

CURRENT TRANSPORTATION ISSUES IN JAKARTA AND ITS IMPACTS ON ENVIRONMENT

Dail Umamil Asri
Chief of Road Infrastructure Section
Directorate of Transportation
National Development Planning Agency
Republic of Indonesia
Jl. Taman Surapati No.2 Jakarta Pusat,
Jakarta-20001 , INDONESIA
Fax: +62-21-314-8550
E-mail: dail@bappenas.go.id

Budi Hidayat
Transport Planner
Directorate of Transportation
National Development Planning Agency
Republic of Indonesia
Jl. Taman Surapati No.2 Jakarta Pusat,
Jakarta-20001 , INDONESIA
Fax: +62-21-314-8550
E-mail: buhid@bappenas.go.id

Abstract: Transportation issues are very complex because various social, economic and cultural aspects are involved and inconsistency between land use plan and transportation plan is also one of the problem causes. The increasing traffic demand has brought about traffic congestion resulting in longer travel times on roads. Since transportation infrastructure and services play a significant role in urban system, the expected role is to support to improve quality of life, to attain sustainable urban growth, and to strengthen economic competitiveness of the region. The expansion of social and economic activities has resulted in rising pollution and environmental degradation following the economic crisis in Jakarta Metropolitan area where environmental regulations were largely disregarded during this period

Keywords: Transportation Issues, Jabodetabek, Air Quality

1. INTRODUCTION

Jabodetabek, a large-scale metropolitan area with a population of 21 million, consists of Daerah Khusus Ibukota/DKI (Capital Special Region) Jakarta, as the capital city of Indonesia, which is the center of politics, economy and social activities, and 7 local governments (Bodetabek) in the surrounding areas covering Kota (municipality) Bogor, Kabupaten (regency/district) Bogor, Kota Depok, Kota Bekasi, Kabupaten Bekasi, Kota Tangerang, and Kabupaten Tangerang.

Traffic congestion is a chronic problem faced in the Jabodetabek region and the situation is expected to worsen should there be no improvement of any kind made on the existing transportation system. At present, the economic loss caused by traffic congestion in the region could be as much as \$ 68 million per year due to traffic congestion – and this estimate excludes the impacts of traffic congestion and pollution on human health (Dikun, 2003).

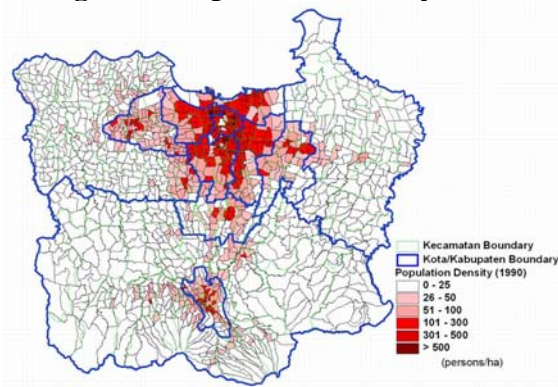
The paper identifies the existing urban structure, urban transportation problems and the effects of those on the Jabodetabek region, anticipated future urban growth and urban structure alternatives, the implementation mechanism, the policy measures taken to implement projects and programs should be taken into consideration when developing a master plan, based on the latest information obtained from the on going study of JICA SITRAMP, other previous studies, and recently published statistical data.

2. URBAN STRUCTURE AND TRANSPORTATION RELATED ISSUES

2.1 Population Growth and Urbanization

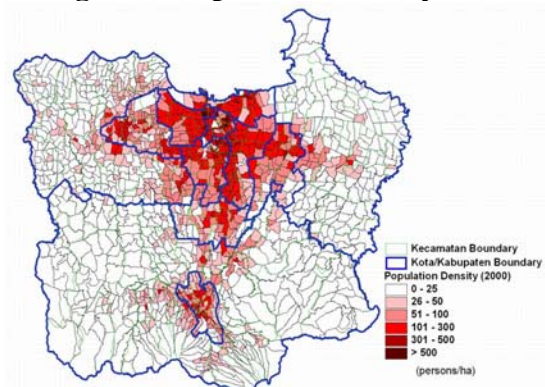
The total population size in Jakarta-Bogor-Depok-Tangerang-Bekasi (Jabodetabek) Metropolitan area amounted in 2000 to round 21 million people. The population size in Jakarta and Bogor-Depok-Tangerang-Bekasi (Bodetabek) was recorded at 8.4 million and 12 million people respectively, while average household sizes in DKI Jakarta and in Bodetabek were calculated at 3.74 and 3.84 respectively. Urbanization in Bodetabek between 1990 to 2000 was 3.7 percent per annum while the growth in Jakarta was merely 0.2 percent per annum, where the distribution of population density is shown by following Figures.

Figure 1. Population Density 1990



Source: SITRAMP 2004

Figure 2. Population Density 2000



Source: SITRAMP 2004

This implies that suburbanization has rapidly preceded and population has spread out in Bodetabek area to seek better life quality, housing circumstance and environment and/or look for cheaper place of housing due to increasing land price in DKI Jakarta. The population movement toward suburban area has generated longer trips between residence and workplace and given much burden on existing transport infrastructure and environment. Based on the latest population census, University of Indonesia provides the latest population projection of about 26 million in the region in the year 2020.

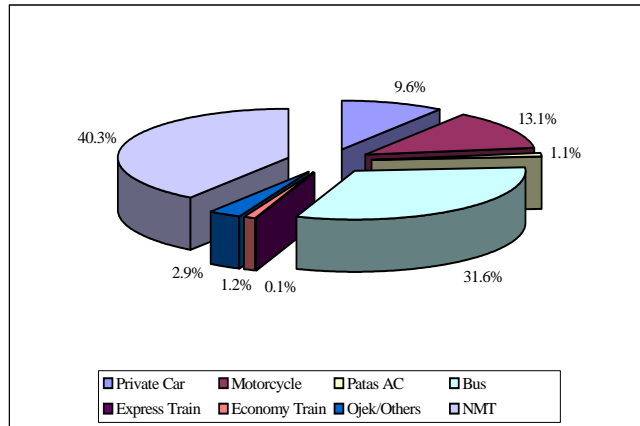
2.2 Motorization and Traffic Congestion

Although rapid growth of car and motorcycle registration has been hampered by the economic crisis, the number of cars and motorcycles has again been increasing in recent years. It can be attributable to deterioration of the service level of public transportation. After the region's economy has recovered, real household income would increase again in the coming few years; it is anticipated that motorization will be further accelerated. If many residents use private modes of transportation, then traffic woes would be worsened and environmental pollution would be more serious than at present.

According to Jakarta Regional Police, the number of motorcycles registered has increased by 60 percent from 1,5 million in 1998 to 2,4 millions in 2002. While, private car has increased as well from about 1 million in 1998 to 1,4 million in 2002. This increase can be attributed partly to deterioration of public transportation services and reduced motorcycle price.

The modal share in Jabodetabek including non-motorized transport is summarized as shown in Figure 3. Excluding non-motorized transport, the share of bus transport exceeds 50%, private transport of car 16% and motorcycle accounts for 22%. Recently a number of motorcycles have been increasing rapidly and have become a popular mode of transportation for the middle income class.

Figure 3. Modal Share in Jabodetabek



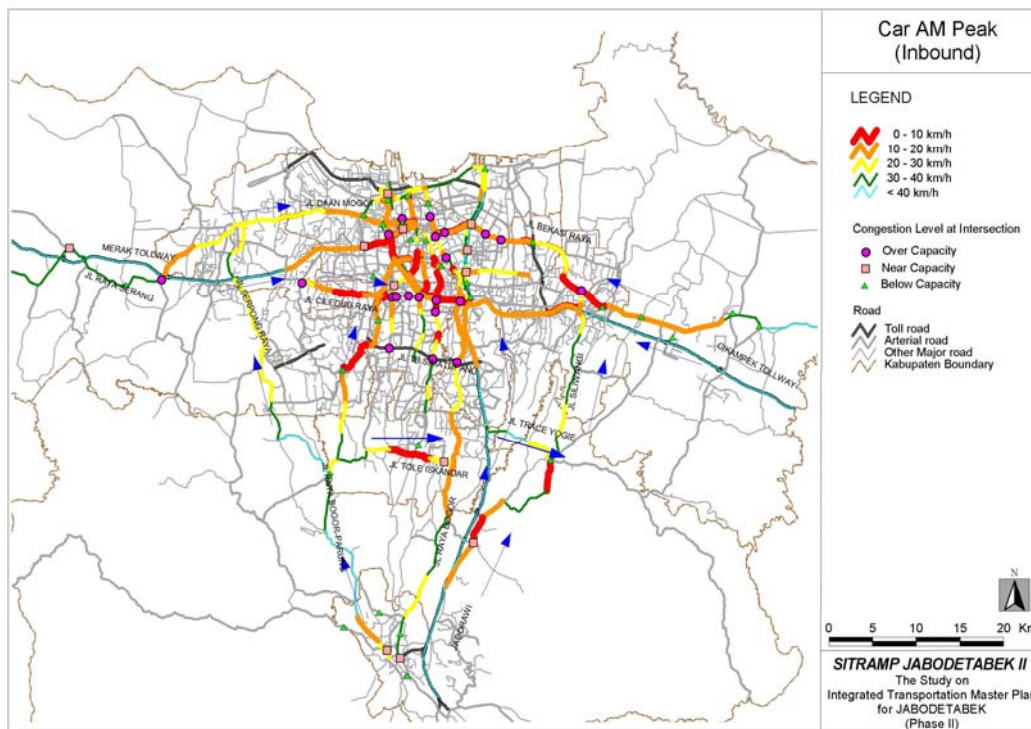
Source : SITRAMP 2004

need of improvement: a poorly developed sub-arterial network, interference from roadside activities, and mixed traffic remain causes of delay and reduced capacity.

2.3 Low Mobility due to Traffic Congestion

Jabodetabek's main road system is dominated by the influence of Jakarta. The national, provincial, and local road networks serving Bogor, Depok, Tangerang, and Bekasi are primarily oriented towards Jakarta and carry substantial volumes of traffic. Toll roads have helped to relieve urban traffic congestion in these cities, but internal traffic circulation is still in

Figure 4. Many Sections and Intersections are Saturated



Source : SITRAMP 2004

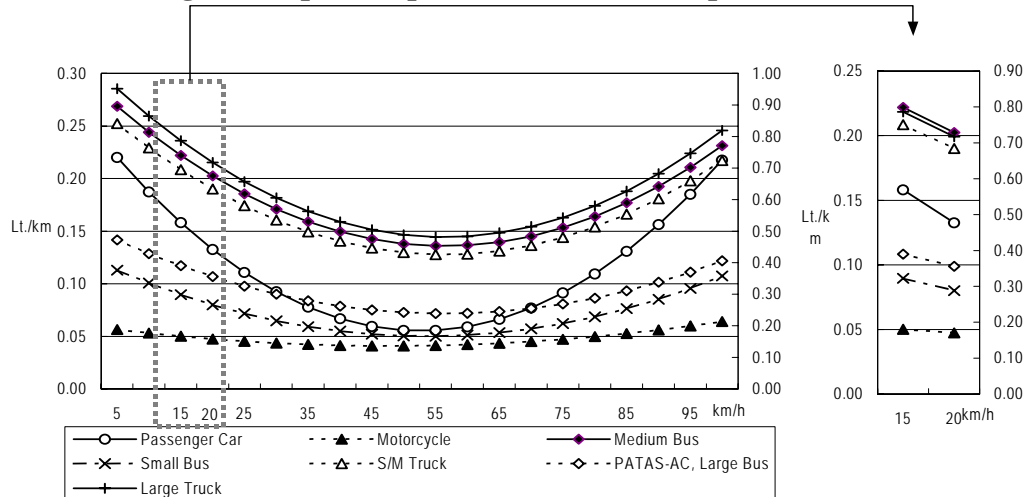
Severe traffic congestion is often seen in the central area of Jakarta and the radial highways every morning and afternoon. The increasing traffic demand has brought about traffic congestion resulting in longer travel times on roads. This implies that mobility in the region has gone down as well as efficiency in the performance of economic activities. The expansion of social and economic activities and subsequent growth of travel demand in

Jabodetabek has inevitably brought about serious urban transport problems. Road network is insufficient to meet the increasing car traffic demand and public transport service is inefficient and the level of service is far from satisfaction. Since Jabodetabek's urban structure is changing rapidly and dynamically, the urban transport system serving Jakarta and the surrounding areas has not been expanded in a way that keeps pace with urban development growth. As a consequence, worsening traffic congestion, overcrowded buses and trains, deteriorated air pollution have been catalyzed.

2.4 Inefficient Fuel Consumption

Fuel economy improvement can be implemented by raising traveling speed and replacing overage vehicles with fuel saving ones like hybrid cars. Especially traveling speed has a significant effect on fuel consumption and the lowest fuel consumption rates occur in a speed range of 40 to 55 km/h as shown in the following figure.

Figure 5. Speed-dependent Fuel Consumption Rates

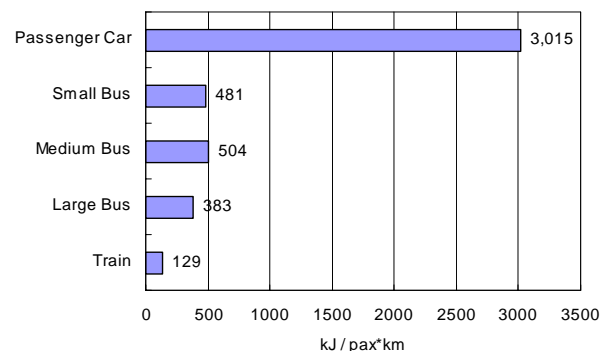


Note: Large Truck and Large Bus (PATAS-AC) apply the right axis.

Source : SITRAMP 2004

In addition, for improvements of the energy efficiency of total transport system, it is effective to promote mass transport and facilitate modal shift from passenger car to bus and train. The following figure shows fuel consumption amount from transport modes. Though mass transport requires more fuel for operation, they can save the consumption because they have higher transport capacities and they are more energy-efficient than private vehicles.

Figure 6. Energy consumption per a person-km by traffic mode



Source : SITRAMP 2004

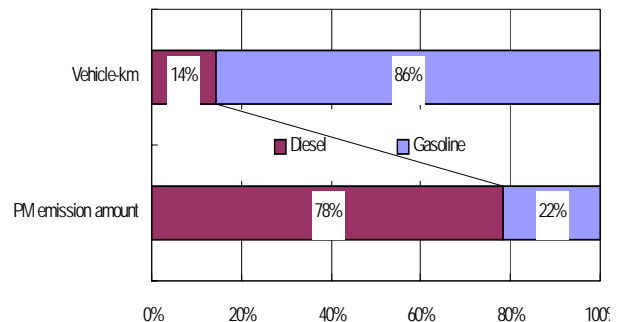
2.5 Air Pollution and Air Quality Caused by Traffic

Fast urbanization and industrialization in Indonesia have produced severe air pollution problems, predominantly in JABODETABEK as the economic center. Air pollution in

Jabodetabek was an occasional annoyance in the past, but Jabodetabek has suffered the disgrace of being in the category of cities with the worst air quality worldwide and it has become a new chronic issue as a threat to the health of the urban people. In the early 1990s, UNEP ranked Jakarta as the third most polluted mega city in the world, after Mexico City and Bangkok (World Bank 2003). The main pollutants are lead, particulates, CO, NO_x, HC, SO₂, and CO₂. The main sources of NO_x are automobiles (68.8%) and industries (25.7%), for SO_x, industries (76.3%) and automobiles (14.6%) and, for TSP, industries (57.1%) and automobiles (40.2%).

In Jabodetabek, automobiles are regarded as the main sources of air pollution. Rapid increase of the vehicles does not only increase the total emission amount in proportion to the number of vehicles, but also the unit emission amount at an exponential rate by slowing down travel speed with the congestion. Generally the higher a vehicle runs, the less emission factor is achieved without any emission control and the effect is observed largest at low speed range. Particularly, there observed high concentration of PM10 along the roadside by the field.

Figure 7. PM10 Emission by fuel type and by vehicle type (2002)



Source : SITRAMP 2004

The recent monitoring data shows excessive PM10 concentration is the major cause of the air pollution and the recent study estimated more than 70% of PM10 emission was generated by vehicles. PM10 exceeded the air quality standard at 27 locations out of 33 survey stations. The stationary sources, namely, factories and power plants, are considered to emit the majority (57.1%) of PM10 rather than automobiles (40.2%). However, high concentrations at roadsides, indicate that automobiles should be the major source in the bottom layer of areas adjacent to heavily congested roads which are closely linked with people's urban life (JICA, 2004).

As the most significant source of PM10 emission, diesel vehicles are not targeted only in Jabodetabek but also the other major cities even in developed countries. As shown in Figure 8, they exhaust over 80 % of PM10 emitted from vehicles while they provide less than 30 % of total road transportation at 2002, and the most emitting vehicle type is Bus and it is followed by Truck. The following figure shows PM10 emission amounts per one kilometer traveled. It indicates Large truck is the highest emitter among them and the second is Large bus (PATAS-AC) which generates 33 times and 22 times as much emission as Passenger car respectively. Therefore the PM10 emission control on these heavy-duty diesel vehicles is most effective and should be placed the highest priority on to the chronic air pollution.

3. ESTABLISHMENT OF ENVIRONMENTAL MANAGEMENT SCHEME

Indonesia has been one of the signatories of the Kyoto Protocol since 1998. The country has established its policy and strategy on climate change in 1995 and a national action plan at 1999. Since the national strategy has not been officially adopted, the plan is to declare a high level of governmental act, such as issuance of presidential decree, and passage of fundamental law on the climate changes. Meanwhile, efforts to manage and improve air quality have been

hampered by poor regulations, weak enforcement, capacity and a lack of reliable information. For the first time, in 1999, GOI established a comprehensive network of ambient air quality monitoring stations in 10 cities; in addition, the government is also undertaking programs like the Blue Sky Program and the Clean Air Program for improving air quality in cities (World Bank 2003).

Environmental pollution could be avoided by continuous environmental management, implementing pollution control programs that are evaluated and, if necessary, upgraded on a project cycle basis. This requires an environmental management scheme which consists of environmental monitoring for evaluation and environmental impact simulation based on regularly updated emission source inventory for planning. And to establish and develop the scheme, capacity building for technical staffs and reinforcement of institution/capacity for policy makers in the scheme should be undertaken.

In this regard, one essential issue for the reduction of vehicle emission is the “Lead phase-out of Gasoline” and “Sulfur reduction of Diesel”. Production and sale of “Lead phase-out of Gasoline” and “Sulfur reduction of Diesel” are the pre-condition for the Vehicle Emission Control to be implemented effectively. In Jakarta, Legal Restriction on the sale of leaded gasoline was implemented and unleaded gasoline was introduced since January 2001. It is postponed to apply the restriction in whole country after 2005 though it was originally scheduled to be implemented by 2002.

In Jakarta, compulsory emission checks are stipulated in Gubernatorial Degree No. 95/2000 but full implementation has been delayed. Currently only public transportation vehicles have to undergo regular emission tests. Implementation, however, has been marred allegedly by fraud, resulting in city transportation with poor emission levels. In this context, it is very necessary to find practical measures to reduce the number of poorly maintained vehicles.

Growing congestion and pollution in the Jabodetabek’s regions are bound to affect the quality of life and their ability to compete. It may also lead to community resistance in urban areas to uncontrolled pollution and pressure to slow industrial expansion, especially in those areas where future growth is most likely to occur. The key challenge is to define a strategy for the management of urban areas that accommodates their growth while protecting the environment. It will also require more effective policies and incentives for environmentally responsible behavior by firms, households and individuals, and for enhanced institutional capacities for urban environmental planning and management. This is easier said than done. What's at stake? The health and welfare of Indonesia's urban population, the country's growth and the efficiency of its cities.

At the kota/kabupaten levels, priorities should be more focused for better traffic planning and management for reducing vehicular air pollution through a combination of critical investments, improved traffic management and engineering, more effective land-use planning, higher technical standards for motor vehicles, introduction of cleaner fuels, expansion of public transport systems, and more effective policies for demand-side management.

4. CONCLUSION

The expansion of social and economic activities has resulted in rising pollution and environmental degradation following the economic crisis in Jakarta Metropolitan area where

environmental regulations were largely disregarded during this period. The current condition of the urban structure and some previous studies give some lesson in identifying how to solve the transportation problems in the Jabodetabek region by explaining not only how the physical development of the transportation network should evolve but also how to ensure the required funds including sharing of responsibility, regulatory reform, institutional rearrangement, and consensus building among the stakeholders. So, transportation decision makers have responsibility to pursue more integrated approach, economic approach, and political approach in transport planning without generating emissions that threaten public health and global climate.

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