



State of the Environment in Vietnam 2001

Air Pressure

- Issues
- Maps
- Overview
- Annexs
- FOREWORD
- General Conclusion
- Homepage
- Link
- Pressure
- Response
- State and Impact
- Summary



- ***State and Impact***
- ***Response***
- ***Conclusion***

- **Air pollution due to industrial activities**
- **Air pollution caused by transport activities**
- **Sources of air environment pollution caused by construction activities**
- **Sources of air environment pollution caused by cooking**

Major pollutant sources causing air environment pollution include: industrial activities, transport activities, building activities and household cooking activities.



Air pollution due to industrial activities

Old industries (built before 1975) are often the medium and small industries, with old production technologies. Only some facilities have filter equipment and most of the old industries do not have equipment for treating toxic waste gases. In general, the old industries do not meet the standards of environmental quality. The old industries are also dispersed, and due to expanding urbanization and growth of urban centers most of these industries are located within urban areas of many towns and cities. For example, Ho Chi Minh city has about 700 factories, of which 500 are located within the urban area. Hanoi capital has 300 factories, of which 200 are located within the urban area.

New industries. Most of the new industrial facilities are concentrated in 66 industrial zones. Before the construction of each project, an "Environmental Impact Assessment" is carried out in order to ensure the standards of environmental quality. Therefore, pollution from new industrial facilities is not a severe problem at present.

*Industrial sectors causing major
pollution of air environment*



The following are the main industries that cause major pollution of air environment at present:

- **Thermoelectricity sub-sector:** this sub-sector contributes 60% of total electric energy output in Vietnam. Thermoelectric plants are concentrated in the North (located along the highway N°18) and in South (Ho Chi Minh City, Dong Nai, and Ba Ria - Vung Tau provinces). The fuels for thermoelectricity generation are coal, FO oil and natural gas. Coal from Quang Ninh is a major source of fuel for thermoelectric plants, with sulfur content $S \approx 0.5\%$, ash content $A = 10-15\%$ of total volume. Coal is also obtained from other provinces (Thai Nguyen, for example), but has a large sulfur content $S \approx 3-3.5\%$, ash content $A = 30-40\%$. The FO oil is imported from foreign sources and has a sulfur content $S = 2.7-3\%$ and ash content $A = 0.01-0.15\%$. Therefore, thermoelectric plants emit enormous volumes of dust and SO_2 gas, along with CO , CO_2 , and NO_2 causing pollution of the ambient air.

- **Cement and construction materials production.** Cement and building materials production is one of the very fast expanding sub-sectors in Vietnam and the industries are located in the Northern, Central and Southern regions.

According to statistic of 1998, cement output was less than 10 million metric tones, baked brick output was 7,378 millions pieces, and baked tile output 484 million pieces. All plants of cement, glass, brick, tile etc often use coal as combustion fuel, therefore, they emit a high volume of dust and air pollutants such as: SO_2 , NO_2 , CO , and CO_2 . In addition, air pollutants are discharged from about 60 plants of stand-furnace cement together with brick, tile, and lime factories dispersed throughout the country.

- **Metallurgical Industry**

Metallurgical industry is one of the sub-sectors that generates high volume of pollutants into the air environment. However, metallurgical industry in Vietnam is still on a small scale. Rolled steel production (mainly in Thai Nguyen Plant) is only 900,000 tones/year, and crude tin production (mainly in Cao Bang mining zone) is only 2,425 tones/year. Production of other metals is insignificant, resulting in limited impact on air pollution.

- **Chemical Industry**

Chemical industry not only generates dust pollution, but also emits extremely toxic and hazardous pollutants like SO_2 , H_2SO_4 , HF , Cl_2 , HCl , NH_3 , volatile organic compounds, etc causing serious air pollution problems. Chemical industry output in Vietnam, however, is still low. For example, they produce 22,775 tones of H_2SO_4 , 10,288 tones of $NaOH$, 974,000 tones of fertilizers, less than 20,000 tones of pesticides, and 28,400 tones of chemical paints annually. Some chemical enterprises causing pollution of surrounding air environment are: Lam Thao superphosphate enterprise (Phu Tho province), chemical factories in Viet Tri (Phu Tho), Thu Duc, Tan Binh (Ho Chi Minh city), Dong Nai chemical factory, Ha Bac nitrogenous fertilizer plant, phosphate fertilizer factories in Ha Noi, Ninh Binh, Thanh Hoa,

battery factories in Viet Tri, Hai Phong, Dong Nai, etc.

- Other industries

Some other industries causing significant pollution of air environment are paper-mill, food processing (sugar, alcohol, beer), textile, dyeing, rubber, plastics and cosmetics.

[\[Top\]](#)

Air pollution caused by transport activities

Together with process of industrialization and urbanization, the number of motor vehicles has increased very rapidly, particularly in urban centers. Before 1980, 80-90% of urban people used bicycles, but at present 80% of urban peoples use motorcycles. Emissions from transportation has become a major source of air pollution in urban areas, particularly in large cities such as Ha Noi, Ho Chi Minh City, Hai Phong and Da Nang.

According to data of the Ministry of Transport [12], the number of registered automobiles in the country (except for automobiles of the Ministry of Defense) was 372,010 units in 1996, and increased to 443,000 units in 1998. This means that the average rate of increase per year was 9-10%. The number of registered motorcycles was 4,022,683 units in 1996 and reached 5,309,928 units in 1998, increasing at the annual rate of 15-18%. Therefore, the number of motorcycles increased faster than the number of automobiles. This increase of motorcycle numbers not only causes air pollution but also generates traffic congestion in many large towns. 75% of all automobiles use petrol, 25% use diesel, while all motorcycles use petrol. 70% of total petrol used is Mogas 83 and 30% is Mogas 92. Mogas 92 has lead (Pb) content of 0.15 g/l and Mogas 83 has lead content of 0.40 g/l. Therefore, transport activities emit not only dust, exhalant petrol, (C_nH_m), CO, NO₂, SO₂, but also harmful lead.

[\[Top\]](#)

Sources of air environment pollution caused by construction activities

Nowadays in Vietnam, a lot of construction activity (new construction, rehabilitation, repair, upgradation of ancient monuments) of houses, roads, bridges is taking place everywhere, particularly in the urban centers. Activities such as digging up of soil, dumping of soil, demolition of old buildings, building materials dropping during transportation, etc generate serious dust pollution for the environment. Measured results show that 60-70% of dust volume in urban air is powdered soil and stone whirling from surface of land and roads and originating from construction activities.

[\[Top\]](#)

Sources of air environment pollution caused by cooking

For cooking in the rural areas in Vietnam people use wood, straw, grass, leaf and a small number of people also use charcoal. While urban people are used to cooking with coal, kerosene, firewood,

electricity, and natural gas. Cooking with coal, charcoal and kerosene emits a significant volume of waste gas that is a major source of pollution of indoor air environment, affecting directly the health of inhabitants. Over the past few years, as the living standard of urban people has gradually improved, many urban households use gas stove instead of coal stove or kerosene stove. Therefore, air environment pollution caused by cooking sources has decreased considerably. As presented in document [11], for example, the number of households using gas stoves in several quarters in Hanoi increased as follows: North Thanh Xuan quarter had 50.3% of total households using coal stove and 2.8% using gas stove in 1994, but this rate changed to 41.4% of total households using coal stove and 12.2% using gas stove in 1997; Bach Khoa quarter had 29.2% of total households using coal stove and 3.1% using gas stove in 1994, which changed to 22% of total households using coal stove and 23.5% using gas stove in 1997.

[\[Top\]](#)

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