Bicycle Lanes are a Climate Solution

The environmental and economic impacts of citywide networks of protected bicycle lanes

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Protected Bicycle Lanes Protect the Climate

Measuring How Networks of Protected Bicycle Lanes Reduce Carbon Emissions, Transport Costs, and Premature Death
Takeaway Message

Citywide networks of protected bicycle lanes are a cost-effective way of reducing emissions and creating economic value.
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Citywide

People near protected bicycle lanes in Bogotá
Planned network of protected bicycle lanes in Addis Ababa
Of protected lanes

Protected intersection in Bogotá, video by Carlos Felipe Pardo
Citywide networks of protected bicycle lanes are a cost-effective way of reducing emissions and creating economic value.
Methods

Counts

- Number of cyclists passing the average point per day
- Length of protected cyclelane network, km (GIS)

\[ \times \]

\[ = \]

Surveys

- Mode used if no bikelanes
- Percent of travel shifting from car / taxi / motorcycle (on a per-passenger-km basis)
- Greenhouse gas emissions per km driven

\[ \times \]

\[ \times \]

\[ = \]

Emissions reduction due to bicycle lanes
Carbon reduction cost-effectiveness in middle-income countries

Tonnes of CO2-eq emissions prevented per million USD spent on infrastructure (20y horizon)

- Networks of protected bicycle lanes
- Bus rapid transit
- Car electrification
- Metro
- Highways

Highways cause 1 tonne of emissions for every ~$200 spent
# Sketch Model for Predicting Impacts of Protected Bicycle Lane Networks

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To use this model, either download it as a .xlsx file and open it in Microsoft Excel, or use Google Sheets to make a copy in your own Drive so that you can edit it: [File -> Make a copy].

<table>
<thead>
<tr>
<th>User Inputs</th>
<th>Test City</th>
</tr>
</thead>
<tbody>
<tr>
<td>World region (choose one from dropdown)</td>
<td>Brazil</td>
</tr>
<tr>
<td>City total population</td>
<td>6,000,000</td>
</tr>
</tbody>
</table>

People Near protected Bikeways (%) for proposed network (percentage of population within 300m walking distance of a protected bicycle lane): 70%

## OR

**Length of protected bicycle lane network (km)**

<table>
<thead>
<tr>
<th>Predicted Impacts</th>
<th>20.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in GHG emissions (tonnes CO2-eq per year) (min)</td>
<td>15,000</td>
</tr>
<tr>
<td>Reduction in GHG emissions (tonnes CO2-eq per year) (max)</td>
<td>23,000</td>
</tr>
<tr>
<td>Reduction in GHG emissions (tonnes CO2-eq per year)</td>
<td>15,000 to 23,000</td>
</tr>
</tbody>
</table>

Average population density in the area of the network (people per km²)

- Current citywide modal share of private car: 20.0%
- Current citywide modal share of taxi/ridehailing: 5.0%
- Current citywide modal share of motorcycle: 5.0%
- Current citywide modal share of transit (bus, rail, etc): 43.0%
- Current citywide modal share of walking: 25.0%
- Current citywide modal share of bicycle: 2.0%

Citywide networks of protected bicycle lanes are a cost-effective way of reducing emissions and creating economic value.
Costs and benefits of a 500-km network of protected bicycle lanes

In a middle-income city, averaged from Bogota, Colombia and Guangzhou, China

- Inexpensive travel: Cost savings to residents (~0.36 USD per trip) - $60
- Physical exercise: Economic benefits of reduced premature deaths - $145
- Capital cost: Building the network (amortized over ten years) - $12
- Subtotal - $193

Total benefit: 193 million USD per year

Not including benefits from time savings, reduced air pollution, land value uplift, etc.
**Cities:**
- Understand benefits of protected bicycle lane networks.

**Funders (banks, national governments):**
- Choose most impactful projects.

**Advocates:**
- Show benefits of investments in cycling.
Thank you!

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