Dome

Good morning judges Today, we will be presenting about Zeropath: A Web Application for Calculating and Reporting Carbon Emissions

Ozone

Over the past 50 years, carbon dioxide emissions have increased by six times.

To control this problem, in **2025**, the Thai government will **start a new law** to reduce carbon emissions.
This follows the **COP29** or **Net Zero agreement**.

One part of this law is called the **Carbon Tax**.
This means companies or factories that **produce too much carbon dioxide** will have to **pay more tax**.

The tax rate is **200 Baht per 1 ton** of carbon dioxide.
For example, if a factory **releases 10,000 tons** of carbon dioxide **per month**, it will have to pay **2 million Baht** every month.
This is **a lot of money**, right?

So, companies need a way to **reduce their emissions** and **save money**.

One of the best ways to do this is by using **Carbon Credits**.

Jed

A **carbon credit** is a special **right** that a company or factory **gets** when they **reduce carbon emissions**.

If the company **produces less carbon dioxide** than the government **limit**, the company can **sell** or **trade**

the **extra carbon credits**
to other companies.

Some people may ask,
"**Where can we buy carbon credits?**"

Carbon credits are **available in carbon markets**.
But you can also **create your own carbon credits**
by **making your company more eco-friendly**.

In **2023**,
the Thailand's **Ministry of Energy** reported that the **transportation sector**
released **81.6 million tons of carbon dioxide per year**.

This is **a big problem**,
because transportation is **very important**
for the **growth of the country**,
but it also produces **high emissions**.

So, if a company **wants more investment**
from the **government or private sectors**,
it must **reduce emissions**,
report carbon emissions correctly,
and **calculate carbon tax**
in a **clear and professional way**.

This is why we created **ZeroPath**.

ZeroPath is a **web application**
that helps **calculate** and **report** carbon emissions
quickly and **correctly**.

ZeroPath also helps you
find the best route,

save fuel,
and **reduce carbon dioxide**.

Dome
Zeropath's Target customer group is
Logistics Companies
Mass Transit operators
and Companies with corporate Fleets

Key features of ZeroPath include providing accurate emissions data,
which helps you **analyze your company's environmental performance**
and **evaluate whether your operations are truly sustainable** or not.

ZeroPath can automatically generate ESG reports that meet carbon tax audit requirements and demonstrate your company's commitment to Net Zero.
These reports are fully compliant with **ISO 14064** and other **internationally recognized environmental standards**, making them ready for both regulatory submission and investor presentations.

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is fuel consumption estimation.
Our system can **calculate the cost of each trip**
based on **real-time fuel prices**,
helping businesses **plan budgets more accurately**.

ZeroPath can also calculate the exact number of carbon credits required
based on your company's total emissions.
This allows businesses to **offset their carbon footprint**
through **verified carbon credit programs**,
while also **preparing for future regulatory compliance**.

Finally, **By using ZeroPath, companies can:**

- **Improve their brand image in sustainability**
- **Stand out in ESG reporting and audits**

- **Win bids or contracts that require carbon disclosure**

The system framework of ZeroPath works as follows:

**First, the user enters trip information into the system.
This information is then stored in a MySQL database
and processed through a standard routing API
to determine the travel path.**

**The data is then analyzed using a Linear Regression model,
which calculates emissions and fuel consumption.**

**Meanwhile, the Carbon Credit API and Fuel Price API
are used on the frontend of the platform
to display the number of carbon credits required
and the total fuel cost of the journey in real-time.**

In developing ZeroPath, we follow a structured process that begins with data collection.

We gather data from two primary sources:

1. **Emissions Factors for Industries and Vehicles in Thailand,
   published by the Thailand Greenhouse Gas Management Organization (TGO).**
2. **Vehicle Emissions and Specifications Dataset,
   provided by the European Environmental Agency (EEA),
   which includes detailed emissions data and technical specifications for various vehicle types.**

Next, we trained six different machine learning models using the collected datasets.

After evaluating the performance of each model and Based on these results,
we selected **Linear Regression** as the **core predictive model** used in **ZeroPath**
to ensure the **highest accuracy** in emissions and fuel consumption calculations.

For the web development, we use a combination of HTML, PHP, and JavaScript.

- The **frontend** of the platform is built using **HTML**,
  providing a user-friendly and accessible interface.
- The **backend** is developed with **PHP and JavaScript**,
  handling data processing, calculations, and system operations.

The website is **hosted on an Apache Linux web server**,
ensuring **stability**, **security**, and **high availability** for users.

To enable ZeroPath's core functionality, we integrate three key APIs:

1. **TomTom Maps API**
   – Used for **route calculation** and for displaying trips on an **interactive map**.
2. **Bangchak Fuel Price API**
   – Provides **real-time fuel prices**, allowing the system to **calculate the total trip cost** based on current fuel rates.
3. **TGO Carbon Credit Price API**
   – Calculates the **required carbon credits** needed to **offset the emissions** generated by each trip.

This is a screenshot of ZeroPath's main dashboard.

Here, the user can easily view:

- The **company's total carbon emissions over time**,
- The **latest fuel prices**, and
- The **current carbon credit prices**.

Next is the routing screen.

The user can **enter the starting location** and **destination**
to calculate the **carbon credits required for the trip**.

The user can also **select the vehicle type**.
In this example, the vehicle is an **Isuzu D-Max**.

ZeroPath then **displays the best route**,
which uses **the least fuel** and produces **the lowest carbon emissions**.
The system also shows **emissions data** and **the total trip cost**.

Finally, this is the Database screen.

Here, the user can **track all trips** taken by the company
and **see the total emissions** recorded.

There is also an **ESG report generation feature**.
The user can simply **press the green button**,
and the system will **generate an ESG report**,
which appears **on the right side of the screen**.

What makes ZeroPath stand out from other solutions?

- It is **easy to use**,
- It provides **highly accurate results**,
- And it is **cost-effective** compared to other platforms.

If any of the judges would like to try ZeroPath,
please feel free to scan this QR code to test it live.

Thank you for listening.