Electric Transmission: Meeting the Needs of the 21st Century

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AEP AMERICAN® ELECTRIC POWER


Agenda

- American Electric Power
- Energy Policy Act of 2005
  - Drivers of the Act
  - EPAct05: Striking a Balance
- National Interest Electric Transmission Corridors
- Building an Interstate Transmission System
  - Changing our expectations of transmission
  - Wind Integration
- AEP Advocacy Initiatives
- Siting Transmission

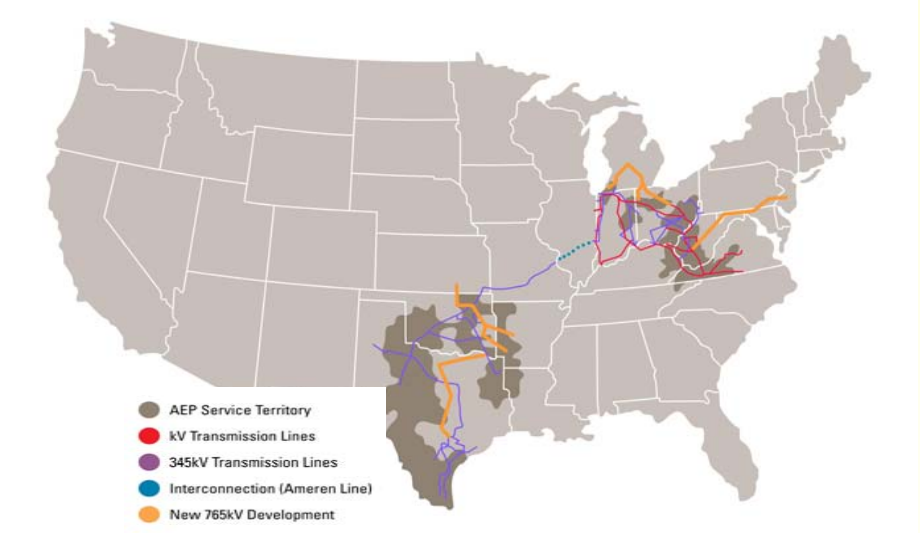
American Electric Power

Strength & Scale in Assets & Operations

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

Asset	Size	Industry Rank
Domestic Generation	~38,400 MW	#2
Transmission	~39,000 miles	#1
Distribution	~208,000 miles	#1

- **Coal & transportation assets:**
  - Control over 8,000 railcars
  - Own/lease and operate over 2,600 barges & 51 towboats
  - Coal handling terminal with 20 million tons of capacity

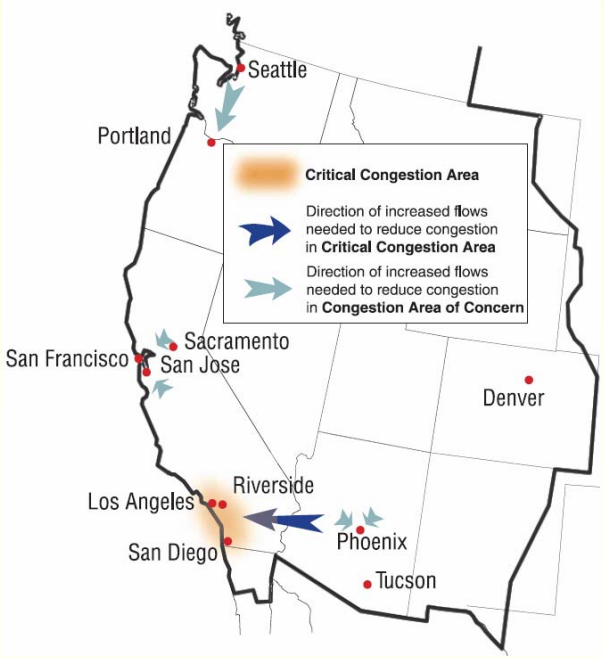


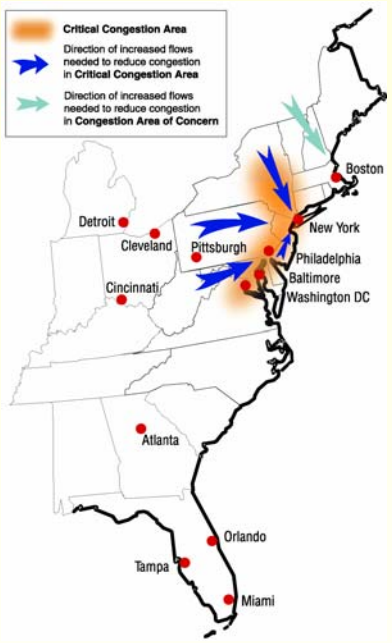
AEP Generation Portfolio				
Coal	Gas	Nuclear	Hydro	Wind
67%	24%	6%	2%	1%

AEP enjoys significant presence throughout the energy value chain.

Drivers of EPAct05

Reliability & Congestion



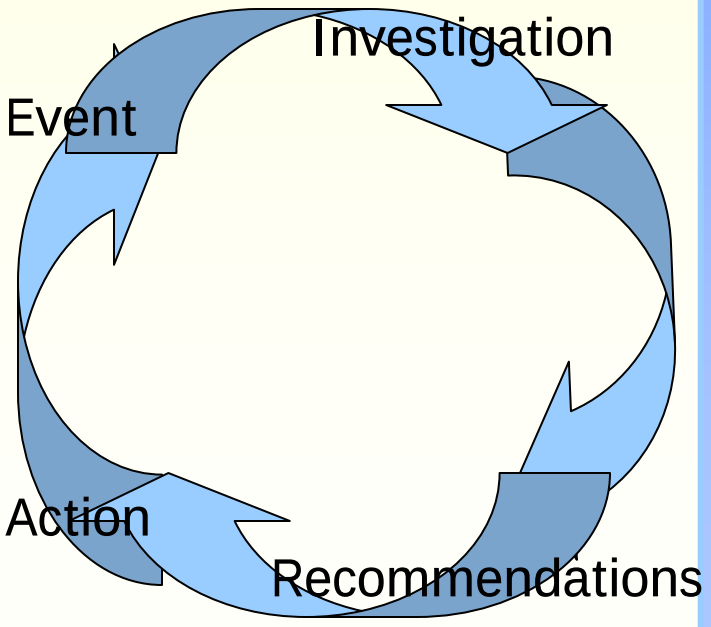


Source: 2006 DOE National Electric Transmission Congestion Study

- Transmission problems can impact more than a state or an entire region.
  - August 14, 2003 blackout affected an estimated 50 million people and 61,800 megawatts (MW) of electric load in the states of Ohio, Michigan, Pennsylvania, New York, Vermont, Massachusetts, Connecticut, New Jersey and Ontario.
- Similarly, transmission improvements can benefit multiple states.

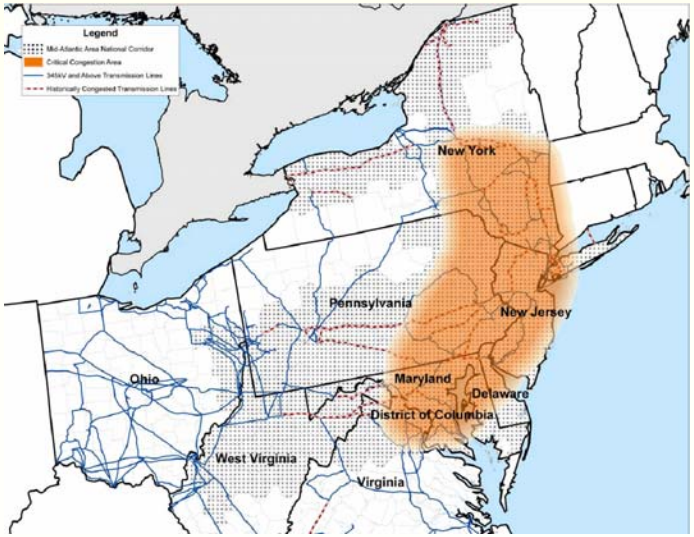
Drivers of EPAct05

- **August 13, 2003 Blackout**
- **August 15, 2003** President Bush and Prime Minister Chrétien directed formation of a joint U.S.-Canada Power System Outage Task Force to investigate the causes
- **DOE Issues Recommendations**
  - Imposition of *"Mandatory and Enforceable"* Reliability Standards with *penalties* for non-compliance.
  - Develop a regulator approved mechanism for funding NERC and the Regional Reliability Councils, to ensure *independence*.
  - Strengthen the institutional framework for reliability management in North America.
- **EPAct05 Passes Promoting**
  - System modernization and incentives for new technologies
  - Clean fuel technology and efficiency
  - Recognition of state interests
  - Strengthening Nation's power grid improving system reliability and fair wholesale competition



National Interest Electric Transmission Corridors

- EPAct05 requires the Secretary of Energy to conduct a nationwide study of electric transmission congestion (within one year from the date of enactment and every three years thereafter). Federal law requires:
  - DOE to consult with ''affected States.''
  - Provides ''interested parties'' with an opportunity to offer ''alternatives and recommendations.''
- DOE designated two NIETC corridors, one in the Mid-Atlantic Region and one in the Southwest U.S.



Building an Interstate Transmission System: Regulatory Support Needed

- Advancing a Vision Takes Leadership and Action
  - Federal jurisdiction over interstate transmission is needed to ensure efficient interstate commerce:
    - Oversight of cost allocation and siting for interstate transmission assets, defined as existing and new transmission at voltages above 300 kV
    - Elimination of hurdles to inter-regional projects caused by the application of different planning and cost allocation policies.
  - States must act to ensure their constituents benefit with better access and market efficiency enabled by the interstate grid:
    - Pass-through of costs at the retail level.
    - Collaborative regional planning and expedited siting.

As the electric grid evolves, so must our polices for planning, siting, allocating, and recovering transmission investments.

AEP®

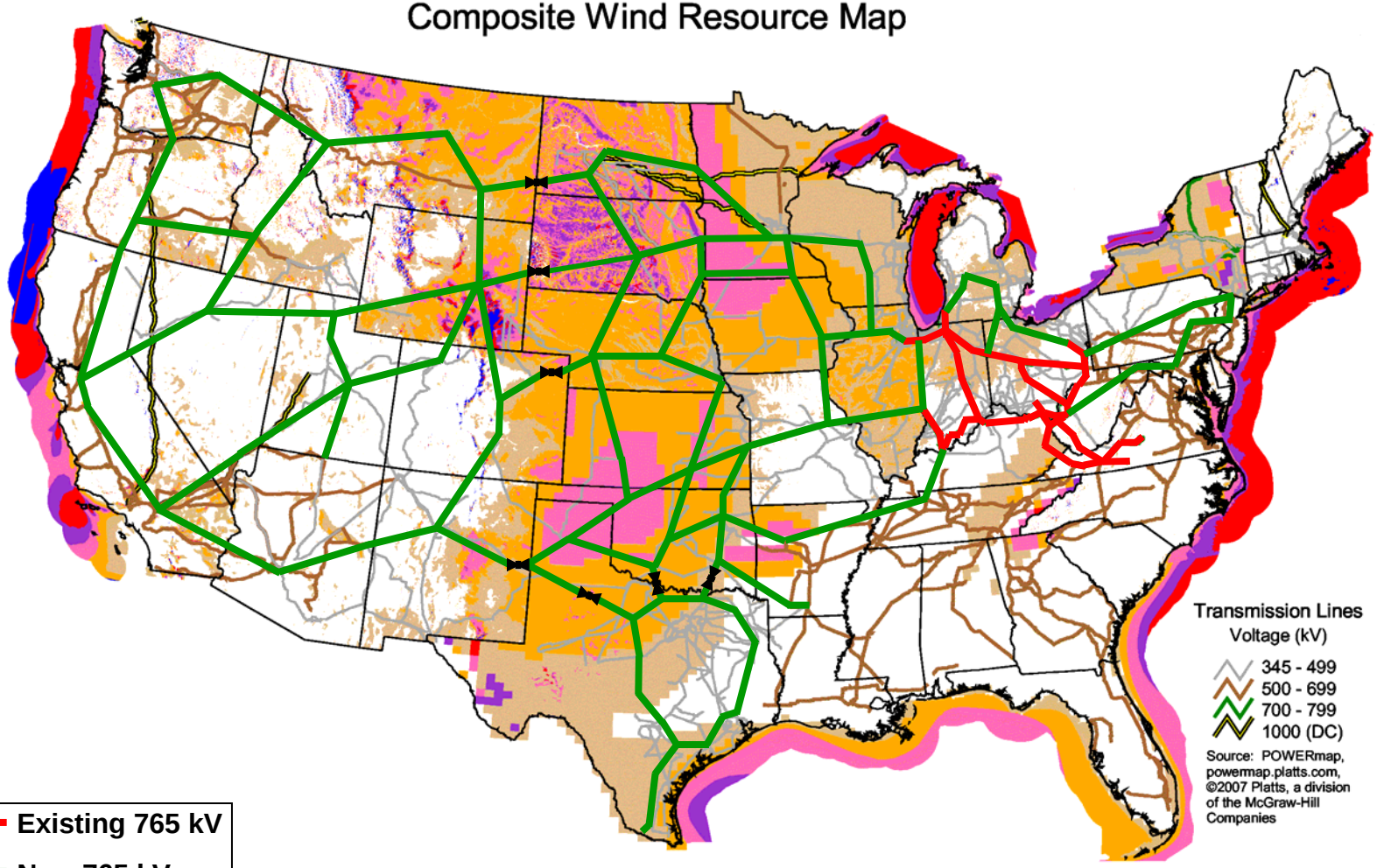
Building an Interstate Transmission System

"We need a true nationwide transmission version of our interstate highway system; a grid of extra-high voltage backbone transmission lines reaching out to remote resources and overlaying, reinforcing, and tying together the existing grid in each interconnection to an extent never before seen."

Suedeen Kelly-Commissioner FERC

July 23, 2007 ERO006-18-007/008 (FERC's denial of rehearing on MISO's current cost allocation method.)

Composite Wind Resource Map



Transmission Lines
Voltage (kV)
345 - 499
500 - 699
700 - 799
1000 (DC)

Source: POWERmap, powermap.platts.com, ©2007 Platts, a division of the McGraw-Hill Companies

Existing 765 kV
New 765 kV
AC-DC-AC Link

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed [a] at 50 m m/s	Wind Speed [a] at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

[a] Wind speeds are based on a Weibull k value of 2.0

U.S. Department of Energy
National Renewable Energy Laboratory

NREL

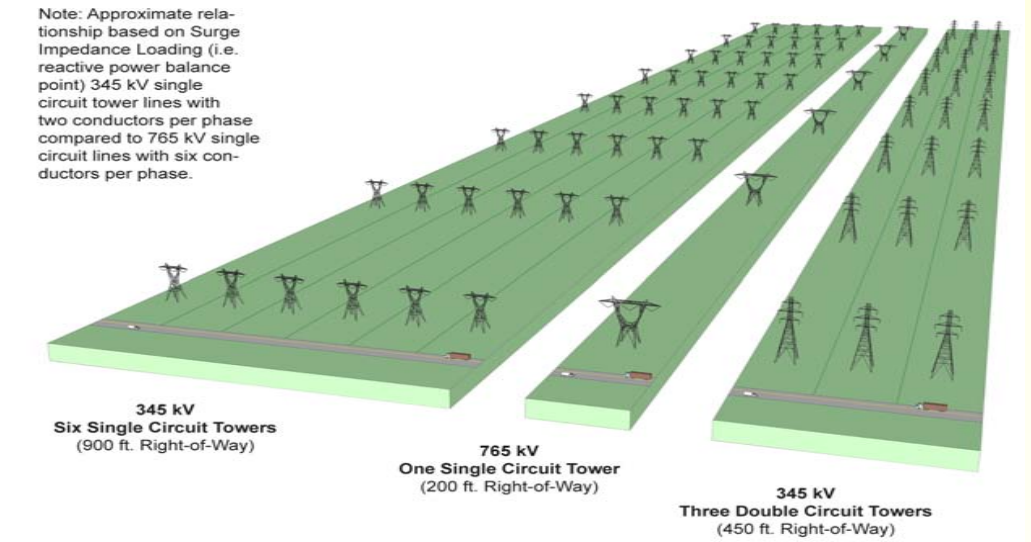
19-APR-2007 1.5.9

Key Advantages of 765-kV

Advanced Technology

- Advanced six-conductor bundles for higher capacity, lower line losses and reduced noise
- Fiber-optic shield wires for better protection and control
- Wide-area monitoring, control, and remote diagnostics
- Independent-phase operation for improved line performance
- Line design and right-of-way usage for least environmental impact

Environmental Stewardship



765-kV maximizes land use thus providing more capacity in less right-of-way.

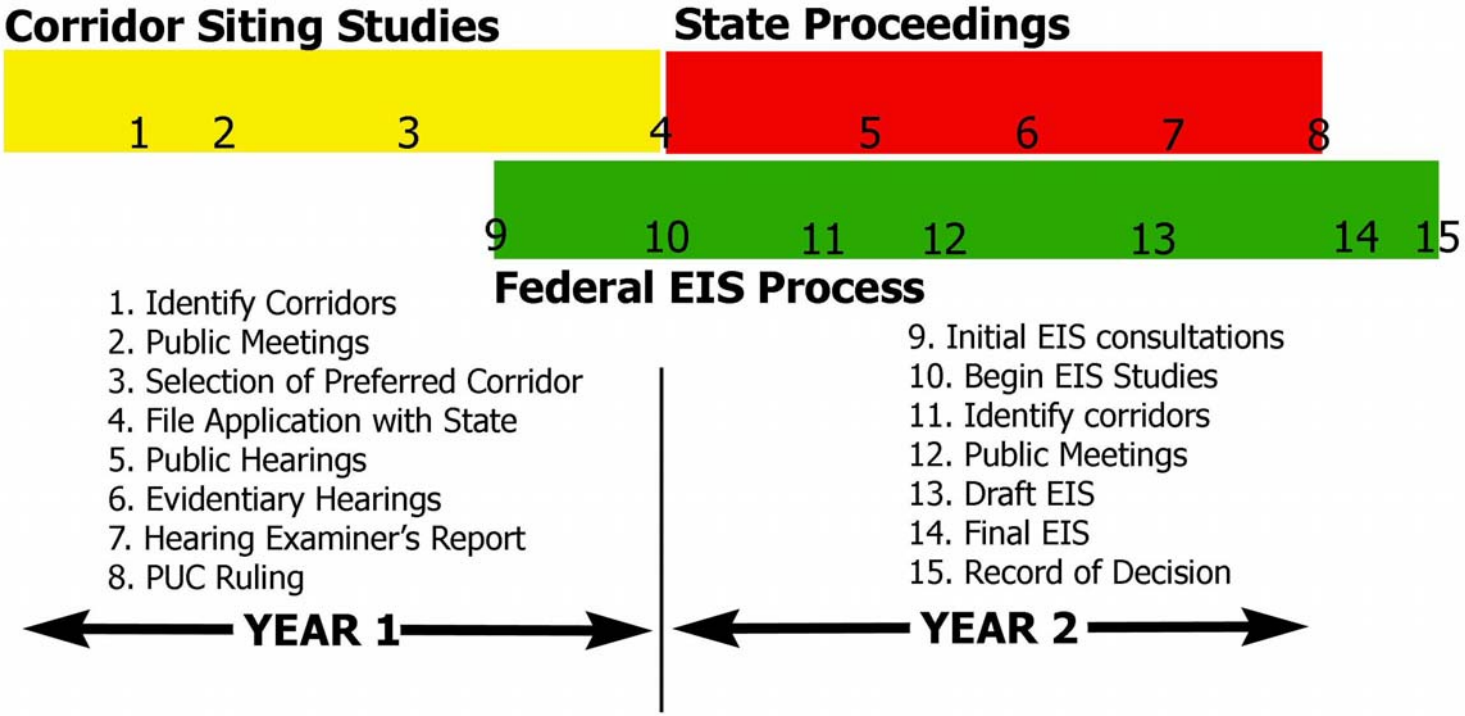
AEP Advocacy Initiatives

AEP Advancing the Development of a National Interstate Grid Today

AEP will continue to:

- Support the development of a federally regulated (FERC) extra-high voltage, interstate transmission grid, which will:
  - Improve reliability and efficiency of interstate transmission.
  - Enhance market competition, and optimal economic dispatch.
  - Reduce the need for additional generation across an expanded market area.
- Work with partners to advance the building of the I-765 ™, the next interstate, with the most advanced technological solutions.
- Engage regulators to ensure benefits of access and market efficiency of the next interstate, and to ensure proper planning, siting, allocation and recovery.

Typical Siting Process



Then, an additional 1-3 years are needed for right-of-way acquisition and construction depending on length and complexity of the transmission line.

Siting Transmission

AEP Siting Principles

AEP is dedicated to:

- Providing reliable energy to our customers
- Incorporating new concepts and ideas to address aesthetic and land use issues
- Maintaining strong environmental principles
  - Identifying powerline routes that minimize the overall impact to local residences and the surrounding environment

Example: Protecting Cultural Resources

Project: Wyoming-Jacksons Ferry

- Location: Kimball, WV
- Designated historic district
- Topography used to route project and reduce views
- Demonstrates flexibility

Example: Protecting Cultural Resources

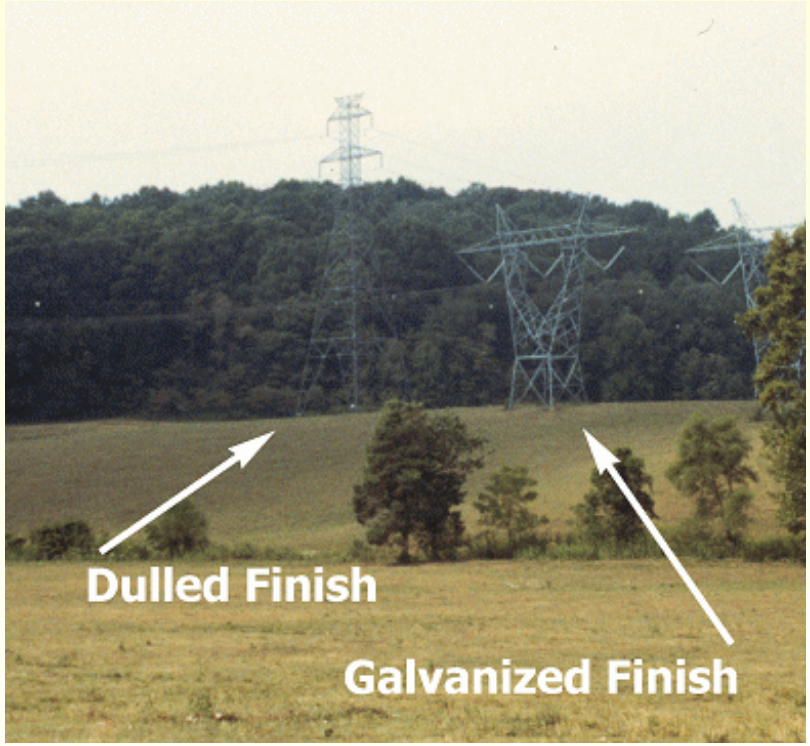
Blue Ridge Parkway

Example: Protecting Natural Resources

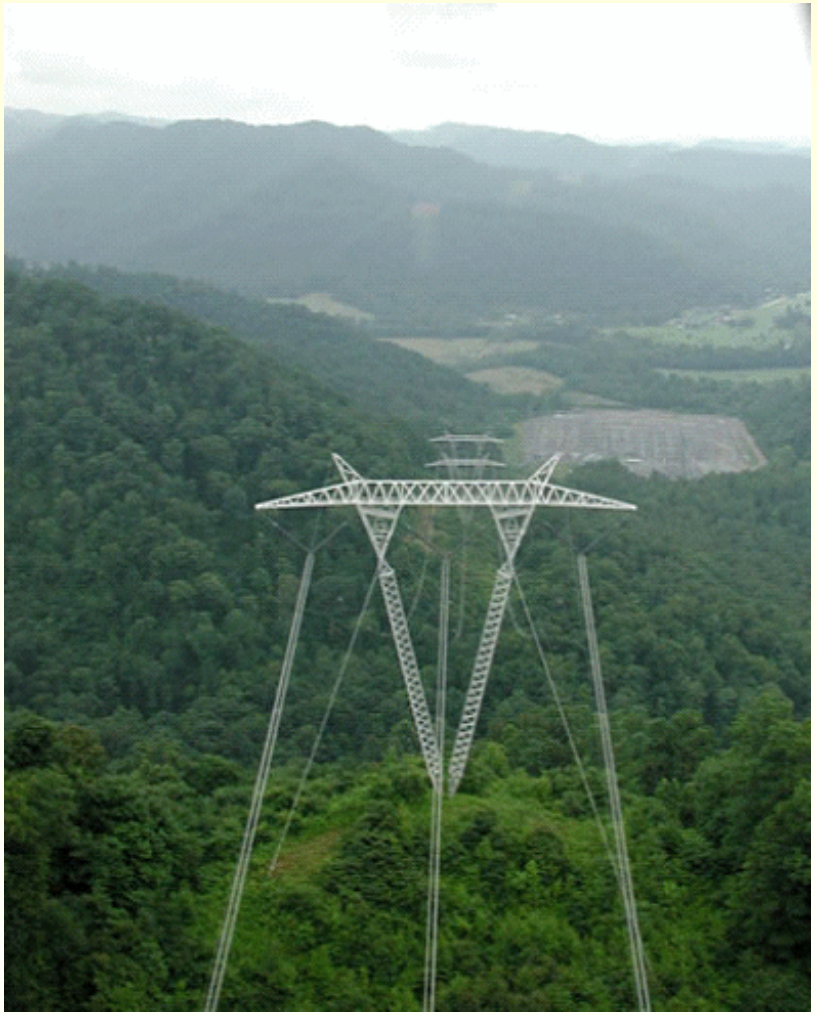
Endangered Species

Construction Techniques

Example: Protecting Visual Resources



Use of Darkened Materials



Select Cut Right-of-way