

# Biofuels in India: Rocky Road to Transformation

## Overview

As the second most densely populated country in the world (1.379 billion people) and the second largest energy consumer in the world, India faces a major challenge: to reduce its energy dependence. The challenge is ambitious in a background of energy poverty: India has only 0.65% of the world's gas reserves, 0.3% of oil reserves and 8.3% of coal reserves and is therefore highly dependent on imports.

To overcome this vulnerability, increased use of biofuels has great potential not only to achieve the objectives of its energy strategy, but also to reduce imports. Therefore, biofuels are of strategic importance to India's energy future.

## The necessity to reduce energy dependence

India imports about 80% of its oil demand from international markets. The country's dependence on oil is very high due to the increasing demand on energy. With fast-growing consumption and flat domestic production, India spends billions of dollars a year on energy bills. In 2017-18, India spent about \$87.8 billion on imports, which reached \$111.9 billion in 2018-19, an increase of 27.5%.

The government has therefore set an ambitious target as early as 2015: to reduce its dependence on oil imports by 10% by 2022. This goal can be achieved by supporting domestic production and the development of biofuels.

## An overly ambitious national strategy?

Biofuel production in India is relatively recent and dates back to 2001. Several national policies have set ambitious goals. The latest, the National Biofuels Policy (2018), aims to increase the use of biofuels in the transportation and energy sectors. This new policy classifies biofuels into basic (1G) and advanced (2G, 3G) biofuels and theoretically allows for the extension of financial and tax incentives in each category.

It also broadens the scope of the use of the raw material and encourages the establishment of a strong supply chain scheme for production and distribution.

This policy also sets ambitious targets for blends: to reach 20% ethanol and 5% biofuels by 2030. The focus is on advanced biofuels.

## Financial incentives remain on paper

The government has been mandated to provide financial and tax incentives to support development and plans to set up bio refineries across the country with total financial support of about \$1.45 billion for ethanol production.

In addition, to attract more investment in the sector, projects would be allowed 100% foreign direct investment, with the exception of plantations, and oil marketing companies have given assurances to buy 2G ethanol from suppliers for a period of 15 years.

Finally, on biofuels, a \$735 million sustainability gap fund is put in place, with additional tax incentives and a higher purchase price for 2G biofuels than for 1G biofuels.

## Limited biofuels production

As for ethanol, even though India is the 5th largest producer in the world, the majority of its production is for industrial use. Ethanol in India is mainly based on sugar molasses, but the current policy has broadened the scope to include other raw materials.

In 2017, fuel ethanol accounted for only 30.26% of the total ethanol consumption of 2230 million litres. In 2018, the projected increase was 40.7% of the 3070 million litres used. The actual blending rate in 2017 was 1.9% and the projected rate in 2018 was 3.2%, due to increased ethanol production and consumption. The projected production capacity is ambitious: 6000-7000 million litres in 2022. Indeed, if achieved, this production would allow the blending target of 15% or more to be achieved.

Biodiesel production in India is marginal, as India is the net importer of vegetable oils. Presently, India has more than 20 plants with a production of around 140 – 300 million litres per year. In fact, in 2017, production was 170 million tonnes with a consumption rate of about 95%. The industry uses inedible industrial oil (palm stearin), used cooking oil (UCO), animal fats and tallow and other oils (sludge, acid oils, and wood-based oils) to produce biodiesel. However, the blending rate is less than 0.15%, contrary to the revised target of 5%.

## Still dependent on imports

Under the government's 2018 policy, exports are restricted and are only allowed for non-oil purposes. As for imports, the status has changed from free to restricted: they require an import licence. The purpose of these restrictions is to develop the internal market and reduce the cost of oil imports. The stated goal is also to improve farmers' income and support job creation.

Despite ambitious goals and the increase in domestic ethanol production, India remains dependent on imports, due to demand from all end users and tight supply.

For biodiesel, imports have steadily increased from 2.7 million litres in 2016 to 7.1 million litres in 2017, an increase of more than 2.5%. This is due to strong domestic demand, which suggests an upward trend.

## Major supply challenges

In India, sugar molasses has been the main resource for bioethanol production, and inconsistency in the supply of raw materials is the main cause of the slow response to the blending objectives. In addition, India faces constant competition from the alcohol-based chemical industry and the alcoholic beverage sector.

Biodiesel production is in worse shape than ethanol in India. With more than 20 biodiesel plants the blend targets are not on track.

The Jatropha Failure - In 2009, with the launch of National Biodiesel Mission (NBM), the government identified Jatropha seeds as the potential feedstock to produce biodiesel in India and to achieve the then blend target of 20% by 2017. However, due to serious shortages of the seeds, the plan failed to transpire into a reality.

Nonetheless, the government soon realized the need for developing multi feedstocks approach and with the policy revision of 2018, it not only established the use of advance feedstocks but also took into serious consideration the need for providing financial and fiscal incentives to build the domestic market for biodiesel. Nowadays, the biodiesel industry seems to be very oriented to the waste-based feedstock, where the key challenge will be to set up the supply chain over India, the 7th largest country in the World.

### Environmental issues

With the ratification of the Paris Agreement, India committed to reducing its CO2 emissions intensity from 33% to 35% by 2030: it must achieve this goal through sustainable, green and clean energy with transport as the black spot. Today, India is the third largest emitter of greenhouse gases with a particularly energy-

intensive transport sector that individually contributes more than 10% of its energy-related CO2 emissions each year. In addition, economic growth and rising per capita income stimulate transport demand and thus increase CO2 emissions.

Therefore, transport is an essential element of India's climate strategy. With the National Action Plan on Climate Change, the country has taken the lead in improving the penetration of biofuels in industry.

In addition, in 2017, India developed a partnership with the EU in several clean energy sectors, including advanced biofuels.

### What a Future for Biofuels in India?

In the context of energy dependence and an increasing demand, India faces a major challenge.

How to develop biofuel sector with waste based feedstock or none crops based feedstock?

If India focus only on 2G ethanol, the ambitions seem too high: second-generation technologies are expensive and complex to approach. Even in Europe, despite a proactive policy in favour of second-generation ethanol,

many production plants have shut down.

On the waste-based biodiesel, the full supply chain of waste oil & fat needs to be established through the country. UCO resources seems to be huge but the collection sector need to be organized. Tallow resource through the country is also available; however strong religious issue can be a major bottleneck as the majority of the tallow is from cow / buffalo. The challenge seems huge for a country but the policy objectives of reducing dependence on imported fossil fuels in 2030 are clear and even if the government changes in the coming years, these objectives will remain relevant. Today, the local states own Oil Company starts to buy biodiesel or even offer term contracts for several years to guarantee the market and support investments.

It is to be hoped that China will not follow India's example in terms of restricting exports, on which Europe depends to successfully achieve its ambitious programme for waste based biodiesel.

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