***Mega Conversion from LPG to Induction Stove to achieve Indonesia's Clean Energy Transition***

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## Overview

Indonesian government is facing the burden increase of state budget from the energy subsidy, especially Liquefied Petroleum Gas (LPG) subsidy. According to state budget plan of Indonesia (RAPBN) year 2019, the LPG subsidy (3 kg tube) year 2019 was estimated more than 70 Billion Rupiah. The subsidy nominal for LPG 3 kg tube is fluctuated because influenced by the uncertainty of world crude oil price where the LPG is the refinery product of crude oil. The increase of crude oil price in the global market could significantly increase the LPG subsidy of Indonesia’s government. In the other hand, PLN as Indonesia’s state-owned electricity company currently constructing new power plant approximately 35,000 MW that lead to the increasing of reserve margin in the power system that should be absorbed by the consumers. Recently, induction stove emerges by the Indonesia’s government as a solution for those two issues above. However, the literature review regarding the economics and policy of the development of induction stove in Indonesia’s electricity market is still limited. This research provides the economic valuation of induction stove compared to the utilization of LPG stove for each electricity and LPG tariff, i.e. subsidy and non-subsidy tariff. This research could serve as an academic reference for energy sector stakeholders in Indonesia in objective to implementing the clean energy policy to shift cooking technology from LPG stove to induction stove.

## Methods

This research has an objective to determine the economic valuation and policy implication of induction stove compared to LPG stove for each electricity tariff. To address research objective above, this study applied descriptive analysis and economic valuation methodology. Economic simulation was performed by comparing the cost of cooking of induction stove and LPG stove to determine the cooking cost saving. The efficiency assumption of induction stove in this simulation is based on the reference from (PLN Research Institute 2017) where PLN Research Institute performed efficiency study and cooking time experiment using different type kind of stove, i.e. LPG stove, electricity stove, and induction stove.

## Results and Conclusion

This study has conducted the economic simulations of induction stoves compared to LPG stoves under various scenarios. The simulations carried out in this study consider various possibilities that can occur in the field.

• For various possible economic scenarios conducted in this study, the application of induction stoves for cooking are more economical when compared to LPG stoves.

• In the existing condition (without electrical installation uprating) for low income households, the transition of cooking behavior from LPG (subsidized) stove to 300-Watt induction stove provides monthly cooking savings per household of Rp 10,344. The application of 500-Watt induction stove provides savings in cooking costs of Rp. 21,344 per month per household. These scenarios needs to consider the availability of low power induction stoves, in this case the induction stove with the scale of 300 Watt and 500 Watt.

• In the existing conditions for the middle- and high-income household group, the cooking cost savings obtained will be even greater of Rp 43,606 per month per household. This economic scenario is carried out by considering the use of an 1,800 Watt high-efficiency induction stove.

• If the electrical installation rating for a low-income household is upgraded so that the household can apply a high-efficiency induction cooker (1,800 Watt), the cooking cost saving gained will increase significantly of Rp. 31,761 per month per household.

• The economic saving for low income households will increase significantly if there are a scarcity of 3 kg LPG tubes in the field.

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