

A smarter approach to environmental improvements without risking economic and energy security



Paul Loeffelman
phloeffelman@aep.com

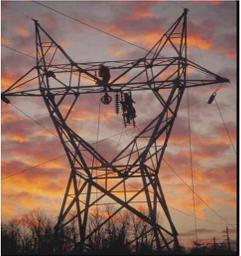


SSEB 2011 Briefing to Southern Legislators
July 16, 2011

American Electric Power



One of the largest U.S. electricity generators



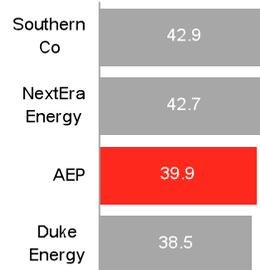
The largest U.S. electricity transmitter



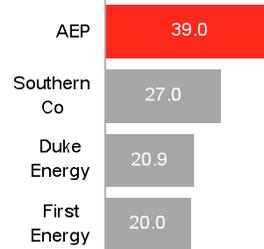
One of the largest U.S. electricity distributors



Generation owned¹ (GW)



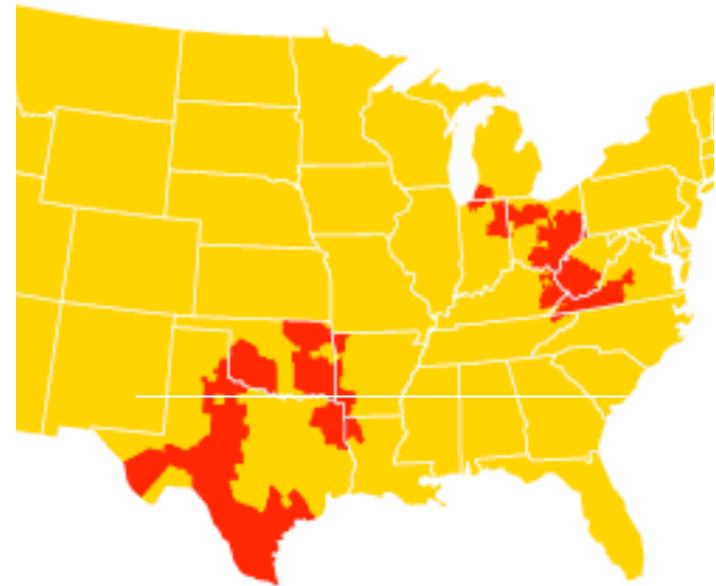
Transmission miles¹ ('000s)



Electric customers¹ (mm)

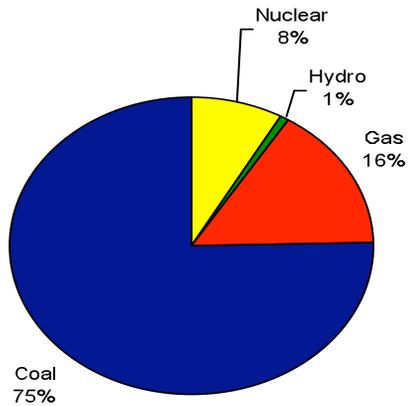


Serving electric customers in 11 states

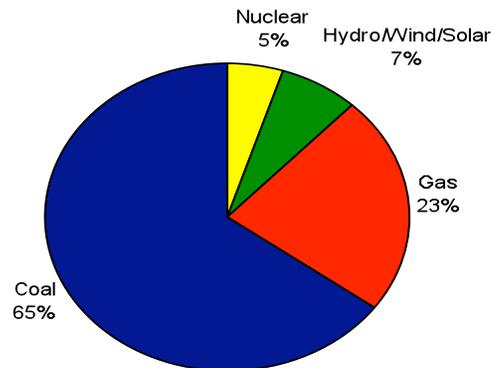


Generation Transformation

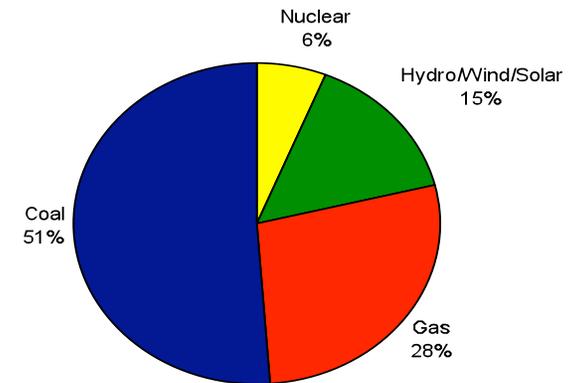
1990 AEP Generating Capacity by Fuel
37,428 total MW's



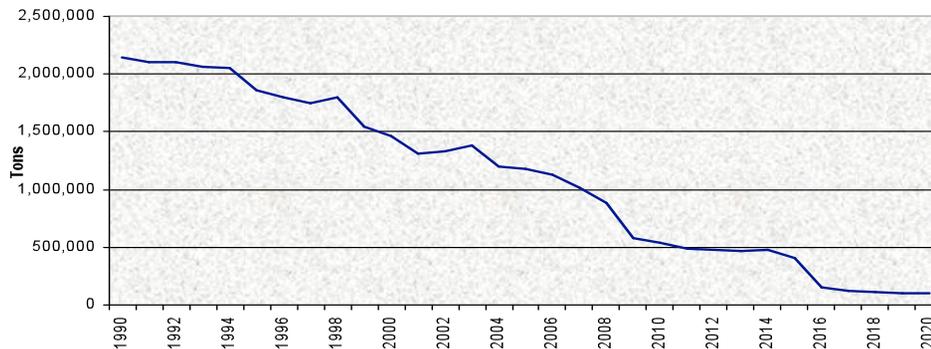
2010 AEP Generating Capacity by Fuel
39,910 total MW's



2020 AEP Generating Capacity by Fuel
37,707 total MW's



Total System NOx & SO2 (actual through 2010 and forecasted based on proposed EPA regulations)



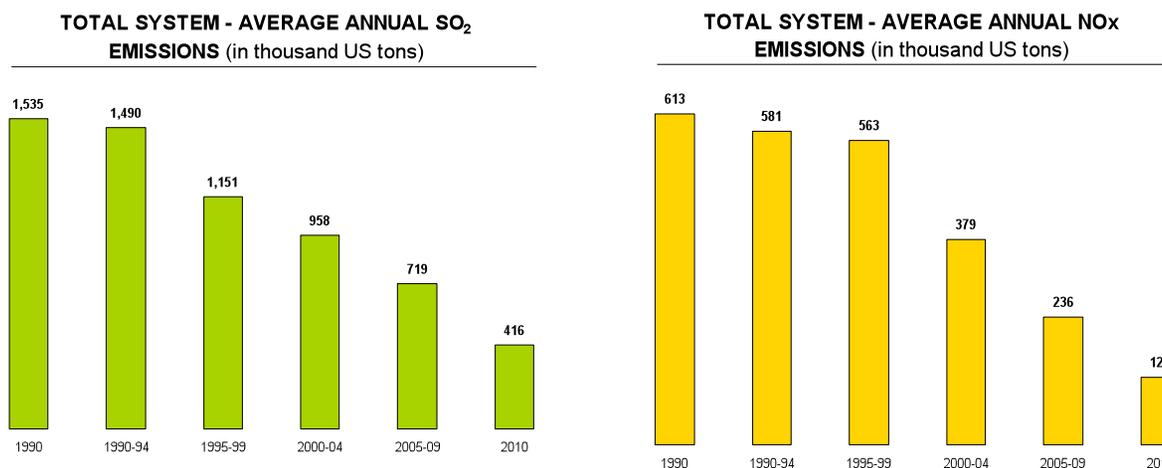
- \$7.2 billion capital invested from 1990-2010 to reduce emissions approximately 1.7 million tons
- Estimated \$6-\$8 billion additional capital investment from 2012-2020 for further reductions of approximately 440,000 tons

Questions and Answers

- We all support protecting the environment but how much improvement in air quality really has been made for ozone, fine particulates and mercury?
- What will be the cost of the EPA regulatory program to reduce emissions further to everyone, industry and state economies and what can we change to improve the environment at lower costs?
- Americans like a cleaner environment, but how much can they afford right now with gasoline prices heading higher, jobs being scarce, their mortgages are being foreclosed, they are on fixed incomes, and their state is still in a recession?
- Would a ***smarter approach be legislation*** from our elected representatives in Congress, not regulations from the EPA Administrator, that balances economic growth, energy security, reliability and affordability and environmental protection?

Ongoing air quality improvements

- **AEP has improved its environmental performance.**
 - **Since 1990, AEP has reduced its NOx emissions by 80% and its SO₂ emissions by 73%.**
 - **AEP has invested more than \$7 billion since 1990 to reduce emissions from its coal-fueled generation fleet .**
- **AEP will continue to improve the environmental performance of its power plants.**



In 2009, Electric Generating Units (EGUs) Contributed Just 8% of Total Ozone Precursor Emissions in the Eastern U.S.

REGIONAL NOX AND VOC EMISSIONS, 1999 AND 2009 (thousand tons/year)

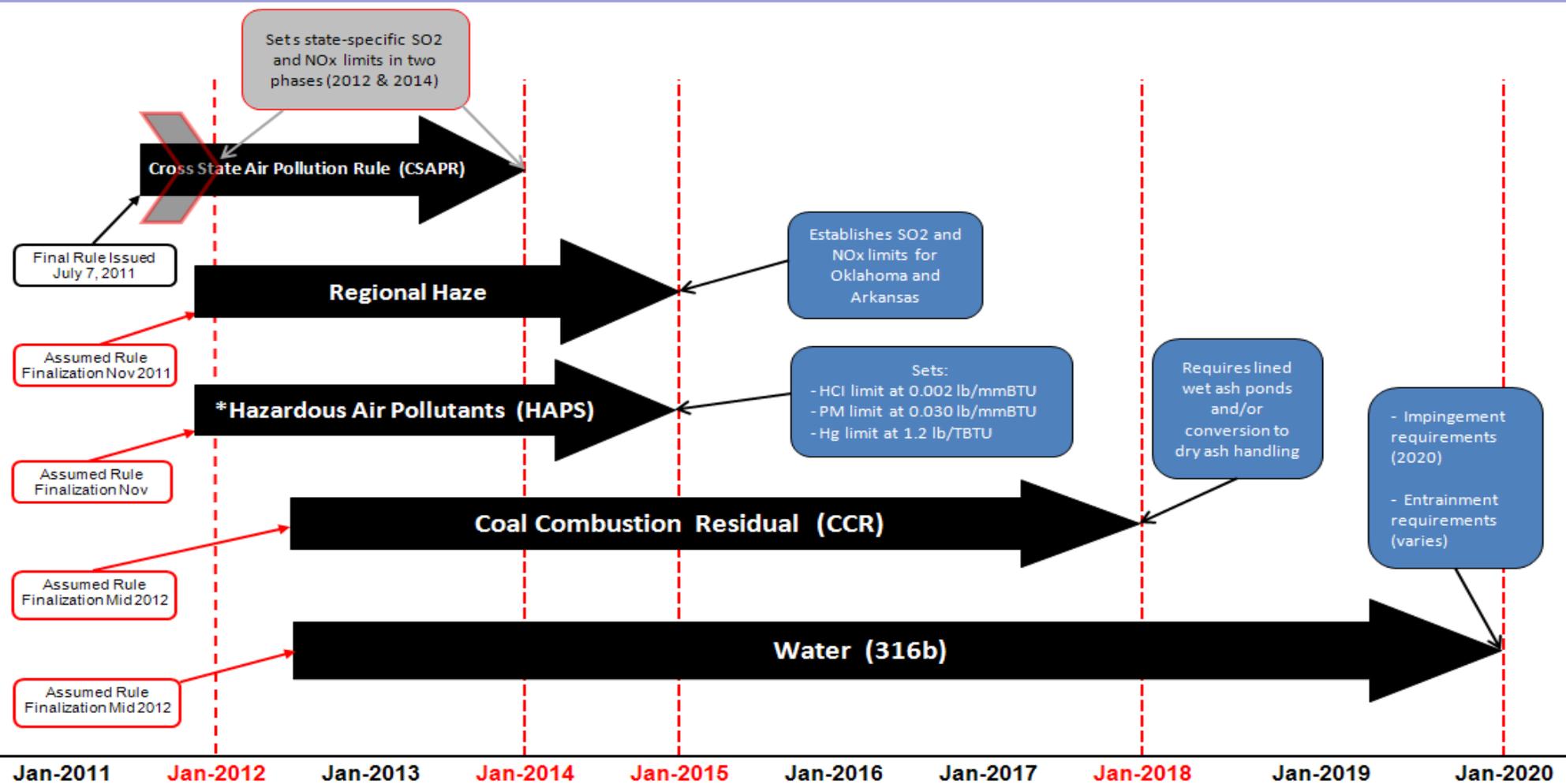
Region	Total EGU NOX		Coal EGU NOX		Onroad vehicle NOX	All other NOX		Total NOX		Total VOCs	
	1999	2009	1999	2009	1999 2009	1999	2009	1999	2009	1999	2009
Northeast	527	220	400	161	1,478 681	1,034	903	3,038	1,803	3,059	2,645
Midwest	1,369	441	1,334	414	1,392 798	1,281	1,140	4,042	2,379	3,073	2,361
Southeast	1,964	516	1,719	436	2,092 1,226	1,878	1,529	5,934	3,271	4,848	3,989
Central	1,185	606	841	470	1,671 927	2,549	2,595	5,405	4,127	3,793	3,109
Total	5,044	1,782	4,294	1,480	6,633 3,631	6,742	6,167	18,419	11,581	14,773	12,105

Source: Alpine Geophysics/ENVIRON
<ftp://ftp.alpinegeophysics.com/pub/Trends/>

Updated data and models can show more improvement than we realize

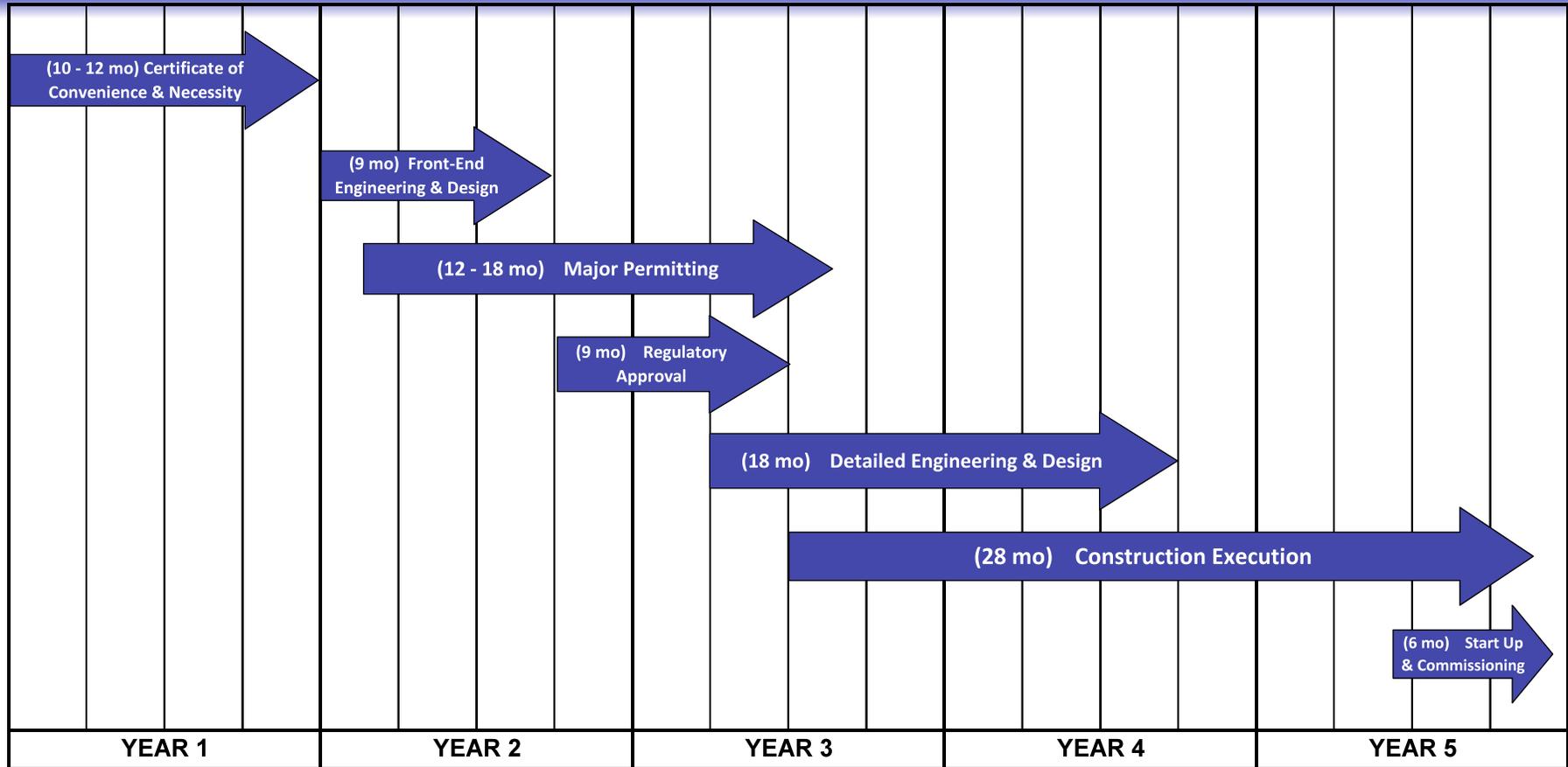
- ***The ozone objectives of the proposed transport rule 1 can be achieved within the 12km modeling domain with no new controls no later than 2014***
- ***The annual PM objectives of the proposed transport rule 1 can be achieved within the 12km modeling domain with no new controls no later than 2014 with the possible exception of local controls at the Allegheny PA location***
- ***The 24-hr PM objectives of the proposed transport rule 1 can be achieved within the 12km modeling domain with no new controls no later than 2014 with the possible exception of local controls at the Allegheny PA and Brooke WV locations***

Environmental Regulations and Compliance Deadlines



* Units that will be retrofit are eligible for a one year compliance extension from the EPA

Typical AEP FGD Retrofit Timeline



- *Timeline milestone lengths based on actual AEP construction experience*
- *Phases could be longer if the support system becomes strained from multiple companies facing similar compliance deadlines*
- *From 2003-10 AEP retrofitted 7,800 MWs (9 units), using over 35 million work hours at a cost of over \$3.6 billion*

Major impacts for AEP

To meet compliance deadlines for new environmental regulations, AEP expects it will need to invest \$6 billion to \$8 billion to:

- Retire nearly 6,000 MW of existing coal-fired generation by Dec. 31, 2014.
- Refuel, retrofit with new or upgrade existing environmental controls on another 11,000 MW. (*see appendix)
- Temporarily (1 – 4 years) idle / curtail 1,500 MW – 5,200 MW.
- Build approximately 1,700 MW of new generation. (*see appendix)

This will create:

- Abrupt rate increases ranging from 10% to 35%.
- Significant reliability concerns, particularly in the 2014 – 2016 time frame.
- The need to install additional equipment to address impacts on the transmission system due to the reduction in generating capacity.
- Net loss of 600 Jobs
- Annual lost wages of \$40 million
- \$20 million decline in payroll taxes
- \$12 million decline in property tax payments

Retirements

Operating Company	Plant	MW	Expected Retirement
AEP Ohio	Sporn 5	450	2011
	Conesville 3	165	2012
	Muskingum River 1-4	840	2014
	Picway 5	100	2014
	Sporn 2-4	300	2014
	Kammer 1-3	630	2014
	Total MW	2,485	
APCO	Glen Lyn 5	95	2014
	Glen Lyn 6	240	2014
	Clinch River 3	235	2014
	Sporn 1	150	2014
	Sporn 3	150	2014
	Kanawha River 1	200	2014
	Kanawha River 2	200	2014
Total MW	1,270		
I&M	Tanners Creek 1	145	2014
	Tanners Creek 2	145	2014
	Tanners Creek 3	205	2014
Total MW	495		
KPCo	Big Sandy 1	278	2014
	Big Sandy 2	800	2014
Total MW	1,078		
SWEPCO	Welsh 2	528	2014
	Total MW	528	
Grand Total		5,856	

❑ Plant units are located in Ohio, West Virginia, Virginia, Indiana, Kentucky and Texas

❑ Units to be retrofitted and new generation are listed in the appendix

Other Economic Impacts of EPA Regulations

- ***Higher natural gas use and related price increases affects ALL consumers***
- ***\$0.50/MMBtu gas price change increases other consumer costs about \$8-9 billion/year***
- ***Net Job Impacts are Negative:***
 - ***Near term increases in temporary (2-5 years) construction jobs***
 - ***BUT, “NET” NEGATIVE for Total Jobs mostly due to large electricity price increases***
 - ***NET LOSS of 1.4MM Jobs (2013-2020) **According to National Economic Research Associates (June 2011)***
 - ***‘Green jobs’ studies such as PERI study don’t consider big negatives of higher electricity & energy prices***

No New Plants under EPA's Maximum Achievable Control Technology Standards?

- ❑ **John W. Turk Jr. Ultra-Supercritical Coal Plant is a base load 600-MW advanced coal combustion plant. Located in Arkansas. SWEPCo owns 73 percent or roughly 440 megawatts of the total unit.**
- ❑ **Will begin commercial operation in 2012.**
- ❑ **The Turk Plant will use low-sulfur coal and state-of-the art emission control technologies, including a design that allows for the retrofit of carbon dioxide controls**



- ❑ **EPA's MACT standards are technology, not health based, requirements that are supposed to reflect the capabilities of emission control technologies in use now by the best performing units**
- ❑ **EPA overstates these capabilities with proposed standards that cannot all be met by any state-of-the-art plants now being built.**
- ❑ **EPA data show that no coal plant in operation could meet all of the standards.**
- ❑ **Air permits issued by states for new units reflect vendor guarantees, fuel data, variable operating condition that are practical and achievable and will protect public health.**

What can Americans afford today?

- ***Determine average family incomes using U.S. Census Bureau data.***
- ***Calculate energy costs by household income group, using 2005 U.S. Department of Energy survey data and DOE/EIA energy prices for 2011.***
- ***Measure the impacts of energy prices on lower-income households, including impacts on elderly and minority families.***
- ***www.americaspower.org shows analysis and report for the US and many states***

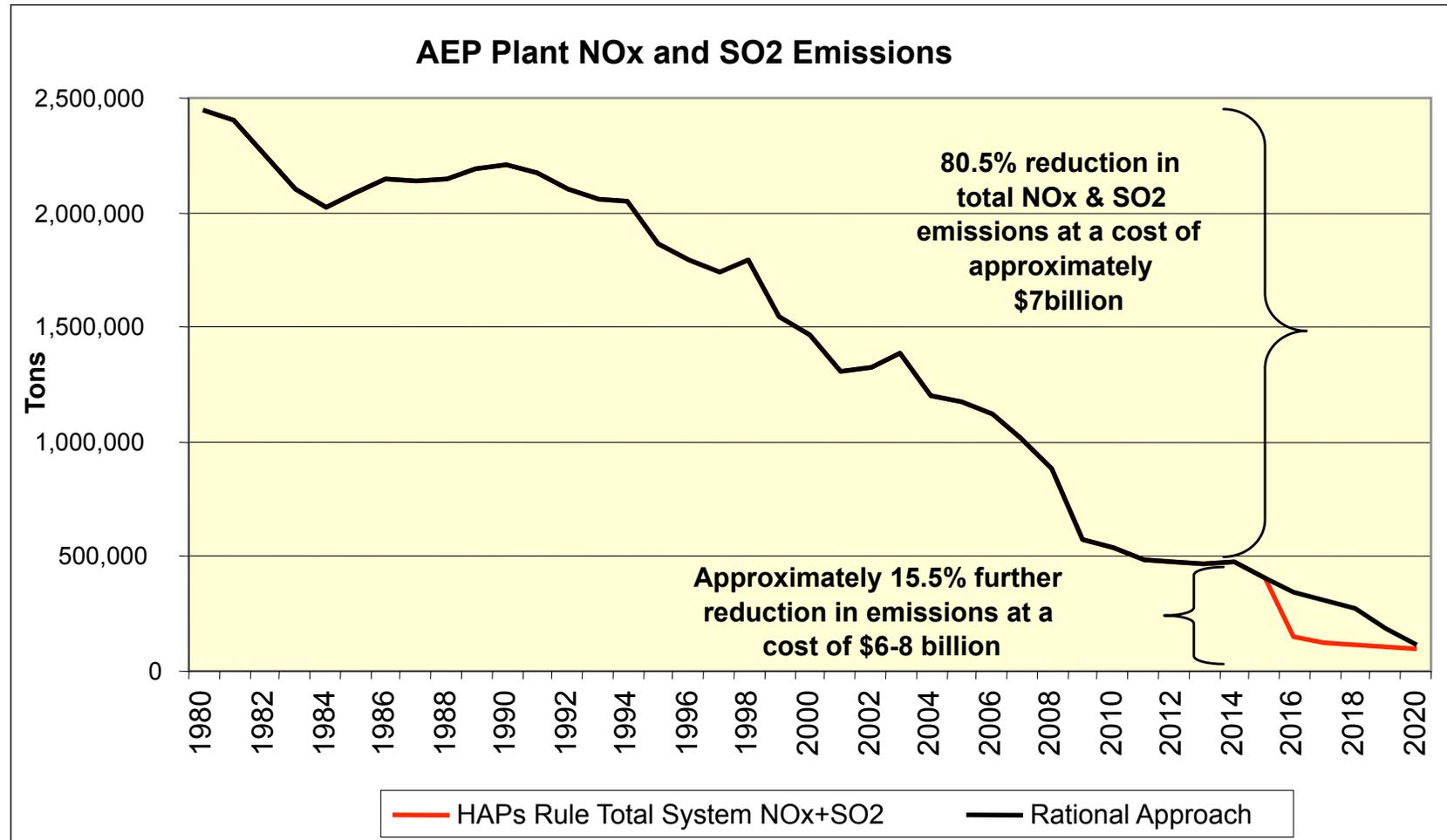
Energy price impacts in brief

- ***One-half of U.S. households have average pre-tax annual incomes less than \$50,000.***
- ***In 2001, these families spent an average of 12% of their after-tax income (\$21,834) on residential and transportation energy.***
- ***In 2011, these households will spend an estimated 20% of their after-tax income of \$22,727 on energy.***

There is a Better Way...

- ***More flexibility in regulations (e.g., HAPs emissions averaging, low capacity factor allowed during retrofit construction)***
- ***Phase-in requirements over 2015-2020***
- ***Allow off-ramp for units that commit to retire or repower through 2020***
- ***Continues emission reduction progress starting today, but reduces capital cost, rate shock and other economic impacts***
- ***All coal units “well controlled” by 2020***

A Phased-in Approach Will Arrive at the Same Destination



Legislation, not regulation, is a smarter approach

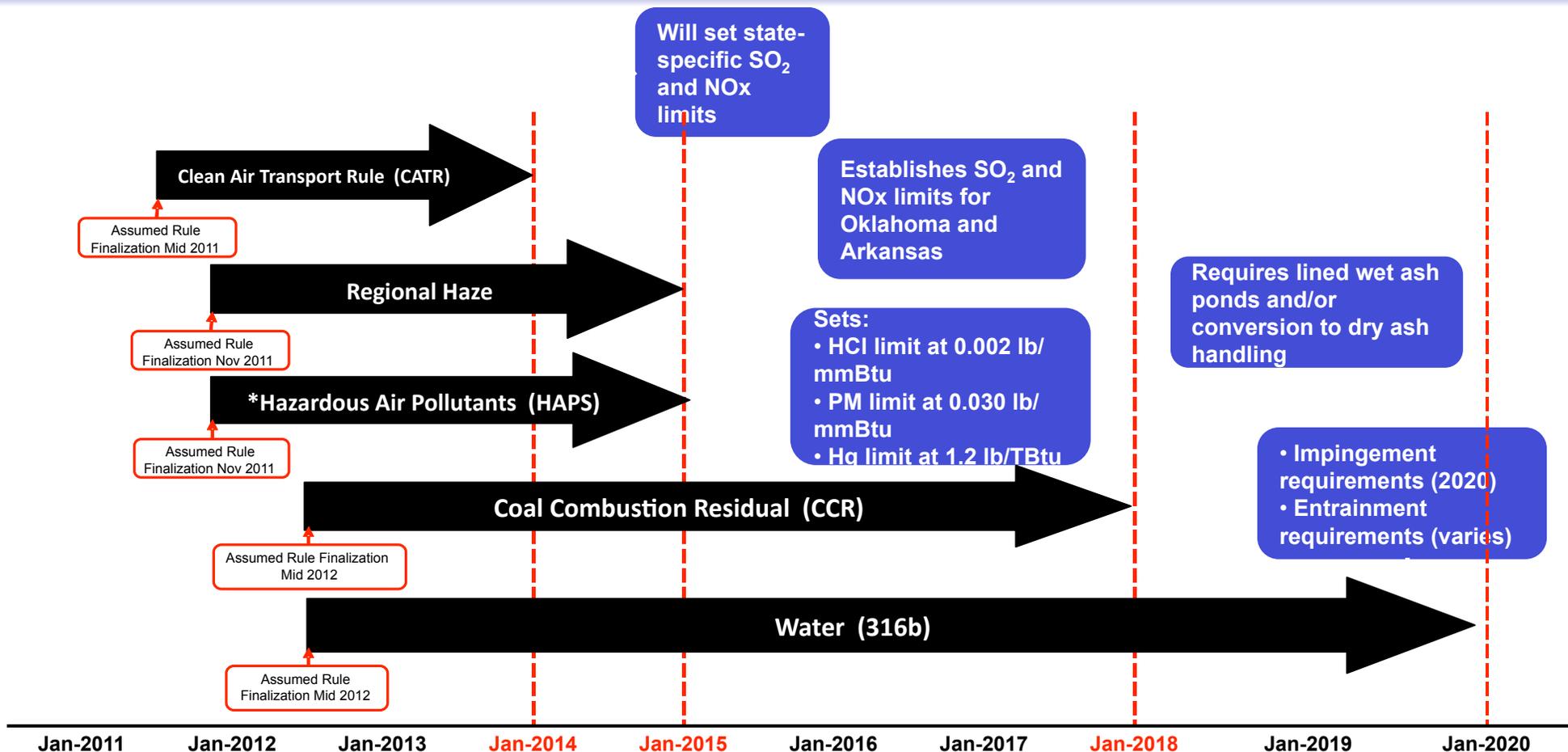
We need legislation from our elected representatives in Congress that balances economic growth, energy security, reliability and affordability and environmental protection by giving more time for pollution control retrofits and a fully integrated and coordinated emissions reduction program that efficiently uses the hard earned money of Americans.

Appendix

Benefits of a phased-in approach

- ***Will provide the time utilities need to install environmental retrofits without idling or curtailing generating units.***
- ***Will allow unit retirements to occur over a more reasonable timeframe needed to address grid reliability issues.***
- ***Will support construction jobs over a longer period of time.***
- ***Will provide long-term environmental benefits.***
- ***Will give local communities time to plan for economic losses.***

Anticipated environmental regulations and compliance deadlines



* Units that will be retrofit are eligible for a one year compliance extension from the EPA

Retrofits/New Generation

- The tables below represent our estimated \$6 - \$8 billion capital investment from 2012 to 2020 for environmental retrofits on 10,500 MW and new/refueled generation of 2,152 MW. The below costs include management estimates for compliance with CATR, HAPs MACT, CCR and 316(b) regulations as currently proposed.

Plant	MW	Type of retrofit	Low Cost Estimate 2012-2020 (\$MM)	High Cost Estimate 2012-2020 (\$MM)
Conesville 5	400	SCR, DSI		
Conesville 6	400	SCR, DSI		
Muskingum River 5	510	Refuel with Natural Gas		
Gavin 1	1320	FGD upgrade		
Gavin 2	1320	FGD upgrade		
Zimmer 1	330	FGD upgrade		
Total Expected Cost			2,100	2,800 *
Clinch River 1	211	Refuel with Natural Gas		
Clinch River 2	211	Refuel with Natural Gas		
Dresden	580	New Natural Gas		
Total Expected Cost			580	765 **
Rockport 1	1320	FGD, SCR		
Rockport 2	1320	FGD, SCR		
Tanners Creek 4	500	DSI, ACI		
Total Expected Cost			1,240	1,670 ***
Big Sandy 1	640	New Natural Gas		
Total Expected Cost			400	525

Operating Company	Plant	MW	Type of retrofit	Low Cost Estimate 2012-2020 (\$MM)	High Cost Estimate 2012-2020 (\$MM)
PSO	Northeastern 1	470	FGD, ACI, Baghouse		
	Northeastern 2	465	FGD, ACI, Baghouse		
	Oklauion	101	FGD upgrade, ACI		
	Total Expected Cost			700	940
SWEPCO	Flint Creek	264	FGD, ACI, Baghouse		
	Welsh 1	528	ACI, DSI, Baghouse		
	Welsh 3	528	ACI, DSI, Baghouse		
	Pirkey	580	ACI, Baghouse		
	Dolet Hills	270	ACI, Baghouse		
Total Expected Cost			900	1,200	
TNC	Oklauion	377	FGD upgrade, ACI		
	Total Expected Cost			80	100

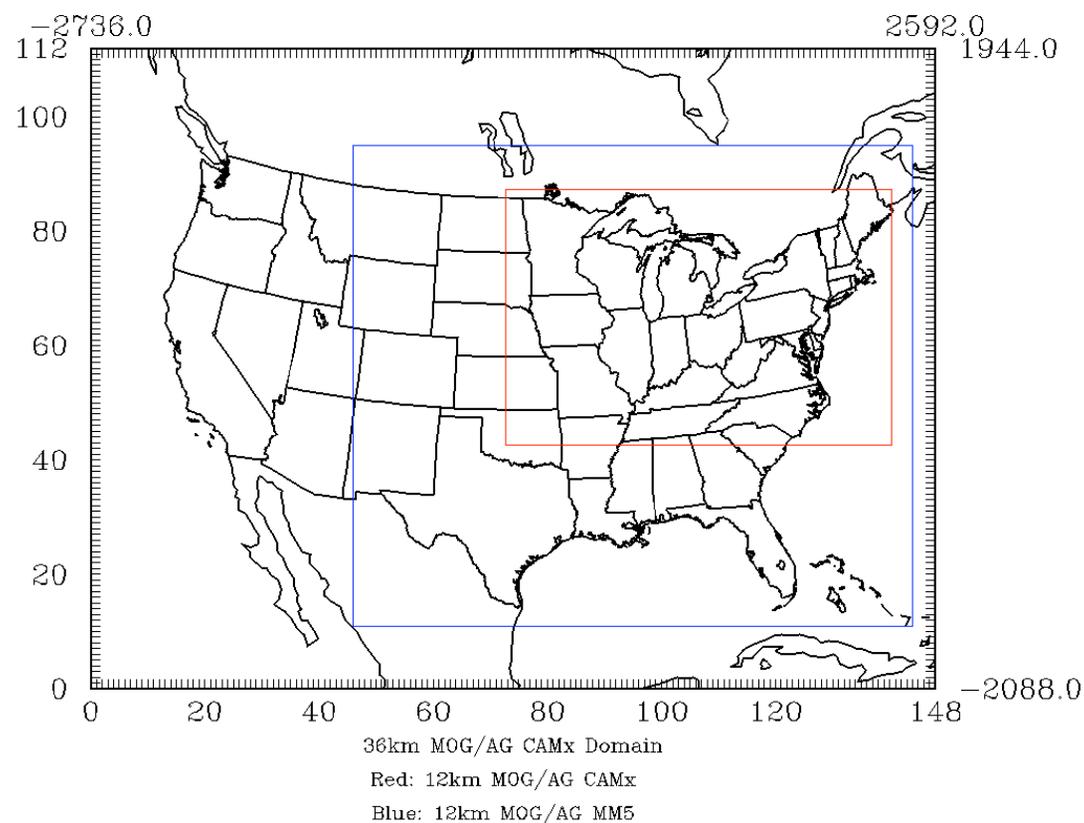
*Assumes regulatory cost recovery for environmental investments including refuel are non-bypassable surcharges as proposed in the 2012 - 2014 ESP

** Total capital invested is expected to be \$366 million for the Dresden plant once completed; \$343 million of which is forecasted to be spent prior to 2012.

*** Includes AEG portion of costs related to Rockport upgrade



Updated data and modeling make a difference



Principal factors driving energy costs

- ***Household expenditures for gasoline have more than doubled since 2001.***
- ***Increased gasoline costs account for nearly three-fourths of average household energy cost increases since 2001.***
- ***The average household electric bill has increased from \$938 in 2001 to an estimated \$1,369 in 2011 (46%).***

Impacts on minorities

- ***In 2009, 61% of Hispanic families and 67% of African-American families earned less than \$50,000 annually, compared with 46% of Caucasian households.***
- ***The average household incomes of Hispanic and African-American families were 29% and 37% lower, respectively, than the average income of Caucasian households.***
- ***The inequality of income distribution makes minority families disproportionately vulnerable to energy price increases.***

And senior citizens ...

- ***Senior citizens also are vulnerable to energy price increases due to their relatively low incomes.***
- ***In 2009, the median gross income of 25 million senior households over 65 years was \$31,354, some \$19,000 below the national median income of \$50,200.***
- ***Seniors have the highest per capita residential energy consumption among all age categories.***

“The Nightmare on Utility Street?”

■ **Transport Rule**

- ***SO₂ and NO_x caps in 2012, tighter SO₂ caps in 2014***
- ***FGD effectively “required” for most all AEP East units in 2014***

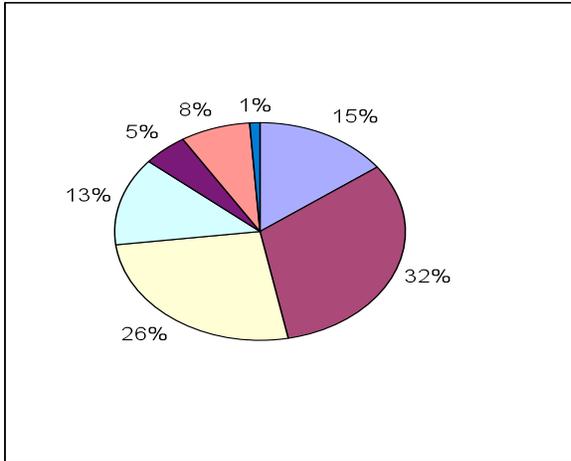
■ **Mercury and Other HAPs MACT Rules**

- ***Compliance in 3 years = 1/2015 (or 1/2016 “case by case”)***
- ***FGD for acid gases likely required on most AEP-East units***
- ***Baghouses (BH) w/ activated carbon injection (ACI) COULD ALSO be required to meet Hg and heavy metal limits***
- ***Some AEP-West coal units may be able to comply with only BH and ACI; however other EPA requirements (CAVR) likely to force scrubbers at most units***

■ **CCR Rule (e.g. ash disposal)**

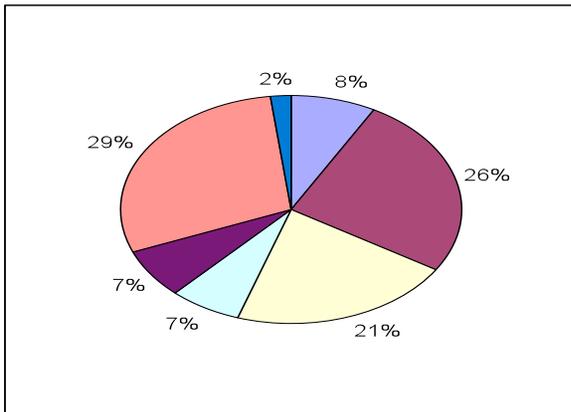
- ***Compliance estimated by 2017***
- ***AEP capital + pond closure cost: \$1.4-2.4 billion if “non-hazardous”***
- ***Costs DOUBLE with “hazardous” designation by EPA***

In 2009, Electric Generating Units (EGUs) Contributed Just 8% of Total Ozone Precursor Emissions in the Eastern U.S.



PERCENTAGE SHARE OF NOX EMISSIONS
Eastern United States, 2009

- 15% Electric generating units
- 32% Onroad vehicles
- 26% Offroad vehicles
- 13% Industrial fuel
- 5% Other fuel
- 8% Industrial processes
- 1% Miscellaneous



PERCENTAGE SHARE OF TOTAL NOX PLUS VOC EMISSIONS
Eastern United States, 2009

- 8% Electric generating units
- 26% Onroad vehicles
- 21% Offroad vehicles
- 7% Industrial fuel
- 7% Other fuel
- 29% Industrial processes
- 2% Miscellaneous

Source: <ftp://ftp.alpinegeophysics.com/pub/Trends/>