

# Coal to Chemicals Industry In China

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At Woodrow Wilson International Center for Scholars

# Background

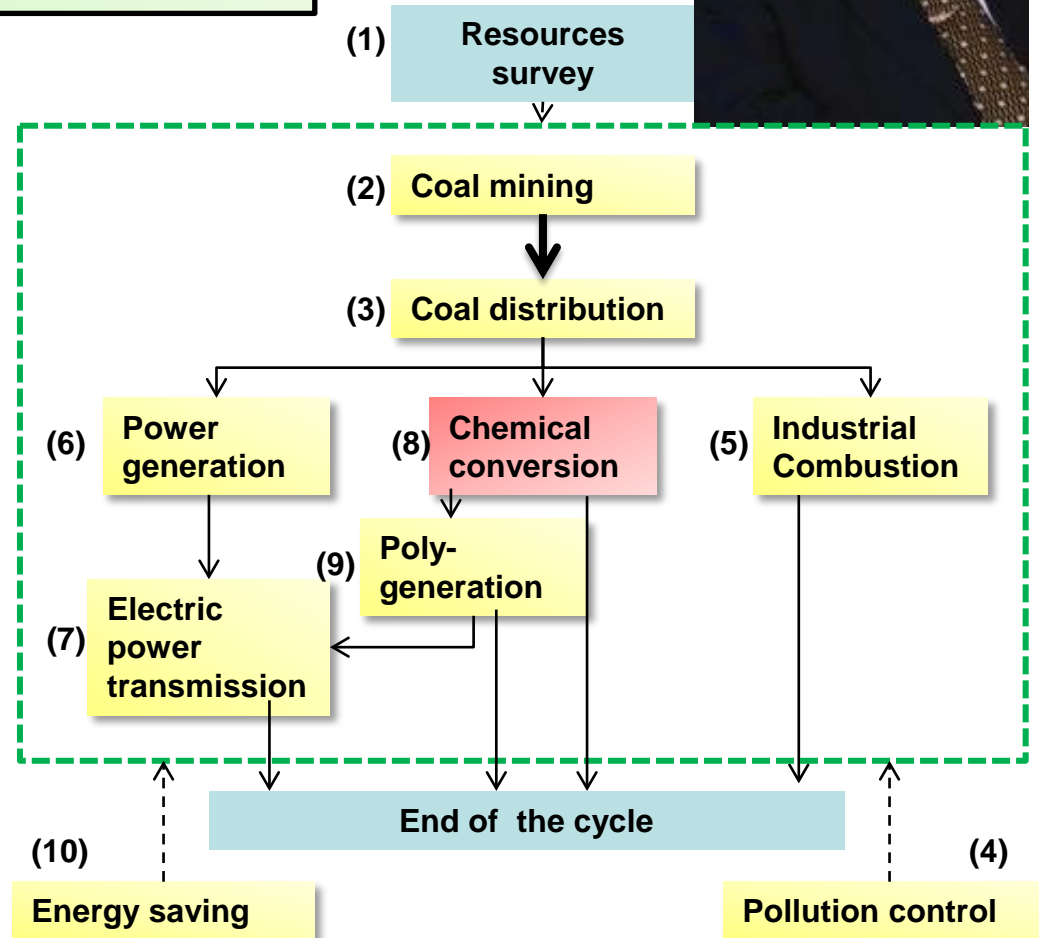


Launched by the Chinese Academy of Engineering in cooperation with the Shenhua Group.(2011.1-2012.6),

Project leader: Prof. Kechang Xie

Clean, High-efficiency and Sustainable Exploration and Utilization of Chinese Coal

- 1 Coal and water resources
  - 2 Safe, high-efficiency and green coal mining technology
  - 3 Coal upgrading technology and distribution
  - 4 Pollution control and purification technologies
  - 5 New clean coal combustion technology
  - 6 Advanced coal-fired power generation technology
  - 7 Transmission of electric power
  - 8 Clean and high-efficiency coal conversion
  - 9 Poly-generation technology
  - 10 Energy saving technologies in coal exploration & utilization
- Composite group



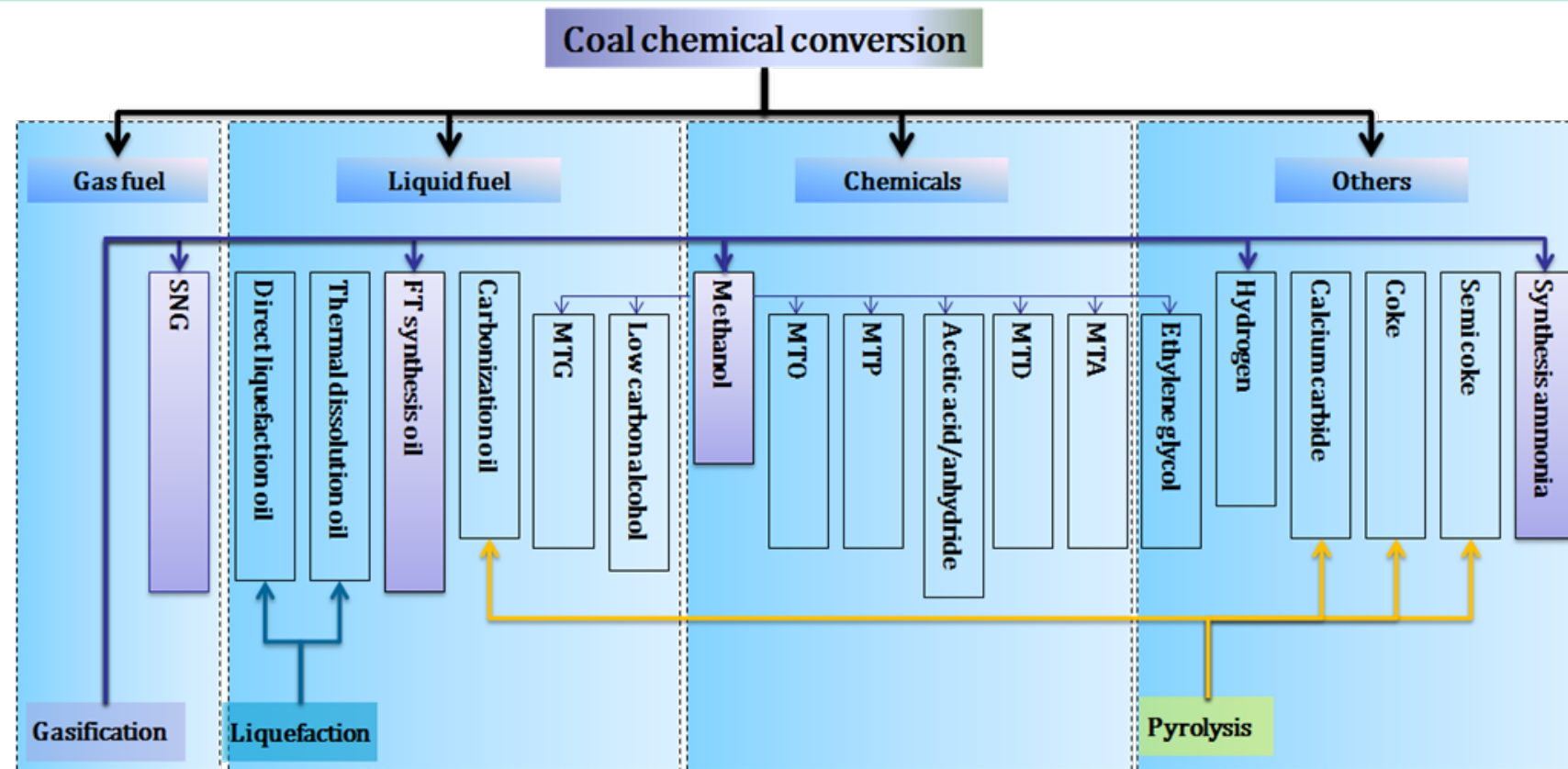
The whole chain of coal utilization industry is covered

ny.com

NICE leads the 8<sup>th</sup> project



# Production line



20 COAL-BASED PRODUCT  
REPORTS



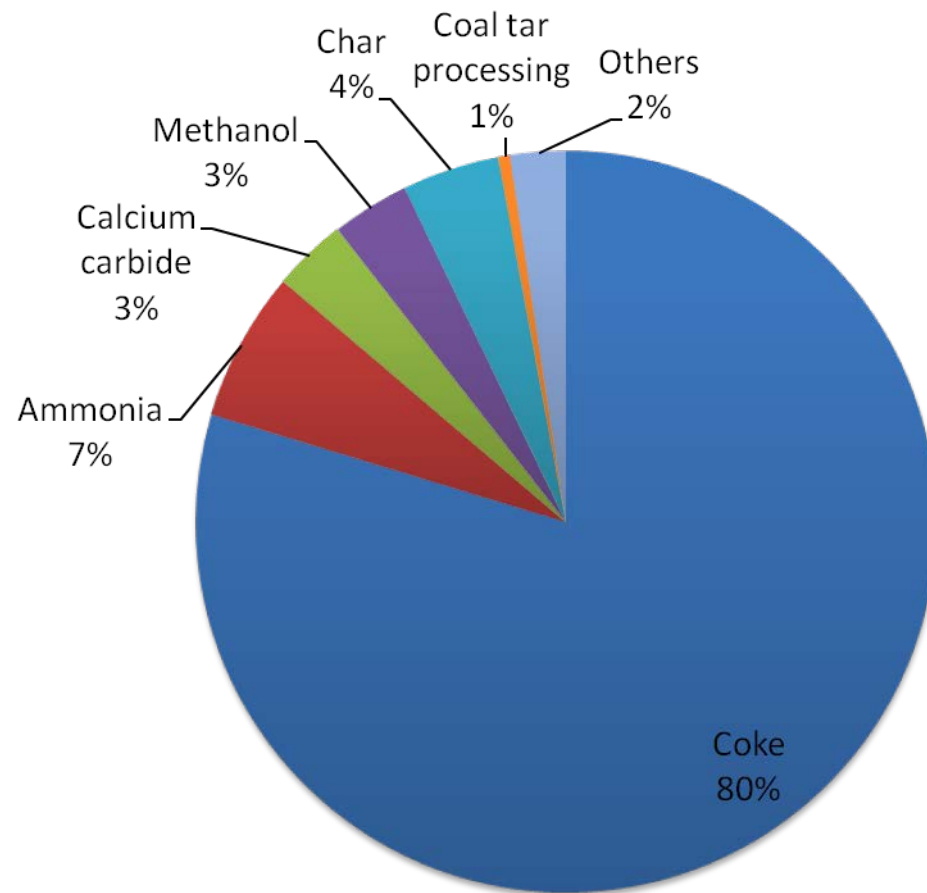
ONE INVESTIGATION  
REPORT



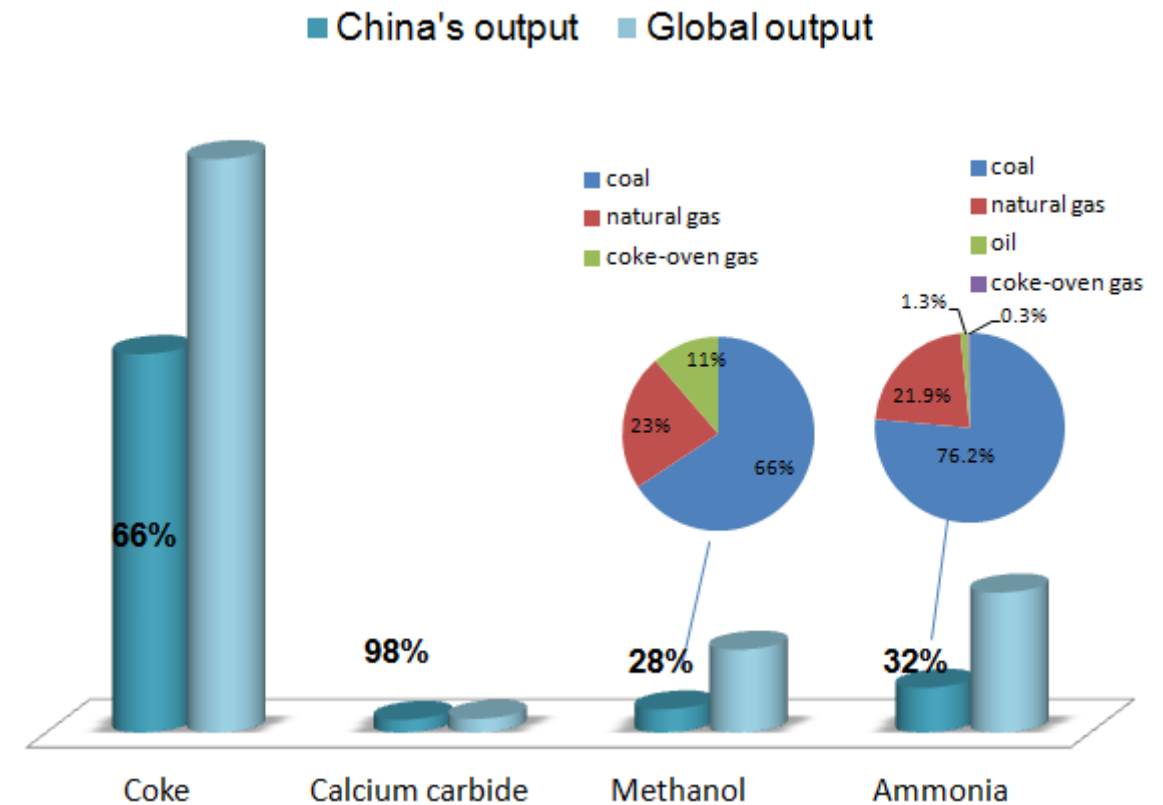
# Production Capacity



## Product proportion in 2010



## China's output in 2010







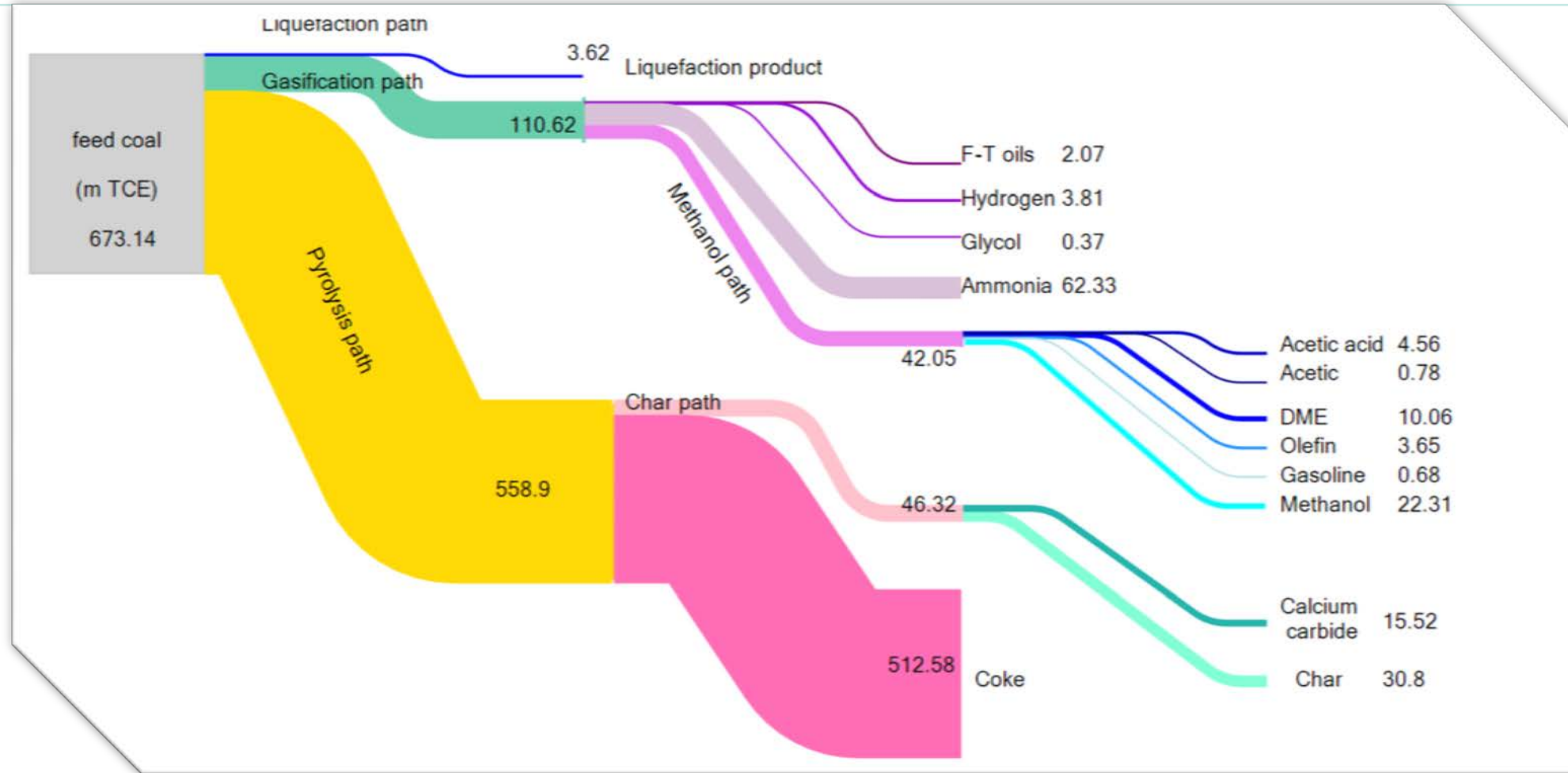
# Production Situation



Products		Capacity (million tons)	Output (million tons)
1	Coke	592.16	388.64
2	Ammonia	46.12	37.82
3	Char	31.55	20.00
4	Methanol	25.22	10.21
5	Calcium carbide	24.00	14.62
6	Liquefaction	1.08	—
7	F-T oils	0.50	—
8	MTG	0.10	—
9	DME	7.26	2.90
10, 11	MTO/P	0.60	—
12	Acetic acid	6.70	3.84
13	Acetic	0.76	—
14	Hydrogen	0.50	—
15	Glycol	0.20	—
16	Coal tar processing	4.00	2.00
17	Alcohol ether fuel	—	3.00 (Methanol)
18	MTA	—	—
19	SNG	—	—

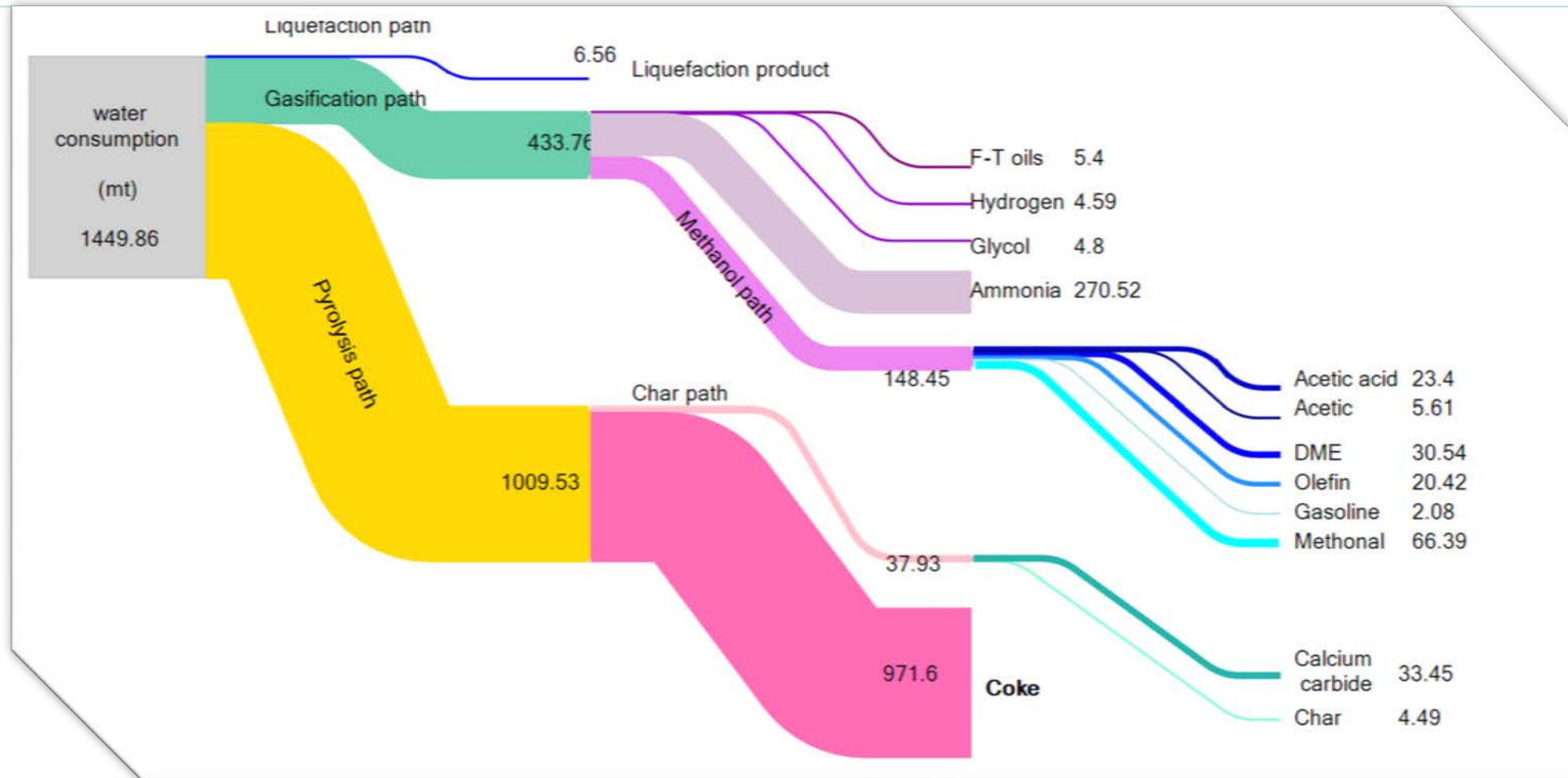


# Coal Consumption In Coal Conversion Industry



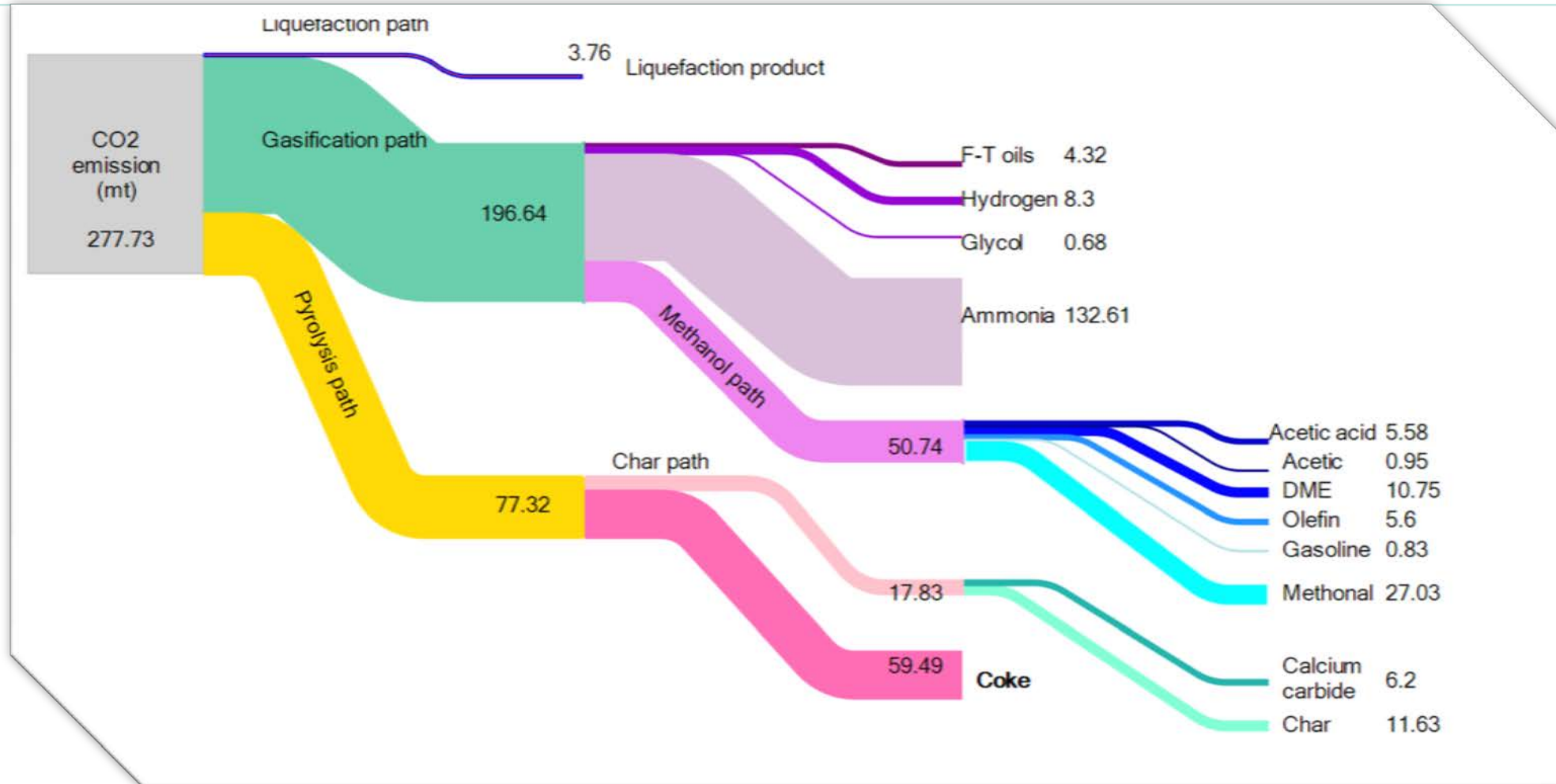
- ◆ ~ 673 million ton coal was consumed in 2010 to produce chemicals , about 21% of total coal production of China
- ◆ ~ 83% is converted via cokers.
- ◆ In gasification path, most of coal is used to produce methanol & ammonia

# Water Consumption In Coal Conversion Industry



- ◆ ~1.5 billion m3 fresh water is consumed in 2010
- ◆ About 1.0% of the total fresh water consumed by industry
- ◆ Coke production used 67% fresh water

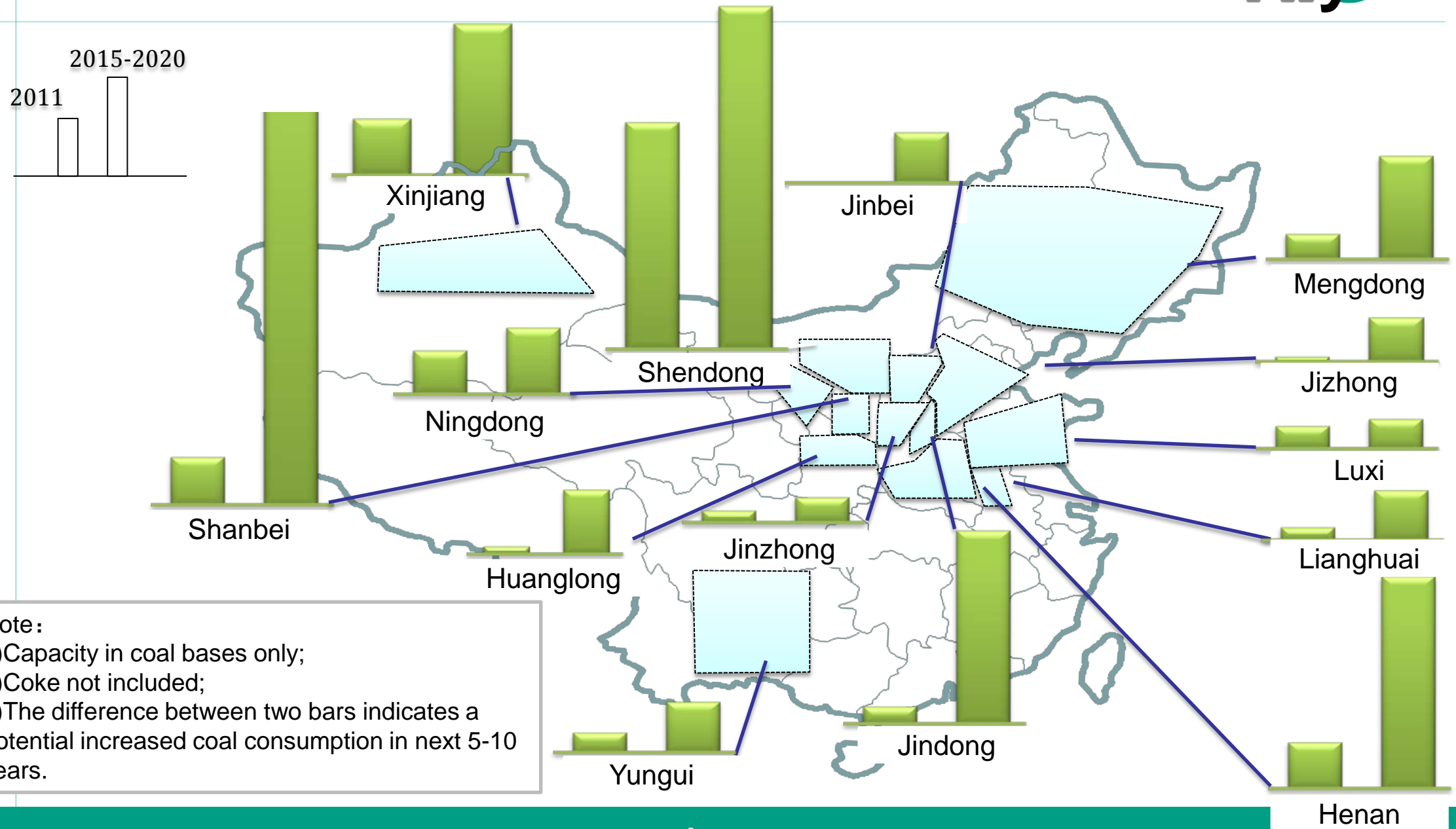
# CO<sub>2</sub> emission In Coal Conversion Industry



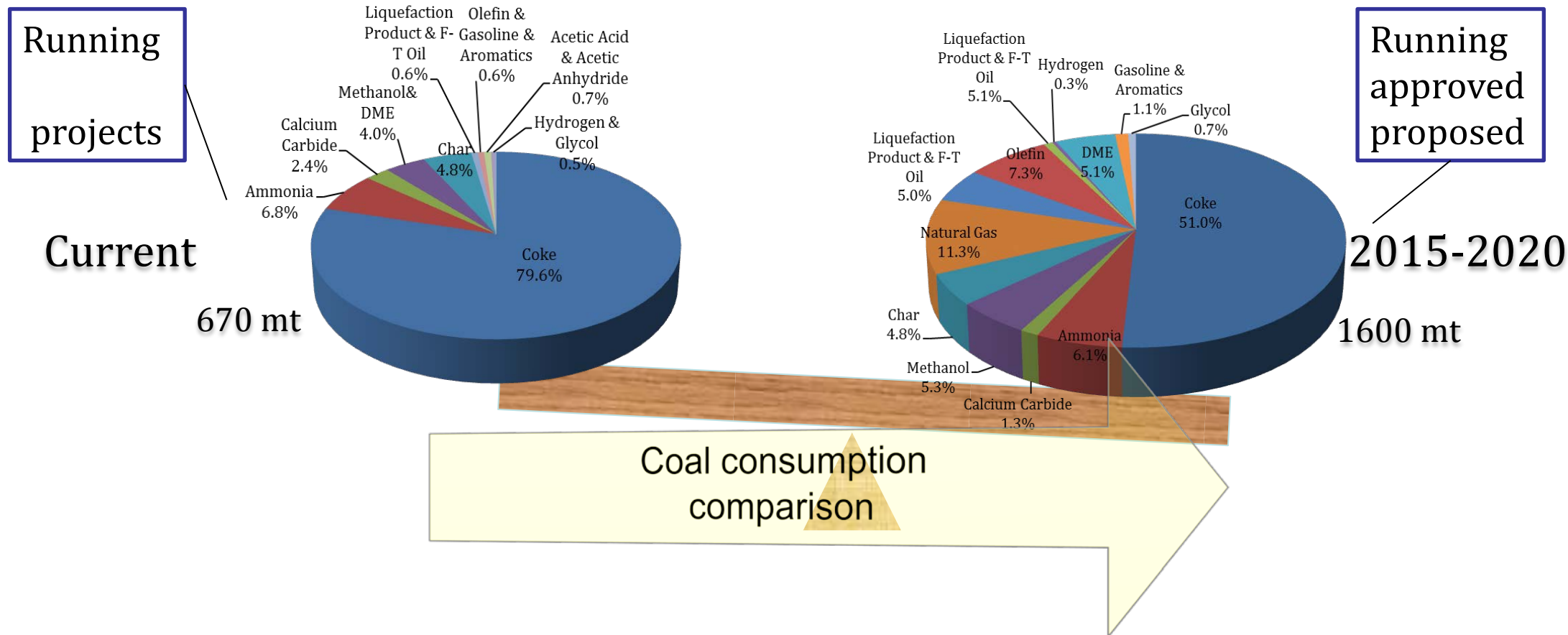
- ◆ About 277 million ton CO<sub>2</sub> was emitted in 2010,
- ◆ 3.6% of the total carbon emission of China
- ◆ 70% is from gasification path



# Potential of Coal Conversion Industry

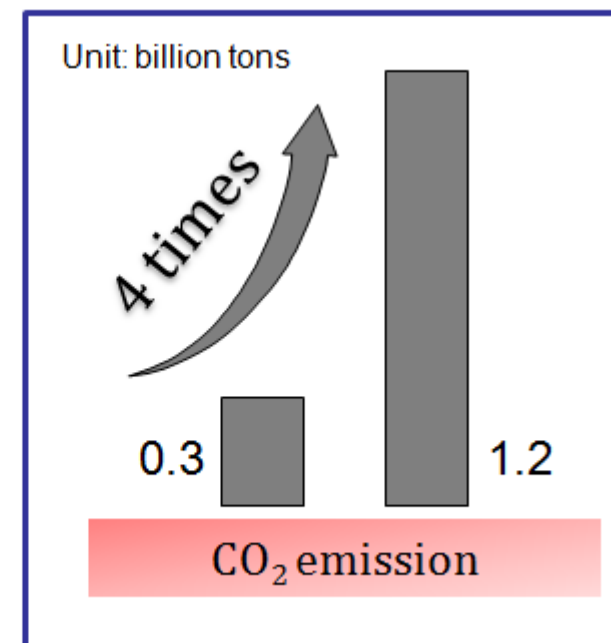
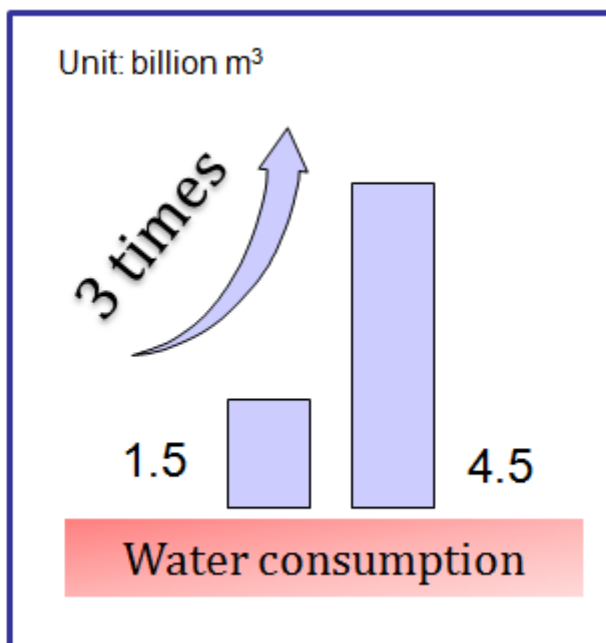
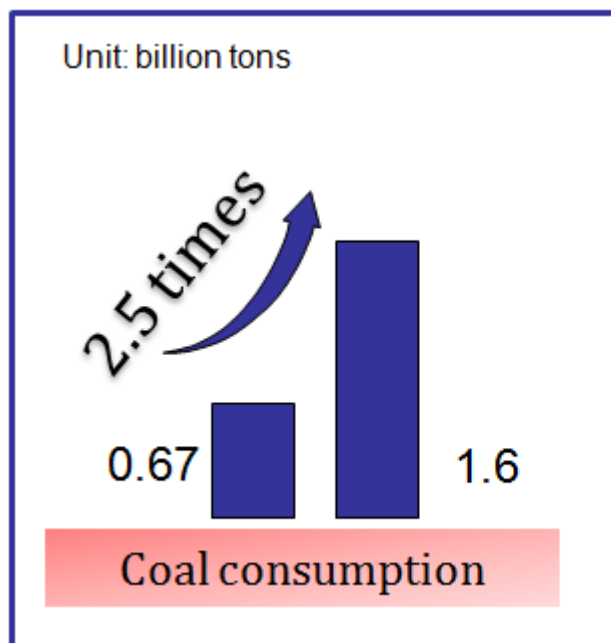
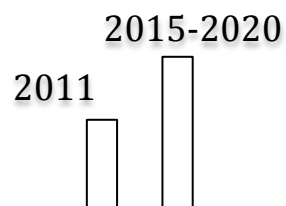


# Trend of Coal Conversion Industry



- Portion for coal to coke, ammonia & CaC<sub>2</sub> reducing
- Coexist of coke, ammonia & other chemicals will last for years

# Challenges of Coal Conversion Industry



## Future challenges:

- More resources would be consumed,
- More impacts on environment would be caused



# Sustainable Development Strategy **niE**

## Key technologies suggested

- ✓ Advanced coal chemical process and technology
- ✓ Advanced high-efficiency catalysis technology
- ✓ Material and Manufacture technology for super-large and specific equipment domestically
- ✓ Advanced energy-saving technology
- ✓ CCUS technology of the CO<sub>2</sub> produced in coal chemical processes
- ✓ **Advanced water-saving technology**
- ✓ Reuse technology of the wastes discharged by coal chemical industry





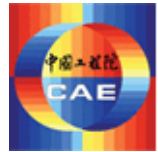
# SWOT Analysis on Coal Conversion Industry

- ✓ The **shale gas** in China and rest of the world & its impact on coal conversion industry
- ✓ **Impact of the lower cost chemicals (LNG, methanol, C2, C3) from Middle-East, and from NG condensate in North America**
- ✓ Impact of **carbon taxi** on coal conversion industry.

- ✓ **The roadmap** of coal conversion industry
- ✓ The **super-large national coal conversion industrial demo park** around coal production arena
- ✓ Develop the novel **technologies of energy-saving, water-saving technologies**
- ✓ The **national clean production standards**, assessment system.

- ✓ **Launch the multi-billion dollar national key project on coal** for the fundamental understanding of coal science(esp. low rank coal). Develop innovative technology & people.

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