State Policy Planning for a Clean Smart Grid

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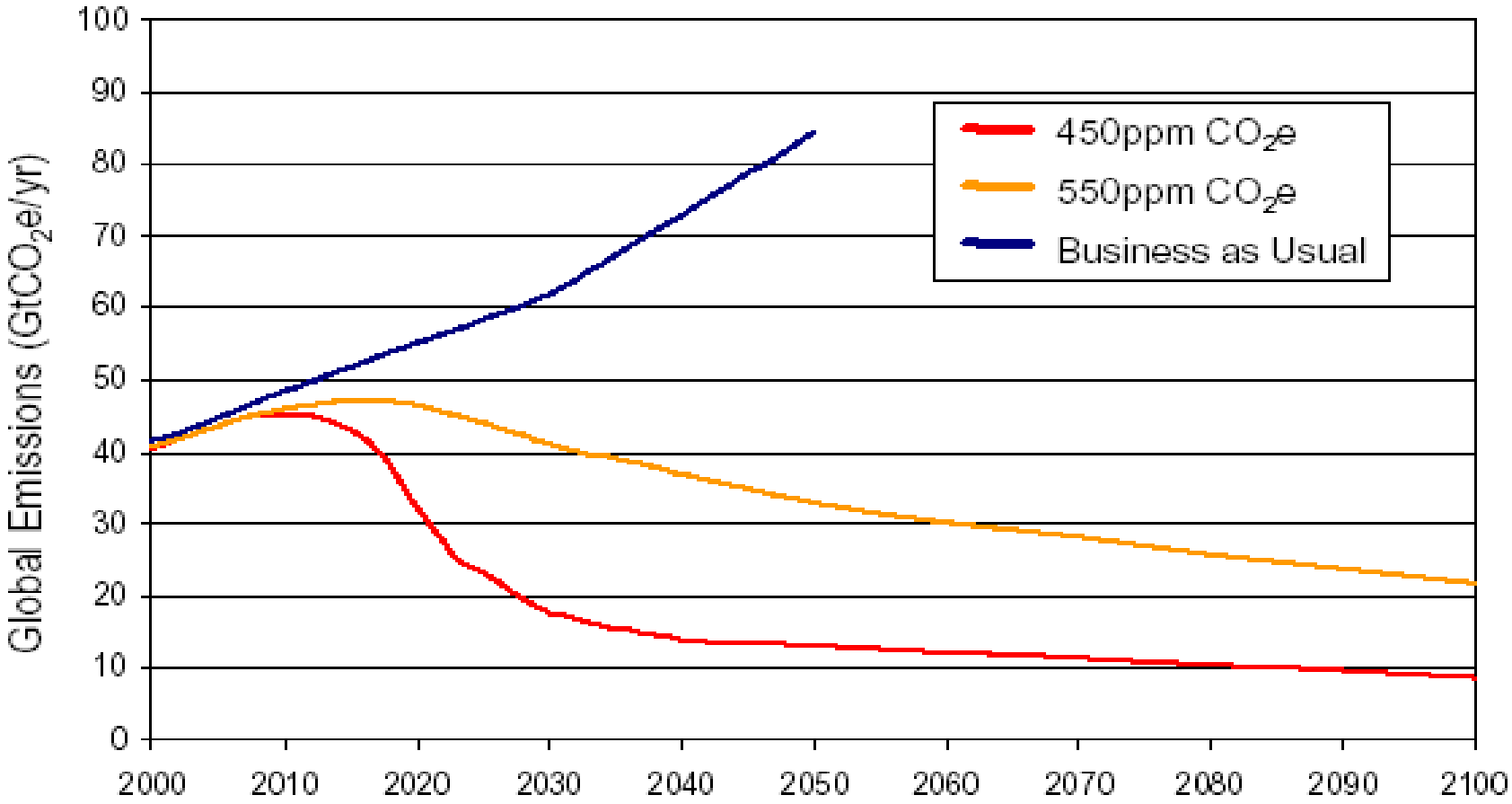
The Regulatory Assistance Project

China ♦ EU ♦ India ♦ United States

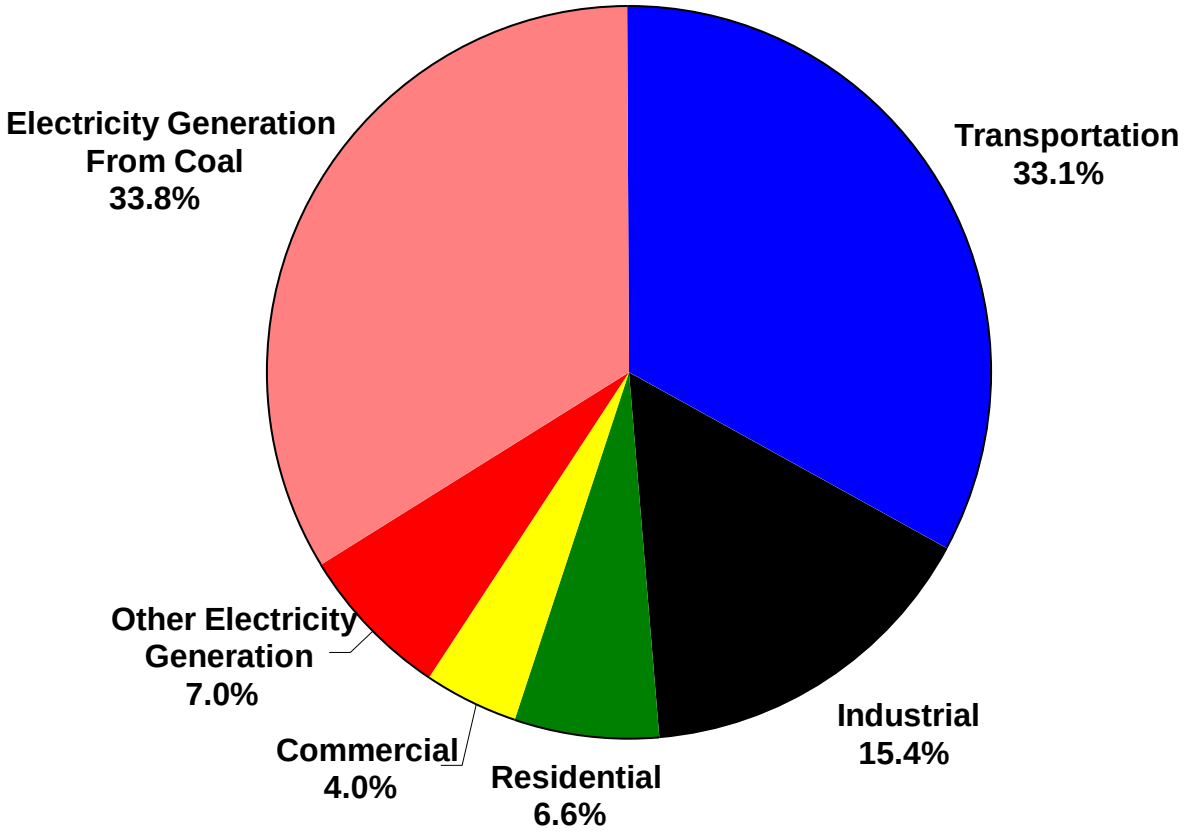
We have a long way to go



Source: Stern Review, October 2006

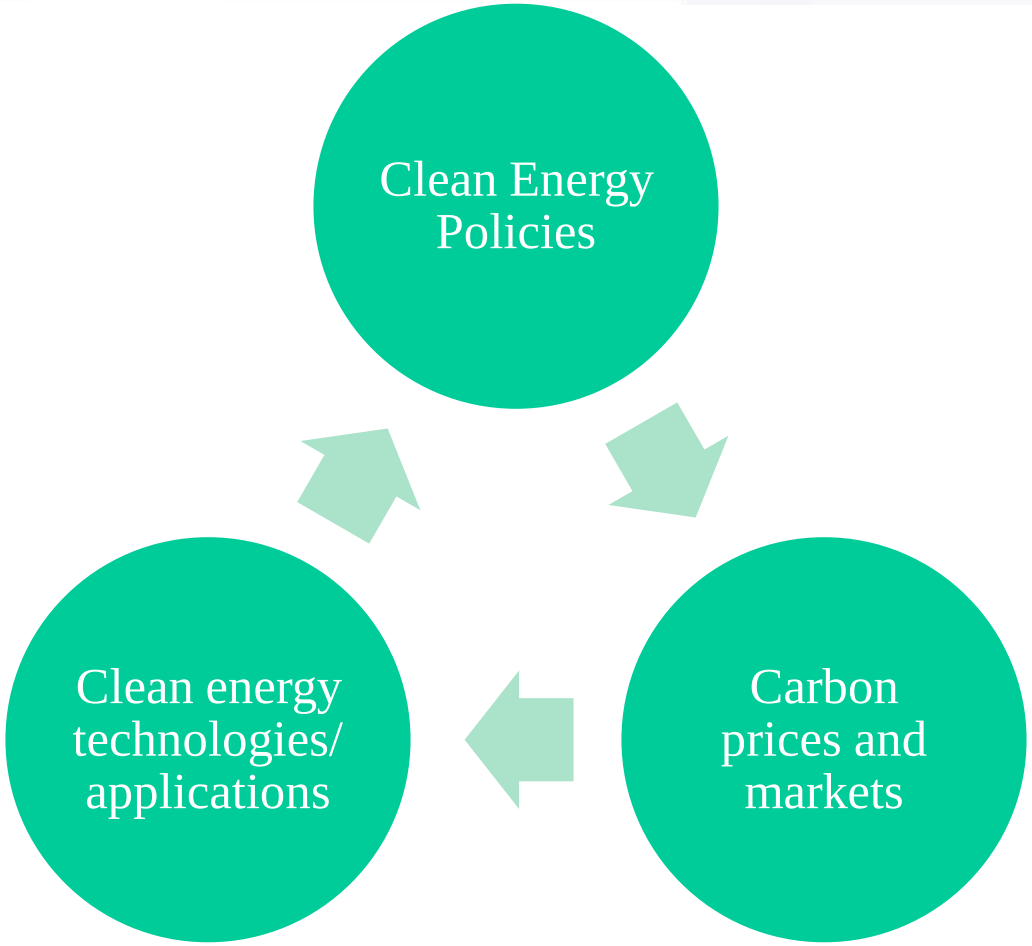
Sources of US Energy-Related CO_2 Emissions: 2004

Power sector accounts for ~40% of emissions but may be called on for 75% of solution



Source: EPA 2006

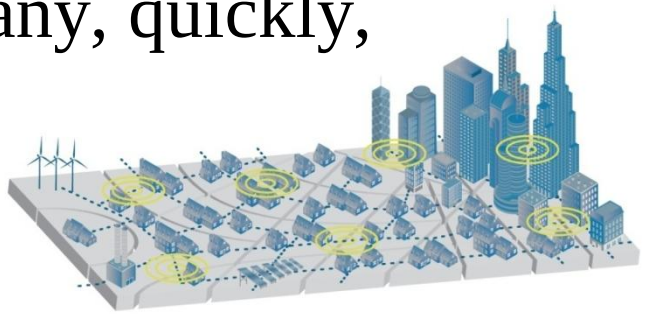
Carbon pricing alone is not enough



To keep global warming increases <2°C by 2050, we need to de-carbonize the electric system and transportation system. State-jurisdictional policies will play a big role.

Smart grid's clean energy benefits are not automatic

- Smart grid is an interconnected system of technologies that can engage many, quickly, but it's only an *enabler*.
- Clean energy benefits require adoption of smart policies.
  - Many of the policies should be adopted even without smart grid investments.



- Without the right policies, smart grid will divert attention and funds from carbon reductions achievable today.
  - Ask which *specific* technologies, programs, policies and rules must be in place to get clean energy benefits.

Preparing for smart grid

- Engage consumers
- Set guiding principles and objectives
- Specify min. functional requirements
- Require utility transition plans with updates
- Address information, data security, privacy, interoperability and cyber-security issues
- Update existing rules and requirements as needed
- Don’t let clean energy policies lag behind – *today’s focus*

Consider environmental goals in energy regulation

- Smart grid vision
  - *Massive increases* in electric efficiency, distributed demand and supply options, variable renewable energy sources, and energy storage plus a *significantly smaller environmental footprint*
- Getting there will require broadening the energy regulator's mandate to consider environmental goals
  - Are power sector regulations working at cross purposes with carbon reduction and other environmental goals?
  - What are the environmental benefits of smart grid investments compared to other investments?

Acquire all cost-effective energy efficiency

- By and large, energy efficiency is the cheapest resource.
- Ample supplies at cost-effective levels
- State investment in energy efficiency below what is easily achievable and cost-effective is at odds with the rationale behind many smart grid investments.
- States should adopt energy efficiency resource standards with aggressive targets for cumulative savings or require acquisition of all cost-effective energy efficiency.
  - With targeted programs and sufficient funding

Treat demand-side resources >/= supply-side alternatives

- Energy efficiency, demand response, and distributed generation and storage should be treated at least on a par with other resources
  - In integrated resource planning/portfolio management
  - In competitive bidding processes for energy and capacity

Align utility and consumer interests

- To optimize deployment of smart grid and clean energy resources
- *The throughput problem* - Energy efficiency and on-site generation reduce sales, and dynamic pricing reduces usage during highest-priced hours
  - **Revenue requirement** (expenses + return of and return on investment + taxes) in test year
  - **Prices** = revenue requirement ÷ *expected* unit sales
  - **Utility profit** = *actual* sales - *actual* expenses
  - **↓ sales = ↓ revenue to cover fixed costs = ↓ profits**

Align utility and consumer interests (cont.)

- Decoupling is a ratemaking mechanism that breaks the link between energy sales and utility profits.
  - Prices are periodically adjusted (up or down) based on *actual* units sold to keep utility revenue at *allowed level* – no more, no less.
  - Decoupling removes the disincentive for energy efficiency but provides *no incentive* to go after it.
- Consider shareholder incentives when energy efficiency programs are ramping up to high levels or to motivate a utility to continue performing at a high level.
  - Utilities have little reason to invest in energy efficiency* – or support higher codes and standards – without a dedicated incentive mechanism.

**Except during prolonged periods of high market prices where the utility does not have an automatic power cost adjustment.*

Ensure access to usage information

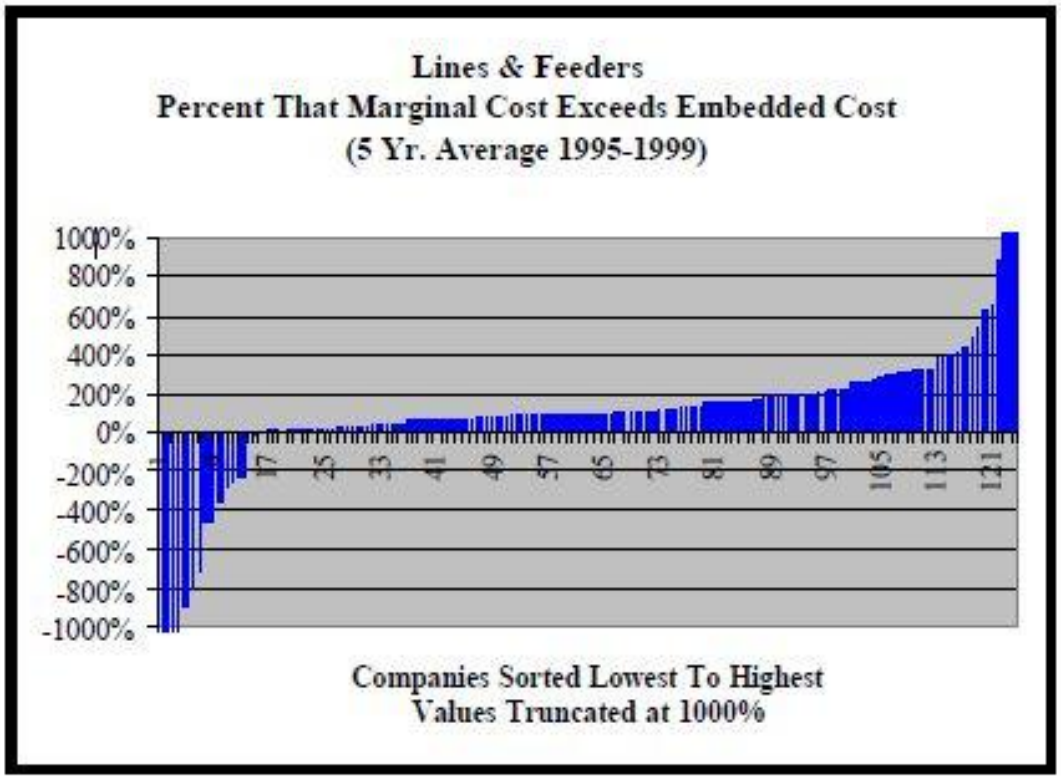
- Specify consumers' access to their energy usage data
  - Day after vs. near-real time
  - Historical usage
  - Also retail and wholesale prices

- Spell out rights and consumer protections for sharing data with 3rd parties that can offer customized products and services
- Address data security and privacy issues

Integrate smart grid with rate design, demand-side programs

- Smart grid allows customers to become more involved in how and when they use energy.
  - But they won't respond just because they get shiny new meters.
- Let customers choose a dynamic pricing option that varies according to market prices and system conditions.
  - Rates that reduce overall utility costs, encourage customers to reduce peak loads *long-term*, and support demand-side resources
- Make it easy for customers to shift load
  - Automated controls
- Help customers permanently reduce peak loads
  - e.g., air-conditioning efficiency programs

Reveal locational value of customer-side resources



As you'd expect, generally marginal costs exceed embedded costs for distribution lines and feeders – by a lot. It's a major source of risk for escalating rates. And it's an opportunity to use distributed resources to shave peak in specific locations.

Source: Wayne Shirley, RAP, 2001

Reveal locational value of customer-side resources (cont.)

- Except in markets with locational pricing, only the utility knows the value of customer-side resources at specific locations on its system.
- Consumers and 3rd parties have no incentive to develop customer-side solutions to defer or avoid expensive utility T&D upgrades.
- Utilities should periodically file major planned upgrades
  - Cost per kW plus reductions needed to defer them, by date
- Commissions should develop guidelines for considering cost-effective, customer-side alternatives.
  - RFP process is one way
  - Credits to consumers and 3rd parties for economic deferrals

Advancing renewable energy, clean distributed resources and transportation electrification

No time to cover today

- Streamlined interconnection standards
- Renewable portfolio standards
- Targeted procurement of small-scale renewable generation through feed-in tariffs or auctions
- PURPA and net metering
- Cost-based standby rates with optional non-firm service
- Right-time charging/discharging of electric vehicles

For More Information

- David Moskovitz and Lisa Schwartz, "Smart Grid or Smart Policies: Which Comes First?" RAP *Issuesletter*, July 2009, at http://raponline.org/docs/RAP_IssuesletterSmartGridPolicy_2009_07.pdf
- Lisa Schwartz, RAP, "Tour of Smart Grid Projects and State Policies," Sept. 9, 2009, at http://raponline.org/docs/RAP_Schwartz_SmartGridProjectsandPoliciesORwks_2009_09_09.pdf
- Victor Niemeyer, Electric Power Research Institute, "The Change in Profit Climate: How Will Carbon-Emissions Policies Affect the Generation Fleet?*" Public Utilities Fortnightly*, May 2007
- Wayne Shirley, Jim Lazar and Frederick Weston, RAP, *Revenue Decoupling Standards and Criteria: A Report to the Minnesota Public Utilities Commission*, June 2008, at http://www.raponline.org/Pubs/MN-RAP_Decoupling_Rpt_6-2008.pdf
- Wayne Shirley and Lisa Schwartz, RAP, "Energy Efficiency Incentives for Utilities: A Review of Approaches So Far," Oct. 6, 2009, at http://raponline.org/docs/RAP_Schwartz_Shirley_UtilityEfficiencyincentives_2009_10_6.pdf
- Wayne Shirley, RAP, *Distribution System Cost Methodologies for Distributed Generation*, September 2001, at http://raponline.org/docs/RAP_Shirley_DistributionCostMethodologiesforDistributedGeneration_2001_09.pdf

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RAP is committed to fostering regulatory policies for the electric industry that encourage economic efficiency, protect environmental quality, assure system reliability, and allocate system benefits fairly to all customers.