

# **Energy Efficiency and Conservation Authority (EECA) Comments on Australian National Fuel Quality Standards Discussion Paper:**

## **Measuring Cetane Number: options for diesel and alternative diesel fuels**

**April 2004**

### **Introduction**

In New Zealand EECA, through the National Energy Efficiency and Conservation Strategy, has a focus on increasing the amount of renewable energy consumed and thereby reducing greenhouse gas emissions. One component of this is the 2 PJ indicative target for renewable energy use in transport. Current work is promoting the national use of petrol/ethanol and diesel/biodiesel blends to achieve this target.

The development of New Zealand specifications for biodiesel and biodiesel blends is a significant part of the move towards commercialisation of the fuel in this country, and as such we are interested in both the guidelines for and availability of cetane testing of biodiesel in the region.

Diesel and biodiesel share some common issues regarding fuel quality and cetane number and index, but there are also some significant points of difference. We believe that in order for the advantages of using alternative diesel fuels to be fully realised, these differences need to be recognised in any fuel quality standards.

### **Testing regimes for biodiesel**

Biodiesel can be produced commercially in quantities substantially smaller than mineral diesel and, as a result, the costs and infrastructural requirements of regular cetane testing of individual batches of biodiesel could prove to be prohibitive.

In contrast, the cetane rating of biodiesel is closely tied to both the quality and type of feedstock used to produce the fuel, and the quality of the production process. Given that these parameters are well defined in any fuel that meets appropriate biodiesel standards it seems likely that the fuel will also meet minimum cetane requirements.

As a result it seems that it would be feasible to develop a cetane index for biodiesel based on an algorithm that includes the feedstock source and production quality of the fuel. In the near term this could be as simple as assigning standard cetane indices to various biodiesel fuels based on feedstock, methyl or ethyl ester and a conservative interpretation of existing data. The cetane index of a biodiesel blend would then be the weighted mean of the cetane indices for the petro-diesel and biodiesel components

## **Diesel biodiesel blends**

With regard to diesel/biodiesel blends, current cetane index calculations for the mixture fail to fully take into consideration the characteristics of the biodiesel component of the blend. The variation in biodiesel can give rise to differences between the cetane number and index in the range of +/- 40 points by feedstock type and +/- 2 points by production method.

When biodiesel is used in low percentage blends of up to 5% it should be acceptable to use the current cetane index algorithm for diesel. At these levels the difference to the calculated cetane index of the base fuel will be minimal, and the cetane number of the resultant fuel is likely to be slightly increased.

In higher percentage diesel/biodiesel blends there may need to be a separate algorithm used to calculate cetane index, as discussed above. We suggest that this would be preferable to an expensive test requirement.

## **Recommendation**

EECA recommends that The Department of the Environment and Heritage develop an algorithm to calculate cetane index of biodiesel and biodiesel blends.

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