

# AI IN THE ENVIRONMENT AND SUSTAINABILITY

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AI is being used in various fields. Also, there are various AI for sustainable environment, which is one of the recent hot topics.

AI for the environment can help address and solve climate change issues by predicting future climates, managing resources efficiently, and identifying polluted areas. The following are examples of how AI is being used to protect the environment.

In October 2024, Google said that it's more important than ever to develop tools that help communities address and adapt to the impacts of today's climate change caused by changes in urban populations, and presented <sup>1</sup>“8 ways we're using AI to help cities be more sustainable.”

One example mentioned is the Google Environmental Insights Explorer (EIE).<sup>2</sup> EIE is a freely available data and insights tool that analyzes emission estimates, renewable energy production potential, and estimated forest canopy areas based on Google data. It contributes to identifying strategies to reduce emissions and finding effective measures through analysis in cities and regions. On its website, you can see estimates and potentials for various regions around the world.

Among them, the “Tree Canopy Lab,”<sup>3</sup> implemented since 2020, is a partnership used for tree planting between LA and Google to address urban heat island effects. Through the data analysis capabilities of aerial photography, Google AI, and Google Earth Engine, it helps each city identify its current green space area and plan future tree planting projects. Based on data from 2009 to 2022, the average percentage of tree canopy coverage across the city of LA was estimated at 24%. Google announced it would expand the project starting with LA. According to a March 2023 article from Google,<sup>4</sup> Tree Canopy has expanded from 14 cities to nearly 350 cities globally - including Atlanta, Baltimore, Buenos Aires, Lisbon, Mexico City, Paris, Sydney, and Toronto, and more, highlighting Tree Canopy's high potential.

In 2022, Google announced the Google.org Impact Challenge and supported the World Resource Institute (WRI) to close data gaps using sensors, satellite imagery, and AI and model air temperature, humidity, surface reflectivity, tree cover, and heat vulnerability.<sup>5</sup> In 2023, WRI mentioned that they are working with cities and urban decision-makers to improve the uptake of “cool infrastructure” solutions.<sup>6</sup>

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<sup>1</sup> Megan Friedman. (October 17, 2024). 8 Ways We're Using AI to Help Cities Be More Sustainable. Google The Keyword. <https://blog.google/outreach-initiatives/sustainability/ai-sustainable-cities/>

<sup>2</sup> Environmental Insights Explorer. Google. <https://insights.sustainability.google/>

<sup>3</sup> Nicole Lombardo, Ruth Alcantara. (November 18, 2020). Creating New Tree Shade with The Power of AI and Aerial Imagery. Google The Keyword. <https://blog.google/products/earth/helping-cities-plant-new-trees-with-tree-canopy-lab/>

<sup>4</sup> Kate Brandt. (March 29, 2023). How We're Helping People and Cities Adapt to Extreme Heat. Google The Keyword. <https://blog.google/outreach-initiatives/sustainability/extreme-heat-support/>

<sup>5</sup> Kate Brandt. (March 29, 2023). How We're Helping People and Cities Adapt to Extreme Heat. Google The Keyword. <https://blog.google/outreach-initiatives/sustainability/extreme-heat-support/>

<sup>6</sup> Data for Cool Cities. World Resources Institute. <https://www.wri.org/initiatives/data-cool-cities>

Also, Google funded American Forests and Resilient Cities Catalyst to support work happening at the local level. Google's tree canopy tool was used in both projects.<sup>7</sup>

Several methods are also mentioned for reducing emissions from transportation and energy using AI.

Project Green Light uses AI and Google Maps to help city traffic engineers optimize traffic lights at intersections to improve traffic flow and cut emissions. With this information, cities can make cost-effective updates to existing infrastructure to reduce the number of times vehicles stop at traffic lights. In 2023, Google mentioned the potential of Project Green Light, which can help save fuel and lower emissions for up to 30 million car rides per month.<sup>8</sup>

Google Maps will suggest the most fuel-efficient routes. Fuel-efficient route settings, through AI, suggest routes with fewer hills, less traffic, more consistent speeds, and similar or nearly identical ETAs. Users can see the relative fuel savings and ETA differences between the two routes and choose the route they prefer.<sup>9</sup> It is also estimated that since its launch in October 2021, it has helped prevent more than 2.4 million metric tons of CO<sub>2</sub>e emissions.<sup>10</sup>

Through AI, contrails can be reduced. The 2022 IPCC report noted that clouds created by contrails account for about 35% of aviation's global warming impact. Since contrails can trap large amounts of heat that would otherwise leave Earth's atmosphere, they create a global warming effect. Avoiding flying through areas that create contrails can reduce warming.

After testing flights using Google's AI-based predictions to reduce contrails, they mentioned that pilots could reduce contrails by up to 54%, by analyzing satellite images. Google also announced they are committed to working across the aviation industry to use AI to make contrail avoidance a reality over the coming years.<sup>11</sup>

Meanwhile, as AI develops and data increases rapidly, environmental issues are intensifying due to the power consumption required to cool this data. If low-power cooling systems are built to prevent excessive power consumption, it will help reduce environmental damage and create synergy with AI for the environment.

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<sup>7</sup> Kate Brandt. (March 29, 2023). How We're Helping People and Cities Adapt to Extreme Heat. Google The Keyword. <https://blog.google/outreach-initiatives/sustainability/extreme-heat-support/>

<sup>8</sup> Kate Brandt. (October 10, 2023). New Ways We're Helping Reduce Transportation and Energy Emissions. Google The Keyword. <https://blog.google/outreach-initiatives/sustainability/google-transportation-energy-emissions-reduction/>

<sup>9</sup> Russell Dicker. (October 6, 2021). 3 New Ways to Navigate More Sustainably with Maps. Google The Keyword. <https://blog.google/products/maps/3-new-ways-navigate-more-sustainably-maps/>

<sup>10</sup> Kate Brandt. (October 10, 2023). New Ways We're Helping Reduce Transportation and Energy Emissions. Google The Keyword. <https://blog.google/outreach-initiatives/sustainability/google-transportation-energy-emissions-reduction/>

<sup>11</sup> Carl Elkin, Dinesh Sanekommu. (August 8, 2023). How AI Is Helping Airlines Mitigate the Climate Impact of Contrails. Google The Keyword. <https://blog.google/technology/ai/ai-airlines-contrails-climate-change/>

