

# Renewable Energy for BD

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# Diesel/Gasoline Consumption

- ◆ Bangladesh consumes about 80 Thousands Barrels of Diesel per day.
- ◆ Bangladesh consumes about 15 Thousands Barrels Gasoline per day.
- ◆ Part of Diesel consumption can be produced from renewable sources.
- ◆ At least 15% Ethanol can be added to motor Gasoline/Petrol.

# Renewable Diesel

- ◆ Because of the general concern about fossil fuel resources and global warming from CO<sub>2</sub> emissions, the use of alternative, sustainable sources of diesel for transportation have been increasing. There are two different classes of green fuels, namely first-generation *biofuels*, and second-generation *renewable fuels*. The definition of renewable diesel is a synthetic diesel fuel, produced from a renewable source that meets the ASTM D975 specifications for diesel fuel. In this process, renewable organic materials such as vegetable oil are reacted with hydrogen at elevated temperatures and pressure in a catalytic reactor. The obvious advantage of hydro processing compared to the use of FAME biodiesel is the fact that the final products, simple paraffins, from this process are the same components as those already present in fossil diesel.

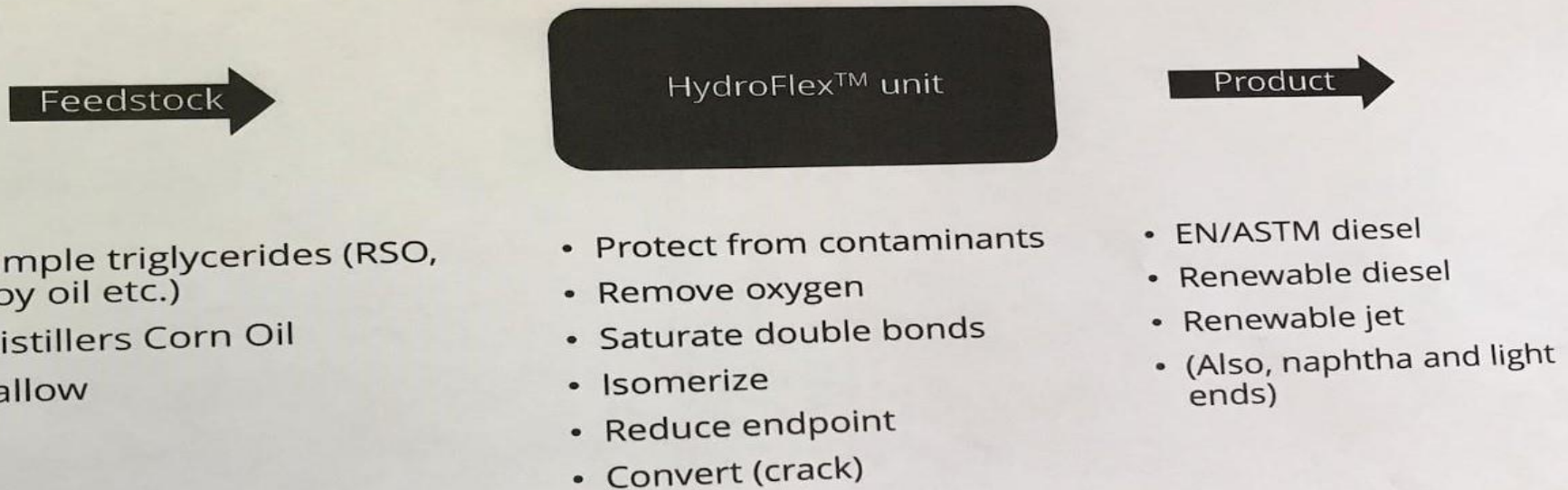
# Process of Production

- ◆ Biodiesel: Biofuel produced by transesterification of fatty acids. Transesterification is the process where free fatty acids/TAG reacts with alcohol in the presence of a catalyst for biodiesel production.
- ◆ Renewable Diesel: Hydrocarbon diesel fuel produced by hydro processing of renewable feedstock- hydrotreated vegetable oil.
- ◆ Feedstock: Simple triglycerides (Soyabean oil/Corn Oil)- Remove oxygen/Saturate double bonds/isomerize/reduce endpoint/crack to produce renewable diesel/renewable jet.
- ◆ Coconut oil is chemically reacted with an alcohol, like methanol or ethanol, in the presence of a catalyst, like sodium or potassium hydroxide. This process converts the oil's fatty acids into alkyl esters, which are known as biodiesel

# Process of Production

## Setting the scene...

What happens in HydroFlex™ Unit



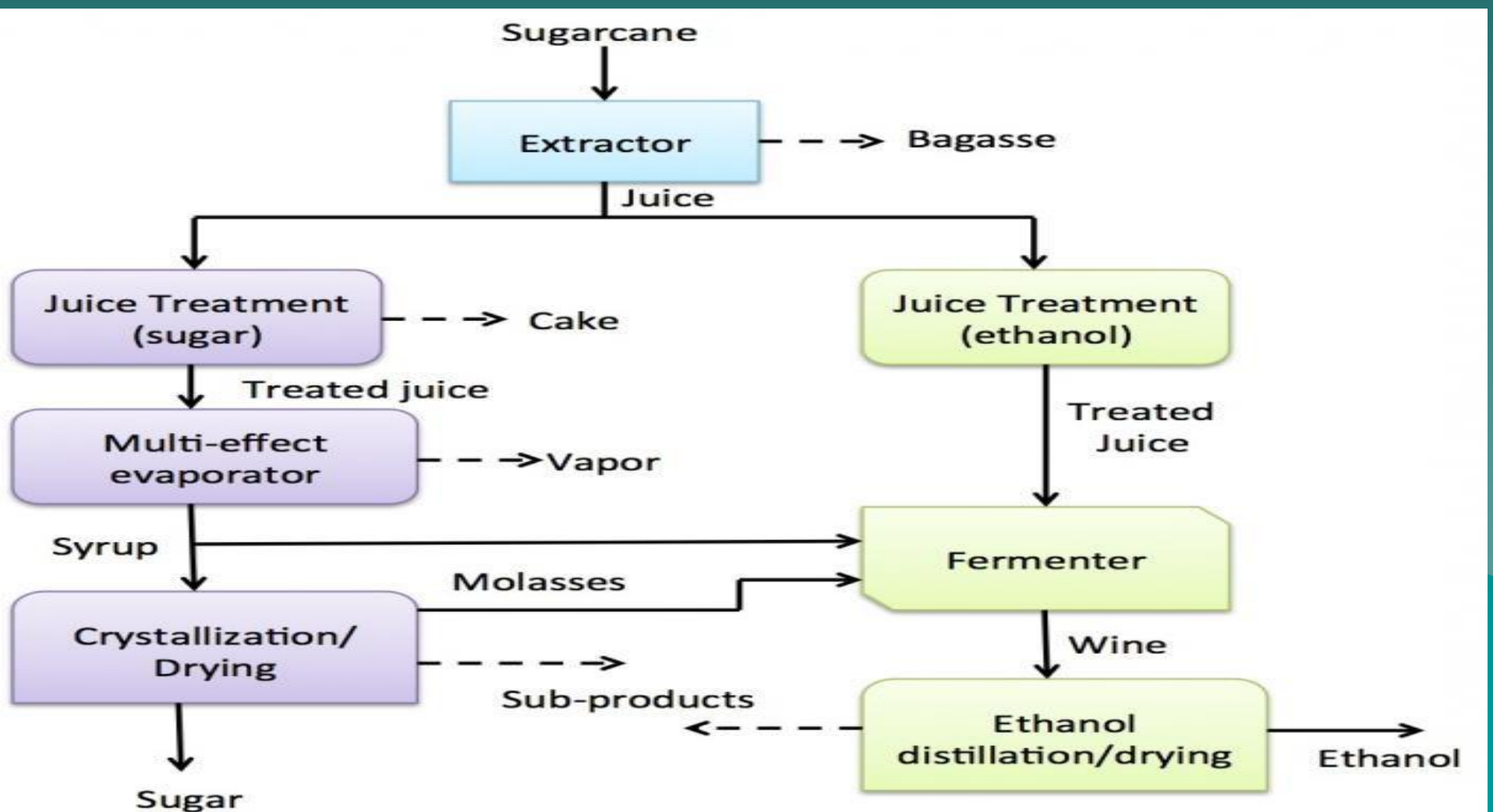
Renewable diesel can be produced by several different technology pathways. Currently, commercial production facilities are using the hydrotreating pathway, with fats, oils, and greases as the most common feedstocks.

- **Traditional hydrotreating**—Used in petroleum refineries, hydrotreating involves reacting the feedstock (lipids) with hydrogen under elevated temperatures and pressures in the presence of a catalyst. Commercial plants currently use this technology.
- **Biological sugar upgrading**—This pathway uses a biochemical deconstruction process, similar to that used with cellulosic ethanol with the addition of organisms that convert sugars to hydrocarbons.
- **Catalytic conversion of sugars**—This pathway involves a series of catalytic reactions to convert a carbohydrate stream into hydrocarbon fuels.
- **Gasification**—During this process, biomass is thermally converted to syngas and catalytically converted to hydrocarbon fuels.
- **Pyrolysis**—This pathway involves the chemical decomposition of organic materials at elevated temperatures in the absence of oxygen. The process produces a liquid pyrolysis oil that can be upgraded to hydrocarbon fuels, either in a standalone process or as a feedstock for co-feeding with crude oil into a standard petroleum refinery.
- **Hydrothermal processing**—This process uses high pressure and moderate temperature to initiate chemical decomposition of biomass or wet waste materials to produce an oil that may be catalytically upgraded to hydrocarbon.

# Production of Ethanol

- ◆ Ethanol can be produced from sugar cane. Brazil today is home to the world's largest fleet of vehicles that use ethanol derived from sugarcane as an alternative fuel to fossil fuel. Twenty-seven million cars, 73% of the total, can use a mix of ethanol and gasoline. Many cars are now designed to run on E85 fuel. That is 85% ethanol and 15% Gasoline. Gasoline is needed for the start up of the engine. Bangladesh's weather is suitable for the growth of sugar cane. The production of sugar and ethanol can be done at the same time by building appropriate industry. Source: Internet.

# Ethanol Production



# BD Energy Consumption

Related indicators	Latest value	Reference	Measure
Oil reserves	0.03	2021	billion barrels
Oil production	3.00	2022	thousand Barrels Per Day
Oil consumption	109.00	2014	thousand barrels per day
Diesel and heating oil consumption	81.49	2021	thousand barrels per day
Gasoline production	1.38	2014	thousand barrels per day
Gasoline consumption	6.40	2021	thousand barrels per day
LPG production	0.38	2014	thousand barrels per day
LPG consumption	0.29	2021	thousand barrels per day
Jet fuel production	0.02	2014	thousand barrels per day
Jet fuel consumption	7.50	2021	thousand barrels per day
Coal reserves	322.98	2021	million short tons
Coal production	831.14	2022	thousand short tons
Coal consumption	8,237.55	2022	thousand short tons
Coal imports	6,149.28	2022	thousand short tons
Coal exports	0.00	2022	thousand short tons
Electricity production capacity	18.49	2021	million kilowatts
Electricity production	80.57	2021	billion kilowatthours
Electricity consumption	77.68	2021	billion kilowatthours
Electricity imports	6.56	2021	billion kilowatthours
Electricity exports	0.00	2021	billion kilowatthours
Renewable power capacity	0.57	2021	million kilowatts
Renewable power generation	1.36	2021	billion kilowatthours

# Emissions reduction

- **Fewer emissions**—An [NREL study \(PDF\)](#) found renewable diesel reduced both carbon dioxide and nitrogen oxide emissions when compared with petroleum diesel. California's [Low Carbon Fuel Standard Certified Carbon Intensities](#) shows renewable diesel reduces carbon intensity on average by 65% when compared with petroleum diesel.