AEP’s Strategy for Managing Climate Change Risks: The Value of GHG Reductions

EPA’s SF₆ and the Environment Conference
December 1, 2004

Bruce H. Braine
Vice President, Strategic Policy Analysis
American Electric Power
Introduction

• Overview of AEP

• AEP’s Environmental Strategy

• AEP Board of Directors Emission Assessment Report to Shareholders
AEP: An Introduction

- Largest U.S. electricity generator and coal user
- A leading consumer of natural gas
- Major wind developer
- 220,000+ miles of T&D
- 5 million customers in 11 states

AEP Fuel Portfolio: Increasingly Diverse

<table>
<thead>
<tr>
<th></th>
<th>Coal</th>
<th>Gas</th>
<th>Nuclear</th>
<th>Hydro</th>
<th>Wind</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>88%</td>
<td>0%</td>
<td>9%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Today</td>
<td>70%</td>
<td>20%</td>
<td>7%</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Our Strategy

• Asset diversification and optimization
  – Multi-fuels (coal, gas, renewables)

• Coal has important long-run role
  – Substantial air emissions compliance –
    $5 billion in retrofit controls thru 2020
  – IGCC/new technology –
    Build new IGCC plant in next 5-7 years

• Integrated environmental/energy strategy
AEP GHG/CO2 Strategy

**Active engagement in GHG issue**
- Support research on science of climate change
- Pursue policy, research, technology, and business opportunities
- Position paper on Global Climate Change

**Advocate market mechanisms and flexibility**
- Avoidance, reduction, and sequestration options
- Advocate trading, banking, offsets, early action credit (CCX)
- Reform NSR to allow for efficiency investments

**Short Run – Voluntary cost-effective actions to reduce GHGs**
- Improve generation efficiency, renewables (biomass & wind), forestry

**Long Run – Technology development and deployment**
- Low/zero carbon coal generation (e.g., FutureGen, geologic sequestration)

**Bottom Line: Reduce financial risk associated with GHGs**
AEP Board Subcommittee Emission Assessment Report to Shareholders

• “An Assessment of AEP’s Actions in Mitigate the Economic Impacts of Emissions Policies”
  – Assessed AEP’s actions to mitigate economic impacts of possible requirements to reduce CO2 and other emissions
  – Interviews of 28 individuals with diverse views and expertise; management interviews to determine AEP actions; AEP provided Board technology assessment and scenario cost analysis

• **Central challenge for AEP**: Making large investments at long-lived assets ($5 billion by 2020 for air pollution control) given major policy and technology uncertainties

• **Subcommittee concludes**: “**AEP actions over the last decade constitutes solid foundation for future efforts.**” Among recommendations:
  – Commit to being an industry leader in development of IGCC technology (**AEP to build at least one large IGCC**)
Conclusions from Economic Analysis

- AEP’s near-term investment decisions in scrubbers and SCRs at its existing plants are unaffected by possible future greenhouse gas legislation (e.g., Carper or McCain-Lieberman)
  - These investment decisions are “robust” because they are being made at AEP’s lowest cost plants
  - Only when marginal retrofit decisions need to be made (post-2010) would a CO2-constraint affect the decision

- Carper bill costs AEP substantially more than McCain-Lieberman largely because of its allocation of CO2 reductions/allowances
  - This demonstrates how economic impacts are affected by policy design considerations independent of actual greenhouse gas reduction benefits
AEP’s Long Term Greenhouse Gas Strategy: A Portfolio Approach

**Long Term GHG Strategy**

- **Renewables** (e.g. biomass co-firing, wind)
- **New generation R&D and technology**
- **CCX and other market-based credits**
- **AEP off-system reductions (e.g. forestry)**

Example: AEP Long-Term 20% Reduction: 35 MMTons

### Technology
- Red

### Forestry
- Green

### Market
- Blue

### Renewables
- Yellow
AEP’s Portfolio of Current Initiatives

• Proactive participation in international and national policy
  – Pew Center Business Environmental Leadership Council member
  – Board of Directors of International Emissions Trading Association (IETA)
• EPA Climate Leaders program (w/ GHG reduction target)
  – Also Natural Gas Star & SF$_6$ programs
• Chicago Climate Exchange (CCX)
• Business Roundtable Climate RESOLVE Initiative
• e7 CDM projects
  – Wind development in Galapagos and Chile
• Renewables
• Forestry/terrestrial sequestration
• Coal IGCC and geologic sequestration
… and AEP

- Unprecedented voluntary GHG reduction/trading pilot
- AEP founder (70+ total members)
- 4% reduction in GHG emissions by 2006; 10% cumulative reductions = 16 MM Metric Tons of CO2

Why CCX?
- Policy precedent
- Low cost insurance; Learning by doing
- Voluntary commitment
- Integral to strategy
Renewables

• Principal activities:
  – AEP 2\textsuperscript{nd} largest US wind generator in 2002; doubling wind generation by 2006
  – Biomass co-firing in US and UK

• AEP’s key development principles:
  – Permanent Production Tax Credit (PTC) for all renewables
  – Integration into state energy plans

• Wind advantages:
  – Zero emissions
  – Vast “technical” potential

• Wind constraints:
  – Intermittent
  – High capital
  – Remote/Transmission
AEP Terrestrial Sequestration Projects

- Noel Kempff Mercado Climate Action Project
  - Largest forestation project in the world
- Guaraquecaba Climate Action Project
  - 7-9 MMT of CO2 sequestered
- Catahoula National Wildlife Refuge Project
  - $6 million investment; approximately 5 MMT of CO2
- UiltiTree Carbon Company and PowerTree Carbon Company
  - UTCC: 41 utilities; $3.2 million investment; 3 MMT of CO2
  - PTCC: $3 million funding; 3,800 acres; over 2 MMT of CO2
- US DOE Climate Challenge Tree Planting & Forestry Management
  - $11.95 million investment; 30,000 acres; 22 million trees; 9.1 MMT of CO2
- Land Restoration (The Wilds, ReCreation Land)

AEP has planted 60 million trees since the 1940’s
IGCC – The Good, the Bad, and the Ugly

The good…
- Superior efficiency on Eastern bituminous coal
- Superior environmental performance
- Flexible byproduct processing
  - Tri-generation opportunities
  - Hydrogen production
- Conducive to carbon capture & disposal

The bad…
- High capital cost
- Currently not economical for low-BTU coals
- More IGCC must be built to reduce cost

…and the ugly
- The business deal: (1) no equipment suppliers, only technology licensers
  (2) virtually all technology/performance risk on plant owner

But … GE recently purchased Chevron Texaco’s gasification business
On 11/21/02, the U.S. DOE announced that AEP, Battelle and our collaborators would lead a $4.2 million research project on geologic CO$_2$ disposal.

Major sponsors include DOE, Battelle, AEP, Ohio Coal Development Office, BP, and Schlumberger

$1 Billion, 10-year demo project to create world’s first coal based, zero-emission electricity and hydrogen plant with sequestration

Major sponsors include AEP, Cinergy, CONSOL, Kennecott, PacifiCorp, Peabody, RAG American, Southern, North American Coal, TXU
AEP’s Participation in EPA’s SF₆ Program

- AEP charter partner (1999)
  - 1999 SF₆ emissions: 19,778 lbs. (Rate: 10%)
  - 2003 SF₆ emissions: 12,929 lbs. (Rate: 4%)
  - Total SF₆ emissions prevented (1999-2003): 32,538 lbs. (0.3 MMT CO₂-equivalent)
AEP’s SF$_6$ Actions

- Monitor purchases of SF$_6$; Recycling/Reuse
- Review/implement preventative maintenance
- Training on proper handling
- Replace leaking circuit breakers
- Encourage development of lower-leak breakers
- Annual reports, conferences, etc.
- Implement best-practices
- Laser imaging video

- Efforts paid for themselves through avoided gas purchases
- Annual savings exceed $50,000 in SF$_6$ gas purchases
- Subsequent activity will increase savings even more