

INDONESIA COULD LEAD THE WORLD IN CELLULOSIC ETHANOL PRODUCTION

Indonesia has ambitious goals for expanding domestic biofuels production to limit fuel imports and a new ICCT study examines the potential for the country to become a world leader in cellulosic ethanol production. Cellulosic ethanol is a sustainable, second-generation biofuel that utilizes waste biomass for energy. The study is a techno-economic analysis of cellulosic ethanol production in Indonesia and it explores a roadmap for the government to support this advanced technology industry, with specific policy recommendations.

KEY FINDINGS

Indonesia has significant advantage in cellulosic ethanol production, and developing the industry would:

- » Create jobs, and support smallholders and the rural economy
- » Reduce foreign oil imports
- » Boost gasoline octane and reduce vehicle emissions
- » Reduce greenhouse gas emissions by switching from first-generation, plant-based biofuel feedstock

Indonesia has more than enough low-cost feedstocks to supply an emerging cellulosic ethanol industry. The country has a significant amount of palm biomass residues such as palm trunk and empty fruit bunch. While these are currently wasted, they could be used to produce advanced cellulosic ethanol that can be blended in gasoline. The amount of palm biomass residues readily available in Indonesia could support dozens of commercial-scale cellulosic ethanol plants.

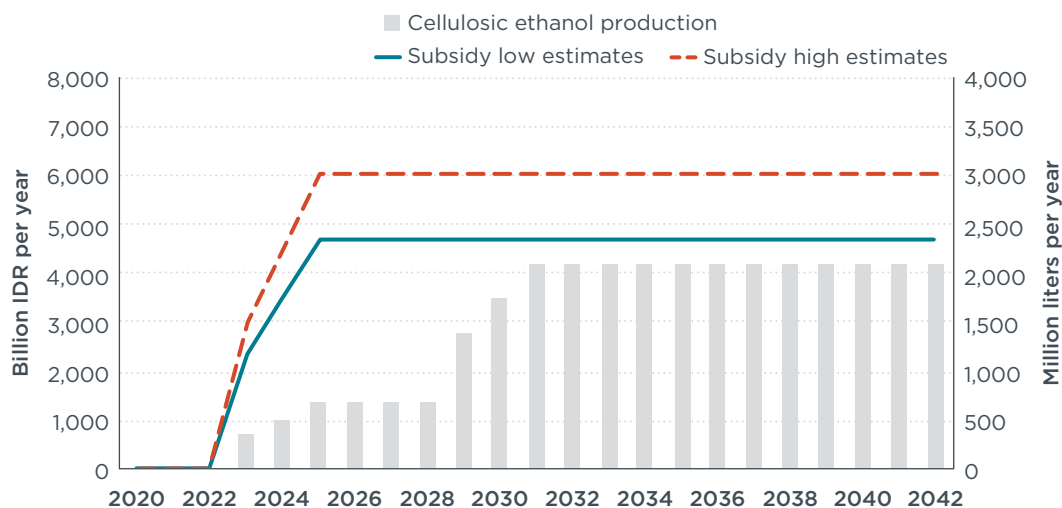
If Indonesia were to support the construction of 30 commercial facilities over the next 10 years, the country **could produce 2 billion liters of cellulosic ethanol annually, replacing a conservative estimate of 4% of its gasoline consumption at a relatively low cost** compared to other countries.

Modest financial incentives are needed for the initial establishment of this advanced technology industry. **The cellulosic ethanol subsidy needed in Indonesia could be as low as IDR 6,720 (US\$0.46) per liter, almost 60% lower than that needed in European countries.** To support the development of the first 10 commercial cellulosic ethanol facilities, the Indonesian government could provide **either upfront grants totaling IDR 90-116 trillion (US\$6.1-7.9 billion) to support facility construction or an annual subsidy of IDR 4.7-6 trillion for the whole industry. This amount is 20% lower than the annual palm biodiesel subsidy from 2015-2019.**



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Annual subsidy needed to support the establishment of a cellulosic ethanol industry in Indonesia (left axis) and the total quantity of cellulosic ethanol that could be produced each year (right axis)

POLICY RECOMMENDATIONS

Using palm biomass residues as feedstocks for advanced biofuels could bring multiple benefits, including enhanced energy security, more job opportunities, increased revenues to smallholders and rural regions, and reduced greenhouse gas emissions. The following policy changes could foster the development of a new cellulosic ethanol sector in Indonesia.

Introduce a regulation clarifying that palm residues are eligible biofuel feedstocks.

As the central government regulates and approves commercial biofuel production, it is necessary for the central government to explicitly allow these feedstocks to be used for biofuel production.

Introduce financial incentives for cellulosic ethanol, such as a production subsidy or investment grants.

Financial incentives are necessary to foster the development of new advanced technology industries. Providing upfront grants would reduce the initial investment burden of new biofuel facilities, and providing incentives annually to offset some of the production cost would enable the products to be made available at competitive prices.

Develop supportive programs to establish a sustainable feedstock supply chain.

The development of basic infrastructure, including roads in palm plantation areas—but not through surrounding forests—is necessary to leverage Indonesia’s resources through efficient supply chains. The government can also collaborate with civil society organizations to educate feedstock suppliers regarding the value of waste-to-energy and to help overcome potential technical challenges in feedstock collection and treatment.

Designate Special Economic Zones (KEKs) to boost regional economic development.

The government can designate a Special Economic Zone (KEK) around an emerging sustainable biofuel industry and its supplying palm oil plantations. Siting biofuel plants close to the suppliers will reduce feedstock transportation costs. This would also help accelerate regional development and alleviate uneven development.

Integrate cellulosic ethanol into other government initiatives.

The government can integrate cellulosic ethanol into the national strategy for improving fuel quality and reducing vehicle air pollution. Particularly, blending cellulosic ethanol in gasoline can achieve high octane fuel, which supports more efficient vehicles.



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