

BUILDING A WORLD OF DIFFERENCE

August 23, 2016

RISK INFORMED BUDGET PRIORITIZATION

ONE WATER UTILITY WORKSHOP

MAT POWIS - MANAGER



BUDGET PRIORITIZATION & OPTIMIZATION PROCESS AND TOOLS

TWO CASE STUDIES DEMONSTRATE GOOD PRACTICE BUDGET PLANNING

- ✓ FINANCIAL RISK WEIGHTED NPV
- ✓ SCORING BASED APPROACH



FINANCIAL RISK WEIGHTED NPV APPROACH DELIVERS THREE CRITICAL PLANNING RESULTS FOR THE BUDGET PROCESS

- Project Rankings Based on Financial Efficiency
 - ✓ NPV benefit and 'Bang for the Buck' metric quantified
- Project Rankings Based on Planning Criteria
 - ✓ Weighted Scoring Approach
- Optimized Implementation Schedule that Incorporates Budget Constraints
 - ✓ Dovetails with Utility Financial Plan for Rate Increases and Financing Needs







CASE STUDY 1: MID TO LARGE SIZE UTILITY



CAPITAL PRIORITIZATION & OPTIMIZATION FINANCIAL RISK WEIGHTED NPV PROCESS

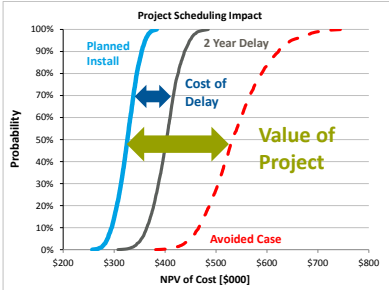
Task 1 Identify Projects	Task 2 Project Assumptions	Task 3 Business Case Development	Task 4 Project Scheduling
<ul style="list-style-type: none"> Based on Condition Assessment AMPs Other Investment needs (growth, regulatory, safety, etc...) Include Asset Operator recommendations 	Input Assumptions <ul style="list-style-type: none"> Planning Criteria Capital Costs O&M Impact Growth Assumptions Revenues Schedule Constraints Failure Probability 	Key Results <ul style="list-style-type: none"> Financial Template NPV Benefit-Avoided Case Financial Efficiency Balance Scorecard Project Ranking/Prioritization 	Optimization Model <ul style="list-style-type: none"> Financial Efficiency Risk Tolerance Budget Constraints Criteria Scoring Regulatory & Environmental Safety Customer Service

 Assumptions Form
  Monte Carlo Simulation
  Genetic Algorithms




EXAMPLE PROJECT FINANCIAL ANALYSIS

- Project Value based on the Avoided Case
- Process Financially Quantifies the Cost/Risk of Project Delay



Risk analysis is incorporated in NPV results through Monte Carlo Simulation



FINANCIAL ANALYSIS CONSISTENTLY EVALUATES PROJECTS BASED ON PROJECT NPV

Business Case Development

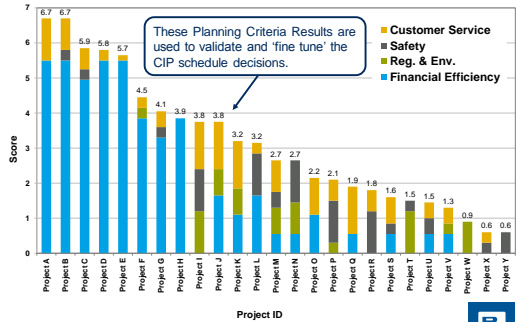
- Consistent project proforma used for economic and risk analysis
- Both avoided costs and cash savings /revenue incorporated
- Financial Efficiency or 'Bang for the Buck' = Expected Outcome / Capital Cost

Count	Project ID	Expected Outcome NPV \$000	Capital Cost Nominal\$ \$000	Install Year
1	Project G	-36,710	1,419	2014
2	Project Q	-19,686	2,361	2014
3	Project X	-10,912	6,401	2015
4	Project H	-5,635	26,480	2019
5	Project B	-4,041	5,875	2016
6	Project W	-3,981	256	2014
7	Project E	-3,731	8,778	2017
8	Project K	-3,359	2,199	2019
9	Project T	-2,392	1,794	2014
10	Project D	-1,201	2,846	2017
11	Project I	-815	13,355	2015
12	Project M	-550	5,586	2015

7

PLANNING CRITERIA ARE USED WITH THE FINANCIAL RESULTS TO ARRIVE AT A BALANCED SCORE FOR EACH PROJECT

Business Case Development

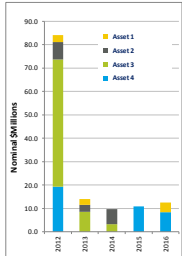


8

PROJECTS SCHEDULED TO INCLUDE BUDGET CONSTRAINTS

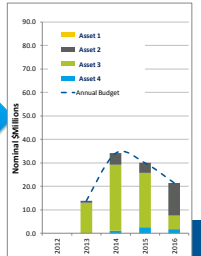
Project Scheduling

Annual Capital Costs NO BUDGET constraint
Installation years determined through Prioritization Process



Optimization Model

Annual Capital Costs WITH BUDGET constraint
Lower ranking projects moved back in schedule to meet budget constraints

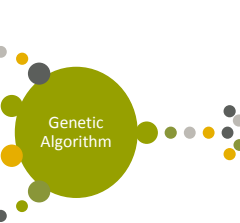


9

OPTIMIZATION MODEL

Project Scheduling

- Budget Constraint
- Schedule Constraints
- Non-Financial Constraints
- Project Economics



Optimized Schedule

&

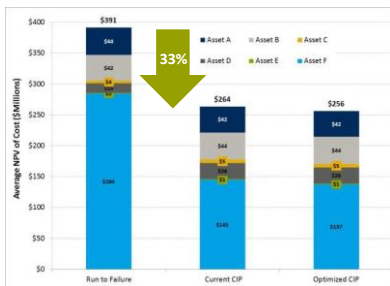
Project Portfolio NPV Benefit Maximized

10

PORTFOLIO OPTIMIZATION RESULTS

Project Scheduling

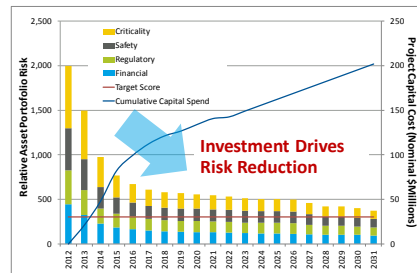
- \$48 million delayed out of 5 Year CIP
- \$8 Million reduction in Total Risk Weighted NPV of Cost (40 year) with Optimized CIP w/o changing budget level



11

CAPITAL SPEND REDUCES PORTFOLIO RISK

Project Scheduling

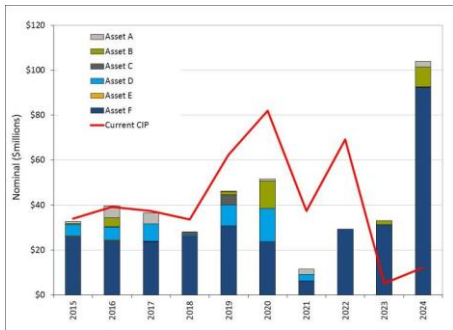


- Higher Level of Spending in 2013-2016 Reduces Significant Level of Portfolio Risk
- Capital is Being Spent on the Most Important Projects

12

OPTIMIZED IMPLEMENTATION SCHEDULE

Project Scheduling

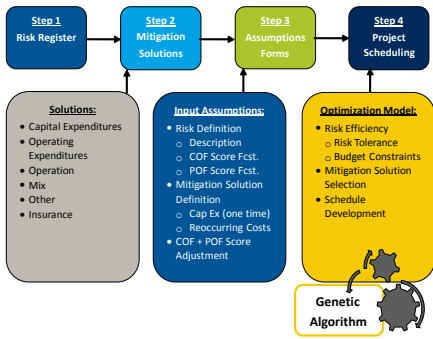


13

CASE STUDY 2: SMALL/MID-SIZE UTILITY

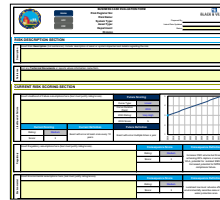
14

CAPITAL PRIORITIZATION & OPTIMIZATION SCORING BASED APPROACH PROCESS



15

ASSUMPTIONS FORM = CONSISTENCY, DOCUMENTATION

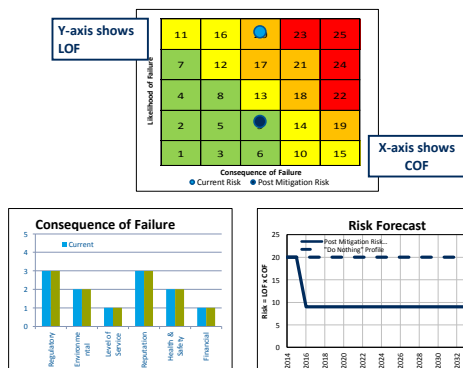


- Input parameters
- Capital costs
- Target installation
- Incremental O&M
- Likelihood of failure
- Consequence of Failure (Regulatory, Environmental, Level of Service, Reputation, Health and Safety, and Financial)

Primary Output
Pre and Post Total Risk Score Over Time

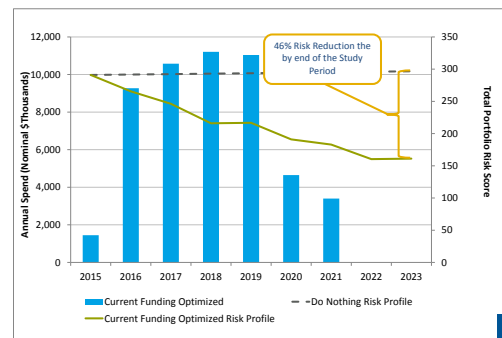
16

Pre and Post Total Risk Score Over Time



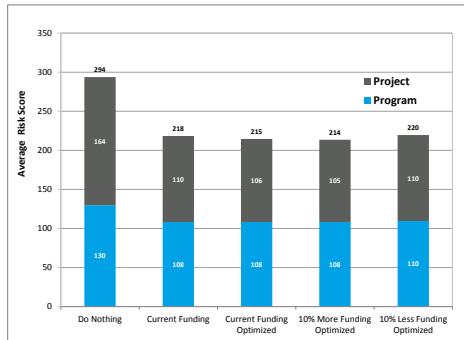
17

ANNUAL SPEND RISK ANALYSIS



18

PORTFOLIO OPTIMIZATION RESULTS



Optimization decreases overall Portfolio Risk



19

SUMMARY



20

FINANCIAL VS. SCORING APPROACH

Description	Financial Risk Weighted NPV (Case Study 1)	Scoring Based Approach (Case Study 2)
Cost Results	No Difference	
Benefit Results	Reduction in total risk weighted NPV \$	Reduction in Risk Score
CIP Development	CIP optimized to maximize NPV Benefit while maintaining budget	CIP optimized to maximize risk reduction while maintaining budget
Robustness of End Results	Best in class sophisticated approach, highly defensible and objective.	Best practice with use of risk based prioritization, defensible with subjective scoring.
Risk Monetization	Best if final client is board/commission/city council. End Results = \$ (risk is monetized)	Useful for internal clients, end result = risk score, doesn't monetize risk directly.



21

VALUE OF OPTIMIZATION PROCESS

- Strategic Value**
 - Objectively incorporates risk tolerance and budget constraints
 - Defendable approach
 - Visual and quantified risk of project delays
 - Condition of assets incorporated
 - Understanding and quantification of risk
- Functional Value**
 - Documentation of all project assumptions
 - Quick sensitivity analysis
 - New budget constraints
 - Easy integration of new projects
 - Quick re-prioritization when assumptions change
 - Communication between business units and functions
 - Consistency and knowledge management



22

BALANCING TRADEOFFS



- In summary, this prioritization process and model assists utilities with managing the important balance of the following tradeoffs:
 - Budget constraints
 - Capex vs. Opex tradeoffs
 - Risk: Reliability and Outages, Safety, Financial
 - Identifies greatest Value Creation projects in portfolio

Process helps management balance tradeoffs between budget constraints and risk



23

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