中英清洁能源挑战及政策建议

Global Issues in Clean Energy and Potential Solutions

Southeast University, Nanjing, China

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Group C

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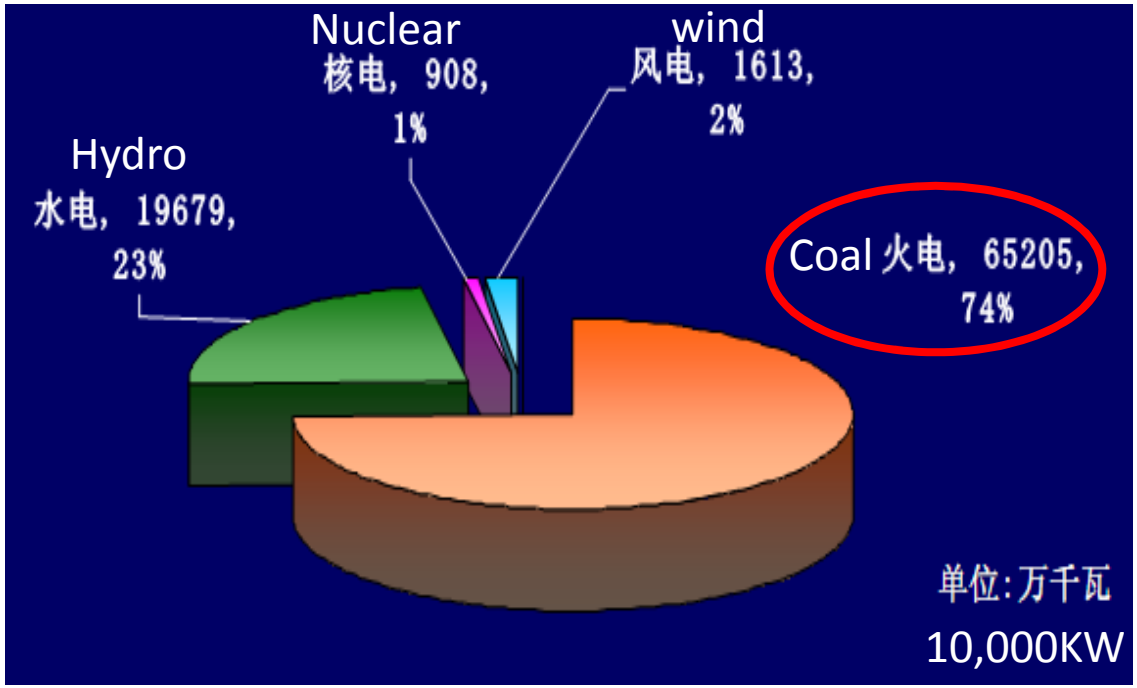
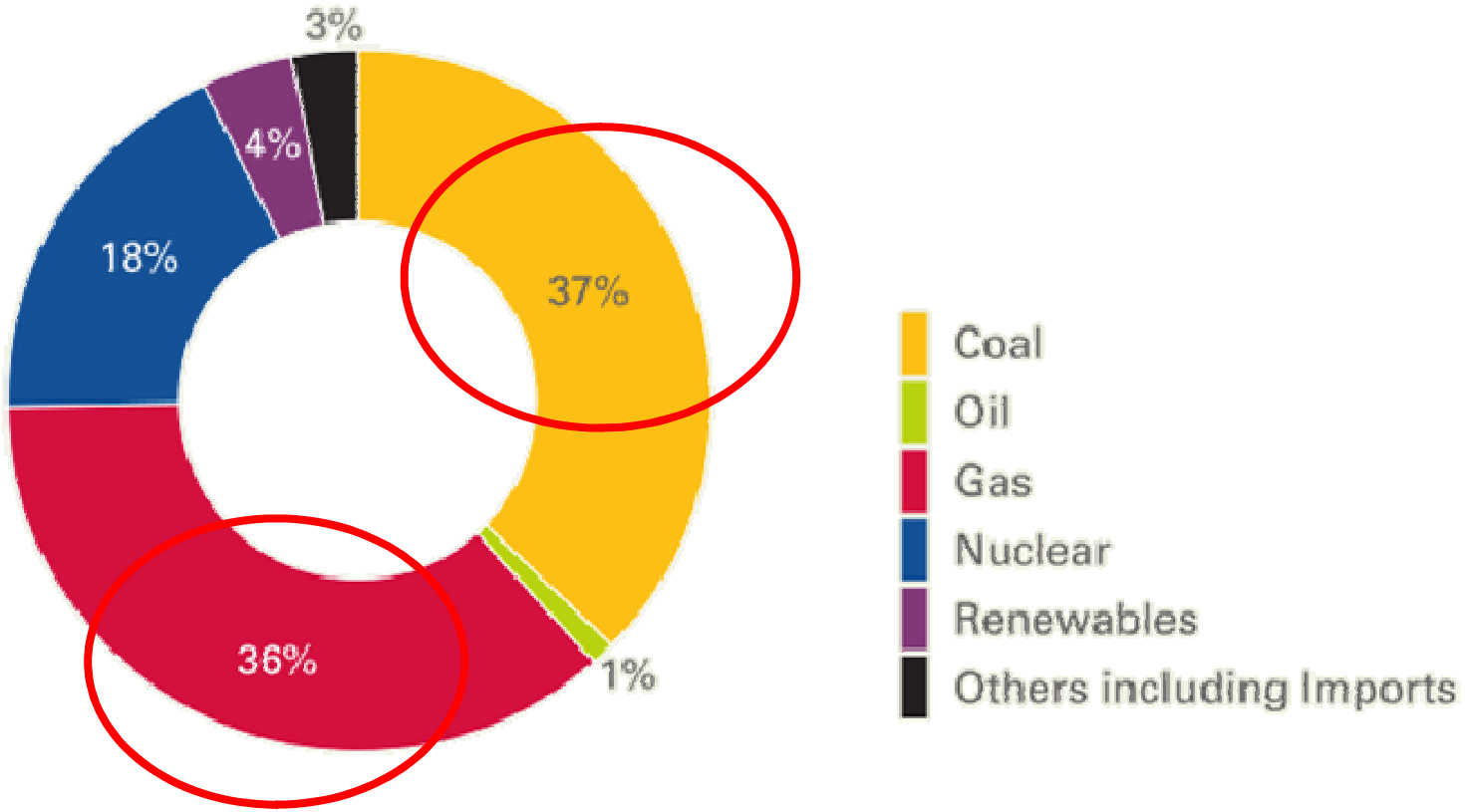
2009年中国电力结构
China Generation Structure in 2009



2007年英国电力结构
UK Generation Structure in 2007



Source: DTI, 2007

中国电源结构引发的挑战
China Energy Challenges

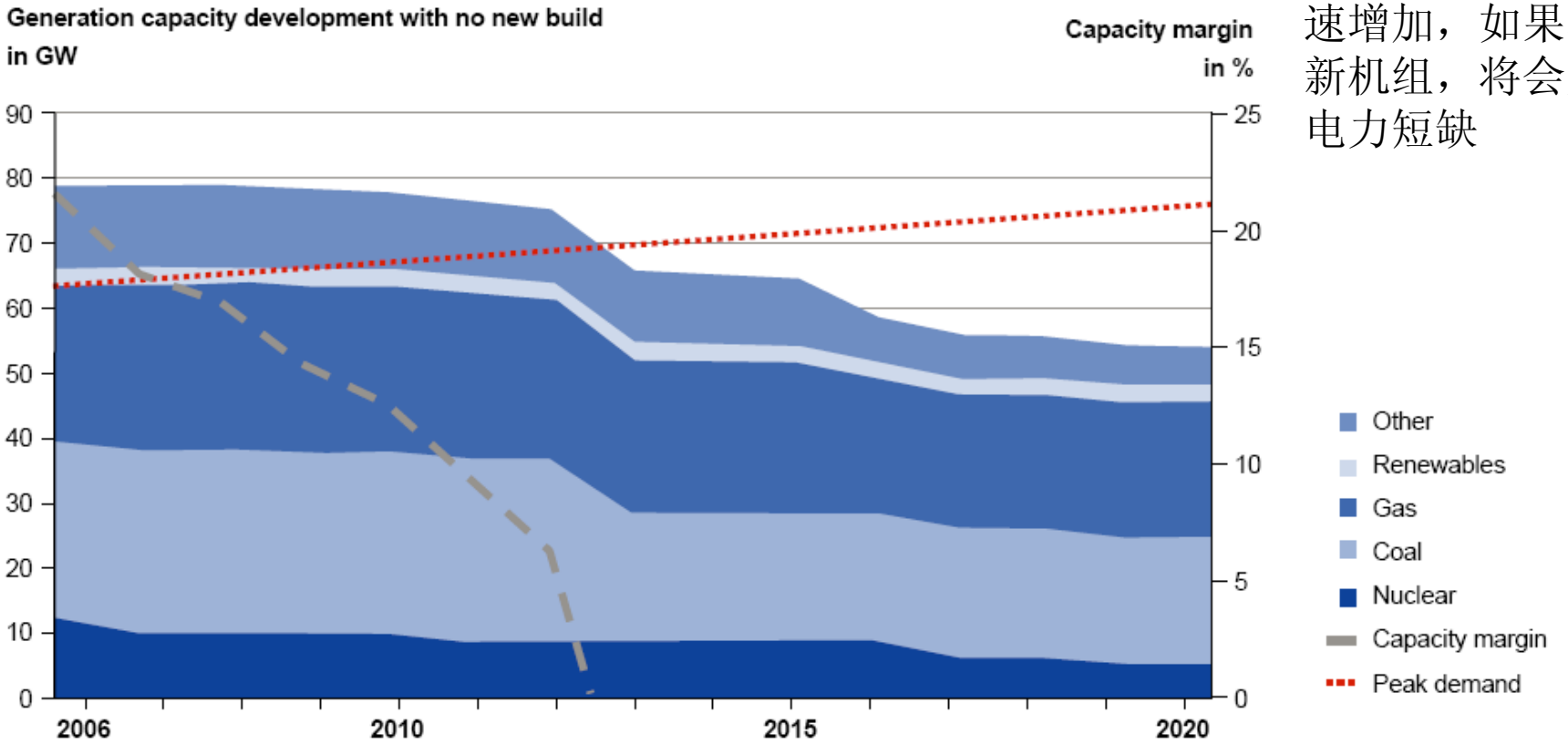
- Pollution:
  以火电站为主（74%） →污染问题严峻
  Mainly coal plants (74%)→ Particles 、SO_x、NO_x、CO_2、Hg……

- Energy security：
  石油严重依赖进口→能源安全问题
  Oil Import Dependent → Energy Security

- Renewable technology difficult to commercialize:
  新能源技术不成熟 →高成本、低效率、低稳定性 →短期很难实现商业化
  Renewable technology immature → high cost, low efficiency and stability → long term to commercialize

英国能源挑战
UK Energy Challenges

随着用电需求的快速增加，如果不上新机组，将会形成电力短缺

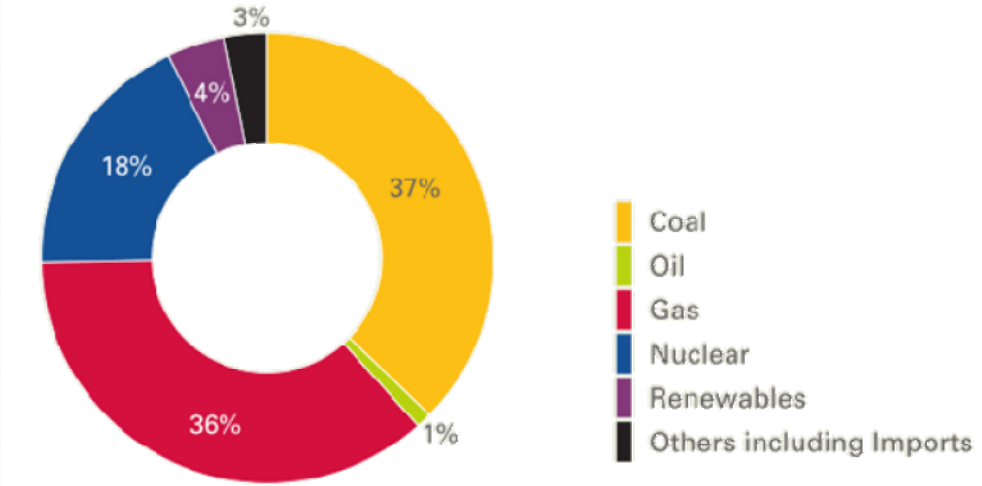


- Approximately 20 – 40 GW of new capacity (= 25 – 50% of total capacity) will be required by 2020 to maintain margins.
- Market fundamentals support a sustained return of value to the generation sector.

英国能源挑战
UK Energy Challenges

- 能源安全
  UK energy security
  - Old nuclear closing
  - Closing coal and oil due to European legislation

- CO_2减排的压力
  UK need to meet CO_2 targets
  - 34% reduction by 2020 and 80% by 2050



Source: DTI, 2007

- 政府不允许上新机组，除非加装CCS
  No new coal without CCS
  - Government preventing new coal without CCS technology

清洁能源发电路线
Routes to Clean Energy Power Generation

- 洁净煤发电：也是一种新能源技术
  Clean coal power generation is a new technology

- 中期路线：以洁净煤发电为主体，多种发电技术齐头并进；
  Invest in clean coal power generation and develop renewable energy technologies

- 目标 Target：
  - 实现“煤基近零排放”
    Near-zero emissions technology
  - 可再生能源发电技术逐渐成熟
    Develop and mature renewable energy technologies
  - 建立智能电网
    Establish smart grid

什么是近零排放？
What is Near-Zero Emission?

- 脱除粉尘、SO_2、NO_x、CO_2
  Reduce particles、SO_2、NO_x、CO_2……

- 燃烧前（气化）（煤基近零排放多联产系统）
  Pre-combustion : IGCC+CO_2 and storage

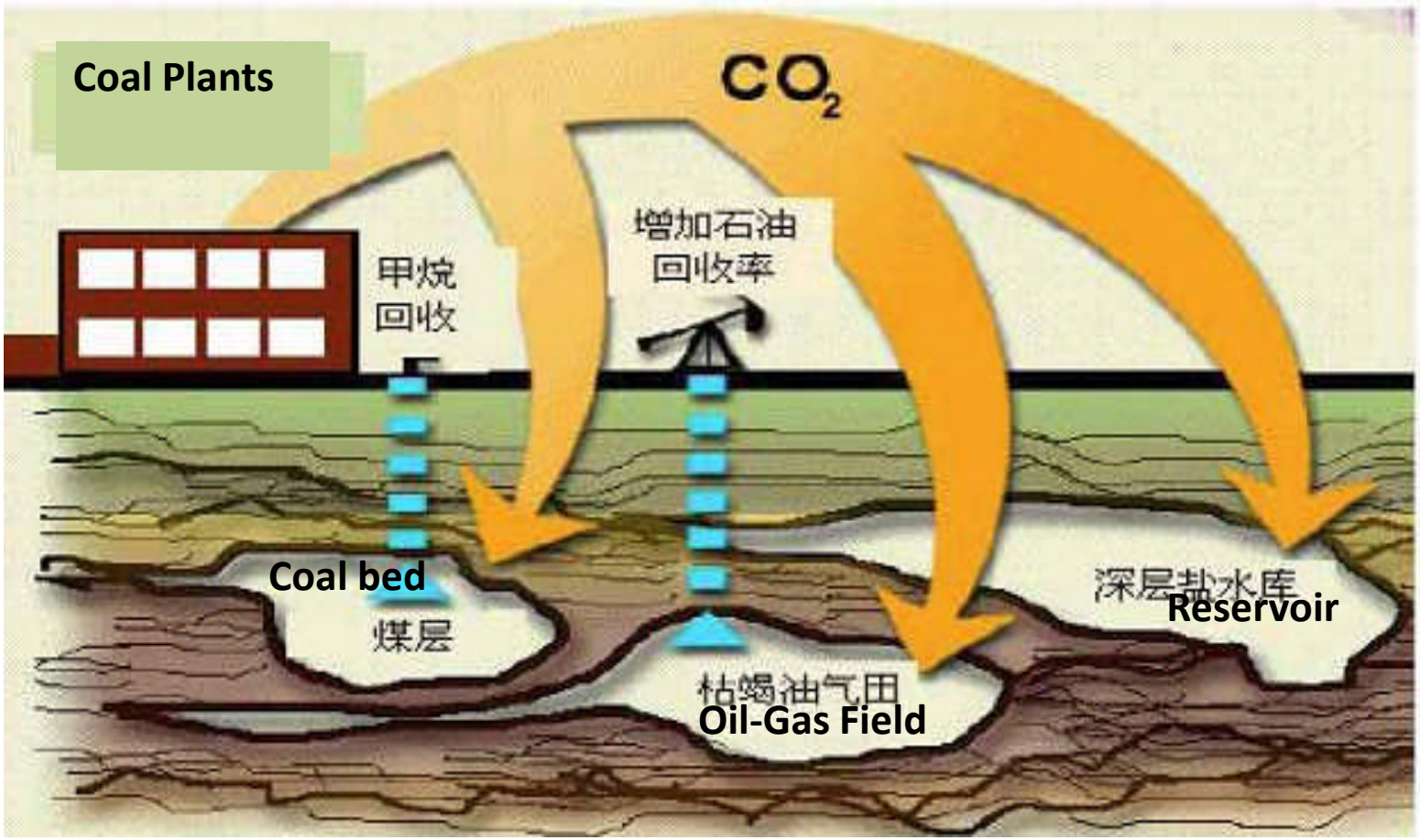
- 燃烧中（新型燃烧器）
  During-combustion: O_2/CO_2 looping combustion (oxyfuel)

- 燃烧后（烟气脱除）
  Post-combustion: FGD , SCR, **CCS**

CO2存储

石油天然气增产开采、煤层气回收、地下蓄水层存储

CO_2 Storage and Enhanced Oil Recovery



英国能源问题的解决方案 UK Solutions

- Increase generation capacity
  增加发电容量
  - Increase in generation capacity is required to 'bridge the energy gap'
    填补供电缺口
  - Gas power stations currently under construction
    建设煤气发电厂
  - Diverse energy portfolio required to ensure energy security
    建立多样的能源构架以确保能源安全
  - Clean coal as an option
    选择清洁煤发电路线
- Introduce a carbon trading market
  引进碳交易市场
  - Give generating companies greater incentive to build clean coal
    鼓励发电公司采用洁净煤技术

英国能源问题的解决方案
UK Solutions

- New or reformed Government policies
  改进已有政策
  - Allow quicker implementation of new technologies
    促进新技术尽快实施

- Improved integration with EU Grid
  与欧洲电网集成
  - Will allow short term solution to bridging the energy gap
    短期内填补电力缺口
  - Allow long term projects such as nuclear power stations to be built
    长期内有利于建设核电站
  - Doesn't effect UK emissions
    对英国碳排放影响小

政策建议（英国）
UK Policy Suggestions

- Renew energy policy
  改进已有政策
  - Carbon neutral electricity generation by 2025
    2025年有望实现零碳排放
  - Allow new build of efficient coal stations, but must have full CCS capabilities by 2025
    在能够实现CCS的基础上，允许新建煤高效利用电站
- Define and implement carbon market by 2025
  确定并成立碳交易市场
  - Staged introduction
    阶段式引进
  - Further initiative to ensure CCS implementation
    鼓励CCS的有效实施

政策建议（英国）
UK Policy Suggestions

- Integrated ‘EU super grid’
  形成欧洲超级电网
  - Allow greater capacity to import energy
    Chinese Translation
- Further government incentives
  建立政府奖励政策
  - To research and develop zero emission technologies
    研究发展近零排放技术
  - Feed in tariffs for electricity and heat to encourage small scale green technologies
    引入电、热关税，鼓励小规模绿色技术

政策建议（中国）
China Policy Suggestions

- 征收碳税

  Implementation of carbon tax
  - 设定碳排放基准，征收超标碳税，用于清洁能源、CCS等技术。

    Setting the quotas for carbon emission and charging excessive emission taxes for investments in clean energy, CCS technologies, etc.

- 立法规范、支持太阳能等新能源产业发展

  Legislation for regulating and supporting solar industry as well as other new energies
  - 防止饱和及恶性竞争

    Preventing excess manufacturing leading to inefficient use of photovoltaics
  - 投资补助并网发电

    Funding for solar electricity combined to grid
  - 补贴安装光伏系统

    Subsidies for construction of photovoltaic system in new buildings

政策建议 （中国）
China Policy Suggestions

- 价格杠杆调控能耗

  Introducing tiered pricing to reduce energy consumption

  – 设定基础标准，累进计算电价

    Adopting basic categories with increasing prices of electricity per unit

50kw/month/person	0.5 Yuan(RMB)/kw
51-100kw/month/person	1 Yuan(RMB)/kw
＞100kw/month/person	2 Yuan(RMB)/kw

政策建议 （中国）
China Policy Suggestions

- 倡导节约意识，培养绿色消费理念

  Advocating and promoting a green, low carbon and healthy lifestyle
  - 绿色出行，电子化办公，垃圾分类回收，树立榜样

    Public transportation, computerized office work, recycling, the importance of improving public perception towards reducing carbon footprints

- 建立能源技术国际共享机制

  Establishment of international institutions for sharing advanced clean energy technologies
  - 订立国际公约，规定能源技术共享义务

    International agreements to define obligations of sharing clean energy technologies among countries
  - 国际社会共同努力，实现全球减排目标

    Efforts to reach emission reduction target as a whole

总结
Summary

- Both the UK and China's energy challenges have been discussed in detail enabling an appreciation and understanding of issues unique to and shared by each nation
  分析了中英双方面临的能源挑战，对双方的异同点有了一定的理解，并达成共识

- Potential government policies have been outlined for the UK and China to attempt to alleviate the challenges that they currently face
  共同提出了能源政策建议，有助于解决目前面临的能源挑战。

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