



Prepared for
SINOPEC S-MTO Workshop

Sinopec R&D and Technology Licensing Business

China Petrochemical Technology Co., Ltd.
July 18, 2016





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Sinopec Core Business

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The core businesses cover oil & gas exploration and production, refining, chemical production, oil products sales and distribution.



Oil & Gas exploration and production



Refining



Chemical production

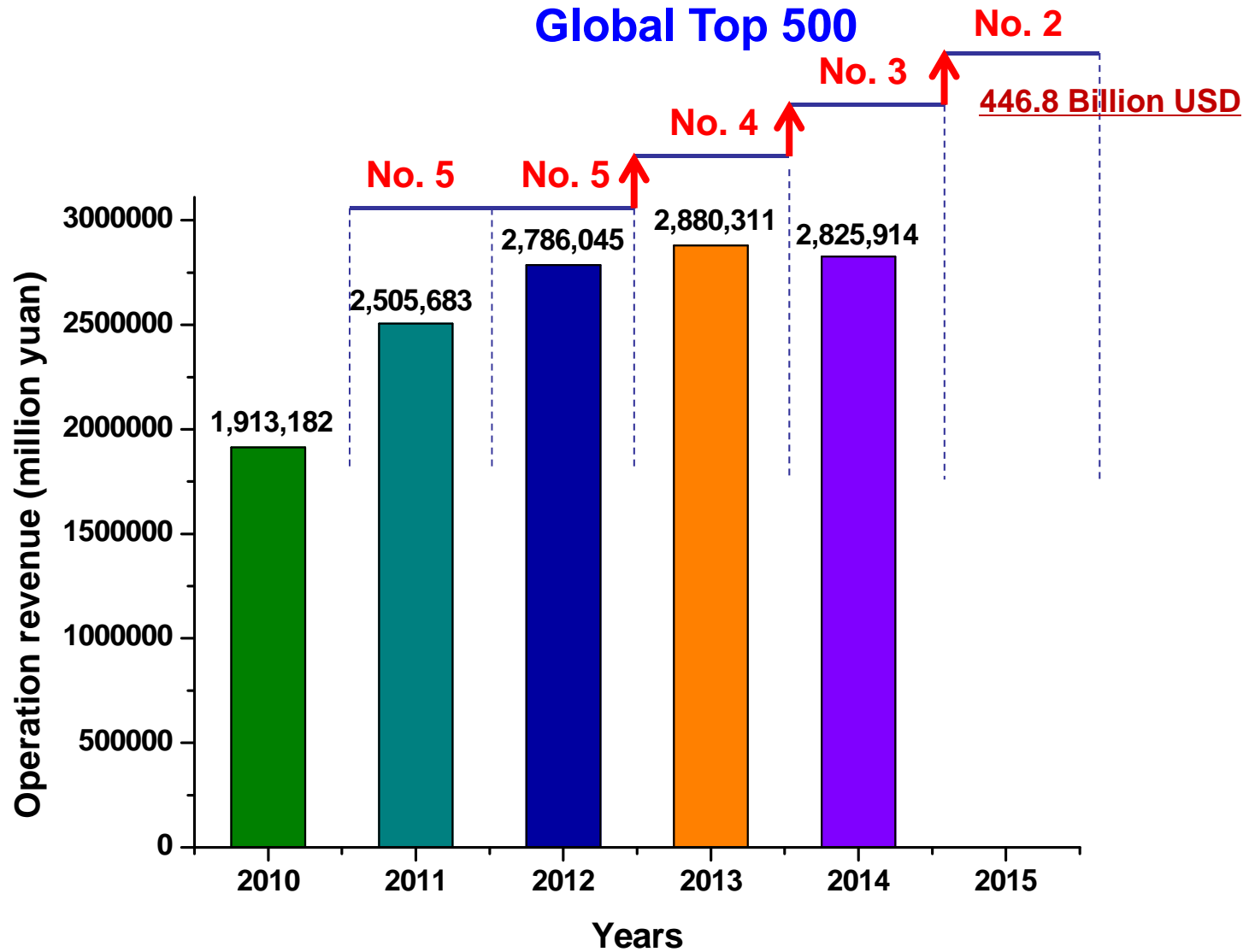


Products sales and distribution



Revenue & Ranking

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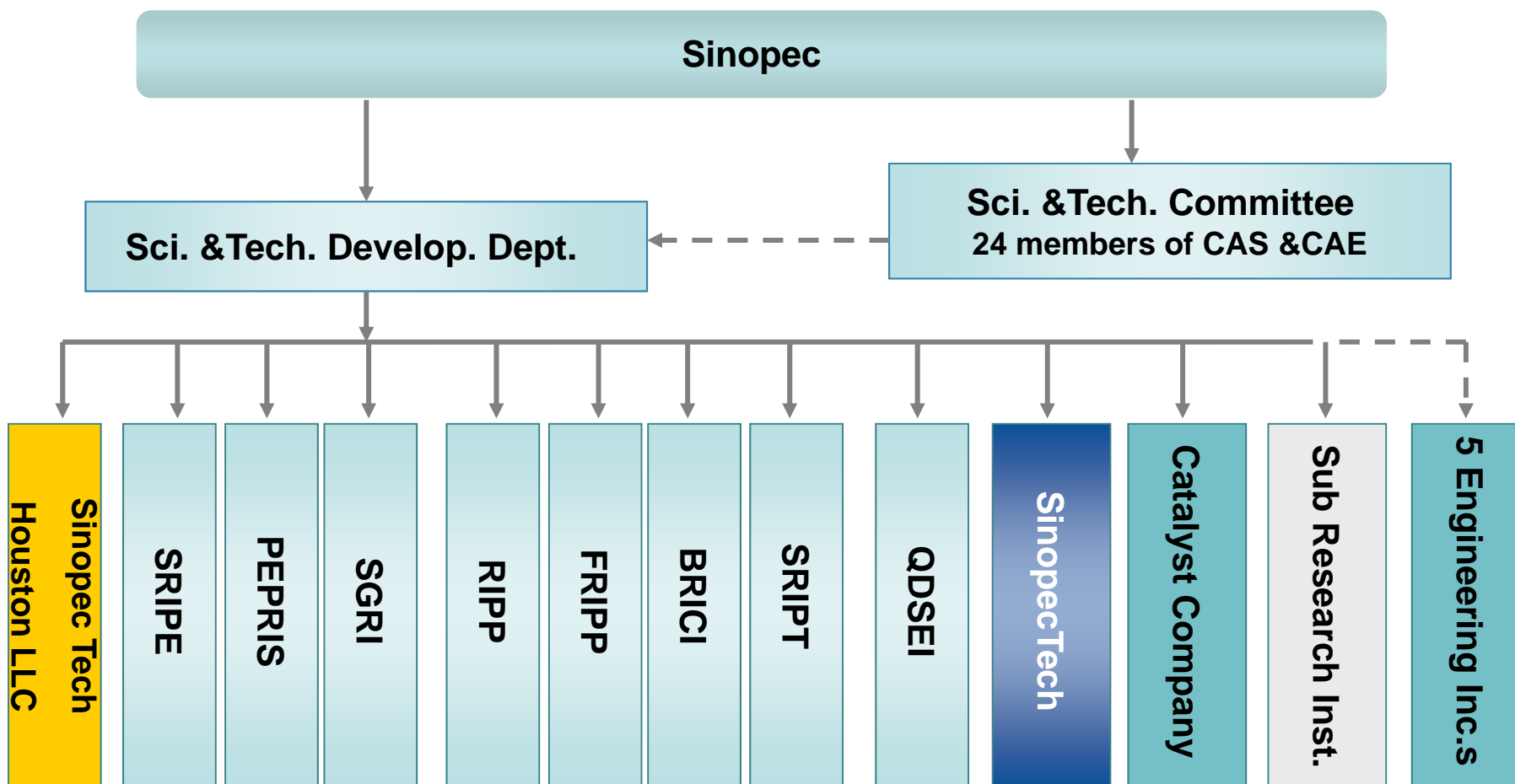
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Sinopec R&D Framework

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Sinopec R&D Capability

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- Sinopec has established a complete system for technology development, intellectual property management and has strong capability in R&D.
- 9 Research Institutes are devoted to R&D.



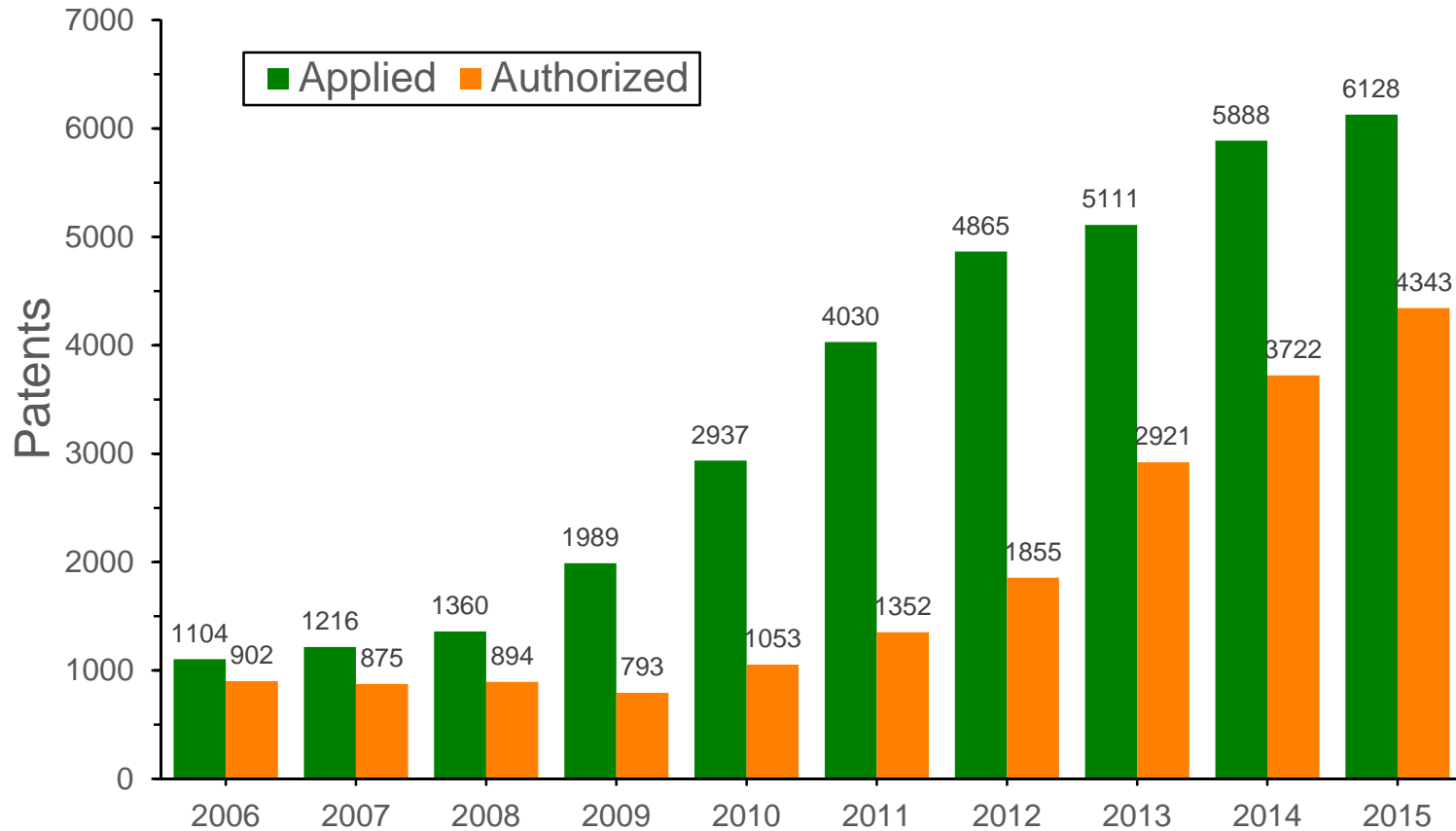
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Patents of Sinopec

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250 patents applied and 204 patents authorized overseas in 2015

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Sinopec Refining Technologies

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- ❑ Sinopec provides multi-technical package solutions targeted for fuel oriented, fuel & lube oil oriented or petrochemical feedstock oriented refineries with a maximum processing capacity of **15 MMTA** of a single train.
- ❑ The specifications of the oil products meet the requirements of **EURO V**.

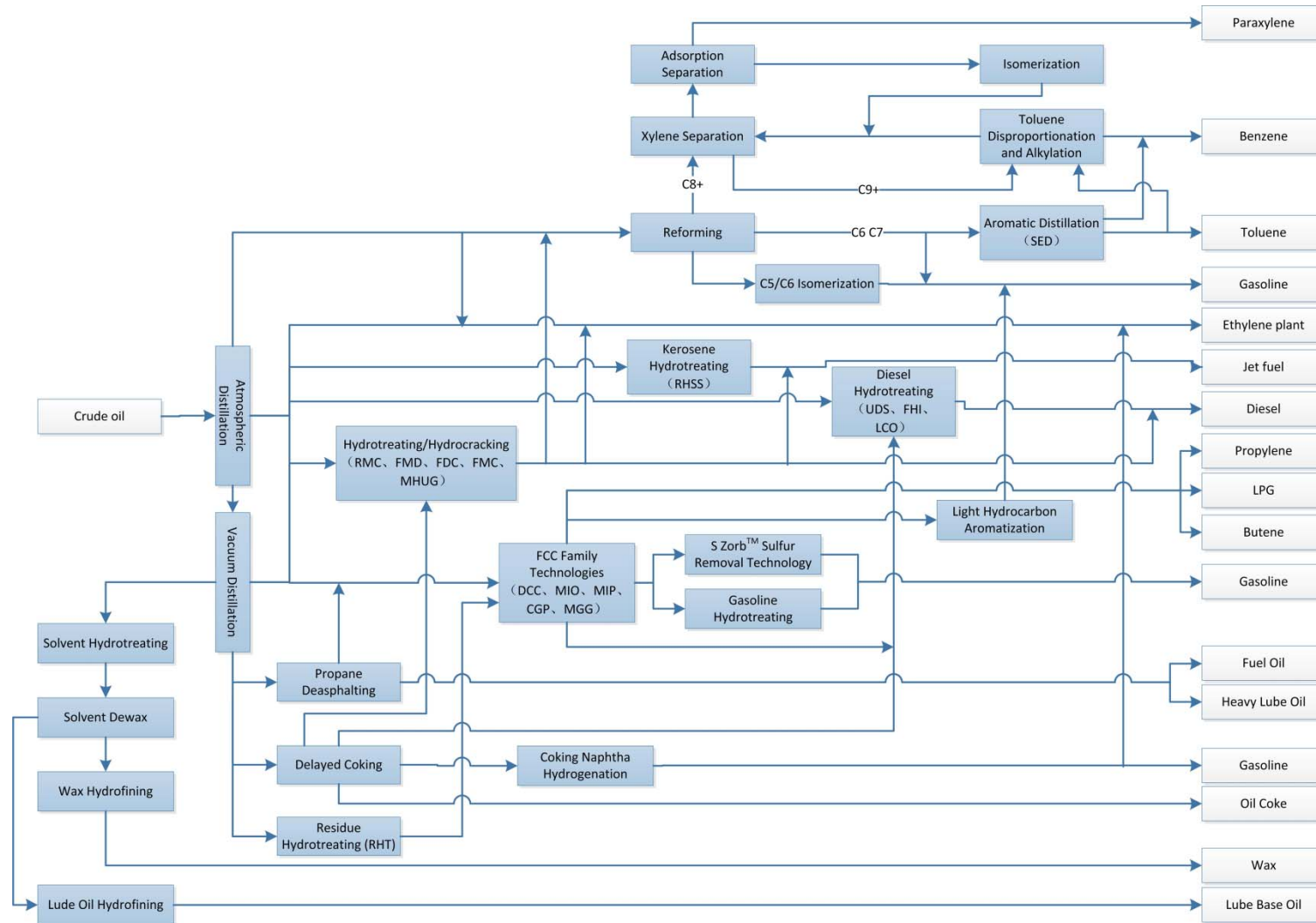


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Sinopec Refining Technologies

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Sinopec Petrochemical Technologies

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- ❑ Sinopec holds a series of **petrochemical and coal chemical technologies** with the example of ethylene technology widely used in the industry.
- ❑ Feedstock of Steam Cracking Furnace can be from **gas to heavy hydrogenation tail oil**. The capacity of a single set of ethylene plant can reach **one million tons/year**.



Tianjin 1 MMTA Ethylene



Zhenhai 1 MMTA Ethylene



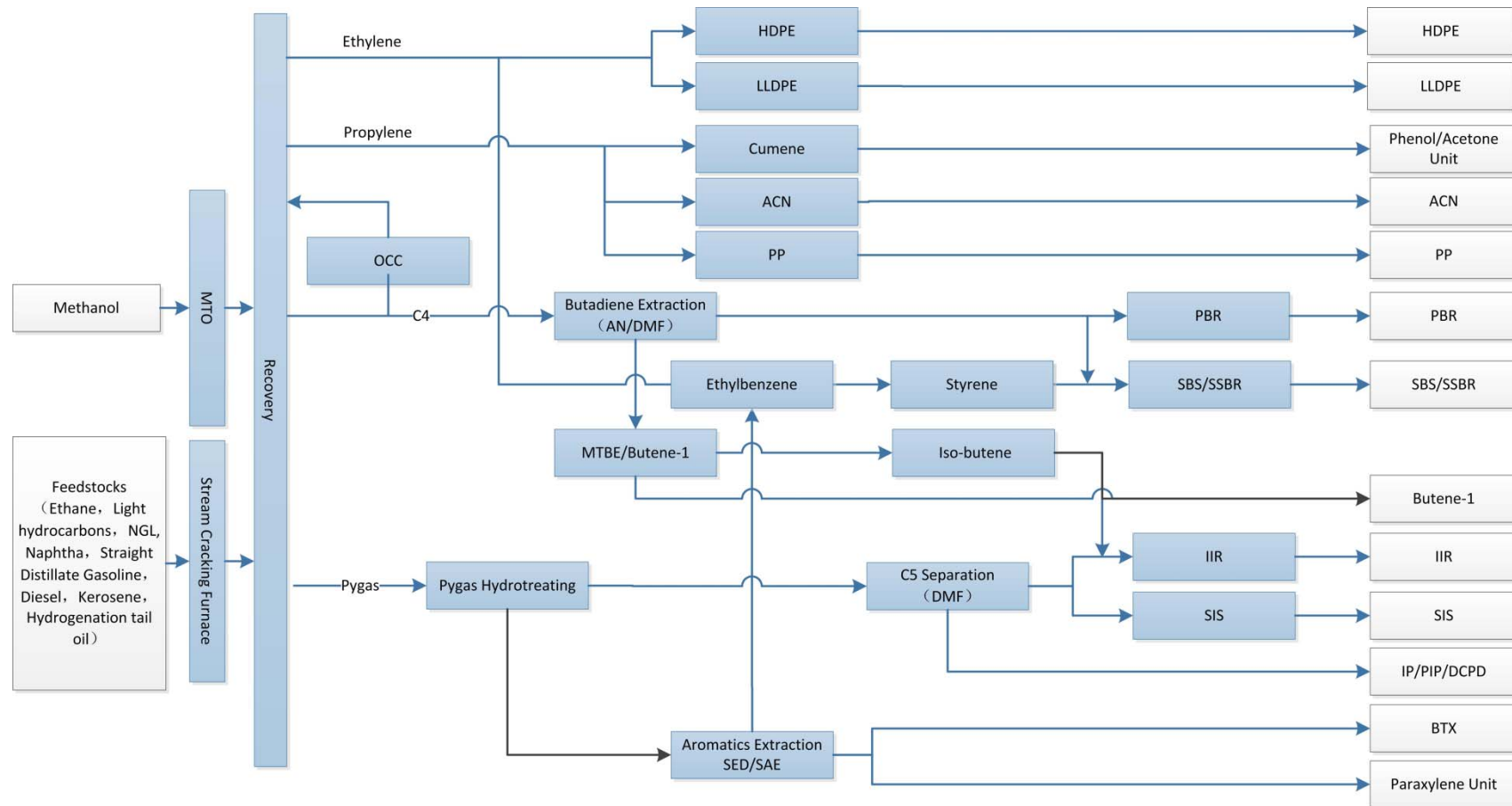
Wuhan 0.8 MMTA Ethylene

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Sinopec Petrochemical Technologies

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Sinopec Petrochemical Technologies

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Petrochemical and Coal-chemical Technology List

No.	Technology Type	Process
1	Ethylene/Propylene Technologies	CBL Furnace Technology
2		Intensify Heat Transfer Technology for Cracking Furnace — Swirling Element of Radiant Tube (SERT)
3		Ethylene Recovery Technology (LECT & ART)
4		Tail-end Selective Hydrogenation Technology for Removal of Acetylene in C2 Fraction
5		Technology of Refinery Off-gas Recovery by Shallow Cold Oil Absorption (COAT)
6		Catalytic Cracking of C4 Olefin to Propylene and Ethylene Technology (OCC)
7		Pyrolysis Gasoline Hydrogenation Technology (PGH)
8	Polyolefin Technologies	Gas-Phase Polyethylene Production Technology (SGPE)
9		Continuous Prepolymerization Technology for Gas-Phase Polymerization of Propylene
10		Loop Reactor Polypropylene Process (ST-PP)



Sinopec Petrochemical Technologies

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Petrochemical and Coal-chemical Technology List

No.	Technology Type	Process
11	Aromatics Technologies	Sufolane Aromatics Extraction Process (SAE)
12		Sufolane Extractive Distillation Process (SED)
13		S-TDT Process for Toluene Disproportionation and Transalkylation
14		C8 Aromatics Isomerization Technology (C8AIT)
15		Para-xylene Adsorptive Separation Technology
16		SINOPEC Cumene Technology (S-ACT)
17		Liquid phase alkylation with circulation for ethylbenzene production (EBLC)
18		Vapor Phase Alkylation of Benzene and Ethylene to Ethylbenzene
19		Process Technology for vapor phase alkylation of ethanol to ethylbenzene
20		Process Technology for vapor phase alkylation of dilute ethylene to ethylbenzene (SGEB)
21		Styrene Production Process by Ethylbenzene Dehydrogenation (S-SMT)

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Sinopec Petrochemical Technologies

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Petrochemical and Coal-chemical Technology List

No.	Technology Type	Process
22	Rubber Production Technologies	Aromatic Rubber Extender Oil Extraction Technology (ARE)
23		Poly-butadiene Rubber Production Technology
24		Technology for Styrene-Butadiene Thermoplastic Elastomer
25		Technology for Solution Polymerized Styrene-Butadiene Rubber (SSBR)
26	Organic Materials Production Technologies	C5 Fractions Separation Technology
27		Butadiene Extraction Technology (ACN)
28		MTBE/Butene-1 Process Technology
29		Butene Oxidative Dehydrogenation Technology (ODB)
30		Production of Cyclohexanone Oxime by Continuous Ammoximation of Cyclohexanone in Single-reactor (CACS)
31		Hydrorefining of Caprolactam in Magnetically Stabilized Bed Reactor
32		Technology for Methyl-Ethyl-Ketone Production (MEK)
33	Acrylonitrile Process Technology (S-ANT)	

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Sinopec Petrochemical Technologies

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Petrochemical and Coal-chemical Technology List

No.	Technology Type	Process
34	Coal and Natural Gas Chemical Technologies	Single nozzle, cold wall type of pulverized coal pressurized gasification technology (SE)
35		Methanol to Olefins Technology (S-MTO)
36		Process for Alkylation of Toluene with Methanol to Produce Xylene (S-MTX)
37		Natural Gas to Acetylene Process
38	Others	Technology of Absorption Heat Transformer for Recovering Low Temperature Heat (AHT)
39		New Technology for Capture of CO ₂ in Flue Gas
40		Gas Purification Technology (S-AGR)
41		Sulfur Tolerant CO Shift Technology (S-COS)
42		Biodiesel Process (SRCA)



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About SinopecTech

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China Petrochemical Technology Co., Ltd. (SinopecTech) is in charge of the licensing and transferring of Sinopec's Proprietary technologies and actively involved in global licensing competition.

- ◆ **A subsidiary of Sinopec**
- ◆ **Integrating Sinopec's R&D and engineering capability**
- ◆ **A corporate entity for the licensing and transferring of Sinopec's Intellectual Property**
- ◆ **Owner: Sinopec
5 engineering Co.**



What We Provide

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Typically provide:

- ❑ Process Design Package
- ❑ Basic Design Package

With inside team /outside partners

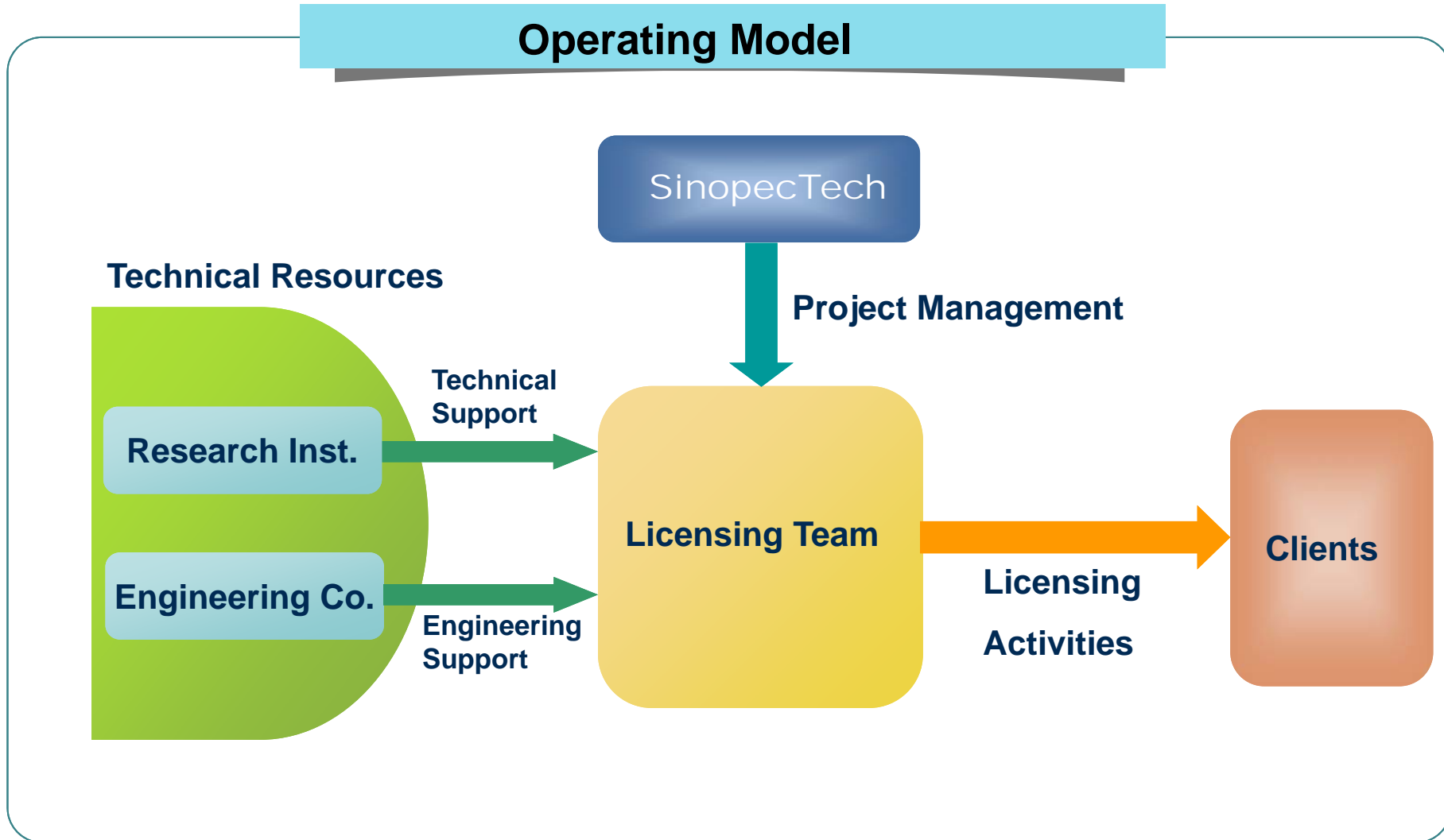
- Technical Consulting
- Feasibility Study
- Pre-FEED / FEED
- Detail Engineering Design
- Technical Service
- EPC Contractor





Operating Model of Licensing Activity

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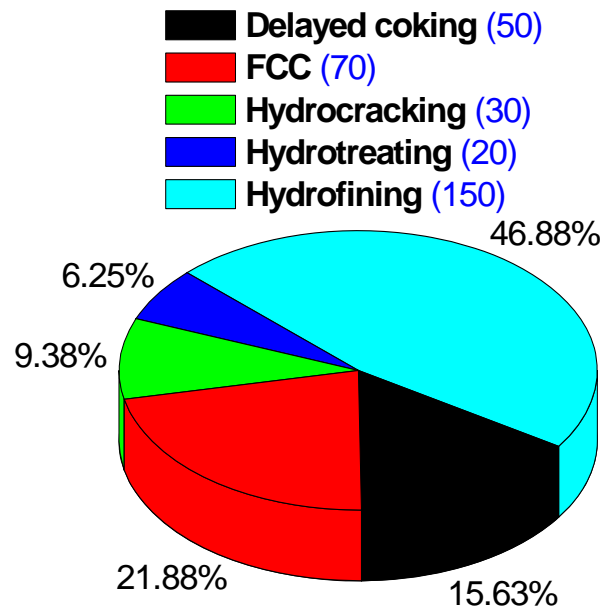


Commercial Experiences and Achievements

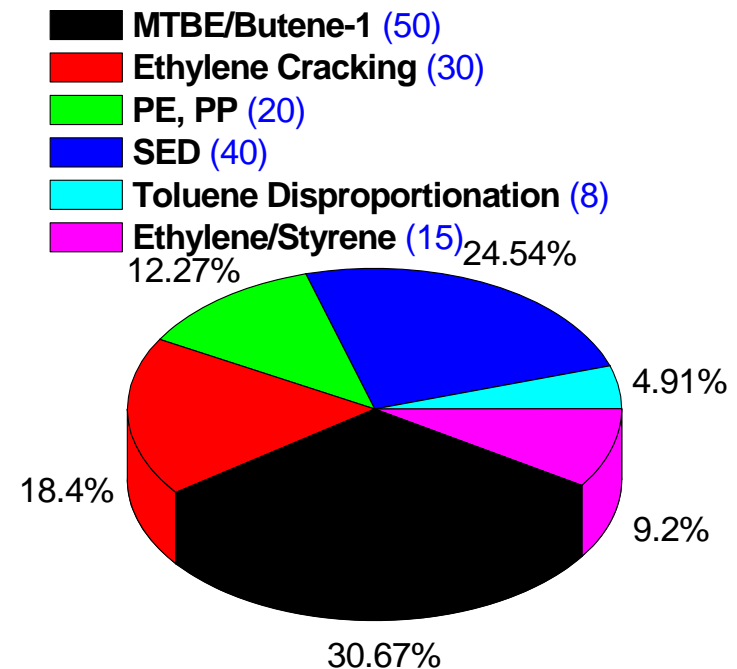
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In recent 10 years, we have successfully licensed more than 400 projects which includes more than 15 overseas projects.

Refining



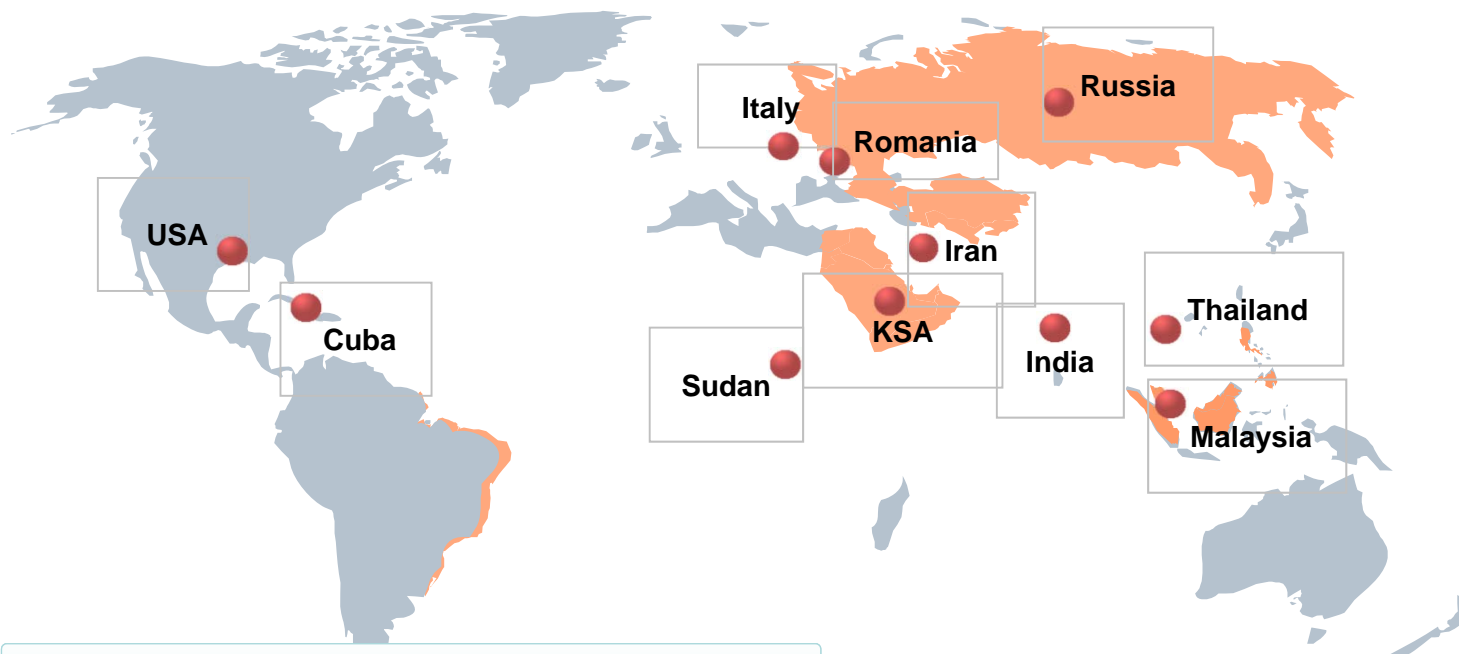
Petrochemical





Commercial Experience

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- ◇ Cuba, Cienfuegos Refinery Delayed Coking Unit
- ◇ Cuba, Matanzas Refinery Delayed Coking Unit
- ◇ Cuba, Matanzas Refinery FCC Unit
- ◇ Cuba, Matanzas Refinery PSA Unit

◇ Malaysia, Ethane Cracking Furnace

◇ Iran, The third Aromatic Plant Toluene Disproportionation Unit

- ◇ Italy, Eni SBS Unit
- ◇ Sudan, Port Sudan Delayed Coking Unit
- ◇ Iran, Hormuz Refinery Delayed Coking Unit
- ◇ Romania, Rafo Armatization Unit
- ◇ India, 2 DCC Units
- ◇ Russia, DCC Unit
- ◇ Saudi Arabic, DCC Unit
- ◇ Thailand, 2 DCC Units
- ◇ USA, PP Prepolymerization Unit

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Clients and Partners

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Commercial Experiences and Achievements

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Hainan Refinery
Capacity: 8 MMTA



Qingdao Refinery
Capacity: 10 MMTA



Fujian Refinery
Capacity: 12 MMTA



Yanshan Refinery
Capacity: 10 MMTA



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Commercial Experiences and Achievements

Zhenhai Ethylene
Capacity: 1000 KTA



Puyang MTO & OCC
Capacity: 600 KTA



SPC C5 Separation
Capacity: 1500 KTA



Hainan PX
Capacity: 600 KTA



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Commercial Experiences and Achievements

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TITAN Cracking Furnace



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Summary

- ❑ **Strong capability and devotion of professionals to R&D;**
- ❑ **Proprietary technologies cover the whole industry; matched proprietary catalyst and equipment; strong engineering capability;**
- ❑ **Commercial references and excellent operating skills with expertise contributing to clients' value enhancement;**
- ❑ **SinopecTech is the platform for Sinopec's technology transfer and licensing. We are committed to cooperating with clients and partners and providing them our state-of-the-art technologies and superior services.**





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THANK YOU!

