

UGM Center Develops Energy Efficient Product Innovation


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The conversion of kerosene to the LPG gas policy which has been recently imposed by the government took effect for the lower classes of society, including tobacco farmers and fishermen in West Nusa Tenggara. The tobacco farmers can no longer dry their tobacco crop using kerosene-fueled furnace as has been done so far because the non-subsidized kerosene price is getting out of reach. It was also experienced by the fishermen in NTB; they can no longer use kerosene-based lantern while fishing in the sea at night.

This condition encourages the UGM Center for Energy Studies to develop bioethanol-fueled furnace and premium-fueled lantern. The head of Center for Energy Studies, Prof. Dr. Jumina, mentions that the bioethanol furnace was developed to answer the needs of tobacco farmers, especially in West Nusa Tenggara. Bioethanol furnace can be used to dry tobacco as well as kerosene-fueled furnace. This furnace has several advantages compared with kerosene furnace, including the price of fuel which is cheaper than kerosene. "Fuel with 70% content of ethanol such as wood spirits cost Rp7000/liter while kerosene up to Rp10,000/liter," he explained recently.

In terms of fuel consumption, said Jumina, the bioethanol furnace is about 2-3 times more efficient than the fuel consumption of kerosene furnace. Besides, the bioethanol furnace is more environmentally friendly because the level of CO₂ emissions of bioethanol furnace is lower than the use of kerosene furnace.

In addition to developing bioethanol furnace, the Center also develops premium-fueled lantern. This type of lantern is expected to help to overcome the problems of fishermen in West Nusa Tenggara who are constrained with the expensive and scarce petroleum. The premium-fueled lantern can save the cost of fuel. As we all know, the price of 1 liter of premium is Rp4,500, while the price of 1 liter of kerosene is much more expensive at Rp10,000.



Besides, the premium-fueled lantern takes less fuel consumption than kerosene. For comparison, 1 liter of kerosene can be used for 4 hours to turn the lantern on while 1 liter of premium can be used for 7 hours to turn the premium-fueled lantern on. "The premium-fueled lantern is much more efficient than kerosene-fueled lantern," Jumina explained.

Furthermore, Jumina conveyed that the work scheme of the premium-fueled lantern is similar with the usual lantern in general. The physical form is also similar, it's only that the capillary tube is much smaller compared with kerosene-fueled lantern. "The exterior design of premium-fueled lantern is similar to kerosene lantern in general. The difference is in the capillary tube, it is smaller, about half of the usual capillary tube. Should we use an ordinary pipe, it will be prone to explode because the heat capacity of gasoline is higher than that of kerosene," he explained.

Not only developing bioethanol furnace and premium-fueled lantern, the Center also has successfully developed a bioethanol stove. This stove uses bioethanol 70% content, for example wood spirits as the fuel. This tool can be used for domestic purposes.

Jumina added that the bioethanol stove when combined with the development of domestic industry, bioethanol made from raw cassava or fruits waste such as cashew and *salak pondoh*, the use of bioethanol stove can support the Energy Independent Family concept which is also promoted by this UGM Center.

The three products innovation will be mass produced in cooperation with PT. Bionas Yogyakarta. A unit of bio-ethanol furnace sells for Rp900,000, while 1 unit of bioethanol stove Rp375,000 and 1 unit of premium-fueled lantern Rp350,000.

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