



Industry

Natural Resources

**Commercialization of IGCC / Gasification
Technology for U.S. Market**

2008 Gasification Technologies Conference

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Nature

Human Life

MITSUBISHI HEAVY INDUSTRIES, LTD.

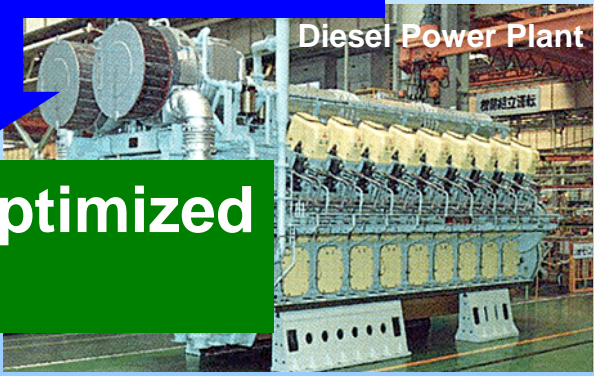
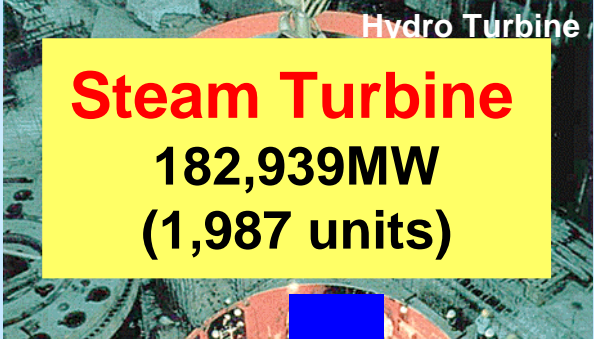
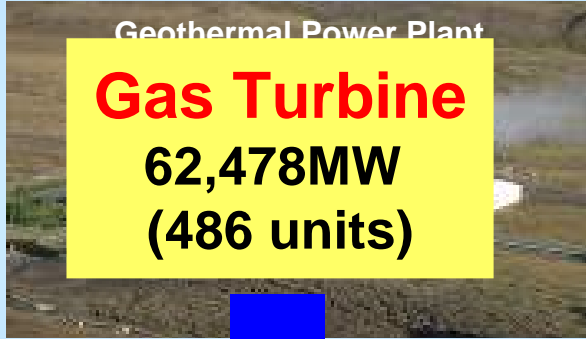
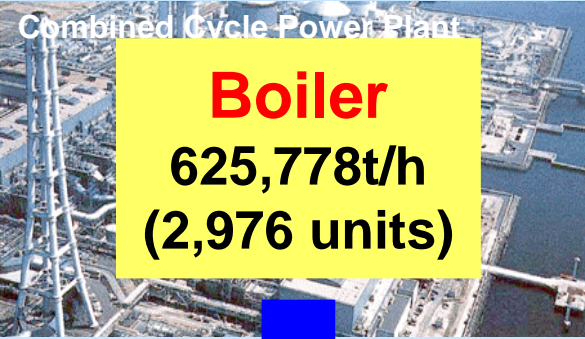
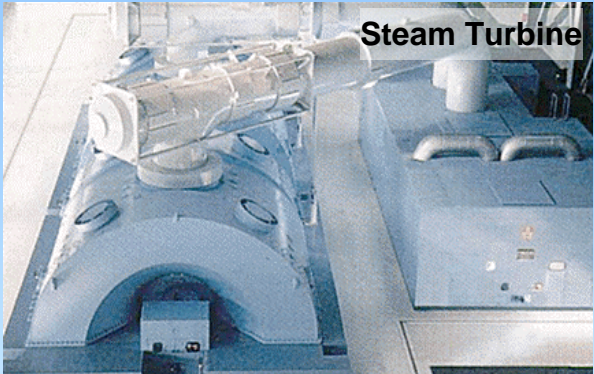
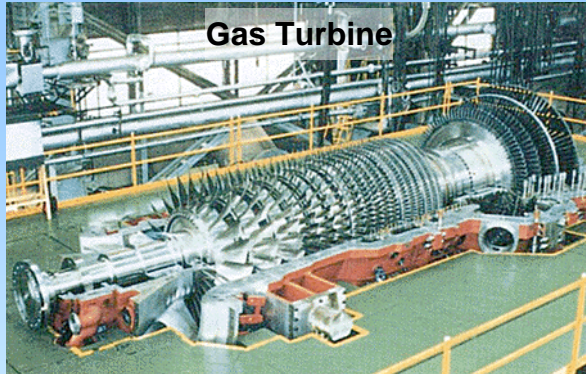


- **Accumulated Original Technologies through Long Term R&D Activities since Early 1980's**



- **Achievement of High Reliability in Operation at Nakoso 250MW Demo. Plant - Fully Supported by the Client CCP**

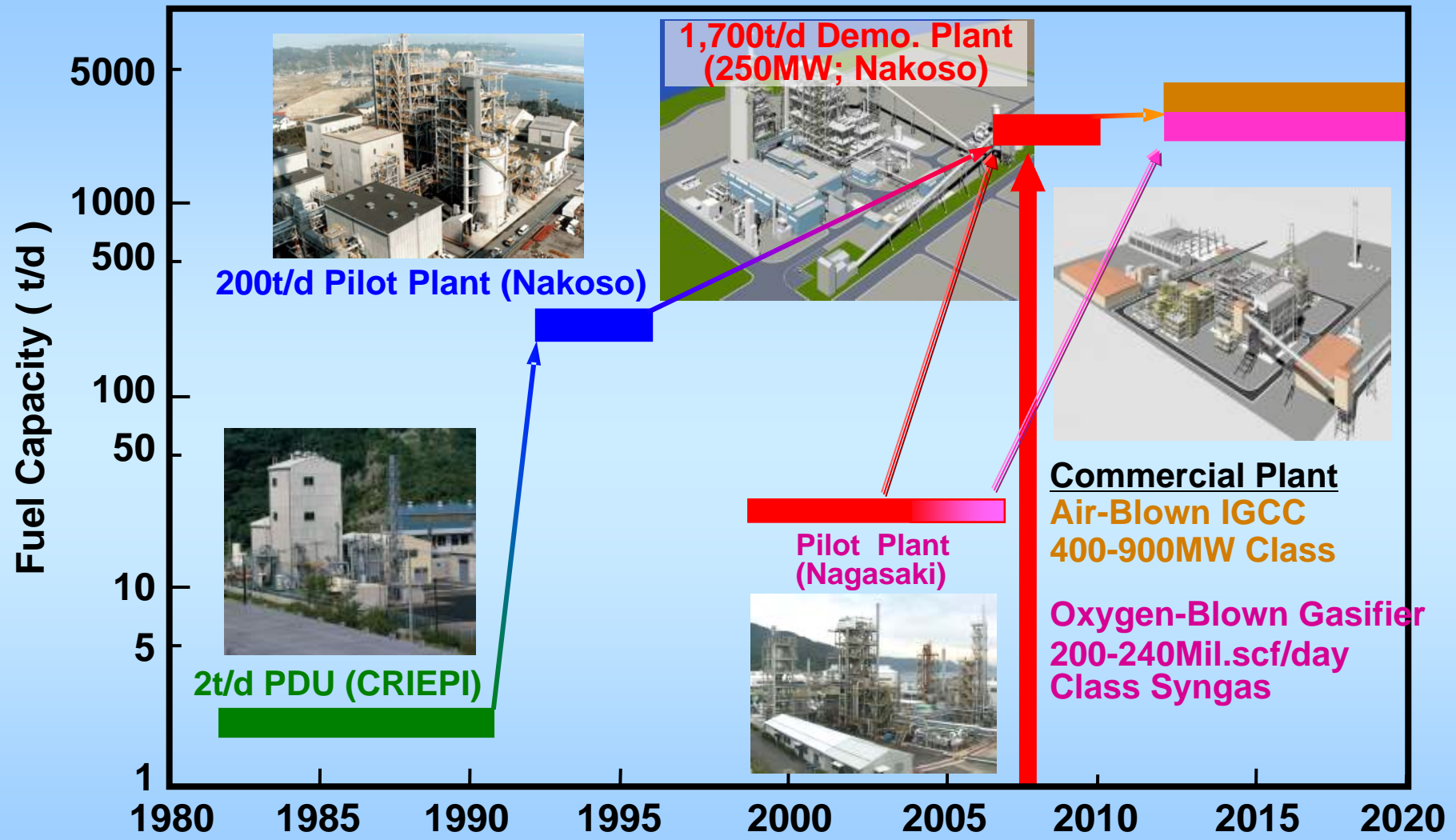
Origin of MHI IGCC/Gasification Tech.



Contribute to Both of the Power Generation and the Chemical Industries

- **Air-Blown Gasifier with High Temp. GT for IGCC (i.e. for the Power) at the Highest Plant Efficiency and Economy**
 - Proven by Nakoso Demo. Plant
- **Oxygen-Blown Gasifier for Chemical Products (SNG, CTL, etc.)**
 - Verified through Unremitting R&D Activities

Development of Commercial Plant

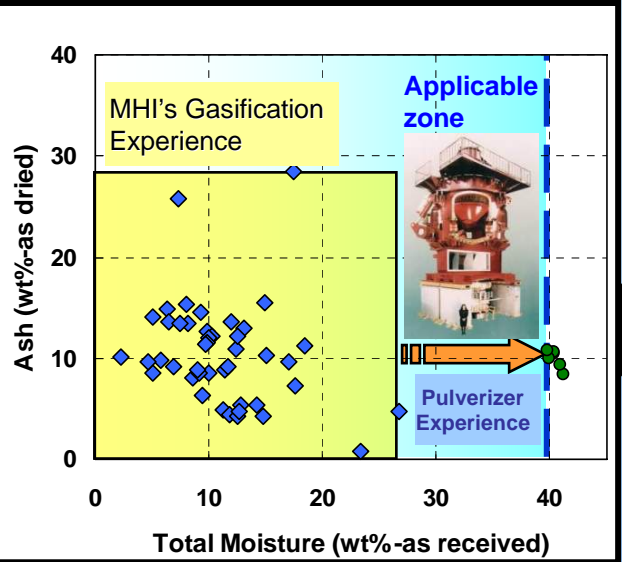
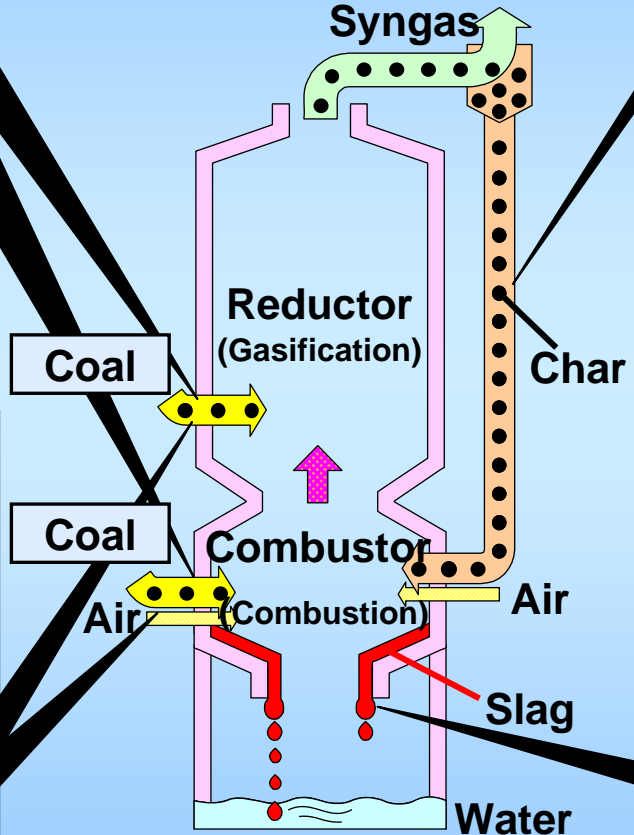
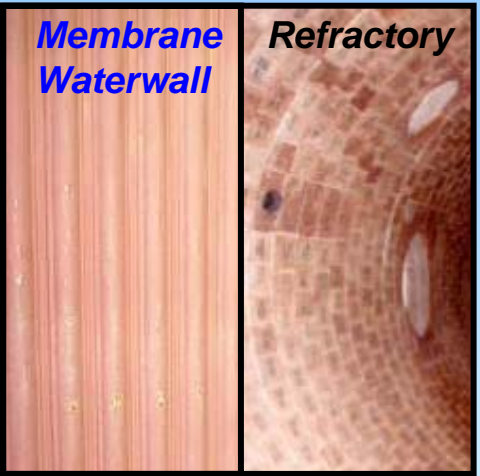
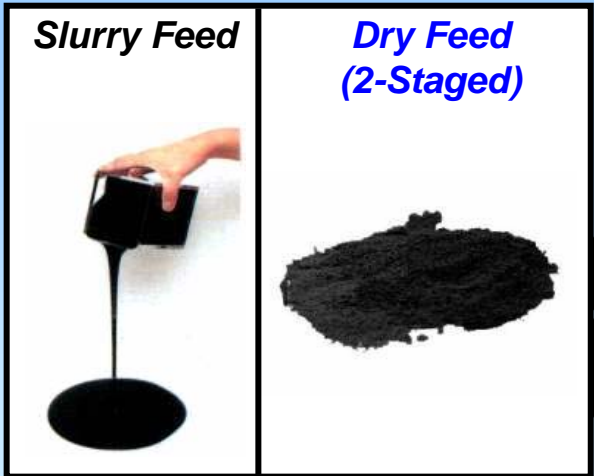


PDU : Process Development Unit
 CRIEPI : Central Research Institute of Electric Power Industry

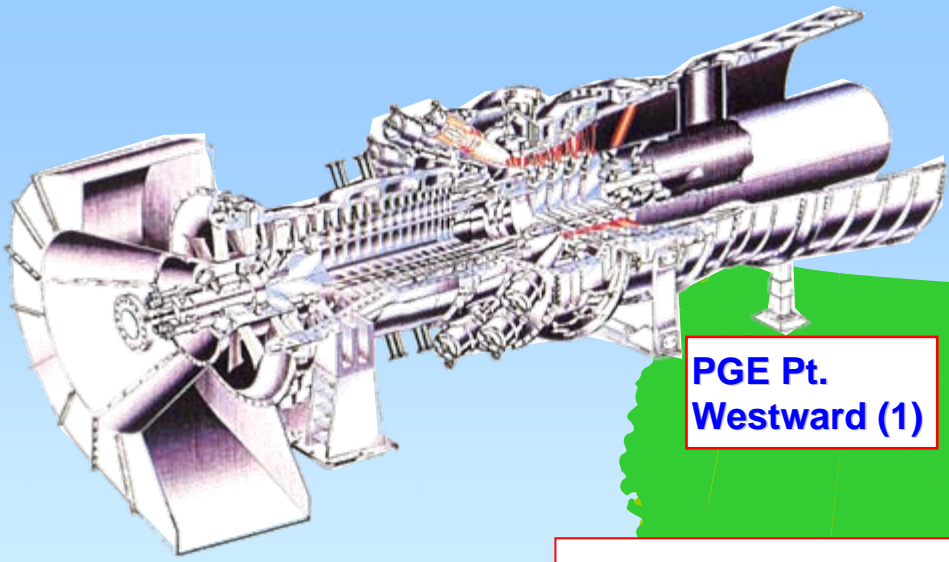
Realizes the Lowest Cost with Various Advantages

- **Highest Plant Efficiency Because of Air-Blown Gasifier for IGCC**
- **Technologically Verified Oxygen-Blown Gasifier for Syngas Production**
- **Flexibility for Variety of Coal Including PRB & Lignite Because of 2-Stage Dry Coal Feed and “Fine” Coal Pulverizing System**
- **Higher Reliability & Easier Maintainability with Membrane Waterwall**
- **Effective Utilization of By-Product like Discharged Molten Slag, Recovered Sulfur, etc.**
- **High Plant Efficiency by “G” Type High Temp. GT and High Reliability from Abundant “Low BTU Gas Firing” GTs**

Features of MHI IGCC / Gasifier



Features of MHI IGCC / Gasifier



Worldwide MHI "G" GT Fleet : 66units

- M501G x 56
- M701G x 10
- 32 in the US

- 34 in operation world wide
- 32 new orders world wide

"G" GT Fleet in Operation > 615,000hrs / 7,300starts

- Lead M701G Unit > 62,600 hrs
- Lead M501G Unit (USA) > 38,600 hrs

Product Fabrication in MHI Workshop



Transportation & Erection - Best Fitting to Site Location & Conditions

If the site location is...

Barge / Dolly Accessible ;

→ **Modularized Components** Transportation & Erection

Otherwise ;

→ **Small Piece by Piece** Transportation & Erection

Site Welding of Thick Pressure Vessels is Ready from Our Experience.

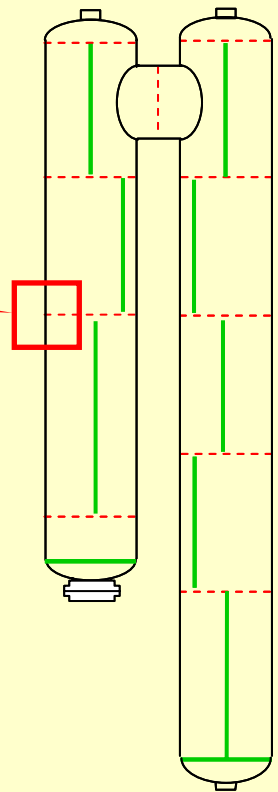
Safety Transportation to the Site



Site Welding of Thick Pressure Vessel is Ready.



Narrow Gap Auto Welder



--- Site Welding
— Shop Welding

Specifications;

- **Gasifier** Air-Blown for IGCC
Oxygen-Blown for Gasification Plant
- **Coal** Bituminous / Sub-bituminous / Lignite
- **AGR** Selexol® / MDEA
- **Sulfur recovery** Elemental Sulfur / Sulfuric Acid / Gypsum
- **Gas turbine** M-501G / M-701F4 / M-701G
- **Net Plant Output** 450MW for IGCC with M-501G
(1 on 1 w/o CO₂ Capture) 500MW for IGCC with M-701F4
- **Syngas Output** 200-240Mil.scf / day for Gasification Plant
- **CO₂ capture** 60 - 65% or more

Mitsubishi's Roles;

- **Gasification Technology Provider**
- **OEM of Main Equipment (Gasifier/GT/ST)**
- **EPC Contractor**



***“Mitsubishi’s Contribution for
Energy and Environment Solutions”***