



2018 NCCMP Annual Conference **KEEPING HEALTHY PLANS HEALTHY**

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 **Segal Consulting**

Multiemployer Universe

Distribution of Zone Status

Zone	Plans	Participants (Millions)	Average Funded Percentage (Market Value)
Green	773	6.1	92%
Yellow	149	1.2	69%
Red	204	2.1	64%
Critical and Declining	116	1.3	50%
Total	1,242	10.7	81%

62% of Plans are in the Green Zone

Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.



Discussion Topics

- 1. Assessing a Plan's Health—Not as Simple as it Seems**
2. What are the Factors in Assessing a Plan's Health
3. Strategies for Healthy Plans

Case Study #1

Which of These Two **Green Zone** Plans is Healthier?

Zone Status: **Green Zone**

Key Results at 1/1/2018	Plan A	Plan B
Valuation Interest Rate	7.5%	7.5%
Funded Percentage	96%	82%
Inactive/Active Participant Ratio	2.2	1.4
Contributions/Assets	2.0%	6.2%

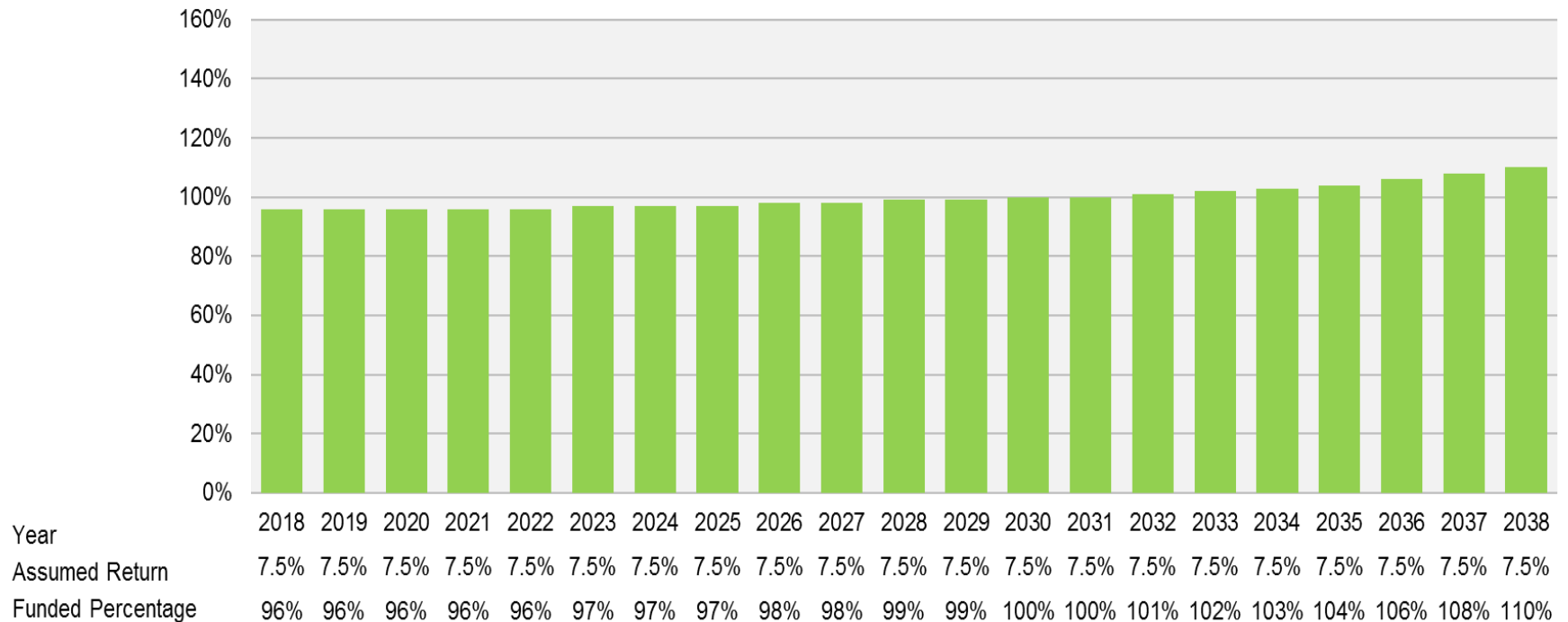
Anecdotal History

- **Plan A:** “**Green Zone**” since 2008; some corrective action taken in recent years; contributions barely cover normal cost; some work level declines in recent years (trustees believe they have stabilized)
- **Plan B:** Recently emerged from endangered status; significant increases to contributions in recent years; reduced future accrual rate; relatively stable work levels in recent years

Case Study #1

Plan A: 7.5% Returns in All Future Years

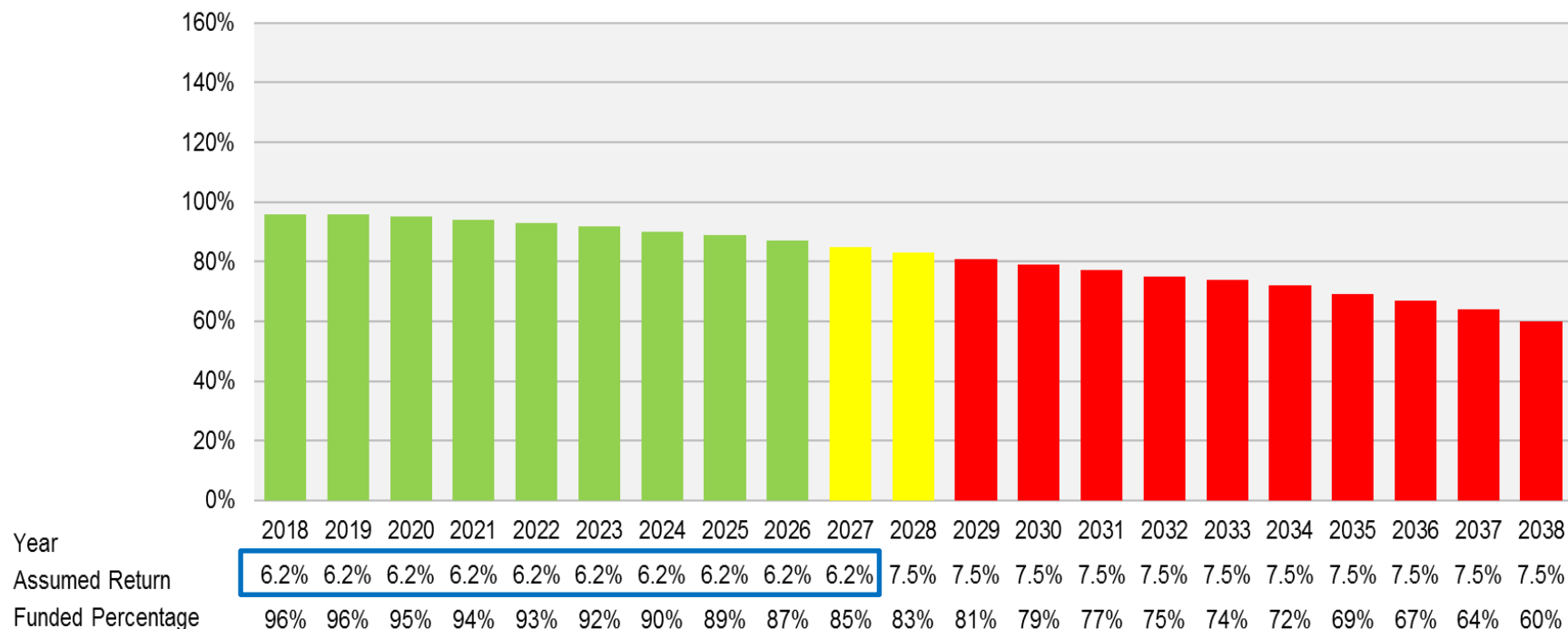
Projected Funded Percentage



Case Study #1

Plan A: 50th Percentile Returns for Next 10 Years

Projected Funded Percentage

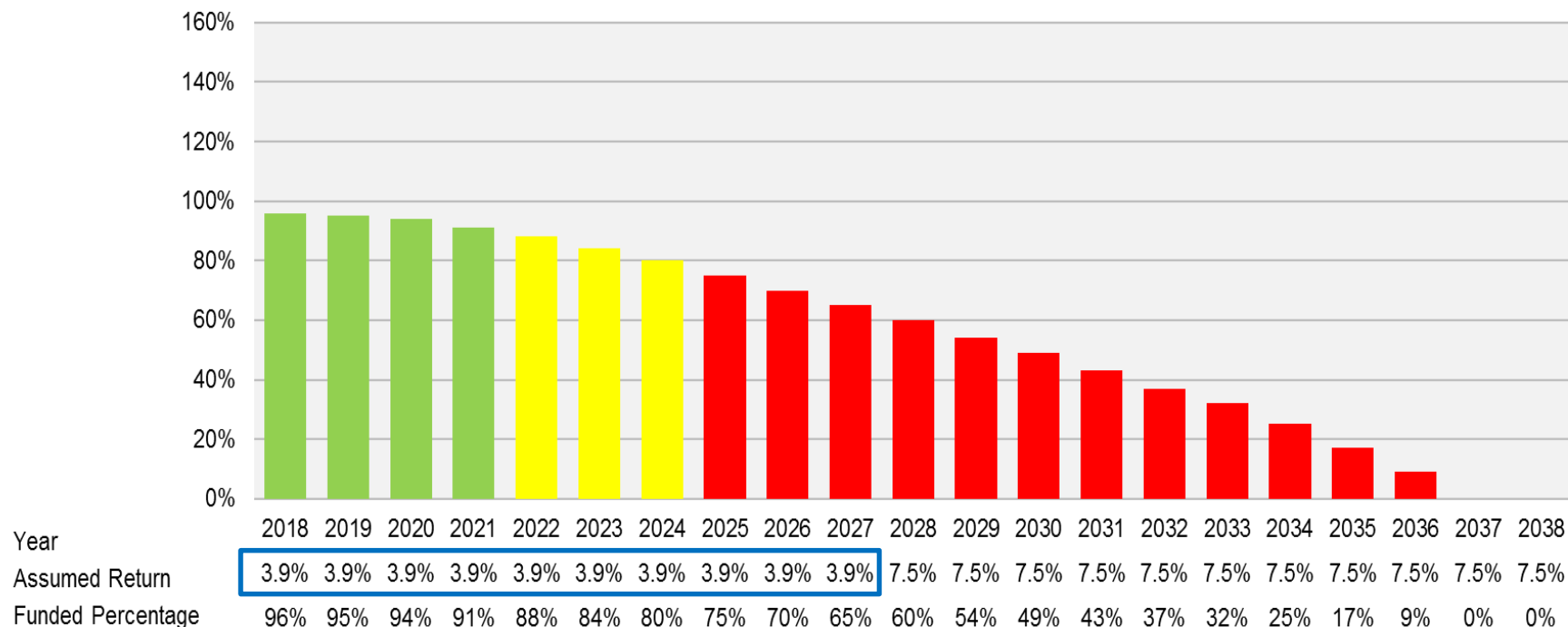


6.2% = 50th percentile expected returns over next 10 years for this plan's asset allocation, considering capital market assumptions of plan's investment consultant and the 2017 survey of capital market assumptions by Horizon Actuarial Services, LLC

Case Study #1

Plan A: 25th Percentile Returns for Next 10 Years

Projected Funded Percentage

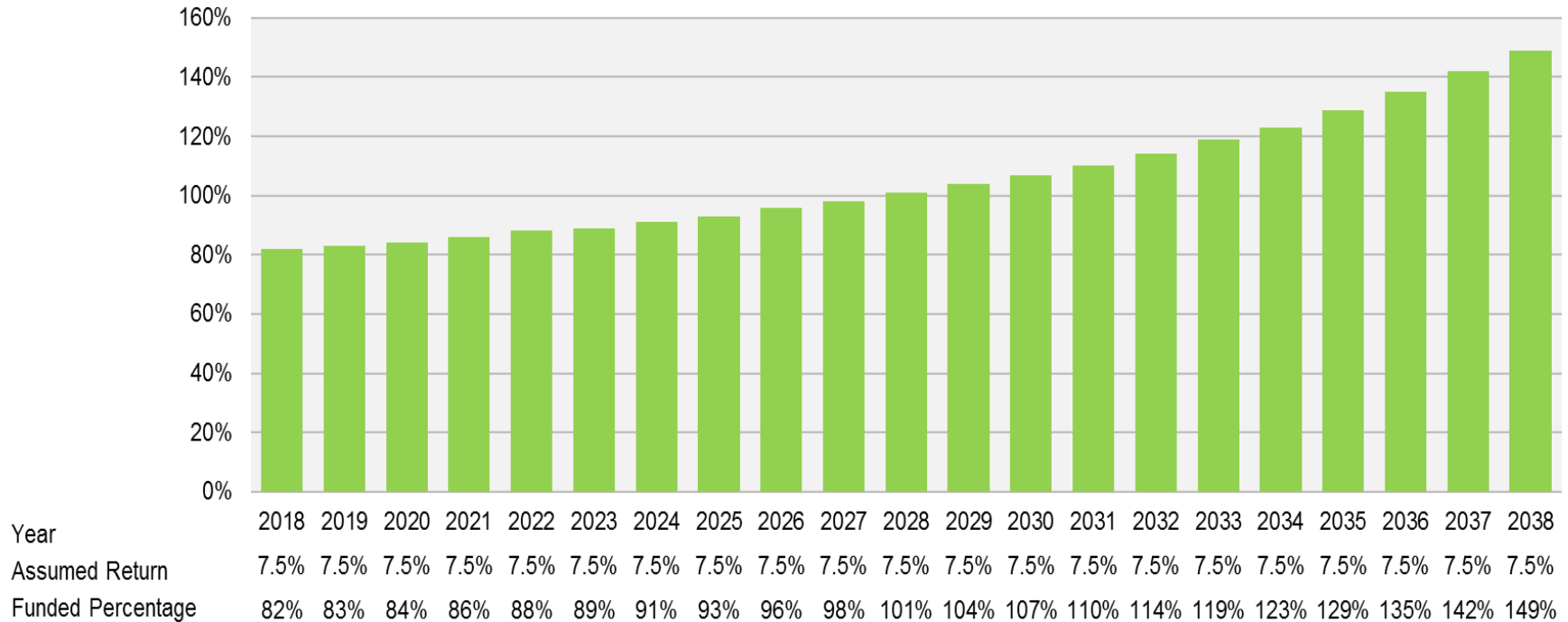


3.9% = 25th percentile expected returns over next 10 years for this plan's asset allocation, considering capital market assumptions of plan's investment consultant and the 2017 survey of capital market assumptions by Horizon Actuarial Services, LLC

Case Study #1

Plan B: 7.5% Returns in All Future Years

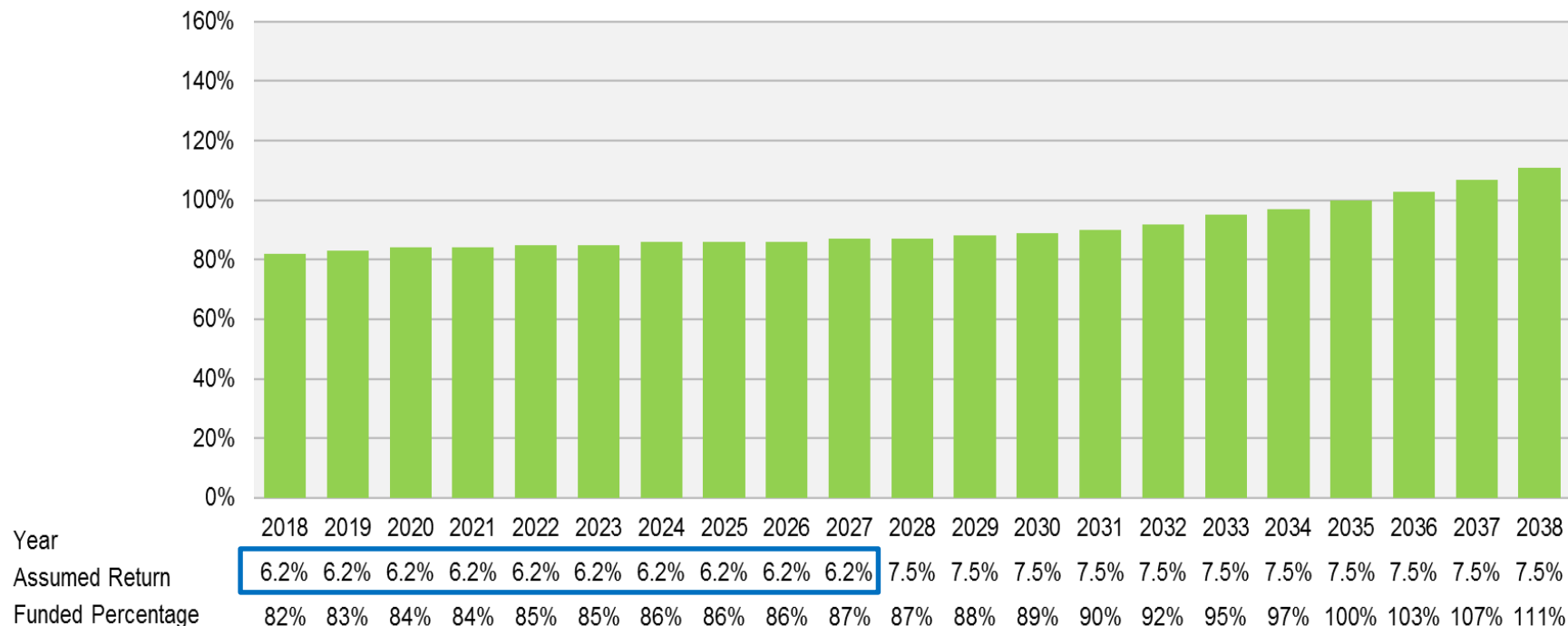
Projected Funded Percentage



Case Study #1

Plan B: 50th Percentile Returns for Next 10 Years

Projected Funded Percentage

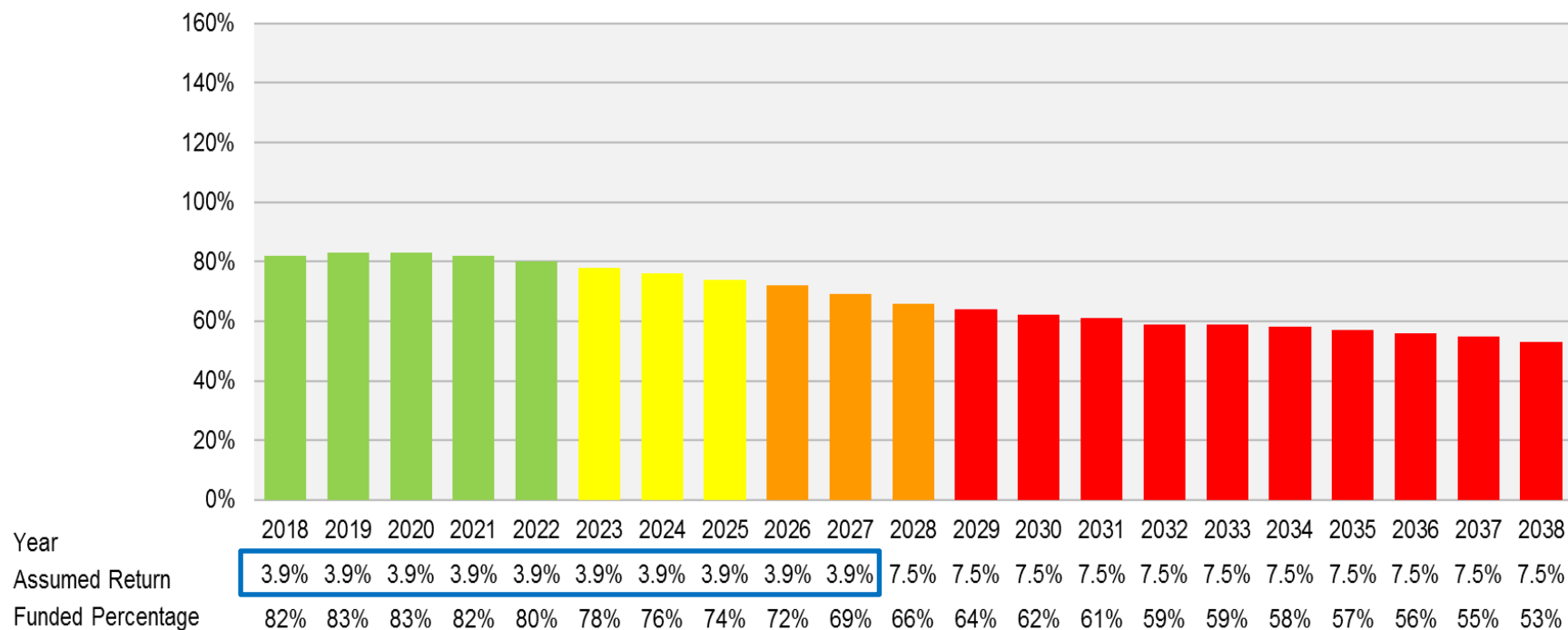


6.2% = 50th percentile expected returns over next 10 years for this plan's asset allocation, considering capital market assumptions of plan's investment consultant and the 2017 survey of capital market assumptions by Horizon Actuarial Services, LLC

Case Study #1

Plan B: 25th Percentile Returns for Next 10 Years

Projected Funded Percentage



3.9% = 25th percentile expected returns over next 10 years for this plan's asset allocation, considering capital market assumptions of plan's investment consultant and the 2017 survey of capital market assumptions by Horizon Actuarial Services, LLC

Case Study #1

Summary of Results

Projected Funded Percentage

Plan Year	2018 Current	2028 Year 10	2038 Year 20
Plan A: 7.5% in all Future Years (baseline)	96%	99%	110%
50 th Percentile Returns (6.2%) for 10 Years	96%	83%	60%
25 th Percentile Returns (3.9%) for 10 Years	96%	60%	0%
Plan B: 7.5% in all Future Years (baseline)	82%	101%	149%
50 th Percentile Returns (6.2%) for 10 Years	82%	87%	111%
25 th Percentile Returns (3.9%) for 10 Years	82%	66%	53%

Funding Projections are needed to show that Plan B is actually healthier even though its current Funded Percentage is less than Plan A.

Other Observations

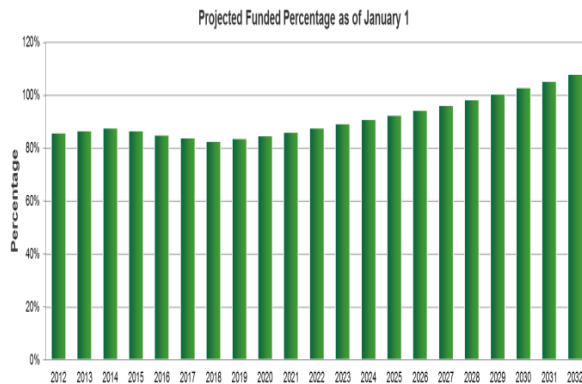
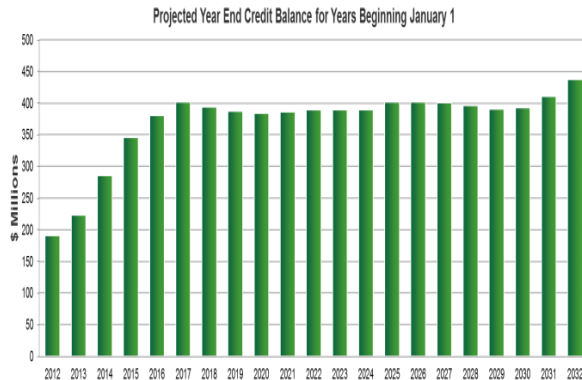
Would any of these items change the dynamics?

- What if Plan A used a 6.5% investment return?
- What if Plan B had just updated their mortality table?
- What if Plan B had just increased benefits (past and future) and increased their contribution rate to pay for it?

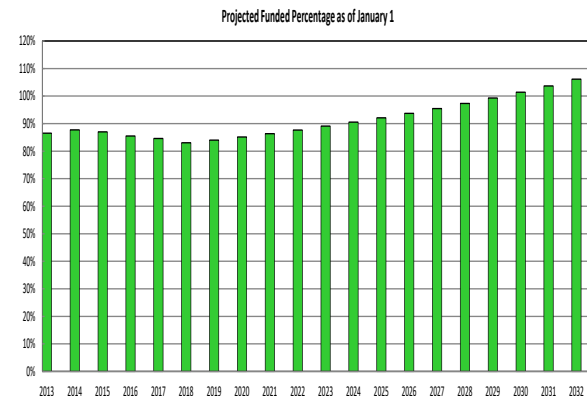
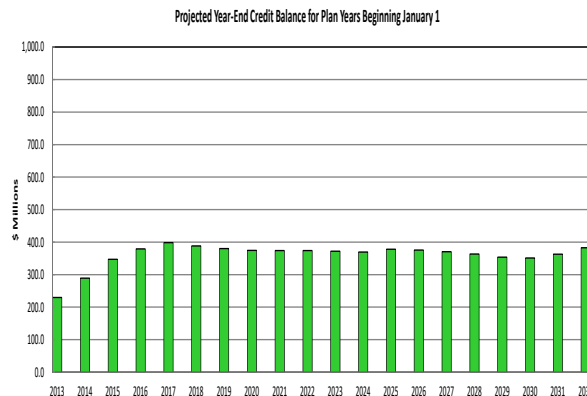
Case Study #2

Is a Green Zone Plan Always Healthy?

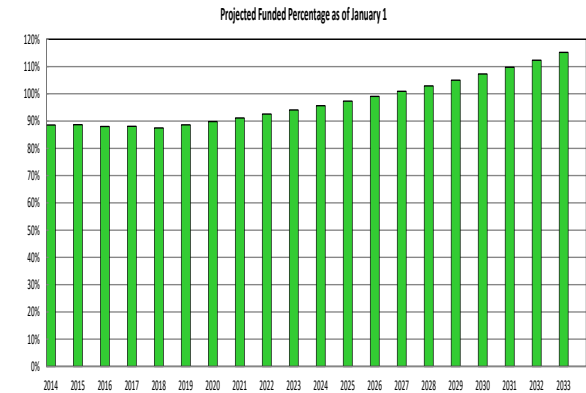
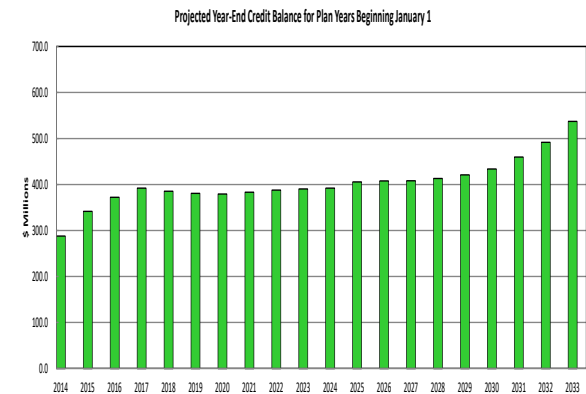
January 2016



January 2017



January 2018

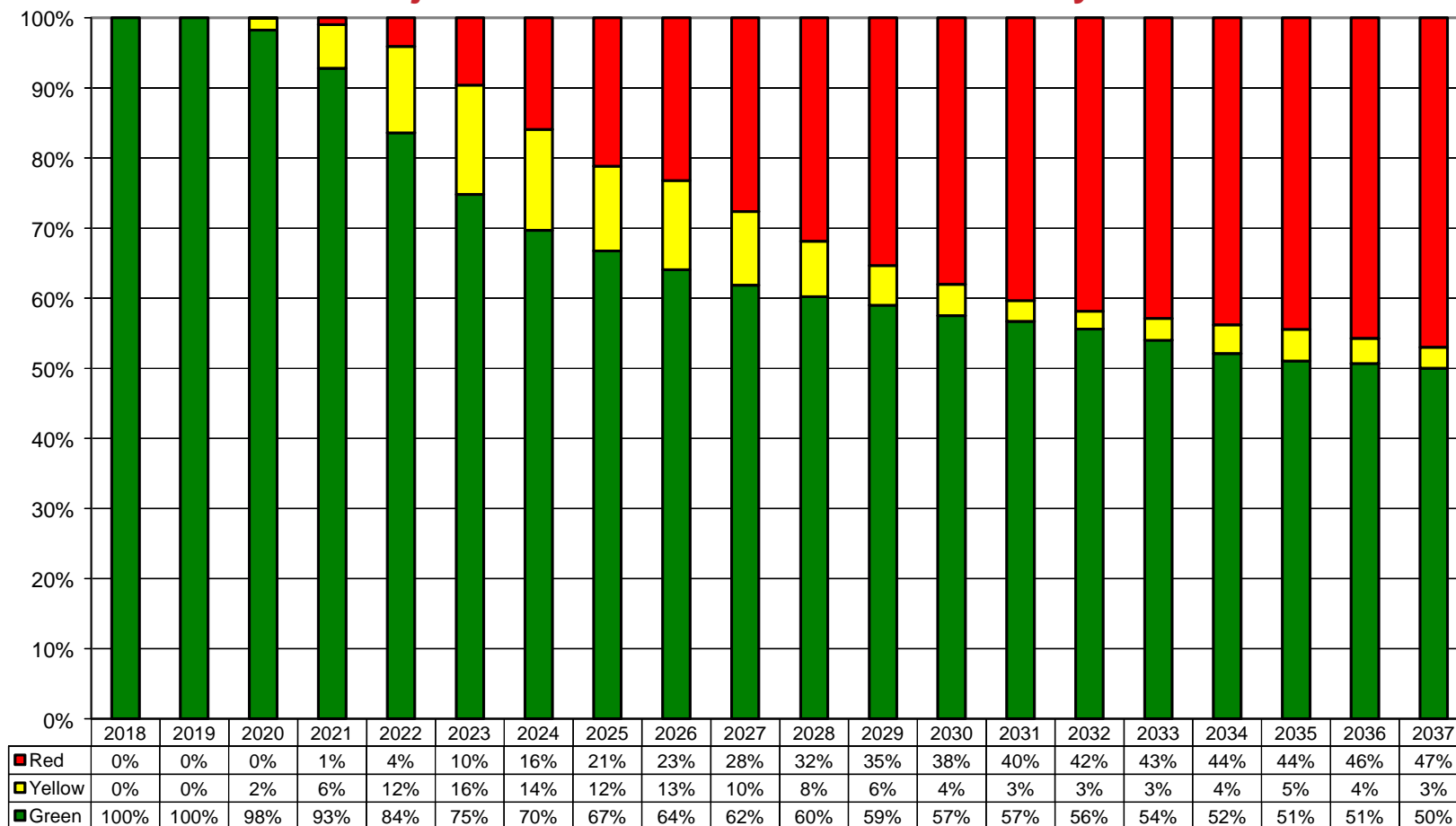


Each year projections show nothing but
Green Zone

Case Study #2

Is a Green Zone Plan Always Healthy?

Projected PPA Zone Status as of January 1



The annual deterministic projections on the prior slide show only half the picture; stochastic analysis shows only a 50% probability of staying Green over 20 years.

Conclusions

- There are many factors that contribute to a Plan's financial health and all should be considered
- It is very important to perform projections
 - Deterministic scenario analysis
 - Stochastic analysis

Methods for Assessing Risk

➤ Sensitivity Tests

Example: Solve for an investment return where any return lower will ultimately move the plan into a lower Zone (**Yellow** or **Red**)

➤ Deterministic Projections

Example: Projections based on a single set of assumptions, e.g., using the current interest rate assumption and other scenarios varying the market return

➤ Stochastic Projections

Example: Projections using a defined asset allocation mix to produce a distribution of possible returns and determine, for example, the probability of the Plan being in the Green Zone in 10 years

Stochastic Projections

➤ **Given a certain set of assumptions:**

- What is the range of possible results?
- What is the probability of reaching certain metrics (e.g. zone status, funded percentage, positive credit balance, etc.)?
- Alternatively, what is the likelihood of long-term “success?”

➤ **What are metrics for success?**

- Probability of remaining in (or returning to) the “**Green Zone**?”
- Probability of avoiding insolvency?
- Probability of reaching a certain funding level?
- Probability of being able to improve benefits or reduce contributions?
- Other?

➤ **More than one metric can be modeled**

- Stochastically model investment returns and overlay the results on various hours or employment assumptions



Discussion Topics

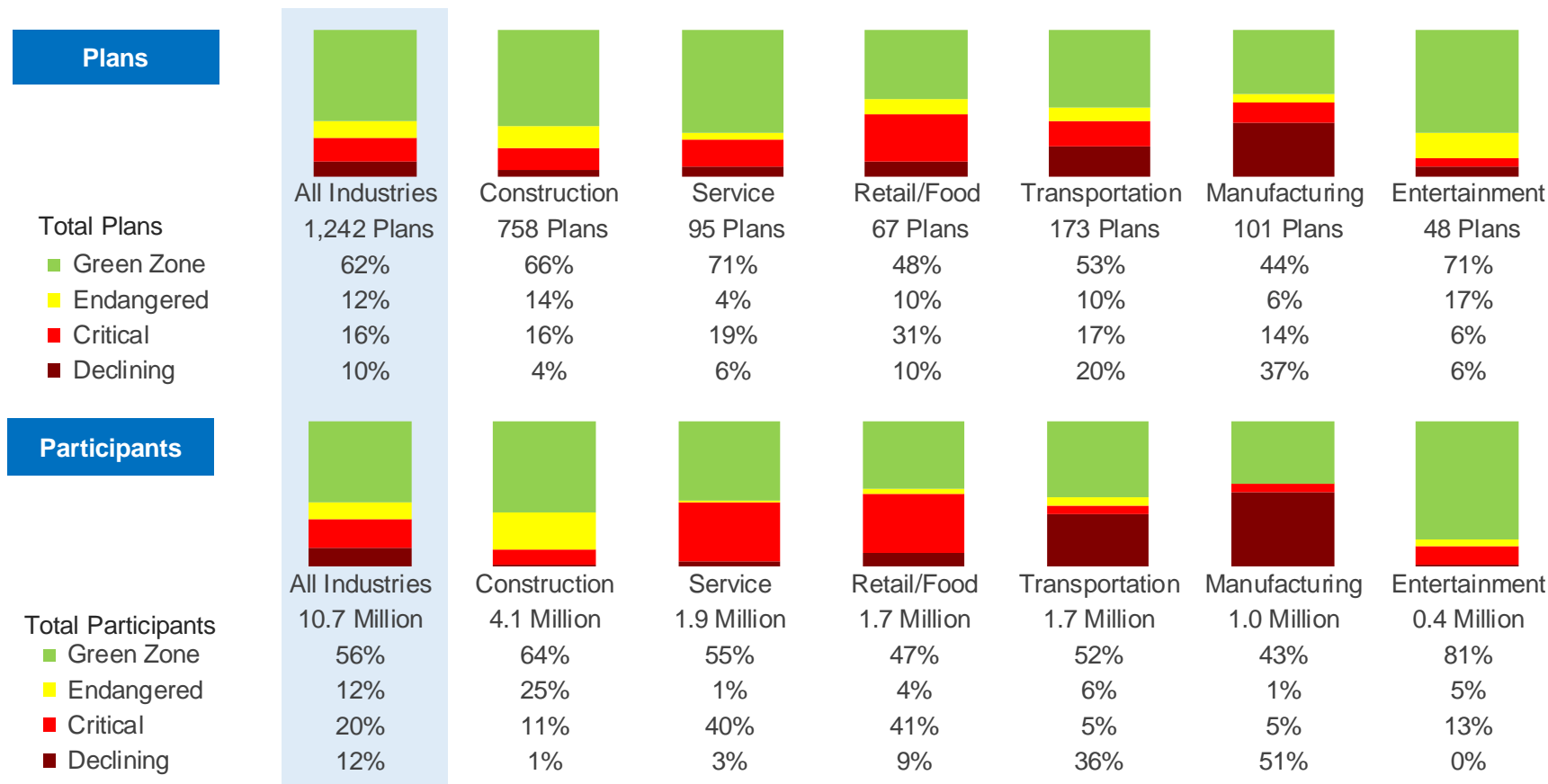
1. Assessing a Plan's Health—Not as Simple as it Seems
- 2. What are the Factors in Assessing a Plan's Health**
3. Strategies for Healthy Plans

Current and Projected Funding Levels

- PPA Zone status
- Projected funded percentage
- Investment return assumption

Multiemployer Universe

Zone Status: Industry Comparison



Percentages may not add, due to rounding.

For simplicity, certain industries and trades are grouped as follows:

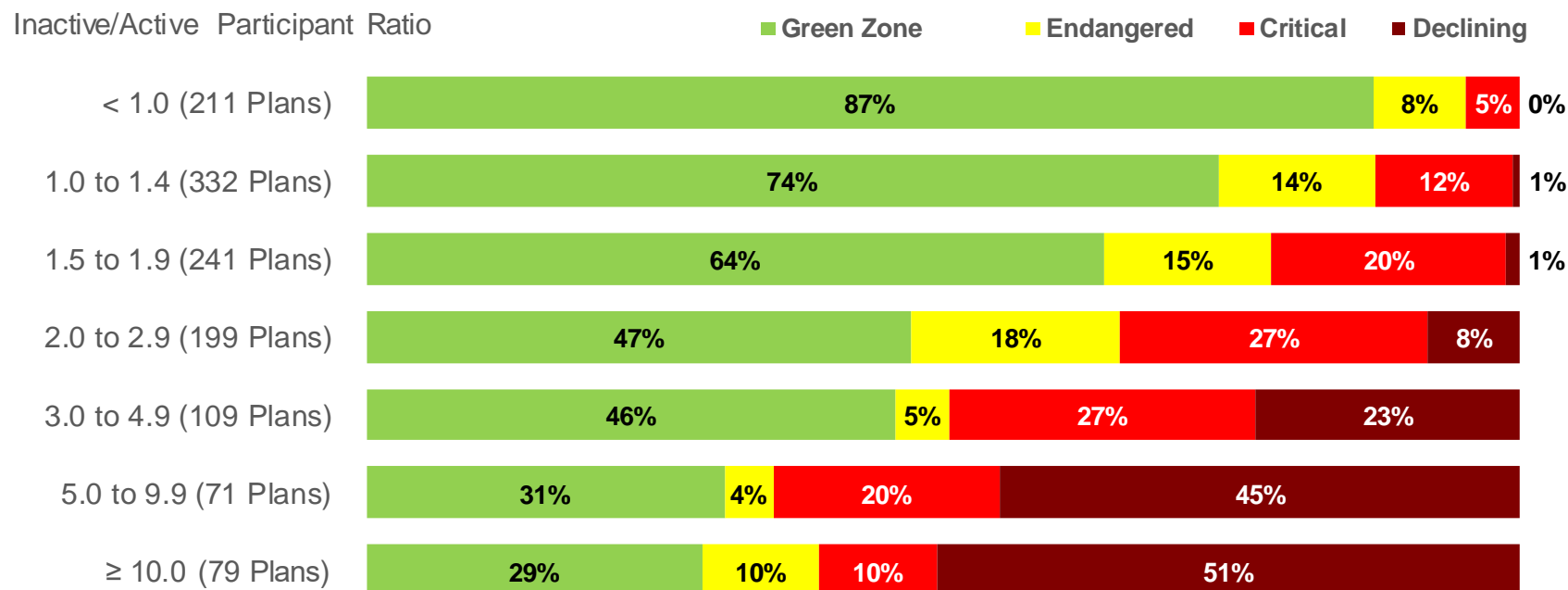
- Transportation includes trucking and freight, warehouse workers, bakery drivers, and maritime
- Manufacturing includes bakery workers, printing, energy, mining, and agriculture
- Service includes hospitality, healthcare, education, and communications

Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Multiemployer Universe

Plan Maturity vs. Zone Status

Inactive/Active Participant Ratio vs. Zone Status

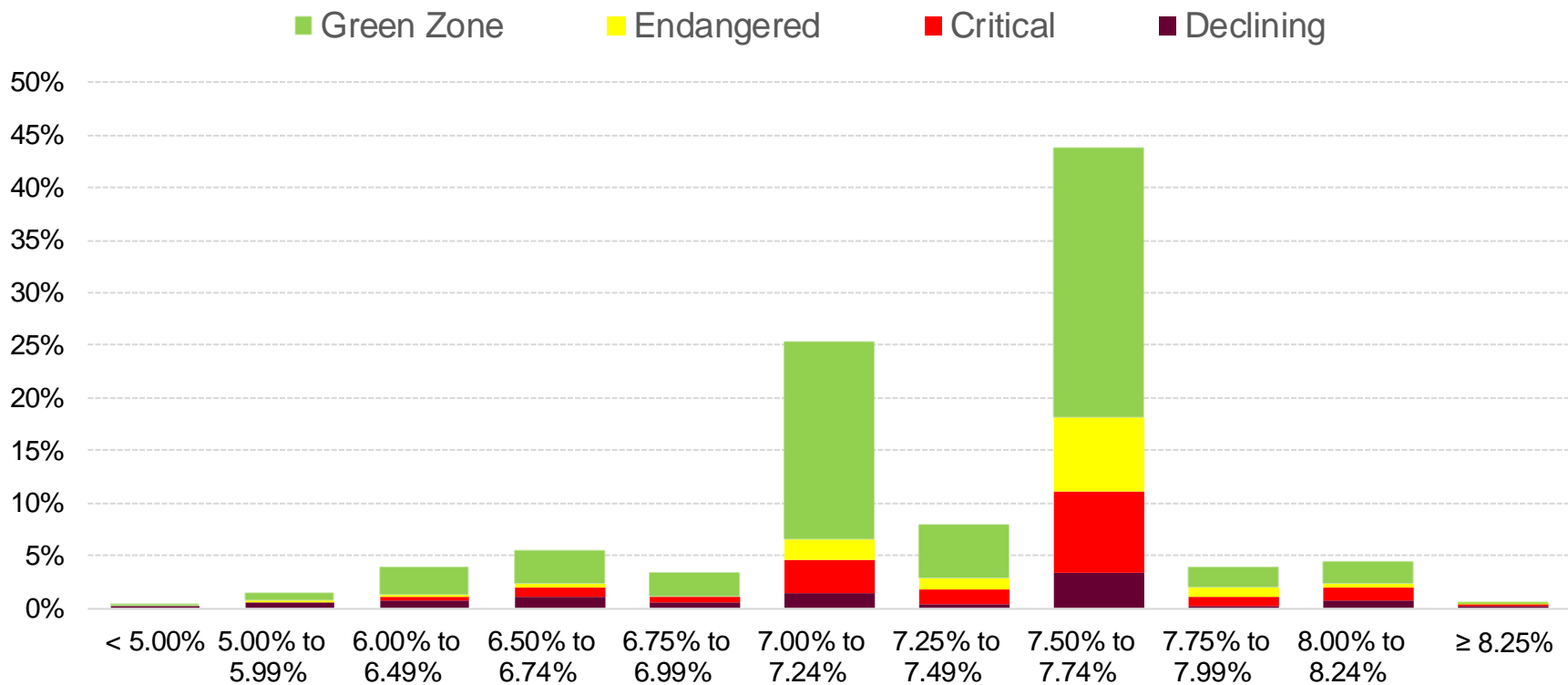


Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Multiemployer Universe

Valuation Interest Rate Assumption

Distribution of Plans: Valuation Interest Rate



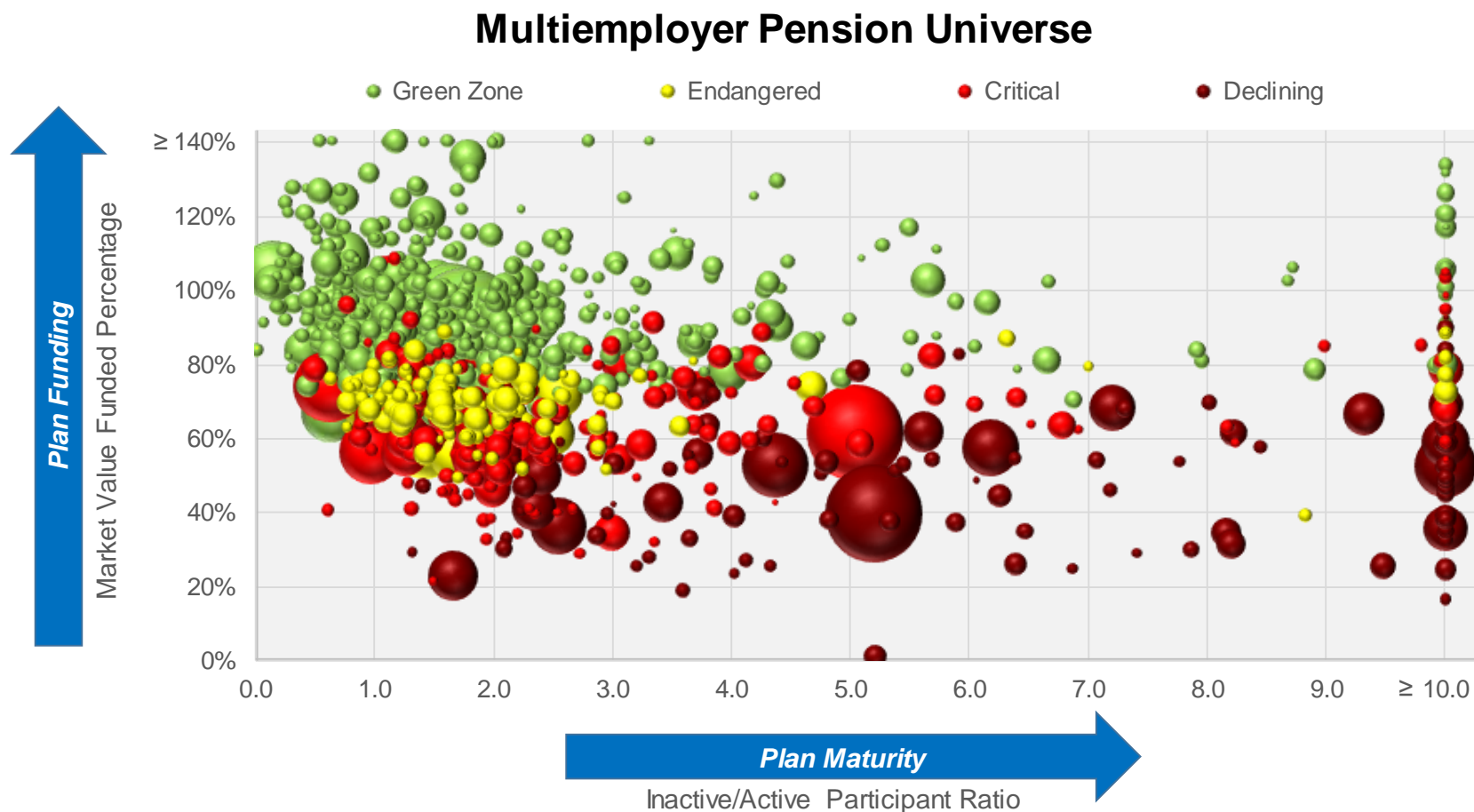
Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Plan Maturity

- Ratio of inactive to active participants (or liability)
- Cash flow (“burn rate”)
- Ratio of benefit payments to contributions or contributions as a percent of assets

Multiemployer Universe

Funding vs. Maturity: All Plans

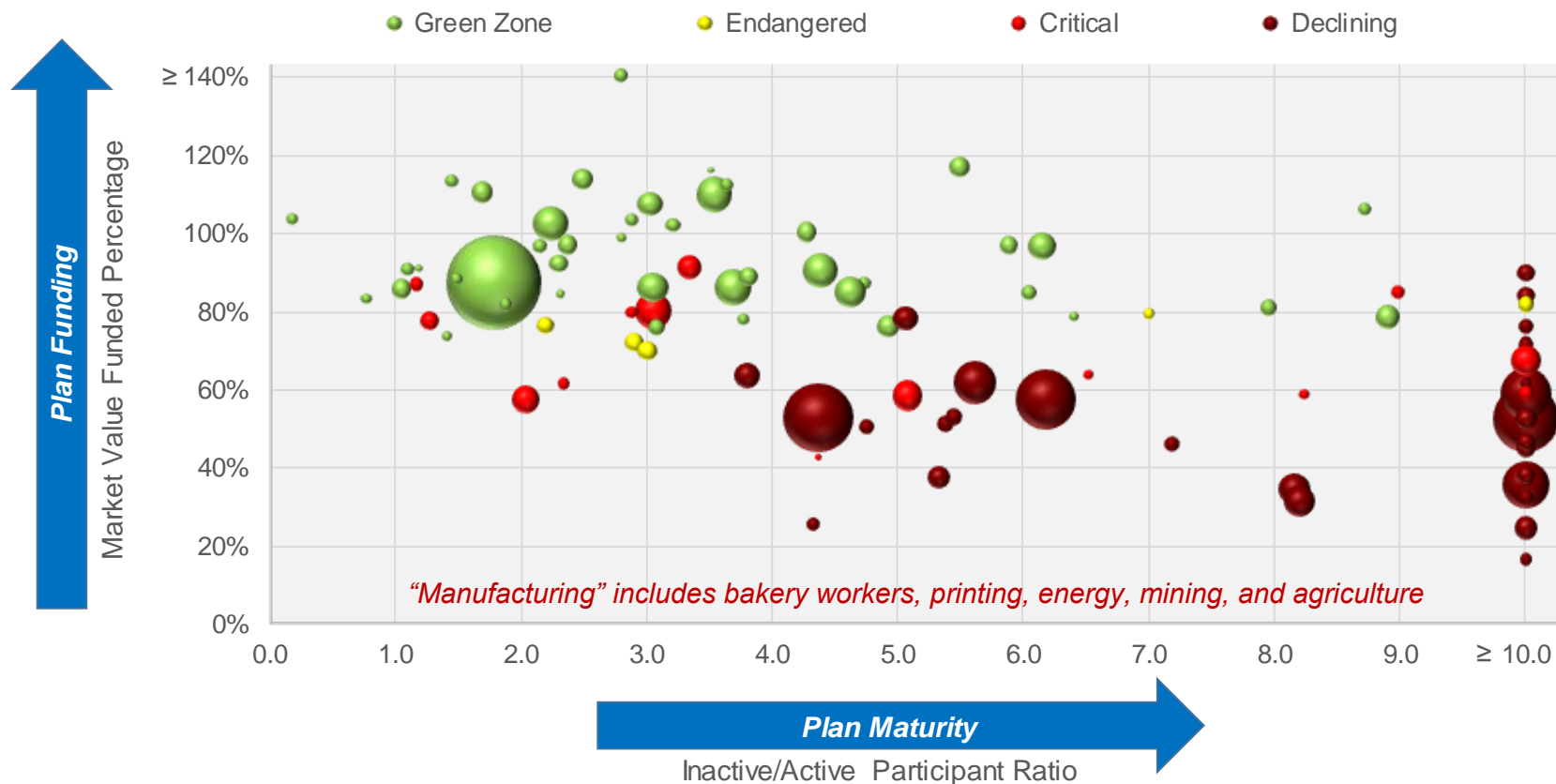


Plan Count: 1,242

Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Funding vs. Maturity: Manufacturing Industry

Manufacturing Industry Plans

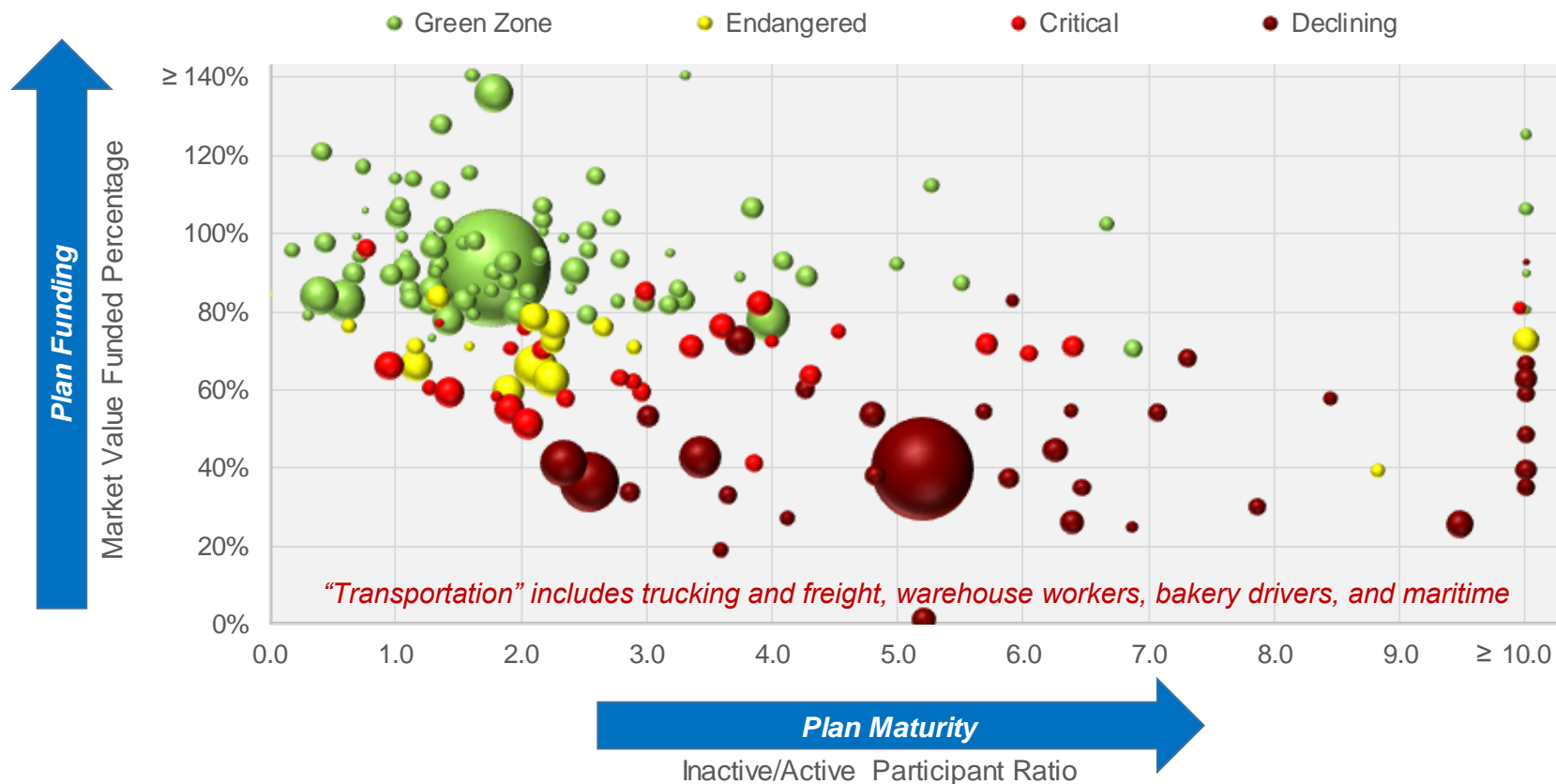


Plan Count: 101

Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Funding vs. Maturity: Transportation Industry

Transportation Industry Plans



Plan Count: 173

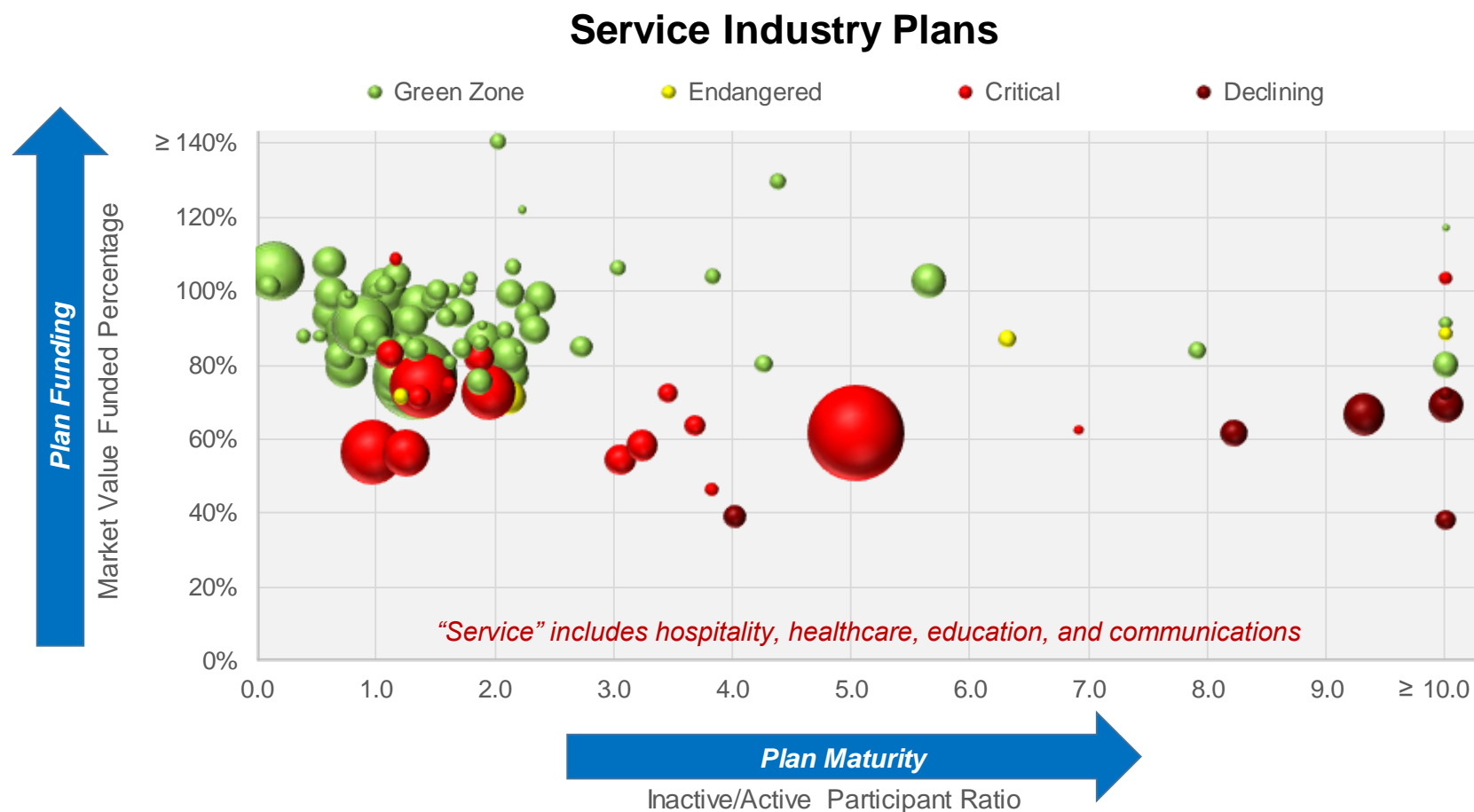
Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Funding vs. Maturity: Retail/Food Industry



Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Funding vs. Maturity: Service Industry



Plan Count: 95

Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

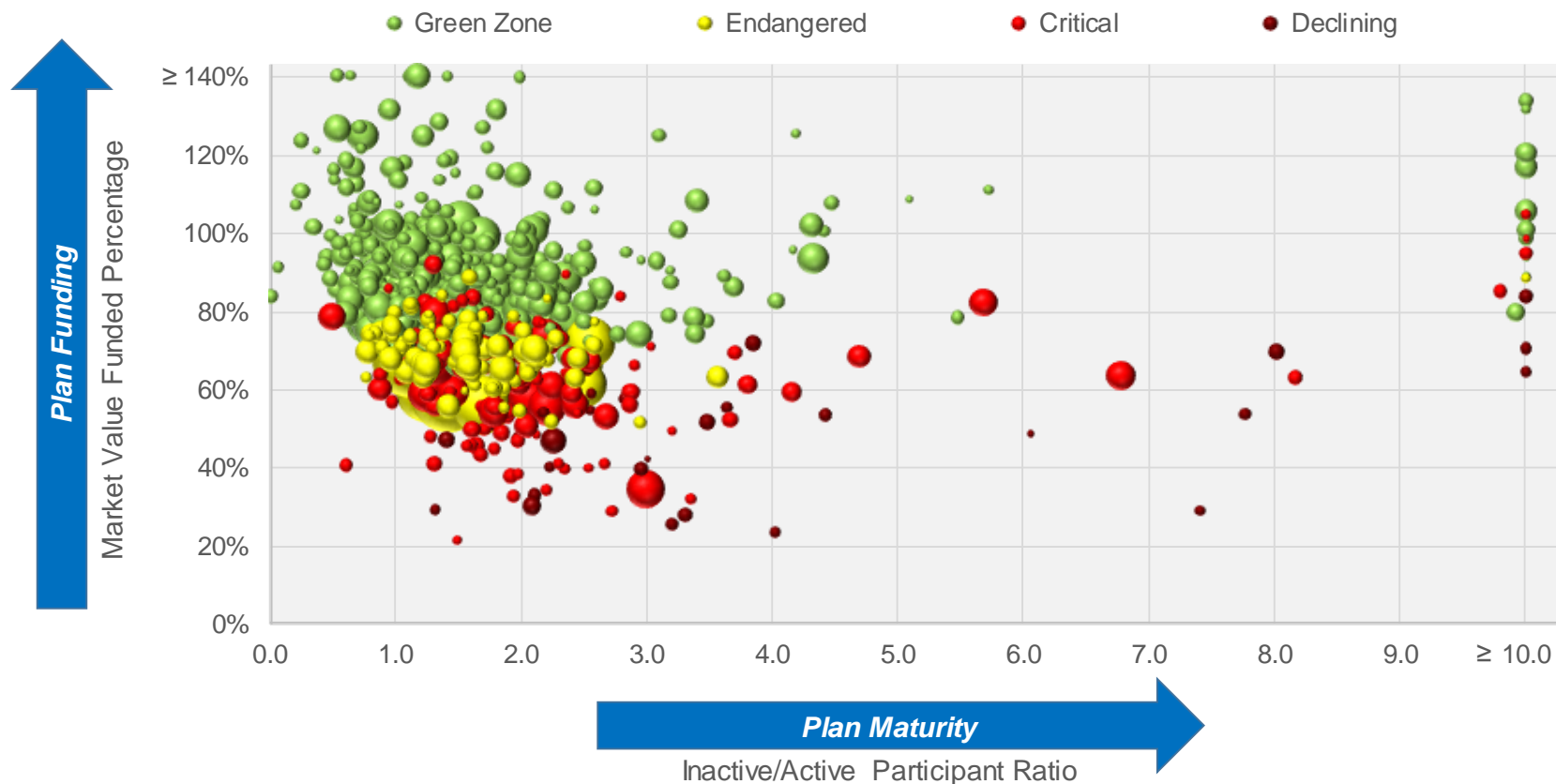
Funding vs. Maturity: Entertainment Industry



Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Funding vs. Maturity: Construction Industry

Construction Industry Plans



Plan Count: 758

Source: Segal Consulting analysis of Form 5500 data for plan years ending in 2016. Zone status applies to plan years ending in 2017.

Other Factors in Assessing a Plan's Health?

➤ **Are there investment or economic issues on the horizon?**

- How much investment risk is in the portfolio?
- What are the anticipated future economic conditions?
 - Hours or work levels?
 - Ability to raise contribution rates?

➤ **Are current actuarial assumptions reasonable?**

- Investment returns / valuation interest rate
- Mortality, other demographic assumptions
- Administrative expenses / PBGC premium increases

➤ **How resilient is the plan to adverse experience?**

- In other words, how highly leveraged is the plan?
- Following high-level analysis focuses on investment return sensitivities
 - Also worth considering contribution rates, work levels, expenses, etc.



Discussion Topics

1. **Assessing a Plan's Health—Not as Simple as it Seems**
2. **What are the Factors in Assessing a Plan's Health**
3. **Strategies for Healthy Plans**

Strategies for Healthy Plans

➤ Review Funding Assumptions

- Investment return
- Mortality
- All other demographic assumption

➤ Review Current Benefit Rules/Features

- Are the Plan's disqualifying employment rules working?
- Are any benefits being overly used relative to expectation (i.e., disability, early retirement, optional forms, etc.)
- Review process for recalculating benefits after someone goes back to work and later re-retires
- Review minimum distribution rules
- Review late retirement rules/suspension vs. actuarial increases

Strategies for Healthy Plans *continued*

➤ Understanding Plan Risks and Managing Them

- Actuarial Standard of Practice (ASOP) Number 51 (*Requires actuaries help users of our reports better understanding the risks inherent in the measurement of pension plan obligations*)
- Examples of risk
- Measuring investment return risk
- Plan maturity risk
- Employment (or contribution) risk

➤ Adopt a Plan Management Policy

- Set parameters for on when benefits can be improved
- Set triggers for when corrective action must be taken (benefit reductions or contribution increases)
- Build up a cushion to protect against possible adverse experience
- Establish a glide path for de-risking investments

Strategies for Healthy Plans *continued*

➤ **Realign assets with liabilities**

- Coordinate investment policy with maturing plan liabilities
- Immunize (de-risk) portions of the investment portfolio
- More attainable as funding levels improve and interest rates rise

➤ **Implement a variable plan design**

- Vary benefit levels based on investment experience
- Can significantly reduce investment risk (which increases as plans mature)
- Variable plan design is prospective only; legacy funding obligations remain

Examples of Multiemployer Plan Risk

- Investment Return Risk
- Plan Maturity Risk
- Employment (or Contribution) Risk
- Withdrawal Liability Risk
- Plan Design Risk
- Longevity (or Mortality) Risk
- Retirement Risk

Plan Maturity Risk

➤ How much will Plan mature over time?

- Consider different scenarios for future active population, etc.

➤ As Plan matures, they will become more sensitive to investment volatility

- In other words, it will be harder to recover from investment losses with increases in employer contributions, reductions in benefit accruals, or both

➤ Examples of Maturity Measures:

- Inactive Liability/Total Liability
- Cash Flow (“Burn Rate”)
- Ratio of Benefit Payments to Contributions
- Inactive/Active Participant Ratio

Plan Maturity: Example

Projected Ratio of Inactive Participants to Active Participants

Plan Year	Keeping Actives Constant			Keeping Ratio Constant		
	Inactives	Actives	Inactive to Active Ratio	Inactives	Actives	Inactive to Active Ratio
2017	16,303	12,059	1.35	16,306	12,059	1.35
2018	17,031	12,059	1.41	17,031	12,595	1.35
2019	17,541	12,059	1.45	17,541	12,973	1.35
2020	18,015	12,059	1.49	18,015	13,323	1.35
2021	18,459	12,059	1.53	18,470	13,659	1.35
2022	18,841	12,059	1.56	18,859	13,947	1.35
2023	19,199	12,059	1.59	19,225	14,217	1.35
2024	19,517	12,059	1.62	19,549	14,457	1.35
2025	19,765	12,059	1.64	19,802	14,644	1.35
2026	20,004	12,059	1.66	20,046	14,825	1.35

Employment (or Contribution) Risk

- Employment levels (industry activity) impact the Plan's projected zone status or other funding metrics
- Decreases in future employment typically reduces expected contributions
- Various future employment levels can be deterministically modeled
- Drop in future actives (including staggered decreases over time)
- Drop in employment per active (or total contribution base)

Plan Management Policies

➤ **Trustees desire to manage plan thoughtfully and prudently**

- With careful review of plan's long-term financial health, using various measures
- With continued improvements in benefits, or reductions if necessary

➤ **Preliminary policy objectives**

- Promised benefits will be paid 100% of the time
- Maintain a well-funded plan (funded to a certain percentage)
- Avoid falling out of Green Zone (into Yellow or Red)
- Manage withdrawal liability
- Keep benefits up to date for inflation (including retirees)

➤ **Need for formal policy for plan management**

- Manage risk
- Quantitative process for implementing benefit improvements or reductions
- Help in communicating funding to contributing employers and members
- *Question: is policy rigid or merely a set of guidelines?*

Sample Plan Management Policy Illustration

➤ Contemplated benefit changes

- Increase accrual rate by \$X/month (all service, future service or past service)
- Improve retiree benefits by Y%

➤ Sample Policy Parameters

- Zone Status
 - Stay in Green Zone with a X% probability
- Scheduled Cost
 - Close any deficit created within Z years with a Y% probability
- Funded Status
 - Stay above Z% and improve funded status with a X% probability
- Credit Balance
 - Maintain a positive credit balance with a X% probability
 - Maintain a positive credit balance for at least Z years with a Y% probability
- Withdrawal Liability
 - Reduce/eliminate withdrawal liability with a X% probability

The policy parameters are not independent of each other, therefore an actual policy may contain only a subset of these.

Liability Immunization

Illustrative Examples for Two Sample Plans

- Immunize either 50% or 100% of retiree liabilities
- Evaluate different market immunization rates: 3.00%, 4.50%, 6.00%
- “Cost” is percentage points of accrued liability at 7.50% interest rate

Immunization Strategy		Scenario A		Scenario B		Scenario C	
Immunization Interest Rate	N/A	3.0%		4.5%		6.0%	
% of Retiree Liability	None	50%	100%	50%	100%	50%	100%

Plan #1	Normalized Actuarial Liability						
Active	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Inactive Vested	23.4	23.4	23.4	23.4	23.4	23.4	23.4
Retired	49.4	58.7	67.9	56.2	62.9	53.9	58.3
Total	100.0	109.2	118.4	106.7	113.5	104.4	108.8
Immunization "Cost"	N/A	9.2	18.4	6.7	13.5	4.4	8.8

Plan #2	Normalized Actuarial Liability						
Active	36.0	36.0	36.0	36.0	36.0	36.0	36.0
Inactive Vested	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Retired	57.0	71.1	85.2	66.9	76.8	63.1	69.1
Total	100.0	114.1	128.2	109.9	119.7	106.1	112.1
Immunization "Cost"	N/A	14.1	28.2	9.9	19.7	6.1	12.1

Variable Plan Designs: An Overview

- Provide lifetime income to participants, while reducing risk to plan sponsor
- Legacy plan benefits are protected and must still be funded
- No free lunch: benefit protections and reduced volatility come with higher costs
- Various transition considerations
 - e.g., one plan or two, coordination with legacy benefits
- Note: “composite plan” not included in this discussion
 - Not yet permitted under current U.S. law

Design	Key Features
Variable Accrual	<ul style="list-style-type: none">• Traditional defined benefit plan with variable future accrual rate• Accrual rate adjusts each year, usually based on asset returns• Benefits are fixed once they have been accrued• Funding risk increases over time as more benefits become fixed
Variable Annuity	<ul style="list-style-type: none">• Hybrid defined benefit plan with variable total benefit• Benefit often defined as units; unit value changes based on asset returns• Caps and floors can reduce benefit volatility (but increase risk to plan)• Benefit at retirement can be fixed (more risk) or remain variable (less risk)

Variable **Accrual** Plan

- Future benefit accrual rate adjusts each year
 - Usually based on asset returns for prior year(s)
- Benefits are fixed once they have been accrued
 - Total benefit is sum of each year's accrual
 - Benefit remains fixed in retirement

Illustrative Example

Prior Year Investment Return	Prior Plan Accrual Rate for Year	Variable Accrual Rate for Year
< 0.0%	\$100	\$0
0.0% to 2.9%	\$100	\$30
3.0% to 5.9%	\$100	\$70
6.0% to 8.9%	\$100	\$100
≥ 9.0%	\$100	\$140

Variable Annuity Plan

➤ Basic Design Considerations

- What is hurdle rate?
- Is there a floor benefit?
- Are retiree benefits fixed or variable at retirement?
 - If variable, is there a cap on annual increases to buffer against decreases?
 - **NOTE:** variable benefit will likely provide inflation protection
- How to coordinate with legacy benefits (“A+B” or wear-away)?

➤ Variable Formula

$$\text{Annual Adjustment} = (1 + \text{Actual Rate}) \div (1 + \text{Hurdle Rate})$$

Illustrative Example: Hurdle Rate = 5.0%

Year 1 Unit Value	Year 1 Asset Return	Year 2 Unit Value
\$100.00	10.0%	$\$100.00 \times (1.10 \div 1.05) = \104.76
	5.0%	$\$100.00 \times (1.05 \div 1.05) = \100.00
	0.0%	$\$100.00 \times (1.00 \div 1.05) = \95.24



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