



THE GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION  
ENVIRONMENTAL PROTECTION DEPARTMENT

**Provision of Services for  
Study on Possible Measures to Encourage Wider Use of  
Biodiesel in Hong Kong**

**Executive Summary**

September 2016

**AECOM**

## EXECUTIVE SUMMARY

In exploring the potential for wider adoption of biodiesel in Hong Kong, this Study has investigated:

- Justifications of using biodiesel
- User profiles of conventional diesel and biodiesel
- Sustainability issues of biodiesel feedstocks
- Technical considerations in wider use of biodiesel
- Cost implications of using B5 diesel in Hong Kong
- Possible measures for wider use of biodiesel in Hong Kong on a mandatory basis
- Possible measures for wider use of biodiesel in Hong Kong on a voluntary basis

### **i) Justifications of using biodiesel**

The biodiesel produced in Hong Kong is mainly derived from waste cooking oils (WCO) gathered from local restaurants and other food premises. Wider use of biodiesel supports sustainable development of the local recycling industry through diverting WCO from wastage and converting waste into energy. It helps safeguarding public health by channeling WCO to proper recycling outlets thus preventing such waste from getting back into the food chain. Besides, it contributes to reducing emission of greenhouse gas (GHG) and some air pollutants. Furthermore, biodiesel provides an additional source of renewable energy for Hong Kong.

### **ii) User profiles of conventional diesel and biodiesel**

Each year Hong Kong consumes approximately 1,440,000 tonnes of conventional diesel. Most of the conventional diesel is used in road transport and construction industry applications.

In 2014 and 2015, about 900 tonnes of pure biodiesel is used in Hong Kong per annum. Main users include the Government, private construction companies and the Airport Authority of Hong Kong. The biodiesel they use is B5 diesel, a blend of 5% pure biodiesel and 95% conventional (Euro V) diesel.

If the 1,440,000 tonnes total annual consumption of conventional diesel in Hong Kong is replaced by B5 diesel, this would equate to substituting a total of about 72,000 tonnes of conventional diesel with pure biodiesel per annum.

With a total of 3 biodiesel plants, Hong Kong has the capacity to produce over 100,000 tonnes of pure biodiesel per year. Nonetheless, only a total of about 32,000 tonnes of WCO can be gathered in Hong Kong per annum. With the export of WCO for recycling being allowed under the international Basel Convention, some of Hong Kong's WCO is exported. If the demand of pure biodiesel is to be raised to 72,000 tonnes per year for full substitution of conventional diesel by B5 diesel, at least 40,000 tonnes of WCO or other biodiesel feedstocks would be needed from overseas. Alternatively, Hong Kong oil companies would have to make up any shortfall through direct imports of biodiesel or B5 diesel.

### **iii) Sustainability issues of biodiesel feedstocks**

Biodiesel feedstock can be classified as either being waste derived (e.g. WCO such as used cooking oil and grease trap oil) or cultivated (e.g. palm oil, rapeseed oil, etc.). Using biodiesel made from cultivated feedstocks would not maximize the GHG reduction possible. It might even aggravate climate change, when compared with biodiesel derived from waste derived feedstock. Indeed, there have been grave concerns in the international community on massive production of agricultural products as feedstocks for biodiesel production which

has led to deforestation, improper land use changes and adverse biodiversity consequences. The European Union (EU) has adopted certification schemes to verify the origins of biodiesel feedstocks in order to achieve higher environmental benefits.

Hong Kong should restrict the supply of its biodiesel to feedstock derived from WCO or other waste substances thereby ensuring higher environmental gains are secured. Related legislation needs to empower this restriction. A number of factors, such as the actual environmental gains, compliance cost, potential rise in biodiesel production costs, associated social and economic impacts and etc., should be carefully taken in account into in the developing the approach.

**iv) Technical considerations in wider use of biodiesel**

Based on worldwide and local experience, B5 diesel is fully compatible with conventional diesel for use in most of the diesel engines, except those older engines that were manufactured before introduction of biodiesel blends. Most diesel manufacturers warrant their engines for B5 diesel and some even offer warranty to higher biodiesel blends. There has been no obvious loss of power output, abnormal engine breakdown, reported deficiency in performance nor increase in maintenance frequency. While older engines will phase out in Hong Kong progressively, more education and promotion would be needed to raise public awareness and enhance acceptability of biodiesel amongst users.

Suitable storage and blending facilities are required for supplying B5 diesel. At present, two oil companies and two biodiesel producers in Hong Kong have already equipped themselves with facilities for storing biodiesel, blending with conventional diesel and supplying B5 in Hong Kong.

Logistics for distributing B5 diesel to diesel users with their own storage and refueling facilities are already in place in Hong Kong. The situation for other diesel users is not as positive. A lack of space and other physical constraints at most retail filling stations restricts the installation of additional B5 diesel storage tanks and the dispensers for supplying B5 diesel in addition to conventional diesel at these retail filling stations.

**v) Cost implications of using B5 diesel in Hong Kong**

Since B5 diesel comprises 95% conventional diesel and 5% pure biodiesel, the price of B5 diesel is expected to be higher than that of conventional diesel. In general, local retail prices for diesel are subject to a basket of complicated factors, including the prices of the raw materials, inflation, economic outlook, land costs, labour costs, logistics costs, policy, market competition and the individual marketing strategies of the oil companies. There is insufficient information to make a reliable forecast on the price of B5 diesel if B5 diesel were to replace conventional diesel.

**vi) Possible measures for wider use of biodiesel in Hong Kong on a mandatory basis**

Given that the infrastructure for supplying B5 diesel to the retail market will rely on substituting conventional diesel with B5 diesel, the territory-wide mandatory conversion could, in theory, be effected through two options: tightening the fuel specifications to impose a minimum biodiesel content in diesel fuels, or by providing extra tax credit for biodiesel over conventional diesel which would incentivize oil companies to switch over to supplying B5 diesel.

In evaluating these options, the following factors should be carefully considered:

- The mandatory move to B5 diesel would necessitate import of feedstocks or biodiesel;
- The use of cultivated feedstock is not recommended due to sustainability concerns and

significant lower GHG reduction;

- Import of WCO or other waste derived feedstocks will inevitably have some reduction on the net environmental gain due to the transportation of WCO or waste-derived feedstock;
- There is a need to have appropriate means, such as an internationally recognized tracking/certification system to ensure that: (i) in the case of feedstock that its source is known, and (ii) in the case biodiesel being imported, that it is not derived from cultivated feedstock. This would need to be covered by legislation.
- Restricting oil companies to waste derived biodiesel would increase market competition for waste feedstock, thereby impacting the collection price of the waste feedstock, and may lead to a rise in the price of pure biodiesel and ultimately the retail price of B5 diesel. This may not be good for diesel users and consumers. Using biodiesel will have some impact on engine performance of the older vehicles.
- More education and promotion would be needed to raise the awareness and acceptance of the community on B5 diesel. Public engagement and education will take time and mandatory replacement of conventional diesel with B5 diesel may not be instantly accepted by the public.
- Consensus would have to be reached on whether the interference in the Hong Kong diesel and WCO market is warranted by the environmental gains possible from wider use of biodiesel.

**vii) Possible measures for wider use of biodiesel in Hong Kong on a voluntary basis**

Environmental aspirations within the community and corporate social responsibility have and will continue to be the main driver for wider adoption of B5 diesel in Hong Kong.

Taking into account the above deliberations, it would be more pragmatic to pursue the wider use of biodiesel in Hong Kong on a voluntary basis.

Government should continue its lead in using B5 diesel through expanding its pilot schemes within Government itself and extending the commitment in respect of public works to include public housing projects.

Government should step up its current liaison with oil companies to explore provision of more B5 diesel filling points and with main diesel users to raise their awareness and acceptance on using B5 diesel.

Government should continue to promote the adoption of B5 diesel in the wider community, and thereby inspire private companies striving for enhancement of their corporate social responsibility goals for sustainability.

Government should continue to strengthen its regulation on recycling of WCO in Hong Kong to legitimate recycling outlets and thereby establish a comprehensive collection network for waste feedstock.