

*Huayi - Praxair
Partnership in
Integrated Coal
to Chemical Site*

Oct. 5~6 2008

*Gasification Technology
Conference,
Washington , D.C.*



Huayi Group's Overview

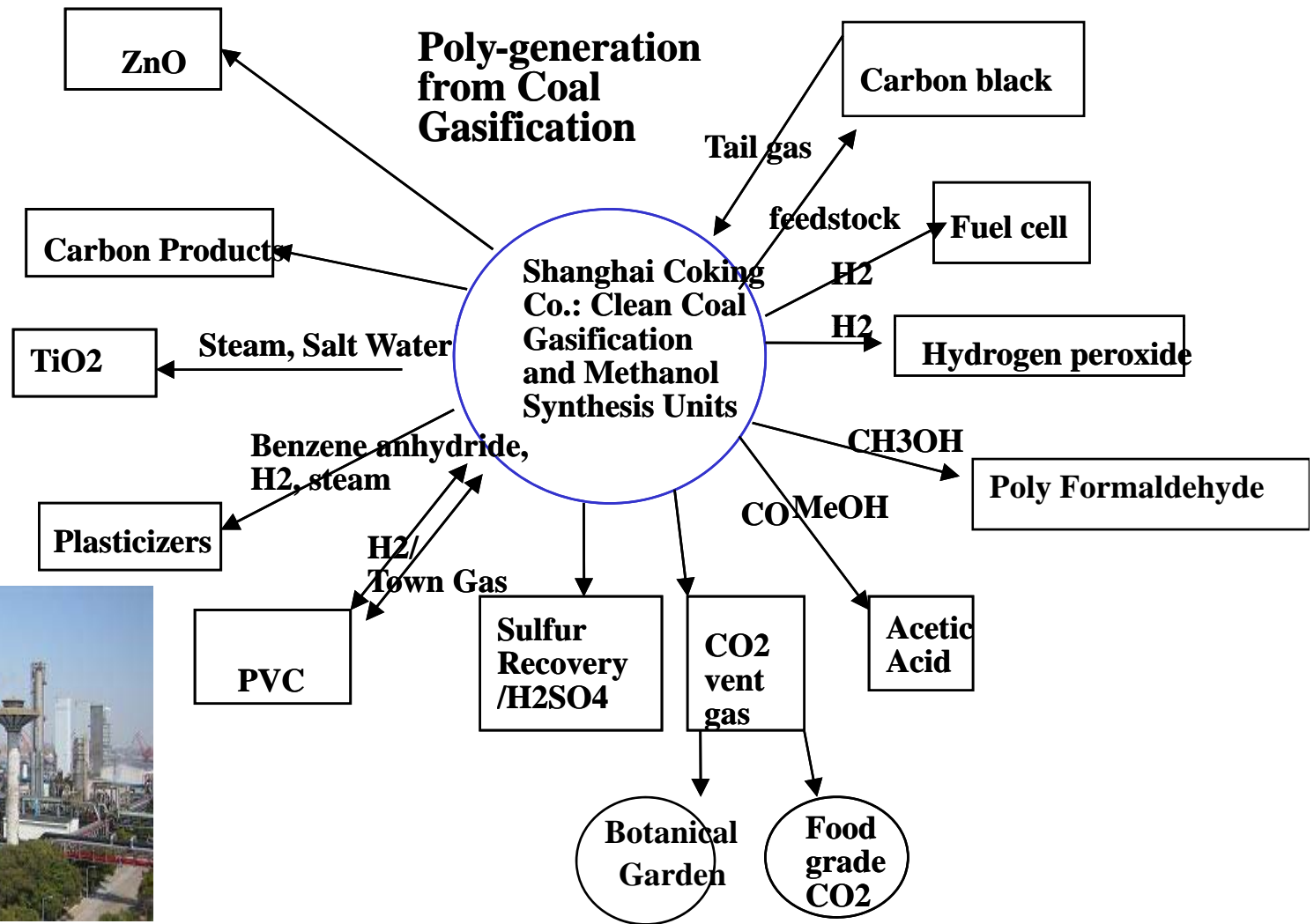
- Large state-owned co., one of the earliest and most successful CTC producers in China , located at Shanghai
- Subsidiary listed in Shanghai stock exchange.
- Assets 5.6 bil\$, employee 45,000, professional technician over 35%.
- Year 2007 Top 2 Chemical Co., No. 145 of Industrial 500 in China .
- Current CTC capacity: Glacial acetic acid 500kt, Methanol 800kt.
- 2007 group sales revenue:4.68bil\$, profit 76mil\$

上海华谊 (集团) 公司主要基地分布图
The Layout of Main Bases of Shanghai Huayi (Group) Company



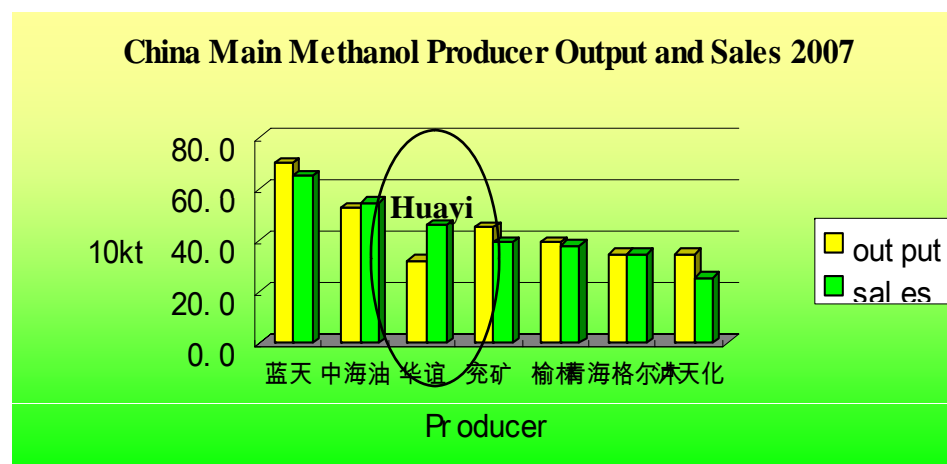
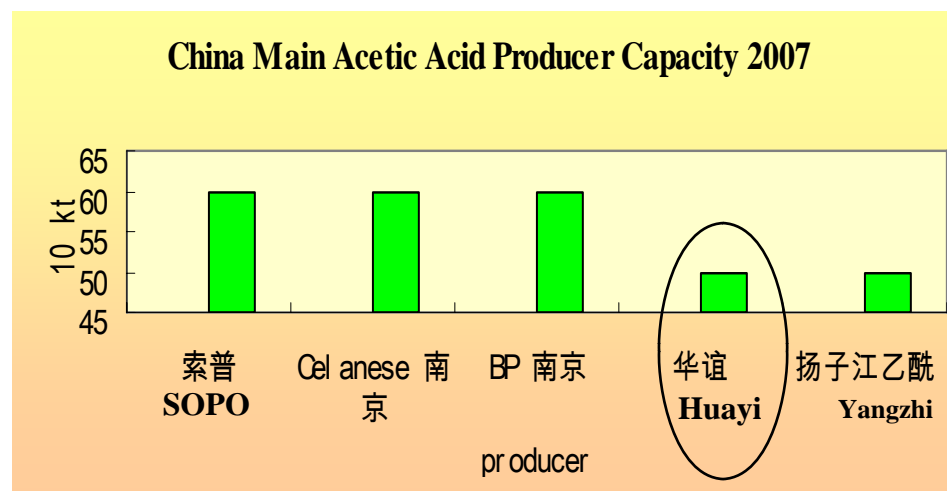
上海华谊 (集团) 公司化工基地 (Industrial Site of Huayi (Group) Company)

Huayi Group's Coal based Poly-generation



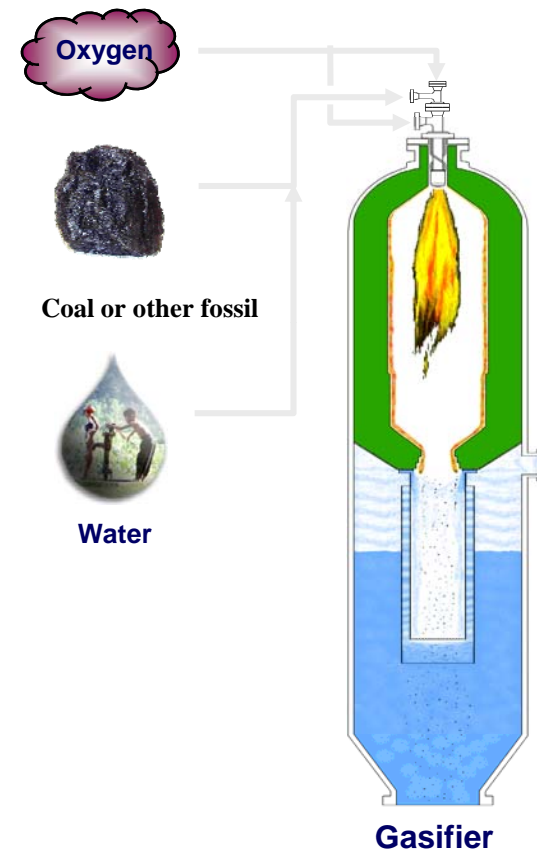
Industrial Competitiveness:

- **Leading position in acetic acid and methanol**
- **Single-plant Acetic Acid output ranked No. 4 in China.**
- **Single-plant methanol output ranked No. 3 in China in 2007 and No. 2 in 2008.**
- **Substantial achievements in gasification operation and innovation**

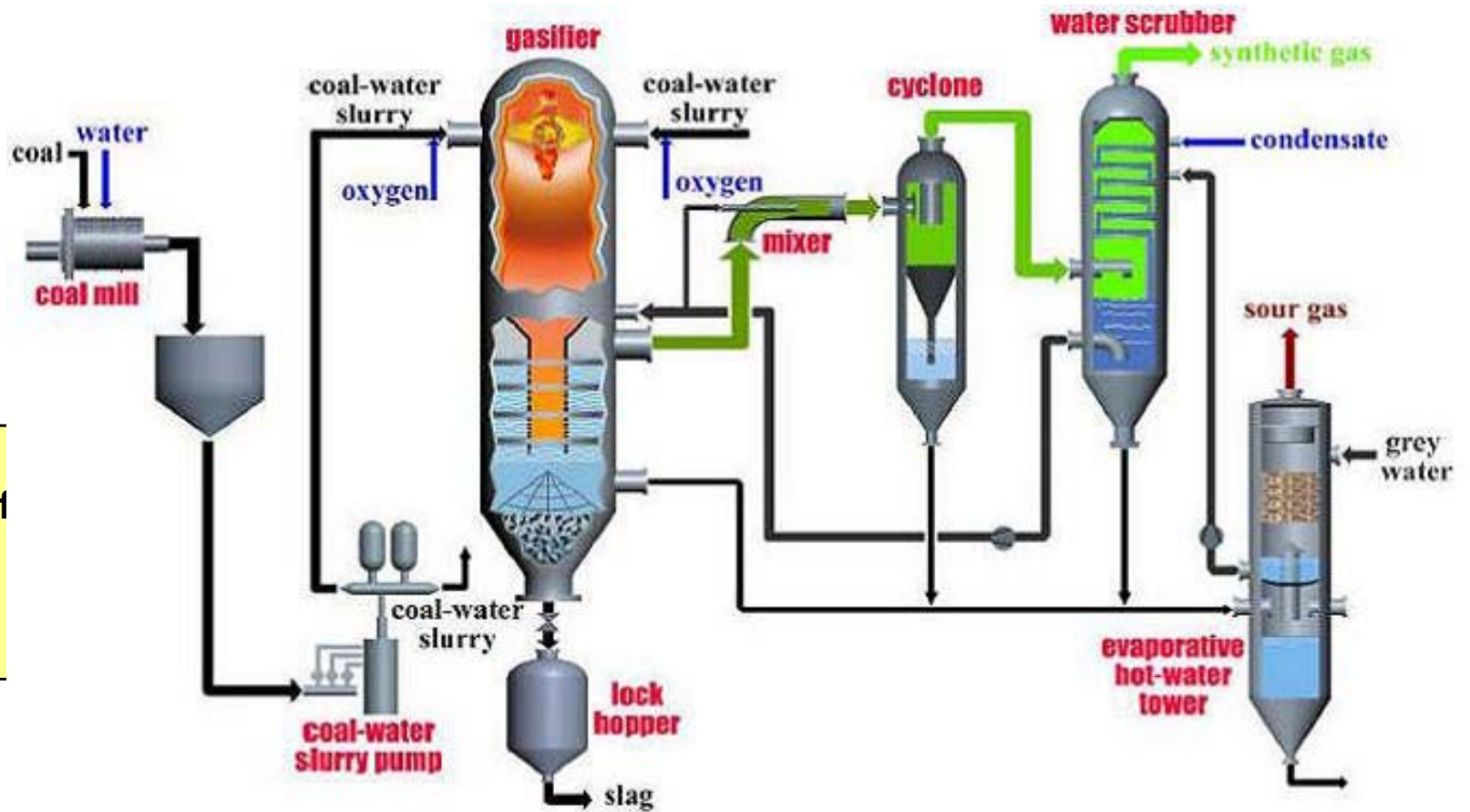


Successful Experience in Gasification by Huayi

- In 1995, first startups of 4X500tpd gasifiers by Texaco at Shanghai Coking, Huayi Group
- The 2nd earliest Coal gasification tech. importer in China
- 200ktpy methanol started up in 1995
- Supply of pipeline CO outside the fence in 1996
- Additional 4X500tpd gasifiers by GE started up in July, 2008
- 3X1500tpd gasifiers by ECUST to be started up at Wuwei, in 2011



Opposed Multi-Burner Gasification Technology:



Verbal discussion of reasons why chosen and comparison



华东理工大学 ECUST

兖矿集团有限公司 Yanquang

Huayi

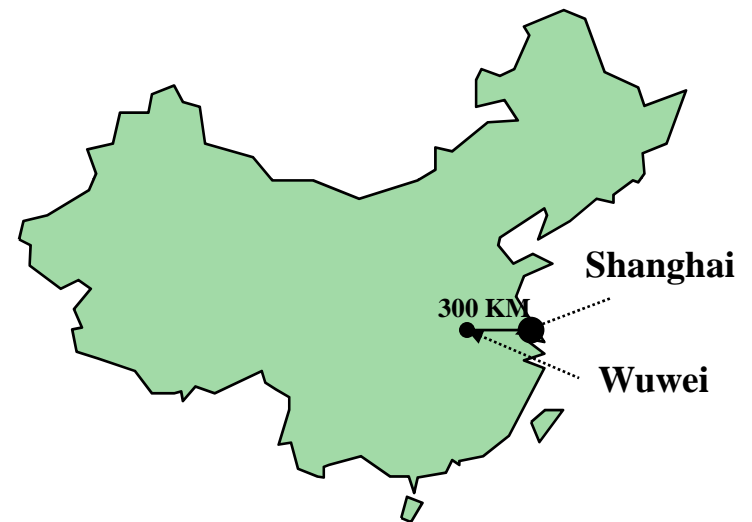
PRAXAIR

Huayi's Strategic View and Objective:

- **Develop safe, environmental friendly and recycling “Green” Production Base located along Yantse River, with Shanghai as the headquarter**
- **Develop core business: coal chemicals and clean energy, polymers and rubbers, fine chemicals, logistics, and biological medicine/ chemicals**
- **Improve CO conversion and reduce CO2 emission**
- **Strengthen and expand business based on low cost feedstock from coal gasification**
- **Integrate production chain from raw material down to processed products**

2008 and Beyond Strategic Planning

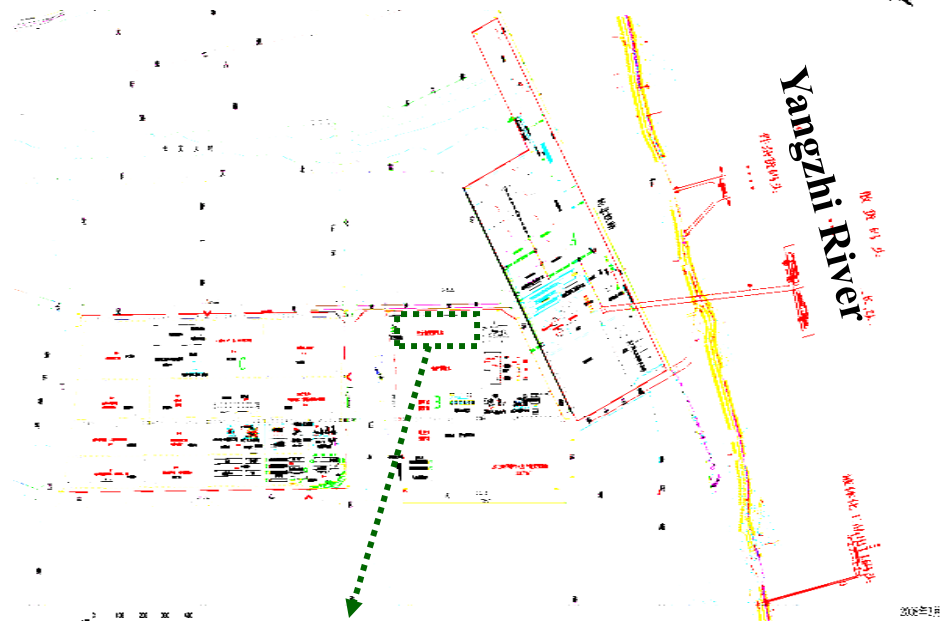
- Using CTC as core business, and expanding main product capacity
- Planned Huayi Coal Chemistry Park of 1.66 km², final over 5 km² in Wuwei, Anhui
- Develop down stream products to balance Acetic acid production, coal to olefins, DME etc.
- Integrate production chain from raw material down to processed products
- Lower cost with Coal as raw material to compete globally.



Coal to Chemical Project in Anhui Wuwei

- At Phase 1, invest 760MM\$, produce methanol 600 ktpy, CO 250 ktpy , acetic acid 500 ktpy, and acetate 300 ktpy
- Adopt coal slurry gasifiers to produce methanol synthetic gas
- Adopt dual tower methanol wash process.
- Strategic partnership, air separation plant supplied by Praxair.
- Adopt 3 patented technologies.
- Phase 2 and 3 will increase methanol to 2.4MM tpy and equivalent downstream processes

Anhui Wuwei Coal to Chemical Site Layout



Air Separation Plant Site

What Praxair will do at Wuwei project

- Invest, design, construct, and operate a T-3000 ASU plant to supply 84,000Nm³/h oxygen, and 30,000 Nm³/h N₂ and 8,000Nm³/h Air to Huayi Wuwei Project for a term of 15 years at Phase 1 to be on stream by Jan. 2011.
- This is the 2nd T-3000 ASU for sale of gas by Praxair in China after Sopo Jiangsu which will be onstream in July of 2009.
- By the completion of Huayi's phase 3 project, there will be 4 to 5 T-3000 size plants to supply over 320,000~400,000Nm³/h oxygen

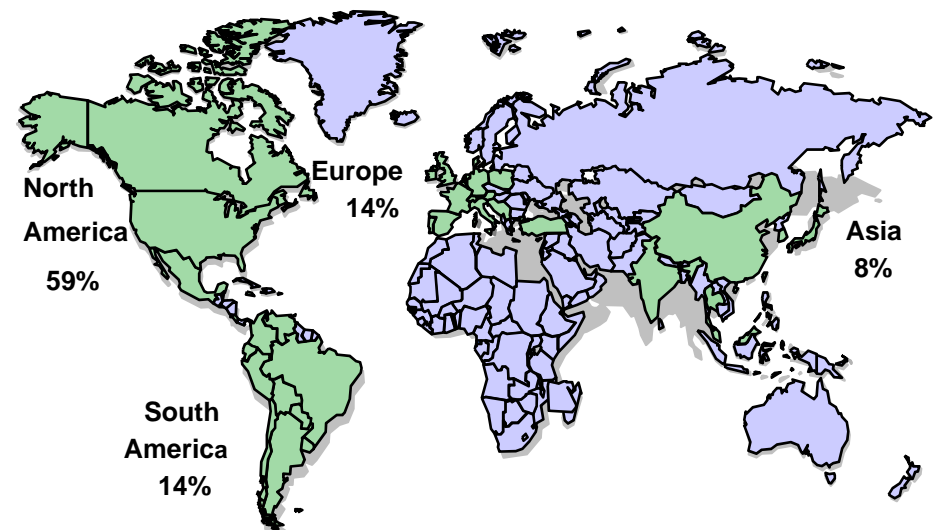


5 Sets of ASU's
5套8万空分布置

Praxair Overview :

- **2007 Sales: \$9.4 billion, among top three gases companies in the world**
- **Chemicals and Energy is a Strategic Segment (23% of total sales)**
- **100 years of air separation experience**
- **Voted one of the most admired chemical companies in the world**
- **3,000 active patents**
- **China is a Strategic Focus**

Industrial Gases Sales by Region



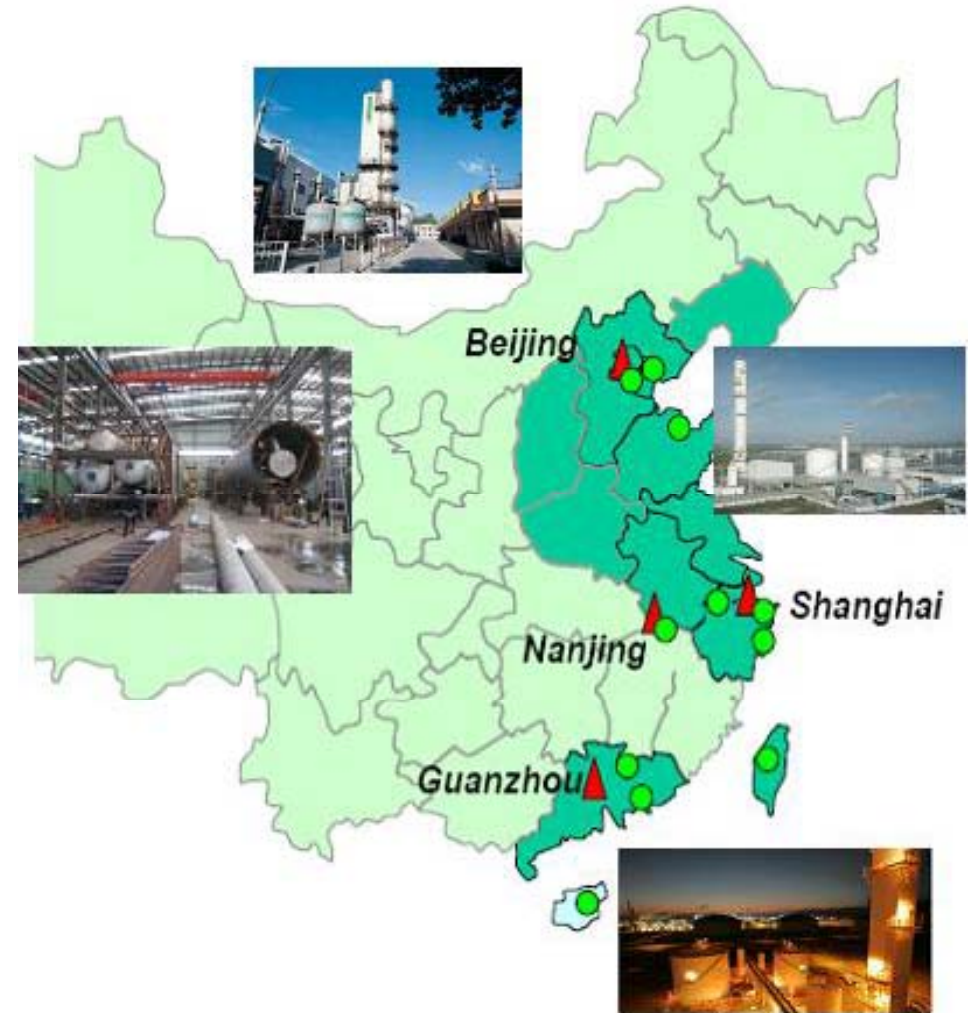
Gasification Project & Operations Experience

- **Houston, Texas – Shell, Pipeline supply**
- **Wilmington, California - Texaco, 800 TPD**
- **Texas City, Texas -Dow, 600 TPD**
- **Texas City, Texas - Praxair/Sterling, Pipeline supply**
- **API Refinery, Falconara, Italy, 2000 TPD**
- **Texaco, El Dorado, Kansas (Gas Turbine Integration), 200 TPD**
- **Star Refinery - Delaware, USA, 2900 TPD**
- **SOPo, Zhenjiang, China 3300 TPD (in construction)**
- **Huayi Group, Anhui, China 3300TPD (in construction)**
- **North West Upgrading, Alberta, Canada, 1700 TPD**



Praxair In China

- \$600MM investment by 2007
- 25 entities, 20+ locations
- Over \$300MM sales in 2007
- >1200 employees
- China and Asia HQ's in Shanghai
- Regional Engineering and R&D Centers in Shanghai
- Fabrication in China
- Pipeline Complex
 - Beijing (1st in China)
 - Shanghai (SCIP)
 - BASF, BP, Sinopec, Bayer, Huntsman
 - Daya Bay, Cnooc-Shell



Air Separation Plant Technologies

- **Key technology**

- **Integrated supply systems**
- **Model Predictive Control (MPC) Systems**
- **Turndown efficiency**
- **Unattended operation for many of our facilities**
- **Hi Flux Tubes for Oxygen boilers.**



- **High Capacity Packing**



- **Key customer benefits**

- **Lower power consumption**
- **Lower product costs**
- **Lower site preparation**
- **Enhanced Reliability**
- **Increased Safety**

Strategic partnership between Huayi and Praxair

- **Alliance of Leaders, leverage respective advantages**
- **Praxair Advantages**
 - **Reliable technology,**
 - **Extensive operation experience**
 - **Quick response**
 - **Customer focus**
- **Invest capital on respective core processes**
- **Win-Win situation**

Current Project Execution Status

- **ASU Orders placed for equipment with long lead time in May 2008**
- **MEI for gasifiers and utility to be completed by Oct. 2010**
- **Mechanical completion for methanol facility by Dec., 2010 and Test-run by Jan. 2011**
- **Cold box, CO compressor to be completed by Dec. of 2010**
- **Mechanical completion for ASU by the end of 2010, and test run in Jan. of 2011,**
- **On stream in Feb. of 2011 expected.**

**Graphic
timeline**

Summary

- **Coal Gasification Technology is reality in China with wide applications**
- **State of the art Integrated acetic acid and methanol production based on feedstock from coal gasification competes cost effectively globally**
- **Methanol from coal gasification is an important product for**
 - **As a transportation fuel or fuel addition, pending issuance of national standards**
 - **As the building block for downstream chemicals including olefin**
- **Chinese Fabrication with world class technology and QA provides best of the both worlds**
- **Partnership of Huayi and Praxair will be long and prosperous on the world stage**



Thank You.