

February 27, 2018

Mr. David Eager  
Interim Executive Director  
Kentucky Retirement Systems  
1260 Louisville Road  
Frankfort, KY 40601

**Re: Actuarial Analysis of Proposed Pension Reform Legislation SB 1 (BR 427) and its Financial Impact on KERS and CERS Non-Hazardous Systems**

Dear Mr. Eager:

We have reviewed and analyzed the summary of proposed changes in the proposed pension reform legislation SB 1 (BR 427). The purpose of this letter is to communicate to the fiscal analysis of this proposed legislation on the retirement and insurance funds maintained by the Kentucky Retirement System (KRS) as it applies to the Non-Hazardous Systems (i.e. KERS Non-Hazardous and CERS Non-Hazardous).

### **Principal Provisions of Proposed Legislation**

Exhibit 1 provides a summary of the provisions in the pension reform bill that have a fiscal impact on the retirement system. In summary, the Tier 3 Hybrid Plan will be the default plan for providing benefits to future members, but beginning January 1, 2019 there will be a new optional defined contribution plan that members may make a one-time irrevocable election to earn future retirement benefits in the defined contribution plan, in lieu of the defined benefit plan. The amortization of the unfunded actuarial accrued liability will be determined on a level-dollar basis, but the amortization period will remain unchanged and continue to decrease by one year each future year. Finally, active Tier I members who became participants on or after July 1, 2003 (but prior to September 1, 2008) will contribute the lesser of 3% of pay and their normal cost to the Health Insurance Funds.

### **Summary of Cost Impact**

Section 1 includes exhibits that show a comparison of the fiscal impact of the proposed legislation to the current plan over the next 35 years. Specifically, these exhibits show the projected impact on the: (1) unfunded actuarial accrued liability, (2) funded ratio, (3) total employer contribution dollars, and (4) projected composite employer contribution rates, for each of the funds (retirement and health insurance). Section 2 provides additional detail regarding each projection under the current plan and Section 3 provides similar information under the proposed legislation. Section 4 provides the fiscal impact under an alternative assumption scenario for the KERS Non-Hazardous System that assumes a decreasing active membership count consistent with recent trends. Below are comments regarding the cost projection for each fund.

#### KERS Non-Hazardous Retirement Fund

The changes in the benefit provisions have a minimal impact on the change in the actuarial accrued liability (and unfunded actuarial accrued liability) as of June 30, 2017. The change in the interest crediting rate for the Tier 3 hybrid plan will slightly decrease the ongoing liability and cost for this benefit tier. However, the slight decrease in the employer cost is partially offset by the employer cost for members who elect to earn benefits in the optional defined contribution plan. As described later in this letter, we project the long-term cost of this defined contribution plan to be 3.5% of payroll, which is slightly higher than the cost of providing benefits in the Tier 3 hybrid plan. As Tier 3 and defined contribution plan members become a larger percentage of the active population, this will gradually have a larger impact on total employer contributions.

Additionally, some of the differences in the projected unfunded liability and projected employer contributions compared to the baseline projection of the current plan are due to slight differences in applying contributions that are determined biannually and as a percentage of expected payroll (i.e. the baseline projections) and applying contributions that are determined annually and as both a percentage of payroll (i.e. the normal cost rate in the proposed legislation projections) and a dollar amount (i.e. the amortization of the unfunded actuarial accrued liability in the proposed legislation projections).

#### KERS Non-Hazardous Insurance Fund

The changes in the benefit provisions have a minimal impact on the change in the actuarial accrued liability (and unfunded actuarial accrued liability). The initial reduction in the projected required employer contributions is due to the increase in the Tier I member contribution requirement to the health insurance fund. The slight differences in the projected unfunded liability and projected employer contributions compared to baseline projection of the current plan are not significant and mostly due to nuances in applying contributions that are determined biannually and as a percentage of expected payroll (i.e. the baseline projection) and applying contributions that are determined annually and as both a percentage of payroll (i.e. the normal cost rate in the proposed legislation projections) and a dollar amount (i.e. the amortization of the unfunded actuarial accrued liability in the proposed legislation projections). *For business making decisions stakeholders should consider the proposed increase to certain Tier I member contributions to result in a cost savings for the participating employers, but there are not any changes to the benefits provided by the health insurance funds that have a fiscal impact.*

#### CERS Non-Hazardous Retirement Fund

Similar to the KERS non-hazardous retirement fund, there is minimal change in the actuarial accrued liability (and unfunded actuarial accrued liability) as of June 30, 2017 due to changes in the benefit provisions. The change in the interest crediting rate for the Tier 3 hybrid plan will slightly decrease the ongoing liability and cost for this benefit tier. However, the slight decrease in the employer cost is offset by the employer cost for members who elect to earn benefits in the optional defined contribution plan. As described later in this letter, we project the long-term cost of this defined

contribution plan to be 3.5% of payroll, which is slightly higher than the cost of providing benefits in the Tier 3 hybrid plan. As Tier 3 and defined contribution plan members become a larger percentage of the active population, this will gradually have a larger impact on total employer contributions.

The projected employer contribution requirements under the proposed legislation become larger than the projected cost in baseline projection beginning with the fiscal year 2020/2021 and through the fiscal year 2029/2030 due to the use of a level-dollar amortization (versus a 2% payroll growth assumption). However, this effect is reversed after fiscal year 2029/2030.

#### CERS Non-Hazardous Insurance Fund

The change in the benefit provisions had a minimal impact on the change in the actuarial accrued liability (and unfunded actuarial accrued liability). The initial savings in the employer contribution requirement is due to the increase in the Tier I member contribution requirement to the health insurance fund. This decrease in the projected employer contribution requirement is partially offset due to the use of a level-dollar amortization (versus a 2% payroll growth assumption). This effect is reversed around fiscal year 2029/2030.

#### **GRS Comments on Proposed Legislation**

Below are comments on certain provisions in the proposed legislation.

#### New Optional Defined Contribution Plan

The proposed legislation would provide a new optional defined contribution plan to members in the KERS and CERS nonhazardous retirement systems that would allow all current and future members a one-time irrevocable election to earn future retirement benefits in a defined contribution plan that provides a 4.00% of pay employer contribution (the member contribution requirement will remain unchanged at 5.00% of pay). This new defined contribution plan will not decrease the employer cost, but will shift the risks, such as investment risk and longevity risk, from the participating employers to the members with respect to the members earning benefits in the defined contribution plan.

For the fiscal impact analysis, we project the long-term cost of this defined contribution plan to be 3.5% of payroll, after reflecting the effects of forfeitures in the employer matching contributions when employees separate from service prior to becoming vested.

The proposed legislation also allows all current members the opportunity to make a one-time irrevocable election to freeze their benefits earning in the defined benefit plan and earn future benefits in the new defined contribution plan. There are a couple policy issues that the General Assembly may want to consider when finalizing this legislation. First, the Tier 1 and Tier 2 benefits are more valuable than the benefit provided in the new defined contribution plan and allowing all current members in the KERS and CERS nonhazardous retirement systems to elect to switch to the defined contribution plan provides an opportunity for Tier 1 and Tier 2 members to adversely select against themselves. Limiting the election opportunity to current Tier 3 members hired after January 1, 2014

would limit possible of adverse selection.

Second, the proposed legislation provides current members in the defined benefit plan an indefinitely open window to elect to earn future benefits in the defined contribution plan. We suggest providing a limited window for the current members hired prior to January 1, 2019 to make an election to earn retirement benefits in the optional defined contribution plan.

The proposed legislation requires employers to make a normal cost contribution as a percentage of pay that is an annual amount sufficient, when combined with employee contributions, to fund benefits earned during the year, including costs for those members who elect to participate in the optional defined contribution plan (Tier IV). Tier I, Tier II, Tier III, and Tier IV have different normal cost rates because the value of the benefits provided by each benefit tier vary. We interpret this provision to require each employer contribute a single “blended” normal cost rate that will slightly vary year-to-year as the demographics of the plan changes. This method is relatively simple and would reduce possible anti-selection due to differences in the normal cost of the Tier III and Tier IV benefit plans. However, it may be difficult for the retirement system to administer as it would require a process of identifying the Tier IV contributions that must be directed to the members’ accounts. We suggest the General Assembly seek input from the Retirement System regarding this process and whether it would be preferable to charge employers different normal cost rates depending on the retirement benefit tier of their employee, or an alternative method that is cost neutral and administratively feasible.

#### Change in the Interest Crediting Rate Formula in the Tier 3 Hybrid Plan

The change in the interest crediting rate formula to 85% of the 10-year geometric average will result in greater “risk-sharing” in the funds actual investment performance. Compared to the current formula, the proposed formula will generally provide a lower interest credit during times when the average return is less than 10.00% and a higher interest credit when the average return is in excess of 10.00%. Over time, we expect the new formula to provide an interest credit that is 0.40% to 0.50% less in annual interest credits compared to the current formula. Increasing the averaging period from 5 years to 10 years is not projected to have a fiscal impact but will reduce the short-term volatility in the year-to-year change in the interest crediting rate provided at each June 30.

#### Allocation of Amortization Payment to Participating Employers in CERS and Agencies Participating in KERS

The employers’ (and agencies) allocation percentage will be based on the average covered payroll during the last three fiscal years (FY 14/15, FY 15/16, and FY 16/17) to the average total covered payroll for the system. This allocation percentage would remain unchanged in future years (albeit, minor adjustments if employers cease participating in the system). There are some favorable characteristics with this method as each employer’s contribution effort to finance the unfunded actuarial accrued liability will remain relatively constant and eliminates incentives for employers to pursue the use of “contract” employees to reduce their covered payroll (and required contribution). Employers that are increasing in size will not be burdened to pay a greater share of the unfunded

actuarial accrued liability on the covered payroll for those additional employees. Rather, the marginal change in the employer's pension contribution effort will be the normal cost rate on the change in covered payroll.

We have not analyzed the change in covered payroll for the participating employers in the systems or how the average of the fiscal years identified in the proposed legislation compare to the distribution of covered payroll among employers in other years, such as the 12/13 and 13/14 fiscal years. Given the declining covered payroll experienced by some of the systems over the last several years, it is possible that using a 5-year average period or the currently proposed 3-year averaging period using different fiscal years may be more representative of the allocated share of each employer's share of the unfunded actuarial accrued liability. There will not be a fiscal impact to the system if the averaging method is changed, but there would be a cost increase or decrease for individual participating employers. We recommend the Legislative Research Commission seek input from Kentucky Retirement Systems regarding the fiscal years and the averaging period used in the calculation.

Further to this point, using a static allocation may gradually drift from mirroring the employer participation demographics in future years (some employers are growing and other entities are decreasing their workforce). Also, while this proposed method may be appropriate for allocating the existing unfunded liability, it may not be appropriate for allocating unfunded liabilities that may be incurred in a future year. Note, if this issue does occur, then it could be easily addressed by the General Assembly in a future year by using a layered amortization base.

#### Modification in the Reemployment after Retirement Provisions

If a member retires after January 1, 2019 and becomes reemployed by a participating employer in KRS or TRS on a full-time basis between a three-month and a twelve-month time period following the member's initial retirement date, then the member's retirement allowance will be suspended until the first anniversary of the member's initial retirement date. This would be between a one-month and a nine-month suspension of the member's retirement allowance. This provision will result in some reduced financial benefit (when considering their total income from all sources) for members to commence their retirement benefit at an earlier age and seek reemployment. However, we do not believe the reduction in the member's financial benefit due to this suspension is significant enough to change retirement behavior. As a result, we have not adjusted, or delayed, the anticipated age members will commence their retirement due to this modification. However, this modification may still be important and relevant for policy reasons.

#### Distribution of the Actuarial Accrued Liability Among Membership Status

The proposed legislation would make certain changes to retirement and health insurance benefits to active members after January 1, 2019 as well as future active members in these Non-Hazardous Retirement Systems. For educational and informational purposes, the actuarial accrued liability attributable to the current retirees and inactive members (vested and non-vested) in the KERS Non-Hazardous Retirement System is approximately 75% of the total actuarial accrued liability. (Similarly,

the retiree and inactive member liability is approximately 60% of the total actuarial accrued liability for the CERS Non-Hazardous Retirement System). As a result, while the proposed changes may have a material impact on the actuarial accrued liability attributable to the current active members in the Retirement System, the changes have a much smaller impact as a percentage of the total actuarial accrued liability attributable of the entire Retirement System.

### **Basis of Calculations**

GRS based the calculations and analysis in this letter on the member and financial data provided by KRS and used to perform the actuarial valuation as of June 30, 2017. Except where noted otherwise, the projections assume no actuarial gains or losses will occur in the future, and that members will terminate, retire, become disabled, or die as predicted by the actuarial assumptions documented in the June 30, 2017 actuarial valuation report.

These projections also do not reflect the actual investment experience of the retirement system after the measurement date of June 30, 2017. The projections assume that the participating employers in each Retirement System will maintain the current workforce in each future year and that as current active members terminate or retire from a covered position in the Retirement System, the employer would replace them with a new employee. We have assumed that all current active members earning Tier 1 and Tier 2 retirement benefits will not elect to earn future benefits in the optional defined contribution plan. However, we have assumed that 25% of all active members currently in Tier 3 and 25% of all future members will elect to earn retirement benefits in the defined contribution plan.

We have assumed the new interest credit formula for the Tier 3 hybrid plan will provide 0.50% less in annual interest credits for the KERS (non-hazardous and hazardous) and SPRS systems and 0.40% less in annual interest credits for the CER (non-hazardous and hazardous) systems.

Our calculations are based upon assumptions regarding future events, which may or may not materialize. Depending on actual plan experience, actual results could deviate significantly from our projections. They are further based on the interpretation of the legislation that members who elect the optional defined contribution plan are still eligible for insurance benefits and that while the level dollar amortization method is effective at the 2019 valuation, the 30-year amortization period that was effective with the 2013 valuation is not re-set at the 2019 valuation.

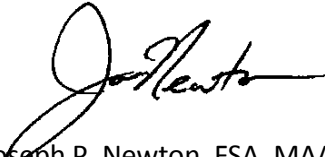
### **General Comments**

We are not attorneys, and we cannot provide a legal opinion regarding the changes in this proposed legislation. Nothing in this letter should be construed as providing legal, investment or tax advice. It may be prudent to consult with the Retirement System's counsel before enacting any such changes. Finally, no statement in this letter is intended to be interpreted as a recommendation in favor of or in opposition to the changes studied herein.

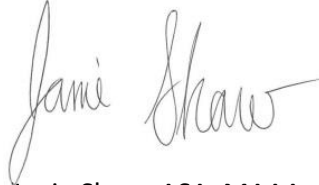
Mr. White and Mr. Newton are Enrolled Actuaries. All the of the undersigned are also members of the American Academy of Actuaries and we meet all of the Qualification Standards of the American

Mr. David Eager  
February 27, 2018  
Page 7

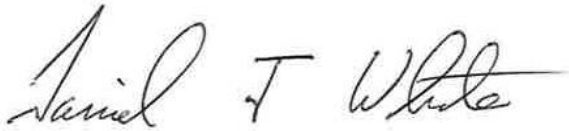
Academy of Actuaries to render the actuarial opinion contained herein. In addition, all of the undersigned are experienced in performing valuations for large public retirement systems. If you have any questions, or require any additional or clarifying information, please do not hesitate to contact us. Sincerely,



Joseph P. Newton, FSA, MAAA, EA  
Senior Consultant



Janie Shaw, ASA, MAAA  
Consultant



Daniel J. White, FSA, MAAA, EA  
Senior Consultant

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Enclosures

Exhibit 1. Summary of Proposed Changes

Section 1. Comparison of Fiscal Impact

Section 2. Projected Cost of the Retirement and Insurance – Current Plan

Section 3. Projected Cost of the Retirement and Insurance – Proposed Legislation

Section 4. Alternative Projection Scenario for KERS Non-Hazardous System



# Exhibit 1. Summary of Changes in Benefit Provisions and Employer Funding for the KERS and CERS Non-Hazardous Systems

## Retirement Formulas

### Tier 1:

- No change to the basic formula.
- For retirements on or after January 1, 2019, the highest five years of pay used to determine the member's final average compensation must be complete fiscal years and must contain at least 60 months.

### Tier 2:

- No change to the basic formula.

### Tier 3:

- Interest credits on or after June 30, 2018 will be 85% of the fund's geometric 10-year net investment return (0% for those not participating in the Hybrid plan).
- Removal of the \$5,000 post-retirement death benefit for all members hired on and after January 1, 2014.

### Optional 401(a) Defined Contribution Plan:

- Future employees can elect participate in the new defined contribution plan that requires 5.00% of pay contributions from the member and 4.00% of pay contributions from the employer rather than the Tier 3 hybrid defined benefit plan. The members become 100% vested in the employer provided benefit upon attaining 5 years of service.
- Tier 1, 2, and 3 members can make a one-time election to prospectively earn future benefits in the new optional 401(a) defined contribution plan.

## Member Contribution Rates

- Member contribution rates to the retirement fund for Tier 1, Tier 2, and Tier 3 members remain unchanged at 5.00% of pay. Effective January 1, 2019, contributions to the health insurance funds for Tier 1 members who began participation on or after July 1, 2003 (but prior to September 1, 2008) will increase to the lesser of 3.00% of pay or the normal cost rate, as separately determined for these members based upon the system in which they participate.
  - The 3.00% maximum will be phased in over three years (i.e. from 0% to 3% of pay) and may be adjusted annually after the phase-in by increments of 0.25% of pay, but in no case shall exceed 3% of pay.
- The contributions to the health insurance funds are classified as 401(h) contributions and are not refundable to the member.

## Pension Anti-Spiking Provisions

### Compensatory time payments upon termination for Tier I members

- The payment of compensatory time upon termination of employment will be excluded in creditable compensation (which is used in the calculation of the member's final average compensation) for Tier I members retiring after July 1, 2023.

### Equipment/Uniform Allowances:

- Excluded from creditable compensation earned on or after January 1, 2019.



# **Exhibit 1. Summary of Changes in Benefit Provisions and Employer Funding for the KERS and CERS Non-Hazardous Systems (Continued)**

## **Sick Leave**

- Converted sick service cannot exceed amount for accumulated sick leave as of August 1, 2018.
- Sick leave service credit does not count towards retirement eligibility for those retiring on or after August 1, 2018.

## **Retiree Health Accessibility**

- No change.

## **Line of Duty Death**

- The surviving spouse (if any) shall supersede all previous beneficiary designations for members that die in the line of duty.

## **Reemployment After Retirement**

The following reemployment after retirement provisions apply to members who retire on or after January 1, 2019 in order to continue to receive their retirement allowance during their reemployment:

- Must have a three (3) month break in employment and no prearranged reemployment agreement.
- After required employment break, the retired member can return to work in a part-time or full-time position.
  - Monthly pension will not be suspended for the duration of reemployment in a part-time position or for the duration of reemployment in a full-time position if the member has not returned to reemployment for at least a twelve (12) month period following initial retirement.
  - If a member returns to full-time reemployment prior to the twelve month period, the monthly pension will be suspended until twelve months have passed following initial retirement.
  - The retiree will not earn additional retirement benefits.
- Employer required to make normal cost contributions (both pension and retiree health) on the payroll of the reemployed retiree.

# Exhibit 1. Summary of Changes in Benefit Provisions and Employer Funding for the KERS and CERS Non-Hazardous Systems (Continued)

## Employer Funding

The Board will continue to have the authority to change the contribution rates for CERS on an annual basis and will have the authority to change contribution rates for KERS on an annual basis after the fiscal year ending June 30, 2020.

Actuarially Determined Contributions (ADC) for actuarial valuations performed on and after June 30, 2019 are based on normal cost plus an amortization payment to finance the unfunded actuarial accrued liability:

- Normal cost determined using entry age normal cost method paid as a percentage of payroll.
- Unfunded liability payment determined using a closed amortization period (25 years remaining in the 2018 valuation).
- Allocation of amortization payment for the unfunded liability to participating employers in KERS, and CERS is based on a level-dollar amortization
  - The dollar amount of the amortization payment will be allocated to each participating employer in proportion to their average percentage of the total compensation for years (FY 14/15, FY 15/16, and FY 16/17), adjusted for any employers who cease participation in the System.
  - Each employer's proportionate share of the amortization payment will remain a relatively constant percentage each future year.

**Section 1.**  
**Comparison of Fiscal Impact**  
**Current Plan vs. Proposed Changes**

**Kentucky Retirement Systems**  
**Exhibit 1-1**  
**KERS Non-Hazardous Retirement Fund**  
**Comparison of Fiscal Impact**  
**(\$ in Millions)**

Fiscal Year Beginning July 1, (1)	Unfunded Actuarial Accrued Liability			Funded Ratio			Employer Contribution			Employer Contribution Rate		
	Current (2)	Proposed (3)	Difference (4)	Current (5)	Proposed (6)	Difference (7)	Current (8)	Proposed (9)	Difference (10)	Current (11)	Proposed (12)	Difference (13)
2017	\$ 13,468	\$ 13,465	\$ (3)	14%	14%	0%	\$ 629	\$ 629	\$ 0	41.1%	41.1%	0.0%
2018	13,591	13,593	2	13%	13%	0%	1,101	1,085	(16)	71.0%	70.0%	-1.1%
2019	13,349	13,366	17	15%	14%	-1%	1,118	1,087	(31)	71.0%	69.0%	-2.0%
2020	13,042	13,090	48	17%	16%	-1%	1,097	1,083	(14)	68.5%	67.7%	-0.9%
2021	12,700	12,762	62	19%	18%	-1%	1,116	1,081	(35)	68.5%	66.4%	-2.1%
2022	12,334	12,435	101	21%	20%	-1%	1,086	1,076	(10)	65.5%	65.0%	-0.6%
2023	11,979	12,092	113	23%	22%	-1%	1,105	1,071	(34)	65.5%	63.5%	-2.0%
2024	11,580	11,732	152	25%	24%	-1%	1,075	1,068	(7)	62.6%	62.2%	-0.4%
2025	11,190	11,354	164	27%	26%	-1%	1,095	1,065	(30)	62.6%	60.8%	-1.7%
2026	10,755	10,956	201	30%	28%	-2%	1,064	1,062	(2)	59.6%	59.5%	-0.1%
2027	10,327	10,538	211	32%	30%	-2%	1,084	1,058	(26)	59.6%	58.2%	-1.4%
2028	9,853	10,099	246	35%	32%	-3%	1,052	1,055	3	56.7%	56.9%	0.2%
2029	9,385	9,637	252	37%	34%	-3%	1,072	1,052	(20)	56.7%	55.6%	-1.1%
2030	8,868	9,150	282	40%	37%	-3%	1,040	1,049	9	53.9%	54.4%	0.5%
2031	8,355	8,640	285	43%	39%	-4%	1,062	1,047	(15)	53.9%	53.1%	-0.8%
2032	7,791	8,102	311	46%	42%	-4%	1,028	1,043	15	51.1%	51.8%	0.7%
2033	7,229	7,538	309	49%	45%	-4%	1,051	1,041	(10)	51.1%	50.6%	-0.5%
2034	6,614	6,944	330	53%	49%	-4%	1,015	1,039	24	48.3%	49.5%	1.1%
2035	6,000	6,320	320	57%	53%	-4%	1,038	1,037	(1)	48.3%	48.3%	0.0%
2036	5,331	5,663	332	61%	57%	-4%	1,003	1,035	32	45.6%	47.1%	1.5%
2037	4,661	4,973	312	65%	61%	-4%	1,028	1,035	7	45.6%	45.9%	0.3%
2038	3,931	4,247	316	70%	66%	-4%	987	1,035	48	42.8%	44.8%	2.1%
2039	3,204	3,485	281	76%	72%	-4%	1,012	1,035	23	42.8%	43.7%	1.0%
2040	2,414	2,681	267	81%	78%	-3%	963	1,036	73	39.7%	42.7%	3.0%
2041	1,634	1,835	201	87%	84%	-3%	987	1,037	50	39.7%	41.7%	2.0%
2042	788	944	156	94%	92%	-2%	897	1,040	143	35.2%	40.8%	5.6%
2043	-	-	-	100%	100%	0%	76	74	(2)	2.9%	2.8%	-0.1%
2044	-	-	-	100%	100%	0%	77	75	(2)	2.9%	2.8%	-0.1%
2045	-	-	-	100%	100%	0%	78	76	(2)	2.9%	2.8%	-0.1%
2046	-	-	-	100%	100%	0%	79	76	(3)	2.8%	2.7%	-0.1%
2047	-	-	-	100%	100%	0%	81	78	(3)	2.8%	2.7%	-0.1%
2048	-	-	-	100%	100%	0%	82	79	(3)	2.8%	2.7%	-0.1%
2049	-	-	-	100%	100%	0%	83	80	(3)	2.8%	2.7%	-0.1%
2050	-	-	-	100%	100%	0%	85	82	(3)	2.8%	2.7%	-0.1%
2051	-	-	-	100%	100%	0%	87	83	(4)	2.8%	2.7%	-0.1%

Notes and assumptions:

It is assumed that the employer cost of defined contribution plan is 3.50% of pay, after reflecting the effects of forfeitures attributable to nonvested members, and that 25% of current Tier 3 members and 25% of future member elect to enter the DC plan.

**Kentucky Retirement Systems**  
**Exhibit 1-2**  
**CERS Non-Hazardous Retirement Fund**  
**Comparison of Fiscal Impact**  
**(\$ in Millions)**

Fiscal Year Beginning July 1, (1)	Unfunded Actuarial Accrued Liability			Funded Ratio			Employer Contribution			Employer Contribution Rate		
	Current (2)	Proposed (3)	Difference (4)	Current (5)	Proposed (6)	Difference (7)	Current (8)	Proposed (9)	Difference (10)	Current (11)	Proposed (12)	Difference (13)
2017	\$ 6,039	\$ 6,034	\$ (5)	53%	53%	0%	\$ 355	\$ 355	\$ 0	14.5%	14.5%	0.0%
2018	6,219	6,225	6	53%	52%	-1%	546	534	(12)	21.8%	21.4%	-0.5%
2019	6,299	6,317	18	53%	53%	0%	548	544	(4)	21.5%	21.4%	-0.1%
2020	6,292	6,316	24	54%	54%	0%	558	643	85	21.5%	24.8%	3.3%
2021	6,165	6,103	(62)	56%	56%	0%	563	639	76	21.3%	24.2%	2.9%
2022	6,099	5,955	(144)	57%	58%	1%	561	628	67	20.9%	23.3%	2.5%
2023	6,026	5,804	(222)	58%	59%	1%	565	624	59	20.6%	22.8%	2.1%
2024	5,941	5,646	(295)	59%	61%	2%	570	619	49	20.4%	22.2%	1.8%
2025	5,840	5,477	(363)	61%	63%	2%	575	615	40	20.2%	21.6%	1.4%
2026	5,725	5,300	(425)	62%	64%	2%	580	610	30	20.0%	21.1%	1.1%
2027	5,595	5,112	(483)	63%	66%	3%	585	607	22	19.8%	20.6%	0.8%
2028	5,446	4,913	(533)	64%	67%	3%	591	603	12	19.7%	20.1%	0.4%
2029	5,280	4,701	(579)	66%	69%	3%	597	600	3	19.5%	19.6%	0.1%
2030	5,094	4,479	(615)	67%	70%	3%	604	596	(8)	19.3%	19.1%	-0.3%
2031	4,885	4,243	(642)	68%	72%	4%	611	594	(17)	19.2%	18.6%	-0.5%
2032	4,654	3,992	(662)	70%	73%	3%	619	591	(28)	19.0%	18.2%	-0.9%
2033	4,397	3,728	(669)	72%	75%	3%	627	589	(38)	18.9%	17.7%	-1.2%
2034	4,115	3,447	(668)	74%	77%	3%	636	586	(50)	18.7%	17.3%	-1.5%
2035	3,803	3,149	(654)	76%	79%	3%	645	584	(61)	18.6%	16.9%	-1.8%
2036	3,462	2,833	(629)	78%	81%	3%	655	583	(72)	18.5%	16.5%	-2.0%
2037	3,087	2,499	(588)	80%	83%	3%	666	582	(84)	18.4%	16.0%	-2.3%
2038	2,677	2,144	(533)	83%	85%	2%	678	583	(95)	18.3%	15.7%	-2.6%
2039	2,230	1,767	(463)	86%	88%	2%	690	583	(107)	18.1%	15.3%	-2.8%
2040	1,742	1,368	(374)	89%	90%	1%	703	584	(119)	18.0%	15.0%	-3.0%
2041	1,211	942	(269)	92%	93%	1%	715	585	(130)	17.9%	14.7%	-3.3%
2042	634	489	(145)	96%	96%	0%	730	588	(142)	17.9%	14.4%	-3.5%
2043	-	-	-	100%	100%	0%	78	88	10	1.9%	2.1%	0.2%
2044	-	-	-	100%	100%	0%	79	89	10	1.9%	2.1%	0.2%
2045	-	-	-	100%	100%	0%	80	90	10	1.8%	2.1%	0.2%
2046	-	-	-	100%	100%	0%	82	92	10	1.8%	2.1%	0.2%
2047	-	-	-	100%	100%	0%	83	93	10	1.8%	2.0%	0.2%
2048	-	-	-	100%	100%	0%	84	95	11	1.8%	2.0%	0.2%
2049	-	-	-	100%	100%	0%	86	97	11	1.8%	2.0%	0.2%
2050	-	-	-	100%	100%	0%	88	99	11	1.8%	2.0%	0.2%
2051	-	-	-	100%	100%	0%	89	101	12	1.8%	2.0%	0.2%

Notes and assumptions:

It is assumed that the employer cost of defined contribution plan is 3.50% of pay, after reflecting the effects of forfeitures attributable to nonvested members, and that 25% of current Tier 3 members and 25% of future member elect to enter the DC plan.

**Kentucky Retirement Systems**  
**Exhibit 1-3**  
**KERS Non-Hazardous Insurance Fund**  
**Summary of Fiscal Impact**  
**(\$ in Millions)**

Fiscal Year Beginning July 1, (1)	Unfunded Actuarial Accrued Liability			Funded Ratio			Employer Contribution			Employer Contribution Rate		
	Current (2)	Proposed (3)	Difference (4)	Current (5)	Proposed (6)	Difference (7)	Current (8)	Proposed (9)	Difference (10)	Current (11)	Proposed (12)	Difference (13)
2017	\$ 1,859	\$ 1,859	\$ -	31%	31%	0%	\$ 128	\$ 128	\$ 0	8.4%	8.4%	0.0%
2018	1,886	1,886	-	32%	32%	0%	191	191	-	12.4%	12.4%	0.0%
2019	1,862	1,856	(6)	34%	35%	1%	194	194	-	12.4%	12.4%	0.0%
2020	1,820	1,807	(13)	37%	38%	1%	188	178	(10)	11.8%	11.2%	-0.6%
2021	1,770	1,760	(10)	40%	41%	1%	191	176	(15)	11.8%	10.9%	-0.9%
2022	1,721	1,719	(2)	43%	43%	0%	182	174	(8)	11.1%	10.6%	-0.5%
2023	1,674	1,676	2	46%	46%	0%	186	172	(14)	11.1%	10.3%	-0.8%
2024	1,621	1,630	9	48%	48%	0%	178	170	(8)	10.4%	10.0%	-0.5%
2025	1,570	1,582	12	51%	50%	-1%	181	169	(12)	10.4%	9.7%	-0.7%
2026	1,510	1,531	21	53%	52%	-1%	173	167	(6)	9.8%	9.4%	-0.3%
2027	1,454	1,477	23	55%	54%	-1%	176	165	(11)	9.8%	9.1%	-0.6%
2028	1,390	1,420	30	57%	56%	-1%	168	164	(4)	9.1%	8.9%	-0.2%
2029	1,327	1,359	32	59%	58%	-1%	171	162	(9)	9.1%	8.6%	-0.5%
2030	1,255	1,295	40	62%	60%	-2%	162	160	(2)	8.5%	8.4%	-0.1%
2031	1,187	1,227	40	64%	62%	-2%	166	158	(8)	8.5%	8.1%	-0.4%
2032	1,109	1,155	46	66%	64%	-2%	158	157	(1)	7.9%	7.9%	-0.1%
2033	1,033	1,079	46	68%	67%	-1%	162	157	(5)	7.9%	7.7%	-0.2%
2034	947	999	52	71%	69%	-2%	155	156	1	7.4%	7.5%	0.1%
2035	863	914	51	73%	71%	-2%	158	156	(2)	7.4%	7.3%	-0.1%
2036	769	824	55	76%	74%	-2%	151	156	5	6.9%	7.2%	0.2%
2037	675	727	52	79%	77%	-2%	155	157	2	6.9%	7.0%	0.1%
2038	572	625	53	82%	80%	-2%	149	157	8	6.5%	6.9%	0.4%
2039	469	515	46	85%	84%	-1%	152	157	5	6.5%	6.7%	0.2%
2040	355	400	45	89%	87%	-2%	145	158	13	6.0%	6.6%	0.5%
2041	242	276	34	92%	91%	-1%	149	159	10	6.0%	6.4%	0.4%
2042	118	143	25	96%	95%	-1%	135	160	25	5.4%	6.3%	1.0%
2043	-	-	-	100%	100%	0%	13	13	-	0.5%	0.5%	0.0%
2044	-	-	-	100%	100%	0%	13	13	-	0.5%	0.5%	0.0%
2045	-	-	-	100%	100%	0%	13	13	-	0.5%	0.5%	0.0%
2046	-	-	-	100%	100%	0%	13	13	-	0.5%	0.5%	0.0%
2047	-	-	-	100%	100%	0%	14	14	-	0.5%	0.5%	0.0%
2048	-	-	-	100%	100%	0%	14	14	-	0.5%	0.5%	0.0%
2049	-	-	-	100%	100%	0%	12	12	-	0.4%	0.4%	0.0%
2050	-	-	-	100%	100%	0%	12	12	-	0.4%	0.4%	0.0%
2051	-	-	-	100%	100%	0%	12	12	-	0.4%	0.4%	0.0%

**Kentucky Retirement Systems**  
**Exhibit 1-4**  
**CERS Non-Hazardous Insurance Fund**  
**Summary of Fiscal Impact**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Unfunded Actuarial Accrued Liability			Funded Ratio			Employer Contribution			Employer Contribution Rate		
	Current	Proposed	Difference	Current	Proposed	Difference	Current	Proposed	Difference	Current	Proposed	Difference
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2017	\$ 1,128	\$ 1,128	\$ -	66%	66%	0%	\$ 114	\$ 114	\$ 0	4.7%	4.7%	0.0%
2018	1,171	1,171	-	67%	67%	0%	154	154	-	6.2%	6.2%	0.0%
2019	1,192	1,183	(9)	67%	68%	1%	153	143	(10)	6.1%	5.7%	-0.4%
2020	1,190	1,176	(14)	69%	69%	0%	154	155	1	6.0%	6.0%	0.1%
2021	1,153	1,125	(28)	71%	72%	1%	153	153	-	5.8%	5.8%	0.0%
2022	1,140	1,097	(43)	72%	73%	1%	150	148	(2)	5.6%	5.6%	-0.1%
2023	1,125	1,069	(56)	73%	75%	2%	149	146	(3)	5.5%	5.4%	-0.1%
2024	1,109	1,040	(69)	74%	76%	2%	148	144	(4)	5.4%	5.2%	-0.2%
2025	1,089	1,009	(80)	75%	77%	2%	147	142	(5)	5.2%	5.0%	-0.2%
2026	1,067	977	(90)	76%	78%	2%	146	140	(6)	5.1%	4.9%	-0.2%
2027	1,042	942	(100)	77%	80%	3%	145	138	(7)	5.0%	4.7%	-0.2%
2028	1,013	905	(108)	78%	81%	3%	144	135	(9)	4.8%	4.5%	-0.3%
2029	982	867	(115)	79%	82%	3%	144	134	(10)	4.7%	4.4%	-0.3%
2030	947	826	(121)	80%	83%	3%	143	131	(12)	4.6%	4.2%	-0.4%
2031	908	783	(125)	81%	84%	3%	143	130	(13)	4.5%	4.1%	-0.4%
2032	865	738	(127)	82%	85%	3%	143	129	(14)	4.4%	4.0%	-0.4%
2033	818	691	(127)	84%	86%	2%	144	129	(15)	4.4%	3.9%	-0.4%
2034	766	641	(125)	85%	87%	2%	144	129	(15)	4.3%	3.8%	-0.5%
2035	709	588	(121)	86%	88%	2%	146	130	(16)	4.2%	3.8%	-0.5%
2036	646	531	(115)	87%	90%	3%	147	130	(17)	4.2%	3.7%	-0.5%
2037	578	471	(107)	89%	91%	2%	150	131	(19)	4.2%	3.6%	-0.5%
2038	503	407	(96)	90%	92%	2%	151	131	(20)	4.1%	3.6%	-0.6%
2039	421	338	(83)	92%	94%	2%	155	132	(23)	4.1%	3.5%	-0.6%
2040	330	264	(66)	94%	95%	1%	157	134	(23)	4.1%	3.5%	-0.6%
2041	231	184	(47)	96%	97%	1%	160	135	(25)	4.0%	3.4%	-0.6%
2042	123	98	(25)	98%	98%	0%	166	138	(28)	4.1%	3.4%	-0.7%
2043	-	-	-	100%	100%	0%	41	41	-	1.0%	1.0%	0.0%
2044	-	-	-	100%	100%	0%	41	41	-	1.0%	1.0%	0.0%
2045	-	-	-	100%	100%	0%	42	42	-	1.0%	1.0%	0.0%
2046	-	-	-	100%	100%	0%	42	42	-	1.0%	1.0%	0.0%
2047	-	-	-	100%	100%	0%	43	43	-	0.9%	0.9%	0.0%
2048	-	-	-	100%	100%	0%	43	43	-	0.9%	0.9%	0.0%
2049	-	-	-	100%	100%	0%	43	43	-	0.9%	0.9%	0.0%
2050	-	-	-	100%	100%	0%	43	43	-	0.9%	0.9%	0.0%
2051	-	-	-	100%	100%	0%	44	44	-	0.9%	0.9%	0.0%

Gabriel Roeder Smith & Company



**Section 2.**  
**Projected Cost of the Retirement and Insurance**  
**Current Plan**

**Kentucky Retirement Systems**  
**Exhibit 2-1**  
**KERS Non-Hazardous Retirement Fund**  
**Current Plan**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2017	\$ 15,592	\$ 2,124	\$ 13,468	14%	\$ 629	\$ 77	\$ 1,532	41.06%	41.98%
2018	15,629	2,038	13,591	13%	1,101	78	1,551	71.03%	71.03%
2019	15,645	2,296	13,349	15%	1,118	79	1,574	71.03%	69.79%
2020	15,643	2,601	13,042	17%	1,097	80	1,601	68.54%	68.54%
2021	15,624	2,924	12,700	19%	1,116	81	1,628	68.54%	67.18%
2022	15,587	3,253	12,334	21%	1,086	83	1,656	65.54%	65.54%
2023	15,535	3,556	11,979	23%	1,105	84	1,686	65.54%	64.13%
2024	15,466	3,886	11,580	25%	1,075	86	1,718	62.57%	62.57%
2025	15,383	4,193	11,190	27%	1,095	88	1,751	62.57%	61.15%
2026	15,285	4,530	10,755	30%	1,064	89	1,785	59.60%	59.60%
2027	15,172	4,845	10,327	32%	1,084	91	1,819	59.60%	58.21%
2028	15,052	5,199	9,853	35%	1,052	93	1,854	56.71%	56.71%
2029	14,918	5,533	9,385	37%	1,072	95	1,891	56.71%	55.37%
2030	14,769	5,901	8,868	40%	1,040	96	1,929	53.90%	53.90%
2031	14,609	6,254	8,355	43%	1,062	99	1,970	53.90%	52.59%
2032	14,440	6,649	7,791	46%	1,028	101	2,012	51.10%	51.10%
2033	14,262	7,033	7,229	49%	1,051	103	2,056	51.10%	49.82%
2034	14,077	7,463	6,614	53%	1,015	105	2,101	48.33%	48.33%
2035	13,884	7,884	6,000	57%	1,038	107	2,147	48.33%	47.09%
2036	13,689	8,358	5,331	61%	1,003	110	2,198	45.62%	45.62%
2037	13,496	8,835	4,661	65%	1,028	113	2,253	45.62%	44.35%
2038	13,309	9,378	3,931	70%	987	115	2,310	42.75%	42.75%
2039	13,132	9,928	3,204	76%	1,012	118	2,368	42.75%	41.48%
2040	12,967	10,553	2,414	81%	963	121	2,427	39.68%	39.68%
2041	12,815	11,181	1,634	87%	987	124	2,487	39.68%	38.35%
2042	12,675	11,887	788	94%	897	127	2,547	35.22%	35.22%
2043	12,549	12,549	0	100%	76	130	2,608	2.93%	2.93%
2044	12,436	12,436	0	100%	77	133	2,669	2.89%	2.89%
2045	12,338	12,338	0	100%	78	137	2,731	2.86%	2.86%
2046	12,254	12,254	0	100%	79	140	2,794	2.84%	2.84%
2047	12,184	12,184	0	100%	81	143	2,858	2.82%	2.82%
2048	12,130	12,130	0	100%	82	146	2,924	2.80%	2.80%
2049	12,092	12,092	0	100%	83	150	2,990	2.79%	2.79%
2050	12,069	12,069	0	100%	85	153	3,058	2.79%	2.79%
2051	12,064	12,064	0	100%	87	156	3,127	2.78%	2.78%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation and assumes constant active membership count in all future years.

The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

The employer contribution amount shown does not include the \$87 million additional contribution budgeted to be paid in fiscal year beginning 2017.

**Kentucky Retirement Systems**  
**Exhibit 2-2**  
**CERS Non-Hazardous Retirement Fund**  
**Current Plan**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2017	\$ 12,804	\$ 6,765	\$ 6,039	53%	\$ 355	\$ 123	\$ 2,452	14.48%	14.48%
2018	13,121	6,902	6,219	53%	546	125	2,500	21.84%	21.84%
2019	13,421	7,122	6,299	53%	548	127	2,547	21.50%	21.50%
2020	13,704	7,412	6,292	54%	558	130	2,594	21.53%	21.53%
2021	13,970	7,805	6,165	56%	563	132	2,642	21.33%	21.33%
2022	14,218	8,119	6,099	57%	561	135	2,690	20.86%	20.86%
2023	14,445	8,419	6,026	58%	565	137	2,740	20.64%	20.64%
2024	14,652	8,711	5,941	59%	570	140	2,790	20.43%	20.43%
2025	14,836	8,996	5,840	61%	575	142	2,842	20.22%	20.22%
2026	14,998	9,273	5,725	62%	580	145	2,894	20.03%	20.03%
2027	15,136	9,541	5,595	63%	585	147	2,948	19.84%	19.84%
2028	15,259	9,813	5,446	64%	591	150	3,003	19.67%	19.67%
2029	15,359	10,079	5,280	66%	597	153	3,062	19.50%	19.50%
2030	15,438	10,344	5,094	67%	604	156	3,124	19.34%	19.34%
2031	15,496	10,611	4,885	68%	611	159	3,187	19.18%	19.18%
2032	15,536	10,882	4,654	70%	619	163	3,254	19.03%	19.03%
2033	15,558	11,161	4,397	72%	627	166	3,323	18.88%	18.88%
2034	15,565	11,450	4,115	74%	636	170	3,394	18.74%	18.74%
2035	15,556	11,753	3,803	76%	645	173	3,467	18.61%	18.61%
2036	15,535	12,073	3,462	78%	655	177	3,545	18.49%	18.49%
2037	15,507	12,420	3,087	80%	666	181	3,628	18.37%	18.37%
2038	15,478	12,801	2,677	83%	678	186	3,714	18.25%	18.25%
2039	15,451	13,221	2,230	86%	690	190	3,803	18.14%	18.14%
2040	15,428	13,686	1,742	89%	703	195	3,895	18.04%	18.04%
2041	15,413	14,202	1,211	92%	715	199	3,988	17.94%	17.94%
2042	15,406	14,772	634	96%	730	204	4,083	17.87%	17.87%
2043	15,409	15,409	0	100%	78	209	4,179	1.87%	1.87%
2044	15,423	15,423	0	100%	79	214	4,277	1.85%	1.85%
2045	15,449	15,449	0	100%	80	219	4,377	1.83%	1.83%
2046	15,488	15,488	0	100%	82	224	4,478	1.82%	1.82%
2047	15,540	15,540	0	100%	83	229	4,581	1.81%	1.81%
2048	15,606	15,606	0	100%	84	234	4,686	1.80%	1.80%
2049	15,687	15,687	0	100%	86	240	4,792	1.79%	1.79%
2050	15,783	15,783	0	100%	88	245	4,901	1.79%	1.79%
2051	15,895	15,895	0	100%	89	251	5,012	1.78%	1.78%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation and assumes constant active membership count in all future years.  
The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

**Kentucky Retirement Systems**  
**Exhibit 2-3**  
**KERS Non-Hazardous Insurance Fund**  
**Current Plan**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2017	\$ 2,683	\$ 824	\$ 1,859	31%	\$ 128	\$ 5	\$ 1,524	8.41%	8.41%
2018	2,760	874	1,886	32%	191	6	1,541	12.40%	12.40%
2019	2,837	975	1,862	34%	194	7	1,564	12.40%	12.09%
2020	2,907	1,087	1,820	37%	188	8	1,590	11.81%	11.81%
2021	2,972	1,202	1,770	40%	191	9	1,617	11.81%	11.50%
2022	3,032	1,311	1,721	43%	182	10	1,645	11.09%	11.09%
2023	3,085	1,411	1,674	46%	186	10	1,675	11.09%	10.77%
2024	3,133	1,512	1,621	48%	178	11	1,706	10.44%	10.44%
2025	3,174	1,604	1,570	51%	181	12	1,738	10.44%	10.12%
2026	3,208	1,698	1,510	53%	173	13	1,772	9.76%	9.76%
2027	3,235	1,781	1,454	55%	176	14	1,806	9.76%	9.47%
2028	3,254	1,864	1,390	57%	168	15	1,841	9.13%	9.13%
2029	3,264	1,937	1,327	59%	171	15	1,877	9.13%	8.82%
2030	3,265	2,010	1,255	62%	162	16	1,915	8.48%	8.48%
2031	3,259	2,072	1,187	64%	166	17	1,956	8.48%	8.23%
2032	3,248	2,139	1,109	66%	158	18	1,998	7.92%	7.92%
2033	3,233	2,200	1,033	68%	162	19	2,041	7.92%	7.68%
2034	3,215	2,268	947	71%	155	20	2,085	7.42%	7.42%
2035	3,195	2,332	863	73%	158	20	2,132	7.42%	7.20%
2036	3,175	2,406	769	76%	151	21	2,183	6.94%	6.94%
2037	3,156	2,481	675	79%	155	22	2,237	6.94%	6.74%
2038	3,141	2,569	572	82%	149	23	2,293	6.48%	6.48%
2039	3,129	2,660	469	85%	152	23	2,351	6.48%	6.28%
2040	3,122	2,767	355	89%	145	24	2,410	6.02%	6.02%
2041	3,120	2,878	242	92%	149	25	2,469	6.02%	5.83%
2042	3,122	3,004	118	96%	135	25	2,529	5.35%	5.35%
2043	3,131	3,131	0	100%	13	26	2,589	0.49%	0.49%
2044	3,144	3,144	0	100%	13	26	2,650	0.49%	0.49%
2045	3,162	3,162	0	100%	13	27	2,712	0.48%	0.48%
2046	3,184	3,184	0	100%	13	28	2,774	0.48%	0.48%
2047	3,208	3,208	0	100%	14	28	2,838	0.48%	0.48%
2048	3,233	3,233	0	100%	14	29	2,903	0.48%	0.48%
2049	3,260	3,260	0	100%	12	30	2,969	0.42%	0.42%
2050	3,287	3,287	0	100%	12	30	3,036	0.41%	0.41%
2051	3,315	3,315	0	100%	12	31	3,105	0.40%	0.40%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation and assumes constant active membership count in all future years.  
The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

**Kentucky Retirement Systems**  
**Exhibit 2-4**  
**CERS Non-Hazardous Insurance Fund**  
**Current Plan**  
**(\$ in Millions)**

Fiscal Year	Actuarial	Actuarial	Unfunded	Funded		Employer	Member	Covered	Employer	Employer
Beginning	Accrued	Value of	Actuarial	Ratio		Contribution	Contribution	Payroll	Contribution as %	Actuarially
July 1,	Liability	Assets	Accrued Liability	(3) / (2)					of Covered Payroll	Determined
(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)	(10)
2017	\$ 3,355	\$ 2,227	\$ 1,128	66%		\$ 114	\$ 10	\$ 2,429	4.70%	4.70%
2018	3,514	2,343	1,171	67%		154	11	2,477	6.21%	6.21%
2019	3,667	2,475	1,192	67%		153	13	2,524	6.06%	6.06%
2020	3,813	2,623	1,190	69%		154	14	2,572	5.98%	5.98%
2021	3,951	2,798	1,153	71%		153	15	2,619	5.84%	5.84%
2022	4,081	2,941	1,140	72%		150	17	2,668	5.62%	5.62%
2023	4,202	3,077	1,125	73%		149	18	2,718	5.48%	5.48%
2024	4,315	3,206	1,109	74%		148	19	2,768	5.35%	5.35%
2025	4,419	3,330	1,089	75%		147	20	2,820	5.21%	5.21%
2026	4,514	3,447	1,067	76%		146	22	2,873	5.08%	5.08%
2027	4,600	3,558	1,042	77%		145	23	2,926	4.96%	4.96%
2028	4,676	3,663	1,013	78%		144	24	2,982	4.83%	4.83%
2029	4,745	3,763	982	79%		144	26	3,040	4.72%	4.72%
2030	4,807	3,860	947	80%		143	27	3,102	4.60%	4.60%
2031	4,862	3,954	908	81%		143	28	3,166	4.51%	4.51%
2032	4,912	4,047	865	82%		143	29	3,232	4.42%	4.42%
2033	4,958	4,140	818	84%		144	31	3,301	4.35%	4.35%
2034	5,002	4,236	766	85%		144	32	3,372	4.28%	4.28%
2035	5,045	4,336	709	86%		146	33	3,445	4.23%	4.23%
2036	5,089	4,443	646	87%		147	34	3,522	4.18%	4.18%
2037	5,135	4,557	578	89%		150	35	3,605	4.15%	4.15%
2038	5,184	4,681	503	90%		151	36	3,691	4.10%	4.10%
2039	5,235	4,814	421	92%		155	37	3,780	4.09%	4.09%
2040	5,289	4,959	330	94%		157	38	3,872	4.06%	4.06%
2041	5,347	5,116	231	96%		160	39	3,965	4.04%	4.04%
2042	5,409	5,286	123	98%		166	40	4,059	4.08%	4.08%
2043	5,475	5,475	0	100%		41	41	4,156	0.98%	0.98%
2044	5,545	5,545	0	100%		41	42	4,253	0.97%	0.97%
2045	5,619	5,619	0	100%		42	43	4,352	0.97%	0.97%
2046	5,696	5,696	0	100%		42	44	4,453	0.95%	0.95%
2047	5,775	5,775	0	100%		43	46	4,555	0.94%	0.94%
2048	5,855	5,855	0	100%		43	47	4,660	0.92%	0.92%
2049	5,937	5,937	0	100%		43	48	4,766	0.91%	0.91%
2050	6,019	6,019	0	100%		43	49	4,874	0.89%	0.89%
2051	6,102	6,102	0	100%		44	50	4,985	0.88%	0.88%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation and assumes constant active membership count in all future years.  
The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

**Section 3.**  
**Projected Cost of the Retirement and Insurance**  
**Proposed Legislation**

**Kentucky Retirement Systems**  
**Exhibit 3-1**  
**KERS Non-Hazardous Retirement Fund**  
**Proposed Legislation**  
**(\$ in Millions)**

Fiscal Year	Actuarial	Actuarial	Unfunded	Funded				DC Plan	Employer	Member	Total	Total
Beginning	Accrued	Value of	Actuarial	Ratio	Employer	Member	Covered	Covered	Contribution	Contribution	Employer	Employer
July 1,	Liability	Assets	Accrued Liability	(3) / (2)	Contribution	Contribution	Payroll	Payroll	DC Plan	DC Plan	Contributions	Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(6) + (10)	(12) / [(8)+(9)]
2017	\$ 15,589	\$ 2,124	\$ 13,465	14%	\$ 629	\$ 77	\$ 1,532	\$ 0	\$ 0	\$ 0	\$ 629	41.06%
2018	15,614	2,021	13,593	13%	1,082	73	1,452	99	3	5	1,085	69.97%
2019	15,621	2,255	13,366	14%	1,083	73	1,453	121	4	6	1,087	69.04%
2020	15,607	2,517	13,090	16%	1,078	73	1,457	143	5	7	1,083	67.66%
2021	15,574	2,812	12,762	18%	1,075	73	1,463	165	6	8	1,081	66.40%
2022	15,521	3,086	12,435	20%	1,069	73	1,469	187	7	9	1,076	64.96%
2023	15,449	3,357	12,092	22%	1,064	74	1,477	210	7	10	1,071	63.51%
2024	15,358	3,626	11,732	24%	1,060	74	1,486	232	8	12	1,068	62.18%
2025	15,249	3,895	11,354	26%	1,056	75	1,497	254	9	13	1,065	60.83%
2026	15,123	4,167	10,956	28%	1,052	75	1,509	276	10	14	1,062	59.51%
2027	14,979	4,441	10,538	30%	1,048	76	1,521	298	10	15	1,058	58.17%
2028	14,825	4,726	10,099	32%	1,044	77	1,534	320	11	16	1,055	56.90%
2029	14,652	5,015	9,637	34%	1,040	77	1,548	343	12	17	1,052	55.64%
2030	14,461	5,311	9,150	37%	1,036	78	1,564	365	13	18	1,049	54.38%
2031	14,256	5,616	8,640	39%	1,033	79	1,583	387	14	19	1,047	53.14%
2032	14,037	5,935	8,102	42%	1,029	80	1,603	409	14	20	1,043	51.83%
2033	13,807	6,269	7,538	45%	1,026	81	1,625	431	15	22	1,041	50.63%
2034	13,564	6,620	6,944	49%	1,023	82	1,647	454	16	23	1,039	49.46%
2035	13,311	6,991	6,320	53%	1,020	84	1,671	476	17	24	1,037	48.29%
2036	13,050	7,387	5,663	57%	1,018	85	1,701	497	17	25	1,035	47.08%
2037	12,787	7,814	4,973	61%	1,017	87	1,735	517	18	26	1,035	45.94%
2038	12,526	8,279	4,247	66%	1,016	89	1,772	537	19	27	1,035	44.81%
2039	12,272	8,787	3,485	72%	1,016	91	1,811	557	19	28	1,035	43.71%
2040	12,024	9,343	2,681	78%	1,016	93	1,851	576	20	29	1,036	42.69%
2041	11,785	9,950	1,835	84%	1,016	95	1,891	596	21	30	1,037	41.70%
2042	11,555	10,611	944	92%	1,018	97	1,931	615	22	31	1,040	40.84%
2043	11,335	11,335	-	100%	52	99	1,973	635	22	32	74	2.84%
2044	11,124	11,124	-	100%	52	101	2,015	654	23	33	75	2.81%
2045	10,924	10,924	-	100%	52	103	2,058	673	24	34	76	2.78%
2046	10,736	10,736	-	100%	52	105	2,103	691	24	35	76	2.72%
2047	10,559	10,559	-	100%	53	107	2,149	710	25	35	78	2.73%
2048	10,395	10,395	-	100%	54	110	2,196	728	25	36	79	2.70%
2049	10,245	10,245	-	100%	54	112	2,245	746	26	37	80	2.68%
2050	10,109	10,109	-	100%	55	115	2,294	763	27	38	82	2.68%
2051	9,989	9,989	-	100%	56	117	2,346	781	27	39	83	2.65%

**Notes and assumptions:**

The projection is based on the results of the June 30, 2017 actuarial valuation.

The actuarial determined contribution is determined by the prior year's actuarial valuation.

The employer contribution amount shown does not include the \$87 million additional contribution budgeted to be paid in fiscal year beginning 2017.

It is assumed that the employer cost of defined contribution plan is 3.50% of pay, after reflecting the effects of forfeitures attributable to nonvested members, and that 25% of current Tier 3 members and 25% of future member elect to enter the DC plan.



**Kentucky Retirement Systems**  
**Exhibit 3-2**  
**CERS Non-Hazardous Retirement Fund**  
**Proposed Legislation**  
**(\$ in Millions)**

Fiscal Year	Actuarial	Actuarial	Unfunded	Funded					DC Plan	Employer	Member	Total	Total
Beginning	Accrued	Value of	Actuarial	Ratio	Employer	Member	Covered	Covered	Contribution	Contribution	Contributions	Employer	Employer
July 1,	Liability	Assets	Accrued Liability	(3) / (2)	Contribution	Contribution	Payroll	Payroll	DC Plan	DC Plan	(6) + (10)	(12)	Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(13)
2017	\$ 12,799	\$ 6,765	\$ 6,034	53%	\$ 355	\$ 123	\$ 2,452	\$ 0	\$ 0	\$ 0	\$ 355		14.48%
2018	13,096	6,871	6,225	52%	527	115	2,310	190	7	10	534		21.36%
2019	13,381	7,064	6,317	53%	536	116	2,321	226	8	11	544		21.36%
2020	13,646	7,330	6,316	54%	634	117	2,333	261	9	13	643		24.79%
2021	13,890	7,787	6,103	56%	629	117	2,346	296	10	15	639		24.19%
2022	14,112	8,157	5,955	58%	616	118	2,360	331	12	17	628		23.34%
2023	14,309	8,505	5,804	59%	611	119	2,374	366	13	18	624		22.78%
2024	14,482	8,836	5,646	61%	605	119	2,389	401	14	20	619		22.18%
2025	14,628	9,151	5,477	63%	600	120	2,406	436	15	22	615		21.64%
2026	14,748	9,448	5,300	64%	594	121	2,423	471	16	24	610		21.08%
2027	14,838	9,726	5,112	66%	589	122	2,441	506	18	25	607		20.59%
2028	14,909	9,996	4,913	67%	584	123	2,462	541	19	27	603		20.08%
2029	14,951	10,250	4,701	69%	580	124	2,487	576	20	29	600		19.59%
2030	14,967	10,488	4,479	70%	575	126	2,514	610	21	30	596		19.08%
2031	14,957	10,714	4,243	72%	571	127	2,544	644	23	32	594		18.64%
2032	14,923	10,931	3,992	73%	567	129	2,576	677	24	34	591		18.16%
2033	14,867	11,139	3,728	75%	564	131	2,612	711	25	36	589		17.73%
2034	14,789	11,342	3,447	77%	560	132	2,650	744	26	37	586		17.27%
2035	14,689	11,540	3,149	79%	557	134	2,689	777	27	39	584		16.85%
2036	14,572	11,739	2,833	81%	555	137	2,735	810	28	40	583		16.45%
2037	14,442	11,943	2,499	83%	553	139	2,786	841	29	42	582		16.04%
2038	14,304	12,160	2,144	85%	552	142	2,842	872	31	44	583		15.70%
2039	14,163	12,396	1,767	88%	551	145	2,901	902	32	45	583		15.33%
2040	14,021	12,653	1,368	90%	551	148	2,962	933	33	47	584		15.00%
2041	13,880	12,938	942	93%	551	151	3,025	963	34	48	585		14.67%
2042	13,742	13,253	489	96%	553	155	3,091	992	35	50	588		14.40%
2043	13,610	13,610	-	100%	52	158	3,158	1,022	36	51	88		2.11%
2044	13,483	13,483	-	100%	52	161	3,227	1,051	37	53	89		2.08%
2045	13,364	13,364	-	100%	52	165	3,297	1,080	38	54	90		2.06%
2046	13,254	13,254	-	100%	53	168	3,370	1,108	39	55	92		2.05%
2047	13,154	13,154	-	100%	53	172	3,444	1,137	40	57	93		2.03%
2048	13,065	13,065	-	100%	54	176	3,520	1,166	41	58	95		2.03%
2049	12,987	12,987	-	100%	55	180	3,598	1,194	42	60	97		2.02%
2050	12,923	12,923	-	100%	56	184	3,678	1,223	43	61	99		2.02%
2051	12,873	12,873	-	100%	57	188	3,761	1,251	44	63	101		2.02%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation.

The actuarial determined contribution is determined by the prior year's actuarial valuation.

It is assumed that the employer cost of defined contribution plan is 3.50% of pay, after reflecting the effects of forfeitures attributable to nonvested members, and that 25% of current Tier 3 members and 25% of future member elect to enter the DC plan.

**Kentucky Retirement Systems**  
**Exhibit 3-3**  
**KERS Non-Hazardous Insurance Fund**  
**Proposed Legislation**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2017	\$ 2,683	\$ 824	\$ 1,859	31%	\$ 128	\$ 5	\$ 1,524	8.41%	8.41%
2018	2,760	874	1,886	32%	191	12	1,541	12.40%	12.40%
2019	2,837	981	1,856	35%	194	13	1,564	12.40%	11.69%
2020	2,907	1,100	1,807	38%	178	14	1,590	11.19%	11.19%
2021	2,972	1,212	1,760	41%	176	15	1,617	10.88%	10.88%
2022	3,032	1,313	1,719	43%	174	15	1,645	10.58%	10.58%
2023	3,085	1,409	1,676	46%	172	16	1,675	10.27%	10.27%
2024	3,133	1,503	1,630	48%	170	17	1,706	9.96%	9.96%
2025	3,174	1,592	1,582	50%	169	17	1,738	9.72%	9.72%
2026	3,208	1,677	1,531	52%	167	18	1,772	9.42%	9.42%
2027	3,235	1,758	1,477	54%	165	19	1,806	9.14%	9.14%
2028	3,254	1,834	1,420	56%	164	19	1,841	8.91%	8.91%
2029	3,264	1,905	1,359	58%	162	20	1,877	8.63%	8.63%
2030	3,265	1,970	1,295	60%	160	20	1,915	8.36%	8.36%
2031	3,259	2,032	1,227	62%	158	21	1,956	8.08%	8.08%
2032	3,248	2,093	1,155	64%	157	21	1,998	7.86%	7.86%
2033	3,233	2,154	1,079	67%	157	22	2,041	7.69%	7.69%
2034	3,215	2,216	999	69%	156	22	2,085	7.48%	7.48%
2035	3,195	2,281	914	71%	156	22	2,132	7.32%	7.32%
2036	3,175	2,351	824	74%	156	22	2,183	7.15%	7.15%
2037	3,156	2,429	727	77%	157	23	2,237	7.02%	7.02%
2038	3,141	2,516	625	80%	157	23	2,293	6.85%	6.85%
2039	3,129	2,614	515	84%	157	24	2,351	6.68%	6.68%
2040	3,122	2,722	400	87%	158	24	2,410	6.56%	6.56%
2041	3,120	2,844	276	91%	159	25	2,469	6.44%	6.44%
2042	3,122	2,979	143	95%	160	25	2,529	6.33%	6.33%
2043	3,131	3,131	-	100%	13	26	2,589	0.49%	0.49%
2044	3,144	3,144	-	100%	13	26	2,650	0.49%	0.49%
2045	3,162	3,162	-	100%	13	27	2,712	0.48%	0.48%
2046	3,184	3,184	-	100%	13	28	2,774	0.48%	0.48%
2047	3,208	3,208	-	100%	14	28	2,838	0.48%	0.48%
2048	3,233	3,233	-	100%	14	29	2,903	0.48%	0.48%
2049	3,260	3,260	-	100%	12	30	2,969	0.42%	0.42%
2050	3,287	3,287	-	100%	12	30	3,036	0.41%	0.41%
2051	3,315	3,315	-	100%	12	31	3,105	0.40%	0.40%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation.

The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

**Kentucky Retirement Systems**  
**Exhibit 3-4**  
**CERS Non-Hazardous Insurance Fund**  
**Proposed Legislation**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2017	\$ 3,355	\$ 2,227	\$ 1,128	66%	\$ 114	\$ 10	\$ 2,429	4.70%	4.70%
2018	3,514	2,343	1,171	67%	154	21	2,477	6.21%	6.21%
2019	3,667	2,484	1,183	68%	143	26	2,524	5.66%	5.66%
2020	3,813	2,637	1,176	69%	155	27	2,572	6.03%	6.03%
2021	3,951	2,826	1,125	72%	153	28	2,619	5.84%	5.84%
2022	4,081	2,984	1,097	73%	148	28	2,668	5.55%	5.55%
2023	4,202	3,133	1,069	75%	146	29	2,718	5.37%	5.37%
2024	4,315	3,275	1,040	76%	144	30	2,768	5.20%	5.20%
2025	4,419	3,410	1,009	77%	142	31	2,820	5.04%	5.04%
2026	4,514	3,537	977	78%	140	32	2,873	4.87%	4.87%
2027	4,600	3,658	942	80%	138	32	2,926	4.72%	4.72%
2028	4,676	3,771	905	81%	135	33	2,982	4.53%	4.53%
2029	4,745	3,878	867	82%	134	34	3,040	4.41%	4.41%
2030	4,807	3,981	826	83%	131	35	3,102	4.22%	4.22%
2031	4,862	4,079	783	84%	130	35	3,166	4.11%	4.11%
2032	4,912	4,174	738	85%	129	36	3,232	3.99%	3.99%
2033	4,958	4,267	691	86%	129	36	3,301	3.91%	3.91%
2034	5,002	4,361	641	87%	129	36	3,372	3.83%	3.83%
2035	5,045	4,457	588	88%	130	36	3,445	3.77%	3.77%
2036	5,089	4,558	531	90%	130	36	3,522	3.69%	3.69%
2037	5,135	4,664	471	91%	131	37	3,605	3.63%	3.63%
2038	5,184	4,777	407	92%	131	38	3,691	3.55%	3.55%
2039	5,235	4,897	338	94%	132	38	3,780	3.49%	3.49%
2040	5,289	5,025	264	95%	134	39	3,872	3.46%	3.46%
2041	5,347	5,163	184	97%	135	40	3,965	3.40%	3.40%
2042	5,409	5,311	98	98%	138	41	4,059	3.40%	3.40%
2043	5,475	5,475	-	100%	41	42	4,156	0.98%	0.98%
2044	5,545	5,545	-	100%	41	43	4,253	0.97%	0.97%
2045	5,619	5,619	-	100%	42	44	4,352	0.97%	0.97%
2046	5,696	5,696	-	100%	42	45	4,453	0.95%	0.95%
2047	5,775	5,775	-	100%	43	46	4,555	0.94%	0.94%
2048	5,855	5,855	-	100%	43	47	4,660	0.92%	0.92%
2049	5,937	5,937	-	100%	43	48	4,766	0.91%	0.91%
2050	6,019	6,019	-	100%	43	49	4,874	0.89%	0.89%
2051	6,102	6,102	-	100%	44	50	4,985	0.88%	0.88%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation.

The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

**Section 4:**  
**Alternative Scenario for KERS Non-Hazardous**  
**Projected Cost of the Retirement and Insurance**  
**Current Plan with Projected Population Decrease**

**Kentucky Retirement Systems**  
**Exhibit 4-1 (Alternative Assumptions that Assume a Decreasing Active Membership)**  
**KERS Non-Hazardous Retirement Fund**  
**Comparison of Fiscal Impact**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Unfunded Actuarial Accrued Liability			Funded Ratio			Employer Contribution			Employer Contribution Rate		
	Current	Proposed	Difference	Current	Proposed	Difference	Current	Proposed	Difference	Current	Proposed	Difference
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2017	\$ 13,468	\$ 13,465	\$ (3)	14%	14%	0%	\$ 629	\$ 629	\$ 0	41.1%	41.1%	0.0%
2018	13,590	13,593	3	13%	13%	0%	1,085	1,083	(2)	71.0%	70.9%	-0.2%
2019	13,364	13,366	2	15%	14%	-1%	1,084	1,071	(13)	71.0%	70.2%	-0.9%
2020	13,089	13,104	15	16%	16%	0%	1,081	1,081	0	70.9%	70.8%	0.0%
2021	12,763	12,777	14	18%	18%	0%	1,081	1,078	(3)	70.9%	70.7%	-0.2%
2022	12,433	12,449	16	20%	20%	0%	1,071	1,071	-	70.3%	70.2%	0.0%
2023	12,092	12,106	14	22%	22%	0%	1,071	1,067	(4)	70.3%	70.0%	-0.3%
2024	11,729	11,746	17	24%	23%	-1%	1,063	1,062	(1)	69.7%	69.7%	-0.1%
2025	11,351	11,368	17	26%	25%	-1%	1,063	1,059	(4)	69.7%	69.4%	-0.3%
2026	10,950	10,969	19	28%	27%	-1%	1,054	1,054	-	69.1%	69.1%	0.0%
2027	10,532	10,551	19	30%	29%	-1%	1,054	1,051	(3)	69.1%	68.9%	-0.2%
2028	10,089	10,110	21	32%	31%	-1%	1,045	1,046	1	68.6%	68.6%	0.0%
2029	9,628	9,647	19	35%	34%	-1%	1,045	1,042	(3)	68.6%	68.4%	-0.2%
2030	9,140	9,160	20	37%	36%	-1%	1,037	1,038	1	68.1%	68.2%	0.0%
2031	8,630	8,648	18	40%	39%	-1%	1,038	1,035	(3)	68.1%	67.9%	-0.2%
2032	8,089	8,110	21	43%	41%	-2%	1,031	1,031	-	67.6%	67.6%	0.0%
2033	7,525	7,544	19	46%	44%	-2%	1,032	1,027	(5)	67.6%	67.2%	-0.3%
2034	6,927	6,948	21	49%	48%	-1%	1,023	1,024	1	66.9%	67.0%	0.0%
2035	6,302	6,322	20	53%	51%	-2%	1,025	1,020	(5)	66.9%	66.6%	-0.3%
2036	5,641	5,664	23	57%	55%	-2%	1,019	1,018	(1)	66.3%	66.3%	0.0%
2037	4,951	4,973	22	62%	60%	-2%	1,023	1,016	(7)	66.3%	65.8%	-0.5%
2038	4,217	4,245	28	67%	65%	-2%	1,014	1,014	-	65.4%	65.4%	0.0%
2039	3,453	3,481	28	72%	70%	-2%	1,019	1,012	(7)	65.4%	64.9%	-0.5%
2040	2,643	2,677	34	78%	77%	-1%	1,005	1,012	7	64.2%	64.6%	0.4%
2041	1,803	1,830	27	85%	84%	-1%	1,010	1,010	-	64.2%	64.2%	0.0%
2042	914	939	25	92%	91%	-1%	988	1,009	21	62.5%	63.9%	1.3%
2043	-	-	-	100%	100%	0%	46	46	-	2.9%	2.9%	0.0%
2044	-	-	-	100%	100%	0%	46	45	(1)	2.9%	2.8%	-0.1%
2045	-	-	-	100%	100%	0%	46	45	(1)	2.9%	2.8%	0.0%
2046	-	-	-	100%	100%	0%	45	45	-	2.8%	2.8%	0.0%
2047	-	-	-	100%	100%	0%	45	44	(1)	2.8%	2.8%	-0.1%
2048	-	-	-	100%	100%	0%	45	43	(2)	2.8%	2.7%	-0.1%
2049	-	-	-	100%	100%	0%	45	43	(2)	2.8%	2.7%	-0.1%
2050	-	-	-	100%	100%	0%	45	43	(2)	2.8%	2.7%	-0.1%
2051	-	-	-	100%	100%	0%	45	43	(2)	2.8%	2.7%	-0.1%

Notes and assumptions:

The active membership population count is assumed to decrease by 2% per year each future year.

It is assumed that the employer cost of defined contribution plan is 3.50% of pay, after reflecting the effects of forfeitures attributable to nonvested members, and that 25% of current Tier 3 members and 25% of future member elect to enter the DC plan.

**Kentucky Retirement Systems**  
**Exhibit 4-2 (Alternative Assumptions that Assume a Decreasing Active Membership)**  
**KERS Non-Hazardous Insurance Fund**  
**Summary of Fiscal Impact**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Unfunded Actuarial Accrued Liability			Funded Ratio			Employer Contribution			Employer Contribution Rate		
	Current	Proposed	Difference	Current	Proposed	Difference	Current	Proposed	Difference	Current	Proposed	Difference
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2017	\$ 1,859	\$ 1,859	\$ -	31%	31%	0%	\$ 128	\$ 128	\$ 0	8.4%	8.4%	0.0%
2018	1,886	1,886	-	32%	32%	0%	188	188	-	12.4%	12.4%	0.0%
2019	1,864	1,858	(6)	34%	34%	0%	188	188	-	12.4%	12.4%	0.0%
2020	1,828	1,815	(13)	37%	38%	1%	185	178	(7)	12.2%	11.7%	-0.5%
2021	1,781	1,768	(13)	40%	40%	0%	185	176	(9)	12.2%	11.6%	-0.6%
2022	1,737	1,726	(11)	43%	43%	0%	180	173	(7)	11.9%	11.4%	-0.5%
2023	1,693	1,683	(10)	45%	45%	0%	180	172	(8)	11.9%	11.4%	-0.5%
2024	1,646	1,638	(8)	47%	48%	1%	176	170	(6)	11.6%	11.2%	-0.4%
2025	1,597	1,590	(7)	49%	50%	1%	176	168	(8)	11.6%	11.1%	-0.5%
2026	1,543	1,538	(5)	52%	52%	0%	172	166	(6)	11.4%	11.0%	-0.4%
2027	1,489	1,484	(5)	54%	54%	0%	172	164	(8)	11.4%	10.8%	-0.5%
2028	1,428	1,426	(2)	56%	56%	0%	167	162	(5)	11.1%	10.7%	-0.3%
2029	1,366	1,364	(2)	58%	58%	0%	167	160	(7)	11.1%	10.6%	-0.5%
2030	1,299	1,299	-	60%	60%	0%	163	158	(5)	10.8%	10.5%	-0.3%
2031	1,231	1,231	-	62%	62%	0%	163	157	(6)	10.8%	10.4%	-0.4%
2032	1,156	1,158	2	64%	64%	0%	159	155	(4)	10.5%	10.2%	-0.3%
2033	1,079	1,081	2	66%	66%	0%	159	154	(5)	10.5%	10.2%	-0.3%
2034	996	1,001	5	68%	68%	0%	156	154	(2)	10.3%	10.1%	-0.1%
2035	910	914	4	71%	70%	-1%	156	154	(2)	10.3%	10.1%	-0.2%
2036	817	823	6	73%	73%	0%	154	153	(1)	10.1%	10.0%	-0.1%
2037	720	726	6	76%	76%	0%	155	153	(2)	10.1%	10.0%	-0.1%
2038	616	623	7	79%	79%	0%	153	153	-	9.9%	9.9%	0.0%
2039	506	513	7	83%	83%	0%	154	153	(1)	9.9%	9.9%	-0.1%
2040	389	397	8	87%	86%	-1%	151	153	2	9.7%	9.8%	0.1%
2041	267	273	6	91%	91%	0%	152	153	1	9.7%	9.8%	0.1%
2042	136	141	5	95%	95%	0%	149	154	5	9.5%	9.8%	0.3%
2043	-	-	-	100%	100%	0%	8	8	-	0.5%	0.5%	0.0%
2044	-	-	-	100%	100%	0%	8	8	-	0.5%	0.5%	0.0%
2045	-	-	-	100%	100%	0%	8	8	-	0.5%	0.5%	0.0%
2046	-	-	-	100%	100%	0%	8	8	-	0.5%	0.5%	0.0%
2047	-	-	-	100%	100%	0%	8	8	-	0.5%	0.5%	0.0%
2048	-	-	-	100%	100%	0%	8	8	-	0.5%	0.5%	0.0%
2049	-	-	-	100%	100%	0%	7	7	-	0.4%	0.4%	0.0%
2050	-	-	-	100%	100%	0%	7	7	-	0.4%	0.4%	0.0%
2051	-	-	-	100%	100%	0%	6	6	-	0.4%	0.4%	0.0%

Notes and assumptions:

The active membership population count is assumed to decrease by 2% per year each future year.

**Kentucky Retirement Systems**  
**Exhibit 4-3 (Alternative Assumptions that Assume a Decreasing Active Membership)**  
**KERS Non-Hazardous Retirement Fund**  
**Current Plan**  
**(\$ in Millions)**

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2017	\$ 15,592	\$ 2,124	\$ 13,468	14%	\$ 629	\$ 77	\$ 1,532	41.06%	41.98%
2018	15,628	2,038	13,590	13%	1,085	76	1,528	71.03%	71.03%
2019	15,642	2,278	13,364	15%	1,084	76	1,526	71.03%	70.87%
2020	15,635	2,546	13,089	16%	1,081	76	1,526	70.85%	70.85%
2021	15,610	2,847	12,763	18%	1,081	76	1,526	70.85%	70.65%
2022	15,566	3,133	12,433	20%	1,071	76	1,525	70.27%	70.27%
2023	15,503	3,411	12,092	22%	1,071	76	1,525	70.27%	70.00%
2024	15,421	3,692	11,729	24%	1,063	76	1,525	69.71%	69.71%
2025	15,321	3,970	11,351	26%	1,063	76	1,525	69.71%	69.45%
2026	15,204	4,254	10,950	28%	1,054	76	1,525	69.14%	69.14%
2027	15,068	4,536	10,532	30%	1,054	76	1,525	69.14%	68.87%
2028	14,922	4,833	10,089	32%	1,045	76	1,524	68.60%	68.60%
2029	14,757	5,129	9,628	35%	1,045	76	1,523	68.60%	68.36%
2030	14,574	5,434	9,140	37%	1,037	76	1,523	68.11%	68.11%
2031	14,375	5,745	8,630	40%	1,038	76	1,525	68.11%	67.87%
2032	14,163	6,074	8,089	43%	1,031	76	1,526	67.55%	67.55%
2033	13,937	6,412	7,525	46%	1,032	76	1,528	67.55%	67.27%
2034	13,699	6,772	6,927	49%	1,023	76	1,529	66.93%	66.93%
2035	13,447	7,145	6,302	53%	1,025	77	1,531	66.93%	66.66%
2036	13,187	7,546	5,641	57%	1,019	77	1,536	66.32%	66.32%
2037	12,924	7,973	4,951	62%	1,023	77	1,543	66.32%	65.92%
2038	12,661	8,444	4,217	67%	1,014	78	1,551	65.36%	65.36%
2039	12,401	8,948	3,453	72%	1,019	78	1,559	65.36%	64.85%
2040	12,146	9,503	2,643	78%	1,005	78	1,567	64.15%	64.15%
2041	11,896	10,093	1,803	85%	1,010	79	1,574	64.15%	63.65%
2042	11,652	10,738	914	92%	988	79	1,580	62.54%	62.54%
2043	11,414	11,414	-	100%	46	79	1,585	2.93%	2.93%
2044	11,182	11,182	-	100%	46	79	1,589	2.89%	2.89%
2045	10,956	10,956	-	100%	46	80	1,593	2.86%	2.86%
2046	10,737	10,737	-	100%	45	80	1,596	2.84%	2.84%
2047	10,524	10,524	-	100%	45	80	1,600	2.82%	2.82%
2048	10,318	10,318	-	100%	45	80	1,603	2.80%	2.80%
2049	10,120	10,120	-	100%	45	80	1,606	2.79%	2.79%
2050	9,931	9,931	-	100%	45	80	1,609	2.79%	2.79%
2051	9,750	9,750	-	100%	45	81	1,611	2.78%	2.78%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation. The active membership population count is assumed to decrease by 2% per year each future year.

The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

The employer contribution amount shown does not include the \$87 million additional contribution budgeted to be paid in fiscal year beginning 2017.



**Kentucky Retirement Systems**  
**Exhibit 4-4 (Alternative Assumptions that Assume a Decreasing Active Membership)**  
**KERS Non-Hazardous Retirement Fund**  
**Proposed Legislation**  
**(\$ in Millions)**

Fiscal Year	Actuarial	Actuarial	Unfunded	Funded	Employer	Member	Pension Plan	DC Plan	Employer	Member	Total	Total
Beginning	Accrued	Value of	Actuarial	Ratio	Contribution	Contribution	Covered	Covered	Contribution	Contribution	Employer	Employer
July 1,	Liability	Assets	Accrued Liability	(3) / (2)	Pension Plan	Pension Plan	Payroll	Payroll	DC Plan	DC Plan	(6) + (10)	(12) / [(8)+(9)]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2017	\$ 15,589	\$ 2,124	\$ 13,465	14%	\$ 629	\$ 77	\$ 1,532	\$ 0	\$ 0	\$ 0	\$ 629	41.06%
2018	15,614	2,021	13,593	13%	1,080	72	1,435	93	3	5	1,083	70.88%
2019	15,619	2,253	13,366	14%	1,067	71	1,417	109	4	5	1,071	70.17%
2020	15,602	2,498	13,104	16%	1,077	70	1,401	125	4	6	1,081	70.84%
2021	15,565	2,788	12,777	18%	1,073	69	1,386	140	5	7	1,078	70.66%
2022	15,506	3,057	12,449	20%	1,066	69	1,370	155	5	8	1,071	70.24%
2023	15,426	3,320	12,106	22%	1,061	68	1,356	169	6	8	1,067	69.98%
2024	15,326	3,580	11,746	23%	1,056	67	1,341	183	6	9	1,062	69.66%
2025	15,206	3,838	11,368	25%	1,052	66	1,328	197	7	10	1,059	69.44%
2026	15,066	4,097	10,969	27%	1,047	66	1,314	211	7	11	1,054	69.11%
2027	14,906	4,355	10,551	29%	1,043	65	1,300	224	8	11	1,051	68.94%
2028	14,733	4,623	10,110	31%	1,038	64	1,286	238	8	12	1,046	68.64%
2029	14,539	4,892	9,647	34%	1,033	64	1,272	251	9	13	1,042	68.41%
2030	14,325	5,165	9,160	36%	1,029	63	1,259	264	9	13	1,038	68.15%
2031	14,092	5,444	8,648	39%	1,025	62	1,249	276	10	14	1,035	67.89%
2032	13,843	5,733	8,110	41%	1,021	62	1,238	288	10	14	1,031	67.57%
2033	13,579	6,035	7,544	44%	1,017	61	1,228	299	10	15	1,027	67.23%
2034	13,299	6,351	6,948	48%	1,013	61	1,218	311	11	16	1,024	66.98%
2035	13,004	6,682	6,322	51%	1,009	60	1,209	322	11	16	1,020	66.63%
2036	12,698	7,034	5,664	55%	1,006	60	1,204	331	12	17	1,018	66.28%
2037	12,386	7,413	4,973	60%	1,004	60	1,203	340	12	17	1,016	65.84%
2038	12,071	7,826	4,245	65%	1,002	60	1,204	348	12	17	1,014	65.37%
2039	11,758	8,277	3,481	70%	1,000	60	1,205	355	12	18	1,012	64.90%
2040	11,448	8,771	2,677	77%	999	60	1,206	361	13	18	1,012	64.58%
2041	11,141	9,311	1,830	84%	997	60	1,206	368	13	18	1,010	64.18%
2042	10,838	9,899	939	91%	996	60	1,206	374	13	19	1,009	63.88%
2043	10,539	10,539	-	100%	33	60	1,206	379	13	19	46	2.90%
2044	10,244	10,244	-	100%	32	60	1,205	384	13	19	45	2.83%
2045	9,955	9,955	-	100%	31	60	1,205	388	14	19	45	2.83%
2046	9,672	9,672	-	100%	31	60	1,204	392	14	20	45	2.82%
2047	9,395	9,395	-	100%	30	60	1,205	395	14	20	44	2.75%
2048	9,125	9,125	-	100%	29	60	1,205	398	14	20	43	2.68%
2049	8,863	8,863	-	100%	29	60	1,206	399	14	20	43	2.68%
2050	8,611	8,611	-	100%	29	60	1,208	401	14	20	43	2.67%
2051	8,369	8,369	-	100%	29	60	1,209	402	14	20	43	2.67%

**Notes and assumptions:**

The projection is based on the results of the June 30, 2017 actuarial valuation. The active membership population count is assumed to decrease by 2% per year each future year. The actuarial determined contribution is determined by the prior year's actuarial valuation. The employer contribution amount shown does not include the \$87 million additional contribution budgeted to be paid in fiscal year beginning 2017. It is assumed that the employer cost of defined contribution plan is 3.50% of pay, after reflecting the effects of forfeitures attributable to nonvested members, and that 25% of current Tier 3 members and 25% of future member elect to enter the DC plan.

**Kentucky Retirement Systems**  
**Exhibit 4-5 (Alternative Assumptions that Assume a Decreasing Active Membership)**  
**KERS Non-Hazardous Insurance Fund**  
**Current Plan**  
**(\$ in Millions)**

Fiscal Year	Actuarial	Actuarial	Unfunded	Funded	Employer	Member	Covered	Employer	Employer
Beginning	Accrued	Value of	Actuarial	Ratio	Contribution	Contribution	Payroll	Contribution as %	Actuarially
July 1,	Liability	Assets	Accrued Liability	(3) / (2)				of Covered Payroll	Determined
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2017	\$ 2,683	\$ 824	\$ 1,859	31%	\$ 128	\$ 5	\$ 1,524	8.41%	8.41%
2018	2,760	874	1,886	32%	188	6	1,518	12.40%	12.40%
2019	2,836	972	1,864	34%	188	7	1,516	12.40%	12.28%
2020	2,905	1,077	1,828	37%	185	7	1,516	12.21%	12.21%
2021	2,969	1,188	1,781	40%	185	8	1,515	12.21%	12.09%
2022	3,026	1,289	1,737	43%	180	8	1,514	11.90%	11.90%
2023	3,077	1,384	1,693	45%	180	9	1,514	11.90%	11.77%
2024	3,122	1,476	1,646	47%	176	9	1,514	11.63%	11.63%
2025	3,159	1,562	1,597	49%	176	10	1,514	11.63%	11.50%
2026	3,188	1,645	1,543	52%	172	10	1,514	11.35%	11.35%
2027	3,210	1,721	1,489	54%	172	11	1,514	11.35%	11.21%
2028	3,222	1,794	1,428	56%	167	11	1,513	11.05%	11.05%
2029	3,224	1,858	1,366	58%	167	12	1,512	11.05%	10.91%
2030	3,217	1,918	1,299	60%	163	12	1,512	10.76%	10.76%
2031	3,202	1,971	1,231	62%	163	13	1,514	10.76%	10.63%
2032	3,180	2,024	1,156	64%	159	13	1,515	10.49%	10.49%
2033	3,153	2,074	1,079	66%	159	13	1,517	10.49%	10.39%
2034	3,122	2,126	996	68%	156	14	1,518	10.28%	10.28%
2035	3,087	2,177	910	71%	156	14	1,520	10.28%	10.21%
2036	3,051	2,234	817	73%	154	15	1,525	10.12%	10.12%
2037	3,015	2,295	720	76%	155	15	1,532	10.12%	10.03%
2038	2,980	2,364	616	79%	153	15	1,540	9.93%	9.93%
2039	2,947	2,441	506	83%	154	15	1,548	9.93%	9.84%
2040	2,917	2,528	389	87%	151	15	1,556	9.73%	9.73%
2041	2,890	2,623	267	91%	152	15	1,562	9.73%	9.65%
2042	2,866	2,730	136	95%	149	16	1,568	9.51%	9.51%
2043	2,846	2,846	-	100%	8	16	1,573	0.49%	0.49%
2044	2,829	2,829	-	100%	8	16	1,578	0.49%	0.49%
2045	2,814	2,814	-	100%	8	16	1,582	0.48%	0.48%
2046	2,800	2,800	-	100%	8	16	1,585	0.48%	0.48%
2047	2,787	2,787	-	100%	8	16	1,588	0.48%	0.48%
2048	2,773	2,773	-	100%	8	16	1,591	0.48%	0.48%
2049	2,759	2,759	-	100%	7	16	1,594	0.42%	0.42%
2050	2,743	2,743	-	100%	7	16	1,597	0.41%	0.41%
2051	2,725	2,725	-	100%	6	16	1,600	0.40%	0.40%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation. The active membership population count is assumed to decrease by 2% per year each future year. The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.

**Kentucky Retirement Systems**  
**Exhibit 4-6 (Alternative Assumptions that Assume a Decreasing Active Membership)**  
**KERS Non-Hazardous Insurance Fund**  
**Proposed Legislation**  
**(\$ in Millions)**

Fiscal Year	Actuarial	Actuarial	Unfunded	Funded		Employer	Member	Covered	Employer	Employer
Beginning	Accrued	Value of	Actuarial	Ratio		Contribution	Contribution	Payroll	Contribution as %	Actuarially
July 1,	Liability	Assets	Accrued Liability	(3) / (2)					of Covered Payroll	Determined
(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)	(10)
2017	\$ 2,683	\$ 824	\$ 1,859	31%		\$ 128	\$ 5	\$ 1,524	8.41%	8.41%
2018	2,760	874	1,886	32%		188	12	1,518	12.40%	12.40%
2019	2,836	978	1,858	34%		188	13	1,516	12.40%	11.87%
2020	2,905	1,090	1,815	38%		178	13	1,516	11.74%	11.74%
2021	2,969	1,201	1,768	40%		176	14	1,515	11.62%	11.62%
2022	3,026	1,300	1,726	43%		173	14	1,514	11.43%	11.43%
2023	3,077	1,394	1,683	45%		172	14	1,514	11.36%	11.36%
2024	3,122	1,484	1,638	48%		170	15	1,514	11.23%	11.23%
2025	3,159	1,569	1,590	50%		168	15	1,514	11.10%	11.10%
2026	3,188	1,650	1,538	52%		166	15	1,514	10.96%	10.96%
2027	3,210	1,726	1,484	54%		164	16	1,514	10.83%	10.83%
2028	3,222	1,796	1,426	56%		162	16	1,513	10.71%	10.71%
2029	3,224	1,860	1,364	58%		160	16	1,512	10.58%	10.58%
2030	3,217	1,918	1,299	60%		158	16	1,512	10.45%	10.45%
2031	3,202	1,971	1,231	62%		157	16	1,514	10.37%	10.37%
2032	3,180	2,022	1,158	64%		155	17	1,515	10.23%	10.23%
2033	3,153	2,072	1,081	66%		154	16	1,517	10.15%	10.15%
2034	3,122	2,121	1,001	68%		154	16	1,518	10.14%	10.14%
2035	3,087	2,173	914	70%		154	16	1,520	10.13%	10.13%
2036	3,051	2,228	823	73%		153	16	1,525	10.03%	10.03%
2037	3,015	2,289	726	76%		153	16	1,532	9.99%	9.99%
2038	2,980	2,357	623	79%		153	16	1,540	9.94%	9.94%
2039	2,947	2,434	513	83%		153	16	1,548	9.88%	9.88%
2040	2,917	2,520	397	86%		153	16	1,556	9.83%	9.83%
2041	2,890	2,617	273	91%		153	16	1,562	9.80%	9.80%
2042	2,866	2,725	141	95%		154	16	1,568	9.82%	9.82%
2043	2,846	2,846	-	100%		8	16	1,573	0.49%	0.49%
2044	2,829	2,829	-	100%		8	16	1,578	0.49%	0.49%
2045	2,814	2,814	-	100%		8	16	1,582	0.48%	0.48%
2046	2,800	2,800	-	100%		8	16	1,585	0.48%	0.48%
2047	2,787	2,787	-	100%		8	16	1,588	0.48%	0.48%
2048	2,773	2,773	-	100%		8	16	1,591	0.48%	0.48%
2049	2,759	2,759	-	100%		7	16	1,594	0.42%	0.42%
2050	2,743	2,743	-	100%		7	16	1,597	0.41%	0.41%
2051	2,725	2,725	-	100%		6	16	1,600	0.40%	0.40%

Notes and assumptions:

The projection is based on the results of the June 30, 2017 actuarial valuation. The active membership population count is assumed to decrease by 2% per year each future year. The employer actuarially determined contribution rate for a particular year is determined by the prior year's actuarial valuation.