Transmission Planning for a New Energy Future

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American Electric Power

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## American Electric Power

### Company Overview

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues (in billions)</td>
<td>$13.5</td>
</tr>
<tr>
<td>Net Income (in millions)</td>
<td>$1,357 ¹</td>
</tr>
<tr>
<td>Earnings Per Share</td>
<td>$2.96 ¹</td>
</tr>
<tr>
<td>Cash Dividends Per Share</td>
<td>$1.64</td>
</tr>
<tr>
<td>Service Territory</td>
<td>197,500 mi²</td>
</tr>
<tr>
<td>Transmission</td>
<td>39,000 miles</td>
</tr>
<tr>
<td>Distribution</td>
<td>215,800 miles</td>
</tr>
<tr>
<td>Generating Capacity</td>
<td>38,988 MW ²</td>
</tr>
<tr>
<td>Generating Stations</td>
<td>More than 80</td>
</tr>
<tr>
<td>Renewable Portfolio (hydro)</td>
<td>364 MW ³</td>
</tr>
<tr>
<td>Pumped Storage</td>
<td>586 MW</td>
</tr>
<tr>
<td>Renewable Portfolio (wind, solar)</td>
<td>1,406 MW ⁴</td>
</tr>
<tr>
<td>Total Kilowatt-hour Sales (in millions)</td>
<td>195,312</td>
</tr>
<tr>
<td>Total Assets (in billions)</td>
<td>$48.3</td>
</tr>
<tr>
<td>U.S. Customers (year-end, in thousands)</td>
<td>5,220</td>
</tr>
</tbody>
</table>

1. Generally Accepted Accounting Principles.
2. Represents nominal capacity; includes 270 MW of mothballed / decommissioned generation, AEP’s interest in Ohio Valley Electric Corp., purchased power agreements and renewables.
3. Excludes pumped storage; includes owned capacity and purchased power.
4. Regulated wind and solar capacity on line or under contract.
Electricity Supply Challenges

- **Generation**
  - Increasing electricity demand
  - Climate change and drive to reduce CO₂ emissions: role of fossil fuels, nuclear, and renewables
  - Increased investment costs
  - Re-emergence of market-based supply

- **Transmission**
  - Aging and stressed infrastructure in need of renewal to maintain reliability and reduce congestion
  - Expansion to provide access to renewable resources
  - Needed changes in planning, cost allocation, and siting

- **Distribution**
  - Managing continued increase in demand
  - Integrating Smart Grid technologies and customer interface
  - Aging infrastructure
Transmission Today

• Why Change Now?
  – Dramatic shifts in generation profile
  – Increase in electrically isolated large scale renewables
  – Environmental requirements forcing retirement of large fossil units
  – Search for a “bright line” between reliability and economic transmission projects is increasingly artificial

• What Needs to Change?
  – Planning for a new energy supply paradigm
  – Cost allocation principles to enable a strategic expansion of transmission
  – Siting processes which are aligned with state, regional and national energy policy objectives

• “What got us here won’t get us there.”
Renewable Energy Development

47% of Nation’s Generation Interconnection Queue
Evolution of Planning

- We need long-term national plan for electric transmission that considers regional differences but maintains a common goal
  - Existing transmission, resources, and populations vary widely

- Plan objectives must include:
  - Connecting renewable energy
  - Replacing aging assets
  - Market efficiency
  - Reliability

A strategically planned Extra High Voltage (EHV) grid can provide capacity, operating flexibility, and the ability draw on diverse resources that will insulate consumers from shortages, catastrophic events, and higher prices.
Costs & Benefits

- Substantial transmission investments in transmission have a small impact on customers.

- Transmission expansion facilitates lower delivered energy costs due to:
  - Increased competition and less constrained markets
  - Reduced energy losses

- Studies show transmission pays for itself

“Least Cost” is rarely “Best Value”
SPP taking steps to address multi-state EHV transmission expansion and cost allocation

New cost allocation proposal filed with FERC:
- “Highway” projects (transmission >300 kV): costs are shared on postage-stamp basis
- “Byway” projects 100-300kV: 1/3 of costs shared on postage stamp basis; 2/3 allocated to local zones
- “Byway projects” <100 kV: costs fully allocated to local zones

Priority Projects: Group of six “no regrets” transmission projects recently approved

Now beginning the Integrated Transmission Planning (ITP) Process
- 20-year time frame
- Develops transmission solutions to address economics, reliability, market efficiency, and renewable integration
We Have to Start Somewhere...

- Major transmission projects can take many years to build – the longer we wait, the longer it will take to meet our energy goals

- Numerous studies have been completed or are underway across the U.S., many with similar results and common elements

- We need to move to develop some “no regrets” projects
A Way Forward

• Three major hurdles to transmission development:
  – Planning – What do we build and when?
  – Cost Allocation – I don’t want to pay for that guy’s transmission...
  – Siting – NIMBY

• Hurdles can be overcome by:
  – Clear energy policy, particularly as it relates to renewables and CO₂
  – Broad, collaborative transmission planning that recognizes the unique challenge of renewable integration
  – Cost support for strategic EHV transmission expansion
  – State and federal support for siting transmission lines, particularly those that are critical to meeting energy goals