Target thematic issues

* Fighting climate change
* Advancing future of mobility

Problem statement

The current Malaysian traffic system needs an upgrade in terms of red light detection and traffic signal optimization in order to increase road safety and inefficiency.

Our solution

* Streamlights, a smart traffic light program that scans all incoming cars on the road including its number plate and measures real-time traffic flow. Information on red light runners is made available for government action. When roads are empty, actuated signals can be sent to prolong green light signals at other roads in order to reduce vehicle idle time.

Future features

* Red light running detection [makes travelling on roads safer](https://www.google.com/search?sxsrf=ALeKk03FhCqTda__wZ3PrWH7QbRlS2ZyKQ%3A1607433770774&ei=Kn7PX-PTLvmF4-EPleiE0A4&q=traffic+light+camera+costs+malaysia&oq=traffic+light+camera+costs+malaysia&gs_lcp=CgZwc3ktYWIQAzIFCAAQzQI6CAghEBYQHRAeOgUIIRCgAToECCEQClDbDFjLT2DAUWgDcAB4AIAB9AGIAZgWkgEGMC4yMS4xmAEAoAEBqgEHZ3dzLXdpesABAQ&sclient=psy-ab&ved=0ahUKEwjjkKC3vb7tAhX5wjgGHRU0AeoQ4dUDCA0&uact=5), essentially improving mobility.

Modules

* Detectron 2

Core aspect of product

* Able to detect and identify cars on the road
* Able to detect red light runners

Pros of product

* Cost advantage compared to conventional red light cameras
  + [Implementation costs](https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/2b209ad2c5ad2ab985256db10045892b#:~:text=Implementation%20costs%20for%20automated%20red,%2467%2C000%20to%20%2480%2C000%20per%20intersection.) for automated red light camera systems range from $67,000 to $80,000 per intersection (US)
  + Current vehicle detection uses in-pavement inductive loop detectors which cost approx. $5,000 per leg
  + Product is a software which analyses footage from conventional low-cost video camera systems, reducing the need for high setup costs and manual traffic analysis.

Foreseeable obstacles of product

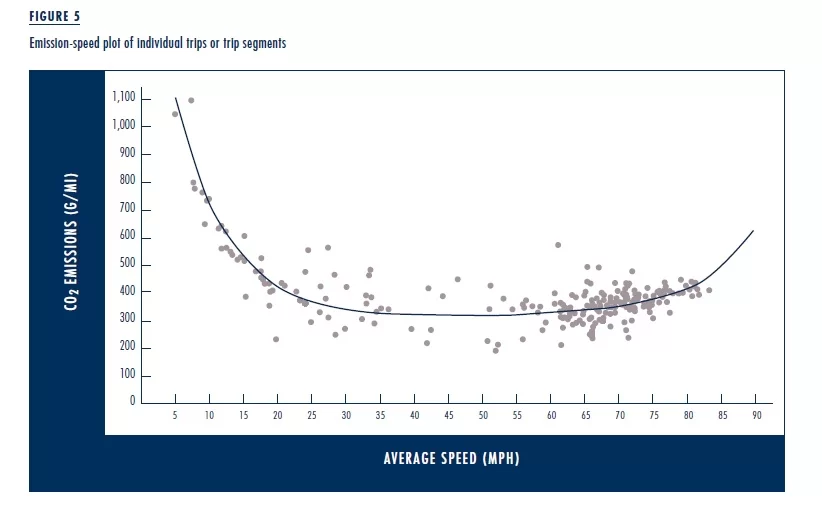
* Privacy concerns

Info to touch on in pitch

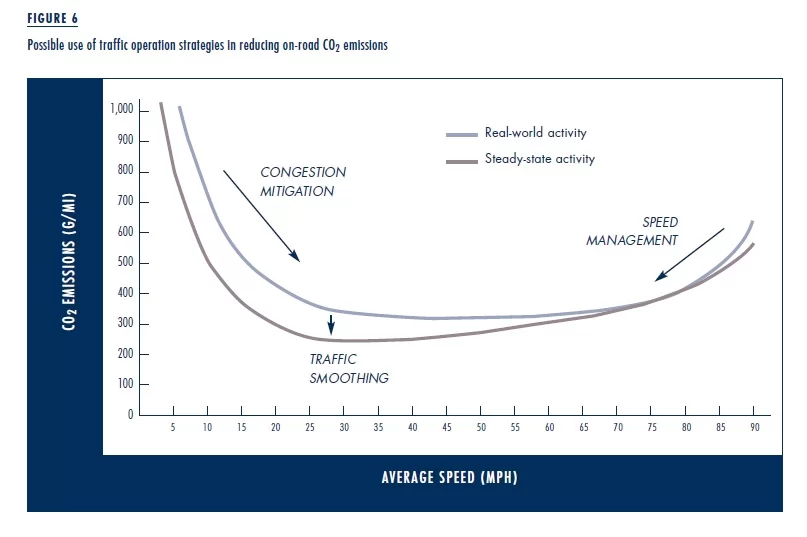
* Appeal emotionally - “ever been stuck in a traffic jam?”
* Simple ideas, impactful changes
* Counts number of cars and plots against time, allowing officials to determine choke points in the traffic system
* Helps average out congestion by allowing more busy roads stay green
* Works particularly well for night time drivers when one road is busy and the other is empty

Statistics to use

* Study by professors of University of California, Riverside (UCR) <https://www.accessmagazine.org/fall-2009/traffic-congestion-greenhouse-gases/>



Smart traffic lights eases congestion and ensures smoother traffic flow. This would help the problem in 2 ways. Easing congestion reduces the right side of the U-shaped graph as more people will be in a greater average speed which results in lower emissions. Smoother traffic would lower the total average of emissions. Both are illustrated below.



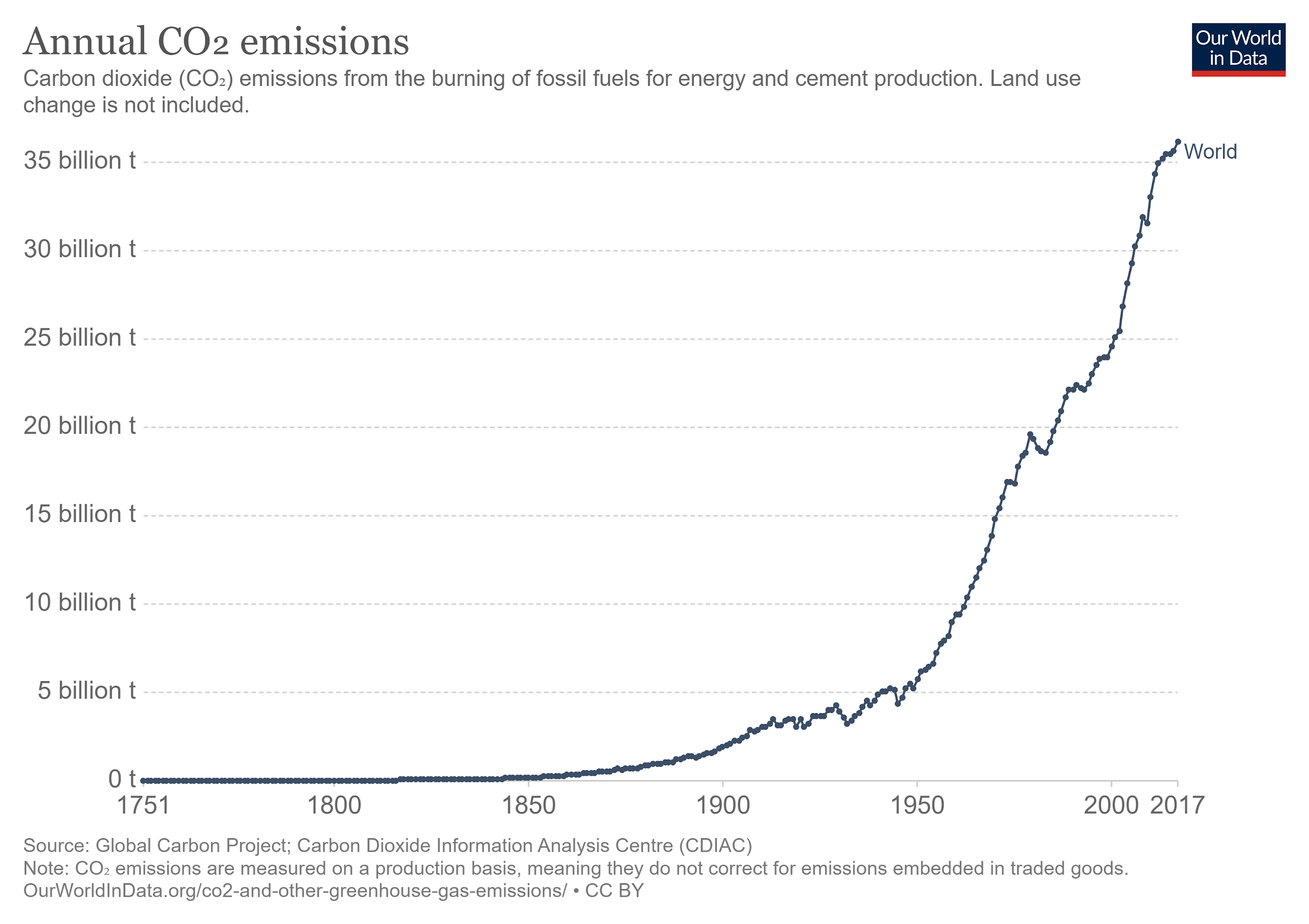
* Idling cars are [bad for the environment](https://time.com/5502192/smart-traffic-lights-ai/), generating about 30 million tons of CO2 emissions in the U.S. annually.

<https://www.freethink.com/articles/smart-traffic-lights>

* <https://en.wikipedia.org/wiki/Red_light_camera>
* <https://www.google.com/search?sxsrf=ALeKk03FhCqTda__wZ3PrWH7QbRlS2ZyKQ%3A1607433770774&ei=Kn7PX-PTLvmF4-EPleiE0A4&q=traffic+light+camera+costs+malaysia&oq=traffic+light+camera+costs+malaysia&gs_lcp=CgZwc3ktYWIQAzIFCAAQzQI6CAghEBYQHRAeOgUIIRCgAToECCEQClDbDFjLT2DAUWgDcAB4AIAB9AGIAZgWkgEGMC4yMS4xmAEAoAEBqgEHZ3dzLXdpesABAQ&sclient=psy-ab&ved=0ahUKEwjjkKC3vb7tAhX5wjgGHRU0AeoQ4dUDCA0&uact=5>
* <https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/traffic-signals/fixed-vs-actuated-signalization/>
* <https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/2b209ad2c5ad2ab985256db10045892b#:~:text=Implementation%20costs%20for%20automated%20red,%2467%2C000%20to%20%2480%2C000%20per%20intersection>.

<https://ourworldindata.org/co2-emissions>

https://ourworldindata.org/co2-emissions-from-transport



Target market

* Government

Script *(take 140 words of constant speaking to be 1 min → 420 words or less of possible)*

Traffic congestion is a major factor contributing to global vehicular CO2 emissions, which exceeded an estimated 4.9 gigatons in 2018 alone. Studies have shown that congestion mitigation leads to a direct decrease in CO2 emissions.

This is where our product comes in. Streamlights is a smart traffic light program that scans all incoming cars on the road and measures real-time traffic flow. It does this by utilizing Detectron2 and a simple counter algorithm.

This allows for 2 key features. One, traffic light signals can be semi-actuated to reduce vehicle idle time. Two, valuable and accurate traffic data can be made available. This includes

We begin by inserting 2 videos representing real-time traffic on a given junction. For the sake of this demo, we will use one short clip of cars moving and another with no cars present. Our program subsequently outputs these 2 videos and some data below. An example of what our application can provide is a graph of the number of vehicles passing against time for a given traffic light.

Here is a simulation demonstrating an ideal result. On the left is our product in action and on the right is a typical traffic light operating on timers. Each white block represents a car, and this light here represents the state of the road, whether green or red. We have a simple algorithm implemented to count how much time is saved. We calculated this by comparing the time cars spent moving on both simulations and this percentage is relative to each other.

In the future, our team plans to introduce a red light runner detection feature using text recognition which could significantly increase road safety. In addition, the program can be coded to recognize when its functionality has been compromised, for example when the cameras have been vandalized.

Our team believes that this product outdoes existing traffic logging methods in terms of cost and accuracy. Presently, traffic data is gathered via shared smartphone location signals and induction loop traffic sensors. Location signals are oftentimes switched off and induction loop traffic sensors cost upwards of $5,000 per leg. In contrast, our product works with much more low-cost camera systems.

Of course, there are caveats. Firstly, constant surveillance may raise privacy issues. Secondly, the object detection algorithm must be further refined to overcome adverse conditions such as bad weather or lighting.

Nevertheless, we believe Streamlights could potentially be our future.