

CURRENT STATUS OF THE ROAD FREIGHT FLEET IN INDONESIA, AND POTENTIAL PATHWAYS TOWARD IMPROVING ITS ENVIRONMENTAL PERFORMANCE



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Abstract

This paper takes stock of the current status of the road freight fleet in Indonesia, the 4th most populous country in the world and the 10th largest emitter of CO₂ emissions. Transport represents almost 30% of the country's total carbon emissions. We present data on the age profile of the fleet and the main conditions that govern the market for road freight vehicles, in the form of a SWOT analysis.

The aim of the research underlying this paper was the preparation of a policy measure to promote a green fleet renewal program.

Keywords: Low emission transport, Indonesia, green fleet

1. Introduction

As part of its goal to help developing country improve their sustainability, the German Institute for International Cooperation (GIZ) has set up the TRANSfer program, which focuses specifically on the mitigation of transport carbon emissions. For Indonesia, its freight program called TRANSFER III consists of 2 aspects: (1) increasing the share of intermodal rail transport, and (2) improving the “green” performance of the road fleet.

For the latter aspect, several studies have been performed to take stock of the current situation in terms of fleet composition, vehicle use, organizational aspects of the road freight sector and the legislative and institutional context in which it operates.

The current paper summarizes the findings of a study that carries the policy preparation process another step forward, by synthesizing the available information and identifying the main responsible parties within Indonesia’s government and among the wide range of stakeholders in the road freight market, demonstrating the complexity of policy reform in this area.

2. Research approach

The objective of the research was to provide an assessment framework of the current state of the road freight fleet in Indonesia, with the aim of setting up a policy action program that improves the environmental performance of road freight transport, namely by promoting more sustainable use of available vehicles and by creating incentives to renew the fleet.

The information presented in this paper was collected through a review of available literature performed during earlier projects in the TRANSfer program, and through own data collection efforts including an overview of applicable legislation, statistics from local and international data providers, interviews with stakeholders and comparative analysis with other countries in the region.

3. Results

3.1 Current status of the road freight fleet

- Overall and per weight class: Indonesia’s road freight fleet in 2016 consisted of 7.1 million vehicles, but grew by an average of 7.1% per year since 2010. Extrapolation of that growth would put the number at 8.1 million in 2018. It is notable that the growth of the passenger car fleet was even higher (8.6%) (BADAN PUSAT Statistik, 2016).

- No statistics are available for the split of the heavy duty vehicle fleet by gross vehicle weight (GVW), but sales figures provide a useful indicator (GAIKINDO, 2016) (Sehlleier, et al., 2017).

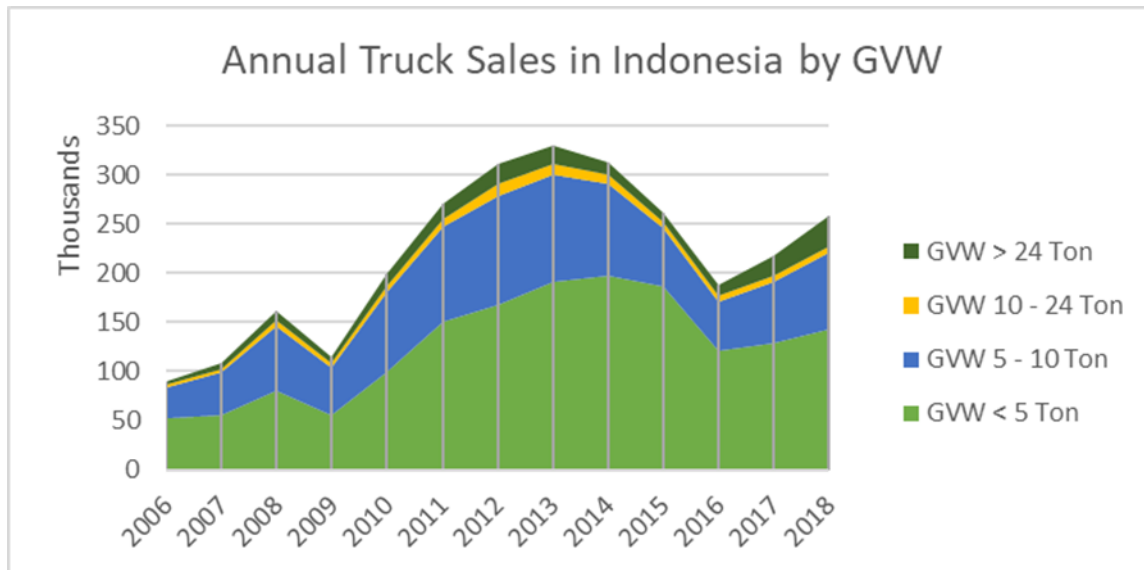


Figure 1: Annual Road Freight Vehicle Sales by Vehicle Type 2006-2018

Light Commercial Vehicles (<5 tonnes GVW) dominated the road freight vehicle market in the 2006-2018 period, making up more than 57% of all sales. Light trucks are so popular because of their versatility for the ever-growing small business owner segment (owner operators, e.g., retail shop owners) who generally prefer more affordable and compact commercial vehicles.

There was a major decrease in sales from 2013 to 2016, due to a slowing economy in Indonesia as well the fact that in 2012 the Indonesian Central Bank increased the minimum down payment for the financing of commercial vehicles from 10 to 25%.

- Vehicle age: The Ministry of Trade (quoted in (Sehlleier, et al., 2017)) found that the average truck age was 10-11 years, but more than half the trucks in Indonesia's busiest port of Tanjung Priok were older than 15 years. The low share of vehicle between 5-15 years (see Table 1) is likely an indicator for the market structure: larger firms operate younger vehicles as part of a big fleet, while the oldest vehicles are used by owner-operators who do not replace their vehicle often, or purchase them second hand. While national and local legislation is in place to ban vehicles older than a certain age, enforcement is non-existent.

Age of truck	Share in Tanjung Priok activity (2014)
<5 years	30%
5-10 years	8%
10-15 years	11%
15-20 years	26%
> 20 years	25%

Table 1: Share of truck ages in Tanjung Priok (2014) (Source: Ministry of Trade via (Schlleier, et al., 2017))

- **Fuel consumption:** there is a lack of detailed information on heavy truck fuel efficiency in Indonesia. The only available indicator is the diesel fuel consumption of road vehicles with an engine size over 5000cc (the category in which heavy freight vehicles would fall – a 400 horsepower vehicle has an engine size of around 10 000 - 15 000 cc), which is 23.2 l/100 vkm on average (Ministry of Energy via (Purwanto et al., 2017)). It is also known that road freight transport accounts for around 60% of total surface transport tank-to-wheel (TTW) CO₂ emissions (Parikesit et al., 2014), which is consistent with (Clean Air Asia, 2012).

3.2 Market conditions

- There are no specific fiscal policy instruments supporting cleaner trucks in Indonesia. VAT, income tax, etc. all apply as standard, but there are no automobile purchase taxes, much less differentiated taxes based on environmental properties of vehicles. A vehicle ownership tax does exist, which decreases with vehicle age. This works as a disincentive for fleet renewal, as newer, cleaner vehicles actually pay higher taxes than older vehicles.
- Most vehicles are owned by owner-operators. They have limited knowledge of the vehicle market, a weak negotiation position in the relationship with clients, and limited access to financing (for modern trucks or fuel-saving upgrades of older vehicles).
- Land transport relies heavily on road freight, which has a market share of around 99%. Long distance rail freight transport is ineffective and inefficient, with an undeveloped network.
- The Indonesian road network is underdeveloped, in poor condition and suffers from heavy congestion.
- An important cause of congestion are traffic accidents, often due to overdimensioning and overloading (ODOL). This practice also causes damage to roads, thus necessitating repairs and more congestion.
- More stringent EURO IV emission standards (the current standard is EURO II, first introduced in Europe in 1998) are being introduced but the availability of the low-sulphur fuel required to use vehicles that meet those standards is insufficient.
- Biofuel is blended in diesel at a mandatory minimum level of 20% (B20) since 2015, and this will increase to a minimum of 30% (B30) by early 2020. As the biodiesel is

produced domestically from palm oil with high well-to-tank emissions that exceed those of fossil diesel (Harsono, Prochnow, Grudmann, Hansen, & Hallmann, 2011), this is detrimental to the climate and the CO₂ emission targets of the country.

Furthermore, high biodiesel blends reduce fuel economy and can degrade some vehicle components and materials, as well as affecting vehicle emissions. Vehicles specially designed for higher biodiesel blends are available, but most diesel vehicles are not designed for the use of these blends (Searle & Bitnere, 2018). Behind the policy of this growing mandatory blending level of biofuel in transport fuels is the Indonesian government's objective to reduce oil import that significantly contributes to the country energy trade deficit (IEA, 2019). Even further, in October 2019, the Indonesian government issued a new luxury sale tax (PM no 73/2019 regulation) that favours low carbon emission vehicle technologies, that include also flex-fuel vehicles that can run on B100 and E100 fuels.

- Periodic vehicle checks are mandatory every six months, but in practice they are nothing more than an administrative formality. Vehicle inspection services generally do not have sufficient capacity to perform the required amount of vehicle tests.
- Ecodriving is not part of the curriculum to obtain a license, but is promoted by the National Land Transport Association in Indonesia (ORGANDA).

4. Conclusions and discussion

We present the main findings of the research in the form of a SWOT analysis.

4.1 Strengths

A general policy framework to reduce GHG emissions is in place at the national level (RAN GRK), and it is linked with similar plans detailing the objectives at the provincial level (RAD GRK). While the plans are more focused on passenger transport than on freight transport, several elements could be applied to both markets, including:

- Development and implementation of ITS;
- Congestion pricing and road charging;
- Promotion of ecodriving and application of speed limitations (with the purpose of saving fuel);
- Emission standardization, labelling and emission based taxation

The planning system for greening the road freight fleet will be aided by the fact that road transport vehicles are built domestically (due to extremely high import taxes for vehicles), giving the country full control over the supply of green vehicles, while allowing for the development of technical knowledge and highly skilled workers. While vehicle manufacturers are the same large international players that dominate the global market, green technology is available from other world regions and the Indonesian market is sufficiently large to support investments in innovation.

4.2 Weaknesses

While planning processes are in place, it is not clear how the GHG reduction efforts in Indonesia's Intended Nationally Determined Contribution (NDC) will be distributed between

sectors, which types of actions will be taken in each sector and if the targets can actually be achieved – a reality check of the policy is needed. However, the focus in GHG reduction plans in transport is heavily skewed towards passenger transport, whereas freight emits around 60% of road transport CO₂ and has an even greater impact on air quality due to the consumption of diesel fuel. This discrepancy in policy focus is likely caused by inflexible institutional structures and lack of capacity building opportunities, as staff in management positions at ministries is moved frequently between departments. The attitude towards freight is that is mostly an issue of the private market, whereas the government should lead in issues regarding passenger transport.

Freight transport emission control programs are among the most common instruments in Indonesia, given the link with the country's ample supply of feedstock for alternative fuels (biofuels) for transport. These policies are more oriented towards domestic business development that towards environmental improvements. Demand-side management or system efficiency improvement measures such as network development, strategic spatial planning and correct pricing systems have not been developed or have been ineffective. An important reason is the lack of effective co-ordination between the Ministries that are involved in GHG programs to ensure that fuel efficiency standards, vehicle labelling and an eco-based taxation system are all effectively developed, implemented and enforced.

Data availability for policy assessment ex-ante and ex-post is insufficient. Vehicle sales information is presented periodically by GAIKINDO (the association of Indonesia Automotive Industries), but a general overview of active vehicles (based on e.g. registration records or reports of periodic checks) was not found. Ideally, these data would also include the properties of vehicles, such as their weight class, engine power, emission class, year of first registration, odometer reading,...

The last important weakness of the greening potential of the road freight transport is related to the age of the fleet and the market structure. The current road freight fleet is old, and many trucks are in poor condition. However, many transport business owners lack the financial capacity to invest in newer, greener, safer trucks. The vehicle ownership tax that decreases with age is a disincentive for vehicle replacement, as it encourages owners to keep their vehicles operational as long as possible.

4.3 Opportunities

As the world's fourth most populous country (275 million inhabitants), Indonesia is one of the focal points of international support for the implementation of GHG reduction policies. As such, international funding is available from multiple sources (World Bank, ASEAN, ...) that could support the adoption and implementation of green freight programs. Encouraged by the availability of international funding, the national government has also devoted more attention and funding to GHG reduction measures in the transport sector.

Support from the international community can go beyond financial means. International standards and know-how are available to vehicle manufacturers in Indonesia to support a quick transition towards world class environmental standards in road freight transport.

Aside from the government and international institutions, the private sector, particularly multinational enterprises, is increasingly showing goodwill and taking action towards climate change mitigation and preservation of the environment, which in turn leads them to impose higher performance standards on their suppliers and service providers. This should have an effect on the demand for green vehicles, provided that vehicle owners have the capacity to make the investments required.

Opportunity can also be found in the government's experience in developing and supporting programs that target passenger transport. While freight and passenger transport have very different specificities, they can use similar frameworks for the preparation, assessment and implementation, so as to serve as a guideline for the development of similar actions in freight transport.

4.4 Threats

The main threat for the GHG reduction potential of a green road freight program in Indonesia is the economic situation of road transport operators. Competition is fierce on both the financial and operational level, with drivers risking serious harm by speeding and driving overweight. According to (Jihanny, et al., 2018), for the island of Sumatera, between 30 and 98% of trucks were overloaded between 2007 and 2014, based on the exceedance of the maximum axle load limit of 10 tonnes. The Vehicle Damage Factor (which is the result of the 4th power law calculation) can be as high as 12.63, which means that these vehicles are more than 12 times more damaging than standard vehicles. The pavement service life in the area is reduced from the design life of 10 years to just 3.64 years.

On top of normal vehicle replacement costs, green freight vehicles come with an additional upfront investment cost for logistic operators. This increases the disincentive for fleet renewal. Because of the lack of financial knowledge of operators, any government incentive programs (subsidies or loans) need to be promoted and offered proactively.

The mandatory blending of biofuels in transport fuel as an economic stimulus to the agricultural sector will be detrimental to the climate objectives of Indonesia. The Indirect Land Use change caused by the cultivation of palm trees for palm oil has a global impact. This link between transport and unsustainable biofuels should be cut.

Lastly, the many societal issues Indonesia faces, like increasing poverty and unemployment, while population growth and GDP growth remains high, takes focus away from climate change and air quality as fundamental global issues. The international attention for climate change mitigation in the Indonesian transport sector is well warranted.

4.5 Discussion and next steps

Achieving a greener, younger road freight fleet in Indonesia will be challenging, and policy preparation is hampered by a lack of comprehensive data on current fleet composition. With 99% of land transport going on roads and a very large share of financially fragile owner-operators, shocks to the system could have important consequences for the country's economy and its people.

There are several options on the table:

- The introduction of more stringent emission and fuel consumption standards;
- Retrofitting programs to speed up the implementation of technologies like low rolling resistance tyres or certain aerodynamic improvements;
- Fiscal policy could be implemented/reformed in the form a “stick” (taxation) or “carrot” (subsidy), e.g. purchase tax, ownership tax, scrappage premiums and fleet renewal schemes, low interest loans, fuel tax,...
- Access restrictions to certain areas for vehicles not complying with set standards;
- Organising ecodriving courses for truck drivers;
- Better enforcement of current regulation, including vehicle inspection;

5. Acknowledgements

The report (Breemersch, Purwanto, Nahry, & Kusuma, 2019) this paper is based on was sponsored by the German Institute for International Cooperation (GIZ).

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