

# THE ENVIRONMENTAL BENEFITS AND IMPACTS OF THE AEP INTERSTATE PROJECT

## SUMMARY OF ENVIRONMENTAL BENEFITS AND IMPACTS

AEP proposes to build the AEP Interstate Project, a major 765 kV transmission project from West Virginia to New Jersey. AEP and many others believe that electric transmission should be developed into our nation's next interstate highway system. The goal for transmission development must be a higher degree of transparency to enable our nation:

- To allow generators to compete head to head, lowering costs to consumers,
- To encourage siting of newer, more fuel diverse, and environmentally advanced generators to achieve a stronger domestic energy position, and
- To provide a higher degree of reliability to foster enhanced national security.

### **Long Term Environmental Benefits**

In addition to the substantial economic benefits associated with the line (described in a companion paper), there are potential environmental benefits and impacts. In the long run, we expect the line will be environmentally beneficial as it helps further the development of newer more efficient generation capacity, including environmentally advanced technologies such as Integrated Gasification Combined Cycle (IGCC). In addition, the line should also facilitate the interconnection of new renewable power generators (e.g. wind, biomass, and others), through the elimination of current congestion problems. This will reduce overall air emissions as newer, cleaner technologies displace older less efficient power plants. Because broader market penetration of newer technologies depends on a "learning curve," improvements will only occur as more facilities are constructed. A less congested transmission grid will play an important role in allowing for the development and maturation of newer technologies, such as IGCC coal plants. Also, IGCC can play a critical role in ultimately providing the option of carbon capture and sequestration.

In the case of IGCC (as well as other new advanced coal fired plants), the economics of construction and operation improves significantly if they can be sited in the western portion of the PJM system (e.g. western Pennsylvania, West Virginia, Ohio, Kentucky, Indiana and Illinois), in closer proximity to low-cost coals. As such, a less congested grid will allow for greater siting flexibility and allow for greater development of clean coal technologies such as IGCC. The economics will be further helped as the construction of additional plants brings

down costs (“learning curve” improvements) and improves future plant efficiencies (e.g., current IGCC plants are expected to have heat rates of approximately 8,800 Btu/kWh, which can probably be improved by as much as an additional 10-15 percent as more experience is obtained).

Among renewable technologies, wind power has had the best market penetration and has the best long-term promise for meeting a significant portion of future electricity needs. In addition to the current production tax credit, the economics of wind power are heavily driven by the available wind resources at a given site, with higher wind areas resulting in higher capacity factors than lower wind areas. Within PJM, many of the best wind resources are in West Virginia and in west and central Pennsylvania, while the resources are more limited in New Jersey, Maryland and Delaware. A less congested grid will allow for more wind projects to be sited and the energy transmitted to eastern PJM. Further, as an intermittent resource that effectively “must-run” when the wind blows, wind power requires a less congested grid to be most effectively used. The bottom line is that wind development should be helped in the long run by the AEP Interstate project with the result being more zero emitting generation in PJM.

### **Direct Environmental Effects**

Direct environmental effects of the project will be studied in detail as part of the siting process. Although the proposed corridor includes approximately 550 miles, actual “on the ground” impacts will be limited to tower sites, material storage sites used during construction, and any additional access roads required during construction or for operation/maintenance.

While the 765 kV line will only require a 200 foot-wide right-of-way, a 1,000-foot wide corridor will be assumed for preliminary investigation during the planning stage. Part of this investigation will include identification of environmentally sensitive areas within that corridor in order to arrive at the selection of a preferred route and alternatives that minimize overall environmental impacts.

More detailed examinations will be required in connection with certain state and/or federal permits issued for the project, and may include, as appropriate, wetland surveys, stream crossing evaluations, historic and cultural resource evaluations, examination of any threatened or endangered species that are present in the project area, and other studies. As is AEP practice, the line will be designed and built in an environmentally friendly manner to ensure mitigation/minimization of any impacts.

### **No Indirect Environmental Effects on Regulated Air Emissions**

Secondary, or indirect environmental effects of the project also will be evaluated during the siting process, including any potential effects the additional

transmission capacity may have on regulated air emissions from the generation of electricity. However, with the implementation of the Clean Air Interstate Rule (CAIR), the Clean Air Visibility Rule (CAVR), and the Clean Air Mercury Rule (CAMR), regulated air emissions of sulfur and nitrogen oxides and mercury will be subject to declining caps by the time this project comes into service, so no net increase will occur. (See “Detailed Discussion of Environmental Impacts” for more discussion)

Impacts on non-regulated emissions, such as greenhouse gases, are difficult to predict, given the substantial uncertainties associated with fuel and emission allowance prices, new generation choices, and the lack of a current regulatory framework.

## **DETAILED DISCUSSION OF INDIRECT ENVIRONMENTAL IMPACTS**

### **Impacts on Regulated Air Emissions**

Regulated air emissions (i.e. SO<sub>2</sub>, NO<sub>x</sub> and Hg) are subject to declining limits or caps that have substantially reduced, and will continue to reduce, air emissions over time. In 2005, EPA issued a final Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR). The limits under these rules will result in:

- Aggregate reductions across the eastern half of the U.S. of about 50% in SO<sub>2</sub>, NO<sub>x</sub> and Hg by 2010 (below current levels), and approximately 65-70% reductions by 2015 (2018 for Hg), when the line is operational.
- Since 1994, even greater aggregate reductions of SO<sub>2</sub> and NO<sub>x</sub> emissions, when the effects of CAIR and CAMR are combined with regulations under the 1990 Clean Air Act Amendments (i.e. the 1990 Amendments took effect in 1995).

The reductions in the AEP-East system are estimated to be even more substantial than the average across the CAIR and CAMR affected regions in the U.S. It is expected that the AEP experience will be fairly typical of other PJM West and Midwestern electric power producers that could see higher generation demand as a result of the transmission line project.

By the 2015-18 period, when the line is scheduled to be fully operational, AEP-East coal-fired power plants are estimated to have reduced their SO<sub>2</sub> and NO<sub>x</sub> emissions by about 80-85% since 1994. By 2018, mercury emissions are estimated to be 65-70% below current levels. This percentage reduction is expected to be fairly typical of other Midwestern/ PJM West coal fired generators over a similar period.

By the 2015-18 period, approximately three quarters of AEP's eastern coal-fired capacity in operation is estimated to have a maximum level of controls (i.e. about 95% SO<sub>2</sub> removal from FGD, 90% NO<sub>x</sub> removal from SCR, and some substantial Hg removal as a co-benefit of SCR/FGD installations) or will be new clean coal technology (such as IGCC with even lower emission rates). Again, this level of controls is expected to be typical of others in the region.

It is against this backdrop of tightly controlled, low-emitting, coal-fired plants in 2015 and beyond that the impact of the AEP Interstate Project must be assessed. The AEP Interstate Project is likely to result in an increase in incremental generation from PJM West and the Midwest, and a reduction in generation in the eastern portion of PJM (e.g. Eastern PA, NJ, MD and DE). Some of this incremental generation may come from coal-fired power plants in the Midwest, displacing the operation of oil and gas fired power plants in Eastern PJM. Despite this:

- Aggregate regulated air emissions will be unaffected. Companies will continue to have to meet their SO<sub>2</sub>, NO<sub>x</sub> and Hg caps. Thus, aggregate emissions will be unchanged. To the extent emissions of SO<sub>2</sub>, NO<sub>x</sub> and/or mercury increase at one power plant (because of greater operation), they will be offset by further reductions at other power plants within the system.
- Regional shifts in emissions may occur, but any such shifts would be expected to be very small. Even to the extent that offsets do not occur in the immediate region, the shifts in emissions will be very small, because average SO<sub>2</sub> and NO<sub>x</sub> emission rates from coal fired power plants will be very tightly controlled at or below the emission rates at many existing oil and gas steam power plants.
- There could be air quality benefits associated with shifts in regional emissions and earlier reductions. One response to higher projected generation at coal fired units in 2015 and beyond is additional emission reductions in earlier years, with the extra reductions "banked" and used to offset possible increases in emissions (due to higher generation). The net effect of this shift would be an air quality benefit because more reductions would occur sooner.

### **Impacts on CO<sub>2</sub> Emissions**

Shifts in regional generation that result from the completion of the AEP Interstate Project could result in changes in CO<sub>2</sub> emissions. Though CO<sub>2</sub> emissions are not regulated in the U.S. as a whole, there are voluntary reduction programs such as the Chicago Climate Exchange (CCX), of which AEP is a member, that cap and reduce CO<sub>2</sub> and other greenhouse gases. (During 2003-10, AEP will be reducing a cumulative 46 million metric tons under the CCX program) In addition, several Northeastern states (including New Jersey and

Delaware within PJM) have agreed to limit their electric power CO2 emissions under the Regional Greenhouse Gas Initiative (RGGI).

In the years immediately following the completion of the AEP Interstate Project, the effect on CO2 emissions is uncertain. The uncertainty stems from two major factors:

- First, the amount of additional power that flows as a result of the line completion will vary. The increase in carrying capability from the west to eastern PJM of approximately 5,000 MW will depend on actual conditions (e.g. which plants are operated in the various PJM generator locations). Further, the amount of time during the course of the year in which it will be economic to move power from west to east will depend on relative demands across the region, generating capacity available and a host of market and economic factors. A conservatively high estimate is that an additional 20 Million MWh will flow from western to eastern PJM. However, due to economic factors, significantly lower amounts of incremental power may move from West to East over the course of the year.
- Second, shifts in generation by fuel type are uncertain and will depend on relative fuel prices, generating capacity efficiencies and emission allowance costs, as well as amount of new generating capacity built and existing capacity retired a decade or more from now. For example to the extent current oil and gas prices prevail and oil and gas fired generation continues to operate at current levels, there could be significant reduction in oil and gas generation replaced by new coal fired generating plants or possibly newer gas fired combined cycle units. To the extent gas prices fall to much lower levels, new gas-fired generation may displace oil or even existing coal-fired generation.

By 2015, several other important factors drive the shifts in generation as well.

- Existing coal-fired power plants will be running at or near their maximum capacity factors, thus there will be little additional incremental generation that will come from these plants.
- Most incremental generation would likely come from (1) new coal/IGCC plants sited in the most economic locations near fuel supplies in the Midwest/ PJM West; (2) new renewable plants such as wind that are sited in the best wind resource locations with minimal environmental impacts; (3) recently built combined cycle gas plants which are substantially underutilized.
- Most generation displaced in eastern PJM would include less efficient, more expensive to operate oil/gas steam capacity, perhaps some older more expensive coal-fired units, and gas combustion turbines and gas combined cycles.

- In general, variable operating cost of units in eastern PJM would be expected to be higher than in PJM West/Midwest. This reflects higher delivered coal costs (reflecting greater distance from the coal fields) and somewhat higher delivered gas prices (reflecting existing gas transmission bottlenecks moving gas into the Northeast).

In light of these factors, CO<sub>2</sub> emissions may increase, decrease or stay approximately the same in the years immediately after the line is completed. To the extent coal-fired generation increases and displaces gas-fired generation, emissions will increase. To the extent new coal-fired generation displaces less-efficient coal, emissions will decline. Also, to the extent currently underutilized, combined cycle gas (or new gas) displaces less efficient oil or gas generation, emissions will decline. Finally, to the extent new non-fossil generation such as renewables or nuclear increases, emissions will also decline. As noted, the indirect emission impacts of the project will be the subject of future, more detailed environmental impact analyses during the siting process.

However, in the long run, the AEP Interstate Project is expected to result in environmental benefits as it enables a diversity of low- or zero-emitting, new energy technologies to be sited and economically built and operated.