Special PC Session
Cost Containment and Competitive Proposals

Special Planning Committee Session

May 24, 2017

Cost Containment and Competitive Proposals Effort Objective

Objective:

- Evaluate the need for and, if appropriate, develop guiding principles for PJM to consider cost containment provisions offered by proposing entities in the evaluation and selection of projects within the competitive planning process.

Discussion Items for Today

- Cost containment and how we are defining it
- Industry experience with cost containment
- Transmission facility cost recovery
- Typical areas of project uncertainty
- Observed forms of cost containment
- Evaluating cost impacts for risk factors

What is Cost Containment?

- Cost caps and containment mechanisms are, essentially, “risk transfer” mechanisms that developers voluntarily design and offer as part of their technical and construction proposals to differentiate themselves from peer competitors.

- Risk transfer is a primarily a financial tool intended to transfer all or portions of any project cost overruns from utility ratepayers to the developer(s) and their investors/financiers.

Industry Experience
PJM

- 13 project proposal windows held since 2013
- 2 projects selected with cost containment provisions
- Approximately 18% of the 650 proposed projects included some form of cost containment
- Cost containment in three main areas
  - Capital cost cap
  - Foregoing incentive rate
  - Revenue requirement cap

Industry Experience
Other RTOs

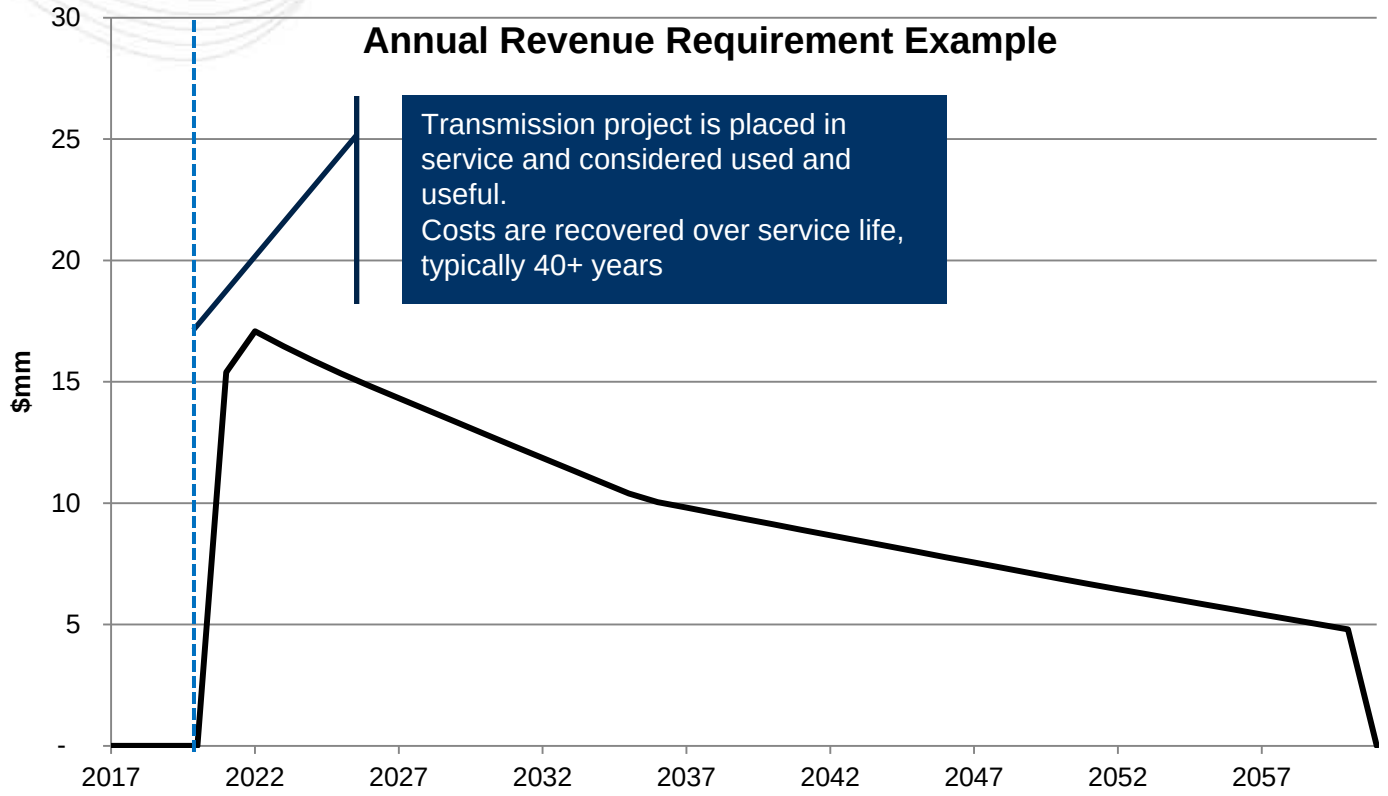
- 12 competitive windows across CAISO, SPP and MISO
- 54% of the 56 proposed projects included some form of cost containment
- 55% of the projects selected utilized cost containment
- Forms of cost containment are becoming more wide ranging
- Developer proposed exclusions, exceptions and adjustments to cost containment mechanisms are also growing in complexity

Transmission Facility Cost Recovery

- Transmission rates are included in PJM's OATT as an Attachment H, however, the Transmission Owner has the sole responsibility, working with FERC and stakeholders, after filing, to determine appropriate rates and recovery for its asset investments.
- Transmission rates are subject to FERC regulations
- Transmission rates are subject to rate protocols, where applicable
- Transmission Owners or developers are responsible to implement any cost containment provisions that it commits to as part of a project

Transmission Facility Cost Recovery

- Key revenue requirement components
  - Depreciation on capital invested
  - Return on equity
  - Cost of debt
  - O&M
  - Taxes
    - Income and property



Typical Areas of Project Uncertainty

- Transmission facilities project scope change
- Line route and/or substation location change
- Site conditions
- Environmental mitigation costs
- Equipment and labor costs
- Project delays
- O&M costs
- Financing risk

Observed Categories of Cost Containment

Project Costs	Financial
• Capital cost	• Return on equity (ROE)
• O&M cost	• Capital structure
	• Forgo FERC authorized incentive adder or return
	• Revenue requirement (RR) or offer a RR discount

Observed Forms of Cost Containment
Capital Cost

Permutations	Description of Permutation
Cap - incl. AFUDC / CWIP & Contingency	Binding cost cap which includes all construction costs, any assumed contingency in addition, financing fees, and the recovery of AFUDC / CWIP.
Cap - incl. Contingency, excl. AFUDC / CWIP	Binding cost cap which includes all construction costs, any assumed contingency in addition, and financing fees. However, AFUDC / CWIP are uncapped and still adjust with actual construction spend
Cap - excl. Contingency, incl. AFUDC / CWIP	Binding cost cap which includes all construction costs, financing fees, and the recovery of AFUDC / CWIP. No contingency is embedded in the construction cost cap.
Rate Base Cap	A cap on the rate base which goes into service, which caps all capital costs (construction, AFUDC, financing, etc.) and the assumed escalation of those costs (inflation, commodity price changes, etc.)
Cap - Capital Cost only	Binding cost cap on all construction costs
Cap - Portion of Capital Cost only (e.g., Materials)	Binding cost cap on a portion of construction costs

Observed Forms of Cost Containment
Revenue Requirement

Permutations	Description of Permutation
Revenue Requirement Discount	Annual revenue requirement is discounted by a fixed dollar amount (e.g., $2M) or a percentage (e.g., 2%) for a limited duration or the life of the project.
Revenue Requirement Cap	Annual revenue requirement is capped at a not to exceed amount over a certain duration or the life of the project.

Observed Forms of Cost Containment
Return on Equity

Permutations	Description of Permutation
ROE Cap - incl. incentive adders	Cap that limits the return on equity (ROE) that a bidder can request, including both the base ROE and any FERC authorized incentive adders, such as the 50 basis points for RTO participation.
ROE Cap - base ROE only	Cap that limits the base return on equity (ROE) that a bidder can request
WACC Cap - limited duration	Cap on the overall weighted average cost of capital (WACC) that a bidder can earn on a project. Capping WACC does not cap any individual component, including ROE, cost of debt, or the equity share of the cap structure, but rather the overall return required to finance the project.
Forgone ROE incentive adder (all incl. RTO)	A bidder may choose to forgo the inclusion of all FERC authorized incentive adders on top of their approved Base ROE, including but not limited to the 50 basis points for RTO participation
Forgone ROE incentive adder (all except RTO)	A bidder may choose to forgo the inclusion of all FERC authorized incentive adders on top of their approved Base ROE, not including the 50 basis points for RTO participation

Observed Forms of Cost Containment
Equity Structure

Permutations	Description of Permutation
Cap on Equity Percentage	Cap on the equity share of a project's capital structure, either for a limited duration or the life of the project (e.g., 45% for first 5yrs)

Observed Forms of Cost Containment
O&M Costs

Permutations	Description of Permutation
O&M Cap (limited duration)	Cap on operations & maintenance (O&M) expenses for either a limited duration or the life of the project
Forgone O&M recovery (limited duration)	Commitment to forgo recovery on O&M expenses for the first few years of the project after in-service

Observed Forms of Cost Containment
Project Delay

Permutations	Description of Permutation
Forgo return on/of portion of capital	Commitment to forgo on and of capital (i.e., cost of capital and depreciation expenses) in the event of a late in-service date

Observed Adjustments to Cost Containment Measures

Categories	Adjustment Type	Adjustment Cause
Capital Cost	**Cost Cap Nullification or Variable Adjustment**	Force majeure
		ISO / gov't scope changes
		Change of law
		Route changes
		Contractor scope changes
		Delays due to gov't and/or upgrade project (i.e., substation)
		Material use changes
		Commodity price, material cost, or inflation changes
	Cost Cap Fixed Adjustment	Route length change (e.g., $1M/mile increase)
		Alternate route revisions to cost cap
ROE	**Over budget incentive adjustment**	Opt to forgo FERC authorized incentive adder on construction costs above estimate

Observed Exclusions to Cost Containment Measures

Categories	Exclusion Type
Capital Cost	AFUDC
	Inflation
	Additional Costs Stemming from Environmental Permitting, Remediation, and Mitigation
	Additional Costs Stemming from Schedule Delays Due to Interconnecting Utilities' Substation Delays
	Increase in Route Length Above a Specified Mileage
	Increase in Land Acquisition Cost Above a Certain Threshold
ROE	Ferc authorized Incentive adder (e.g., RTO participation)

Evaluating Cost Impacts for Risk Factors

- NPV analysis for a greenfield transmission project

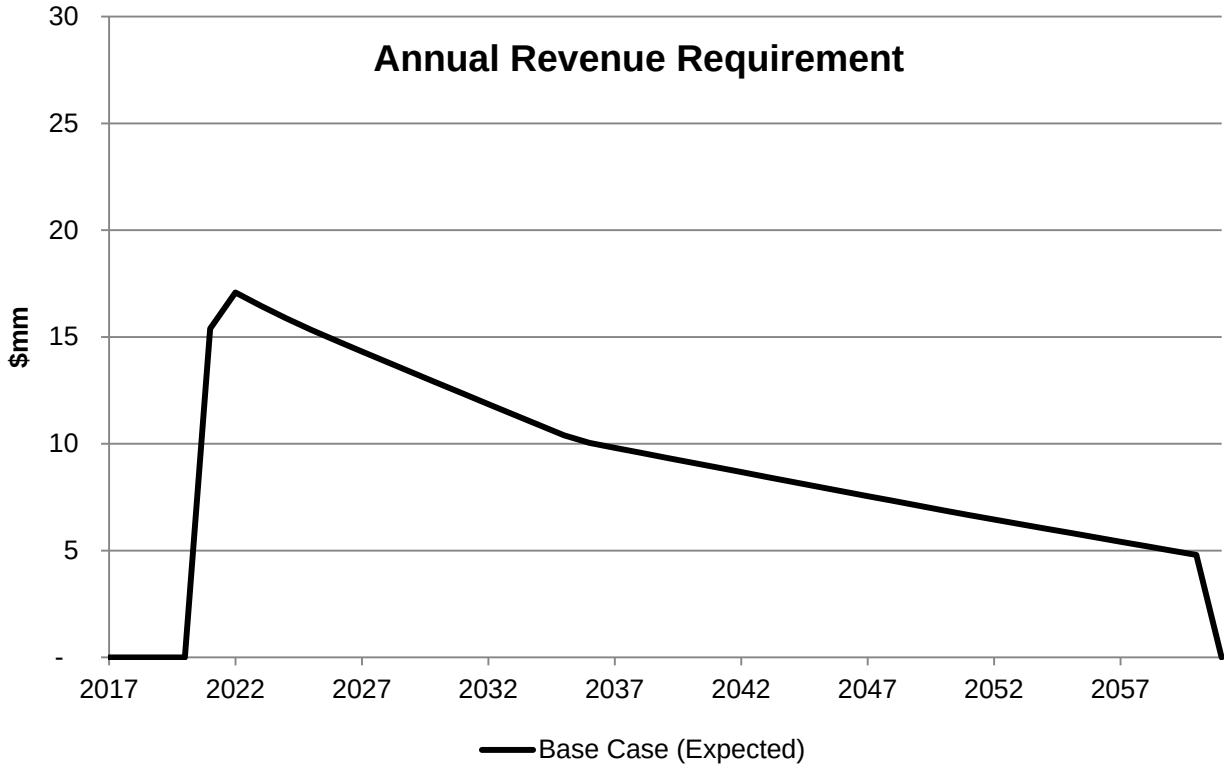
- New greenfield transmission project (line or substation)
  - Cost: $100 million
  - Time to construct: 48 months

- Sensitivities
  - Capital cost
  - ROE
  - Equity percent of capital structure
  - O&M

Evaluating Impact of Risks

New greenfield transmission project (line or substation)

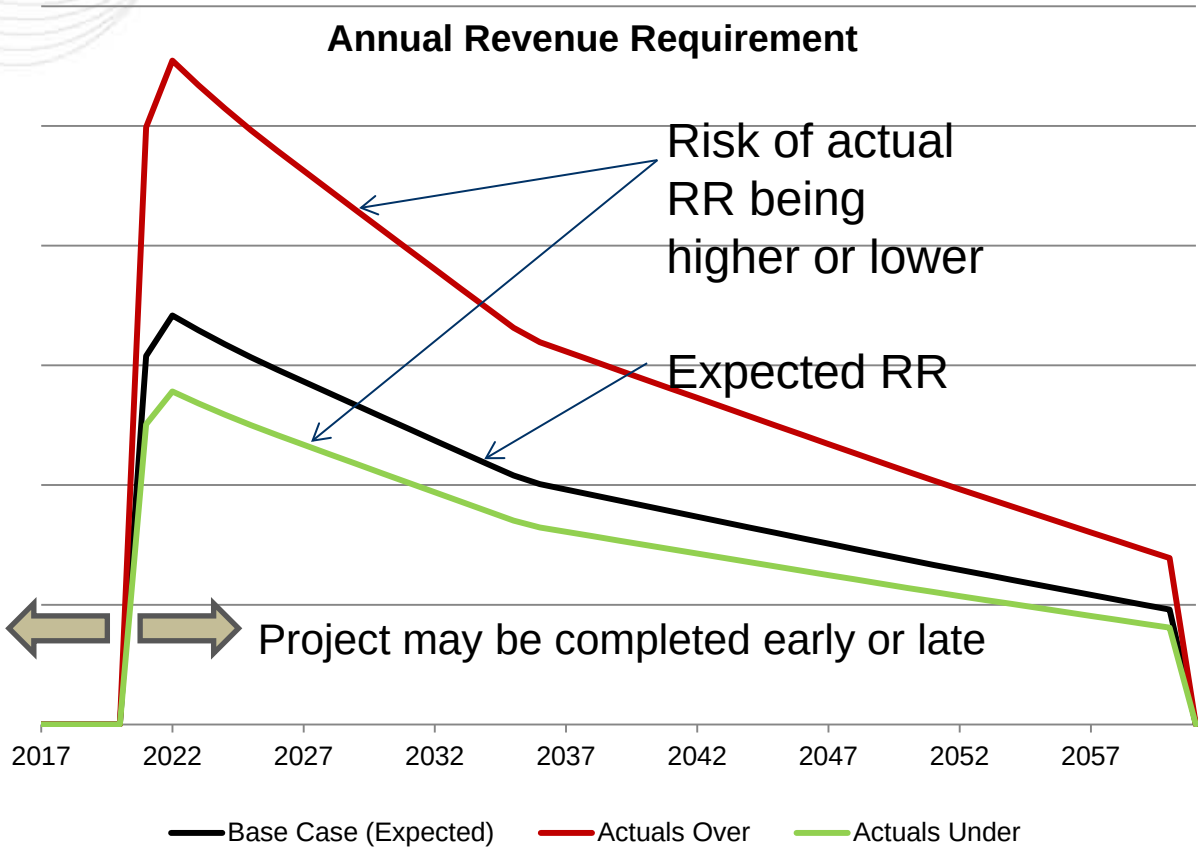
Base Case Inputs	Expected
CapEx (MM, $2016)	100
O&M (MM p.a., $2016)	0.75
ROE (%)	10.82%
Equity % of Capital Structure	50%
Construction Period Length	48 months
NPV ATRR (MM)	120



Evaluating Impact of Risks

New greenfield transmission project (line or substation)

Base Case Inputs	Expected +/-
CapEx (MM, $2016)	100 +/-
O&M (MM p.a., $2016)	0.75 +/-
ROE (%)	10.82% +/-
Equity % of Capital Structure	50% +/-
Construction Period Length (months)	48 +/-
NPV ATRR (MM)	120 +/-



Evaluating Impact of Risks – CapEx Scenarios

- New greenfield transmission project (line or substation)
  Cost: $100 million
  Time to construct: 48 months

- Scenarios:
  - CapEx spend actual exceeds estimate by 50%
  - CapEx spend actual is below estimate by 10%

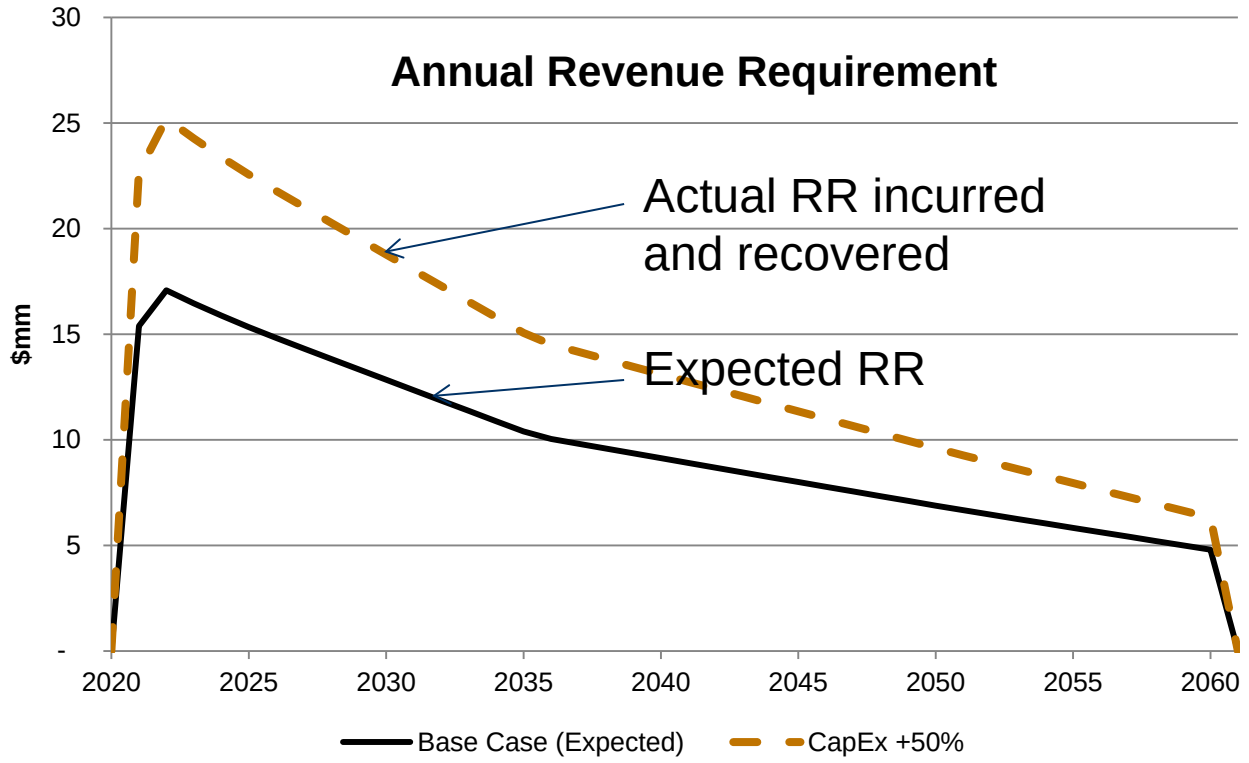
- Project cost containment:
  - None
  - Cost Cap CapEx spend

Evaluating Impact of Risks – CapEx Scenarios

- Scenario:
  - CapEx spend increases by 50% above expected estimated cost

- Project cost containment:
  - None

Base Case Inputs	Expected	High Value
CapEx (MM, $2016)	100	150
O&M (MM p.a., $2016)	0.75	0.75
ROE (%)	10.82%	10.82%
Equity % of Capital Structure	50%	50%
Construction Period Length (months)	48	48

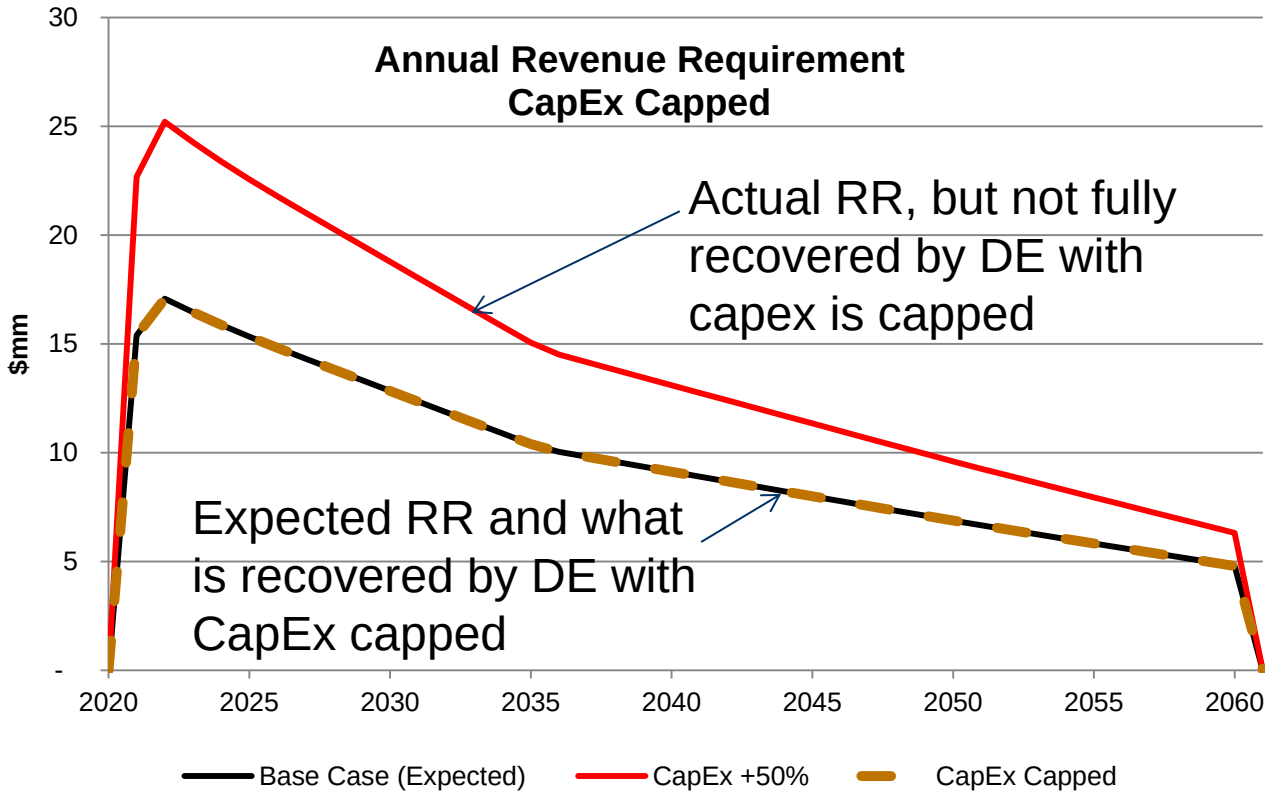


Evaluating Impact of Risks – CapEx Scenarios

- Scenario:
  - CapEx spend increases by 50% above expected estimated cost

- Project cost containment:
  - Cap CapEx spend at $100M

Base Case Inputs	Expected	High Value
CapEx (MM, $2016)	100	150
O&M (MM p.a., $2016)	0.75	0.75
ROE (%)	10.82%	10.82%
Equity % of Capital Structure	50%	50%
Construction Period Length (months)	48	48

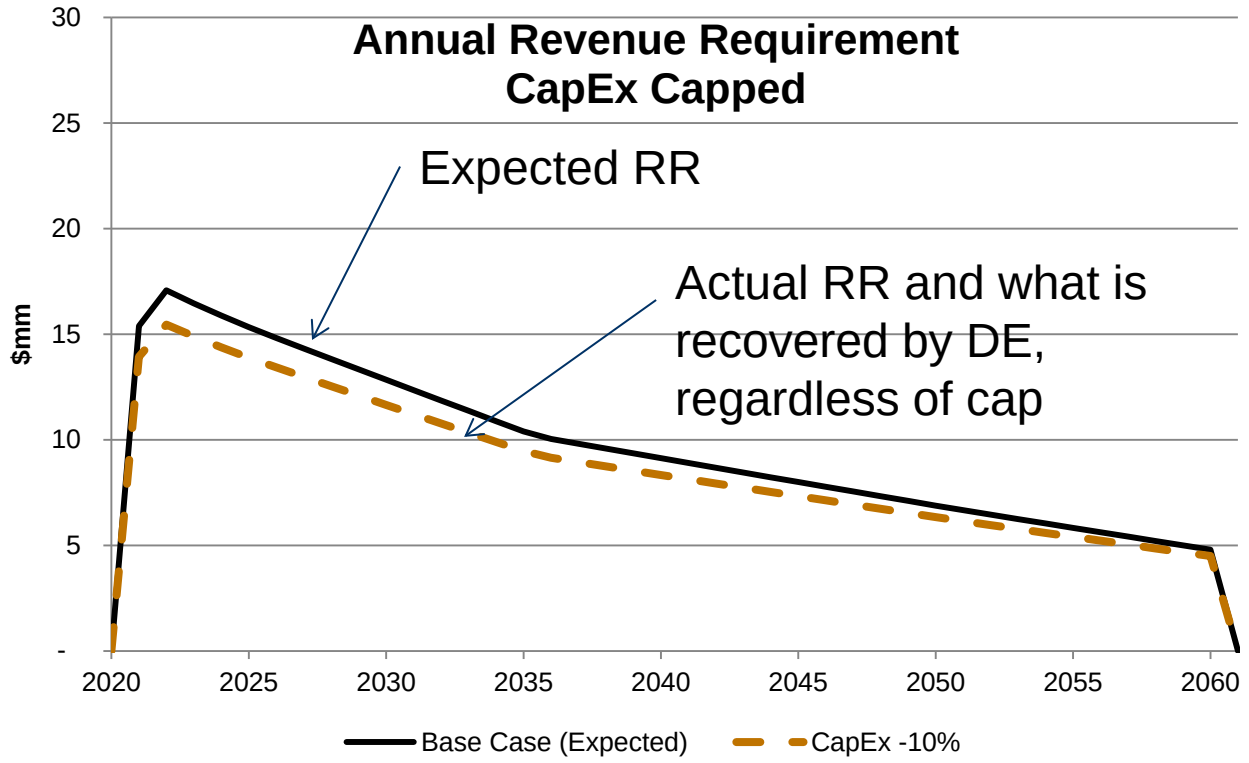


Evaluating Impact of Risks – CapEx Scenarios

- Scenario:
  - CapEx spend is 10% below expected estimated cost

- Project cost containment:
  - Cap CapEx spend at $100M

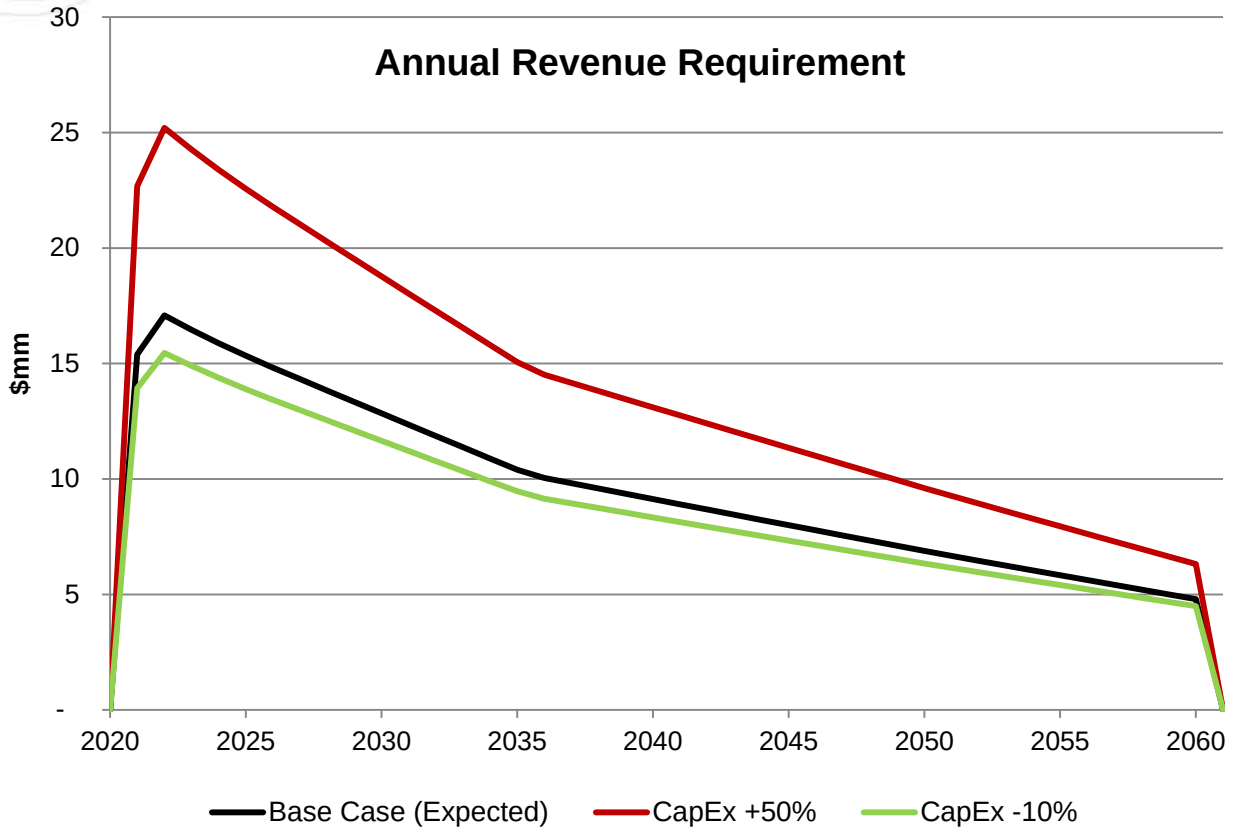
Base Case Inputs	Expected	Low Value
CapEx (MM, $2016)	100	90
O&M (MM p.a., $2016)	0.75	0.75
ROE (%)	10.82%	10.82%
Equity % of Capital Structure	50%	50%
Construction Period Length (months)	48	48



Evaluating Impact of Risks – CapEx Scenarios

- Scenario:
  - CapEx spend varies
  - +50%, -10%

Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	90	100	150
O&M (MM p.a., $2016)	0.75	0.75	0.75
ROE (%)	10.82%	10.82%	10.82%
Equity % of Capital Structure	50%	50%	50%
Construction Period Length (months)	48	48	48



Evaluating Impact of Risks – ROE Scenarios

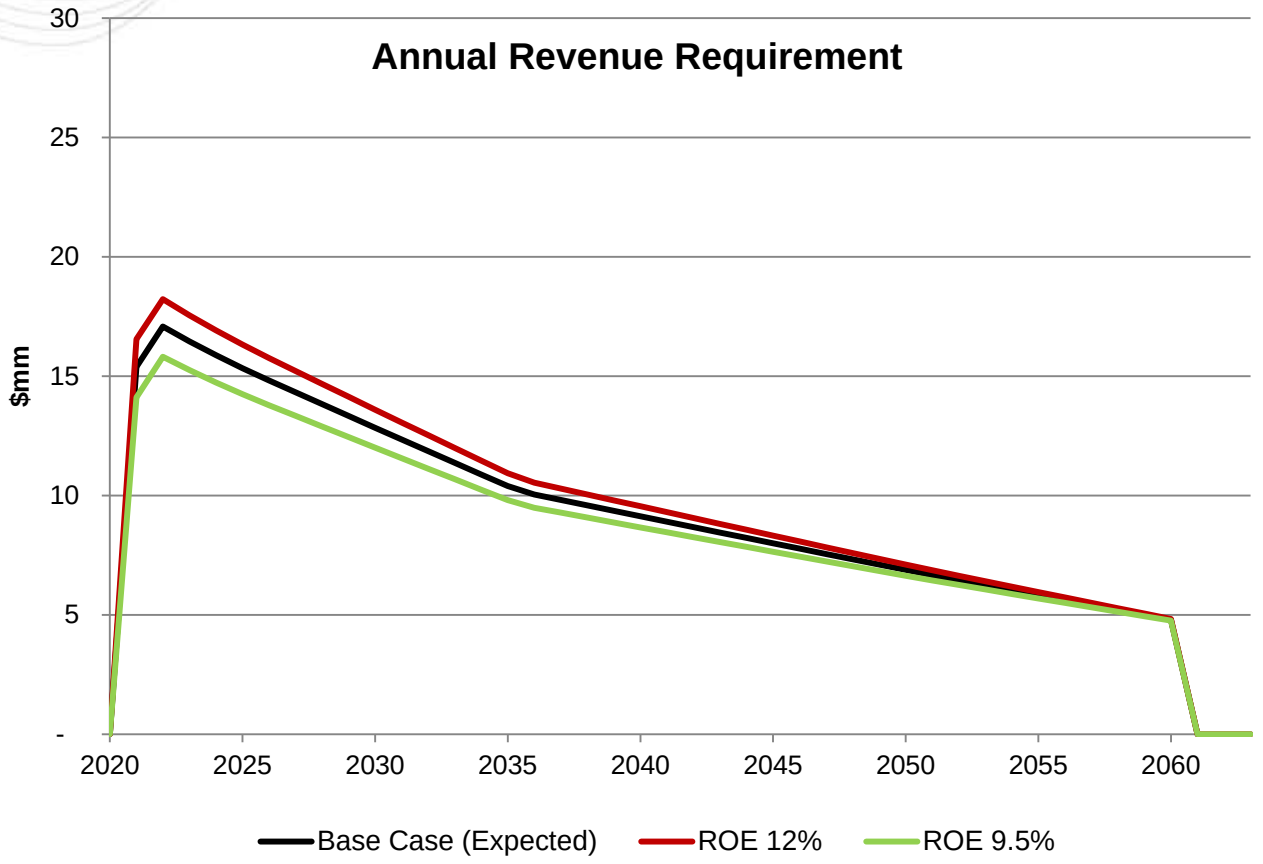
- New greenfield transmission project (line or substation)
  Cost: $100 million
  Time to construct: 48 months

- Scenarios:
  - Expected ROE : 10.82%
  - ROE is higher than initial expected rate, 12%
  - ROE is lower than initial expected rate, 9.5%

- Project Cost Containment:
  - None
  - CAP ROE at fixed maximum value

Evaluating Impact of Risks – ROE Scenarios

Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	100	100	100
O&M (MM p.a., $2016)	0.75	0.75	0.75
ROE (%)	9.50%	10.82%	12.00%
Equity % of Capital Structure	50%	50%	50%
Construction Period Length (months)	48	48	48



Evaluating Impact of Risks – O&M Scenarios

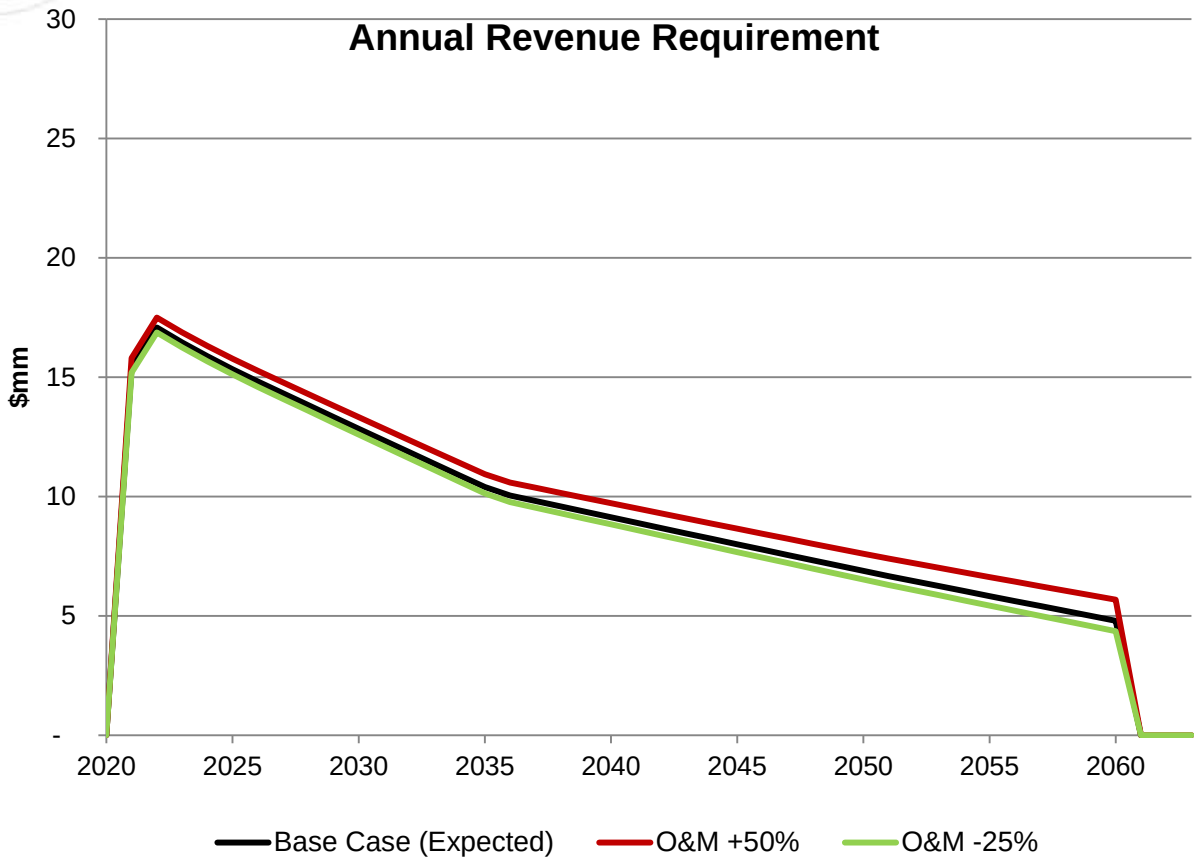
- New greenfield transmission project (Line or Substation)
  Cost: $100 million
  Time to Construct: 48 months

- Scenarios:
  - Expected O&M, $750K
  - O&M is higher than expected, $560K
  - O&M is lower than expected, $1.13 M

- Project Cost Containment:
  - None
  - O&M is capped at fixed maximum value

Evaluating Impact of Risks – O&M Scenarios

Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	100	100	100
O&M (MM p.a., $2016)	0.56	0.75	1.13
ROE (%)	10.82%	10.82%	10.82%
Equity % of Capital Structure	50%	50%	50%
Construction Period Length (months)	48	48	48



Evaluating Impact of Risks – Equity Scenarios

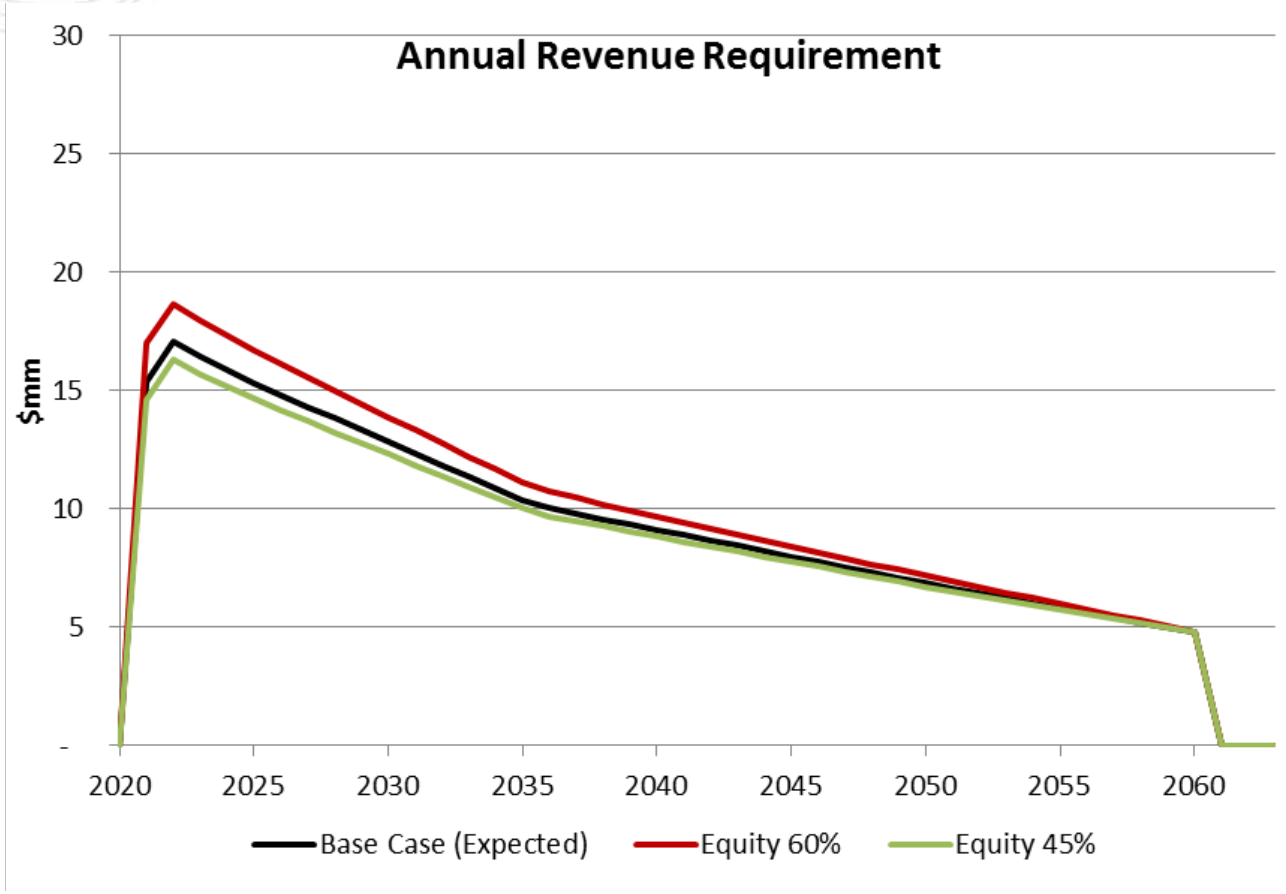
- New greenfield transmission project (line or substation)
  Cost: $100 million
  Time to construct: 48 months

- Scenarios:
  - Equity expected, 50%
  - Equity percentage is higher than expected, 60%
  - Equity percentage is lower than expected, 45%

- Project cost containment:
  - None
  - Equity percentage is capped at fixed maximum value

Evaluating Impact of Risks – Equity Scenarios

Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	100	100	100
O&M (MM p.a., $2016)	0.75	0.75	0.75
ROE (%)	10.82%	10.82%	10.82%
Equity % of Capital Structure	45%	50%	60%
Construction Period Length (months)	48	48	48



Evaluating Impact of Risks – Project Delay Scenarios

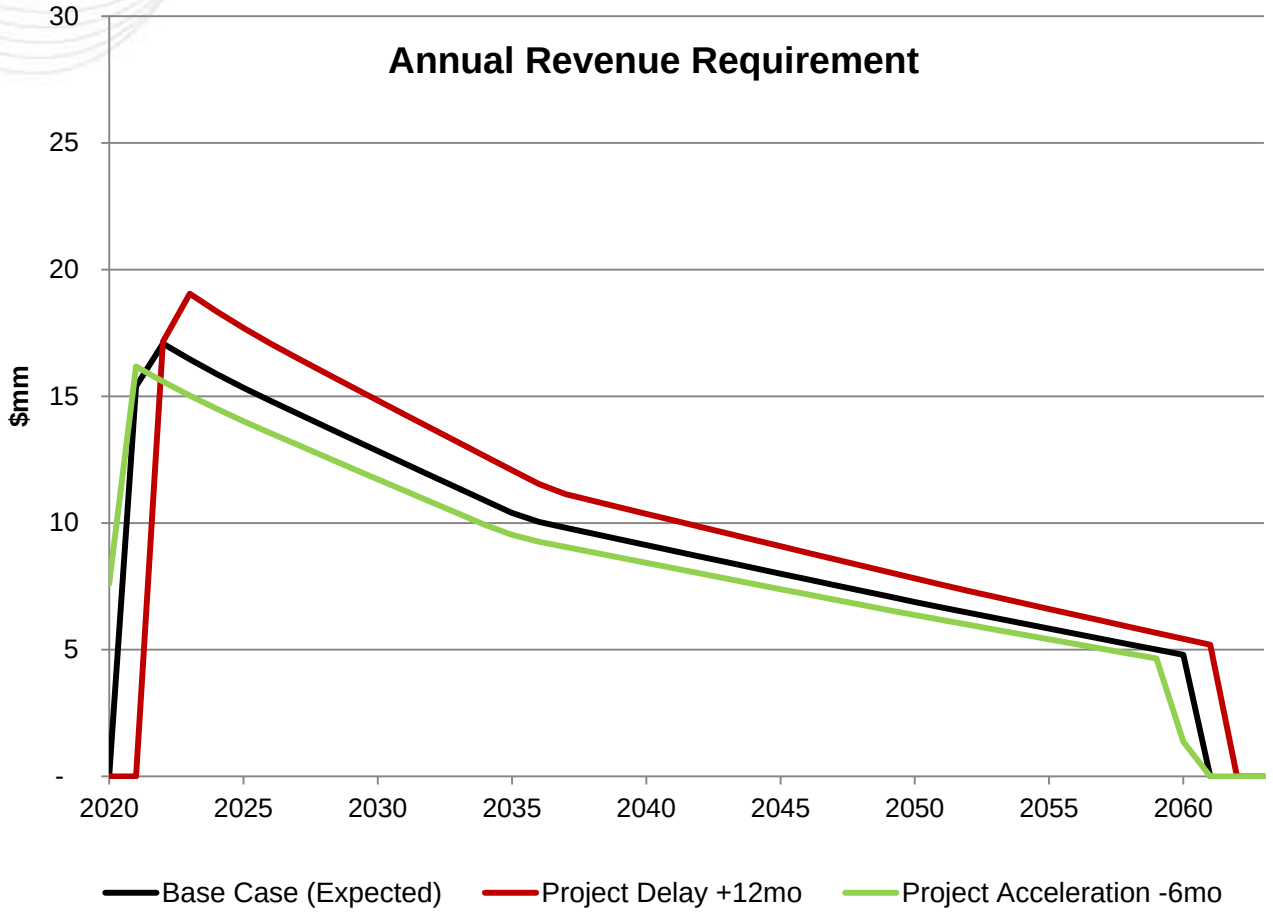
- New greenfield transmission project (line or substation)
  Cost: $100 million
  Time to construct: 48 months

- Scenarios:
  - Project is completed in 60 months, 1 year late
  - Project is completed in 42 months, 6 months early

- Project cost containment:
  - None
  - Forgo FERC authorized incentive adder on all capital

Evaluating Impact of Risks – Project Delay Scenarios

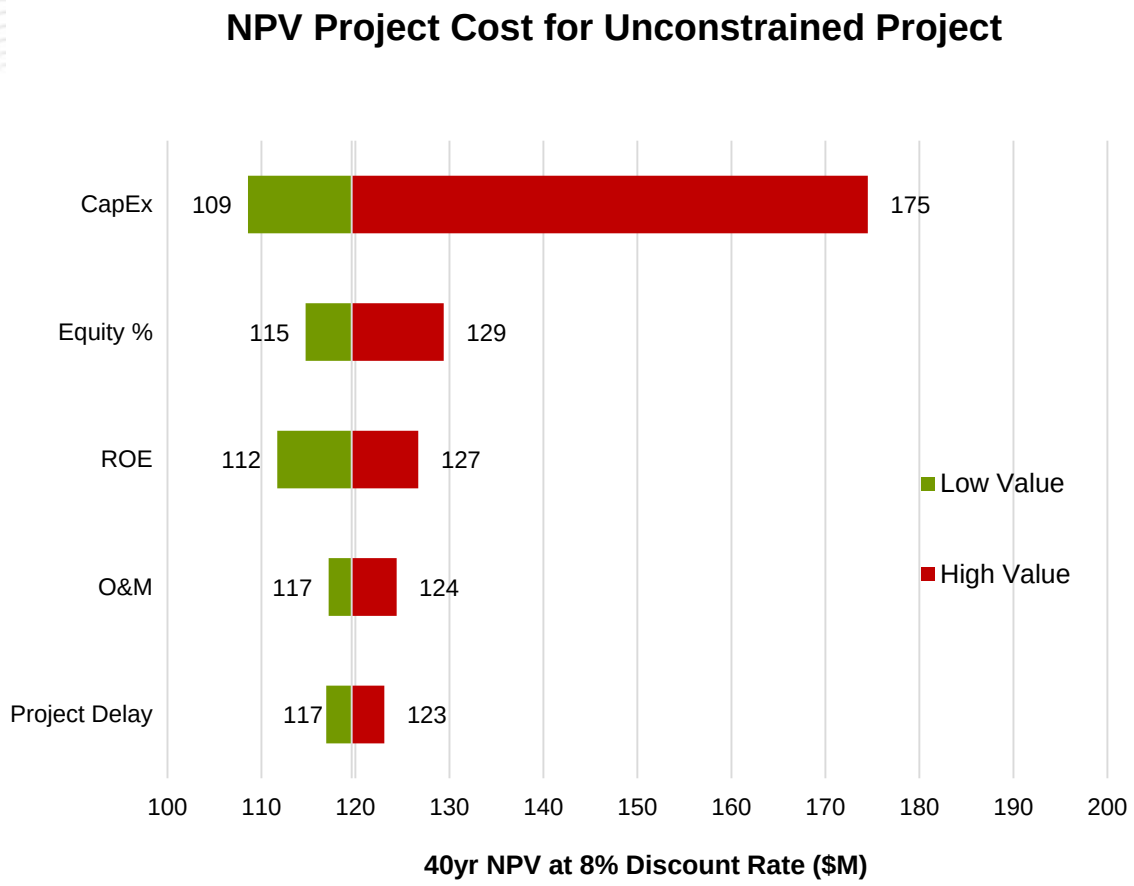
Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	100	100	100
O&M (MM p.a., $2016)	0.56	0.75	1.13
ROE (%)	9.50%	10.82%	12.00%
Equity % of Capital Structure	45%	50%	60%
Construction Period Length (months)	42	48	60



Summary of NPV for Project Cost for Different Scenarios

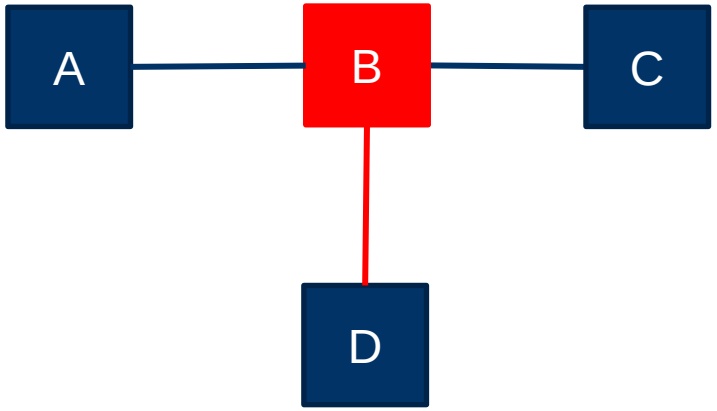
- Summary of NPV analysis for cost containment categories and comparative impact for different sensitivities

Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	90	100	150
O&M (MM p.a., $2016)	0.56	0.75	1.13
ROE (%)	9.50%	10.82%	12.00%
Equity % of Capital Structure	45%	50%	60%
Construction Period Length (months)	42	48	60



Impact of Upgrade Work

- Impact of upgrade costs to projects with cost containment
  - Projects typically include a portion of work that is considered a Transmission Owner Upgrade and not subject to competition
  - New substation cutting into an existing line or new line interconnecting two existing substations

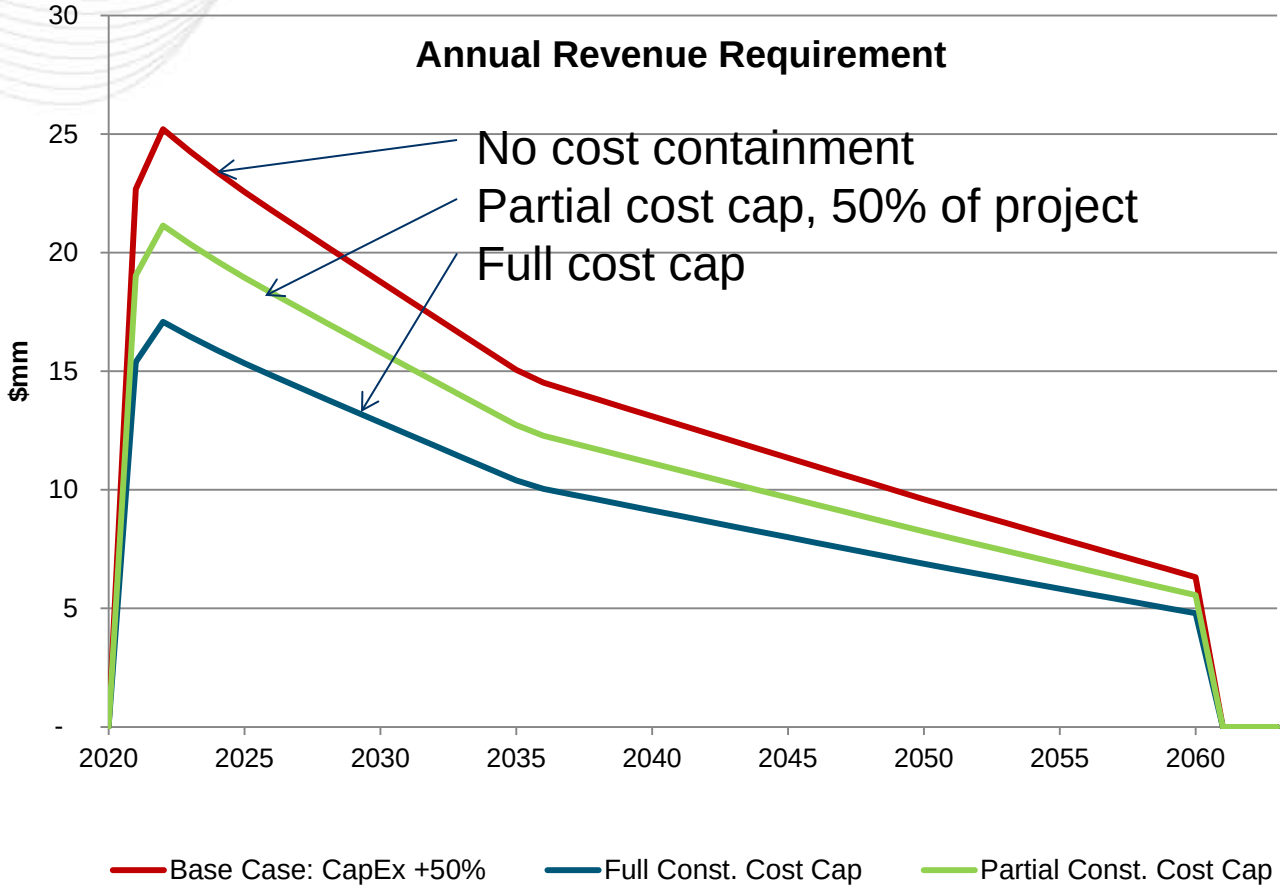


Evaluating Impact of Risks – Partial Cost Commitment

- Impact of upgrade costs to projects with cost containment for 4 scenarios
  - $100 million project, upgrade work estimate is 50% of total cost
  - 50% of the project is a greenfield transmission project and *subject to cost containment*
  - 50% of the project is a Transmission Owner upgrade and *not covered by any cost containment commitment*.

Evaluating Impact of Risks – Partial Cost Commitment

Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	90	100	150*
O&M (MM p.a., $2016)	0.75	0.75	0.75
ROE (%)	10.82%	10.82%	10.82%
Equity % of Capital Structure	50%	50%	50%
Construction Period Length (months)	48	48	48



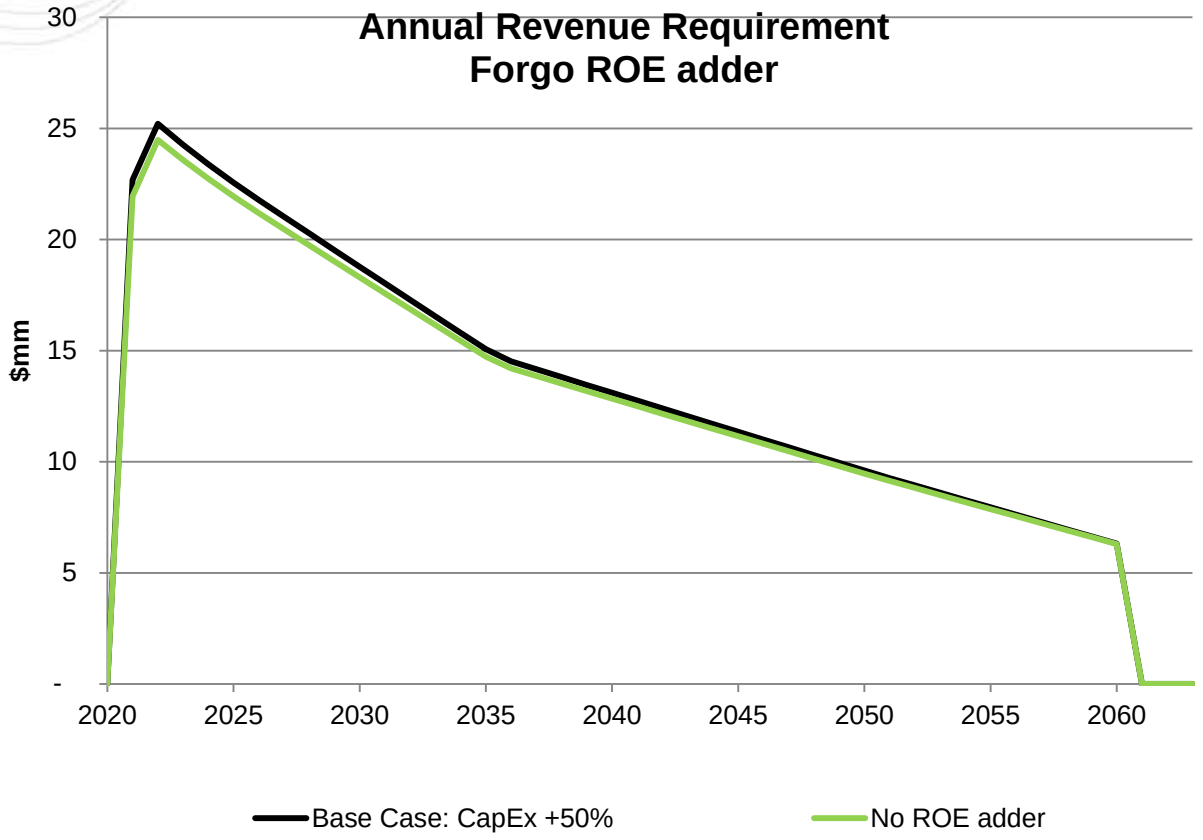
Evaluating Impact of Risks – Partial Cost Commitment

- Impact of limited cost containment to ROE incentive
  - $100 million project
  - Proposer commits to give up FERC authorized incentive adder if construction cost exceeds a certain amount and also the earnings on the construction cost that exceeds a certain amount.

Evaluating Impact of Risks – Partial Cost Commitment

- Scenario:
  - CapEx spend varies
  - +50%
  - Forgo ROE adder 50bp for cost overrun

Base Case Inputs	Low Value	Expected	High Value
CapEx (MM, $2016)	90	100	150
O&M (MM p.a., $2016)	0.75	0.75	0.75
ROE (%)	10.82%	10.82%	10.82%
Equity % of Capital Structure	50%	50%	50%
Construction Period Length (months)	48	48	48



Cost Containment Details – Future Discussions

- Additional education topics?
- Are there additional scenarios that should be considered?
- Are the assumptions reasonable relative to industry experience?
- Additional discussion on controllable and uncontrollable costs?
- Least cost and least risk
- Cost rigor versus cost containment
- Probability of exceptions, exclusions, and adjustments to cost containment

Cost Containment Details – Future discussions

- Should there be standardized terms and conditions?
- Should there be a common set of features that all cost containment mechanisms should include for consideration?
- What level of detail should be public versus non-public?
- Should cost containment be encouraged?
- Should there be some categories of work that should be excluded from cost containment?
- How does regulatory authority factor in evaluation?

Appendix

Appendix
Assumptions

Other Inputs	
Construction Period	4 years
Cost of Debt (%)	4%
Debt % of Capital Structure	50%
Inflation Rate	2% p.a.
Fed Tax Rate	35%
State Tax Rate	5.75%
Property Tax Rate	1.75%
WACC	8%
Asset Life	40 years
AFUDC or CWIP	AFUDC

Appendix – Cost Containment Proposals

In Chronological Order (date of selection report issuance)

		Imperial Valley Policy Element	Gates - Gregg 230kV	Sycamore - Penasquitos 230kV	Miguel 500kV	Suncrest 230kV	Estrella Substation	Spring Substation	Wheeler Ridge Junction Substation	Delaney - Colorado River 500kV	Harry Allen - Eldorado 500kV	Walkemeyer - North Liberal 115kV	Duff - Coleman EHV 345kV
	# of Bidders	**2**	**5**	**5**	**1**	**2**	**4**	**3**	**4**	**5**	**3**	**11**	**11**
	% of Bidders proposing cost containment	**100%**	**0%**	**0%**	**N/A**	**100%**	**50%**	**33%**	**25%**	**80%**	**100%**	**45%**	**91%**
Categories	**Permutations**												
Capital Cost	Cap - incl. AFUDC / CWIP & Contingency					▲	▲			▲		■	▲
	Cap - incl. Contingency, excl. AFUDC / CWIP	■						■	■		▲		■
	Cap - excl. Contingency, incl. AFUDC / CWIP	▲									■		
	Rate Base Cap											■	
	Cap - Capital Cost only										■		■
	Cap - Portion of Capital Cost only (e.g., Materials)												■
	No Cost Containment		▲	▲			■	▲	▲	■		▲	■
Rev. Req	Revenue Requirement Discount												■
ROE	ROE Cap - incl. incentive adders										▲	■	▲
	ROE Cap - base ROE only									▲			
	WACC Cap - limited duration												■
	Forgone ROE incentive adder (all incl. RTO)									▲			
	Forgone ROE incentive adder (all except RTO)						■		■	■			■
	No Cost Containment	▲	▲	▲		■	▲	■	▲	■		▲	■
Equity %	Cap on Equity Percentage						■		■		▲	■	▲
	No Cost Containment	▲	▲	▲		■	▲	▲	▲	▲	■	▲	■
O&M	O&M Cap (limited duration)					▲	▲	■	■		■		■
	Forgone O&M recovery (limited duration)									■			
Project Delay	Forgo return of/on portion of capital									■	■		

Key

- MISO
- SPP
- CAISO
- ▲ Proposed by selected bidder
- ■ Proposed by one or multiple bidders

- Revision History
  - Ver 1, May 23, 2017, Original posted
  - Ver 2, May 26, 2017, revised slide 7, revising “to file” to “after filing”