

OVERVIEW OF GASIFICATION IN CHINA

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by
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SFA Pacific Background in China

World Bank: Efficiency & environmental impact of coal use in China
(analyzed town gas, chemical & steel industries)

United Nations Development Program (UNDP): Developed
projects for improved coal utilization (Dalian CFBC project)

United Nations (UNDP & UNEP): Participated in 3 China conferences

Asian Development Bank & the People's Republic of China:
International consultant to the People's Republic of China National
Response Strategy for Global Climate Change

SINOPEC: Oil residue upgrading analysis

**China Council for International Cooperation on Envir. & Dev.
(CCICED):** Energy Strategic Consideration for the 10th 5-yr plan,
presentation on energy deregulation & cogeneration/polygeneration

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In China the “Real” Action is in Gasification

Gasification development in the West is currently a lot of talk with little action

Gasification development in China is mostly action

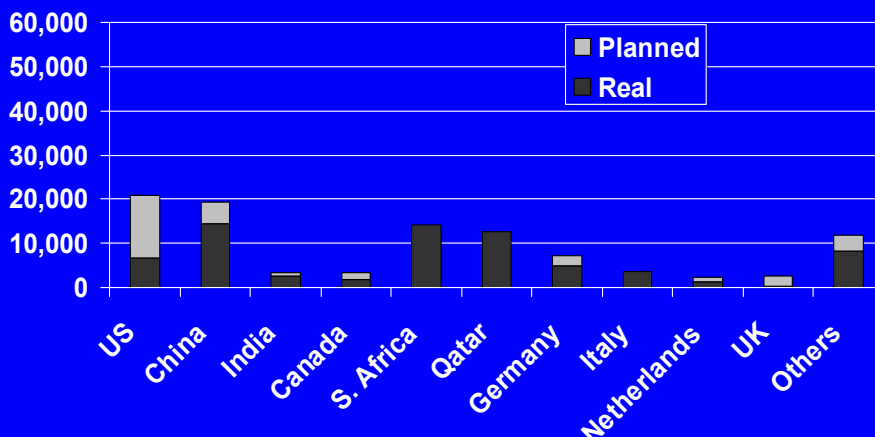
- Over 50 “real” gasification projects in operation or construction with a total capacity of over 14,500 MWt syngas or >20% of world total
- Over 25 gasification projects under development with a total capacity of over 20,000 MWt syngas, many with high probability to become real
- Commercial demonstrations of important gasification improvements
 - World’s highest pressure gasifiers (solids CWS, not oil) – GE gasifiers
 - World’s first use of CO₂ for dry solids fed gasifiers – Shell gasifiers
 - First scale-up to commercial size of both Siemens & U-Gas/SES gasifiers
 - World’s newest commercial scale gasification technology – OMB ICCT

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Gasification by Country

SFA Pacific Probability of Each Planned Project Becoming Real in Jan 2007

MW_{th} syngas



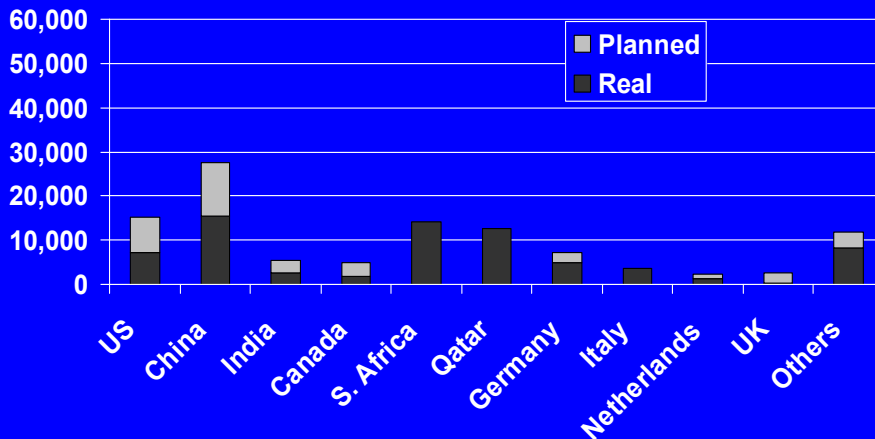
Source: SFA Pacific 2007 client private *Gasification Multisponsored Analysis*

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Gasification by Country

SFA Pacific Probability of Each Planned Project Becoming Real Updated to Oct. 2007

MW_{th} syngas



Source: SFA Pacific modified from its 2007 client private *Gasification Multisponsored Analysis*

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Energy Facts that Help Gasification in China

Annual GDP growth rate of 7-12% per year with electric growth rate about 8-14% per year

Total energy consumption currently at about 70-75 quads per year and growing at about 4-5% per year

High liquid fuel consumption growth at the same time domestic oil production is declining, making China the second largest oil importing nation in the world

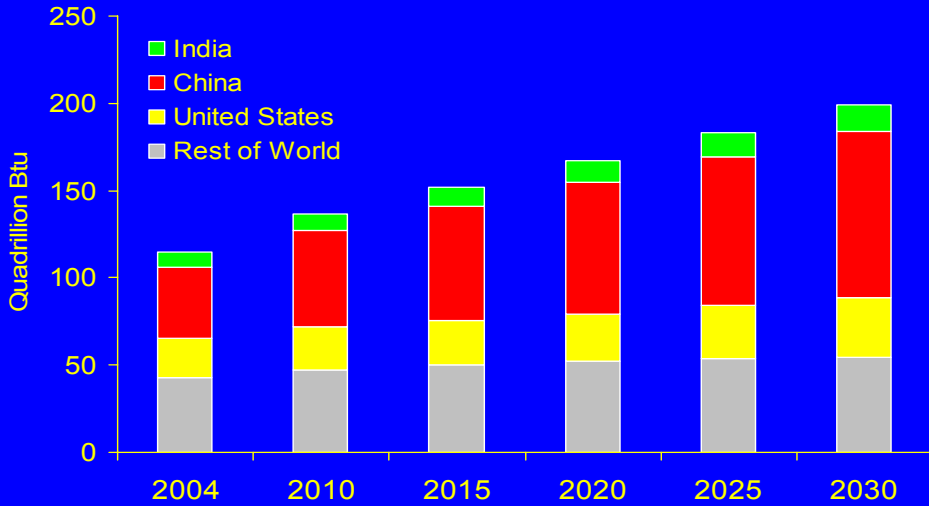
70% of total energy supplied from coal & growing at 4%/yr

- About 40% of this coal is not utilized for central power plants

China surpassing the USA this year to become the world's largest man-made CO₂ emissions nation

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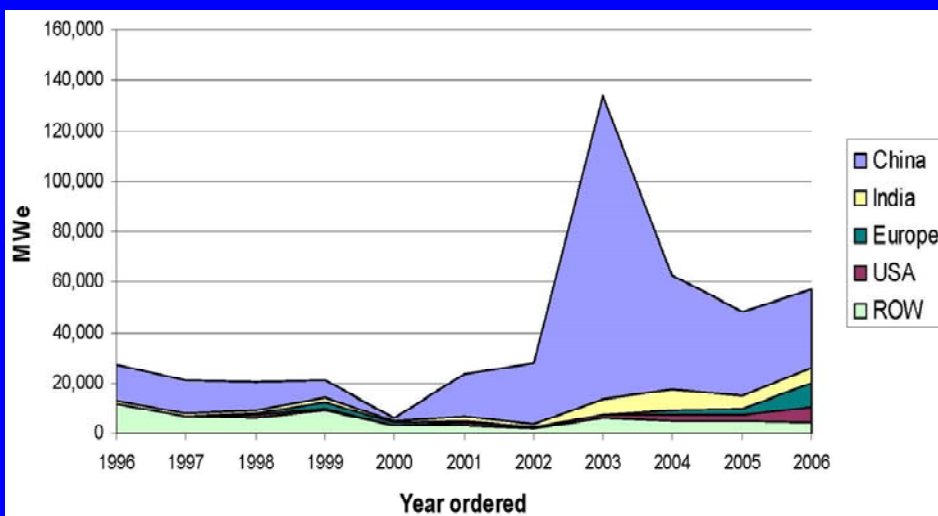
World Coal Consumption Projections



Source: EIA IEO 2007

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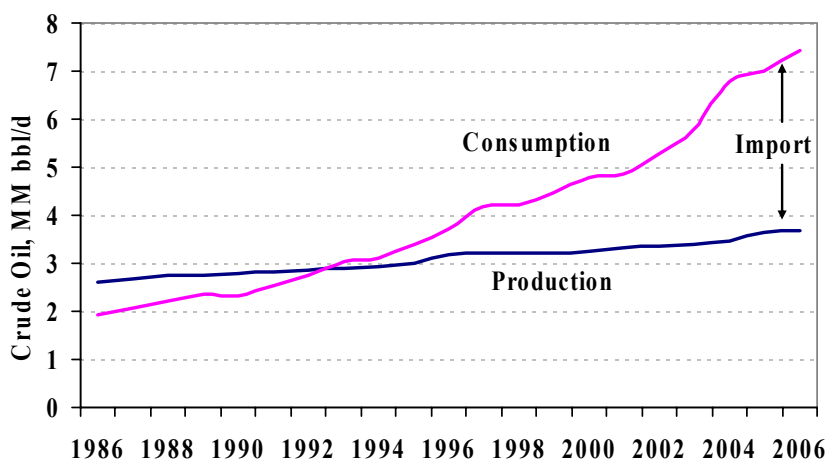
New Boiler (mostly coal) Orders <200 MW



Source: Doosan Babcock Energy

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China's Oil Import Growth



Source: Reference 5 of the SFA Second 2007 Quarterly Report - British Petroleum

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Gasification Applications in China

Current applications

- Ammonia fertilizer to feed over 20% of the world's population
- Methanol for traditional methanol based chemicals
- Hydrogen for oil refinery hydrotreating & hydrocracking
- Hydrogen for direct coal liquefaction

Future applications with much larger market potential

- Methanol for plastics (acetic acid & larger olefins applications) plus 5-10% gasoline blending + MeOH-to-gasoline to replace import oil
- F-T diesel for clean high efficient diesel vehicles to replace import oil
- Polygeneration once policy reforms to enable sales of baseload cogen power into the grid at the fair price relative to half as efficient traditional central coal (PC or IGCC) power

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