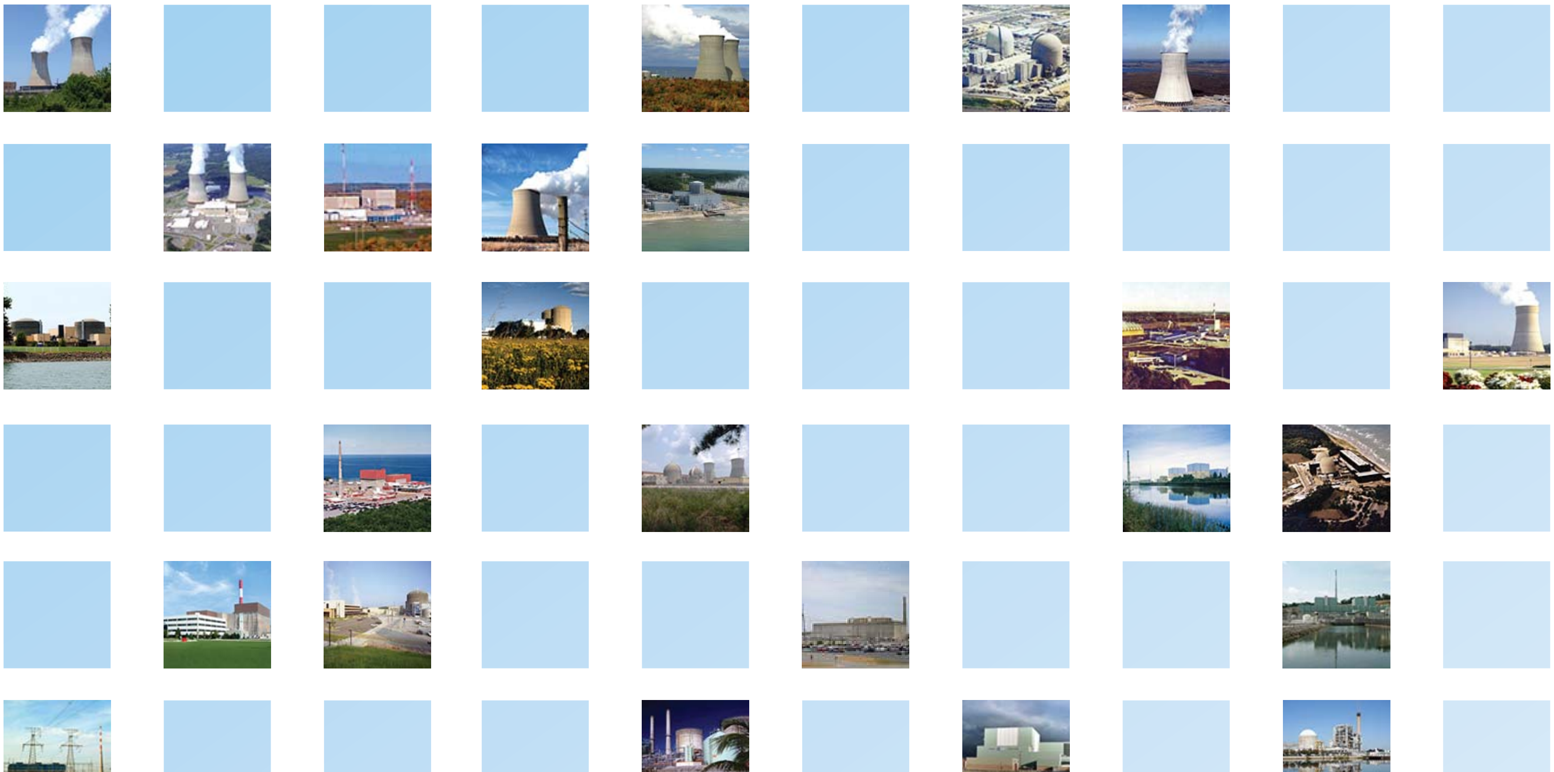

2016 NDT SURVEY

NUCLEAR DECOMMISSIONING TRUST

NISA INVESTMENT ADVISORS, LLC®

INTRODUCTION

NISA Investment Advisors, LLC (NISA) is pleased to present the 15th edition of the biennial Survey of Nuclear Decommissioning Trust (NDT) Sponsors. This report is published as a resource for and service to the NDT community. It is intended to provide insight into investment activities and trends within the NDT industry. Information contained herein has many potential uses and a variety of audiences, including trust sponsors, federal and state regulatory bodies, trust custodians, and investment managers.

U.S. NUCLEAR POWER REACTORS BY THE NUMBERS

- The U.S. Nuclear Regulatory Commission (NRC) has issued combined licenses (COL) representing seven new units and is reviewing two COL applications for three new units.
- Watts Bar 2 recently began commercial operation, and four new nuclear power plant reactors are currently under construction.
- There are currently 99 operating nuclear power plant reactors with 34 boiling water reactors (BWRs) and 65 pressurized water reactors (PWRs). There are 80 individual plant owners and 23 plant operators. Investor Owned Utilities (IOUs) represent approximately 81% of operating megawatt capacity.
- The NRC approved 12 license extensions since the 2014 survey, eight others are currently under review, and five additional submissions are expected. In total, 84 of the 99 operating reactors have received 20-year license renewals.
- There was one individual unit shutdown since the last survey and a number of merchant plants have announced shutdowns in the near future.
- Currently, 34 power reactors are undergoing decommissioning or have completed a significant portion of decommissioning.

U.S. OPERATING COMMERCIAL NUCLEAR POWER REACTORS

1. Arkansas Nuclear 1
2. Arkansas Nuclear 2
3. Beaver Valley 1
4. Beaver Valley 2
5. Braidwood 1
6. Braidwood 2
7. Browns Ferry 1
8. Browns Ferry 2
9. Browns Ferry 3
10. Brunswick 1
11. Brunswick 2
12. Byron 1
13. Byron 2
14. Callaway
15. Calvert Cliffs 1
16. Calvert Cliffs 2
17. Catawba 1
18. Catawba 2
19. Clinton
20. Columbia Generating Station
21. Comanche Peak 1
22. Comanche Peak 2
23. Cooper
24. D.C. Cook 1
25. D.C. Cook 2
26. Davis-Besse
27. Diablo Canyon 1
28. Diablo Canyon 2
29. Dresden 2
30. Dresden 3
31. Duane Arnold
32. Farley 1
33. Farley 2
34. Fermi 2
35. FitzPatrick
36. Ginna
37. Grand Gulf 1
38. Hatch 1
39. Hatch 2
40. Hope Creek 1
41. Indian Point 2
42. Indian Point 3
43. La Salle 1
44. La Salle 2
45. Limerick 1
46. Limerick 2
47. McGuire 1
48. McGuire 2
49. Millstone 2
50. Millstone 3
51. Monticello
52. Nine Mile Point 1
53. Nine Mile Point 2
54. North Anna 1
55. North Anna 2
56. Oconee 1
57. Oconee 2
58. Oconee 3
59. Oyster Creek
60. Palisades
61. Palo Verde 1
62. Palo Verde 2
63. Palo Verde 3
64. Peach Bottom 2
65. Peach Bottom 3
66. Perry 1
67. Pilgrim 1
68. Point Beach 1
69. Point Beach 2
70. Prairie Island 1
71. Prairie Island 2
72. Quad Cities 1
73. Quad Cities 2
74. River Bend 1
75. Robinson 2
76. Saint Lucie 1
77. Saint Lucie 2
78. Salem 1
79. Salem 2
80. Seabrook 1
81. Sequoyah 1
82. Sequoyah 2
83. Shearon Harris 1
84. South Texas 1
85. South Texas 2
86. Summer
87. Surry 1
88. Surry 2
89. Susquehanna 1
90. Susquehanna 2
91. Three Mile Island 1
92. Turkey Point 3
93. Turkey Point 4
94. Vogtle 1
95. Vogtle 2
96. Waterford 3
97. Watts Bar 1
98. Watts Bar 2
99. Wolf Creek 1

Information as of December 31, 2016 was requested from IOUs and several Public Power Authorities (PPAs). Surveys were sent to owners/operators of nuclear plants. Twenty five sponsors completed surveys, representing 82% of total IOU megawatt capacity and 75% of total megawatt capacity. Unless otherwise noted, averages are calculated based on the number of responses.

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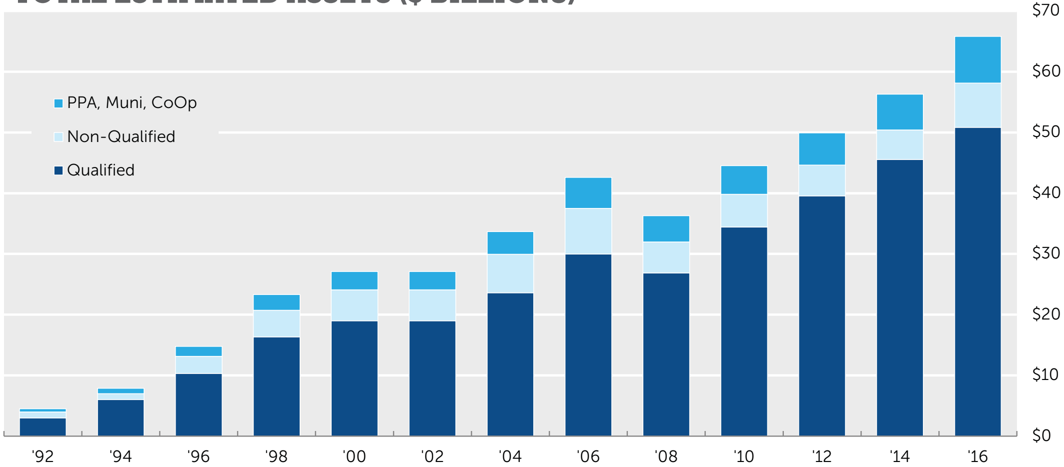
NUCLEAR DECOMMISSIONING TRUSTS

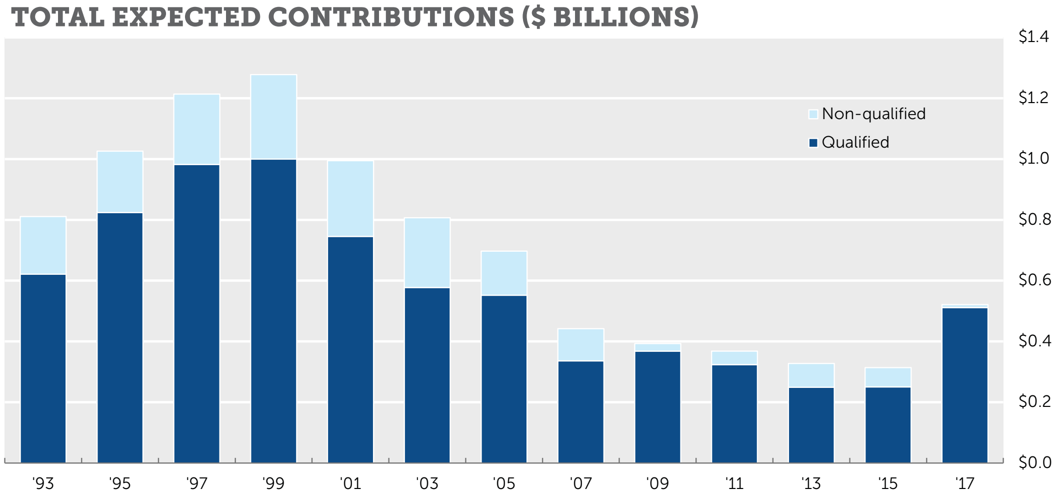
ESTIMATED ASSETS | The total estimated market value of NDT assets grew to almost $66 billion, an increase of nearly $10 billion. Assets held by Investor-owned Utilities grew to over $58 billion and assets held by Public Power Authorities, Municipalities, and Cooperatives grew to almost $8 billion. Qualified Trust assets increased more than 10% for the fourth consecutive survey. Non-qualified Trust assets increased for the first time in a decade. The discrepancy in asset changes was due to variations in asset allocation within each trust type, costs associated with various plant shutdowns, previously non-reported Non-qualified assets, and contributions.

TOTAL ESTIMATED ASSETS ($ BILLIONS)



EXPECTED CONTRIBUTIONS | Total expected contributions rose rather significantly from the prior survey, primarily due to two sponsors' projected outsized contributions. A handful of sponsors now account for over 50% of total NDT contributions, despite the majority of sponsors still making contributions. Projected 2017 contributions are $521 million, with $511 million allocated to Qualified Trusts and only $10 million to Non-qualified Trusts. Only one Public Power respondent indicated projected contributions in 2017, although NRC filing data shows a handful of sponsors planning contributions over the next several years.

TOTAL EXPECTED CONTRIBUTIONS ($ BILLIONS)

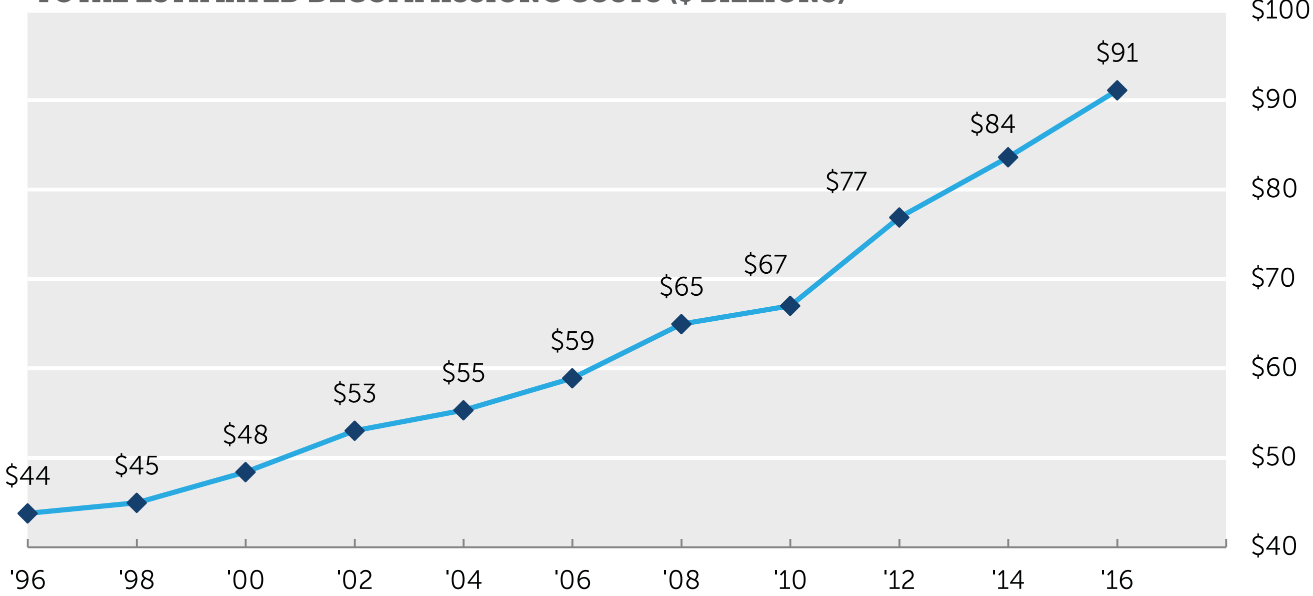


Approximately 60% of respondents indicated continued contributions to Qualified Trusts and 20% of respondents indicated continued contributions to Non-qualified Trusts, with the largest individual non-qualified contribution projected to be only $5 million.

ESTIMATED DECOMMISSIONING COSTS | The IOU and PPA 2016 estimated decommissioning costs were $91 billion based on survey responses. The 2016 decommissioning estimate increased 9.0% from the 2014 survey, a similar percentage increase to the 2012-2014 survey. The annualized cost escalation rate for the 20-year period from 1996 to 2016 was approximately 3.7%.

The estimated costs shown below represent the greater of NRC-filing or site-specific costs provided by respondents. Based on individual survey responses, NRC costs were, on average, 60% of site-specific costs compared to 70% in the prior survey.

TOTAL ESTIMATED DECOMMISSIONG COSTS ($ BILLIONS)



NRC FILING DATA | Selected asset and cost data from publicly available decommissioning financial assurance filings, as of December 31, 2016, were compared to survey data as a reasonableness check. Survey and NRC differences appear to result primarily from assets and costs attributable to non-radiological decommissioning and site-specific vs. CFR 50.75 methodologies. The data in the table above were estimated based on NRC filings.

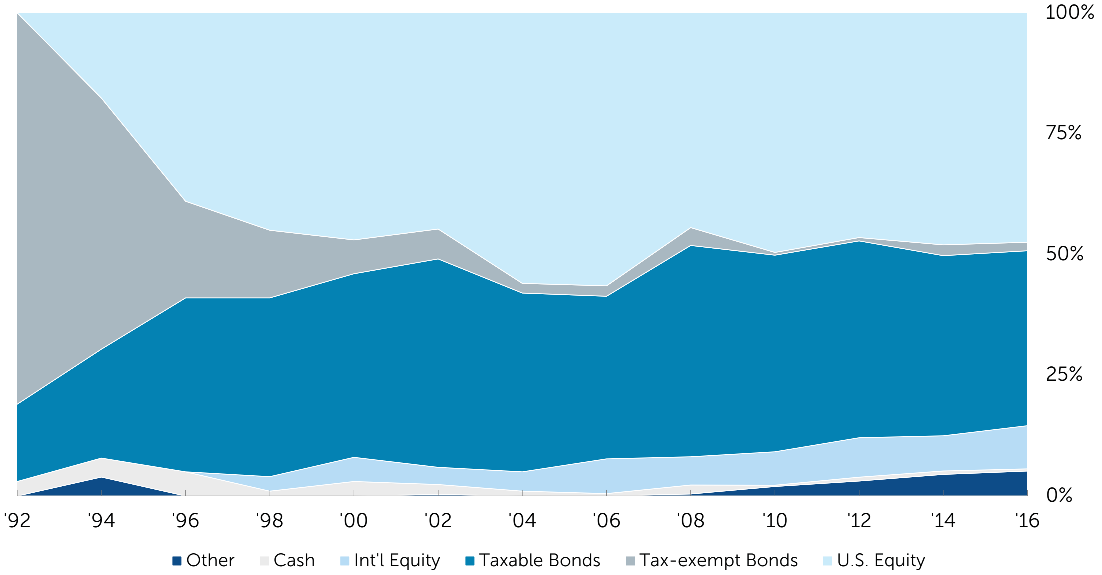
	NRC (in billions)	
OPERATIONAL	Cost	Assets
Investor-owned Utilities	$42.8	$46.4*
Non-investor-owned Utilities	$9.9	$7.0
TOTAL	**$52.7**	**$53.4**

*After-tax

QUALIFIED NDT

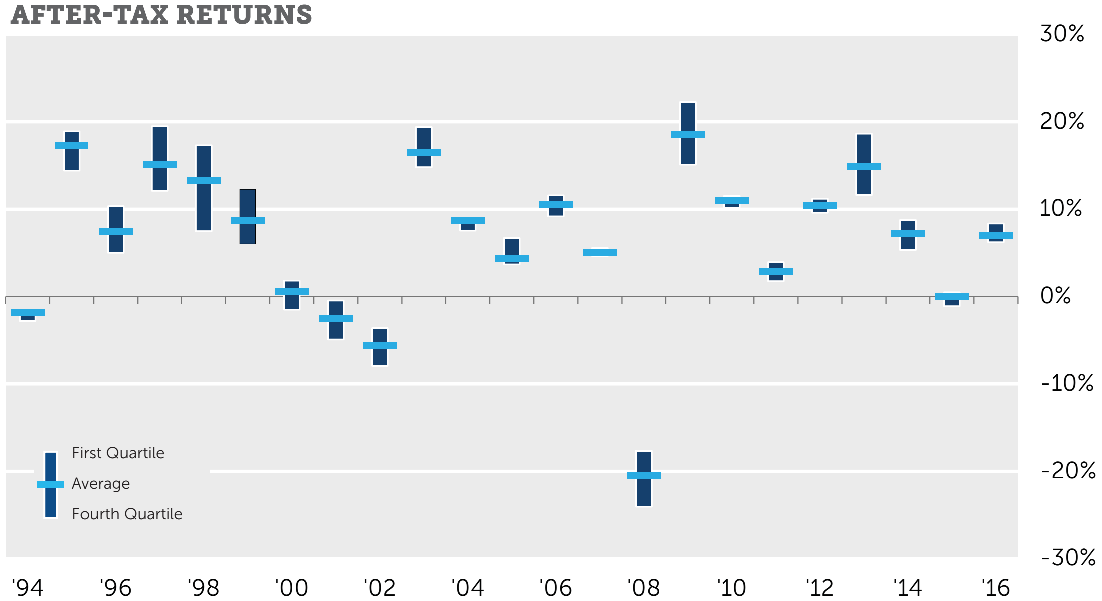
HISTORICAL ASSET ALLOCATION | Despite several significant equity market movements and periods of high volatility over the past 16 years, asset allocations have remained fairly constant. The average Qualified Trust equity allocation rose just 1% to 56% in 2016. There is continued interest in the "other" category, (primarily hedge funds, private equity and debt, and real estate), which at 5% of total assets, is the highest in the history of the Survey. About 25% of sponsors indicated a target allocation to alternative asset strategies; the average target allocation of those sponsors is just over 15%. Taxable fixed income allocations dropped to 36%, the lowest level since 2006.

AVERAGE TRUST ALLOCATIONS



HISTORICAL AFTER-TAX RETURNS | Qualified Trust average performance was effectively flat in 2015 and rose approximately 7% in 2016. The average trust return has been flat or positive for 13 out of the past 14 years and 19 of the 23 years shown in the graph. The average annual after-tax return for the 23-year period was 6.5%.

AFTER-TAX RETURNS



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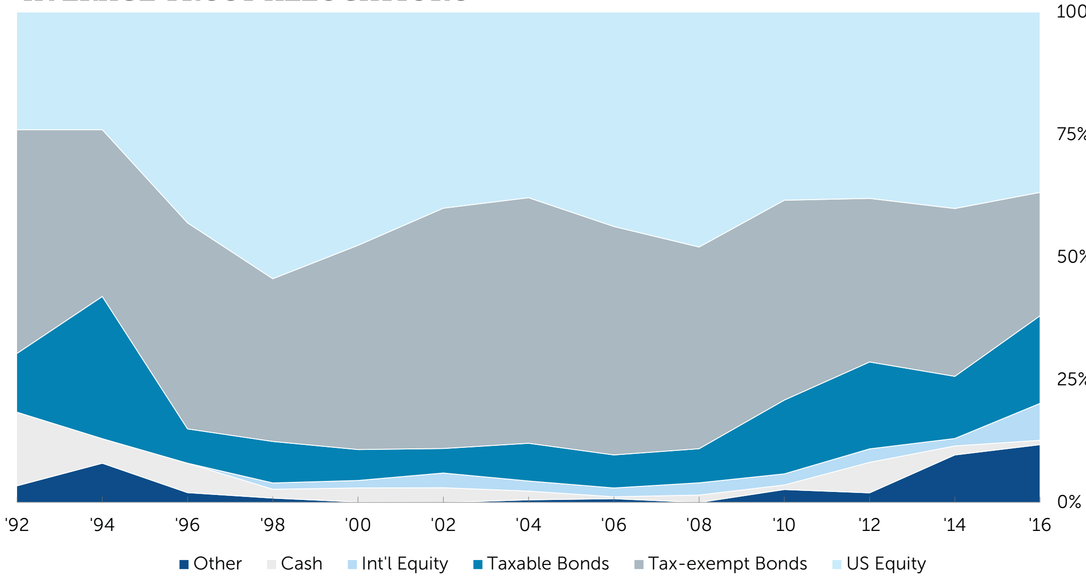
NON-QUALIFIED NDT

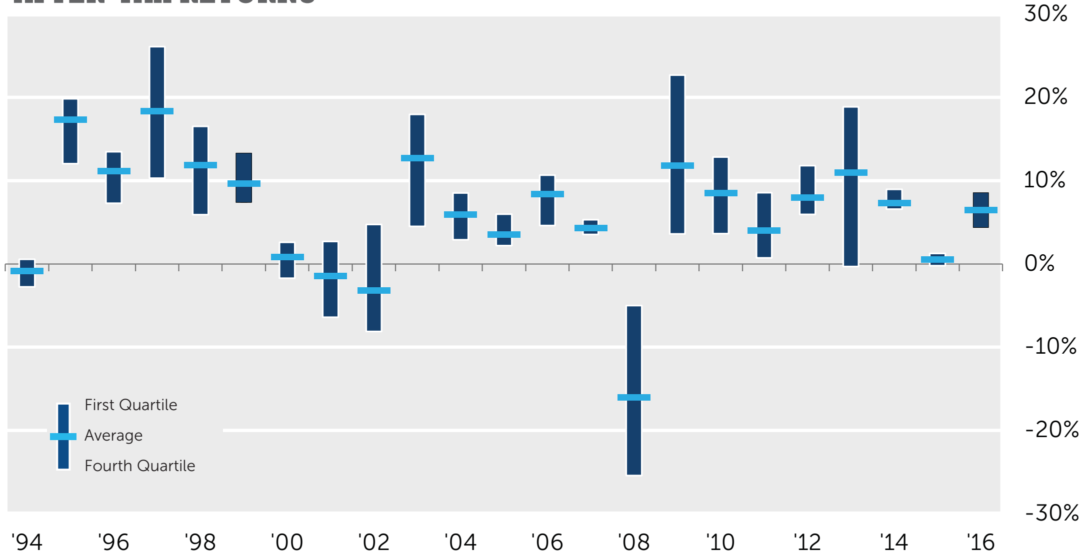
HISTORICAL ASSET ALLOCATION | Non-qualified Trust assets remained close to 10% of total NDT assets in 2016. Of the respondents, 11 sponsors reported having Non-qualified trusts, although only a few sponsors hold over 60% of Non-qualified Trust assets. Several Non-qualified Trusts have 100% allocations to a specific asset class. The “other” category remained outsized when compared to Qualified Trusts or PPA asset allocations due to a sponsor holding the majority of their Non-qualified assets in private equity and private debt. Tax exempt bonds dropped to their lowest allocation in the history of the Survey, at 25%.

AVERAGE TRUST ALLOCATIONS



HISTORICAL AFTER-TAX RETURNS | The average Non-qualified Trust after-tax total return for the two-year period since the last survey was 7.0%. The pre-tax total returns of the S&P 500 Index and Barclays Full Municipal Bond Index over the same period were 13.5% and 3.6%, respectively. The average annualized after-tax return for the 23 years was 6.1%, which compares favorably with the after-tax return assumptions for the same period.

AFTER-TAX RETURNS



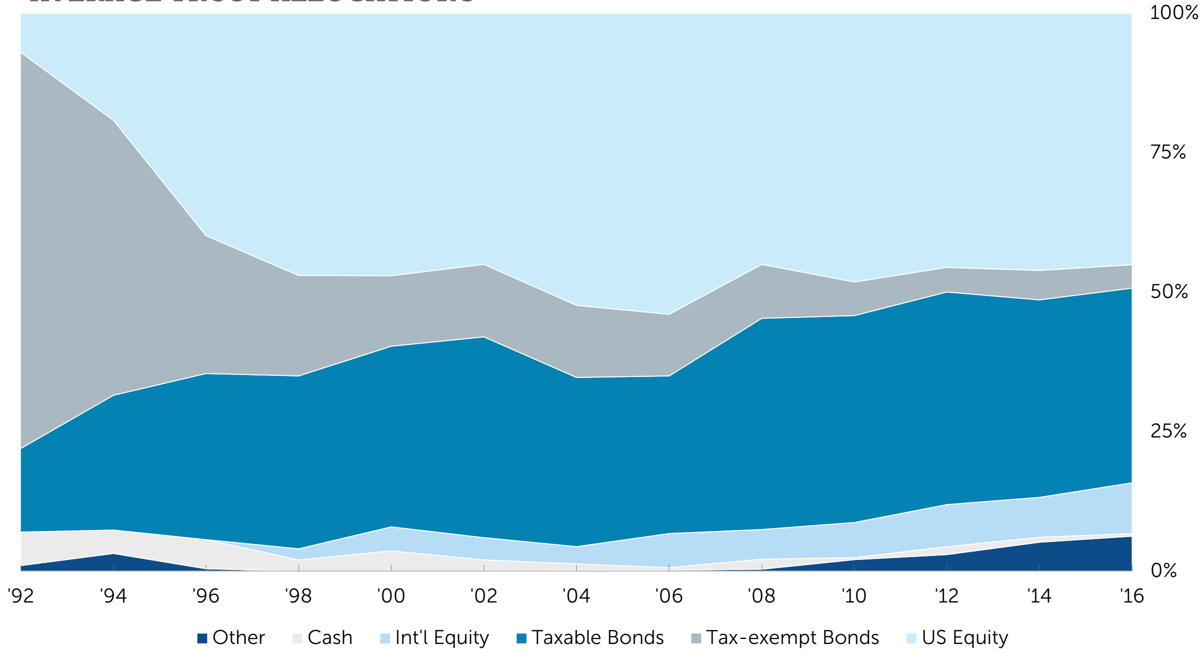
TOTAL NDT

HISTORICAL ASSET ALLOCATION | The graph below shows average actual allocations to major asset classes since 1992. Overall, asset allocations remained steady from the last survey. International equity saw the largest jump in allocation, rising by 2% to 9%. All other asset allocations moved less than 1% in the two years ending December 31, 2016.

The overall target allocations for equity, fixed income, and "other" are very close to actual allocations across the corresponding asset classes.

Approximately one third of respondents indicated an allocation to alternative asset strategies resulting in the 6% allocation to the "other" asset class. For those that indicated an allocation to alternatives, the average target allocation was 17%, with the maximum target of 35% and minimum of 3%.

AVERAGE TRUST ALLOCATIONS



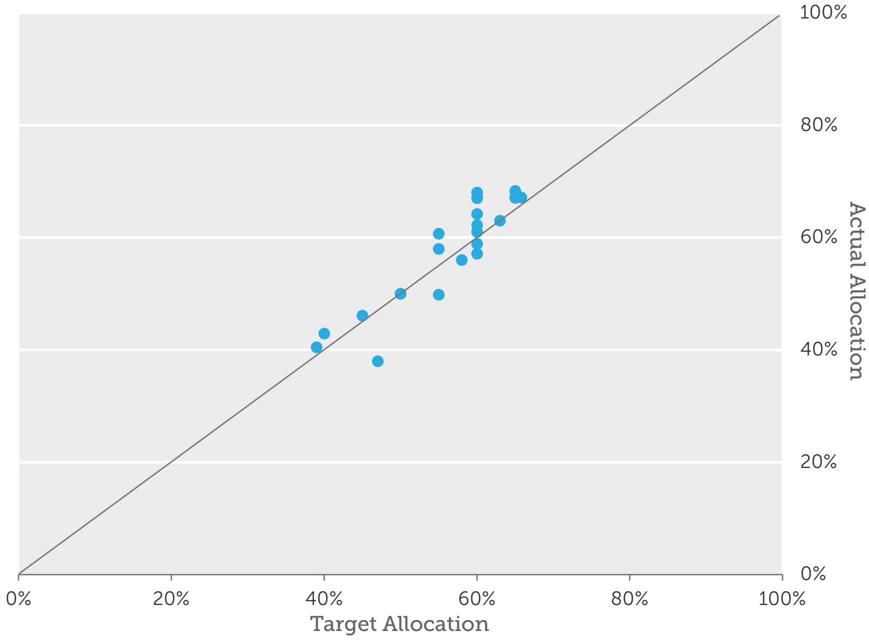
Sponsors seem to be satisfied with their current asset class line up. Of asset classes not currently utilized that are under consideration, only 11 cumulative options were chosen across all returned surveys compared to 45 in the prior survey.

ASSET ALLOCATIONS

EQUITY ALLOCATIONS | The chart on the right shows each trust's actual equity allocation relative to its target allocation for December 31, 2016. Observations below the diagonal reflect equity allocations which are below their targets, while those above the diagonal reflect allocations above their targets.

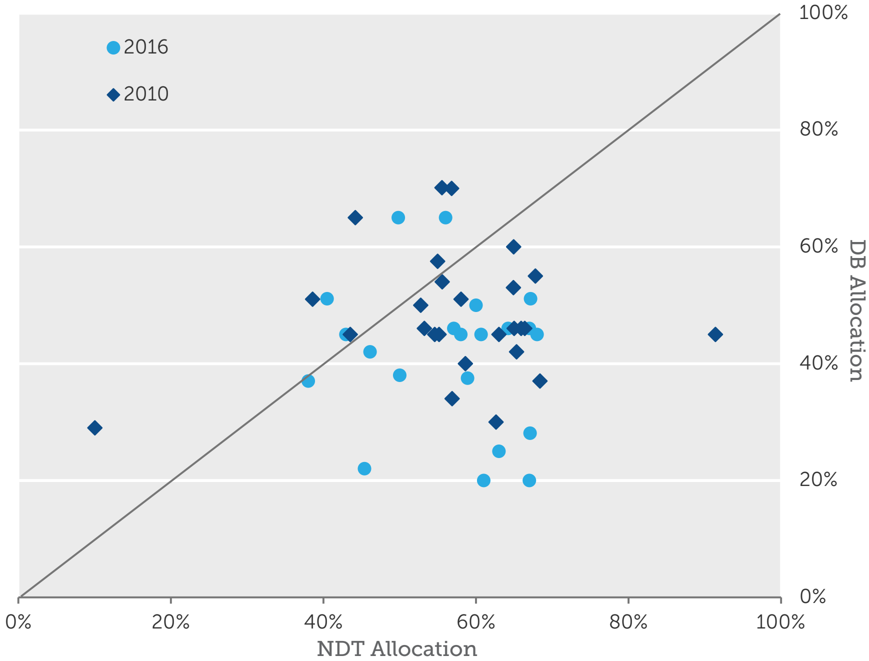
For the 2016 survey, the average actual equity allocation was slightly higher than the average target equity allocation (+1%). Based on survey responses, the average overweight was +3% and the average underweight was -4%. One standard deviation around the mean was under 5%.

2016 ACTUAL VS. TARGET



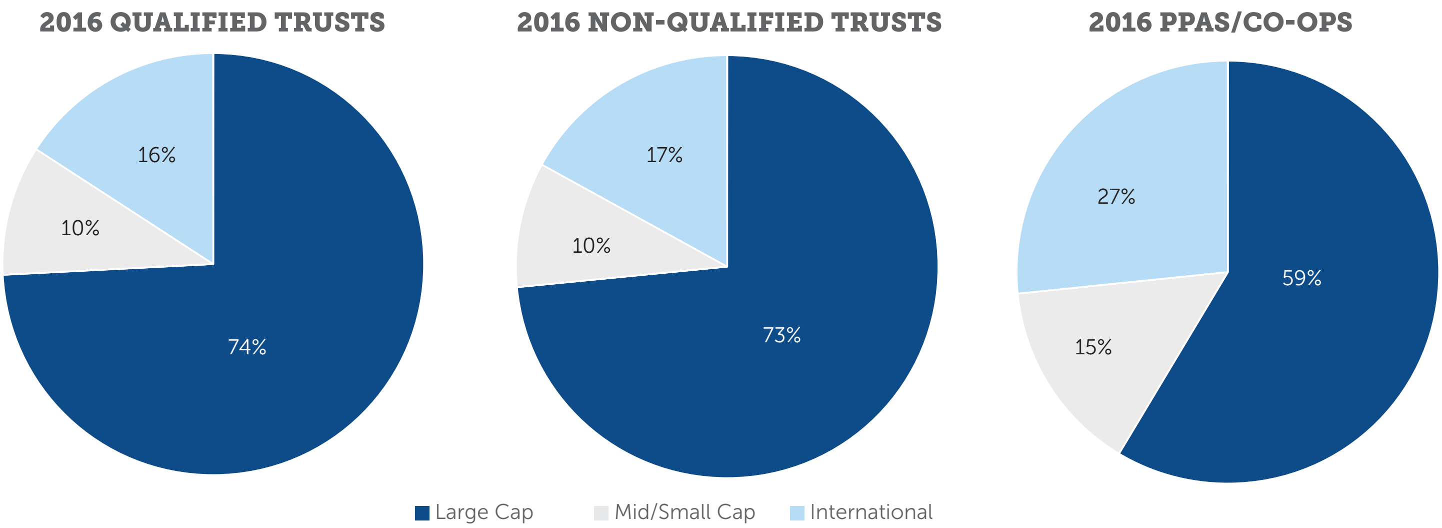
NDT VS. DEFINED BENEFIT | The chart on the right shows the relationship of each sponsor's NDT equity allocation relative to its Defined Benefit (DB) equity allocation. Observations above the diagonal indicate a larger equity allocation in the DB plan relative to the NDT. Survey responses indicated that the average NDT had a much larger allocation to the U.S. Equity asset class than did the average DB plan. The shift in DB equity assets has occurred over the past six years. The overwhelming majority of DB Fixed Income assets were in longer duration strategies while no sponsors indicated an allocation to long duration fixed income strategies in their NDTs.

EQUITY ALLOCATIONS

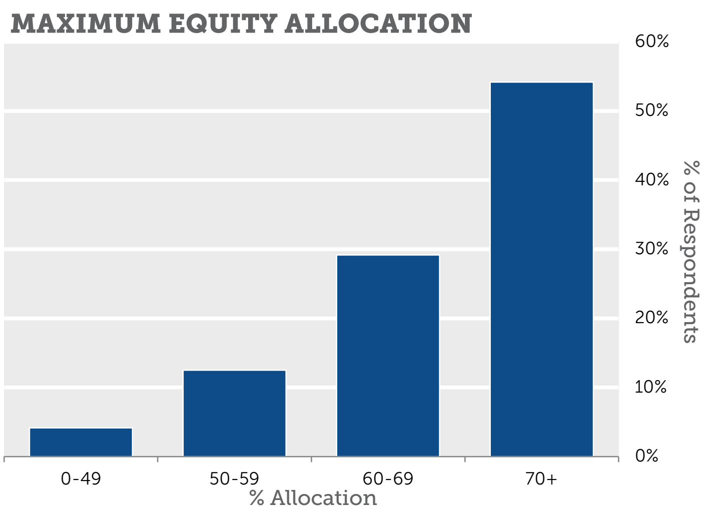


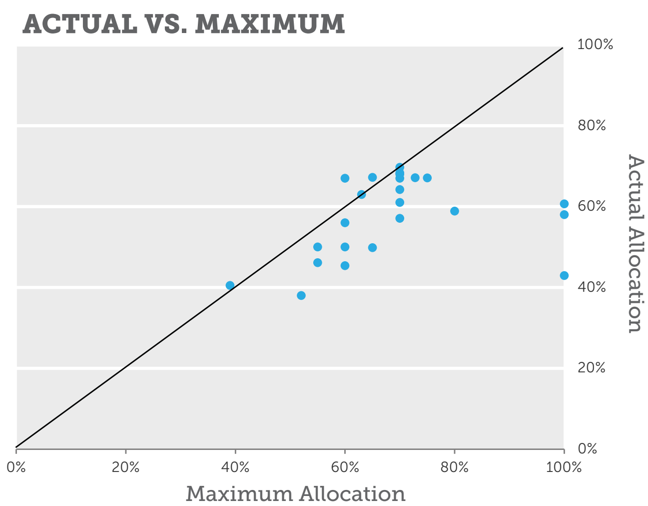
EQUITY

STYLE ALLOCATIONS | The estimated total equity allocation was $28.7 billion for Qualified Trusts, $3.2 billion for Non-qualified Trusts, and $3.7 billion for Public Power Authorities, Municipalities, and Cooperatives. Historically, large cap equity styles in Non-qualified Trusts dominated the overall equity allocation, potentially due to the divided-received-deduction (DRD). However, they were in-line with Qualified Trusts in the most recent survey results. International equity allocations increased across all Trust types, despite lagging in total returns when compared to domestic equities. International equity now represents over one fourth of PPA equity allocations. The S&P 500, S&P 400, S&P 600, and MSCI All World-Ex U.S. (USD) had total returns, as reported by the index providers, of 13.5%, 18.1%, 23.9%, and -1.4%, respectively, for the two-year period ending December 31, 2016.



MAXIMUM ALLOCATIONS | The average maximum equity allocation rose by 4% to 69% in 2016 compared to 2014, but still down from 74% in 2008. The average actual equity allocation was approximately 14% below the average maximum allowed. A number of respondents were nearing their maximum equity allocation and three respondents exceeded the maximum.

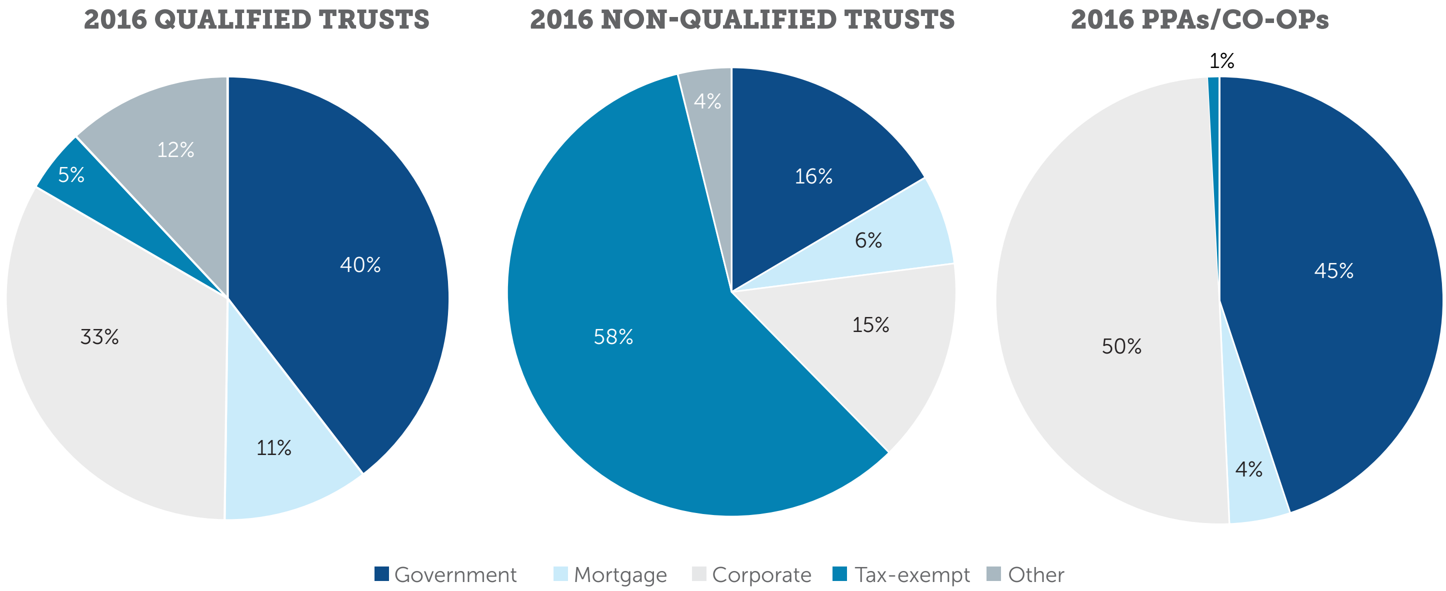




FIXED INCOME

SECTOR ALLOCATIONS | The estimated total fixed income allocation was $19.3 billion for Qualified Trusts, $3.1 billion for Non-qualified Trusts, and $3.3 billion for Public Power Authorities, Municipalities, and Cooperatives.

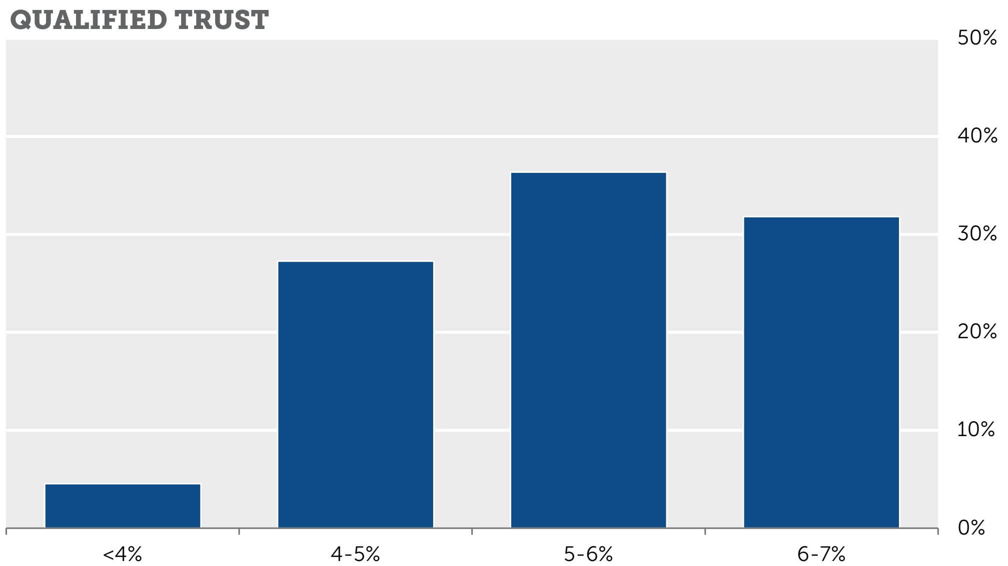
Qualified Trusts saw a significant shift into the “Other” category at the expense of the traditional Aggregate allocation. All Trust sector allocations in the chart below reflect the mix of fixed income benchmarks (Aggregate, Government/Credit, etc.). The “Other” category, which is primarily high yield and emerging market debt, accounted for more assets than mortgage backed securities for the first time in the history of the survey. While still dwarfing the other asset classes in Non-qualified Trusts, tax-exempt securities lost overall market share when compared to all other asset classes in the charts below. PPA Trusts remained primarily a mix of Government and Credit securities.



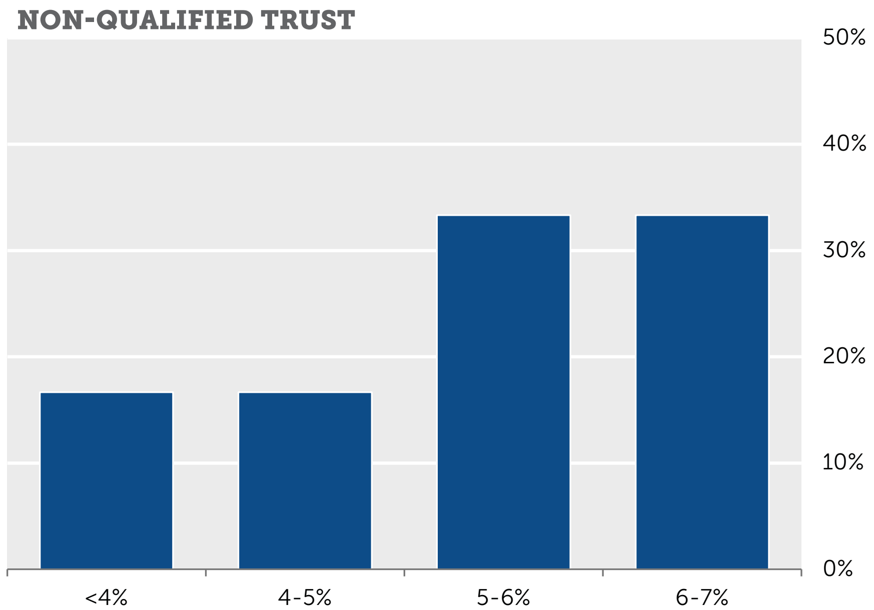
Despite the increase in the “Other” category, only two respondents indicated they were considering emerging market or high yield debt that are not currently utilizing either.

ASSET RETURN ASSUMPTIONS

AFTER-TAX RETURN ASSUMPTIONS: QUALIFIED TRUST | The Qualified Trust average after-tax return assumption dropped to its lowest level in survey history, and is well below peak levels of the late 1990s. This is likely due to interest rates remaining at historical lows and tapered expectations of a continued strong equity market. Based on each respondent's target asset allocations and expected returns for each asset class, the median after-tax return assumption was 5.2%; the average after-tax return assumption was 5.4%.



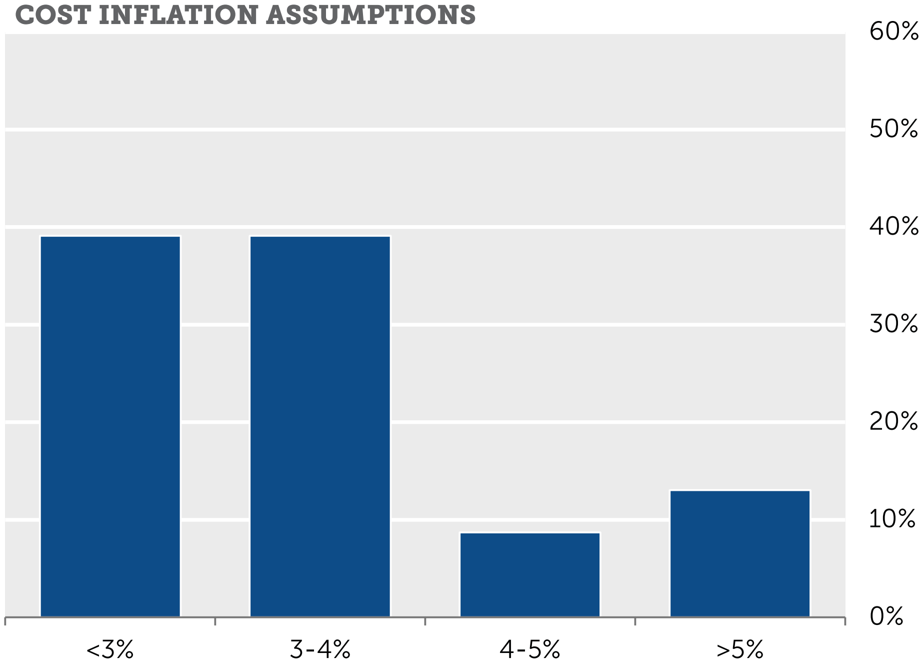
AFTER-TAX RETURN ASSUMPTIONS: NON-QUALIFIED TRUST | The Non-qualified Trust average after-tax return assumption bounced back a bit after dropping significantly in the prior survey. Based on each respondent's target asset allocations and expected returns for each asset class, the median after-tax return assumption was 5.2% and average after-tax return assumption was 5.1%. Non-qualified Trust average after-tax return expectations ranged from 200 basis points lower than their respective Qualified Trust expected after-tax returns to equal after-tax return expectations, resulting from higher tax rates and differing asset allocations.



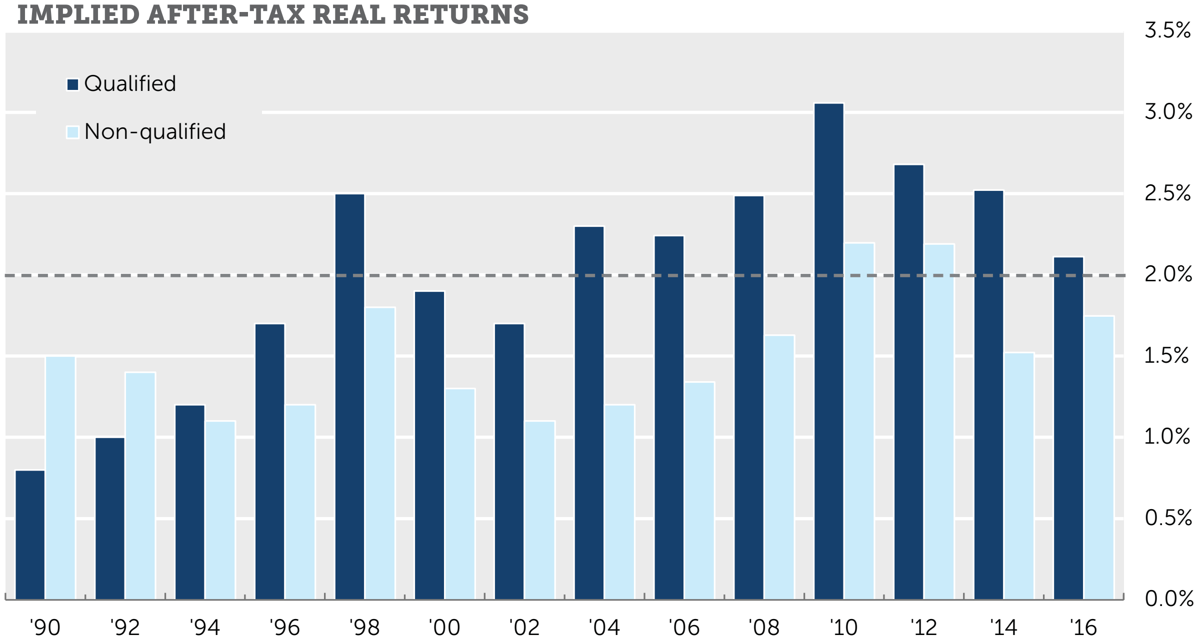
COST INFLATION ASSUMPTIONS | Inflation assumptions have a prevailing influence on estimating decommissioning liabilities and determining implied after-tax real rates of return. The average composite cost inflation assumption increased by 10 basis points from the 2014 Survey, along with the CPI 10-year forecast. Cost Inflation estimates have averaged 100 basis points over CPI forecasts over the past five surveys. Estimates ranged from 2.4% to 5.9%.

IMPLIED AFTER-TAX REAL RETURN ASSUMPTIONS | Implied after-tax real return assumptions were calculated based on each respondent's after-tax return and cost inflation assumptions. Qualified Trust implied after-tax return assumptions were at the lowest levels in survey history. The horizontal line at 2% represents the allowable real return assumption permitted in 10 CFR §50.75 (e) (1) (ii). Weighting the 2016 Qualified, Non-qualified, and PPA Trusts' implied after-tax returns by their market values as shown on page four yields a total NDT average implied after-tax real return of 2.1%.

COST INFLATION ASSUMPTIONS



IMPLIED AFTER-TAX REAL RETURNS



NDT MANAGEMENT

A new question was posed to survey participants in the last survey and was repeated this year: What do you feel are the greatest risks to decommissioning funding adequacy in the future? All options received a number of votes and many respondents marked multiple risks; the overall percentage for each option can be seen below. Virtually all respondents see cost increases outpacing investment returns as a major issue and half see potential regulatory issues as a major hurdle.

	2014	2016
Regulatory Issues	35%	50%
Spent Fuel Disposal	54%	46%
Low-level Radioactive Waste Disposal	23%	19%
Cost Increases Outpacing Investment Returns	69%	88%
A "Black Swan" Event	38%	38%
Other	8%	12%

One data point we attempted to extract from this round of surveys is a breakdown of asset values and allocations relative to remaining plant life and, furthermore, asset allocation depending on the decommissioning method chosen. While the majority of multi-unit and multi-site survey responses were returned aggregated as one survey, we were able to make the following observations:

- A number of sponsors with near-term planned plant shutdowns and/or immediate costs have shortened the duration of a significant portion of their assets and have reduced the equity risk in the total Trust.
- Despite the long duration of the decommissioning liability for the majority of operating plants, long duration fixed income remains virtually non-existent in plan sponsors asset allocations.
- Plants that have announced shutdown in the next few years are approximately 150% funded relative to the NRC 50.75 formula and approximately 80% funded based on their site specific studies.

Alternative/Absolute Return Strategies (ARS) are not being considered at this time by the majority of respondents. Of those respondents who are considering or have used ARS, Private Equity, Hedge Funds and Real Estate are the most popular asset classes, for the second consecutive survey. Return diversification remains a primary motivation for asset allocation policy changes.

While overall not looking at new asset classes, sponsors are making attempts to enhance returns within their current suite of assets. For instance, a number of sponsors lowered the quality constraint restrictions on individual issues and/or the total portfolio (e.g., AA to A). Also, the average maximum allocation for each asset class (equity, fixed income, and other) increased from the prior survey.

Rebalancing activity remains robust across trust sponsors for myriad reasons. More than half of respondents indicated they rebalanced the asset allocation in the past two years, with the majority of those citing it was an internally-driven decision as opposed to investment committee or regulatory driven. That number is actually down from the prior survey, likely due to equity returns in this surveys' time period lagging those of the prior survey. Some sponsors dialed down risk (equity allocations) due to pending early shutdowns or near-term funding needs. On the other hand, a number of sponsors cited revised risk parameters and made allocation changes in order to boost projected returns. Diversification remained the overall primary objective for revising asset allocations, as it was in the prior two surveys.

NDT/DB – When viewed from either the asset or liability side, NDTs, on average, are approximately half the size of DB plans for IOUs. Given the typical long term nature of both NDTs and DBs, one might surmise that similar allocations may be warranted. This remains far from the case. The average DB invests across a broader spectrum of investments and focuses on longer duration fixed income while the average NDT remains in a more traditional asset mix. For instance, sponsors reported a 27% allocation to long duration fixed income and a 21% allocation to the "other" asset class in their DB plans while those numbers were 0% and 6% respectively in NDTs. There are many potential explanations for this including taxes, regulatory restrictions, the method of viewing the liability, and separate investment committees, among others.

NISA'S NDT TEAM

NISA is a 100% employee-owned investment management firm based in St. Louis, Missouri. NISA has $239 billion under management* for 187 clients including NDTs, defined benefit plans, defined contribution plans, and other institutional investors. NDT assets are the largest source of NISA's taxable assets under management. NISA has managed assets for NDT clients since our inception in 1994 and currently manages $12.5 billion in NDT assets for 12 utilities.

NISA manages all portfolios with a team approach. A team of senior investment professionals services the NDT portfolios, supported by a staff of investment professionals. The Investment Committee (Jess Yawitz, David Eichhorn, Bill Marshall, Ken Lester, Joe Murphy, and Anthony Pope) has the primary responsibility for the overall NDT investment strategy.

Please contact Rusty Groth if you would like additional copies of this report or more information regarding NDT management services. This survey and prior year surveys are available at www.nisa.com.

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Thank you to our NDT sponsors for their participation in this survey.

*Represents $149 billion of physical assets and $89 billion in derivatives notional value as of June 30, 2017.
All photos courtesy of the U.S. Nuclear Regulatory Commission.
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