Massachusetts Bay Transportation Authority
Fiscal and Management Control Board

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Financial & Investment Advisors

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Draft for Discussion & Policy Purposes Only

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Overview of the Engagement

PFM has been engaged to undertake four tasks:

1. Analyze Current Outstanding Debt

2. Analyze the Swap Portfolio

3. Review the Authority's Debt Policy

4. Evaluate System Debt Capacity

Plan Consistent with Debt Policy

- The Financing Plan scenarios were developed taking into consideration the Authority's proposed Debt Policy

	✓ Proposed Policy	Comments
Term of Debt	✓ Amortized within 30 years ✓ Term of debt to limited to useful life of asset being financed	
Refunding Parameters	✓ Meets present value savings of at least 3%, ✓ Maturity by maturity savings of 2%, ✓ Consideration of efficiency in the escrow, ✓ Cost of call features and protection of future refunding opportunities, ✓ Restructurings maybe considered to provide cash flow relief or modify legal provisions	
Limits on Unhedged Variable Rate Debt	Limited to the amount of offsetting natural hedges ✓ In no event, more than 20% of total outstanding debt	Not dollar for dollar hedge; will require conservative budgeting; and structures which limit put features

Summary Recommendation

The elements of the recommended plan:

- Issue new, lower interest rate bonds to refund outstanding higher rate bonds, with debt service savings meeting or exceeding the criteria in the Debt Policy
  - 3% overall savings and 2% by maturity (such structure referred to as a "Refunding")

- Terminate the portion of the existing swaps that provide discounts to the termination cost and optimize opportunities to restructure the underlying debt related to the swaps

- Issue new, unhedged variable rate bonds to restructure the principal on the variable rate debt hedged by the terminated swaps, amortizing the new debt in a manner to minimize debt service impact and appropriately mitigate against risks associated with such debt (such structure and others that shift principal amortization referred to as "Restructurings")

Proposed Debt Policy

- The Authority's debt policy has been reviewed and revised to reflect industry best practices
- It generally aligns with the DOT policy and reflects certain features of other state agencies' policies
- Features which are proposed additions to the existing adopted policy are outlined below

	Proposed Policy
Term of Debt	Policy references statutory limit of 40 years; policy further limits term of debt to useful life of asset being financed.
Refunding Parameters	Must be overall present value savings of at least 3%, maturity by maturity savings of 2%, plus consideration of efficiency in the escrow, cost of call features, and potential future refunding opportunities; Restructurings may be considered to provide cash flow relief or modify legal provisions.
Limits on Unhedged Variable Rate Debt	Limited to the amount of offsetting natural hedges and, in no event, more than 20% of total outstanding debt
Method of Sale	Presumes bond sales will be competitive unless the specific requirements of the financing require a negotiated sale.
Investor Relations	Engage in ongoing communication with investors and respond to inquiries and requests.

Summary of Current Outstanding Debt

Summary of MBTA's Current Outstanding Long-Term Debt

- Four types of bonds
  - General Transportation System (Commonwealth Guarantee)
  - Sales Tax
  - Assessments
  - Parking Revenue

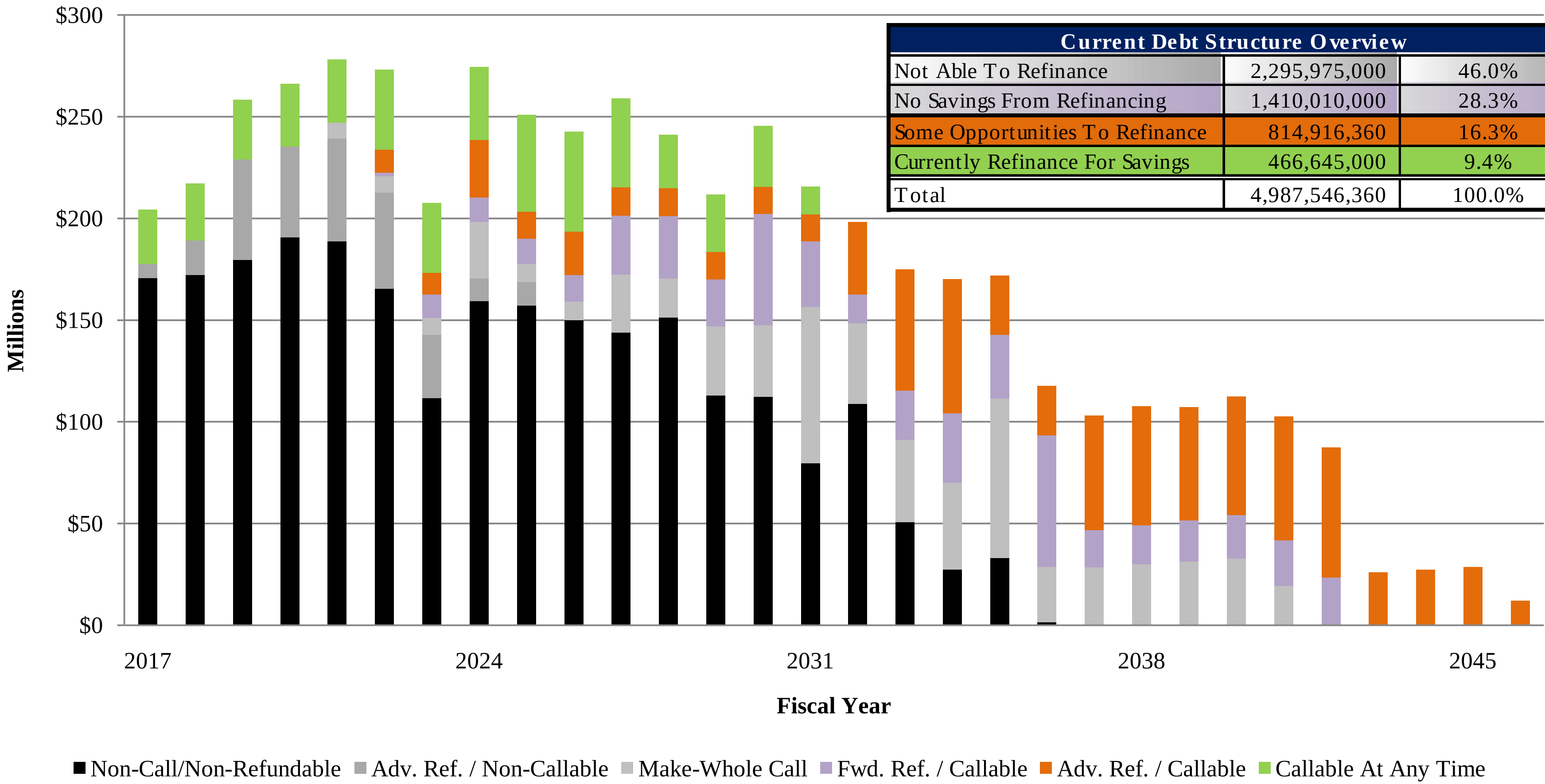
Takeaways:

- The debt portfolio has a total of $5.2 billion of long-term current outstanding debt; $4.6 billion are fixed rate bonds
- The remainder, $542 million, is synthetically fixed rate bonds (underlying variable rate debt that has been swapped to a fixed interest rate)
- The Authority also has a $61.8 million swap attached to its $67.3 million of outstanding commercial paper
- There is limited ability to refund bonds for savings in the portfolio

Outstanding Long-Term Debt

Annual Principal Payments

As of July 1, 2016



Current Debt Structure Overview		
Not Able To Refinance	2,295,975,000	46.0%
No Savings From Refinancing	1,410,010,000	28.3%
Some Opportunities To Refinance	814,916,360	16.3%
Currently Refinance For Savings	466,645,000	9.4%
Total	4,987,546,360	100.0%

Variable Rate Debt Portfolio

- Variable Rate Demand Bonds (VRDBs) provide the best opportunity to restructure debt in the near term
- Most outstanding VRDBs are callable any time without a premium
- Variable Rate debt comprises 10.4% of Total Long-Term Outstanding Debt Portfolio
- Nearly all of the MBTA's VRDBs are swapped
- To refinance VRDBs, MBTA would need to terminate associated swaps

Bonds	Series	Par Amount	Maturity	Swap Counterparty
Sales Tax	2008 A-1	$130,275,000	7/1/2021	Deutsche Bank
Sales Tax	2008 A-2	$121,415,000	7/1/2026	Deutsche Bank
Assessment	2006A^	$19,260,000*	7/1/2024	Deutsche Bank
Assessment	2006A^	$5,000,000*	7/1/2025	Deutsche Bank
Sales Tax	2010A	$79,645,000***	7/1/2030	JP Morgan
Sales Tax	2003C^	$25,005,000*	7/1/2020	Morgan Stanley**
GTS	2000	$161,420,000	3/1/2029	UBS
Total Variable		$542,020,000		

*** Variable CPI bonds, not VRDBs but non-callable**
**** Only 2020 Maturity swapped**
***** Only $79,645,000 is hedged with swap; $610,000 is floating**
^Non-callable
Note: This table does not include the $61.8 million swap attached to its $67.3 million of outstanding commercial paper

MBTA Swap Portfolio

- **The MBTA has eight (8) floating-to-fixed interest rate swaps that hedge underlying variable-rate debt as detailed in the table below**
  - A Swap is a contract where two financial parties exchange interest rates – it is used to hedge interest rate risk
  - The swaps had an indicative total mark-to-market value (ex-accruals) of (-$126.8 M) on 3/31/16 (before discounts)
    - the mark-to-market value equals the PV of the difference between the cashflows calculated at the contract's fixed swap rate and today's comparable maturity fixed swap rate

MBTA Pays	MBTA Receives	Current Floating Rate Reset	Effective Date	Maturity Date	Current Notional	MTM Value*	PV01	Counterparty	Moody's	S&P
3.8340%	SIFMA Swap Index	0.4000%	10/01/08	07/01/21	$130,275,000.00	($11,686,648.03)	$38,201.50	Deutsche Bank	Baa1	BBB+
3.0830%	62% of USD LIBOR+0.24%	0.5093%	10/01/08	07/01/26	$121,415,000.00	($18,128,345.39)	$91,992.02	Deutsche Bank	Baa1	BBB+
4.6700%	MUNI-CPI+1.23%	2.2773%	10/01/08	07/01/24	$19,260,000.00	($3,882,848.61)	$15,022.26	Deutsche Bank	Baa1	BBB+
4.6600%	MUNI-CPI+1.23%	2.2773%	10/01/08	07/01/25	$5,000,000.00	($1,004,102.42)	$3,899.86	Deutsche Bank	Baa1	BBB+
5.2000%	SIFMA Swap Index	0.4000%	03/01/03	03/01/22	$61,785,000.00	($10,408,247.74)	$24,534.22	J.P. Morgan Chase	Aa3	A+
5.6100%	SIFMA Swap Index	0.4000%	03/01/09	03/01/30	$79,645,000.00	($34,854,630.61)	$81,013.73	J.P. Morgan Chase	Aa3	A+
4.1300%	MUNI-CPI+0.79%	1.8373%	02/03/04	07/01/20	$25,005,000.00	($2,575,697.48)	$10,475.47	Morgan Stanley Capital Services	A3	BBB+
5.0000%	100% of USD LIBOR	0.4340%	08/02/05	03/01/30	$161,420,000.00	($44,244,612.75)	$127,522.67	UBS	A1	A
				Total	**$603,805,000.00**	**($126,785,133.02)**	**$392,661.72**			
**indicative mid-market values ex-accruals as of 3/31/16*										

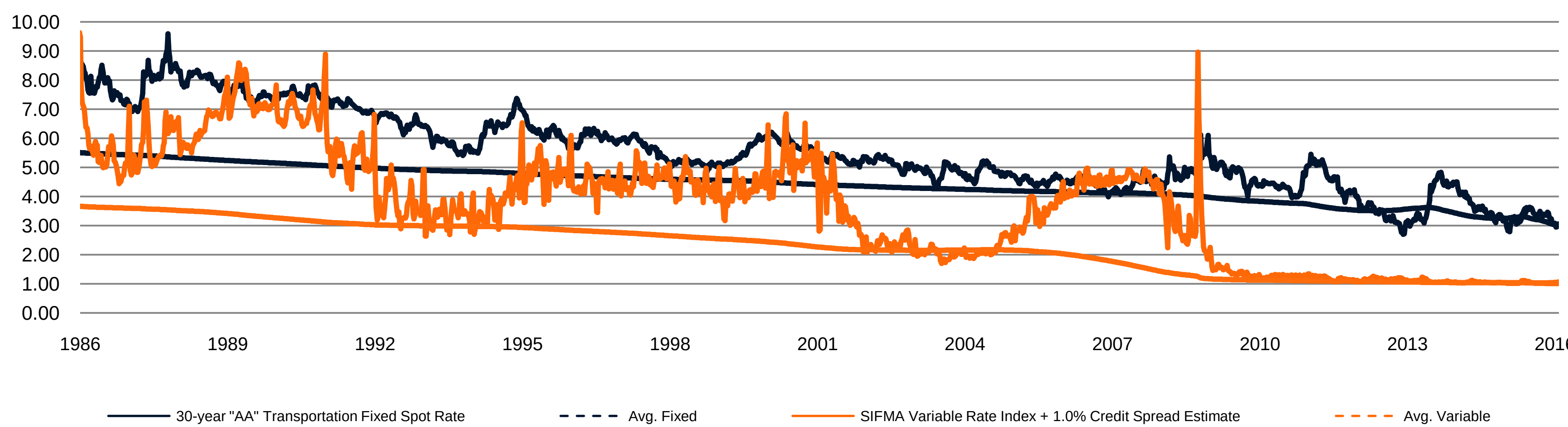
Fixed Rate v. Variable Rate

Variable Rate Debt has provided lower cost of capital (on average) than fixed rate debt; but it carries more risks

Since January 1986:

- Avg. Fixed = 5.51%[1]
- Avg. Variable = 3.66%[2]

Tax-Exempt Fixed and Variable Rates



Source: TM3.com.
1.Revenue Bond Index until 10/2/1997, and 30-year "AA" Revenue Fixed Spot Rate thereafter.
2.JJ Kenny Variable Rate Index + 1.0% Liquidity Spread Estimate until 6/29/1989, and SIFMA Variable Rate Index + 1.0% Liquidity Spread Estimate thereafter. Calculated as a moving average

Current Opportunities for Consideration

Below, there are four opportunities that will provide the MBTA debt service savings and more financial flexibility and can be pursued immediately:

1. **Optimal Refunding & Restructuring** – Advance refunding of fixed rate debt for savings, termination of DB & UBS swaps for market discounts and restructuring of VRDBs
2. **Fixed Rate Refunding with DB & UBS Swap Terminations** – Advance refunding of fixed rate debt for savings with termination of DB & UBS swaps
3. **Fixed Rate Refunding with DB Swap Terminations** – Advance refunding of fixed rate debt with termination of DB swaps
4. **Fixed Rate Refunding with UBS Swap Terminations** – Advance refunding of fixed rate debt with termination of UBS swaps

Notes:

- *Swap terminations will only be undertaken for those swaps where market discounts can be achieved*
- *All swap termination payments are assumed to be made with cash by the MBTA*
- *None of the scenarios include any type of projected new money issuances*

1. Optimal Refunding & Restructuring

($M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	Total
A **Terminate DB Swaps**[1]												
Interest Savings[2]	3.9	7.5	6.8	6.1	5.4	4.5	3.7	3.1	2.1	0.9	0.2	44.4
Restructuring Savings	-	-	-	-	-	-	-	-	-	-	-	
B **Terminate UBS Swaps**[1]												
Interest Savings[2]	7.5	6.9	6.6	6.2	5.8	5.4	5.0	4.5	4.0	3.4	2.8	58.2
Restructuring Savings	-	-	-	-	-	-	-	-	-	-	-	
C **Refund Fixed Rate Bonds**												
Interest Savings[2]	0.5	1.1	1.1	1.1	1.1	4.0	4.0	4.0	4.0	4.0	4.0	28.5
Restructuring Savings	-	-	-	-	-	-	-	-	-	-	-	
D **Portfolio Restructuring**												
Restructuring Savings[3]	-0.7	6.9	7.9	9.0	10.1	8.5	9.7	10.8	12.4	14.1	15.4	104.1
Total*	**11.2**	**22.4**	**22.4**	**22.4**	**22.4**	**22.4**	**22.4**	**22.4**	**22.4**	**22.4**	**22.4**	**235.2**
Total Lifetime Savings*	**235.2****											
Incremental Debt Capacity	89.4	74.5	95.0	112.2	124.5							
Total Debt Capacity – FY 18:21[4]		2,058	2,406	2,685	3,115							

**All savings are taken upfront so zero savings after FY 2027 and some figures may not add due to rounding*

1. Assume swap termination payment is cash funded

2. Interest savings are generated through interest rate reduction and/or swap termination, not restructuring

3. Restructuring savings are generated through principal restructuring

4. Includes $600M for CIP, $308M for TIFIA/RRIF Loans and $187M in annual state additional assistance (subject to annual appropriation)

****This scenario assumes that variable rates remain at current level of 0.50% per annum**

1B. Optimal Refunding & Restructuring With Higher Reset Rates

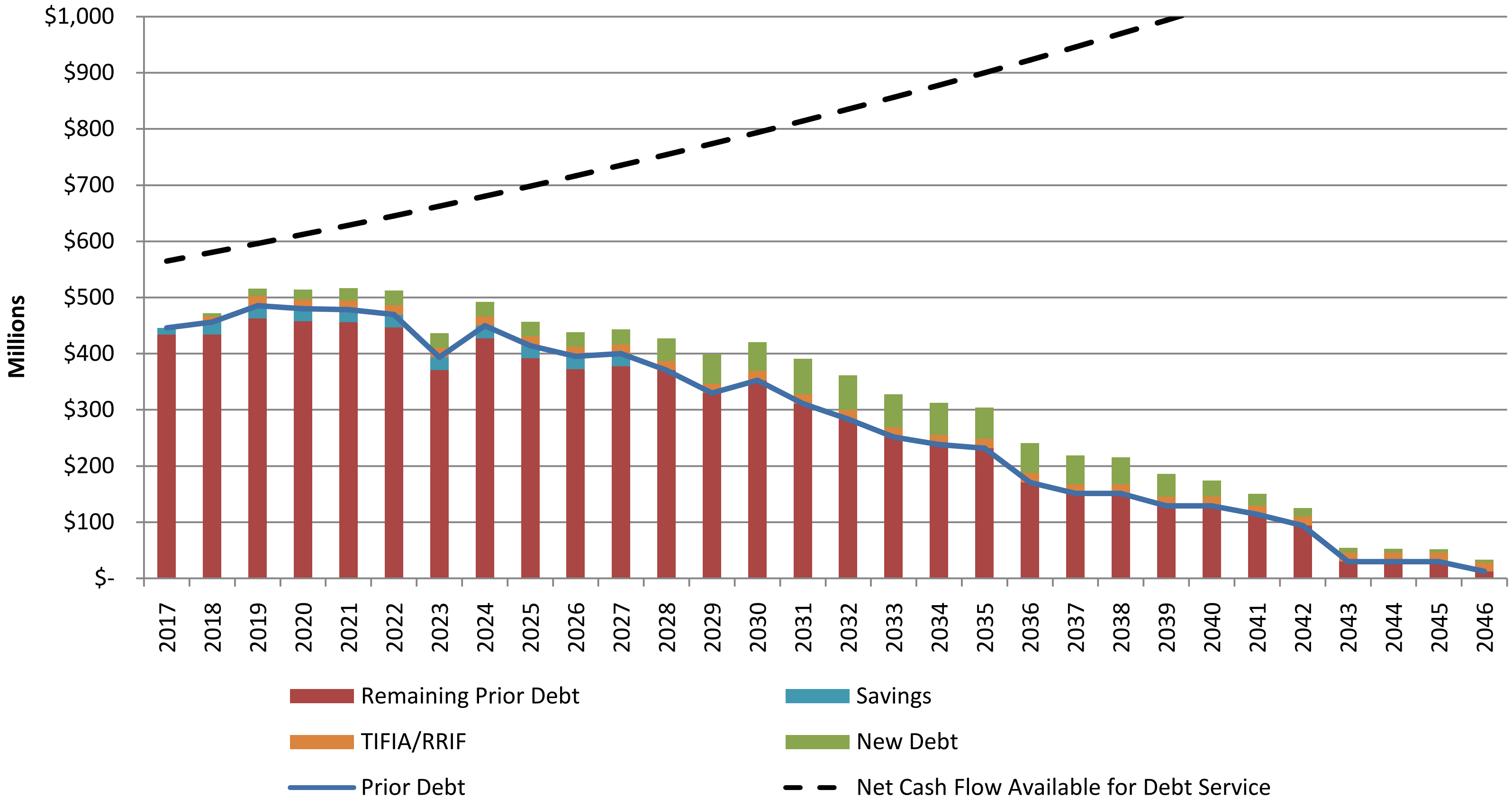
($M)	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	Total
A Terminate DB Swaps[1]												
Interest Savings[2]	3.9	7.5	6.8	6.1	5.4	4.5	3.7	3.1	2.1	0.9	0.2	44.4
Restructuring Savings	-	-	-	-	-	-	-	-	-	-	-	
B Terminate UBS Swaps[1]												
Interest Savings[2]	7.5	6.9	6.6	6.2	5.8	5.4	5.0	4.5	4.0	3.4	2.8	58.2
Restructuring Savings	-	-	-	-	-	-	-	-	-	-	-	
C Refund Fixed Rate Bonds												
Interest Savings[2]	0.5	1.1	1.1	1.1	1.1	4.0	4.0	4.0	4.0	4.0	4.0	28.5
Restructuring Savings	-	-	-	-	-	-	-	-	-	-	-	
D Portfolio Restructuring												
Restructuring Savings[3]	-4.4	-0.5	0.5	1.6	2.7	1.1	2.3	3.4	4.9	6.7	8.0	26.3
Total*	**7.5**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**15.0**	**157.4**
Total Lifetime Savings*	**157.4****											
Incremental Debt Capacity	82.1	67.3	87.7	104.7	124.5							
Total Debt Capacity – FY 18:21[4]		1,910	2,257	2,537	2,966							

**All savings are taken upfront so zero savings after FY 2027 and some figures may not add due to rounding*
1. Assume swap termination payment is cash funded

2. Interest savings are generated through interest rate reduction and/or swap termination, not restructuring
3. Restructuring savings are generated through principal restructuring
4. Includes $600M for CIP, $308M for TIFIA/RRIF Loans and $187M in annual state additional assistance (subject to annual appropriation)

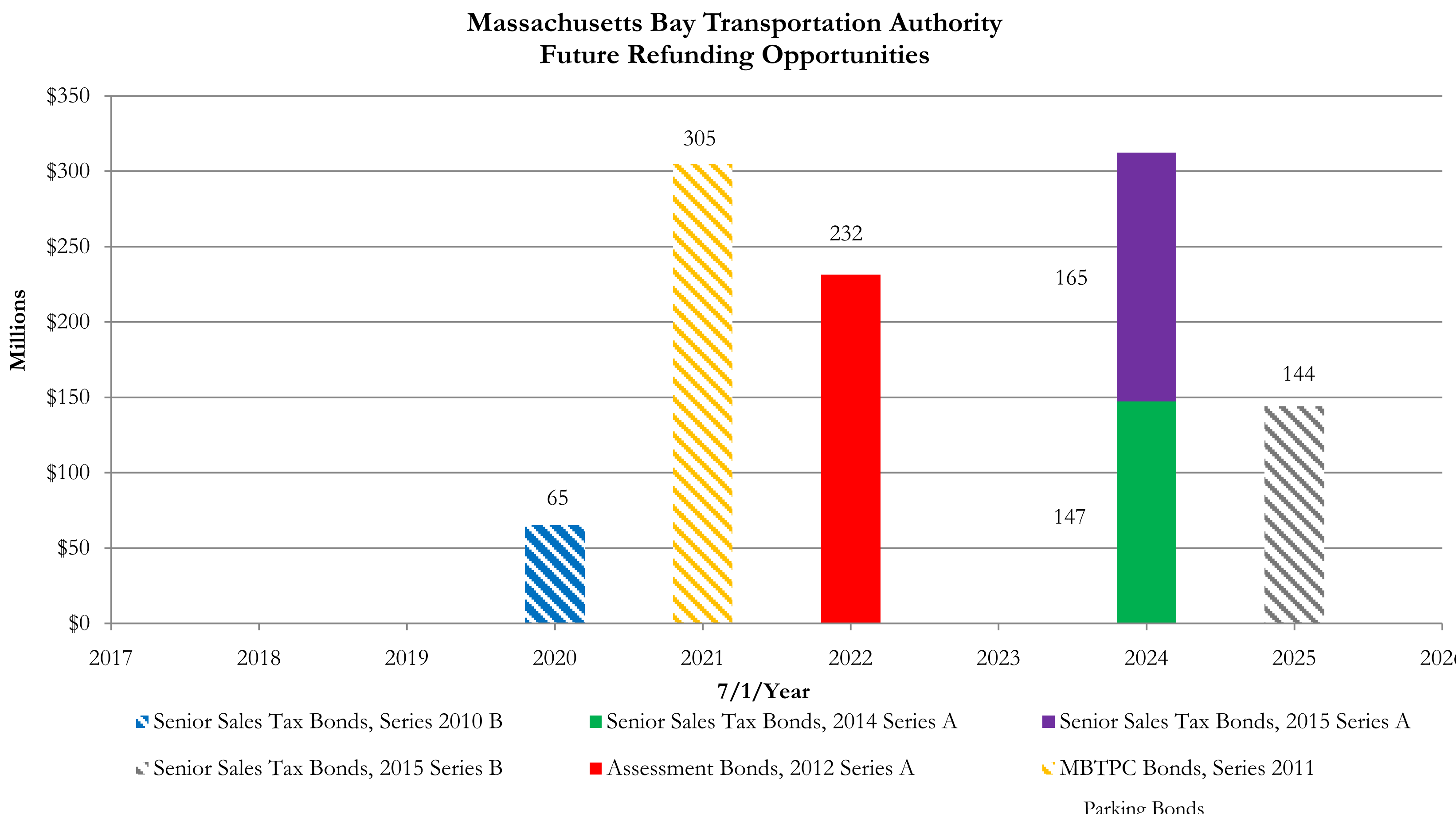
****This scenario assumes that variable rates are 1.5% in FY17 and escalate to 2.5% for the remainder of the period**

1. Prior Debt Service v. New Debt Service*



***New debt includes incremental $600 million for CIP and $308 million in TIFIA and RRIF loans**
Assumes $187 million in annual revenue from additional state assistance (which is subject to annual appropriation)

No Other Refunding Opportunities Until 2020



**Diagonal lines mean that the series can only be refunded within 90 days of the call date*

***Senior Sales Tax Bonds, Series 2007 A-2 (Call Date: 7/1/2017) and Assessment Bonds, Series 2008 (Call Date: 7/1/2018) excluded from chart above*

Policy Questions

Swaps

- Does FMCB want to terminate any of the swaps – if so how much?
  - Is it willing to use cash?

Debt

- A reasonable portion of the debt portfolio will be unhedged variable (depending on amount of swap terminations) – is the FMCB comfortable with this structure?

Risks Related to Variable Rate Debt

Variable Rate Demand Bonds have several features that introduce additional risk into the portfolio

- Interest rate risk due to changing interest rates over time
  - Can be hedged by short term invested assets that benefit from rising interest rates
- Put Risk – Bondholders can 'put' bonds back to the Authority on a weekly basis and bonds will need to be remarketed
  - Currently, the Authority's VRDBs reset weekly and we are allowed to switch to a different reset mode (daily, weekly, or monthly) in the future, but the fundamental issue of put risk related to VRDBs remains the same regardless of reset mode
- Remarketing risk – Bonds are remarketed weekly and remarketing is to being able to be remarketed by market conditions; supporting liquidity-bank credit quality; investor preferences
- Renewal risk – risk related to the availability and cost of bank liquidity to support bonds
  - Bank facilities mature every 3-5 years; Increased banking regulation since 2008

Potential Risk	VRDBs	Natural Fixed Rate Bonds	Risks already in the Portfolio
Put Risk	Yes	No	Yes
Remarketing Risk	Yes	No	Yes
Renewal/Refinancing Risk	Yes	No	Yes
Interest Rate: Short-term Market Conditions	Yes	No	No
Interest Rate: Credit Quality of Bank Liquidity	Yes	No	Yes
Interest Rate: Credit Quality of Borrower	Yes	No	Yes

- Interest rate risk can also be mitigated by budgeting conservatively and building a cash cushion for interest rate fluctuations
- Rating agencies will assess and consider the exposure to additional risks

Variable Rate Peer Comparisons

MBTA
Peer Comparison
Variable Rate Debt, Hedged and Unhedged

Agency	Policy *	Hedged*	Unhedged*	Total Outstanding Debt ($B)
MBTA	**20%**	**10.4%**	**.01%**	**$5.2**
MTA	25%	6.2%	8.4%	$36
CTA	20%	0.0%	0.0%	$4.3
MARTA	20%	0.0%	9.5%	$2.1
DC Metro	N/A	0.0%	65.00% (Lines of credit)	$.77
Houston	N/A	0.0%	0.00%	$1.2

**As a percentage of Total Outstanding Debt*

Commonwealth Agency Peers

Agency	Hedged*	Unhedged*	Variable Rate Debt	Total Outstanding Debt ($B)
MBTA	10%		$542m	**$5.20**
MEFA	12% (caps)	13%	$360m	$1.46
MDFA			$0	$0.10
MHFA	3%	7%	$265m	$2.65
MassPort		6%	$111m	$1.79
MSBA			$0	$6.00
MSCBA			$0	$1.29
UMBA	16%	0%	$436m	$2.80
CWT			$0	$2.80
DOT	42%		$815m	$1.93
Commonwealth	11%	5%	$3.7b	$23.10

**Percentage of Current Outstanding Long Debt not including commercial paper*

Managing Variable Rate Debt

- Unhedged Variable Rate Demand Bonds will require a higher level of management by staff than the current synthetic fixed rate debt structure
  - Will require experienced finance staff with expertise in ongoing management of variable rate debt combined with cash management
  - Will require on-going monitoring of short term cash and investments to hedge the debt where possible
  - Conservative budgeting will be required to build up cash cushion to protect against rising rates
- Mitigation Measures
  - Will assess alternative variable rate structures that eliminate put risk
  - Diversify maturities of liquidity facilities and counterparty banks