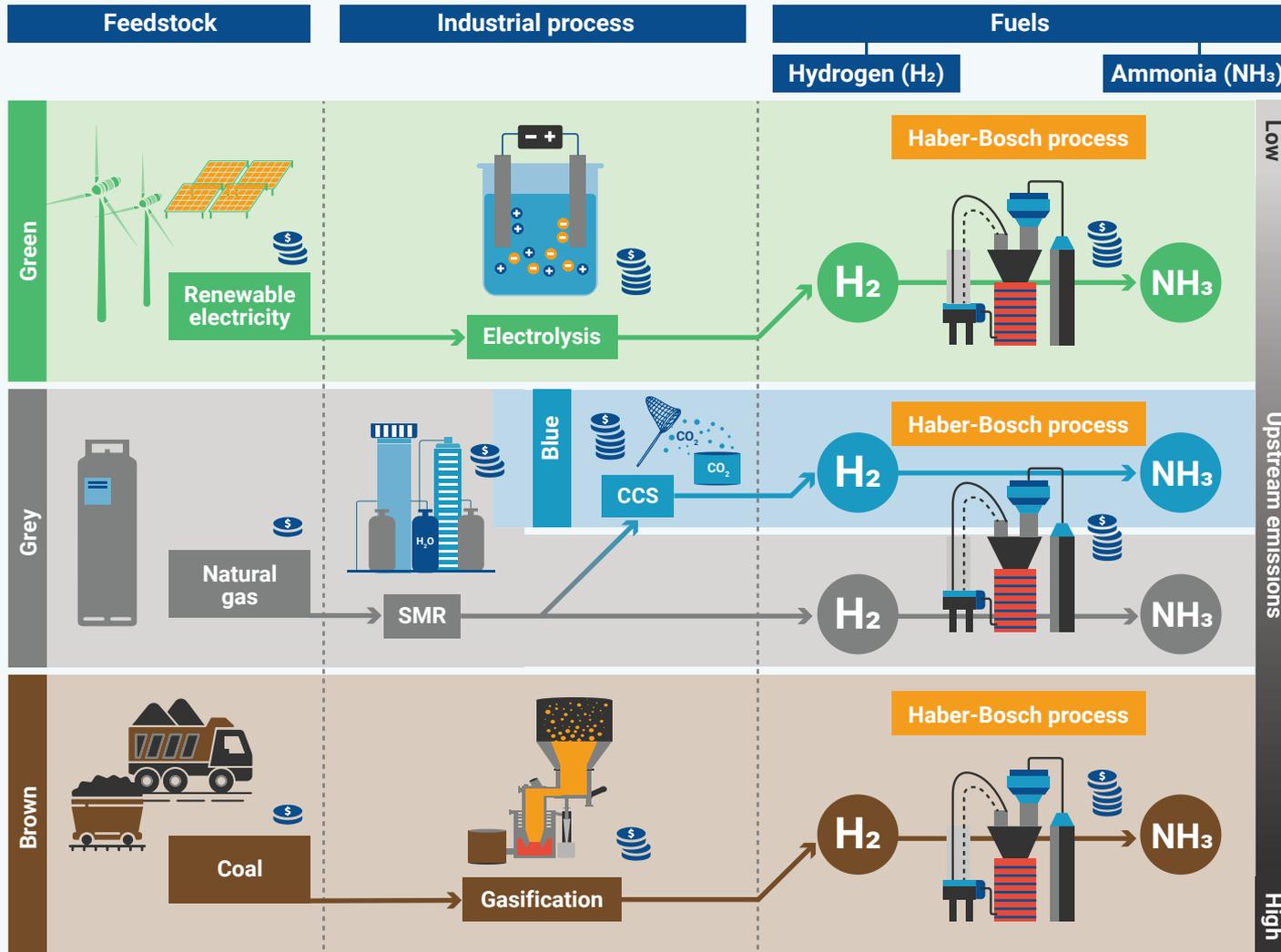


# What's in your tank?

Hydrogen and ammonia have great potential for being scalable zero-emission fuels. However the way these fuels are produced may have a big impact on their environmental credentials. The *colour* of a fuel is based on the feedstock and industrial processes used for production which have a big impact on environmental credentials.

## Hydrogen / ammonia production pathways



### Cost implications for each process



### Industrial process

#### Electrolysis

A process by which substances are broken down into their components by applying an electric current. Green hydrogen utilizes electrolysis to split water into hydrogen and oxygen.

#### Steam methane reformation (SMR)

SMR accounts for 95% of all hydrogen produced today and emits 285 gCO<sub>2</sub>/kWh of energy in addition to fugitive methane emissions. The process involves reacting high-temperature steam with natural gas and a catalyst to produce hydrogen and carbon monoxide.

#### Carbon capture and storage (CCS)

CCS plants capture CO<sub>2</sub> produced during the combustion of fossil fuels and store it in underground geological formations. Current capture rates are uncertain, but industry leaders suggest 70% (this number may be adapted later on) of emitted CO<sub>2</sub> is captured.

#### Coal gasification

Coal gasification is a much less common method of producing hydrogen and emits 675 gCO<sub>2</sub>/kWh of energy. It involves the combustion of coal to form a synthesised gas (syngas) comprised of hydrogen and carbon monoxide; pure hydrogen can then be extracted from the syngas.

#### Haber-Bosch process

The process is a well-established method which combines hydrogen and nitrogen under high temperatures and pressures in the presence of a catalyst to form ammonia.

### Technical maturity

