

*Proposed EPA Regulations Will
Increase the Cost of Coal-fired
Electricity*

*Vic Staffieri, Chairman, CEO and President
October 21, 2010*

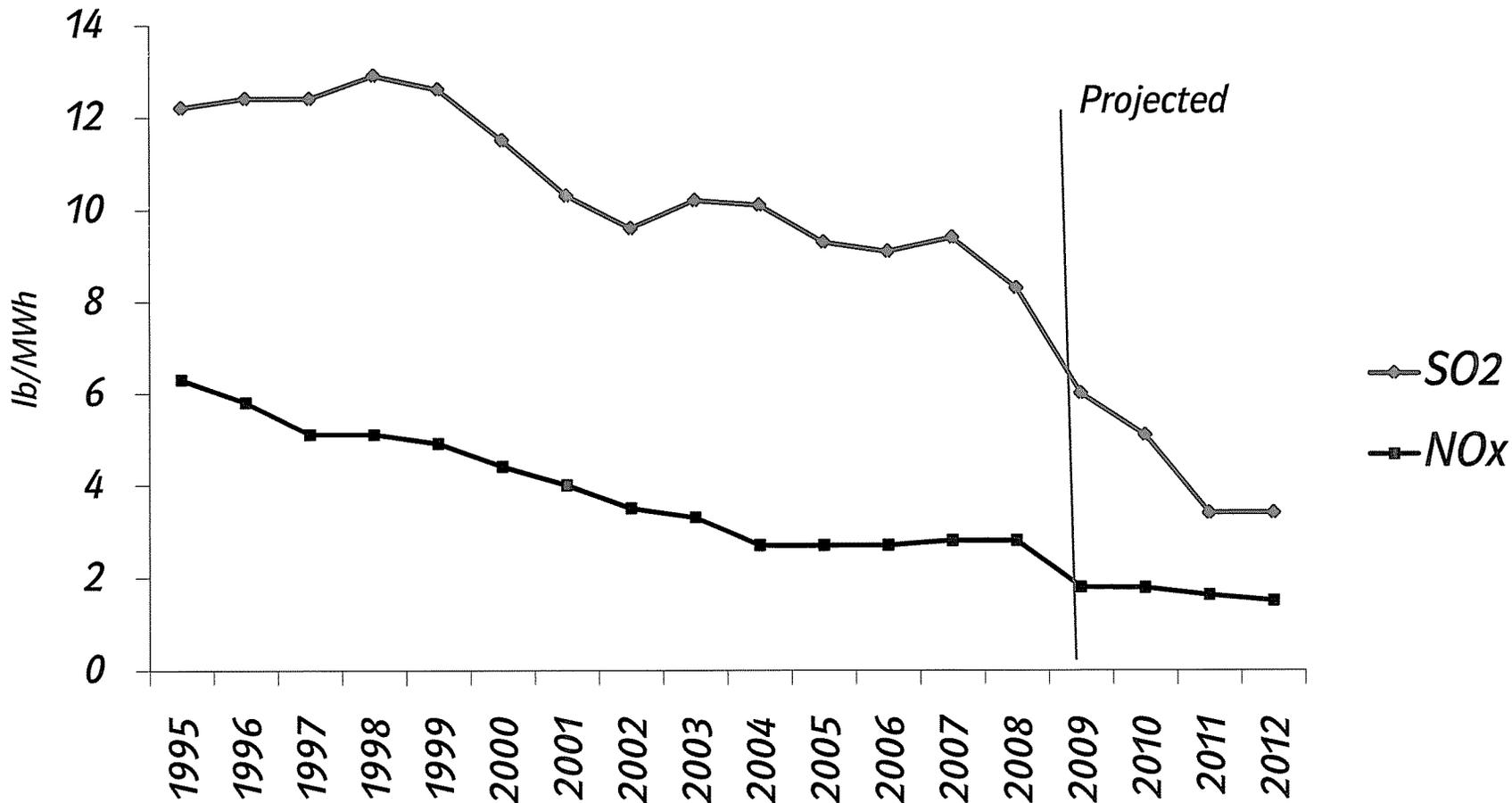
Environmental compliance is a high priority for LG&E and KU

- *In the 1970's, LG&E pioneered flue gas desulfurization (FGD) or "scrubber" technology used to control SO₂.*
- *LG&E and KU and their customers have spent \$2.6 billion on emission controls since the 1970's.*



- *Our new TC2 generating unit will be among the cleanest coal-fired power plants in the U.S. including:*
 - *Selective Catalytic Reduction (SCR); Dry Electrostatic Precipitator (ESP); Powdered Activated Carbon Injection; Fabric Filter Baghouse; Wet Flue Gas Desulfurization (WFGD); Wet Electrostatic Precipitator (WESP)*

Since 1995, LG&E and KU have reduced coal SO₂ emission rates by 50%; NO_x emission rates by 70%. Further reductions are expected when TC2 and the Brown FGD come online.



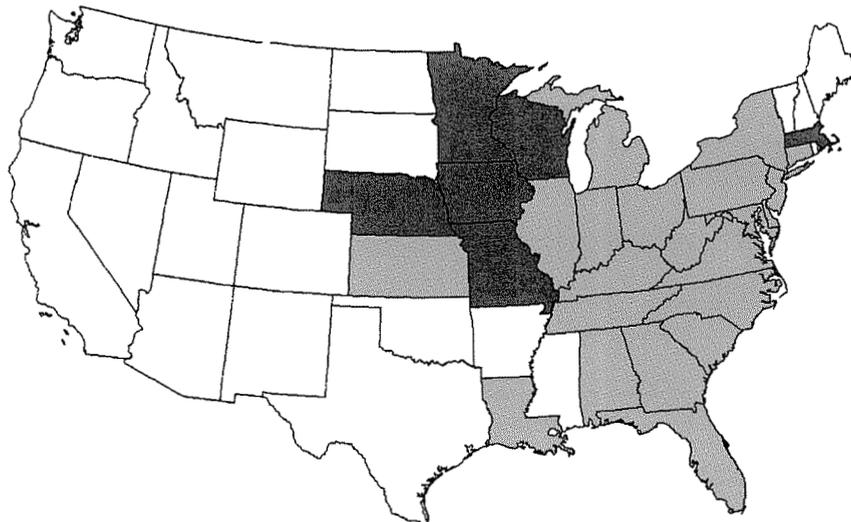
Unprecedented number of proposed regulations

EPA is proposing an unprecedented number of regulations that will have a major impact on coal-fired utilities and their customers. The significant risks are as follows –

- Absence of a comprehensive and coordinated federal strategy compels implementation on a piecemeal basis.*
- Reversal of prior regulatory determinations will generate large economic impacts.*
- Inconsistent deadlines will cause unnecessary compliance costs.*
- Short deadlines are compromising state and utility efforts to prepare proper implementation plans.*
- Practical implication: we will be proposing construction projects without benefit of final regulations in order to meet federal deadlines for compliance because of long lead time in fabrication and construction.*

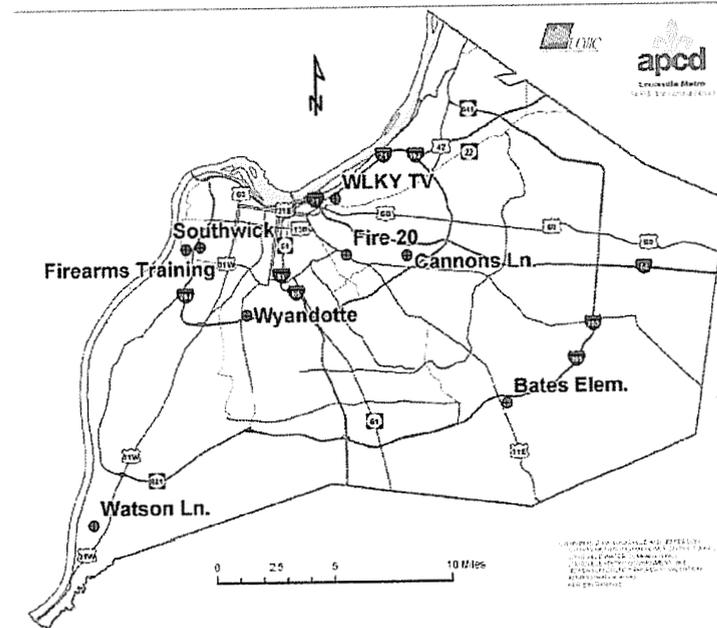
New air regulations

- **National Ambient Air Quality Standards (NAAQS)** – revised hourly SO_2 , NO_x , ozone, and particulate matter (**PM**) standards will make Louisville a "nonattainment" area subject to federal sanctions.



■ States controlled for both fine particles (annual SO_2 and NO_x) and ozone (ozone season NO_x) (21 States + DC)
 ■ States controlled for fine particles only (annual SO_2 and NO_x) (8 States)
 ■ States controlled for ozone only (ozone season NO_x) (4 States)
 ■ States not covered by the Transport Rule

Source: U.S. EPA

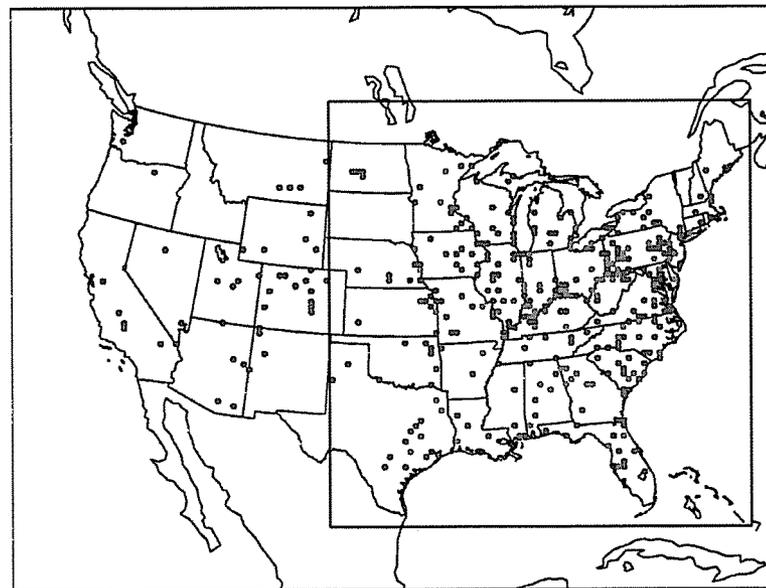


Source: LMAPCD

- **Clean Air Transport Rule (CATR)** – aimed at reducing air quality problems (SO_2 , NO_x , ozone and particulate matter) in the eastern U.S.

New air regulations (continued)

- *Maximum Achievable Control Technology (MACT) for Hazardous Air Pollutants (HAP) - new federal focus on plant-by-plant controls (as opposed to a system basis) will dramatically increase the cost of reducing mercury and other emissions.*
- *CO₂ Best Available Control Technology (BACT) - EPA will require implementation of BACT despite the consensus that no commercial scale control technology is currently available.*

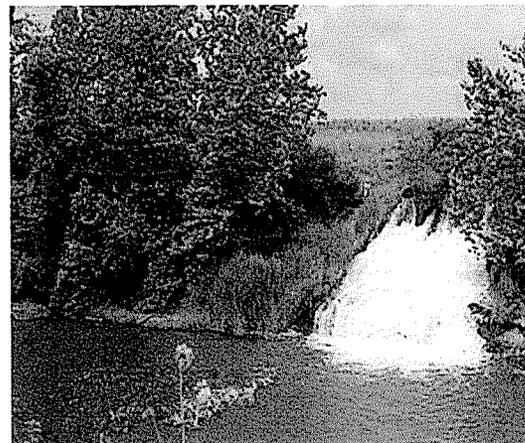


Source: U.S. EPA



New coal combustion residuals and water regulations

- *Coal Combustion Residuals (CCR) – Despite past EPA determinations that CCRs do not pose any significant human health or environmental risks, EPA is considering designation of CCRs as a "hazardous waste," subject to extensive requirements or modifying current "non-hazardous" rules with more stringent requirements. Both approaches will increase costs.*
- *Water quality – EPA is revising cooling water withdrawal and water discharge guidelines and standards.*



Short compliance timelines likely once final rules are issued

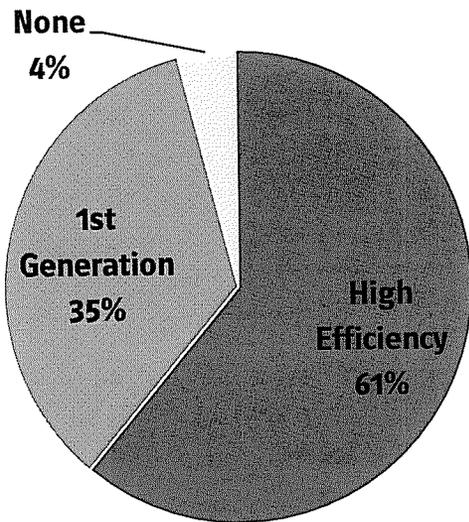
- *National Ambient Air Quality Standards (NAAQS) for NO₂ and SO₂ – Issued: February - June 2010; Compliance: 2016, 2017 respectively.*
- *Clean Air Transport Rule (CATR) – Projected Final Rule: June 2011; Compliance: January 2012 & January 2014.*
- *Maximum Achievable Control Technology (MACT) for Hazardous Air Pollutants (HAP) – Projected Final Rule: November 2011; Compliance: January 2015.*
- *Carbon Dioxide (CO₂) Best Available Control Technology (BACT) – Issued: May 2010; Compliance: January 2011.*
- *Coal Combustion Residuals (CCR) – Alternatives Proposed: May 2010; Projected Final Rule: uncertain; Compliance: within five years of final rule.*
- *Water quality – Water withdrawal Projected Issue date: December 2010; Water Discharge Projected Issue date: 2012; Compliance: uncertain.*

The new EPA regulations will significantly impact Kentucky's electric customers

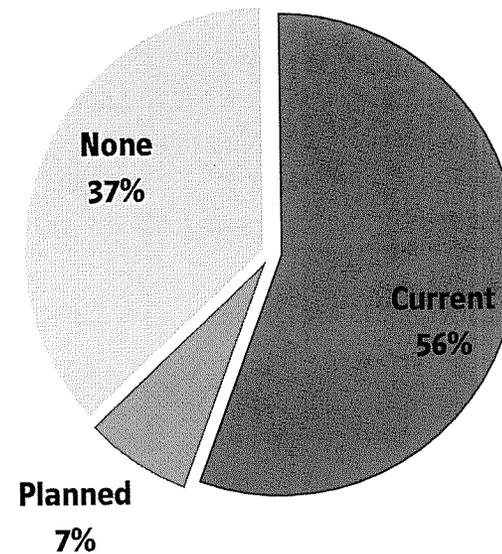
- *The new regulations are focused on coal-fired power plants.*
- *95% of Kentucky's electricity is provided by coal.*
- *LG&E and KU will comply with any new EPA regulations in the most cost effective manner possible, but the cost increase will be significant.*

LG&E and KU's coal fleet already has a high level of SO₂ and NO_x control technologies, but some additions or enhancements will be required

FGDs in Coal Fleet



SCRs in Coal Fleet



Percents are based on capacity including TC2.

Technology options for addressing air emissions are known – except for CO₂

Technology	Targeted Pollutant	Regulation Addressed	Removal Rate	LG&E/KU Estimated Cost (\$/kW)	LG&E/KU Estimated Cost (\$/quantity captured)
Flue Gas Desulfurization (FGD)	SO ₂	CATR, NAAQS	98%	\$450 – 900	\$5,000 – 11,000 /ton
Selective Catalytic Reduction (SCR)	NO _x	CATR, NAAQS	90%	\$300 – 500	\$4,000 – 8,000 /ton
FGD + SCR (Hg Co-Benefit)	Hg	MACT for HAP	60-70%	Co-benefit	Co-benefit
Fabric Filter & PAC* Injection (with FGD and SCR)	Hg	MACT for HAP	25-35%	\$200 – 500	\$150,000 – 450,000 /lb
Sorbent Injection	SO ₃ , Hg	MACT for HAP	TBD	\$15 – 30	TBD
Replace Coal Plant with Gas Plant					
Combined Cycle Combustion Turbine	All	All	NA	\$950 – 1,250	NA

*Powdered Activated Carbon

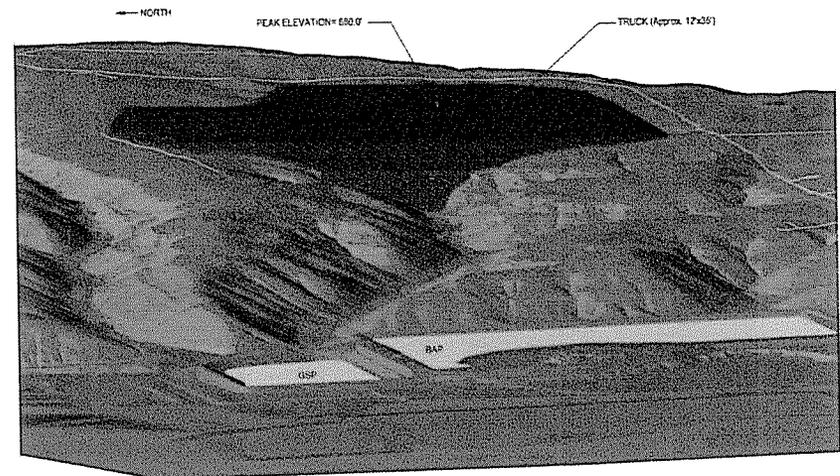
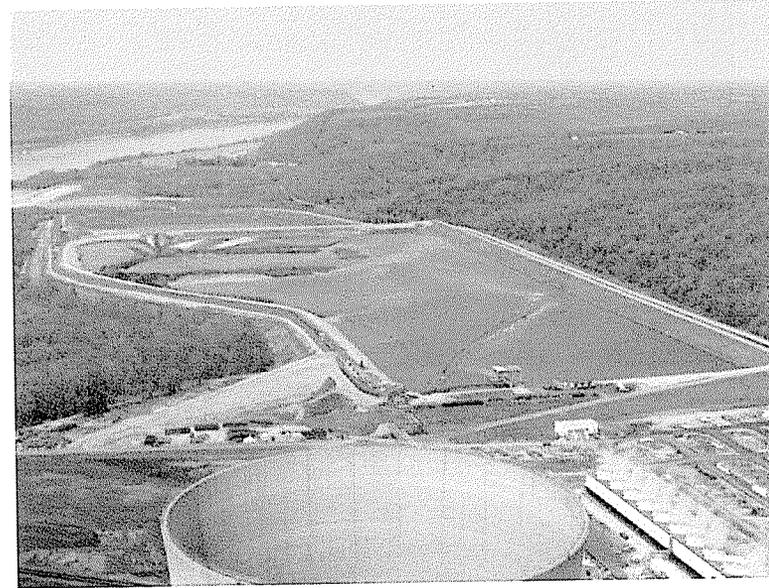
Despite low emission levels at most stations, sizable investments will be required to meet new air regulations

Station	Capacity (Net MW)	Options to Address Regulations	Cost (\$M)
Brown	684	SCR, Fabric Filter Baghouse, PAC Injection, Lime Injection	\$350 - 450
Ghent	1,918	SCR, Fabric Filter Baghouse, PAC Injection	\$950 - 1,150
Green River	163	SCR, Fabric Filter Baghouse, PAC Injection	\$150 - 250
Cane Run	563	FGD, SCR, Fabric Filter Baghouse, PAC Injection, Lime Injection	\$850 - 950
Mill Creek	1,472	FGD, SCR, Fabric Filter Baghouse, Electrostatic Precipitator (ESP), PAC Injection, Lime Injection, Ammonia	\$1,250 - 1,900
Trimble County	932	Fabric Filter Baghouse, PAC Injection	\$150 - 200
Replace Coal Plant with Gas Plant			
Potential CCCT Replacement	640	640 MW 2x1 Combined Cycle Combustion Turbine	\$600 - 800

Note: Does not include any investment to control for CO₂

Proposed EPA CCR regulations would require dry storage and closing of existing ash ponds

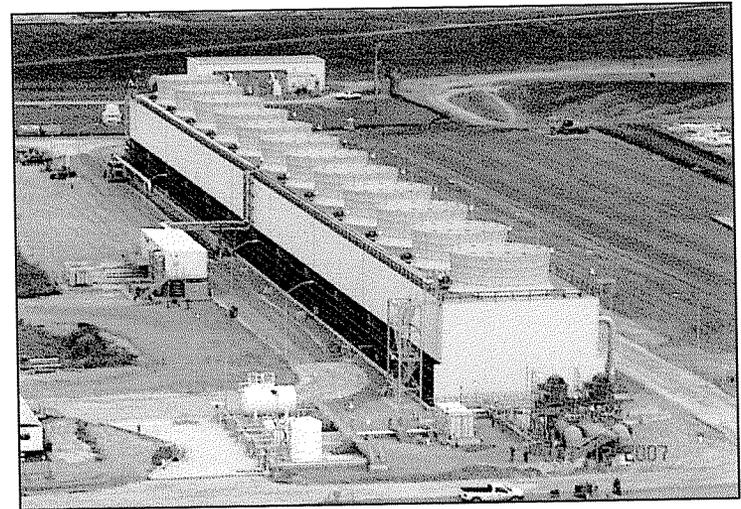
- *Retrofit or close 21 ponds, including 10 ash ponds and 11 process/runoff ponds across the fleet (8 stations).*
- *Build landfills for future storage (Brown, Cane Run, Ghent, Mill Creek, Trimble County).*
- *Construct new process water ponds for each operating site.*
- *Decommissioning ponds for moving to dry storage will cost an estimated \$700 million over the next ten years under the proposed CCR rules for non-hazardous waste. Additional closure costs will be incurred upon plant retirements.*



1L-CH Proposed Mound (Looking East)

Increased water withdrawal and discharge requirements

- *Potential federal EPA water regulations would impose more stringent requirements on water withdrawal and discharges.*
- *Potential addition of cooling towers or discharge water treatment systems:*
 - *Stations without cooling towers: Cane Run, Green River, Mill Creek 1, Tyrone*



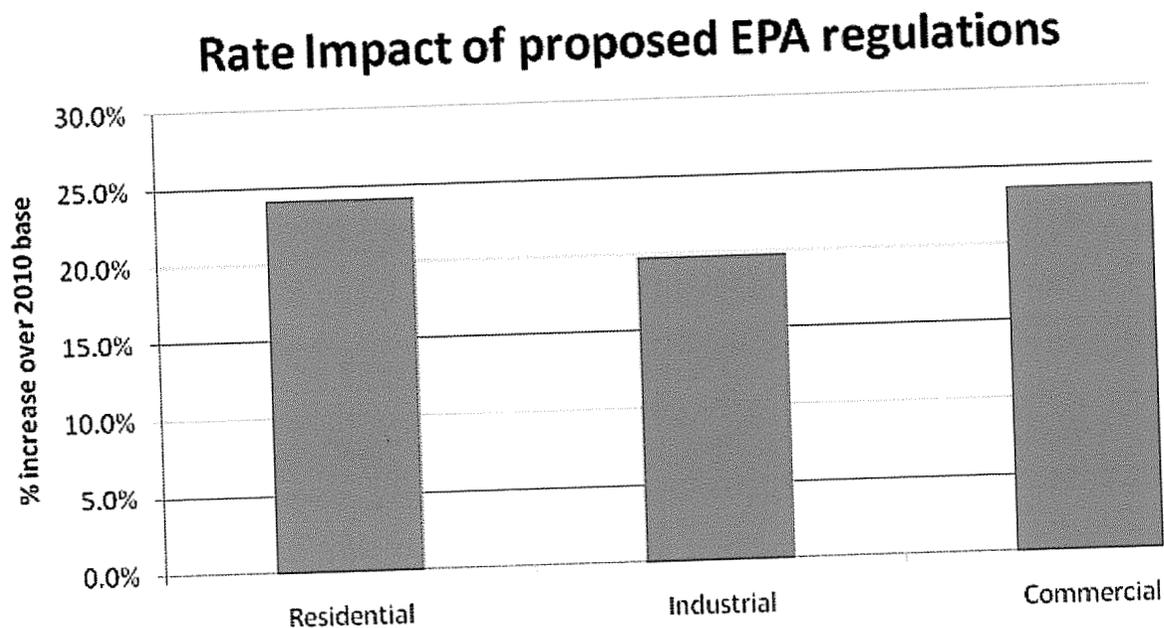
- *New treatment technologies are being developed for water discharges, but are not widely deployed in utility operations:*
 - *Physical-chemical treatment and/or biological treatment systems may be required*
 - *Cost of \$40 - \$300 million for each site pending final regulations, specific standards and treatment volumes*

Estimate at least \$4 billion in capital costs needed over next ten years

Regulation	Capital (\$M)	Annual Operating Expense (\$M)
<i>Air</i>	<i>\$3,300 - 5,000</i>	<i>\$150 - 300</i>
<i>CCR</i>	<i>\$700</i>	<i>To be determined</i>
<i>Water</i>	<i>To be determined</i>	

Cumulative impact of proposed EPA regulations will significantly increase electricity rates

- *Due to these regulations, by 2019 rates could increase by more than 20% and almost \$550 million annually.*



Note: This calculation does not include potential compliance costs for water regulations, Renewal Portfolio Standards (RPS) or carbon dioxide (CO₂) reductions.

Challenges and risks related to proposed regulations

- **Short time horizon** – *some air regulations would require compliance as early as 2012 with the most costly regulations beginning in 2014 and 2015. This allows insufficient time to design facilities, obtain necessary federal and state regulatory approvals, contract with vendors and install equipment.*
- **Potential impacts on system reliability and transmission system** – *one consequence of the proposed regulations will be the retirement of significant amounts of coal-fired generation across the region.*
- **Rapid cost escalation** – *industry rush to achieve compliance will drive up labor and material costs (repeat of 2008) and make it difficult to obtain labor and equipment at any price.*
- **CO₂ policy could change** – *uncertainty associated with future CO₂ legislation could result in less than optimal long-term investment decisions.*

What should you expect?

- *Requests for Kentucky Public Service Commission approval of environmental compliance projects perhaps before the federal regulations are finalized.*
- *Compressed construction timelines due to compliance timing.*
- *Additional compliance costs to meet implementation dates of federal rules.*
- *More frequent requests for rate increases due to substantial upward cost pressures caused by compliance with the federal regulations.*

What are LG&E and KU doing?

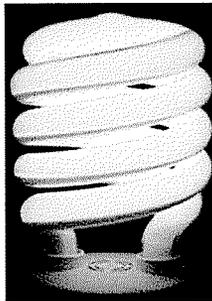
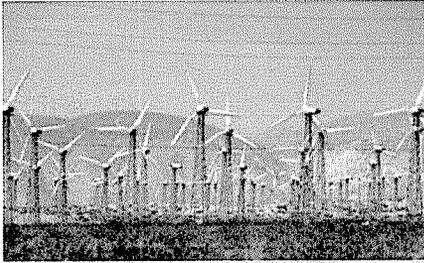
- *Evaluating multiple compliance alternatives.*
- *Participating in industry efforts to advocate more reasonable regulations and timelines.*
- *Communicating our concerns directly with EPA on proposed regulations.*
- *Educating elected officials, regulators and customers on the effect of the federal regulations will have on their electric bill.*



March 25, 2010

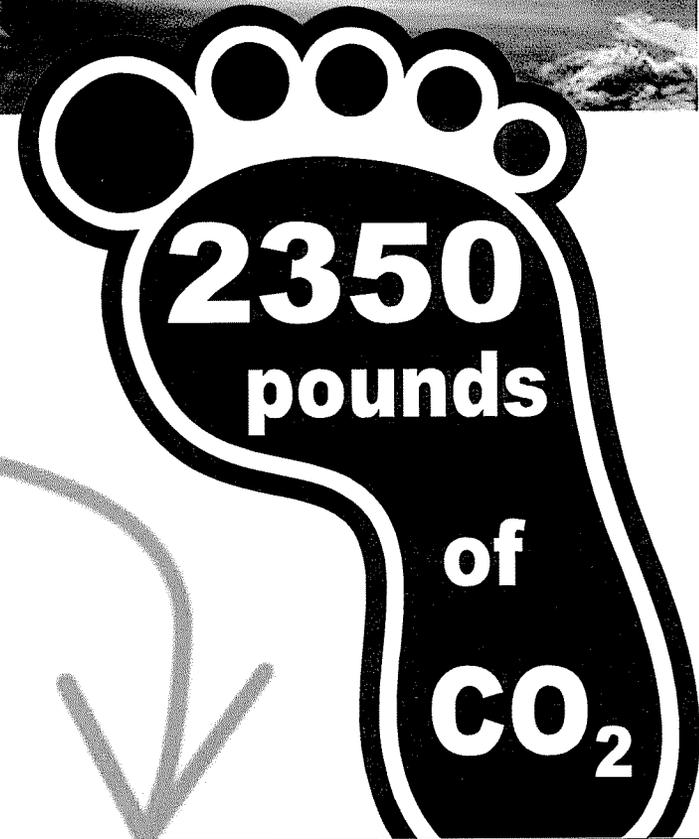
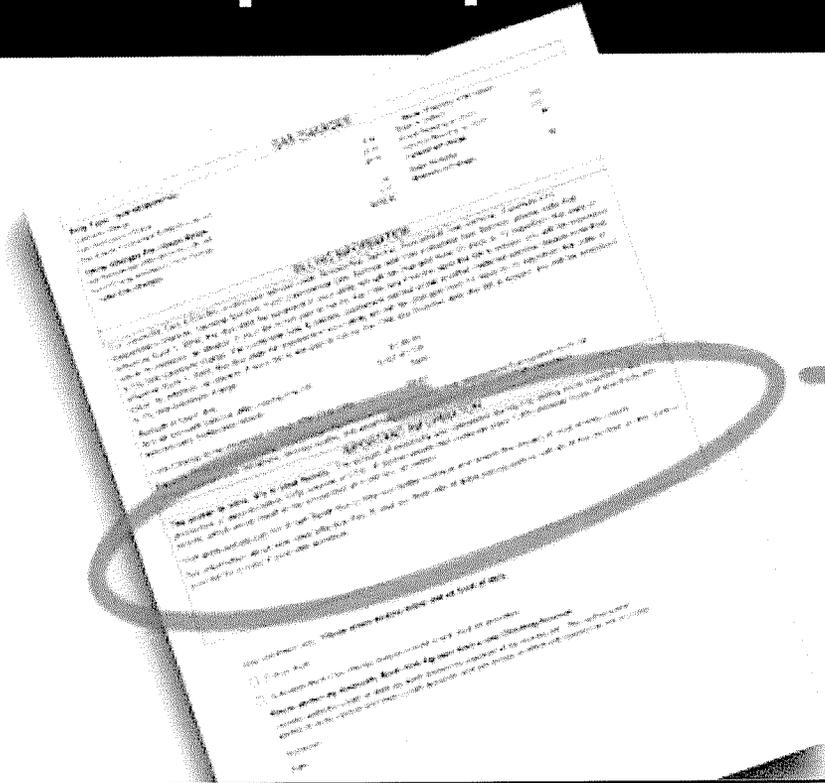
**Kentucky's carbon footprint:
Where does it lead?**

Tough issues, tough solutions



- *Renewable Energy*
- *Transmission Grid*
- *Carbon Legislation or EPA Regulation*
- *Efficient Use of Electricity*

Carbon footprint is about to leave a deeper impression



IMPORTANT INFORMATION

The power to save. It's in your hands. The amount of electricity you consumed during this billing cycle resulted in the production of approximately

You can reduce the impact of these emissions by joining our Demand Conservation program, which allows you to help us reduce the need for generating electricity at peak times. Visit our website at www.eon-us.com or call for more information or to sign up today.

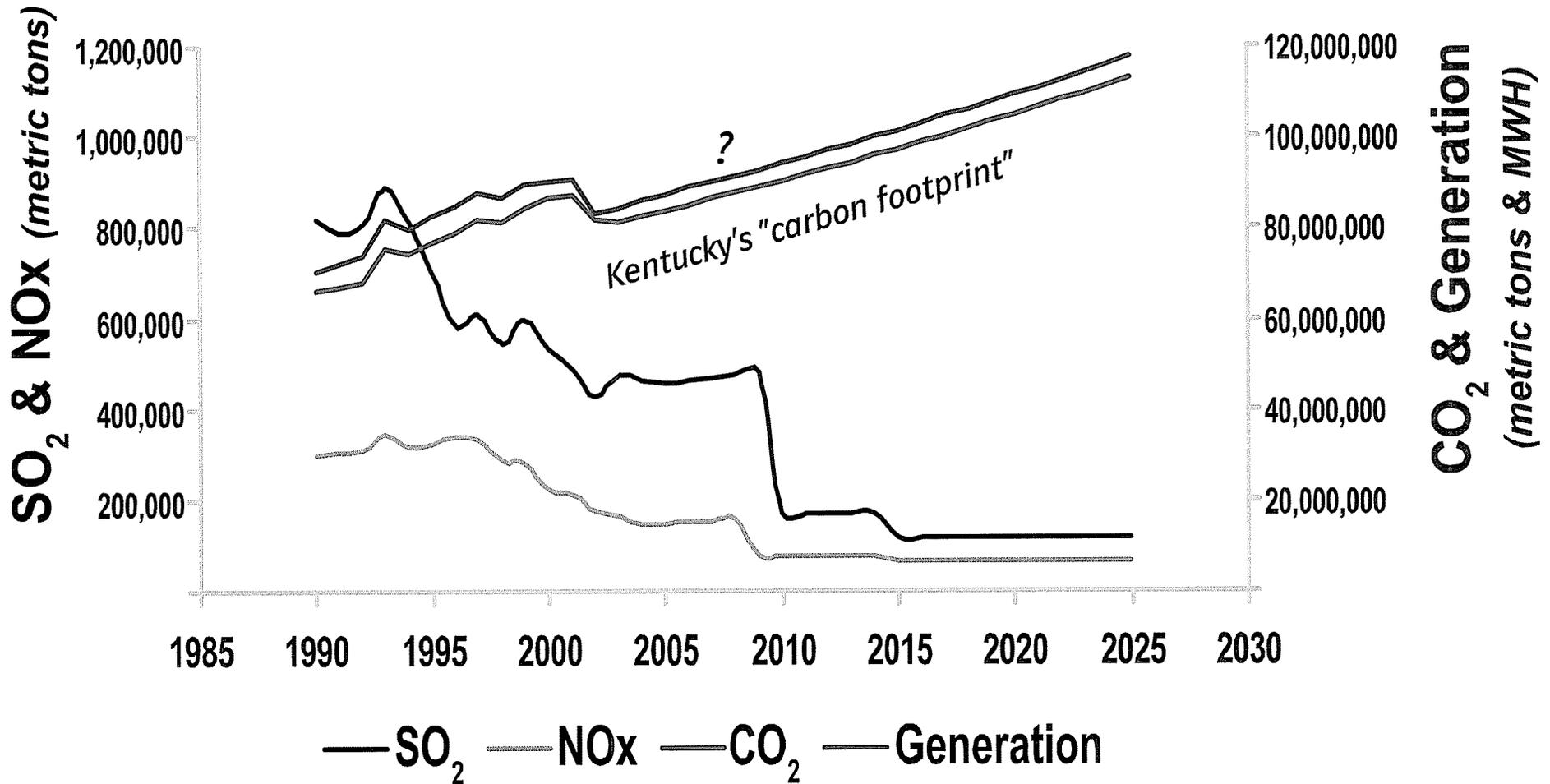
To request a copy of your rate schedule, please call (502) 589-1444.



Past successes, future challenges

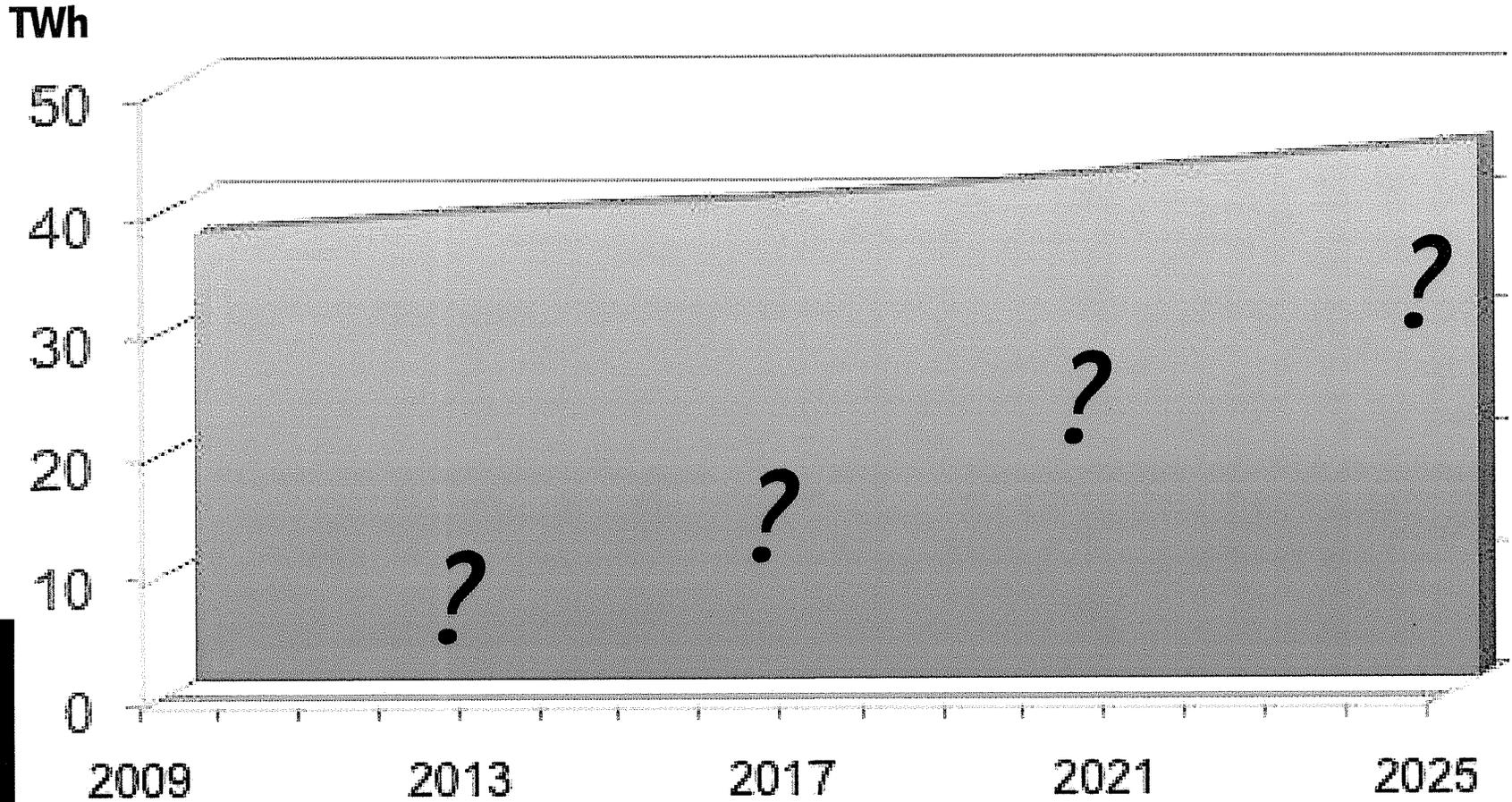


CO₂ emissions: **100 times** larger issue than SO₂/NO_x



Sources: U.S. DOE Energy Information Administration for historic emissions and generation. U.S. EPA for future SO₂ and NO_x state budgets. In-house projections of generation and CO₂ based on 1.5% annual growth. 2007 data.

Your growth in electric usage



PROJECTED ELECTRIC DEMAND BY LG&E/KU CUSTOMERS

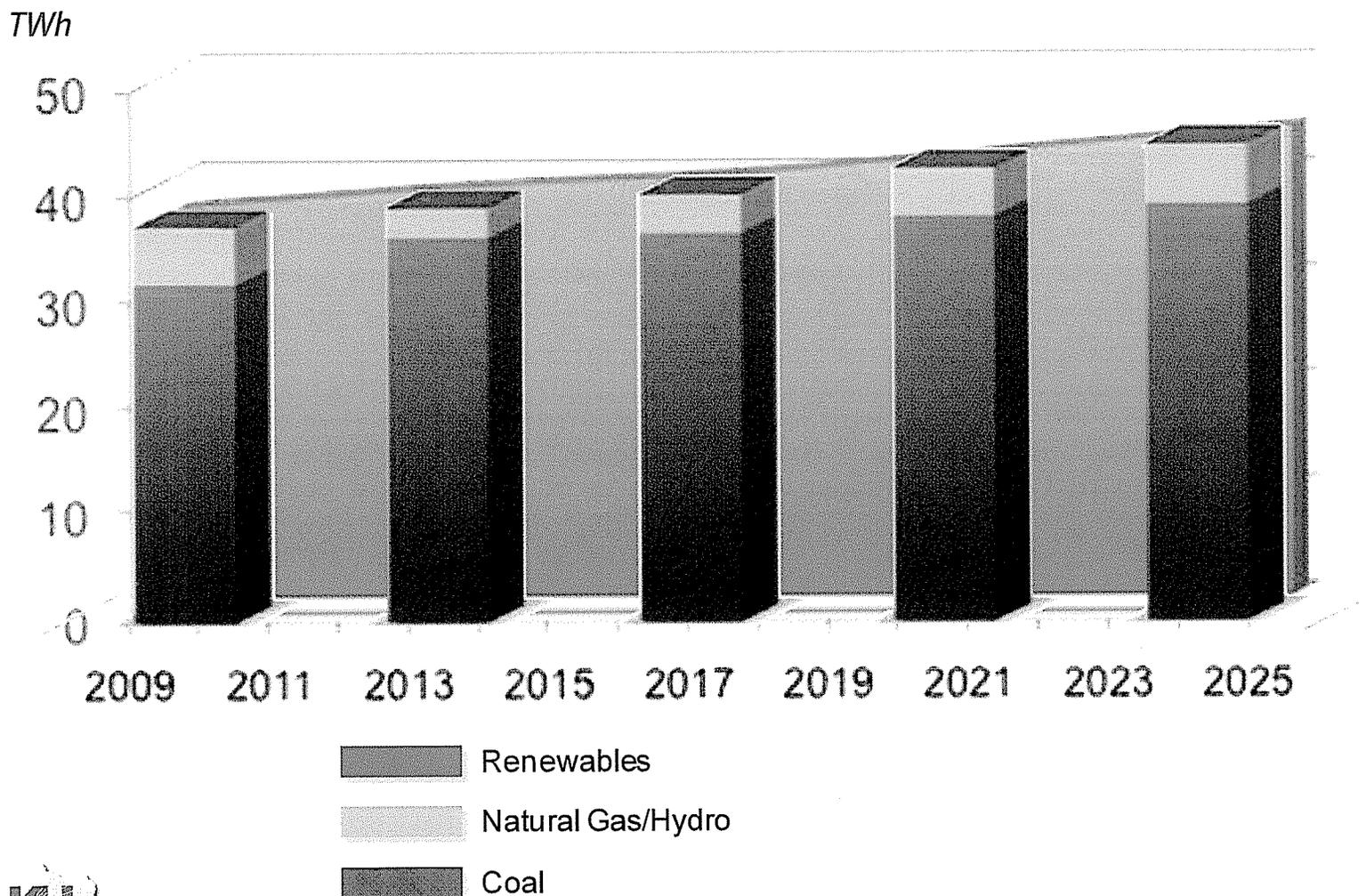


SOURCE: 2008 Integrated Resource Plan

How we plan to meet your electric demand



95% OF THE ELECTRICITY YOU USE COMES FROM COAL-FIRED POWER PLANTS

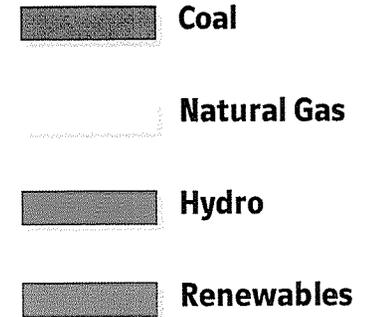


SOURCE: 2008 Integrated Resource Plan

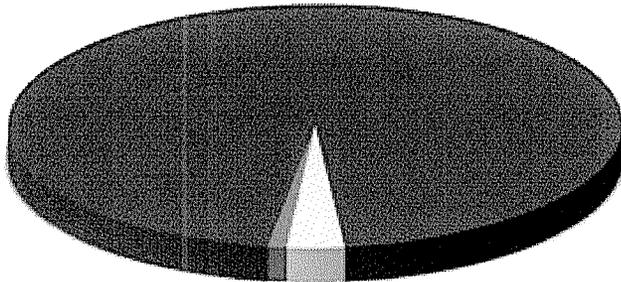
"Renewable portfolio standards"



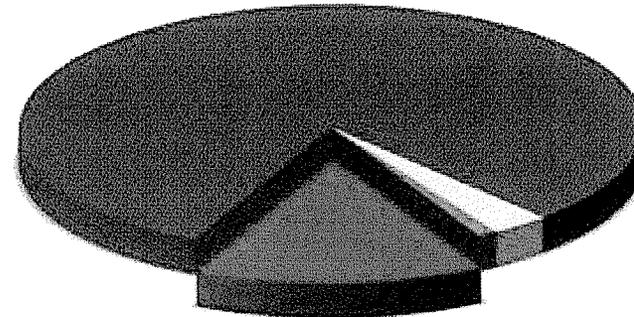
Renewable Portfolio Standards (RPS) should be considered in the context of national or regional greenhouse gas restrictions.



Currently Zero Renewables

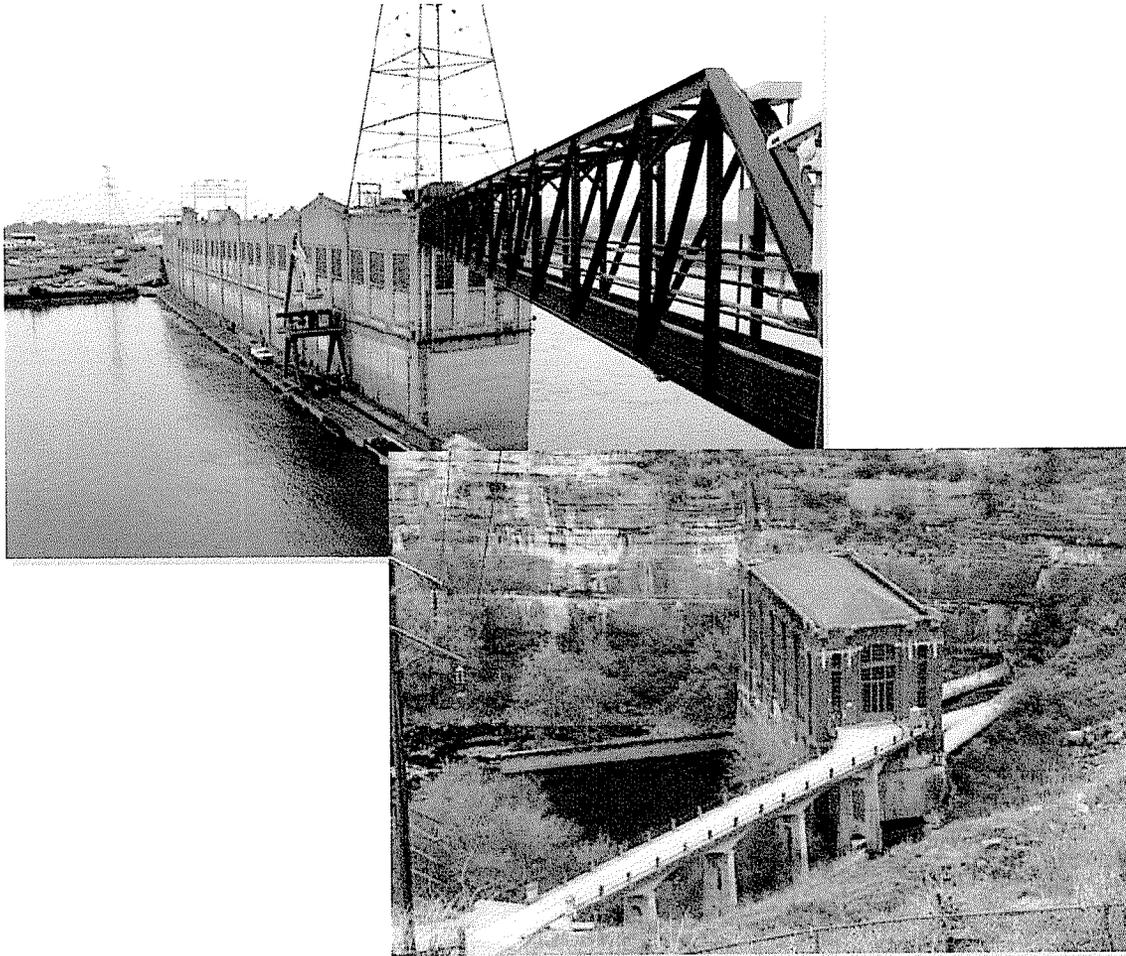


Under 2020 Federal Proposals



Note: Existing hydro does not count toward renewable mandates.

Considerations — hydro

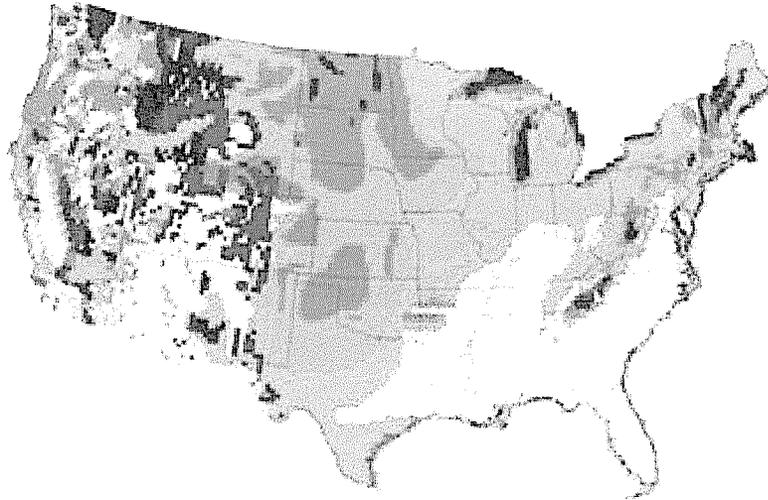


- *Annual availability equivalent up to 40 percent of continuous maximum capability*
- *Many legal/regulatory entities involved with different missions — recreation, transportation, nature preserves*
- *Low operating cost — “no fuel”*
- *Most hydro locations are already being used*

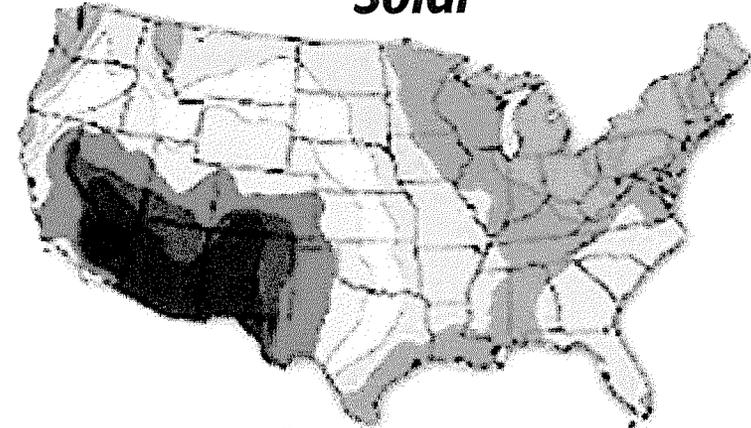
Considerations — wind, solar and geothermal



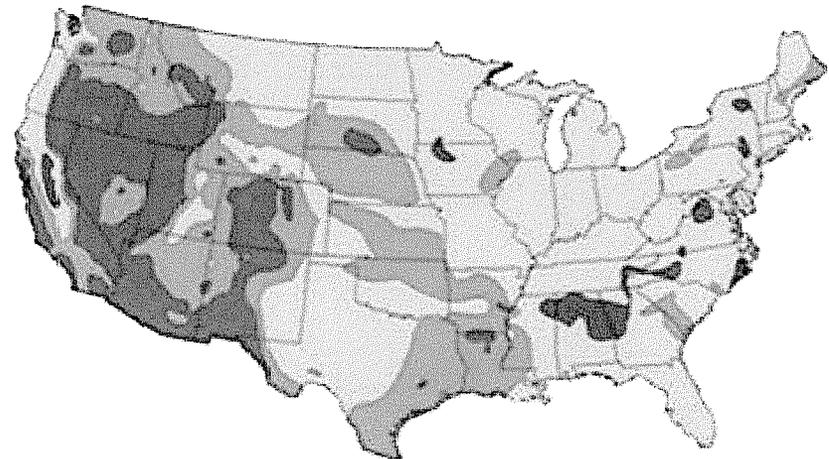
Wind



Solar

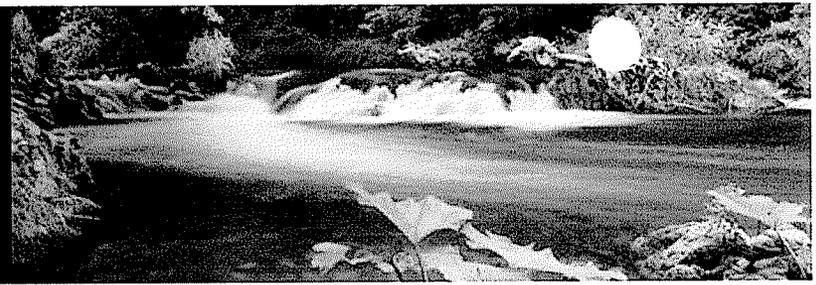


Geothermal

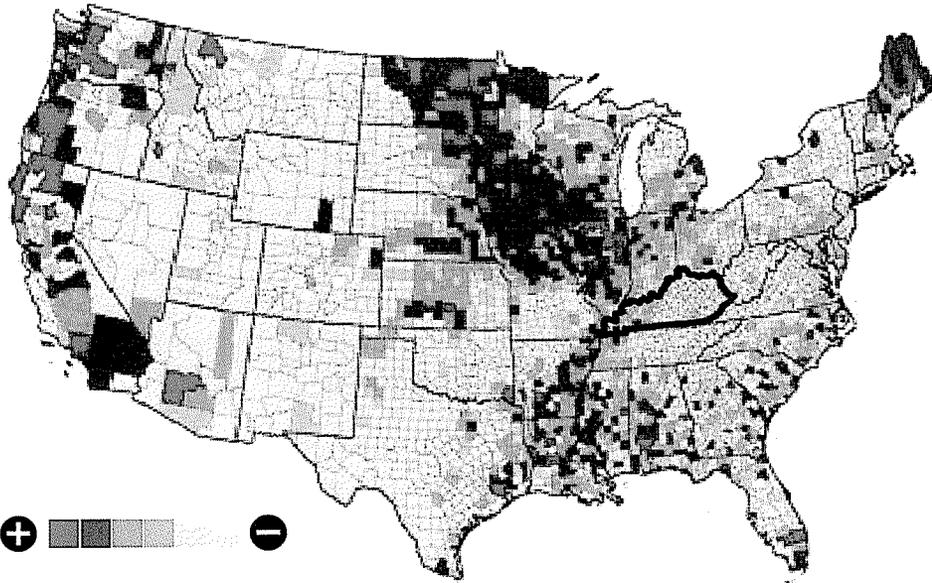


SOURCES: Dept. of Energy
National Renewable Energy Laboratory

Considerations — biomass



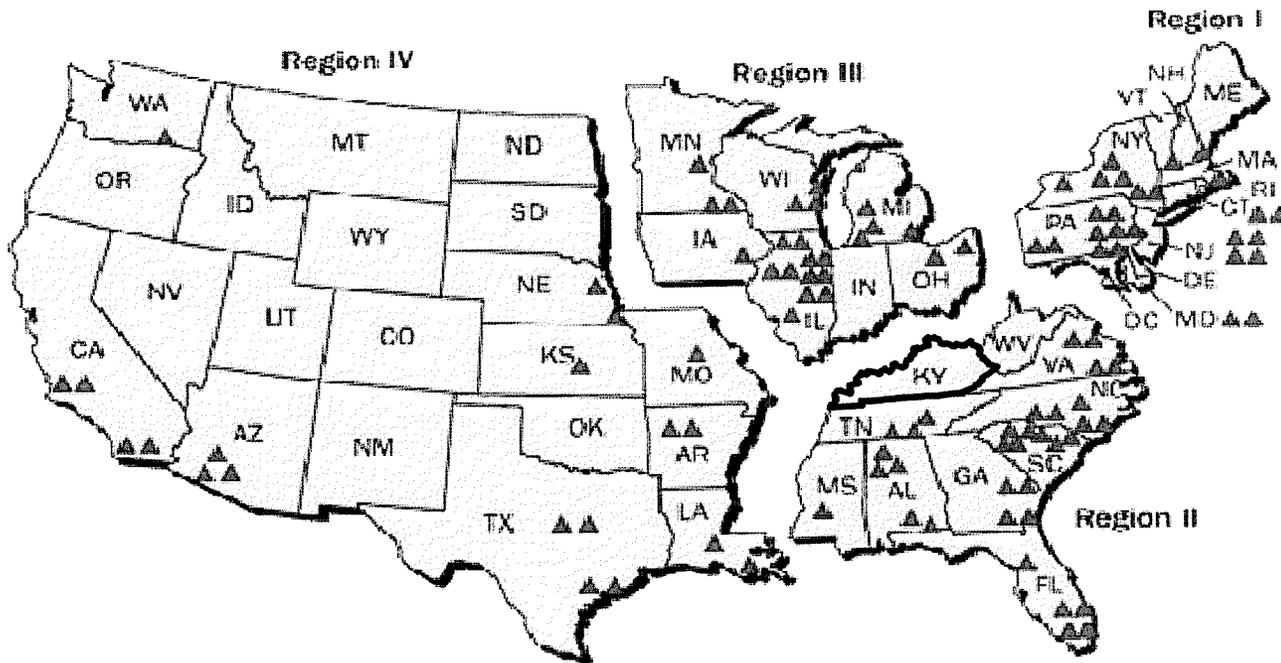
Biomass



Governor's Biomass Task Force

- *Meet RPS requirements with "in-state" resources*
- *Co-fire biomass with coal*
- *15 million tons of biomass combustion for 12% RPS*
- *Supply infrastructure and sustainability*

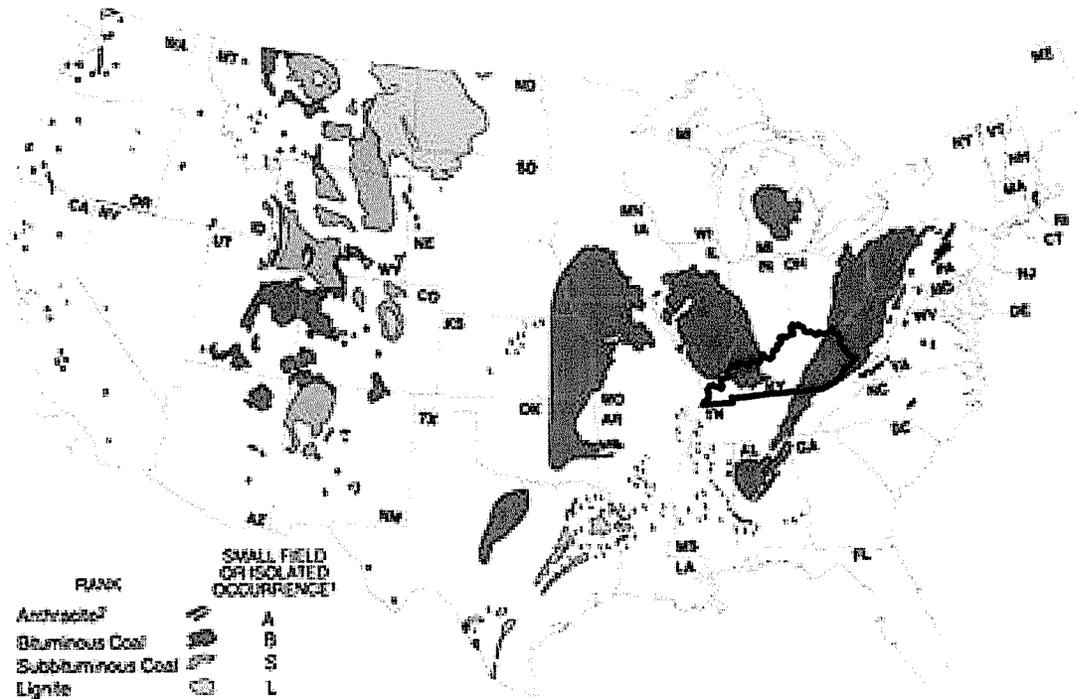
The nuclear option



Nuclear plants currently licensed to operate
SOURCE: Nuclear Regulatory Commission

- *Zero-carbon option*
- *Enormous investment of time and money*
- *Critical that there be a strong public and political consensus*
- *Disposal still an issue*
- *Nuclear is a **potential long-term** solution for Kentucky*

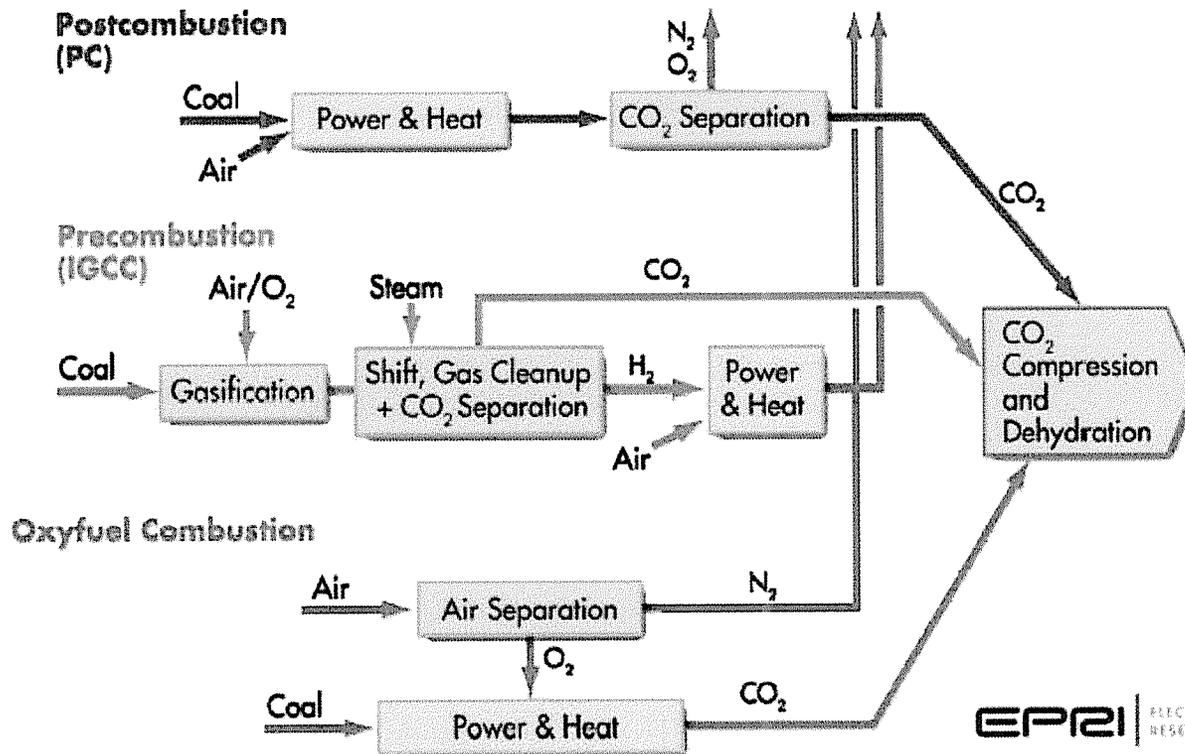
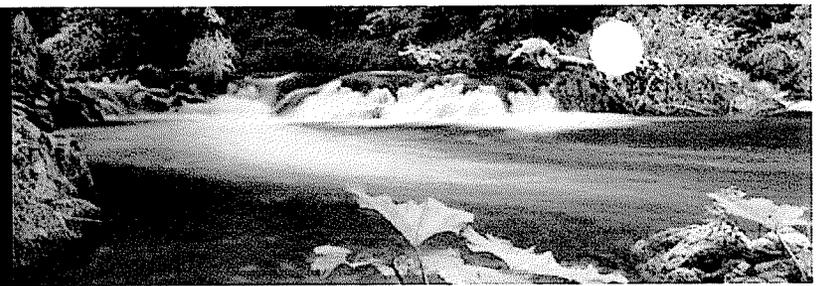
Considerations — coal



SOURCE: Dept. of Energy

- *One of the most widely-used fuels for electrical generation — 90% availability*
- *50% of U.S. power produced today*
- *95% of Ky. power produced today*
- *One of the largest fixed-source producers of CO₂*
- *Relatively low transportation costs (river barge)*

Carbon capture

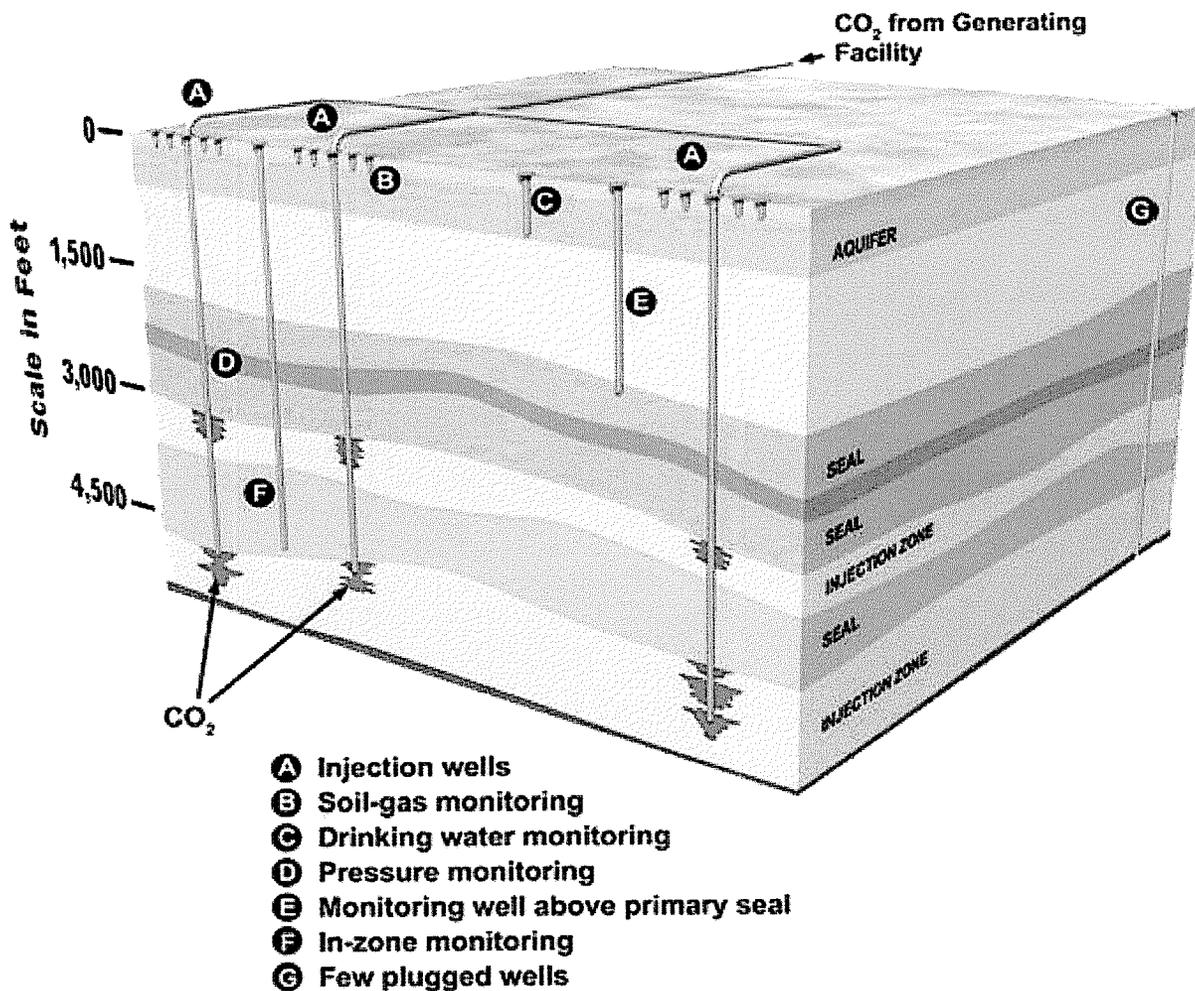


EPRI | ELECTRIC POWER RESEARCH INSTITUTE

What's involved....

- Three technology paths for capture
 - Post-combustion
 - Pre-combustion
 - Oxy-fuel combustion
- Promising options, but no large-scale commercial application yet
- E.ON U.S. involved in post- and pre-combustion R&D

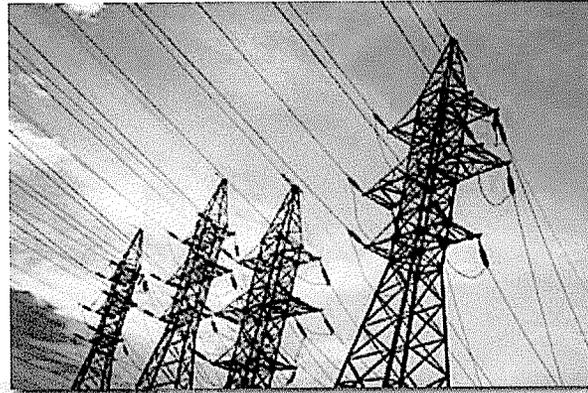
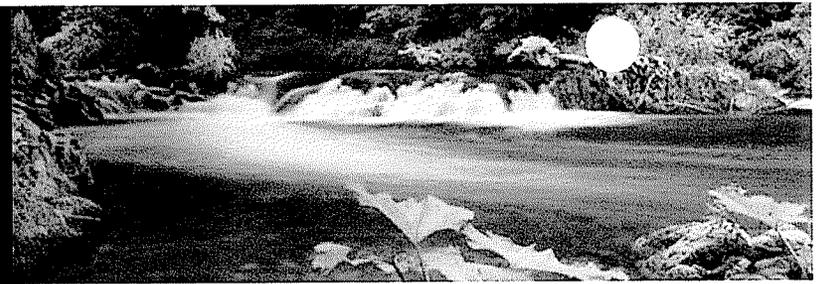
Carbon capture & sequestration



What's involved....

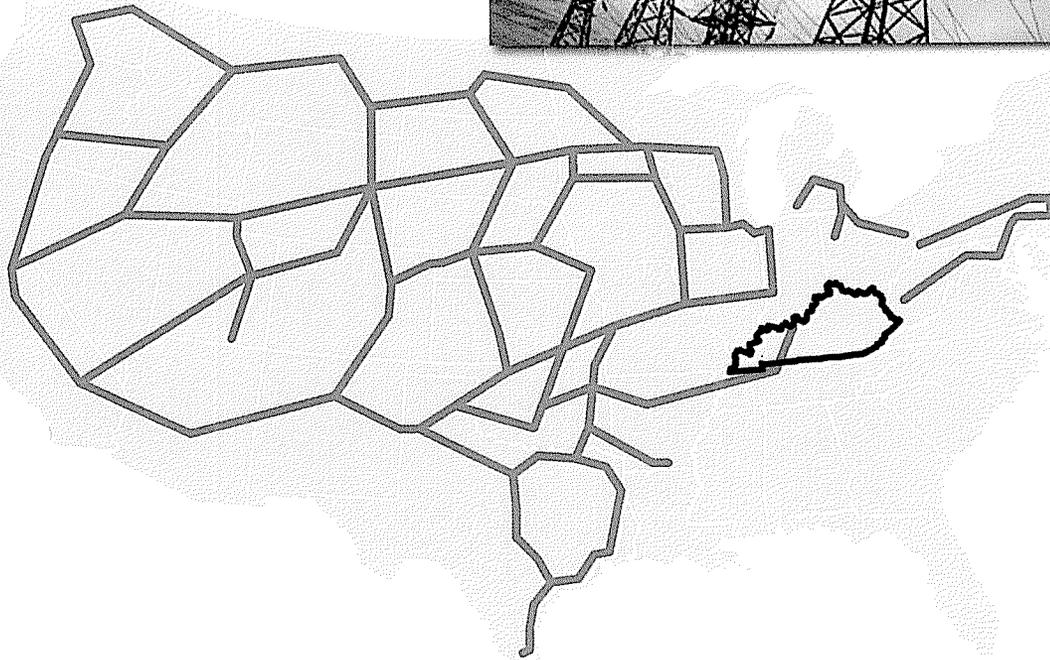
- "Bury" the problem
- Deep underground wells — depleted oil fields
- Significant investments in new technology, pumping systems
- Promising option, but no large-scale commercial application yet
- "NUMBY"

If we can't make it, why not just *move* it?



"Costs" of transmission...

- *Current grid is stretched — would require major new construction at large capital cost*
- *Risks of over-reliance on single highway (Canadian blackout)*
- *Development/approval time*
- *NIMBY*



**Transmission grid system needed to support new
renewable power development**

*SOURCE: Dept. of Energy
National Renewable Energy Laboratory*



Carbon legislation or EPA regulation



Carefully crafted, comprehensive legislation is a more effective option for controlling greenhouse gas emissions than piece-meal EPA regulation

Legislation should:

- *Cover economy-wide entities*
- *Provide larger initial allowance allocations and longer phase-out period to ease transition*
- *Begin with an effective safety valve allowance price*

EPA regulation via the Clean Air Act would:

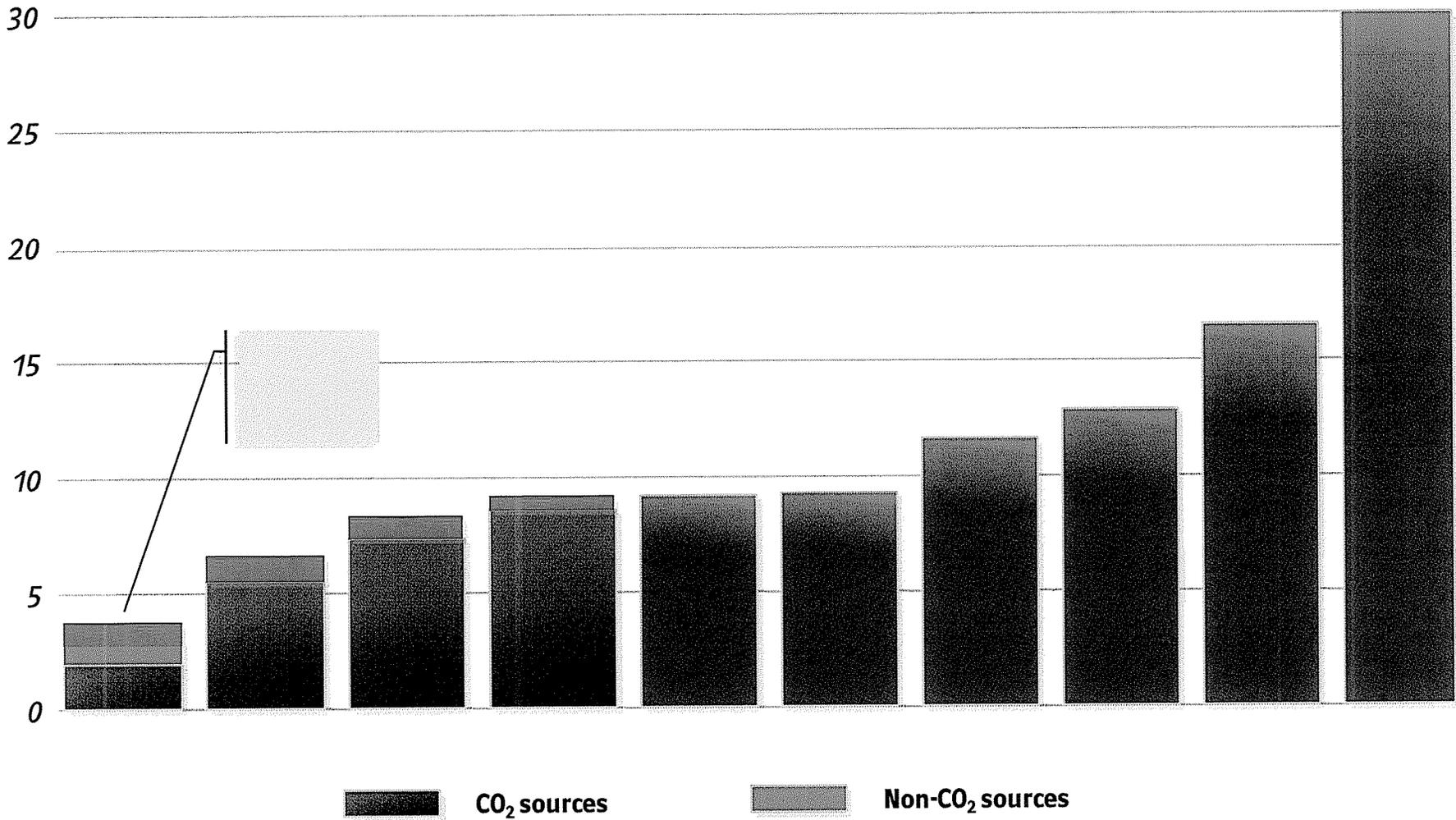
- *Utilize low threshold levels for applicable entities*
- *Establish a significant number of non-attainment areas*
- *Regulate an extremely high-volume pollutant with no commercial control technology available*



Cost Comparison



Generation Costs
¢/kwh



American Clean Energy and Security Act of 2009



- *Passed House on June 26, 2009.*
- *Mandates a 17 percent reduction in greenhouse gases by 2020 and 83 percent by 2050 from 2005 levels.*
- *Senate did not advance similar bill.*
- *Current form contains elements that are a step in the right direction.*
- *Copenhagen commitments were based on the House bill targets.*

To further mitigate costs to our customers, additional elements E.ON U.S. would like to see included in the bill are:

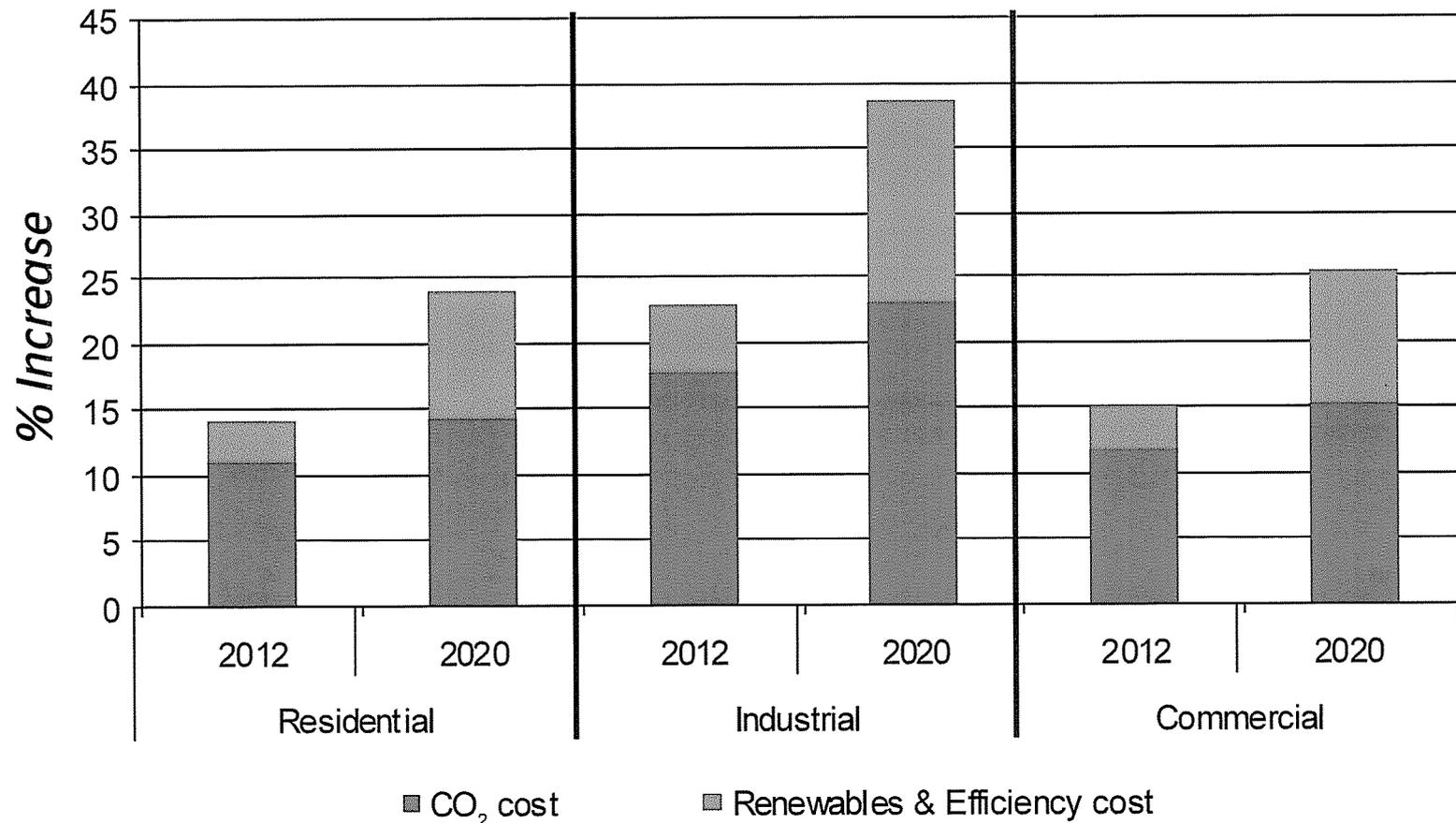
- *Modified near- and mid-term greenhouse gas reduction targets and timetables.*
- *Inclusion of a price "ceiling" on emission allowance costs.*
- *Extension of the phase-out period for the allocation of allowances.*
- *Preempt inappropriate EPA regulation under the CAA .*



Estimated costs



Percent rate impact of carbon tax and renewable energy requirements on E.ON U.S. customer bills



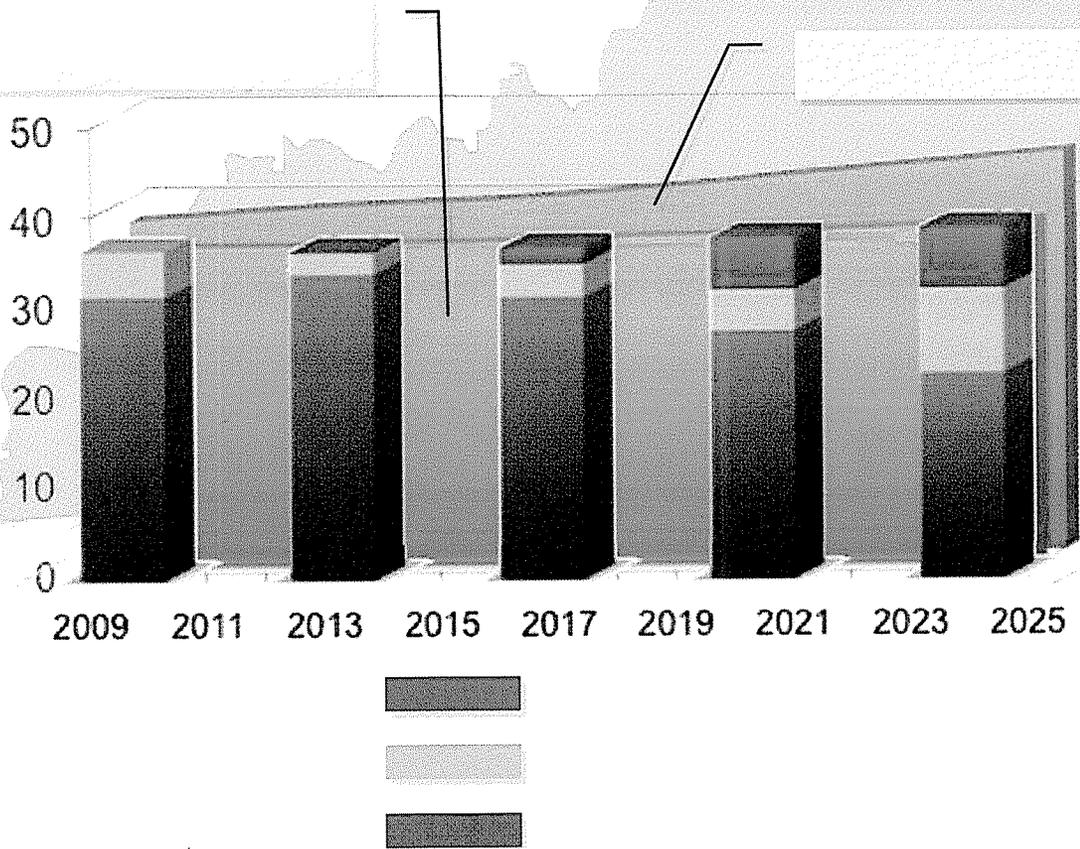
- Percentage increases calculated using 2008 rates applied to 2020 projected sales
- CO₂ allowance is calculated at \$20 a ton, allocation methodology is 41% purchase in 2012, 53% purchase in 2020
- Assumes utilities meet the CERES target entirely through purchase of Alternative Compliance Payments (ACPs) set in the bill at 2.5 cents per KWH in 2010 (and subsequently indexed).



Reducing demand — the challenge



EFFECT OF AGGRESSIVE ENERGY-EFFICIENCY PROGRAM



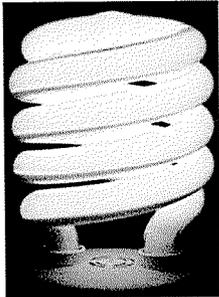
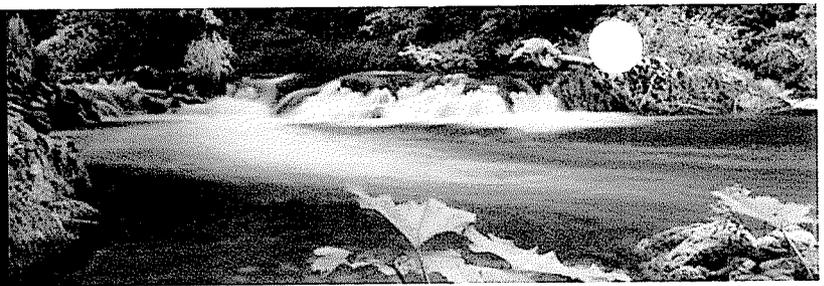
What it would take...

- *15+% reduction in demand*
- *Unprecedented consumer commitment to energy efficiency*
- *Commitment to "smart grid"*
- *Less coal in total generation mix, less exposure to carbon tax, but high cost of purchased or developed renewable power sources*



SOURCE: 2008 Integrated Resource Plan

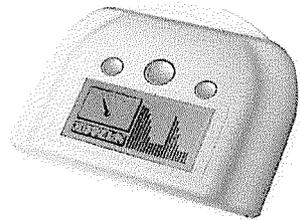
Energy Efficiency Initiatives



- *E.ON U.S. is investing more than \$25 million in energy efficiency programs annually — at least \$182 million over the life of the program*

Examples:

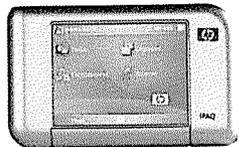
- *Enhanced energy audits*
- *Commercial rebates*
- *Residential lighting*



- *Expected to reduce the need for additional generation by more than 500 megawatts*

- *Conserve Energy During Heavy Demand*

- *Load control program: partnership with customers that allows us to cycle off AC units during peak demand*
- *Smart meter pilot program: helps customers manage their usage*



What are "the next steps?"



- *Understand that rising energy costs will be a way of life for years to come — consider everything you do with that in mind*
- *Make major, sustained commitment to energy efficiency*
- *E.ON U.S. — to address issues of carbon capture and sequestration with help of policy-makers*
- *E.ON U.S. — share information and work constructively with policy-makers*



Balanced Outcome

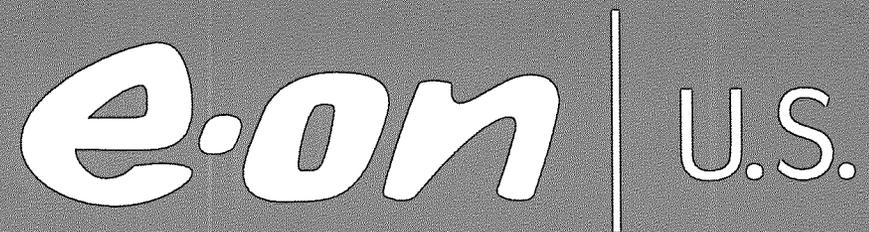


- *Insist on a thorough evaluation of cost*
- *Allow technology to catch up*
- *Demand an equitable allocation of carbon credits*
- *Be efficient — seek incentives for efficiencies*



*"To build may have to be the slow and laborious task of years.
To destroy can be the thoughtless act of a single day."*

— Winston Churchill



Kentucky's Energy Future

- Renewable Standards

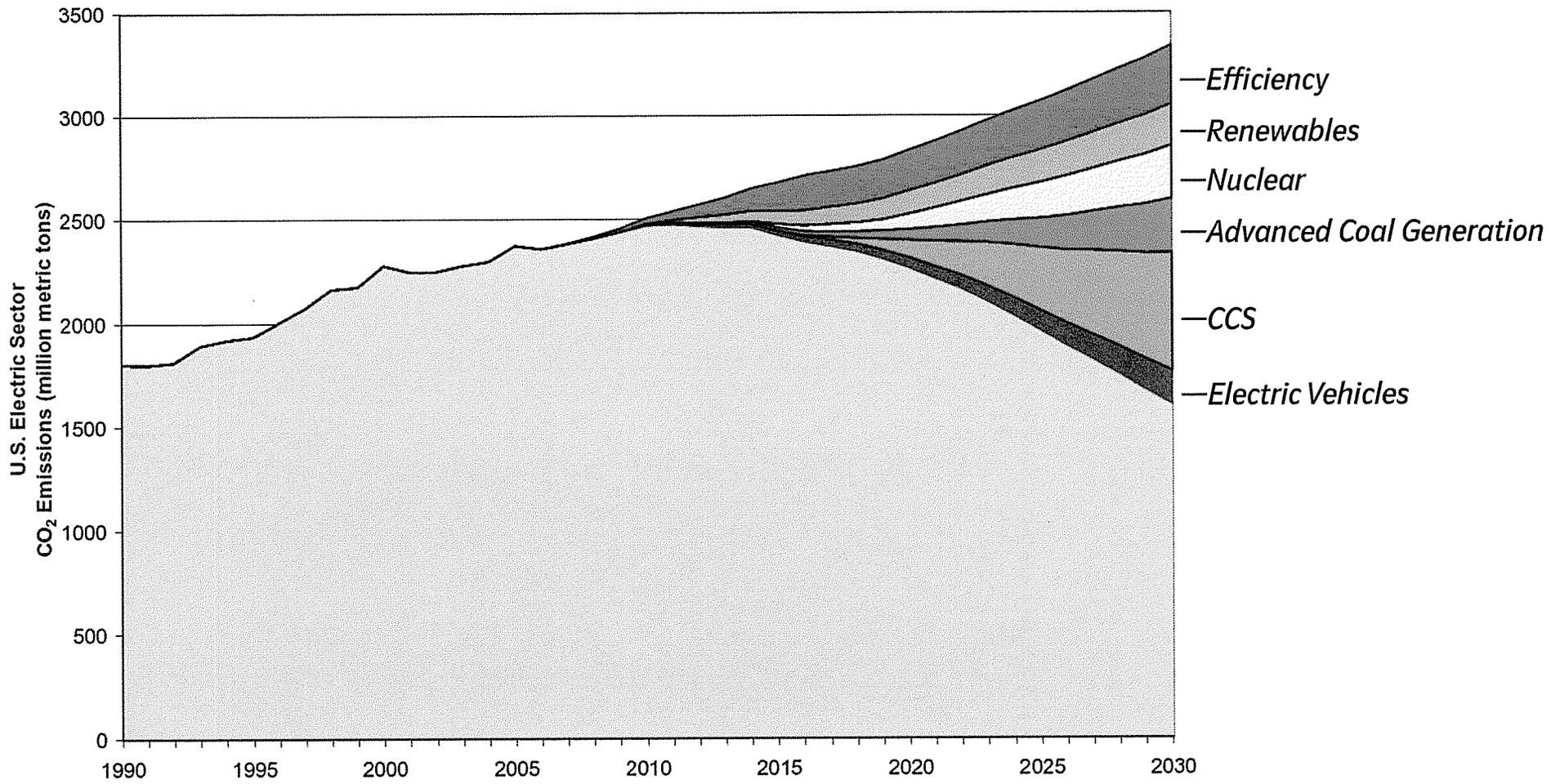
- Carbon Caps

John N. Voyles, Jr.

Vice President, Transmission and Generation Services

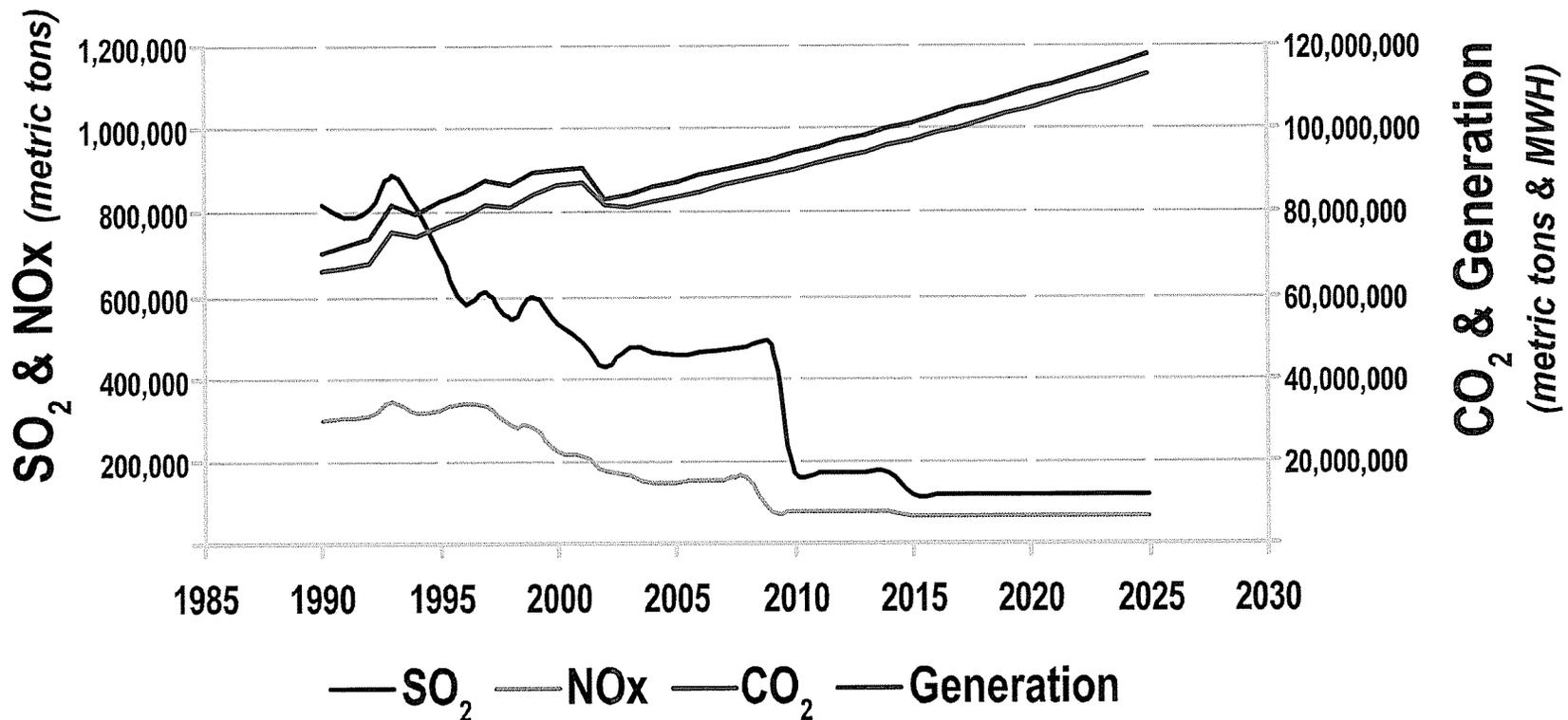
KIUC Energy Conference, March 26, 2009

The CO₂ Challenge Requires a Cooperative Effort



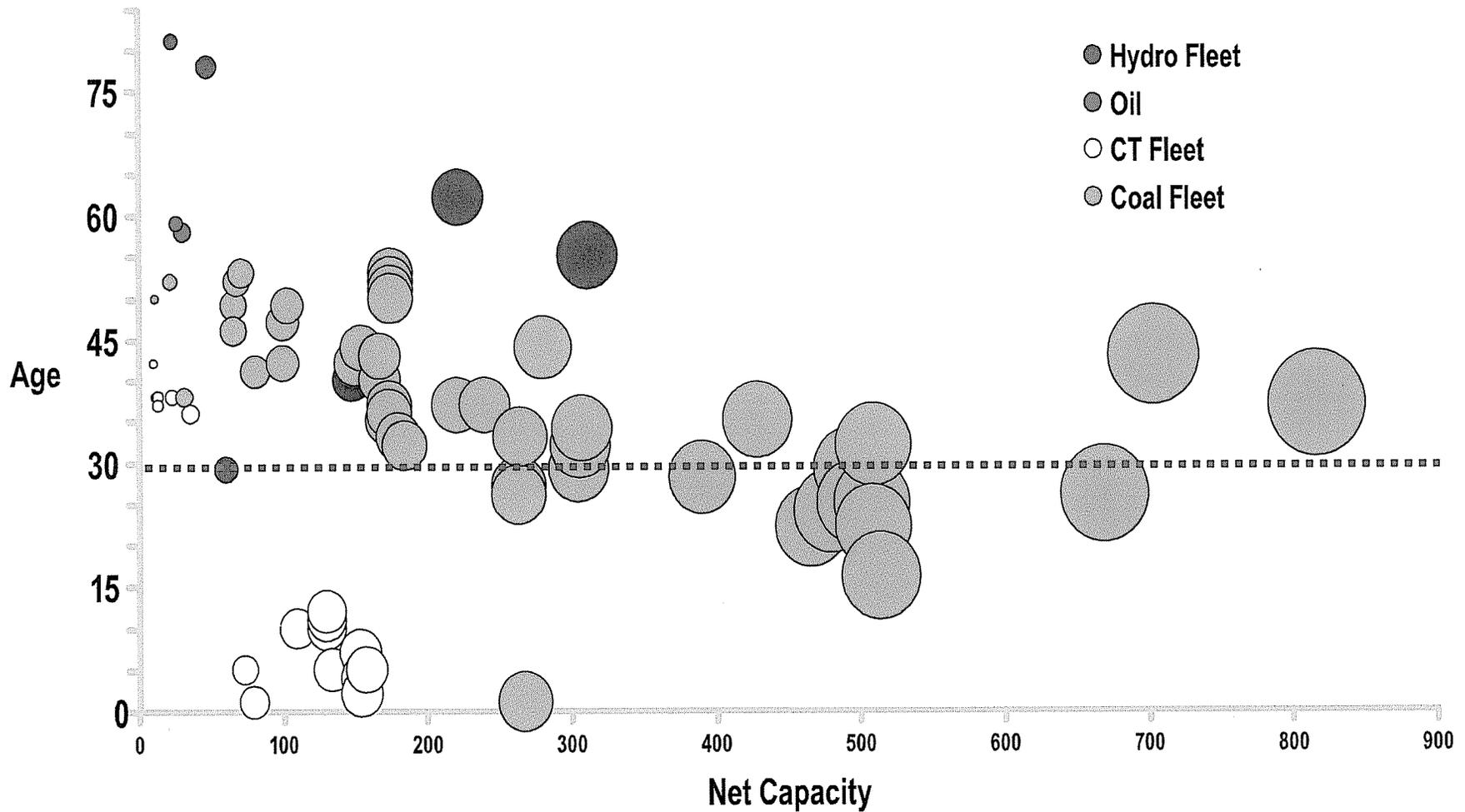
Kentucky Coal-Fired Generation

- **CO₂ emissions: 100 times larger issue than SO₂/NOx**

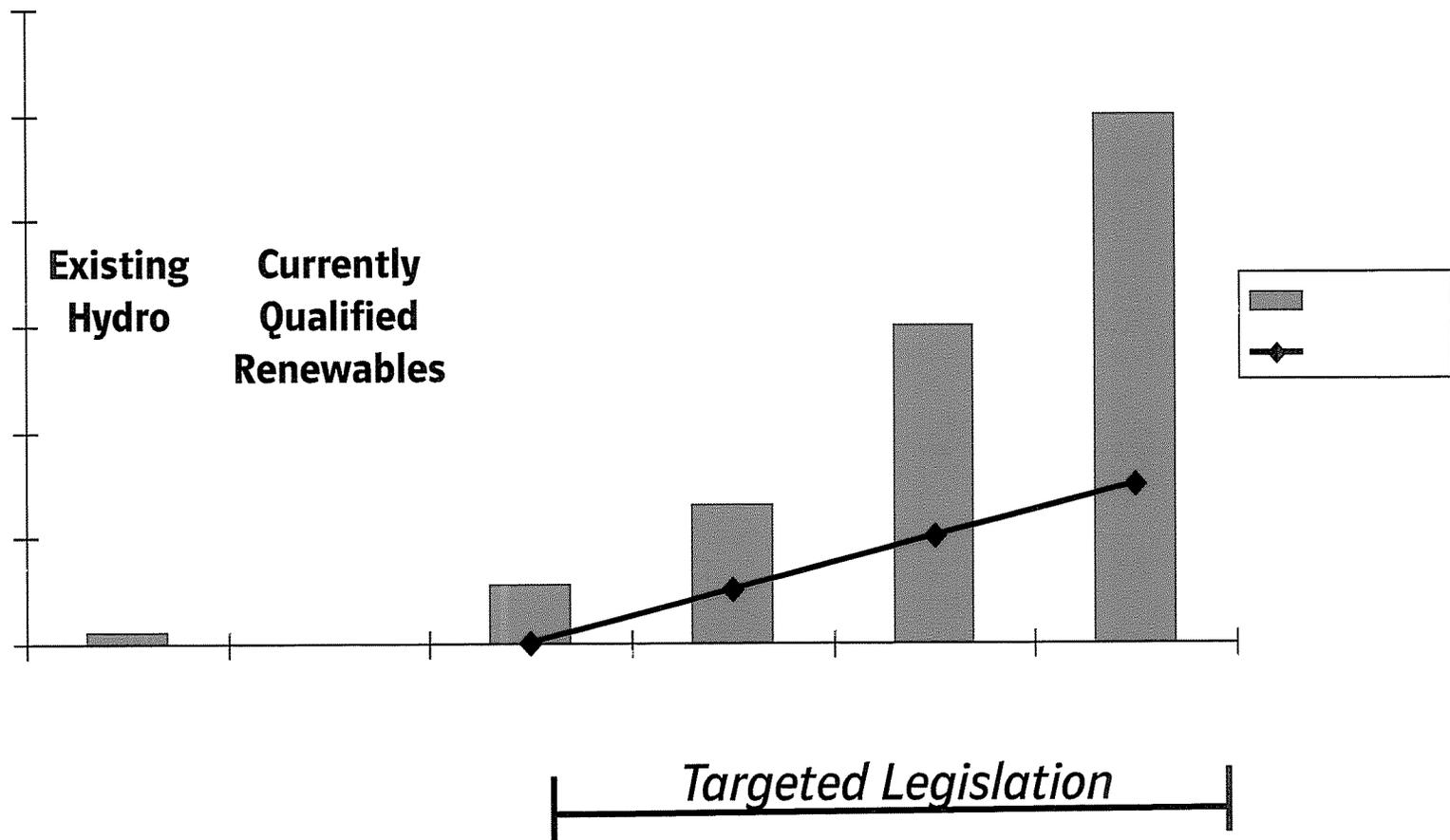


Sources: U.S. DOE Energy Information Administration for historic emissions and generation. U.S. EPA for future SO₂ and NOx state budgets. In-house projections of generation and CO₂ based on 1.5% annual growth.

Utility Asset Matrix — Aging Units Across Kentucky



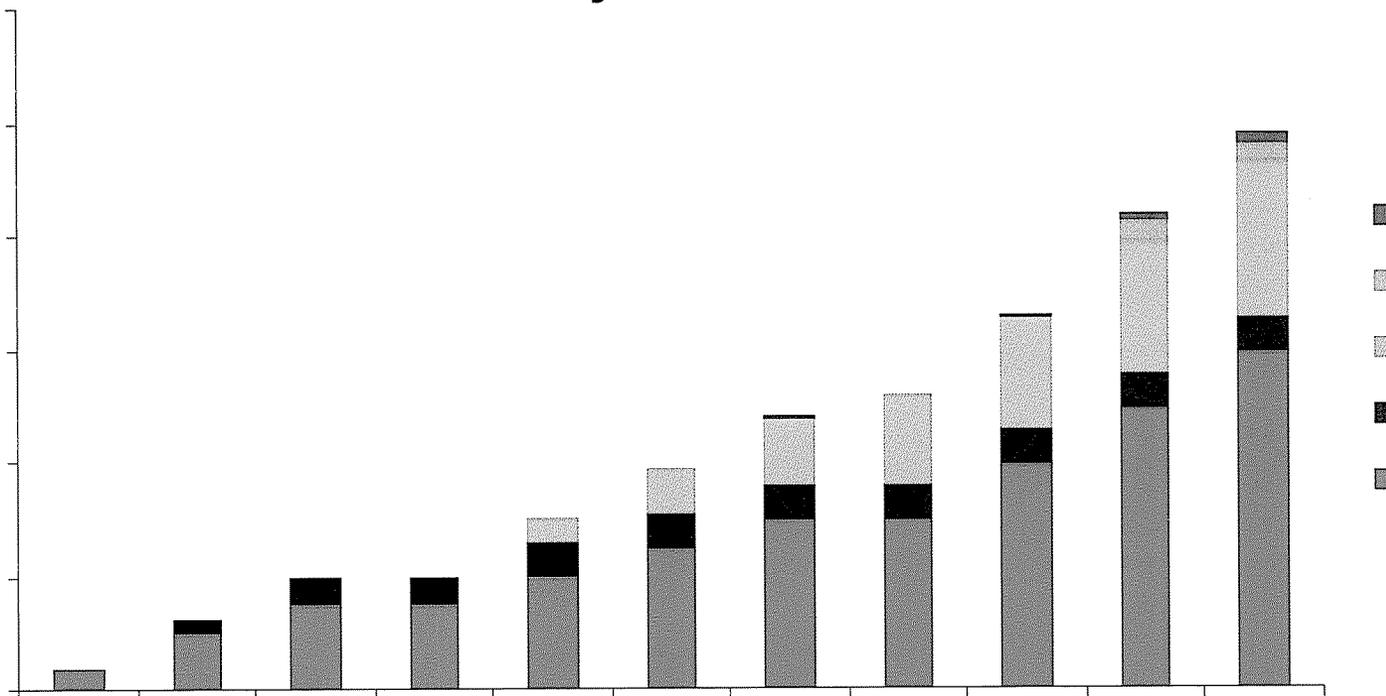
Renewables Legislation — Federal or State Standards?



If required by 2020...

One way to meet a 15% Federal RPS for E.ON U.S. Production

Generation by source (GWh)



Renewable Energy at a 15% standard will leave an impression

Adds about 1.5 cents / KWh

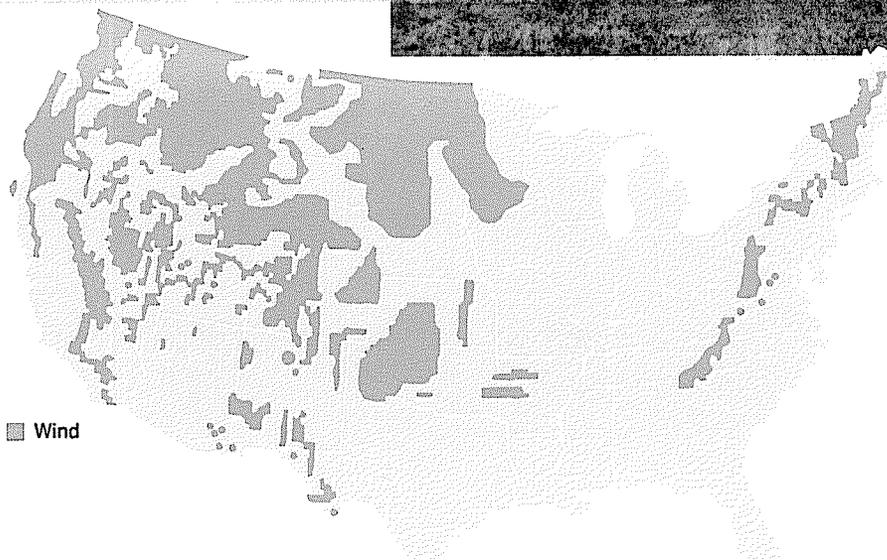
What is your "cost?"

IMPORTANT INFORMATION

The power to save. It's in your hands. The amount of electricity you consumed during this billing cycle resulted in the production of approximately 2350 pounds of CO₂.

You can reduce the impact of these emissions by joining our Demand Conservation program, which allows you to help us reduce the need for generating electricity at peak times. Visit our website at www.eon-us.com or call 1-866-857-COOL (2665) for more information or to sign up today.

To request a copy of your rate schedule, please call (502) 589-1444.



Top 3 out of 6 regional ratings

*SOURCE: Dept. of Energy
National Renewable Energy Laboratory*

Single turbine generates about 1.5 MW

500 MW:

- One unit of typical coal plant, or*
- 5,000 wind turbines*

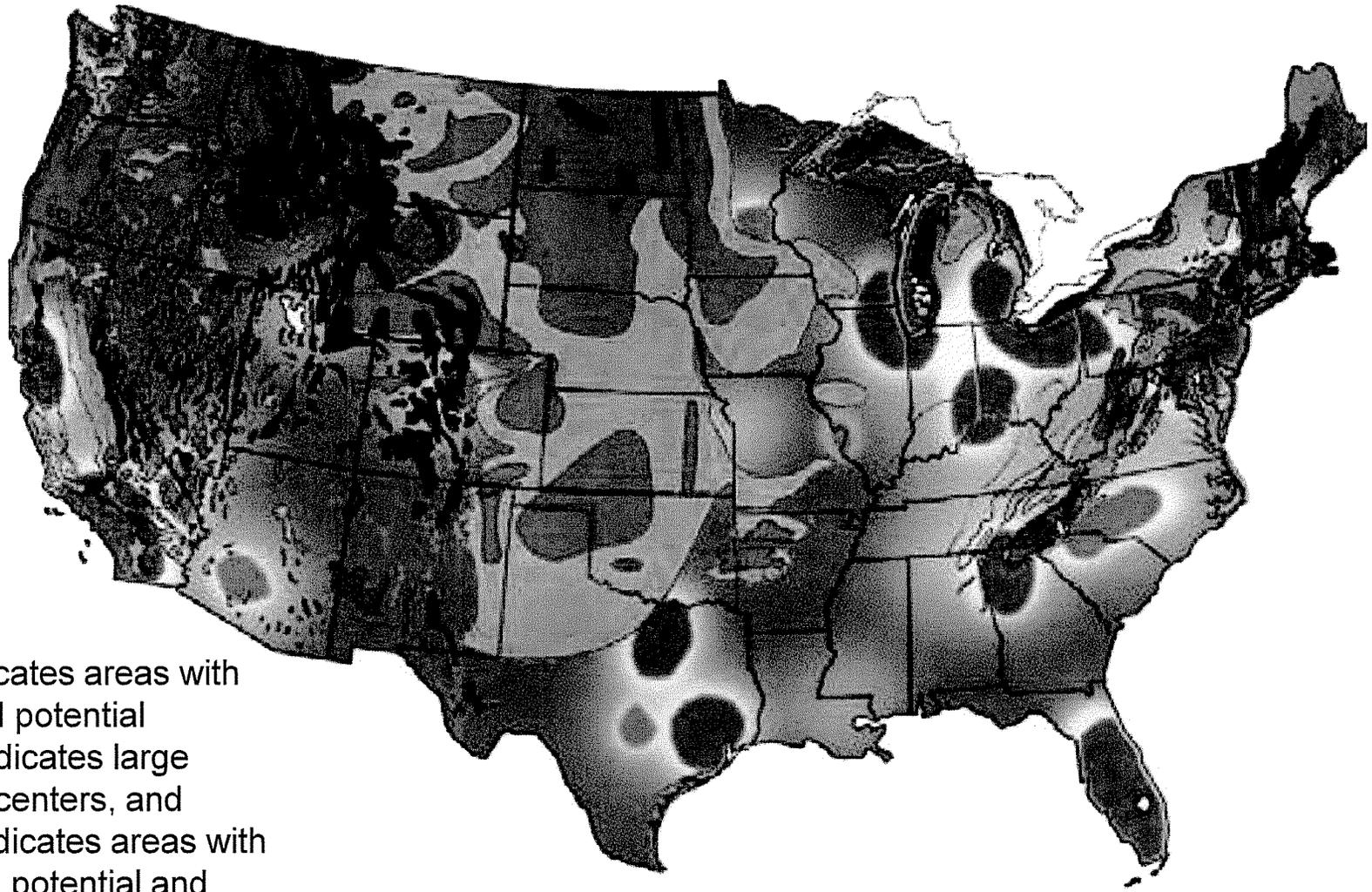
Kentucky in lowest category (marginal) for useful wind power

Efficiency (KY):

- 31% on average day*
- 8% on a hot summer day*

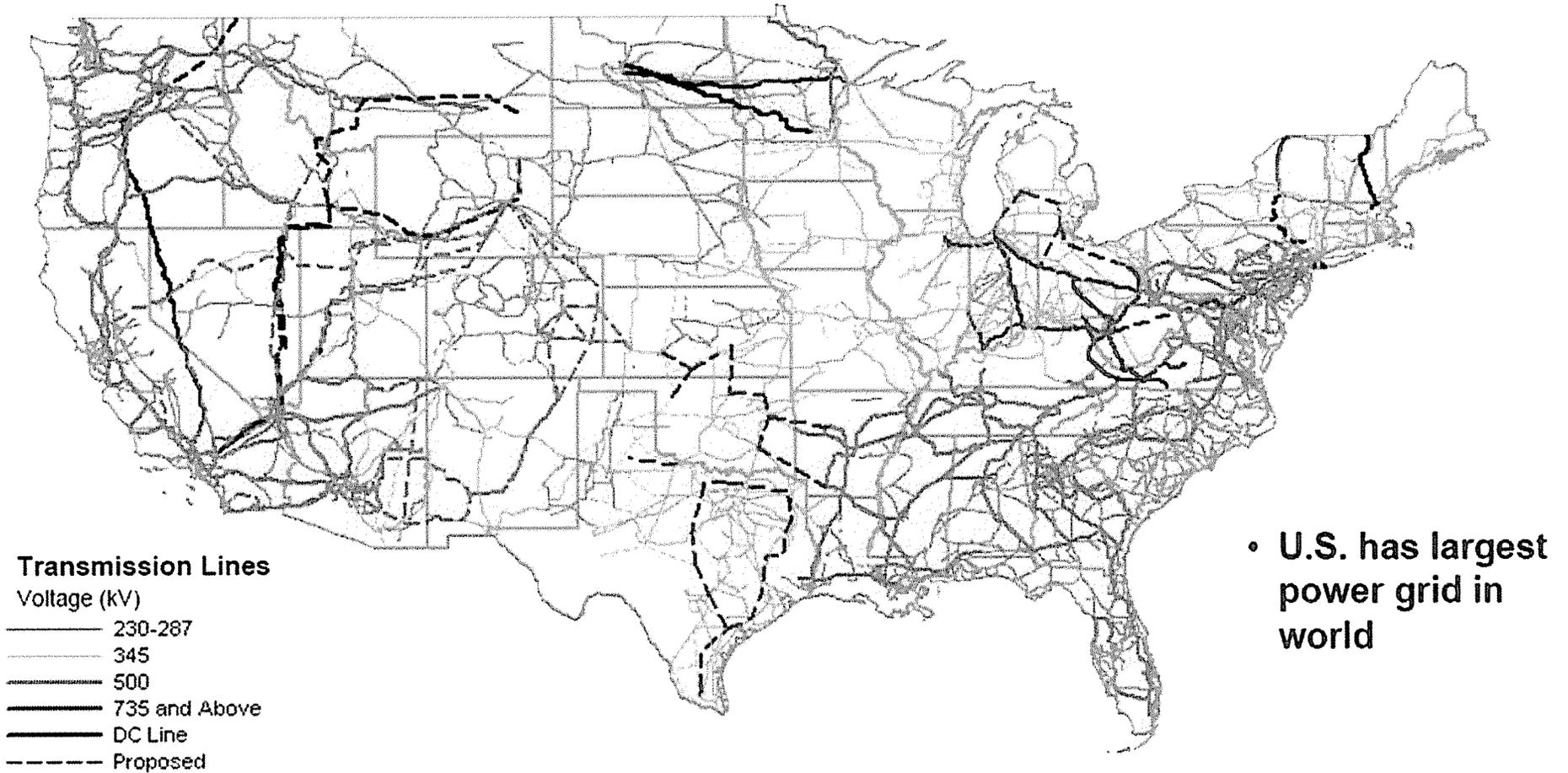
Requires back-up power from natural gas peaking unit, pumped hydro, other

Wind Availability Compared to Demand Centers



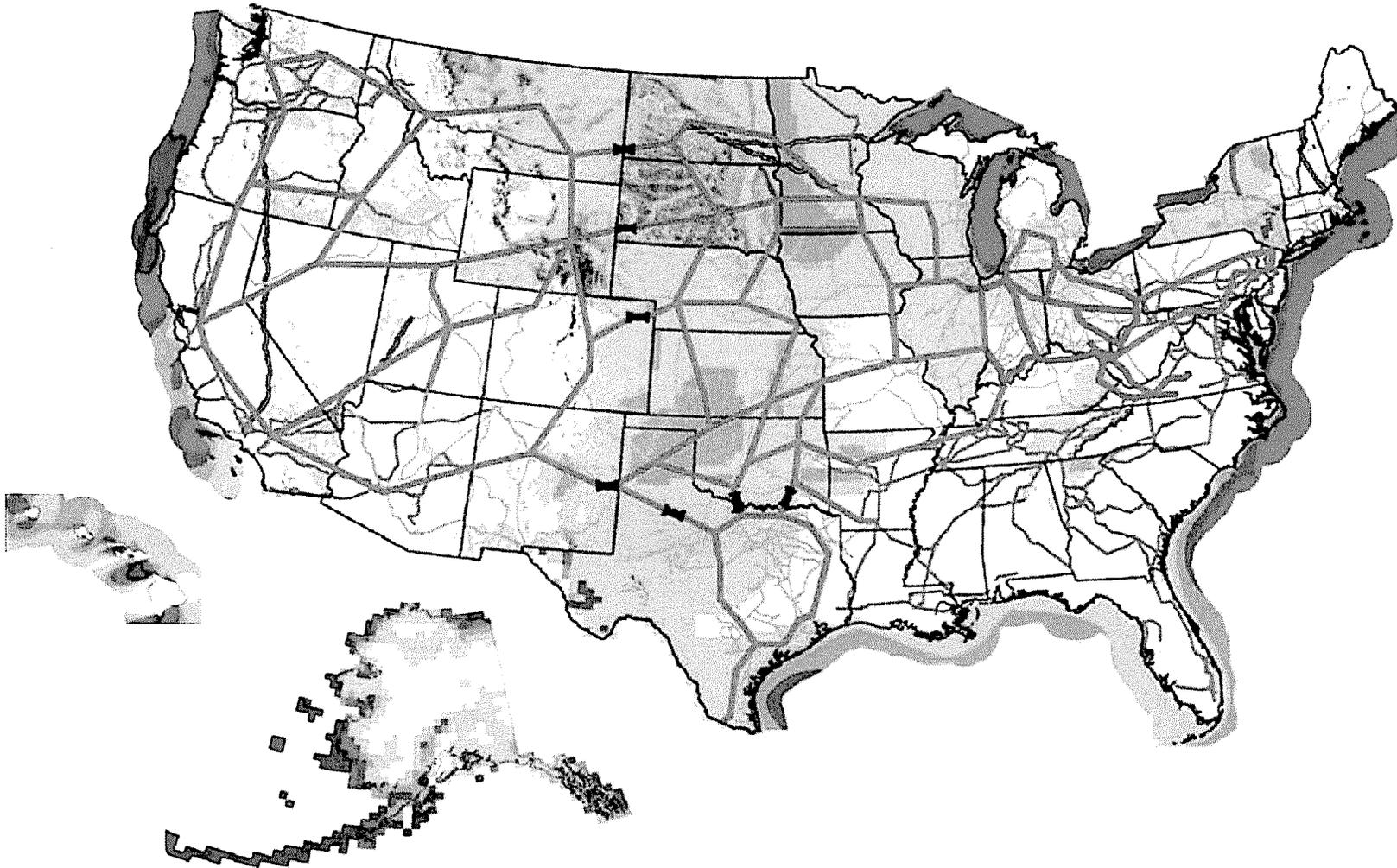
- Blue indicates areas with high wind potential
- Brown indicates large demand centers, and
- Green indicates areas with little wind potential and smaller demand centers

U.S. Interstate Power Grid (163,480 Circuit Miles)

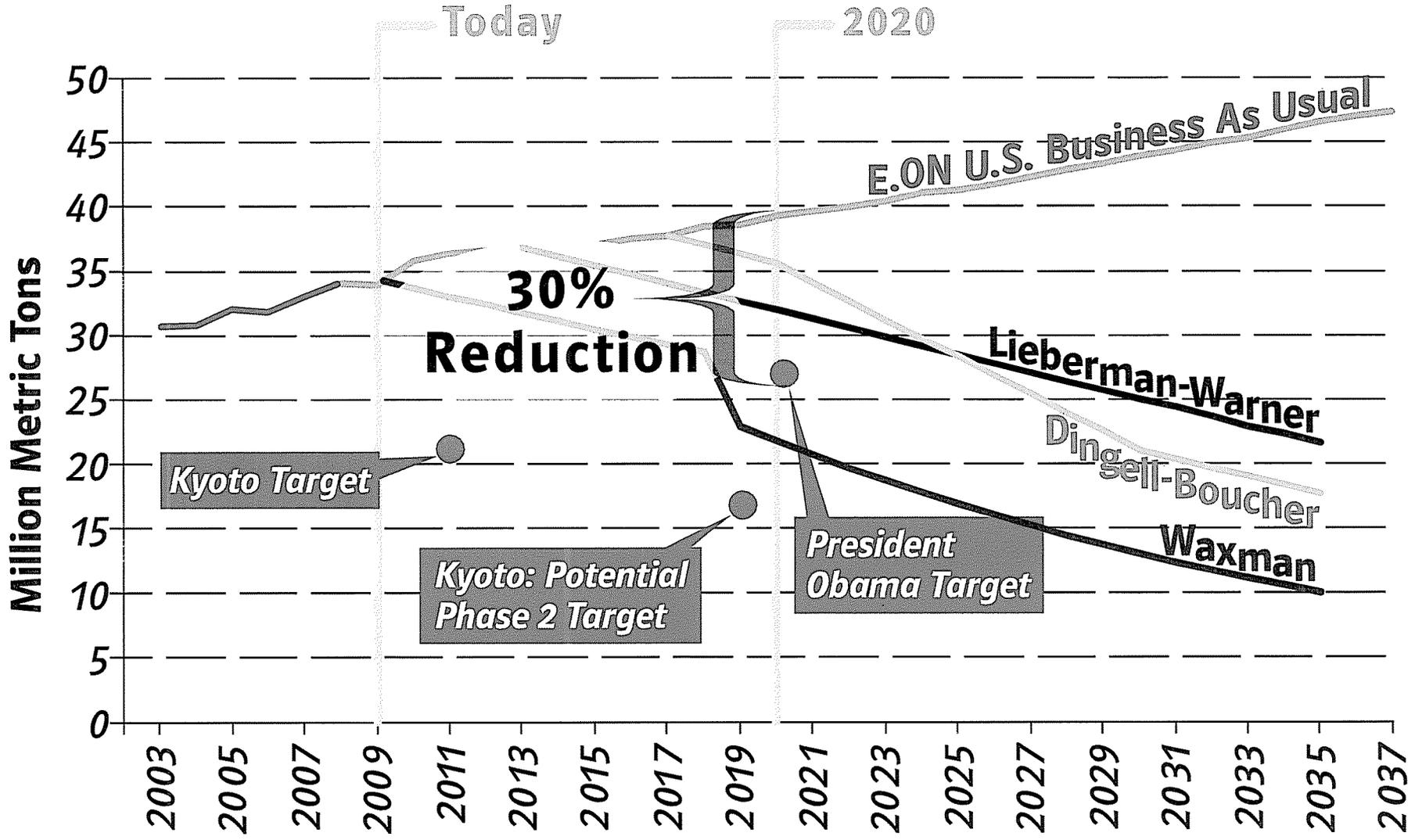


Source: Based on data from Global Energy Decisions, LLC, Velocity Suite, June 2008

Wind Transmission Upgrades



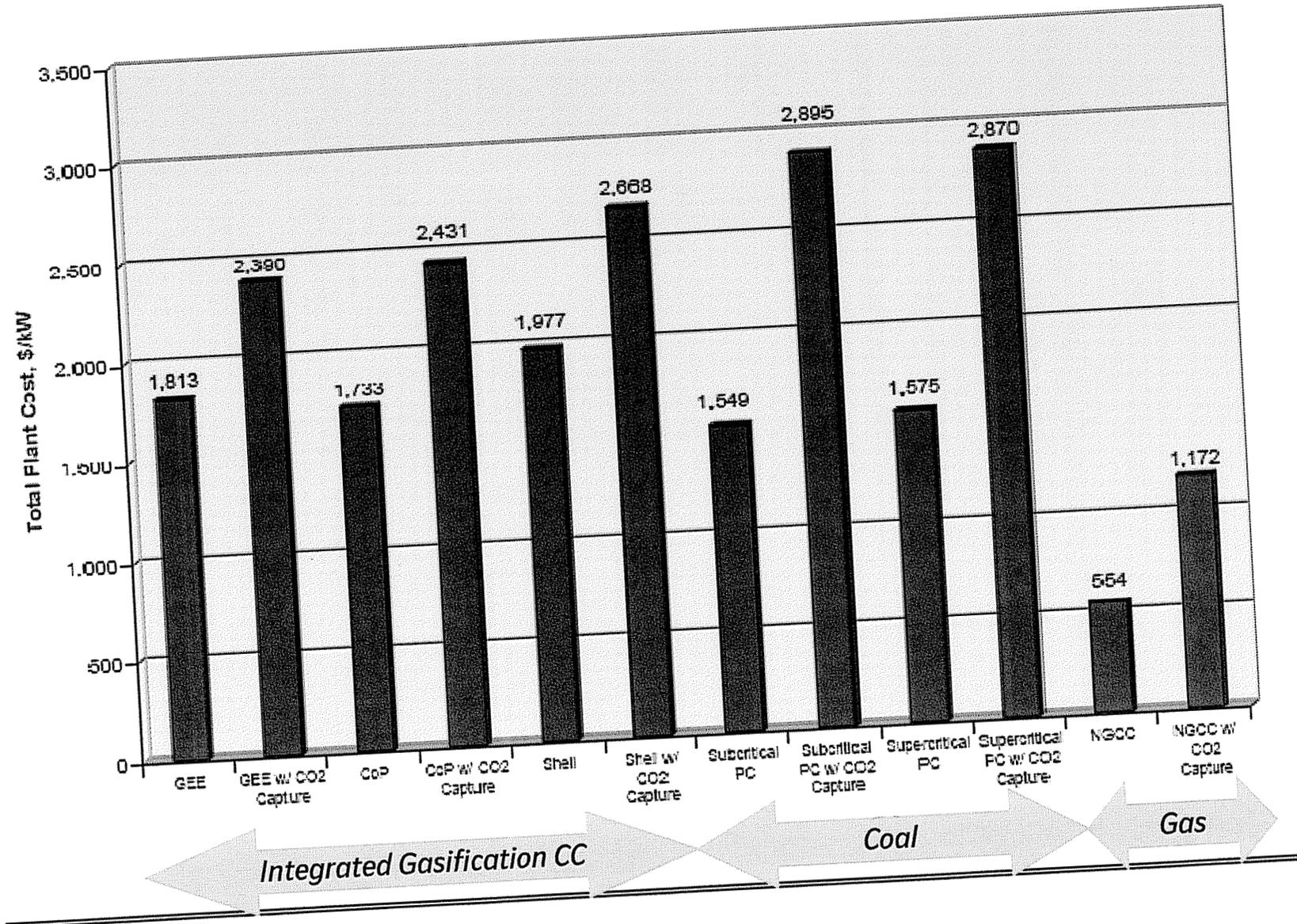
Comparison Carbon Cap Proposals



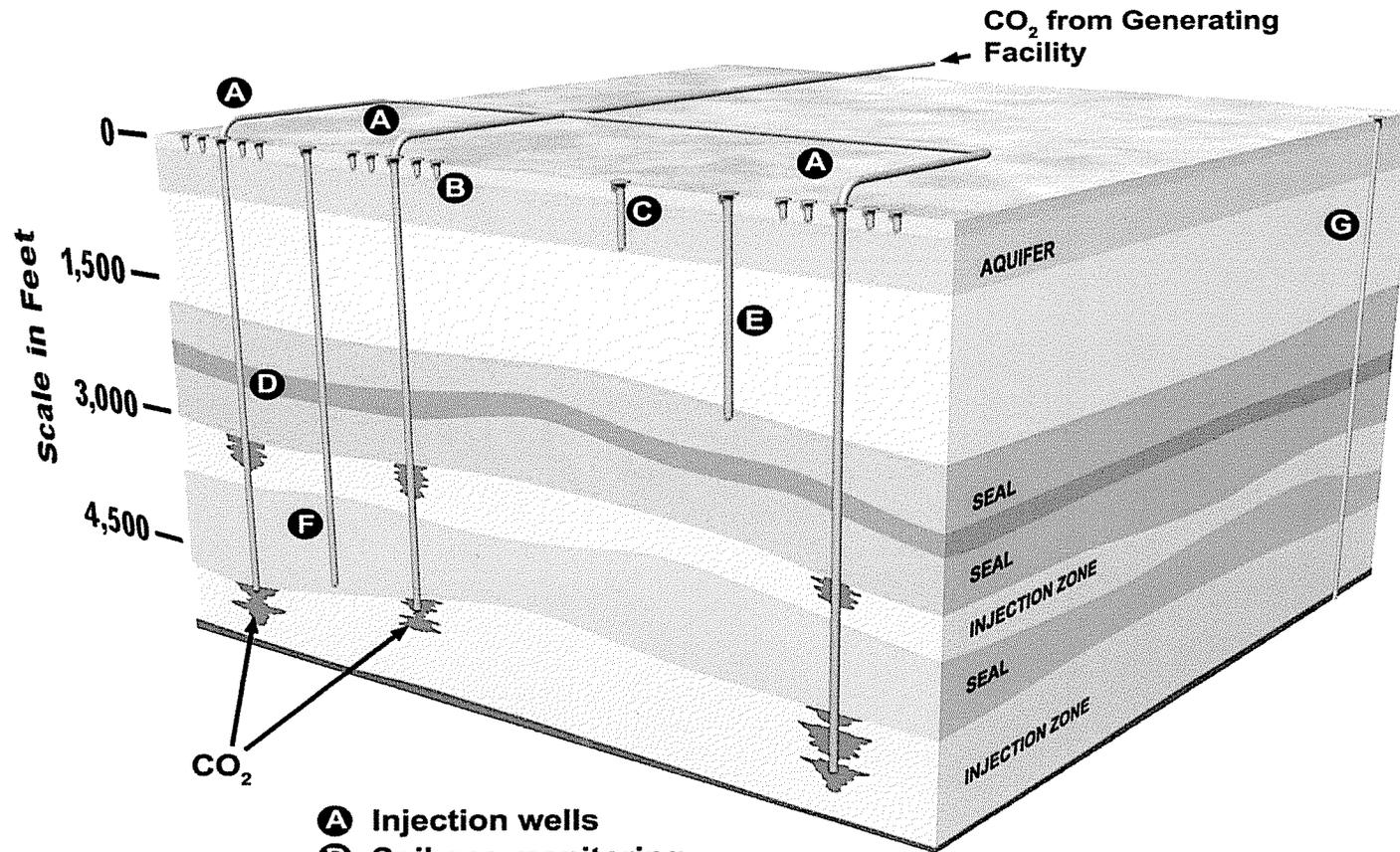
Total Plant Costs for Carbon Capture (Gasification, Coal & Natural Gas)

Exhibit ES-5 Total Plant Cost

NETL Bituminous Coal and Natural Gas to Electricity - May 2007

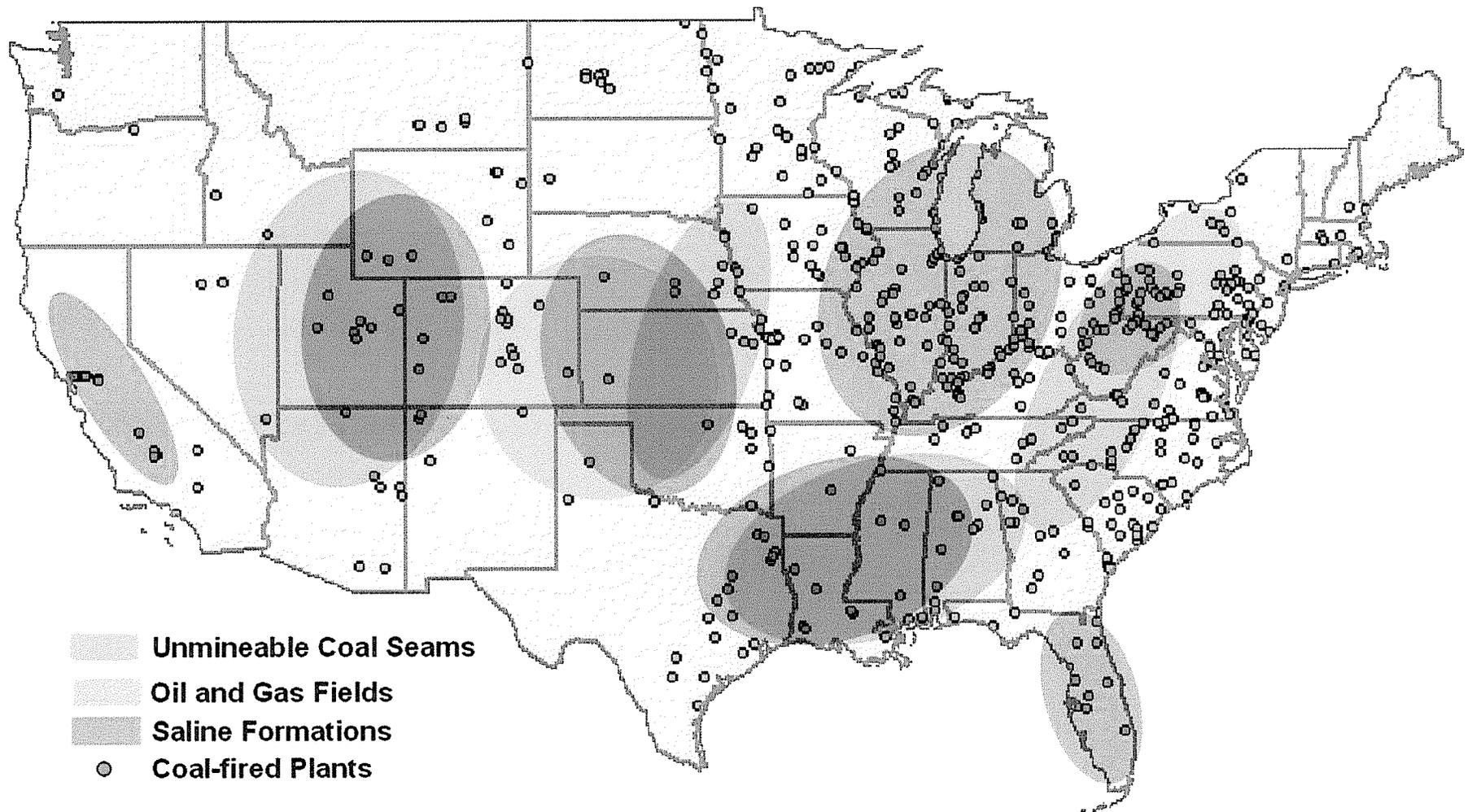


Sequestering Carbon Dioxide with Appropriate Monitoring



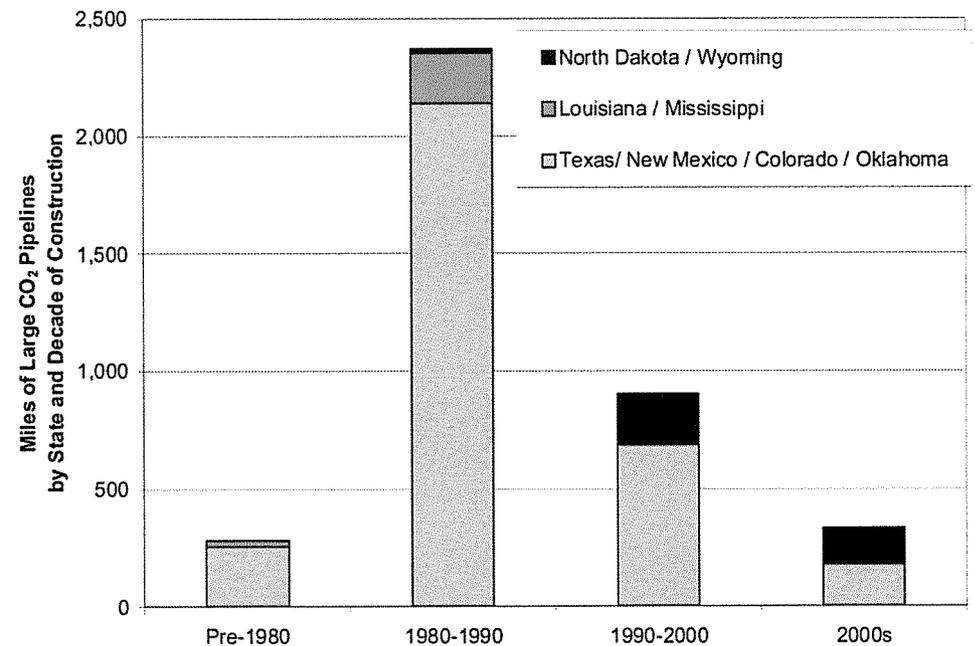
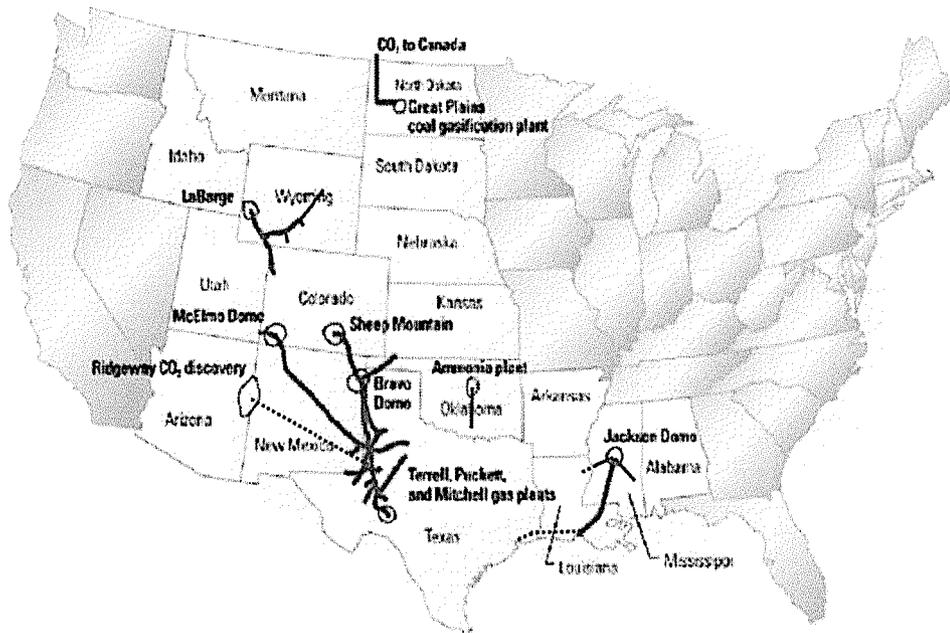
- A** Injection wells
- B** Soil-gas monitoring
- C** Drinking water monitoring
- D** Pressure monitoring
- E** Monitoring well above primary seal
- F** In-zone monitoring
- G** Few plugged wells

Coal-fired Plants and Potential Storage Regions



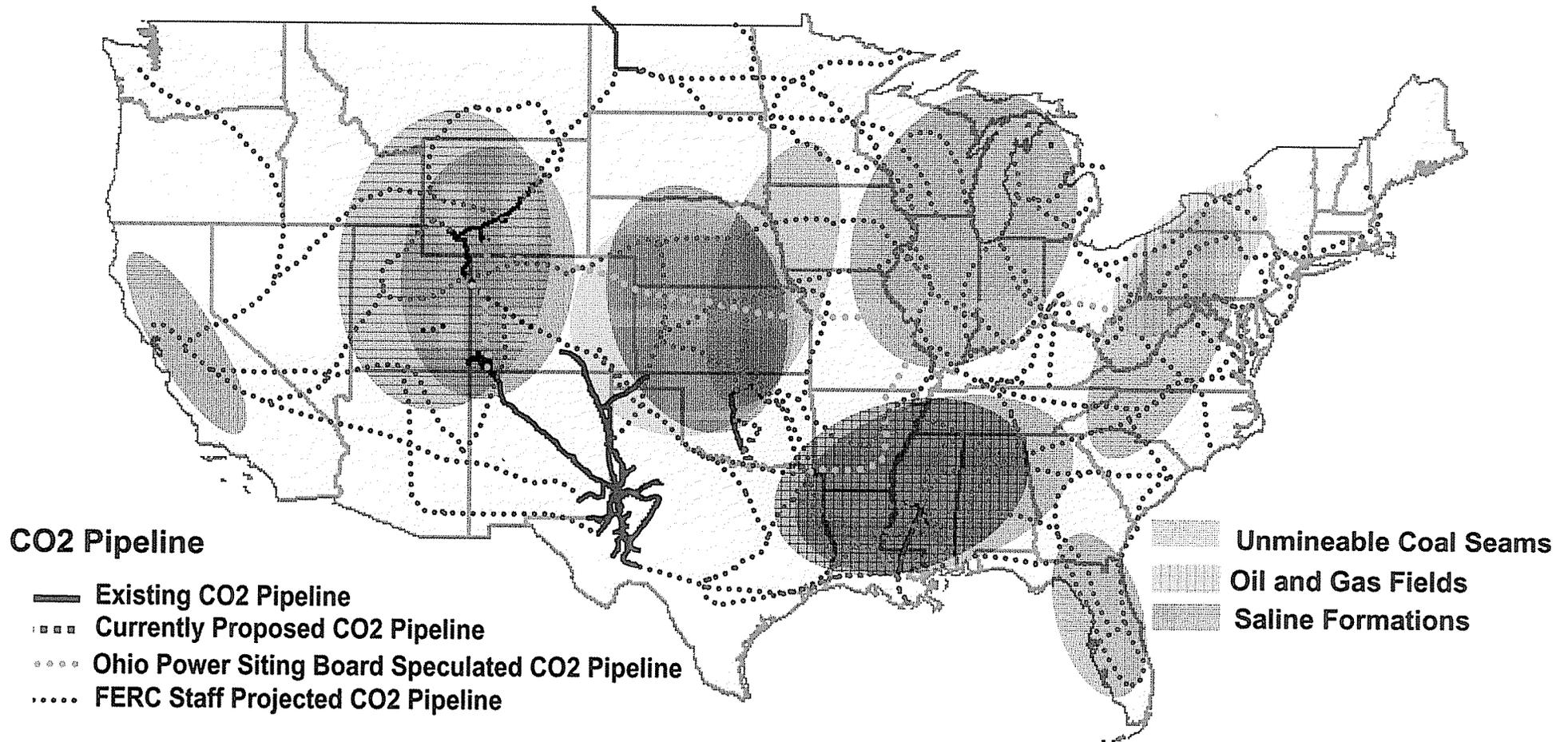
Existing CO₂ Pipeline Infrastructure

3,900 miles of CO₂ pipeline built to date

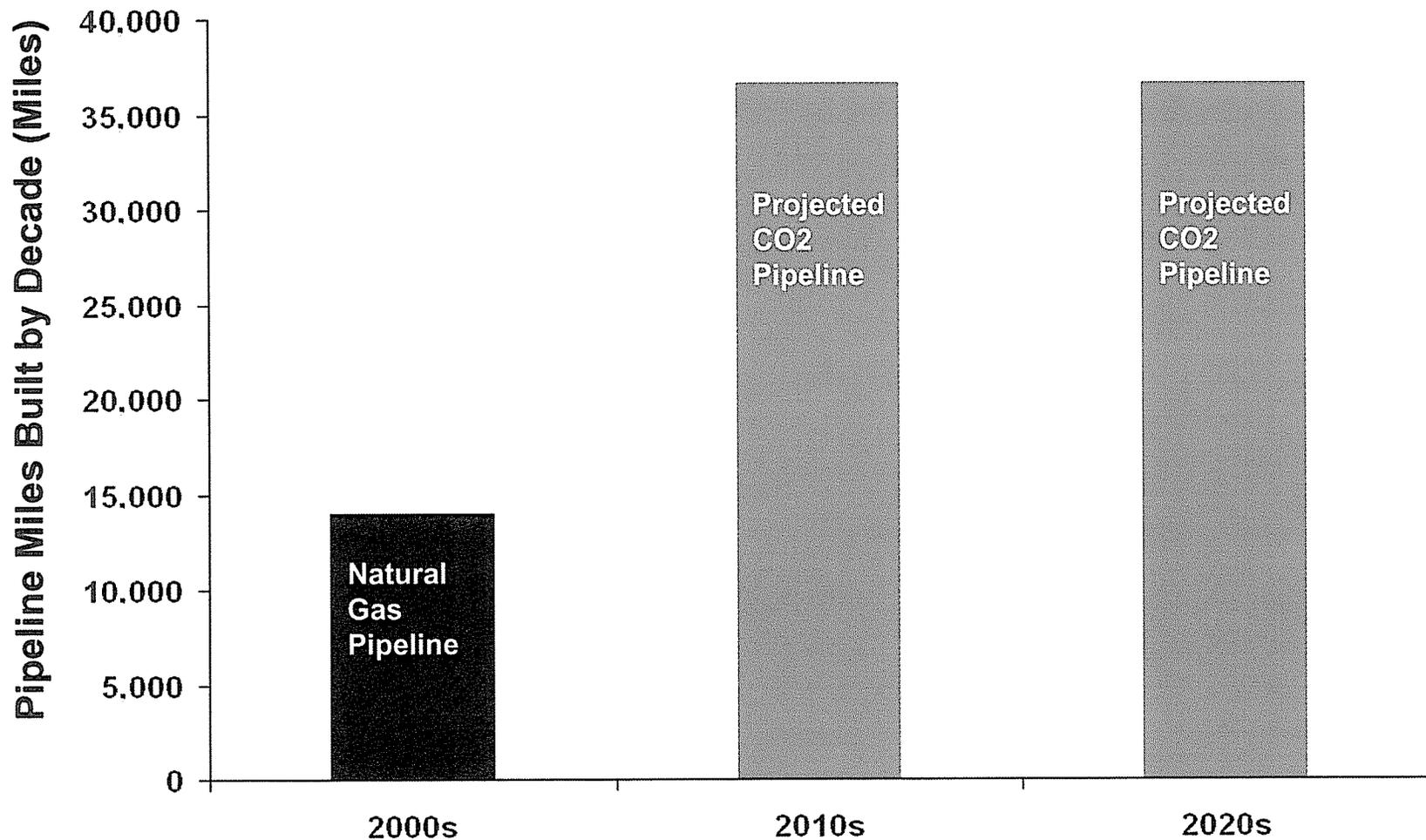


- >60% of this was built in the 1980s
- >50% was built in and around West Texas in the 1980s

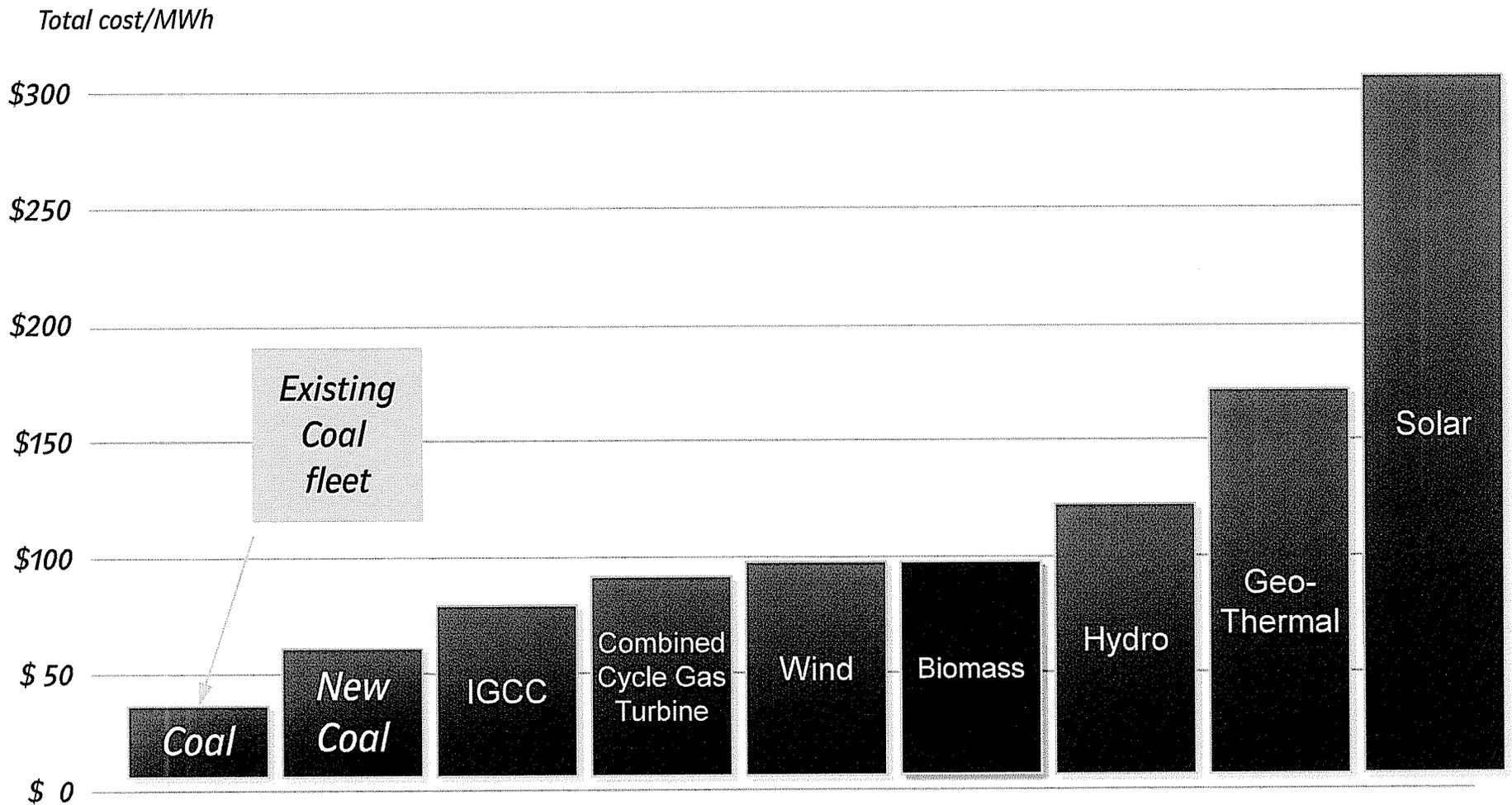
Potential Future CO₂ Pipeline Network



*To get a 73,000-mile system for CO₂ by 2030.
we need to build about 36,500 miles per decade.*

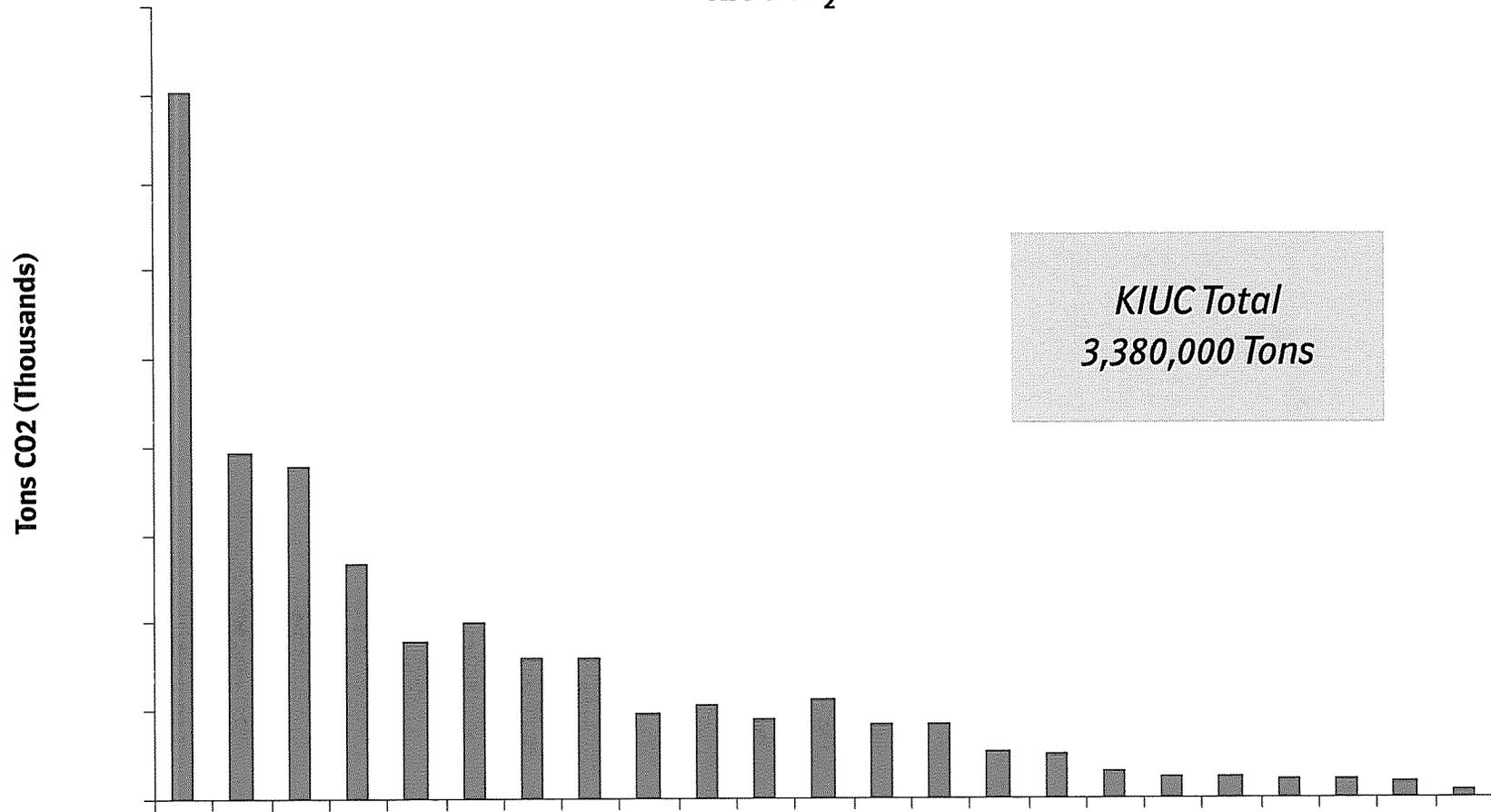


Energy Generation Options (Without Carbon Capture)



KIUC Carbon Emissions (Electric Use Only — 2007/08 Avg.)

KIUC CO₂ Emissions



Carbon footprint is about to leave a deeper impression

At approximately 1 Ton CO₂ / MWh

What is your "cost?"

IMPORTANT INFORMATION

The power to save. It's in your hands. The amount of electricity you consumed during this billing cycle resulted in the production of approximately 2350 pounds of CO₂.

You can reduce the impact of these emissions by joining our Demand Conservation program, which allows you to help us reduce the need for generating electricity at peak times. Visit our website at www.eon-us.com or call 1-866-857-COOL (2665) for more information or to sign up today.

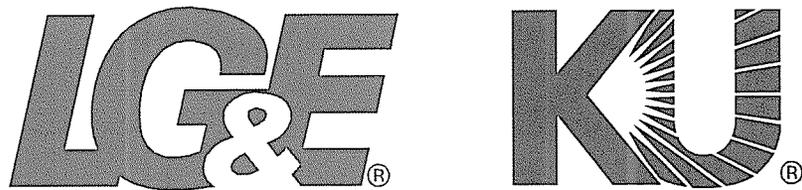
To request a copy of your rate schedule, please call (502) 589-1444.

Closing Thoughts

- *E.ON U.S. will continue to provide the most reliable and economic cost of electricity consistent with federal and state mandates dealing with CO2 reduction and the use of renewable energy*
- *You should make every effort to understand the economic impacts to your business for the future*
- *We (you and me) must convey the economic realities to our policy makers*

e-on | U.S.

Questions



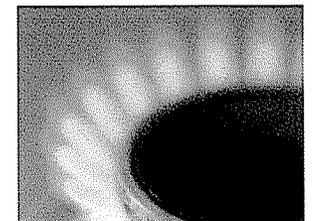
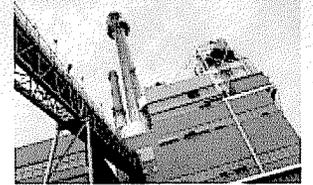
PPL companies

New/proposed EPA regulations will increase cost of coal-fired electricity

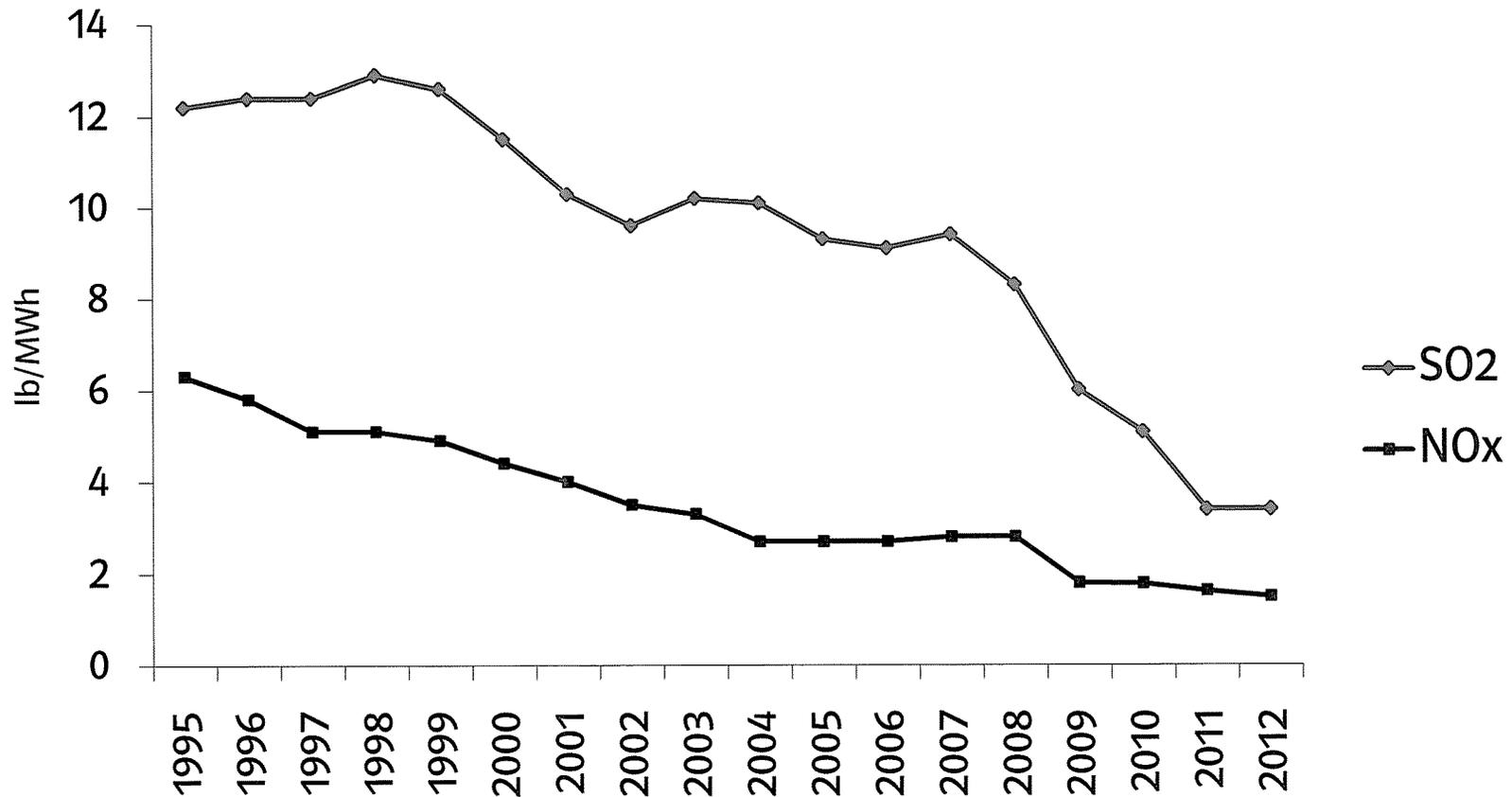
2011 KIUC Energy Conference - March 24, 2011

John Voyles

Vice President, Transmission & Generation Services



Historical emission reductions at LG&E and KU



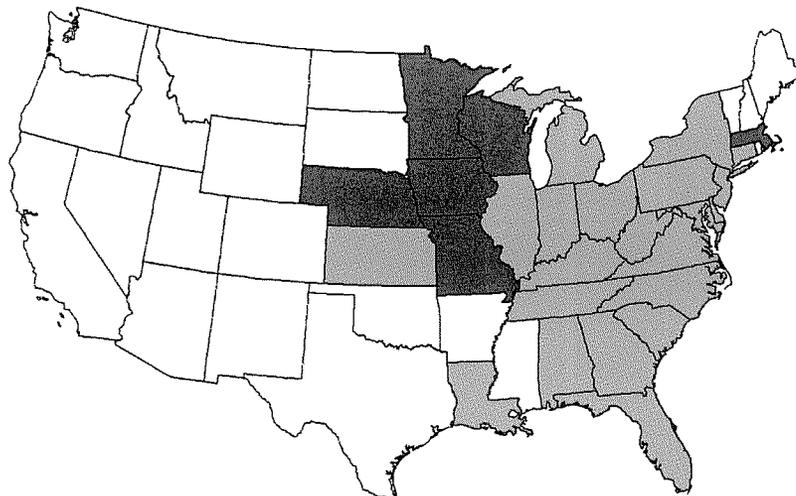
Unprecedented number of proposed regulations

EPA proposals will have a major impact on coal-fired utilities and their customers.

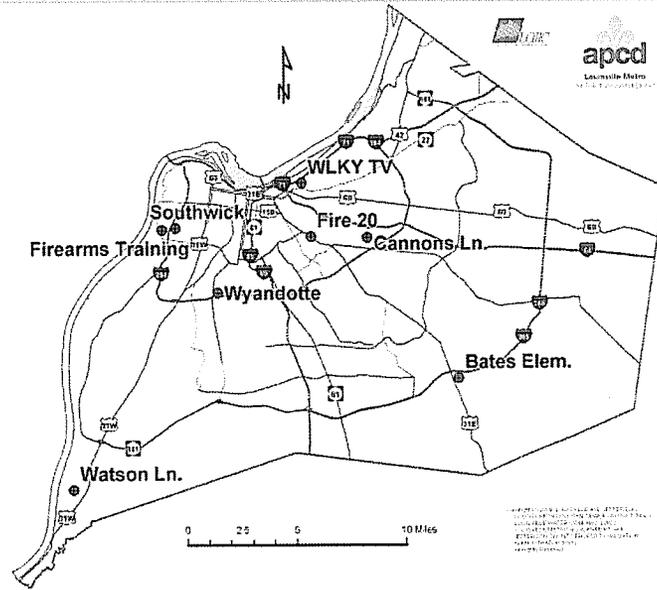
- Significant risks include —
 - *No coordinated federal strategy creates a piecemeal compliance approach.*
 - *Reversal of prior regulatory determinations*
 - *Inconsistent and short deadlines compromise state and utility efforts to prepare proper implementation plans.*
 - *Aggressive construction schedules must occur in absence of final regulations due to long lead times in fabrication.*

New air regulations

- National Ambient Air Quality Standards (*NAAQS*)
 - Ground level air monitors across the state
 - Compliance by 2016 or 2017



■ States controlled for both fine particles (annual SO₂ and NO_x) and ozone (ozone season NO_x) (21 States + DC)
 ■ States controlled for fine particles only (annual SO₂ and NO_x) (8 States)
 ■ States controlled for ozone only (ozone season NO_x) (4 States)
 ■ States not covered by the Transport Rule

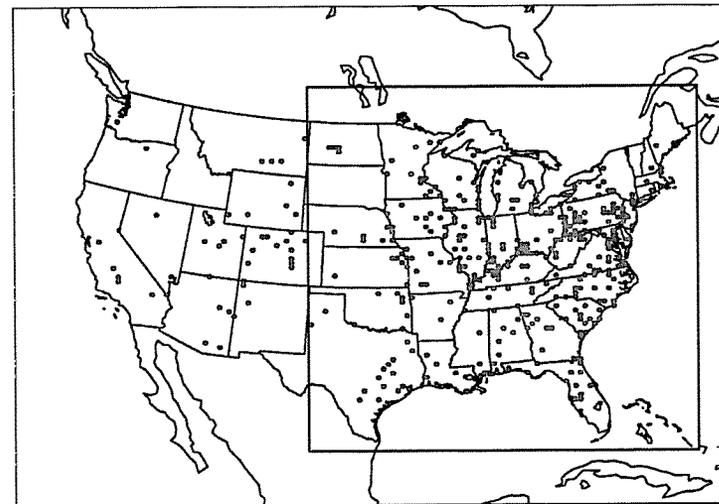
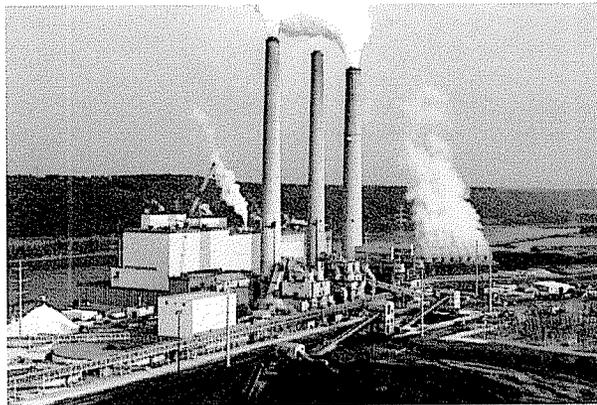


- Clean Air Transport Rule (*CATR*)
 - Regional air pollution effects
 - Possible compliance dates of 2012 and 2014.

New air regulations

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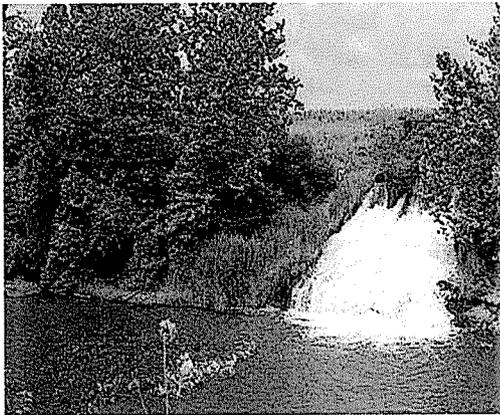


- CO₂ Best Available Control Technology (*BACT*)

- Permits for new or modified sources
- Compliance by 2011
- GHG new source standards; proposal by July 2011

New coal combustion residuals and water regulations

- Coal Combustion Residuals (CCR)
 - Hazardous or Non-hazardous
 - Wet ponds must have liners
 - Draft rule expected in 2012
 - Compliance within 5 years of final rule

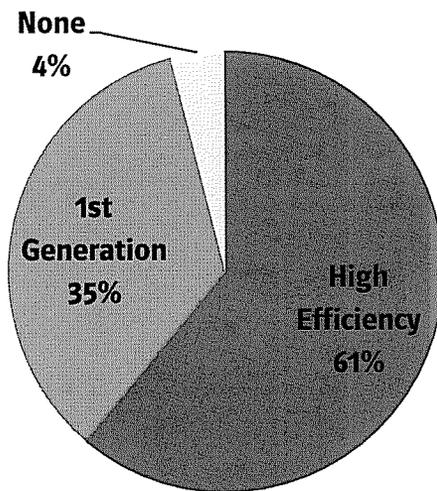


- Water quality (1974 Clean Water Act)
 - Water Withdrawal, proposed rule expected March 28th
 - Water Discharges
 - Possible final rules by 2012, then compliance

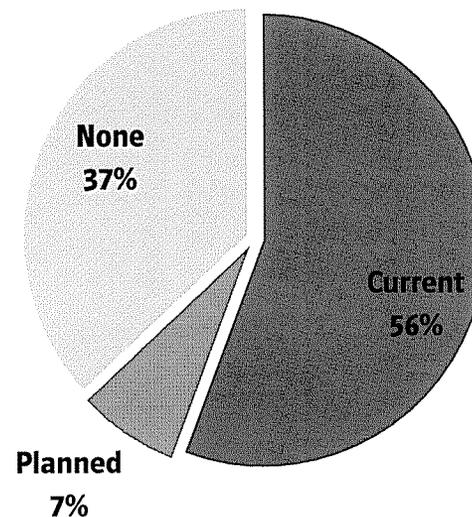
LG&E/KU's coal fleet already has high level of SO₂ and NO_x control technologies...

...but some additions or enhancements will be required.

FGDs in Coal Fleet



SCRs in Coal Fleet



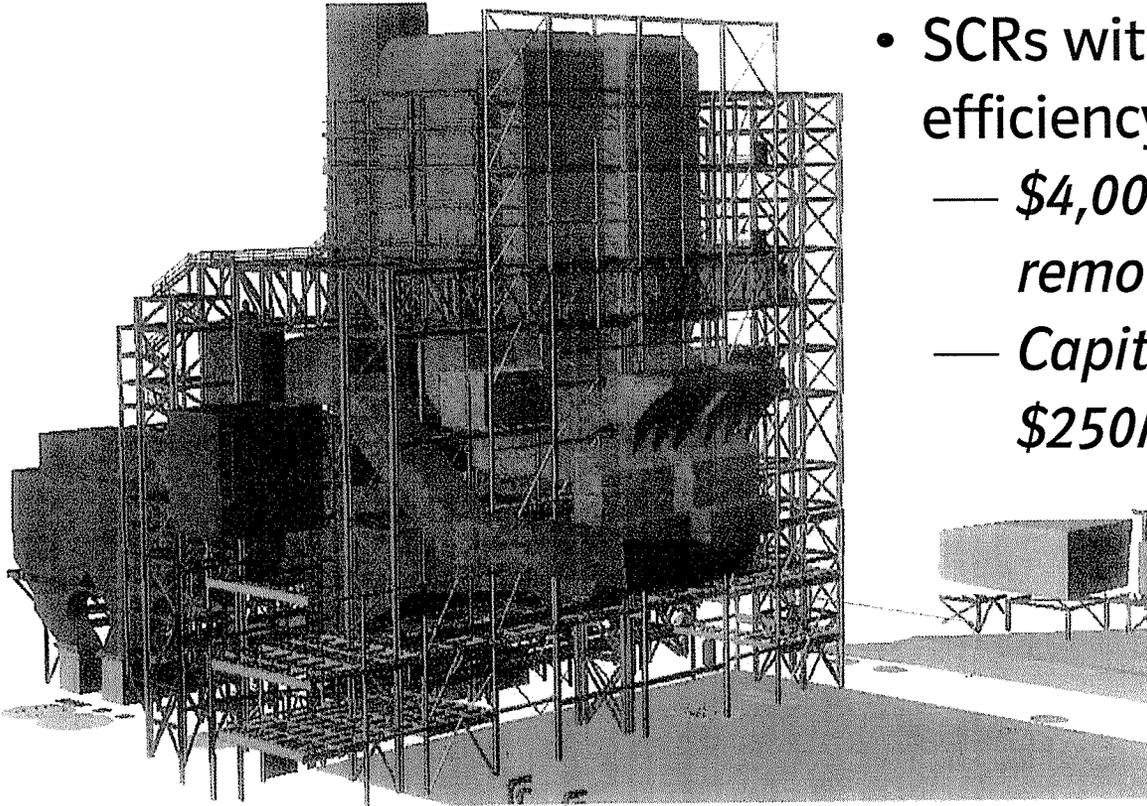
Percents are based on capacity including TC2

SO₂ technology options for NAAQS & CATR



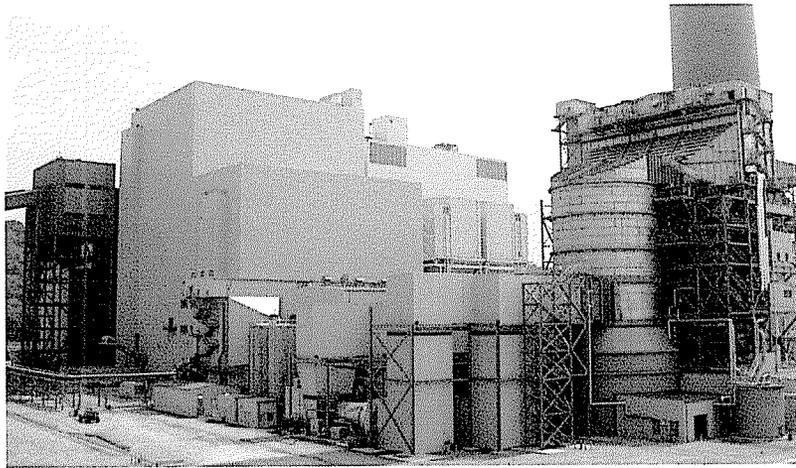
- FGDs with high removal efficiency
 - *\$5,000 to \$11,000 per ton removed*
 - *Capital Costs of \$300M to \$700M each*

NO_x technology options for NAAQS & CATR



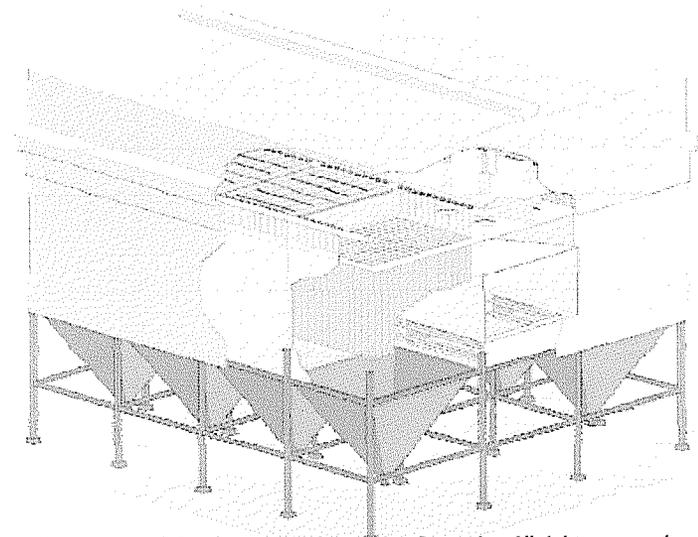
- SCRs with high removal efficiency
 - *\$4,000 to \$8,000 per ton removed*
 - *Capital costs of \$100M to \$250M each*

HAP technology options for MACT rules



- Fabric Filter particulate controls with carbon injection
 - Capital Costs of \$50M to \$175M each

- Co-benefits with combinations of technology
 - Mercury at \$150,000 to \$450,000 per pound removed



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Alternative supply choice — retire coal and switch to gas



Source: Effingham County Power, LLC
a Progress Energy Company

- Natural Gas Combined Cycle units
 - *Zero SO_2 and 50% less NO_x emissions*
 - *Capital costs of \$600M to \$800M each*

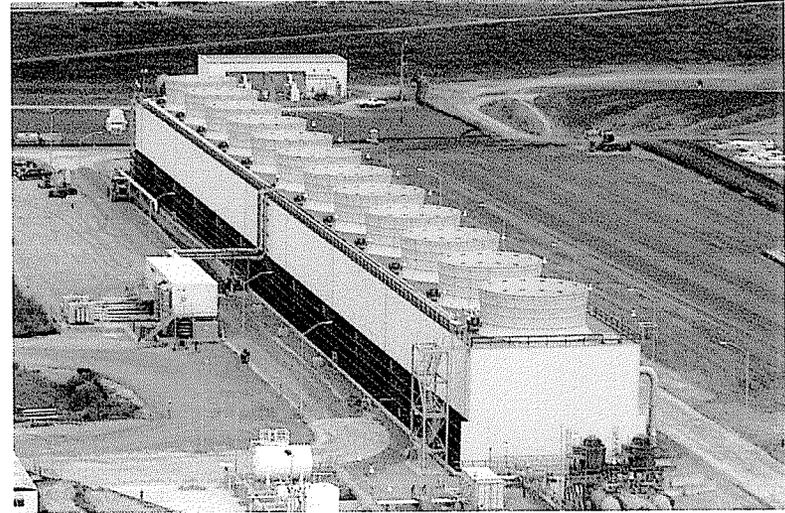
Proposed EPA CCR regs would require dry storage & closing existing ash ponds

- Retrofit or close 21 ponds
 - 10 ash ponds
 - 11 process/runoff ponds
- Build landfills for future storage
- Construct new process water ponds for each operating site
- Decommissioning ponds will cost an estimated \$700 million



Increased water withdrawal and discharge requirements

- Water Withdrawal
 - *Units without cooling towers*
 - Cane Run
 - Green River
 - Mill Creek 1
 - Tyrone



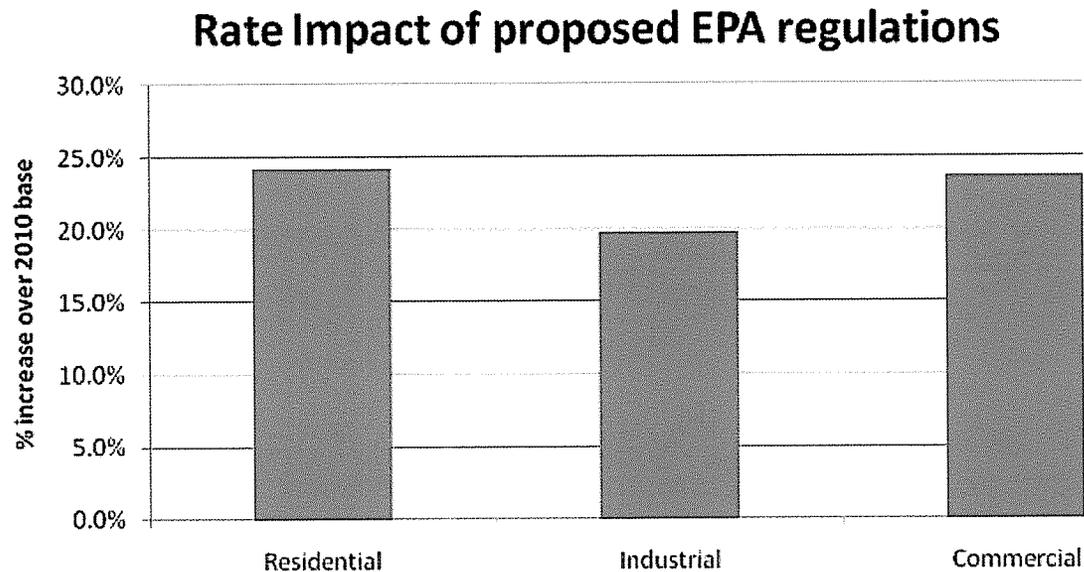
- New water discharges standards
 - *Physical-chemical treatment*
 - *Biological treatment systems*
 - *Cost of \$40 - \$300 million for each site*

Estimate at least \$4 billion in capital costs needed over next ten years

Regulation	Capital (\$M)	Annual Operating Expense (\$M)
Air	\$3,300 – 5,000	\$150 – 300
CCR	\$700	<i>To be determined</i>
Water	<i>To be determined</i>	

Potential rate impact of proposed EPA regulations

Due to these regulations, by 2019, rates could increase by more than 20% and almost \$550 million annually

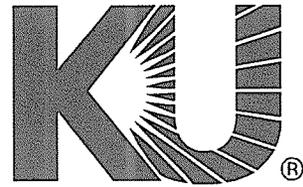
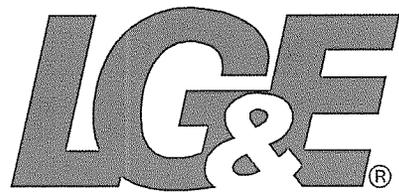


Note: This calculation does not include potential compliance costs for water regulations, Renewal Portfolio Standards (RPS) or carbon dioxide (CO₂) reductions

What are LG&E and KU doing?

- Evaluating multiple compliance alternatives.
- Participating in industry efforts to advocate more reasonable regulations and timelines.
- Communicating our concerns directly with EPA on proposed regulations.
- Educating elected officials, regulators and customers on the effect of the federal regulations will have on their electric bill.

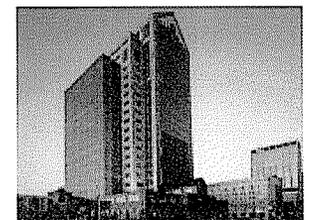
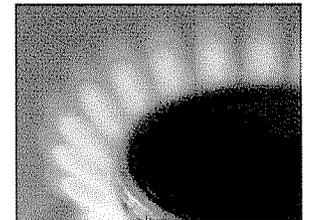
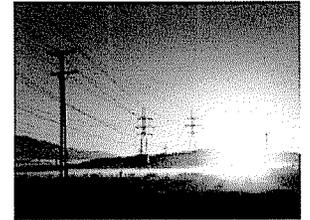
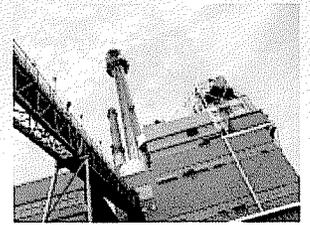
Questions?



PPL companies

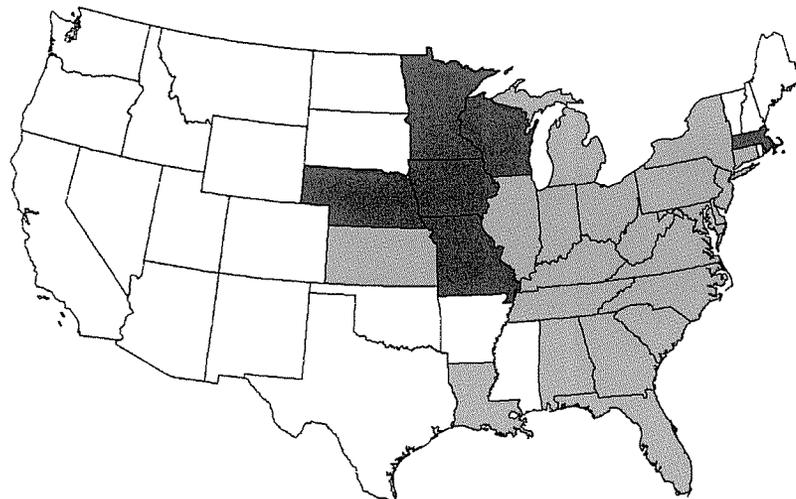
LG&E And KU Future Plans

May 2011

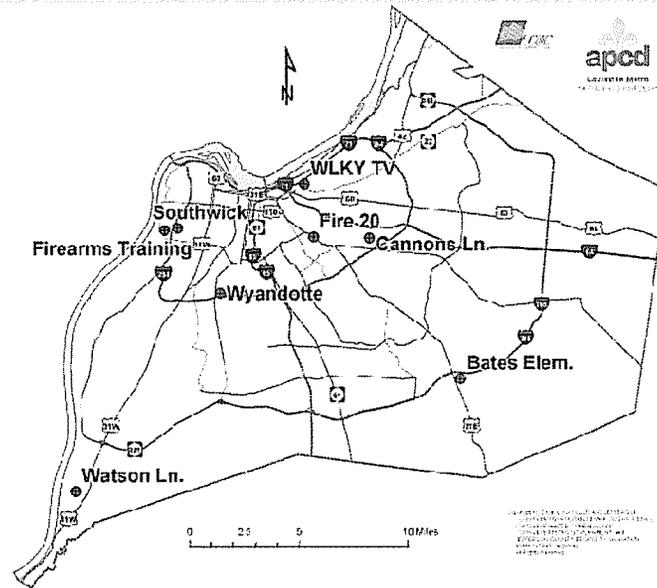


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 - Ground level air monitors across the state
 - Compliance by 2016 or 2017



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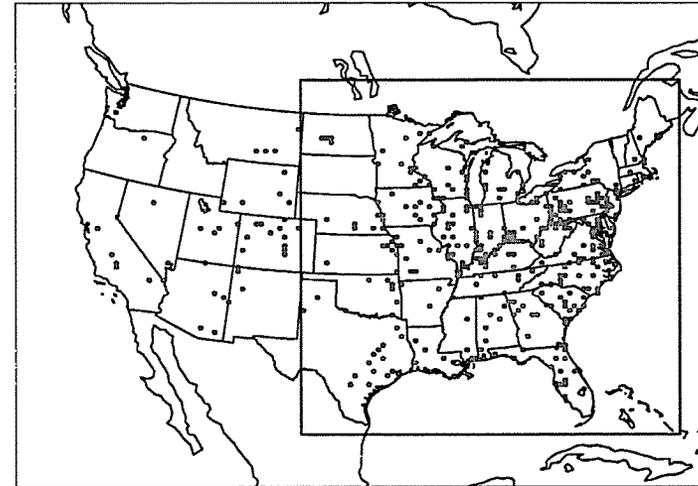


- Clean Air Transport Rule (*CATR*)
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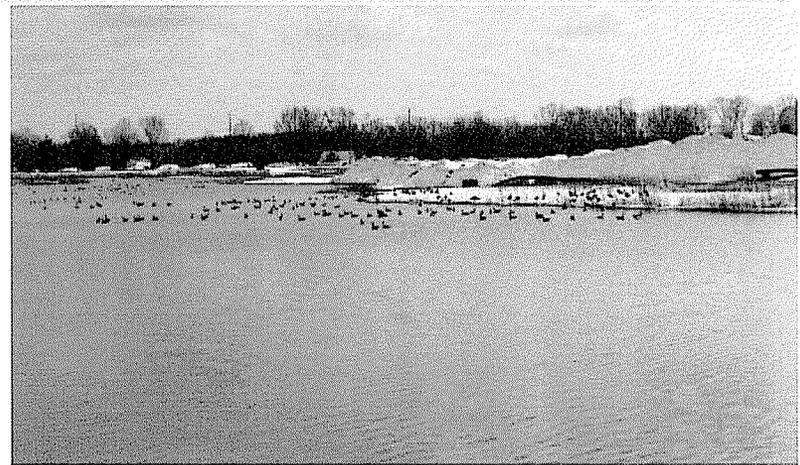
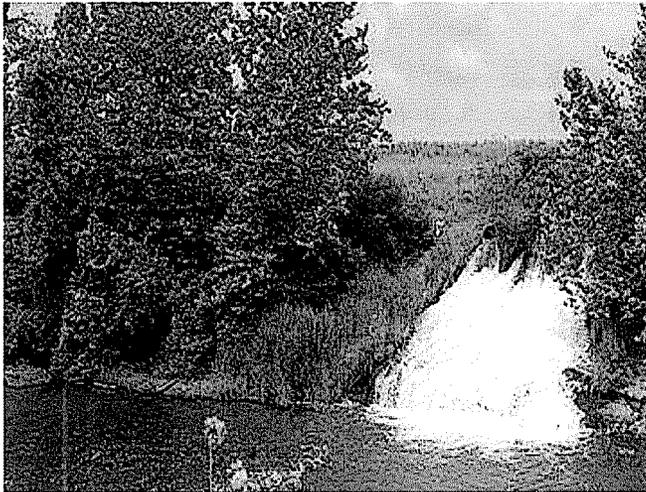


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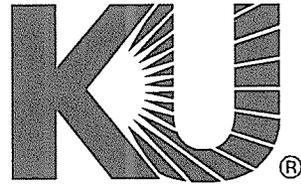
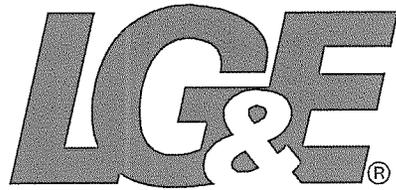
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- Greenhouse gas new source standards; proposal by July 2011

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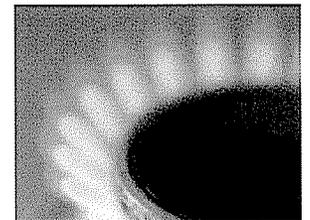
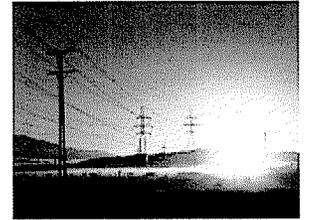
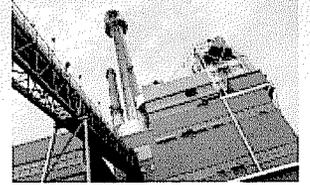


- Water quality (1974 Clean Water Act)
 - *Water Withdrawal proposed rule released March 28; expect final rule July 2012*
 - *Water Discharges draft rule expected mid 2012 with final rules by 2013, then compliance*



PPL companies

Environmental Regulations and Upcoming ECR Filing



2010–11 Engineering Activities & Studies

- Control equipment studies for all stations
- Mill Creek scrubber (FGD) Performance Improvement study & structural review
- Precipitator (ESP) upgrade study
- Flow modeling studies for the SCR upgrades
- E.W. Brown study of a smaller ash pond, with delayed conversion to a landfill

Engineering & Analytical Findings/Results

- Demonstrate prudence of installing emission controls (versus retiring units)
 - *Installing controls at Cane Run, Green River and Tyrone not cost effective*
- HAPs (MACT)
 - *Fabric Filter Baghouses needed for mercury control*
- NAAQS & CATR
 - *Construct new FGD/chimney for Mill Creek Units 1 & 2*
 - *Construct new FGD/chimney on Mill Creek Unit 4*
 - *Upgrade existing SCR operations*
- CCR
 - *Conversion ash pond project at Brown to a landfill*

LG&E and KU estimate approximately \$4 billion in capital costs needed over next ten years

Regulation	Capital (\$M)	Annual Operating Expense (\$M)
Air	\$3.3	\$150 – 300
CCR	\$700	<i>To be determined</i>
Water		<i>To be determined</i>

Note: This calculation does not include potential compliance costs for water regulations, Renewal Portfolio Standards (RPS) or carbon dioxide (CO₂) reductions

Air Compliance Costs

ECR Filing*

- Total company capital costs estimated at \$2.5 billion
 - *KU approximately \$1.1 billion*
 - *LG&E approximately \$1.4 billion*
- Projected rate impacts
 - *KU estimated at 12.2% by 2016*
 - *LG&E estimated at 19.2% by 2016*

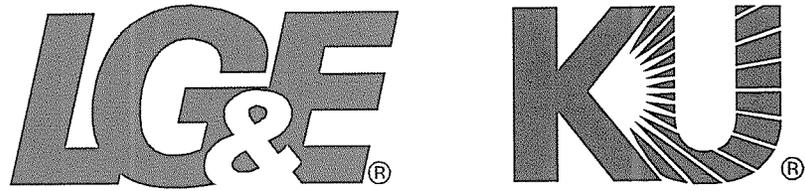
Replacement Energy

- Actions on Cane Run, Green River and Tyrone forthcoming
 - *Expected cost of up to \$800 million*
 - *KU estimated additional 2%*
 - *LG&E estimated additional 5%*

*The \$700 million associated with the CCR is not included in this ECR filing

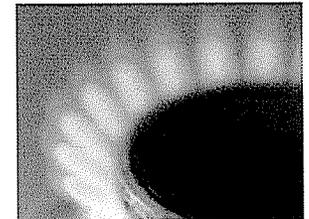
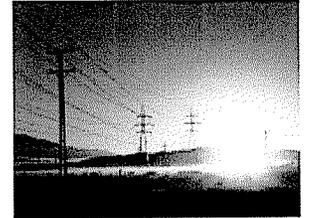
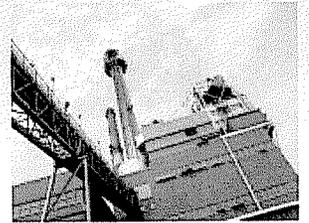
Plan Risks

- Schedule — completion by 2016
- Major equipment lead times
- Equipment availability for fans and electrical motors
- Shop fabrication space
- Engineering and construction labor availability
- Cost escalations



PPL companies

2011 Integrated Resource Plan (IRP)



The IRP is part of LG&E/KU's Ongoing Planning Process (Filed April 21st)

- Analysis and forecast of key drivers of electricity demand (peak and energy) over the next 15 years
- Evaluate dozens of generating technologies to meet future demand
- Evaluate various demand side management (DSM) programs to offset or delay the need for new generation
- Communicates to the KPSC how the Company might meet customers' energy needs based on certain assumptions about the future

2011 IRP Highlights

- Energy (after DSM) grows at ~1.5% annually (2011-2025)
- Expected DSM peak reduction of 500 MW by 2017
- Target reserve margin (capacity over peak) increases from 14% to 16%
- Significant impact from pending EPA regulations – older, smaller coal units retired
- Combined cycle natural gas generation is the least-cost technology to meet future electricity needs

Cost Comparisons

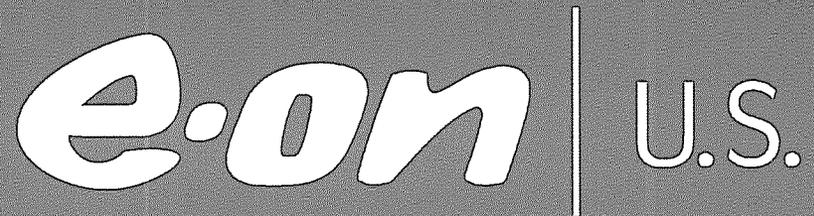
- Comparison information about cost per kW CCGT versus renewable energy

Coal still Dominant Energy Source despite Retirements and New Gas Generation

- Environmental regulations result in 800 MW of retirements at Cane Run, Green River and Tyrone in 2016
 - Represents 13% of today's LG&E/KU coal fleet
 - Reduces coal burn by 1.5 million tons annually
- New combined cycle plant planned in 2016 to meet 875 MW reserve margin deficit
 - Coal will still provide ~90% of energy in 2016 (compared to 97% currently)
- Second combined cycle unit in 2018 to meet future load growth

The IRP is a Plan, not a Request for Approval from the KPSC

- Final decisions require further study and regulatory approvals
- Impacts of environmental regulations will be addressed in ECR and CCN filings
- New generation decisions subject to market alternatives (RFP last year) compared to self-build options and CCN filing



Carbon Update

Mike Beer — VP, Federal Regulation & Policy

David Sinclair — VP, Energy Marketing

John Voyles — VP, Transmission/Generation Services

Previous E.ON U.S. Legislative Positions

E.ON U.S. Tenets of Climate Change Legislation

Start Date	2012
Emission Targets	Baseline year 2000 CO ₂ emission level achieved by 2012, 10% below 2000 by 2020
Covered Entities	Economy-wide
"Electric Facilities" Industry Sector Allowance Allocation	100% in 2012, 90% in 2015, 80% in 2020, 70% in 2025
Safety Valve	\$10 per ton of CO ₂ in 2012, adjusted annually for inflation plus 5%
Research and Development	Incentives for Research and Development in clean coal technology

Updated tenets should focus on price collar and extended timelines

- Consideration of a collar should apply to the entire pool of allowances (not just a “strategic reserve” as in W-M) and is a choice between:
 1. A “ceiling centric” approach advocating a ceiling to minimize customer cost
 2. A “floor centric” approach, which could advocate a meaningful floor to encourage responsive actions
- Extended timelines for reductions are preferable (e.g. 2105), but these should also reduce near-term targets (e.g. 14% below 2005 by 2020)
- Careful assessment of the impact of offsets in conjunction with cap & trade and collar provisions (e.g. global competition, near-term availability)
- Exemption from regulation of utility CO₂ emissions under CAA.

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Carbon Legislation

Key Federal Legislation

House Bill 2454 (passed June 2009)

- American Clean Energy and Security Act of 2009 (Waxman-Markey)

Senate Bill 1733

- Clean Energy Jobs and American Power Act of 2009 (Kerry-Boxer)

Senate Bill 1462

- American Clean Energy and Leadership Act of 2009 (Bingaman)

Economy-wide CO₂ Reductions — Setting the Cap (Percentage below 2005 levels)

Year	House Bill 2454 (Waxman - Markey)	Senate Bill (Kerry - Boxer)
2012	3	3
2020	17	20
2030	42	42
2050	83	83

Renewable Electricity Standard (% of Energy Sales)

Year	House Bill 2454 Waxman - Markey	Senate Bill 1462 (Bingaman)
2012	6	3
2013	6	3
2014	9.5	6
2015	9.5	6
2016	13	6
2017	13	9
2018	16.5	9
2019	16.5	12
2020	16.5	12
2021 - 2039	20	15

(Provisions for energy efficiency offset included in both bills)

Allowance Allocations

American Clean Energy and Security Act of 2009 (Waxman-Markey)

- 55% to mitigate consumer energy price increases (includes 35% to electric utility industry)
- 19% to trade-vulnerable and energy intensive industries
- 13% to support clean energy investments
- 10% for domestic adaptation
- 3% to assure budget neutrality
- Auction of Allowances to commence in 2026 with 15% being auctioned, ramping up to 70% by 2031

Clean Energy Jobs and American Power Act of 2009 (Kerry-Boxer)

- Allocation to electric utility industry consistent with Waxman-Markey
- Distribution formula similar to Waxman-Markey
- Additional 10% of allowances auctioned immediately for deficit reduction, ramping up to 25% by 2040

Availability and Use of Carbon Offsets

American Clean Energy and Security Act of 2009 (Waxman-Markey)

- Limited to aggregate of 2 billion tons offset credits
- International offsets limited to no more than 1 billion tons
- Ratio of 5 tons of offset credit for 4 tons of emissions

Clean Energy Jobs and American Power Act of 2009 (Kerry-Boxer)

- Limited to aggregate of 2 billion tons offset credits
- International offsets limited to no more than 500 million tons
- Ratio of 5 tons of offset credit for 4 tons of emissions

Limited preemption of EPA regulating GHGs for 6 Years (Waxman-Markey)

Kerry-Graham-Lieberman Compromise Discussions

- Parallel Path with Kerry-Boxer, But Promoted As Middle Ground Between Boxer and Inhofe
- Intended to Assure 60 Votes in Favor of Passage Prior to Reporting Bill to Floor
- Intended to Include Stronger Nuclear Preference
- Intended to Be More Protective of American Business Interests and Protective of Economy
- Very Little Known at this Time Other Than Key Provisions Revolve Around Cap-and-Trade

What's Next in Washington?

- House Has Concluded Action on Climate Change and is Awaiting Bill from Senate
- Kerry-Boxer Subject to Multiple Committee Hearings and Mark-Ups
- Republican Support Still Highly Unlikely Due to High Cost Projections and Disproportionate Impact on Certain Regions of the Country
- Conservative Democrat Support Unlikely Without Strong Protection of and Promotion of Agricultural Interests Through Mitigation of Economic Impact and Promotion of Bio-Fuels
- Copenhagen Unlikely to Effect U.S. Timetable for Moving Legislation

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EPA Activities

December 7th — EPA Issues Endangerment Finding

Administrator Jackson announced EPA's final endangerment finding under the Clean Air Act (CAA)

- Determined greenhouse gas (GHG) emissions present a danger to human health and welfare.
- Under the requirements of the CAA, endangerment finding requires development of regulations. (Unless preempted by Congressional action).
- Although finding relates to motor vehicles, it lays the ground work for regulation of sources like power plants.
- Potential exists for aggressive use of the CAA citizen suit provisions

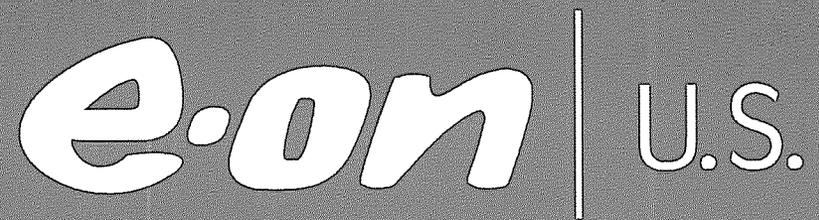
Other EPA Activities

GHG Tailpipe Ruling

- Initial regulations for mobile sources expected March 2010
- Increased vehicle mileage standards

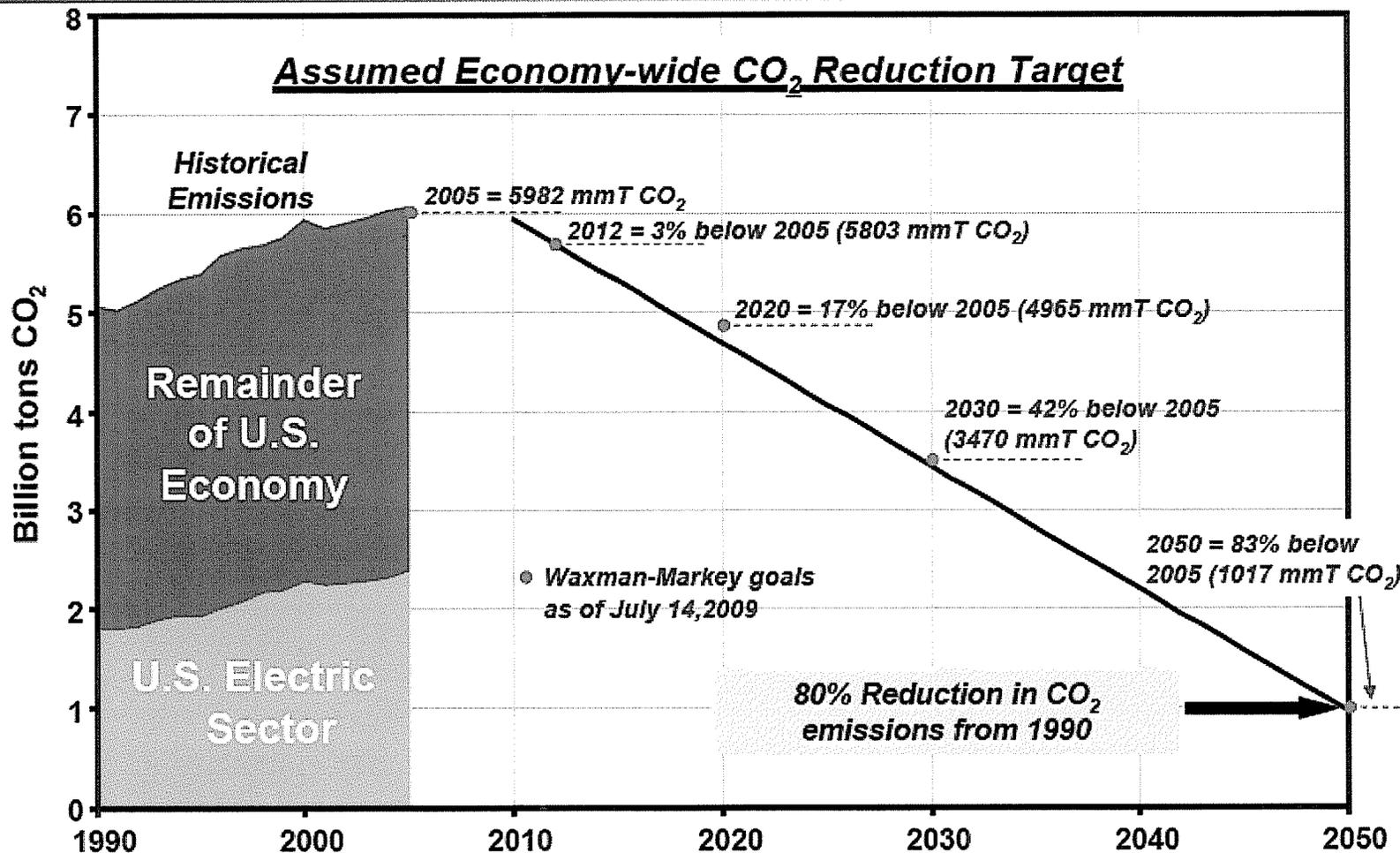
Prevention of Significant Deterioration (PSD) Tailoring Rule

- Triggers CO₂ Best Achievable Control Technology (BACT) for existing units that undertake a major modification.
- All new sources and major modification of existing sources subject to New Source Review (NSR)
- Likely follow up could impose CO₂ performance standards on new and existing facilities.

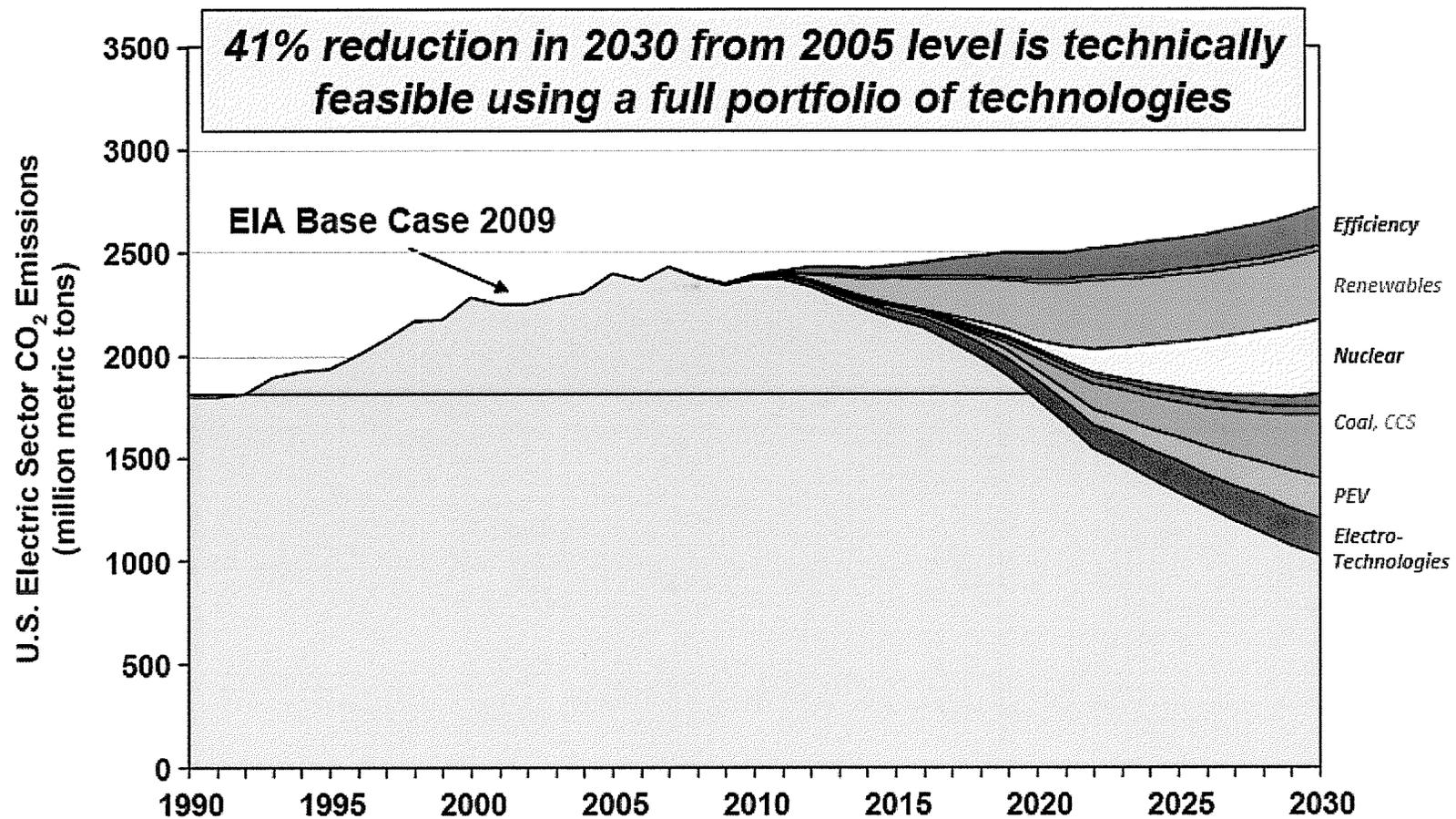


The Technology Challenge
A View from EPRI

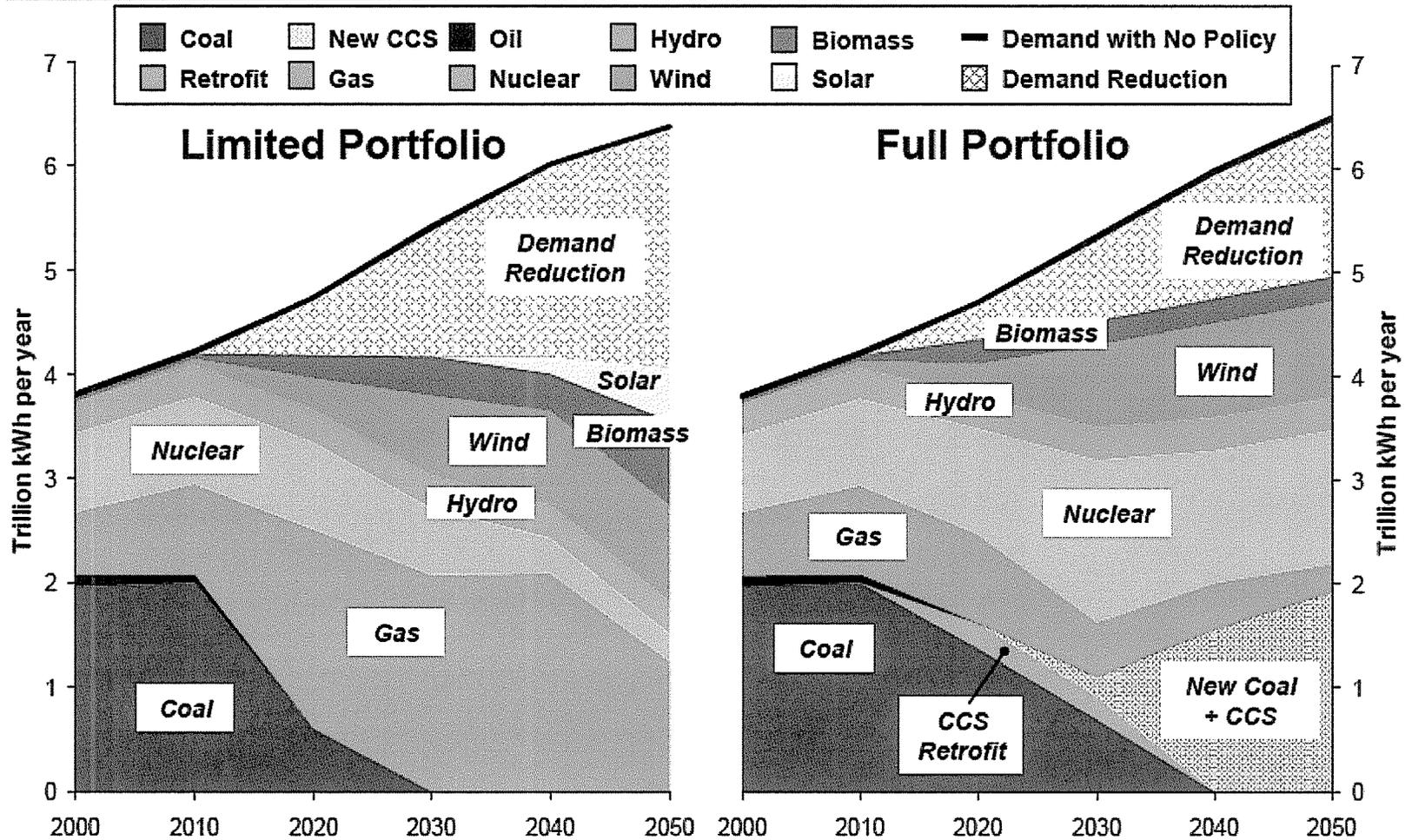
The CO₂ Challenge



2009 Prism



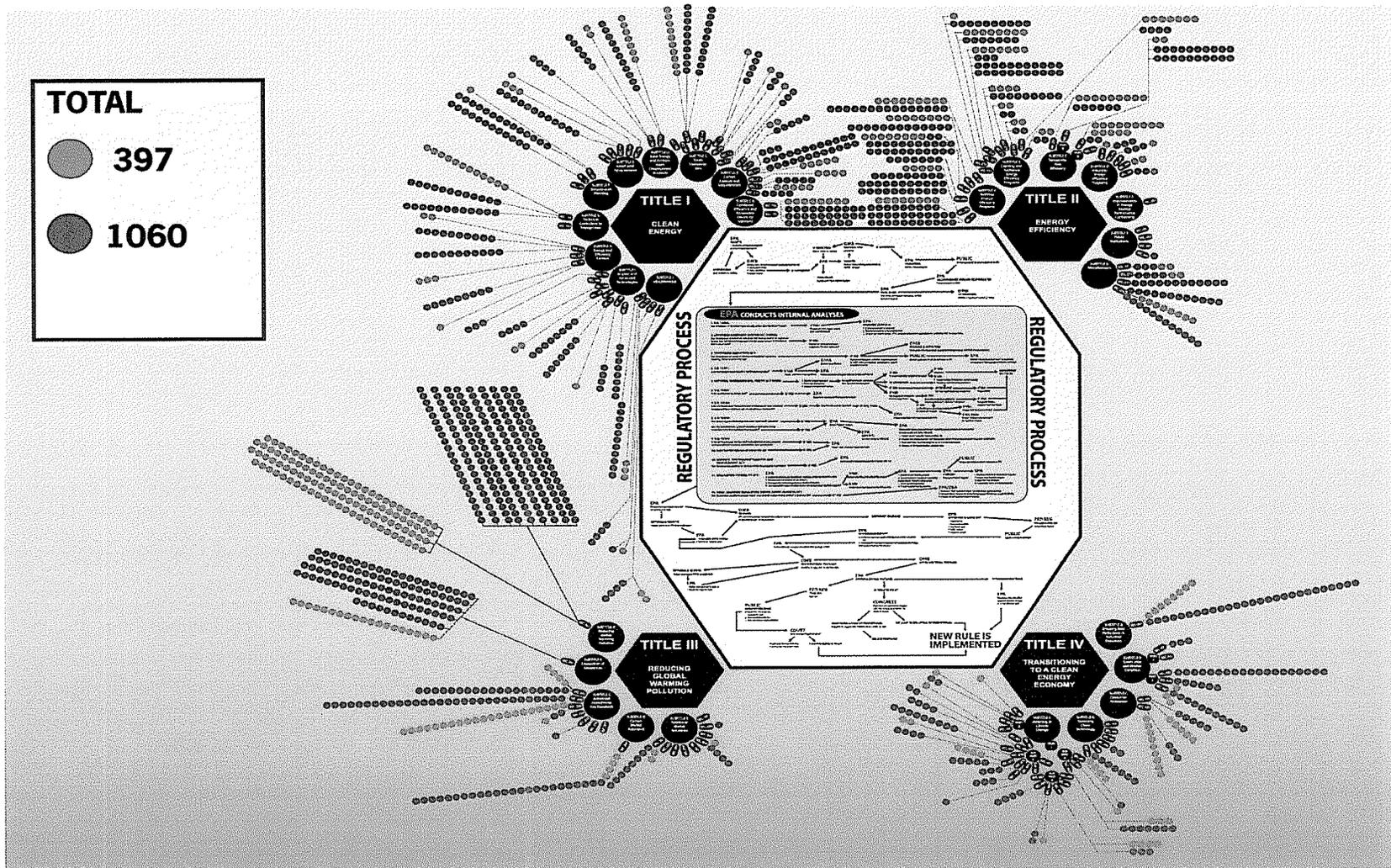
MERGE U.S. Electric Generation Deployment



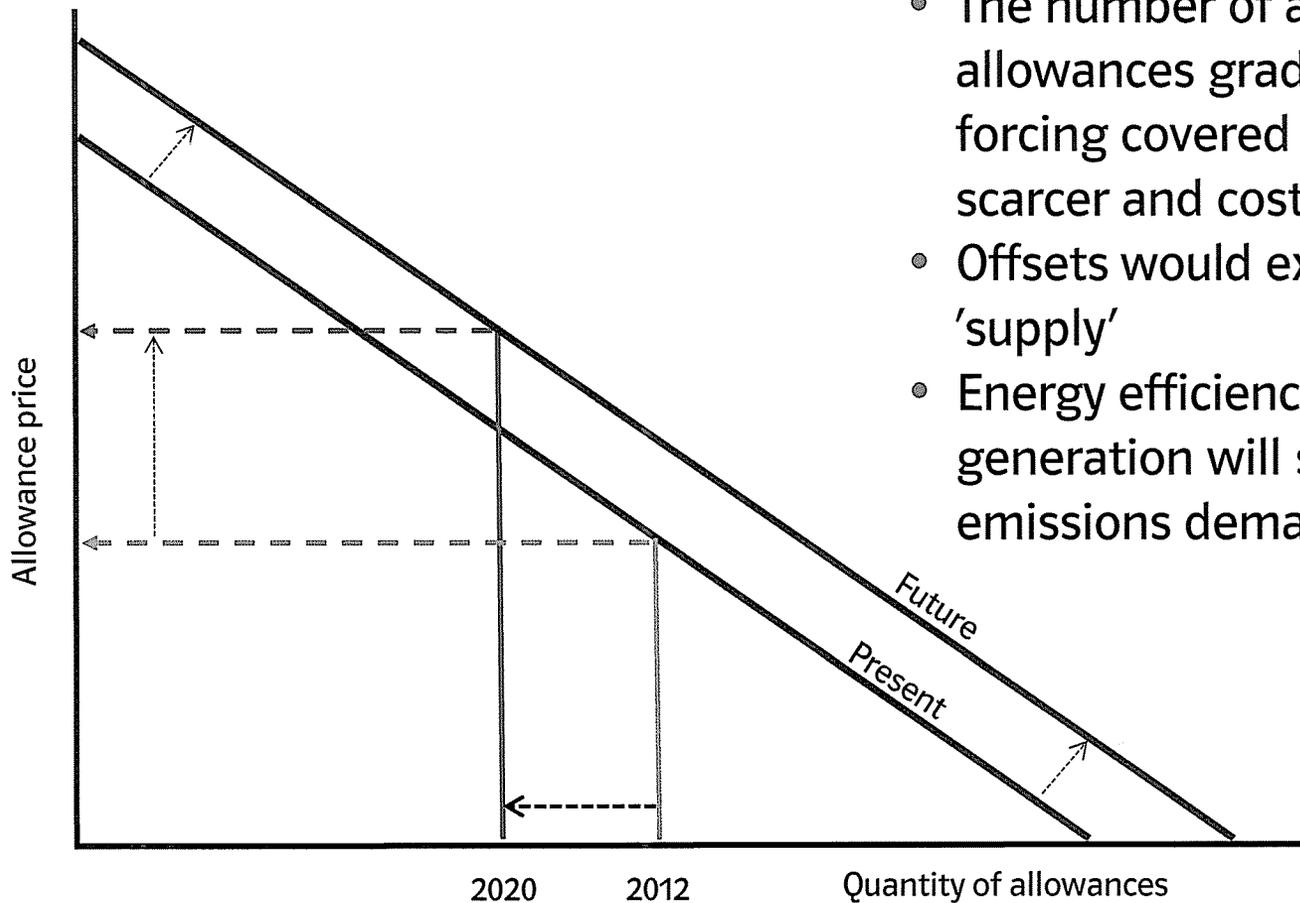
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Cap & Trade and Carbon Offsets

Waxman-Markey made easy



Cap & Trade 101



- The number of available allowances gradually declines, forcing covered entities to buy scarcer and costlier allowances
- Offsets would expand allowance 'supply'
- Energy efficiency and renewable generation will slow growth in emissions demand

How would a CO₂ Price Collar impact competing interests?

- Both Waxman-Markey and Kerry-Boxer include limited provisions to restrict prices if they become 'too high'
- Technology oriented lobby wants adequate long-term prices to support investment
- Consumers will benefit from a lower ceiling; producers will benefit from a higher floor

Responsive actions are encouraged at CO₂ prices above \$40/ton

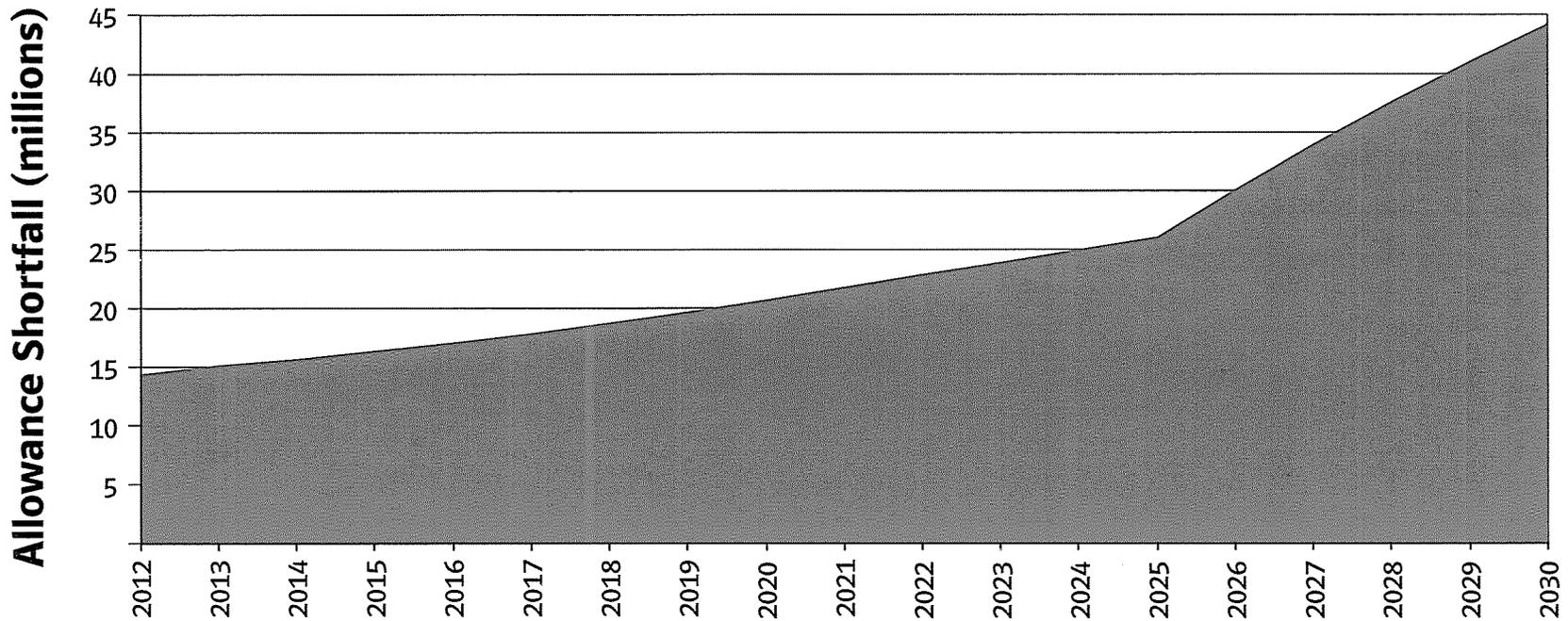
CO ₂ Price (\$/ton)	Response	2020 Bill Impact % (Res/Ind/Comm)
\$20	None (pay for emissions)	25/40/25
Up to \$40	None (pay for emissions)	40/60/45
\$40 – \$50	Wind PPA, LF gas, biomass	45/70/50 ¹
\$60 – \$80	Retire coal and build gas CCCT, CCS deployment	60/95/70 ²

1) @ \$45/ton

2) @ \$70/ton

E.ON U.S. projected emissions exceed potential allowance allocation

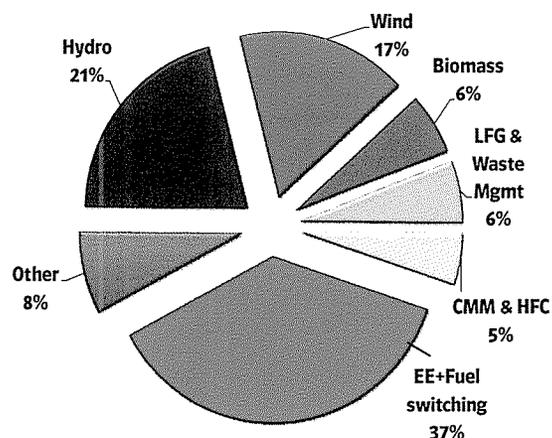
- After 2025, power sector allocation of free allowances declines to zero by 2030



Offsets could offer significant financial reward to developing countries

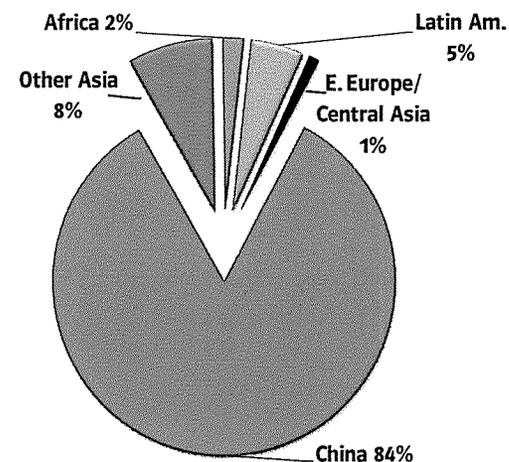
- Waxman-Markey included provision for 2 billion tons of offsets with 50-50 domestic/international split; Kerry-Boxer bill proposes 75-25 split
- Kyoto allowed offsets as a direct substitute for compliance with CO₂ limits
- Additional voluntary offset market exists; U.S. supplies 28% of this market

Share of volume, 2008 CDM projects



Source: World Bank, 2009

2008 CDM projects by region

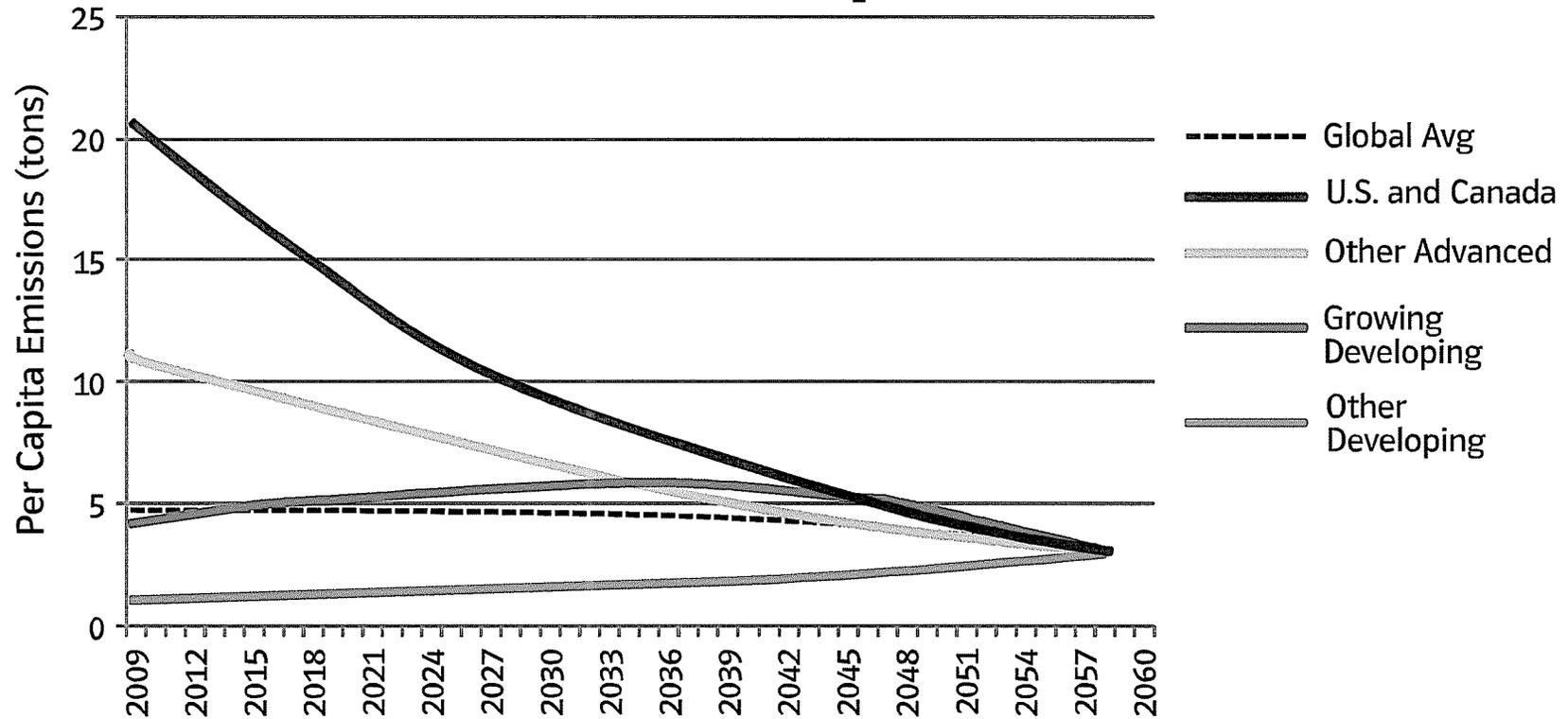


Copenhagen is unlikely to result in significant progress

- "Conference of Parties" expected to discuss a new mandatory agreement to replace the Kyoto Protocol when it expires in 2012
- Low likelihood of agreement on near-term emissions targets
 - U.S. has not passed climate legislation
 - China is likely to commit only to reducing their increase in CO₂ emissions
 - India will attempt to reduce emissions intensity but won't accept legally binding targets
- Negotiations will be difficult
 - Developed countries want to avoid economic damage
 - Developing countries want funds for adaptation and mitigation

Attaining the G8 Forum's global temperature and CO₂ concentration goals will be challenging

- U.S. would need to reduce per capita CO₂ emissions by over 75% by 2050



Source: Commission on Growth and Development, "Climate Change, Mitigation, and Developing Country Growth"

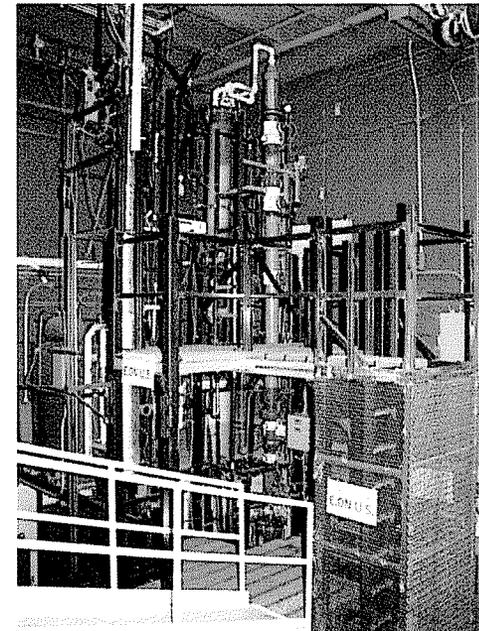
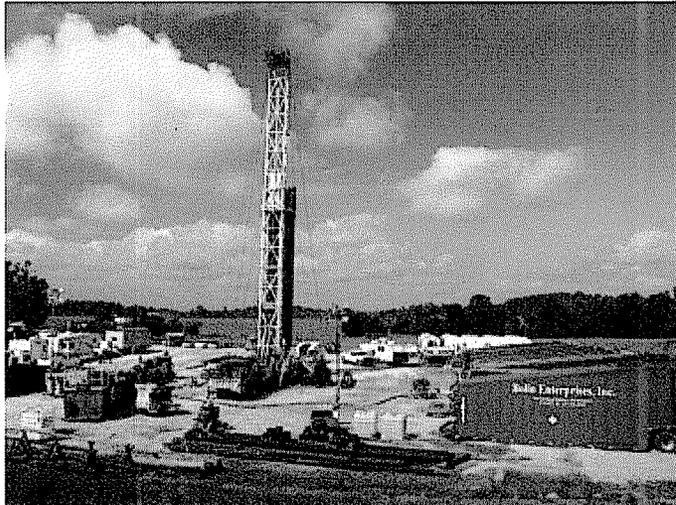
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Supporting Technology Development

Supporting existing technology research

University of Kentucky, Carbon Management (CAER)

- Pilot plant equivalent to 30kW is being operated
- 0.5-1 MW moveable test plant is being planned for construction



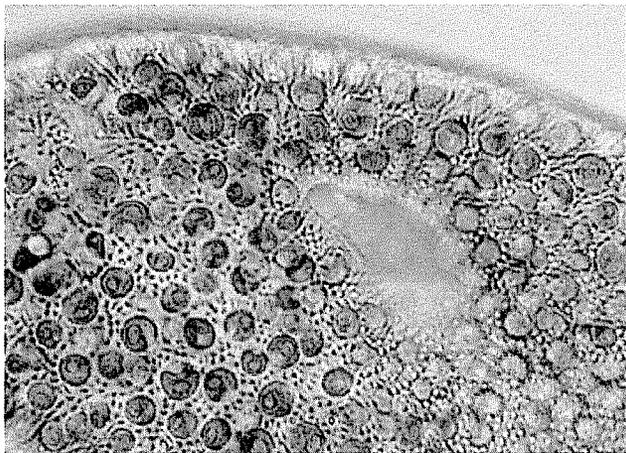
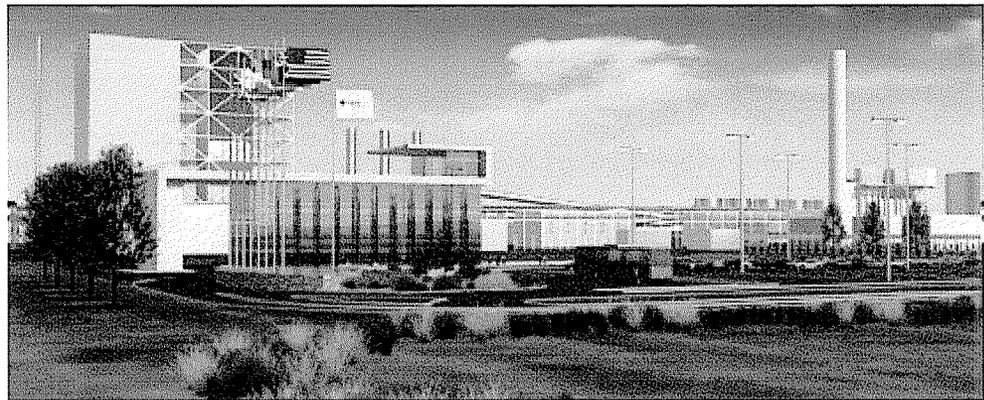
Ky. Consortium for Carbon Storage (KYCCS)

- Carbon Sequestration Project
- 323 tons of CO₂ injected

Supporting planned technology research projects

FutureGen (CCS) — Planned

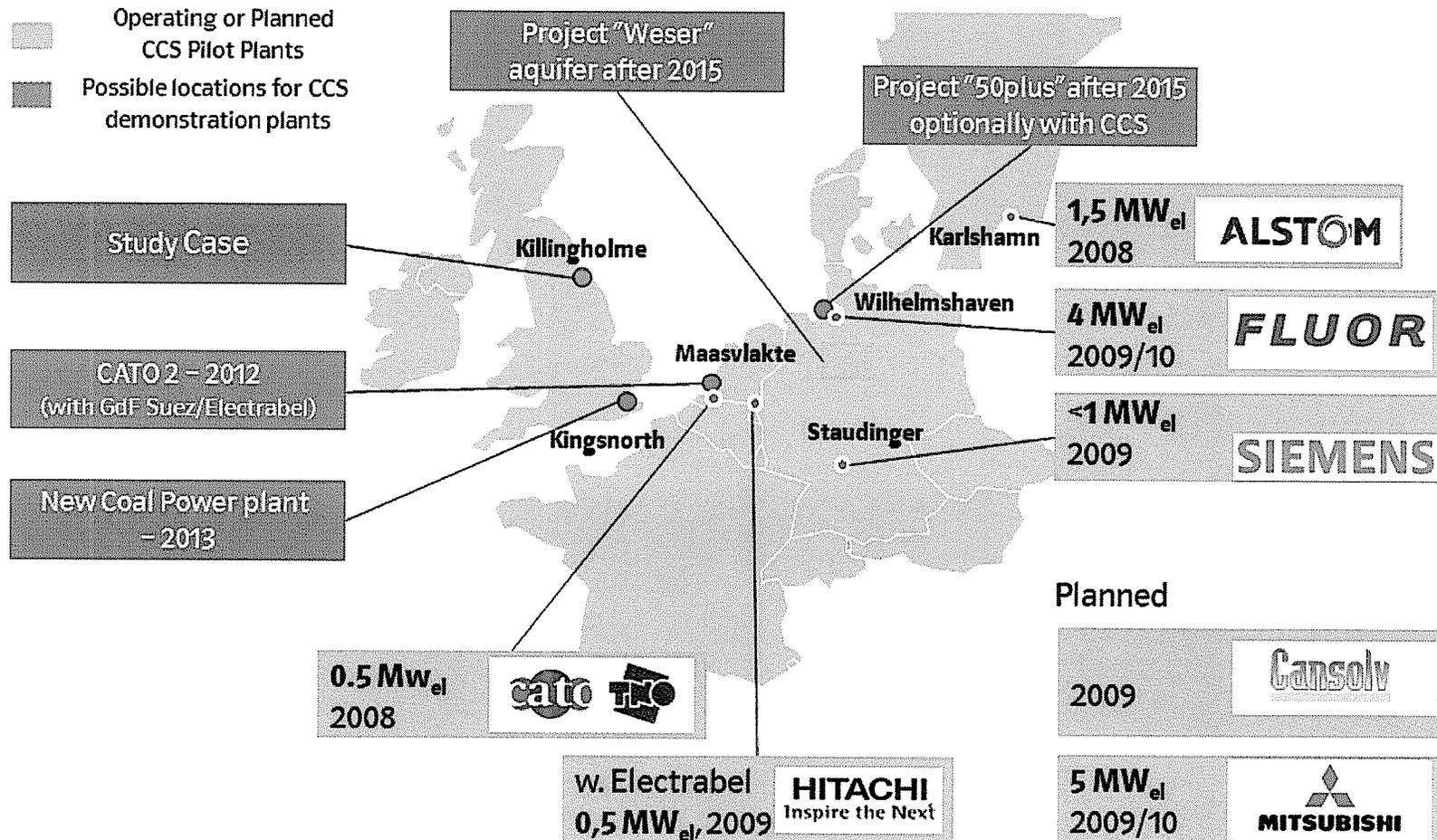
- 275 MW IGCC plant with permanent CO₂ storage
- Public/Private Partnership: alliance of utilities and mining companies



Algae (CCS) — Planned

- E.ON U.S. Trimble County host site
- CO₂ from flue gas converted to bio-fuel by algae

Supporting Carbon Capture & Sequestration in Europe

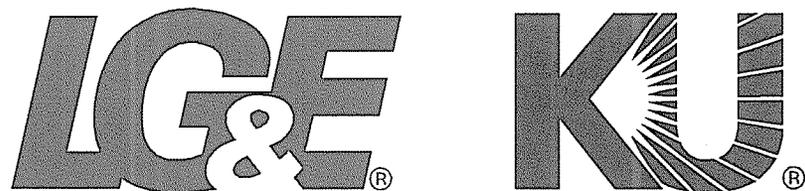


Where do we go next? What will it mean?

- Provide policy makers with facts for decision making
- Continue our educational outreach (policy makers and public)
- Potential for major shifts in our industry infrastructure
- Cost of delivering energy will increase
- Potential exists for major change in traditional business model

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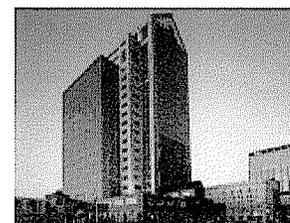
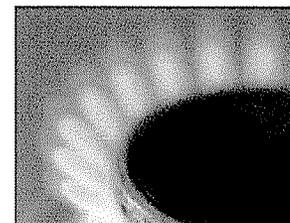
Questions?



PPL companies

2011 KPSC Updated Filings: IRP — ECR

John Voyles
Vice President, Transmission/Generation Services



2011 IRP Highlights — Filed April 21

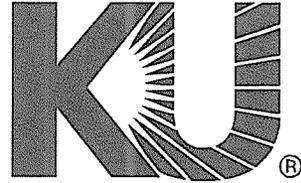
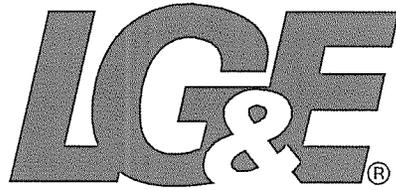
- Net peak demand grows at ~1.5% annually (2011-2025)
- Expected DSM peak reduction of 500 MW by 2017
- Target reserve margin moves up from 14% to 16%
- Significant impact from EPA regulations — older, smaller coal units retired
- New generation is expected to be combined cycle gas

Generation Resource Plan

- Environmental regulations result in 800 MW of retirements at Cane Run, Green River and Tyrone in 2016
- New combined cycle plant planned in 2016 to meet 875 MW reserve margin deficit
- Second combined cycle unit in 2018 to meet future load growth

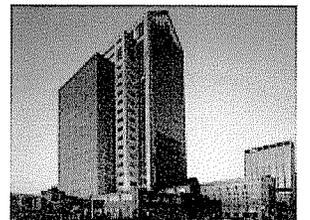
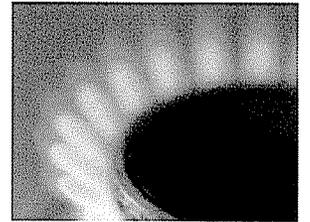
Ongoing Planning Process

- IRP communicates how the company might meet customers' energy needs based on certain assumptions about the future
- Continue to evaluate future resource alternatives including a Request for Proposals for third-party capacity
- Final decisions require further study and regulatory approvals

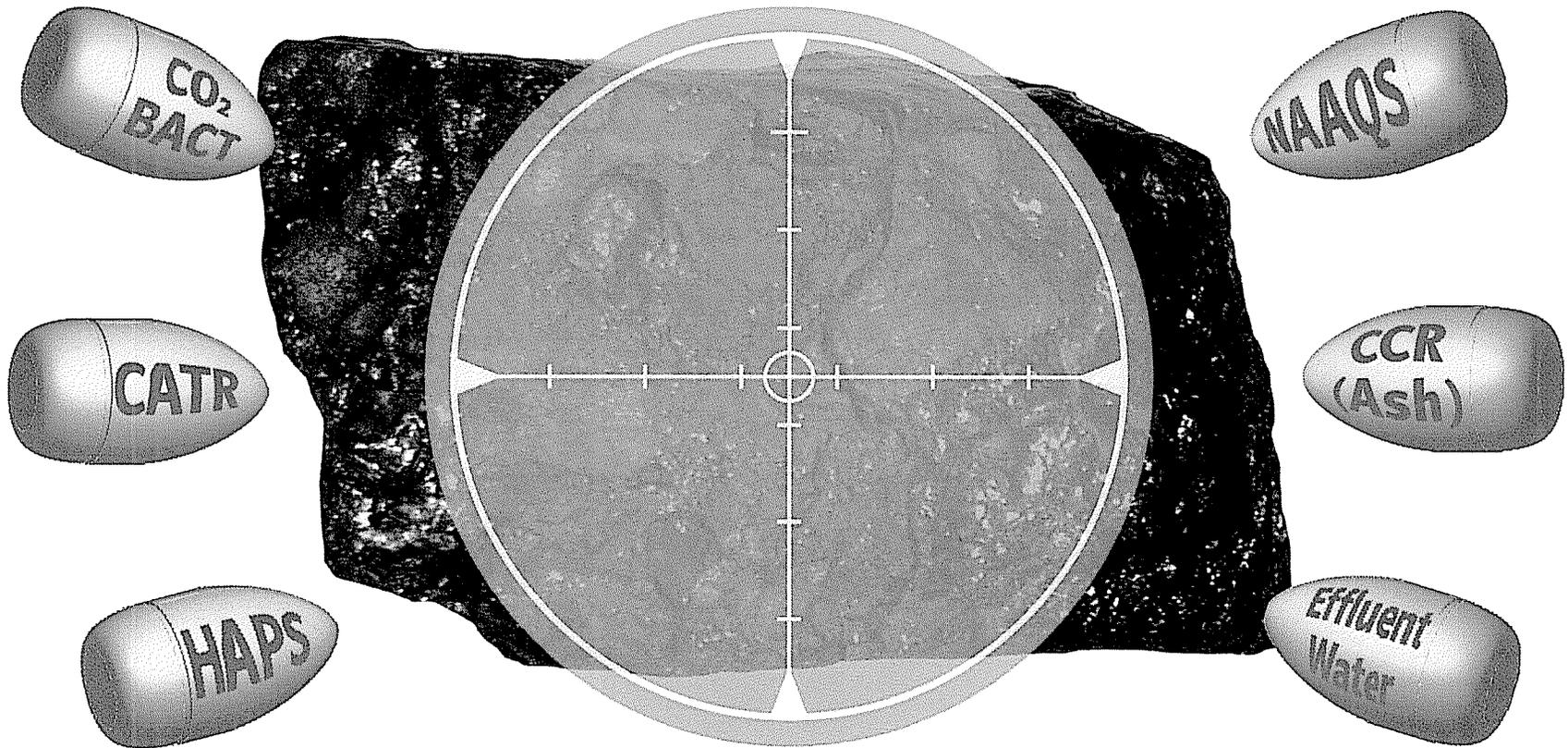


PPL companies

Environmental Cost Recovery Plan Update



EPA Regulatory Drivers



2010–11 Engineering Activities & Studies

- Control equipment studies for all stations
 - *Level 1 engineering completed for Mill Creek, E.W. Brown and Ghent Stations.*
- Mill Creek scrubber (FGD) Performance Improvement study & structural review
- Precipitator (ESP) upgrade study
- Flow modeling studies for the SCR upgrades
- E.W. Brown study of a smaller ash pond, with delayed conversion to a landfill

Engineering & Analytical Findings/Results

- Demonstrate prudence of installing emission controls (versus retiring units)
 - *Installing controls at Cane Run, Green River and Tyrone not cost effective*
- HAPs (MACT)
 - *Baghouses needed for mercury control*
- NAAQS & CATR
 - *Construct new FGD/chimney for Mill Creek Units 1 & 2*
 - *Construct new FGD/chimney on Mill Creek Unit 4*
 - *Upgrade existing SCR operations*
- CCR
 - *Conversion ash pond project at Brown to a landfill*

2011 Environmental Compliance Plan Filing

- Fabric filter baghouses for Brown, Ghent, Mill Creek and Trimble Co. (TC1)
 - *Sorbent injection technologies included in the projects*
- FGD replacements and upgrades at Mill Creek
 - *New stacks to facilitate construction schedule*
- Conversion of Brown ash pond project to a dry landfill

ECR Capital Plan Costs

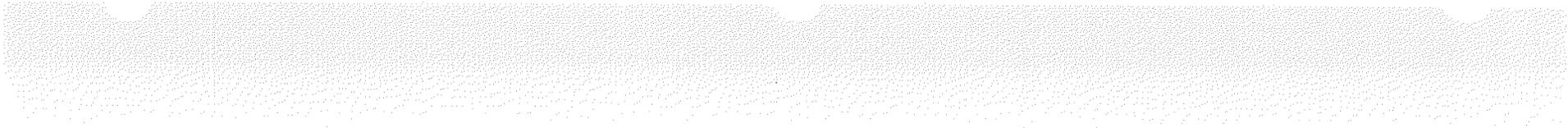
- Total company capital costs estimated at \$2.3 billion
 - *KU approximately \$940 million*
 - *LG&E approximately \$1.4 billion*
- Projected rate impacts
 - *KU estimated at 11 % by 2015*
 - *LG&E estimated at 19% by 2015*

Risks

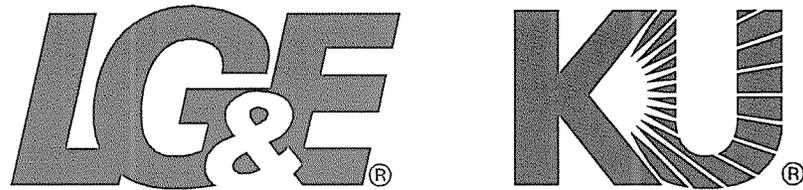
- Schedule — completion by 2016
- Major equipment lead times
- Equipment availability for fans and electrical motors
- Shop fabrication space
- Engineering and construction labor availability
- Cost escalations

ECR Filing Schedule

- May 2 — File notice of intent with KPSC
- May 25 — Publication of KU and LG&E newspaper notices begin
- June 1 — File Certificates of Public Convenience & Necessity (CPCN) and Environmental Cost Recovery (ECR) applications
- November — KPSC orders expected



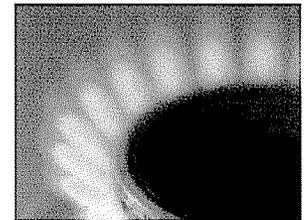
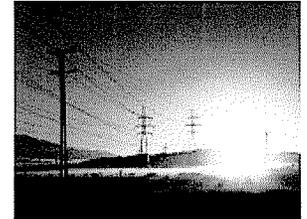
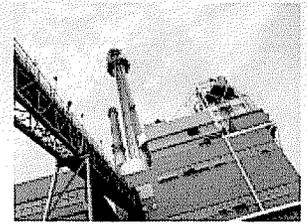
PPL companies



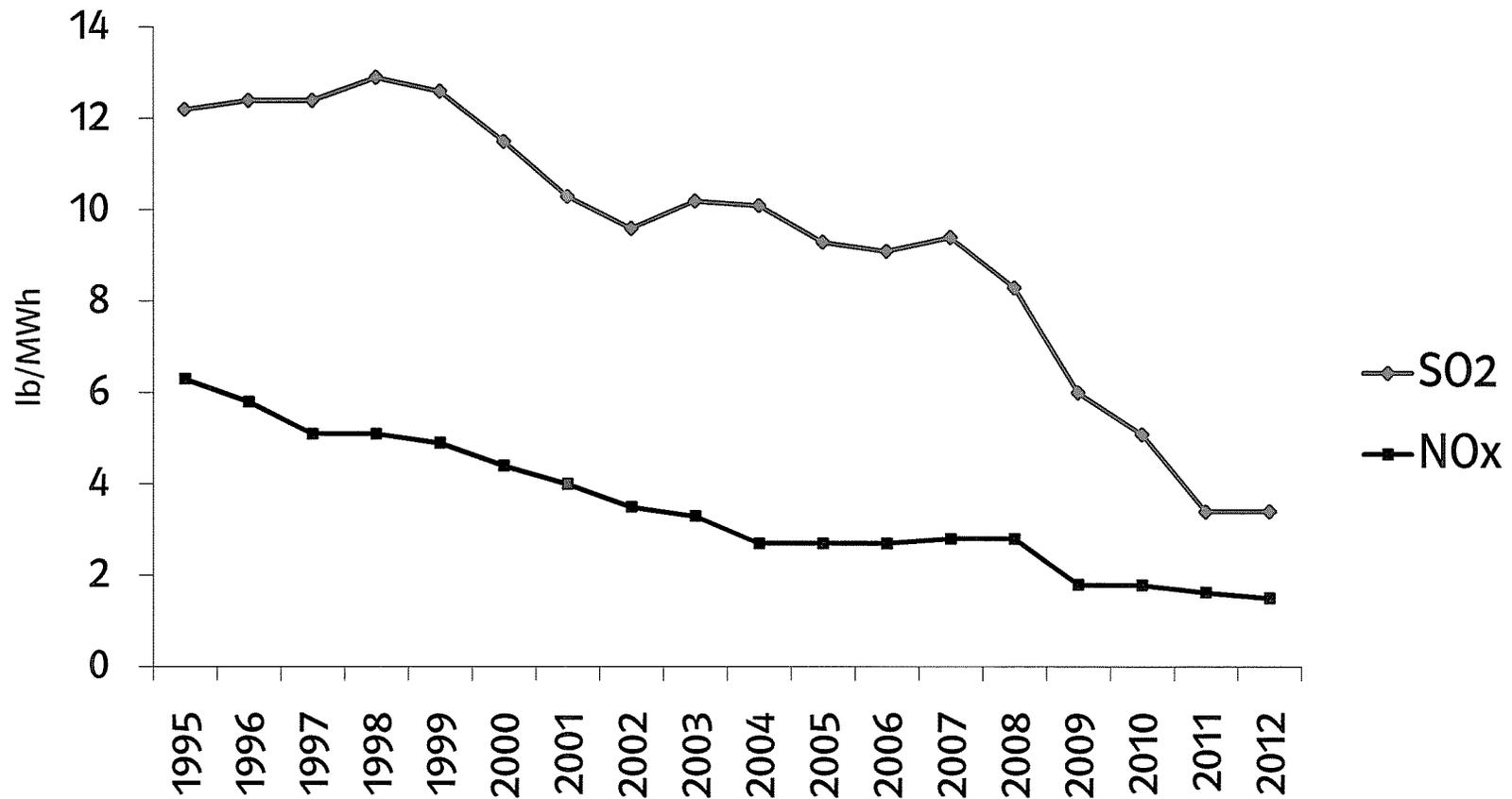
PPL companies

New/proposed EPA regulations will increase cost of coal-fired electricity

*John Voyles
Vice President, Transmission & Generation Services*



Historical emission reductions at LG&E and KU



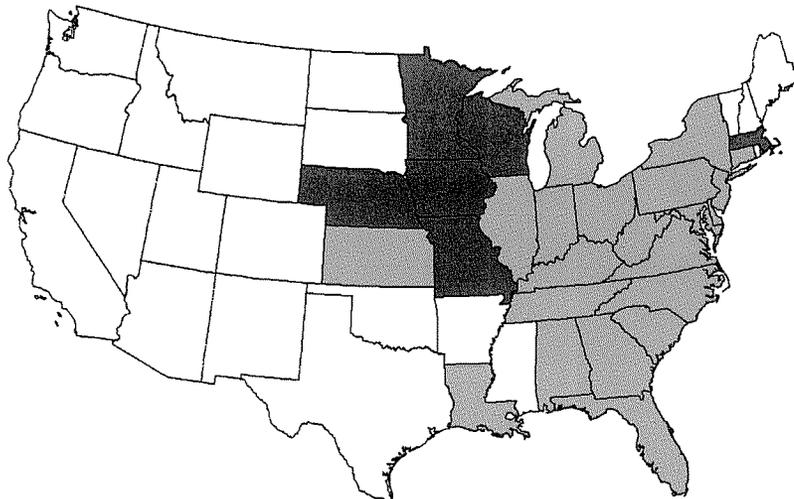
Unprecedented number of proposed regulations

EPA proposals will have a major impact on coal-fired utilities and their customers.

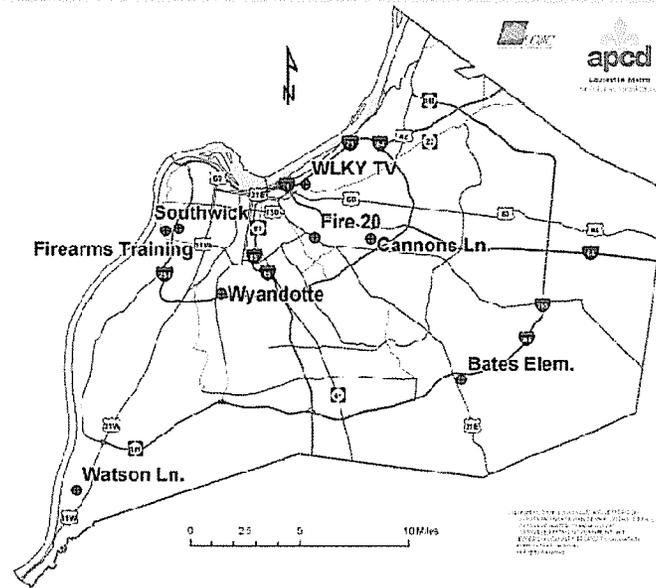
- Significant risks include —
 - *No coordinated federal strategy creates a piecemeal compliance approach.*
 - *Reversal of prior regulatory determinations*
 - *Inconsistent and short deadlines compromise state and utility efforts to prepare proper implementation plans.*
 - *Aggressive construction schedules must occur in absence of final regulations due to long lead times in fabrication.*

New air regulations

- National Ambient Air Quality Standards (*NAAQS*)
 - Ground level air monitors across the state
 - Compliance by 2016 or 2017



■ States controlled for both fine particles (annual SO₂ and NO_x) and ozone (ozone season NO_x) (21 States + DC)
 ■ States controlled for fine particles only (annual SO₂ and NO_x) (8 States)
 ■ States controlled for ozone only (ozone season NO_x) (4 States)
 □ States not covered by the Transport Rule

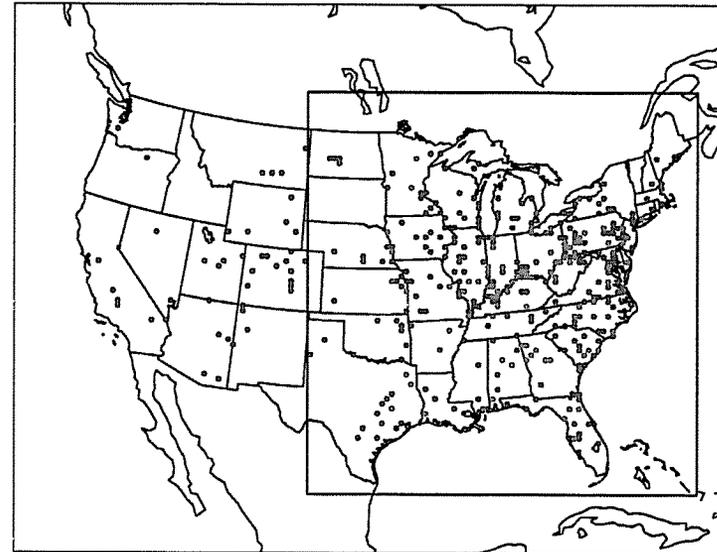


- Clean Air Transport Rule (*CATR*)
 - Regional air pollution effects
 - Possible compliance dates of 2012 and 2014.

New air regulations

- Maximum Achievable Control Technology (*MACT*) for Hazardous Air Pollutants (*HAPs*)

- Mercury, Arsenic, Selenium
- Acid aerosols
- Plant-by-plant controls
- Compliance by 2015 or 2016



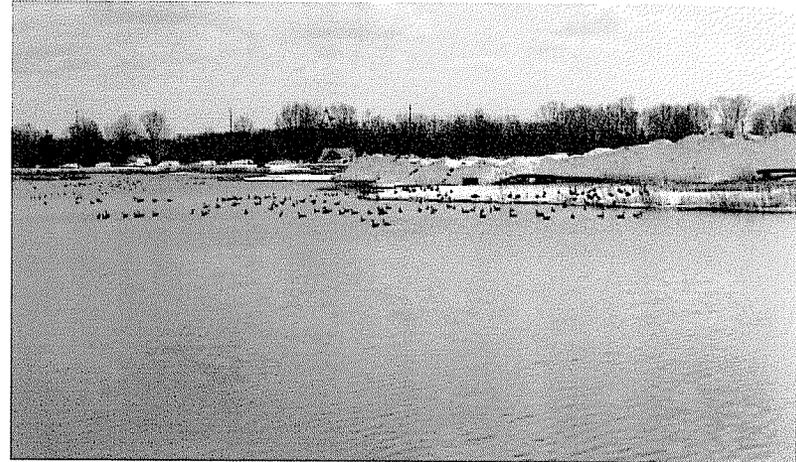
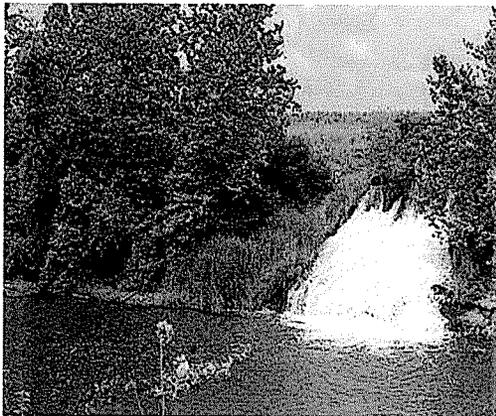
- CO₂ Best Available Control Technology (*BACT*)

- Permits for new or modified sources
- Compliance by 2011

New coal combustion residuals and water regulations

- Coal Combustion Residuals (CCR)

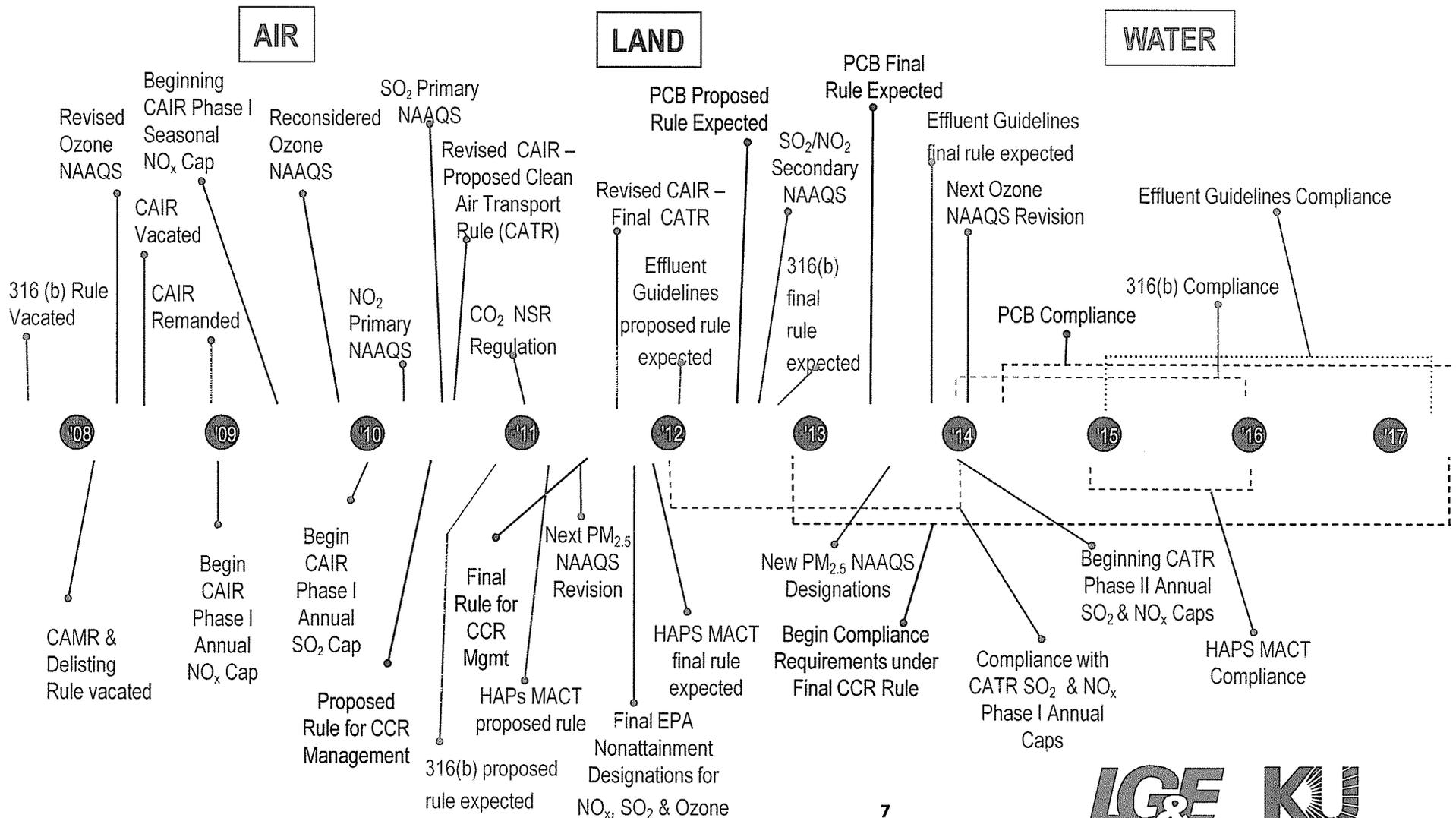
- *Hazardous or*
- *Non-hazardous*
- *Wet ponds must have liners*
- *Compliance within 5 years of final rule*



- Water quality (*1974 Clean Water Act*)

- *Water Withdrawal*
- *Water Discharges*
- *Possible final rules by 2012, then compliance*

Timeline of federal regulations from EPA



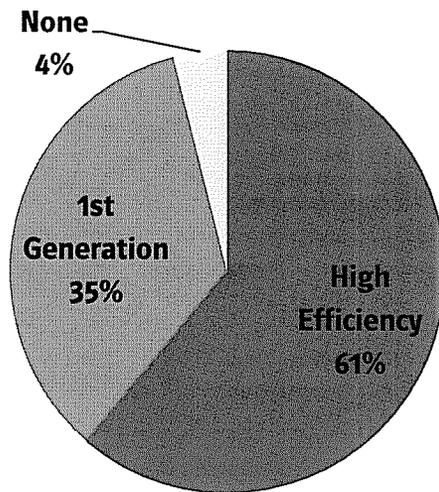
— adapted from (EPA 2008) Updated August, 2010



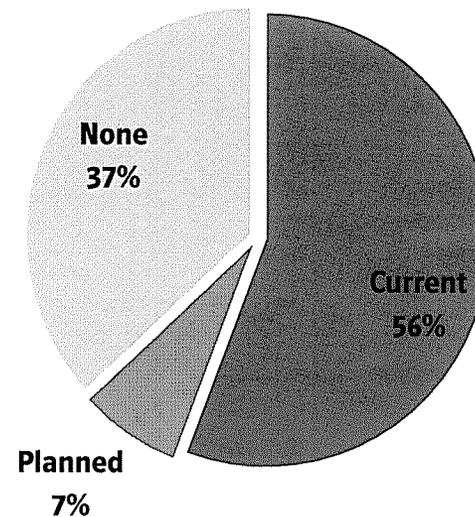
LG&E/KU's coal fleet already has high level of SO₂ and NO_x control technologies...

...but some additions or enhancements will be required.

FGDs in Coal Fleet



SCRs in Coal Fleet



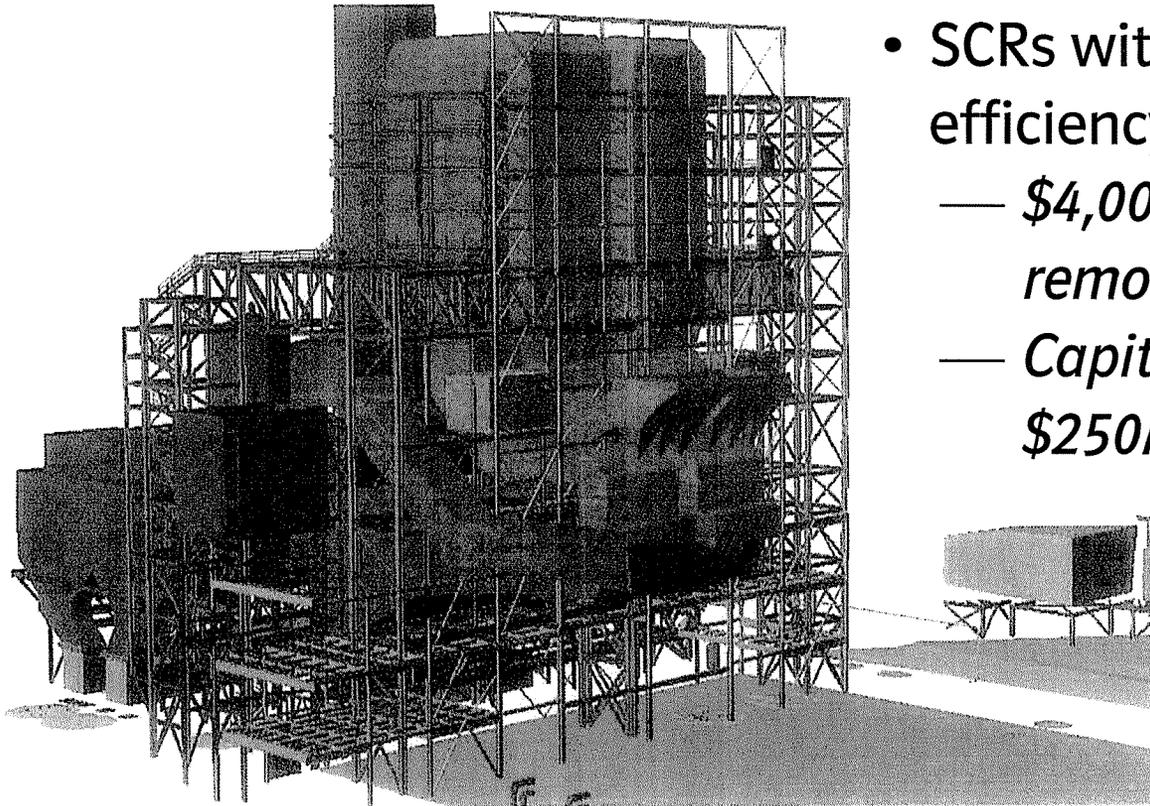
Percents are based on capacity including TC2

SO₂ technology options for NAAQS & CATR



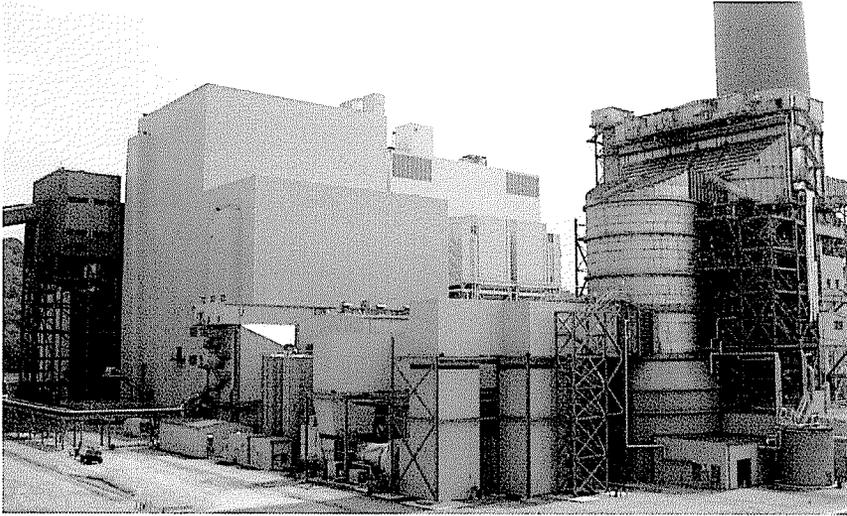
- FGDs with high removal efficiency
 - *\$5,000 to \$11,000 per ton removed*
 - *Capital Costs of \$300M to \$700M each*

NO_x technology options for NAAQS & CATR



- SCRs with high removal efficiency
 - *\$4,000 to \$8,000 per ton removed*
 - *Capital costs of \$100M to \$250M each*

HAP technology options for MACT rules



- Co-benefits with combinations of technology
 - *Mercury at \$150,000 to \$450,000 per pound removed*
- Fabric Filter particulate controls with carbon injection
 - *Capital Costs of \$50M to \$175M each*

Alternative supply choice — retire coal and switch to gas

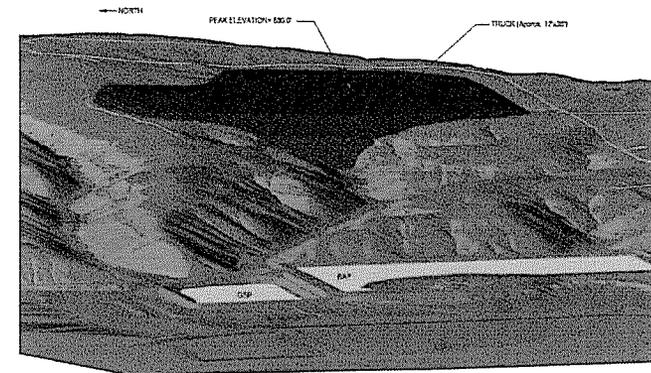


Source: Effingham County Power, LLC
a Progress Energy Company

- Natural Gas Combined Cycle units
 - *Zero SO_2 and 50% less NO_x emissions*
 - *Capital costs of \$600M to \$800M each*

Proposed EPA CCR regs would require dry storage & closing existing ash ponds

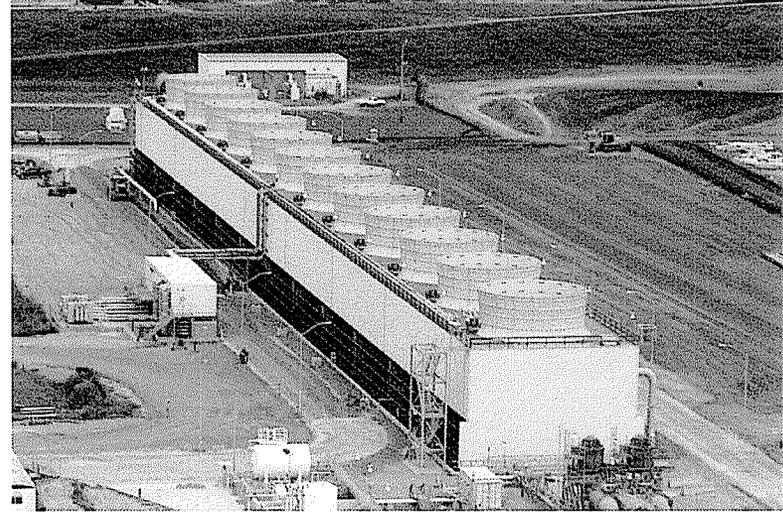
- Retrofit or close 21 ponds
 - 10 ash ponds
 - 11 process/runoff ponds
- Build landfills for future storage
- Construct new process water ponds for each operating site
- Decommissioning ponds will cost an estimated \$700 million



1L-CH Proposed Mound (Looking East)

Increased water withdrawal and discharge requirements

- Water Withdrawal
 - *Units without cooling towers*
 - Cane Run
 - Green River
 - Mill Creek 1
 - Tyrone



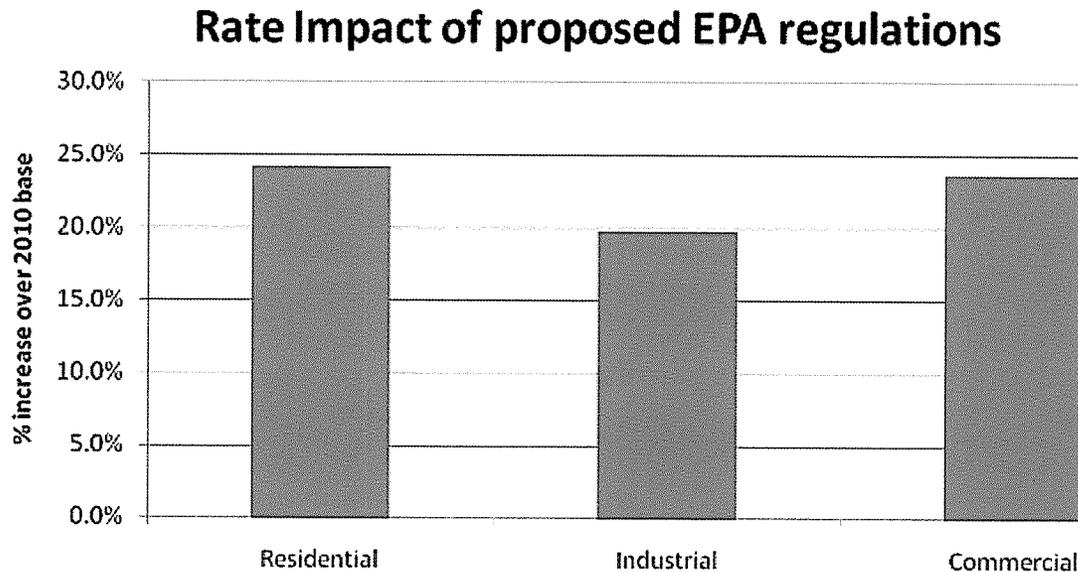
- New water discharge standards
 - *Physical-chemical treatment*
 - *Biological treatment systems*
 - *Cost of \$40 - \$300 million for each site*

Estimate at least \$4 billion in capital costs needed over next ten years

Regulation	Capital (\$M)	Annual Operating Expense (\$M)
Air	\$3,300 – 5,000	\$150 – 300
CCR	\$700	<i>To be determined</i>
Water	<i>To be determined</i>	

Potential rate impact of proposed EPA regulations

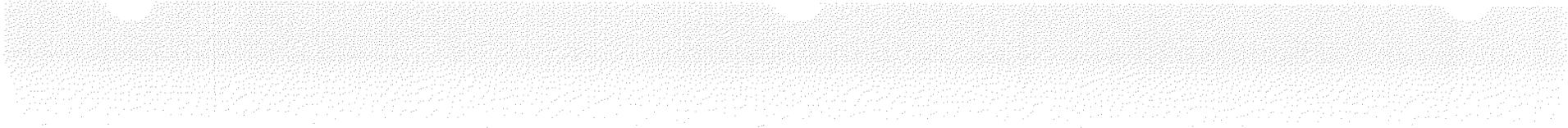
Due to these regulations, by 2019, rates could increase by more than 20% and almost \$550 million annually



Note: This calculation does not include potential compliance costs for water regulations, Renewal Portfolio Standards (RPS) or carbon dioxide (CO₂) reductions

What are LG&E and KU doing?

- Evaluating multiple compliance alternatives.
- Participating in industry efforts to advocate more reasonable regulations and timelines.
- Communicating our concerns directly with EPA on proposed regulations.
- Educating elected officials, regulators and customers on the effect of the federal regulations will have on their electric bill.



PPL companies

Various Analysis

Bellar, Lonnie

From: Yussman, Eric
Sent: Friday, October 10, 2008 6:12 PM
To: Sinclair, David; Siemens, George; Beer, Mike; Ingebrigtsen, Brent; Voyles, John
Subject: Dingell cap-and-trade

This week, House Energy & Commerce Committee Chairman John Dingell released his cap-and-trade proposal. As always, three key elements dictate the cost to E.ON U.S.:

1. Size of the annual cap on emissions

Dingell's proposal is less stringent in the early years than most other proposals, but it is more stringent in later years. The ultimate goal is 80% below 2005 levels by 2050 (comparatively, Lieberman-Warner-Boxer is 71% by 2050).

2. Percentage of annual allocations

This proposal has four options for allocating allowances, but for us the key constant across all four is **100% auctioning beginning 2026**. In terms of costliness to E.ON U.S., the only proposal more severe is Rep. Ed Markey's from May, which established 100% auctioning beginning 2012.

3. Percentage of available offsets

As opposed to most other proposals (which have a constant % of available offsets from day one) Dingell's proposal is initially stingy, then more generous as the years pass...escalates from 5% of the compliance obligation in 2013 and growing to 35% in 2024. This feature adds costs to E.ON U.S. in the early years.

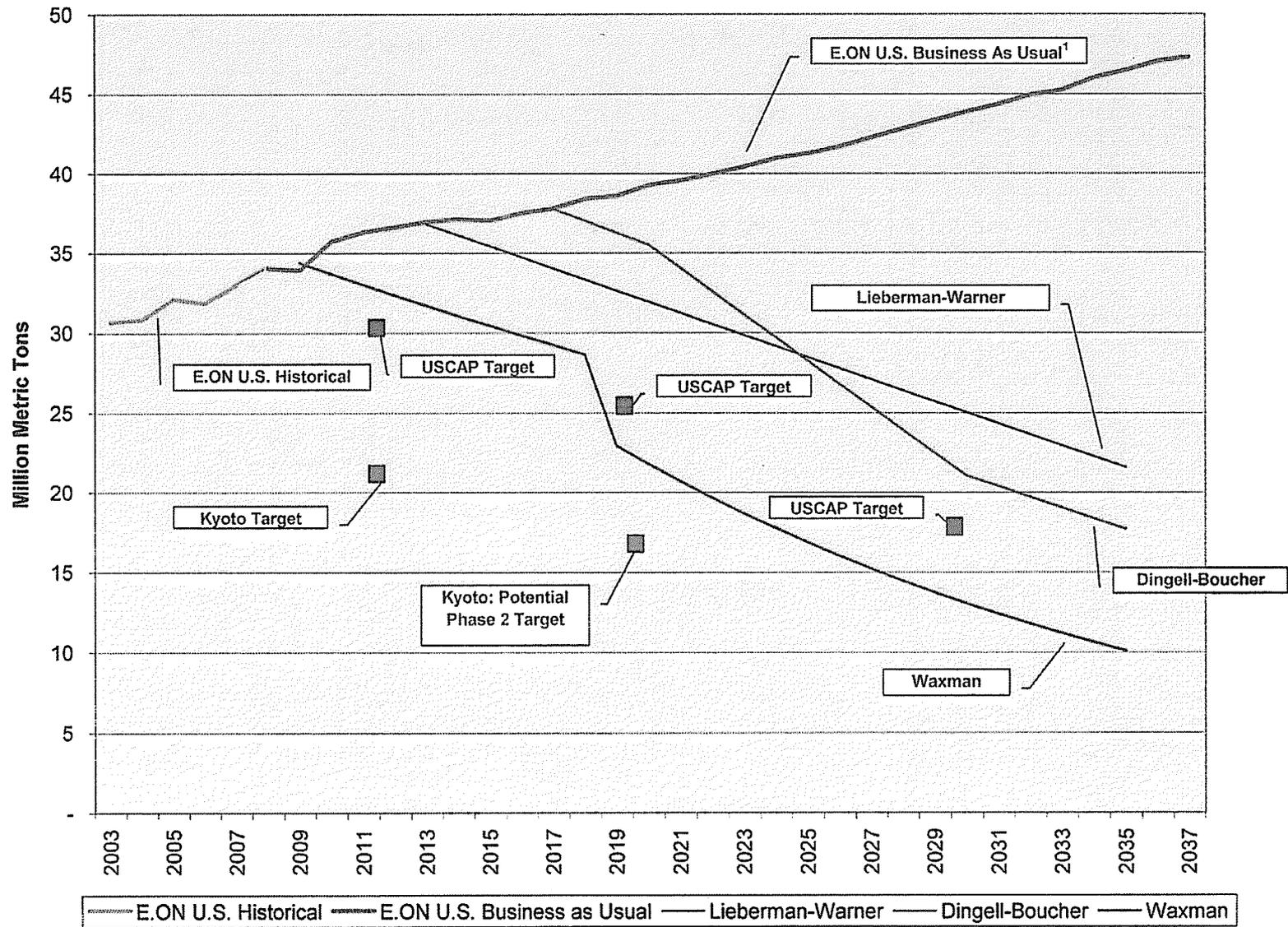
One other interesting aspect of this proposal: FERC would have responsibility for carbon market oversight, including prevention of fraud and manipulation. The bill establishes an Office of Carbon Market Oversight within FERC, which would have "exclusive jurisdiction over regulated instruments not subject to the securities laws." FERC would be required to promulgate rules governing its oversight of the carbon market within one year of the date of enactment of the law. FERC would coordinate its activities with EPA. FERC would be in charge of monitoring the carbon market and preventing or eliminating excess speculation. Mike/Brent, your thoughts on that?

It'll take some time to crunch all the numbers of Dingell's four options for allocating allowances. But one can estimate the cost to E.ON U.S. ultimately will land between the "L-W Boxer" and "Markey" numbers from the chart below:

Comparison of L-W 2007 vs. L-W Boxer Amendment vs. Markey Bill

in each cell, the 1st line = CO2 price, 2nd line = E.ON U.S. cost (millions), 3rd line = E.ON U.S. bill increase

	2015			2020			2030		
	L-W 2007	L-W Boxer	Markey	L-W 2007	L-W Boxer	Markey	L-W 2007	L-W Boxer	Markey
EPA 4-08	CO2 = \$20 \$461 10-15%	CO2 = \$20 \$453 10-15%	CO2 = \$20 \$920 35-40%	CO2 = \$30 \$869 35-40%	CO2 = \$30 \$845 35-40%	CO2 = \$30 \$1,482 45-60%	CO2 = \$60 \$2,415 60-75%	CO2 = \$60 \$2,477 60-75%	CO2 = \$60 \$3,064 90-130%
EPA 3-08	CO2 = \$40 \$923 35-40%	CO2 = \$40 \$907 35-40%	CO2 = \$40 \$1,841 45-60%	CO2 = \$51 \$1,477 45-60%	CO2 = \$51 \$1,437 45-60%	CO2 = \$51 \$2,435 60-75%	CO2 = \$83 \$3,340 90-120%	CO2 = \$83 \$3,427 90-120%	CO2 = \$83 \$4,266 130-180%
CRA 4-08	CO2 = \$51 \$1,177 40-45%	CO2 = \$51 \$1,157 40-45%	CO2 = \$51 \$2,347 60-75%	CO2 = \$61 \$1,767 45-60%	CO2 = \$61 \$1,719 45-60%	CO2 = \$61 \$2,913 90-120%	CO2 = \$89 \$3,582 90-120%	CO2 = \$89 \$3,674 90-120%	CO2 = \$89 \$4,575 130-180%



2009 Congressional Legislation: CO2, Renewables, Energy Efficiency

March 27, 2009

<i>Date Introduced</i>	<i>Sponsor</i>	<i>Title & Last Action</i>	<i>Purpose</i>	<i>Comment</i>
February	Rep. Ed Markey	American Renewable Energy Act (HR 890) <i>Feb 4:</i> Referred to the House Committee on Energy and Commerce	Establishes federal renewable portfolio standard, with percentage of renewable sales progressing from 6% in 2012 to 25% in 2025.	Markey prices federal "alternative compliance payments" (ACP) at 5 cents/kWh, whereas most of last year's RPS proposals were 3 cents. This rise from 3 to 5 cents is significant to E.ON US, costing us as much as \$100 million more in later years (as we approach the "25% in 2025" target). This amount presumes we are buying renewable energy credits (not making physical changes) to meet our compliance mandate. The ACP is set higher than the expected price of renewable energy credits. Hence, obligated entities will only pay the ACP if (a) the REC price goes too high, or (b) they can't buy enough RECs in the market to satisfy their mandate.
February	Rep. Ed Markey	Save American Energy Act (HR 889) <i>Feb 4:</i> Referred to the House Committee on Energy and Commerce	Establishes federal energy efficiency resource standard. Requires annual reductions in consumption (relative to the average annual quantity of electricity or natural gas delivered during the 2 calendar years immediately preceding), progressing from 1% in 2012 to 15% in 2020.	Markey introduced a similar bill in 2007 which never advanced beyond committee.
February	Senator Jeff Bingaman	unnamed discussion draft	Establishes federal renewable portfolio standard, with percentage of renewable sales progressing from 4% in 2012 to 20% in 2025.	Bingaman prices federal "alternative compliance payments" at 3 cents/kWh. See Markey comment above.
February	President Obama	A New Era of Responsibility: Renewing America's Promise <i>March 25:</i> House and Senate budget resolutions do not include Obama's proposed \$645 billion revenue from CO2 allowance auctions. Office of Management and	10-year budget	Obama memorialized his preferences for a federal cap-and-trade program: <ul style="list-style-type: none"> ◦ 100% auction ◦ target reduction of GHG emissions 14% below 2005 levels by 2020 and 83% below 2005 levels by 2050 ◦ return to the public roughly 80% of auction revenues via the "Making Work

2009 Congressional Legislation: CO2, Renewables, Energy Efficiency

March 27, 2009

		Budget Director Peter Orszag conceded this revenue will not be in the federal budget.		<p>Pay" refundable income tax credit for low- and middle-income citizens enacted as part of the economic stimulus package</p> <ul style="list-style-type: none"> • use the remainder of auction revenues to fund clean energy investments <p>A \$14/ton CO2 price is assumed by dividing the cumulative \$645 billion revenue in 2019 by the cumulative 45 billion allowances that would be sold through 2019 assuming 85% of the economy is "covered" (i.e., Lieberman-Warner-Boxer's percentage). The CO2 price also has been estimated at \$20/ton. The difference stems from assumptions about how much of the economy is "covered"...the more (less) coverage, the lower (higher) the price.</p>
March	Rep. John Larson	<p>America's Energy Security Trust Fund Act of 2009 (HR 1337)</p> <p><i>March 5:</i> Referred to the Committee on Ways and Means, as well as Committee on Foreign Affairs</p>	Impose a \$15 upstream tax per metric ton of CO2 ("on any taxable CO2 substance sold by the manufacturer, producer, or importer"), rising \$10 annually until U.S. CO2 emissions are 80% below 2005 levels.	Revenues raised by the program would be used to rebate payroll taxes and invest in "clean" energy initiatives, with up to \$10 billion a year dedicated to "transition assistance" for certain CO2-intensive industries.
March	Rep. Bob Inglis	Raise Wages, Cut CO2 Act (discussion draft)	Beginning 2010, impose a \$15 upstream tax per metric ton of CO2 ("on any taxable CO2 substance sold by the manufacturer, producer, or importer"), rising to \$100 per ton in 2040 and adjusted annually for inflation.	Less stringent than Larson's tax proposal above since (a) Inglis sets no emission target (i.e., 80% below 2005 levels) that must be achieved, and (b) his annual tax increases are \$1-4, below Larson's \$10.
March	Sens. Tom Carper, Arlen Specter	<p>Clean, Low-Emission, Affordable, New Transportation Efficiency Act (S 575)</p> <p><i>March 11:</i> Referred to the Committee on Environment and Public Works.</p>	Mandates 10% of the revenue from a federal cap-and-trade system go toward a "Greenhouse Gas Transportation Fund" intended to reduce greenhouse gas emissions by financing "clean" state transportation projects.	No direct impact on utilities.

2009 Congressional Legislation: CO2, Renewables, Energy Efficiency

March 27, 2009

March	Sen. Jeff Bingaman	Appliance Standards Improvement Act (S 598) <i>March 16:</i> Referred to the Committee on Energy and Natural Resources.	Changes the way federal appliance efficiency standards are set. Requires DOE to act within 180 days on petitions for new or revised test procedures that measure product energy use, and then, within 18 months if the petition to review is granted, publish an amended test method or decision not to amend.	The standards-setting process for home and industrial equipment has been plagued by delays, so this bill might cause efficiency standards to be promulgated on a more quick, frequent basis.
March	Sen. Jeff Bingaman	Restoring America's Manufacturing Leadership through Energy Efficiency Act of 2009 (S 661) <i>March 19:</i> Referred to the Committee on Energy and Natural Resources.	Help industries improve their energy efficiency through measures including a grant program and "public-private partnerships."	The bill's premise is to help prepare industries to compete internationally under a carbon regime.
March	Rep. Lloyd Doggett	Safe Markets Development Act of 2009 (HR1666) <i>March 23:</i> Referred to the Committee on Ways and Means, in addition to the Committee on Energy and Commerce	Establishes some parameters for a cap-and-trade program: <ul style="list-style-type: none"> • The bill creates a "Climate Program Oversight and Coordination Board"--six Presidential appointees--to (a) make forecasts and to set targets for allowance prices and (b) review the functioning of carbon markets. The Board will "establish procedures for auctions of allowances that would achieve the target price on average over all trading of allowances during the year." • To stabilize allowance prices the Board, the bill would allow fluctuation in annual emissions goals during "Phase I" of the program: years 2012 through 2019. "Phase II" of the program--years 2020 through 2050--would see a more traditional cap-and- 	This bill isn't a comprehensive cap-and-trade bill, in that it doesn't delineate auction vs. allowance provisions, etc. Rather, it's more of a side-piece companion bill whose components could be part of a future comprehensive cap-and-trade bill. The key aspect of this bill is that a government-appointed board, rather than the marketplace, would pick the price of carbon credits. The establishment of "oversight boards" is one alternative to establish price stability under a climate program. Other bills could have approaches including safety valve, or use of an emission allowance reserve, or significant banking and borrowing of allowances from future compliance periods.

2009 Congressional Legislation: CO2, Renewables, Energy Efficiency

March 27, 2009

			<p>trade program with hard annual emissions caps.</p> <ul style="list-style-type: none"> The bill proposes reduction goals of 32% below 2005 levels by 2020 and 97% by 2050. For comparison, Obama seeks 14% by 2020 and 83% by 2050. 	
March	Rep. Jim McDermott	<p>Clean Environment and Stable Energy Market Act of 2009 (HR1683)</p> <p><i>March 24:</i> Referred to the Committee on Ways and Means, in addition to the Committee on Energy and Commerce</p>	<p>Seeks to combine the price certainty of a carbon tax (there are no auctions or trading) with the perceived environmental certainty of a GHG cap.</p> <p>Requires emitters to buy non-transferable emissions allowances from the federal government, the price of which would be set by the Secretaries of Treasury, EPA, and Energy.</p> <p>The bill proposes reduction goals of 26% below 2005 levels by 2020 and 82% by 2050. For comparison, Obama seeks 14% by 2020 and 83% by 2050.</p>	<p>Proceeds from tax would be deposited in a trust fund, with the money used to finance energy projects and/or offset the increased economic burden on low- and middle-income families that will accompany GHG restrictions.</p>
March	Rep. Rick Boucher	<p>Carbon Capture and Storage Early Deployment Act (HR1689)</p> <p><i>March 26:</i> Referred to the Subcommittee on Energy and Environment</p>	<p>Impose a fee on "retail customers of fossil based electricity" to fund (\$1 billion a year) a quasi-private corporation to oversee carbon capture and storage (CCS) demonstration projects.</p>	<p>Boucher introduced the same legislation last year with support from NARUC and AEP. The bill includes a pass-through, not a tax credit, to fund CCS R&D. Also, the Boucher bill puts the R&D dollars in EPRI.</p> <p>The fee annual per kwh for coal-generated electricity is \$0.00043, natural gas is \$0.00022, and oil is \$0.00032. Based on 2008 E.ON generation and sales, this fee would total \$14-15 million.</p>



MEMORANDUM

DATE: April 1, 2009

TO: David Sinclair, Chuck Schram, Robert Thomson

FROM: Eric Yussman

SUBJECT: American Clean Energy and Security Act of 2009

This memo summarizes the House Energy & Commerce Committee's climate legislation discussion draft, sponsored by Representatives Henry Waxman and Edward Markey and released March 31, 2009.

Key Points

The draft contains a GHG cap-and-trade program (no cap on allowance prices), renewable portfolio standard (ending with 25% by 2025), energy efficiency resource standard (ending with 15% by 2020 for electric LDCs and 10% by 2020 for gas LDCs), and various "smart grid advancement" and transmission provisions.

Energy efficiency savings may satisfy up to one-fifth of the renewable portfolio standard's mandate.

The draft is silent on the GHG cap-and-trade program's auction/allocation rules, which will determine annual costs to E.ON U.S. Those rules will be detailed when committee markup begins April 27.

Compared to previous climate legislation, this draft allows more of the GHG cap-and-trade program's compliance mandate to be satisfied with offsets.

Renewable Portfolio Standard. The draft defines "renewable resources" as wind, solar, geothermal, biomass, landfill gas, qualified hydropower, and marine & hydrokinetic energy. The draft defines "qualified hydropower" as:

(A) electricity generated solely from increased efficiency achieved, or additions of capacity made, on or after January 1, 2001 at a hydroelectric facility that was placed in service before that date; or (B) electricity generated from generating capacity added on or after January 1, 2001 to a dam that did not previously have the capacity to generate electricity, provided that FERC certifies (i) the dam was placed in service before the date of the enactment of this section and was operated for flood control, navigation, or water supply purposes and did not produce hydroelectric power before January 1, 2001; (ii) the hydroelectric project installed on the dam is licensed by FERC and meets all other applicable environmental, licensing, and regulatory requirements, including applicable fish passage requirements; and (iii) the hydroelectric project installed on the dam is operated so that the water surface elevation at any given location and time that would have occurred in the absence of the hydroelectric project is maintained, subject to any license requirements that require changes in water surface elevation for the purpose of improving the environmental quality of the affected waterway.

Retail electric suppliers submit to the Energy Secretary a quantity of renewable electricity credits equal to the total amount of electric energy (MWh) sold by the retail electric supplier multiplied by these annual percentages:

“Calendar year	Required annual percentage
2012	6.0
2013	6.0
2014	8.5
2015	8.5
2016	11.0
2017	11.0
2018	14.0
2019	14.0
2020	17.5
2021	17.5
2022	21.0
2023	21.0
2024	23.0
2025 through 2039	25.0

The Governor of a State may petition the Energy Secretary to reduce, by up to one fifth, a covered entity’s required annual percentage if the covered entity has complied with the Federal Energy Efficiency Resource Standard (see below).

The draft sets the price of federal “alternative compliance payments” (ACP) at the lesser of \$50/MWh or 200% of the average market value of a renewable electricity credit (REC) for the previous compliance year. The ACP is set higher than the expected REC price. Hence, covered entities will only pay the ACP if (a) the REC price goes too high, or (b) they can’t buy enough RECs in the market to satisfy their mandate.

Energy Efficiency Resource Standard. The draft sets nationwide minimum levels of electricity and natural gas savings to be achieved through utility efficiency programs, building energy codes, appliance standards, and related efficiency measures. Savings are defined as “a reduction in end-use electricity or natural gas consumption at a facility of an end-use consumer of electricity or natural gas served by a retail electricity distributor or natural gas distributor.” These savings are relative to a base quantity defined as “the average annual quantity of electricity or natural gas delivered by the retail electricity distributor or retail natural gas distributor to retail customers during the two calendar years immediately preceding such year.” Retail electric and natural gas distributors are to achieve savings equal these annual percentages:

“Calendar Year	Cumulative Electricity Savings Percentage	Cumulative Natural Gas Savings Percentage
2014	3.25	2.50
2015	4.50	3.50
2016	6.00	4.75
2017	7.50	6.00
2018	10.00	7.25
2019	12.50	8.50
2020	15.00	10.00

Not later than December 2018, the Energy Secretary will set targets post-2020.

The penalty for noncompliance is \$50/MWh of electricity savings the retail electricity distributor failed to achieve and \$5/MMBtu of natural gas savings the retail natural gas distributor failed to achieve.

GHG Cap-and-Trade Program. The draft sets targets for GHG reductions 20% below 2005 levels by 2020 (slightly more aggressive than that endorsed by the Obama administration), 42% below 2005 levels by 2030, and 83% below 2005 levels by 2050 (equaling Obama's target). By 2016, the goal of the program is to cover 85% of the economy responsible for U.S. GHG emissions in 2005.

The draft is silent on the GHG cap-and-trade program's auction/allocation rules, which will determine annual costs to E.ON U.S. Those rules will be detailed when committee markup begins April 27.

A progressively higher annual percentage of a covered entity's compliance mandate can be satisfied with offsets, rising from 30% in 2012 to 34% in 2027 to 50% in 2042. No more than half of those percentages can be domestic offsets, and no more than half can be international offsets. Although the draft is generous in these percentages compared to previous climate legislation, there is a catch: 1.25 offsets must be submitted in lieu of 1 emission allowance. This ratio (1.25:1) essentially ups the price of using offsets.

The draft's penalty for noncompliance is less severe than previous climate legislation, since (a) there is no "floor" penalty (whereas Lieberman-Warner-Boxer's was \$200 per deficient allowance) and (b) the penalty amount is twice the market value of allowances (whereas Lieberman-Warner-Boxer's was three times the market value).

Smart Grid Advancement and Transmission. The draft stipulates "not later than one year after the date of enactment of this Act, load-serving entities, or States, shall determine and publish peak demand reduction goals." The draft adds that such goals could also be established by a "regional entity for a larger region that shares a common system peak demand and for which peak demand reduction measures would offer regional benefit." The minimum percentage of peak demand reduction would be those "...that are realistically achievable with an aggressive effort to deploy Smart Grid and peak demand reduction technologies and methods" including but not limited to:

- Direct reduction in megawatts of peak demand through energy efficiency measures
- Megawatts enrolled in demand response programs
- Megawatts subject to the ability of a load-serving entity to call on demand response programs, smart appliances, smart electricity storage devices, distributed generation resources on the entity's customers' premises, or other measures directly capable of actively, controllably, reliably, and dynamically reducing peak demand ("dynamic peak management control")

- Megawatts available from distributed dynamic electricity storage under agreement with the owner of that storage.
- Megawatts committed from dispatchable distributed generation demonstrated to be reliable under peak period conditions.
- Megawatts available from smart appliances and equipment with Smart Grid capability available for direct control by the utility through agreement with the customer owning the appliances or equipment.
- Megawatts from a demonstrated and assured minimum of distributed solar electric generation capacity in instances where peak period and peak load conditions are directly related to solar radiation and accompanying heat.

The draft has no penalties for non-compliance. Rather, FERC will provide an annual report to Congress “on compliance with this Act and success in meeting applicable peak demand reduction goals and, as appropriate, shall make recommendations as to how to increase peak demand reduction efforts.”

The draft does not include an expansion of federal siting authority, instead giving FERC one year to create "grid planning principles" and then to support stakeholders during a regional transmission planning process that is to take no more than 18 months. FERC would have to take renewable energy and alternatives such as efficiency and demand-side resources into account under the planning principles. But the measure does not endow FERC with any siting authority, which renewable energy advocates and utilities say is necessary to build a grid that can support the country's future energy needs. They argue the current siting process that requires authorization by each state a line crosses is the greatest barrier to getting interstate transmission built to improve reliability, relieve congestion and reach remotely located renewable energy sources.

Other. Various issues will be the focus of hearings and markup this month:

- Jurisdiction Over Markets. The draft gives FERC control over the carbon allowances and offset market. FERC currently has jurisdiction over the physical energy markets, while the CFTC oversees the futures markets. The two agencies are already at odds in the courts on whether FERC has the enforcement authority over financial players whose illegal actions harm prices in the physical market. Rep. Markey argues FERC should have the authority because of the agency's experience with energy and utilities. House Agriculture Chairman Collin Peterson says CFTC clearly has more experience dealing with trading and commodities, and currently oversees the only voluntary carbon offset market in the United States, the Chicago Climate Exchange.
- State Pre-emption. The draft preclude states from setting more ambitious emissions reduction targets than the federal government. States and localities may not implement or enforce their own caps on greenhouse gas

emissions from 2012 through 2017, in order to give time for a federal trading program to proceed. A key issue is whether states could preserve the right to restart their own systems if the federal program falters.

- Carbon Capture and Sequestration (CCS). The draft's various CCS provisions include language from a bill sponsored this month by Rep. Rick Boucher that creates a \$1 billion annual fund over a decade to help accelerate the commercial-scale use of CCS. A fee would be imposed on "retail customers of fossil based electricity" to fund a quasi-private corporation run by EPRI to oversee CCS demonstration projects.
- Rebates and Border Adjustments. A provision calling for heavy manufacturers such as iron and steel manufacturers to receive "rebates" leaves some uncertainties about which industries would be eligible. A key issue is how to measure the point at which U.S. businesses are at a disadvantage to their counterparts overseas. The draft allows the President to force foreign importers from countries without a carbon cap to pay a penalty covering the energy content of their products if the rebates don't correct competitiveness "imbalances."

Residential Bill Impacts of Carbon Tax (@ \$20/t) and Renewable Energy Initiatives

Typical residential bill (\$/month for 1,000 kWh consumption)

KY's Carbon Footprint (E.ON US, May 7, 2009)

	2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)	35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)	0.0	0.0	0.0	0.0
Free allowances as % of requirement	0%	0%	0%	0%

Typical bill (\$/month)	Today	2012	2016	2020	2024
LG&E/KU	75	82	92	104	117
+ Carbon Tax		20	20	20	20
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	104	118	137	151

Rate increase from today		39%	57%	83%	101%
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Waxman-Markey (EEI interpretation)

	2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)	35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)	20.3	22.7	20.5	17.3
Free allowances as % of requirement	57%	61%	53%	42%

Typical bill (\$/month)	Today	2012	2016	2020	2024
LG&E/KU	75	82	92	104	117
+ Carbon Tax		9	8	9	12
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	93	106	126	143

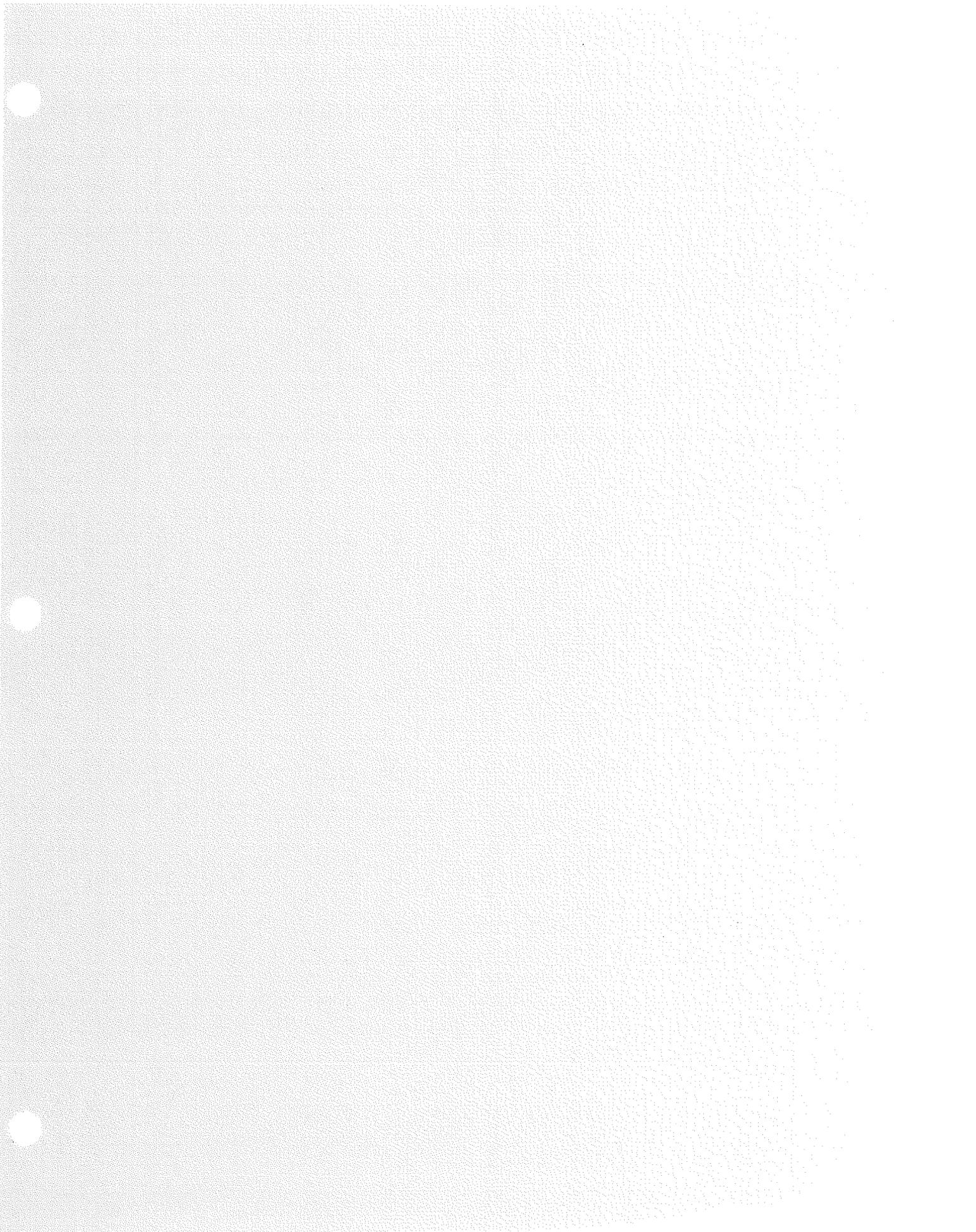
Rate increase from today		23%	41%	69%	90%
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Waxman-Markey with Boucher amendment

	2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)	35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)	21.2	24.4	22.7	18.0
Free allowances as % of requirement	60%	66%	58%	44%

Typical bill (\$/month)	Today	2012	2016	2020	2024
LG&E/KU	75	82	92	104	117
+ Carbon Tax		8	7	8	11
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	92	105	125	142

Rate increase from today		23%	40%	67%	90%
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E.ON US: Calculation of Free CO2 Allowance Allocation

Waxman-Markey ("KY's Carbon Footprint")													
US emissions reduction target (vs 2005)	US emissions cap (economy-wide) (million tonnes)	Free allocation to power sector	Reserved for merchant plant	Share of power sector allocation to Utilities	Utility share allocated to companies on basis of sales shares	Utility share allocated to companies on basis of emissions shares	E.ON US share of Utility sales	E.ON US share of Utility emissions	E.ON US allocation	E.ON US emissions	E.ON US allowance shortfall	Free allowance allocation to E.ON US	
2012	-3%	4,770	0%	0%	0%	50%	50%	0.9%	1.4%	-	35.5	35.5	0%
2013		4,666	0%	0%	0%	50%	50%	0.9%	1.4%	-	35.9	35.9	0%
2014		5,058	0%	0%	0%	50%	50%	0.9%	1.4%	-	36.3	36.3	0%
2015		4,942	0%	0%	0%	50%	50%	0.9%	1.4%	-	36.6	36.6	0%
2016		5,391	0%	0%	0%	50%	50%	0.9%	1.4%	-	37.0	37.0	0%
2017		5,261	0%	0%	0%	50%	50%	0.9%	1.4%	-	37.4	37.4	0%
2018		5,132	0%	0%	0%	50%	50%	0.9%	1.4%	-	37.9	37.9	0%
2019		5,002	0%	0%	0%	50%	50%	0.9%	1.4%	-	38.4	38.4	0%
2020	-20%	4,873	0%	0%	0%	50%	50%	0.9%	1.4%	-	39.0	39.0	0%
2021		4,739	0%	0%	0%	50%	50%	0.9%	1.4%	-	39.5	39.5	0%
2022		4,605	0%	0%	0%	50%	50%	0.9%	1.4%	-	40.0	40.0	0%
2023		4,471	0%	0%	0%	50%	50%	0.9%	1.4%	-	40.5	40.5	0%
2024		4,337	0%	0%	0%	50%	50%	0.9%	1.4%	-	41.0	41.0	0%
2025		4,203	0%	0%	0%	50%	50%	0.9%	1.4%	-	41.6	41.6	0%
2026		4,069	0%	0%	0%	50%	50%	0.9%	1.4%	-	42.1	42.1	0%
2027		3,935	0%	0%	0%	50%	50%	0.9%	1.4%	-	42.6	42.6	0%
2028		3,801	0%	0%	0%	50%	50%	0.9%	1.4%	-	43.2	43.2	0%
2029		3,667	0%	0%	0%	50%	50%	0.9%	1.4%	-	43.7	43.7	0%
2030		3,533	0%	0%	0%	50%	50%	0.9%	1.4%	-	44.3	44.3	0%

Waxman-Markey original with EEI 50-50-50 implementation													
US emissions reduction target (vs 2005)	US emissions cap (economy-wide) (million tonnes)	Free allocation to power sector	Reserved for merchant plant	Share of power sector allocation to Utilities	Utility share allocated to companies on basis of sales shares	Utility share allocated to companies on basis of emissions shares	E.ON US share of Utility sales	E.ON US share of Utility emissions	E.ON US allocation	E.ON US emissions	E.ON US allowance shortfall	Free allowance allocation to E.ON US	
2012	-3%	4,770	40%	3%	37%	50%	50%	0.9%	1.4%	20.3	35.5	15.3	57%
2013		4,666	40%	3%	37%	50%	50%	0.9%	1.4%	19.8	35.9	16.1	55%
2014		5,058	40%	3%	37%	50%	50%	0.9%	1.4%	21.4	36.3	14.9	59%
2015		4,942	40%	3%	37%	50%	50%	0.9%	1.4%	20.9	36.6	15.8	57%

2016		5,391	40%	3%	37%	50%	50%	0.9%	1.4%	22.7	37.0	14.3	61%
2017		5,261	40%	3%	37%	50%	50%	0.9%	1.4%	22.2	37.4	15.3	59%
2018		5,132	40%	3%	37%	50%	50%	0.9%	1.4%	21.6	37.9	16.3	57%
2019		5,002	40%	3%	37%	50%	50%	0.9%	1.4%	21.0	38.4	17.4	55%
2020	-20%	4,873	40%	3%	37%	50%	50%	0.9%	1.4%	20.5	39.0	18.5	53%
2021		4,739	40%	3%	37%	50%	50%	0.9%	1.4%	19.9	39.5	19.6	50%
2022		4,605	40%	3%	37%	50%	50%	0.9%	1.4%	19.3	40.0	20.7	48%
2023		4,471	40%	3%	37%	50%	50%	0.9%	1.4%	18.8	40.5	21.8	46%
2024		4,337	40%	3%	37%	50%	50%	0.9%	1.4%	18.2	41.0	22.9	44%
2025		4,203	40%	3%	37%	50%	50%	0.9%	1.4%	17.6	41.6	24.0	42%
2026		4,069	38%	3%	35%	50%	50%	0.9%	1.4%	16.3	42.1	25.7	39%
2027		3,935	37%	3%	34%	50%	50%	0.9%	1.4%	15.1	42.6	27.5	36%
2028		3,801	35%	3%	32%	50%	50%	0.9%	1.4%	14.0	43.2	29.2	32%
2029		3,667	34%	3%	31%	50%	50%	0.9%	1.4%	12.9	43.7	30.9	29%
2030		3,533	32%	3%	29%	50%	50%	0.9%	1.4%	11.8	44.3	32.5	27%

Waxman-Markey with Boucher amendment

	US emissions reduction target (vs 2005)	US emissions cap (economy-wide) (million tonnes)	Free allocation to power sector	Reserved for merchant plant	Share of power sector allocation to Utilities	Utility share allocated to companies on basis of sales shares	Utility share allocated to companies on basis of emissions shares	E.ON US share of Utility sales	E.ON US share of Utility emissions	E.ON US allocation	E.ON US emissions	E.ON US allowance shortfall	Free allowance allocation to E.ON US
2012	0%	4,987	40%	3%	37%	50%	50%	0.9%	1.4%	21.2	35.5	14.3	60%
2013		5,025	40%	3%	37%	50%	50%	0.9%	1.4%	21.3	35.9	14.6	59%
2014		5,912	40%	3%	37%	50%	50%	0.9%	1.4%	25.0	36.3	11.3	69%
2015		5,855	40%	3%	37%	50%	50%	0.9%	1.4%	24.7	36.6	11.9	68%
2016		5,797	40%	3%	37%	50%	50%	0.9%	1.4%	24.4	37.0	12.6	66%
2017		5,740	40%	3%	37%	50%	50%	0.9%	1.4%	24.2	37.4	13.2	65%
2018		5,625	40%	3%	37%	50%	50%	0.9%	1.4%	23.7	37.9	14.3	62%
2019		5,510	40%	3%	37%	50%	50%	0.9%	1.4%	23.2	38.4	15.3	60%
2020	-6%	5,395	40%	3%	37%	50%	50%	0.9%	1.4%	22.7	39.0	16.3	58%
2021		5,176	40%	3%	37%	50%	50%	0.9%	1.4%	21.7	39.5	17.7	55%
2022		4,956	40%	3%	37%	50%	50%	0.9%	1.4%	20.8	40.0	19.2	52%
2023		4,736	40%	3%	37%	50%	50%	0.9%	1.4%	19.9	40.5	20.6	49%
2024		4,516	40%	3%	37%	50%	50%	0.9%	1.4%	18.9	41.0	22.1	46%
2025		4,297	40%	3%	37%	50%	50%	0.9%	1.4%	18.0	41.6	23.6	43%
2026		4,077	40%	3%	37%	50%	50%	0.9%	1.4%	17.1	42.1	25.0	41%
2027		3,857	40%	3%	37%	50%	50%	0.9%	1.4%	16.1	42.6	26.5	38%
2028		3,637	40%	3%	37%	50%	50%	0.9%	1.4%	15.2	43.2	28.0	35%

2029	3,418	40%	3%	37%	50%	50%	0.9%	1.4%	14.3	43.7	29.5	33%
2030	3,198	40%	3%	37%	50%	50%	0.9%	1.4%	13.3	44.3	30.9	30%

Waxman-Markey current draft (5/13/09)

	US emissions reduction target (vs 2005)	US emissions cap (economy-wide) (million tonnes)	Free allocation to power sector	Reserved for merchant plant	Share of power sector allocation to Utilities	Utility share allocated to companies on basis of sales shares	Utility share allocated to companies on basis of emissions shares	E.ON US share of Utility sales	E.ON US share of Utility emissions	E.ON US allocation	E.ON US emissions	E.ON US allowance shortfall	Free allowance allocation to E.ON US
2012	-3%	4,770	35%	0%	35%	100%	0%	0.9%	1.4%	15.2	35.5	20.4	43%
2013		4,666	34%	0%	34%	100%	0%	0.9%	1.4%	14.4	35.9	21.5	40%
2014		5,058	33%	0%	33%	100%	0%	0.9%	1.4%	15.1	36.3	21.2	42%
2015		4,942	32%	0%	32%	100%	0%	0.9%	1.4%	14.3	36.6	22.3	39%
2016		5,391	31%	0%	31%	100%	0%	0.9%	1.4%	15.1	37.0	21.9	41%
2017		5,261	31%	0%	31%	100%	0%	0.9%	1.4%	14.3	37.4	23.2	38%
2018		5,132	30%	0%	30%	100%	0%	0.9%	1.4%	13.5	37.9	24.5	36%
2019		5,002	29%	0%	29%	100%	0%	0.9%	1.4%	12.7	38.4	25.7	33%
2020	-17%	5,056	28%	0%	28%	100%	0%	0.9%	1.4%	12.5	39.0	26.6	32%
2021		4,739	27%	0%	27%	100%	0%	0.9%	1.4%	11.3	39.5	28.2	29%
2022		4,605	26%	0%	26%	100%	0%	0.9%	1.4%	10.6	40.0	29.5	26%
2023		4,471	25%	0%	25%	100%	0%	0.9%	1.4%	9.9	40.5	30.6	24%
2024		4,337	24%	0%	24%	100%	0%	0.9%	1.4%	9.2	41.0	31.8	22%
2025		4,203	23%	0%	23%	100%	0%	0.9%	1.4%	8.6	41.6	33.0	21%
2026		4,069	22%	0%	22%	100%	0%	0.9%	1.4%	8.0	42.1	34.1	19%
2027		3,935	22%	0%	22%	100%	0%	0.9%	1.4%	7.4	42.6	35.2	17%
2028		3,801	21%	0%	21%	100%	0%	0.9%	1.4%	6.8	43.2	36.4	16%
2029		3,667	20%	0%	20%	100%	0%	0.9%	1.4%	6.3	43.7	37.5	14%
2030		3,533	19%	0%	19%	100%	0%	0.9%	1.4%	5.8	44.3	38.5	13%

Residential Bill Impacts of Carbon Tax and Renewable Energy Initiatives

Typical residential bill (\$/month for 1,000 kWh consumption)

Assumed CO2 allowance price (\$/tonne) **\$20**

Waxman-Markey ("KY's Carbon Footprint")					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		0.0	0.0	0.0	0.0
Free allowances as % of requirement		0%	0%	0%	0%
Typical bill (\$/month)	Today	2012	2016	2020	2024
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$20/tonne		20	20	20	20
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	104	118	137	151
Rate increase from today		39%	57%	83%	101%

Assumptions

Emissions based on E.ON US IRP load forecast: no offsets for efficiency gains or for RPS program
No free allowances (100% auction)

Waxman-Markey original with EEI 50-50 implementation					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		20.3	22.7	20.5	17.3
Free allowances as % of requirement		57%	61%	53%	42%
Typical bill (\$/month)	Today	2012	2016	2020	2024
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$20/tonne		9	8	9	12
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	93	105	126	143
Rate increase from today		23%	41%	69%	90%

Assumptions

Emissions based on E.ON US IRP load forecast: no offsets for efficiency gains or for RPS program
Based on original Waxman-Markey economy-wide CO2 allowance caps
Power sector share of allowances held at 40% of economy total through 2025, then phased out over following 25 years (to full auction)
8% share of power sector allocation reserved for merchant coal plant
50% of utility allowances allocated according to company shares of emissions (fixed historic share)
50% of utility allowances allocated according to company shares of sales (current shares in each year)

Waxman-Markey with Boucher amendment					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		21.2	24.4	22.7	18.0
Free allowances as % of requirement		60%	66%	58%	44%
Typical bill (\$/month)	Today	2012	2016	2020	2024
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$20/tonne		8	7	8	11
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	92	105	125	142
Rate increase from today		23%	40%	67%	90%

Assumptions

Emissions based on E.ON US IRP load forecast: no offsets for efficiency gains or for RPS program
Waxman-Markey economy-wide CO2 allowance caps replaced by Dingell-Boucher economy-wide allowance caps
Power sector share of allowances held at 40% of economy total throughout
8% share of power sector allocation reserved for merchant coal plant
50% of utility allowances allocated according to company shares of emissions (fixed historic share)
50% of utility allowances allocated according to company shares of sales (current shares in each year)

Waxman-Markey current draft (5/13/09)					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		15.2	15.1	11.6	9.1
Free allowances as % of requirement		43%	41%	30%	22%
Typical bill (\$/month)	Today	2012	2016	2020	2024
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$20/tonne		11	12	14	16
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	95	110	131	147
Rate increase from today		27%	46%	75%	95%

Assumptions

Emissions based on E.ON US IRP load forecast. no offsets for efficiency gains or for RPS program

Original Waxman-Markey economy-wide CO2 allowance caps - except for 2020, where less stringent reduction (vs 2005) applies (17% vs 20% in original)

Power sector share of allowances set at 35% in 2012 - entirely to LDCs (no merchant share)

LDC allocation declines by approx 1% per year (to full auction by 2050)

100% of LDC allowance allocated to companies according to shares of total sales (current shares in each year)

No trade-offs between (i) CO2 reduction targets & allowance allocations and (ii) RPS targets

Residential Bill Impacts of Carbon Tax and Renewable Energy Initiatives

Typical residential bill (\$/month for 1,000 kWh consumption)

Assumed CO2 allowance price (\$/tonne) **\$40**

As the CO2 price increases, the value of the allocated allowances is magnified.

For example, at \$20/tonne, the 2012 residential bill increase is about 9% less with the allowance allocation in the current draft-Waxman Markey compared to the original Waxman Markey 100% auction. But at \$40/tonne, the same bill increase is 14% less in the current draft-Waxman Markey compared to the 100% auction scenario.

The allocated allowances are more valuable as the price of CO2 rises.

Waxman-Markey ("KY's Carbon Footprint")					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		0.0	0.0	0.0	0.0
Free allowances as % of requirement		0%	0%	0%	0%
Typical bill (\$/month)	Today				
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$40/tonne		40	40	40	40
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	124	138	157	171
Rate increase from today		65%	84%	109%	128%

Assumptions

*Emissions based on E.ON US IRP load forecast: no offsets for efficiency gains or for RPS program
No free allowances (100% auction)*

Waxman-Markey original with EEI 50-50-50 implementation					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		20.3	22.7	20.5	17.3
Free allowances as % of requirement		57%	61%	53%	42%
Typical bill (\$/month)	Today				
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$40/tonne		17	15	19	23
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	101	113	136	154
Rate increase from today		35%	51%	81%	105%

Assumptions

*Emissions based on E.ON US IRP load forecast. no offsets for efficiency gains or for RPS program
Based on original Waxman-Markey economy-wide CO2 allowance caps
Power sector share of allowances held at 40% of economy total through 2025; then phased out over following 25 years (to full auction)
8% share of power sector allocation reserved for merchant coal plant
50% of utility allowances allocated according to company shares of emissions (fixed historic share)
50% of utility allowances allocated according to company shares of sales (current shares in each year)*

Waxman-Markey with Boucher amendment					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		21.2	24.4	22.7	18.0
Free allowances as % of requirement		60%	66%	58%	44%
Typical bill (\$/month)	Today				
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$40/tonne		16	14	17	22
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	100	112	134	153
Rate increase from today		33%	49%	78%	105%

Assumptions

Emissions based on E.ON US IRP load forecast: no offsets for efficiency gains or for RPS program
Waxman-Markey economy-wide CO2 allowance caps replaced by Dingell-Boucher economy-wide allowance caps
Power sector share of allowances held at 40% of economy total throughout
8% share of power sector allocation reserved for merchant coal plant
50% of utility allowances allocated according to company shares of emissions (fixed historic share)
50% of utility allowances allocated according to company shares of sales (current shares in each year)

Waxman-Markey current draft (5/13/09)					
		2012	2016	2020	2024
E.ON US CO2 emissions (million tonnes)		35.5	37.0	39.0	41.0
Allowances allocated 'free' (million tonnes)		15.2	15.1	11.6	9.1
Free allowances as % of requirement		43%	41%	30%	22%
Typical bill (\$/month)	Today				
LG&E/KU	75	82	92	104	117
+ Carbon Tax @ \$40/tonne		23	24	28	31
+ Federal Renewables Proposal		2	6	13	14
Total bill	75	107	122	145	162
Rate increase from today		42%	62%	93%	116%

Assumptions

Emissions based on E.ON US IRP load forecast: no offsets for efficiency gains or for RPS program
Original Waxman-Markey economy-wide CO2 allowance caps - except for 2020, where less stringent reduction (vs 2005) applies (17% vs 20% in original)
Power sector share of allowances set at 35% in 2012 - entirely to LDCs (no merchant share)
LDC allocation declines by approx 1% per year (to full auction by 2050)
100% of LDC allowance allocated to companies according to shares of total sales (current shares in each year)
No trade-offs between (i) CO2 reduction targets & allowance allocations and (ii) RPS targets

2012

2012: Estimated Increase in Annual Customer Bills - CO2 only (\$ millions)

	Cost @ \$20/t CO ₂	% Increase	Cost @ \$30/t CO ₂	% Increase	Cost @ \$40/t CO ₂	% Increase
Waxman-Markey ("KY's Carbon Footprint" E.ON US, May 7, 2009) (0% free allowance allocation)						
Residential	208	27%	313	41%	417	54%
Industrial	200	44%	300	66%	400	87%
Commerical/Other	216	29%	324	43%	431	58%
Waxman-Markey original with EEI 50-50-50 implementation (57% free allowance allocation)						
Residential	90	12%	134	17%	179	23%
Industrial	86	19%	129	28%	172	38%
Commerical/Other	93	12%	139	19%	185	25%
Waxman-Markey with Boucher amendment (60% free allowance allocation)						
Residential	83	11%	125	16%	167	22%
Industrial	80	17%	120	26%	160	35%
Commerical/Other	86	12%	129	17%	173	23%
Waxman-Markey current draft (5/13/09) (43% free allowance allocation)						
Residential	119	15%	178	23%	238	31%
Industrial	114	25%	171	37%	228	50%
Commerical/Other	123	16%	184	25%	246	33%

Below is an additional sheet for 2012 showing the combined impact of CO2 and RPS.
 However, the RPS impact is minimal at this point since we are assuming that the 15% RPS is not mandated until 2020.

2012: Estimated Increase in Annual Customer Bills - CO2 + RPS (\$ millions)

	Cost @ \$20/t CO ₂	% Increase	Cost @ \$30/t CO ₂	% Increase	Cost @ \$40/t CO ₂	% Increase
Waxman-Markey ("KY's Carbon Footprint" E.ON US, May 7, 2009) (0% free allowance allocation)						
Residential	232	30%	336	44%	441	57%
Industrial	223	49%	323	71%	423	92%
Commerical/Other	240	32%	348	46%	456	61%
Waxman-Markey original with EEI 50-50-50 implementation (57% free allowance allocation)						
Residential	113	15%	158	21%	203	26%
Industrial	109	24%	152	33%	195	43%
Commerical/Other	117	16%	164	22%	210	28%
Waxman-Markey with Boucher amendment (60% free allowance allocation)						
Residential	107	14%	149	19%	190	25%
Industrial	103	22%	143	31%	183	40%
Commerical/Other	111	15%	154	21%	197	26%
Waxman-Markey current draft (5/13/09) (43% free allowance allocation)						
Residential	142	19%	202	26%	261	34%
Industrial	137	30%	194	42%	251	55%
Commerical/Other	147	20%	209	28%	270	36%

Notes:

1. Costs are determined based on the 2012 projected customer class share of total LG&E/KU Retail Sales
2. Percentage increases were calculated using 2008 rates applied to 2012 projected sales

2020

2020 - Estimated Increase in Annual Customer Bills - CO2 only \$ millions						
	Cost @ \$20/t CO ₂	% Increase	Cost @ \$30/t CO ₂	% Increase	Cost @ \$40/t CO ₂	% Increase
Waxman-Markey ("KY's Carbon Footprint" E.ON US, May 7, 2009) (0% free allowance allocation)						
Residential	208	27%	313	41%	417	54%
Industrial	200	44%	300	66%	400	87%
Commerical/Other	216	29%	324	43%	431	58%
Waxman-Markey original with EEI 50-50-50 implementation (53% free allowance allocation)						
Residential	98	13%	147	19%	196	25%
Industrial	94	21%	141	31%	188	41%
Commerical/Other	101	14%	152	20%	203	27%
Waxman-Markey with Boucher amendment (58% free allowance allocation)						
Residential	88	11%	131	17%	175	23%
Industrial	84	18%	126	28%	168	37%
Commerical/Other	91	12%	136	18%	181	24%
Waxman-Markey current draft (5/13/09) (30% free allowance allocation)						
Residential	146	19%	219	28%	292	38%
Industrial	140	31%	210	46%	280	61%
Commerical/Other	151	20%	226	30%	302	40%

2020 - Estimated Increase in Annual Customer Bills - CO2 + RPS \$ millions						
	Cost @ \$20/t CO ₂	% increase	Cost @ \$30/t CO ₂	% Increase	Cost @ \$40/t CO ₂	% Increase

	Cost @ \$20/t CO ₂	% increase	Cost @ \$30/t CO ₂	% Increase	Cost @ \$40/t CO ₂	% Increase
Waxman-Markey ("KY's Carbon Footprint" E.ON US, May 7, 2009) (0% free allowance allocation)						
Residential	376	49%	480	62%	585	76%
Industrial	361	79%	461	101%	561	123%
Commerical/Other	389	52%	497	66%	605	81%
Waxman-Markey original with EEI 50-50-50 implementation (53% free allowance allocation)						
Residential	266	35%	315	41%	364	47%
Industrial	255	56%	302	66%	349	76%
Commerical/Other	275	37%	326	43%	376	50%
Waxman-Markey with Boucher amendment (58% free allowance allocation)						
Residential	255	33%	299	39%	343	45%
Industrial	245	54%	287	63%	329	72%
Commerical/Other	264	35%	309	41%	355	47%
Waxman-Markey current draft (5/13/09) (30% free allowance allocation)						
Residential	314	41%	387	50%	459	60%
Industrial	301	66%	371	81%	441	96%
Commerical/Other	325	43%	400	53%	476	64%

Notes:

1. Costs are determined based on the 2020 projected customer class share of total LG&E/KU Retail Sales
2. Percentage increases were calculated using 2008 rates applied to 2020 projected sales

Summary of Waxman-Markey 5-15-09 Draft

GHG Cap-and-Trade Program. Waxman-Markey sets these targets for GHG reductions, relative to other recent proposals:

<i>Year</i>	<i>Waxman-Markey (5-15-09)</i>	<i>USCAP</i>	<i>Dingell-Boucher</i>
2012	3% below 2005 levels	3% below to 2% above 2005 levels	n/a
2020	17% below 2005 levels	14-10% below 2005 levels by 2020	6% below 2005 levels by 2020
2030	42% below 2005 levels	42% below 2005 levels by 2030	44% below 2005 levels by 2030
2050	83% below 2005 levels	80% below 2005 levels by 2050	80% below 2005 levels by 2050

Waxman-Markey offers **no safety valve**; required allowance purchases will be made at market prices. Waxman-Markey does create a Strategic Reserve for the purpose of creating a cushion should prices rise faster than suggested. The reserve is created using a relatively inconsequential percentage of allowances taken from future years in the base allocation pool.

From 2012-2029, the average allocation to LDCs is 30%, with the remainder going to other generators (merchant coal, QFs and IPPs).

<i>Year</i>	<i>Electric Sector</i>	<i>Other generators share</i>	<i>LDC share</i>
2012-2013	43.75%	4.37%	39.37%
2014-2015	38.89%	3.89%	35.0%
2016-2025	35%	3.5%	31.5%
2026	28%	2.8%	25.2%
2027	21%	2.1%	18.9%
2028	14%	1.4%	12.6%
2029	7%	0.7%	6.3%

Under both Waxman-Markey and the EEI proposal, 50% of allowances are allocated based on the LDC's share of nationwide emissions and 50% are allocated based on the LDC's share of nationwide sales. An LDC may select any 3 consecutive years between 1999 and 2008 for each base period (with 2006 to 2008 as the default). The base period for sales is updated every 3 years by the product of an LDC's average annual customer deliveries during its selected base period times the number of its customers in the most recent year in which the formula is updated.

Combined Efficiency and Renewable Electricity Standard (CERES).¹ The draft defines "renewable resources" as electricity generated from (1) a renewable energy resource: wind, solar, geothermal, renewable biomass, biogas and biofuels derived exclusively from renewable biomass, marine and hydrokinetic, and qualified hydropower (*generation achieved from*

¹ Components of which were previously separated into a Renewable Portfolio Standard (RPS) and an Energy Efficiency Resource Standard (EERS).

increased efficiency or additions made after January 1, 1992, to a hydroelectric facility placed in service before that date or to generating capacity added to a dam that did not previously have the capacity to generate electricity prior to that date) or (2) other qualifying energy resources: landfill and wastewater treatment gas, coal mine methane and qualified waste to energy.

One renewable energy credit (REC) is awarded for each MWh of renewable energy generated by each generator after December 31, 2011. Retail electricity suppliers shall submit RECs to FERC for the annual percentage of the retail electric supplier's retail electric energy sold to customers (*excluding hydropower other than qualified hydropower, electricity generated from a nuclear generating unit placed in service after the date of enactment, and the proportion of electricity generated by a fossil fuel-generating unit that is equal to the proportion of greenhouse gases produced by the unit that are captured and sequestered*):

Year	Required Annual Percentage of Retail Sales from Renewable Energy
2012	6.0
2013	6.0
2014	9.5
2015	9.5
2016	13.0
2017	13.0
2018	16.5
2019	16.5
2020 – 2039	20.0

One-fifth of these percentages can be met with energy efficiency savings from utility programs instead of from renewable generation (i.e., the 2020 target can be met with 15% renewables and 5% energy efficiency savings). Upon petition and approval of governor's request, up to two-fifths of these percentages can be met with energy efficiency savings (i.e., the 2020 target can be met with 12% renewables and 8% energy efficiency savings).

Alternative compliance payments (ACP) are \$25/MWh.² Covered entities will only pay the ACP if they can't buy enough RECs in the market to satisfy their mandate. ACPs are to be paid directly to the state in which the retail electricity supplier is located and are to be used exclusively for deploying renewable technologies and cost-effective energy efficiency measures and programs.

Other. Waxman-Markey addresses various issues beyond renewables and GHG reduction.

- Smart Grid Advancement. "Not later than one year after the date of enactment of this Act, load-serving entities, or States, shall determine and publish peak demand reduction

² 2010 dollars adjusted for inflation

goals.” The draft adds that such goals could also be established by a “regional entity for a larger region that shares a common system peak demand and for which peak demand reduction measures would offer regional benefit.” The minimum percentage of peak demand reduction would be those “...that are realistically achievable with an aggressive effort to deploy Smart Grid and peak demand reduction technologies and methods.”

There are no penalties for non-compliance. Rather, FERC will provide an annual report to Congress “on compliance with this Act and success in meeting applicable peak demand reduction goals and, as appropriate, shall make recommendations as to how to increase peak demand reduction efforts.”

- Transmission. FERC must adopt national grid planning principles to achieve national policy goals, including facilitating the deployment of renewable and other zero-carbon energy, ensuring reliability, reducing congestion, and ensuring cyber-security. Planning should take into account all significant demand-side and supply-side options, including energy efficiency, smart grid, electricity storage and underground transmission technologies, and conventional electric transmission capacity and corridors. Planning entities³ are to submit plans to FERC within 18 months and are to build on subregional requirements and plans. FERC is to encourage the planning entities to coordinate and harmonize their plans, and is to assist the planning entities to resolve any conflicts between the plans. FERC is to review the plans, make recommendations, and convene multi-regional meetings to discuss the plans and to resolve any conflicts. FERC is to recommend how to resolve the conflicts.
- Jurisdiction Over Markets. The President shall delegate responsibility for regulation of allowance derivative markets to relevant agencies based on advice from an interagency working group to include EPA. Agencies regulating an allowance derivative shall have the same enforcement authority as the Commodity Futures Trading Commission has for matters under its jurisdiction. Until and unless regulations provide otherwise, all derivative transactions must occur on regulated exchanges, effectively barring customized OTC derivative transactions common in the existing sulfur dioxide (SO₂) and nitrogen oxide (NO_x) markets.
- Carbon Capture and Sequestration (CCS). This section incorporates the provisions of Rep. Boucher’s CCS wires charge bill, H.R. 1689, which authorizes an assessment on deliveries of fossil fuel-fired electricity to retail consumers to create a \$10-billion fund to support demonstration and early deployment of commercial-scale CCS projects over a 10-year period. The annual fee per kwh for coal-generated electricity is \$0.00043, natural

³ REGIONAL PLANNING ENTITIES—Not later than 3 months after the date of adoption by the Commission of national electricity grid planning principles, entities that conduct or may conduct transmission planning pursuant to State or Federal law or regulation, including States, entities designated by States, public utility transmission providers, operators and owners, regional organizations, and electric utilities, and that are willing to incorporate the national electricity grid planning principles adopted by the Commission in their electric grid planning, shall identify themselves and the regions for which they propose to develop plans to the Commission.

gas is \$0.00022, and oil is \$0.00032. (This cost is an addition to CO2 allowance purchases incurred from Waxman-Markey's cap-and-trade program). A Carbon Storage Research Corporation, an affiliate of EPRI and not an agent of the U.S. government, is created to competitively award funds to projects. This section is very similar to a House Energy and Commerce Committee Staff Discussion Draft released in September 2008 that reflected the input of stakeholders, and includes new language for assessing the charge within the Electric Reliability Council of Texas.

I. Estimated E.ON U.S. Customer Bills Under a Full CO2 Allowance Auction - 2012

2012 Estimated Average Increases - Initial Waxman-Markey (May 7, 2009)						
Customer Class	\$20 a ton CO2		\$30 a ton CO2		\$40 a ton CO2	
	(\$ Millions)	% Increase	(\$ Millions)	% Increase	(\$ Millions)	% Increase
Residential	208	27%	313	41%	417	54%
Industrial	200	44%	300	66%	400	87%
Commercial/Other	216	29%	324	43%	431	58%

A cap-and-trade program with full auction of allowances.

Notes:

1. Costs are determined based on the 2012 projected customer class share of total LG&E/KU Retail Sales
2. Percentage increases were calculated using 2008 rates applied to 2012 projected sales

II. Estimated E.ON U.S. Customer Bills Under a Modified CO2 Allowance Auction - 2012

2012 Estimated Average Increases - Waxman-Markey May 15, 2009						
Customer Class	\$20 a ton CO2		\$30 a ton CO2		\$40 a ton CO2	
	(\$ Millions)	% Increase	(\$ Millions)	% Increase	(\$ Millions)	% Increase
Residential	85	11%	128	17%	171	22%
Industrial	82	18%	123	27%	164	36%
Commercial/Other	88	12%	133	18%	177	24%

A cap-and-trade program with free allowance of 59% to utilities.

Notes:

1. Costs are determined based on the 2012 projected customer class share of total LG&E/KU Retail Sales
2. Percentage increases were calculated using 2008 rates applied to 2012 projected sales

III. Estimated E.ON U.S. Customer Bills Under a Full CO2 Allowance Auction - & Renewable Portfolio Standard - 2020

2020 Estimated Average Increases - Initial Waxman-Markey (May 7, 2009) + 15%RPS						
Customer Class	\$20 a ton CO2		\$30 a ton CO2		\$40 a ton CO2	
	(\$ Millions)	% Increase	(\$ Millions)	% Increase	(\$ Millions)	% Increase
Residential	376	49%	480	62%	585	76%
Industrial	361	79%	461	101%	561	123%
Commercial/Other	389	52%	497	66%	605	81%

A cap-and-trade program with full auction of allowances.

Notes:

1. Costs are determined based on the 2020 projected customer class share of total LG&E/KU Retail Sales
2. Percentage increases were calculated using 2008 rates applied to 2020 projected sales

IV. Estimated E.ON U.S. Customer Bills Under a Modified CO2 Allowance Auction & Renewable Portfolio Standard - 2020

2020 Estimated Average Increases - Waxman-Markey May 15, 2009						
Customer Class	\$20 a ton CO2 (\$ Millions)	% Increase	\$30 a ton CO2 (\$ Millions)	% Increase	\$40 a ton CO2 (\$ Millions)	% Increase
Residential	290	38%	346	45%	401	52%
Industrial	279	61%	332	72%	385	84%
Commercial/Other	301	40%	358	48%	415	55%

A cap-and-trade program with free allowances of 47% to utilities.

Notes:

1. Costs are determined based on the 2020 projected customer class share of total LG&E/KU Retail Sales
2. Percentage increases were calculated using 2008 rates applied to 2020 projected sales
3. Assumes that the Utilities meet the CERES target (20% of sales covered) through the combination of (i) a renewables portfolio (15%); (ii) efficiency savings (2%); and (iii) Alternative Compliance Payments (3%)

Alternatively, the Utilities could meet the CERES (RPS/efficiency) target entirely through purchase of Alternative Compliance Payments (ACPs), set in the Bill at \$25/MWh in 2010 (and subsequently indexed)

Customer Class	Cost @ \$20 a ton CO2 (\$ Millions)	% Increase	Cost @ \$30 a ton CO2 (\$ Millions)	% Increase	Cost @ \$40 a ton CO2 (\$ Millions)	% Increase
Residential	184	24%	239	31%	294	38%
Industrial	176	39%	229	50%	282	62%
Commercial/Other	190	25%	247	33%	304	41%

Bellar, Lonnie

From: Yussman, Eric
Sent: Thursday, June 11, 2009 4:41 PM
To: Beer, Mike; Siemens, George
Cc: Sinclair, David; Bellar, Lonnie; Voyles, John; Schram, Chuck; Thomson, Robert
Subject: FW: Bingman RPS

Senator Bingaman's proposed Renewable Portfolio Standard (RPS) would require utilities to use renewable energy to supply 12% of their electricity sales by 2020. Energy efficiency savings may satisfy a portion of the annual targets, and "alternative compliance payments" offer another means of compliance. Bingaman's proposal, which addresses only RPS requirements and not CO2 cap-and-trade, is part of a comprehensive energy bill the Senate Energy and Natural Resources Committee is crafting.

- For two reasons, Senator Bingaman's RPS would have a lesser impact on E.ON U.S. rates than Waxman-Markey's proposed RPS:

1) Weaker annual mandates

Waxman-Markey		Bingaman	
Years	Minimum Annual Percentage	Years	Minimum Annual Percentage
2012-2012	6.0	2011-2013	3.0
2014-2015	9.5	2014-2016	6.0
2016-2017	13.0	2017-2018	9.0
2018-2019	16.5	2019-2020	12.0
2020-2039	20.0	2021-2039	15.0

2) Lower Alternative Compliance Payment (ACP)

Bingaman's ACP is \$21/MWh rather than \$25/MWh as in Waxman-Markey

- Bingaman has an "off-ramp" unavailable in Waxman-Markey...

"RATEPAYER PROTECTION.—Effective beginning June 1, 2010, and not later than June 1 of each year thereafter, an electric utility may petition the Secretary to waive, for the following compliance year, all or part of the requirements...in order to limit the rate impact of the incremental cost of compliance of the electric utility to not more than 4% per retail customer in any year."

For E.ON U.S. the cost of meeting Bingaman's 2020 RPS target would require rate increases by that date in the range of 15-25% (*renewables build-out*) or 5-10% (*ACP*) relative to current rates. A 4% cap on annual rate increases would potentially allow for a substantially greater (48%) cumulative increase in rates by 2020 - and so the inclusion of a cap set at this level will not be effective in limiting E.ON U.S. RPS-related rate increases. RPS mandates would have to be significantly more stringent before this cap is effective. Current state caps (limits on RPS-related annual rate increases) typically range between 0.5%-2.0%.

- The attachment shows a comparison of (E.ON U.S.) rate impacts under the two alternative proposals (Bingaman and Waxman-Markey). We assume that the Waxman-Markey's cap-and-trade regime applies regardless of the choice of RPS proposal; the Senate Energy and Natural Resources Committee has not yet proposed a cap-and-trade program.



Rate impacts by class with Bin...

Impact on E.ON U.S. customer bills in 2020

Compliance through renewables build-out

2020	Waxman-Markey CO2 regime (\$20/t) + Waxman-Markey RPS		Waxman-Markey CO2 regime (\$20/t) + Bingaman RPS	
	Increase (\$ million)	% increase in bill	Increase (\$ million)	% increase in bill
Residential	290	38%	222	29%
Industrial	279	61%	213	47%
Commercial/Other	301	40%	230	31%

Compliance through Alternative Compliance Payment (ACP)

2020	Waxman-Markey CO2 regime (\$20/t) + Waxman-Markey RPS		Waxman-Markey CO2 regime (\$20/t) + Bingaman RPS	
	Increase (\$ million)	% increase in bill	Increase (\$ million)	% increase in bill
Residential	184	24%	145	19%
Industrial	176	39%	139	30%
Commercial/Other	190	25%	150	20%

Notes:

- 1 *Bingaman RPS proposal has no impact on CO2 program costs. Above estimates allow for 47% 'free' allocation of CO2 allowances in 2020 per Waxman-Markey provisions*
- 2 *It is assumed that the E.ON utilities achieve ~2% load reduction through (incremental) energy efficiency under either RPS proposal, reducing the compliance target by this amount (e.g. from 20% to 18% in the case of the Waxman RPS, or from 12% to 10% in the case of the Bingaman RPS)*

Summary of NAM's Waxman-Markey Analysis

On August 12, the National Association of Manufacturers (NAM) and the American Council for Capital Formation (ACCF) released a joint Waxman-Markey analysis that included a Kentucky impact assessment focusing on energy prices, industrial output, job losses, and household income. The ACCF/NAM study's projected CO₂ prices (*\$48-\$61 per ton by 2020 and \$123-\$159 per ton by 2030*), more than triple the Environmental Protection Agency's projections (*\$16 by 2020 and \$27 by 2030*) from its June Waxman-Markey analysis.

It is unclear to what extent NAM may be factoring other indirect impacts into its results. NAM has been unresponsive to our requests for further information on their methodology and assumptions. However, we assume that NAM has ascribed certain benefits to households, similar to the Congressional Budget Office review of Waxman-Markey, in their computation of overall impacts.

Energy prices. NAM forecasts an increase in Kentucky (residential) electricity prices by 2030 within the range of 45% to 64% versus 2007. The projected increases by 2020 and 2025 are far lower, 0-3% by 2020 and 4-6% by 2025, but no detail is provided to support the conclusions.

A separate study from March 2009 ("Analysis of the Electricity Price Impacts of Alternative Carbon Emission Cap-And-Trade Programs in the Midwest") by Christensen Associates Energy Consulting produced a very different result: electricity prices in Indiana (which has a similar share of coal-fired generation to Kentucky) were projected to increase 25-40% from 2005 to 2020, assuming a \$45-\$65 per ton CO₂ price. In the view of one of the Christensen report authors, *"NAM's forecast electricity price impacts for 2020 and 2025 are unrealistically low, while those for 2030 may be reasonable but are on the low side of the range of reasonableness."*

E.ON U.S. calculations on the impact of Waxman-Markey consider only the direct effect of a CO₂ emission cost adder to generation cost – assuming direct pass-through of the cost of net purchases of emission allowances (i.e., after allowing for an allocation of free allowances as prescribed in the draft legislation). Based on E.ON U.S. shares of total electric utility CO₂ emissions and of total electricity sales, the company anticipates an allocation from the pool of 'free' allowances available to the electric utility sector equivalent to 47% of its requirements in 2020 (down from 59% in 2012). At a cost of \$20 per ton for the 53% of uncovered emissions in 2020, the increase in residential rates – relative to 2008 – would be almost 15% (consistent with the 'Carbon Footprint' presentation). This increase relates to incremental CO₂ costs only; further increases would be necessary to achieve mandatory RPS targets.

E.ON U.S. has not attempted to estimate the indirect impacts of CO₂ legislation on household income associated with any reallocation of productive resources, or redistribution of income, resulting from cap-and-trade legislation.

Job losses, reduced industrial output, lower household incomes. NAM forecasts Kentucky job losses between 25,000 - 35,000 by 2030. Using EPA estimates of the national impact of the 2008 Lieberman-Warner bill, the E.ON U.S. paper "Kentucky-Specific Implications of Green

September 4, 2009

Economy Policy" (February 2009) assumed a significantly greater impact: 114,000 job losses (the CO₂ price in the Lieberman-Warner analysis was within NAM's high CO₂ price range of \$123-\$159 by 2030). Again, further information on NAM's methodology is necessary to understand this difference.

NAM also forecasts that Kentucky household incomes will fall by up to \$176 per year by 2020 and by up to \$980 by 2030. NAM concludes – consistent with the E.ON 'Green Economy' analysis – that most of Kentucky's major economic sectors will be negatively affected by emission caps. Manufacturing output overall is projected to be around 6% lower than it otherwise would be by 2030, while the impact is even greater in energy-intensive industries (12-14% output loss), transportation manufacturing (down 7-8%) and metallic products manufacturing (down 25-29%). Coal production is projected to be down over 75% by 2030, and electricity generation down by 15-19%, relative to a 'no legislation' scenario.