MOBILE EMISSION & AIR QUALITY IN HANOI

1. VEHICLE NUMBERS

|	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CARS	17.5	22.1	31.2	40.2	47.9	54.4	73.0	98.8	135.8	167.0	212.5	234.5	271.6
BUSES	3.0	3.9	5.2	6.3	7.2	7.7	9.4	10.7	12.1	13.5	16.4	17.3	19.0
LIGHT TRUCK	10.4	12.7	15.9	18.9	21.6	23.9	28.7	35.1	43.3	50.7	62.6	67.3	76.1
HEAVY TRUCKS	1.5	2.1	2.7	3.2	3.5	3.8	4.7	5.9	7.4	8.6	10.8	11.6	13.2
OTHERS	0.8	0.9	0.9	1.3	1.4	1.5	1.8	2.5	3.0	3.6	4.6	5.0	5.7
MOTOR CYCLES	944.5	1,113.4	1,205.1	1,306.2	1,384.7	1,521.6	1,673.8	1,836.9	2,000.0	2,196.6	2,412.6	2,545.4	2,732.1

2. EMISSION FACTORS

Based on vehicle fleet composition data collected and other national/regional sources, emission factors were developed for each vehicle class (segregated by age and/or technology and criteria pollutant) specially tailored to the Hanoi vehicle fleet. With this data the model will be prepared including these established emission factors for each vehicle class.

Type	ECVC	CO	HC	NOx	CO2	SO2[c]	PM	% Composition per Vehicle Class
Motorcycle	Motorcycle [Gasoline] Pre-Euro	13.20[a]	1.28[a]	0.13[a]	26.88[a]	0.03	0.30[b]	35%
	Motorcycle [Gasoline] Euro 2	11.49[a]	0.88[a]	0.10[a]	31.19[a]	0.02	0.01	65%
Car	Car [Gasoline] Pre-Euro	1.88[a]	0.23[a]	1.14[b]	221.34[a]	0.12	0.09[b]	26%
	Car [Gasoline] Euro 2	1.54[a]	0.07[a]	0.11[a]	178.85[a]	0.09	0.003	68%
	Car [Diesel] Pre-Euro	1.50	0.29	6.24	244.56	0.14	0.41	2%
	Car [Diesel] Euro 2	0.77	0.13	1.43	224.36	0.13	0.25	4%
Taxi	Taxi [Gasoline] Pre-Euro	1.88[a]	0.23[a]	1.14[b]	221.34[a]	0.12	0.09[b]	26%
	Taxi [Gasoline] Euro 2	1.54	0.07	0.11	178.85	0.09	0.003	68%
	Taxi [Diesel] Pre-Euro	1.50	0.29	6.24	244.56	0.14	0.41	2%
	Taxi [Diesel] Euro 2	0.77	0.13	1.43	224.36	0.13	0.25	4%
Light truck	Light truck [Gasoline] Pre-Euro	25.43	1.20	8.03[b]	207.94	0.13	0.14[b]	11%
	Light truck [Gasoline] Euro 2	0.61	0.03	0.10	211.75	0.11	0.003	17%
	Light truck [Diesel] Pre-Euro	0.89	0.29	12.12[b]	232.57	0.13	0.79[b]	25%
	Light truck [Diesel] Euro 2	0.87	0.05	0.80	201.68	0.12	0.04	48%
Heavy truck	Heavy truck [Gasoline] Pre-Euro	16.49	2.82	9.52[b]	264.36	0.17	0.35[b]	0%
	Heavy truck [Gasoline] Euro 2	3.84	0.16	0.24	267.46	0.14	0.003	0%
	Heavy truck [Diesel] Pre-Euro	3.27	1.34	21.58[b]	982.63	0.57	2.33[b]	39%
	Heavy truck [Diesel] Euro 2	1.74	0.51	8.99	805.72	0.46	0.18	61%
Bus	Bus [Gasoline] Pre-Euro	21.44	3.21	4.36[b]	276.56	0.19	0.63[b]	2%
	Bus [Gasoline] Euro 2	4.09	0.15	0.16	284.98	0.15	0.003	1%
	Bus [Diesel] Pre-Euro	4.26	1.53	10.35[b]	1,028.00	0.60	2.35[b]	40%
	Bus [Diesel] Euro 2	1.86	0.47	6.29	858.50	0.50	0.18	58%

3. MODELING PERFORMANCE AND COMPILE RESULTS

All vehicle data collected in the field will be entered into the AirQUIS model and the model will be run for the selected sampling periods. The model output will be an inventory format displaying the total annual emission rates of each criteria pollutant for each vehicle class in tabular form
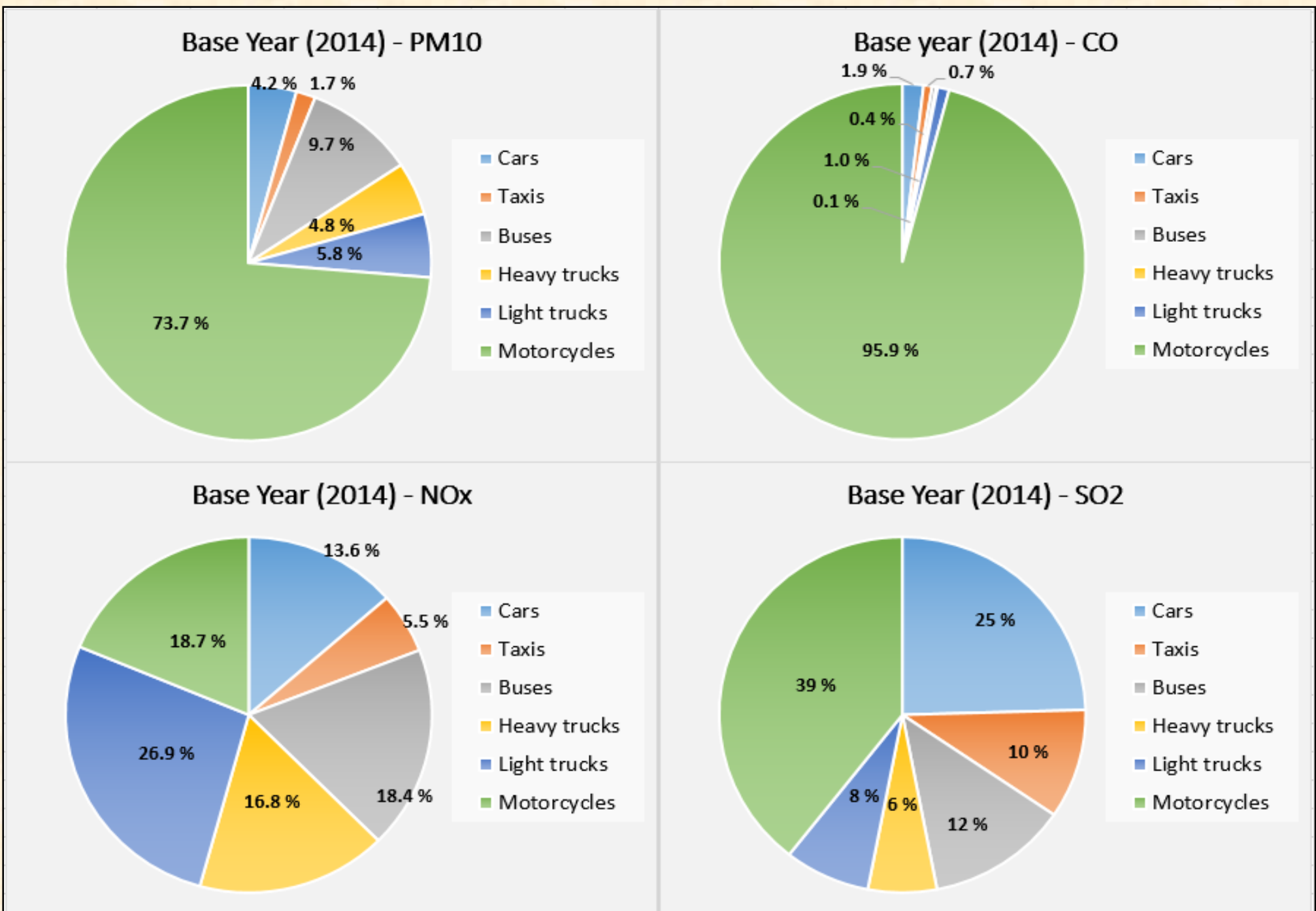

The daily diurnal variation factors for difference pollutants were presented in Figure 22.The diurnal variation during a day for Hanoi traffic is typical for city life and reflect city lifestyle. A clear deduction of traffic emission at about 13:00-14:00 reflect the lifestyle of Vietnamese having a short snap after lunch time to prepare for afternoon activites this is a clear different habit compare to other cities in Europe or Aisa.
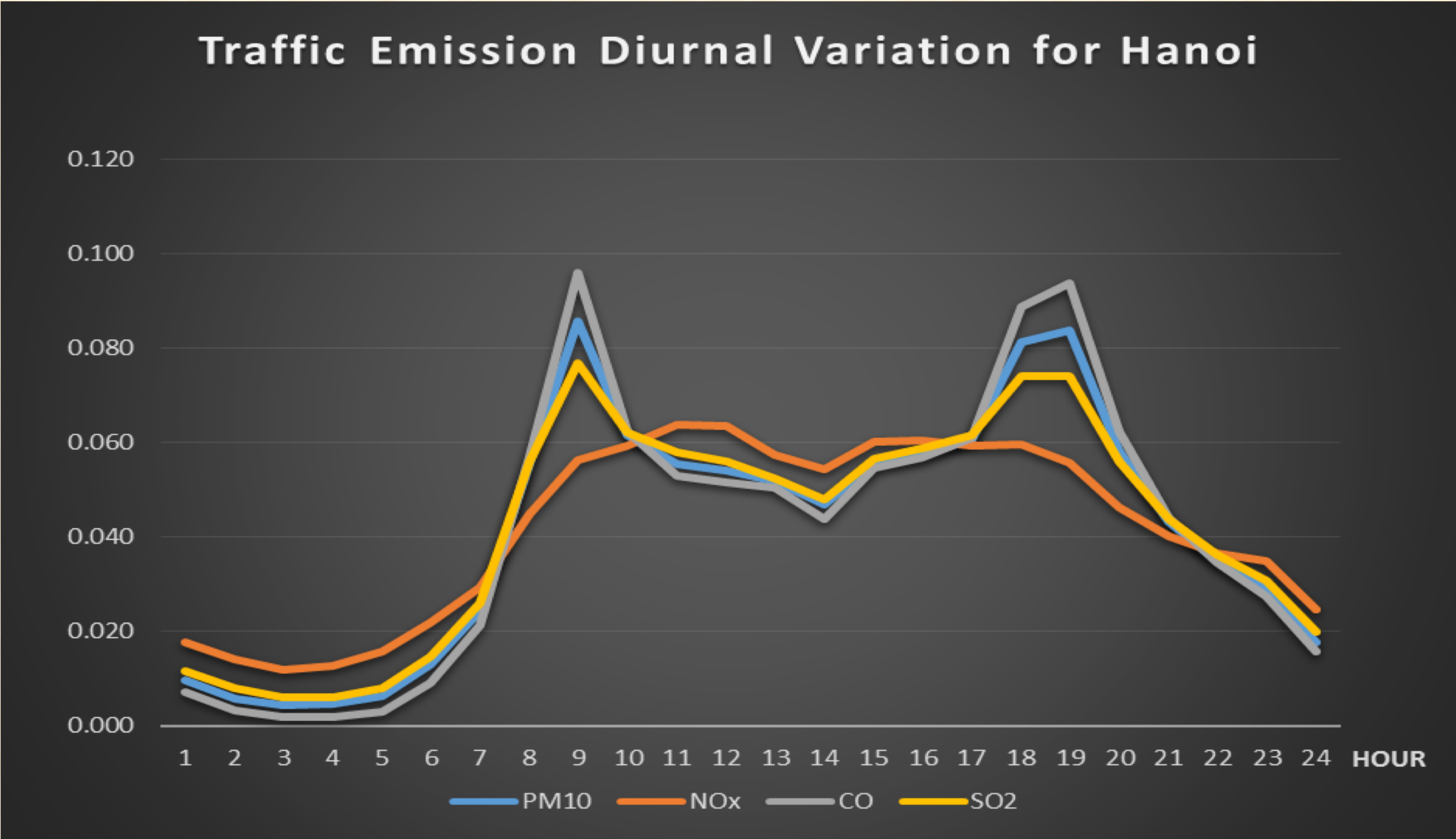
4. MOBILE SOURCE EMISSION CONTROL PLANNING AND INTERVENTIONS

The interventions that are proposed to be modelled into the AirQUIS model have been assessed by checking parameters such as the following:
• Relevance of the interventions in terms of addressing the sources of traffic sources of pollution in the city of Hanoi
• Consistency of the interventions with the current developments in terms of policies, projects and programs related to air pollution mitigation in the City of Hanoi
• Feasibility of reflecting the potential impacts of the interventions in the AirQUIS model
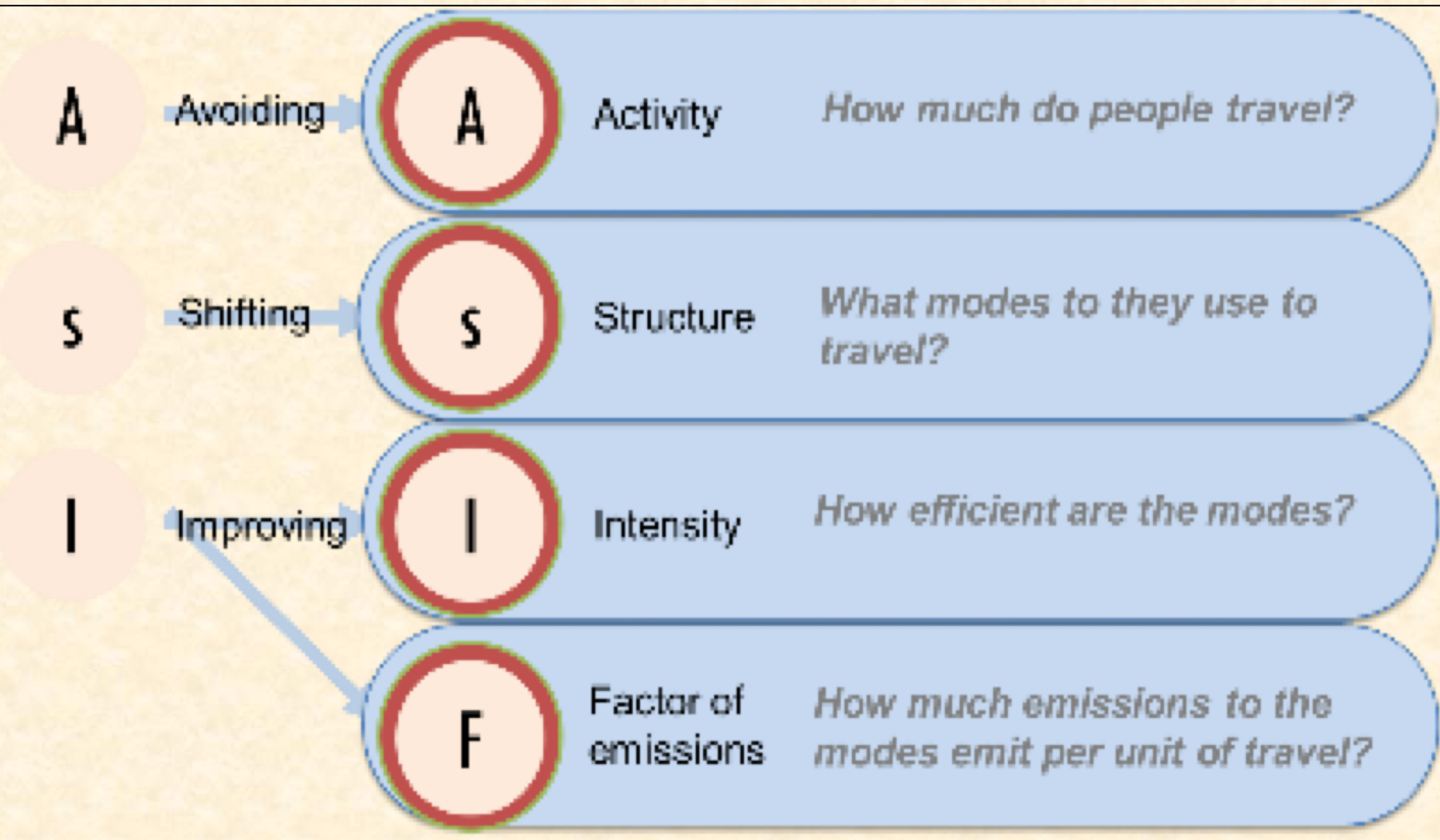
5. FUTHER WORKS

■ Emission Inventory for Mobile; Industrial; Domestic (bottom up)

■ Other EI data set(s) with support from MICS-Asia: GFED v4.1s; MEGAN; REASv3;

■ SEA Modelling in connection with SEA GROUP - MICS-Asia (Japan and Hongkong)

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