

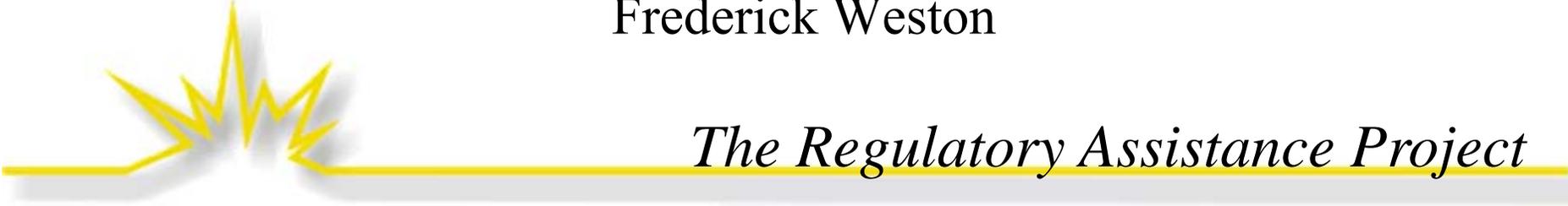
Climate Change Initiatives in the Chinese Power Sector

NARUC

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Frederick Weston



The Regulatory Assistance Project

50 State Street, Suite 3
Montpelier, Vermont USA 05602
Tel: 802.223.8199
Fax: 802.223.8172

27 Penny Lane
Cedar Crest, New Mexico USA 87008
Tel: 505.286.4486
E-Fax: 773.347.1512

110 B Water St.
Hallowell, Maine USA 04347
Tel: 207.623.8393
Fax: 207.623.8369



The Chinese Power Sector

- Approximately 800 GW, world's second largest (after US, 1,032 GW in 2007)
- 15% growth per year since 2005
 - 105 GW in 2006, 90% coal-fired
 - 95 GW in 2007, >80% coal-fired
 - 90 GW in 2008, 73% coal-fired
- Projected need of 1,300 GW additional capacity by 2030
- China is the world's largest emitter of GHGs
 - >6 billion metric tons CO₂, with emissions expected to double 2002 levels by 2030
- China's total annual spending on energy efficiency amounts to approximately 3.5% of electric revenues
 - Sources: direct gov't investment, SBCs, utility surcharges, loans
 - More than that of the US



Eight Policies

- Energy intensity and emissions reduction targets
- Renewable energy mandatory market share
- Modernization of the coal generation fleet
- Efficiency benchmarks for industries and the Top 1000 Enterprises Program
- Differential pricing for energy-intensive industries
- Industry-specific energy consumption standards including coal-fired power generation
- Demand-side management and the Efficiency Power Plant (EPP)
- Environmental dispatch



First Five in Brief

- Energy intensity and emissions reduction targets
 - Current Five-Year Plan (the 11th) adopted nationwide goals to improve energy intensity (energy consumption/GDP), by 20% and to reduce absolute emissions (SO₂ and CO₂) by 10% by 2010.
 - Disaggregated by sector, province, and, in some cases, individual firms. Gov't officials' career advancement linked to performance. 2010 energy target within reach.
- Renewable energy mandatory market share
 - An RPS of 15% by 2020, expected to be raised to 20%
- Modernization of the coal generation fleet
 - >50 GW of small, inefficient power plants (≤50MW) closed down
- Efficiency benchmarks for industries and the Top 1000 Enterprises Program
 - Top 1000 aims to cut 240 million tons GHG between 2005 and 2010.
- Differential pricing for energy-intensive industries
 - Electricity prices linked to the efficiency with which electricity is used
 - Applies to the eight largest energy-consuming industries
 - Surcharges as high as 2¢ per kWh



Three in More Detail

- Industry-specific energy consumption standards
 - Applies to 22 major industries, including electric generation
 - Output-based efficiency standards
 - Energy consumption/unit of output
 - E.g., MWh/ton of cement or, for coal-fired generators, gce/kWh
 - Standards for new and existing facilities, broken down by plant size, type, and, in some cases, location



In More Detail (2)

- Efficiency Power Plant (EPP)
 - An EPP is a bundled set of energy efficiency programs designed to deliver the energy and capacity equivalent of a large conventional power plant
 - Deployed in 300 MW blocks, easily replicated and transferred
 - Four models, differing in funding approaches
 - Grid company obligation, least-cost procurement
 - SBC and third-party administration
 - Government-financing
 - Loan programs with on-bill repayment
 - Pilots in five provinces under development



In More Detail (3)

➤ Environmental Dispatch

- Current method: according to average total cost
 - Thus a 5¢/kWh unit with a 3¢/kWh variable cost is dispatched before a 6¢/kWh unit with a 2¢/kWh variable cost
- Merit order, or economic, dispatch would have immediate economic and environmental benefits
- In 2007, China announced that it would adopt environmental (or “efficiency”) dispatch
 - Loading order determined by SO₂ emissions/MWh output
 - Clean first: renewables, hydro, nuclear
 - CHP, then gas, coal last
 - Ties broken by thermal efficiency, i.e., merit order dispatch
 - CEM data used by system operator to assure compliance
 - Six provinces now developing operational rules, including compensation mechanism



Next?

- China's steps are only a start, but its local problems more acute
 - First-order consequences of these policies are improved environmental and economic performance
- What policies will we adopt, to reduce our GHG emissions by 80% over the next 40 years?



Questions

- Email: rweston@raponline.org
- Web: www.raponline.org
- RAP is a non-profit, non-governmental organization, founded in 1992. We provide technical and educational assistance to government officials on energy and environmental issues. RAP Principals are former state utility and environmental regulators, consumer advocates, and energy efficiency professionals
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