

WIFIA Benefit-Cost Analysis

Demonstration User Interface Guide

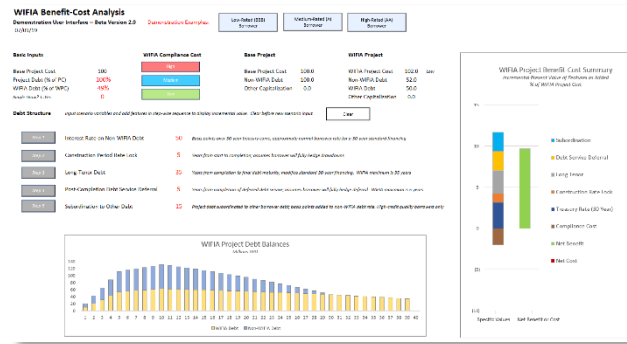
Model Version: WIFIA BCA Educational InRecap Beta 1.0 07262019.xlsm

August 2019

1 Overview and Purpose

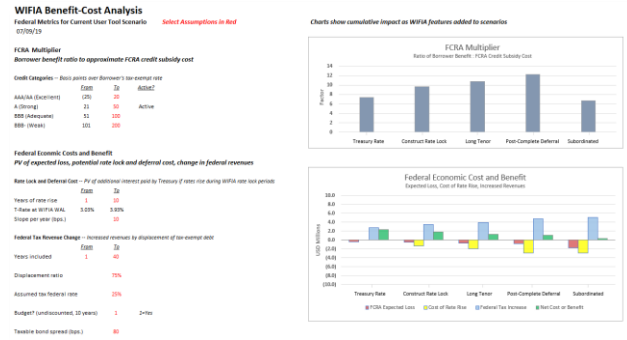
The WIFIA BCA Educational Model is an Excel-based financial model designed to demonstrate the potential benefits of various WIFIA debt structuring features. This Guide explains the underlying concepts and operations of the Model.

The Model has two user interfaces under the 'User Tool' and 'Fed Metrics' tabs:



User Tool Tab: WIFIA Borrower perspective

- Five primary WIFIA debt structuring features are considered. The potential value of each feature is demonstrated through a sequence of debt structuring steps.
- Value is defined in terms of lower present value of debt service from using a WIFIA Loan and displayed as incremental benefit as each feature is added. Overall debt structure is also displayed.



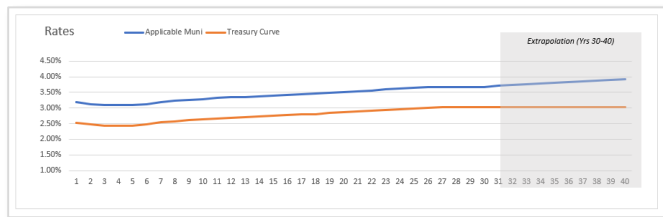
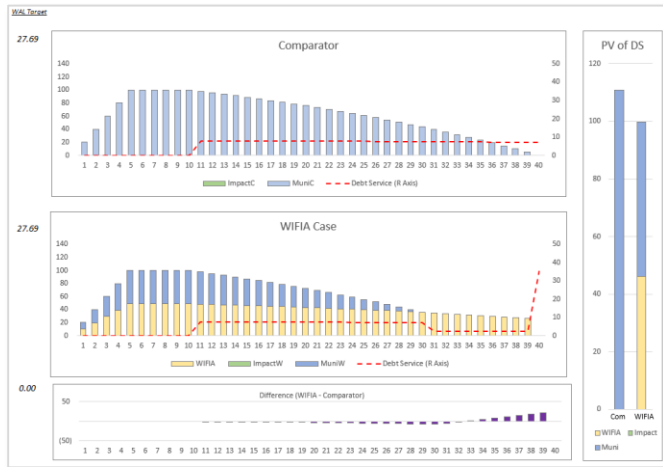
Fed Metrics Tab: Federal Lender Perspective

- A more technical interface to demonstrate various federal budgeting and economic metrics based on the current debt structuring scenario in the User Tool.
- Metrics include approximate FCRA credit cost, Lender losses if rates rise during a locked period and potential federal revenue benefits by WIFIA Loan displacement of tax-exempt debt.

2 General Methodology

The Model generally follows a standard public-sector benefit-cost methodology often called ‘Value for Money’ or VfM. In a VfM analysis, two financing options are considered, a traditional ‘Comparator’ (what the public sector authority would usually do) and an ‘Alternative’ (a new approach or program). The options are modelled to be structurally comparable and their respective costs are estimated on a present value or PV basis. The difference in PV is the net benefit or cost of the Alternative.

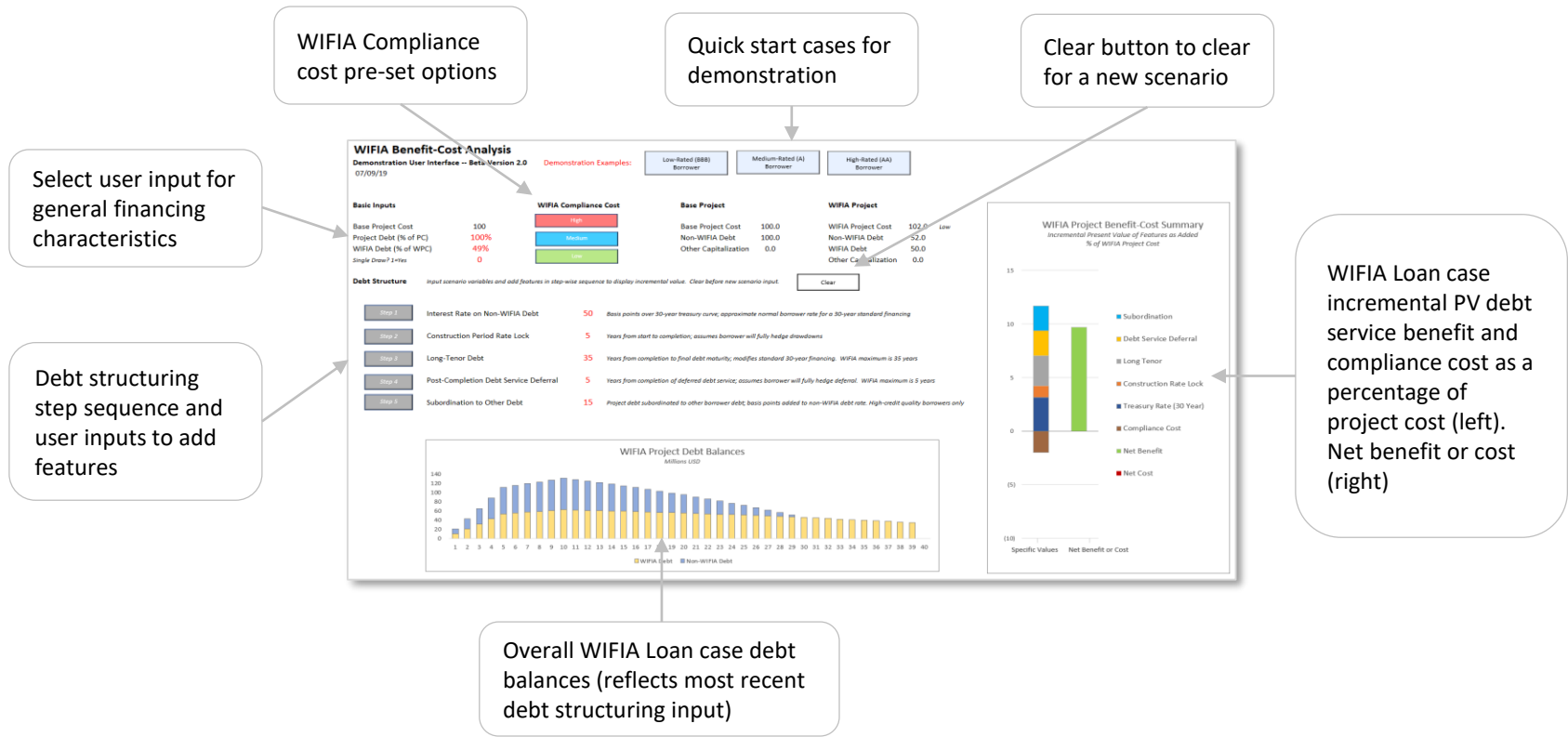
Some specific aspects of Model methodology are described below (charts from non-interface tabs ‘Dashboard’ and ‘Rates’):



- In the Model, the Comparator is a one-tranche Non-WIFIA Debt financing for a long-lived infrastructure asset, generally expected to be a tax-exempt bond. It is structured with respect to drawdown, interest capitalization periods, amortization and tenor.
- The Alternative is a two-tranche combination of Non-WIFIA Debt and a WIFIA Loan. It is structured to be comparable to the Comparator; when tranche amortization is not pro-rata (‘sculpted’) the targeted value is an exactly equal weighted average life or WAL.
- The relevant difference in the two cases is financing cost (interest and hedging). The Model uses simplified estimates based on the March 2019 Treasury curve. Non-WIFIA Debt interest rate is WAL Treasury rate plus a user-defined spread. The WIFIA Loan rate is WAL Treasury rate. Non-WIFIA Debt delayed draws are fully hedged with SLGS; WIFIA Loan delayed draws do not required hedging.
- The debt service of each case is discounted by the WIFIA Loan rate. The lower PV of the WIFIA Loan case is defined as the benefit. For demonstration purposes, the change in benefit as structural features are added is recorded in a VfM-style bar chart stack.

3 User Tool Interface

The User Tool interface is operated by macro-based buttons and specific user inputs in red ink. Although results are roughly accurate (given the Model's simplifying assumptions) the primary objective of the interface is educational demonstration, not precise evaluation.



4 Quick Start Demonstration Examples

To provide a 'quick start' demonstration, the User Tool interface includes three pre-set cases activated by macro buttons. The three cases correspond to typical WIFIA Borrower financings that require different debt structures. The macro buttons use pre-set inputs and automatically follow the debt structuring sequence.

- Note that it is always important to 'Clear' the current scenario before considering a new one.

Low-Rated (BBB)
Borrower

Low-Rated Borrower: A typical water facility project financing whose senior debt is rated about 'BBB'. The asset has a 30-year useful life. The primary Borrower objective is to reduce interest cost and fully hedge construction draws. Non-WIFIA Debt is senior PABs. This Borrower utilizes two WIFIA Loan features in a 30-year financing: Treasury rate financing (which saves about 100 bps.) and construction rate lock.

Medium-Rated (A)
Borrower

Medium-Rated Borrower: A typical small city water system planning to finance a series of deferred maintenance projects that have at least a 40-year useful life. Interest cost and hedging are important, but this Borrower also seeks to minimize financing amortization so that local water rates can rise more gradually. Non-WIFIA Debt is senior system Revenue Bonds rated 'A' based on water rate covenants but limited market beyond 30-year tenors. This Borrower utilizes two additional WIFIA Loan features: a 40-year WIFIA Loan tenor (including Non-WIFIA Debt 30-year sculpting) and debt service deferral.

High-Rated (AA)
Borrower

High-Rated Borrower: A typical large city water system that is required to finance a major delayed investment with a very long useful life. Like the Medium-Rated Borrower, this Borrower seeks minimal amortization to delay water rate increases but it also wants to preserve its senior bond debt capacity. Non-WIFIA Debt would be rated 'AA' on a senior basis but the Borrower plans to issue subordinated bonds which carry a higher interest rate. The WIFIA Loan is fully pari-passu with this Non-WIFIA Debt issue (subordinated only to Borrower senior bonds unrelated to current project). This Borrower utilizes all five WIFIA features.

5 Changing Basic Project Assumptions

Since the focus of the User Tool interface is on debt structuring, specific characteristics of the asset to be financed are largely outside of its scope. However, for demonstration purposes it may be useful to show changes to the relative size of a WIFIA Loan in terms of project cost and limits on Non-WIFIA Debt sculpting. In addition, the schedule of construction draws can affect the cost of hedging during the construction period. These are subtle effects – for most demonstration purposes, original default values should simply be used unchanged.

- Changes to these inputs should be made prior to starting a new debt structuring scenario. The Clear button will not clear these inputs.

Basic Inputs	
Base Project Cost	100
Project Debt (% of PC)	100%
WIFIA Debt (% of WPC)	49%
Single Draw? 1=Yes	0

Base Project Cost: Since PV benefits and costs are expressed as a percentage of project cost, for simplicity this is set at 100 (though automatically adjusted for Compliance Costs).

Project Debt Percentage: The Model assumes that the WIFIA Loan replaces Non-WIFIA Debt, so Project Debt must equal at least the WIFIA Loan percentage. PV benefits are unchanged unless sculpting is included in the debt structure scenario, where the relative size of the sculpted Non-WIFIA Debt is relevant (see below).

WIFIA Debt Percentage: As a percentage of project cost (including Compliance Cost), this cannot exceed 49% but may be less (e.g. due to limited Eligible Assets). A smaller amount will obviously reduce benefit values expressed as a percentage of project cost, but it may also limit the range of sculpting Non-WIFIA Debt in longer tenor cases. This is because the Model adjusts the final WIFIA payment in order to make the WIFIA and Comparator cases equal in terms of WAL. A relatively small WIFIA Loan might require a large final payment that is beyond both Model scope and WIFIA program authority. Hence, the lower input limit is about 35%.

Single Draw Switch: As a simplifying default assumption, the Model assumes a straight-line financing drawdown during the construction rate lock period specified in the debt structuring section. But the rate lock feature may also be used to do a single draw at construction completion and refinance short-term construction debt or Borrower cash. This may be an efficient option for larger Borrowers that have existing liquidity facilities. The Single Draw feature is activated by inputting '1' value.

6 WIFIA Compliance Costs

A WIFIA Loan case will need to comply with certain federal requirements that are not required in the Comparator case. The cost of complying with Davis-Bacon, American Iron & Steel and NEPA laws may be a significant factor in the VfM analysis.

Although many Compliance Costs can be capitalized and included in the permanent financing, for demonstration purposes the User Tool includes them separately as the present value of their overall effect. This is generally valid because although Compliance Costs may affect the size of a financing, they will not materially change the relative value of long-term debt structuring alternatives. Since User Tool Benefit-Cost Summary results are presented on a PV basis as a percentage of Project Cost, the PV of WIFIA debt structuring benefits and the PV of Compliance Costs can be netted to show the overall VfM.

Three pre-set Compliance Cost cases are included in the User Tool. They can be selected at any time and are not affected by other interface functions or inputs.



High

High: In this case, a labor-intensive project is in an area where wages are low relative to prevailing union scale. In addition, the project is located on a greenfield site and uses a lot of steel in construction. Present value of Federal Compliance Costs is estimated to be **8%** of Project Cost.



Medium

Medium: In this case, a labor-intensive project is in an area where wages are slightly below prevailing union scale. The project is located on a brownfield site and uses some steel in construction. Present value of Federal Compliance Costs is estimated to be **5%** of Project Cost.



Low

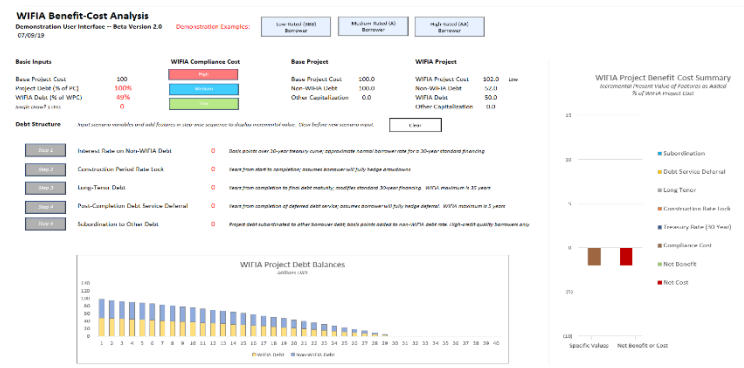
Low: In this case, a labor-intensive project is in an area where wages are comparable to prevailing union scale. The project is located on a brownfield site and uses little steel in construction. Federal Compliance Costs are estimated to be **2%** of Project Cost.

7 Exploring Debt Structure Alternatives

The central purpose of the User Tool is to demonstrate the effect and potential value of using a WIFIA Loan to replace Non-WIFIA Debt in various scenarios.

To do this, the Debt Structuring section of the interface presents a series of five sequential ‘Steps’ that change assumptions about the financing structure. In each Step the WIFIA Loan and Non-WIFIA Debt react differently, thereby highlighting specific WIFIA features. The incremental change in the PV of debt service is displayed and recorded in the Benefit-Cost Summary. The overall debt structure (reflecting the most recent Step) is displayed in the WIFIA Project Debt Balances chart.

- To start, the interface should be Cleared. The User Tool then reflects (as shown below) a 30-year financing fully drawn at closing in which the interest rate (Treasury flat rate at financing WAL) and the amortization schedules of the WIFIA Loan and Non-WIFIA Debt are identical – and hence there is no difference in the PV of debt service.
- To change these assumptions, the user inputs a Step value and executes by pushing the related Step button. Steps 1 through 5 are described in the following pages.
- Note that because the interface records incremental values, it is important to add Steps in sequence and to Clear before considering a new scenario.



8 Step 1: Basic Interest Rate Benefit on 30-Year Financing

The most basic benefit of a WIFIA Loan is simply a lower interest rate – a WIFIA Loan has a Treasury-flat rate (corresponding to the Loan's WAL) while Non-WIFIA Debt will generally have a rate that includes a spread over Treasury.

Step 1

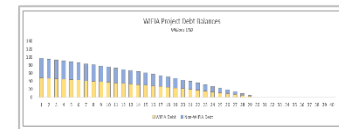
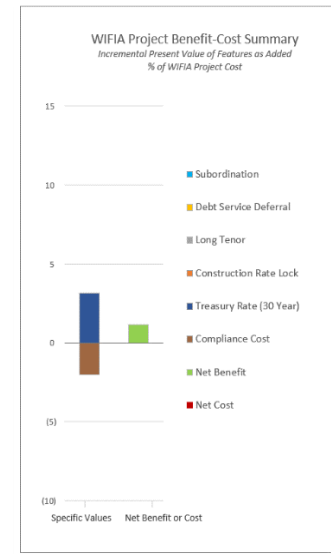
Interest Rate on Non-WIFIA Debt

50

Basis points over 30-year treasury curve; approximate normal borrower rate for a 30-year standard financing

In this example, Step 1 adds a spread of 0.50% over Treasury rate to Non-WIFIA Debt

- The Comparator (which is 100% Non-WIFIA Debt) will now reflect this increased rate.
- In the WIFIA Loan case, only the Non-WIFIA Debt (51% of the financing) will reflect this change. The 49% WIFIA Loan will still carry a Treasury-flat rate. As a result, there is a lower overall financing rate in this case.
- The positive difference in the PV of debt service between the two cases (about 3% of project cost) is recorded in the summary.
- The benefit of including the WIFIA Loan in the debt structure slightly exceeds the Compliance Cost and overall WIFIA VFM is slightly positive.
- Since amortization is not affected, overall debt balances do not change.



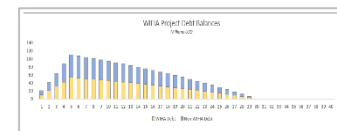
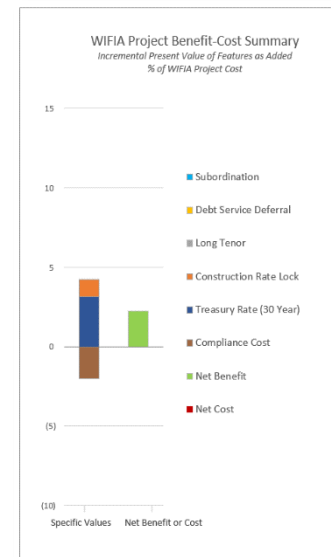
9 Step 2: Add Construction Period Rate-Lock

Most infrastructure assets will have a multi-year construction draw period. To avoid the risk of interest rates rising in this period, Non-WIFIA Debt will require a hedge. In contrast, future draws on a WIFIA Loan are locked at the starting interest rate.



In this example, Step 2 adds a 5-year straight-line drawdown construction period to the scenario.

- The Comparator will hedge interest rate risk by drawing the full amount of the financing at the outset and investing in short-term SLGS, thereby incurring negative arbitrage.
- In the WIFIA Loan case, WIFIA's 49% of the financing can remain unhedged because the WIFIA Loan rate is locked at the outset and negative arbitrage is avoided.
- The incremental difference in the PV of debt service between the two cases (about 1% of project cost) is now added to the summary.
- Total WIFIA Loan benefits are now slightly higher and overall VfM is increased.
- The delayed drawdown is reflected in the debt balance chart.



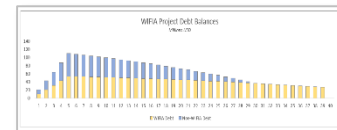
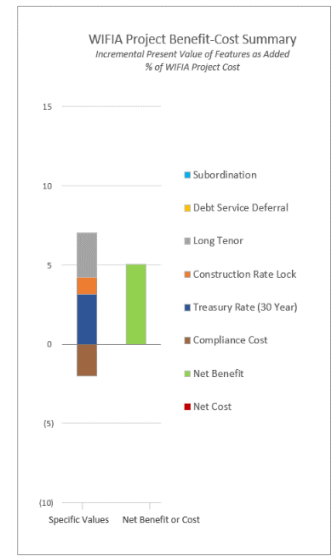
10 Step 3: Add Long Tenor and Sculpting

Many water infrastructure assets have very long lives. Borrowers often want to reflect this fact by using long-tenor debt. For strong credits, borrowing beyond 30 years is not a problem per se but it can be expensive due to debt market conventions. In contrast, a WIFIA Loan can extend for 35 years from asset completion on a Treasury ‘flat forward’ basis.

Step 3 Long-Tenor Debt 35 Years from completion to final debt maturity; modifies standard 30-year financing. WIFIA maximum is 35 years

In this example, Step 3 extends the final tenor of the financing by 35 years after completion (40 years total).

- To achieve this final tenor, in the Comparator case the Borrower will need to issue some debt in the 31 to 40-year range, outside usual market conventions, and incur increasing rates (up to about an additional 25 bps.) for those maturities.
- In the WIFIA Loan case, WIFIA’s 49% of the financing can (1) be extended to 40 years using a ‘flat forward’ Treasury curve and (2) be sculpted to allow Non-WIFIA Debt to be issued within the 30-year market.
- The incremental difference in the PV of debt service between the two cases (about 3% of project cost) is added to the summary.
- Total WIFIA Loan benefits are now up to about 7% of Project Cost. Overall VfM is approximately 5% of Project Cost – this is a significant net benefit.
- The longer tenor and sculpting are now reflected in the debt balance chart.



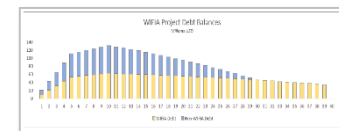
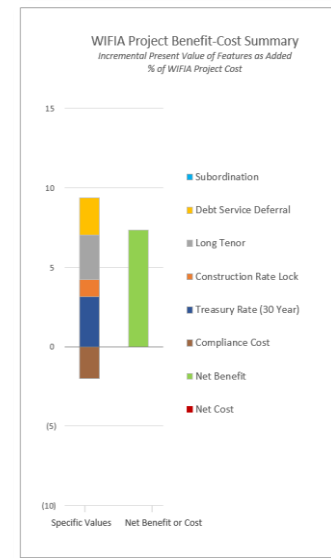
11 Step 4: Add Post-Construction Debt Service Deferral

A credit-worthy Borrower may want to preserve cash flow for a few years after asset completion to let revenues ‘catch up’ to increased costs. This can be accomplished by deferring debt. For Non-WIFIA Debt, future capitalized interest will require a hedge. In contrast, a WIFIA Loan will accrue capitalized interest at the original starting rate.

Step 4 Post-Completion Debt Service Deferral 5 Years from completion of deferred debt service; assumes borrower will fully hedge deferral. WIFIA maximum is 5 years

In this example, Step 4 adds 5 years of post-completion debt service deferral to the scenario.

- In the Comparator case, delayed principal amortization extends the WAL of the financing slightly which results in a minor rate increase. More significantly, capitalizing interest during the deferral is effectively a delayed draw. To hedge this against interest rate risk is relatively expensive – the amount is relatively small, but the time period is long.
- In the WIFIA Loan case, 49% of the financing will also incur a slightly higher rate due the increased WAL. But the hedging cost is avoided because the WIFIA Loan will simply accrue at the original starting rate.
- The incremental difference in the PV of debt service between the two cases (about 2% of project cost) is added to the summary.
- Total WIFIA Loan benefits now approach 9% of Project Cost with 7% net VfM benefit.
- The delayed amortization of principal and capitalization of interest during the deferral are now reflected (as a slight rise in years 5 to 10) in the debt balance chart.



12 Step 5: Add Subordination to Non-Project Borrower Debt

To preserve senior debt capacity, a highly-rated Borrower may want to issue subordinated debt to finance a major asset. For Non-WIFIA Debt, this will inevitably require a higher interest rate. In contrast, A WIFIA Loan with strong credit metrics may be subordinated to the Borrower’s other senior debt (unrelated to the asset) at the same Treasury-flat rate.

Step 5

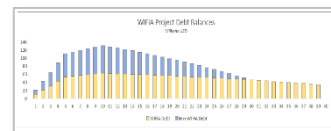
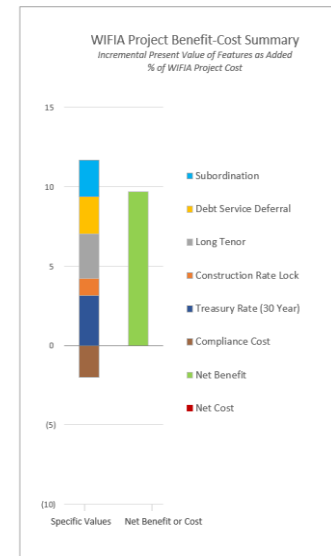
Subordination to Other Debt

15

Project debt subordinated to other borrower debt; basis points added to non-WIFIA debt rate. High-credit quality borrowers only

In this example, the final Step 5 adds 0.15% of interest spread to the Non-WIFIA Debt to reflect subordinated status

- In the Comparator case, this change effectively makes the Non-WIFIA Debt interest rate Treasury + 65 bps.
- In the WIFIA Loan case, the 51% Non-WIFIA Debt rate will also rise to Treasury + 65 bps. But WIFIA’s 49% of the financing will remain at the Treasury-flat rate. As in Step 1, this results in a lower overall financing rate – but the effect is more powerful in this Step 5 because it is applied to the longer and more complex debt structure defined in the prior Steps.
- The incremental difference in the PV of debt service between the two cases (about 2% of project cost) is added to the summary. Amortization is not affected, and debt balances do not change in this Step.
- Total WIFIA Loan benefits exceed 12% with a VfM approaching 10%. Note the change between Step 1 and Step 5 – there are no major interest rate differences between WIFIA Loan and Non-WIFIA Debt, but the cumulative effect of debt structuring results in a compelling level of VfM.



13 Federal Metrics Interface

The Federal Metrics interface presents several evaluation metrics for the WIFIA Loan in the current User Tool scenario from the federal Lender’s perspective. As with the User Tool, this interface is intended to demonstrate the application of VfM concepts for a Lender, not provide precise evaluation. A few primary assumptions may be input by the user (red ink) but otherwise the interface is automatically updated by User Tool macros. Two metrics panels are shown. Both panels follow the User Tool sequence as Steps are added, reflecting incremental change.

FCRA Multiplier: The FCRA Credit Subsidy cost (a reserve for expected credit losses) is a primary budgeting metric for federal Lenders because it requires the allocation of a limited resource, appropriated funding. The FCRA Multiplier metric shows the ratio of a Borrower’s benefit from a WIFIA Loan to the Loan’s specific FCRA cost.

Federal Economic BCA: Specific direct economic costs and benefits to the Lender (i.e. unrelated to Borrower benefit or policy objectives) of a WIFIA can be estimated on a PV basis and a net position determined.

Input for FCRA credit categories

Input assumptions for the cost of rate lock and deferral due to rate rise

Input assumptions for tax-exempt debt displacement estimation

WIFIA Benefit-Cost Analysis
Federal Metrics for Current User Tool Scenario
07/05/19 Select Assumptions in Red

FCRA Multiplier
Borrower benefit ratio to approximate FCRA credit subsidy cost

Credit Categories -- Basis points over Borrower's tax-exempt rate

Rating	Points	Active?
AAA/AA (Excellent)	25	20
A (Strong)	21	50
BBB (Adequate)	51	100
BBB- (Weak)	101	200

Federal Economic Costs and Benefit
PV of expected loss, potential rate lock and deferral cost, change in federal revenues

Rate Lock and Deferral Cost -- PV of additional interest paid by Treasury if rates rise during WIFIA rate lock periods

Assumption	Points	Rate
Years of rate rise	1	10
T-Rate at WIFIA WAL	3.03%	3.93%
Slope per year (bps.)	10	

Federal Tax Revenue Change -- Increased revenues by displacement of tax-exempt debt

Assumption	Points	Rate
Years included	1	40
Displacement ratio		75%
Assumed tax federal rate		23%
Budget? (undiscounted, 10 years)	1	J=Yes
Taxable bond spread (bps.)		80

Charts show cumulative impact as WIFIA features added to scenarios

FCRA Multiplier
Ratio of Borrower Benefit : FCRA Credit Subsidy Cost

Federal Economic Cost and Benefit
Expected Loss, Cost of Rate Rise, Increased Revenues

Upper Panel – FCRA Multiplier

Lower Panel – Federal BCA

14 FCRA Multiplier

Based on a WIFIA Loan's fundamental credit quality, the Model applies an expected loss (EL) factor to outstanding Loan balances over the Loan term. Annual EL values are then discounted (at the WIFIA Loan rate) to a PV of the total EL for the Loan, which is approximately equivalent to the FCRA Credit Subsidy amount required in federal lender budgeting.

- Since both Borrower benefit and the Lender FCRA cost are evaluated on a PV basis, they can be compared directly.

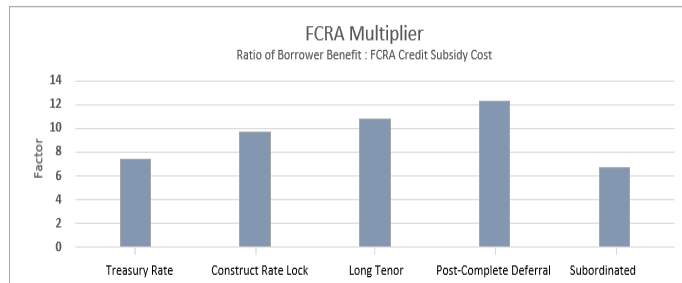
FCRA Multiplier

Borrower benefit ratio to approximate FCRA credit subsidy cost

Credit Categories -- Basis points over Borrower's tax-exempt rate

	<u>From</u>	<u>To</u>	<u>Active?</u>
AAA/AA (Excellent)	(25)	20	
A (Strong)	21	50	Active
BBB (Adequate)	51	100	
BBB- (Weak)	101	200	

- The Model uses simplified FCRA estimates of expected loss factor based on four credit categories roughly corresponding to investment grade rating.
- User can define category ranges based on Borrower spread.
- The Model uses input from Step 1 of the User Tool to determine the correct category for the WIFIA Loan in the current scenario, shown as 'Active'.



- The ratio of Borrower benefit to FCRA cost is a type of 'multiplier' that shows the policy benefit delivered per unit of appropriated funds expended.
- As Steps are added in the User Tool, both Borrower benefit and FCRA costs change. In the example shown, the FCRA Multiplier increases as WIFIA features are added to the debt structure – until Subordination (which has a significant credit impact).

15 Federal BCA: Cost of FCRA and Rate Lock, Deferral

In addition to the FCRA value, other PV metrics of Lender benefit and cost can be estimated from the WIFIA Loan scenario in the User Tool. Two others are considered in this interface: (1) cost to the Lender of a rise in rates during a period when the Borrower can draw on the WIFIA Loan and (2) the benefit to the Lender of a WIFIA Loan displacing tax-exempt debt (discussed next page).

The Model assumes the WIFIA Loan is 'match funded' by Treasury issues. If rates rise during draw period, a mismatch is locked in, resulting in a PV of cost to the Lender.

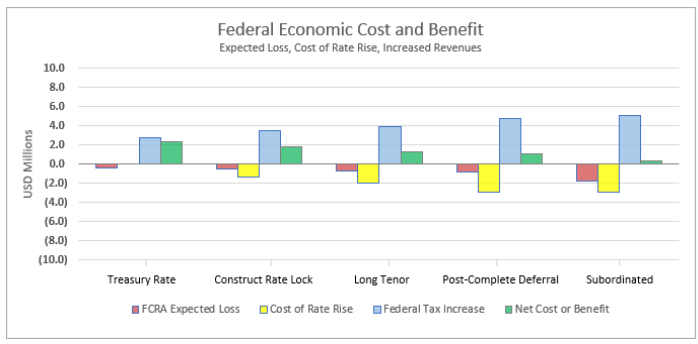
Federal Economic Costs and Benefit

PV of expected loss, potential rate lock and deferral cost, change in federal revenues

Rate Lock and Deferral Cost -- PV of additional interest paid by Treasury if rates rise during WIFIA rate lock periods

	<u>From</u>	<u>To</u>
Years of rate rise	1	10
T-Rate at WIFIA WAL	3.03%	3.93%
Slope per year (bps.)		10

- Potential rate rise is user-defined by two inputs: the time period over which rise occurs and the annual change (slope).
- In the current example, the Treasury rate at WIFIA Loan WAL rises over 9 years by 10 bps. per year, from 3.03% at start to 3.93% (this is in line with current CBO assumptions)



- The Federal Economic BCA panel shows three metrics and their net effect in dollar amounts (since Project Cost is set at 100, this is also equal to percentages) as Steps are added in the User Tool.
- FCRA cost increases as loan tenor and accrued amount increase over User Tool Steps.
- Rate rise cost increases as Rate Lock and Deferred Debt Service features are added.

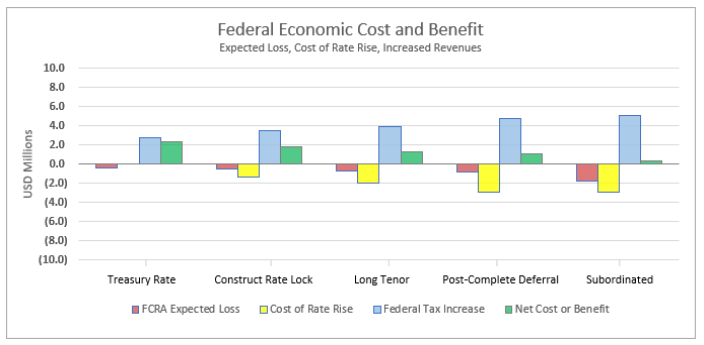
16 Federal BCA: Benefit of Tax-Exempt Debt Displacement

The Model assumes that WIFIA Loan will displace Non-WIFIA Debt. Since most water systems in the US are public-sector authorities, Non-WIFIA Debt is often tax-exempt, especially for larger Borrowers with efficient access to the municipal bond market.

- In a static portfolio adjustment analysis (roughly what JCT uses), displacement of tax-exempt debt by a WIFIA Loan will cause investors to instead buy an equal amount of equivalent taxable debt, thereby raising federal tax revenue. The Model estimates this increase on a PV basis.

Federal Tax Revenue Change -- Increased revenues by displacement of tax-exempt debt		
	<u>From</u>	<u>To</u>
Years included	1	40
Displacement ratio		75%
Assumed tax federal rate		25%
Budget? (undiscounted, 10 years)	1	1=Yes
Taxable bond spread (bps.)		80

- User-defined assumptions include the time period considered in the analysis, the displacement ratio (the percentage of the WIFIA Loan which causes portfolio displacement of tax-exempt debt), assumed federal tax rate and the taxable debt rate.
- The Budget switch allows user to choose a 10-year undiscounted total of tax revenue change (roughly JCT 'pay-for' budget methodology) or economic impact (discounted PV over the period specified above).



- The displacement of tax-exempt debt is a benefit to the federal Lender. This offsets the two costs included in the panel.
- As Steps are added in the User Tool, the increased accrued amount and longer term of the WIFIA Loan increase the amount of tax-exempt debt displaced.
- In the final Step, Subordination increases FCRA cost (the other two metrics do not change) and the net BCA is effectively zero – the economic effect to the Lender is roughly neutral.