

JCF[®]

JGC Coal Fuel

Energy Innovation Utilizing Low Rank Coal



JGC

Background

The world's total coal reserves are projected to last another 118 years*, but about half of these reserves consist of low rank coal (LRC).

As increasing demand for high rank coal products places a burden on the available supply, utilization of LRC will become ever more important.

Indonesia has vast reserves of coal, over 80% of which are LRC.

However, LRC is characterized by:

- High water content
- Low calorific value
- Spontaneous combustion
- Coal dust
- ... Transportation inefficiency
- ... Combustion inefficiency
- ... Handling difficulty
- ... Negative impact on environment

JGC has developed proprietary technology to rectify such disadvantages in the form of a process that upgrades LRC to JGC Coal Fuel (JCF) as a new coal slurry fuel used as an alternative to fuel oil.

By enabling the utilization of previously unused LRC reserves, JCF contributes to the energy security of Indonesia.

* Source : World Coal Association

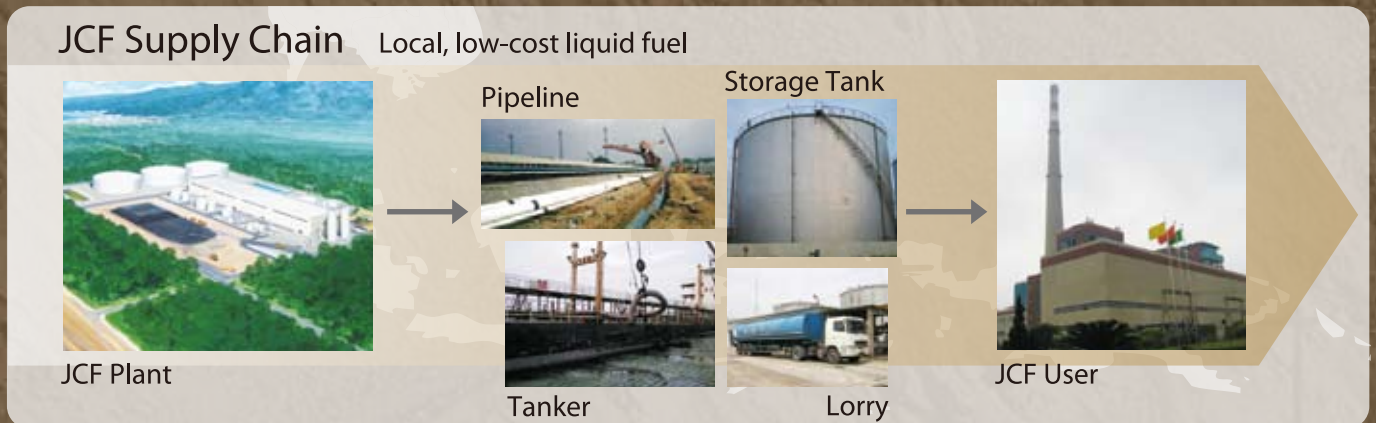


feedstock : LRC



Commercial Plan

As a leading global engineering company, JGC has accumulated long years of experience in the construction of various types of plants, in Indonesia and other countries worldwide. The aim is to build a total business chain from upstream to downstream, including coal concession acquisition, production and transportation of JCF, together with JCF sale and the supply of power to the Indonesian market.



History — Toward a New Era in Energy —

1980's	Beginning of coal slurry technology development
1990~1996	Commercial production of coal slurry from bituminous coal in China
1992~1996	Development of LRC upgrading technology and construction of pilot plant in Japan
2012	Completion of JCF Demonstration Plant * Supported by Japanese government
2015	Commercial production of JCF in Indonesia (under planning)



JCF Technology

Coal is formed from plant biomass through hundreds of millions of years of exposure to heat and pressure, deep underground. The JCF process artificially accelerates the natural coalification process, using HWT Upgrading Technology.

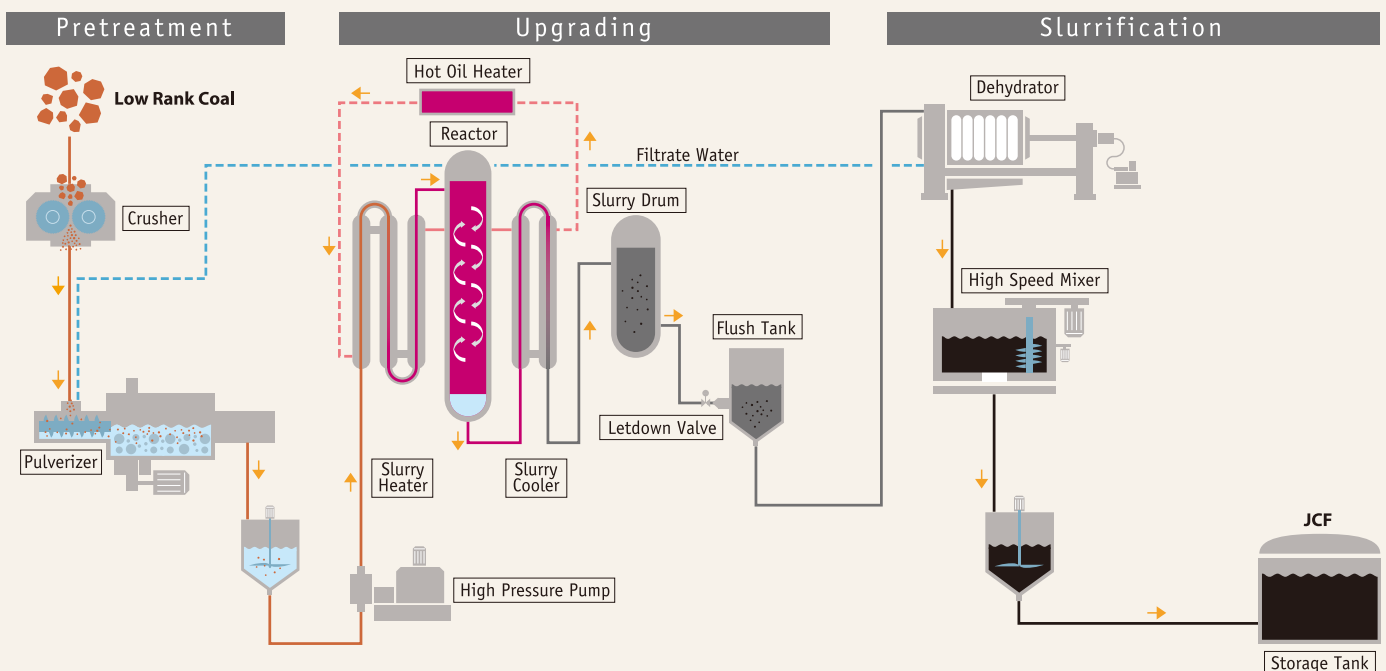
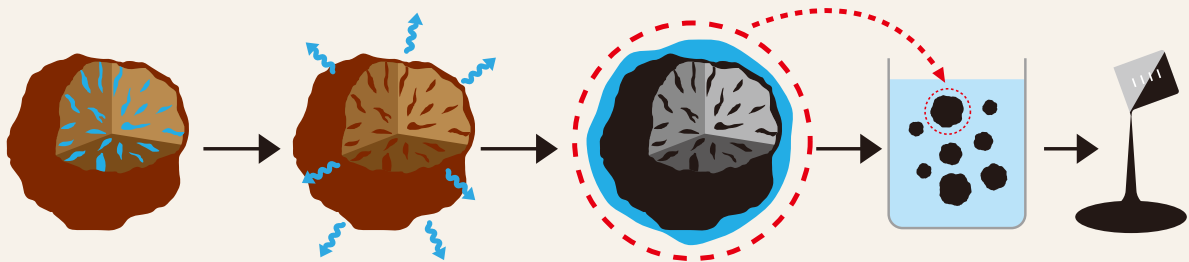
① Upgrading (HWT - Hot Water Treating)

When LRC is immersed in high-temperature, high-pressure water (15 MPa at 330°C), its properties change from hydrophilic to hydrophobic, and the water held in numerous pockets within LRC is expelled. At the same time, some of the LRC undergoes a reaction and breaks up to form tar which fills the pockets, preventing the water from seeping back in while simultaneously increasing the caloric value of the coal.

② Slurrification

With the addition of special additives, the water expelled from LRC can be used to convert the newly upgraded LRC into slurry, which is composed of small solid particles suspended in a liquid and which has fluid-like properties.

With Upgrading and Slurrification, LRC is transformed into JCF — removing the disadvantages inherent in LRC. JCF coal slurry can be handled just as if it were heavy oil (Marine Fuel Oil, MFO), with storage tanks and pipeline transportation adopted.



Demonstration Plant

The JCF Demonstration Plant is located in Karawang, West Java, about one hour's drive from Jakarta. JCF is produced from various Indonesian LRC sources, and can be used in place of MFO as a boiler fuel for power generation or in industrial plants.

Samples of JCF are provided to interested parties.

Tours of the JCF demonstration plant facilities, guided by knowledgeable local operators, are also available.



product : JCF

Specification of JCF

	Lignite (feedstock)	JCF
Moisture	40 - 65%	35 - 40%
Heating Value (*) as received	2,500kcal/kg 3,500kcal/kg	4,000kcal/kg 4,500kcal/kg
Viscosity	—	1,000cp
Mean particle size	50mm	20µm
Density	0.7 (bulk density)	1.2

Supporting Indonesia's energy supply
and building a bright future for its people.



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