Transmission Planning

Putting the Horse Before the Cart

Robert A. O'Neil

Regional State Committee Meeting

Kansas City

July 23, 2007

Preliminary Comments

- These comments are focused on the need for effective long term backbone transmission planning
- These comments advocate a departure from current practices
- These comments are personal, and do not purport to represent the position of any SPP Member.

Overview

Planning Backbone Transmission: Historic

- Vertically integrated utilities planned transmission as needed to allow utility owned generating plants to reliably serve utility load
- Transmission interconnections with adjoining utilities were undertaken for reliability purposes and to support utility negotiated purchases or sales
- Utilities accepted “transmission congestion” resulting in out of merit dispatch and the cost of that congestion was passed on to all utility customers
- Third party transmission access was limited; utilities generally did not plan transmission to meet third party needs

Planning Backbone Transmission Current

- Transmission owners are supposed to provide non-discriminatory transmission access, including non-discriminatory planning for the needs of third party transmission customers
- Balancing interests of customers who require transmission upgrades with customers who have adequate transmission has been problematic
- Elaborate (and imperfect) computer modeling is used to identify the beneficiaries of new transmission
- Backbone transmission upgrades are planned based upon serving identified new generation resources

Planning Backbone Transmission Future

- Backbone transmission planning should be focused on assuring a robust system that offers a high probability that future energy requirements for a region can be reliably served from a broad portfolio of as yet unidentified resources
- Planning should seek to accommodate large inter-system flows, including large volumes of renewable energy
- The backbone planning process should have a minimum 20 year horizon
  - Backbone routing should be “friendly” to new generation resources
  - Rights of way should be acquired as soon as possible, and sized to accommodate future transmission upgrades

The Problem

Backbone Transmission Planning Should Not Follow Generation

- Generation construction lead times often are shorter than transmission planning, siting and construction lead times
  - Peaking: 12-18 months
  - Combined cycle: 24 months
  - Coal: 48-54 months
  - Nuclear: ?
- Backbone transmission permitting, acquisition of rights of way, construction etc. may exceed 60+ months
  - Increased development will make acquisition of rights of way more difficult
- Deferring backbone transmission upgrades until new generation is committed is risky: new generation capacity additions are timed to coincide with load requirements and SPP rules discourages construction of “excess” capacity, especially by small entities
  - Base plan funding for DNRs limited to levels that do not exceed 125% of load.

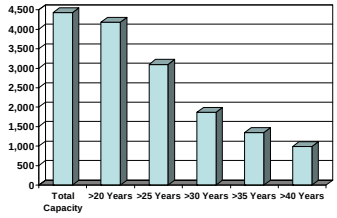
The Reliability vs Economic Upgrade Distinction

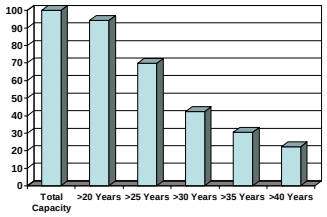
- Existing approach to meeting reliability fails to consider many factors
  - Fuel diversity
    - Gas curtailments could have material effect on reliability
  - Age of generation fleet
    - Risk of unit failure may increase with age
  - Vulnerability of existing transmission
    - e.g., SPS Oklaunion 354KV located in area prone to tornadoes
  - Increasing difficulty in permitting base load generation

SPS Generation Capacity

(SPS Capacity Older Than 20, 25, 30, 35, and 40 Years)

- Approximately 1000 MW of SPS generation is more than 40 years old
- Approximately 40% of SPS generation more than 30 years old





Based on SPS' 2003 FERC Form 1

Reliability vs Economic Upgrades

- 2007 Example
  - Loss of SPS Oklaunion 345KV line reduced imports to a 5000 MW+ control area to 78 MW
  - Transmission limitations together with minor shortages of capacity triggered numerous VRLs
    - June 20: VRLs during 5 hours, integrated hourly LIPs of $1034, $1614, $1765, $1077, $710
    - June 24: VRLs during 4 hours, integrated hourly LIPs of $2064, $584, $1902, and $583
    - June 26: VRLs during 4 hours, integrated hourly LIPs of $1059, $2041, $1559 and $1045
- Current SPP plans show no “reliability” need for SPS upgrades until 2016

Reliability vs Economic Upgrades

- If SPS upgrades now proposed for 2016 were in place reliability would be materially enhanced
  - VRLs are unlikely to have been triggered in June
- Additional benefits would be realized
  - economic import capability would be materially enhanced
  - substantial export capability for wind generation would exist
  - firm capacity imports could be accommodated when new DNRs come on line

The Existing Planning Process

- Traditional stakeholders focus on near to mid term (5-10 years)
  - Generators
  - TOs
  - LSEs
  - Reliability organizations
  - Regulators
- Long term process should utilize the expertise of a broad range of resources
  - Economic development organizations
    - Economic well being of communities will require reliable energy
  - Demographers
    - E.g., where will the baby boomers go?
  - Economists
    - Can economic modeling provide useful long term energy projections?
  - Energy conservationists
    - To what extent can growth in energy consumption be held in check through conservation? Potential may differ by geographic area

Factors Influencing Effective Long Term Transmission Development

- Traditional stakeholders tend to focus on near to mid term (5-10 years)
  - Generators
    - Plan resource additions to meet load
      - Financial requirements tie resource additions to projected load increases
      - Existing generators profit from capacity shortages
  - TOs
    - Regulatory limitations on revenue recovery can discourage new transmission investment
      - Lack of transmission also preserves/adds value to company owned generation
  - LSEs
    - Do not have the ability to unilaterally influence long term regional needs.
    - Also may be driven by short term interests
  - Reliability organizations
    - May lack power to implement a long term plan
  - Regulators
    - Broad responsibility to protect immediate, near term interests of ratepayers adds to challenge of identifying best long term actions

Recommendation

The Appropriate Planning Process

- Design backbone plan to meet the long term (20+ years) energy needs of the geographic “study” area (e.g., the SPP)
- Seek transmission routing that intersects or is near to favorable generating sites
  - Rail, water, natural gas pipelines, favorable wind areas, etc.
  - If feasible, planning organization should publish expected ability to accept generation injections without further upgrade costs
- Initiate two part regulatory approval process
  - Phase 1: Approval of transmission routing and acquisition of rights of way
    - Planning process may engender support of community leaders
  - Phase 2: Release for construction and provision for cost recovery (only needed if regulators are reluctant to grant long term pre-approval and automatic cost recovery not allowed)

Benefits of Long Term Transmission Planning on Generation Markets

- Prior regulatory approval and acquisition of rights of way assures that transmission lines can be built when the timing is appropriate to initiate construction
- Generation developers can make moderate capital investments to acquire/obtain options on plant sites, water rights, etc., near acquired transmission rights of way with comfort that needed transmission can be constructed in a timely manner and that it can accommodate planned generation additions
- Robust transmission reduces risk of generation being "locked in"
  - access to broader markets will encourage generation investment
  - Greater generation investment enhances reliability and competition

Other Social Benefits: Renewable Energy

- 45,000 MW of wind generation forecast by 2015
  - Intermittent nature of wind poses great challenges to reliability and operational economics
    - Regulation of wind adversely affects heat rates
    - Increases in spinning reserves may be needed to hedge against loss of wind energy
    - Additional "line pack" may be needed so gas units can respond to loss of wind energy
- Wind energy requires massive transmission investment
  - To move wind energy to load centers
  - To integrate wind generation with resources (supply side and demand side) that can manage wind generation output swings

Cost Recovery

- New transmission will not be built without adequate provision for recovery of costs
  - Long lead time costs (e.g., early planning costs, regulatory approval costs, and cost of acquisition of backbone transmission right of way) should be recovered currently through a surcharge applied on a regional (e.g.,SPP wide) or multi-regional basis
  - Actual cost to build, own and operate line segments should be recovered through a standardized formula rate
  - Right to build own and operate transmission should be obtained through a competitive bidding process that is open to all qualifying transmission owner/operators
    - Bidders could structure offers creatively (e.g., participation rights could be included for market participants)

Implementing A New Approach To Meeting Backbone Needs

- Use the expertise of an expanded regional stakeholder resource pool to develop the best long term backbone expansion plan
- Use the results of the expanded regional stakeholder process to demonstrate to state regulators that building a strong regional backbone system is more important to the long term interests of their citizens than short term savings from delaying such projects
- Implement a standardized formula rate that supports cost recovery for long lead time investment (right of way acquisition, etc.) and actual construction and operation of new backbone facilities
- Use the competitive bidding process to select which qualified entity will construct and own new backbone facilities
  - Competitive bidding would neutralize inherent conflicts within Companies that own both transmission and generation where separation of functions does not exist at level where capital budgeting occurs. (i.e., the same executives responsible for funding transmission are responsible for preserving value of generation)
- Utilize modern financing and securitization techniques to minimize costs and protect customer interests
  - e.g., Transmission trust may hold property rights (easements, etc.), and retain subordinated security interests in assets

The Need For Change Is Becoming More Apparent

- SPP Staff has developed several backbone overlay scenarios that offer significant potential
- SPP stakeholders are increasingly seeing the benefit of expanding backbone infrastructure
- Significant progress requires a change in mindset to think regionally rather than parochially

Conclusion

- Backbone Transmission planning should precede, not follow, generation planning
- Backbone Transmission routing should seek to anticipate and accommodate new generation
- Regulatory approval and transmission rights of way should be acquired early in the process