What AQ information is already available in Thailand?

- Key sources of pollution in the country:
  - Vehicular emissions in cities
  - Biomass burning and transboundary haze in rural and border areas
  - Industrial discharges in concentrated industrialized zones
- The Pollution Control Department monitors all criteria air pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2, O_3, and CO) and displays them on the Air4Thai platform
  - Real-time and historical data is accessible for 96 stations across Thailand (as of 2024)
- Emission inventories are available for both air and climate pollutants
  - Sectors covered:
    - Energy (covers transport and industry sector)
    - Industrial Processes and Product Use (IPPU)
    - Agriculture
    - Waste
    - Land use, Land-use Change and Forestry (LULUCF)

What are the existing national AQ related legislation, regulations and policy?

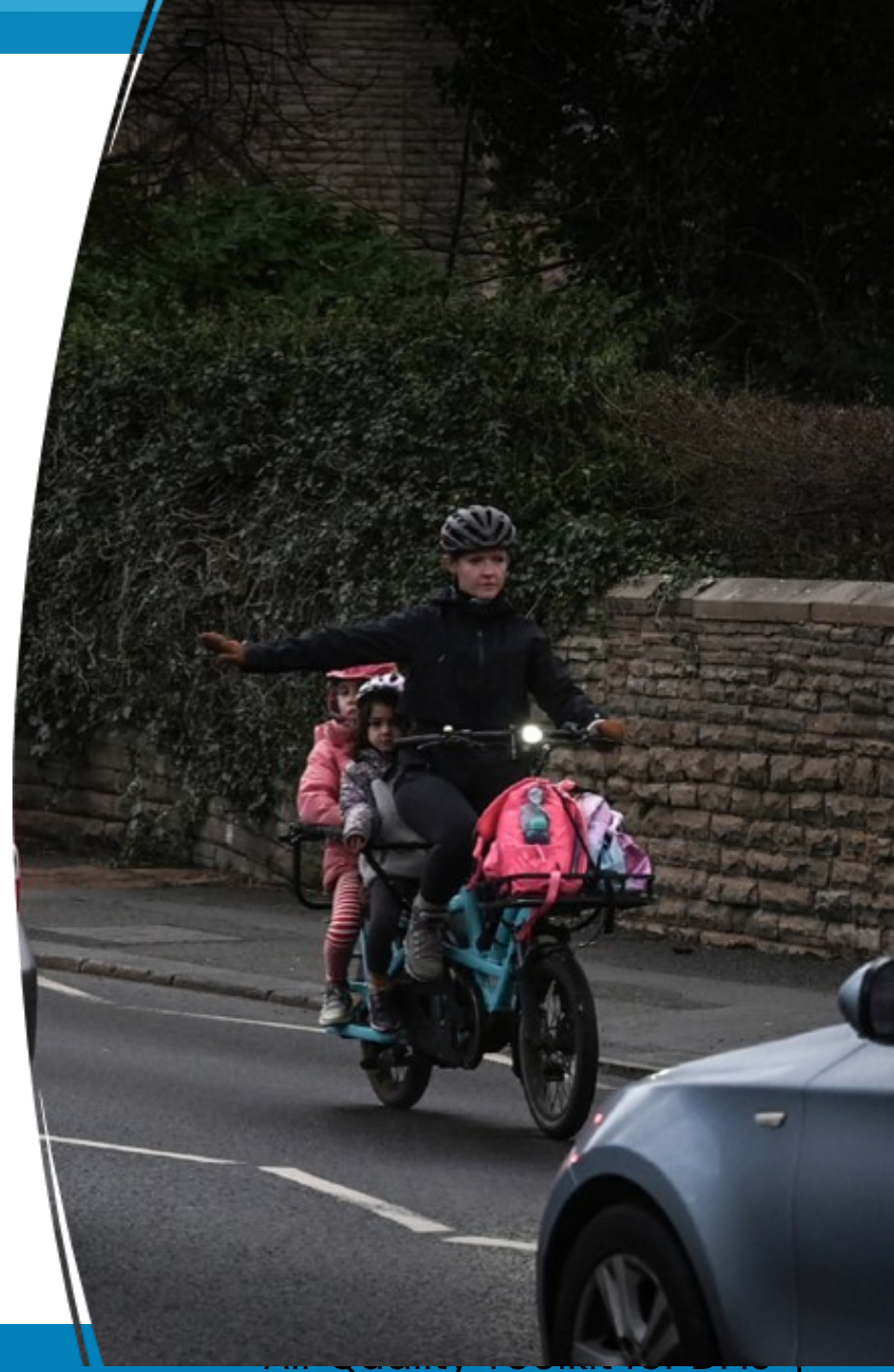
- Existing AQ legislation and policies:
  - Enhancement and Conservation of National Environmental Quality Act, B.E. 2535
  - Clean Air Act (Draft)
- Existing air quality and climate action plan
  - 20-year master Plan of Air quality Management (2018-2037)
  - National Action Plan for Particulate Pollution Control B.E. 2562 (2019)
  - Action Plan to drive national agenda "Solving the Dust Pollution Problem" No. 2, 2025-2027 and the next 5-year period
  - Health and Pollution Action Plan (HPAP)
  - Bangkok 16-point Action Plan
  - Chiang Mai Air Pollution Action Plan
  - Thailand's Pollution Control Department's 2024 plan

- National Ambient Air Quality Standards

Pollutant	1-Hr	8-Hr	24-Hr	Annual
$PM_{2.5}$ ($\mu g/m^3$)	-	-	37.5	15
PM_{10} ($\mu g/m^3$)	-	-	120	50
TSP ($\mu g/m^3$)	-	-	330	100
SO_2 (ppm)	0.3	-	0.12	0.04
NO_2 (ppm)	0.17	-	-	0.03
O_3 (ppm)	1.0	0.07	-	-
CO (ppm)	30	9	-	-

Emission standards

- Thailand subscribed to the Euro system of light-duty vehicle standards in May 1998. The country is currently transitioning in Euro 6 emission standards:
- **Light-Duty Vehicles** – EU Reference Standard: Euro 6 spark ignition (SI) engines; Thai Standard: TIS 3017-2563 gasoline
- **Heavy-Duty Diesel Engines** - EU Reference Standard: Euro V; Thai Standard: TIS 3043-2563 gasoline, TIS 3046-2563 diesel



Relevant sectoral action plan

- From Thailand's NDC, the transport sector targets a 30-40% GHG emission reduction by 2030 compared to BAU, supporting the goal of full decarbonization by 2050. Key actions include:
- ***Clean Mobility Fund*** (A revolving fund fed by revenues from congestion charge), ***Congestion Charging Scheme*** (regulatory framework for implementing a congestion charge in a pilot area – Bangkok Metropolitan Region), ***Promotion of electric vehicles (EVs)*** and hybrid vehicles for public transport; phasing in EVs for public vans, taxis, motorcycles in major provinces, ***Non-Motorised Transport & Urban Design*** (infrastructure for walking, biking and bike-sharing services)
- The transport sector is expected to reduce about 41 Mt CO_2e by 2030 under the NDC Roadmap.
- Ministry of Transport's Low-Carbon Development Plan
- National Electric Vehicle Roadmap
- Thailand's Low Emission Zone initiative

Quick interactive exercise:

Scan the QR code to answer via menti

or Join at menti.com
code 8225 9037

FIGURE 2: COMMON AIR POLLUTANTS AND EMISSIONS SOURCES

Particulate matter (PM)

Complex mixture of solid and liquid particles. Some emitted directly, some formed in the atmosphere as secondary PM. Grouped by particle size, the composition of PM tends to vary by source.

Sulfur dioxide (SO_2)

A gas produced due to the burning of sulfur containing fuels. Irritant effect on nose, throat and airways. Also contributes to the formation of secondary PM.

Non-methane volatile organic compounds (NMVOCs)

Consists of a large variety of compounds, from both natural and man-made sources such as industrial processes, domestic, and agriculture. React with NO_x in the atmosphere, in the presence of sunlight, to form tropospheric O_3. Also, a key source of indoor air pollution.

Ammonia (NH_3)

A gas released from natural and man-made sources, such as fertilizer, manure and wastewater. Once in the atmosphere, contributes to habitat damage through acidification and eutrophication. Also contributes to the formation of secondary PM.

Nitrogen oxides (NO_x)

A group of highly reactive gases comprising nitrogen dioxide (NO_2) and nitric oxide (NO). Mainly formed by combustion processes and largely associated with transport and energy sector emissions. A respiratory irritant that causes inflammation of the airways and may cause reduced lung development. Contributes to the formation of ground-level ozone (O_3) in the presence of

Carbon monoxide (CO)

A gas produced through the incomplete burning of fuel e.g., from the domestic and transport sectors. The highest concentrations typically present in the air can be detrimental to health.

FIGURE 3: SHORT-LIVED CLIMATE POLLUTANTS, THEIR SOURCES AND LIFETIMES

Black Carbon (BC)

A climate forcer and air pollutant, is released during the burning of fossil fuels and crude fuels such as wood, charcoal, and kerosene.

Ground-level Ozone (O_3)

An air pollutant and greenhouse gas formed by the interaction of sunlight with methane, NMVOCs, and other emissions from vehicles and industry.

Methane (CH_4)

The second most abundant greenhouse gas after carbon dioxide, is emitted by human activities, such as fossil fuel production, waste, and agriculture, as well as by natural sources.

Hydrofluorocarbons (HFCs)

Human-made greenhouse gases used in air conditioning, refrigeration, solvents, fire extinguishing systems, and aerosols.

Key sources of pollution

- Vehicular emissions in cities
- Biomass burning and transboundary haze in rural and border areas
- Industrial discharges in concentrated industrialized zones.

Brief information on quality monitoring system

- The Pollution Control Department monitors all criteria air pollutants (PM2.5, PM10, NO2, SO2, O3, and CO) and displays them on the Air4Thai website and app.
- Real-time data for all pollutants are accessible, while daily historical data for PM2.5 and PM10 can be accessed and exported in CSV format from 2011-2024.
- As of 2024, 96 stations across Thailand are accessible.

Information on emissions inventory

- Emission inventories are available for both air and climate pollutants, as presented in the 2024 Biennial Transparency Report, covering the years 2000-2022
- Inventory for air pollutants include for NOx, CO, NMVOCs, and SO2, while the climate pollutants inventories include CO2, CH4, N2O, HFCs, PFCs, SF6, and NF3
- Sectors covered: energy, IPPU, agriculture, waste, and LULUCF (note: industry and transport are under the energy sector)
- Energy industries were the highest contributor of emissions, accounting for 65.89% of total emissions in 2022

Ideas for air quality opportunities

- **Integrating air quality management in institutional reforms and capacity building**, e.g., embedding emissions monitoring and air quality improvement targets in fleet operations and planning
- Avoiding congestion-related emissions through **route and charging plans**
- **Identify high-exposure areas to prioritize investments**; target for first phase electrification and charger placement (since the project already considers both profitable and non-profitable routes for the transition).
- **Integration of real-time air quality data monitoring into the route plans to guide project implementation, policy design (or amendments), and impact monitoring**. This would entail cooperation with the BMA and PCD to leverage existing air quality monitoring efforts.
- Introduce **real-time air quality dashboards linked with traffic flow data** to adjust operations as needed (e.g., reroute buses during high pollution events). This would entail working with the BMA, PCD, and OTP.
- Ensure that charging depot and terminal upgrades follow **low-dust and low-emission construction protocols**.
- Include **battery waste management** in the sustainability plan and/or environmental management plan.