NASUCA Briefing on NACAA’s
Implementing EPA’s Clean Power Plan: A Menu of Options

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Presented by David Farnsworth, Associate
Introduction

The Regulatory Assistance Project (RAP) is a global, non-profit team of energy experts, mostly veteran regulators, advising current regulators on the long-term economic and environmental sustainability of the power and natural gas sectors. 

(www.raponline.org)

– Foundation-funded; some contracts
– Non-advocacy; no interventions

David Farnsworth is an Associate at RAP. His experience as a utility regulator came as a Hearing Officer and Staff Attorney for the Vermont Public Service Board.
NACAA “Menus of Options” 1999, 2006
Latest in a Series of NACAA “Menus of Options” 2015

A 465-page summary of technologies, programs and policies to reduce greenhouse gas emissions from the electric power sector.
EPA Sets State Specific Goals, but...

- States are not limited to the four building blocks in order to meet their CO2 emissions goals.
- The *Menu of Options* is intended to provide a comprehensive compilation of all of the potential strategies that states may employ in order to craft their greenhouse gas reduction plans.
The *Menu* Does Not Express Preferences

- Also agnostic on merits of EPA’s CPP, and what states should do to comply.
- Technologies programs and policies described viable before the CPP was proposed, and they will continue to be viable in the future.
- *Menu*’s underlying message: *It is possible to reduce emissions, control costs, and maintain reliable and safe electric service.*
The Preparation of the Menu

• RAP was NACAA’s contractor and responsible for helping to write the report.
• The work was guided by a NACAA steering committee of over 20 participants from over a dozen states.
• The Menu was also influenced by discussions at NACAA Board and membership meetings for the past year.
NACAA Menu of Options: Each Chapter Contents

- Profile (description, pros, cons, etc.)
- Regulatory Backdrop
- State & Local Implementation Experience
- GHG Emissions Reductions
- Co-Benefits
- Costs and Cost-Effectiveness
- Other Considerations
- For More Information
- Summary
More Stringent Ozone Standards Coming? (EPA, Ozone Concentrations, 2010)

EPA Clean Air Science Advisory Committee (CASAC) is considering a 60-70 ppb range for new NAAQS.
Characterizing the *Menu*

- The *Menu* is about “what can be done.”
- Remember that NACAA is also developing a *Model Plan* —or more accurately, a menu of model plans.
- The Model Plans are about that “how to do it.”
One final caveat

• It took more than a year to write the *Menu*, and the world kept spinning during that year.
• It was impossible to publish a document of this size that is completely up to date on every aspect of every option.
• More recent information is available in many instances, and we won’t be surprised if there are mistakes. Let us know.
EPA’s BSER Building Blocks and Menu of Options Chapters

1. Heat Rate Improvements
2. Redispatch to Natural Gas
3. Renewable and Nuclear Generation
4. Energy Efficiency

11. Establish Energy Efficiency Targets (EE, DSM, EERS)
13. Pursue Behavioral Efficiency Programs
14. Boost Appliance Standards
15. Boost Building Codes

6. Increase Low-GHG Generation
2. Electric-Sector CHP
1. Optimize Power Plant Operations
3. Other-Sector CHP
Final CPP Rule Hits the “Reset Button”

• BSER “goes away”
• States get a target, and a clean sheet of paper
• EPA moves into “review” mode
Implementing EPA’s Clean Power Plan: A Menu of Options

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Chapter 1: Optimize Power Plant Operations

• Traditional “inside the fence line” steps
• Boiler optimization; improved thermal efficiency
• Neural networks and artificial intelligence monitor and manage
• 4-7% improvement

Chapter 2: Implement Electric-Sector CHP

• Capture EGU waste heat for central HVAC or industrial processes in neighboring facilities
• Cost-effective; commercially available
• Great technical potential across the U.S.
• Reliability, cost, scale, multi-p & water benefits
Chapter 3: Implement CHP in Other Sectors

- CHP in the commercial, industrial, institutional, and manufacturing sectors
- Improves economic competitiveness
- Scalable; host-dependent
- Reliability, cost, multi-p, etc. benefits

Chapter 4: Improve Coal Quality

- Variations in coal properties affect EGU thermal performance and efficiency
- High ash or sulfur content can also impair duct work, fly ash removal, combustion controls, etc.
- “Beneficiation” like coal washing, blending
Chapter 5: Optimize Grid Operations
• Improve performance and efficiency of electricity transmission and distribution systems
• Conservation voltage reduction, power factor optimization, phase balancing, electrical and thermal storage capabilities, demand response

Chapter 6: Increase Low-Emitting Generation
• Mature technologies like hydro and nuclear
• Maturing resources like wind, solar, tidal
• Principal challenges: cost, integrating non-dispatchable resources into the grid, and balancing generation in real-time
Chapter 7: Pursue CCS (or CCUS)
• Carbon capture and utilization and/or storage
• Before or after combustion
• Compressed, transported & stored; or used (EOR)
• Technical, legal, and economic hurdles remain
• Not fully commercialized yet

Chapter 8: Retire Aging Power Plants
• Sensitive – can have significant economic impacts for ratepayers, utilities, and host communities
• Risk of stranded costs
• But may be lowest-cost option
Chapter 9: Switch Fuels at Existing Plants

- Familiar, proven emission reduction method
- Lower costs than many alternatives
- Use-weighting; blending; repowering
- Could increase operating costs, require capital

Chapter 10: Reduce T&D Line Losses

- Electricity losses pervade T&D system
- Typically 6-7%, but 20%+ at peaks
- Primary obstacles are economic, not technical, so doing new builds correctly is critical
Chapter 11: Establish Energy Savings Targets

- EE is a low-cost, low-risk resource
- Energy Efficiency Resource Standard (EERS) and other mechanisms reduce CO2 while stimulating job growth and state economies
- Generally ratepayer funded; significant potential

Chapter 12: Foster New Markets for EE

- Builds on Chapter 11 with voluntary, market-based
- Technology, operational, and behavioral changes for better service with lower energy consumption
- Audits, energy savings contracts, private EE, financial/tax incentives, labeling, ability to compete in wholesale markets
Chapter 13: Pursue Behavioral EE Programs

- Information dissemination, social interaction, competition, and/or potential rewards to change energy consumption behavior
- Types, benefits, and limitations of behavioral programs; states’ experiences

Chapter 14: Boost Appliance EE Standards

- Set minimum energy and water efficiency requirements for certain appliances/equipment
- States can’t set standards for federally regulated products, but can for products not covered by federal standards
- Have been one of most cost-effective EE policies
Chapter 15: Boost Building Energy Codes

- ~ Half of U.S. energy use
- Sets mandatory requirements for HVAC & lighting
- “Lock in” future energy savings vs. costly retrofits
- Latest national code ~30% less energy than conventional building standards
- “Net zero” energy use is now possible

Chapter 16: Boost Clean Energy Procurement

- Increase share of zero- and low-emitting generation
- Accelerates deployment of clean energy “at scale”
- Often RPS policies, on load-serving entities
- Costs driven by RE availability, target levels, and safety valves/ACPs
Chapter 17: Encourage Clean DG

- Facilities <20 MW interconnected to the distribution grid
- Encompasses solar PV, wind, biomass, anaerobic digestion, geothermal, fuel cell, and small CHP
- Also avoids some or all T&D line losses
- Is increasingly cost-competitive

Chapter 18: Transmission Pricing and Access

- Doesn’t directly reduce GHG emissions, but enables reliable, cost-effective choices that can
- Some transmission build essential for RE at scale
- Some improvements vital for RE integration
- Allocation of costs to beneficiaries is key
Chapter 19: Revise Capacity Market Policies

- In many (but not all) areas of the U.S.
- Where they exist, the market rules can and do affect GHG emissions
- Rule reforms can be a tool to support and enhance other GHG strategies (e.g., EE, RE, NTAs, etc.)

Chapter 20: Improve Grid Integration of RE

- Steps to help ensure reliability as grid morphs to greater RE
- Don’t reduce emissions themselves, but necessary complements for lower-GHG portfolio
- Balancing areas, balancing periods, etc.
Chapter 21: Change Dispatch Order of Plants

- Change to run lower-emitting plants more and higher-emitting plants less
- Several ways: Pricing, cap-and-trade, CO2 adder
- Or, “environmental dispatch” (dispatch based on emissions or emissions+cost vs. cost-only)

Chapter 22: Improve Utility Resource Planning

- aka Integrated Resource Planning (IRP)
- Focuses on meeting long-term energy demand in an area through combination of supply-side and demand-side resources
- Goals: Ensure reliability; minimize cost (and CO2)
Chapter 23: Improve Demand Response (DR)
• Intentional modification of electricity usage by or for end-use customers
• First targeted peaks (via curtailment); now can provide ancillary services too (voltage regulation)
• Promote economic efficiency in wholesale markets
• Can reduce costs and facilitate RE integration

Chapter 24: Adopt Market-Based Programs
• Price emissions and rely on market forces to reduce costs (innovation, competition, customization)
• Price can be direct (e.g., tax) or indirect (e.g., RGGI)
• Easy to implement; significant U.S. experience
Chapter 25: Tax Carbon Dioxide Emissions

- Pricing mechanisms internalize costs so market economies can be more effective
- Most effective in concert with other policies (that enable substitution or increase elasticity)
- Can spur innovation; provides revenue stream

Chapter 26: Emerging Technologies & Policies

- Previous 25 chapters reflect existing options
- Power sector changing from 1-way analog to 2-way digital system
- Supply and demand will both be managed
- Smart grid, “internet of things,” storage, business models, EVs, aggregation, water-energy nexus, etc.
NACAA Menu of Options: What’s NOT in the Menu

• Many technologies and policies are evolving rapidly today via innovation and opportunity
  – Expect many examples of “even better than characterized in the NACAA Menu!”

• How will emissions reductions from these options actually be credited?
  – RAP has done a lot of work on quantification of EE emission reductions, but...
  – Must wait for final CPP rule for clarity
The Biggest Challenges?

• Many compliance options can’t be implemented state-by-state; regional approach required
  – Transmission, grid optimization, integration, dispatch, capacity markets, etc.

• EPA’s never done this before either...

• Morphing the practice of air regulation into the new permissiveness reflected in EPA’s proposed rule may be more difficult (for both EPA offices and the states) than it is for the regulated community to actually comply with the rule...
Key Take-Aways

• Recognize that § 111(d) is not a traditional SIP
• Think “outside the blocks” to NACAA’s 25 options
• Think regional (multi-state)
• Think least-cost, least-risk
  – Changing industry raises specter of stranded-costs
• Think integrated (ozone/particulates, water, & risk co-benefits)
• “Ask not what EPA wants your plan to be; ask what you want it to be”
Thank You for Your Time and Attention

About RAP

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

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

Learn more about RAP at www.raponline.org

David Farnsworth  Dfarnsworth@raponline.org
802 595 5227