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Energy solutions  
for a changing world

# Regional Greenhouse Gas Initiative 区域温室气体行动计划

**International Carbon Action Partnership (ICAP)  
Technical Workshop on Power Sector GHG Emissions Reductions and Monitoring**

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## Frederick Weston

**The Regulatory Assistance Project**

电力监管援助计划

China

European Union

United States

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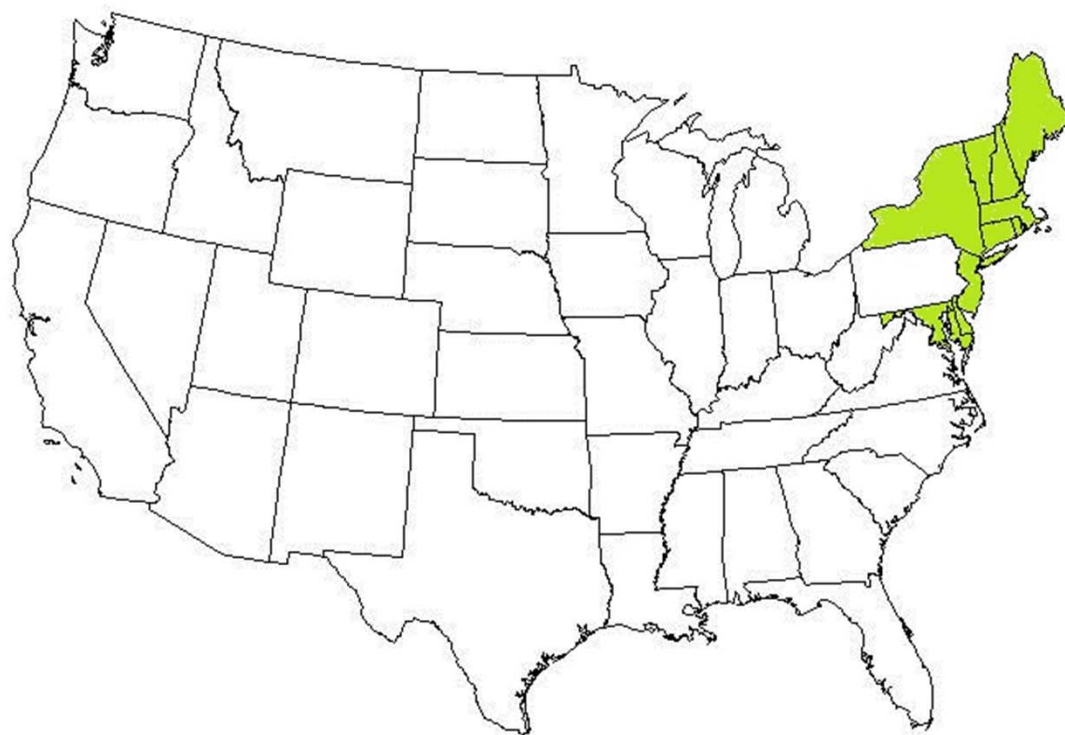
# What is RGGI?

## 什么是“区域温室气体行动计划”？

- **First mandatory, market-based CO<sub>2</sub> emissions reduction program in U.S.**
- **Ten Northeastern States (20% of US GDP)**
- **Affects power plants >25 MW**
- **Cap baseline = 2000-04 emissions (~188 million tons/year)**
- **Program started 1 Jan 2009**
- **Emissions cap kept at baseline through 31 Dec 2014; then**
- **Emissions cap is reduced 10% below baseline by 31 Dec 2018**
- **国首个以市场为基础的强制性 CO<sub>2</sub> 减排计划**
- **东北部 10 个州 (美国GDP的 20%)**
- **对发电量超过 25 MW 的发电厂产生影响**
- **基准上限 = 2000-2004 年排放量 (约 1.88 亿吨)**
- **项目开始于 2009 年 1 月 1 日**
- **2014 年 12 月 31 日前, 排放量保持在基准水平; 然后**
- **2018 年 12 月 31 日前使温室气体排放量比基准下降 10%**

# Regional Greenhouse Gas Initiative (RGGI)

## 区域性温室气体倡议 (RGGI)



# Achieving RGGI's GHG Goals

## 实现“区域温室气体行动计划”的温室气体目标

- Allowances allocated to states
  - MOU (the RGGI agreement) required minimum 25% auction. All states agreed to auction higher %; several auction 100%
  - Quarterly auctions
- Generators responsible for compliance
  - They are the “point of regulation”
- Banking allowed
  - Allowances can be saved and used later
- Emphasis: GHG reductions to occur based on reduced consumption
- 向各州分配排放配额
  - MOU 规定拍卖率至少达到 25%。各州均同意提高拍卖率；有些州甚至赞同拍卖率应达到 100%
  - 季度拍卖
- 发电厂负责合规
  - 它们是“监管点”
- 允许银行介入
  - 可节省津贴留作今后使用
- 重点：在降低耗用量的基础上减少温室气体排放量

# “Complementary” Policies Needed to Achieve GHG Objective

## 实现温室气体目标所需的“辅助”政策

- Should really be called “essential, critical” policies
- Clean energy policies
  - Energy efficiency, renewable energy, combined heat and power
- Modeling (IPM) found that 3 times the current level of energy efficiency savings could reduce GHG sufficiently to meet RGGI goals
- Auction revenues used for funding clean energy investments
- 实际上应当被称为“不可或缺、至关重要的”政策
- 清洁能源政策
  - 能效, 可再生能源, 热电联产
- 建模 (IPM) 显示, 如果能达到目前节能水平的三倍, 则会大幅度减少温室气体排放量, 足以实现“区域温室气体行动计划”的目标
- 拍卖收入用于资助洁净能源

# State Allocations and Energy Efficiency Reinvestment

## 州分配与能效再投资

State	% of Permits to be Auctioned	% of Proceeds Earmarked for Energy Efficiency
Connecticut	77%	69.5%
Delaware	60% (increasing to 100% by 2014)	up to 65%
Maine	100%	up to 88%
Maryland	85%	46%
Massachusetts	98%	at least 80%
New Hampshire	at least 71% (at least 83% after 2011)	up to 90%
New Jersey	up to 99%	up to 80%
New York	97%	up to 100%
Rhode Island	99%	up to 95%
Vermont	99%	100%

# RGGI Auction Design

## “区域温室气体行动计划”拍卖设计

- Two reports: 16 recommendations to guide auction design
  - Uniform-price, sealed bid, single round
  - Reserve price, \$1.86/ton
  - Market monitoring per US Treasury bonds
- EPA database (EATS) for acid rain and NO<sub>x</sub> adjusted for CO<sub>2</sub>; administered by third party (now called COATS)
- 两份报告:16条建议作为拍卖设计的指南
  - 统一价格、密封式投标、单循环
  - 保留价
  - 以美国国库券为基础进行市场监督
- 根据 CO<sub>2</sub> 调整用于酸雨和 NO<sub>x</sub> 的 EPA 数据库 (EATS); 由第三方管理 (现被称为 COATS)

# Monitoring and Verification

## 监测和审核

- Generators must report their CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub> to EPA and the states each quarter
  - Quarterly reporting of continuous emissions monitoring (CEMS) data
  - Based on the EPA NO<sub>x</sub> budget program
- EPA maintains the data system, and performs quality control tests of the data
- State enforcement for:
  - Failure of the generator to perform quality control tests
  - Exceedances of emissions limits
  - Absence of back-up proxy data when CEMS not working
- Data are available on EPA's CAMD web portal five months after reporting
  - After additional testing, the "final" data are reflected in EPA's eGRID
- 发电厂必须每个季度向美国国家环保局和各州报告其CO<sub>2</sub>, NO<sub>x</sub> 和 SO<sub>2</sub> 的排放情况
  - 每季报告自动在线监测排放系统（CEMS）的数据
  - 基于美国国家环保局NO<sub>x</sub>预算方案
- 美国国家环保局负责维护数据系统，并开展数据的质量控制测试
- 国家强制执行：
  - 发电厂无法进行质量控制测试
  - 超出排放上限
  - 在自动监测排放系统（CEMS）无法工作的情况下，后备替代数据缺失
- 在报告5个月后，数据在美国国家环保局CAMD门户网站上能够找到
  - 在进一步测试后，“最终”的数据在美国国家环保局的电子电网（eGRID）上反映



# Auctions

## 拍卖

- There were 11 RGGI auctions between September 2008 and December 2010
  - Total funds raised: \$860,931,768.19
  - Most of the money is used for GHG-reducing investments in energy efficiency, renewables, and other clean energy resources (e.g, combined heat and power)
- 2008年9月至2011年3月期间共举行了11次RGGI拍卖
  - 共筹集资金: \$860,931,768.19美元
  - 大部分资金被用于减少温室气体, 投资能效、可再生能源和其他清洁能源等 (如热电联产)

# Recent Auctions

## 最近拍卖

- 9 December 2010 Auction
  - 57% of the available allowances were purchased at the reserve price of \$1.86/ton
- 9 March 2011 Auction
  - 100% of the available allowances were purchased at the reserve price of \$1.89/ton
- The cap is too high
  - RGGI designers expected CO<sub>2</sub> emissions from the power sector to rise after the base years; in fact, the opposite happened
- 2010年12月9日的拍卖
  - 57%的可用配额被以每吨1.86美元的最低价格拍卖
- 2011年3月9日的拍卖
  - 100%的可用配额被以每吨1.89美元的最低价格拍卖
- 上限过高
  - RGGI设计者预期从基准年之后电力部门的二氧化碳排放量将会增加；而事实却完全相反

# RGGI Benefits to Date

## RGGI截至目前的利益

- **\$441 million invested in additional energy efficiency programs, resulting in energy savings of \$1.1 billion**
- **Additional gross state product of \$2.6 billion**
- **Estimate of 45 job-years per \$1 million of energy efficiency funding, or over 20,000 new job-years as of March 2011**
- **4.41亿美元投资于新增能源效率项目，节省能源11亿美元**
- **新增国家生产总值26亿美元**
- **预计每1百万美元能源效率基金相当于每年增加45个工作机会，也就是说到2011年3月有2万多个新增工作机会**

# Critical Design Questions

## 关键性设计问题

- What is the “point of regulation”? Who should have the carbon obligation?
  - Generators? Grid companies (i.e., load-serving entities)?
- What is the level of the cap? Is it too high or too low? How does it change over time?
- How are allowances allocated? By auction or some other means?
- If by auction, how will the revenues be used?
  - “Cap and invest”
- “调节点”是什么？谁具有碳减排的义务？
  - 发电厂？电网公司（例如，提供负载服务的实体）？
- 上限是多少？它是否过高或过低？未来如何修改？
- 如何分配配额？通过拍卖还是其他方式？
- 如果以拍卖的形式，如何利用收益？
  - “上限与投资”

# Lessons

## 经验教训

- ***Critically important!***: Get the cap's baseline and trajectory right
- Assign the “carbon” obligation to the purchasers of electricity (i.e., the grid companies)
  - They will choose clean resources
  - CO<sub>2</sub> cannot be removed from the smokestack
- **至关重要!**：确定合理的基准上限和轨道
- 将“碳减排”义务附加给电力购买方（如，电网公司）
  - 他们会选择清洁能源
  - 二氧化碳无法从低技术制造行业中清除

# Lessons

## 经验教训

- Don't rely on prices
  - Allowance costs must get very high before people change behavior
  - High prices are politically unpopular
- Auction the allowances
- Use revenues for complementary policies to reduce GHG emissions
- 不要依赖价格
  - 在人们改变行为方式之前，必须保持非常高的配额成本
  - 高价格在政治上不受欢迎
- 拍卖配额
- 将收益用于补充政策，以减少温室气体排放



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## About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at [www.raonline.org](http://www.raonline.org)

**Frederick Weston**  
[rweston@raonline.org](mailto:rweston@raonline.org)



Global  
US  
China  
EU

The Regulatory Assistance Project

50 State Street, Suite 3  
Montpelier, Vermont 05602

phone: 802-223-8199  
fax: 802-223-8172

[www.raonline.org](http://www.raonline.org)

## 关于RAP

监管支持项目(RAP)是一个全球性的非赢利专家组织，致力于电力行业和天然气行业在经济上、环境上的可持续发展，RAP在监管和市场政策方面具有丰富的经验，主要有：

- 提高经济效率
- 保护环境
- 确保系统的可靠性
- 确保所有顾客公平分享系统带来的益处

要了解RAP的更多信息，请登陆[www.raponline.org](http://www.raponline.org)

**Frederick Weston**  
**[rweston@raponline.org](mailto:rweston@raponline.org)**



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The Regulatory Assistance Project

50 State Street, Suite 3  
Montpelier, Vermont 05602

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fax: 802-223-8172

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