

# Kentucky's Affordable Prepaid Tuition

Actuarial Valuation Report  
as of June 30, 2020





September 9, 2020

Board of Directors  
Kentucky's Affordable Prepaid Tuition  
100 Airport Road  
Frankfort, Kentucky 40601

Attention: Mr. David Lawhorn, 529 Program Manager

**Re: Kentucky's Affordable Prepaid Tuition Actuarial Valuation as of June 30, 2020**

Dear Directors:

Gabriel, Roeder, Smith & Company ("GRS") has performed an actuarial valuation of the Kentucky's Affordable Prepaid Tuition Program ("KAPT" or "the Program") as of June 30, 2020. The purpose of this actuarial valuation is to evaluate the financial status of the Program as of June 30, 2020.

This report presents the principal results of the actuarial valuation of KAPT including the following:

- a) A comparison of the actuarial present value of the obligations for prepaid tuition contracts purchased through December 13, 2004 (the most recent ending date for contract sales), with the value of the assets associated with the Program as of June 30, 2020;
- b) An analysis of the factors which caused the deficit/margin to change since the prior actuarial valuation; and
- c) A summary of the member data, financial data, Program provisions, and actuarial assumptions and methods utilized in the actuarial calculations.

The main conclusion of this valuation is that the fund is expected to become depleted in 3-4 years. We understand that the liabilities of the fund are backed by the full faith and credit of the Commonwealth of Kentucky, who will be responsible for satisfying the liabilities not covered by the assets of the fund.

Our valuation results show estimates of the depletion date and present value of the unfunded liabilities under the glide path adopted by the Board (and resulting expected rates of return provided by Graystone Consulting) in Appendix A. In addition, we show the sensitivity of the depletion date and unfunded liabilities to changes in certain assumptions about future activity affecting KAPT in Section G.

This report was prepared at the request of the Program and is intended for use by the Board of Directors ("the Board") and those designated or approved by the Board. This report may be provided to parties other than the Board only in its entirety. This report should not be relied on for any purpose other than the purpose described above. GRS is not responsible for unauthorized use of this report.

The valuation results set forth in this report are based upon data and information, furnished by KAPT, concerning Program benefits, financial transactions, and beneficiaries of KAPT. We reviewed this information for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by KAPT. Further, the data and information provided is through June 30, 2020, and does not reflect subsequent market or membership experience.

There are currently no Actuarial Standards of Practice that specifically refer to prepaid tuition plans. We have followed the guidance from the Actuarial Standards of Practice on pensions due to their similar nature.

The valuation results summarized in this report involve actuarial calculations that require assumptions about future events. The major actuarial assumptions used in this analysis were adopted by, and are the responsibility of the Program and the Program's Board. We have not performed an experience study, but have reviewed the assumptions. Based on our limited review, we believe these assumptions are within a reasonable range and are in compliance with actuarial standards regarding pension calculations.

We have prepared this valuation with the understanding the Program is closed to new participants.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: Program experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in Program provisions or applicable law. We have performed an analysis of the sensitivity of certain changes in future assumptions. See Section G of this report for additional details. In addition, because it is not possible or practical to consider every possible contingency, we may use estimates or simplifications of calculations to facilitate the modeling of future events. We may also exclude factors or data that are deemed to be immaterial.

GRS makes no representations or warranties to any person participating in or considering participation in the Program.

To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the Kentucky's Affordable Prepaid Tuition Program as of June 30, 2020.



Brian B. Murphy and James R. Sparks are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

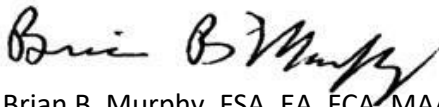
On August 24, 2020, a first draft of this report was issued and discussed with Staff. During that discussion, it was decided that several changes would be made that affected the computations herein. Those changes include: lowering the price inflation assumption (which is used for the discount rate after asset depletion) from 2.50% to 2.00%; lowering the projected expenses to better align with Staff projections and recognizing some minor changes to the assets that were made during the audit process. A second draft was issued on September 8, 2020 which included these changes. This final report contains no substantive changes from the second draft.

The signing individuals are independent of the Program sponsor.

Respectfully submitted,



Kenneth G. Alberts



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



James R. Sparks, ASA, MAAA

KGA/BBM/JRS:dj

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## **SECTION A**

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### **EXECUTIVE SUMMARY**

## Kentucky's Affordable Prepaid Tuition Summary of Results

Valuation Date:	Valuation Results	
	June 30, 2020	June 30, 2019
Membership Summary:		
Accounts		
8 or More Years Beyond Projected College Entrance Year (PCEY)	577	567
1-7 Years Beyond PCEY	1,936	2,046
At or Before PCEY	368	641
Total	2,881	3,254
Average Years until PCEY (Negative if Past PCEY)	(3.9)	(3.2)
Assets		
Market Value of Assets <sup>1</sup>	\$ 44,715,027	\$ 58,157,726
Present Value of Future Contract Payments	\$ 116,764	\$ 298,780
Fees Receivable	\$ 3,244	\$ 10,027
Total Valuation Assets	\$ 44,835,035	\$ 58,466,533
Estimated Annual Return on Market Value of Assets <sup>2</sup>	4.37%	6.34%
Actuarial Liabilities (Present Value of Future Tuition Payments, Refunds, Fees, and Administrative Expenses)	\$ 78,804,442	\$ 96,203,553
Margin/(Deficit)	\$ (33,969,407)	\$ (37,737,020)
Funded Ratio (Total Assets ÷ Actuarial Liabilities)	56.9%	60.8%
Estimated Fiscal year Fund Depleted	2024	2023

<sup>1</sup> Market Value of Assets based upon current Program cash, cash equivalents and investments.

<sup>2</sup> Estimated money-weighted annual return.

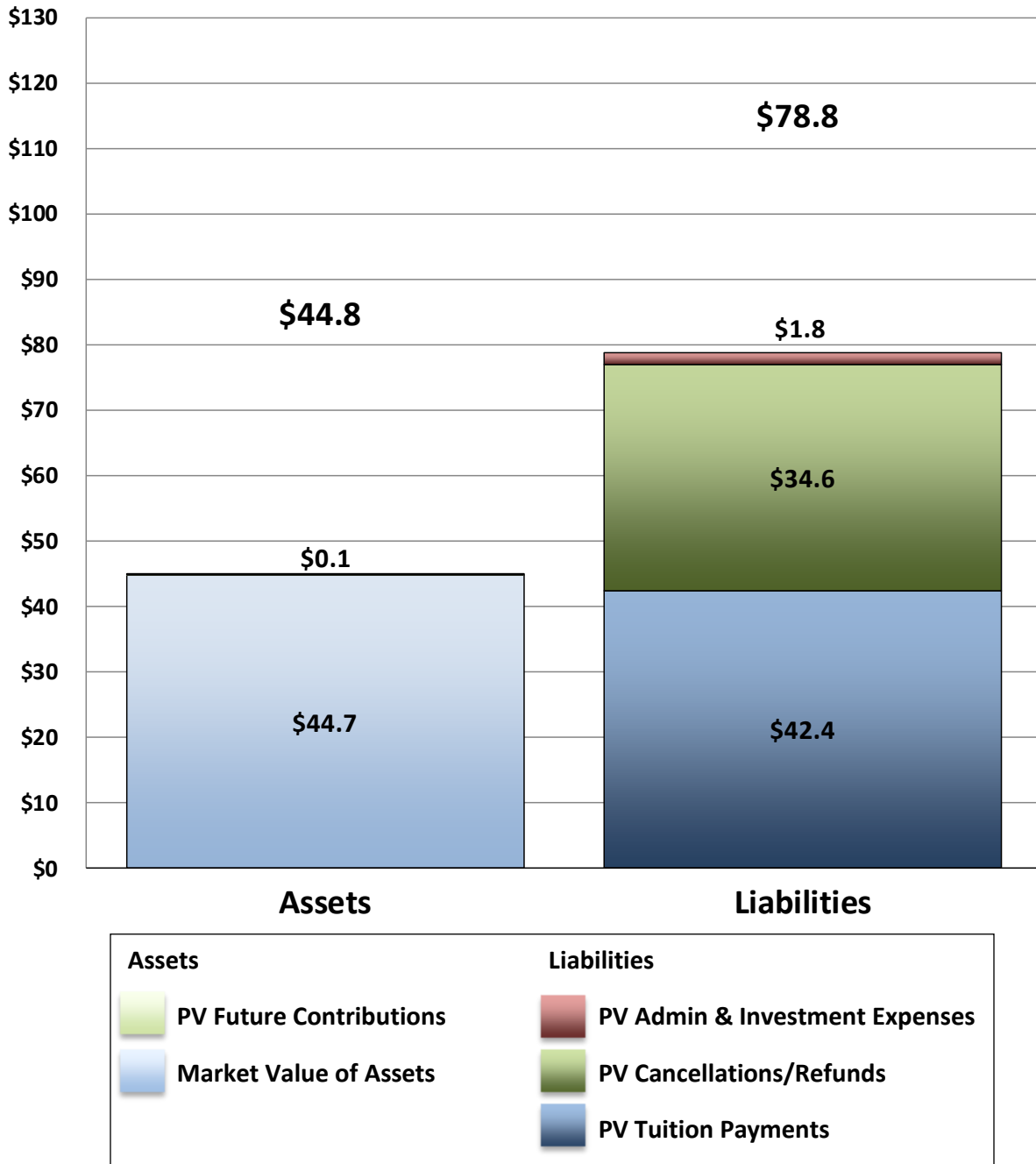
## Kentucky's Affordable Prepaid Tuition Summary of Results

<b>Valuation Results as of June 30, 2020</b>	
Market Value of Assets & Future Contract Receivables	\$ 44,831,791
Other Payables & Receivables	3,244
Actuarial Liabilities	78,804,442
Other Liabilities	<u>N/A</u>
Actuarial Deficit	\$ (33,969,407)
Deficit as a Percent of Liabilities	43.1%



# Kentucky's Affordable Prepaid Tuition Summary of Assets and Liabilities as of June 30, 2020

(\$ in Millions)



*PV – Present Value*

Numbers may not add due to rounding.

## Kentucky's Affordable Prepaid Tuition Funded Status

	June 30, 2020	June 30, 2019
Actuarial Present Value of Future Tuition Payments, Fees and Expenses	\$ 78,804,442	\$ 96,203,553
Market Value of Assets (Including the Present Value of Future Contract Payments)	\$ 44,835,035	\$ 58,466,533
Margin/(Deficit)	\$ (33,969,407)	\$ (37,737,020)

### Change in Margin/(Deficit)

	Margin/(Deficit)
(1.) Values as of June 30, 2019	\$ (37,737,020)
(2.) Interest on Margin/(Deficit) at assumed rate (4.10%)	\$ (1,547,218)
<b>(3.) Projected margin/(deficit) as of June 30, 2020 [(1) + (2)]</b>	<b>\$ (39,284,238)</b>
(4.) Change Due to:	
a. Legislation	-
b. Investment experience above/(below) assumed	151,515
c. Change in program assumptions*	1,690,082
d. Tuition/fee inflation below/(above) assumed	1,869,627
e. Other program experience during fiscal year 2020	1,603,607
Total	\$ 5,314,831
<b>(5.) Actual values as of June 30, 2020 [(3) + (4)]</b>	<b>\$ (33,969,407)</b>

\* Includes changes in liability as a result of changes to the assumed future annual increases in tuition, rates of investment return and administrative expenses.

## Kentucky's Affordable Prepaid Tuition Short-Term and Long-Term Present Values of Future Revenues and Expenditures

	<b>As of June 30, 2020</b>
1. Future Contract Payment Revenue	
Short-Term <sup>a</sup>	\$ 83,480
Long-Term <sup>b</sup>	33,284
Total	\$ 116,764
2. Future Tuition Payments and Refunds	
Short-Term <sup>a</sup>	\$ 14,681,956
Long-Term <sup>b</sup>	62,282,205
Total	\$ 76,964,161
3. Future Administrative Expenses	
Short-Term <sup>a</sup>	\$ 207,819
Long-Term <sup>b</sup>	1,011,542
Total	\$ 1,219,361
4. Future Investment Expenses	
Short-Term <sup>a</sup>	\$ 154,807
Long-Term <sup>b</sup>	466,114
Total	\$ 620,921

<sup>a</sup> Present value of amounts in following year.

<sup>b</sup> Present value of amounts after first year.

# Kentucky's Affordable Prepaid Tuition Discussion

## Financial Status of Program

### Program Status

As of June 30, 2020, the present value of all future tuition obligations under contracts outstanding (and including estimated future administrative and investment expenses) is \$78.8 million. Program assets as of June 30, 2020, including the Market Value of Assets and the present value of installment contract receivables, are \$44.8 million.

The difference between the assets of \$44.8 million and future obligations of \$78.8 million represents a Program deficit of \$34.0 million. The Program is 56.9% funded. This compares to 60.8% as of the prior actuarial valuation. The funded status is not appropriate for measuring the settlement cost of the Program. A funded status less than 100% is an indication that additional contributions (in other words, contributions from sources other than contract payments) will be needed to satisfy the Program's liabilities.

We understand that the Program is backed by the full faith and credit of the Commonwealth of Kentucky. The deficit of \$34.0 million is one estimate of the present value of the contributions the Commonwealth will need to make in order to satisfy its obligation under the Program, if future activity is exactly as assumed.

### Other Measurements to Consider

This report is intended to measure the obligations of the Program. Since the Program obligations will become Commonwealth obligations upon asset depletion, the unfunded obligation of the Program of \$34.0 million is one measure of the obligation of the Commonwealth. However, there are other measures. For example, if the expected payment obligations were summed from the date of depletion, to the date of termination, the sum would total approximately \$38.6 million in tuition, refund payments and expenses.

Fiscal Year	Projected Tuition		Projected Admin.		Total Obligations
	Payments*	Projected Refunds	Expenses		
2024	\$ 1,620,948	\$ 4,770,043	\$ 161,034	\$	6,552,025
2025	3,821,034	5,081,505	138,889		9,041,428
2026	1,697,776	6,015,852	126,111		7,839,740
2027	564,723	3,359,321	113,333		4,037,377
2028	62,429	1,227,985	100,556		1,390,970
2029	-	1,041,759	87,778		1,129,536
2030	-	8,560,757	75,000		8,635,757
TOTAL	\$ 7,766,910	\$ 30,057,223	\$ 802,701	\$	38,626,833

\* Net of remaining program assets in Fiscal Year 2024.

The projected expenses shown above are based on Staff projections. The tuition payments and refunds are based on current assumptions regarding future participant behavior and future tuition increases. If stakeholders intend to create future budgets from this chart, Stakeholders should consider that actual annual obligations will likely differ from the projections and allow for such differences in their budgeting.

### Management's Discussion and Analysis Language Describing Financial Status for Financial Statements

The following language was specifically requested by Fund Management:

*As of June 30, 2020, the Program had a deficit of \$34.0 million. This represents a \$3.7 million decrease from the previous year's deficit. Based on actuarial estimates, the Program's assets will be exhausted in fiscal year 2024, at which time the liability of the Program becomes a General Obligation of the Commonwealth of Kentucky. Per KRS 164A.708, once a real liability is expected to accrue, the General Assembly shall appropriate the necessary funds to meet the liability. Over the remaining estimated life of the Program, through fiscal year 2030, actuarial estimates show the Commonwealth of Kentucky will need to transfer approximately \$38.6 million, as shown above.*



# Kentucky's Affordable Prepaid Tuition Discussion (Continued)

## Program Experience During the Year

Program experience during the year was mostly favorable, resulting in the liabilities decreasing more than assumed, the deficit decreasing, and the solvency of the Program extending. We observed the following experience:

- 1) The market rate of return on fund assets was 4.37%. This compares to an assumed rate of return of 4.10%. This experience does not affect liabilities, but does result in a slight decrease in the deficit compared to assumptions (since the market contribution to the assets is greater than assumed);
- 2) The actual rate of tuition increases for UK and KCTCS were 1.00% and 2.75%, respectively, compared to an assumed increase of 5.75% (assumption from the June 30, 2019 valuation). This results in a lower liability compared to assumed; and
- 3) Tuition payments, refunds and expenses were approximately \$15.8 million compared with projected payments of \$15.9 million. Since payments were made at a rate close to assumed (in last year's valuation), this experience had little impact on liabilities, assets and solvency.

Overall, when experience is combined with the assumption changes (see following pages) and Program changes (none), the funded status of the Program declined from 60.8% to 56.9%; the deficit decreased from \$37.7 million to \$34.0 million and the insolvency date extended into the 2024 fiscal year.

## Benefit Provision Changes

No Legislation changes occurred during the year.

## Valuation and Actuarial Methods

Valuation and Actuarial methods were unchanged during the year.

# Kentucky's Affordable Prepaid Tuition Discussion (Continued)

## Valuation Assumptions

### Changes from Prior Valuation

#### Tuition Increase Assumption

The assumed rate of future tuition increases was lowered from 5.75% to 4.75% for this valuation. This resulted in a decrease in liabilities of approximately \$1.2 million (measured after all other changes).

#### Asset Allocation Glide Path and Assumed Rate of Investment Return

At the May 2019 Board meeting the following target asset allocation was adopted:

Asset Classes	Proposed Target	Proposed Range
U.S. Large Cap Equities	24%	21% to 27%
U.S. Mid Cap Equities	3%	1% to 5%
U.S. Small Cap Equities	3%	1% to 5%
Non-US Equities	6%	4% to 8%
Inflation Indexed Bonds (TIPS)	6%	4% to 8%
U.S. Fixed-Income	33%	30% to 36%
Short Duration U.S. Fixed Income	15%	12% to 18%
Cash Equivalents	10%	8 to 12%

In addition, the Board adopted the following Glide Path asset allocation:

Asset Classes	2019	2020	2021	2022	2023*
Large Cap U.S. Equity	30%	24%	12%	0%	0%
Small/Mid Cap U.S. Equity	9%	6%	4%	0%	0%
International Equity	9%	6%	3%	0%	0%
U.S. Fixed Income	44%	33%	11%	0%	0%
TIPS	7%	6%	0%	0%	0%
Short Duration U.S. Fixed Income	0%	15%	40%	50%	0%
Cash Equivalents	1%	10%	30%	50%	100%
Totals	100%	100%	100%	100%	100%

\* Not expected to have significant assets to invest. Any remaining assets will be in cash equivalents until depletion.

This allocation was first reflected in the June 30, 2019 valuation and is unchanged for the June 30, 2020 valuation.

## Kentucky's Affordable Prepaid Tuition Discussion (Continued)

Graystone Consulting reviewed the Board's adopted Glide Path and then projected expected rates of return until assets were presumed to be 100% in cash or depleted (in 2022). We used the Graystone projected rates in the valuation through 2022 and extended the 2022 assumed rate of 2.50% for the Fiscal Year ending 2023. In Fiscal Years ending 2024 and thereafter, a 2.00% assumed rate of investment return was used. This assumption was first adopted with the June 30, 2020 valuation.

Fiscal Year Ending:	Assumed Investment Return/Discount Rate							
	2019	2020	2021	2022	2023	2024	2025	2026+
Prior Actuarial Valuation (6/30/2019)	N/A	4.10%	3.30%	2.50%	2.50%	2.50%	2.50%	2.50%
Current Assumption (6/30/2020)	N/A	4.10%	3.30%	2.50%	2.50%	2.00%	2.00%	2.00%

Generally, the valuation uses the assumed rate of investment return as a discount rate to calculate the present value of future tuition payments and expenses (the Actuarial Liability). However, since the concept of an assumed rate of return loses meaning once assets are depleted (and Graystone's Glide Path effectively ends at that point), we used an assumed rate of price inflation as the discount rate to recognize the time value of money. In reviewing the reasonableness of the price inflation assumption for the remainder of the program, we reviewed short term inflation projections from different sources, including the CBO and the Philadelphia Federal Bank of Reserve.

### **Other Assumptions to Consider Monitoring**

#### **Refunds**

With the value of contracts growing at full value for up to eight years beyond the Projected College Entrance Year (PCEY), it would seem likely that participants who have not utilized all of their contracts for schooling would hold their contracts until the date the contract reaches its maximum value. The results shown in this report are based on the following assumptions:

- 1) Participants who reach eight years beyond their PCEY in the future are assumed to refund at that point in time (assumed to be 8% of participants); and
- 2) Participants who already have maximized their contract value and not yet refunded (more than eight years beyond their PCEY) are expected to hold their contracts until the end of the Program (June 30, 2030).

#### **Expenses**

Our projections of Program expenses are based on Staff estimates. In prior years, administrative expense projections for the upcoming Fiscal Year were based upon amounts that were similar to the expenses shown in the assets for the year ending on the valuation date. After discussions with staff, there was some concern that the expenses shown in the assets for the year ending June 30, 2020, may include some one-time expenses related to bringing certain administrative functions in-house. As a result, this projected expenses for year following the valuation date may appear low when compared with the expenses from the immediate prior year.



# Kentucky's Affordable Prepaid Tuition Discussion (Concluded)

## Program Status

The Program has a closure date of June 30, 2030, at which point any remaining contract values will be refunded or rolled over to individual 529 College Savings Plans. The Board could elect to start selling contracts again and is charged with annually making that decision. However, if new contracts were to be sold, they would be part of a different plan and would not be backed by the full faith and credit of the Commonwealth. See Appendix B for a discussion regarding the sales of new contracts.

## Future Outlook

The Program is expected to become insolvent in 3-4 years. We understand that the obligations will be transferred to the Commonwealth once the Program becomes insolvent.

The COVID-19 pandemic has created additional short-term uncertainties related to the experience of this Program, including:

- How changes in the delivery of education might affect near term changes in tuition and enrollment;
- How changes in the delivery of education might affect the selection of colleges for those participants who have not yet matriculated; and
- How economic conditions will evolve during the pandemic, potentially affecting future investment returns, tuition increases, and refund experience.

While our sensitivity modeling shows that different experiences will generally only affect the estimated depletion date by a few years, readers should remember that since the baseline line assumptions show depletion in approximately four years, a change of even one year would be a material change in valuation results. It is also important to remember that the projections shown herein are based on future activity that cannot be precisely predicted. While future positive activity may delay the point of fund depletion (the point of becoming pay-as-you-go), future adverse experience may hasten the point of fund depletion. Combining the short-term projections of fund depletions with the need to consider the effects of adverse experience and the greater uncertainty in short-term activity due to the pandemic, stakeholders should prepare for the possibility of trust asset depletion a year or two prior to when the baseline valuation results indicate, just in case future adverse experience accelerates the depletion date.



## **SECTION B**

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### **PROGRAM DESCRIPTION**

# Kentucky's Affordable Prepaid Tuition

## Summary of Program Description Evaluated June 30, 2020

**Purchasing Contracts** – KAPT is currently closed to new participants. Current members purchased from three types of contracts with the following benefits:

- **Value Plan** – Provides in-state tuition and mandatory fees at Kentucky Community and Technical College System (KCTCS). KCTCS tuition price for full-time enrollment will be guaranteed. Depending on tuition rates, any money left over can cover qualified educational expenses.
- **Standard Plan** – Provides in-state undergraduate tuition and mandatory fees at Kentucky's eight public universities. Guarantees tuition price for full-time enrollment at the Commonwealth's most expensive public university (currently University of Kentucky). Depending on tuition rates, any money left over can cover qualified educational expenses such as books, room, and board.
- **Premium Plan** – Provides tuition at Kentucky's private colleges and universities. While no particular school's tuition is guaranteed, your value of the plan grows at the same rate as the University of Kentucky's tuition. Depending on tuition rates, any money left over can cover qualified educational expenses such as books, room, and board.

**Contract Payments** – Contract holders may agree to pay-off their contracts in a variety of ways:

- Lump-Sum Payment (Full Contract paid-in-full at time of enrollment to the Program)
- 3-Year Monthly Payments (36 monthly payments after purchase of contract)
- 5-Year Monthly Payments (60 monthly payments after purchase of contract)
- 7-Year Monthly Payments (96 monthly payments after purchase of contract)
- Extended Monthly Payments (Monthly payments after purchase of contract for defined period up to and including the year of high school matriculation)
- Custom Monthly Payments (Monthly payments based upon a custom determined schedule)

# Kentucky's Affordable Prepaid Tuition

## Summary of Program Description Evaluated June 30, 2020

### ***Refunds***

**If a contract holder elects to close account prior to July 1 of their Projected College Entrance Year (PCEY),** the amount refunded will include payments made towards the contract minus administrative and cancellation fees.

**If a contract holder elects to close account beyond July 1 of their PCEY and before the end of their contract's utilization period,** the contract holder receives the tuition payout value of the account at that time minus administrative and cancellation fees and any benefits already used.

**If a contract holder elects to close account beyond the end of their contract's utilization period, the contracts receive the following:**

*If refunds occur prior to June 30, 2019:*

- Accounts with utilization period end dates prior to 2012 – The value of the remaining prepaid tuition account for the 2014-2015 academic year.
- Accounts with utilization period end dates on or after 2012 – The value of the remaining prepaid tuition account at the end of the utilization period plus any applicable tuition plan value increases in each of the next two years (capped at 3% per annum).

*If refunds occur on or after June 30, 2019:*

- The value of the remaining prepaid tuition account at the end of the utilization period plus any applicable tuition plan value increases through the first eight years beyond the contract holder's original Projected College Entrance Year (PCEY).

Accounts have until June 30, 2030 to utilize benefits. Any remaining contract value will be rolled over into a 529 College Savings Program or refunded.

### ***Change in Beneficiary***

Contract holders can change the beneficiary as long as the new beneficiary is an eligible member of the family of the current beneficiary.

*For purposes of this valuation, it is assumed that no contracts will change beneficiaries.*

*This is a summary of the contract provisions as they pertain to this valuation. This should not be construed as actual contract terms.*



## SECTION C

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### DETAILED CHANGE IN MARGIN/(DEFICIT)

## Kentucky's Affordable Prepaid Tuition Detailed Change in Margin/(Deficit)

	Present Value of Benefits	PV Future Contract Payments	Market Value of Assets	Margin/(Deficit)
(1.) Values as of June 30, 2019	\$ 96,203,553	\$ 298,780	\$ 58,167,753	\$ (37,737,020)
(2.) Expected Contract Payments	\$ -	\$ (181,607)	\$ 181,607	\$ -
(3.) Expected Tuition Payments, Refunds, and Administrative Fees	\$ (15,947,642)	\$ -	\$ (15,947,642)	\$ -
(4.) Interest on Margin/(Deficit) at assumed rate (4.10%)	\$ 3,290,492	\$ 4,804	\$ 1,738,470	\$ (1,547,218)
<b>(5.) Projected Margin/(Deficit) as of June 30, 2020 [(1) + (2) + (3) + (4)]</b>	<b>\$ 83,546,403</b>	<b>\$ 121,977</b>	<b>\$ 44,140,188</b>	<b>\$ (39,284,238)</b>
(6.) Change Due to:				
a. Legislation	-	-	-	-
b. Investment experience above/(below) assumed	-	-	151,515	151,515
c. Change in program assumptions*	(1,690,082)	-	-	1,690,082
d. Tuition/fee inflation below/(above) assumed	(1,869,627)	-	-	1,869,627
e. Other program experience during fiscal year 2020	(1,182,252)	(5,213)	426,568	1,603,607
Total	\$ (4,741,961)	\$ (5,213)	\$ 578,083	\$ 5,314,831
<b>(7.) Actual values as of June 30, 2020 [(5) + (6)]</b>	<b>\$ 78,804,442</b>	<b>\$ 116,764</b>	<b>\$ 44,718,271</b>	<b>\$ (33,969,407)</b>

\* Includes changes in liability as a result of changes to the assumed future annual increases in tuition, rates of investment return and administrative expenses.

## SECTION D

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### PROGRAM ASSETS

## Kentucky's Affordable Prepaid Tuition Statement of Total Assets (at Market Value)

### Market Value of Cash & Investment Assets Held

	as of June 30, 2020		as of June 30, 2019	
	Amount	% of Total	Amount	% of Total
Cash	\$ 4,538,997	10.12%	\$ 926,072	1.58%
Corporate Bonds	\$ 14,922,307	33.28%	\$ 24,481,107	41.87%
U.S. Treasury and Government Agency Securities	\$ 9,184,049	20.48%	\$ 3,979,545	6.80%
Corporate Stock	\$ 16,062,794	35.82%	\$ 28,757,000	49.17%
Money Market	\$ 6,871	0.02%	\$ 13,979	0.02%
Assumed Net Receivables	\$ 126,163	0.28%	\$ 326,692	0.56%
<b>Total</b>	<b>\$ 44,841,181</b>	<b>100.00%</b>	<b>\$ 58,484,395</b>	<b>100.00%</b>

## Kentucky's Affordable Prepaid Tuition Reconciliation of Total Assets (at Market Value)

	FY 2020	FY 2019
<b>Total Market Value of Assets at the beginning of the Fiscal Year</b>	\$ 58,484,395	\$ 70,178,436
<b>Additions:</b>		
<b>Contract Payments</b>	\$ 97,925	\$ 202,217
<b>Investment Revenues:</b>		
a. Net unrealized gain on investments	\$ (6,657,397)	\$ (1,687,283)
b. Interest and investment income	8,770,017	5,503,155
<b>Total Investment Revenues</b>	\$ 2,112,620	\$ 3,815,872
<b>Deductions:</b>		
a. Administrative expenses	\$ 42,455	\$ 41,028
b. Personnel and professional expenses	221,500	381,401
c. Refunds	2,187,352	2,452,259
d. Trustee fee expense	99,478	133,662
e. Tuition benefits expense, net	13,276,587	13,203,867
<b>Total Deductions</b>	\$ 15,827,372	\$ 16,212,217
<b>Change in Net Position</b>	\$ (13,616,827)	\$ (12,194,128)
<b>Change in Net Receivables</b>	\$ (26,387)	\$ 500,087
<b>Total Market Value of Assets at the end of the Fiscal Year</b>	\$ 44,841,181	\$ 58,484,395

Total asset value shown above excludes any receivables for future contract payments.



## **SECTION E**

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### **CONTRACT DATA**

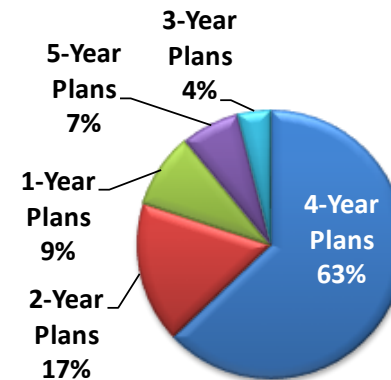
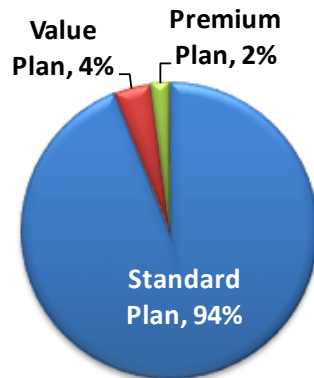
## Kentucky's Affordable Prepaid Tuition Member Matriculation Summary as of June 30, 2020

Projected Matriculation Year	Type of Contract												Total	
	Value Plan 1 Year	Value Plan 2 Years	Standard Plan 1 Year	Standard Plan 2 Years	Standard Plan 3 Years	Standard Plan 4 Years	Standard Plan 5 Years	Premium Plan 1 Year	Premium Plan 2 Years	Premium Plan 3 Years	Premium Plan 4 Years	Premium Plan 5 Years		
2004	-	2	2	2	1	6	-	-	-	-	1	-	14	0.5%
2005	-	2	1	2	3	12	1	-	-	-	1	-	22	0.8%
2006	-	2	1	5	5	24	4	-	-	-	1	-	42	1.5%
2007	2	1	5	12	3	28	3	-	-	-	1	-	55	1.9%
2008	1	1	3	9	-	36	3	-	1	-	3	2	59	2.0%
2009	2	3	8	15	3	50	8	-	-	-	1	1	91	3.2%
2010	1	1	7	15	5	56	10	1	-	-	2	-	98	3.4%
2011	2	3	8	12	5	67	7	-	-	-	1	-	105	3.6%
2012	-	2	6	16	4	55	5	-	-	-	3	-	91	3.2%
2013	2	2	9	16	3	82	11	-	-	-	-	3	128	4.5%
2014	-	5	10	29	5	108	5	-	1	1	5	1	170	5.9%
2015	2	4	10	19	4	117	13	-	-	-	3	2	174	6.0%
2016	2	10	13	28	12	138	22	-	-	-	5	-	230	8.0%
2017	4	5	14	27	6	212	31	-	2	1	1	2	305	10.6%
2018	2	15	24	46	15	246	23	1	1	-	2	-	375	13.0%
2019	2	13	24	45	7	177	12	-	1	1	2	1	285	9.9%
2020	4	9	27	39	9	163	16	-	1	-	1	-	269	9.3%
2021	3	8	26	32	5	125	16	-	1	-	2	-	218	7.6%
2022	3	4	12	12	5	63	9	1	1	1	1	-	112	3.9%
2023	-	-	4	6	-	21	3	-	-	-	1	-	35	1.2%
2024	-	-	-	-	-	1	-	-	-	-	-	-	1	0.0%
2025	-	-	-	1	-	-	-	-	-	-	-	-	1	0.0%
2026	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%
2027	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%
2028	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%
2029	-	-	-	-	-	1	-	-	-	-	-	-	1	0.0%
<b>2004-2012</b>	<b>8</b>	<b>17</b>	<b>41</b>	<b>88</b>	<b>29</b>	<b>334</b>	<b>41</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>14</b>	<b>3</b>	<b>577</b>	<b>20.0%</b>
<b>2013+</b>	<b>24</b>	<b>75</b>	<b>173</b>	<b>300</b>	<b>71</b>	<b>1,454</b>	<b>161</b>	<b>2</b>	<b>8</b>	<b>4</b>	<b>23</b>	<b>9</b>	<b>2,304</b>	<b>80.0%</b>
<b>Grand Total</b>	<b>32</b>	<b>92</b>	<b>214</b>	<b>388</b>	<b>100</b>	<b>1,788</b>	<b>202</b>	<b>3</b>	<b>9</b>	<b>4</b>	<b>37</b>	<b>12</b>	<b>2,881</b>	<b>100.0%</b>
	1.1%	3.2%	7.4%	13.5%	3.5%	62.1%	7.0%	0.1%	0.3%	0.1%	1.3%	0.4%	100.0%	



## Kentucky's Affordable Prepaid Tuition Member Payment Option Summary as of June 30, 2020

Contract Payment Type	Type of Contract												Total	
	Value Plan 1 Year	Value Plan 2 Years	Standard Plan 1 Year	Standard Plan 2 Years	Standard Plan 3 Years	Standard Plan 4 Years	Standard Plan 5 Years	Premium Plan 1 Year	Premium Plan 2 Years	Premium Plan 3 Years	Premium Plan 4 Years	Premium Plan 5 Years		
Lump Sum	9	25	119	151	33	740	84	1	5	4	19	6	1,196	41.5%
3-Year Monthly	2	14	17	20	6	104	15	-	-	-	2	-	180	6.3%
5-Year Monthly	2	6	14	30	6	149	21	1	2	-	4	4	239	8.3%
7-Year Monthly	4	15	25	84	25	333	38	-	-	-	9	1	534	18.5%
Monthly Extended	15	32	39	100	30	404	30	1	2	-	2	1	656	22.8%
Custom Monthly	-	-	-	3	-	58	14	-	-	-	1	-	76	2.6%
<b>Total</b>	<b>32</b>	<b>92</b>	<b>214</b>	<b>388</b>	<b>100</b>	<b>1,788</b>	<b>202</b>	<b>3</b>	<b>9</b>	<b>4</b>	<b>37</b>	<b>12</b>	<b>2,881</b>	<b>100.0%</b>
	1.1%	3.2%	7.4%	13.5%	3.5%	62.1%	7.0%	0.1%	0.3%	0.1%	1.3%	0.4%	100.0%	



## **SECTION F**

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### **METHODS AND ASSUMPTIONS**

# Kentucky's Affordable Prepaid Tuition Valuation Methods and Assumptions

**Assumed Rate of Investment Return/Discount Rate** – These rates in the table were provided by Graystone Consulting and based upon the Board adopted Glide Path (see Appendix A for more details). The assumed rate of investment return is gross of investment and administrative expenses.

Fiscal Year Ending:	Assumed Investment Return		
	2020	2021	2022
Assumed Rates of Return	N/A	3.30%	2.50%

The assumed rate of investment return for the Fiscal Year ending 2023 was 2.50%. The assumed rate of return is used as the discount rate for the determination of the present value of fund tuition payments, refunds and expenses. After fund depletion, a price inflation assumption is used as the discount rate. The assumed rate of price inflation for Fiscal Years ending 2024 and thereafter was 2.00%. We used future short-term forecasts of price inflation from different sources to determine the reasonableness of this assumptions, including forecasts from the CBO and Federal Reserve bank of Philadelphia.

**Assumed Rate of Tuition Increases:**

4-Year Universities – 4.75%  
2-Year Community Colleges – 4.75%

**Assumed Utilization Hours<sup>#</sup>:** It is assumed 92% of contracts who reach projected contract enrollment year (PCEY) on or after the valuation date will utilize 32 KAPT hours per year until they have exhausted all value or reached the end of their utilization period. Contracts with remaining value beyond the utilization period are assumed to refund eight years after their PCEY (maximum refundable value).

*# Liabilities are modeled assuming two payments per year for Tuition payouts (one at beginning of September and one at beginning of January).*

**Refunds:** It is assumed 8% of contracts with PCEY on or after the valuation date will not utilize any additional KAPT hours in the future and will continue holding their contract until eight years after PCEY, at which time they will be issued a refund.

**Past Due Refunds:** Those who are already eight years past their PCEY and have not already refunded are assumed to continue holding their contracts until the Program closure in 2030 and then will be issued a refund.

**Election of Program Changes:** None.

**Election of Change of Beneficiary:** None.

**Liability Adjustments for Investment and Administrative Expenses:** There is a 0.2% expense based upon the Market Value of Assets for Investment Expenses. Administrative expenses are assumed to be \$190,000 in the next year and steadily decrease to \$75,000 in 2030 (the final year of the Program).

**Contract Terms:** No changes in contract terms are assumed once initiated.

**Annual Payout Values for the 2020/2021 Academic Year (based on usage of 32 KAPT hours):**

Value Plan – \$5,984  
Standard Plan – \$12,484  
Premium Plan:

2001-2002 KAPT Enrollment – \$39,513  
2002-2003 KAPT Enrollment – \$43,212  
2004-2005 KAPT Enrollment – \$36,461



## Kentucky's Affordable Prepaid Tuition Valuation Methods and Assumptions

**Cancellations:** It is assumed contracts which have not yet reached their PCEY will cancel and refund based upon the rates below. It is assumed the amount refunded equals the amount of money the contract has paid into the Program towards their contract.

Years Since Purchase	Contract Payment Plan					
	Lump-Sum	36 Monthly Payments	60 Monthly Payments	84 Monthly Payments	Extended Payments	Custom Payments
0	1.50%	3.00%	5.00%	6.00%	8.00%	8.00%
1	1.00%	2.00%	4.00%	4.00%	7.00%	7.00%
2	0.75%	1.00%	3.00%	3.00%	5.00%	5.00%
3	0.75%	1.00%	2.00%	2.00%	4.00%	4.00%
4	0.50%	0.75%	1.00%	1.00%	3.00%	3.00%
5	0.50%	0.75%	0.75%	1.00%	2.00%	2.00%
6	0.50%	0.75%	0.75%	1.00%	1.00%	1.00%
7+	0.50%	0.75%	0.75%	0.75%	0.75%	0.75%

The assumptions were adopted by and provided by the Board either through Staff or through the prior Actuary's valuation report. Where the application of certain assumptions in the prior valuation was not completely clear (such as timing of refunds for participants more than two years past the expected utilization period), we worked with Staff to determine a clear application and/or showed a range of results.

We have reviewed the assumptions for reasonableness and believe the rationale for the assumptions is based on past Program experience (for demographic assumptions) or future expectations (for economic assumptions). We believe the assumptions are reasonable.

## **SECTION G**

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### **PROJECTION RESULTS**

## Kentucky's Affordable Prepaid Tuition Sensitivity Testing Results

The actuarial assumptions regarding future increases in tuition costs and fees and the future rate of investment return were adopted by KAPT. In our opinion, the adopted assumptions are reasonable for the purpose of the measurement. However, no one knows with certainty what the future holds with respect to economic and other contingencies. For example, while it is assumed that the assets of the Program will earn 3.30% gross of investment expenses during the 2021 Fiscal Year, actual return is expected to vary from year to year. Therefore, we have projected the Program's results under alternative assumptions for future investment income and tuition increases, as follows:

<b><u>Pg.</u></b>	<b><u>Description</u></b>
21	Current valuation assumptions – Projection based upon the valuation assumptions and the current Program assets plus the deficit of \$34.0 million as a lump-sum contribution to the Program as of the valuation date to display solvency for the remainder of the Program.
22	Current valuation assumptions – Projection based upon the valuation assumptions and current Program assets for computation of the depletion date.
23	The investment return assumption is 200 basis points higher than assumed in each of the next 4 years.
24	The investment return assumption is 200 basis points lower than assumed in each of the next 4 years.
25	Tuition increases are 100 basis points higher in each future year than assumed.
26	Tuition increases are 100 basis points lower in each future year than assumed.
27	Contracts which, as of the valuation date, are more than eight years past their Projected College Entrance Year (PCEY) but have not refunded yet are assumed to refund immediately in the next fiscal year.
28	Contracts once beyond the Projected College Entrance Year (PCEY) are assumed to not refund their contracts until Program closure in 2030.

The summary of the impact of each of these scenarios on the principal valuation results is presented on the following page. See pages 21 through 29 for detailed projection results of each scenario.



## Kentucky's Affordable Prepaid Tuition Sensitivity Testing Results

	Valuation Results Pages 21 & 22	Plus 200 Basis Points For Next 4 years Page 23	Minus 200 Basis Points For Next 4 years Page 24	Assumed Tuition Increases +100 Basis Points Page 25	Assumed Tuition Increases -100 Basis Points Page 26	Assuming All Maximized Refunds Paid Next Fiscal Year Page 27	Assuming All Maximized Refunds Paid Upon Program Closure Page 28
Assumed Investment Return in Fiscal Year Ending							
2021	3.30%	5.30%	1.30%	3.30%	3.30%	3.30%	3.30%
2022	2.50%	4.50%	0.50%	2.50%	2.50%	2.50%	2.50%
2023	2.50%	4.50%	0.50%	2.50%	2.50%	2.50%	2.50%
2024	2.00%	4.00%	0.00%	2.00%	2.00%	2.00%	2.00%
2025	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
2026	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
2027+	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Assumed Tuition Increases	4.75%/4.75%	4.75%/4.75%	4.75%/4.75%	5.75%/5.75%	3.75%/3.75%	4.75%/4.75%	4.75%/4.75%
Year Insolvent	2024	2024	2024	2024	2024	2023	2030
(Increase)/Decrease in Deficit (\$ in Millions)		\$4.1	(\$3.6)	(\$1.2)	\$2.1	(\$0.9)	\$3.2

# Kentucky's Affordable Prepaid Tuition

## June 30, 2020 Projection Based on Valuation Results

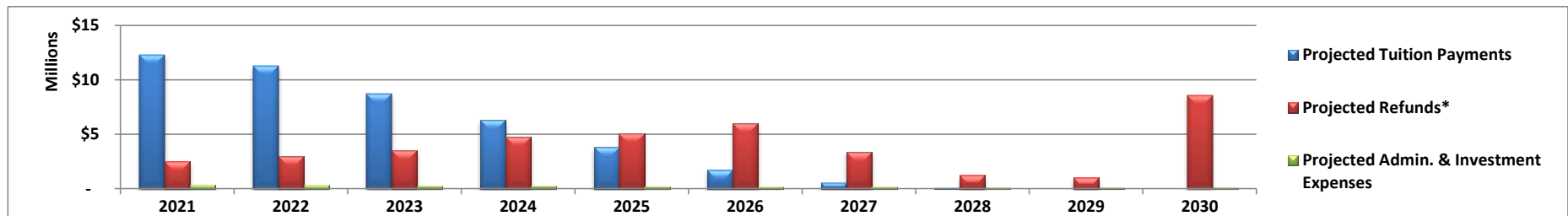
### Projection of Lump-Sum Contribution for Program Solvency

Inputs		
% of BOY Assets:		
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Valuation Results	
Present Value of Future Tuition and Fees	\$ 78,804,442
Present Value of Future Contract Payments	\$ 116,764
June 30, 2020 Assets	\$ 44,718,271
(Margin)/Deficit	\$ 33,969,407
Funded Status	56.9%

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KTCES	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Solvent Market Value of Assets End of Fiscal Year	Lump-Sum Contribution
2020									\$ 44,718,271	\$ 33,969,408
2021	3.30%	N/A	N/A	\$ 78,687,679	\$ 12,308,719	\$ 2,546,445	\$ 368,544	\$ 84,843	65,829,555	
2022	2.50%	4.75%	4.75%	65,829,555	11,241,575	3,013,243	308,881	30,117	52,714,046	
2023	2.50%	4.75%	4.75%	52,714,046	8,718,182	3,523,950	269,873	4,808	41,332,753	
2024	2.00%	4.75%	4.75%	41,332,753	6,335,625	4,770,043	234,332	-	30,685,299	
2025	2.00%	4.75%	4.75%	30,685,299	3,821,034	5,081,505	200,259	-	22,092,763	
2026	2.00%	4.75%	4.75%	22,092,763	1,697,776	6,015,852	170,297	-	14,566,464	
2027	2.00%	4.75%	4.75%	14,566,464	564,723	3,359,321	142,466	-	10,748,873	
2028	2.00%	4.75%	4.75%	10,748,873	62,429	1,227,985	122,053	-	9,537,097	
2029	2.00%	4.75%	4.75%	9,537,097	-	1,041,759	106,852	-	8,567,781	
2030	2.00%	4.75%	4.75%	8,567,781	-	8,560,757	92,136	-	0	

\* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



# Kentucky's Affordable Prepaid Tuition

## June 30, 2020 Projection Based on Valuation Results

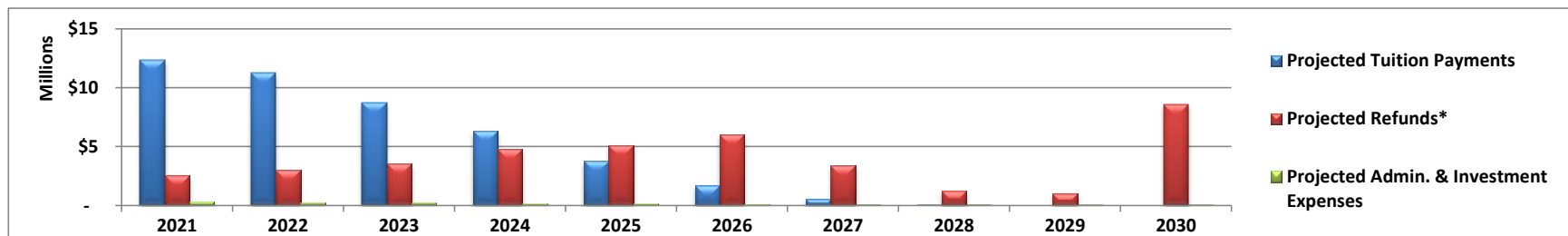
### Projection of Program Depletion

Inputs		
	% of BOY Assets:	
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Solvency Results	
Year Insolvent	2024

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KTCs	Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2020									\$ 44,718,271
2021	3.30%	N/A	N/A	\$ 44,718,271	\$ 12,308,719	\$ 2,546,445	\$ 300,605	\$ 84,843	30,808,210
2022	2.50%	4.75%	4.75%	30,808,210	11,241,575	3,013,243	238,839	30,117	16,888,082
2023	2.50%	4.75%	4.75%	16,888,082	8,718,182	3,523,950	198,221	4,808	4,683,684
2024	2.00%	4.75%	4.75%	4,683,684	6,335,625	4,770,043	161,034	-	(6,622,723)
2025	2.00%	4.75%	4.75%	(6,622,723)	3,821,034	5,081,505	138,889	-	(15,899,437)
2026	2.00%	4.75%	4.75%	(15,899,437)	1,697,776	6,015,852	126,111	-	(24,140,954)
2027	2.00%	4.75%	4.75%	(24,140,954)	564,723	3,359,321	113,333	-	(28,703,270)
2028	2.00%	4.75%	4.75%	(28,703,270)	62,429	1,227,985	100,556	-	(30,682,377)
2029	2.00%	4.75%	4.75%	(30,682,377)	-	1,041,759	87,778	-	(32,436,819)
2030	2.00%	4.75%	4.75%	(32,436,819)	-	8,560,757	75,000	-	(41,807,385)

\* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Enrollment Year (time at which contract value is maximized).



# Kentucky's Affordable Prepaid Tuition

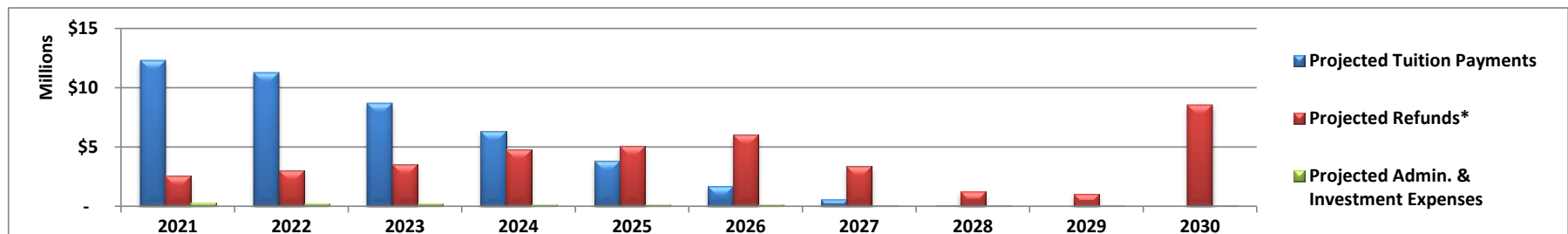
## June 30, 2020 Projection Based on Investment Return +200 Basis Points for 4 Years

Inputs		
% of BOY Assets:		
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Solvency Results	
Year Insolvent	2024

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2020									\$ 44,718,271
2021	5.30%	N/A	N/A	\$ 44,718,271	\$ 12,308,719	\$ 2,546,445	\$ 300,808	\$ 84,843	31,513,010
2022	4.50%	4.75%	4.75%	31,513,010	11,241,575	3,013,243	240,248	30,117	18,059,073
2023	4.50%	4.75%	4.75%	18,059,073	8,718,182	3,523,950	200,563	4,808	6,090,902
2024	4.00%	4.75%	4.75%	6,090,902	6,335,625	4,770,043	163,848	-	(5,200,993)
2025	2.00%	4.75%	4.75%	(5,200,993)	3,821,034	5,081,505	138,889	-	(14,449,273)
2026	2.00%	4.75%	4.75%	(14,449,273)	1,697,776	6,015,852	126,111	-	(22,661,787)
2027	2.00%	4.75%	4.75%	(22,661,787)	564,723	3,359,321	113,333	-	(27,194,519)
2028	2.00%	4.75%	4.75%	(27,194,519)	62,429	1,227,985	100,556	-	(29,143,451)
2029	2.00%	4.75%	4.75%	(29,143,451)	-	1,041,759	87,778	-	(30,867,114)
2030	2.00%	4.75%	4.75%	(30,867,114)	-	8,560,757	75,000	-	(40,206,286)

\* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



# Kentucky's Affordable Prepaid Tuition

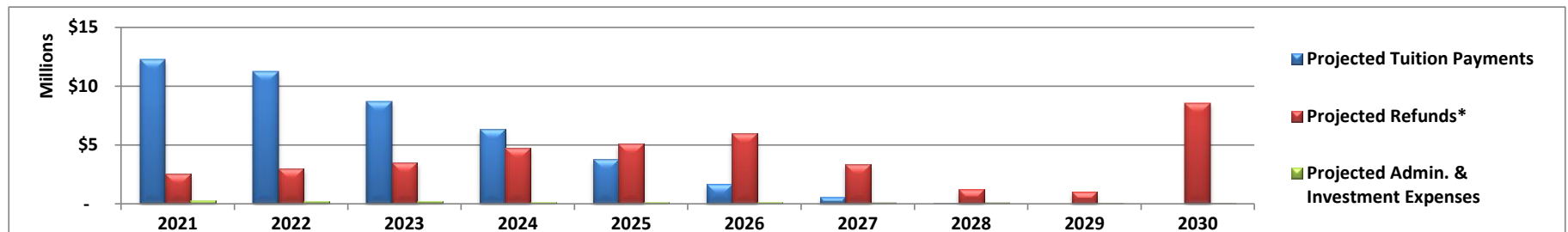
## June 30, 2020 Projection Based on Investment Return -200 Basis Points for 4 Years

Inputs		
% of BOY Assets:		
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Solvency Results	
Year Insolvent	2024

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2020									\$ 44,718,271
2021	1.30%	N/A	N/A	\$ 44,718,271	\$ 12,308,719	\$ 2,546,445	\$ 300,400	\$ 84,843	30,104,499
2022	0.50%	4.75%	4.75%	30,104,499	11,241,575	3,013,243	237,431	30,117	15,747,399
2023	0.50%	4.75%	4.75%	15,747,399	8,718,182	3,523,950	195,939	4,808	3,354,554
2024	0.00%	4.75%	4.75%	3,354,554	6,335,625	4,770,043	158,376	-	(7,909,490)
2025	2.00%	4.75%	4.75%	(7,909,490)	3,821,034	5,081,505	138,889	-	(17,211,940)
2026	2.00%	4.75%	4.75%	(17,211,940)	1,697,776	6,015,852	126,111	-	(25,479,707)
2027	2.00%	4.75%	4.75%	(25,479,707)	564,723	3,359,321	113,333	-	(30,068,798)
2028	2.00%	4.75%	4.75%	(30,068,798)	62,429	1,227,985	100,556	-	(32,075,215)
2029	2.00%	4.75%	4.75%	(32,075,215)	-	1,041,759	87,778	-	(33,857,514)
2030	2.00%	4.75%	4.75%	(33,857,514)	-	8,560,757	75,000	-	(43,256,494)

\* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



# Kentucky's Affordable Prepaid Tuition

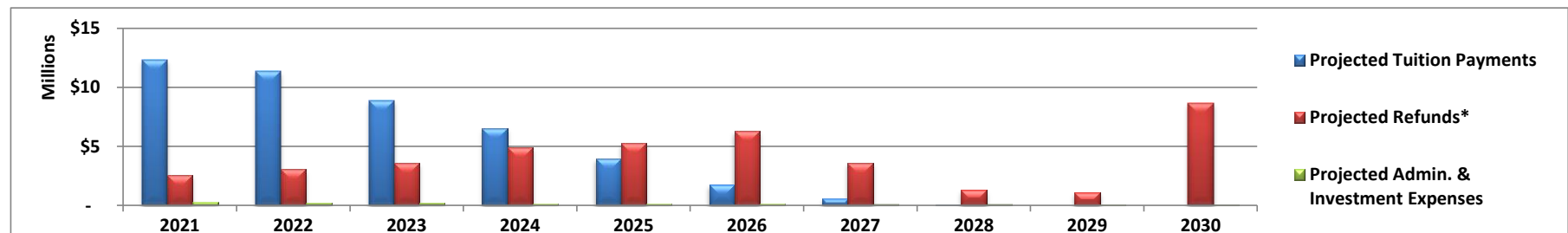
## June 30, 2020 Projection Based on Tuition Increases +100 Basis Points

Inputs		
% of BOY Assets:		
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Solvency Results	
Year Insolvent	2024

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2020									\$ 44,718,271
2021	3.30%	N/A	N/A	\$ 44,718,271	\$ 12,308,719	\$ 2,546,445	\$ 300,605	\$ 84,843	30,808,210
2022	2.50%	5.75%	5.75%	30,808,210	11,348,893	3,041,790	238,839	30,117	16,750,080
2023	2.50%	5.75%	5.75%	16,750,080	8,885,433	3,591,437	197,945	4,808	4,304,155
2024	2.00%	5.75%	5.75%	4,304,155	6,518,813	4,907,956	160,275	-	(7,333,987)
2025	2.00%	5.75%	5.75%	(7,333,987)	3,969,048	5,278,337	138,889	-	(16,973,702)
2026	2.00%	5.75%	5.75%	(16,973,702)	1,780,378	6,308,534	126,111	-	(25,616,003)
2027	2.00%	5.75%	5.75%	(25,616,003)	597,853	3,556,383	113,333	-	(30,440,417)
2028	2.00%	5.75%	5.75%	(30,440,417)	66,723	1,312,425	100,556	-	(32,543,899)
2029	2.00%	5.75%	5.75%	(32,543,899)	-	1,124,019	87,778	-	(34,418,652)
2030	2.00%	5.75%	5.75%	(34,418,652)	-	8,635,645	75,000	-	(43,904,489)

\* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



# Kentucky's Affordable Prepaid Tuition

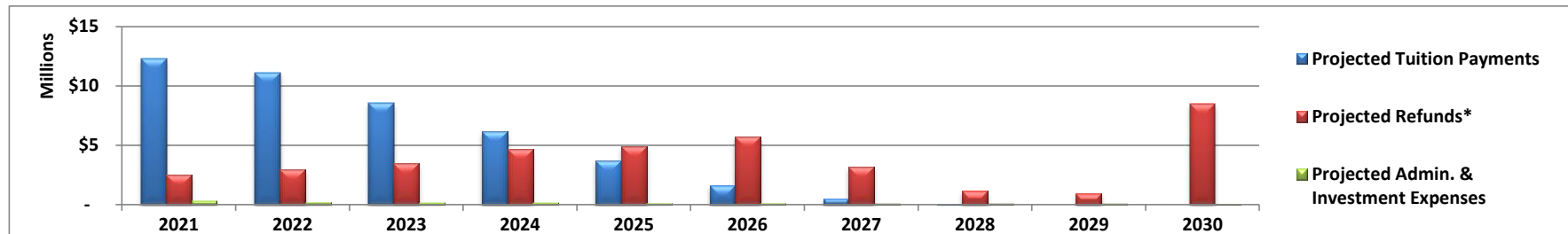
## June 30, 2020 Projection Based on Tuition Increases -100 Basis Points

Inputs		
% of BOY Assets:		
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Solvency Results	
Year Insolvent	2024

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2020				\$ 44,718,271	\$ 12,308,719	\$ 2,546,445	\$ 300,605	\$ 84,843	\$ 44,718,271
2021	3.30%	N/A	N/A	\$ 30,808,210	\$ 11,134,257	\$ 2,984,697	\$ 238,839	\$ 30,117	\$ 17,026,084
2022	2.50%	3.75%	3.75%	17,026,084	8,552,518	3,457,104	198,497	4,808	5,060,950
2023	2.50%	3.75%	3.75%	5,060,950	6,155,903	4,634,739	161,789	-	(5,919,909)
2024	2.00%	3.75%	3.75%	(5,919,909)	3,677,199	4,890,231	138,889	-	(14,843,639)
2025	2.00%	3.75%	3.75%	(14,843,639)	1,618,270	5,734,136	126,111	-	(22,698,953)
2026	2.00%	3.75%	3.75%	(22,698,953)	533,139	3,171,443	113,333	-	(27,010,674)
2027	2.00%	3.75%	3.75%	(27,010,674)	58,375	1,148,246	100,556	-	(28,871,287)
2028	2.00%	3.75%	3.75%	(28,871,287)	-	964,815	87,778	-	(30,511,797)
2029	2.00%	3.75%	3.75%	(30,511,797)	-	8,491,376	75,000	-	(39,773,790)

\* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



# Kentucky's Affordable Prepaid Tuition

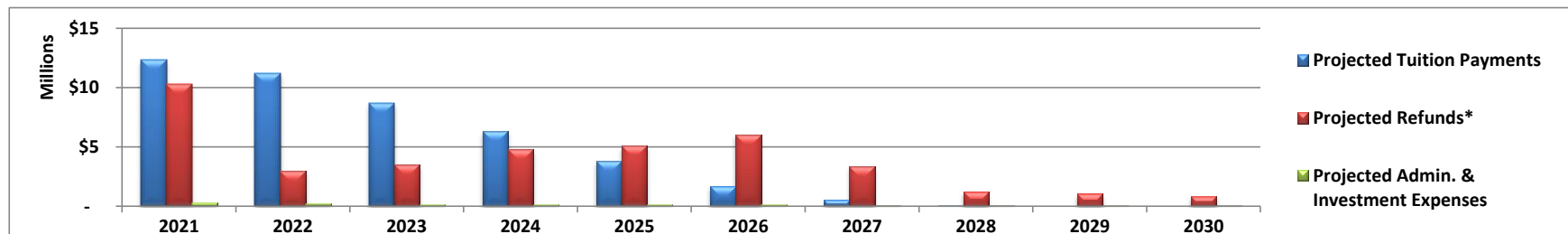
## June 30, 2020 Projection Based on Maximized Refunds Paid Next Fiscal Year

Inputs		
% of BOY Assets:		
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Solvency Results	
Year Insolvent	2023

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2020									\$ 44,718,271
2021	3.30%	N/A	N/A	\$ 44,718,271	\$ 12,308,719	\$ 10,268,353	\$ 300,605	\$ 84,843	22,959,580
2022	2.50%	4.75%	4.75%	22,959,580	11,241,575	3,013,243	223,141	30,117	8,859,129
2023	2.50%	4.75%	4.75%	8,859,129	8,718,182	3,523,950	182,163	4,808	(3,529,735)
2024	2.00%	4.75%	4.75%	(3,529,735)	6,335,625	4,770,043	151,667	-	(14,990,950)
2025	2.00%	4.75%	4.75%	(14,990,950)	3,821,034	5,081,505	138,889	-	(24,435,029)
2026	2.00%	4.75%	4.75%	(24,435,029)	1,697,776	6,015,852	126,111	-	(32,847,257)
2027	2.00%	4.75%	4.75%	(32,847,257)	564,723	3,359,321	113,333	-	(37,583,699)
2028	2.00%	4.75%	4.75%	(37,583,699)	62,429	1,227,985	100,556	-	(39,740,415)
2029	2.00%	4.75%	4.75%	(39,740,415)	-	1,041,759	87,778	-	(41,676,017)
2030	2.00%	4.75%	4.75%	(41,676,017)	-	838,849	75,000	-	(43,432,495)

\* Assumed all maximized refunds as of 6/30/2019 are paid immediately in the next Fiscal Year (2020). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).





# Kentucky's Affordable Prepaid Tuition

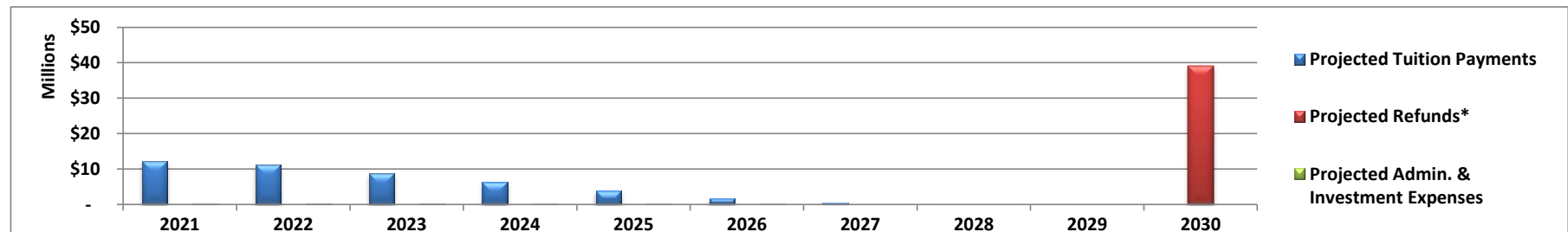
## June 30, 2020 Projection Based on Maximized Refunds Paid Upon Program Closure

Inputs		
% of BOY Assets:		
Investment Expenses:	0.20%	
Admin Expenses:	2020:	2030:
	\$190,000	\$75,000
Closure of Program:	2030	

Solvency Results	
Year Insolvent	2030

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin. & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2020									\$ 44,718,271
2021	3.30%	N/A	N/A	\$ 44,718,271	\$ 12,308,719	\$ 53,787	\$ 300,605	\$ 84,843	33,341,774
2022	2.50%	4.75%	4.75%	33,341,774	11,241,575	22,966	243,906	30,117	22,507,357
2023	2.50%	4.75%	4.75%	22,507,357	8,718,182	6,095	209,459	4,808	13,993,710
2024	2.00%	4.75%	4.75%	13,993,710	6,335,625	272	179,654	-	7,672,009
2025	2.00%	4.75%	4.75%	7,672,009	3,821,034	194	154,233	-	3,797,649
2026	2.00%	4.75%	4.75%	3,797,649	1,697,776	136	133,706	-	2,018,078
2027	2.00%	4.75%	4.75%	2,018,078	564,723	135	117,369	-	1,367,533
2028	2.00%	4.75%	4.75%	1,367,533	62,429	134	103,291	-	1,227,169
2029	2.00%	4.75%	4.75%	1,227,169	-	133	90,232	-	1,160,447
2030	2.00%	4.75%	4.75%	1,160,447	-	39,057,009	77,321	-	(38,340,726)

\* Assumed all refunds after Projected Contract Enrollment Year are paid at closure of Program (2030).



## **APPENDIX A**

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### **GLIDE PATH**

# Kentucky's Affordable Prepaid Tuition Glide Path



## Allocations and Expected Performance

	Secular Forecasts		Strategic Forecasts		Source: Global Investment Committee Feb 28, 2019. Annual return is the forecasted arithmetic average annual return. Annualized volatility, skewness and kurtosis estimates are based on the longest available data through Feb 28, 2019. Strategic Forecasts are calibrated to a 7 year investment horizon. Secular Forecasts are calibrated to a 20+ year horizon. Forecast estimates are for illustrative purposes only, are based on proprietary models and are not indicative of the future performance of any specific investment, index or asset class. Actual performance may be more or less than the estimates shown in this table. Estimates of future performance are based on assumptions that may not be realized.  * The GIC applies significant statistical adjustments to correct for distortions typically associated with hedge fund, private equity and private real estate index returns. For more information, see the 'Return Series Adjustments' section on Appendix page 18.  Investor Suitability: Morgan Stanley recommends that investors independently evaluate each asset class, investment style, issuer, security, instrument or strategy discussed. Legal, accounting and tax restrictions, transaction costs and changes to any assumptions may significantly affect the economics and results of any investment. Investors should consult their own tax, legal or other advisors to determine suitability for their specific circumstances. Investments in private funds (including hedge funds, managed-futures funds and private-equity funds) are speculative and include a high degree of risk.  All figures annualized. Asset class returns are assumed to be serially independent. In some cases, the asset classes in the foregoing presentation are aggregations of the asset classes listed above, as per the mapping detailed on page 2 of the Appendix. Assumptions for aggregated asset class are simply aggregates of the above assumptions with weights as per the Granular Portfolio Allocations on Page 1 of the Appendix and Model Allocations on page 3 of the Appendix respectively. Please refer to the end of this Appendix for important disclosures about this presentation.
	Return	Volatility	Return	Volatility	
<b>Cash &amp; Bonds</b>					
Ultra-Short Fixed Income	2.9%	0.9%	2.3%	0.9%	
Short Term Fixed Income	3.3%	1.4%	2.7%	1.4%	
US Fixed Income	3.9%	5.3%	3.4%	5.3%	
International Fixed Income	3.6%	4.1%	0.5%	4.1%	
Inflation-Linked Securities	4.9%	7.3%	1.7%	7.3%	
High Yield	5.8%	8.2%	3.6%	8.2%	
Emerging Markets Fixed Income	7.2%	12.1%	7.1%	12.1%	
Convertible Bond	7.1%	10.9%	5.5%	10.9%	
<b>Equities</b>					
US Large Cap Growth Equity	8.6%	16.8%	5.2%	15.8%	
US Large Cap Value Equity	8.9%	14.4%	6.1%	13.7%	
US Mid Cap Growth Equity	9.7%	19.8%	4.1%	18.4%	
US Mid Cap Value Equity	9.7%	15.5%	7.0%	14.8%	
US Small Cap Growth Equity	8.5%	22.3%	7.0%	21.0%	
US Small Cap Value Equity	9.7%	17.2%	8.7%	16.7%	
Europe Equity	8.2%	17.2%	7.4%	16.5%	
Japan Equity	8.1%	20.6%	8.0%	19.0%	
Asia Pacific ex Japan Equity	11.0%	22.9%	8.1%	21.3%	
Emerging Markets Equity	11.0%	22.5%	9.5%	21.0%	
<b>Non-Traditional Asset Classes*</b>					
Real Estate Investment Trusts	8.1%	16.7%	7.7%	16.7%	
Commodities	5.0%	15.9%	4.3%	15.9%	
Master Limited Partnerships	8.3%	16.6%	8.4%	16.6%	
Natural Resources	11.3%	19.9%	7.7%	19.9%	
Absolute Return Assets	5.3%	3.9%	3.8%	3.9%	
Equity Hedge Assets	5.8%	8.2%	4.5%	8.2%	
Equity Return Assets	7.0%	8.1%	5.1%	8.1%	
Private Credit	5.9%	6.9%	5.5%	6.9%	
Private Equity	13.6%	13.2%	9.7%	13.2%	
Private Real Estate Funds	10.0%	16.8%	8.4%	16.8%	
Core Private Real Estate Funds	6.8%	9.5%	7.6%	9.5%	

Asset Classes	Recommended Glide Path								
	2018	2019	2020	2021	2022	2023	2024	2025	
Large Cap US Equity	30	30	24	12	0	0	0	0	
Small/Mid Cap US Equity	9	9	6	4	0	0	0	0	
International Equity	9	9	6	3	0	0	0	0	
US Fixed Income	44	44	33	11	0	0	0	0	
TIPS	7	7	6	0	0	0	0	0	
Short Duration US Fixed Income	0	0	15	40	50	0	0	0	
Cash Equivalents	1	1	10	30	50	0	0	0	
<b>Totals</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>0</b>	
2019 Annual Returns (%)		<b>4.60</b>	<b>4.10</b>	<b>3.30</b>	<b>2.50</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	
2019 Standard Deviations (%)		<b>7.20</b>	<b>5.50</b>	<b>2.80</b>	<b>0.09</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	
Change in Expected Return			<b>-11%</b>	<b>-20%</b>	<b>-24%</b>	<b>-100%</b>	<b>0%</b>	<b>0%</b>	
Change in Expected Risk			<b>-24%</b>	<b>-49%</b>	<b>-97%</b>	<b>-100%</b>	<b>0%</b>	<b>0%</b>	

The projections and other information generated by the Morgan Stanley Asset Allocation Center regarding likelihood of various investment outcomes are hypothetical in nature, they do not reflect actual investment results and are not a guarantee of future results.

From May 9, 2019 Glide Path Presentation from Graystone Consulting.



## **APPENDIX B**

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### **DISCUSSION OF SELLING NEW CONTRACTS**

# Kentucky's Affordable Prepaid Tuition Discussion on Selling New Contracts

## Background

The Board must annually consider the selling of new contracts. Contracts were last sold in 2004.

## Long-Term Growth of Contracts

Under the original Program, Participants could leave their contracts in the Program (unused) for as long as they desired and the contract value would continue to grow at the rate of the increase in tuition growth (primarily at the University of Kentucky). Since pricing is based on a present value of expected payments, appropriate pricing under a Program design, such as this, cannot be determined when the value of the contract can grow forever and the rate of increase in value (assumed tuition increases) exceeds the discount rate (assumed rate of investment return).

However, the legislated Program changes in 2014 limited the growth of unused contracts to six years beyond the expected utilization period. Legislated changes in 2019 modified that limit to eight years past the Projected College Entrance year (PCEY). Under either the 2014 limit or the 2019 limit, an appropriate pricing can be determined. If the limit is changed in the future, we would need to assess whether appropriate prices could still be determined.

## Separation of Programs

We understand that if the Board were to re-open sales of new contracts, a separate Program would be created (such as a KAPT II). We further understand that contracts under the new Program would not be backed by the full faith and credit of the Commonwealth and the assets of the new Program would not be used to pay the benefits of the old Program. We further understand that there would be a time limit on the growth of the contract value (similar or the same as under the current KAPT Program).

## Development of Pricing

Under these parameters, we believe that appropriate pricing can be developed. The pricing would be dependent on the following:

- The age of the participant at contract purchase;
- Expected matriculation date;
- Assumptions regarding:
  - Rates of utilization
  - Rates of future tuition increases (or growth of contract value)
  - Rates of assumed investment return
  - Timing of expected tuition payments (or refunds)
  - Rates of cancellation
  - Rates of administrative expenses paid by the contract holder
- Risk margin; and
- Board's funding and pricing policy/guidelines.

# Kentucky's Affordable Prepaid Tuition

## Discussion on Selling New Contracts (Continued)

### Important Considerations

#### Risk Margins

Risk margins are an important aspect of contract pricing. Essentially the contracts are an insurance policy with one-time pricing. Pricing is traditionally built using assumptions developed on average expectations. Meaning that half the time, the contracts are underpriced and that half the time contracts are overpriced. This type of pricing can work when only a short period of time is covered and assumptions can be continually reviewed and contracts can be repriced (such as automobile insurance). In the case of a prepaid tuition plan the time frame between purchase and benefit payment can be as long as 25 years. In addition, short-term risks (for participants who are older at contract purchase) may place significant pressure on cash flow for Programs that are new or smaller. By recognizing these risks, Programs can build a margin into the pricing to manage these risks.

There are two types of Risk Margins that we have seen utilized in contract pricing: implicit risk margin and explicit risk margin. Implicit risk margins are created when pricing assumptions are more conservative than average expectations. For example, a Program may believe that the long term average increase in tuition will be 6%, but include pricing based on increases of 10% for the next six years, 7% for the following six years and 4% for the remaining six years (assuming 18 years for complete payment of benefits).

Another example of an implicit risk premium would be if the long term investment return expectation is 5%, but pricing assumed 2% for the next six years, 4% for the six years after that and 7% for the remaining six years (assuming 18 years for complete payment of benefits).

Explicit risk margins are created when pricing is increased by a specific factor, such as 5%, as the final step.

We have assisted other pre-paid Programs in developing funding policies that connect the risk margin in the pricing to the funded status of the Program (and the relativity to the Board's funding target). For example, an initial risk premium could be established of 3% explicit and 3% implicit. In addition, a funded status target might be established of 115%. Then, in years when the funded target is exceeded by 200 basis points, the risk margin is reduced. Conversely, if the funded target missed by 200 basis points, the risk margin would be increased.

#### Program Size

There is a common misconception that a prepaid tuition Program must have a certain level of participation to be viable. While we do not agree with this sentiment, we do believe that the Program size has implications for the Board to consider. One consideration is the funding target (or risk reserve). Because the Program is basically insurance, the size of the Program is the risk pool. The larger the pool, the more the Program is spreading risk and therefore the smaller the risk reserve will need to be (as a percent of liabilities). Conversely, the smaller the risk pool, the larger the risk reserve needs to be in order to keep the Program healthy.

## **Kentucky's Affordable Prepaid Tuition Discussion on Selling New Contracts (Concluded)**

Program size is also a consideration when determining if the Program is an appropriate use of resources. This is a policy decision, not an actuarial decision. However, the issue is essentially, the expected size of the Program (once it matures) sufficient to justify allocating Commonwealth resources to the maintenance of the Program. A side concern is whether or not the Program is being utilized by the intended population.

### **Final Thoughts**

Should the Board wish to explore opening a new Program and selling new contracts, we would be happy to work with the Board to develop a funding policy, initial pricing assumptions and contract pricing.