Public Transportation Buses Powered By Cooking Oil

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The Greenhouse gases are in a continuous rise and are destroying the environment and public transportation buses contribute dramatically and are in an interrupted increase[1]:

Moreover, the world trend has been moving towards a greener environment through many solutions, and this was depicted by Bee’ah here in Sharjah who are planning to reach zero landfill waste by 2015.

Problems

• Improper cooking oil waste disposal methods, since hydrogenated cooking oil degrade in environment by oxidizing its surrounding
• Used oils acidity destroys the soil and diminishes its fertility
• On average, a building throws approximately 170 liters of cooking oil each week (According to a survey conducted in AUS by the team).
• Limited resources of crude oil with high consumption rates of fuels.
• Large amount of energy wasted by friction in the mechanical parts of a vehicle and heat loss.
• The phenomenon of the global warming is clear as the temperature of the earth increases [2]

Solutions

• Used cooking oil is collected from households using a new system of pipelines and meters that will be fitted into the existing and new buildings. The pipes that will be used are Ductile-Iron Pipes. Also, a meter system measurer is installed for each house measuring the amount of oil recycled and deducting an amount of money from the water and electricity bill of each house as a motivation to recycle used cooking oil
• The cooking oil will then be collected in reservoirs and will be transported to the refinery where it will be transformed to Biodiesel ready to be used in the normal diesel engines.
• The hybrid bus engine will include the following components:

Evaluation

• Ductile-Iron pipes “has long been noted for its long term economy, performance, reliability, and proven record in serving the public’s health [3].” It was also stated by [3] that these pipes have been used to convey acid and sulfur without corroding.
• Almost each building will be storing enough waste cooking oil to operate the new hybrid bus for the whole day.
• The final total cost of biodiesel is 0.4578 $/Liter which is almost double the cost of producing Petro - diesel, however, the gas emissions will differ as follows:

<table>
<thead>
<tr>
<th>Emissions (g/km)</th>
<th>Diesel Bus</th>
<th>Bio-Diesel Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>1633</td>
<td>359.3</td>
</tr>
<tr>
<td>CO</td>
<td>3.5</td>
<td>2.07</td>
</tr>
<tr>
<td>Total Hydrocarbons</td>
<td>1.7</td>
<td>0.544</td>
</tr>
<tr>
<td>NOx</td>
<td>15.2</td>
<td>15.96</td>
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</tbody>
</table>

Even though the NOx gases emissions rise, their effects will not be substantial as they will be diluted in the atmosphere. The effect of CO2, CO and Hydrocarbons on the atmosphere is very dangerous compared to NOx, therefore its increase is insignificant compared to the other emissions.

Conclusion

Due to the expense of biodiesel, the hybrid engine will be an optimum choice to provide a cleaner environment and at the same time decrease the costs of biodiesel. Implementing it in public transportation buses shall be a prototype for further application to more automobiles.

References