



California Debt and Investment Advisory Commission Municipal Debt Essentials

October 27, 2016

Day 2, Session 4: Debt Structuring and Refunding

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Introduction

At this point, the Issuer has made several decisions:

- Identified a need to borrow money
- Identified a revenue stream to pay debt service
- Assembled a finance team
 - Bond counsel/Disclosure counsel
 - Financial advisor
 - Investment banker



It's now time to STRUCTURE THE FINANCING!

Topics

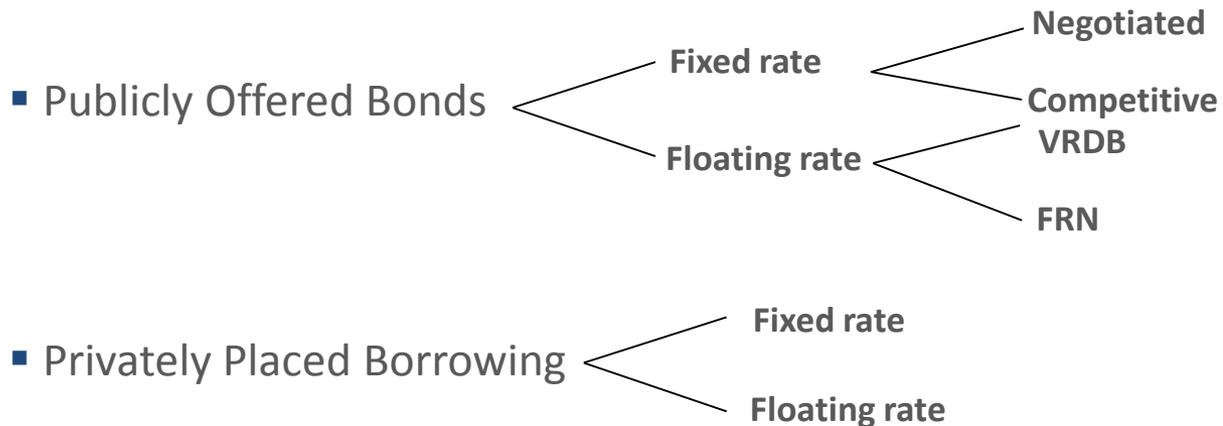
- Types of Debt Obligations
- Sizing the Bond Issue
- Debt Service Structure
- Refunding Bonds
- Ratings
- Credit Enhancement
- Variable Rate Debt
- Managing Interest Rate Swaps

Types of Debt Obligations

There are many types of debt that California governments issue:

- General Obligation Bonds
- TRANs
- Lease Revenue Bonds
- Certificates of Participation
- Revenue Bonds
- Sales Tax Bonds
- Pension Bonds
- Special Tax Bonds
- Tax Allocation Bonds
- Assessment Bonds

There are also a number of ways to access financing:



Types of Debt Obligations

The type of debt being issued can directly affect the structure of the bond issue

- Reserve Fund Requirement
- Additional Bonds Test
- Debt Service Coverage Requirements
- Term
- Tax Treatment
- Call Features
- Leased Assets

Sizing the Bond Issue

Depending on the type of debt and the nature of the plan of finance, proceeds of the bonds may be used for a number of purposes

Project or Construction Fund

Refunding Escrow

Capitalized Interest Fund

Debt Service Reserve Fund

Costs of Issuance

Underwriter's Discount

The Project Fund

Fund acquisition of the asset or construction of the project

- Based on actual costs or reliable estimates
- Net Funded or Gross Funded?
 - Gross Funded – Deposit exact amount required to pay for asset or project
 - Net Funded – Amount deposited plus interest earnings during the drawdown period sufficient to fund project



Refunding Escrow

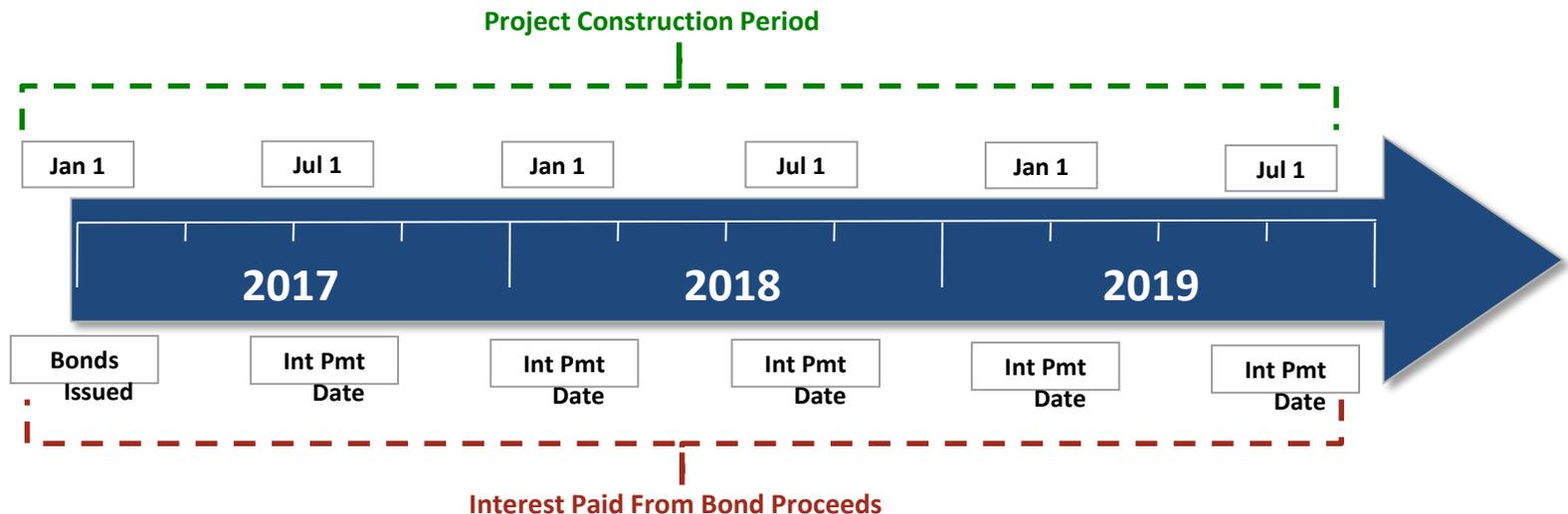
Refinance outstanding bonds

- Current refunding or advance refunding
- An amount of proceeds sufficient to pay principal and interest on the prior bonds is deposited into an escrow account
- Escrowed funds are used to pay off the prior bonds at the call date or maturity

The Capitalized Interest Fund

Bonds proceeds used to pay interest for a finite period of time

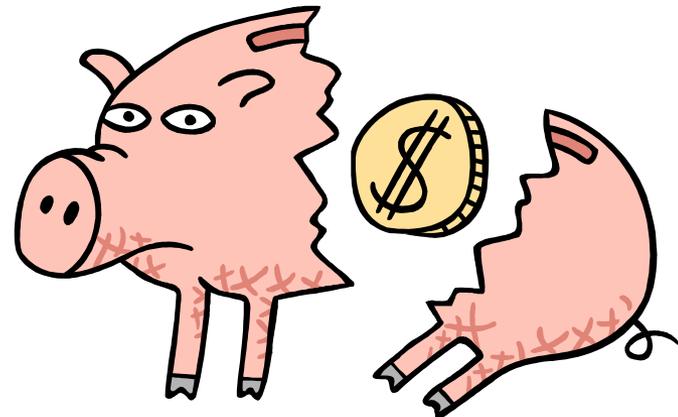
- Interest is capitalized for a number of reasons
 - Until a project/asset can produce revenue
 - Until the issuer has beneficial use (COPs, Lease Revenue Bonds)
 - Until revenue is projected to be sufficient to pay debt service



The Debt Service Reserve Fund

Provides additional security for investors

- Historically found in most credits with the exception of GO Bonds and Pension Obligation Bonds
- Tax Code limits the size of the Reserve Fund to the lesser of:
 - Maximum Annual Debt Service
 - 125% of Average Annual Debt Service
 - 10% of Par Amount
- Fund is invested with earnings usually going as an offset to debt service
- Debt Service Reserve Fund Surety Policy
- Recently, Moody's and S&P have revised their criteria for COPs/LRBs such that a DSRF may not be necessary



Costs of Issuance

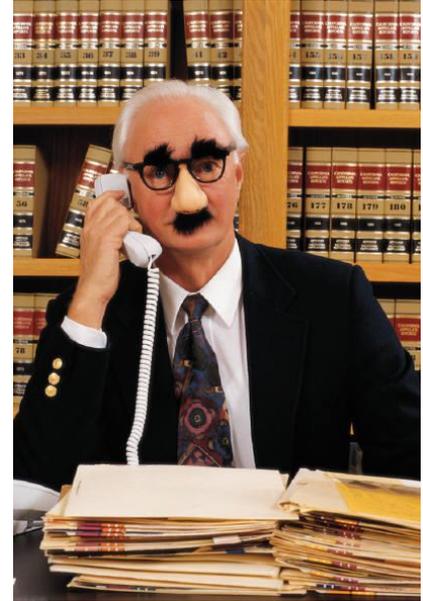
Bond proceeds may be used to pay certain eligible costs

Professional Services

- Bond Counsel and/or Disclosure Counsel
- Financial Advisor and Trustee/Paying Agent
- Rating Agencies
- Appraisal, Feasibility Study, Engineer's Report
- Special Tax Consultant
- Title Insurance

Credit Enhancement

- Bond Insurance and/or Surety Bond Premium
- Letter of Credit fees



Underwriter's Discount

Underwriter's compensation and expenses

Components

- Average Takedown
- Management Fee
- Expenses



Funding Method

- At closing, Underwriter pays for bonds an amount less the Underwriter's Discount

\$100,000,000	Par
<u>(650,000)</u>	<u>Less discount of 6.50/\$1,000</u>
\$ 99,350,000	Purchase Price

- Expressed as dollars per thousand dollars of bonds (e.g., \$6.50/\$1,000)

New Money Sizing Example

Ammonia Springs
Clean Water Authority

Net Funded Construction Fund

Capitalized Interest Fund

Debt Service Reserve Fund

Costs of Issuance

Underwriter's Discount



Sizing Assumptions – Ammonia Springs Clean Water Authority



Project Cost and Draw Schedule

4/1/2017 \$ 10,000,000

10/1/2017 \$ 10,000,000

4/1/2018 \$ 10,000,000

10/1/2018 \$ 10,000,000

\$ 40,000,000 Total Project

Bonds Dated: 1/1/2017

Final Maturity: 1/1/2047

Sizing Assumptions – Ammonia Springs Clean Water Authority

Ammonia Springs
Clean Water Authority



Costs of Issuance

\$200,000

Legal, FA, Trustee
Ratings, Printing, Misc.

Bond Insurance

40bps

Bond Insurance Premium
(Total Debt Service x .40%)

Underwriter's Discount

\$6.50/bond

Takedown, Management Fee,
Expenses

Sizing Assumptions – Ammonia Springs Clean Water Authority



Debt Service Reserve Fund

Lesser of:

- Maximum Annual Debt Service
- 125% of Average Annual Debt Service
- 10% of Par Amount

Capitalized Interest

Through 2-year Construction Period
1/1/2019

Sizing Assumptions - Ammonia Springs Clean Water Authority



Reinvestment Assumptions

<u>Fund</u>	<u>Rate</u>	<u>Earnings Go To:</u>
Capitalized Interest Fund:	2.50%	Construction Fund
Construction Fund:	2.50%	Construction Fund
Debt Service Reserve Fund:	5.0% (Bond Yield)	Construction Fund

Sizing Example – Net Funded Project Fund



Sources of Funds:

Par Amount:	\$ <u>46,390,000</u>
Total Sources of Funds:	\$ <u>46,390,000</u>

Uses of Funds:

Project Fund	\$ 38,723,636
Cap Interest Fund:	\$ 4,008,591
Debt Service Reserve Fund:	\$ 2,795,850
Bond Insurance:	\$ 357,550
COI:	\$ 200,000
Underwriter's Discount:	\$ 301,535
Rounding:	\$ 2,838
Total Uses of Funds:	\$ 46,390,000

1/1/2015 Initial Deposit: \$ 38,723,636

Project Fund Earnings	\$ 968,704
Cap Interest Fund Earnings	\$ 112,609
Debt Service Reserve Fund Earnings	<u>\$ 195,051</u>
Total Project Cost	\$ 40,000,000

Sizing Example – Capitalized Interest Fund



Sources of Funds:

Par Amount:	\$ <u>46,390,000</u>
Total Sources of Funds:	\$ <u>46,390,000</u>

Uses of Funds:

Project Fund	\$ 38,723,636
Cap Interest Fund:	\$ 4,008,591
Debt Service Reserve Fund:	\$ 2,795,850
Bond Insurance:	\$ 357,550
COI:	\$ 200,000
Underwriter's Discount:	\$ 301,535
Rounding:	\$ 2,838
Total Uses of Funds:	\$ <u>46,390,000</u>

1/1/2015 Initial Deposit: \$ 4,008,591

7/1/17 Interest Payment (\$ 1,005,697)

1/1/18 Interest Payment (\$ 1,005,697)

7/1/18 Interest Payment (\$ 998,599)

1/1/19 Interest Payment (\$ 998,599)

Fund Balance on 1/1/19 \$ 0

Sizing Example – Debt Service Reserve Fund



Sources of Funds:

Par Amount:	\$ <u>46,390,000</u>
Total Sources of Funds:	\$ <u>46,390,000</u>

Uses of Funds:

Project Fund	\$ 38,723,636
Cap Interest Fund:	\$ 4,008,591
Debt Service Reserve Fund:	\$ 2,795,850
Bond Insurance:	\$ 357,550
COI:	\$ 200,000
Underwriter's Discount:	\$ 301,535
Rounding:	\$ 2,838
Total Uses of Funds:	\$ 46,390,000

Lesser of:

Maximum Annual Debt Service \$ 2,795,850

125% of Average Annual Debt Service \$ 3,491,698

10% of Par Amount \$ 4,639,000

Sizing Example – Bond Insurance Premium



Sources of Funds:

Par Amount: \$ 46,390,000

Total Sources of Funds: \$ 46,390,000

Uses of Funds:

Project Fund \$ 38,723,636

Cap Interest Fund: \$ 4,008,591

Debt Service Reserve Fund: \$ 2,795,850

Bond Insurance: \$ 357,550

COI: \$ 200,000

Underwriter's Discount: \$ 301,535

Rounding: \$ 2,838

Total Uses of Funds: \$ 46,390,000

Total Principal & Interest \$89,387,448

x.40%

Bond Insurance Premium \$ 357,550



Sizing Example – Costs of Issuance



Sources of Funds:

Par Amount:	\$ <u>46,390,000</u>
<u>Total Sources of Funds:</u>	<u>\$ 46,390,000</u>

Uses of Funds:

Project Fund	\$ 38,723,636
Cap Interest Fund:	\$ 4,008,591
Debt Service Reserve Fund:	\$ 2,795,850
Bond Insurance:	\$ 357,550
COI:	\$ 200,000
Underwriter's Discount:	\$ 301,535
Rounding:	\$ 2,838
Total Uses of Funds:	\$ 46,390,000

Costs of Issuance:

Bond Counsel:	\$100,000
Financial Advisor:	\$ 50,000
Trustee:	\$ 5,000
Rating Agencies:	\$ 30,000
Printing:	\$ 7,500
Miscellaneous:	<u>\$ 7,500</u>
Total COI:	\$200,000



Sizing Example –Underwriter’s Discount



Sources of Funds:

Par Amount: \$ 46,390,000

Total Sources of Funds: \$ 46,390,000

Uses of Funds:

Project Fund \$ 38,723,636

Cap Interest Fund: \$ 4,008,591

Debt Service Reserve Fund: \$ 2,795,850

Bond Insurance: \$ 357,550

COI: \$ 200,000

Underwriter’s Discount: \$ 301,535

Rounding: \$ 2,838

Total Uses of Funds: \$ 46,390,000

Underwriter’s Discount:

Takedown:
(\$3.50/bond): \$ 162,365

Management Fee
(\$1.00/bond): \$ 46,390

Expenses:
(\$2.00/bond): \$ 92,780

**Underwriter’s Discount
(\$6.50/bond): \$301,535**

Debt Service Structure



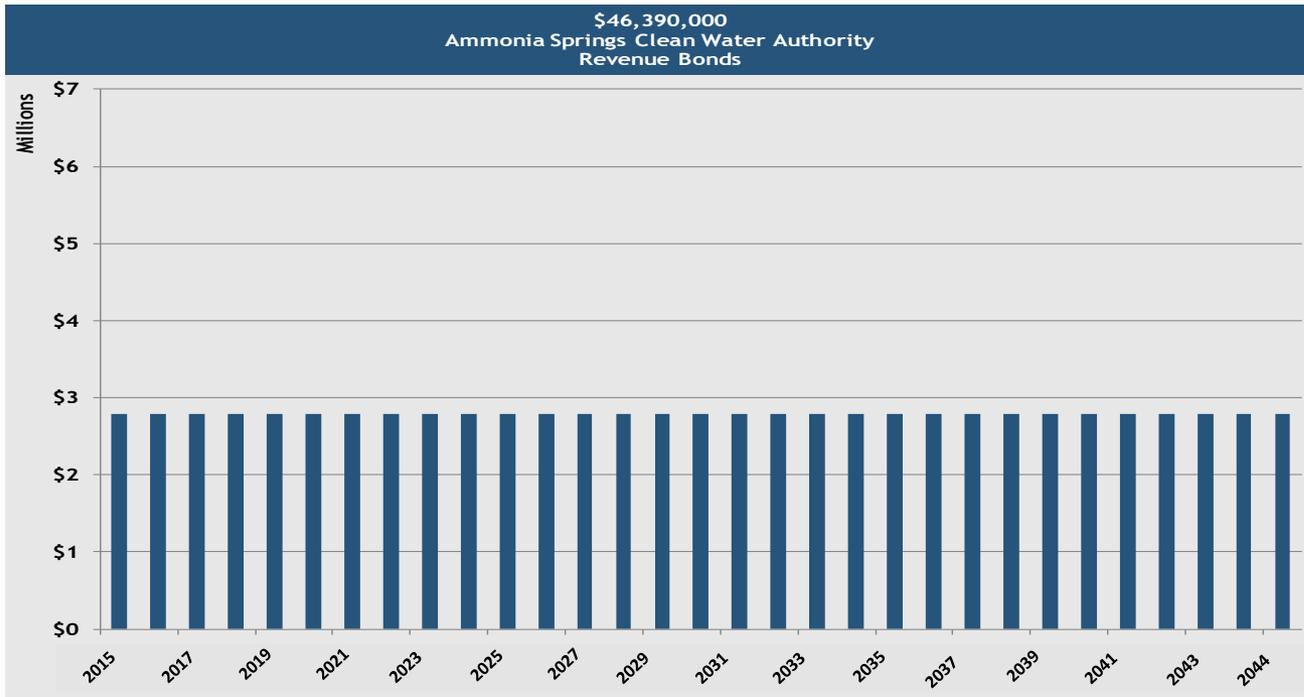
Sample Structures

Current Interest vs. Deferred Interest

Optional Redemption

Refunding Considerations

Level Debt Service



DSRF Implications

Lesser of:

Maximum Annual Debt Service \$ 2,795,850

125% of Average Annual Debt Service \$ 3,491,698

10% of Par Amount \$ 4,639,000

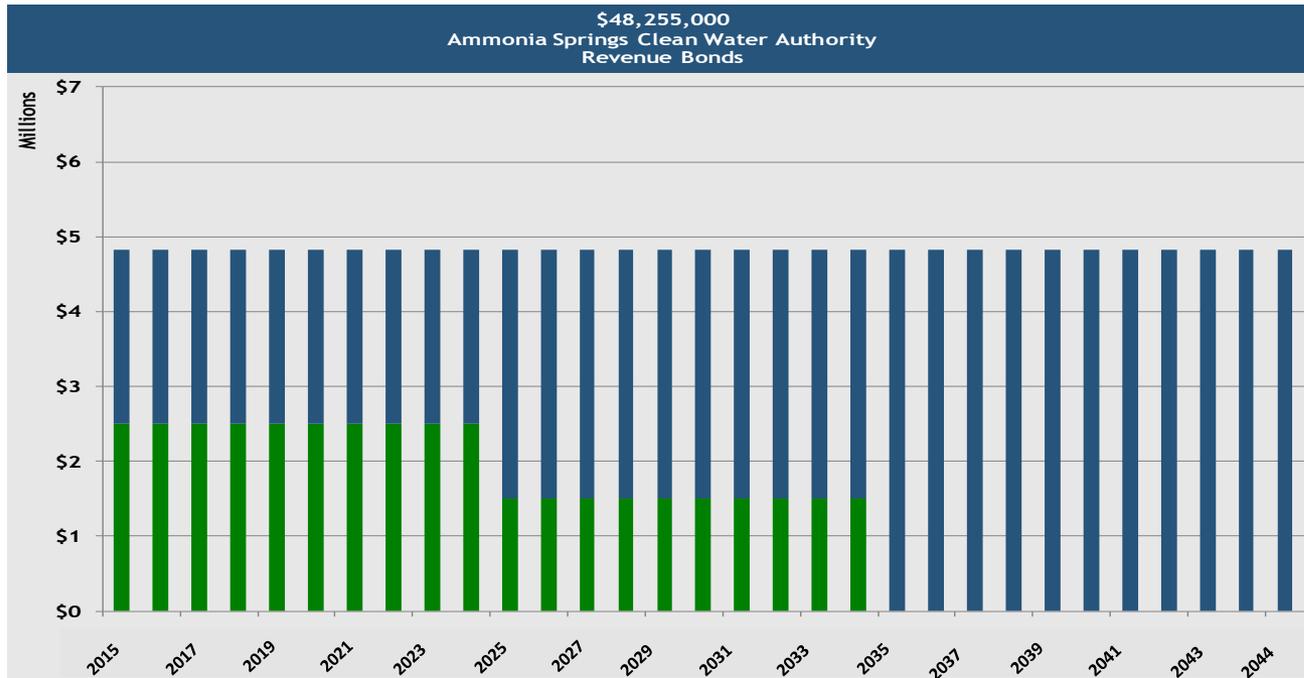
Bond Insurance Implications

Total Principal & Interest: \$ 89,387,448

_____ x.40%

Insurance Premium \$ 357,550

“Wrapped” Debt Service



DSRF Implications

Lesser of:

Maximum Annual Debt Service \$ 4,469,658

125% of Average Annual Debt Service \$ 5,587,072

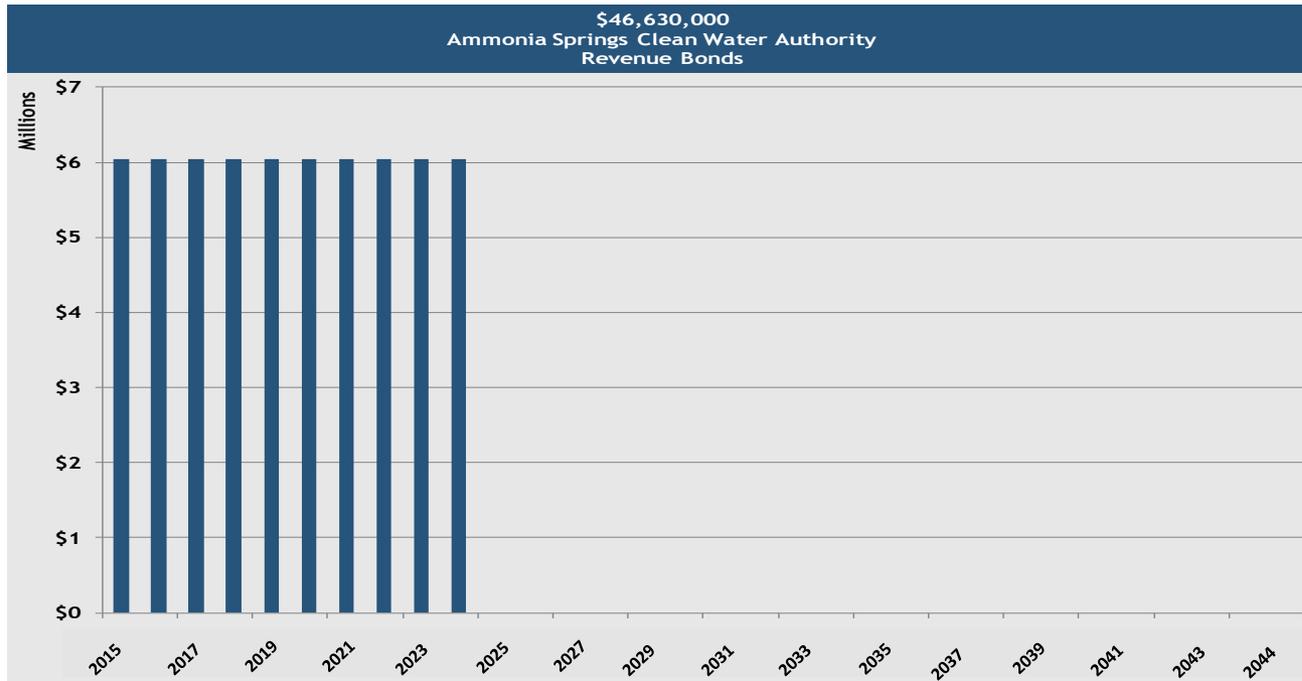
10% of Par Amount \$ 4,825,500

Bond Insurance Implications

Total Principal & Interest: \$ 106,107,854

_____ x.40%
Insurance Premium \$ 424,431

Short Maturity



DSRF Implications

Bond Insurance Implications

Lesser of:

Maximum Annual
Debt Service \$ 6,041,629

125% of Average
Annual Debt Service \$ 7,552,036

10% of Par Amount \$ 4,663,000

Total Principal & Interest: \$ 54,359,382

 x.40%

Insurance Premium \$ 217,438

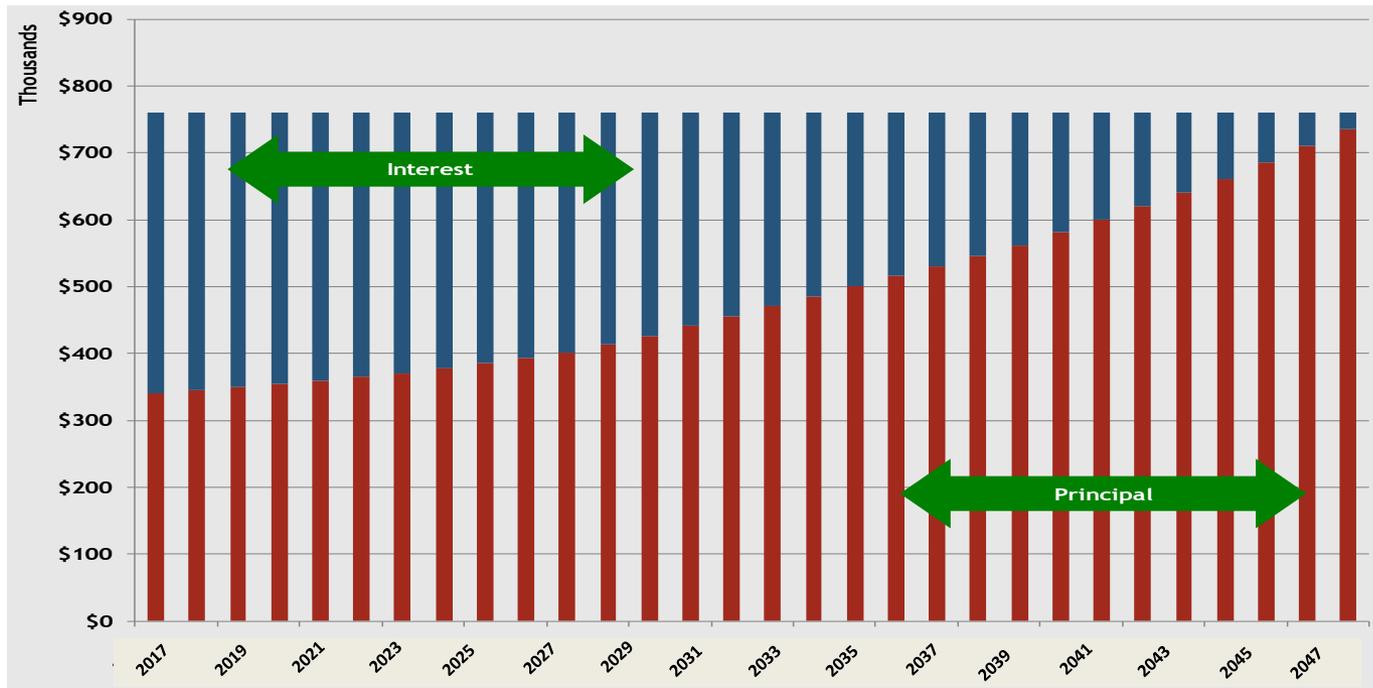
Debt Service Structures At-A-Glance

Summary of Debt Service Structures			
	Level Debt Service	“Wrapped” Debt Service	Short Maturity
Par	\$46,390,000	\$48,225,000	\$46,630,000
Total Debt Service	\$89,387,448	\$106,107,854	\$ 54,359,382
Maximum Annual Debt Service	\$2,795,850	\$4,469,658	\$6,041,629
125% of Average Annual Debt Service	\$3,491,698	\$5,587,072	\$7,552,036
10% of Par	\$4,639,000	\$4,825,500	\$4,663,000

Current or Deferred Interest Bonds

Current Interest Bonds

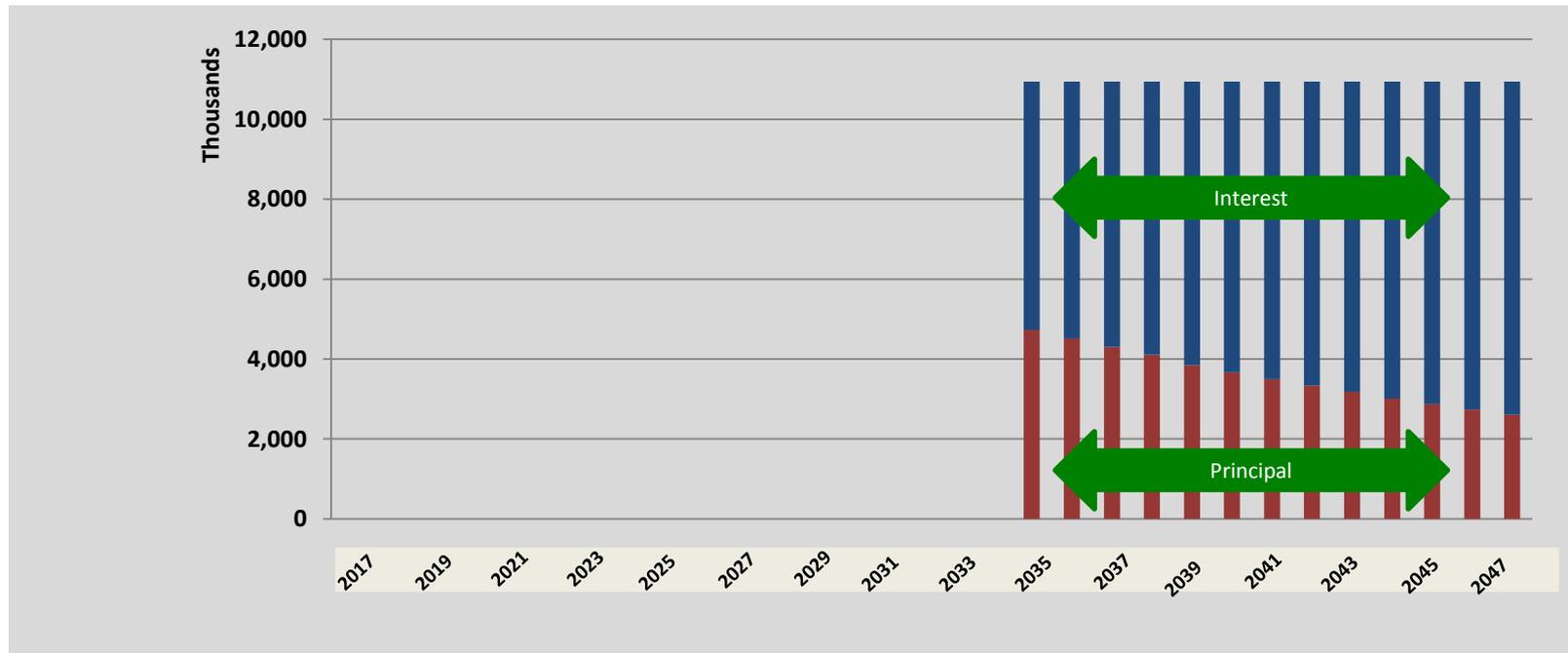
- Pay interest at stated coupon
- Interest typically paid every 6 months
- May be sold at par, at a premium or at a discount
- Investor's yield determined by price paid for the Bond



Current or Deferred Interest Bonds

Capital Appreciation Bonds

- “Zero” coupon or deferred interest bonds
- Interest accretes to maturity
- Sold at a deep discount
- Investor’s yield determined by price paid for the Bond



Comparison of Current Interest and Deferred Interest Structures

	Current Interest Bonds	Capital Appreciation Bonds
Principal	\$46,390,000	\$46,390,000
Interest	\$42,493,734	\$95,867,460
Total¹	\$88,883,734	\$142,257,674

¹May not total due to rounding

Other Considerations

Optional Redemption

- Standard optional redemption period is 10 years
- Callable bonds generally have a higher yield than non-callable bonds
- Par Bonds, Original Issue Discount Bonds, and Original Issue Premium Bonds

	<u>Coupon</u>	<u>Yield</u>	<u>Price</u>
Par Bond	5.00%	5.00%	100%
Discount Bond	5.00%	5.10%	98% (est)
Premium Bond	5.00%	4.90%	100.9% (est)

Refunding Considerations

Advance Refunding

- Old Bonds are not currently subject to optional redemption
- New Bond proceeds are used to fund an escrow that defeases old bonds to call date
- Escrow invested in Treasury (SLGs) with maximum permitted yield equal to bond arbitrage yield
- Can only advance refund one time

Current Refunding

- Old Bonds are currently subject to optional redemption
- New Bond proceeds are used to redeem old bonds

Defeasance

- **Legal Defeasance**

- Escrow securities backed by full faith & credit of U.S. government (e.g., U.S. Treasuries / SLGS)
- Requires bond counsel opinion
- Debt removed from books

- **Economic Defeasance**

- Escrow securities not backed by full faith & credit of U.S. government (e.g., Corporates & Agencies)
- Higher yield / Greater savings
- Debt remains on the books

Defeasance Escrow

- **Refunding (Defeasance) Escrow**

- A portfolio of “eligible securities”, as defined in the Indenture (U.S. Treasuries / SLGS)

- Cash flows sufficient to pay:

- Principal
- Interest
- Call Premium

to the call date, without reinvestment

Escrow Requirements

2016	190,000
2017	195,000
2018	200,000
2019	205,000
2020	215,000
2021	220,000
2022	225,000
2023	235,000
2024	240,000
2025	250,000
2026	260,000
2027	275,000
2028	285,000
2029	295,000
2030	310,000
2031	325,000
2032	340,000
2033	355,000
2034	375,000
2035	390,000
2036	410,000
2037	430,000
2038	455,000
2039	475,000

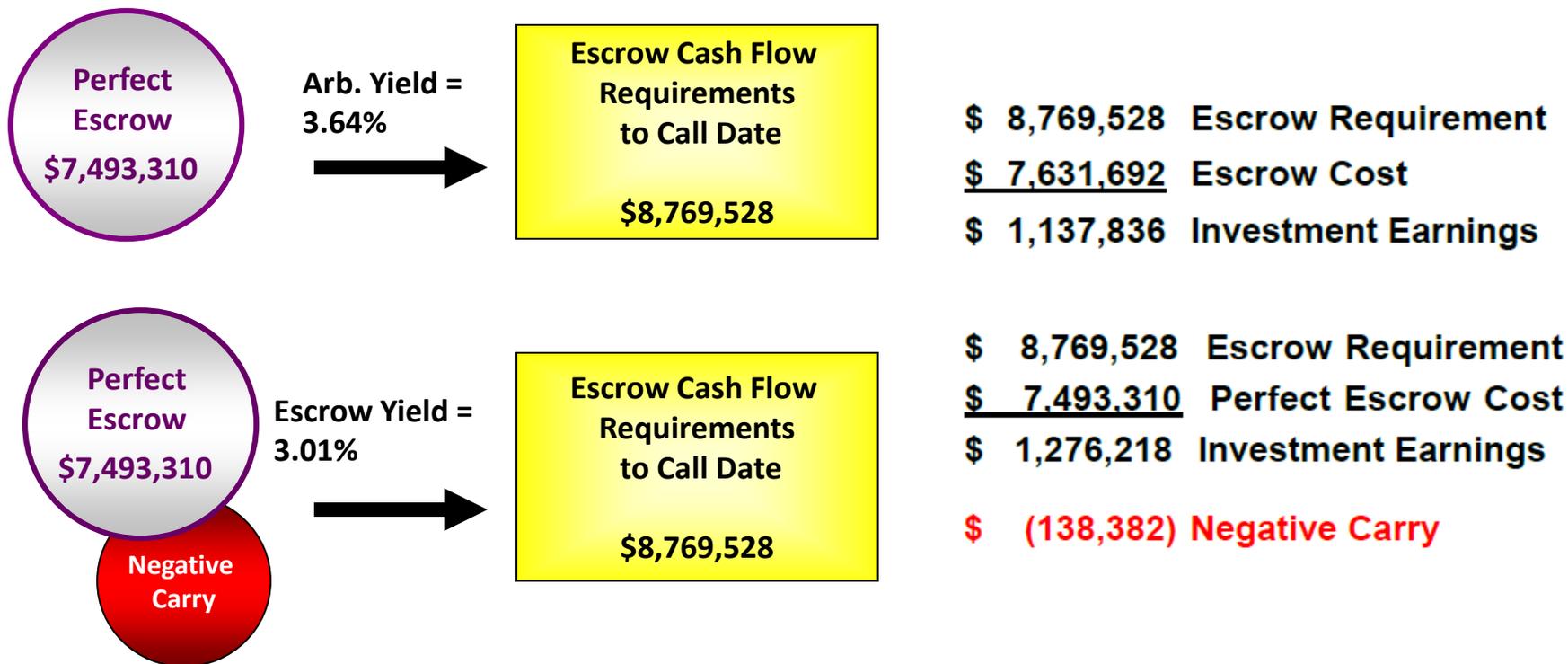
Date	Principal	Interest	Principal	Call Premium	Escrow Requirement
2/1/2016				2.00%	
6/1/2016	-	154,423			154,423
12/1/2016	190,000	154,423			344,423
6/1/2017	-	151,953			151,953
12/1/2017	195,000	151,953			346,953
6/1/2018	-	149,320			149,320
12/1/2018	200,000	149,320			349,320
6/1/2019	-	146,520			146,520
12/1/2019	205,000	146,520			351,520
6/1/2020	-	143,548			143,548
12/1/2020	215,000	143,548	6,150,000	123,000	6,631,548
	<u>\$ 1,005,000</u>	<u>\$ 1,491,528</u>	<u>\$ 6,150,000</u>	<u>\$ 123,000</u>	<u>\$ 8,769,528</u>
	\$2,496,528		Principal & Interest to Dec. 1, 2020		
	\$ 6,150,000		Bonds Outstanding Dec. 1, 2021 +		
	\$ 123,000		2.0%	Redemption Premium	
	\$ 8,769,528		TOTAL ESCROW REQUIREMENT		

Escrow Structuring

	Date	Escrow Requirement	U.S. Treasuries	Coupon	06/01/16	12/01/16	06/01/17	12/01/17	06/01/18	12/01/18	06/01/19	12/01/19	06/01/20	12/01/20	Escrow Cash Flows
	2/1/2016		-												-
1	6/1/2016	154,423	34,210	1.50%	257	2,245	377	2,755	452	3,234	534	3,738	582	106,040	154,423
2	12/1/2016	344,423	224,467	2.00%		2,245	377	2,755	452	3,234	534	3,738	582	106,040	344,423
3	6/1/2017	151,953	34,241	2.20%			377	2,755	452	3,234	534	3,738	582	106,040	151,953
4	12/1/2017	346,953	229,618	2.40%				2,755	452	3,234	534	3,738	582	106,040	346,953
5	6/1/2018	149,320	34,741	2.60%					452	3,234	534	3,738	582	106,040	149,320
6	12/1/2018	349,320	235,193	2.75%						3,234	534	3,738	582	106,040	349,320
7	6/1/2019	146,520	35,627	3.00%							534	3,738	582	106,040	146,520
8	12/1/2019	351,520	241,161	3.10%								3,738	582	106,040	351,520
9	6/1/2020	143,548	36,926	3.15%									582	106,040	143,548
10	12/1/2020	6,631,548	6,525,508	3.25%										106,040	6,631,548
		\$ 8,769,528	\$ 7,631,692		\$ 257	\$ 4,489	\$ 1,130	\$ 11,022	\$ 2,258	\$ 19,403	\$ 3,206	\$ 22,428	\$ 3,490	\$ 636,237	\$ 8,769,528

- Escrow cash flow requirement = \$8,769,528
- Escrow funding costs = \$7,631,692
- Escrow can yield up to the same rate as the arbitrage yield on the refunding bonds (e.g., 3.64%)
- Perfect escrow would cost = \$7,493,310

Negative Carry (Negative Arbitrage)



- Proceeds invested @ the bond rate pays for itself > “carry”
- Investment yield (3.01%) lower than bond yield (3.64%)
- Inefficient Escrow: increase par value of refunding bonds by 2.1%
- \$138,382 in Negative Carry (“negative arbitrage”)

Bond Sizing Requirements

**Bonds
Outstanding
\$6.15 Million**

+

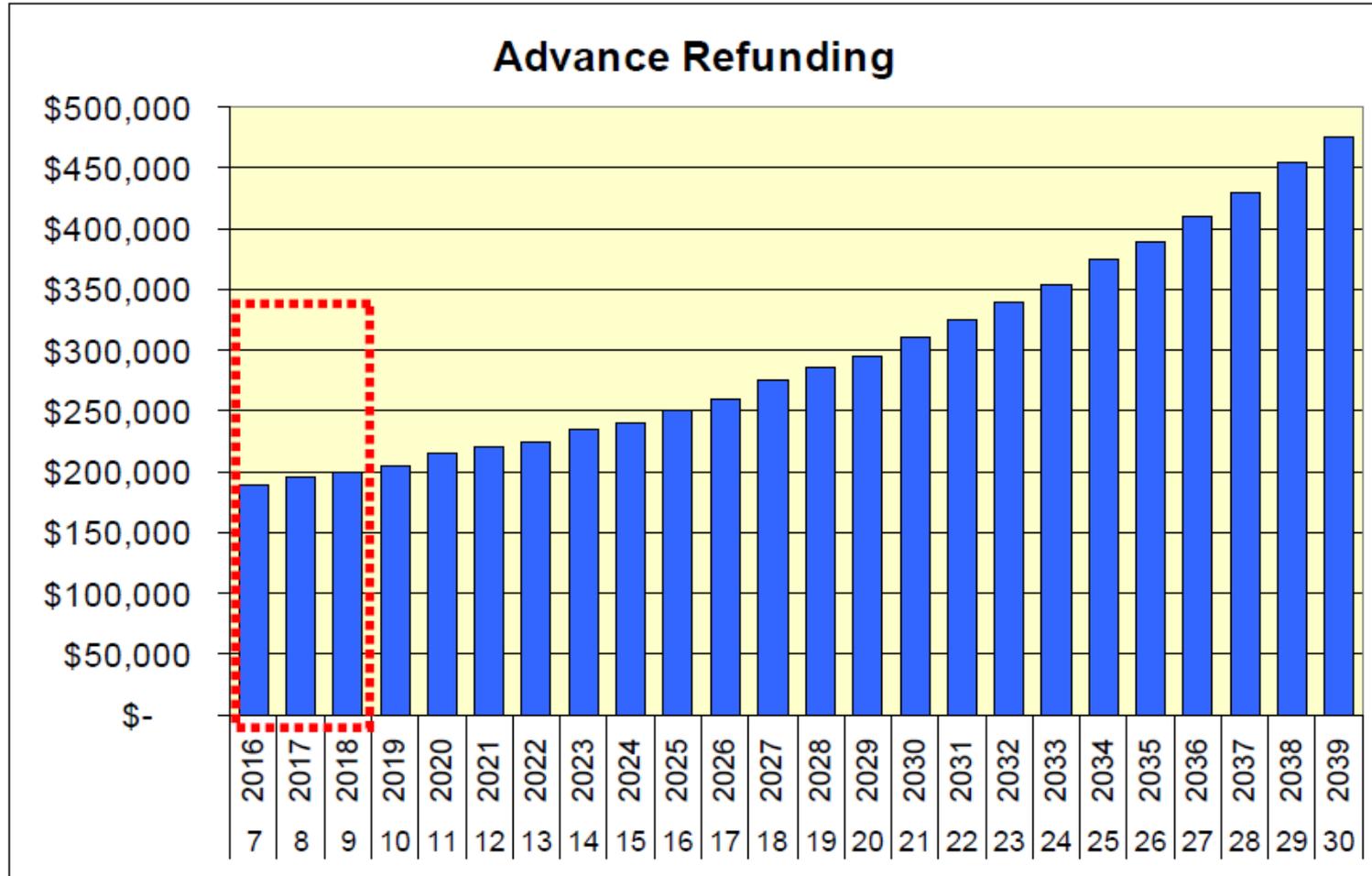
**Additional Costs
3.0% to 6.0%**

**Current Refunding
Bonds:**

\$6,580,000

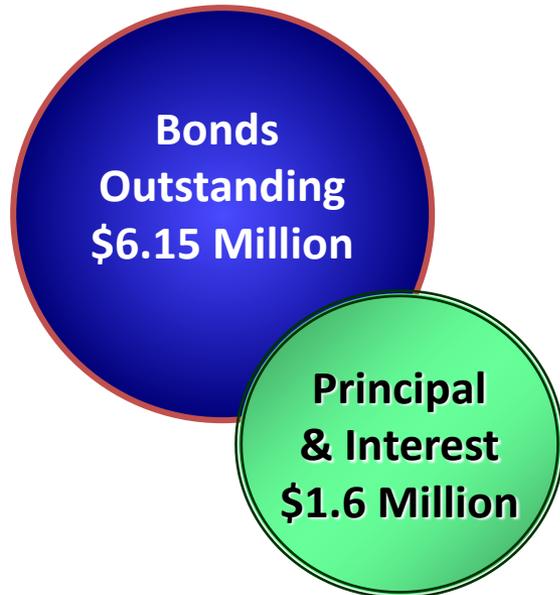
- 1. Cost of Issuance:**
.50% to 1.0%
- 2. Underwriter's Discount:**
.50% to 1.0%
- 3. Redemption Premium:**
2.0% to 3.0%
- 4. Bond Insurance:**
(~2x principal) .50% to 1.0%

Advance Refunding



Non-callable Maturities

Bond Sizing Requirements



Additional Costs
3.0% to 10.0%

Advance Refunding
Bonds:

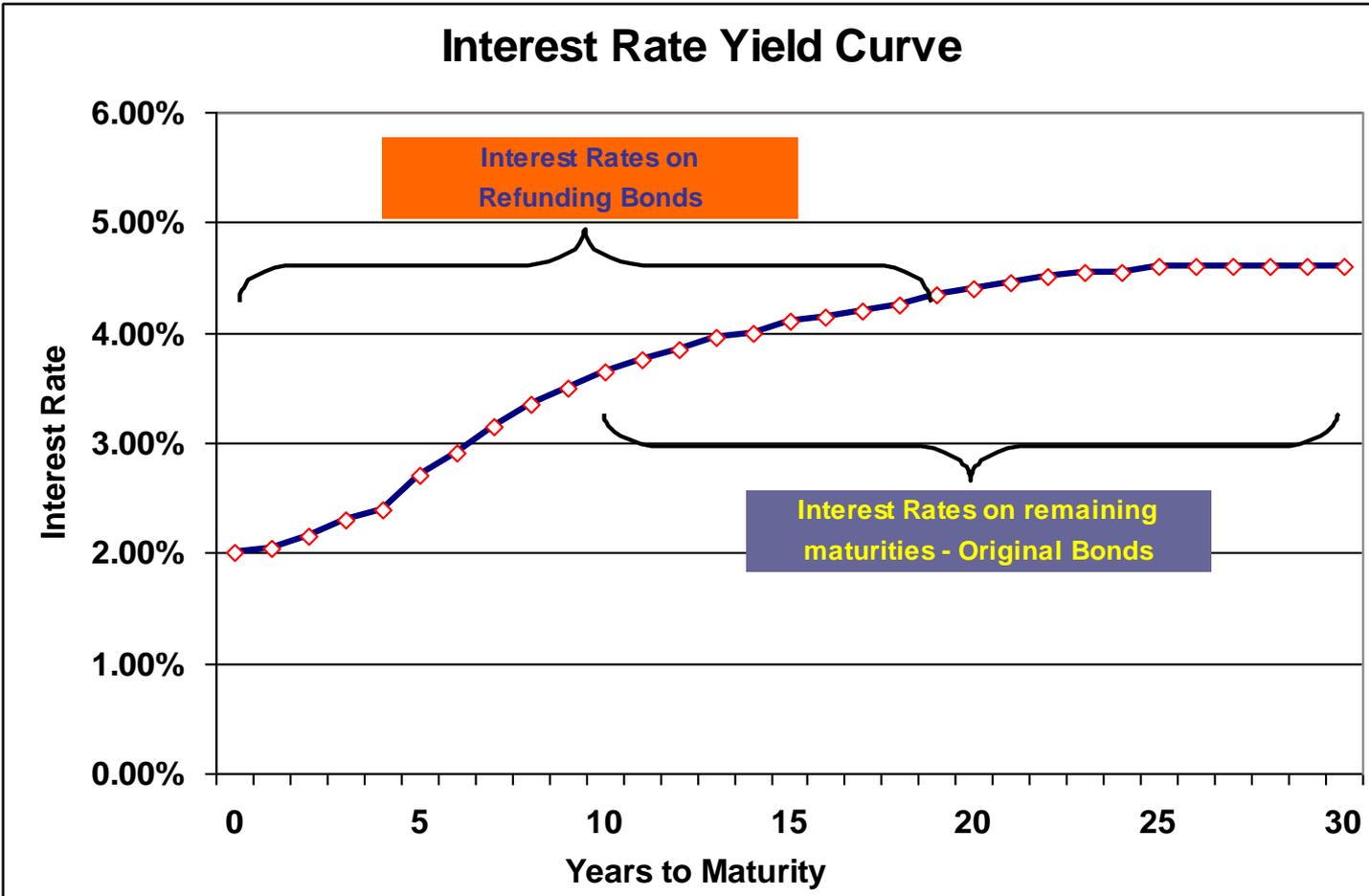
\$8,000,000

1. **Cost of Issuance:**
.50% to 1.0%
 2. **Underwriter's Discount:**
.50% to 1.0%
 3. **Redemption Premium:**
2.0% to 3.0%
 4. **Bond Insurance:**
(~2x principal) .50% to 1.0%
 1. **Negative Carry *:**
1.0% to 3.0%
- * Advance Refunding

How to Evaluate a Refunding

- Debt Service Savings
- Cash Flow Structuring
- Consolidation of Debt
- Remove Restrictive Covenants
- Combination (of above)

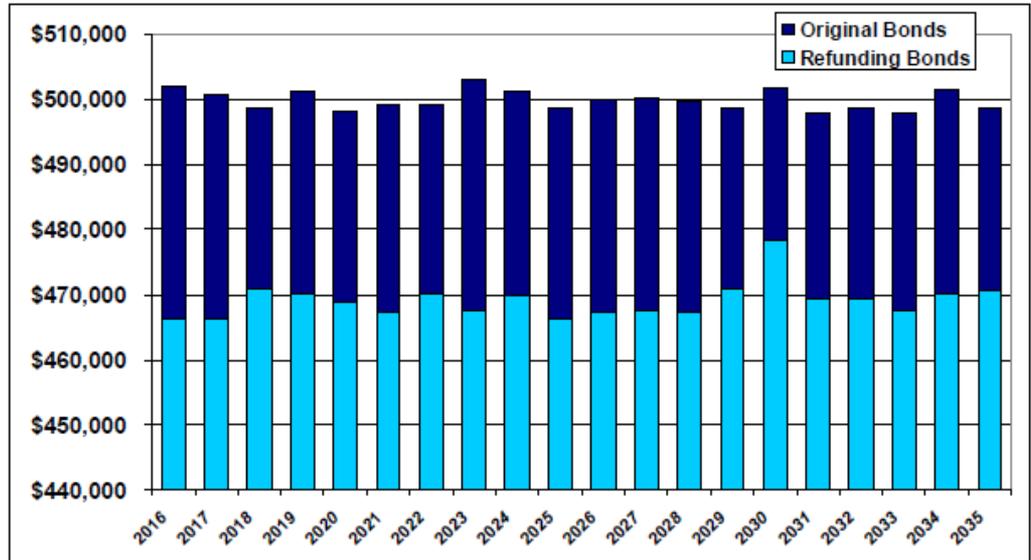
Rolling Down the Yield Curve



Measuring Savings

Year	Original Bonds	Refunding Bonds	Cash Flow Savings
1 2016	502,095	447,428	54,668
2 2017	500,645	450,303	50,343
3 2018	498,715	457,625	41,090
4 2019	501,290	459,445	41,845
5 2020	498,065	460,260	37,805
6 2021	499,065	460,173	38,893
7 2022	499,065	464,153	34,913
8 2023	503,145	461,903	41,243
9 2024	501,320	463,938	37,383
10 2025	498,495	460,245	38,250
11 2026	499,925	461,100	38,825
12 2027	500,200	461,180	39,020
13 2028	499,763	460,290	39,473
14 2029	498,613	463,560	35,053
15 2030	501,750	470,780	30,970
16 2031	498,000	461,905	36,095
17 2032	498,500	462,465	36,035
18 2033	498,000	462,060	35,940
19 2034	501,500	465,865	35,635
20 2035	498,750	468,450	30,300
	\$9,996,900	\$9,223,125	\$ 773,775

NPV Savings **\$ 560,735**



- \$38,689 Avg. Annual Cash Flow Savings
- \$560,735 NPV Savings
- 6.9% of Refunded Bonds (Par Amount of \$8.125M)
- 6.7% of Refunding Bonds (Par Amount of \$8.365M)

The Impact of Investments

Must take into account impact of investments on the Debt Service Reserve Fund

- **Gross-to-Gross Refunding**

- Comparison solely of gross debt service
- Does not take into account earnings from DSRF investments

- **Net-to-Net Refunding**

- Compares Net Debt Service on refunding to prior bonds
- Takes into account investment earnings of DSRF

Net-to-Net Refunding

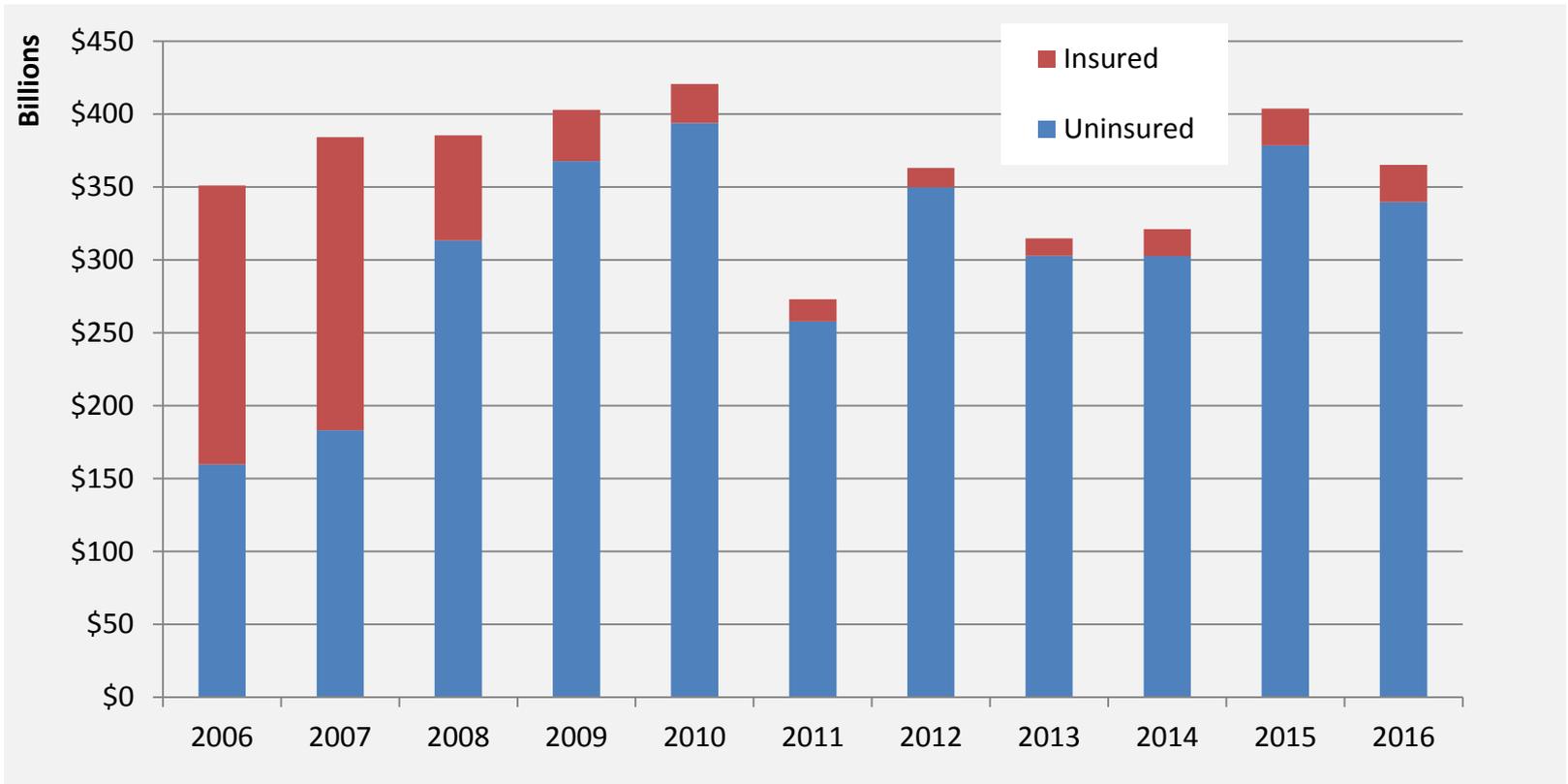
Year	Original Bonds	DSR Earnings	Net Debt Service	Refunding Bonds	DSR Earnings	Net Debt Service	Gross Savings	NPV Savings	Net Savings	NPV Savings
1 2016	502,095	25,157	476,938	466,203	16,749	449,454	35,893	34,632	27,484	26,518
2 2017	500,645	25,157	475,488	466,203	16,749	449,454	34,443	32,065	26,034	24,237
3 2018	498,715	25,157	473,558	470,848	16,749	454,099	27,868	25,033	19,459	17,480
4 2019	501,290	25,157	476,133	470,018	16,749	453,269	31,273	27,105	22,864	19,817
5 2020	498,065	25,157	472,908	468,808	16,749	452,059	29,258	24,467	20,849	17,436
6 2021	499,065	25,157	473,908	467,208	16,749	450,459	31,858	25,706	23,449	18,921
7 2022	499,065	25,157	473,908	470,208	16,749	453,459	28,858	22,467	20,449	15,921
8 2023	503,145	25,157	477,988	467,668	16,749	450,919	35,478	26,651	27,069	20,334
9 2024	501,320	25,157	476,163	469,703	16,749	452,954	31,618	22,917	23,209	16,822
10 2025	498,495	25,157	473,338	466,163	16,749	449,414	32,333	22,612	23,924	16,732
11 2026	499,925	25,157	474,768	467,173	16,749	450,424	32,753	22,101	24,344	16,427
12 2027	500,200	25,157	475,043	467,573	16,749	450,824	32,628	21,244	24,219	15,769
13 2028	499,763	25,157	474,605	467,178	16,749	450,429	32,585	20,471	24,176	15,188
14 2029	498,613	25,157	473,455	470,958	16,749	454,209	27,655	16,763	19,246	11,666
15 2030	501,750	25,157	476,593	478,533	16,749	461,784	23,218	13,579	14,809	8,661
16 2031	498,000	25,157	472,843	469,470	16,749	452,721	28,530	16,100	20,121	11,355
17 2032	498,500	25,157	473,343	469,270	16,749	452,521	29,230	15,916	20,821	11,337
18 2033	498,000	25,157	472,843	467,680	16,749	450,931	30,320	15,929	21,911	11,512
19 2034	501,500	25,157	476,343	470,050	16,749	453,301	31,450	15,943	23,041	11,680
20 2035	498,750	528,302	(29,552)	470,700	495,281	(24,581)	28,050	13,720	(4,971)	(2,431)
	\$ 9,996,900	\$ 1,006,290	\$ 8,990,610	\$ 9,381,608	\$ 813,505	\$ 8,568,102	\$ 615,293	\$ 435,421	\$ 422,508	\$ 305,381
DSR	\$ 503,145	5.00%		\$ 478,533	3.50%					
							\$6,150,000	7.08%		4.97%
							\$6,580,000	6.62%		4.64%

- Net-to-Net Refunding reflects true savings
- May reduce savings level (e.g. 7.08% vs. 4.97%)

Bond Insurance

Bond insurance is no longer as widely used as it once was

Total Municipal Issuance 2006 - 2016 YTD



Source: The Bond Buyer

Bond Insurance - A More Limited Role

- In 2008, most of the insurers lost their “AAA” ratings due to losses associated with sub-prime mortgage bond insurance
- Today, only AGM and BAM are active with “AA” category ratings

2007 Top Bond Insurers			
Rank	Bond Insurer	Par Amt (\$mil)	Number of Issues
1	FSA	48,988.5	1,702
2	AMBAC	48,859.1	1,081
3	MBIA Insurance Corporation	46,398.2	1,037
4	FGIC	30,712.4	375
5	XL Capital Assurance Inc.	13,654.5	587
6	CIFG NA	4,927.1	351
7	Assured Guaranty	3,729.6	144
8	Radian Asset Assurance Inc	2,375.4	207
9	ACA Financial Guaranty Corp	648.7	31

2016 YTD Top Bond Insurers			
Rank	Bond Insurer	Par Amt (\$mil)	Number of Issues
1	AGM formerly FSA Inc	\$15,388.60	489
2	Build America Mutual (BAM)	8,489.76	644
3	Municipal Assurance Corp (MAC)	710.80	169

Variable Rate Bonds

Historical Interest Rates

Structuring Options

Pros and Cons of Alternative Structures

Managing Interest Rate Swaps

Variable Rate vs. Fixed Rate

Securities Industry and Financial Markets Association (SIFMA) Index (formerly BMA)
vs. 20 year AAA MMD



Source: TM3

Pros vs. Cons of Variable Rate Structures

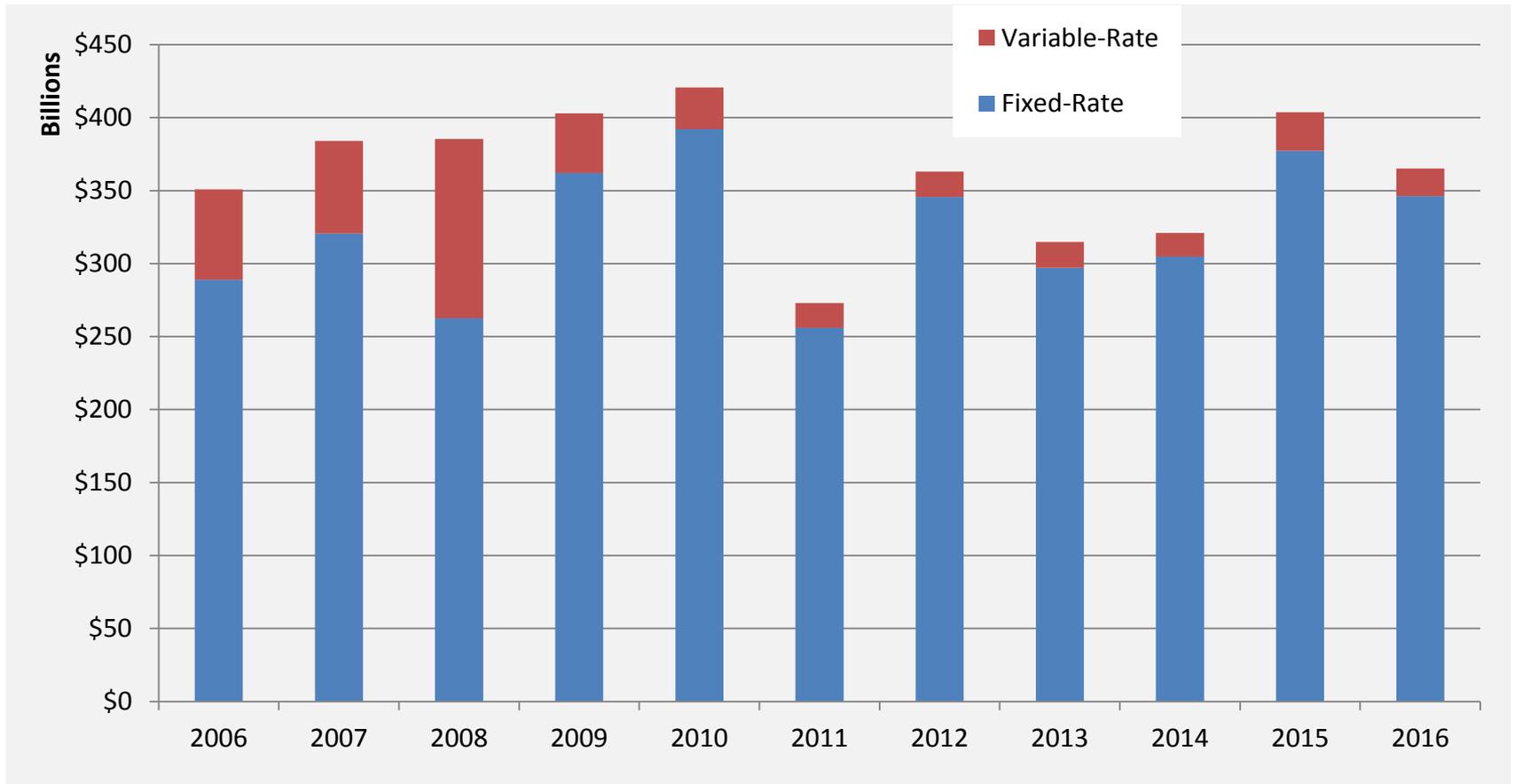
	PROS	CONS
Fixed Rate	<ul style="list-style-type: none">▪ No interest rate risk▪ Easier to budget▪ Less time to manage	<ul style="list-style-type: none">▪ Less flexibility to refinance▪ Historically higher cost▪ Poor hedge for floating rate assets
Variable Rate	<ul style="list-style-type: none">▪ Historically lower cost▪ Easier to restructure/refinance▪ Hedge for floating rate assets	<ul style="list-style-type: none">▪ Interest rates may rise▪ Takes more time to manage▪ Bank renewal and trading risk▪ More challenging to budget

Considerations: Determining the appropriate fixed and floating rate debt mix

- Asset Liability Matching – floating rate investments as a hedge for floating rate debt
- Ability of the Enterprise to weather interest rate volatility (liquidity, cashflow)
- Management’s ability to monitor and manage floating rate structures
- Allows for early pre-payment of bonds with no penalty

Variable Rate Issuance over Time

Total Municipal Issuance 2006 - 2016 YTD



Source: The Bond Buyer

Introduction to Variable Rate Structures

Historically, there have been a number of ways for issuers to achieve variable rate exposure in the municipal market

- Commercial Paper
- Variable Rate Demand Bonds
- Auction Rate Securities
- Direct Purchase
- Indexed Floaters
- Fixed Receiver Swaps

Variable Rate Structuring Options

Commercial Paper

- Can be drawn down and paid back as needed
- Outstanding CP is remarketed for a maximum of 270 days
- Bank credit facility required for liquidity
- Money Market Funds are the primary investor
- Often used to fund construction draws and then taken out with long-term bonds
- Interest rate determined by CP Dealer

Variable Rate Structuring Options

Variable Rate Demand Bonds

- Long-term bond with rate that resets periodically (daily, weekly, monthly, etc.)
- Remarketing Agent sets the rate for the issuer and is paid a quarterly fee
- Investor can “put” bonds on short notice (allows bond to trade at par)
- Bank credit facility required to support put

Variable Rate Structuring Options

Direct Purchase

- Alternative to a VRDB or FRN
- Issuer deals directly with a bank or other lender
- Interest rate can be fixed or floating
- No remarketing agent, rate based on an index plus a spread (ie 70% of LIBOR + XX bps)
- Usually, no rating or disclosure documents

Credit Facilities

2007 Top Letter of Credit Providers			
Rank	Firm	Amount	Issues
1	Bank of America	2,364.6	101
2	J P Morgan Chase	2,340.6	85
3	Wells Fargo Bank	1,688.6	98
4	SunTrust Bank	1,354.4	57
5	Regions Bank	1,295.8	42
6	The Bank of New York Mellon	1,024.8	60
7	LaSalle Bank	955.1	40
8	US Bank	821.8	77
9	KeyBanc	814.0	40
10	Sovereign Bank	699.8	29

First Half 2016 Top Letter of Credit Providers			
Rank	Firm	Amount	Issues
1	PNC Bank NA	\$150.70	1
2	BMO Bancorp	140.3	3
3	Landesbank Hessen-Thuringen	140	1
4	The Bank of New York Mellon	107	1
5	KB Financial Group Inc	80	1
6	US Bank NA	59.3	2
7	J P Morgan Chase	37	1
8	Fed Home Loan Bk of San Fran	23.8	2
9	Citizens Bank	22	1
10	Manufacturers & Traders Tr Co	21.2	1

Source: SDC

- Bank Credit capacity was severely constrained after the financial crisis in 2008 and 2009
- Fewer banks with less capital drove LOC pricing to high levels
- The credit market has stabilized and credit pricing has fallen to much lower levels

Variable Rate Structuring Options

Indexed Floating Rate Bonds

- Interest rate resets based on an index (i.e. SIFMA or LIBOR)
- Rate typically based on a spread over the index (i.e. SIFMA + 50 bps)
- No need for a Remarketing Agent
- Investor does not have a put, so no need for a bank credit facility
- Index period is typically less than 5 years. At the end of the index period, the issuer remarkets the bond for another index period or switches to a different variable rate mode

Variable Rate Structuring Options

Auction Rate Securities

- Long-term bond with rate that resets periodically (weekly, monthly, etc.)
- No “put” feature and thus, no bank facility
- Rate reset via Dutch Auction process



The ARS market died in 2008 with the demise of large scale bond insurance

Variable Rate Considerations

Summary of Variable Rate Alternatives				
Attribute	Traditional VRDBs	Commercial Paper	Index Floater	Direct Purchase
Reset Method	Remarketing Agent	CP Dealer	Index + Fixed Spread	Index + Fixed Spread
Bank Credit	Yes	Yes	No	Yes
Bank Counterparty Risk	Yes	Yes	No	No
Remarketing Agent Risk	Yes	Yes	No	No
Bank Facility Renewal Risk	Yes	Yes	No	Yes
Roll-Over Risk	No	No	Maybe	No
Term Out	Yes	Yes	Maybe	Yes
Ability to call bonds quickly	High	Moderate/High	Moderate	High
Rating Required	Yes	Yes	Yes	No
Disclosure Document	Yes	Yes	Yes	No

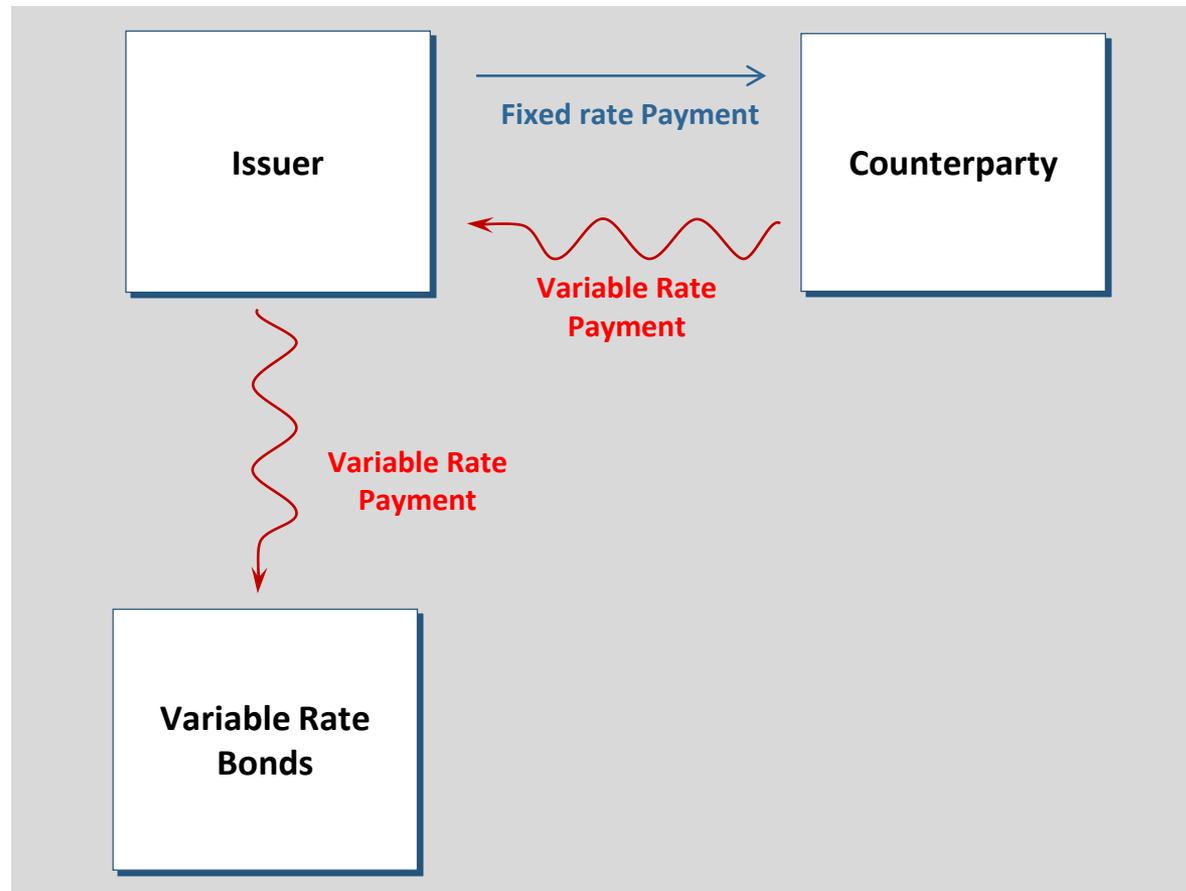
The Best Portfolio Mix

There isn't one

- Economic, political, demographic, regulatory, etc. factors matter
- Risk-centric approach to debt policy might help reduce cost and limit risks
 - Traditional fixed rate debt and risk aversion
 - Certain benefits
 - Opportunity cost – the foregone lower costs of other alternatives – focus on hidden costs of decisions
 - Exchange of one set of risks for another
 - Commitment risk – lack of flexibility to respond to future risks

Managing Existing Interest Rate Swaps

Many issuers have converted floating rate bonds to synthetic fixed rate by entering into interest rate swaps



Interest Rate Swaps Have a Number of Risks

<p>Basis Risk</p>	<p>Swap variable rate received and the actual bond variable rate does not match perfectly</p>	<ul style="list-style-type: none"> • LOC bank is downgraded, causing bonds to trade at higher spread to SIFMA • Market rates compress
<p>Tax Event Risk</p>	<p>Changes in income tax rates alter the value of tax-exempt interest rates relative to taxable interest rates</p>	<ul style="list-style-type: none"> • If tax rates go down, variable bond yield will go up
<p>Counterparty Risk</p>	<p>Swap counterparty will not perform pursuant to the contract's terms. For example if the swap provider defaults or its credit rating declines</p>	<ul style="list-style-type: none"> • Lehman, DEPFA, AMBAC, UBS
<p>Termination Risk</p>	<p>A material decline in credit worthiness could lead to a termination of the swap and require a payment to be made to or from the issuer depending on prevailing market conditions at the time of termination</p>	<ul style="list-style-type: none"> • Negotiate favorable credit triggers and terms for collateral posting • Monitor the mark to market value of the swap

If You Have an Interest Rate Swap...

- Monitor the bank providing liquidity for the variable rate bonds
 - Rating
 - Expiration Date of credit facility
 - Trading characteristics
- Monitor the performance of your Remarketing Agent
- Monitor the credit rating of your swap counterparty
- Monitor long-term interest rates
 - As rates go up, termination values should fall
 - May create an opportunity to terminate the swap