

# Hydrogen Generation Potential from Biogenic Residues of Bangladesh

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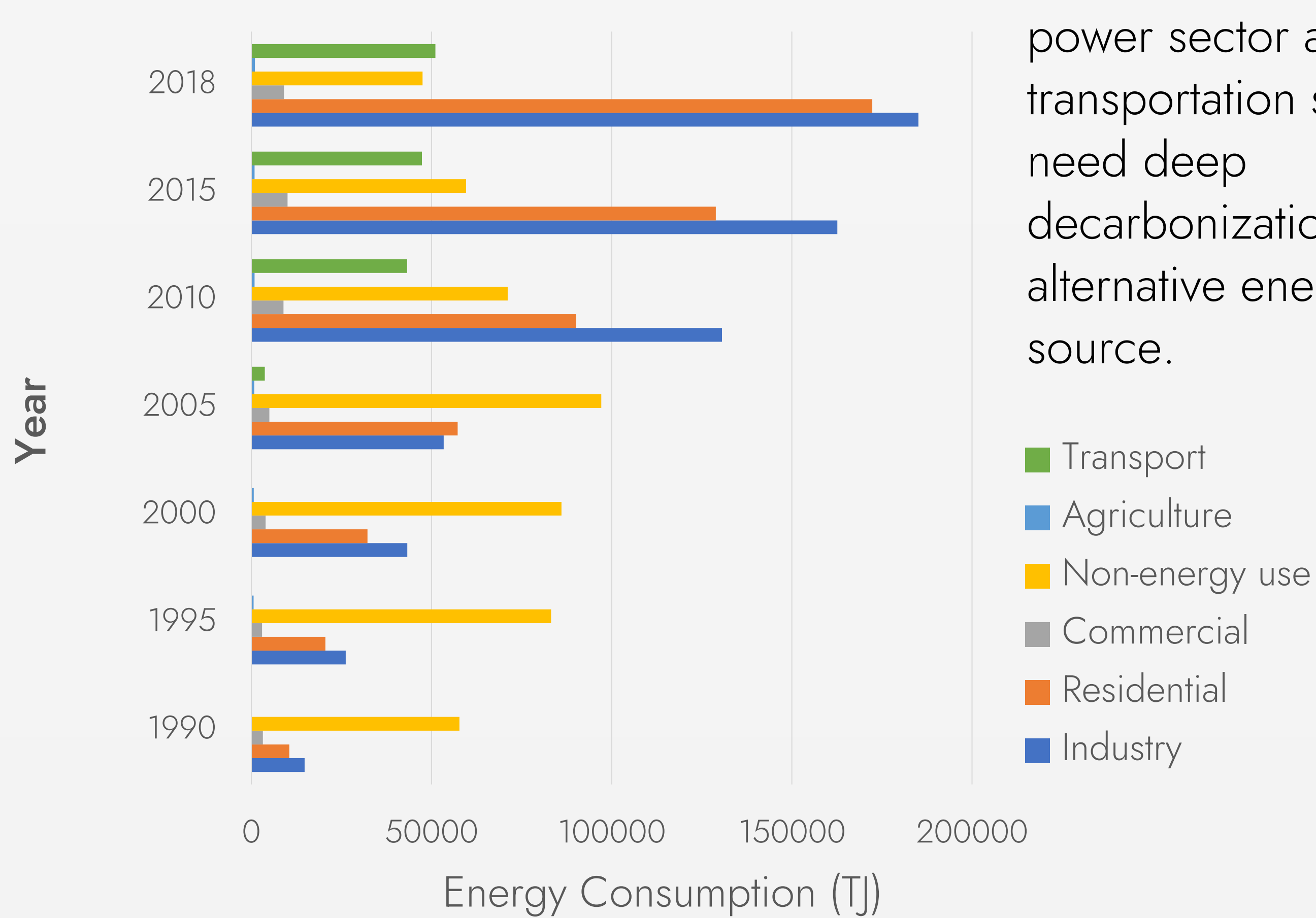
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## Introduction

Bangladesh, a low-income country, is not only rapidly running out of its fossil fuel reserves, but also at the forefront of facing adverse effect of global climate change. Studies estimate that Bangladesh will likely run out of indigenous fossil reserves by 2050 and face an energy resource vacuum. However, being a densely populated and agriculture-focused country, Bangladesh has immense biomass waste in the form of biogenic residues. More than 60 million tons of biogenic waste are generated in the country, which includes livestock waste, field and crop-based residues. which possess an enormous potential to be utilized for sustainable H<sub>2</sub> production. Bangladesh thus has a potential to utilize available infrastructure and viable technologies for paving the way for hydrogen economy.

## Current Energy Scenario of Bangladesh

Natural Gas Consumption by Sector [Ref.1]

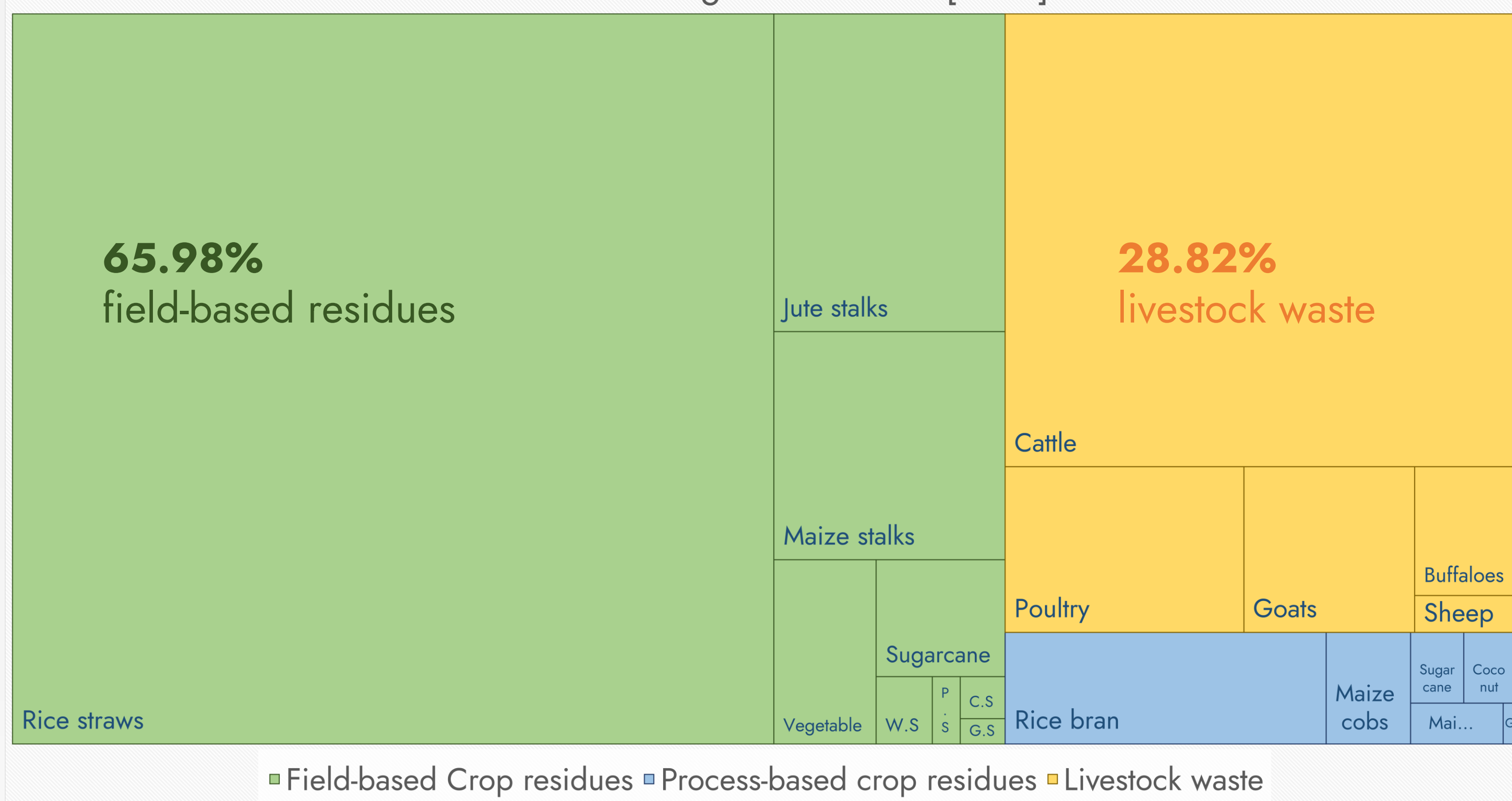


The fertilizer industries, power sector and transportation sector need deep decarbonization and alternative energy source.

## Biogenic Residues of Bangladesh

Bangladesh produces 60.08 million tons of agricultural residues containing mainly crop residues and livestock waste..

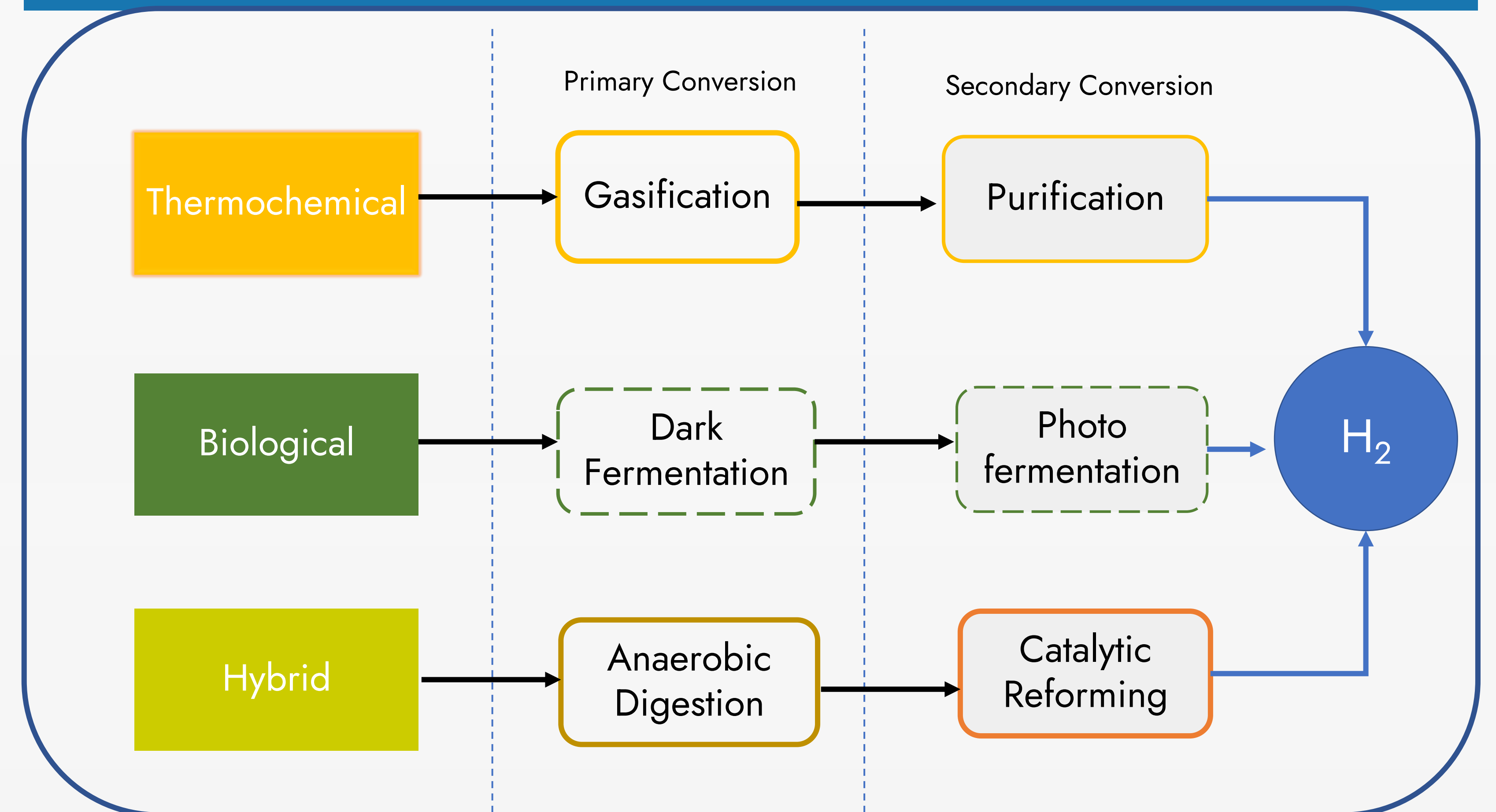
Available Biogenic Residues [Ref.2]



The biogenic waste generated in Bangladesh is currently not well-managed. Majority of the waste is dumped in landfills, while only a fraction of it is often used for biogas production.

According a 2020 report by World Bank, the per capita GHG emission in Bangladesh increased by more than 45% from 2010 to 2020, attributed to fossil fuel usage and disposal of biogenic waste.

## Hydrogen Generation Pathways from Biogenic Residues



Among the mentioned ones, biological routes are currently at development stage whereas thermochemical methods such as gasification has reached maturity and being commercially deployed.

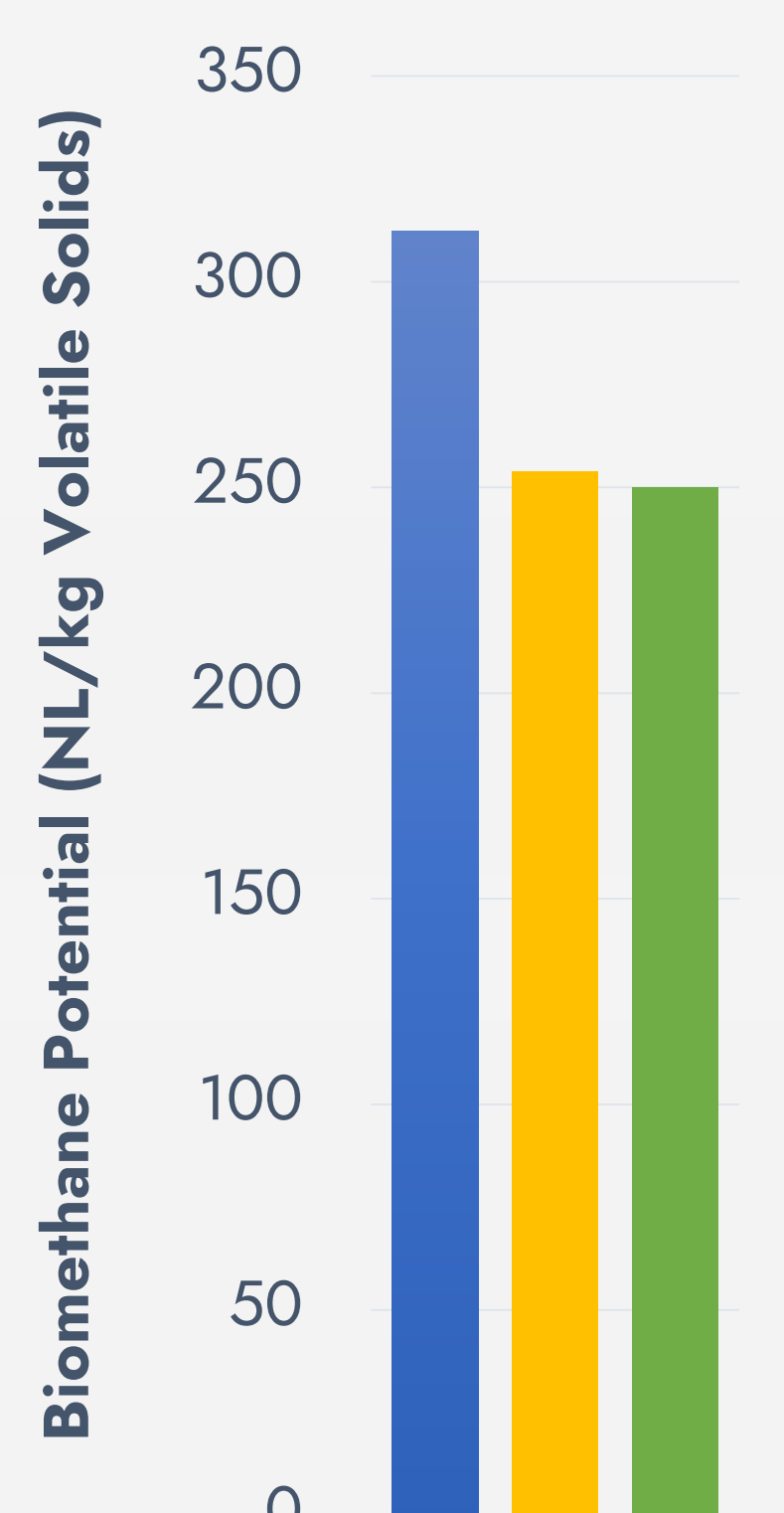
Integrated bio-thermochemical routes are attractive as they utilize the benefits of both routes and maximizing the resource potential of a country.

## Hydrogen Production Potential in Bangladesh

While several technologies are available for H<sub>2</sub> generation, the choice would depend greatly on efficiency, yield, available infrastructure and policy undertaken by nations for short term and long-term plans for decarbonization.

In Bangladesh, there are 91,350 small to large biogas plants, which are mostly fixed dome type, based on single substrate [Ref 2].

60.08 million tons biogenic residues → Hybrid Route → 2 million tons H<sub>2</sub> approximately



■ Cattle manure  
■ Poultry manure  
■ Wheat straw  
[Ref 3,5]

A preliminary estimation has been done considering valorization of net available agricultural biogenic residues via hybrid route [Ref 4].

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