

Regional Air Quality Planning: Energy and Air Quality Integration

区域空气质量规划：将能源和空气质量 政策相结合

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Basics

背景

- 50% of the world's coal consumption occurs in China
- 50% of China's coal use is for generating electricity
- Solving China's air quality and GHG challenges is, at heart, a question of energy policy
- 世界上50%的煤炭消耗来自中国；
- 中国50%的煤炭用于发电；
- 解决中国的空气质量和温室气体排放而面临的挑战，能源政策是核心问题。

China's Energy Goals

中国的能源目标

- Carbon intensity reduction by 40-45% from 2005 levels by 2020
- By 2020, 15% of its primary energy needs will be served by renewable resources.
- China will reduce coal consumption as a percentage of primary energy to below 65% by 2017
 - Coal consumption caps in Jing-Jin-Ji, Shanghai and the Yangtze River area, and the Pearl River Delta
- 到2020年，碳排放强度在2005年基础上降低40-45%。
- 2020年，可再生能源占到一次能源需求的15%。
- 2017年，煤炭占一次能源消费总量比重降低到65%以下。
 - 煤炭消费总量控制目标：京津冀，长江三角洲，珠江三角洲。

Recent Policy Announcements

最近公布的政策

Xi-Obama Agreement, November 2014

- US to cut greenhouse gas emissions 26-28% below 2005 levels by 2025.
- China to hit a peak in its carbon dioxide emissions by 2030—possibly sooner—and to increase the non-fossil fuel share of energy to around 20% by 2030.
- Modeling shows that a peak in carbon emissions must be preceded at least five years earlier by a peak in coal consumption

Deepening Reform of the Power Sector released by CPC and State Council, 19 March 2015

- Environmentally sustainable power sector development
- Grid company reform
- Improved generator dispatch/operations
- Demand-side management
- Developing market mechanisms
- Renewables integration
- Improved planning

Air Quality Rules

- Progressively more stringent regulations over the last three years, to address local air pollution
- Regulations specifically allow for investment in renewable energy and end-use energy efficiency as means of avoiding emissions of pollutants
- Amendments to the Air Law were adopted in August 2015, furthering these reforms

Xi-Obama Agreement on Climate Change, 25 September 2015

- National CO₂ emissions trading
- Green dispatch
- Green buildings

Opportunities to Reduce Emissions through Power Sector Reform

电力行业改革带来的减排机遇

- Document #9, March 2015:
 - Economically efficient system operations (“green dispatch”)
 - End-use energy efficiency and demand response
 - Integration generation from renewables into system operations
 - Reduced “curtailment”
 - Improved planning
- 2015年3月，电改9号文件：
 - 经济有效的系统运营（“绿色调度”）；
 - 终端能效和需求响应；
 - 可再生能源并网
 - 减少弃电
 - 完善规划

Barriers to Emissions Reductions in the Power Sector

电力行业减排遇到的壁垒

- Inefficient power system operations
 - Annual output plan for generation
 - Renewables (RE) are “curtailed” in favor of thermal generation
- Separate regulatory responsibilities
 - Energy and environmental policy are not well integrated
 - AQM planning and implementation
- Economics: relative costs of RE, coal generation, and other resources
 - Good news is that costs are changing
- Policies that favor investment in coal and in-province electricity production
 - Excess coal-fired generation capacity
- 缺乏高效的电力系统运行调度：
 - 年度发电量计划；
 - 通过对可再生能源弃电满足火电厂发电计划。
- 分离的监管职责：
 - 能源和环境政策并未良好的结合；
 - 空气质量管理规划和实施。
- 经济性：可再生能源、煤炭发电和其他资源的相关成本；
 - 好消息是成本在变化。
- 对煤炭和省内发电投资的利好政策：
 - 对燃煤电厂过度建设。



Roadmap for Integrated Policy Must Be Created: Best Practices

需要制定出整合的政策路线图：最佳实践



EU Directives: LCD, P2
欧盟方针

EPA Clean Power Plan
美国环保署
清洁电力计划

Best Approaches: Technologies *and* Techniques

最佳实践：技术和技巧

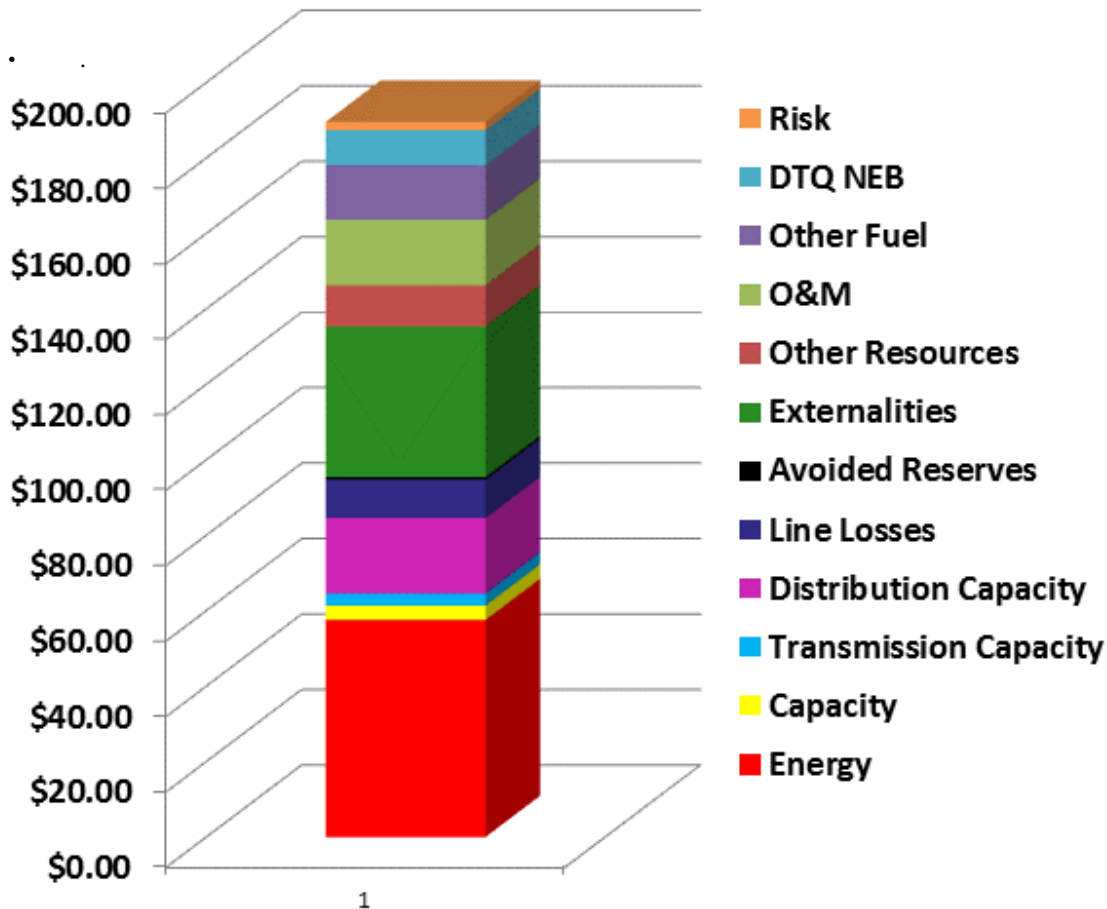
- End-of-pipe: emissions controls
- Root-of-pipe: Actions to avoid dirty and wasteful energy use
 - EU approach: “efficiency first”
 - Energy efficiency on-site
 - Clean energy alternatives
- 终端：排放治理控制；
- 源头：避免使用不清洁的能源，避免浪费能源：
 - 欧盟措施：能效第一
 - 在工厂实施能效
 - 清洁能源替代方案

Integrated Energy and Environmental Policy

整合能源与环境政策

- Energy policy designed to meet environmental goals
- US approach: Clean Power Plan
 - Emissions performance standards that drive investment in clean alternatives and end-use efficiency at *lowest long-term cost*
- 制定可以满足环境目标的能源政策；
- 美国的措施：清洁电力计划；
 - “排放性能标准”（EPS）带动了对最低长期成本的清洁能源替代方案和终端能效的投资。

Vermont Energy Efficiency Savings Value Updated Externality and NEB Values



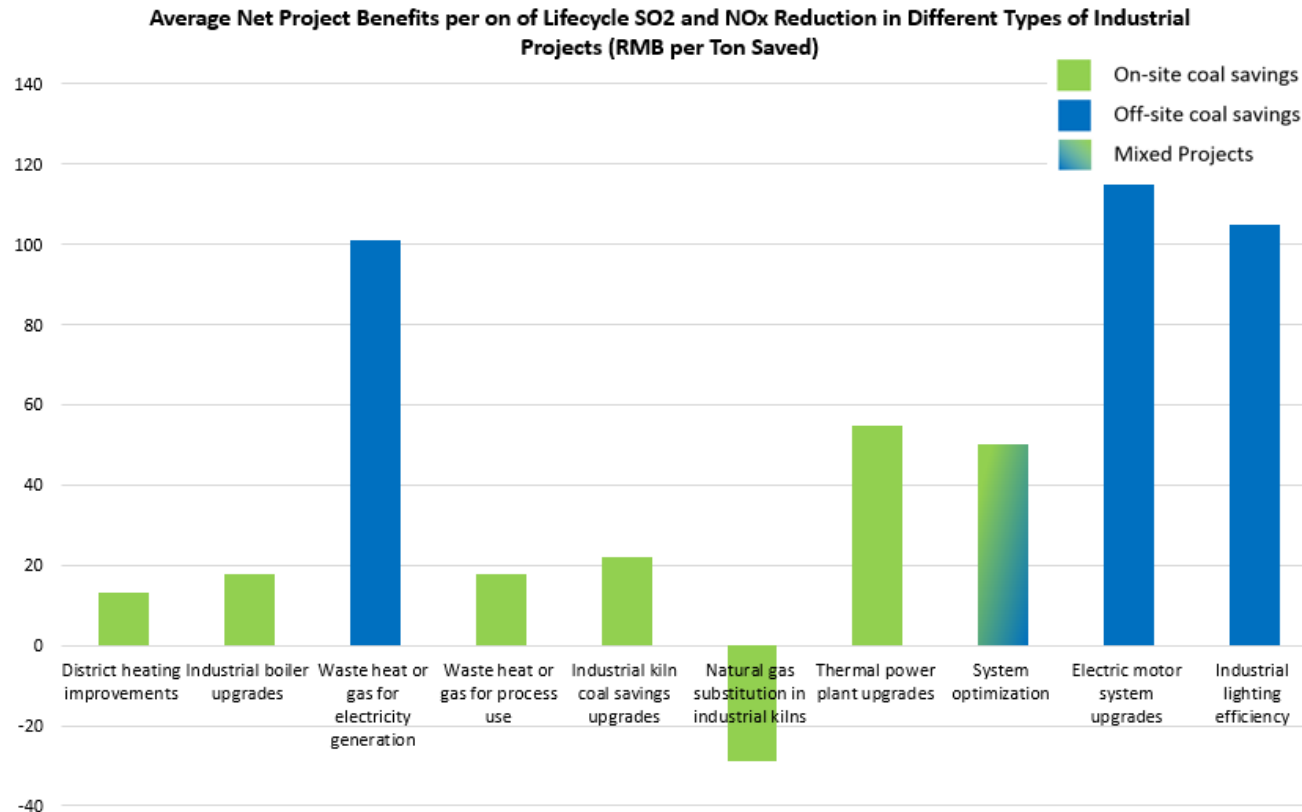
End-use energy efficiency reduces demand for electricity, and therefore reduces emissions
 终端能效降低对电力的需求，
 以此实现减排目标

Source: Regulatory Assistance Project

Industrial Energy Projects

Save Coal and Reduce Emissions

工业能效项目：节煤减排



Pause to Reflect

回顾

- China needs to reduce PM2.5 by 80-90% from 2013 levels
- This won't happen unless air and energy policies are integrated
- End-of-pipe-only approach leads to higher GHGs
 - Smokestack controls use energy (“parasitic” load)
 - Root-of-pipe actions address this problem
- 中国需要在2013年基础上降低80-90%的PM2.5浓度；
- 只有将空气和环境政策有效结合才能实现该目标；
- 单纯的使用终端能效措施会导致更高的温室气体排放：
 - 烟囱控制设备会使用能源；
 - 源头控制可以解决该问题。

Some Observations

现状分析

- Recognize AQ and CO₂ benefits from renewables and end-use efficiency (e.g., Top 10,000 Enterprises Program)
- Coordinate environmental and energy policy and planning
 - Adopt power sector reforms that advance environmental goals
 - End-use efficiency, renewables, market designs that favor clean energy investments, etc.
- 从可再生能源和终端能效中项目中识别出提高空气质量和减排效益（比如，“万家企业节能低碳行动实施方案”）；
- 协调环境、能源政策及规划：
 - 实施电力行业改革以推动实现环境目标：
 - 终端能效，可再生能源，市场设计等有利于清洁能源投资的政策。

Some Observations

现状分析

- China has adopted strong energy and air laws and regulations, but the “devil is in the details”
- Implementation matters:
 - Document #9
 - “Green dispatch,” reduced RE curtailment
 - Clean energy policies as AQM control tool, as required by the Air Law
- This is where the challenges lie
- 中国颁布了强有力的能源和空气法规，但是“细节决定成败”；
- 实施方面：
 - 电改9号文；
 - 绿色调度，减少可再生能源弃电；
 - 诸如空气质量控制工具等清洁能源政策，大气法对此提出了规定。
- 这些也是存在挑战的地方



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关于睿博能源智库

睿博能源智库（RAP）是一个全球性专家咨询机构，主要关注全球能源政策下经济和环境的可持续发展。RAP 在能源政策方面有资深的经验，致力于促进经济效率、保护环境，确保电力系统的可靠性和扩大社会效益。

RAP 帮助中国政策制定者制定和实施相关政策，来促进可持续经济发展、增加能源系统可靠性、改善空气质量和公众健康，从而为中国大量和长期地减少温室气体排放作出贡献。

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