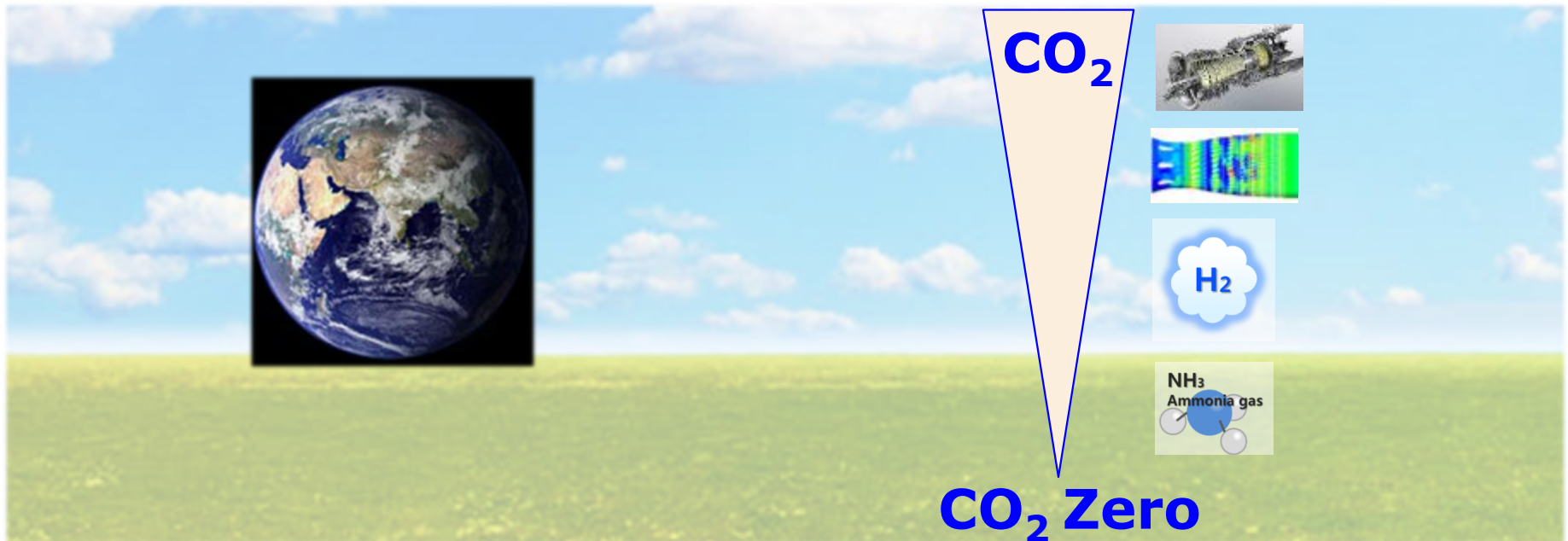


Technology Development for a Low Carbon Society



Oct. 11, 2018

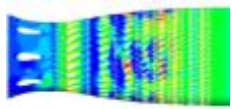
Junichiro Masada,
Senior Vice President
Mitsubishi Hitachi Power Systems

Technology developments for a Low Carbon Society

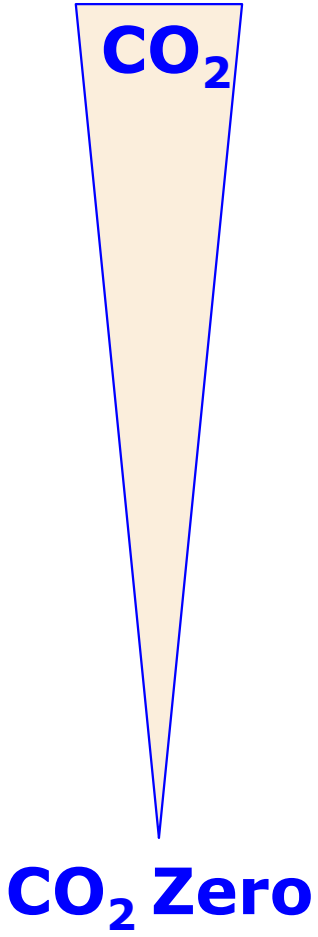
① Super high efficiency GTCC



② Rapid Response Gas Turbine



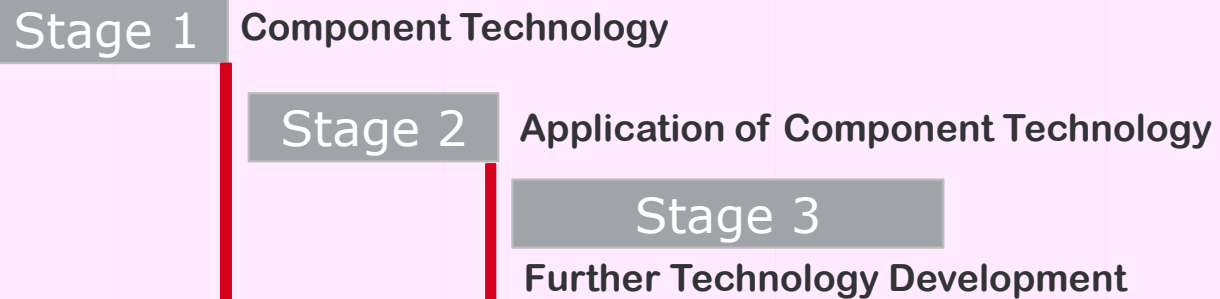
③ H2/Ammonia combustion GT



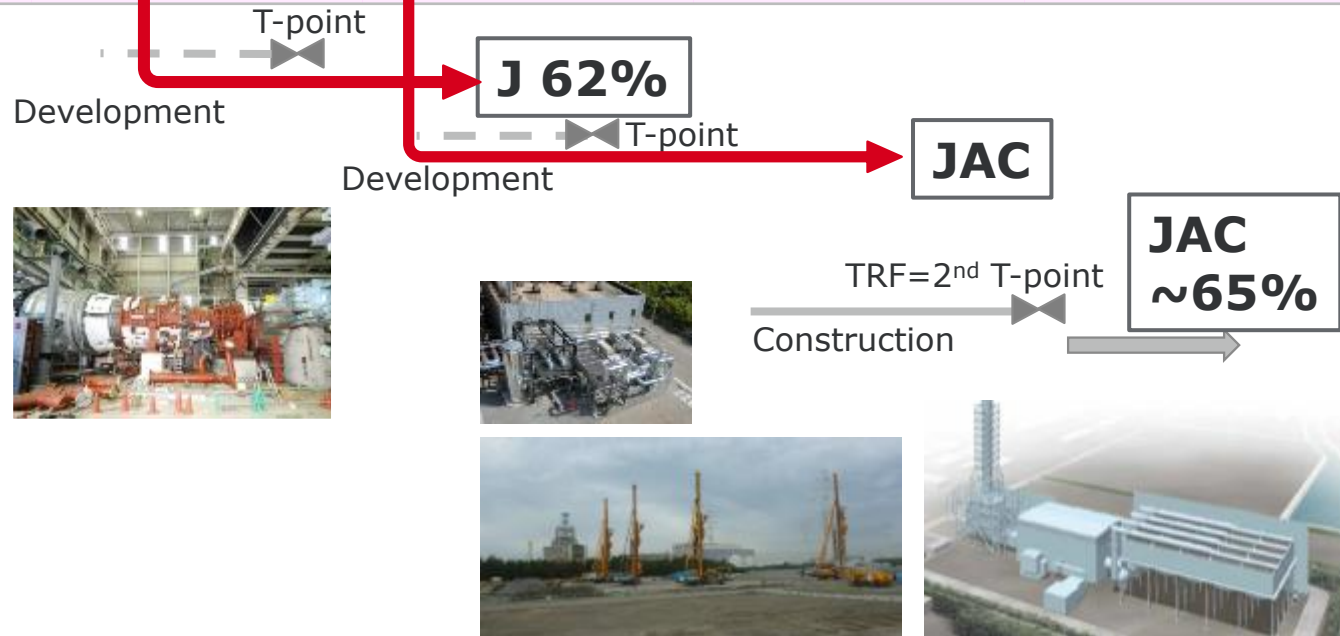
① Super High Efficiency GTCC

~65% available in the near future

**1700degC GT
Japanese
National PJ**



Verification



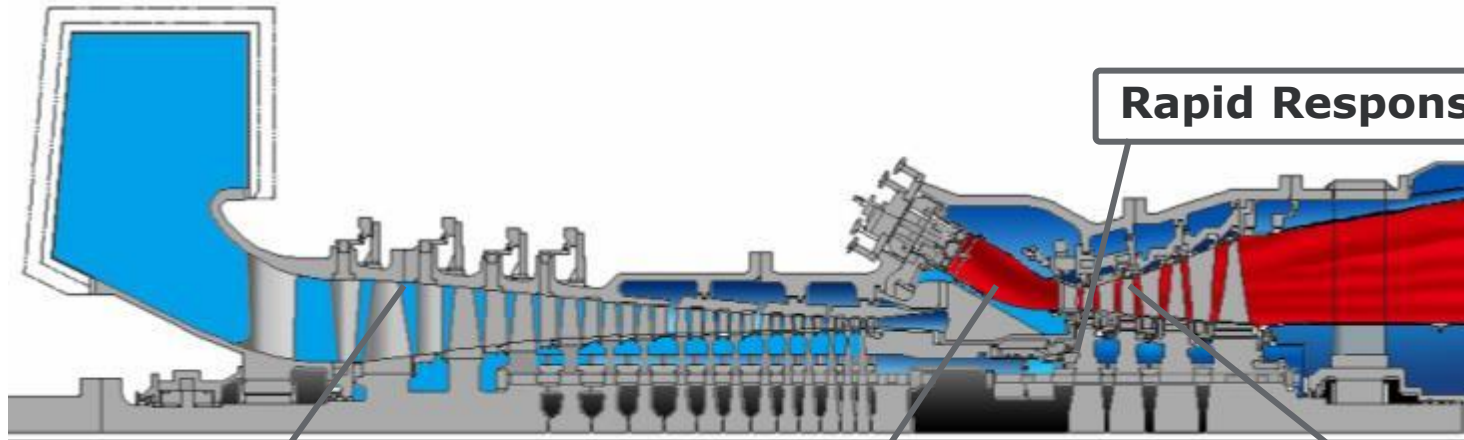
② Rapid Response GTCC

Large GTCC

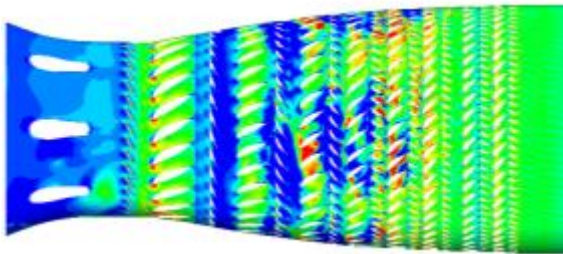
**500MW / 60%
10minutes full load**

*NEDO: New Energy and Industrial Technology Development Organization

* Project Title: Advanced Research Program for Energy and Environmental Technologies / Research and Development of Advanced Gas Turbines for the Firming Grid in the Renewable Energy Age. (2014-2015)



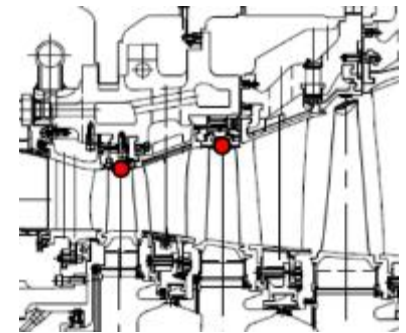
Compressor Stability in Fast Start Up



Combustor Control and Stability



Clearance Control

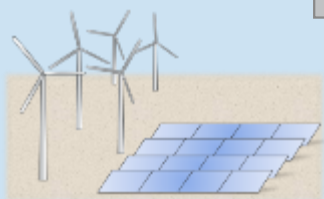


③ Hydrogen value chain for CO2 ZERO society

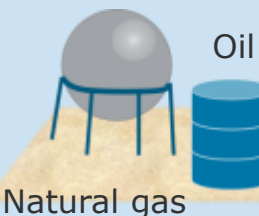
Carbon Free / Carbon Neutral Hydrogen Supply chain

Production

Renewable Energy



Fossil Fuel
Oil · Natural gas



H₂

NH₃

CO₂

(CCS)

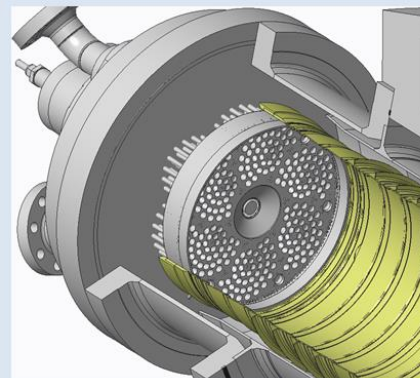
Transportation / Storage

Liquid

Step 3 (~2030)

DLN combustor, 100%H₂

Under investigation on the basis of Multi Cluster burner



NEDO : Hydrogen Value Chain
National Project in Japan

Use

Station
Vehicle

H₂, NH₃)

se

Power for a Brighter Future