



ATC's Participation in UMTDI/RGOS

Michigan Planning Consortium
February 27, 2009

- UMTDI Executive Committee
 - One commissioner from each of five states
 - One representative from each of the governors' offices
- Transmission Planning Working Group
 - Chaired by Chairman David Boyd (MN PUC)
 - Open to participation by all interested parties – two meetings thus far
 - Instructions to participants at Jan 30 meeting: “Work through your states to provide input on the plans – this may be your only chance to provide input”
- Cost Allocation Working Group
 - Chaired by Chairman Eric Callisto (PSCW)
 - Process still emerging – four working groups have been reduced to two or three
 - Principles WG
 - Benefits Measurement WG
 - Survey and Legal WG

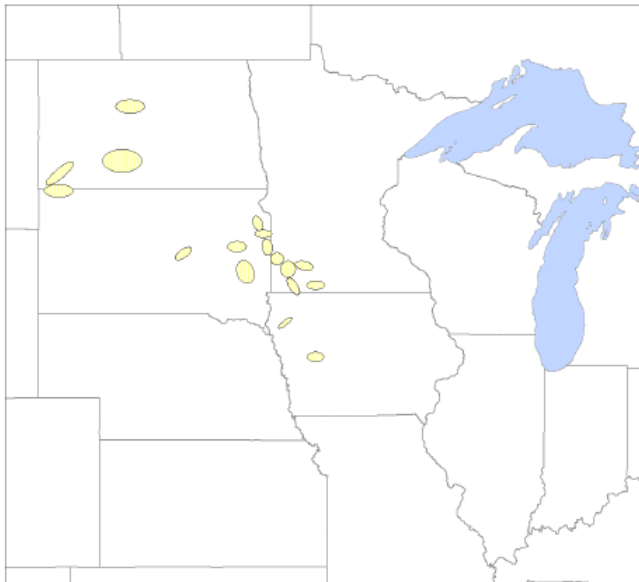


UMTDI – Transmission Planning Working Group

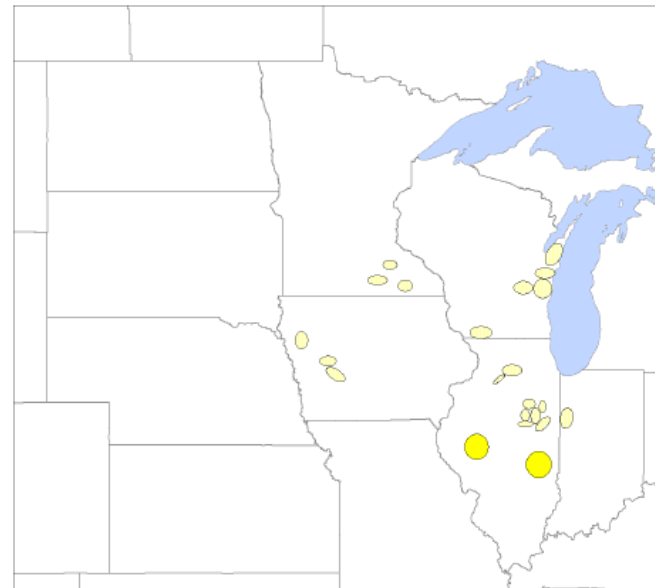
- January 2009 – Initial (and only) meeting of the Transmission Planning Working Group – stakeholders told to provide input through individual states
- February 2009 – Individual state meetings; MISO provides indicative cost information for each plan to Executive Team; Executive Team reviews
- March 2009 – UMTDI Exec Team selects preferred strategy; MISO detailed design study plan by March 15th; progress meeting
- April-May 2009 – MISO conducts design studies
- June-July 2009 – Progress meetings to vet design projects and identify issues for further study
- August 2009 – Progress meeting
- September 2009 – MISO’s detailed transmission design studies completed on feasible transmission projects; meeting to designate final design projects to UMTDI Executive Committee
- October 2009 – MISO includes agreed-upon transmission projects in MTEP 09; UMTDI Executive Committee reports to Governors.

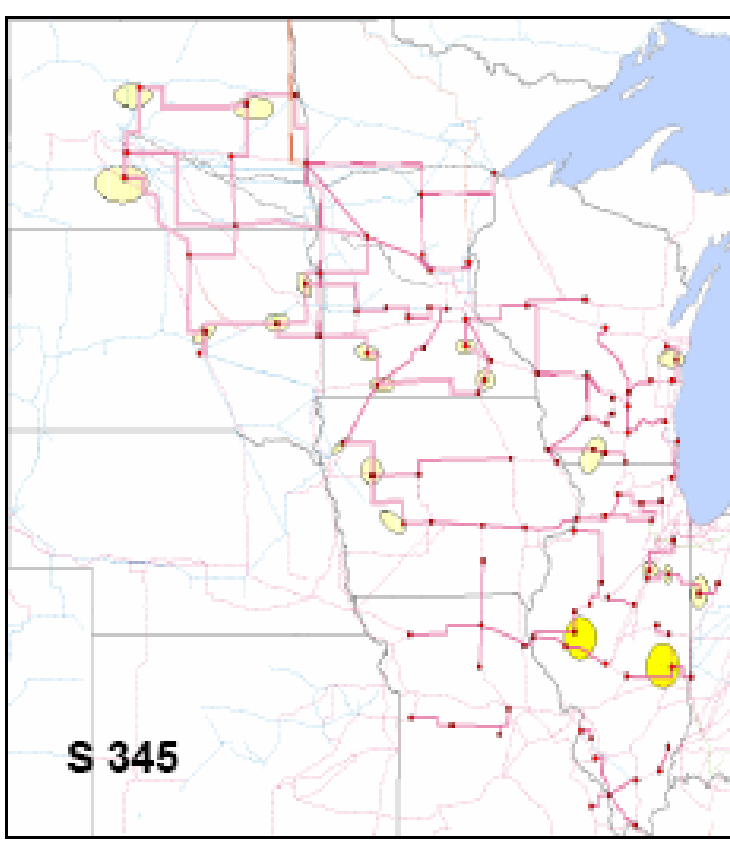
- MISO created Renewable Energy Zones
- MISO created seven Renewable Energy Zone configurations ranging from West to East within 5-state region (labeled T through Z)
- Workshop in January with TOs to develop indicative plans for each configuration

T Zones

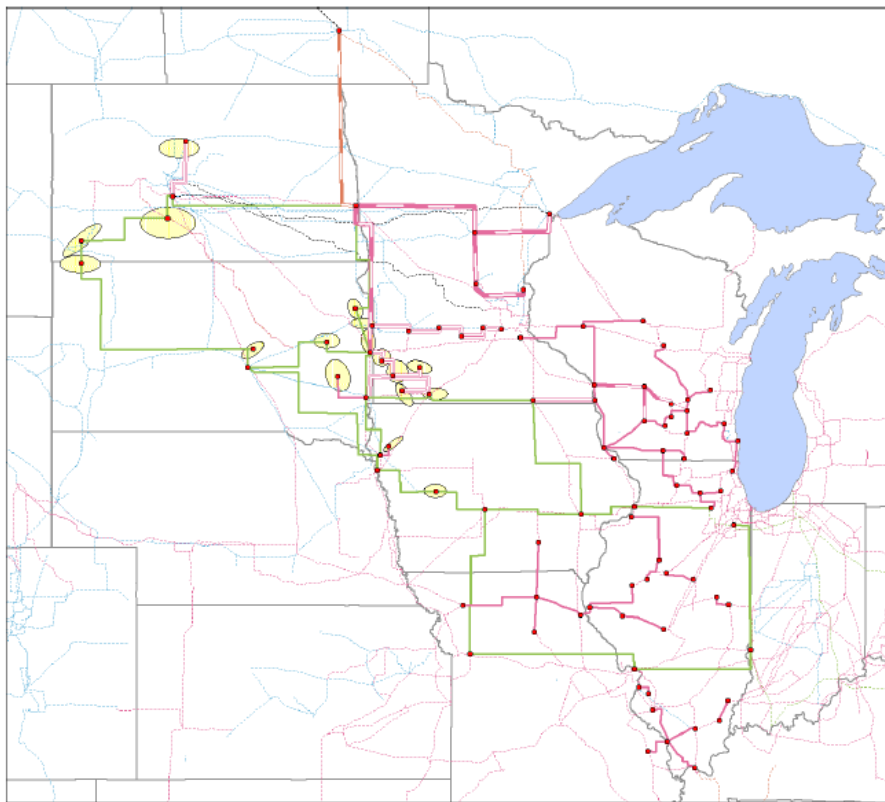


Z Zones

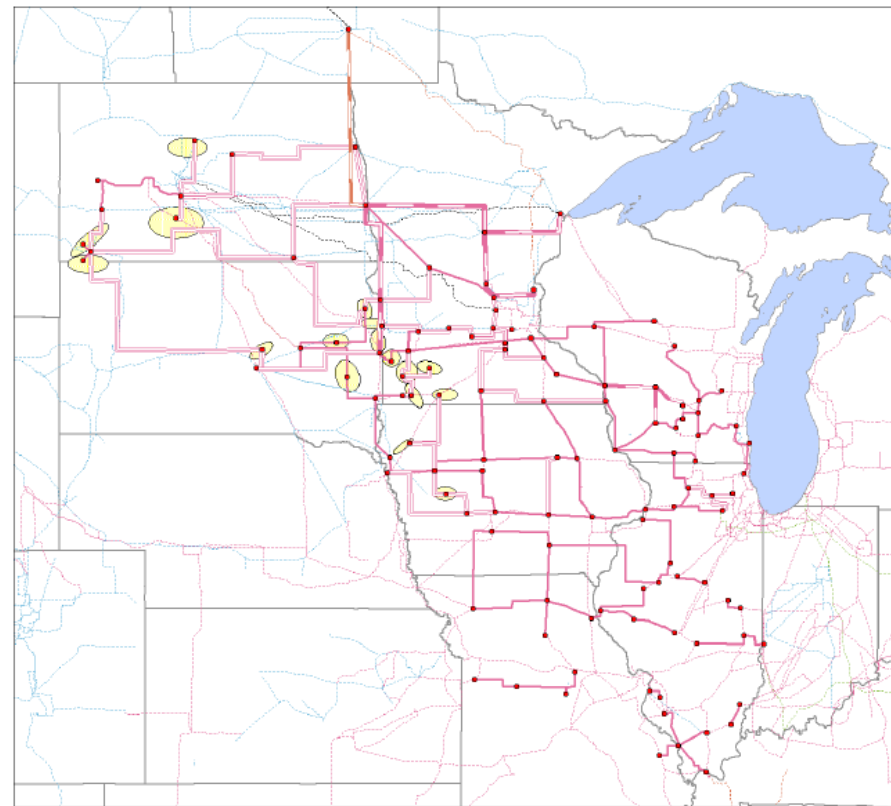




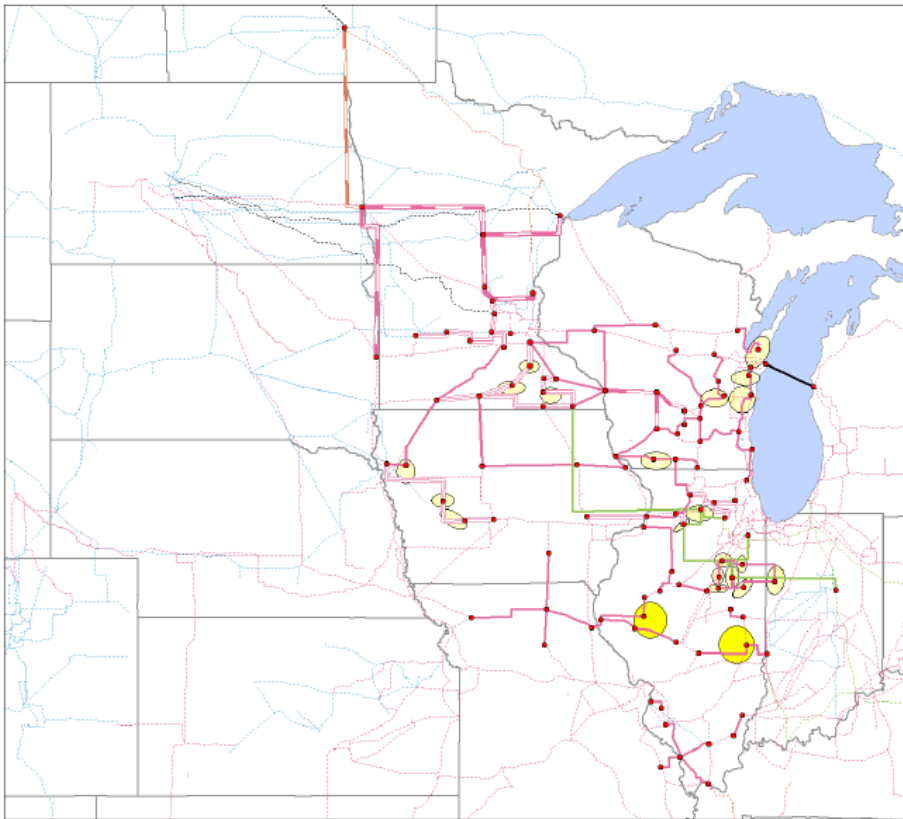
- MISO has added three more options
 - AEP/ITC Green Power Express option
 - Stakeholder specified REZ configuration (S)
 - T.1 configuration moving some zones slightly east



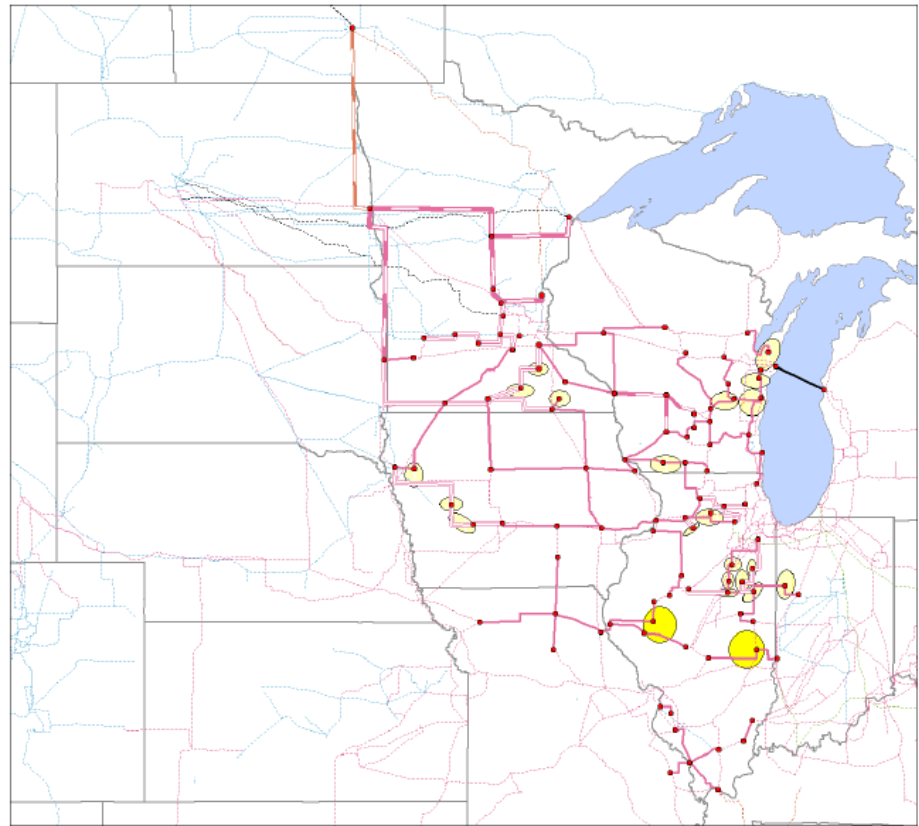
Zone T, 765 kV Solution



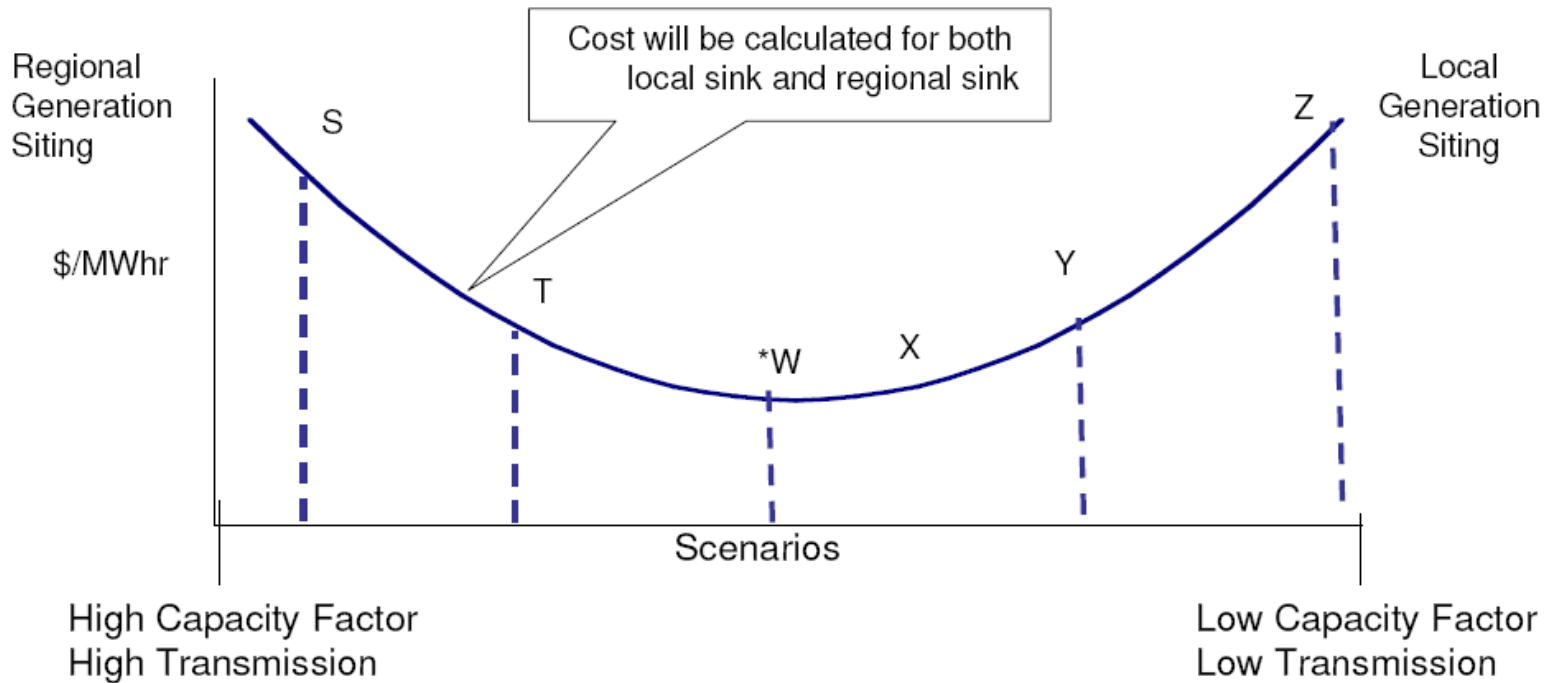
Zone T, 345 kV Solution



Zone Z, 765 kV Solution



Zone Z, 345 kV Solution



Identify the overall cost of generation and transmission to meet existing Renewable Portfolio Standards.

- Total Cost: Transmission Capital + Generation Capital + Production Cost
 - Capital Cost
 - Transmission
 - Sum of line miles by voltage class
 - Apply cost assumption set
 - » \$/mile for voltage class (i.e 345kV, 765kV)
 - » Contingency for substation work and routing
 - Generation
 - Total number of installed MW's
 - Apply cost assumption set
 - » \$/MW for wind turbine
 - Spread cost over the mandates and apply net present value and convert to 2009 \$/MWH
 - Production Cost
 - System analysis using a cost-production model with installed generation and indicative transmission



Regional Generation Outlet Study Technical Review Group

Indicative Scenario Results
Meeting No. 9 – Presentation 1 of 2

February 17, 2009

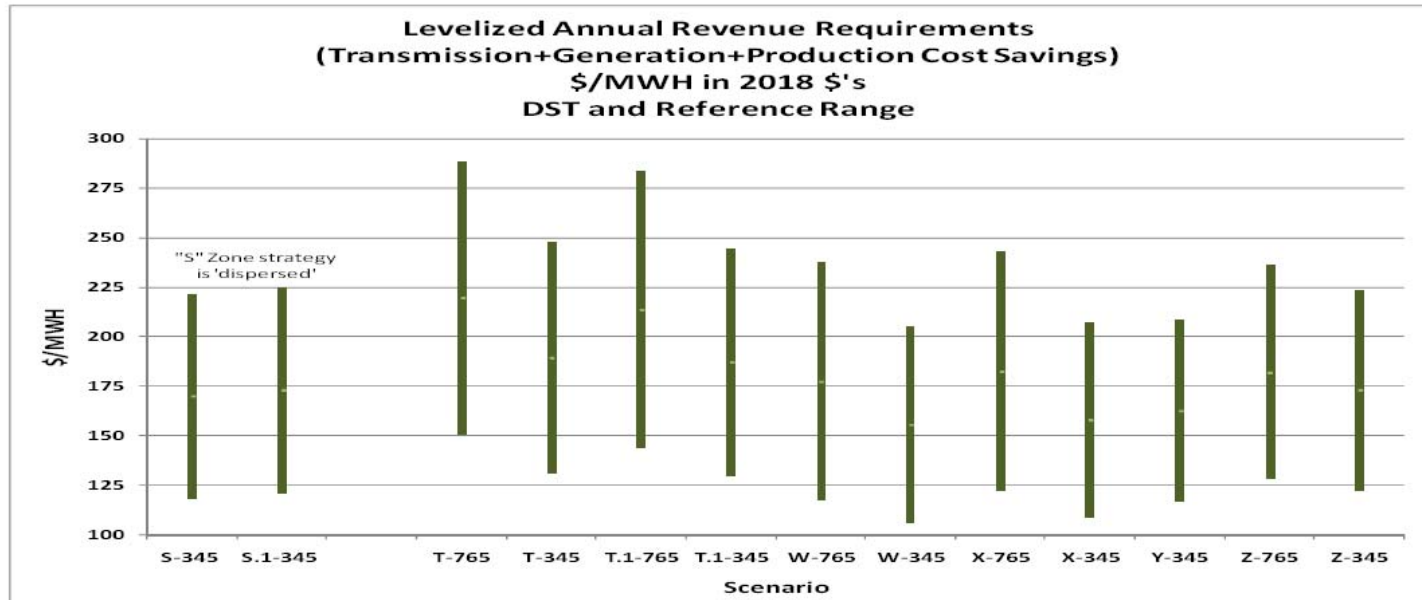
Indicative Scenario Results

- All scenarios provide consistent economic benefit
- Scenario W provides lowest \$/MWH cost
 - 345 kV at \$106 - \$205/MWH (in 2018 \$'s)
 - 765 kV at \$118 - \$237/MWH (in 2018 \$'s)
 - Total RPS Energy = 41,491 GWH (in 2027)
- Assumption set range:
 - Design sub-team (DST) developed assumption set is conservative
 - Reference assumptions created after reconciling with other MISO study work and using similar assumptions as JCSP and MTEP 08

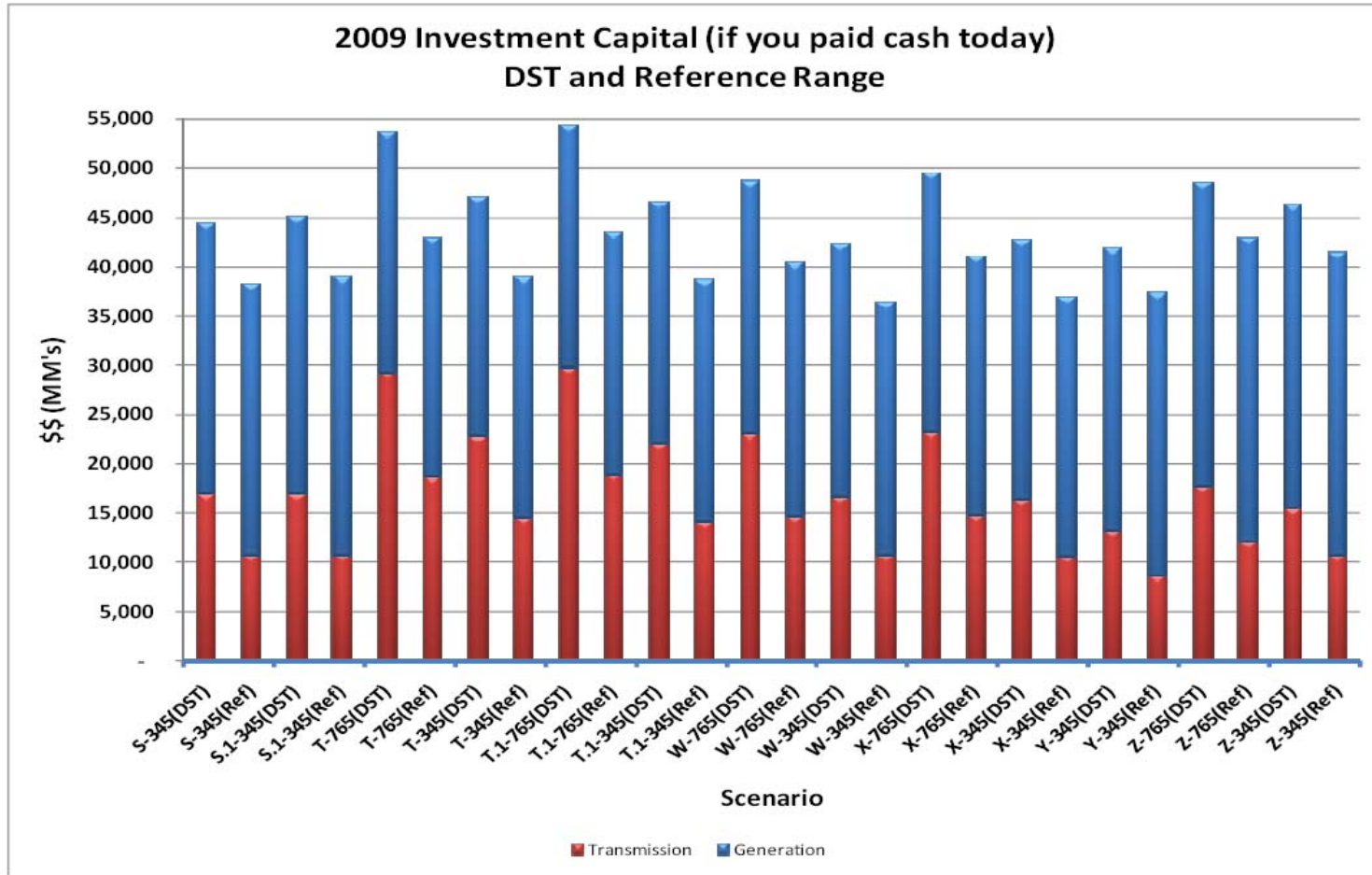
| Assumption | DST | Ref |
|-------------------------|-------------------|-------------------|
| Interest Rate | 8% | 8% |
| Fixed Charge Rate (G&T) | 20% | 14% |
| Escalation Rate | 2.5% | 2.5% |
| Study Period | 35 | 35 |
| Start Yr of Investment | 2015 | 2015 |
| Substation Contingency | 25% of Trans cost | 25% of Trans cost |
| Routing Contingency | 25% of Trans cost | 0% of Trans cost |
| Transmission Mileage | 100% | 75% |

Indicative Scenario Results

- Range of key parameters across strategies
 - Transmission miles (345 kV, 765 kV and DC)
 - DST range: 4263 to 7095 miles
 - Reference range: 3197 to 5321 miles
 - \$/MWH
 - DST range: \$205 to \$288
 - Reference range: \$196 to \$151
 - Installed costs, transmission and generation (2009 dollars, pay cash today)
 - DST range: \$41,848,000,000 to \$54,325,000,000
 - Reference range: \$36,401,000,000 to \$43,492,000,000
 - Cumulative net present value of revenue requirements (2018 dollars)
 - DST range: \$118,109,000,000 to \$153,325,000,000
 - Reference range: \$71,916,000,000 to \$84,908,000,000



| Strategy | Line Miles | | | + Gen MW's # Zones | | Cost Range | | | | |
|-----------|------------|--------|----|--------------------|-----|------------------------|---------------|-----|---------------------|--------|
| | 345 kV | 765 kV | DC | | | Production Cost \$/MWH | *Total \$/MWH | | ** Capital (\$, MM) | |
| | | | | | DST | Ref | DST | Ref | | |
| S-345 | 5170 | 0 | 0 | 13712 | 20 | (38) | 221 | 119 | 44,405 | 38,308 |
| ++S.1-345 | 5170 | 0 | 0 | 13541 | 19 | (38) | 225 | 121 | 45,063 | 38,966 |
| T-765 | 2572 | 3162 | 0 | 12153 | 17 | (25) | 288 | 151 | 53,610 | 42,977 |
| T-345 | 7095 | 0 | 0 | 12153 | 17 | (27) | 248 | 132 | 47,115 | 38,923 |
| T.1-765 | 3092 | 2965 | 0 | 12245 | 18 | (34) | 283 | 144 | 54,325 | 43,492 |
| T.1-345 | 6907 | 0 | 0 | 12245 | 18 | (28) | 244 | 130 | 46,611 | 38,677 |
| W-765 | 2589 | 2321 | 0 | 12796 | 18 | (47) | 237 | 118 | 48,734 | 40,357 |
| W-345 | 5383 | 0 | 0 | 12796 | 18 | (42) | 205 | 106 | 42,349 | 36,401 |
| X-765 | 2601 | 2394 | 0 | 13131 | 18 | (46) | 243 | 122 | 49,496 | 41,133 |
| X-345 | 5331 | 0 | 0 | 13131 | 18 | (42) | 207 | 109 | 42,682 | 36,896 |
| Y-345 | 4263 | 0 | 0 | 14322 | 20 | (36) | 209 | 117 | 41,848 | 37,286 |
| Z-765 | 3798 | 666 | 61 | 15387 | 22 | (47) | 236 | 128 | 48,539 | 42,958 |
| Z-345 | 4305 | 0 | 61 | 15387 | 22 | (47) | 223 | 123 | 46,249 | 41,538 |



QUESTIONS?