



# **5<sup>TH</sup> EMISSION INVENTORY TRAINING**

## **23-25 MAY, 2012**

### **COLOMBO, SRI LANKA**

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# RESULTS

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- ✘ Pak, EPA get prepared National Emissions Inventory of Pakistan in 2000 for eleven years (1980, 1985 and 1991 - 1998).
- ✘ This draft report was prepared by a consultant firm Hagler Bailly Pakistan under Male' Declaration.
- ✘ Hard copy of this report is available.
- ✘ Some facts of this report are as under;

# SOURCES OF DATA

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- ✘ *Pakistan Energy Yearbook*. Prepared by Hydrocarbon Development Institute of Pakistan.
- ✘ *Economic Survey*. Published annually by the Economic Advisor's Wing, Finance Division, Government of Pakistan.
- ✘ *Pakistan Railways Yearbook*. Published by Pakistan Railways.
- ✘ *Agricultural Statistics of Pakistan*. Published by the Ministry of Food, Agriculture and Livestock, Government of Pakistan.
- ✘ *Pakistan Census of Livestock*. Published by Agricultural Census Organization.
- ✘ Various publications of the National Transport Research Center.

# EMISSION FACTORS

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- ✘ All emission factors used in the inventory were based on research and compilation undertaken in the US and the European countries.
- ✘ No research in this area has been conducted in Pakistan.
- ✘ Wherever sufficient information was available the emission factors proposed by western sources were modified to suit local conditions.

## UTILIZATION OF ENERGY IN THE INDUSTRY, DOMESTIC AND TRANSPORTATION SECTOR

Fuel	Industry	Domestic			Transportation
		Residential	Commercial	Agriculture	
Coal	<ul style="list-style-type: none"> <li>• Brick Kilns</li> <li>• Steel Mills</li> </ul>	<ul style="list-style-type: none"> <li>• Cooking</li> </ul>			
Gasoline					<ul style="list-style-type: none"> <li>• Road Transportation</li> </ul>
Kerosene		<ul style="list-style-type: none"> <li>• Lighting</li> <li>• Cooking</li> <li>• Space Heating</li> </ul>			
Diesel	<ul style="list-style-type: none"> <li>• Boilers and Furnaces</li> </ul>			<ul style="list-style-type: none"> <li>• Farm Machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Road Transport</li> <li>• Railway</li> </ul>
Light Diesel Oil				<ul style="list-style-type: none"> <li>• Engines for Water Wells</li> </ul>	
Furnace Oil	<ul style="list-style-type: none"> <li>• Boilers and Furnaces</li> </ul>				<ul style="list-style-type: none"> <li>• Railway</li> </ul>
LPG		<ul style="list-style-type: none"> <li>• Cooking</li> </ul>	<ul style="list-style-type: none"> <li>• Cooking</li> </ul>		<ul style="list-style-type: none"> <li>• Road Transportation</li> </ul>
Natural Gas	<ul style="list-style-type: none"> <li>• Boilers and Furnaces</li> <li>• Feedstock for Fertilizer</li> </ul>	<ul style="list-style-type: none"> <li>• Water Heating</li> <li>• Cooking</li> <li>• Space Heating</li> </ul>	<ul style="list-style-type: none"> <li>• Water Heating</li> <li>• Cooking</li> <li>• Space Heating</li> </ul>		<ul style="list-style-type: none"> <li>• Road Transportation (CNG)</li> </ul>
Biomass	<ul style="list-style-type: none"> <li>• Bagasse in Sugar Mills for Boilers</li> <li>• Fuelwood in Brick Kilns</li> </ul>	<ul style="list-style-type: none"> <li>• Water Heating</li> <li>• Cooking</li> <li>• Space Heating</li> </ul>	<ul style="list-style-type: none"> <li>• Cooking</li> </ul>		
Electricity	<ul style="list-style-type: none"> <li>• Lighting</li> <li>• Motors and Appliances</li> </ul>	<ul style="list-style-type: none"> <li>• Lighting</li> <li>• Appliances</li> </ul>	<ul style="list-style-type: none"> <li>• Lighting</li> <li>• Appliances</li> </ul>	<ul style="list-style-type: none"> <li>• Electric Pumps for Water Wells</li> </ul>	<ul style="list-style-type: none"> <li>• Rail</li> </ul>

# ENERGY CONSUMPTION (MEGATONNES OF OIL EQUIVALENT [mtoe])

Year	Fuel Type	Industry	Domestic				Transportation	Power Generation	Fuel Conversion	Other	Total
			Residential	Commercial	Agricultural	Total					
1998	Coking Coal	0.667								<b>0.667</b>	
1998	lignite and Sub-Bituminous Coal	1.327	0.001			0.001		0.164		<b>1.492</b>	
1998	Crude Oil							0.226		<b>0.226</b>	
1998	Aviation Fuel					0.287			0.220	<b>0.507</b>	
1998	Gasoline					1.410	0.001		0.024	<b>1.435</b>	
1998	Kerosene		0.540			0.540	0.001	0.000	0.020	<b>0.560</b>	
1998	High Speed Diesel	0.243	0.004		0.000	0.004	6.454	0.156	0.114	<b>6.971</b>	
1998	Light Diesel Oil	0.000			0.269	0.269	0.000	0.003	0.000	<b>0.273</b>	
1998	Furnce Oil	1.914					0.008	6.075	0.040	<b>8.037</b>	
1998	LPG		0.153	0.051		0.204	0.038		0.013	<b>0.255</b>	
1998	Other Non Energy Oil	0.243	0.003		0.000	0.003	0.078	0.001	0.003	<b>0.327</b>	
1998	Natural Gas	4.071	3.322	0.463		3.785	0.012	4.422	0.812	2.723	<b>15.825</b>
1998	Biomass (Fuelwood)	0.002	4.812	0.313		5.155				<b>5.157</b>	
1998	Biomass (Crop Residue)	0.557	1.202			1.202				<b>1.759</b>	
1998	Biomass (Animal Residue)		1.234			1.234				<b>1.234</b>	
1998	Biomass (Wood Charcoal)		0.105			0.105				<b>0.105</b>	
1998	Electricity	1.057	1.605	0.201	0.596	2.402	0.001		0.354	<b>3.815</b>	
1998	Hydroelectricity Production								1.897	<b>1.897</b>	
1998	Nuclear Electricity Production								0.032	<b>0.032</b>	

## SULFUR CONTENTS OF FUEL (%)

Fuel Type	Fuel Conversion Sector	Power Generation Sector	Domestic Sector	Transport Sector	Industrial Sector
Coking Coal					0.50000%
Light and Sub-Bituminous Coal		5.10000%	4.90000%	4.90000%	5.10000%
Crude Oil	1.00000%				
Aviation Fuel				0.05000%	
Gasoline		0.01000%		0.01000%	
Kerosene		0.20000%	0.20000%	0.20000%	0.20000%
High Speed Diesel		1.00000%	1.00000%	1.00000%	1.00000%
Light Diesel Oil		1.80000%	1.80000%	1.80000%	1.80000%
Furnce Oil		3.00000%		3.00000%	3.00000%
LPG			0.00016%	0.00016%	
Other Non Energy Oil		0.00000%	0.00000%	0.00000%	0.00000%
Natural Gas		0.01000%	0.01000%	0.01000%	0.01000%
Biomass (Fuelwood)			0.20000%		0.20000%
Biomass (Crop Residue)			0.01000%		0.01000%
Biomass (Animal Residue)			0.00225%		
Biomass (Wood Charcoal)			0.00000%		

## NET CALORIFIC VALUE OF FUELS (TONNES OF OIL EQUIVALENT PER TONNE)

Fuel Type	Fuel Conversion Sector	Power Generation Sector	Domestic Sector	Transport Sector	Industrial Sector
Coking Coal	0.695	0.695	0.695	0.695	0.695
Light and Sub-Bituminous Coal	0.472	0.472	0.472	0.472	0.472
Crude Oil	1.089	1.089	1.089	1.089	1.089
Aviation Fuel	1.096	1.096	1.096	1.096	1.096
Gasoline	1.108	1.108	1.108	1.108	1.108
Kerosene	1.089	1.089	1.089	1.089	1.089
High Speed Diesel	1.110	1.110	1.110	1.110	1.110
Light Diesel Oil	1.100	1.100	1.100	1.100	1.100
Furnce Oil	1.028	1.028	1.028	1.028	1.028
LPG	1.142	1.142	1.142	1.142	1.142
Other Non Energy Oil	0.960	0.960	0.960	0.960	0.960
Natural Gas	1.143	1.143	1.143	1.143	1.143
Biomass (Fuelwood)	0.382	0.382	0.382	0.382	0.382
Biomass (Crop Residue)	0.358	0.358	0.358	0.358	0.358
Biomass (Animal Residue)	0.287	0.287	0.287	0.287	0.287
Biomass (Wood Charcoal)	0.740	0.740	0.740	0.740	0.740



## SULFUR RETENTION IN ASH OF FUELS (%)

Fuel Type	Fuel Conversion Sector	Power Generation Sector	Domestic Sector	Transport Sector	Industrial Sector
Coking Coal					5%
Lignite and Sub-Bituminous Coal		30%	30%	30%	30%
Biomass (Fuelwood)			0%		0%
Biomass (Crop Residue)			0%		0%
Biomass (Animal Residue)			0%		
Biomass (Wood Charcoal)			0%		

## SULFUR CONTENT OF FUELS

Fuel Type	Fuel	Selected Value
Biomass	Animal Residue	0.22500%
Biomass	Crop Residue	0.01000%
Biomass	Fuelwood	0.20000%
Biomass	Wood Charcoal	0.00000%
Coal	General	0.50000%
Diesel	Diesel	1.00000%
Diesel	Light Furnace Oil	1.80000%
Crude	Crude Oil	1.00000%
Furnace Oil	Furnace Oil	3.00000%
Gasoline	Gasoline	0.01000%
Kerosene	Aviation Fuel	0.05000%
Kerosene	Kerosene	0.20000%
Natural Gas	LPG	0.00016%
Natural Gas	Natural Gas	0.01000%

## BIOMASS CONSUMPTION (Pote 000)

Year	Biomass	Industry	Household	Commercial	Total
1998	Firewood	6	12671	819	13496
1998	Crop Residue	1554	3355	0	4909
1998	Dung	0	4304	0	4304
1998	Charcoal	0	141	0	141
	Total	1560	20472	819	22851

Assumed Growth Rate 2%

## NUMBER OF MOBILE SOURCE

Vehicle Type	Taxi Cab				Buses	Truck	Rickshaws	Motor Cars						
	Small (<1.5 l)				All	All		Small (< 1.5 l)		Medium (< 1.5 - 2.1 l)			Large (< 2.1 l)	
Fuel	Gasoline	Diesel	LPG	CNG	Diesel	Diesel	Gasoline	Gasoline	CNG	Gasoline	Diesel	CNG	Gasoline	Diesel
1998	54,914	3,160	3,792	1,334	79,700	136,500	82,900	437,719	9,441	148,343	7,985	3,372	28,746	3,194

## NUMBER OF MOBILE SOURCE

Vehicle Type	Jeeps		Station Wagons	Motorcycles/ Scooters	Tractors	Delivery Vans		Others	Trains		Boats
Size	All		All	All	All	All		All	All		All
Fuel	Gasoline	Diesel	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Furnace Oil	Diesel	
1998	11,500	46,000	72,600	1,843,700	492,200	147,956	9,444	89,700	1,424	89,567	14,320

## NUMBER OF MOBILE SOURCE (ANNUAL DISTANCE TRAVELED IN MILLION KM)

Vehicle Type	Taxi Cab				Buses	Truck	Rickshaws	Motor Cars						
Size	Small (<1.5 l)				All	All		Small (< 1.5 l)		Medium (< 1.5 - 2.1 l)			Large (< 2.1 l)	
Fuel	Gasoline	Diesel	LPG	CNG	Diesel	Diesel	Gasoline	Gasoline	CNG	Gasoline	Diesel	CNG	Gasoline	Diesel
1998	1,785	103	123	43	4,782	7,644	3,233	5,515	119	1,869	101	42	362	40

## NUMBER OF MOBILE SOURCE (ANNUAL DISTANCE TRAVELED IN MILLION KM)

Vehicle Type	Jeeps		Station Wagons	Motorcycles/ Scooters	Tractors*	Delivery Vans		Others	Trains		Boats
Size	All		All	All	All	All		All	All		All
Fuel	Gasoline	Diesel	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	FO	Diesel	
1998	145	580	4,719	16,593	492	7,694	491	718	0	35	0

\* Values are in million hours

## MOBILE SOURCE EMISSION FACTORS (g/km)

Vehicle Type	Taxi Cab				Buses	Truck	Rickshaws	Motor Cars							
Size	Small (<1.5 l)				All	All		Small (< 1.5 l)			Medium (< 1.5 - 2.1 l)			Large (< 2.1 l)	
Fuel	Gasoline	Diesel	LPG	CNG	Diesel	Diesel	Gasoline	Gasoline	CNG	Gasoline	Diesel	CNG	Gasoline	Diesel	
NOx	1.40	1.17	2.11	0.89	5.40	12.96	0.54	0.40	0.89	1.79	1.17	1.13	2.81	1.94	
PM	0.05	0.26			2.50	1.25	0.18	0.05		0.06	0.26		1.01	0.44	
SO2	0.01	1.67	0.00	0.01	4.78	5.58	0.01	0.01	0.01	0.01	1.67	0.01	0.02	2.70	

## MOBILE SOURCE EMISSION FACTORS (g/km)

Vehicle Type	Jeeps		Station Wagons	Motorcycles/ Scooters	Tractors	Delivery Vans		Others	Trains		Boats
Size	All		All	All	All	All		All	All		All
Fuel	Gasoline	Diesel	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Furnace Oil	Diesel	
NOx	3.82	1.56	8.70	0.10	233.34	1.15	1.56	3.89	227.27	155.87	
PM	0.11	0.23	0.95	0.06	11.40	0.03	0.23	0.12	127.23	13.58	
SO2	0.02	1.67	1.39	0.00	83.69	0.01	1.67	0.01	1938.33	74.44	

## TOTAL EMISSION FROM TRANSPORT SECTOR BY SOURCE IN 1998 (tonnes)

Parameter	Non-Government					Railway	Government	All Sources
	Two-Stroke	Small Vehicles	Medium Duty Vehicles	Heavy Duty Vehicles	Total			
Nitrogen Oxides (NOx)	3,397	16,837	53,436	239,766	313,436	5,510	5,527	324,473
Particulate Matter (PM)	1,532	670	4,932	27,121	34,254	503	606	35,362
Sulfur Dioxide (SO <sub>2</sub> )	96	1,533	7,469	106,708	115,806	3,013	2,051	120,871

## MOTOR VEHICLE ON ROAD (000 NUMBER)

Year	Taxi Cabs	Buses	Trucks	Rickshaws	Motor Cars	Jeep	Station Wagon	Motorcycles / Scooter	Tractor	Delivery Van	Other
1998	63.2	79.7	136.5	82.9	638.8	57.5	72.6	1843.7	492.2	157.4	89.7

## NITROGEN OXIDE EMISSIONS FROM STATIONARY FUEL COMBUSTION SOURCES (tonnes)

Year	Fuel Type	Industry	Residential	Commercial	Agricultural	Power	Other
1998	Light and Sub-Bituminous Coal	8,149	5			1,005	
1998	Kerosene		61				2
1998	High Speed Diesel	14,016				1,968	
1998	Light Diesel Oil	10			15,519	31	19
1998	Furnace Oil	13,098				43,453	277
1998	LPG		533	178			44
1998	Natural Gas	7,175	2,005	280		24,470	
1998	Biomass (Fuelwood)	4	10,137	655			
1998	Biomass (Crop Residue)	1,554	5,033				
1998	Biomass (Animal Residue)		5,165				
1998	Biomass (Wood Charcoal)		438				

## PARTICULATE MATTER EMISSIONS FROM STATIONARY FUEL COMBUSTION SOURCES (tonnes)

Year	Fuel Type	Industry	Residential	Commercial	Agricultural	Power	Other
1998	Light and Sub-Bituminous Coal	32,538	3			4,013	
1998	Kerosene		115				4
1998	High Speed Diesel	438				350	
1998	Light Diesel Oil	0			485	6	1
1998	Furnace Oil	7,332				12,271	155
1998	LPG						
1998	Natural Gas	545	236	33		1,035	
1998	Biomass (Fuelwood)	25	114,040	7,371			
1998	Biomass (Crop Residue)	20,204	43,618				
1998	Biomass (Animal Residue)		44,764				
1998	Biomass (Wood Charcoal)		2,464				



## SULFUR DIOXIDE EMISSIONS FROM STATIONARY FUEL COMBUSTION SOURCES (tonnes)

Year	Fuel Type	Industry	Residential	Commercial	Agricultural	Power	Other
1998	Light and Sub-Bituminous Coal	200,626	162			23,773	
1998	Kerosene		1,983				72
1998	High Speed Diesel	4,385				2,556	
1998	Light Diesel Oil	6			8,819	82	11
1998	Furnce Oil	111,707				202,914	2,363
1998	LPG		0	0			0
1998	Natural Gas	848	692	97		921	
1998	Biomass (Fuelwood)	23	50,685	3,276			
1998	Biomass (Crop Residue)		671				
1998	Biomass (Animal Residue)		194				
1998	Biomass (Wood Charcoal)						

## PRODUCTION OF SELECTED INDUSTRIAL ITEMS IN 1998 (000 tonnes)

Paper and Paper Board	Oil Refineries	Nitrogen Fertilizer	Cement Production	Sulphuric Acid Production
344.8	6444.5	28.1	3893.5	9364

## INDUSTRIAL PROCESS EMISSION FACTORS (kg/tonnes of Production)

Sector	NO <sub>x</sub>	PM	SO <sub>2</sub>
Paper and Pulp	2.0	112.5	30.0
Oil Refineries	0.3	0.8	1.3
Sulphuric Acid Production			17.5
Nitrogen Fertilizer Production		2.1	
Cement Production	2.1	22.0	0.6

## EMISSION FROM INDUSTRIAL PROCESSES (tonnes) IN 1998

Parameter	Paper and Pulp	Oil Refineries	Sulphuric Acid Production	Nitrogen Fertilizer Production	Cement Production	Total
Nitrogen Oxides	690	1,933	0	0	19,776	22,398
Particulate Matter	38,790	5,156	0	8,001	206,425	258,371
Sulfur Dioxide	10,344	8,378	492	0	5,383	24,597

## AMMONIA EMISSION FROM ANIMAL HUSBANDRY IN 1998

	Cattle	Buffaloes	Sheep	Goats	Camels	Asses	Horses	Mules	Chicken	Ducks
Population (Number in 000)	21,154	21,334	23,728	44,154	790	3,689	325	151	279,652	1,299
Emission Factors (kg/unit)	20.82	24.19	3.37	6.40	12.20	12.20	12.20	12.20	0.17	0.12
Total Emission (tonnes)	440,426	516,069	79,963	282,586	9,638	45,006	3,965	1,842	48,044	152

## TOTAL EMISSIONS IN (000 TONNES) IN 1998

Parameter	Industrial (Combustion)	Industrial (Processes)	Residential	Commercial	Agricultural	Transportation	Power Generation	Other	Total
Nitrogen Oxide	44.01	22.40	23.38	1.11	15.52	324.47	70.93	0.34	502.16
Particulate Matter	61.08	258.37	205.24	7.40	0.48	35.36	17.67	0.16	585.78
Sulfur Dioxide	317.59	24.60	54.39	3.37	8.82	120.87	230.25	2.45	762.33
Ammonia		46.36				0.87	1.30	1771.07	1819.59

**2005-6**

**DATA**

## PETROLEUM ENERGY PRODUCT CONSUMPTION (TOE) IN 2005

Domestic	Industrial	Agriculture	Transport	Power	Other/Govt
132,716	1,703,633	85,351	8,582,717	4,110,527	373,184

## MOTOR VEHICLE ON ROAD (000 NUMBER)

Taxi Cabs	Buses	Trucks	Rickshaws	Motor Cars	Jeep	Station Wagon	Motorcycles / Scooter	Tractor	Delivery Van	Other
122.1	103.6	151.8	77.8	199.2	65.7	140.8	3791	822.3	143.3	60.2

## **PRODUCTION OF SELECTED INDUSTRIAL ITEMS IN 2005 (000 tonnes)**

Paper and Paper Board	Oil Refineries	Nitrogen Fertilizer	Cement Production	Sulphuric Acid Production
476.2	10498	2411.8	18483	95.5

## **SECTORAL CONSUMPTION OF NATURAL GAS IN 2005 (MMCF)**

Power	Fertilizer	General Industries	Cement	Transport	Commercial	Domestic	Total
491766	198049	278973	15335	38885	29268	171109	1223385



## ENERGY CONSUMPTION (TOE)

Year	Fuel Type	Industry	Domestic			Transportation	Power Generation	Other	Total
			Residential	Commercial	Agricultural				
2005	Coal	3,611,490	0	0	0	0	66,812	0	<b>3,678,302</b>
2005	Oil	1,703,633	132,716	0	85,351	0	4,110,527	373,184	<b>6,405,411</b>
2005	Aviation Fuel	0	0	0	0	563,985	0	0	<b>563,985</b>
2005	Gasoline	0	0	0	0	1,227,579	0	0	<b>1,227,579</b>
2005	Kerosene	0	0	0	0	623	0	0	<b>623</b>
2005	High Speed Diesel	0	0	0	0	6,763,639	0	0	<b>6,763,639</b>
2005	Light Diesel Oil	0	0	0	0	723	0	0	<b>723</b>
2005	Furnce Oil	0	0	0	0	18,831	0	0	<b>18,831</b>
2005	LPG	0	416,102	177,884	0	0	0	31,806	<b>625,792</b>
2005	Other Non Energy Oil	0	0	0	0	0	0	0	<b>0</b>
2005	Natural Gas	7,726,502	4,003,955	684,886	0	909,908	9,978,207	3876494***	<b>23,303,458</b>
2005	HOBC	0	0	0	0	7,336	0	0	<b>7,336</b>
2005	Electricity	1,612,735	2,501,813	385,222	647,349	1042*	0	357394**	<b>5,147,119</b>

\* @ 3412 Btu/kWh. Includes railway traction.

\*\* @ 3412 Btu/kWh. Also include bulk supplies and street light.

\*\*\* Energy and Non Energy uses of Gas in Fertilizer Sector

## EMISSION FROM INDUSTRIAL PROCESSES (tonnes) IN 2005

Parameter	Paper and Pulp	Oil Refineries	Sulphuric Acid Production	Nitrogen Fertilizer Production	Cement Production	total
Nitrogen Oxides	952	3,149	0	0	38,814	42,916
Particulate Matter	53,572	8,398	0	5,064	406,626	473,660
Sulfur Dioxide	14,286	13,644	1,671	0	11,089	40,690

## AMONIA EMISSION FROM ANIMAL HUSBANDRY IN 2005

	Cattle	Buffaloes	Sheep	Goats	Camels	Asses	Horses	Mules	Chicken	Ducks
Population (Number in 000)	25,500	28,400	25,500	61,900	700	4,300	300	300		
Emission Factors (kg/unit)	20.82	24.19	3.37	6.40	12.20	12.20	12.20	12.20		
Total Emission (tonnes)	530,910	686,996	85,935	396,160	8,540	52,460	3,660	3,660		

## BIOMASS CONSUMPTION (Pote 000)

Year	Biomass	Industry	Household	Commercial	Total
2005	Firewood	7	14,445	934	15,386
2005	Crop Residue	1,772	3,525	0	5,297
2005	Dung	0	4,907	0	4,907
2005	Charcoal	0	161	0	161
Total		1,779	23,038	934	25,751

Assumed Growth Rate 2%

## NATURAL GAS CONSUMPTION (MMCFT)

Year	Power	Fertilizer	General Industries	Cement	Transport	Commercial	Domestic	Total
2005	491,766	198,049	278,973	15,335	38,885	29,268	171,109	1,223,385

# MOBILE AIR QUALITY STATION



## MONTHLY MEAN VALUE OF ISLAMABAD FOR YEAR 2009

Months	NO	NO2	NOx	CH4	NMHC	THC	CO	SO2	O3	MC	Wnd Spd	Wnd Dir	Temp	RH	Radiation
	ug/m3	ug/m3	ppb	ug/m3	ppb	ppb	mg/m3	ug/m3	ug/m3	ug/m3	m/s	degrees	degC	%	W/m2
January -2009	51.31	44.79	64.51				0.93	9.56	18.18	66.98	0.88	236.09	11.66	73.13	84.81
Febraury-2009	113.73	68.58	124.78				1.23	22.59	13.65	64.33	1.18	152.52	14.00	63.77	128.95
March-2009	62.34	58.92	80.45				1.01	19.17	27.24	111.88	1.05	134.62	18.77	53.50	154.30
April-2009	67.72	40.93	74.80				0.91	2.59	45.97	37.55	1.13	197.72	21.76	62.49	200.62
May-2009	63.94	49.01	75.72				0.92	8.04	69.79	35.01	1.05	188.95	27.41	46.72	248.58
June-2009	33.52	48.00	50.74	3519.38	573.48	5826.29	0.68	14.15	90.80	33.19	1.00	162.83	31.13	36.38	264.42
July-2009	18.25	35.90	33.45	1750.98	91.79	2704.95	0.52	7.78	96.62	21.88	0.94	86.94	31.43	54.47	229.80
AUG-2009	8.92	28.42	22.00	1901.55	120.84	2958.99	0.45	2.19	107.54	24.71	0.93	146.28	29.47	71.69	191.93
SEP-2009	22.62	35.90	36.91	2434.38	249.37	3882.77	0.63	6.45	72.30	38.28	0.85	143.49	27.58	67.42	169.26
OCT-2009	70.71	52.69	79.23	3427.36	673.36	5774.52	1.25	17.38	41.87	61.63	1.00	197.08	20.61	56.36	119.21
NOV-2009	133.18	67.06	133.58	5939.77	1532.11	8699.64	1.85	27.08	27.28	104.56	0.98	248.69	14.64	63.63	90.61
DEC-2009	167.16	54.45	154.21	11251.26	3892.15	14871.95	2.21	15.53	12.61	111.34	1.11	223.82	10.73	64.30	75.04
<b>ANNUAL MEAN VALUE</b>	<b>67.78</b>	<b>48.72</b>	<b>77.53</b>	<b>4317.81</b>	<b>1019.01</b>	<b>6388.44</b>	<b>1.05</b>	<b>12.71</b>	<b>51.99</b>	<b>59.28</b>	<b>1.01</b>	<b>176.59</b>	<b>21.60</b>	<b>59.49</b>	<b>163.13</b>

# PROBLEMS

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- ✘ Need enough resources to develop new realist emission factors.
- ✘ Inconsistency in officials getting these trainings
- ✘ Non - availability of complete data on internet.
- ✘ Insufficient Resources.

# SUGGESTION

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- ✘ Consistency of officials in training program
- ✘ Either hire dedicated staff for this activity  
OR
- ✘ Provide resources to source out this activity to private firm.
- ✘ Secretariat may get feedback from the countries focal persons at least once a month.
- ✘ Provision of sufficient resources for collecting data and development of new realist emission factors.
- ✘ Pakistan is in a state against terrorism and Pakistan economy is not strong enough to support this activity.



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***THANKS***