# Institutional setting :

### To manage and control automotive air pollution problem and climate change issue, 4 main approaches have been implemented as following :

- **1.Introduce Clean Vehicle Technology by Ministry of Industry (Thailand Industrial** Institute Standards (TISI) and Ministry of Natural Resources and Environment (Pollution Control Department (PCD))
- **2.Introduce Clean Fuel by Ministry of Energy (Department of Energy Business(DEB)** and Ministry of Natural Resources and Environment (Pollution Control Department (PCD))
- **3.Traffic & Transport Management by Ministry of Transport (Office of Transport** Planning and Policy (OTP)) and Bangkok Metropolitan Administration (BMA) **4.Appropriated I/M Program by Ministry of Transport (Land Transport Department** (LTD)) and Ministry of Natural Resources and Environment (Pollution Control **Department (PCD))**

Therefore, the project named "Introducing Low Emission Motortricycle (Tuk-Tuk) in **Bangkok for better Air quality and Climate change issue" was conducted by the Pollution Control Department (PCD), Thailand.** 

## **Problem :** Automotive Air Pollution in Bangkok

| *co2 | NOx   | со  | so2  | CH4   | N <sub>2</sub> O | NH3  | voc   | ос   | BC  | PM <sub>2.5</sub> | PM <sub>10</sub> | TSP  |
|------|-------|-----|------|-------|------------------|------|-------|------|-----|-------------------|------------------|------|
| 44.3 | 132.8 | 382 | 40.3 | 209.8 | 4.8              | 15.2 | 114.5 | 11.8 | 6.9 | 52.3              | 59.9             | 76.4 |



team,KMUTT, JGSEE,2015

### Unit: kt (except CO<sub>2</sub>, unit: Mt)

## Approaches : Clean engine & Clean fuel

### Why Tuk-Tuk (Motortricycle)???

The Tuk Tuk is not only a symbol of traditional life and tourist fun in Bangkok but it has also contributed to high air pollutants since almost 95% of Tuk-Tuk used 2-stroke engine. Therefore, introducing clean engine (4-stroke engine) and improving clean fuel (CNG & Electricity) are needed for better air quality and more environmentally friendly Tuk-Tuk for people and tourist in Bangkok.





### **Electric Tuk-Tuk**



**4-Stroke engine Tuk-Tuk** 

- **Emission reduction & Fuel economy (FC)** 
  - Switching from 2-stroke engine to 4-stroke engine THC ↓ 330% CO ↓ 110% FC ↓ 10%
  - Switching from 2-stroke engine to EV Tuk-Tuk **100 % of Emission Reduction (THC, NOx, CO)**
- **Noise Level** 
  - Switching from 2-stroke engine to 4-stroke engine  $\downarrow$  20%
  - Switching from 2-stroke engine to EV Tuk-Tuk  $\downarrow$  70%
- **Engine performance** 
  - **Good collaboration among government sectors and Tuk-Tuk Association of Thailand including Tuk-Tuk Company**
- Switching from 2-stroke engine to 4-stroke engine 1/4 times

## Lessons :

- Development and demonstration of Electric Tuk-Tuk and 4-stroke engine Tuk-Tuk to a real fleet in Bangkok for emission reductions and energy saving
- To introduce new technology vehicles and clean fuels, cost and benefits are needed and very importance for a success
- Collaboration among relevant organizations are very important for better air quality and traffic management in urban areas
- Knowledge and experience in co-benefits approaches of an implemented clean engine technology and clean fuels (emission & fuel economy reduction, climate change, health impacts, economy impacts etc.)

## Transfer :

- **Knowledge and Technology transfer regarding clean** engine technology and fuel quality improving for better air quality & climate
- **Role model for collaboration among relevant** organizations and institutional frameworks for better air quality and traffic management in the city
- **Community and sustainability co-benefits of clean** engine technology and clean fuels can be transferred
- Technical knowledge & information transfer to bridge the gap between policy makers and researchers
- Transfer of tax exemption/government subsidy for environmental friendly vehicles (Hybrid/Electric Vehicles)