

煤控三期专题研究

China Coal Cap Project Phase III

高耗煤行业煤炭消费总量与配额初始分配方案研究

Research on Coal Consumption Cap and Quota Allocation for Coal-Intensive Industries

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2016. 11. 1



主要内容 | Key Points

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煤炭消费总量与配额初始分配
Coal Consumption Cap and Quota Allocation

2020煤炭消费总量
Coal Consumption Cap in 2020

高耗煤行业配额分配
Quota Allocation in Coal-Intensive Industry

相关报告产出
Outputs

Why? How? What?

2020 Coal Cap

Allocation Scheme

Reports

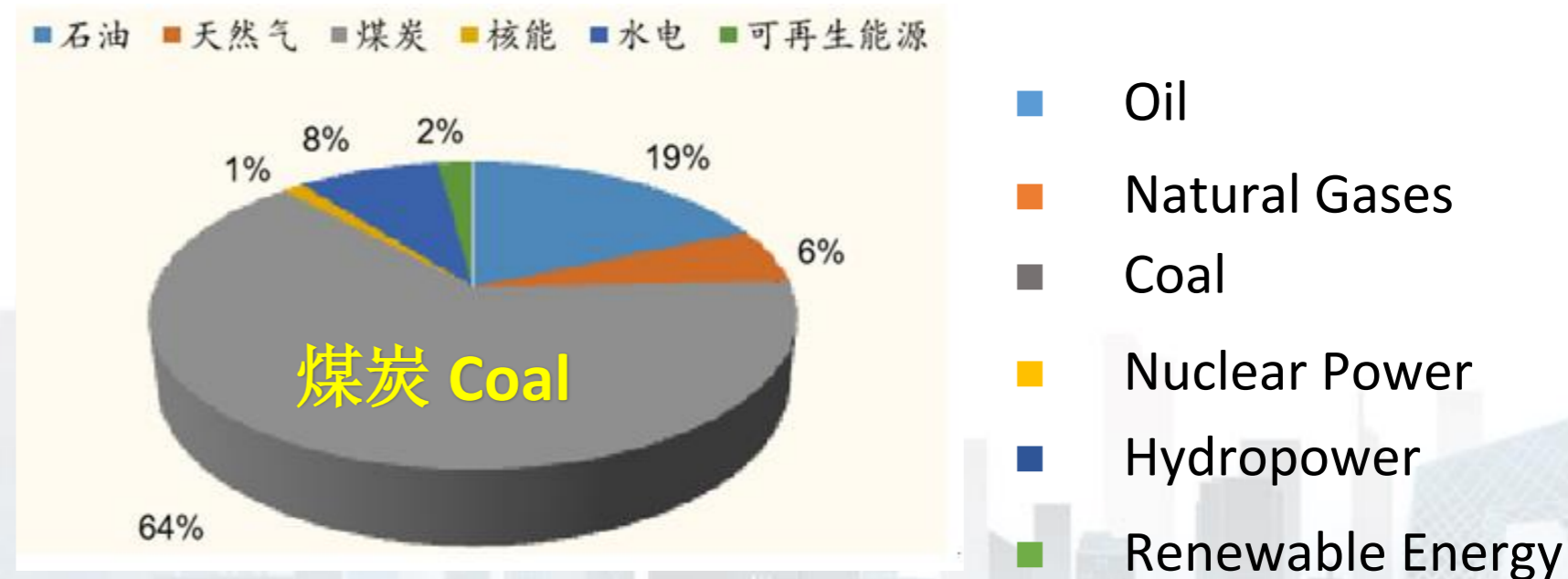
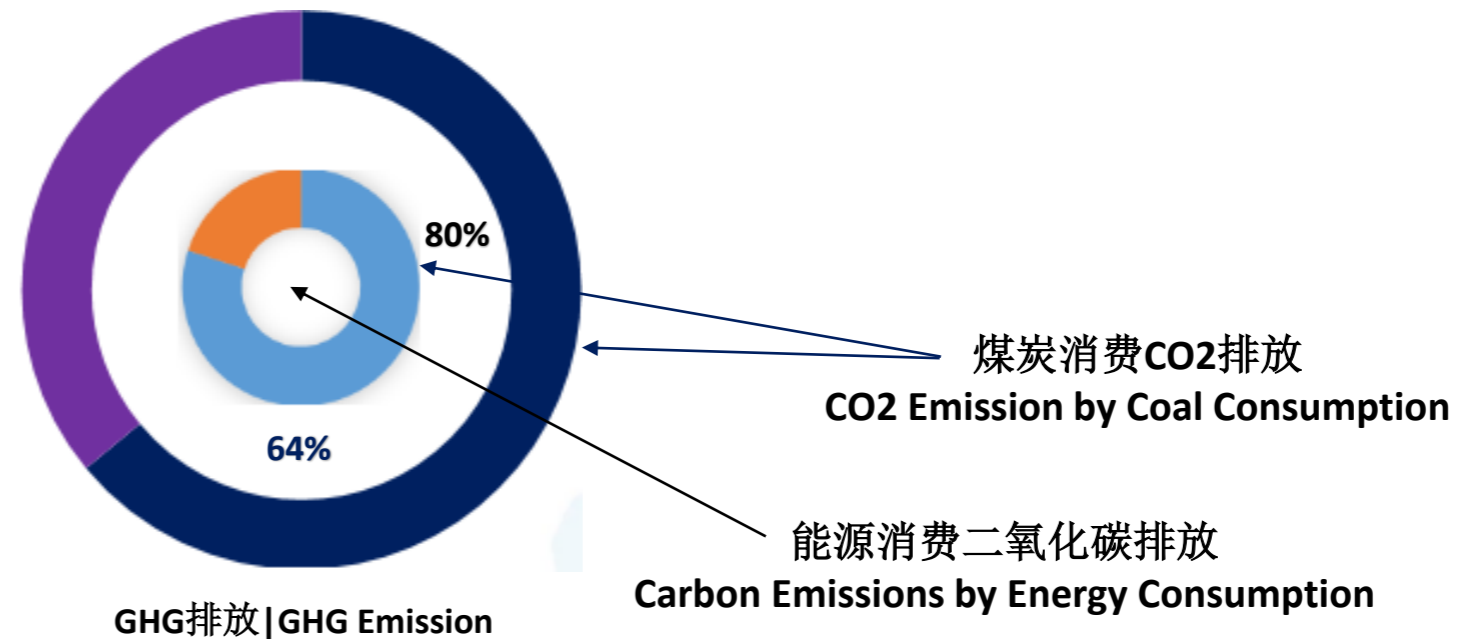
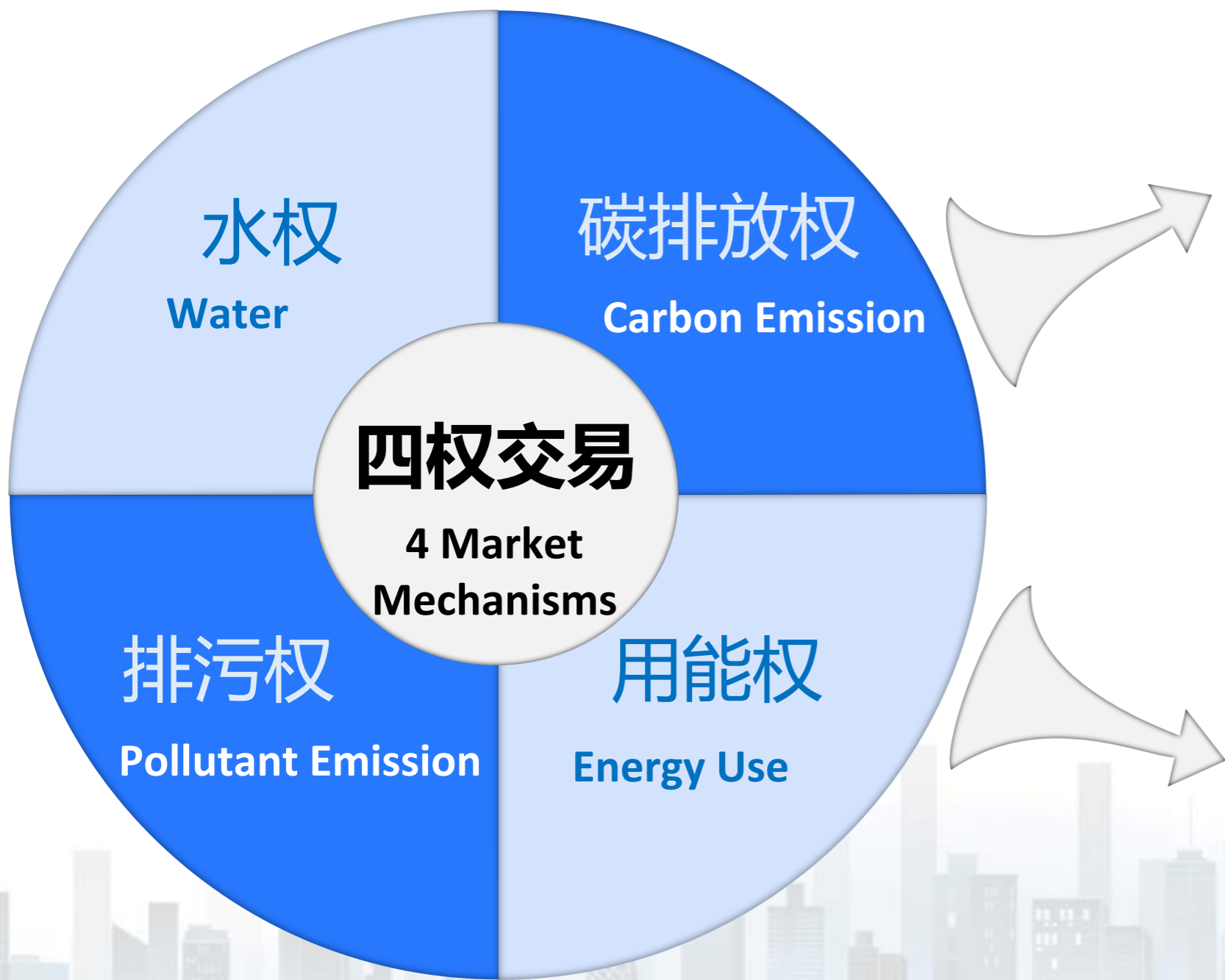
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煤炭消费总量与配额交易研究的意义

Research Aims of Coal Consumption Cap and Trade



研究的意义 | Research Aims



2015一次能源消费结构
2015 Primary Energy Consumption Structure

研究框架 | Research Framework



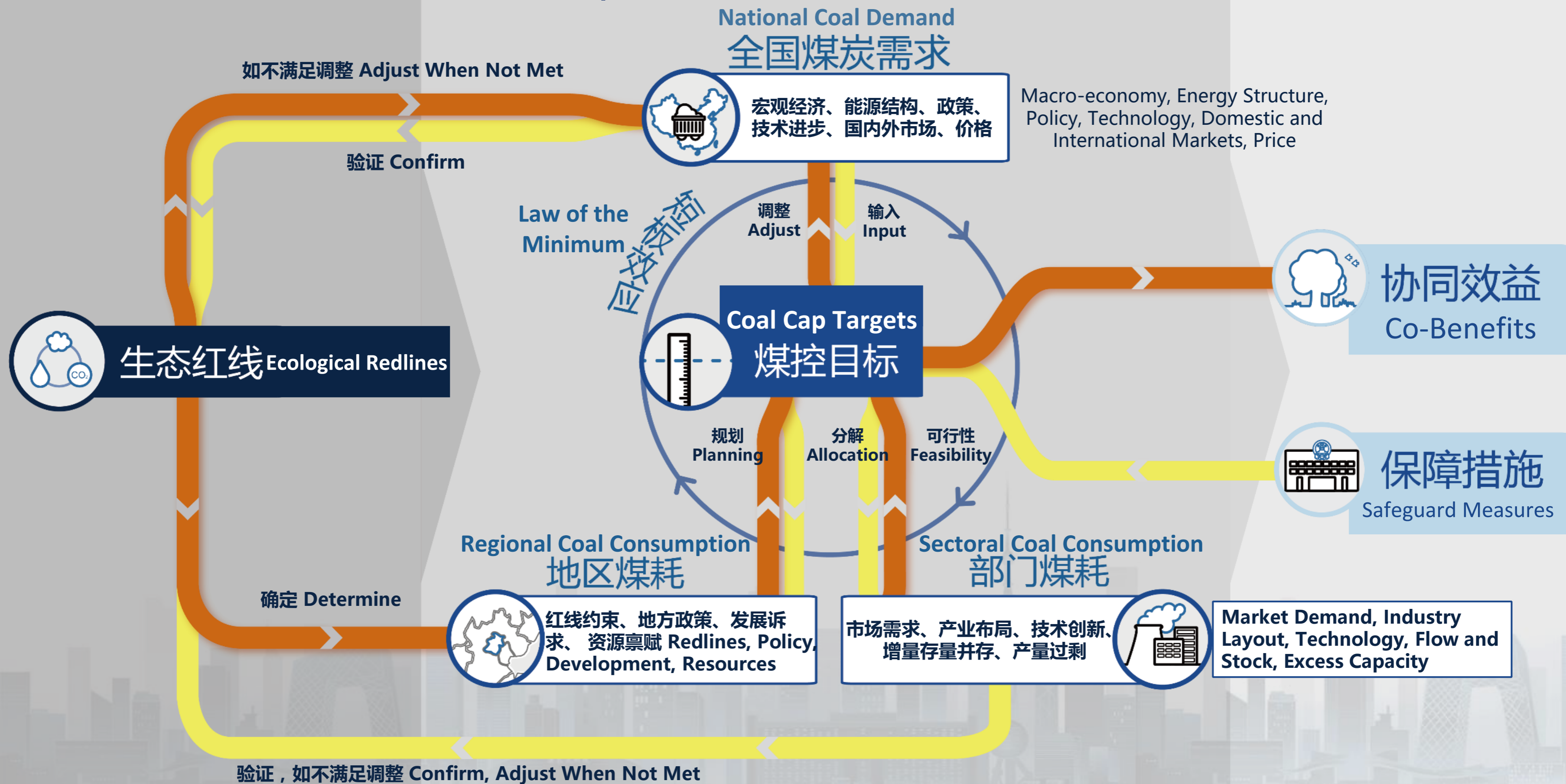
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2020煤炭消费总量

2020 Coal Consumption Cap

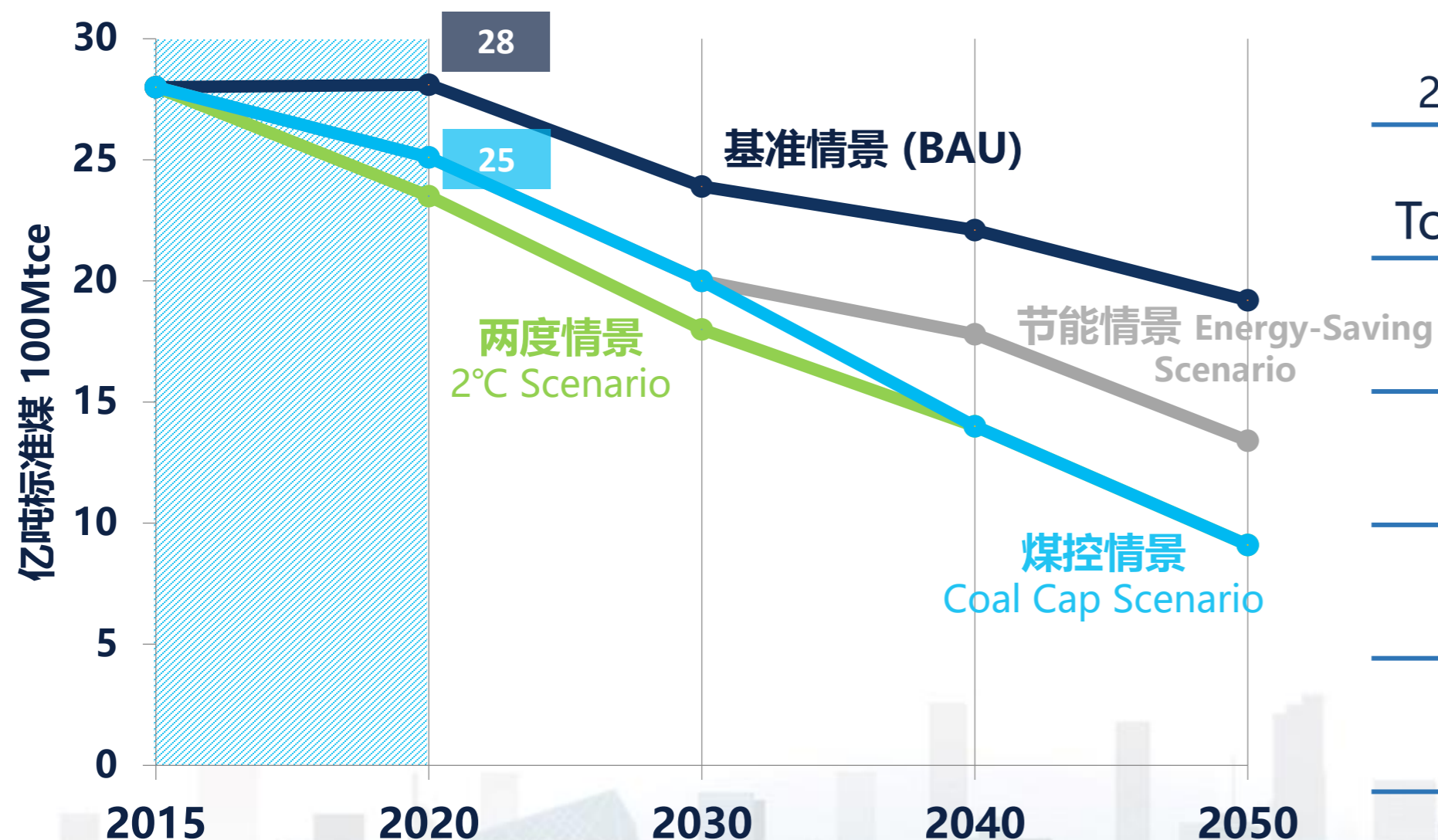


煤控情景分析的耦合模型结构 | Integrating Model of the Coal Cap Scenario Analysis



2020年全国煤控目标: 25 亿吨标煤

2020 National Coal Consumption Cap Target: 2.5 Billion TCE



2015-2050煤炭消费总量情景
Coal Consumption Cap Scenarios 2015-2020

2020全国煤控目标: 25 亿吨标煤 (35亿吨煤)
2020 National Coal Cap Target: 2.5 Btce (3.5 Bil tons Raw Coal)

总能耗: 45.8亿吨标煤
Total Energy Consumption: 4.58 Btce

煤炭比重: 54.8%
Coal:

天然气比重: 10.4%
Natural Gases:

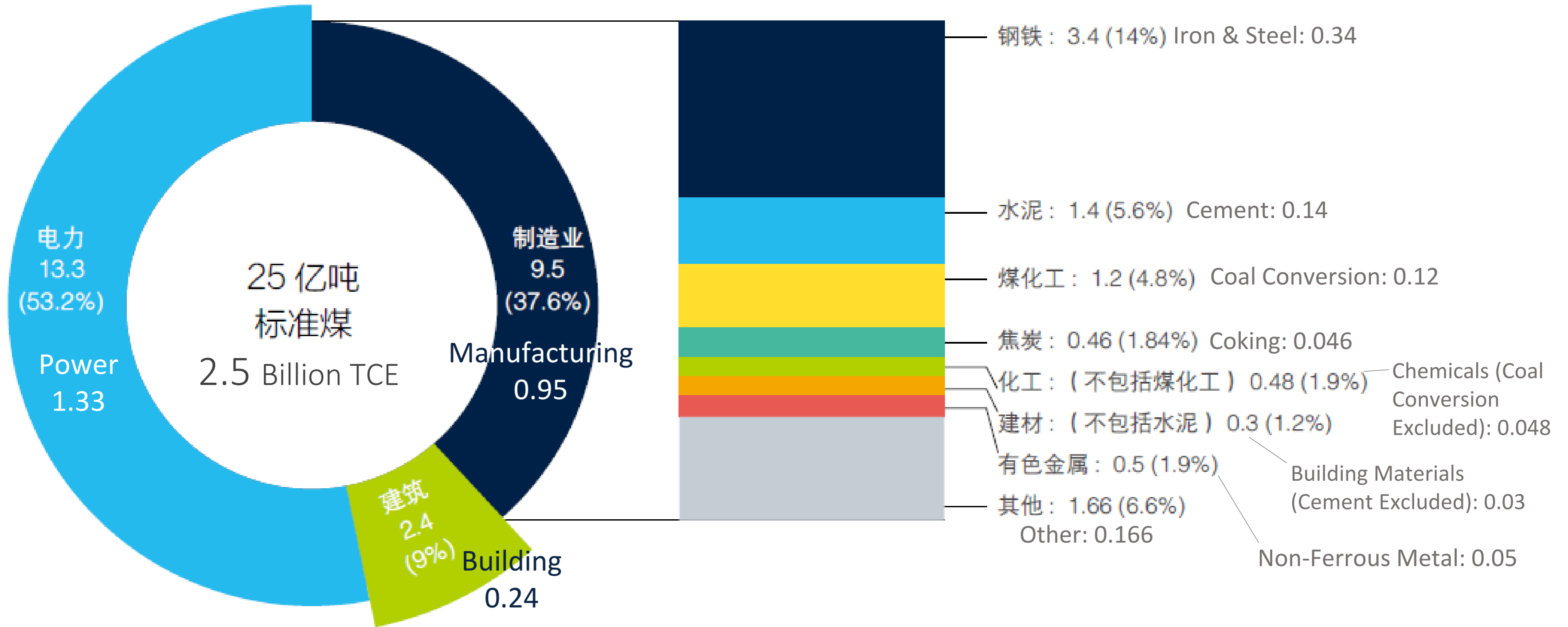
非化石能源比重: 15.7%
Non-Fossil Fuel:

石油比重: 19.0%
Oil:

减煤目标: 3亿吨标煤 (4.2亿吨煤)
Coal Reduction Goal: 0.3 Btce (0.42 Bil tons Raw Coal)

煤炭生产总量控制目标: 34亿吨
Coal Production Cap Goal: 3.4 Billion tons

2020行业煤炭消费总量目标 | 2020 Sectoral Coal Consumption Cap



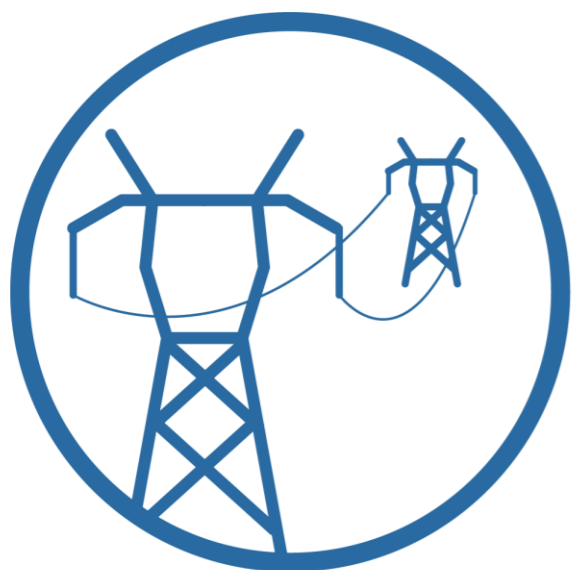
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高耗煤行业煤炭消费总量 和配额分配方案

Coal Consumption Cap and Quota Allocation Scheme
for Coal-Intensive Industries



四大高耗煤行业 | Four Coal-Intensive Industries



电力13.3亿吨标煤
Power Generation
1.33 billion tce



钢铁行业3.4亿吨标煤
Iron & Steel
0.34 billion tce



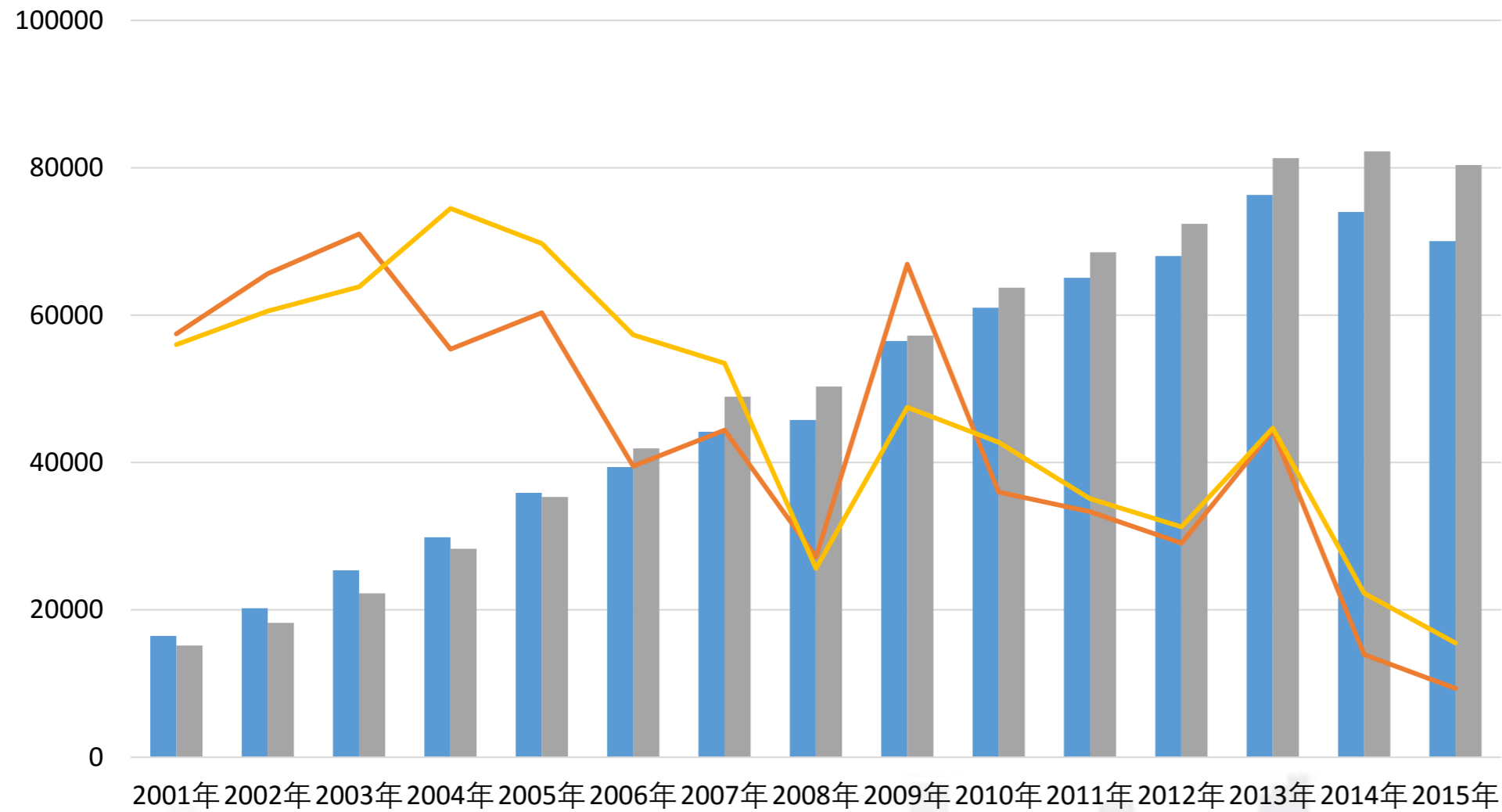
水泥1.4亿吨标煤
Cement
0.14 billion tce



煤化工1.2亿吨标煤
Coal-to-Chemical
0.12 billion tce

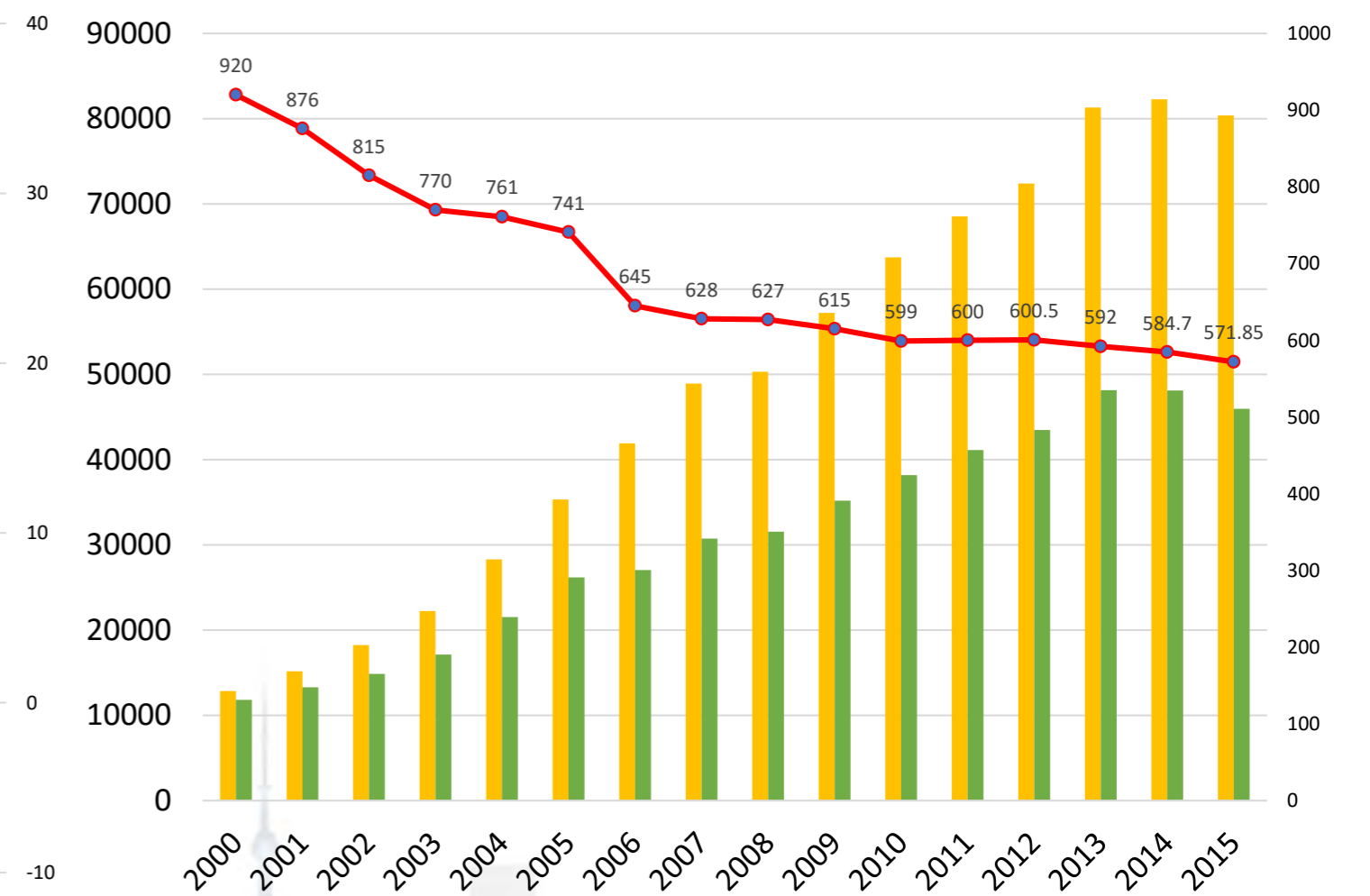


钢铁行业 | Iron & Steel Industry



■ 表观消费量 (万吨) ■ 粗钢产量(万吨)
— 消费增长率 (%) — 产量增长率 (%)

■ Consumption (10 thousand tons) ■ Crude Steel Production (10 thousand tons)
— Growth of Consumption (%) — Growth of Production (%)



■ 粗钢产量(万吨) ■ 总能耗量(万吨标准煤)

— 吨钢综合能耗(kgce/t-s)

■ Crude Steel Production (10 thousand tons)

■ Coal Consumption (10 thousand tons)

— Coal Consumed per Unit Steel Produced

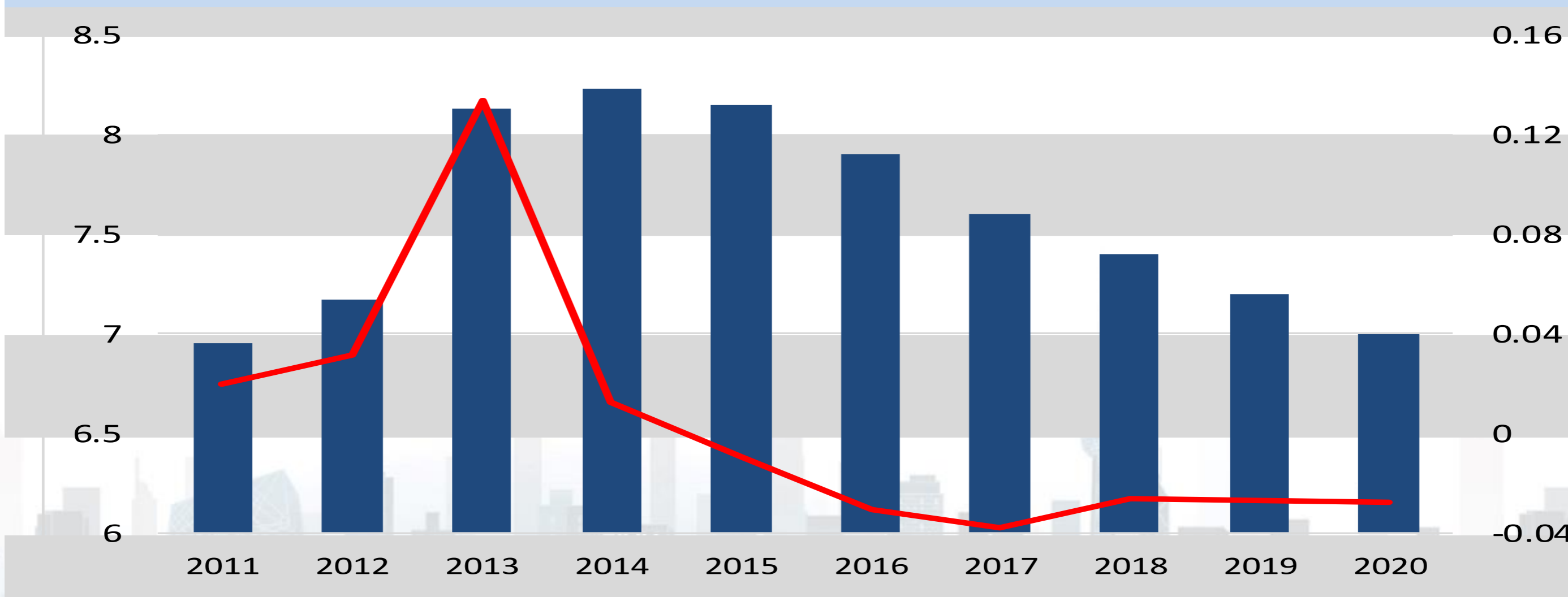


钢铁行业 | Iron & Steel Industry

"十二五", "十三五"(预测) 期间我国粗钢产量变化情况
Crude Steel Production Change During 12th and 13th Five-Year

■ 粗钢产量
Crude Steel Production

— 粗钢产量增长率
Rate





钢铁行业 | Iron & Steel Industry

2016

2017

2018

2019

2020

预计粗钢产量
Estimated Crude
Steel Production

7.9亿吨
790 Million tons

7.6亿吨
760 Million tons

7.4亿吨
740 Million tons

7.2亿吨
720 Million tons

7.0亿吨
700 Million tons

行业煤控目标
Sectoral Coal Cap Targets

4.17亿吨标煤
417 Mtce

3.93亿吨标煤
393 Mtce

3.74亿吨标煤
374 Mtce

3.56亿吨标煤
356 Mtce

3.39亿吨标煤
339 Mtce



钢铁行业 | Iron & Steel Industry

万吨标煤
10,000 TCE

企业配额(Quota):

**历史年均煤炭消费量
×年度下降系数**

Average Annual Historical Coal
Consumption × Annual Decline
Rate of Coal Consumption

历史法

Grandfather

数据完善

Perfecting Data

企业配额(Quota):

烧结(球团)矿产量×烧结(球团)基准值

焦炭产量×炼焦煤炭消费基准值

铁水产量×炼铁煤炭消费基准值

电炉钢水产量×炼钢煤炭消费基准值

Sinters (pellets) production x Sinters Benchmarking Factor

Coking coal production x Coking Benchmarking Factor

Liquid metal production x Melting Benchmarking Factor

molten steel production x Steel-making Benchmarking Factor

基准法

Benchmark

碳排放配额分配方法 Carbon Emission Allowance Allocation Method:

单位配额=历史强度值*减排系数*调整系数*实物产出量

Allowances=Historical Intensity × Mitigation Factor × Adjustment Factor × Actual Output

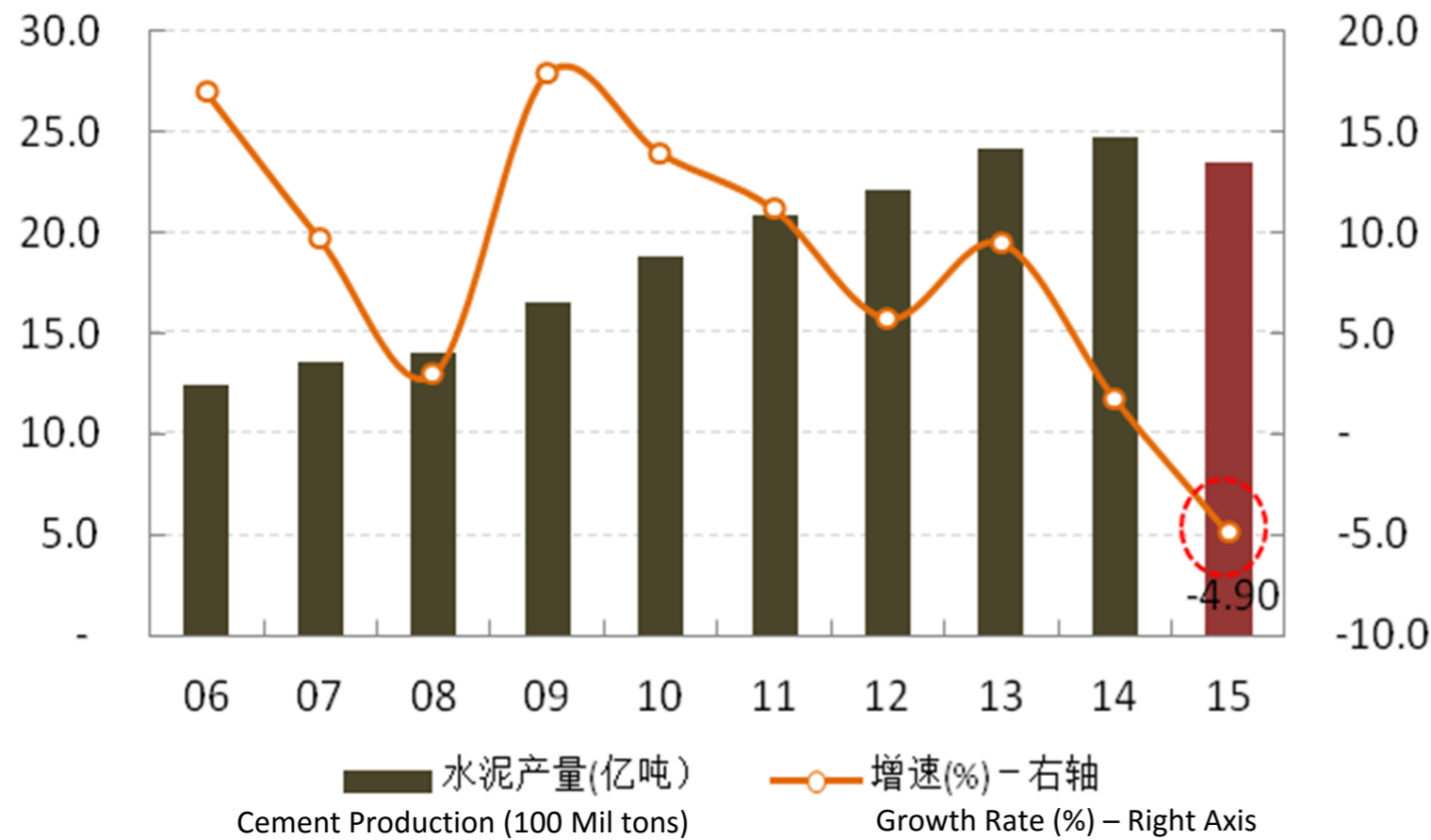
$$C = D \times F_m \times Q \times F_p$$



水泥行业 | Cement Industry

2020煤控目标：1.46亿吨 2020 Coal Cap Target: 146 Million tons

全国 近十年水泥产量及增速 China's Cement Production and Growth Rate 2006-2015



煤控目标: 1.46亿吨标准煤
Coal Cap Target: 146 Million tons

水泥产量: 23.3亿吨 (熟料率60%折算)
Cement Production: 2.33 Bil tons (Clinkers Conversion: 60%)

熟料产量: 14.0亿吨
Cement Clinker Production: 1.4 Bil tons

前十家企业行业集中度: 70%
Market Share of the Top 10 Firms:

万元增加值能耗: 4500
Energy Consumption per 10,000 RMB Value Added:

单位产品煤耗: 104千克标煤/吨熟料
Coal Consumption per Unit Product: 104 kg-ce per ton cement clinkers

二氧化碳减排量: 5385万吨
Mitigation of CO2 Emission: 53.85 Mil tons



水泥行业 | Cement Industry

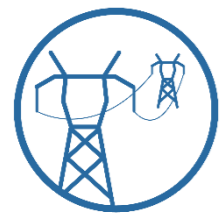
企业配额 = 单位产品综合可比熟料综合煤耗基准
× 熟料产量 × 规模系数 (A)

Entity Quota = Benchmark of consumption per unit produced × Cement
Clinker Production × Scale Factor (A)

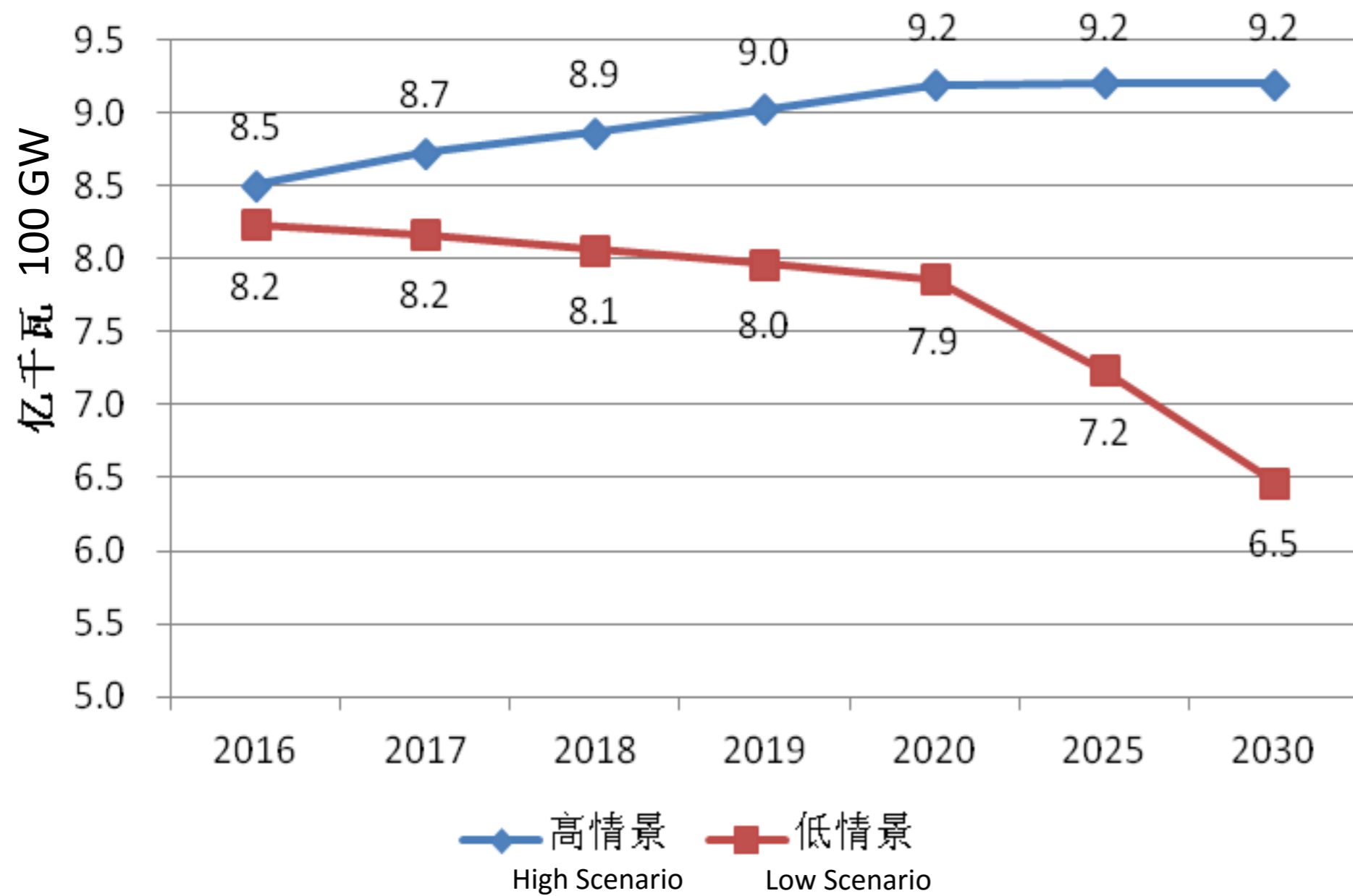
可比熟料综合标准煤耗基准范围 e_{kcl} (kg/t)

Benchmark Range of consumption per unit produced e_{kcl} (kg/t)

≥ 5000t/d	≤103	1.00
	103 < e_{kcl} ≤108	0.98
	108 < e_{kcl} ≤112	0.96
≥ 2500, < 5000 t/d	≤103	1.00
	103 < e_{kcl} ≤108	0.98
	108 < e_{kcl} ≤112	0.97
< 2500 t/d	≤103	1.00
	103 < e_{kcl} ≤108	0.98
	108 < e_{kcl} ≤112	0.97



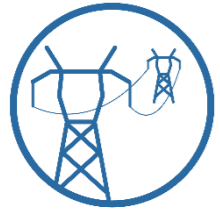
电力行业 | Power Industry



电力煤控目标

13.3亿吨标煤

**Power Industry Coal Cap
Target: 1.33 billion tce**



电力行业 | Power Industry

企业配额
Entity Quota

||

发电量%*省配额总量
% of total provincial power
generated * Total Provincial Quota

+

调整配额
Adjusted Quota

污染物排放绩效 Emission Performance
煤耗绩效 Coal Consumption Performance
绿色证书 RECs
(可再生能源配额制)

现有机组
Current Generators

$$\left(\text{平均发电煤耗}_{t+1} \times \frac{1}{3} \sum_{T=t-3}^{t-1} \text{省煤电发电量}_T \right)$$

关停核减、新建增量
Close down, New added

$$\left(\frac{1}{3} \sum_{T=t-3}^{t-1} \text{关/退机组发电量}_T \times \text{发电煤耗}_{t+1} \right)$$

$$\left(\text{新建机组预计发电量}_{t+1} \times \text{发电煤耗目标}_{t+1} \right)$$

省配额总量
Total Provincial Quota

效率提升
Efficiency Improving

$$\left(\text{平均发电煤耗}_{t+1} - \text{平均煤耗目标}_{t+1} \right) \times \text{CE}_{P,t+1}$$

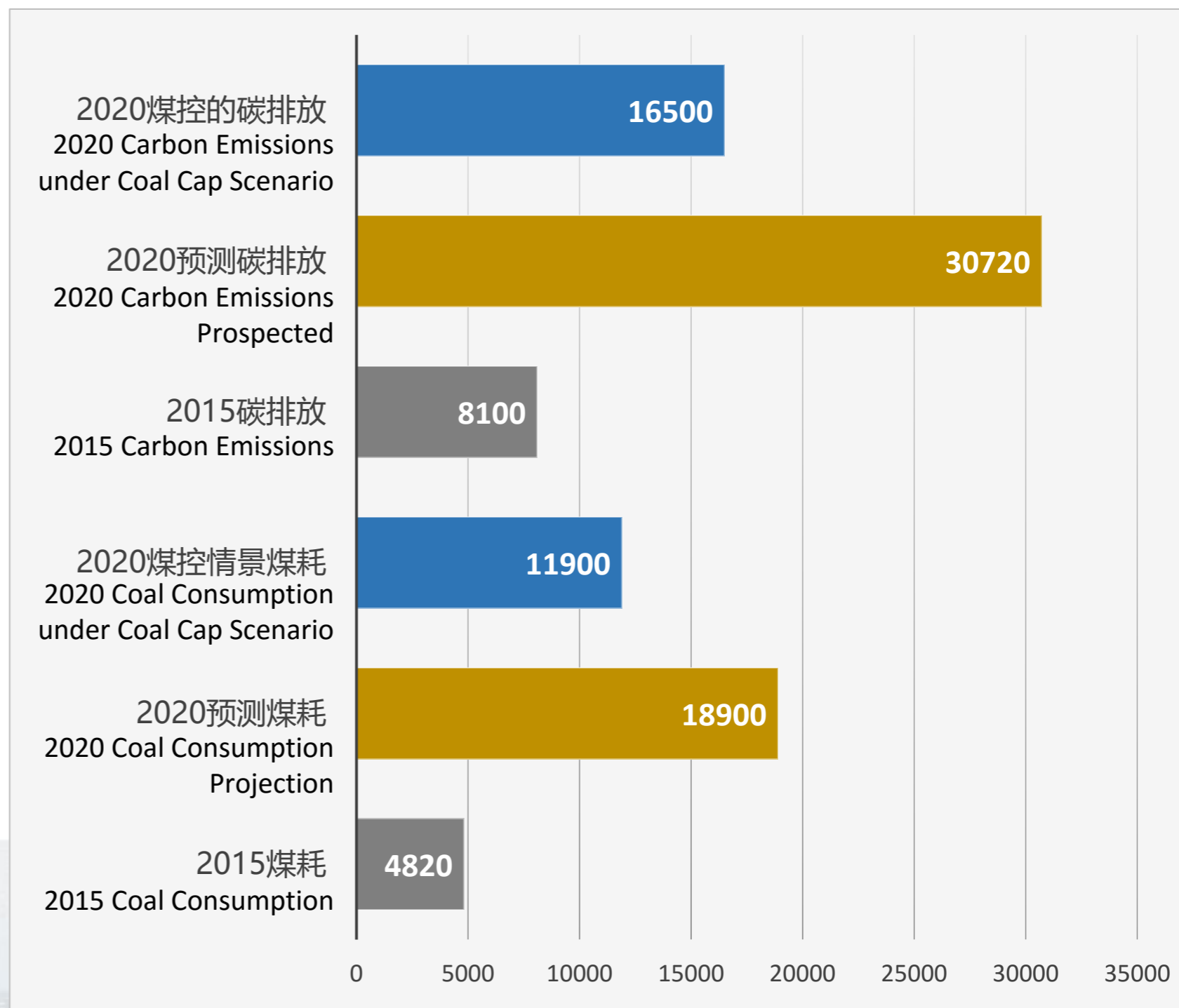
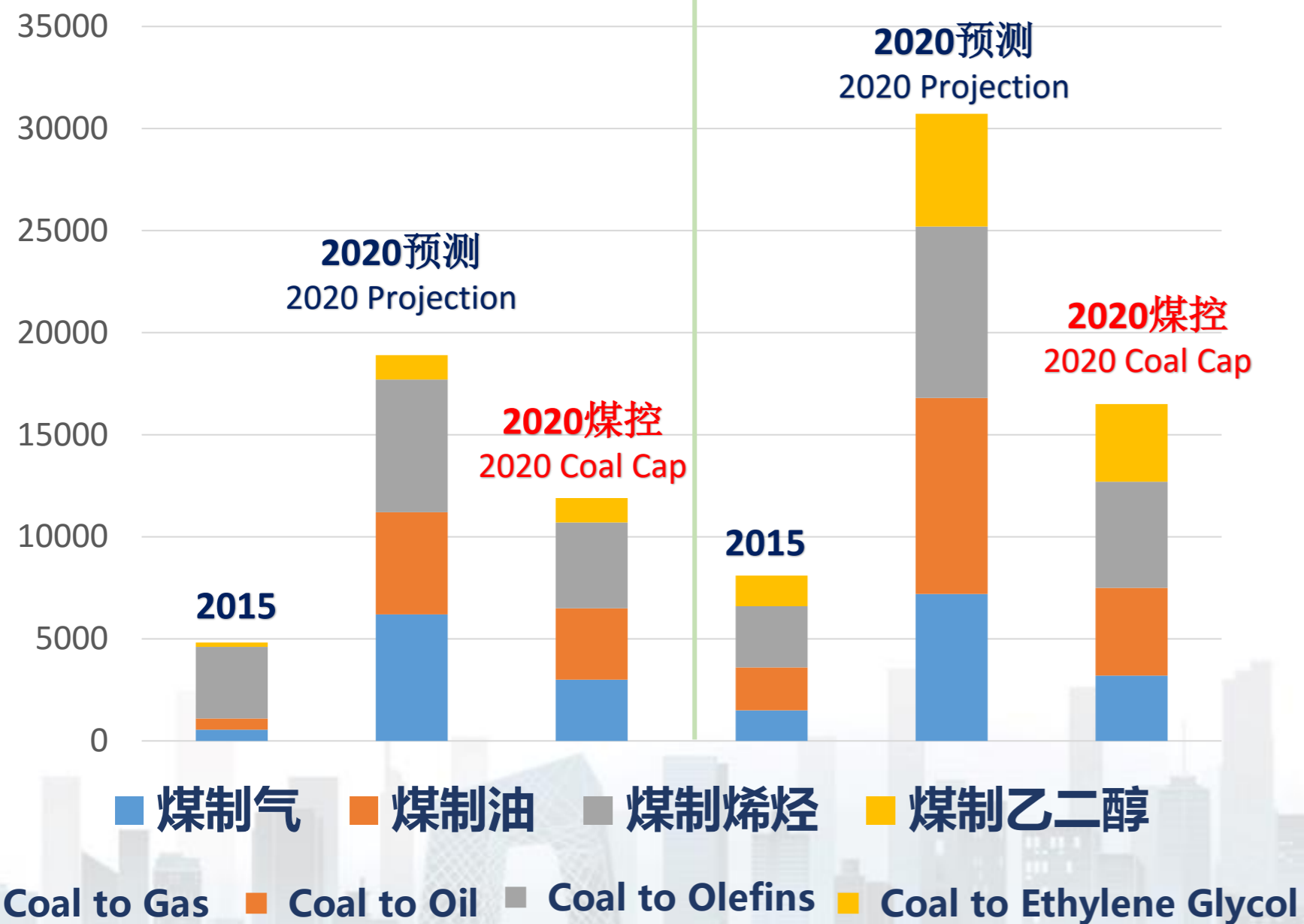
$$\left(\text{RE}_{O,t+1} - \frac{1}{3} \sum_{T=t-3}^{t-1} \text{RE}_T \right) \times \text{平均煤耗目标}_{t+1}$$

非水可再生替代
Non-Hydro Renewable
Replacement



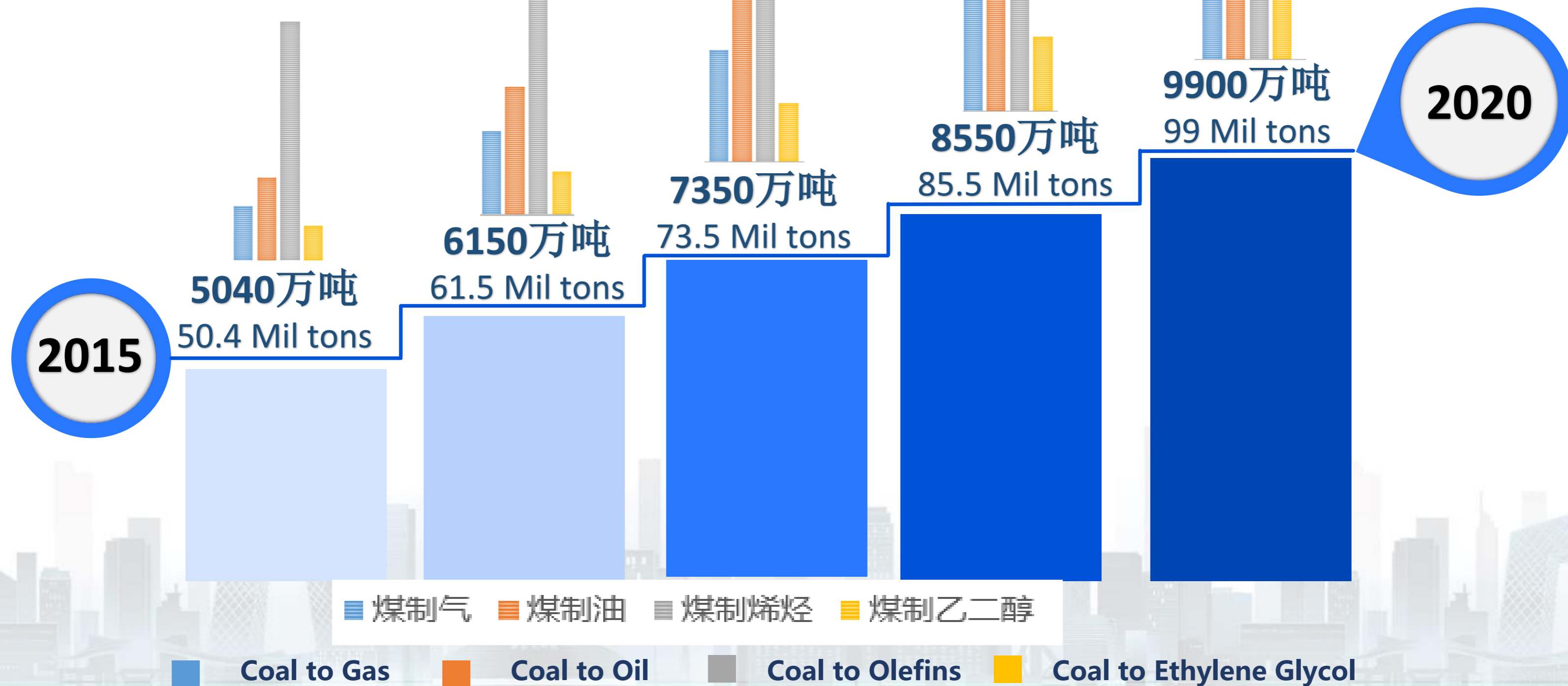
煤化工行业 | Coal-to-Chemicals

Coal Consumption Carbon Emission



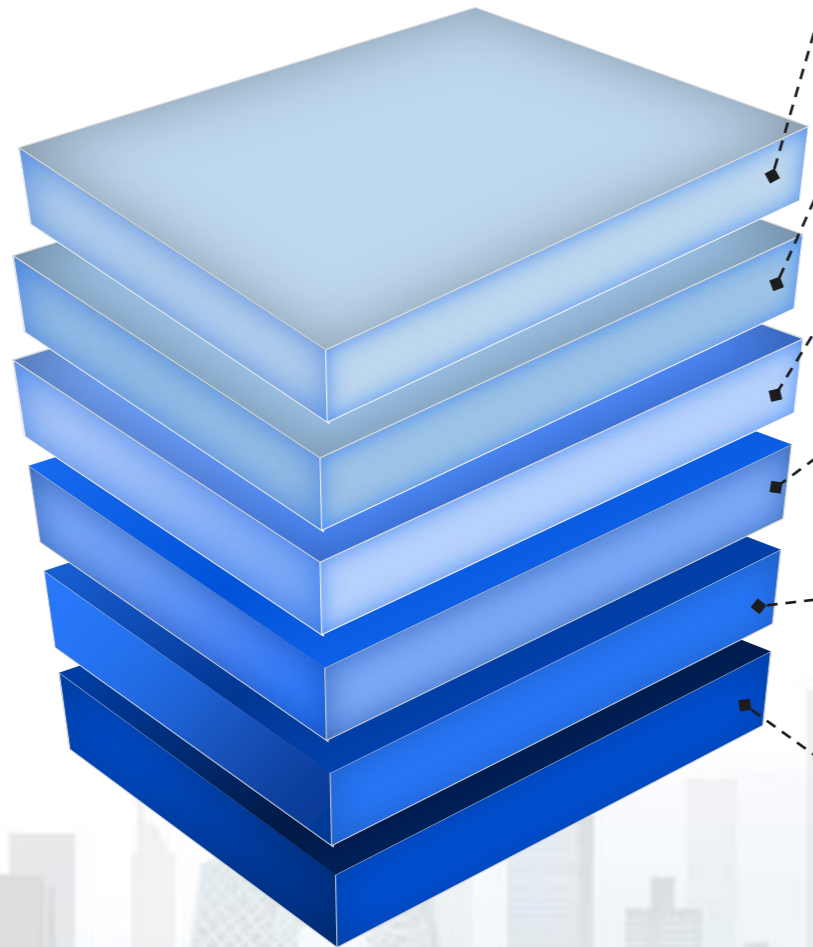


煤化工行业 | Coal-to-Chemicals



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相关报告 | Reports



石家庄燃煤总量配额交易制度实施方案研究

Study on Implementation Plan of Coal Consumption Cap-and-Trade in Shijiazhuang

武汉燃煤总量配额交易制度实施方案研究

Study on Implementation Plan of Coal Consumption Cap-and-Trade in Wuhan

城市燃煤总量配额交易与碳交易的衔接方案研究

Study on Integration of Coal Consumption Cap-and-Trade And National Carbon ETS

行业煤炭消费配额初始分配方案研究

Study on Coal Consumption Quota Allocation Scheme

水泥行业煤控与碳市场协调效应分析

Study on Integration of Coal Consumption Cap-and-Trade And National Carbon ETS for Cement Industry

电力行业煤控与碳市场协同效应分析

Study on Integration of Coal Consumption Cap-and-Trade And National Carbon ETS for Cement Industry

THANK YOU !

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