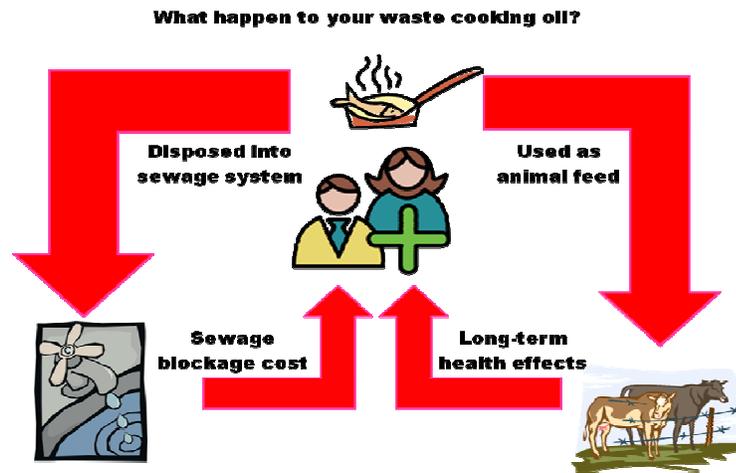


# Alpha Biodiesel Fact Sheet



A potential amount of 20,000 tons of waste cooking oil is disposed into our sewage system annually in Singapore.<sup>1</sup>

Waste cooking oil is used as additives in animal feed overseas.<sup>2</sup>

**Main air pollutants in Singapore** are Sulphur dioxide, oxides of nitrogen, carbon monoxide and particulates matters (PM2.5 & PM10). A significant amount of these pollutants comes from motor vehicles and in particular, diesel vehicles contribute about 50% of the PM2.5 emissions in Singapore<sup>3</sup>.

**Environment-related health effects** such as respiratory problems, decreased lung function and aggravated heart diseases have been known to be caused by sulphur dioxide, oxides of nitrogen, carbon monoxide and particulates.

**Global warming** is caused by the emissions of greenhouse gases like carbon dioxide, methane and nitrous oxide, etc. Human activities, like fossil fuel burning and deforestation have been known to increase the amount of greenhouses gases in the atmosphere.

<sup>1</sup> According to Agri-Food & Veterinary Authority (AVA) of Singapore, 107,087 tons of cooking oil is consumed in Singapore in 2007. It is estimated that 18.5% of the cooking oil consumed can be recovered as waste cooking oil. This is due to the adsorption of oil by the food. This estimation is calculated using the average generation of waste cooking oil in Japan and Thailand (where the food culture is similar to Singapore).

<sup>2</sup>North Carolina Department of Environment and Natural Resources (NCDENR), 1999.

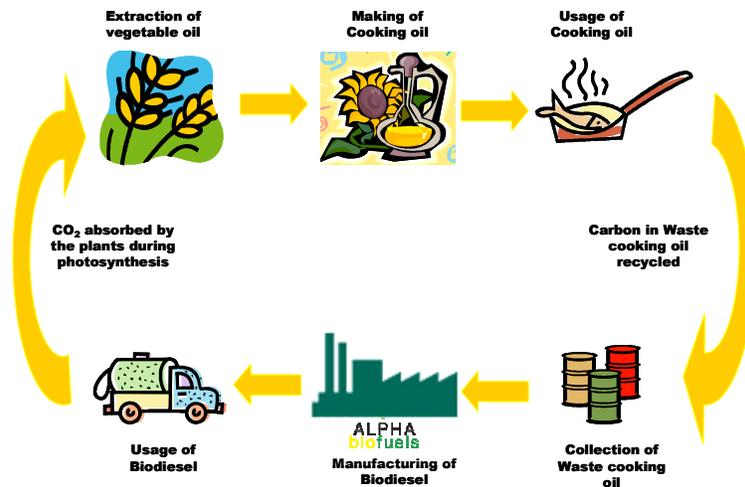
<sup>3</sup> National Environmental Agency, 2008

We need a green and safe fuel!

Comparison of Alpha Biodiesel tailpipe emissions to diesel <sup>4</sup>	
Emissions	Percentage difference in biodiesel
Particulate matter	- 94 %
Sulphur dioxide	- 83 %
Non methane volatile organic compound	- 54 %
Carbon monoxide	- 22 %
Nitrogen oxides	+ 2 %
Carbon dioxide	+ 1 %

The reduction in the first 4 types of emissions is due to the higher oxygen content in biodiesel as compared to diesel, leading to more complete combustion. The slight increase in nitrogen oxide is because PM and soot are effective heat radiators, and when they are mostly oxidised by oxygen, temperature inside the cylinder may increase resulting in higher NOx. There is also a slight increase of carbon dioxide. However, about 95% of the CO<sub>2</sub> is biogenic and recycled from waste cooking oil, whereas the other 5% is fossil-based which comes from methanol.

### LIFE CYCLE OF ALPHA BIODIESEL



### Almost closed carbon loop

Life cycle assessment shows that there is a significant net reduction in carbon emissions of 62.33%. This is due to the carbon recycling of waste cooking oil when producing Alpha Biodiesel.

<sup>4</sup> Emission tests are done on the same diesel vehicle.