Asset Management Program

Presented to Leadership in Federal Facility Asset Management

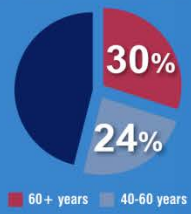
Loida Begley
NNSA Program Manager, Asset Management Program
Office of Infrastructure Operations and Modernization (NA-522)

NNSA SAFETY, INFRASTRUCTURE & OPERATIONS

A VAST AND COMPLEX ENTERPRISE

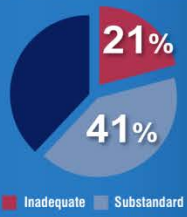
THE CHALLENGE: AGING & DECLINING INFRASTRUCTURE

AGE OF FACILITIES



EXCESS FACILITIES

CONDITION OF FACILITIES



Vision

Safely operate and modernize our enterprise to meet demands now and in the future.

Mission

Maintain, Operate, and Modernize NNSA Infrastructure in a safe, secure, and cost-effective manner to enable program results.

41,000 LABORATORY & PLANT EMPLOYEES

2,000 miles of roads

NEARLY THE DRIVING DISTANCE FROM DC TO LOS ALAMOS

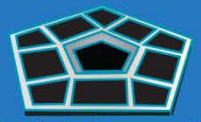
TRACK **400,000** METRIC TONS OF NUCLEAR MATERIALS

safety for **400** nuclear facilities

2,160 square miles of land area

ABOUT THE SIZE OF DELAWARE

36 Million SQUARE FEET OF FACILITY SPACE



(~six Pentagons worth)

15.2 MILLION FT³ OF HAZMAT

ENOUGH TO FILL ~15 WASHINGTON MONUMENTS

9.1 Trillion BTUs ANNUAL ENERGY CONSUMPTION

enough to power ~250,000 homes for one year

JULY 2015

DOE Calls for Asset Management

The Deputy Secretary of Energy
Washington, DC 20585

May 26, 2015

MEMORANDUM FOR HEADS OF DEPARTMENTAL ELEMENTS

FROM: ELIZABETH SHERWOOD-RANDALL

SUBJECT: Department of Energy Asset Management Plan

To strengthen the management of our land, facilities, and equipment, the Secretary has issued an innovative Departmental framework, "Department of Energy Asset Management Plan – A Framework for Decision Making and Implementation." This plan will encourage the return of some of these national resources to their rightful owners — the American public.

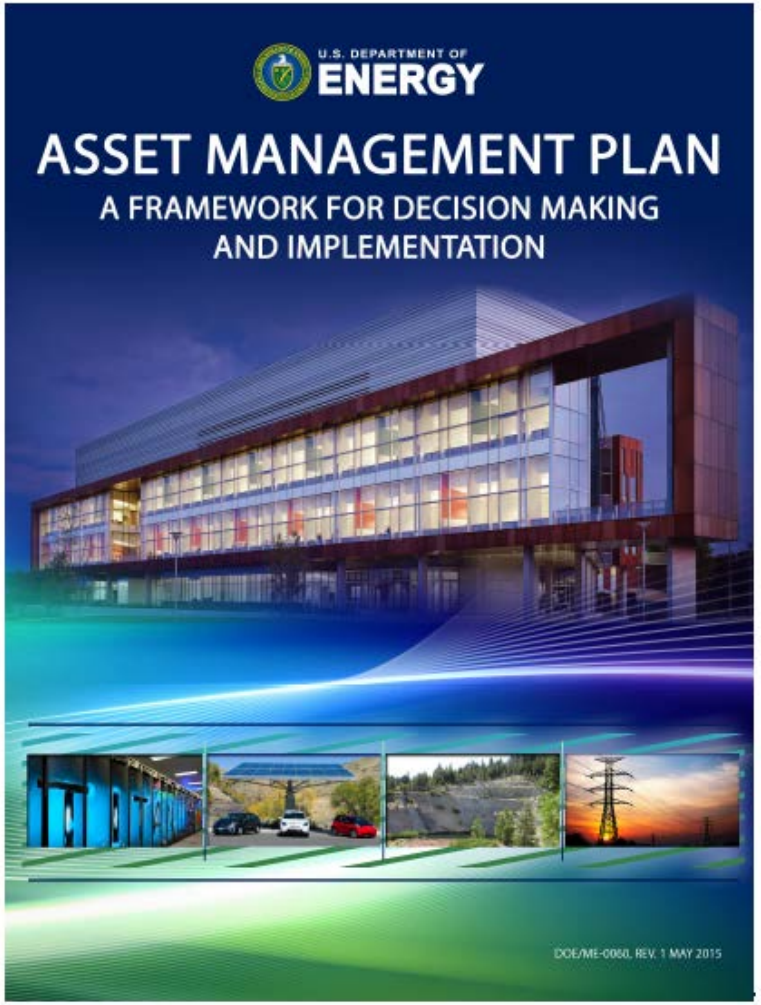
The plan provides an integrating strategy for (1) supporting the management and performance goals in the Department's Strategic Plan; (2) fulfilling Federal requirements governing the acquisition, management, and disposal of property; and (3) conducting activities in a manner that provides the best value for the American taxpayers. The guiding principles ensure the Department's portfolio of real and personal property assets is appropriately sized and aligned to efficiently support mission execution.

Accordingly, the Department of Energy will:

- Manage all of its property as valuable national resources in a cost effective manner.
- Maintain accurate inventories, credible condition assessments, appropriate capacity and utilization, reliable measurements, and repeatable processes.
- Use industry standards and benchmarks for continuous improvement.
- Prioritize investments based on lifecycle cost benefit analyses, best practices, and validated data to guide enterprise-wide decisions.
- Involve stakeholders in property planning and implementation by considering local site conditions as well as the larger regional context in property decisions.
- Ensure the acquisition, sustainment, reuse, or disposal of property assets support critical missions; stimulate the economy; and protect workers, the public, and the environment.

I know you share my desire to right-size and maintain our property portfolio in a sustainable and cost-effective manner; prioritize investment decisions; ensure public participation in our planning processes; and provide our property professionals with

Printed with soy ink on recycled paper



Bottom Line Up Front

- Two main features of NNSA's Asset Management Program:
  1) Designed around managing an infrastructure element
  2) First consider acquisition vehicles that allow for centralization and standardization.

- Today, NNSA has two AMPs, one for roofs, one for Heating, Ventilation, and Refrigeration systems (HVAC). Water is being considered.

- AMPs save time, effort, and money through its use of contracts.

- AMPs allow for more robust portfolio analysis.

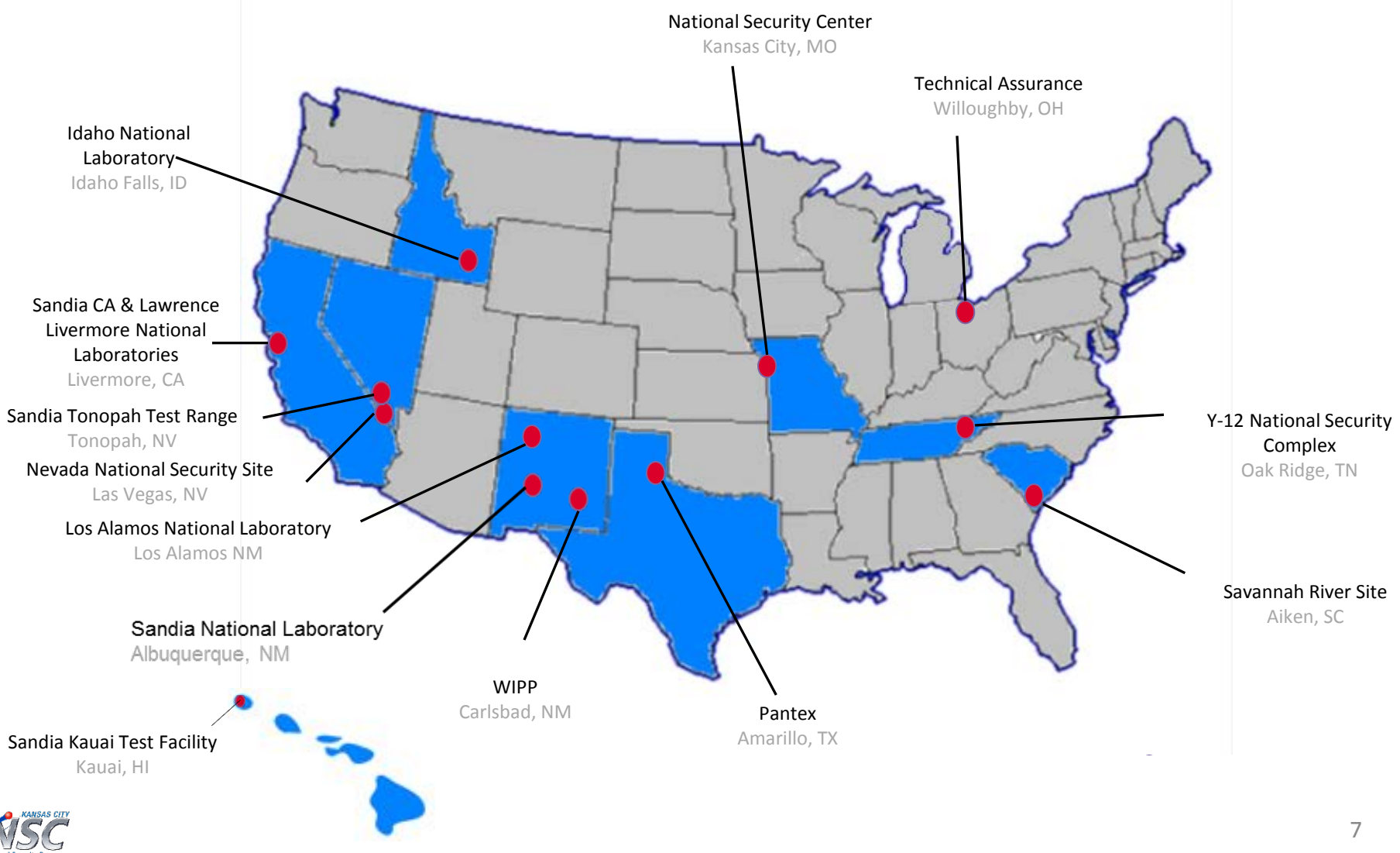
Roof Asset Management Program (RAMP)

Loida Begley for
Robert Schmidt, Kansas City Field Office
RAMP Program Manager

What is RAMP?

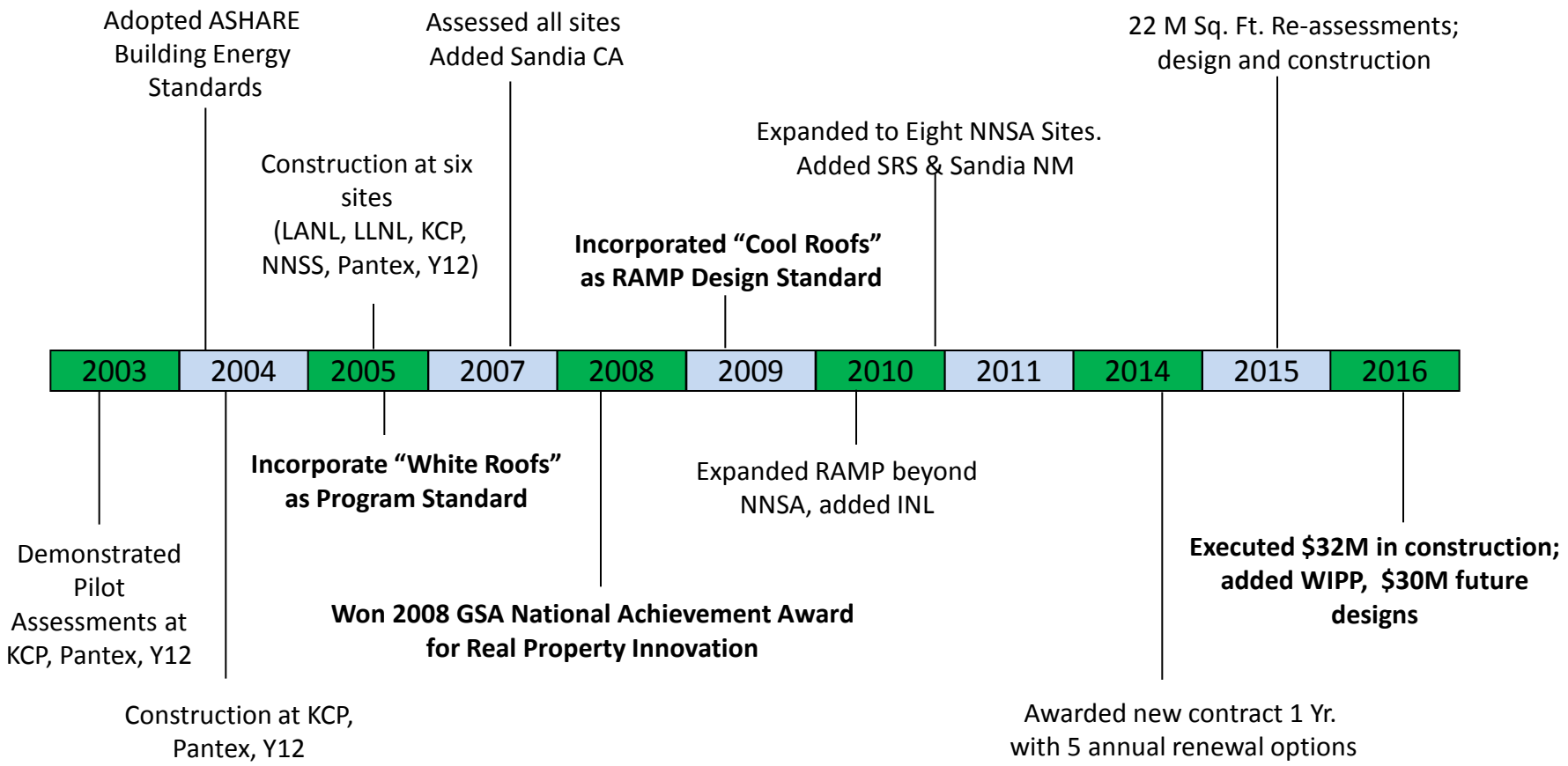
- RAMP originally developed in 2003 in response to overwhelming number of roof failures.
- Program systematically manages NNSA's roof assets to:
  - Increase the average remaining roof life in line with industry
  - Improve facility reliability
  - Reduce deferred maintenance
- Through a unique, corporate approach, RAMP manages roof assets across the complex under one contract managed by Honeywell FM&T at the KCNSE
- Roofing Management Contractor – Technical Assurance, Inc. Willoughby, OH

Where We Work



RAMP Program Timeline

Note: Calendar Years Shown



Benefits

Headquarters Effective centralized management	Site Access to tools
• ***Apples to Apples Priorization*:** One prioritized list of roofing needs across NNSA based on objective, uniform criteria • ***Streamlined Procurement:*** One contract is easier to manage • *Energy savings:* Ability to implement standards, like increased insulation, white and cool roof design • ***Commercially Connected:*** Partnership with Technical Assurance gives access to industry best management practices • ***Economies of scale:*** Leverages the NNSA buying power which saves cost • ***Program continuity:*** Capture programmatic best practices and facilitate communication	• ***Funding stability:*** Dedicated funding for roofing needs • ***Quality Data:*** Database of all roofing deficiencies helps sites prioritize work outside of the program and facilitates informed decisions • ***Expertise within reach:*** Roofing management contractor who is industry expert, provides both design and construction services • ***Procurement tools:*** Centralized procurement results in faster execution • ***Connection:*** Standard industry processes, best management practices and effective interaction among other sites

Program Accomplishments

To Date:

- $28.6 Million in value added by increasing lifespan of roofs
- Reduced $83 Million in deferred maintenance over life of program
- Replaced 4.9 Million square feet of roof with more energy efficient sustainable roofs (18% of inventory), saving an estimated $693K in energy costs per year through FY16

Projected Savings/Cost Avoidance FY16-18 (assume $74M spend plan):

- Internal estimates of 40% more cost effective than decentralized approach
- $15.3M in burden
- $12.2 M in design
- $5.0M in execution
- Procurement Time (Design, Bid and Award): RAMP procurement = 4 weeks to 6 weeks; Site procurement = 12 weeks to 30 weeks

Pantex Before & After

Energy Efficiency

LANL Roof Area

Replaced roof sections have snow, original construction does not.

Department of Energy
National Nuclear Security Administration

Roof Asset Management Program (RAMP)

Presented By:
Edward Taylor, Visionary & Founder, Technical Assurance, Inc.

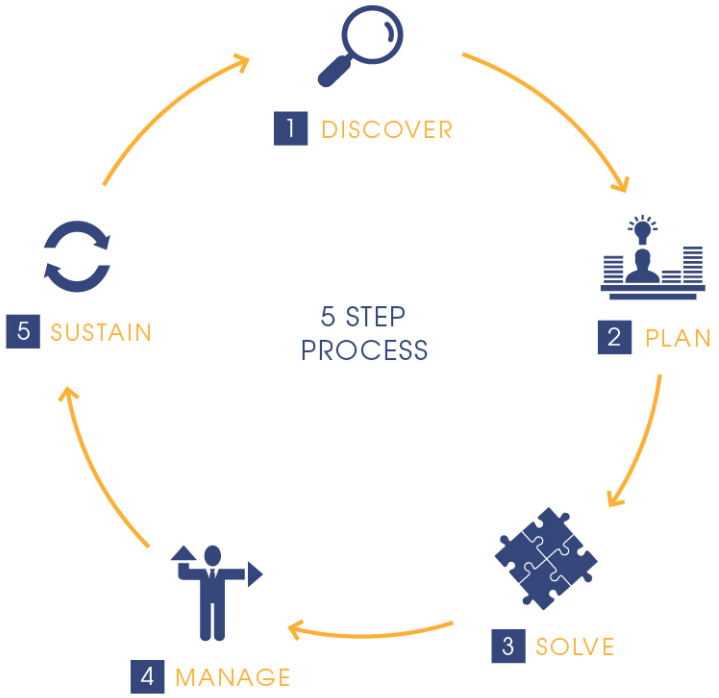
Attending:
William Roess, President, Technical Assurance, Inc.

TECHNICAL ASSURANCE
High Performance Building Enclosure Experts

5 Steps to Asset Sustainability

Ensures thorough, superior results in program assessment, planning, design and management.

Discover:	Condition Assessment
Plan:	Budget and Capital Planning
Solve:	Design and Bid
Manage:	Construction
Sustain:	Sustainable Maintenance

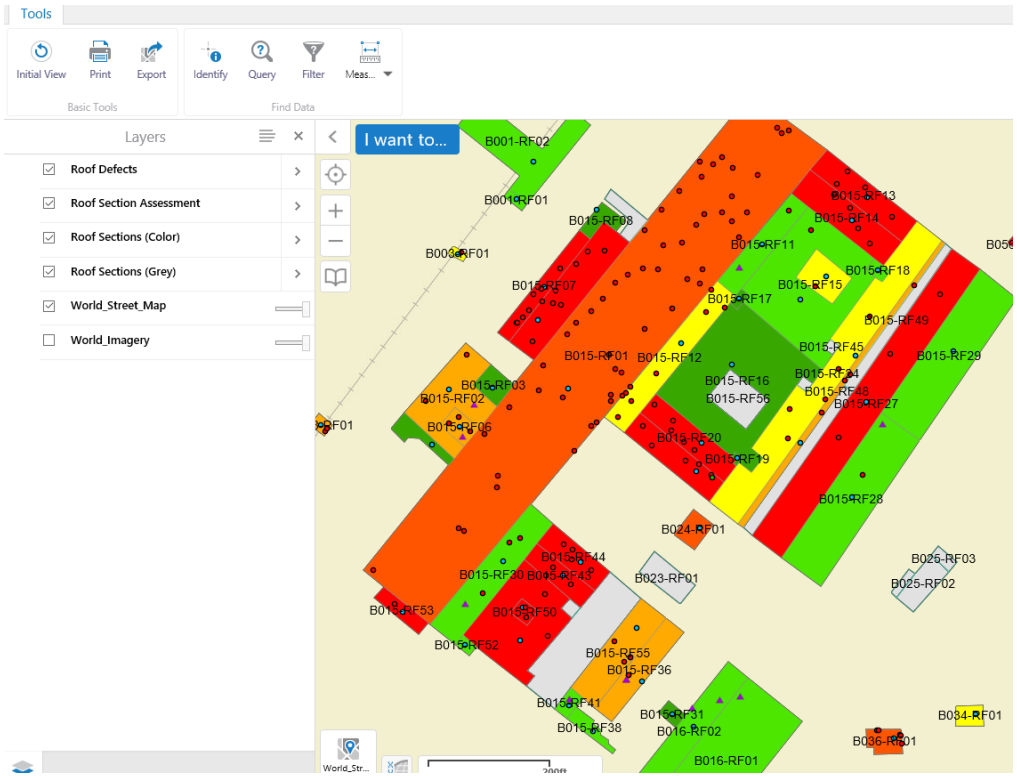


TECHNICAL ASSURANCE
HIGH PERFORMANCE BUILDING ENCLOSURE EXPERTS

ON-PNT® - Enterprise Solution

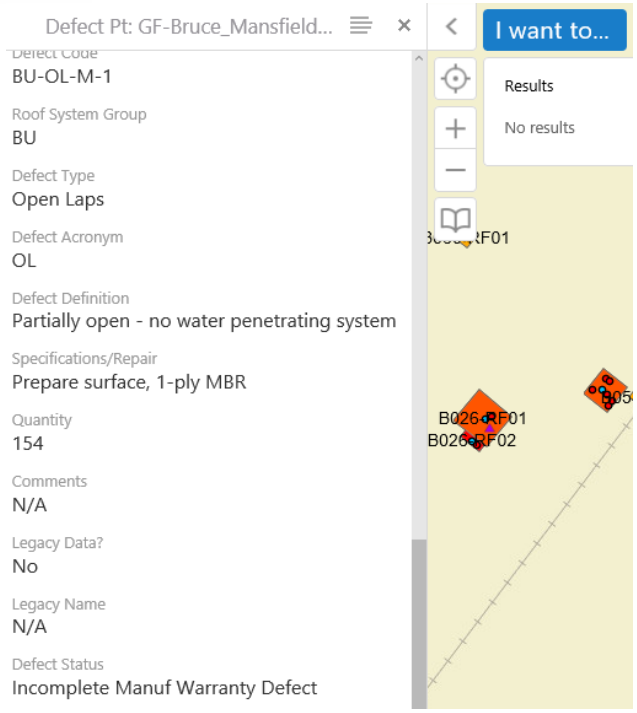
GIS enabled database and web portal technology for management of:

- Building System
- Design Services and Bidding
- Construction
- Sustainable Maintenance



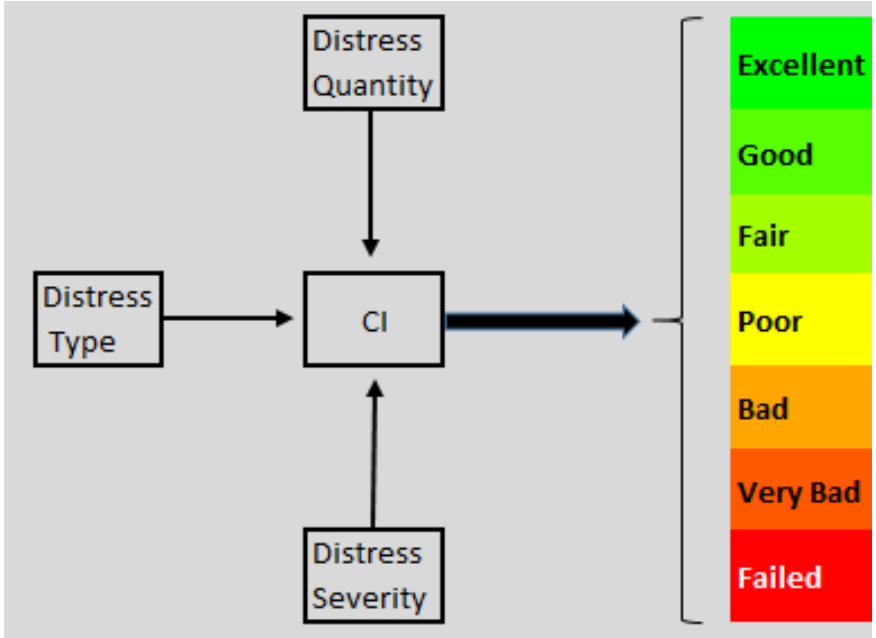
TECHNICAL ASSURANCE
HIGH PERFORMANCE BUILDING ENCLOSURE EXPERTS

Discover



Condition Index:

Objective, repeatable and scientific condition assessments.



- "Asset Lifecycle Model for Total Cost of Ownership", IFMA/APPA
- ASTM E917-05 Measuring Life-Cycle Costs of Buildings and Building Systems
- ASTM E1057-06 Measuring Internal Rate of Return and Adjusted Internal Rate of Return for Investments in Buildings and Building Systems
- ASTM E1121–12 Measuring Payback for Investments in Buildings and Building Systems
- ASTM E1765-11 Standard Practice for Applying Analytical Hierarchy Process (AHP) to Multi-Attribute Decision Analysis of investments related to Buildings and Building Systems

Plan

Create financial plans based on discovery

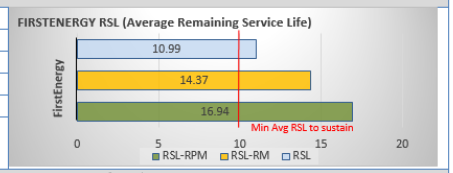
TECHNICAL ASSURANCE
High Performance Building Enclosure Experts

N-PNT

[redacted] RAMP KPIs

Life Cycle: Making Roofs Last Longer

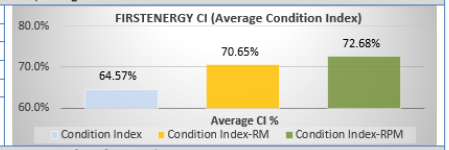
Life Cycle	Average-Program Start 2011 - Current	
Metric	<2011 (Static)	Current (Updated)
RSL	7	11
RSL-RM	10	14
RSL-RPM	11	17



Condition: Improving Roof Condition

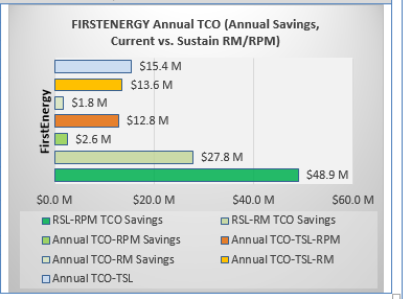
CI	Average	
Metric	<2011 (Static)	Current (Updated)
CI	46.75 %	64.57 %
CI-RM	52.23 %	70.65 %
CI-RPM	54.46 %	72.68 %

50% ↑ Maintain-Repair 50% ↓ Restore-Replace



Savings: Lower Cost of Roof Ownership

TCO	Costs	
Metric	<2011 (Static)	Current (Updated)
Annual TCO-TSL	$14,444,723.58	$15,402,979.10
Annual TCO-TSL-RM	$13,392,754.60	$13,624,654.02
Annual TCO-RM Savings	$1,051,968.98	$1,778,325.09
Annual TCO-RM Savings %	7.28 %	11.55 %
Annual TCO-TSL-RPM	$12,988,348.15	$12,833,977.15
Annual TCO-RPM Savings	$1,456,375.44	$2,569,001.95
Annual TCO-RPM Savings %	10.08 %	16.68 %
RSL-RM TCO Savings	$11,914,644.91	$27,752,427.52
RSL-RPM TCO Savings	$19,119,058.44	$48,922,605.37



TECHNICAL ASSURANCE
High Performance Building Enclosure Experts

N-PNT

[redacted] RAMP DASHBOARD

Site Roof Asset Measurable

Total SF (Square Feet)	11,320,006
Roof ID (Total Count)	2066
Roof Project Budget	$429,047,836.23

Site Roof Sustainability Measurable

RSL	11	(As assessed and without improvements or maintenance)			
RSL-RM	14	Total Roof Defect Costs	2,341,928.25	Maint (Maintenance)	$718,843.76
RSL-RPM	17	Total Roof Defect Costs	2,341,928.25	PM Annual	$718,843.76

Site Roof Sustainability Benefit

TCO		TCO Savings	
Annual TCO-TSL	$17,183,019.48	Annual TCO-RM Savings	$1,959,891.03
Annual TCO-TSL-RM	$15,223,128.45	Annual TCO-RM Savings %	11.41 %
Annual TCO-TSL-RPM	$14,340,991.64	Annual TCO-RPM Savings	$2,842,027.84
		Annual TCO-RPM Savings %	16.54 %
		RSL-RM TCO Savings	$30,840,136.07
		RSL-RPM TCO Savings	$54,954,142.53

5 Year Capital Plan

TSL Plan (As assessed-current path)	
Year	Roof Project Budget
2016	$171,183,919.27
2017	$7,911,658.14
2018	$10,927,931.71
2019	$9,288,881.80
2020	$7,085,614.31

TSL-RM Plan (Sustain-Repair & Maintain)	
Year	Roof Project Budget
2016	$60,101,405.18
2017	$38,689,303.73
2018	$63,323,234.85
2019	$10,712,322.14
2020	$6,747,586.13

TSL-RPM Plan (Sustain-Repair & Bi-Annual PM)	
Year	Roof Project Budget
2016	$60,101,405.18
2017	$38,689,303.73
2018	$24,102,012.07
2019	$39,221,222.78

Repair and Maintenance Improvements Plan

RSL-RM Plan		RSL-RPM Plan	
2016 (Repairs and Maintenance)	$3,060,772.01	2016 (Repairs + Bi-Annual PM)	$3,776,066.79
		2017 and beyond Annual PM	$718,843.76

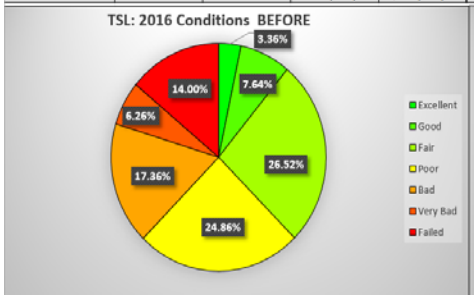
TECHNICAL ASSURANCE
High Performance Building Enclosure Experts

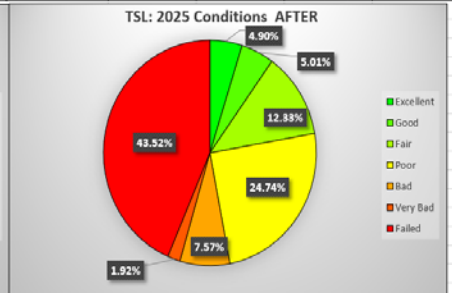
Plan

Portfolio Condition Before and After Snap Shots (Analysis of over 10 years)

$15 million per Year

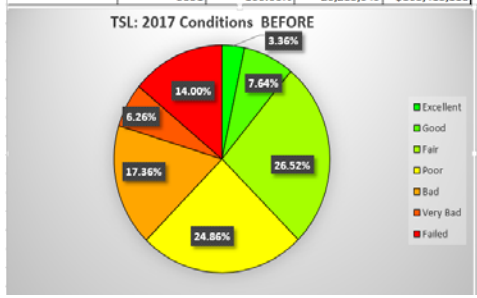
Condition-2017	Count	%	SF	CRV	Condition-2026	Count	%	SF	CRV
Excellent	180	3.36%	1,091,969	$35,919,400	Excellent	262	4.90%	919,718	$37,005,814
Good	409	7.64%	1,576,523	$63,796,199	Good	268	5.01%	1,139,330	$44,930,102
Fair	1419	26.52%	5,052,742	$210,281,570	Fair	660	12.33%	2,444,008	$100,780,620
Poor	1330	24.86%	5,021,059	$206,971,499	Poor	1324	24.74%	3,984,133	$173,761,874
Bad	929	17.36%	3,303,954	$130,526,090	Bad	405	7.57%	1,519,161	$65,441,144
Very Bad	335	6.26%	1,336,532	$50,990,753	Very Bad	103	1.92%	464,812	$17,886,063
Failed	749	14.00%	2,900,870	$104,927,607	Failed	2329	43.52%	9,812,487	$363,607,501
	5351	100.00%	20,283,649	$803,413,118		5351	100.00%	20,283,649	$803,413,118

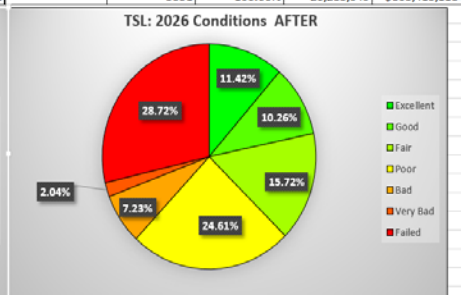




$30 million per Year

Condition-2017	Count	%	SF	CRV	Condition-2026	Count	%	SF	CRV
Excellent	180	3.36%	1,091,969	$35,919,400	Excellent	611	11.42%	2,055,197	$83,057,252
Good	409	7.64%	1,576,523	$63,796,199	Good	549	10.26%	2,126,442	$82,388,201
Fair	1419	26.52%	5,052,742	$210,281,570	Fair	841	15.72%	3,414,202	$136,826,694
Poor	1330	24.86%	5,021,059	$206,971,499	Poor	1317	24.61%	3,936,483	$172,163,374
Bad	929	17.36%	3,303,954	$130,526,090	Bad	387	7.23%	1,445,252	$61,496,783
Very Bad	335	6.26%	1,336,532	$50,990,753	Very Bad	109	2.04%	510,540	$18,829,596
Failed	749	14.00%	2,900,870	$104,927,607	Failed	1537	28.72%	6,795,533	$248,651,219
	5351	100.00%	20,283,649	$803,413,118		5351	100.00%	20,283,649	$803,413,118





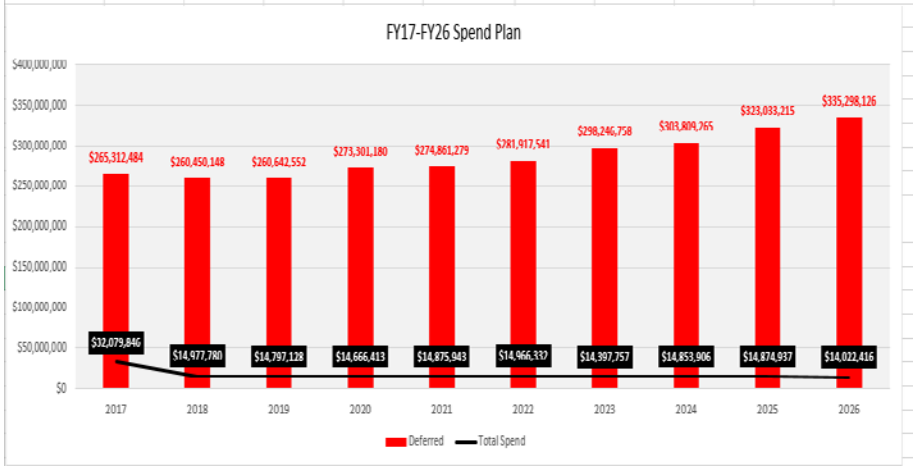
TECHNICAL ASSURANCE
HIGH PERFORMANCE BUILDING ENCLOSURE EXPERTS

Plan

Constrained Budget Spend Plans

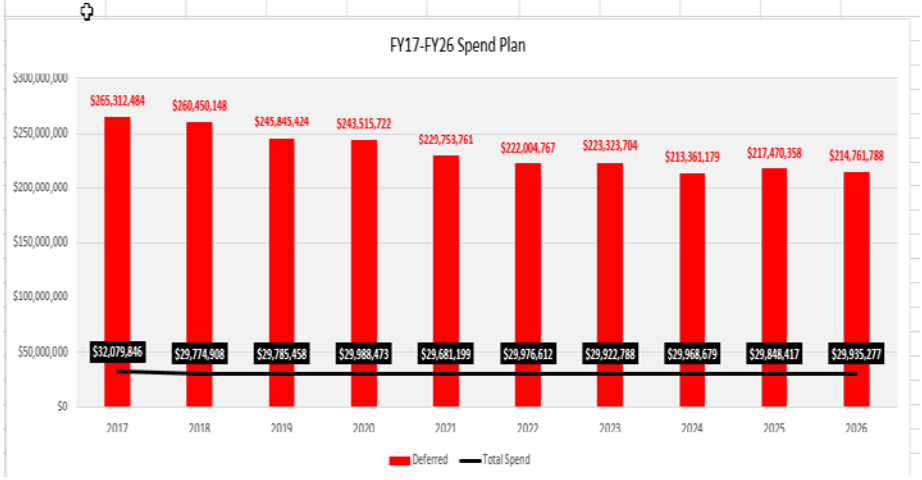
$15 million 10 Year Spend

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Total Spend	$32,079,846	$14,977,780	$14,797,128	$14,666,413	$14,875,943	$14,966,332	$14,397,757	$14,853,906	$14,874,937	$14,022,416
Total TSL Budget	$265,312,484	$27,217,511	$15,170,184	$27,455,756	$16,226,512	$21,932,205	$31,295,549	$19,960,264	$34,077,857	$27,139,848
Deferred	$265,312,484	$260,450,148	$260,642,552	$273,301,180	$274,861,279	$281,917,541	$298,246,758	$303,809,265	$323,033,215	$335,298,126



$30 million 10 Year Spend

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Total Spend	$32,079,846	$29,774,908	$29,785,458	$29,988,473	$29,681,199	$29,976,612	$29,922,788	$29,968,679	$29,848,417	$29,935,277
Total TSL Budget	$265,312,484	$27,217,511	$15,170,184	$27,455,756	$16,226,512	$21,932,205	$31,295,549	$19,960,264	$34,077,857	$27,139,848
Deferred	$265,312,484	$260,450,148	$245,845,424	$243,515,722	$229,753,761	$222,004,767	$223,323,704	$213,361,179	$217,470,358	$214,761,788



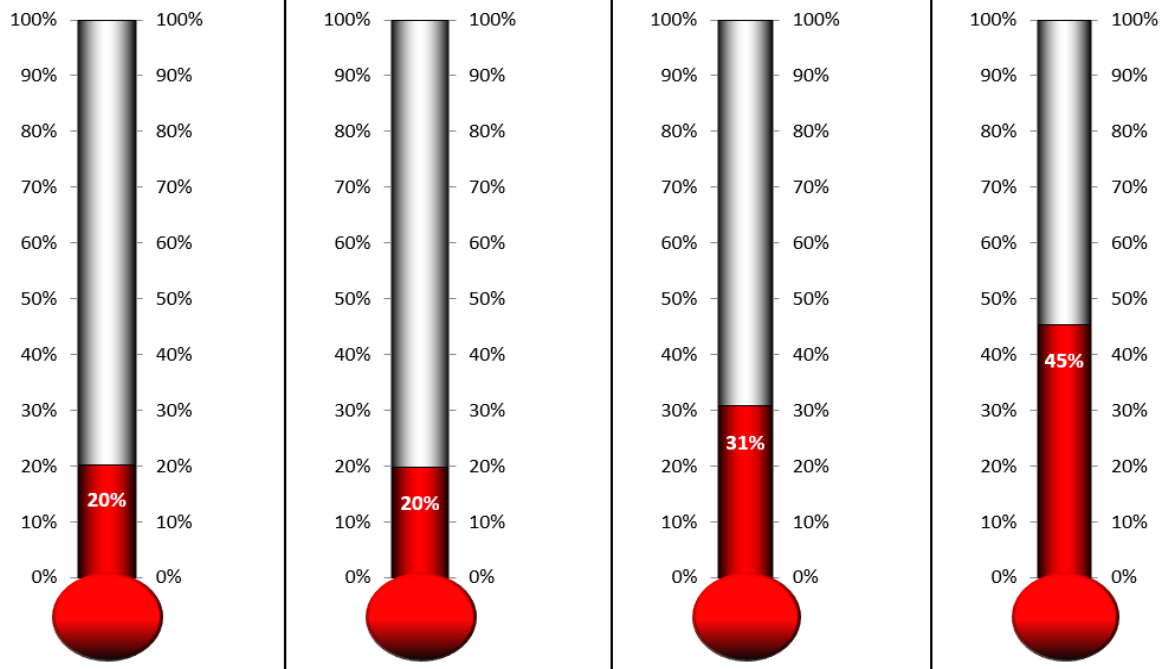
TECHNICAL ASSURANCE
HIGH PERFORMANCE BUILDING ENCLOSURE EXPERTS

Plan

ROOFS REQUIRING REPLACEMENT

10/12/2016

Current Condition of Roofs	$45 Million Annual Spend 2017-2026 $450 Million Total Spend	$30 Million Annual Spend 2017-2026 $300 Million Total Spend	$15 Million Annual Spend 2017-2026 $150 Million Total Spend
2017	2026	2026	2026



Condition-2017	Count	%	Condition-2026	Count	%	Condition-2026	Count	%	Condition-2026	Count	%
Good	2008	37.53%	Good	2777	51.90%	Good	2001	37.39%	Good	1190	22.24%
Bad	2259	42.22%	Bad	1519	28.39%	Bad	1704	31.84%	Bad	1729	32.31%
Failed	1084	20.26%	Failed	1055	19.72%	Failed	1646	30.76%	Failed	2432	45.45%
	5351	100.00%		5351	100.00%		5351	100.00%		5351	100.00%

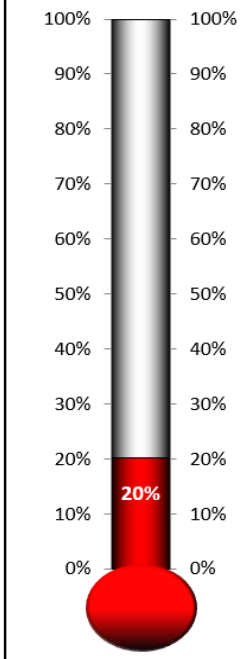
TECHNICAL ASSURANCE
HIGH PERFORMANCE BUILDING ENCLOSURE EXPERTS

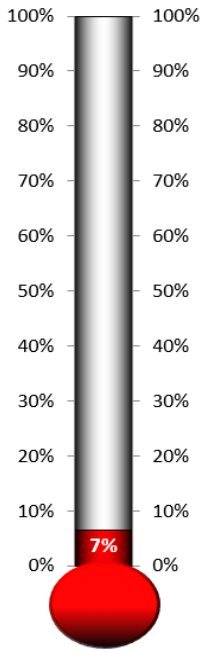
Plan

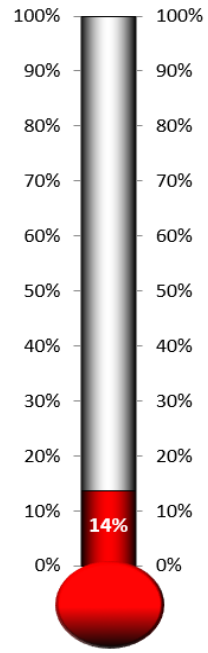
ROOFS REQUIRING REPLACEMENT (REPLACE AND REPAIR STRATEGY)

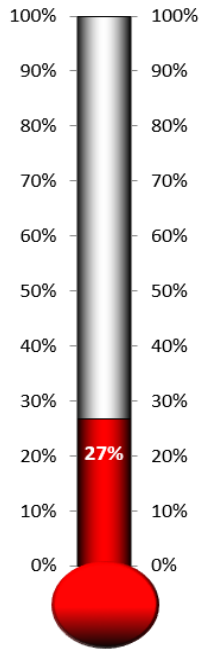
10/12/2016

Current Condition of Roofs	$45 Million Annual Spend 2017-2026 $450 Million Total Spend	$30 Million Annual Spend 2017-2026 $300 Million Total Spend	$15 Million Annual Spend 2017-2026 $150 Million Total Spend
2017	2026	2026	2026









Condition-2017	Count	%	Condition-2026	Count	%	Condition-2026	Count	%	Condition-2026	Count	%
Good	3053	57.05%	Good	3806	71.13%	Good	3239	60.53%	Good	2414	45.11%
Bad	1217	22.74%	Bad	1196	22.35%	Bad	1379	25.77%	Bad	1505	28.13%
Failed	1081	20.20%	Failed	349	6.52%	Failed	733	13.70%	Failed	1432	26.76%
	5351	100.00%		5351	100.00%		5351	100.00%		5351	100.00%

TECHNICAL ASSURANCE
HIGH PERFORMANCE BUILDING ENCLOSURE EXPERTS

Sustain

Asset Sustainability through:

- Increase in roof life cycle
- Increase in time between capital renewals
- Minimization of emergency leak spend

RSL	RSL-R	RSL-RP	Conditio	Condition-RI	Condition-RP	TSL Replace	TSL-RM Replace	TSL-RPM Replace	RSL-RM TCO Savin	RSL-RPM TCO Savin
8	16	19	Fair	Good	Excellent	2024	2032	2035	$ 83,066.33	$ 167,551.41
19	23	26	Poor	Fair	Fair	2035	2039	2042	$ 9,078.21	$ 16,733.19
8	12	15	Poor	Fair	Good	2024	2028	2031	$ 1,412.49	$ 3,433.92
7	11	14	Poor	Fair	Good	2023	2027	2030	$ 887.97	$ 2,289.55
16	23	26	Poor	Fair	Fair	2032	2039	2042	$ 3,416.90	$ 8,079.53
14	17	19	Poor	Poor	Poor	2030	2033	2035	$ 2,104.53	$ 3,565.36
13	21	23	Poor	Fair	Fair	2029	2037	2039	$ 5,093.12	$ 11,271.18
4	12	15	Poor	Fair	Good	2020	2028	2031	$ 53,739.82	$ 106,852.28
3	9	11	Poor	Fair	Fair	2019	2025	2027	$ 17,375.18	$ 33,178.04
9	12	14	Poor	Poor	Poor	2025	2028	2030	$ 441.56	$ 955.50
3	10	12	Poor	Fair	Fair	2019	2026	2028	$ 57,033.08	$ 149,755.11
1	3	5	Bad	Poor	Poor	2017	2019	2021	$ 206.68	$ 495.43
1	3	5	Bad	Poor	Poor	2017	2019	2021	$ 4,286.20	$ 9,807.80
0	4	7	Bad	Good	Good	2016	2020	2023	$ 7,735.53	$ 19,841.55
0	4	7	Bad	Fair	Good	2016	2020	2023	$ 22,892.23	$ 58,537.52
0	3	5	Bad	Fair	Fair	2016	2019	2021	$ 34,782.19	$ 89,387.17
0	2	3	Bad	Poor	Poor	2016	2018	2019	$ 6,211.64	$ 14,449.20
0	2	3	Bad	Bad	Bad	2016	2018	2019	$ 263.02	$ 555.62
0	2	3	Bad	Bad	Bad	2016	2018	2019	$ 1,123.61	$ 2,366.25
0	2	3	Bad	Bad	Bad	2016	2018	2019	$ 152.00	$ 304.64
0	2	3	Bad	Bad	Bad	2016	2018	2019	$ 814.54	$ 1,752.02
0	4	7	Bad	Good	Good	2016	2020	2023	$ 16,878.42	$ 45,070.61
0	2	3	Bad	Bad	Bad	2016	2018	2019	$ 1,537.34	$ 2,792.88
0	2	2	Bad	Bad	Bad	2016	2018	2018	$ 198.11	$ 192.52
0	2	2	Bad	Bad	Bad	2016	2018	2018	$ 196.94	$ 375.93
0	2	3	Bad	Bad	Bad	2016	2018	2019	$ 2,359.90	$ 4,378.75
0	3	5	Bad	Poor	Poor	2016	2019	2021	$ 7,789.77	$ 20,061.27
0	3	5	Bad	Poor	Poor	2016	2019	2021	$ 2,405.12	$ 6,231.41
0	3	5	Bad	Fair	Fair	2016	2019	2021	$ 2,909.05	$ 8,115.24
0	2	2	Bad	Bad	Bad	2016	2018	2018	$ 1,039.33	$ 1,823.73
0	3	5	Bad	Poor	Poor	2016	2019	2021	$ 2,407.00	$ 6,427.00
0	2	2	Bad	Bad	Bad	2016	2018	2018	$ 1,794.94	$ 3,337.64
0	4	7	Bad	Good	Excellent	2016	2020	2023	$ 66,640.39	$ 183,767.58
0	2	2	Bad	Bad	Bad	2016	2018	2018	$ 415.48	$ 399.44
0	2	2	Bad	Bad	Bad	2016	2018	2018	$ 853.53	$ 811.29
0	2	3	Bad	Bad	Bad	2016	2018	2019	$ 305.88	$ 722.09