estimate the trips generated. In an effort to provide a lower bound as requested by CARB, Google provided more detail on a reasonably foreseeable distribution of this active ground-floor space, which allowed Nelson\Nygaard to recalibrate the average retail trip generation rate.

To calculate the lower bound of the retail trip generation, the proposed active floor uses were matched with an ITE trip generation land use and its correspondent trip generation rate. Then each of the ITE trip generation rates were weighted (multiplied) by the percentage area from each proposed retail use on the total retail area. Lastly, the weighted rates were added to obtain a weighted retail trip generation rate of 74. Table A. 1 shows the resultant annual trip numbers and VMT for the period 2024-2060 based on potential retail distribution. Table 1 presents the annual lower bound emissions from mobile emissions.

Table 1: Annual Lower Bound Emissions from Mobile Sources

YEAR	MOBILE SOURCE GHG EMISSIONS [$MTCO_2e/yr$]	YEAR	MOBILE SOURCE GHG EMISSIONS [$MTCO_2e/yr$]
2024	15,795	2043	48,986
2025	15,774	2044	48,973
2026	15,753	2045	48,960
2027	36,714	2046	48,946
2028	36,673	2047	48,933
2029	36,631	2048	48,919
2030	49,112	2049	48,906
2031	49,099	2050	48,893
2032	49,134	2051	48,879
2033	49,120	2052	48,866
2034	49,107	2053	48,852
2035	49,094	2054	48,8391
2036	49,080	2055	34,021
2037	49,067	2056	34,012
2038	49,053	2057	34,0042
2039	49,040	2058	13,319
2040	49,027	2059	13,316
2041	49,013	2060	13,312
2042	49,000		

[1] End of Phase 1 30-year operational reporting period

[2] End of Phase 2 30-year operational reporting period

3 Lower Bound Energy Emissions Results

Additional potential measures were analyzed to reduce the electrical load resulting in further carbon dioxide emissions associated with the site. Additional energy efficiency reductions were modelled including improved insulation of the building envelopes, changing the operation of the HVAC, reducing the plug load, and converting the lighting to occupancy-controlled LEDs, all to meet or exceed ASHRAE 2019 and in line with the LEED Gold commitment. These were all modelled in EnergyPlus and compiled into the demand forecasts. The system has also been modelled using advanced modelling methods to minimize energy waste on the system using a combination of heat recovery chillers, thermal storage, and batteries. Table 2 presents the lower bound of electrical consumption and resultant GHG emissions.

Table 2: Annual Lower Bound Emissions from Electricity

YEAR	ELECTRICITY [MWh/yr]	GHG EMISSIONS (DECARBONIZED) [$MTCO_2e$/yr]
2024	57,996	7,951
2025	57,996	7,569
2026	57,996	7,187
2027	129,287	15,170
2028	129,287	14,318
2029	129,287	13,467
2030	187,104	18,256
2031	187,104	17,024
2032	187,104	15,792
2033	187,104	14,560
2034	187,104	13,327
2035	187,104	12,095
2036	187,104	10,863
2037	187,104	9,630
2038	187,104	8,398
2039	187,104	7,166
2040	187,104	5,933
2041	187,104	4,701

2042	187,104	3,469
2043	187,104	2,236
2044	187,104	1,004
2045	187,104	0[3]
2046	187,104	0
2047	187,104	0
2048	187,104	0
2049	187,104	0
2050	187,104	0
2051	187,104	0
2052	187,104	0
2053	187,104	0
2054	187,104	0
2055	127,516	0
2056	127,516	0
2057	127,516	0
2058	56,291	0
2059	56,291	0
2060	56,291	0

[3] PG&E Grid becomes decarbonized in 2045 in line with CA RPS

4 Lower Bound Water Emissions Results

A water demand study has been conducted to quantify the anticipated water needs for the project. It appears that the CalEEMod water demand factors may not be representative of high-density urban projects. Constructing to CalGreen code requires, for example, using the most advanced low-flow fixtures and greatly reducing water-intensive land cover resulting in much lower indoor and outdoor water use than anticipated using CalEEMod. Water demand factors that are more representative of the type of project planned here have also been adopted by utilities such as San Francisco Public Utilities Commission and third-party organizations such as the US Green Building Council's LEED program. In addition, the commitment to the use of recycled water for all non-potable demands identified in the project, including toilet flushing, irrigation and cooling, will further offset potable water demand. A summary of anticipated water use has been provided in the attached table. Further information can be provided upon request.

The proposed design for wastewater collection includes a potential private, low-pressure sanitary sewer collection network which would be integrated into the proposed utility corridor alignment. Sanitary waste would be collected in a small pump station in each building basement. The pump stations would include a collection tank and a pump to feed into a low-pressure force main, routed within the proposed utility corridor. Pumps would be selected to adequately transfer wastewater solids through the network to the water reuse facility.

The proposed treatment approach for the project employs one or multiple membrane bioreactors (MBRs). The MBR will consist of an anoxic zone for nitrogen removal, an aerobic zone will be used for carbon removal and nitrification and a membrane tank will house the submerged membranes used for tertiary filtration. The secondary solids remaining in the membrane tank will be returned to the activated sludge process as well as removed from the system as waste activated sludge. Upstream of the MBR system, the wastewater will be screened to remove a large fraction of suspended solids. Sanitary solids produced as a by-product from onsite wastewater treatment may be managed onsite through anaerobic digestion, contributing to the project's waste to energy solutions. The tertiary effluent will be disinfected and stored prior to distribution for non-potable end uses. The proposed onsite water reuse facility would treat wastewater to California Code of Regulations Title 22 disinfected tertiary (unrestricted reuse) recycled water standards.

Table 3: Annual Lower Bound Emissions from Water & Wastewater

YEAR	CO_2 EMISSIONS [$MTCO_2$/yr]	CH_4 EMISISONS [$MTCH_4$/yr]	N_20 EMISSIONS [MTN_2O/yr]	GHG EMISSIONS [$MTCO_2e$/yr]
2024	268	3.14	0.08	369

2025	268	3.14	0.08	369
2026	268	3.14	0.08	369
2027	620	7.22	0.18	853
2028	620	7.22	0.18	853
2029	620	7.22	0.18	853
2030	873	10.16	0.25	1,200
2031	873	10.16	0.25	1,200
2032	873	10.16	0.25	1,200
2033	873	10.16	0.25	1,200
2034	873	10.16	0.25	1,200
2035	873	10.16	0.25	1,200
2036	873	10.16	0.25	1,200
2037	873	10.16	0.25	1,200
2038	873	10.16	0.25	1,200
2039	873	10.16	0.25	1,200
2040	873	10.16	0.25	1,200
2041	873	10.16	0.25	1,200
2042	873	10.16	0.25	1,200
2043	873	10.16	0.25	1,200
2044	873	10.16	0.25	1,200
2045	873	10.16	0.25	1,200
2046	873	10.16	0.25	1,200
2047	873	10.16	0.25	1,200
2048	873	10.16	0.25	1,200
2049	873	10.16	0.25	1,200
2050	873	10.16	0.25	1,200
2051	873	10.16	0.25	1,200
2052	873	10.16	0.25	1,200
2053	873	10.16	0.25	1,200
2054	873	10.16	0.25	1,200[4]
2055	605	7.03	0.17	831

[4] End of Phase 1 30-year operational reporting period

2056	605	7.03	0.17	831
2057	605	7.03	0.17	831[5]
2058	253	2.94	0.07	348
2059	253	2.94	0.07	348
2060	253	2.94	0.07	348

5 Lower Bound Stationary Source Emissions Results

Based upon further evaluation of resilience features of the site, listed below are the reflective quantity and sizes of diesel generators. Table 4 below shows a lower bound of annual emissions from generators from the anticipated 50 hours per year testing period.

Table 4: Annual Lower Bound Emissions from Stationary Sources

YEAR	GHG Emissions [$MTCO_2e/yr$]	YEAR	GHG Emissions [$MTCO_2e/yr$]
2024	14.1	2043	30.7
2025	14.1	2044	30.7
2026	14.1	2045	30.7
2027	27.3	2046	30.7
2028	27.3	2047	30.7
2029	27.3	2048	30.7
2030	30.7	2049	30.7
2031	30.7	2050	30.7
2032	30.7	2051	30.7
2033	30.7	2052	30.7
2034	30.7	2053	30.7

[5] End of Phase 2 30-year operational reporting period

2035	30.7	2054	30.7[6]
2036	30.7	2055	16.6
2037	30.7	2056	16.6
2038	30.7	2057	16.6[7]
2039	30.7	2058	3.4
2040	30.7	2059	3.4
2041	30.7	2060	3.4
2042	30.7		

6 Solar Photovoltaic Generation

Google will be studying the incorporation of onsite solar photovoltaic (PV) generation by utilizing both building integrated PV (BIPV) and rooftop arrays. The analysis assumes a 30% rooftop PV coverage across the site with a 0.70 utilization factor (based on a tilt angle of 10 degrees and a spacing factor of 2.5).

For BIPV, the analysis assumes up to 36% net coverage of western-facing façades. This assumption is based on early massing models and will be continuously revised as the design develops. This percent coverage is based on an initial assumption that a portion of the western façade is feasible for solar (to remove façade area too low to generate a substantial amount of electricity). There is an additional reduction that is applied to account for potential shade areas and aesthetics that may preclude BIPV installation on areas of the façade. Table 5 presents Annual Emissions Offset by On-site Solar PV.

Table 5: Annual Emissions Offset by On-site Solar PV

YEAR	OFFSET EMISSIONS FROM SOLAR PV [$MTCO_2e/yr$]	YEAR	OFFSET EMISSIONS FROM SOLAR PV [$MTCO_2e/yr$]
2024	-805	2043	-206
2025	-766	2044	-93

[6] End of Phase 1 30-year operational reporting period

[7] End of Phase 2 30-year operational reporting period

2026	-727		2045	0[8]
2027	-1,423		2046	0
2028	-1,343		2047	0
2029	-1,263		2048	0
2030	-1,682		2049	0
2031	-1,569		2050	0
2032	-1,455		2051	0
2033	-1,342		2052	0
2034	-1,228		2053	0
2035	-1,114		2054	0
2036	-1,001		2055	0
2037	-887		2056	0
2038	-774		2057	0
2039	-660		2058	0
2040	-547		2059	0
2041	-433		2060	0
2042	-320			

[8] PG&E Grid becomes decarbonized in 2045 in line with CA RPS. As such, after this time on-site solar PV no longer offsets carbon emissions from grid electricity.

7 Summary of Lower Bound Operational GHG Emissions

Given the possible lower bound GHG contributions from mobile and stationary sources, combined with a reasonably foreseeable amount of solar PV, the lower bound of the total annual operational emissions for the proposed project are given in Table 6 below. This table shows the results from 2030, the first year of full build-out for all three phases of the project. Table 7 presents the lower bound GHG emissions for all years studied.

Table 6: Lower Bound Operational GHG Emissions Summary for 2030 (full build-out)

CATEGORY	GHG EMISSIONS [$MTCO_2e/yr$]
Mobile	**49,112**
Electricity	**18,256**
Natural gas	**0**
Water and wastewater	**1,200**
Solid waste	**353**
Landscape/area	**83**
Back-up generators	**31**
Sequestration	**-30**
Solar PV	**-1,682**
Total	**67,724**

Table 7: Overall Year-by-Year Emissions

YEAR	CONSTRUCTION EMISSIONS [$MTCO_2e/yr$]	OPERATIONAL EMISSIONS [$MTCO_2e/yr$]	YEAR	CONSTRUCTION EMISSIONS [$MTCO_2e/yr$]	OPERATIONAL EMISSIONS [$MTCO_2e/yr$]
2021	6,695	--	2042	--	53,787
2022	18,363	--	2043	--	52,654
2023	17,302	--	2044	--	51,522
2024	18,917	23,458	2045	--	50,597
2025	18,301	23,094	2046	--	50,584
2026	17,697	22,729	2047	--	50,570
2027	18,536	51,632	2048	--	50,557
2028	15,352	50,819	2049	--	50,544
2029	15,129	50,006	2050	--	50,530
2030	10,954	67,324	2051	--	50,517
2031	--	66,192	2052	--	50,503
2032	--	65,108	2053	--	50,490
2033	--	63,976	2054	--	50,477[9]
2034	--	62,844	2055	--	35,141
2035	--	61,712	2056	--	35,133
2036	--	60,580	2057	--	35,124[10]
2037	--	59,447	2058	--	13,785
2038	--	58,315	2059	--	13,782
2039	--	57,183	2060	--	13,778
2040	--	56,051	Total	157,247	1,765,465
2041	--	54,919			

[9] End of Phase 1 30-year operational reporting period

[10] End of Phase 2 30-year operational reporting period

The annual net increase in GHG emissions are given in Table 8 below.

Table 8: Overall Year-by-Year Increase in Emissions

YEAR	GROSS EMISSIONS [$MTCO_2e/yr$]	NET INCREASE IN EMISSIONS [$MTCO_2e/yr$]	YEAR	GROSS EMISSIONS [$MTCO_2e/yr$]	NET INCREASE IN EMISSIONS [$MTCO_2e/yr$]
2021	6,695	0	2042	53,787	45,437
2022	18,363	10,014	2043	52,654	44,305
2023	17,302	8,952	2044	51,522	43,173
2024	42,375	34,026	2045	50,597	42,248
2025	41,395	33,045	2046	50,584	42,234
2026	40,427	32,077	2047	50,570	42,221
2027	70,168	61,819	2048	50,557	42,207
2028	66,171	57,821	2049	50,544	42,194
2029	65,135	56,786	2050	50,530	42,181
2030	78,278	69,929	2051	50,517	42,167
2031	66,192	57,842	2052	50,503	42,154
2032	65,108	56,759	2053	50,490	42,140
2033	63,976	55,626	2054	50,477	42,127
2034	62,844	54,494	2055	35,141	26,792
2035	61,712	53,362	2056	35,133	26,783
2036	60,580	52,230	2057	35,124	26,774
2037	59,447	51,098	2058	13,785	5,436
2038	58,315	49,966	2059	13,782	5,432
2039	57,183	48,833	2060	13,778	5,428
2040	56,051	47,701	Total	1,922,712	1,590,383
2041	54,919	46,569			

APPENDIX A: SUPPORTING TABLES

Table A.1: Trip Generation Rates and Vehicle Miles Travelled

YEAR	ANNUAL TRIPS	VMT (mi)
2024	6,147,838	60,051,033
2025	6,147,838	59,965,084
2026	6,147,838	59,879,135
2027	14,958,088	139,178,850
2028	14,958,088	139,011,323
2029	14,958,088	138,843,797
2030	20,053,094	186,151,302
2031	20,053,094	186,097,321
2032	20,067,494	186,230,895
2033	20,067,494	186,176,795
2034	20,067,494	186,122,696
2035	20,067,494	186,068,596
2036	20,067,494	186,014,496
2037	20,067,494	185,960,397
2038	20,067,494	185,906,297
2039	20,067,494	185,852,198
2040	20,067,494	185,798,098
2041	20,067,494	185,743,999
2042	20,067,494	185,689,899
2043	20,067,494	185,635,800
2044	20,067,494	185,581,700
2045	20,067,494	185,527,601

2046	20,067,494	185,473,501
2047	20,067,494	185,419,401
2048	20,067,494	185,365,302
2049	20,067,494	185,311,202
2050	20,067,494	185,257,103
2051	20,067,494	185,203,003
2052	20,067,494	185,148,904
2053	20,067,494	185,094,804
2054	20,067,494	185,040,705
2055	14,212,761	128,756,987
2056	14,212,761	128,722,492
2057	14,212,761	128,687,997
2058	5,464,698	50,469,441
2059	5,464,698	50,454,550
2060	5,464,698	50,439,660

Table A.2: PG&E Grid Decarbonization Projection

YEAR	CO_2 INTENSITY PER TOTAL DELIVERED ENERGY ($lbCO_2$/MWh)	TOTAL ENERGY FROM RENEWABLES (%)	CO_2E INTENSITY PER TOTAL DELIVERED ENERGY ($lbCO_2e$/MWh)
2014-2016 3-yr avg	378	30%	378
2024	302	44%	302
2025	288	47%	288
2026	273	49%	273
2027	259	52%	259
2028	244	55%	244
2029	230	57%	230
2030	215	60%	215
2031	201	63%	201
2032	186	65%	186
2033	172	68%	172
2034	157	71%	157
2035	143	74%	143
2036	128	76%	128
2037	113	79%	113
2038	99	82%	99
2039	84	84%	84
2040	70	87%	70
2041	55	90%	55
2042	41	92%	41
2043	26	95%	26
2044	12	98%	12
2045+	0	100%	0

Table A.3: Annual Water Use, Phase 1

LAND USE SUBTYPE	INDOOR WATER USE - POTABLE (gal/year)	INDOOR WATER USE - NONPOTABLE (gal/yr)	OUTDOOR WATER USE - NONPOTABLE (gal/year)	COOLING WATER - NONPOTABLE (gal/yr)
General Office Building	29,251,400	8,068,600	2,923,517	7,485,165
Retail - Free-standing Discount store	13,972,500	748,100	112,443	287,891
Hotel	0	0	0	0
Apartments High Rise	32,762,900	5,037,400	1,472,812	3,770,884
Limited-term corporate accommodation	2,369,600	438,000	140,554	359,864
Event facility - Arena	0	0	0	0
Logistics Center - refrigerated warehouse no rail	178,100	935,100	56,221	143,945
Central Utility Plant	356,200	1,870,300	112,443	287,891
Open space	0	0	4,817,990	0

Table A.4: Annual Water Use, Phase 2

LAND USE SUBTYPE	INDOOR WATER USE - POTABLE (gal/year)	INDOOR WATER USE - NONPOTABLE (gal/yr)	OUTDOOR WATER USE - NONPOTABLE (gal/year)	COOLING WATER - NONPOTABLE (gal/yr)
General Office Building	29,251,400	8,068,600	2,923,517	7,485,165
Retail - Free-standing Discount store	39,122,989	2,094,700	314,840	806,095
Hotel	0	0	0	0
Apartments High Rise	37,677,300	5,793,000	1,693,734	4,336,516

Limited-term corporate accommodation	2,369,648	438,000	140,554	359,864
Event facility - Arena	0	0	0	0
Logistics Center - refrigerated warehouse no rail	0	0	0	0
Central Utility Plant	0	0	0	0
Open space	0	0	5,072,645	0

Table A.5: Annual Water Use, Phase 3

LAND USE SUBTYPE	INDOOR WATER USE - POTABLE (gal/year)	INDOOR WATER USE - NONPOTABLE (gal/yr)	OUTDOOR WATER USE - NONPOTABLE (gal/year)	COOLING WATER - NONPOTABLE (gal/yr)
General Office Building	23,626,200	6,517,000	2,361,302	6,045,710
Retail - Free-standing Discount store	16,767,000	897,700	134,932	345,469
Hotel	5,502,400	1,051,200	224,886	575,782
Apartments High Rise	26,210,300	4,029,900	1,178,250	3,016,707
Limited-term corporate accommodation	2,843,600	525,600	168,664	431,836
Event facility - Arena	734,000	228,300	112,443	287,891
Logistics Center - refrigerated warehouse no rail	178,100	935,100	56,221	143,945
Central Utility Plant	0	0	0	0
Open space	0	0	4,236,698	0

Attachment C

Google's Carbon Offsets White Paper

Google's Carbon Offsets: Collaboration and Due Diligence

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What are carbon offsets? 1
Carbon offset project standards 2
Types of carbon offset projects 3
Procurement and due diligence 4
Applying carbon credits to our footprint 5
Conclusion 6

Google Green

For more information visit:
www.google.com/green

Introduction

At Google, we reduce our carbon footprint through efficiency improvements, generating on-site solar power and purchasing green power. To bring our remaining footprint to zero, we buy carbon offsets.

Purchasing carbon offsets means investing in green projects that have very little to do with our core business. When we purchase a carbon offset, we rely heavily on research, collaboration, standards and due diligence to guarantee we're getting a quality offset that provides long-term global benefit. This paper describes the process we use to select carbon offset projects and apply carbon credits to our carbon footprint.

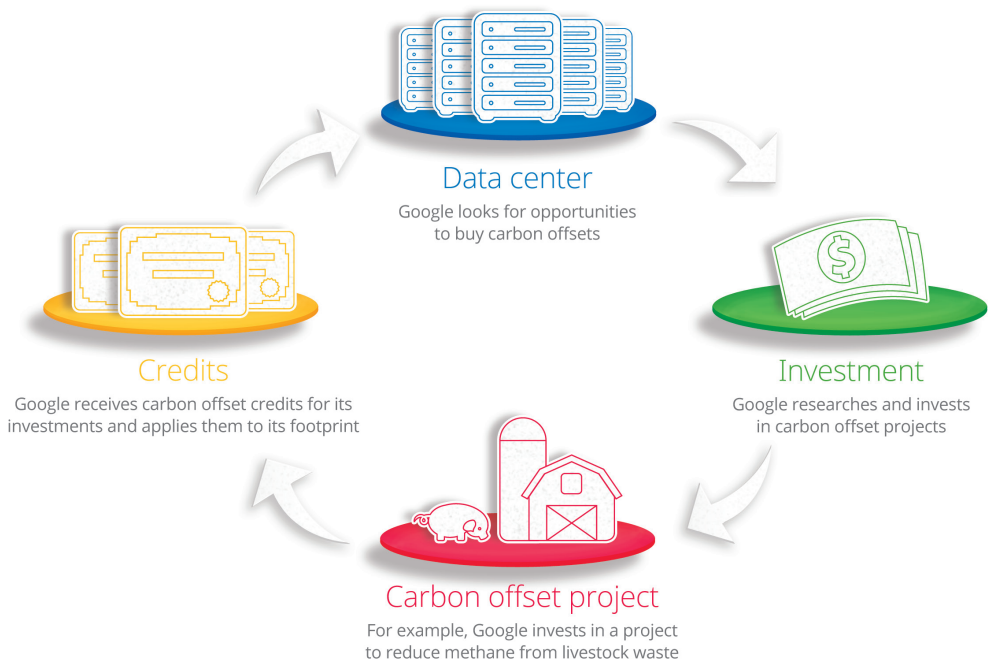
What are carbon offsets?

A carbon offset is an investment in an activity that reduces carbon emissions. The reduction in carbon emissions is represented by a carbon credit. The credit, usually verified by a third party, signifies that greenhouse gas emissions are lower than they would have been had no one invested in the offset. One credit equals one metric ton of carbon dioxide prevented from entering the atmosphere.[1] The credit purchaser can use the credit for carbon accounting.

Here's a hypothetical example: Say there is a Google data center in an area with little renewable power. First, we reduce our data center electricity usage through energy efficiency improvements. We then talk to the local power utility about purchasing more green power. Unfortunately, we discover that there aren't additional green energy sources close to our data center, nor are there plans to build more in the near future.

Until we can power our operations entirely with renewables or reduce our emissions in other ways, we can use the offsets to fund projects that reduce greenhouse gas emissions, indirectly reducing our total carbon footprint. For example, close to our data center, we discover a large farm that produces a lot of animal waste. Livestock waste produces methane — a particularly potent greenhouse gas that's more than 20 times as harmful as carbon dioxide.[2] We invest in a project that allows the farm to collect this waste and process the methane out of it, and they credit us, their fiscal sponsor, with reducing global greenhouse gas emissions.

When we apply that credit to our carbon footprint, it offsets our emissions from using non-renewable energy. We might not know much about manure, and farm operators might not know much about search engines, but through this collaboration we reduce global greenhouse gas emissions and contribute to the communities in which we operate.



Carbon offset project standards

Carbon offset producers have an incentive to pitch planned business improvements as carbon reduction projects to attract outside investment dollars and conserve their own capital. For example, if the farm in the previous example already had plans to build a methane capture system because it made financial sense or was required by law, giving them additional money through carbon offsets would not create any additional benefits for the environment. Since our goal is to offset our carbon emissions, we only support projects that would not come into being without our investment.

When Google first purchased carbon offsets in 2007, we were aware of the difficulties in buying an effective offset. To counter the information asymmetry between Google and carbon offset producers, we do rigorous research to make sure we are buying only quality offsets, based on four standards: additionality, leakage prevention, permanence and verifiability.

Additionality

As previously discussed, Google's first priority when examining a carbon offset project is proving that it provides additionality—meaning that the proposed project reduces greenhouse gas emissions that would not be reduced through other incentives. We work to guarantee additionality by examining past financial information on the project, project details, potential carbon reductions and similar projects in development. We also talk directly to project owners and operators. The goal of these assessments is to determine if our investment would lead to a carbon reduction that would not otherwise happen.

Leakage prevention

An additional criteria is leakage. A reduction of greenhouse gas emissions through one project might simply shift, or leak, to another location or activity. To prevent leakage, we closely examine the community and environment in which the project is going to take place. Identifying project risks and key stakeholders are the primary components in determining potential leakage.

Leakage typically occurs in situations where resources are being protected. For example, if a carbon offset program focuses on protecting a forest from being logged, it's entirely possible that loggers might move their operations down the road to another forest. Ensuring that reductions are more global—and not just local—is critical to preventing leakage.

Permanence

Tied into leakage prevention is the standard of permanence. Greenhouse gases prevented from entering the atmosphere should be stopped permanently. We need to be certain that the projects we invest in are not temporary methods of carbon reduction or greenhouse gas sequestration.

This is typically a concern with forestry projects or anything where greenhouse gases are being stored for a period of time. If there is significant risk that the stored carbon would be released through events such as a forest fire or a leak from sequestered carbon, the project would need to account for this, such as through insurance or a buffer of additional reductions.

Verifiability

The last requirement is verifiability. An objective third party—someone other than the project developer and Google—must be able to look at project data and confirm that the carbon reductions are real and credible. The third-party verifier determines the proper baseline for greenhouse gas reductions and verifies that the reductions adhere to strict monitoring and reporting standards.

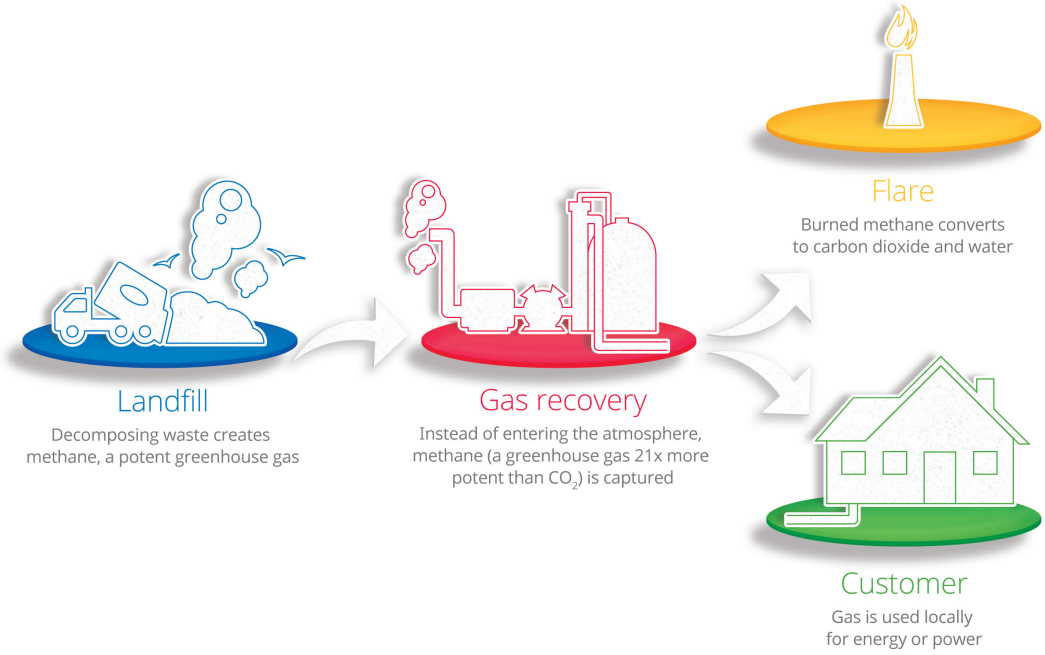
Types of carbon offset projects

A number of different project types qualify for carbon offsets, and more are becoming available as new technologies for reducing greenhouse gases are developed. The kinds of projects Google considers for carbon offsets include:

Landfill gas capture

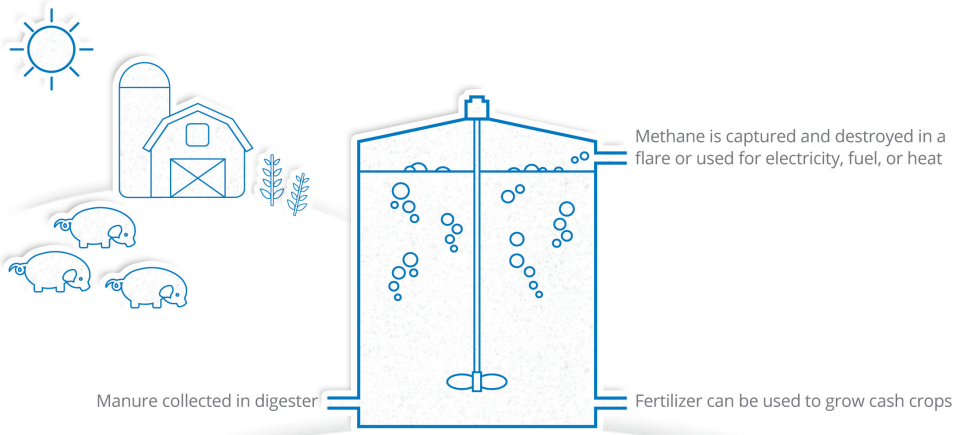
Decomposing waste creates methane gas, which is a potent greenhouse gas. Small and medium-sized landfills in many U.S. states are not required to capture or process methane, and thus the methane vents freely into the atmosphere. Capturing and destroying this gas reduces the total emissions of greenhouse gases. Captured methane can be burned to generate electricity or heat; or after treatment, it can also be injected into the nearby natural gas grid or used locally as compressed natural gas (CNG) for vehicles and other uses. When other options to use the gas aren't available—such as due to the small volume of gas created or the project's remote location—the gas might instead be burned in a flare.

It might sound counterintuitive that burning something reduces carbon emissions, but when methane is burned it converts into carbon dioxide and water. Carbon dioxide is a less potent greenhouse gas than the original methane, effectively reducing greenhouse gas emissions. Currently, the bulk of Google's carbon offsets come from investment in landfill gas projects.



Agricultural methane capture

Similar to landfill gas, agricultural methane is produced at farms from decomposing animal waste. Carbon offset projects are designed to collect this waste and process it into usable products, including energy and heat. One method involves collecting manure into a huge, circulating tank called a "digester." The digester promotes bacterial growth, which breaks down the waste into usable organic fertilizer and methane. The methane is then captured and used or burned.



Agricultural methane capture

Animal manure is broken down into usable organic fertilizer and methane, a greenhouse gas, which is destroyed or used for energy

Forestry projects

A large amount of carbon is stored in forests. As forests grow, they absorb and sequester additional carbon. However, as forests are logged, degraded or burned, carbon is released. There are various kinds of forestry projects offering carbon offsets, but the concept is either to protect forests from destruction and degradation or to enhance and develop new ones.

Procurement and due diligence

Carbon offset projects are verified by third-party investigators using published public standards. Once a project is verified as creating a credible reduction in greenhouse gases, a carbon registry issues a carbon credit for each metric ton of carbon dioxide (or equivalent) reduced.

Google takes a hands-on approach to pursuing offset projects to ensure that we're getting the highest quality offsets available. We source projects in a variety of ways, including requesting proposals from project developers and working directly with project owners, marketers and brokers. While we rely heavily on third-party standards, if we find projects that we believe meet our criteria where no standard exists, we may pursue them and develop a new standard.

When we invest in a carbon offset project, we perform due diligence by:

1. Reviewing the documentation from the offset seller and from third-party sources, including reviewing emissions data, permits and site testing results.
2. Visiting the project site and meeting people in charge of day-to-day operations.
3. Reviewing the verification reports, if a project has already been verified.

Only when we are confident of the operation's quality and have confirmed that the project meets our standards do we purchase the carbon credits associated with the project.

For example, in 2010, Google decided to purchase the offsets associated with the Berkeley County landfill gas project in South Carolina. This project involved collecting methane gas from a landfill and using the gas to generate electricity. A local electric utility, Santee Cooper, would purchase the methane from the site to fuel a nearby power plant.

With revenue from gas sales, Google had to carefully review the project's financials in order to verify additionality.[3] We took into account the costs to install the methane capture system versus the estimated revenue from the sale of landfill gas. We had to answer the following question: If there wasn't revenue from the sale of carbon offsets, would the revenue incentive from the sale of landfill gas to generate electricity be enough for the landfill to install the system anyway?

When we calculated the financial rate of return, we compared two sets of financials: One with carbon offset revenue and one without. In the case of Berkeley County, the project wasn't financially viable for the landfill based on the natural gas revenue alone—gas prices would have needed to be much higher to make the project financially feasible. Thus, the project passed our criteria for additionality, and we invested in it.

Applying carbon credits to our footprint

Once carbon credits from a project are verified by a third party and issued by a carbon registry, ownership of the credits is transferred from the project owner to Google. The carbon credits are then permanently retired and applied to our carbon footprint. When we retire a credit, the serial numbers of the credits are located in the carbon credit registry that created them and permanently designated as retired.

At the end of this long process—finding and reviewing projects, verifying the emission reductions, contracting for the offsets, taking delivery of carbon credits, and then retiring the credits—we finally apply the credits to our own carbon footprint. Until retirement, the metric tons of greenhouse gases reduced from the carbon offset project are an estimate. Once we have an exact figure from the carbon credit registry, we apply those metric tons to our footprint.

Given the uncertainty of estimating the exact number of metric tons from each project, it is difficult to apply a strict rule of offsetting our footprint year with the year the offset was created. Instead, we currently apply a window of up to three years between the footprint year and the year the reduction occurs. Considering that the global warming potential of these gases is calculated over one hundred years or more, the difference in three years is quite small.

Conclusion

In addition to improving our efficiency and investing in green power, we will continue to purchase carbon offsets to bring our carbon footprint down to zero. However, not all carbon offsets are created equal and ensuring that a carbon offset represents actual greenhouse gas reductions can be a long process.

Carbon offsets are still very new. In fact, it's entirely possible that how we offset our emissions a few years from now will be very different from how we do it today. Our offsets may be more personalized, more local and rely on emergent technologies that have a global impact. Google hopes to be part of the evolution of these new offsets, and will continue to foster current offset projects through research, collaboration and investment.

1. Or one metric ton (1,000 kg or 2,204 pounds) of carbon dioxide equivalent (CO_2e). Carbon dioxide equivalent is a quantity that describes, for a given mixture and amount of greenhouse gas, the amount of CO_2 that would have the same global warming potential (GWP), when measured over a specified timescale (generally, 100 years).
2. Some greenhouse gases are more potent than others. Carbon dioxide has a global warming potential of 1, since it's the baseline. Over 100 years, methane has a global warming potential of approximately 20 to 25 times more warming than carbon dioxide. Processing methane converts it to carbon dioxide, reducing it from a GWP of 20 or 25 to 1.
3. An apparent irony of methane destruction projects is that determining whether or not they are additional becomes more complicated if the gas is actually used for electricity, heat or fuel. If the only revenue is from carbon offsets, it is usually quite clear that the large investment in a gas collection system (which can cost up to $1 million) was made for the carbon offset revenue. On the other hand, with a system that has revenue from both carbon offsets and gas or electricity, it's possible that the revenue from the gas or electricity would have been enough to make the project financially attractive. Even though the analysis of carbon offset projects with "beneficial uses" is more complicated, we always prefer to buy credits from projects where the methane is used for something good, and not just burned in an open flare.

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Attachment D

Downtown West San José Mixed Use Plan: City Commitment to Enforce AB 900 Requirements Letter

CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Planning, Building and Code Enforcement
PLANNING DIVISION

October 22, 2019

VIA ELECTRONIC MAIL

Heather King, AICP
Air Pollution Specialist,
Sustainable Transportation and Communities Division
California Air Resources Board

Re: Downtown West San Jose Mixed Use Plan: City Commitment to Enforce AB 900 Requirements

Dear Ms. King:

This letter re-affirms the City of San Jose's ("City") commitment to impose enforceable conditions of approval on the Downtown West San Jose Mixed Use Plan ("Project") that will ensure the Project meets all requirements for AB 900 certification for the life of the obligation, including the requirement that the Project not result in any net additional greenhouse gas emissions. Google sent a letter to the City on August 22, 2019 acknowledging that all mitigation measures required for AB 900 will be conditions of approval and fully enforceable. The City acknowledged and agreed to the statements in the letter, including an acknowledgement of its ongoing obligation to enforce conditions.

With respect to the requirement that the Project not result in any net additional greenhouse gas (GHG) emissions, the City will impose a condition of approval that will require that Google monitor and verify the Project's emissions and provide periodic reports for the City's independent review. To the extent that carbon offsets are used to mitigate GHG emissions from project operations, the City will require that Google purchase voluntary carbon credits that are enforceable and verifiable, and issued by an approved registry for the net increase in construction and operational emissions, prior to issuance of the final Certificate of Occupancy for the first building constructed in each phase of the Project. If the ongoing monitoring of emissions shows that additional offset credits are necessary to maintain the net zero greenhouse gas standard, the City will require that Google timely acquires such additional credits.

Sincerely,

Dr. Robert Manford
Deputy Director - Planning

CC: Alexa Arena – Google
Bhavesh Parikh - Google