



“十三五”电力行业控煤政策研究

China's coal power during the 13th FYP: planning and policy

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“十三五”煤电发展

China's coal power during 13th FYP

- **规划目标**(Planning target: What should be?)
- **现状评价**(Progress assessment: what's happening?)
- **政策展望**(Policy outlook: What's next?)

电力需求展望

Power Demand Prospective

- 2015: 全社会用电量增速0.5%
 - 二产用电量同比下降1.4%，40年来首次负增长 (The secondary industry decreased by 1.4%, the first negative growth in 40 years) ;
 - 第三产业和城乡居民生活用电同比分别增长7.5%和5.0% (Tertiary industry increased by 7.5%, while Household increased by 5.0%) ;
 - 电力增速放缓、产业结构调整! (Slow-down and structural adjustment is there!)
- “十三五”：新常态下电力需求展望是电力规划的首要问题(13th FYP: Demand growth dynamics under the new normal is of primary importance for power planning)!
- 基于部门分解的情景分析法探讨电力需求的动态变化 (Explore the dynamics of power demand by conducting scenario analysis based on sectoral decomposition).

电力需求展望

Power Demand Prospective

□ 主要关注能源密集型产业的影响(Understanding the impact of energy intensive industries is the key)!

电力需求参数假设与情景设定

	变化趋势	情景1 (低限)	情景2	情景3	情景4 (基准)	情景5	情景6 (高限)
第一产业	正常增长	√	√	√	√	√	√
采掘业	正常增长	√	√	√	√	√	√
四大高耗能产业	微增长					√	√
	零增长			√	√		
	负增长	√	√				
传统制造业	高速增长		√		√		√
	正常增长	√		√		√	
新兴制造业	高速增长		√		√		√
	正常增长	√		√		√	
第三产业	高速增长		√		√		√
	正常增长	√		√		√	
居民生活	高速增长		√		√		√
	正常增长	√		√		√	

电力需求展望

Power Demand Prospective

电力需求参数假设

	变化趋势	2016	2017	2018	2019	2020	2021 ~2025	2026 ~2030
第一产业	正常增长	1.0%	1.0%	1.0%	1.0%	1.0%	0.8%	0.8%
采掘业	正常增长	1.0%	1.0%	1.0%	1.0%	1.0%	0.8%	0.8%
四大高耗能产业	微增长	2.0%	2.0%	1.8%	1.8%	1.6%	1.0%	0.6%
	零增长	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	负增长	-2.0%	-2.0%	-1.8%	-1.8%	-1.6%	-1.2%	-1.2%
传统制造业	高速增长	4.0%	3.9%	3.9%	3.8%	3.8%	2.4%	1.5%
	正常增长	2.0%	1.9%	1.9%	1.8%	1.8%	1.6%	1.2%
新兴制造业	高速增长	8.0%	7.8%	7.5%	7.3%	7.0%	5.0%	4.0%
	正常增长	4.0%	3.9%	3.8%	3.7%	3.6%	3.4%	3.0%
第三产业	高速增长	10.0%	9.8%	9.6%	9.3%	9.0%	6.0%	4.6%
	正常增长	8.0%	7.8%	7.6%	7.4%	7.2%	4.6%	3.6%
居民生活	高速增长	8.0%	7.8%	7.6%	7.4%	7.2%	6.0%	4.6%
	正常增长	6.0%	5.8%	5.6%	5.6%	5.4%	4.6%	3.6%

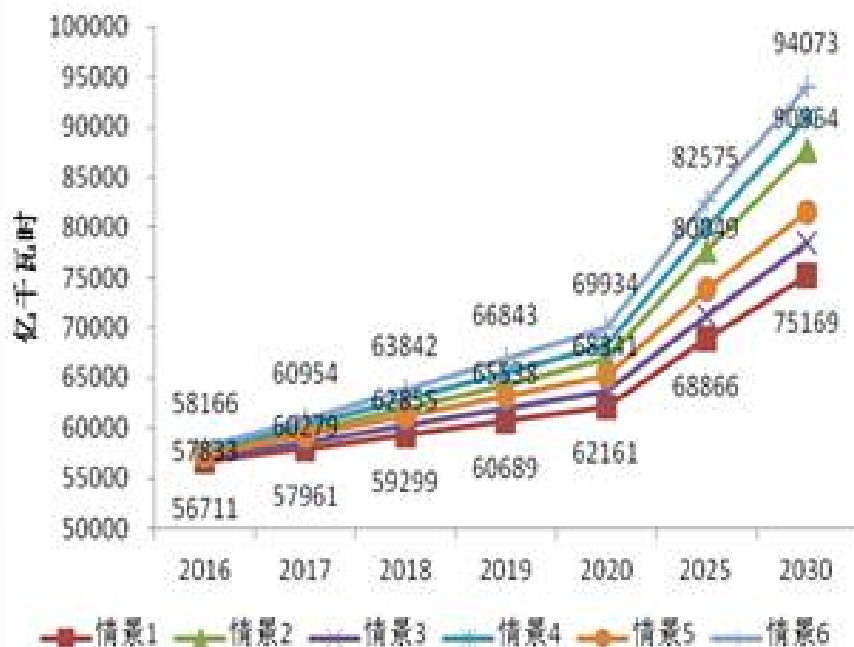
电力需求展望

Power Demand Prospective

□ 情景分析结果(Scenario results):

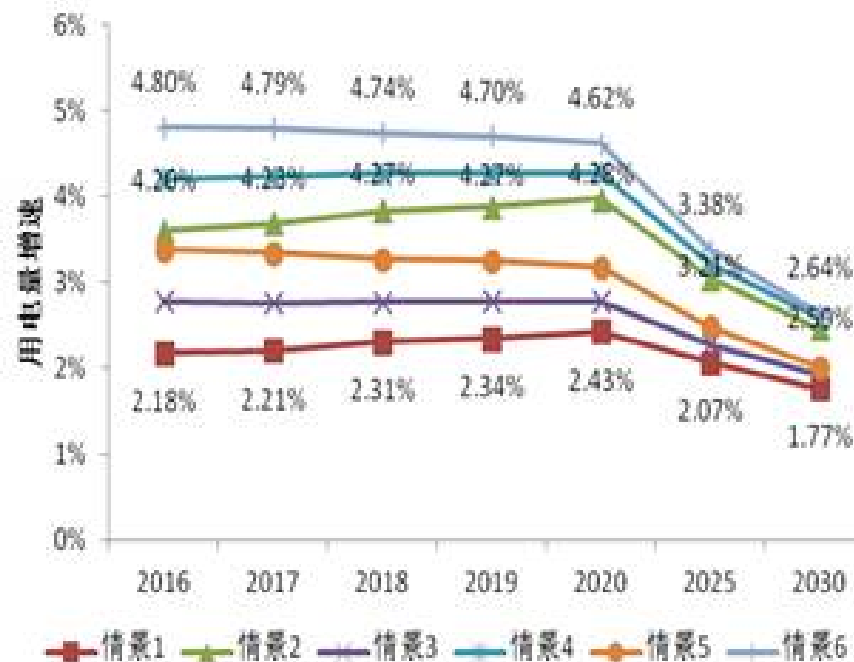
□ 2020: 6.22-6.99万亿千瓦时, 2.29%-4.73%.

□ 2030: 7.52-9.41万亿千瓦时.



不同情景下电力需求的综合比较

Power demand scenarios



不同情景下电力需求增速比较

growth rate of power demand
under different scenarios

煤电规划

Coal Power Planning

□ 基准情景(Baseline scenario) –情景4:

□ “十三五”用电量年均增速4.25%

□ 2020, 6.83万亿千瓦时; 2030, 9.10万亿千瓦时.

2016-2030年电力装机规划 (万千瓦)

	2016	2017	2018	2019	2020	2025	2030
水电	30500	31400	32300	33200	34000	39000	44000
抽蓄	2500	2800	3200	3600	4000	11000	15000
煤电	85049	87274	88675	90255	92000	92000	92000
气电	7200	7800	8500	9200	10000	15000	20000
核电	3450	3600	4300	5000	5800	12500	19000
风电	15000	17500	20000	22500	25000	35500	43000
太阳能 (PV)	6400	8600	10800	13000	15000	21000	30000
太阳能 (CSP)	50	100	300	600	1000	4800	7600
生物质	1150	1200	1280	1340	1400	1700	2000
合计	151053	159760	168553	177581	188200	232500	272600

注: 2020年非化石能源规划目标均为官方数据

煤电规划

Coal Power Planning

■ 煤电规划目标: 电量平衡(energy balance perspective)

最低情景对应的年均用电增速是2.29%，全社会用电量6.2万亿千瓦时；
基准情景中年均增速为4.25%，全社会用电量6.8万亿千瓦时；
最高情景中年均增速为4.73%，全社会用电量达7.0万亿千瓦时。

For the max. scenario, the annual average growth rate is 4.73%, with total power consumption of 7000TWh.



煤电规划

Coal Power Planning

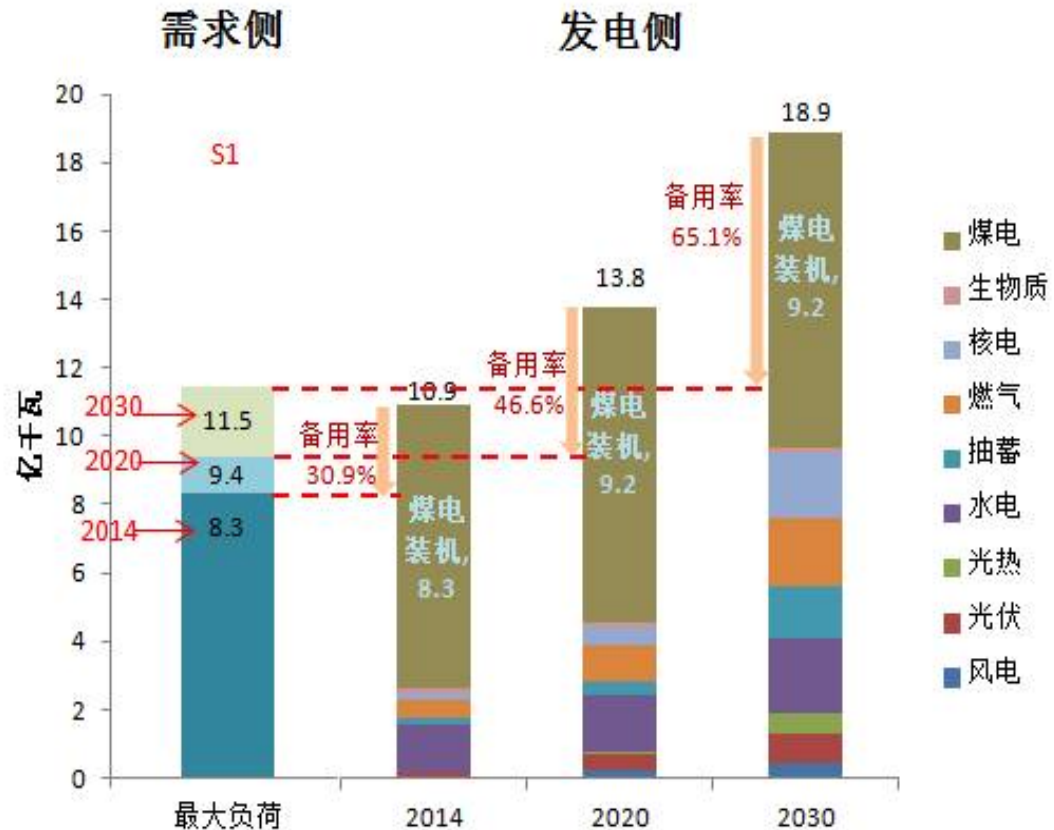
■ 煤电规划目标: 资源裕度 (resource adequacy perspective)

此处假设了3个情景来讨论我国最大负荷的变化以及备用率的差异, 分别为S1, S2和S3。

最大负荷年均增速情景设定

Setting of the annual average growth rate of the peak load in different scenarios

	2015-2020	2021-2030
S1	2.00%	2.00%
S2	3.50%	3.50%
S3	5.00%	3.50%

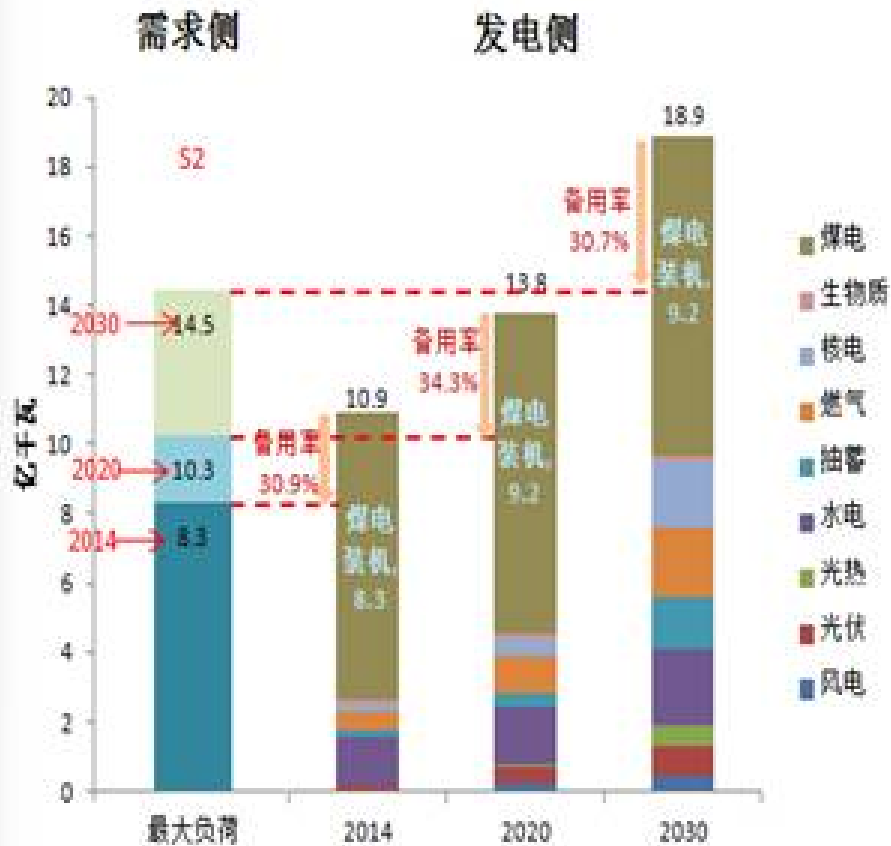


S1情景下最大负荷增长与等效可用容量比较
Comparison of the growth of peak load and the equivalent available capacity in S1

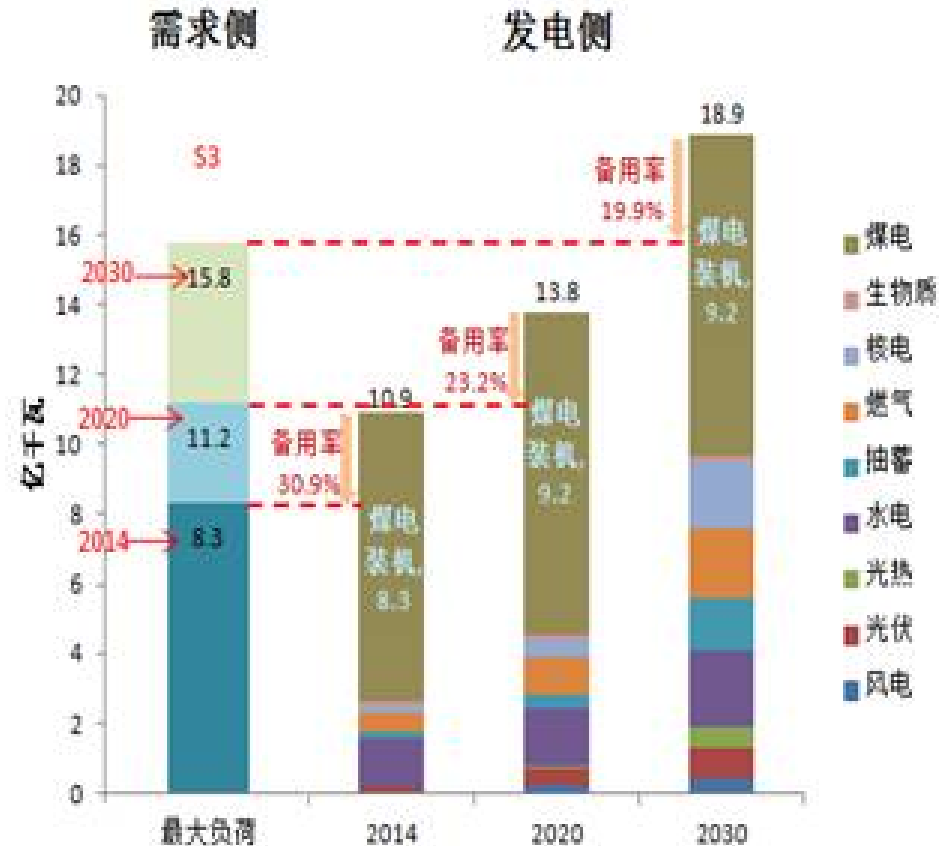
煤电规划

Coal Power Planning

■ 煤电规划目标: 资源裕度 (resource adequacy perspective)



S2情景下最大负荷增长与等效可用容量比较
Comparison of the growth of peak load and the equivalent available capacity in S2

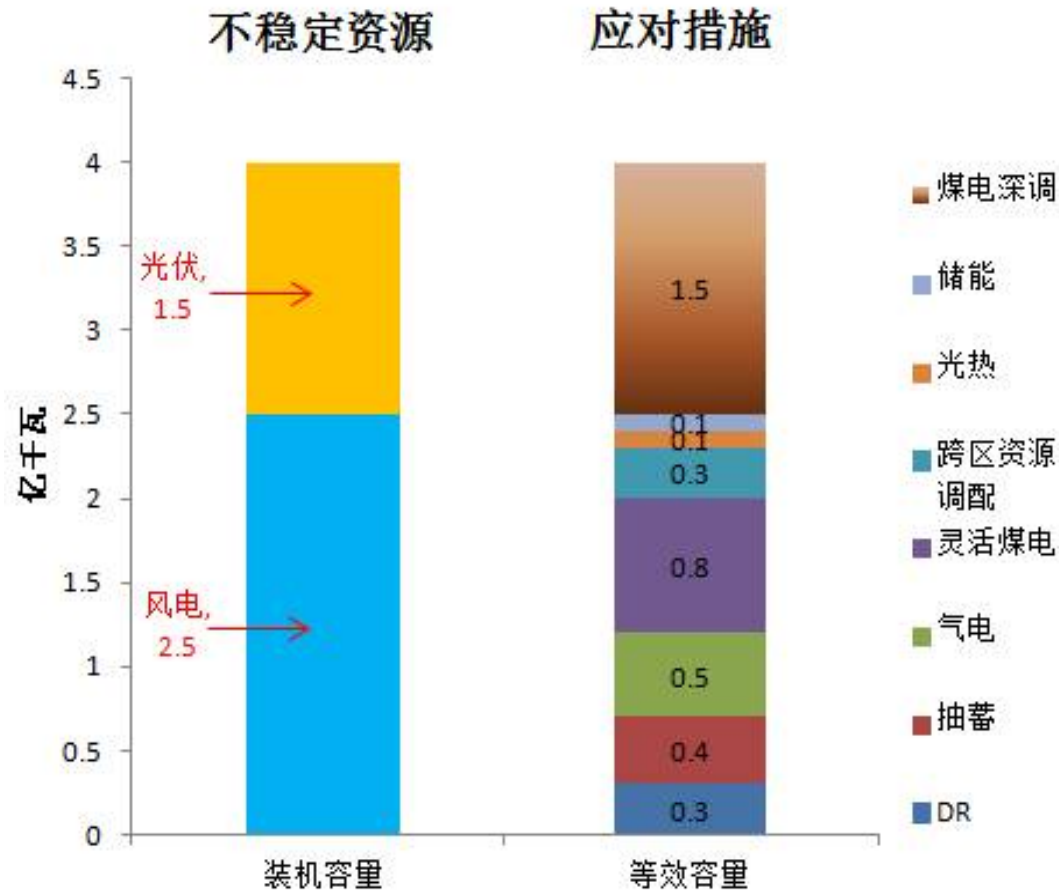


S3情景下最大负荷增长与等效可用容量比较
Comparison of the growth of peak load and the equivalent available capacity in S3

煤电规划

Coal Power Planning

■ 煤电规划目标: 系统灵活性(system flexibility perspective)



间歇性电源与灵活性应对措施
Intermittent sources and flexibility options

煤电调控政策

□ “急刹车” 文件-2016.4.25

- 《关于促进我国煤电有序发展的通知》：有序发展煤电 (Orderly development of coal power)
- 《关于建立煤电规划建设风险预警机制暨发布 2019 年煤电规划建设风险预警的通知》：煤电规划建设风险预警机制 (Planning & Building Risk Early-warning for coal power)
- 《关于进一步做好煤电行业淘汰落后产能工作的通知》：淘汰煤电落后产能 (Phase-out inefficient coal power plants)

煤电调控政策

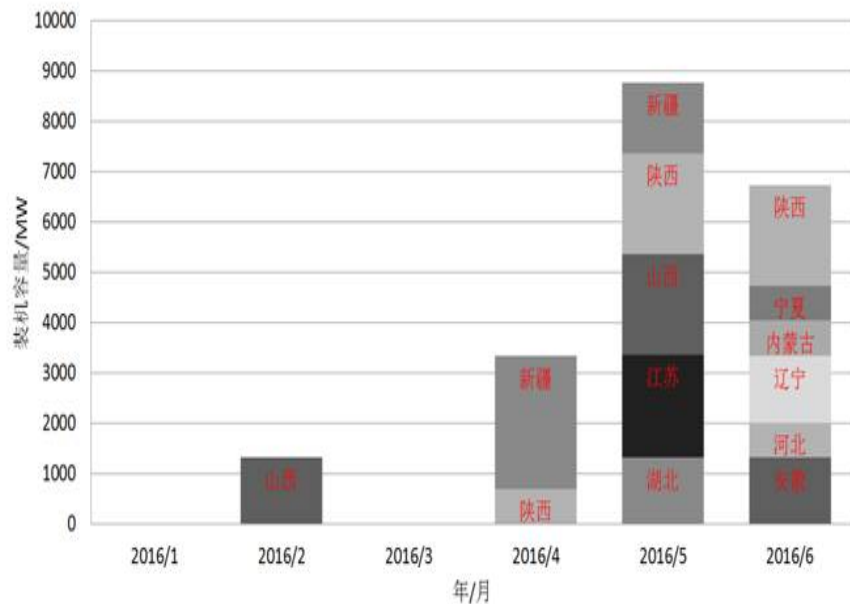
□ 后续政策 Follow-up policy

- * 发电计划放开（征求意见）：放开年度发电计划与电价改革；对于新建煤电机组不在核准年度发电计划（政策建议）
- 煤电定位转型与深度调峰改造：从提供基荷向提供系统辅助性服务转变，灵活性改造试点
- 《进一步规范电力项目开工建设秩序的通知》（2016-8-5）：加强电力项目开工建设秩序的管理
- 关于取消一批不具备核准条件煤电项目的通知（2016-9）：总共取消1250万千瓦的煤电项目 (Cancellation of a total of 12.5GW coal power projects)
- 关于进一步调控煤电规划建设的通知(2016-10):进一步调控煤电规划建设 (Further Control of coal power planning and new building)
 - 红色预警省份严控自用煤电规模：“缓批缓建” Postponing approval and building in red alert regions;
 - 明确外送煤电投产规模：新疆准东、宁夏宁东、内蒙鄂尔多斯、陕西陕北基地，减半执行；内蒙锡盟基地2020年前规模控制在730万千瓦；其它外送项目，要把握投产节奏 Strict control of transregional projects in coal power base s

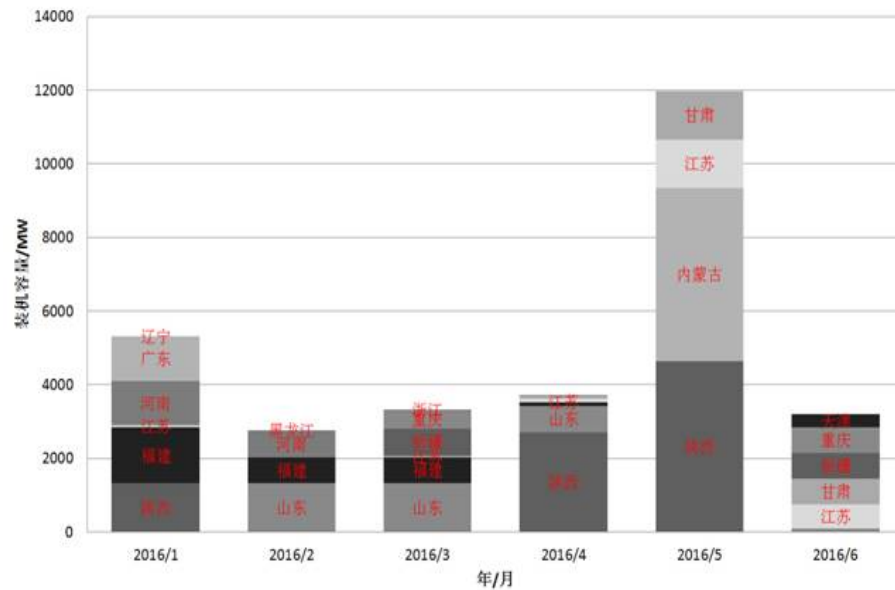
调控效果

- “急刹车”文件发布之后的两个月内（5-6月），仍有13个项目共计**1550万千瓦**开工建设，有1500万千瓦煤电项目**环评**获得受理。这表明“缓核缓建”政策在实际落实中存在一定滞后效应 (In the next two months (May-June) after the policy issued, there were still **15.5GW new projects starting** constructing, and 15GW coal power projects received the **EIA** approval, suggesting the lag effect of the policy.)

2016上半年各省开工建设煤电项目



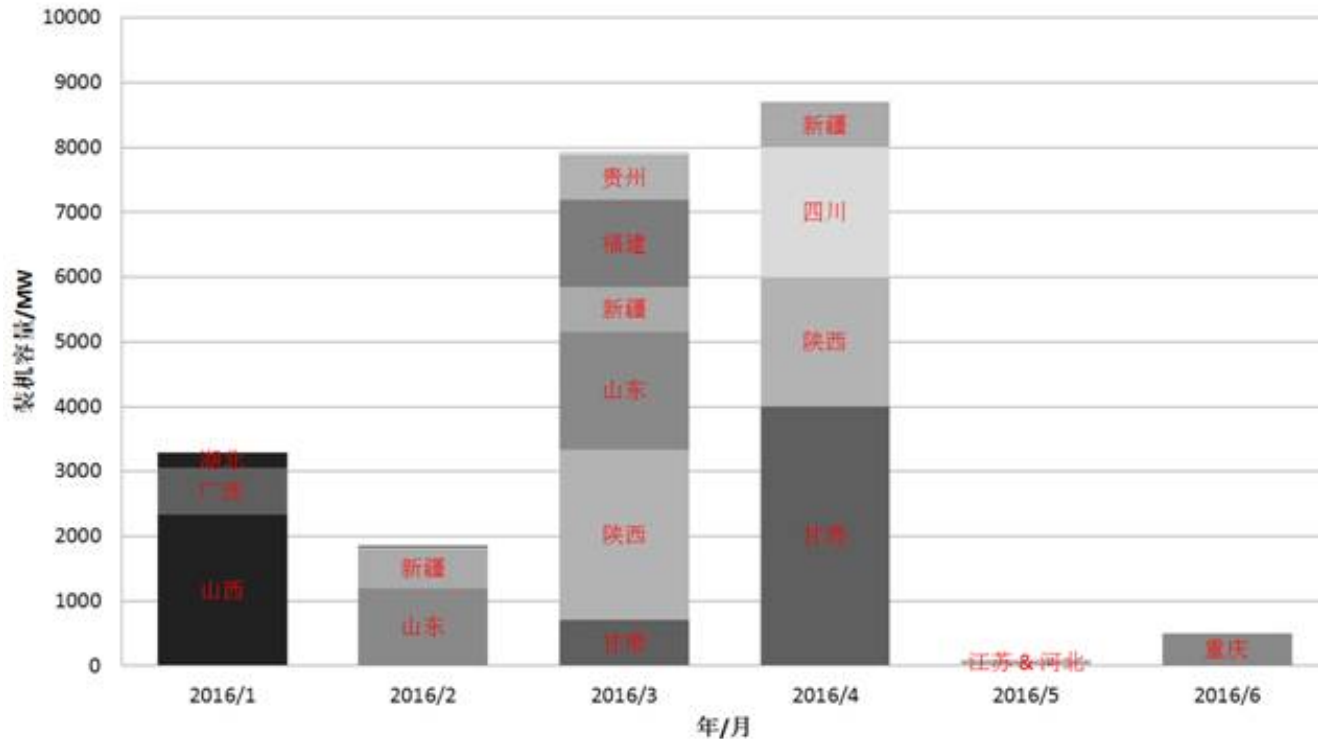
2016上半年各省环评审批煤电项目



调控效果

- 调控政策的积极效果初步显现，包括没有缓核限制的省份在内，鲜有煤电项目获得各省发改委核准。(Positive effect: Few coal power projects were approved by the local Development and Reform Commissions.)

2016 上半年各省发改委核准煤电项目



绿色和平 (2016)

调控效果

□ “急刹车” 调控的短期效果已显现，但长期效果有待进一步观察

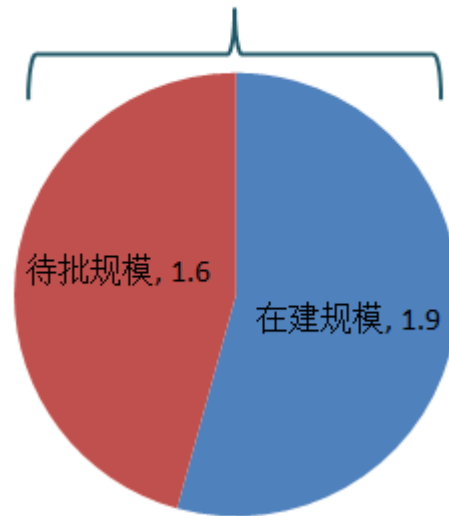
- 上半年火电完成投资379亿元，同比下降6.4%。(For the first half of 2016, accomplished an investment of RMB37.9 billion in thermal power , **down by 6.4%** on a year-on-year base.)
- 但是上半年煤电投产2149万千瓦，同比多投产367万千瓦。(However, in the first half of the year, **21.49GW** coal power was commissioned, a record since 12th FYP.)
- 电源装机15.2亿千瓦，同比增长11.3%，超同期电力消费增速8.6个百分点，**过剩进一步加剧**。(The total capacity reached **1520GW**, up by 11.3% on a year-on-year base and 8.6 percentage point more than the growth rate of electricity consumption.)
- **预计全年煤电新增5000万千瓦，总装机新增1.2亿千瓦**。(CEC predicts that , **coal power will increase by 50GW for 2016.**)

(中电联, 2016)

煤电发展趋势

Development Trend of Coal Power

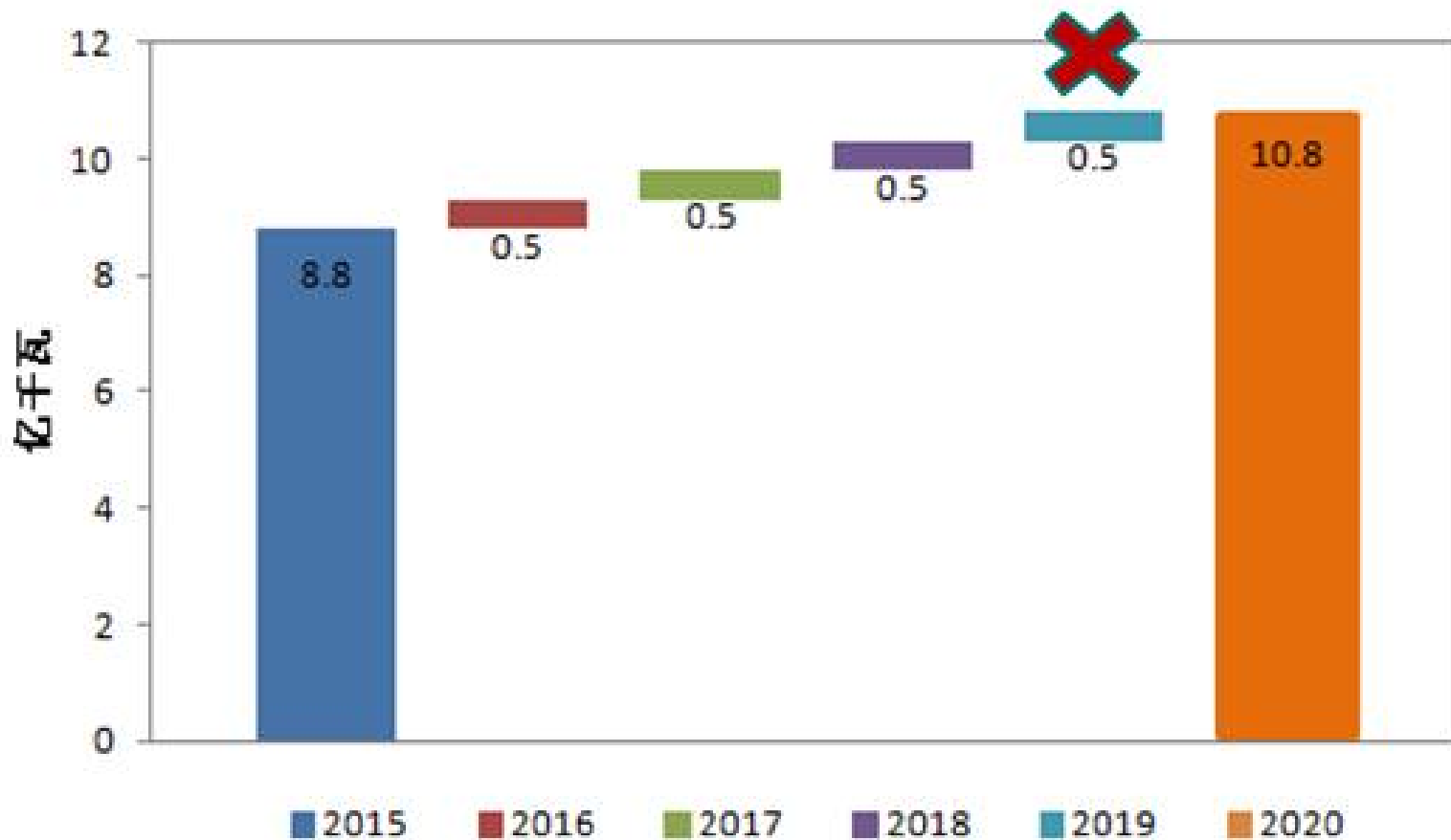
其中，1.1亿千瓦受到
“急刹车”文件影响



煤电新增装机规模（亿千瓦）
（来源：绿色和平，2016/7）

- 预计2016-2018年连续3年，每年新增燃煤发电机组5000万千瓦，2019年不确定性较大。（2016-2018: annual new installation of 50GW new coal power would be unavoidable, for 2019 the number is uncertain now, because of the policy update.）
- 即便2020没有一千瓦煤电新投产，2020年我国煤电装机容量将达到10.8亿千瓦。
- 确保2016年在批项目不形成新的过剩产能，是观察、判断调控政策是否落实到位的核心指标！（No new approval since 2016 and no new building after 2019 can be regarded as the key index for evaluating the long-term effect of the policy.）

下一步调控: 政策建议



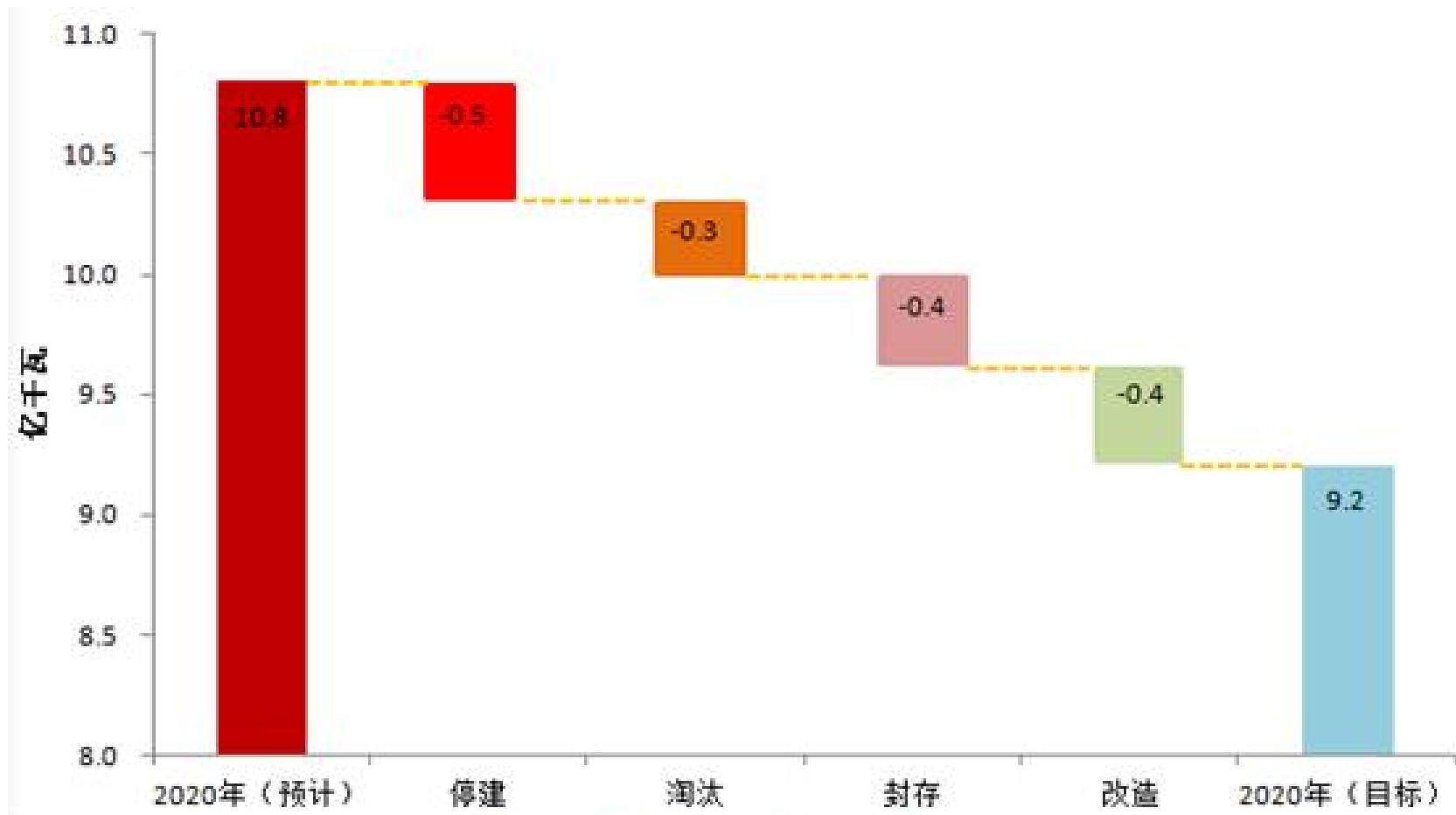
我国煤电“十三五”装机规模展望
Prospect on China's coal power installation capacity during the
“13th Five-year Plan”

下一步调控: 政策建议

- 对2019年底预计达到的10.8亿煤电机组，实行：
 - ✓ “停止新批新建” Stop new approval and new building to make sure no new commission since 2019.
 - ✓ “取消五千万千瓦” Cancellation of 50GW new project.
 - ✓ “淘汰三千万千瓦” Closing down 30GW：所在省区未来无可再生能源的灵活性保障需求且煤电严重过剩省份。
 - ✓ “封存4000万千瓦” Mothballing 40GW：所在省区未来有保障可再生能源的灵活性需求。
 - ✓ “灵活性改造4000万千瓦” Flexibility retrofitting 40GW：改造一批主力机组，未来以系统深度调峰为主，作为电力型机组参与电力市场。(together with the mothballed units, retrofitted units will only serve in ancillary service market)

煤电产能退出路径

Exit Path for Coal Power Capacity



煤电产能退出路径及调控目标

The exit path for coal power capacity and the regulation goal

煤电产能退出路径

Exit Path for Coal Power Capacity

□ 煤电调控任重道远——搁浅资产经济代价

标准60万千瓦煤电厂经济性关键参数设定

上网电价 (元/kWh)	煤价 (元/吨煤)	利用小时数	直购电比例	直购电下电价降幅 (元/kWh)
0.37	321	4500	10%	0.06



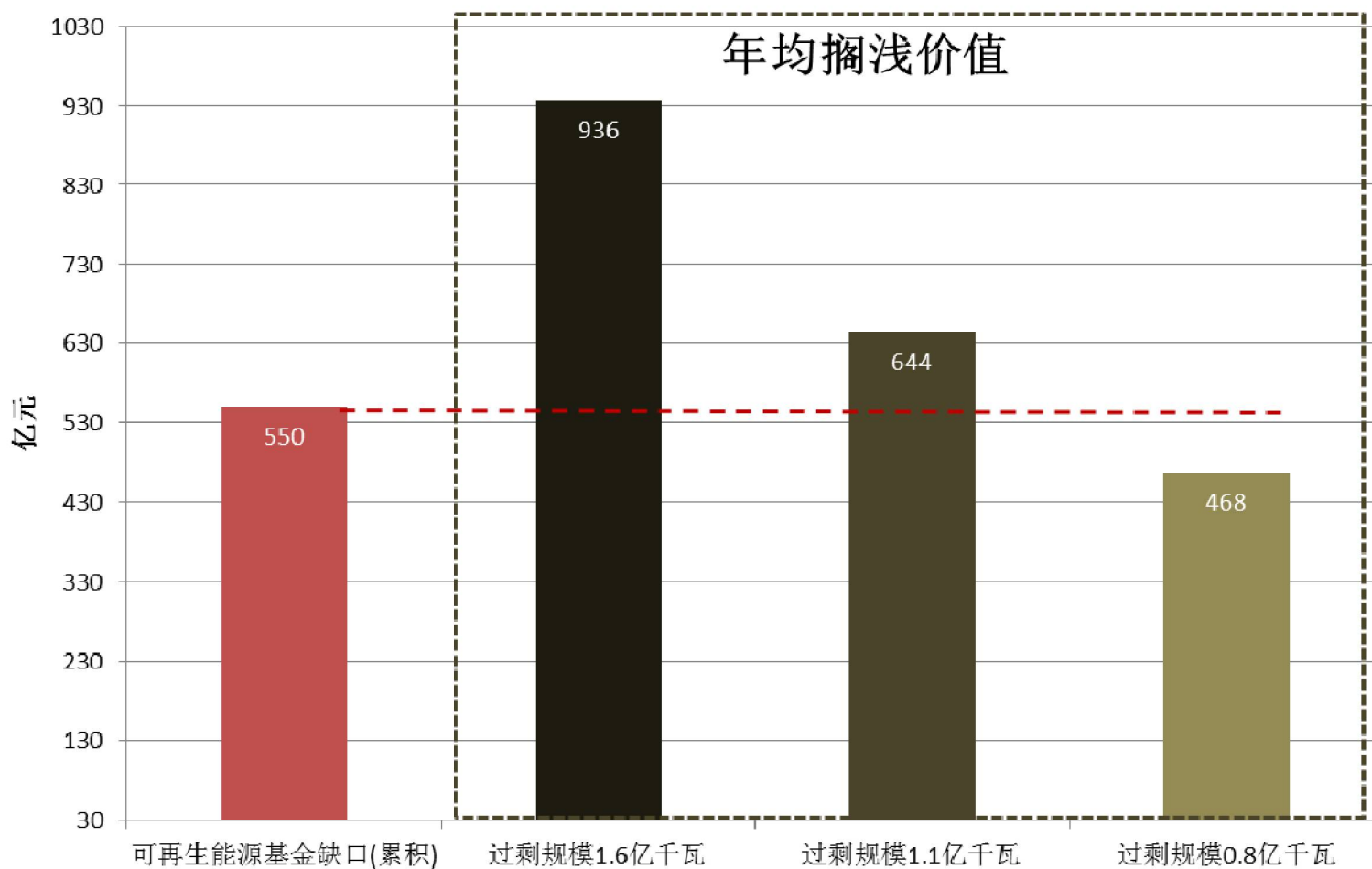
60万千瓦煤电厂投入产出情况 (亿元)

过剩1.6亿千瓦煤电的经济代价 (万亿元)

煤电产能退出路径

Exit Path for Coal Power Capacity

- ❖ 有效避免煤电投资浪费对于促进可再生能源的发展能起到很大帮助！



总结

Wrap-up

- ❖ **新常态意味着煤电增长空间有限!**(New normal means no space for aggressive coal power growth!)
- ❖ **新建项目（在建、批复）的搁浅风险巨大!** (New projects under construction/planning are highly risky!)
- ❖ **调控政策起到了一定成效但未达预期!** (Action is taken, and on the right direction, but is not enough!!!)
- ❖ **区域规划目标(Rational planning target):**
 - Strong determination of renewable transition
 - Clear market signal
- ❖ **可行的调控策略(Feasible regulation strategy):**
 - Expected new addition of coal power during 2016-2018
 - Flexibility requirement of renewable integration
 - Market reform pathway

Comments and questions are welcome!

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