CO_2 Removal and Gases: Hydrogen from Biomass CCS

The vast amount of biomass resources in Nigeria presence a huge opportunity for production of hydrogen through gasification. Gasification is defined as thermal conversion of biomass- or fossil fuel-based carbonaceous materials into a gaseous product called *syngas*, consisting mainly of hydrogen, carbon monoxide and small amounts of methane, water vapor, nitrogen and tar.

One of the main products of the gasification process, hydrogen, that is presently viewed as a key energy carrier of the future, has an energy density that is much higher than the conventional fuels.

Production of hydrogen from gasification plants fitted with carbon capture and storage (CCS) facility offers a means of reducing carbon intensity by capturing and storing CO_2 emitted from the production plants before it escapes to the atmosphere.

Although, no CCS infrastructure has been developed in Nigeria. It is hoped that in not too distant future, this technology will become relevant as the country begins to adopt low-carbon intensive energy systems.

Level 1
No hydrogen is produced form biomass gasification fitted with CCS

Level 2
Hydrogen production from biomass gasification with CCS increases to 10 TWh/year

Level 3
Hydrogen production from biomass gasification with CCS rises to 35 TWh/year

Level 4
Hydrogen from biomass gasification with CCS rises to 80 TWh/year, during which maximum utilizable biomass resources in the country are deployed for gasification.

Key Interaction
In the priority list for producing hydrogen, biomass gasification with CCS is considered as the first option. The total demand for hydrogen is a function of the degree of conversion of the gas grid into hydrogen and the level of demand for gaseous fuels in major energy consuming sectors - buildings, industry and transport.

Default Timing - Start Year: 2035, End Year: 2060

Hydrogen Production

Sub-lever	Units	2015	Level 1	Level 2	Level 3	Level 4
Biomass with CCS	TWh/year	0	0	10	35	80