Debt 2: Accessing the Market

Session 3: Debt Structuring

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Presenters

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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
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

- 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
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

- Average Takedown
- Management Fee
- Expenses

Funding Method

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

$100,000,000 Par

(650,000) Less discount of 6.50/$1,000

$ 99,350,000 Purchase Price

- Expressed as dollars per thousand dollars of bonds (e.g., $6.50/$1,000)
New Money Sizing Example

- 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

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/1/2015</td>
<td>$ 10,000,000</td>
</tr>
<tr>
<td>10/1/2015</td>
<td>$ 10,000,000</td>
</tr>
<tr>
<td>4/1/2016</td>
<td>$ 10,000,000</td>
</tr>
<tr>
<td>10/1/2016</td>
<td>$ 10,000,000</td>
</tr>
</tbody>
</table>

$ 40,000,000 Total Project

---

**Bonds Dated: 1/1/2015**

**Final Maturity: 1/1/2045**
### Sizing Assumptions – Ammonia Springs Clean Water Authority

<table>
<thead>
<tr>
<th>Costs of Issuance</th>
</tr>
</thead>
<tbody>
<tr>
<td>$200,000</td>
</tr>
<tr>
<td>Legal, FA, Trustee Ratings, Printing, Misc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bond Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>40bps</td>
</tr>
<tr>
<td>Bond Insurance Premium (Total Debt Service x 0.40%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Underwriter’s Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6.50/bond</td>
</tr>
<tr>
<td>Takedown, Management Fee, Expenses</td>
</tr>
</tbody>
</table>
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
1/1/2017
### Reinvestment Assumptions

<table>
<thead>
<tr>
<th>Fund</th>
<th>Rate</th>
<th>Earnings Go To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capitalized Interest Fund:</td>
<td>2.50%</td>
<td>Construction Fund</td>
</tr>
<tr>
<td>Construction Fund:</td>
<td>2.50%</td>
<td>Construction Fund</td>
</tr>
<tr>
<td>Debt Service Reserve Fund:</td>
<td>5.0%</td>
<td>Construction Fund</td>
</tr>
<tr>
<td></td>
<td>(Bond Yield)</td>
<td></td>
</tr>
</tbody>
</table>
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

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

- Project Fund Earnings $968,704
- Cap Interest Fund Earnings $112,609
- Debt Service Reserve Fund Earnings $195,051
- Total Project Cost $40,000,000
Sizing Example – Capitalized Interest Fund

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

1/1/2015 Initial Deposit: $4,008,591
- 7/1/15 Interest Payment: ($1,005,697)
- 1/1/16 Interest Payment: ($1,005,697)
- 7/1/16 Interest Payment: ($998,599)
- 1/1/17 Interest Payment: ($998,599)

Fund Balance on 1/1/17: $0
## Sizing Example – Debt Service Reserve Fund

### 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

**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

**Total Uses of Funds:** $46,390,000
## 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

*multiplied by 0.40%*
### Sizing Example – Costs of Issuance

<table>
<thead>
<tr>
<th>Sources of Funds:</th>
<th>Costs of Issuance:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Par Amount:</strong></td>
<td>Bond Counsel: $100,000</td>
</tr>
<tr>
<td><strong>Total Sources of Funds:</strong></td>
<td>Financial Advisor: $50,000</td>
</tr>
<tr>
<td>Total Sources of Funds: $46,390,000</td>
<td>Trustee: $5,000</td>
</tr>
<tr>
<td><strong>Uses of Funds:</strong></td>
<td>Rating Agencies: $30,000</td>
</tr>
<tr>
<td>Project Fund: $38,723,636</td>
<td>Printing: $7,500</td>
</tr>
<tr>
<td>Cap Interest Fund: $4,008,591</td>
<td>Miscellaneous: $7,500</td>
</tr>
<tr>
<td>Debt Service</td>
<td><strong>Total COI:</strong> $200,000</td>
</tr>
<tr>
<td>Reserve Fund: $2,795,850</td>
<td></td>
</tr>
<tr>
<td>Bond Insurance: $357,550</td>
<td></td>
</tr>
<tr>
<td><strong>COI:</strong> $200,000</td>
<td></td>
</tr>
<tr>
<td>Underwriter’s Discount: $301,535</td>
<td></td>
</tr>
<tr>
<td>Rounding: $2,838</td>
<td></td>
</tr>
<tr>
<td><strong>Total Uses of Funds:</strong> $46,390,000</td>
<td></td>
</tr>
</tbody>
</table>
# Sizing Example – Underwriter’s Discount

<table>
<thead>
<tr>
<th>Sources of Funds:</th>
<th>Underwriter’s Discount:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Par Amount:</strong> $46,390,000</td>
<td><strong>Takedown:</strong> ($3.50/bond): $162,365</td>
</tr>
<tr>
<td><strong>Total Sources of Funds:</strong> $46,390,000</td>
<td><strong>Management Fee</strong> ($1.00/bond): $46,390</td>
</tr>
<tr>
<td></td>
<td><strong>Expenses:</strong> ($2.00/bond): $92,780</td>
</tr>
<tr>
<td><strong>Uses of Funds:</strong></td>
<td><strong>Underwriter’s Discount</strong> ($6.50/bond): $301,535</td>
</tr>
<tr>
<td>Project Fund $38,723,636</td>
<td></td>
</tr>
<tr>
<td>Cap Interest Fund: $4,008,591</td>
<td></td>
</tr>
<tr>
<td>Debt Service Reserve Fund: $2,795,850</td>
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</tr>
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<td>Bond Insurance: $357,550</td>
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</tr>
<tr>
<td>Rounding: $2,838</td>
<td></td>
</tr>
<tr>
<td><strong>Total Uses of Funds:</strong> $46,390,000</td>
<td></td>
</tr>
</tbody>
</table>
Debt Service Structure

- Sample Structures
- Current Interest vs. Deferred Interest
- Optional Redemption
- Refunding Considerations
Level Debt Service

Lesser of:

**DSRF Implications**

- **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
- **Insurance Premium**: $357,550

\[ \text{Insurance Premium} = \text{Total Principal & Interest} \times 0.40 \]
“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

- Insurance Premium: $424,431

$48,255,000
Ammonia Springs Clean Water Authority
Revenue Bonds

2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
2044

$0
$1
$2
$3
$4
$5
$6
$7

Millions

x.40%
Short Maturity

DSRF 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

Bond Insurance Implications

Total Principal & Interest: $54,359,382

Insurance Premium: $217,438
# Debt Service Structures At-A-Glance

<table>
<thead>
<tr>
<th>Summary of Debt Service Structures</th>
<th>Level Debt Service</th>
<th>“Wrapped” Debt Service</th>
<th>Short Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Par</td>
<td>$46,390,000</td>
<td>$48,255,000</td>
<td>$46,630,000</td>
</tr>
<tr>
<td>Total Debt Service</td>
<td>$89,387,448</td>
<td>$106,107,854</td>
<td>$54,359,382</td>
</tr>
<tr>
<td>Maximum Annual Debt Service</td>
<td>$2,795,850</td>
<td>$4,469,658</td>
<td>$6,041,629</td>
</tr>
<tr>
<td>125% of Average Annual Debt Service</td>
<td>$3,491,698</td>
<td>$5,587,072</td>
<td>$7,552,036</td>
</tr>
<tr>
<td>10% of Par</td>
<td>$4,639,000</td>
<td>$4,825,500</td>
<td>$4,663,000</td>
</tr>
</tbody>
</table>
# Structuring the Bonds

Ammonia Springs Clean Water Authority

**Water Revenue Bonds**

**Dated:** January 1, 2014  
**Due:** January 1, 2044

<table>
<thead>
<tr>
<th>Maturity (Jan 1)</th>
<th>Principal Amount</th>
<th>Interest Rate</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>780,000</td>
<td>4.000%</td>
<td>1.820%</td>
</tr>
<tr>
<td>2016</td>
<td>795,000</td>
<td>4.000%</td>
<td>2.070%</td>
</tr>
<tr>
<td>2017</td>
<td>815,000</td>
<td>4.000%</td>
<td>2.370%</td>
</tr>
<tr>
<td>2018</td>
<td>830,000</td>
<td>4.000%</td>
<td>2.670%</td>
</tr>
<tr>
<td>2019</td>
<td>855,000</td>
<td>5.000%</td>
<td>3.020%</td>
</tr>
<tr>
<td>2020</td>
<td>880,000</td>
<td>5.000%</td>
<td>3.220%</td>
</tr>
<tr>
<td>2021</td>
<td>910,000</td>
<td>5.000%</td>
<td>3.370%</td>
</tr>
<tr>
<td>2022</td>
<td>940,000</td>
<td>5.000%</td>
<td>3.520%</td>
</tr>
<tr>
<td>2023</td>
<td>970,000</td>
<td>5.000%</td>
<td>3.630%</td>
</tr>
<tr>
<td>2024</td>
<td>1,005,000</td>
<td>5.000%</td>
<td>3.740%</td>
</tr>
<tr>
<td>2025</td>
<td>1,045,000</td>
<td>5.000%</td>
<td>3.840%</td>
</tr>
<tr>
<td>2026</td>
<td>1,085,000</td>
<td>5.000%</td>
<td>3.940%</td>
</tr>
<tr>
<td>2027</td>
<td>1,130,000</td>
<td>5.000%</td>
<td>4.030%</td>
</tr>
<tr>
<td>2028</td>
<td>1,175,000</td>
<td>5.000%</td>
<td>4.110%</td>
</tr>
<tr>
<td>2029</td>
<td>1,220,000</td>
<td>5.000%</td>
<td>4.180%</td>
</tr>
<tr>
<td>2030</td>
<td>1,275,000</td>
<td>5.000%</td>
<td>4.270%</td>
</tr>
<tr>
<td>2031</td>
<td>1,325,000</td>
<td>5.000%</td>
<td>4.350%</td>
</tr>
</tbody>
</table>

**Serial Bonds**
- Mature “serially” by year
- Take advantage of positively sloped yield curve

**Term Bonds**
- Single coupon covering multiple years
- Retired with annual Sinking Fund Payments

---

$46,390,000

$7,610,000 4.72% Term Bonds maturing January 2035

$9,600,000 4.81% Term Bonds maturing January 2040

$12,145,000 4.84% Term Bonds maturing January 2044
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

<table>
<thead>
<tr>
<th></th>
<th>Current Interest Bonds</th>
<th>Capital Appreciation Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Principal</strong></td>
<td>$46,390,000</td>
<td>$46,390,000</td>
</tr>
<tr>
<td><strong>Interest</strong></td>
<td>$42,493,734</td>
<td>$95,867,460</td>
</tr>
<tr>
<td><strong>Total(^1)</strong></td>
<td>$88,883,734</td>
<td>$142,257,674</td>
</tr>
</tbody>
</table>

\(^1\)May 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

<table>
<thead>
<tr>
<th>Bond Type</th>
<th>Coupon</th>
<th>Yield</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Par Bond</td>
<td>5.00%</td>
<td>5.00%</td>
<td>100%</td>
</tr>
<tr>
<td>Discount Bond</td>
<td>5.00%</td>
<td>5.10%</td>
<td>98% (est)</td>
</tr>
<tr>
<td>Premium Bond</td>
<td>5.00%</td>
<td>4.90%</td>
<td>100.9% (est)</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Date</th>
<th>Principal</th>
<th>Interest</th>
<th>Principal</th>
<th>Call Premium</th>
<th>Escrow Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/1/2016</td>
<td>190,000</td>
<td>154,423</td>
<td>154,423</td>
<td>2.00%</td>
<td>154,423</td>
</tr>
<tr>
<td>6/1/2016</td>
<td>195,000</td>
<td>151,953</td>
<td>151,953</td>
<td></td>
<td>151,953</td>
</tr>
<tr>
<td>12/1/2016</td>
<td>200,000</td>
<td>149,320</td>
<td>149,320</td>
<td></td>
<td>149,320</td>
</tr>
<tr>
<td>6/1/2017</td>
<td>195,000</td>
<td>146,520</td>
<td>146,520</td>
<td></td>
<td>146,520</td>
</tr>
<tr>
<td>12/1/2017</td>
<td>200,000</td>
<td>143,548</td>
<td>143,548</td>
<td></td>
<td>143,548</td>
</tr>
<tr>
<td>6/1/2018</td>
<td>205,000</td>
<td>131,500</td>
<td>131,500</td>
<td></td>
<td>131,500</td>
</tr>
<tr>
<td>12/1/2018</td>
<td>215,000</td>
<td>123,000</td>
<td>123,000</td>
<td></td>
<td>123,000</td>
</tr>
</tbody>
</table>

Total Escrow Requirement: $8,769,528

Total Escrow Requirement: $8,769,528
### Escrow Structuring

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

- 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%

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%

Current Refunding Bonds:
$6,580,000
Advance Refunding
Bond Sizing Requirements

**Bonds Outstanding**
$6.15 Million

**Principal & Interest**
$1.6 Million

**Advance Refunding Bonds:**
$8,000,000

**Additional Costs**
3.0% to 10.0%

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

- $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

- **Gross-to-Gross Refunding**
  - Comparison solely of gross debt service
  - Does not take into account reinvestment of bond proceeds

- **Net-to-Net Refunding**
  - Compares Net Debt Services
  - Takes into account reinvestment of bond proceeds
## Net-to-Net Refunding

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Original Bonds</th>
<th>DSR Earnings</th>
<th>Net Debt Service</th>
<th>Refunding Bonds</th>
<th>DSR Earnings</th>
<th>Net Debt Service</th>
<th>Gross Savings</th>
<th>NPV Savings</th>
<th>Net Savings</th>
<th>NPV Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>502,095</td>
<td>25,157</td>
<td>476,938</td>
<td>466,203</td>
<td>16,749</td>
<td>449,454</td>
<td>35,893</td>
<td>34,632</td>
<td>27,484</td>
<td>26,518</td>
</tr>
<tr>
<td>2017</td>
<td>500,645</td>
<td>25,157</td>
<td>475,488</td>
<td>466,203</td>
<td>16,749</td>
<td>449,454</td>
<td>34,443</td>
<td>32,065</td>
<td>26,034</td>
<td>24,237</td>
</tr>
<tr>
<td>2018</td>
<td>498,715</td>
<td>25,157</td>
<td>473,558</td>
<td>470,848</td>
<td>16,749</td>
<td>454,099</td>
<td>27,868</td>
<td>25,033</td>
<td>19,459</td>
<td>17,480</td>
</tr>
<tr>
<td>2020</td>
<td>498,065</td>
<td>25,157</td>
<td>472,908</td>
<td>468,808</td>
<td>16,749</td>
<td>452,059</td>
<td>29,258</td>
<td>24,467</td>
<td>20,849</td>
<td>17,436</td>
</tr>
<tr>
<td>2021</td>
<td>499,065</td>
<td>25,157</td>
<td>473,908</td>
<td>467,208</td>
<td>16,749</td>
<td>450,459</td>
<td>31,858</td>
<td>25,706</td>
<td>23,449</td>
<td>18,921</td>
</tr>
<tr>
<td>2022</td>
<td>499,065</td>
<td>25,157</td>
<td>473,908</td>
<td>470,208</td>
<td>16,749</td>
<td>453,459</td>
<td>28,858</td>
<td>22,467</td>
<td>20,449</td>
<td>15,921</td>
</tr>
<tr>
<td>2023</td>
<td>503,145</td>
<td>25,157</td>
<td>477,988</td>
<td>467,668</td>
<td>16,749</td>
<td>450,919</td>
<td>35,478</td>
<td>26,651</td>
<td>27,069</td>
<td>20,334</td>
</tr>
<tr>
<td>2024</td>
<td>501,320</td>
<td>25,157</td>
<td>476,163</td>
<td>469,703</td>
<td>16,749</td>
<td>452,954</td>
<td>31,618</td>
<td>22,917</td>
<td>23,209</td>
<td>16,822</td>
</tr>
<tr>
<td>2026</td>
<td>499,925</td>
<td>25,157</td>
<td>474,768</td>
<td>467,173</td>
<td>16,749</td>
<td>450,424</td>
<td>32,753</td>
<td>22,101</td>
<td>24,344</td>
<td>16,427</td>
</tr>
<tr>
<td>2027</td>
<td>500,200</td>
<td>25,157</td>
<td>475,043</td>
<td>467,573</td>
<td>16,749</td>
<td>450,824</td>
<td>32,628</td>
<td>21,244</td>
<td>24,219</td>
<td>15,769</td>
</tr>
<tr>
<td>2028</td>
<td>499,763</td>
<td>25,157</td>
<td>474,605</td>
<td>467,178</td>
<td>16,749</td>
<td>450,429</td>
<td>32,585</td>
<td>20,471</td>
<td>24,176</td>
<td>15,188</td>
</tr>
<tr>
<td>2029</td>
<td>498,613</td>
<td>25,157</td>
<td>473,455</td>
<td>470,958</td>
<td>16,749</td>
<td>454,209</td>
<td>27,655</td>
<td>16,763</td>
<td>19,246</td>
<td>11,666</td>
</tr>
<tr>
<td>2030</td>
<td>501,750</td>
<td>25,157</td>
<td>476,593</td>
<td>478,533</td>
<td>16,749</td>
<td>461,784</td>
<td>23,218</td>
<td>13,579</td>
<td>14,809</td>
<td>8,661</td>
</tr>
<tr>
<td>2031</td>
<td>498,000</td>
<td>25,157</td>
<td>472,843</td>
<td>469,470</td>
<td>16,749</td>
<td>452,721</td>
<td>28,530</td>
<td>16,100</td>
<td>20,121</td>
<td>11,355</td>
</tr>
<tr>
<td>2032</td>
<td>498,500</td>
<td>25,157</td>
<td>473,343</td>
<td>469,270</td>
<td>16,749</td>
<td>452,521</td>
<td>29,230</td>
<td>15,916</td>
<td>20,821</td>
<td>11,337</td>
</tr>
<tr>
<td>2033</td>
<td>498,000</td>
<td>25,157</td>
<td>472,843</td>
<td>467,680</td>
<td>16,749</td>
<td>450,931</td>
<td>30,320</td>
<td>15,929</td>
<td>21,311</td>
<td>11,512</td>
</tr>
<tr>
<td>2034</td>
<td>501,500</td>
<td>25,157</td>
<td>476,343</td>
<td>470,050</td>
<td>16,749</td>
<td>453,301</td>
<td>31,450</td>
<td>15,943</td>
<td>23,041</td>
<td>11,680</td>
</tr>
<tr>
<td>2035</td>
<td>498,750</td>
<td>528,302</td>
<td>(29,552)</td>
<td>470,700</td>
<td>495,281</td>
<td>(24,581)</td>
<td>28,050</td>
<td>13,720</td>
<td>(4,971)</td>
<td>(2,431)</td>
</tr>
</tbody>
</table>

DSR $ $503,145 5.00% $478,553 3.50%

Savings as % Refunded Bonds $6,150,000 7.08% 4.97%
Savings as % Refunding Bonds $6,580,000 6.62% 4.64%
Once upon a time, bond insurance was readily available and widely used.
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

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

### 2014 Top Bond Insurers

<table>
<thead>
<tr>
<th>Rank</th>
<th>Bond Insurer</th>
<th>Par Amt ($mil)</th>
<th>Number of Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGM formerly FSA Inc</td>
<td>$9,937.50</td>
<td>568</td>
</tr>
<tr>
<td>2</td>
<td>Build America Mutual (BAM)</td>
<td>7,500.70</td>
<td>707</td>
</tr>
<tr>
<td>3</td>
<td>Municipal Assurance Corp (MAC)</td>
<td>801.5</td>
<td>129</td>
</tr>
</tbody>
</table>

Source: The Bond Buyer
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

A Ten Year History

Source: TM3
# Pros vs. Cons of Variable Rate Structures

<table>
<thead>
<tr>
<th>PROS</th>
<th>CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Rate</td>
<td></td>
</tr>
<tr>
<td>No interest rate risk</td>
<td>Less flexibility to refinance</td>
</tr>
<tr>
<td>Easier to budget</td>
<td>Historically higher cost</td>
</tr>
<tr>
<td>Less time to manage</td>
<td>Poor hedge for floating rate assets</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable Rate</td>
<td></td>
</tr>
<tr>
<td>Historically lower cost</td>
<td>Interest rates may rise</td>
</tr>
<tr>
<td>Easier to restructure/refinance</td>
<td>Takes more time to manage</td>
</tr>
<tr>
<td>Hedge for floating rate assets</td>
<td>Bank renewal and trading risk</td>
</tr>
<tr>
<td></td>
<td>More challenging to budget</td>
</tr>
</tbody>
</table>

**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
Variable Rate Issuance over Time

Total Municipal Issuance 2006-2015

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 SIFMA + XX bps)
- No rating or disclosure documents
## Credit Facilities

<table>
<thead>
<tr>
<th>2007 Top Letter of Credit Providers</th>
<th>2014 Top Letter of Credit Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank</td>
<td>Firm</td>
</tr>
<tr>
<td>1</td>
<td>Bank of America</td>
</tr>
<tr>
<td>2</td>
<td>J P Morgan Chase</td>
</tr>
<tr>
<td>3</td>
<td>Wells Fargo Bank</td>
</tr>
<tr>
<td>4</td>
<td>SunTrust Bank</td>
</tr>
<tr>
<td>5</td>
<td>Regions Bank</td>
</tr>
<tr>
<td>6</td>
<td>The Bank of New York Mellon</td>
</tr>
<tr>
<td>7</td>
<td>LaSalle Bank</td>
</tr>
<tr>
<td>8</td>
<td>US Bank</td>
</tr>
<tr>
<td>9</td>
<td>KeyBanc</td>
</tr>
<tr>
<td>10</td>
<td>Sovereign Bank</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Traditional VRDBs</th>
<th>Commercial Paper</th>
<th>Index Floater</th>
<th>Direct Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset Method</td>
<td>Remarketing Agent</td>
<td>CP Dealer</td>
<td>Index + Fixed Spread</td>
<td>Index + Fixed Spread</td>
</tr>
<tr>
<td>Bank Credit</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Bank Counterparty Risk</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Remarketing Agent Risk</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Bank Facility Renewal Risk</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Roll-Over Risk</td>
<td>No</td>
<td>No</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td>Term Out</td>
<td>Yes</td>
<td>Yes</td>
<td>Maybe</td>
<td>Yes</td>
</tr>
<tr>
<td>Ability to call bonds quickly</td>
<td>High</td>
<td>Moderate/High</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Rating Required</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Disclosure Document</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
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
Asset-Liability Matching

- A balance sheet risk management approach that links the interest rate sensitivity of liabilities and assets

- Rule of thumb: variable rate debt = 100-150% of cash
  - More if revenues are economically sensitive

- If revenues and expenses are economically sensitive, then even issuers without significant cash balances might find fixed rate debt quite risky
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**

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Basis Risk        | Swap variable rate received and the actual bond variable rate does not match perfectly | - LOC bank is downgraded, causing bonds to trade at higher spread to SIFMA  
                    |                                                                   | - Market rates compress                                                  |
| Tax Event Risk    | Changes in income tax rates alter the value of tax-exempt interest rates relative to taxable interest rates | - If tax rates go down, variable bond yield will go up                    |
| Counterparty Risk | Swap counterparty will not perform pursuant to the contract’s terms. For example if the swap provider defaults or its credit rating declines | - Lehman, DEPFA, AMBAC, UBS                                              |
| Termination Risk  | 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 | - 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
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