AEP Climate Change Strategy

Mountaineer Plant - New Haven, WV

Northeastern Plant - Oologah, OK

Bruce Braine

Vice President - Strategic Policy Analysis

April 7, 2008

Company Overview

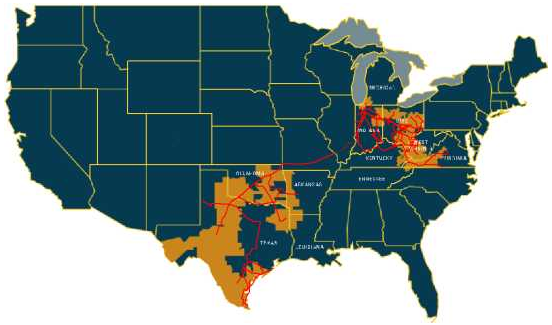
Coal/Lignite
67%

Nat. Gas/Oil
24%

Nuclear
6%

Pumped Storage/ Hydro/Wind
3%

AEP's Generation Fleet
38,388 MW Capacity



5.1 million customers in 11 states
Industry-leading size and scale of assets:

Asset	Size	Industry Rank
Domestic Generation	~38,300 MW	# 2
Transmission	~39,000 miles	# 1
Distribution	~208,000 miles	# 1

AEP's Climate Strategy

FutureGen™ ALLIANCE
Clean Energy for a Secure Future

GLOBAL ROUNDTABLE ON CLIMATE CHANGE

CLIMATE LEADERS
U.S. Environmental Protection Agency

CCX™ Chicago Climate Exchange

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

- Being proactive and engaged in the development of climate policy
- Investing in science/technology R&D
- Taking Voluntary action now, making real reductions thru CCX (2003-07: 40 MM Tons reductions); 2011 Voluntary Commitment (additional 5 MM Tons/year reductions).
- Investing in long term technology (e.g., IGCC, Ultra-supercritical PC and CCS)

AEP®

AEP must be a leader in addressing climate change

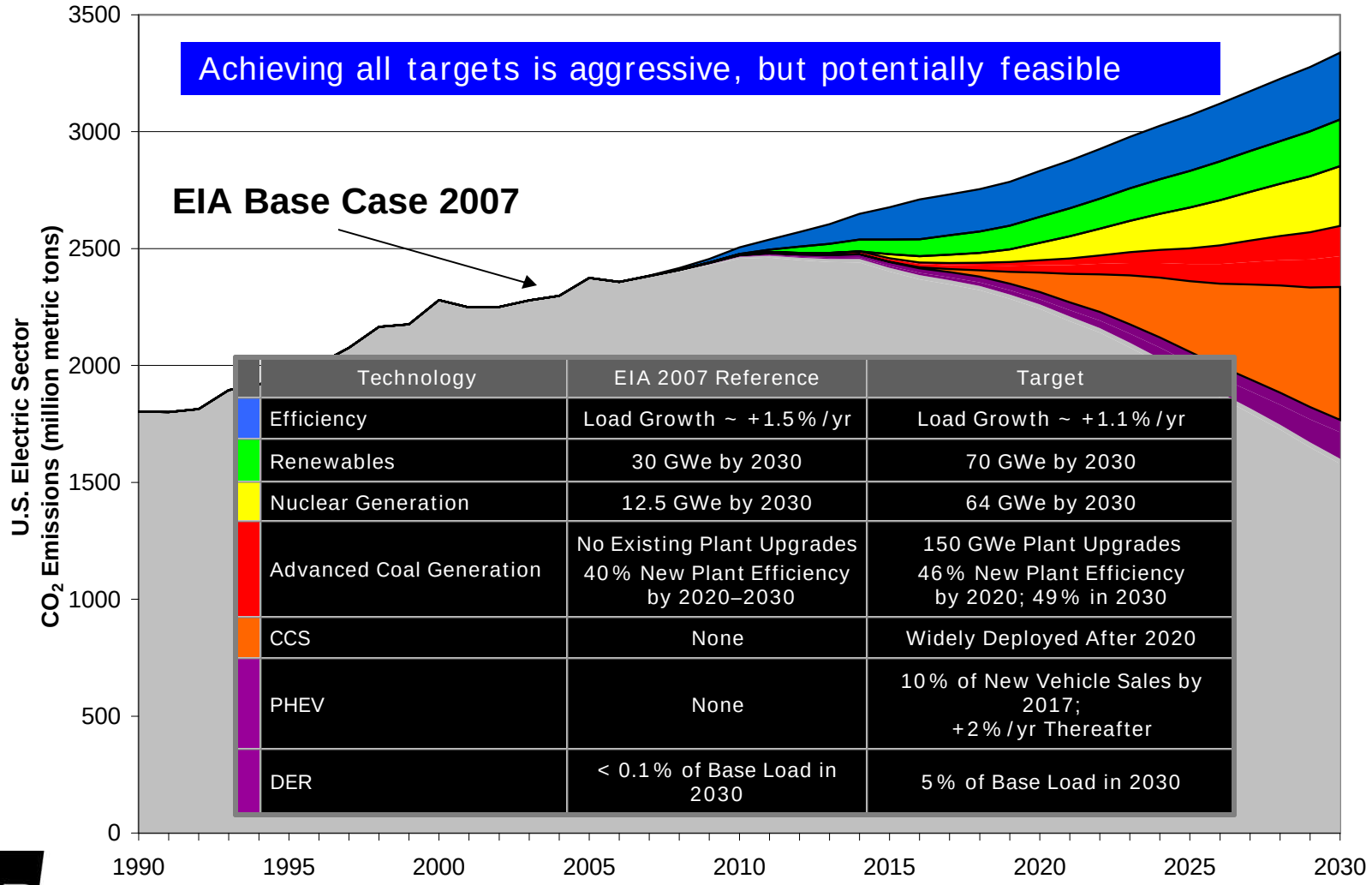
AEP's Climate Position

- A certain and consistent national policy for reasonable carbon controls should include the following principles:
  - Comprehensiveness
  - Cost-effectiveness
  - Realistic emission control objectives
  - Monitoring, verification and adjustment mechanisms
  - Technology development & deployment

- Inclusion of adjustment provision if largest emitters in developing world do not take action

AEP Supports Reasonable Legislation on GHG: Bingaman-Specter "Low Carbon Economy Act of 2007"

EPRI CO_2 Reduction "Prism"

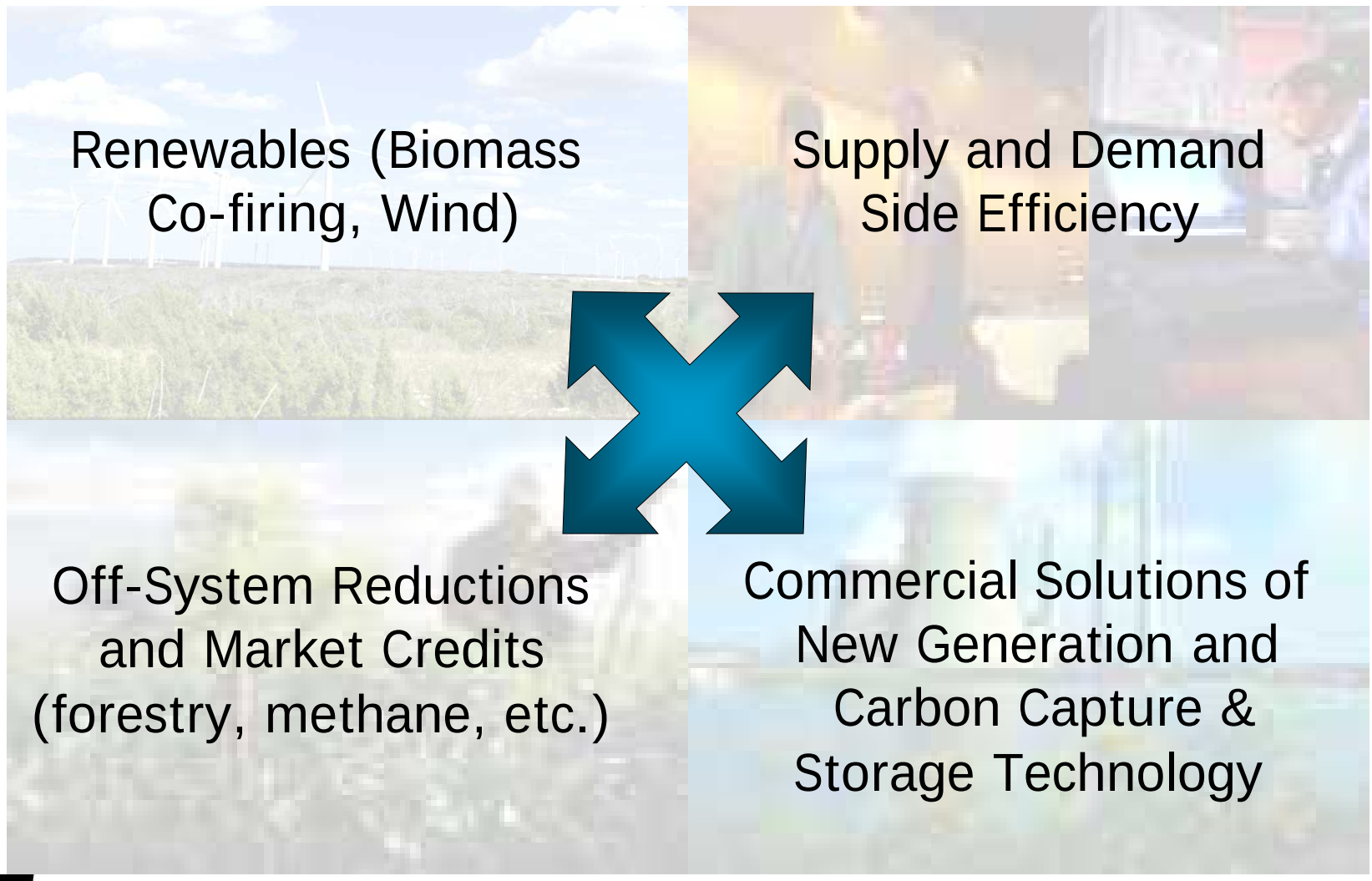


Technology	EIA 2007 Reference	Target
Efficiency	Load Growth ~ +1.5%/yr	Load Growth ~ +1.1%/yr
Renewables	30 GWe by 2030	70 GWe by 2030
Nuclear Generation	12.5 GWe by 2030	64 GWe by 2030
Advanced Coal Generation	No Existing Plant Upgrades 40% New Plant Efficiency by 2020–2030	150 GWe Plant Upgrades 46% New Plant Efficiency by 2020; 49% in 2030
CCS	None	Widely Deployed After 2020
PHEV	None	10% of New Vehicle Sales by 2017; +2%/yr Thereafter
DER	< 0.1% of Base Load in 2030	5% of Base Load in 2030

AEP®

EPRI ELECTRIC POWER RESEARCH INSTITUTE

AEP's Long-Term GHG Reduction Portfolio



AEP is investing in a portfolio of GHG reduction alternatives

A Portfolio Approach: AEP's Long-Term CO_2 Reduction Commitment

Existing Programs

- Existing plant efficiency improvements
- Renewable Energy
  - 800 MWs of Wind
  - 300 MWs of Hydro
- Domestic Offsets
  - Forestry – 0.35MM tons/yr
  - Over 63MM trees planted through 2006
  - 1.2MM tons of carbon sequestered
- International Offsets
  - Forestry projects have resulted in 1MM tons of carbon sequestered through 2006
- Chicago Climate Exchange

AEP's reductions/offsets of CO_2:
- 2003-2005: 31 MMT
- 2006-2010 (proj.): Additional 15 MMT

New Program Additions (by 2011)

- 1000 MWs of Wind PPAs: 2MM tons/yr
- Domestic Offsets (methane): 2MM tons/yr
- Forestry: Tripling annual investment to increase to 0.5MM tons/yr by 2015
- Fleet Vehicle/Aviation Offsets: 0.2MM tons/yr
- Additional actions--end use and supply efficiency and biomass: 0.3MM tons/yr

New Technology Additions

- New Generation – IGCC and USC
- Commercial solutions for existing fleet
  - Chilled Ammonia
  - Oxy-Coal

AEP's reductions/offsets of CO_2:
2011+: 5 MMT/YEAR
Longer Term—New Technology

AEP Wind Operations/Purchases

Trent Mesa (2001)

- 150 MW (100 - 1.5 MW turbines)
- Abilene/Sweetwater, TX

Southwest Mesa (1999)

- **75 MW** (107 – 700kW turbines)
- McCarney, TX
- Power Purchaser

Desert Sky (2002)

- 160 MW (107 - 1.5 MW turbines)
- Bakersfield, TX

Summary

- Owned/Operated 385 MW
- Wind Purchases 392 MW
- Total Existing Wind at end of 2006: 777 MW
- **New Wind Purchases in 2007: 275 MW**

Will acquire an additional 725 MW of new wind to attain goal of 1,000 MW by 2011

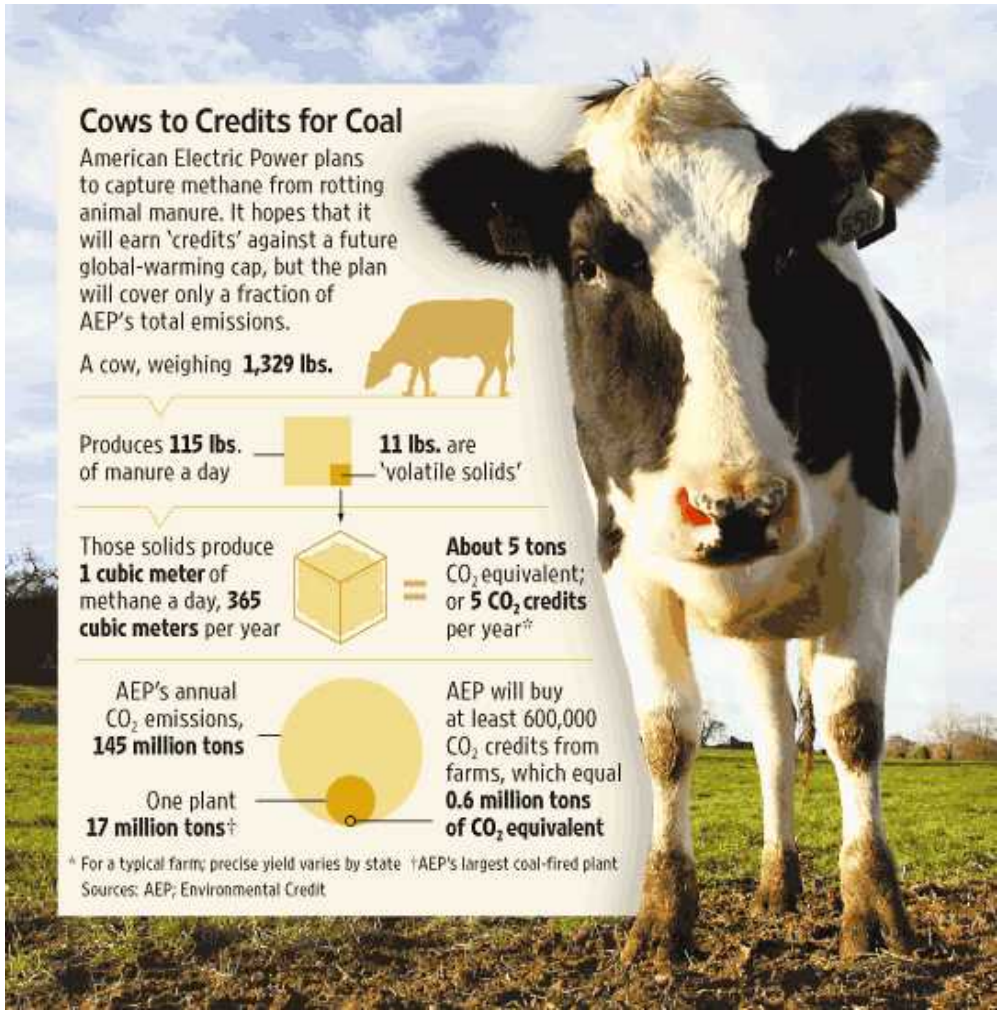
Off-System Reductions

New AEP Offset Commitment by 2011:

- 2 MM tons/year additional CO_2 offsets

Latest Announcement:

- Methane Capture Deal with Environmental Credit Corp.
  - 0.6 MM Tons CO2e per year
  - 2010 through 2017
  - 51% of credits sourced from "AEP States"



Source: Wall Street Journal June 14, 2007

AEP Leadership in New Technology: IGCC and USC

NEW ADVANCED GENERATION

• **IGCC --** AEP first to announce plans to build two 600+ MW IGCC commercial size facilities in US (OH and WV) by mid next decade

• **USC** -- AEP will be first to employ new generation ultra-supercritical (steam temperatures >1100^{o}F) coal plant in U.S (AR)

CO_2 Capture Techniques

Pre-Combustion Capture - *IGCC with Water-Gas Shift*

- Most of the processes commercially available in other industrial applications
  - Have never been integrated together
- Turbine modified for H_2-based fuel, which has not yet been proven at commercial scale
- Creates stream of very high CO_2 concentration
- Parasitic demand (~15-20%) for CO_2 capture - lower than amine or oxy-coal

Modified-Combustion Capture - *Oxy-Coal*

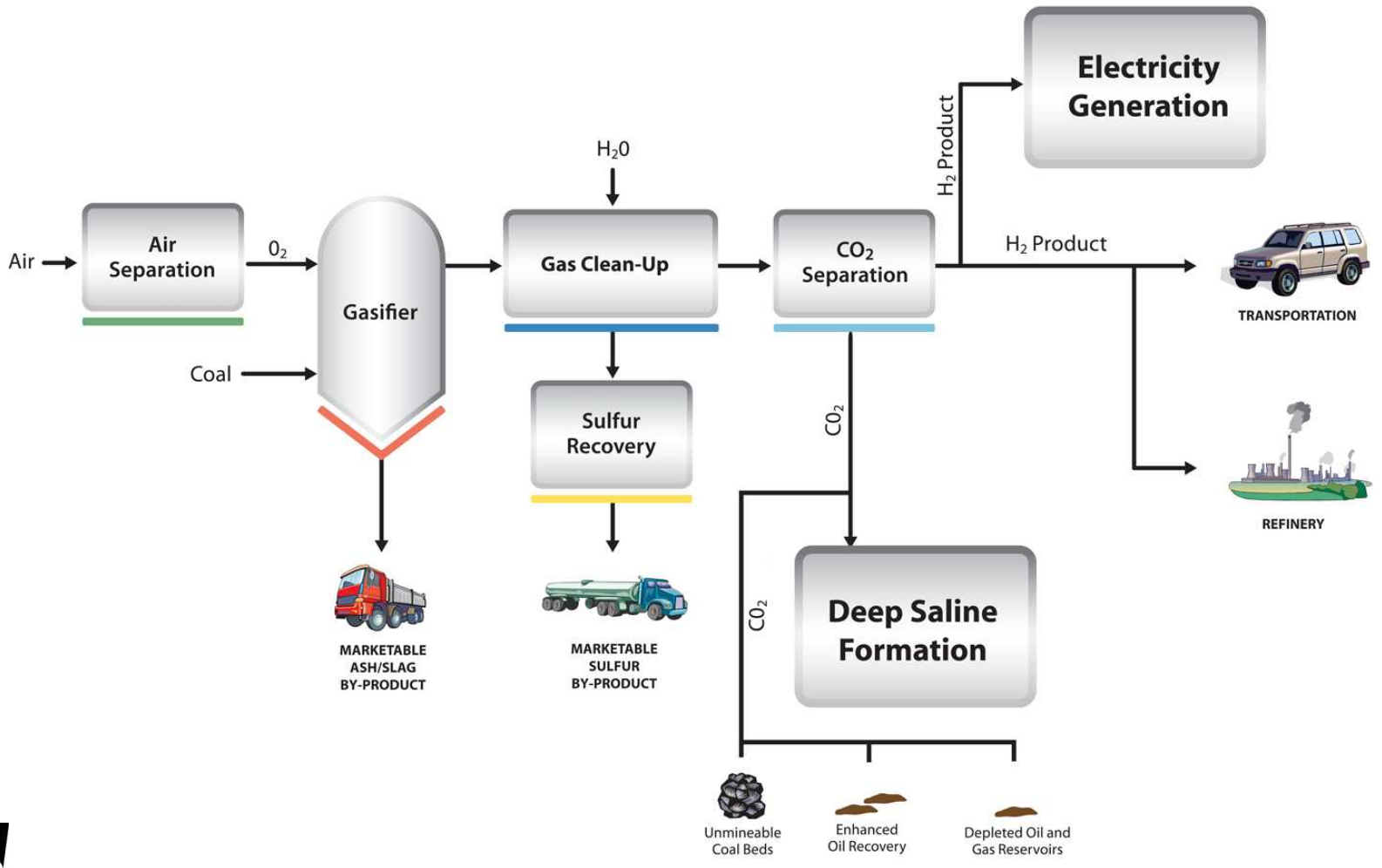
- Technology not yet proven at commercial scale
- Creates stream of very high CO_2 concentration
- High parasitic demand, >25%

Post-Combustion Capture-*Conv. or Advanced Amines, Chilled Ammonia*

- Amine technologies commercially available in other industrial applications
- Relatively low CO_2 concentration in flue gas – Thus difficult to capture
- **High parasitic demand**
  - Conventional Amine ~30%, Chilled Ammonia target ~10-15%
- Amines require **very** clean flue gas

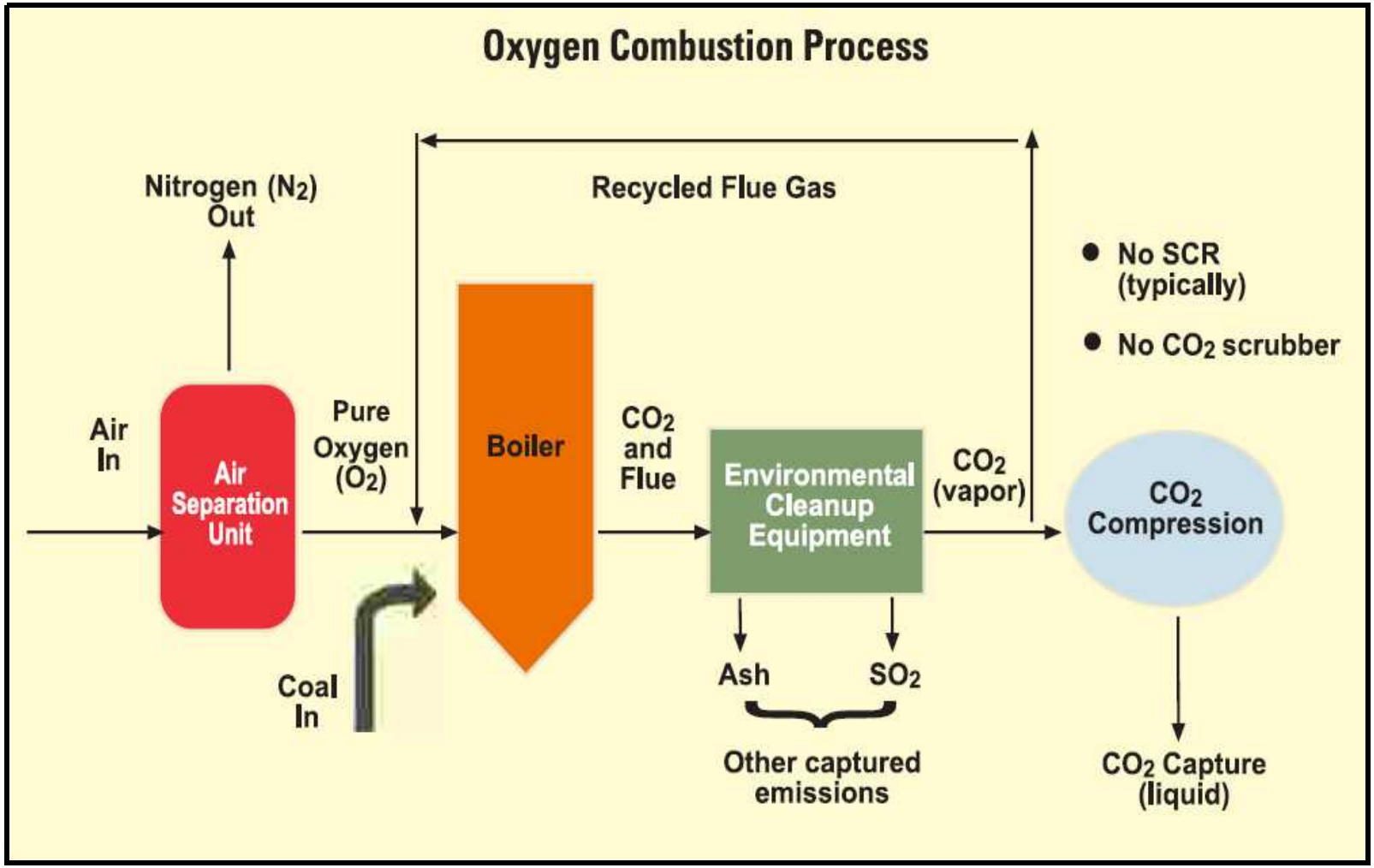
IGCC Water-Gas Shift Process

Pre-Combustion Capture



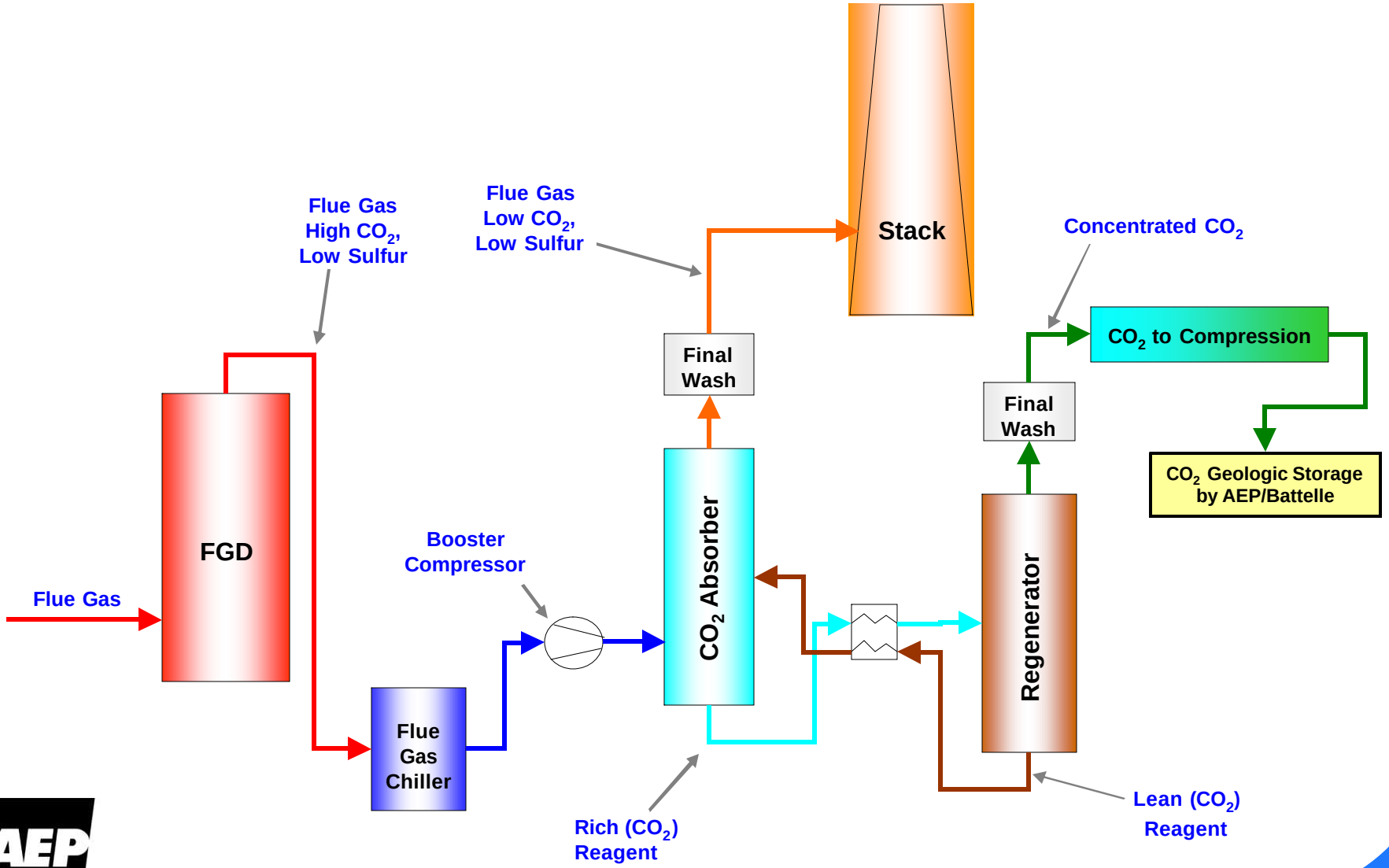
Babcock & Wilcox Oxy-Coal Process

Modified Combustion Capture

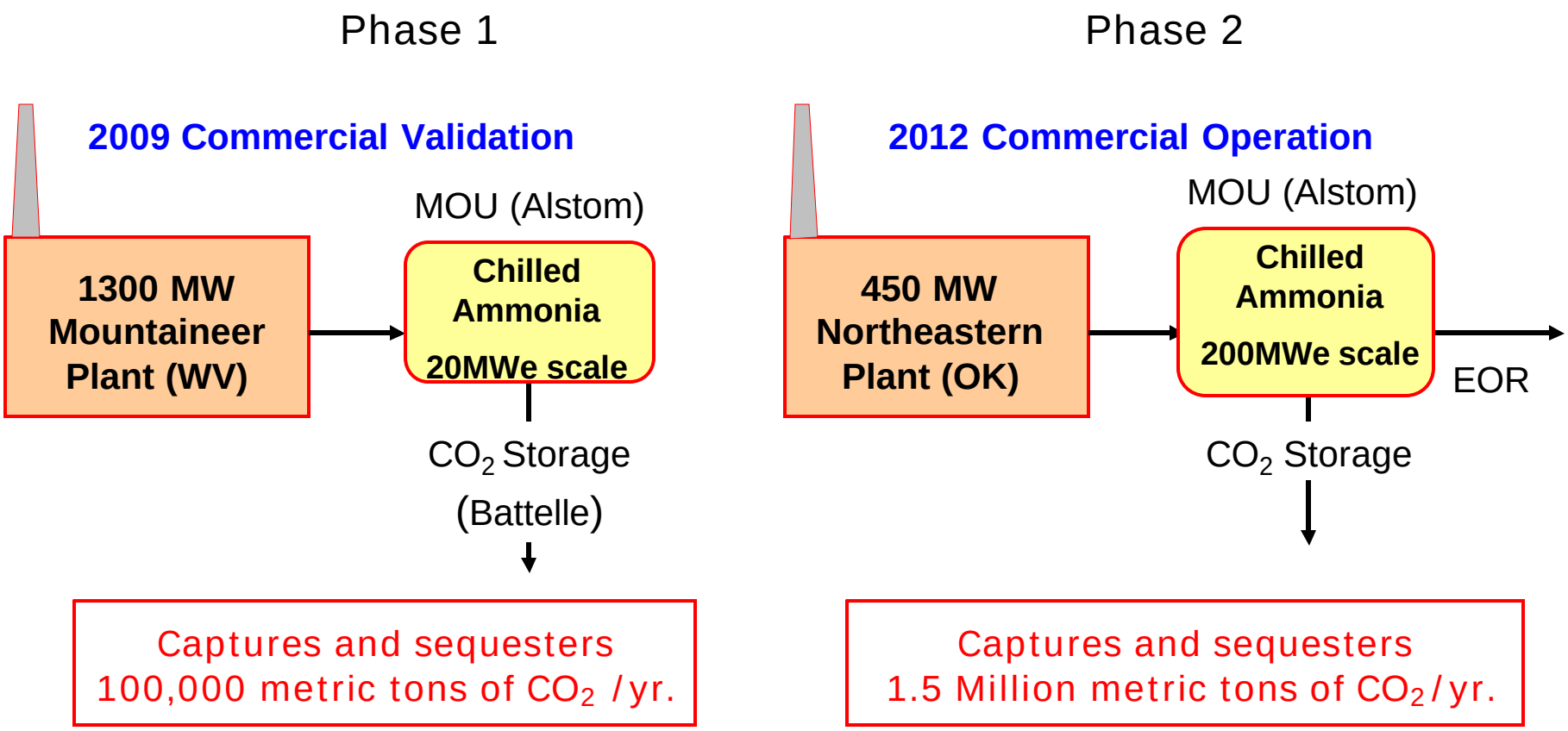


Alstom's Chilled Ammonia Process

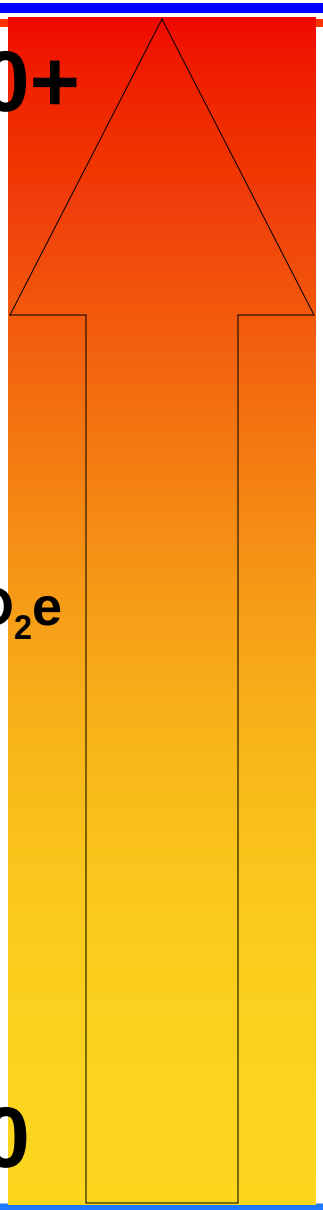
Post-Combustion Capture



AEP Leadership in New Technology: Chilled Ammonia CCS



The Challenge: CCS is Expensive



- Carbon Capture w/ Geologic Sequestration
- Other renewable, advanced geothermal and/or solar
- Carbon Capture for Enhanced Oil Recovery
- New Biomass Generation
- Dispatch of additional gas vs. inefficient coal
- Biomass Co-firing
- Biological Sequestration (e.g. Forestry)
- New Wind
- Energy Efficiency
- Methane Offsets

Nuclear?

CCS: The Business Case

- CO2 Legislation Requiring Very Substantial Long Term Reductions is Likely
- A Portfolio of Reduction Options Will Be Needed
- Future Electricity Demand Requires New "Baseload" Power Options (Predominantly Coal and Nuclear)
- Half of Existing Demand is Met By Coal and Early Retirement of Coal is Expensive. Thus, Retrofit CCS becomes essential.

Key Issues for CCS Development

- Overcoming the “Economic” Hurdle—Bonus Allowances and Other Financial Support
- High Up-Front Capital Investment - Getting Adequate Financing and Recovery in Rates
- Commercial Demonstrations of CCS at Large Coal-Fired Power Plants
- National Standards for Permitting of Storage Reservoirs
- Potential Institutional, Legal and Regulatory Barriers to Carbon Storage