



Energy Benefits

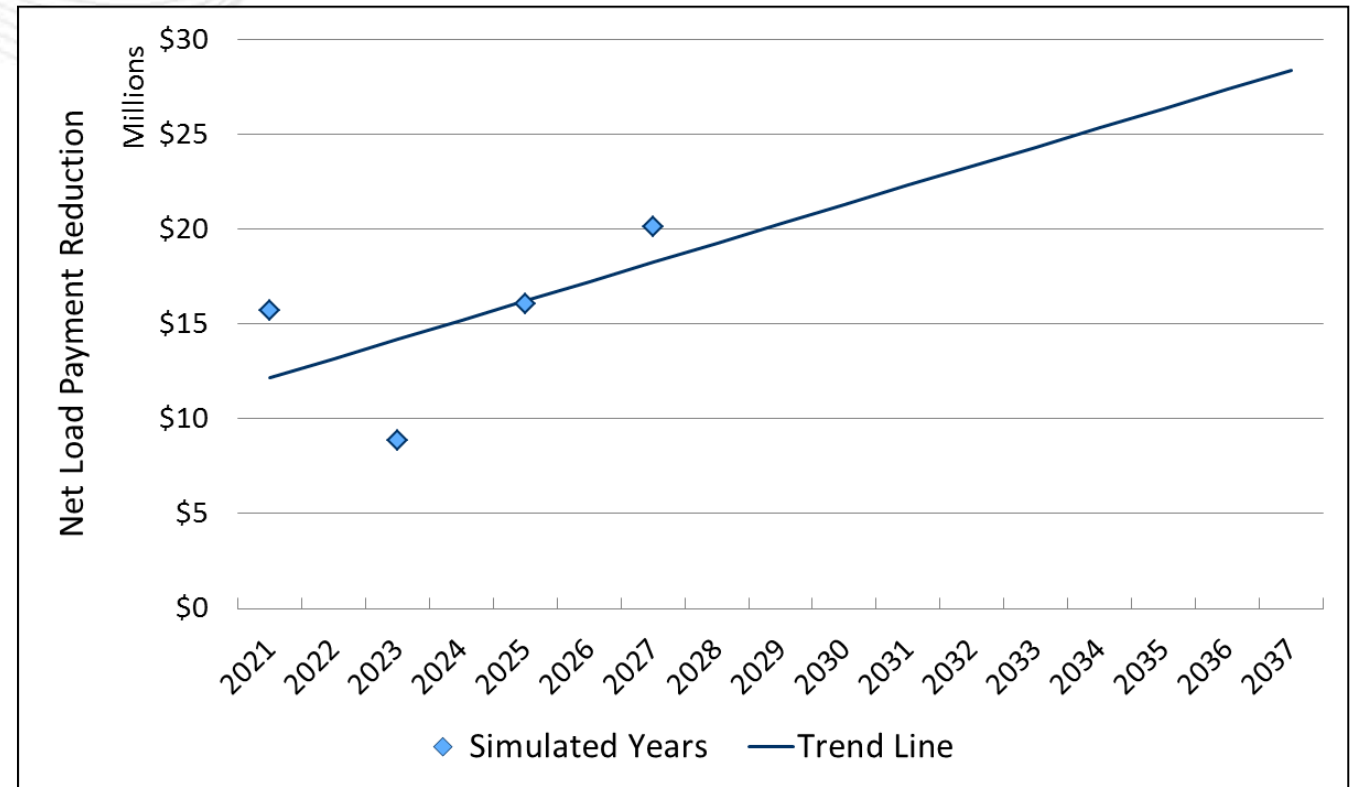
June 15, 2018

- **Simulated Years: RTEP-2, RTEP, RTEP+2 and RTEP+4**
 - The decrease of the simulation horizon by 4 years (from 10 years currently down to proposed 6 years) helps decrease the uncertainties related to various forecasts.
 - In all simulated years, generation and transmission topology are set at RTEP year level.
 - Each simulated year uses the appropriate load forecast and fuel price forecast.
 - Each simulated year has its own nuclear refueling, automatic maintenance and forced outage patterns.
- **Trend**
 - Trend is established based on all 4 simulated years.
 - Project benefits for each year are calculated using the trend values (no interpolations between simulated years).

Simulated Year	Simulated NLP Reduction
2021	\$15.7
2023	\$8.9
2025	\$16.1
2027	\$20.1



	Trend Year	Forecasted NLP Reduction
R-2	2021	\$12.1
R-1	2022	\$13.2
R	2023	\$14.2
R+1	2024	\$15.2
R+2	2025	\$16.2
R+3	2026	\$17.2
R+4	2027	\$18.2
R+5	2028	\$19.2
R+6	2029	\$20.3
R+7	2030	\$21.3
R+8	2031	\$22.3
R+9	2032	\$23.3
R+10	2033	\$24.3
R+11	2034	\$25.3
R+12	2035	\$26.4
R+13	2036	\$27.4
R+14	2037	\$28.4



- Transmission Cost Information Center (TCIC)
 - <http://www.pjm.com/planning/rtep-upgrades-status/cost-allocation-view.aspx>
- For an individual project:
 - Annual Revenue Requirement = Annual Depreciation Expense + (Carrying Value + CWIP) x Carrying Charge
 - Annual Depreciation Expense = Cost Estimate / Average Useful Life of Assets*
 - Carrying Value (Remaining useful value) = Cost Estimate – Accumulated Depreciation
 - Accumulated Depreciation = Annual Depreciation Expense x # Years In Service

*RTO-level average useful life of assets across PJM TO's



Project Cost - Annual Revenue Requirement Example

Input Variables	Value
Project Capital Cost (\$M)	\$50.0
RTO-Level Average Useful Life of Assets	45
Annual Depreciation % (1/Useful Life)	2.2%
RTO-Level Average Carrying Charge	13.8%

Yearly Annual Revenue Requirements					
Simulated Year	Year	Annual Depreciation Expense (\$M)	Accumulated Depreciation (\$M)	Carrying Value (\$M)	Revenue Requirement (\$M)
RTEP	1	\$1.1	\$1.1	\$48.9	\$7.84
	2	\$1.1	\$2.2	\$47.8	\$7.69
RTEP+2	3	\$1.1	\$3.3	\$46.7	\$7.54
	4	\$1.1	\$4.4	\$45.6	\$7.38
RTEP+4	5	\$1.1	\$5.6	\$44.4	\$7.23
	6	\$1.1	\$6.7	\$43.3	\$7.08
	7	\$1.1	\$7.8	\$42.2	\$6.93
	8	\$1.1	\$8.9	\$41.1	\$6.77
	9	\$1.1	\$10.0	\$40.0	\$6.62
	10	\$1.1	\$11.1	\$38.9	\$6.47
	11	\$1.1	\$12.2	\$37.8	\$6.31
	12	\$1.1	\$13.3	\$36.7	\$6.16
	13	\$1.1	\$14.4	\$35.6	\$6.01
	14	\$1.1	\$15.6	\$34.4	\$5.85
	15	\$1.1	\$16.7	\$33.3	\$5.70

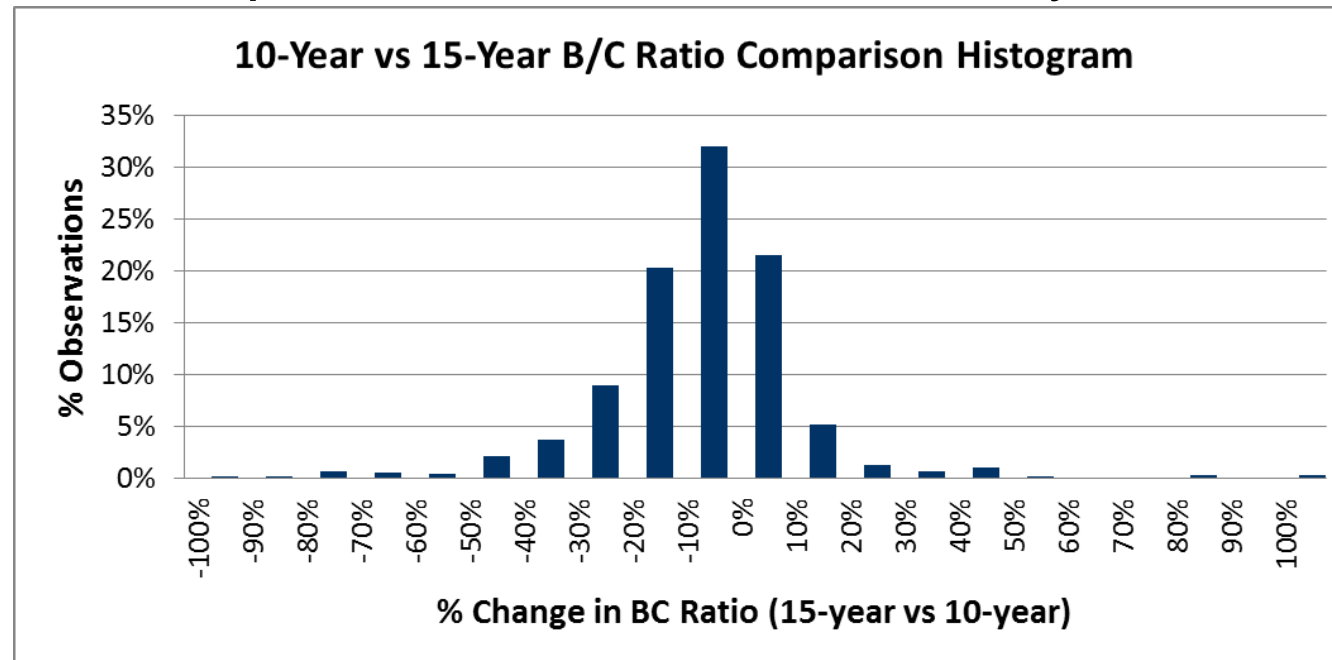
- **Energy Benefit Calculation Period**
 - 15 years starting from project in-service date, capped at RTEP+15
 - B/C ratio should exceed 1.25 threshold.

- **Additional 10-Year B/C Ratio Check**
 - 10-year B/C ratio should exceed 1.25 threshold.
 - 10-year B/C ratio is calculated based on 10 years of annual benefit and 10 years of annual revenue requirement, starting from project in-service date, capped at RTEP+10.

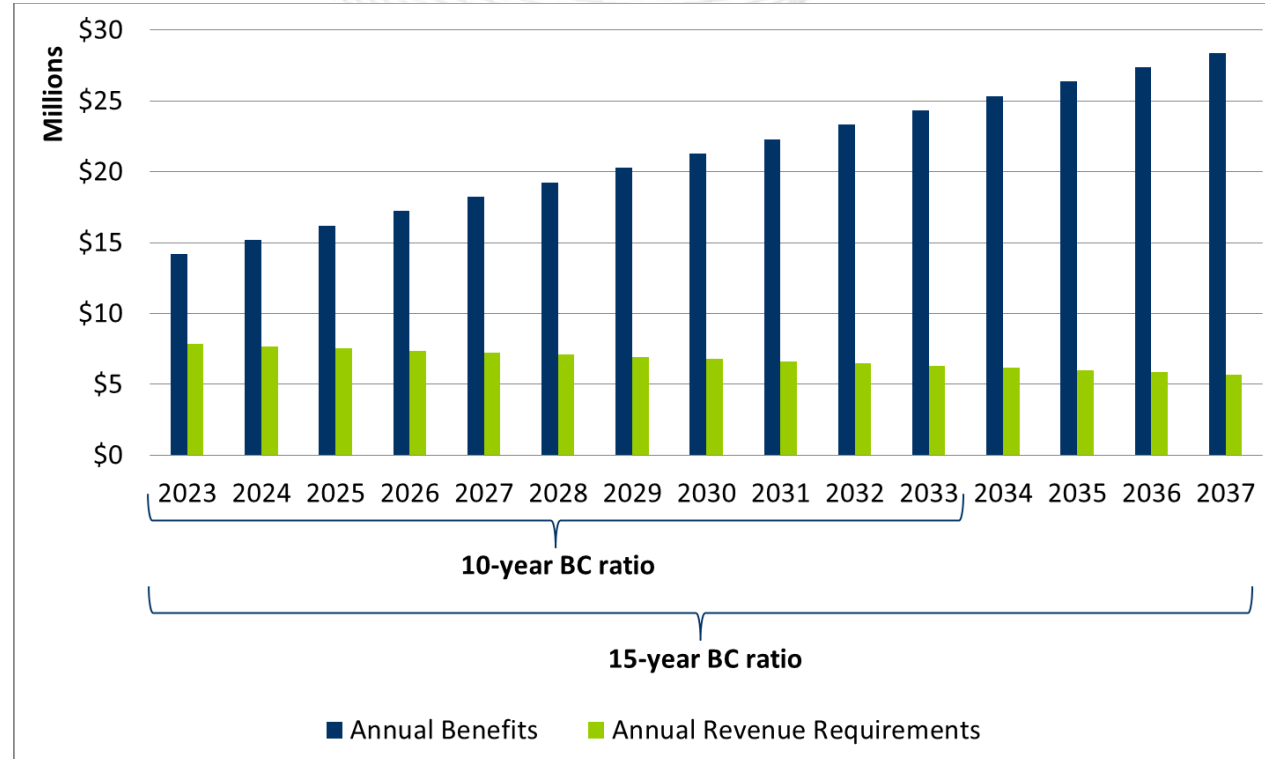
- **Sensitivities**
 - Status Quo (sensitivities are informational only, and used to compare competitive projects during the selection phase).

10-Year B/C Ratio for Past Projects

- Calculated 15-year and 10-year B/C ratios for a number of past projects.
- 65% of projects passed 1.25 threshold with 15-year B/C ratio.
- 59% of projects passed 1.25 threshold with both 10-year and 15-year B/C ratios.
- 6% of projects did not pass 1.25 threshold with 10-year B/C ratio.



Energy Benefit Calculation Period Example



15-year B/C ratio = 2.86 ✓

10-year B/C ratio = 2.37 ✓

- **Energy Benefit Adjustment for In-Service Date**
 - It is PJM's goal to address energy constraints by the RTEP year, and to incentivize projects that are designed and proposed to be in service by RTEP year.
 - PJM will adjust energy benefits of projects that are proposed to be in service later than RTEP year to account for any savings forgone due to later in-service date.
 - Projects with an in-service date earlier than RTEP will be equally treated as projects with an RTEP in-service date.
 - Earlier in-service date will be considered in a qualitative manner when comparing the projects.



Benefit Adjustment for In-Service Date Example

In-Service year = RTEP
B/C Ratio = 2.86

	2023	2024	2025	2026	2027	...	2035	2036	2037
Annual benefit	\$14.2	\$15.2	\$16.2	\$17.2	\$18.2	...	\$26.4	\$27.4	\$28.4
Annual revenue requirement	(\$7.8)	(\$7.7)	(\$7.5)	(\$7.4)	(\$7.2)	...	(\$6.0)	(\$5.9)	(\$5.7)
PV of benefits in RTEP	\$177.2								
PV of costs in RTEP	(\$61.9)								
B/C ratio	2.86								

In-Service year = RTEP+1
B/C Ratio = 2.70

	2023	2024	2025	2026	2027	...	2035	2036	2037
Annual benefit	-	\$15.2	\$16.2	\$17.2	\$18.2	...	\$26.4	\$27.4	\$28.4
Annual revenue requirement	-	(\$7.8)	(\$7.7)	(\$7.5)	(\$7.4)	...	(\$6.2)	(\$6.0)	(\$5.9)
Lost savings in RTEP	(\$14.2)								
PV of benefits in RTEP	\$150.8								
PV of costs in RTEP	(\$55.8)								
B/C ratio	2.70								