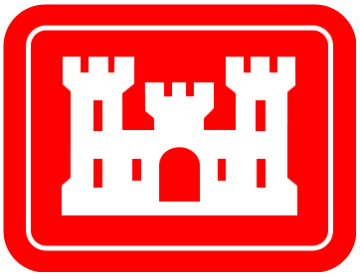
Hydropower Modernization Initiative
Proposed Implementation Strategy

for

FY 2013 Budget Development



U.S. Army Corps of Engineers

HMI Implementation Team

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EXECUTIVE SUMMARY

Asset management is a business discipline that has the objective to deliver sustainable infrastructure-related services at targeted levels of service at the lowest cost and risk. The Hydropower Modernization Initiative (HMI) was created to use asset management principles in support of decisions on how to make modernization investments that provide the greatest return on investment, control risk exposure, and create a coordinated long-term strategy for maintaining the reliability, efficiency and safety of these assets.

The HMI objective is to assess and prioritize the investment needs at U.S. Army Corps of Engineers (USACE) hydropower projects using asset management principles. To achieve this, an asset investment planning process, methodology, and supporting Asset Investment Planning (AIP) tool were developed. The AIP tool was designed to:

1. Review key power train assets and corresponding key attributes.
2. Analyze and prioritize asset investment projects by year based on factors including benefit-cost ratio, net present value and risk.
3. Prioritize the allocation of annual budget dollars to maximize return on investment and reduce the risk of the asset portfolio.

The HMI Implementation Team, consisting of representatives from all USACE Hydropower Divisions and Power Marketing Administrations (PMA), was charged with developing an implementation strategy process and the initial 2013 budget proposal. This strategy process starts with the AIP long-term 20-year output. Using this 20-year output, the team then extracted the first 5-year increment and factored in system and other constraints that reflect current conditions within basins and the current status of the plants. A key aspect of this process involves the Implementation Team's review of model output and application of implementation guidelines. These guidelines and business rules are applied by the team to produce a near-term implementation strategy. This includes a 5-year strategy with a focus on program year 2013. A Fiscal Year (FY) 2013 budget proposal was then developed.

A final 20-year plan is a composite of a single 5-year plan and the initial 20-year plan assuming a given funding level. For years 2018-2032 three funding scenarios were modeled. Each scenario assumed a different maximum level of funding associated with the post 5-year portion of the strategy (see Figure ES-1). Two of the scenarios show an overlap in expenditures between the 5-year and 20-year portions. This overlap is the result of the end-effect expenditures of the 5-year strategy and the new projects that are started with funding available within the three scenarios. In the unconstrained scenario (Scenario 1) the expenditures are limited by the system constraints described in Appendix D, rather limited funding.

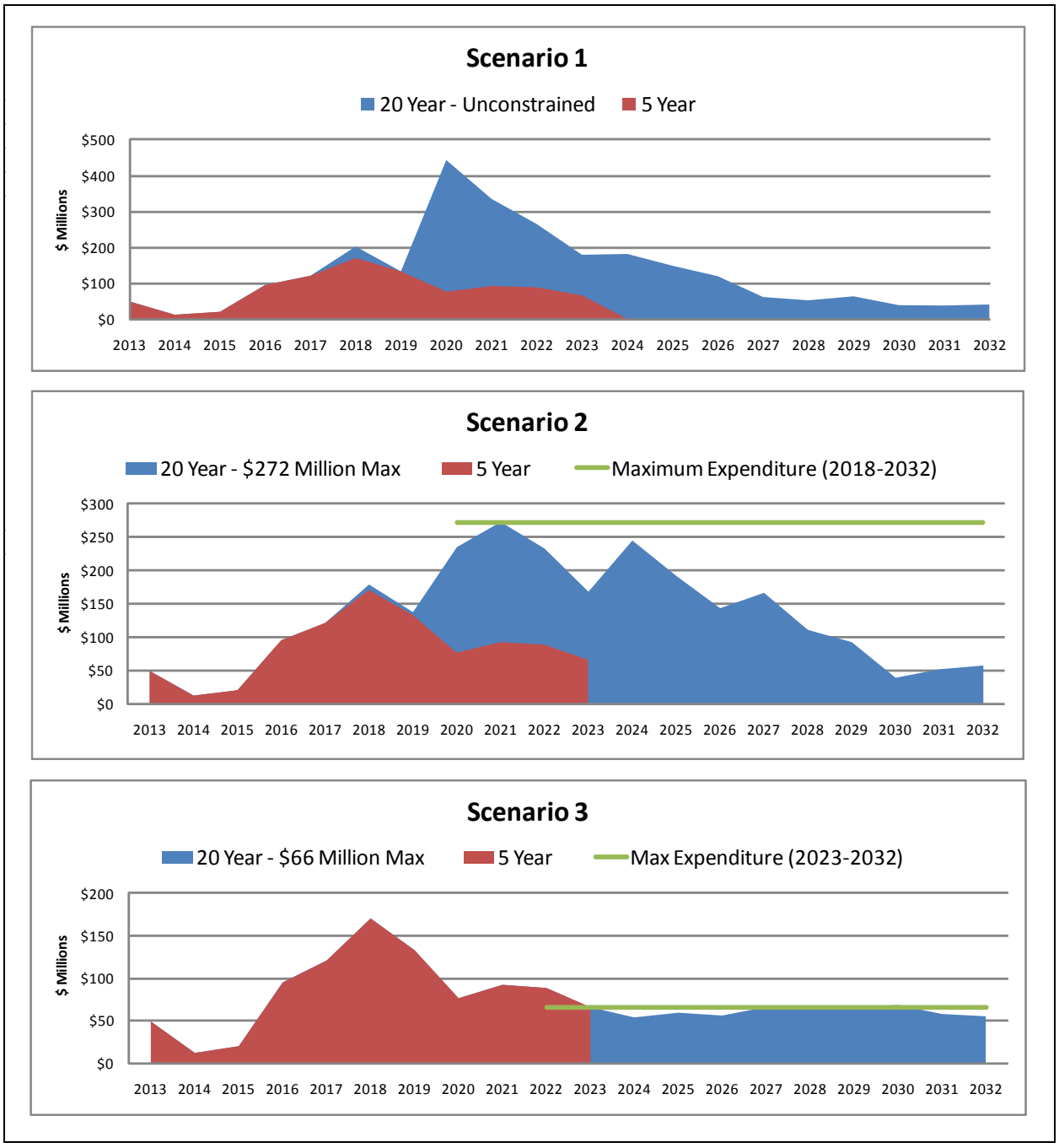


Figure ES-1: 20-year Investment Strategy Funding Scenarios

The results of analyses are displayed in Figures ES-2 (20-year Investment Strategy), Figure ES-3 (5-year Investment Strategy) and ES-4 (Expenditure Distribution for FY 2013).

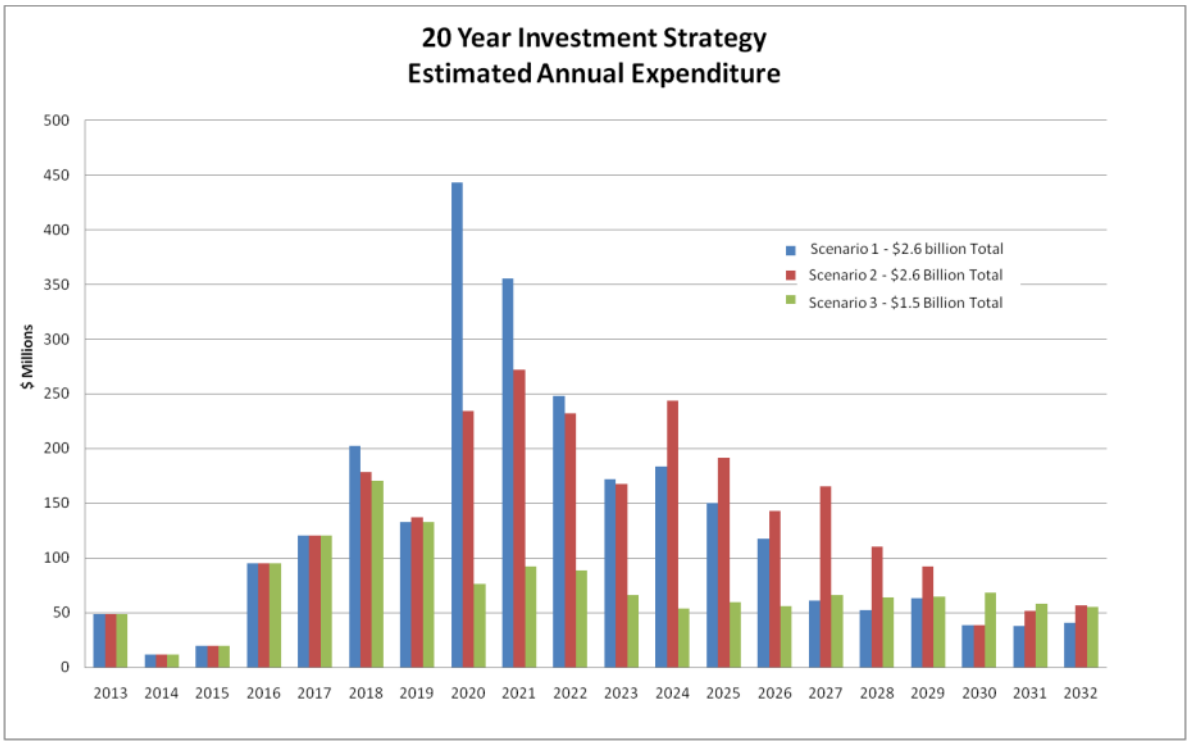


Figure ES-2: 20-year Investment Strategy

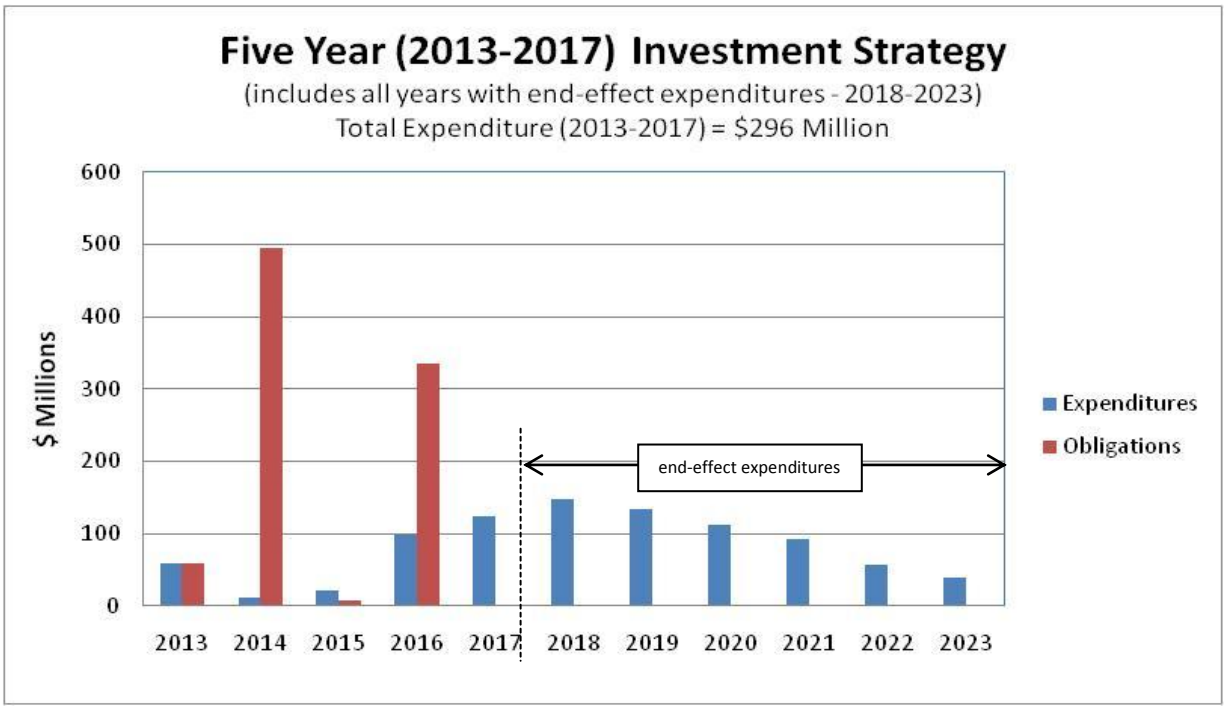


Figure ES-3: 5-year Investment Strategy

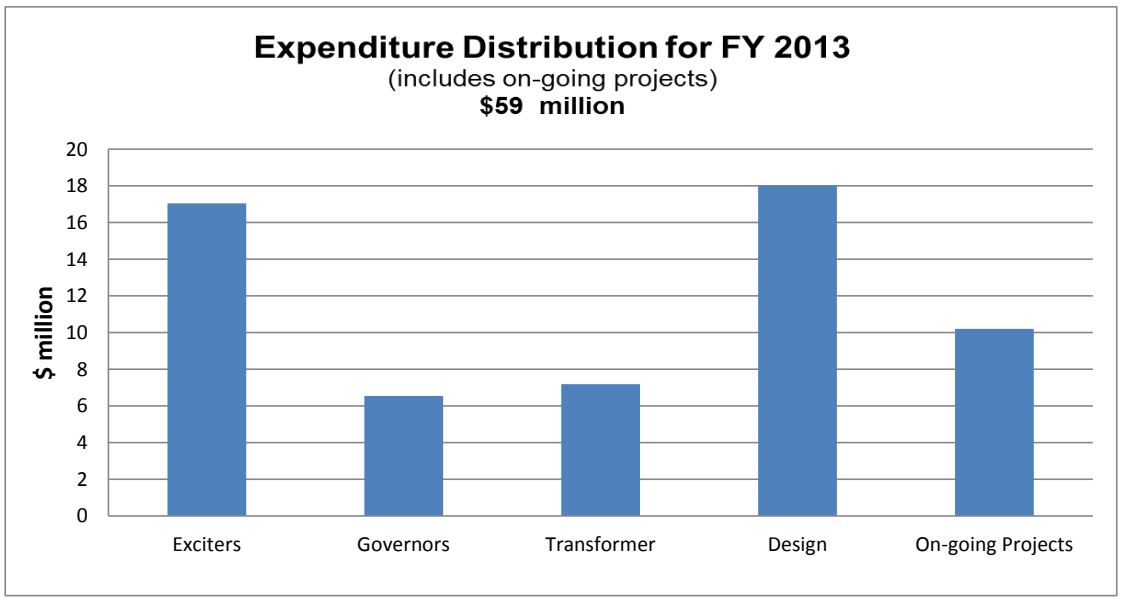


Figure ES-4: Expenditure Distribution for FY 2013

The AIP tool also has the capability of calculating the risk associated with deferring investment. The risk is a product of the likelihood of component failure and the consequence of failure. The consequence of failure for an asset is the sum total of the replacement cost of the asset and the value of the energy that the final unit at a plant would produce during the time required to replace the asset. Figure ES-5 shows the risk reduction potential associated with each of the scenarios. This risk reduction is shown as a percent of risk reduced when compared to a no investment scenario.

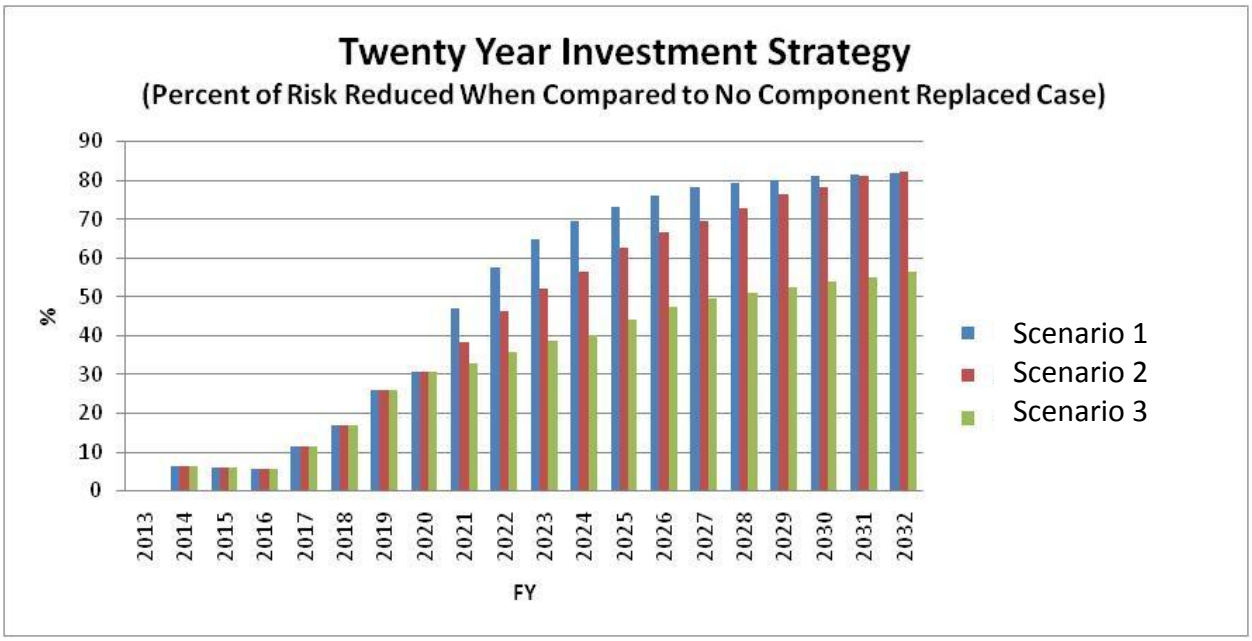


Figure ES-5: Risk Reduction for 20-year Plan

A key environmental benefit of hydropower production is the lack of greenhouse gas emissions (GHG). The GHG emissions reductions are quantified as metric tons of CO_2e (Figure ES-6). The CHG benefits for hydropower come from two sources: (1) a reduction of forced outages by planning replacements before outages, and (2) additional (incremental) generation due to capacity.

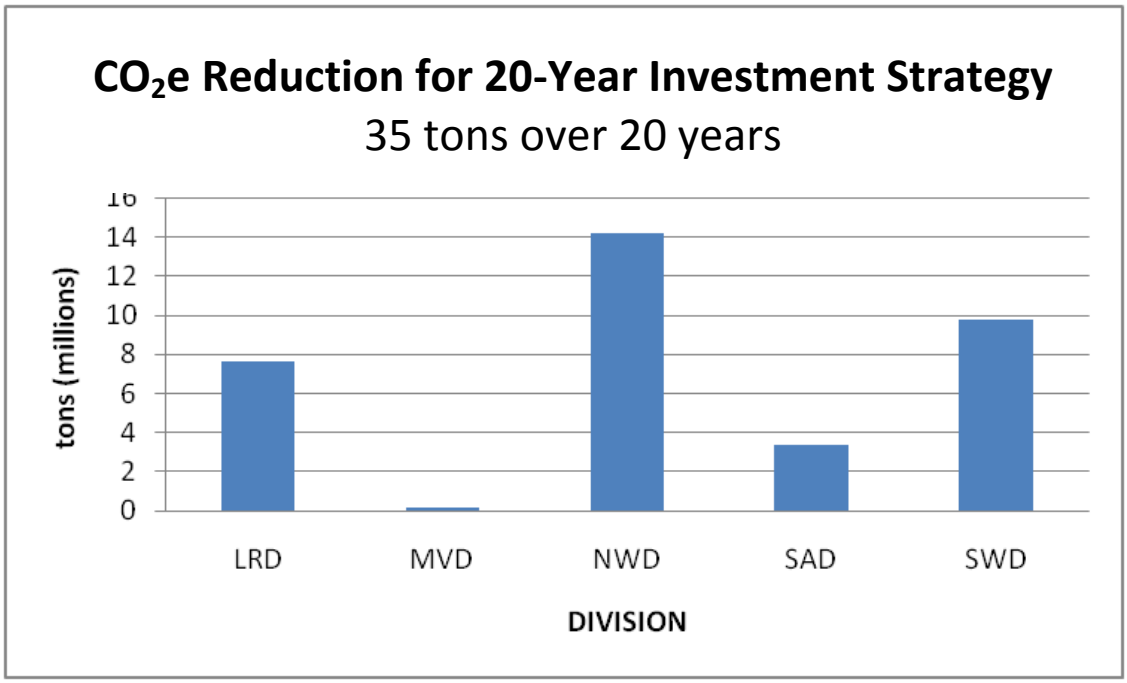


Figure ES-6: Environmental Benefit of 20-year Strategy (Scenario 2)

INTRODUCTION

Background

Across the U.S. Army Corps of Engineers (USACE), many hydropower infrastructure assets are approaching the end of their original design or service life; without major investments in renewals and replacements of critical equipment, this will expose the USACE and PMAs to increasing risk of asset component failures resulting in significant losses in energy production over the next 20 years. To address this risk, the USACE created the Hydropower Modernization Initiative (HMI). The HMI policy was set by a Steering Committee and implementation was directed by a Technical Committee. The Technical Committee engaged a consultant, MWH Americas, to assist in analysis and tool development. The Hydroelectric Design Center provided project management and analytic support.

The HMI uses asset management principles to develop analytical tools to support decisions in modernization investments that provide the greatest return on investment, control the USACE's risk exposure, and create a coordinated, USACE-wide long-term strategy for maintaining the reliability, efficiency and safety of these assets.

The general objectives of the HMI are to develop a long-term investment plan and methodology using a management strategy based on economics and risk management principals. To accomplish this, individual asset projects (i.e. power train components) across the USACE are prioritized using the financial quantification of their benefit-cost ratio (BCR) by determining the risk reduction, reliability and efficiency improvements, and other benefits, plus investment costs. This process supports the alignment of the federal hydropower programs along business and asset management principles and will assist in sustainably maximizing the continuing benefits of the federal hydropower system as a clean, renewable energy source.

To efficiently execute this process, an Asset Investment Planning (AIP) tool was developed. The AIP tool incorporates asset age, equipment condition, facility operations, risk analyses, and financial analyses to provide the overall economic benefits and risk reductions resulting from varying user-defined funding strategies over a 20-year planning horizon (currently 2013 to 2032). The AIP tool evaluates and analyzes the power train assets from 54 USACE hydropower facilities - more than 1,200 power train asset components in total. Power train assets include:

Major Components

- Turbines
- Generators

Auxiliary Components

- Governors
- Exciters
- Main unit transformers
- Main unit circuit breaker

Figure 1 shows the data parameters incorporated in the AIP tool. Each oval on the left side of the diagram represents an input to the AIP tool. These are described briefly below.

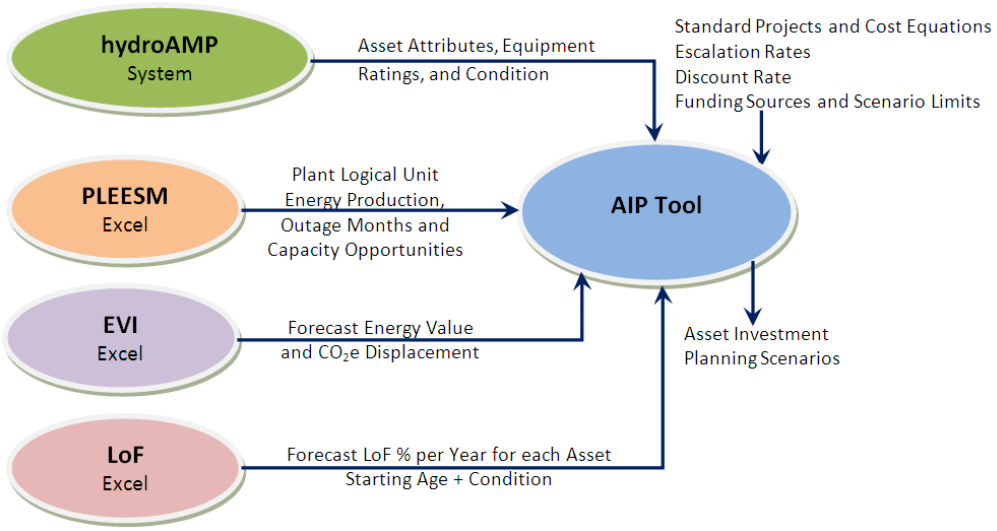


Figure 1: Asset Investment Planning Tool Structure

1. HydroAMP – Provides basic asset component data (including equipment condition ratings) and weighted condition assessment data on individual asset components.
2. PLEESM – The Planning Level Energy and Economics Study Model (PLEESM) estimates on-peak and off-peak energy production at each of the plants, as well as the potential additional energy production from hydraulic capacity increases for each of the 54 hydropower plants.
3. EVI – The energy value input (EVI) provides short-term, long-term, on-peak and off-peak energy values ($/MWh) for the AIP tool.
4. LOF – The likelihood of failure (LOF) forecasting curves define the probability of an asset failing in a given year of the planning horizon, dependent on the asset's age, type, and condition at the start of the planning horizon.

Other inputs include cost parameters, sources of funding, and investment funding scenarios.

Once the asset information is loaded in the AIP tool via the inputs described above, it calculates metrics used for prioritizing potential investments. These calculations are based on a risk management approach, following the fundamental concept that risk is equal to the product of the likelihood of an asset's failure and the consequence of that asset's failure. This analysis only considers major failures resulting in the significant loss of generation for an extended period of time and requiring replacement or major refurbishment of the asset component that failed. The AIP tool iterates 20 times to produce a 20-year plan. Each iteration adjusts the starting conditions based on the results of the previous iteration.

Implementation Strategy

The HMI Implementation Team (see Appendix F) consists of representatives of all USACE Hydropower Divisions and Power Marketing Administrations (PMA). This team is charged with developing an implementation strategy process and the initial 2013 strategy.

The objective of the implementation strategy is to develop a near-term investment plan utilizing the analysis provided by the AIP tool. Near-term is defined as Fiscal Year (FY) 2013-2017 with focus on 2013. To accomplish this, an initial 20-year plan is produced. A 5-year plan is then formulated based on the initial 20-year plan. The first year (i.e., 2013) is then extracted and the three plans are nested together to create the final 20-year plan.

Developing the Plans

The strategy development process involves taking the AIP output and factoring in the system and other constraints that that reflect current conditions within basins and status of the plants. A key aspect of this process involves the Implementation Team's review of model output and application of implementation guidelines. These guidelines and business rules (see Appendix D) are then applied by the team in a formal collaborative session.

The following steps outline the process taken in the development of the Implementation Strategy. This process will be replicated on an annual basis for subsequent fiscal years.

Step 1: Condition assessment of major and auxiliary components (generator, turbine, governor, exciter, main unit breakers and transformers) is updated in HydroAMP.

Step 2: The AIP tool is updated with the current HydroAMP condition data. If necessary, the Energy Valuation input is also updated.

Step 3: The AIP tool is run with updated data. Components that have funding from other than appropriation are identified. These components are excluded from the analysis.

Step 4: An initial 20-year investment strategy is formulated.

Step 5: Using the initial 20-year strategy as a starting point, an initial 5-year plan is formulated by adding balance of plant and other on-going projects to the first 5 years of the 20-year plan.

Step 6: All projects in the initial 5-year plan are evaluated against criteria identified in the Program Implementation Guidance (see Appendix D). This includes project and PMA constraints. This results in a final 5-year plan.

Step7: The final 5-year plan is then used to adjust the initial 20-year plan, resulting in the final 20-year plan.

Step 8: Special projects (i.e., on-going projects from previous years) are added to the first year of the 5-year plan (e.g., FY 2013) to produce a FY 2013 budget proposal.

This process then yields a current year (i.e., 2013) plan, a 5-year plan, and a 20-year plan. Each plan represents a national perspective and is then broken down by PMA regions. This includes the Western Area Power Administration (WAPA), Southwestern Power Administration (SWPA), and the Southeastern Power Administration (SEPA). The Bonneville Power Administration (BPA) is excluded because the investment needs and opportunities at those facilities are directly funded by the BPA.

Risk Assessment and Environmental Benefits

The AIP tool has the capability to produce an assessment of risk reduction and environmental benefits associated with an investment plan. These risk assessments are developed for the USACE-wide 20-year plan and by PMA. The risk assessment is shown two ways: (1) percent risk reduction of a plan versus a no component replaced case, and (2) comparison of power train component age profiles with plan implementation and a no component replaced.

An environmental benefit is also calculated in terms of cumulative greenhouse gases at risk. This calculation is a function of: (1) the energy saved by efficiency improvements associated with the replacement of turbines and generators, and (2) avoided forced outages by making investments in a planned manner rather than waiting until a unit fails. In both cases, the number is determined by the energy that would be replaced by a fossil fuel thermal plant. The fossil fuel plant type varies by region and is accounted for in the calculation. The environmental benefit is described in terms tons of carbon dioxide (CO_2) equivalent (CO_2e).

FIVE-YEAR INVESTMENT PLAN

The 5-year investment plan addresses the present needs and opportunities. This plan was formulated by the HMI Implementation Team using knowledge of current on-going work, system needs, and opportunities. The team used the guidelines shown in Appendix D as well as the criteria described below to develop the 5-year plan.

Major Components

The major components include generators and turbines. The replacement of these assets results in a significant impacts to both the individual hydropower plant and the PMA-defined energy system. These impacts result in a decision to add two constraints on the scheduling for the major component replacement: a single annual unit constraint and a system constraint as described in Appendix D.

Selection of Proposed Projects

The major components require a 3-year lead time before the component can be replaced at the plant. Lead time is for design, contracting and manufacturing. Because of this lead time, the earliest any major components can be replaced is FY 2016. The tool's 2016 risk value, BCR, and HydroAMP conditional rating are used in selection criteria for determining which components should be replaced first. Initially, the following four selection criteria are chosen:

1. BCR > 1
2. Risk Value > 0
3. HydroAMP Condition < 6
4. Selection conforms to PMA system outage constraints

Application of these criteria resulted in a smaller set of components to be considered for the 5-year plan. To meet the system outage constraints, the HMI Implementation Team ranked and scheduled the major component (turbines or generators) replacement based on work currently being done on the plant and other personal expertise that may not be reflected in the AIP tool. Table 1 shows the plants selected (see Appendix A for plant codes) for major component replacement. No replacements are shown beginning prior to 2016 due to the 3-year lead time for design, contracting, and manufacturing.

System	PMA	Plant	#units	Beginning Instalation Date	Completion Date
Cumberland	SEPA	WLC	6	2018	2023
		BRK	4	2016	2019
GASC	SEPA	ALT	2	2016	2017
		CRT	3	2018	2020
		WPT	2	2016	2017
		MLF	3	2018	2020
KERR/PHIL	SEPA	PHI	2	2016	2017
MISSOURI	WAPA	OFP	5	2016	2020
		OFR	8	2016	2023
SWPA	SWPA	KEY	2	2016	2017
		RSK	4	2018	2021
		BLS	8	2016	2023
OTHER	OTHER	SMF	3	2016	2018
		Total	52		

Table 1: Schedule of Major Component Replacement for 5-year Plan

Auxiliary Components

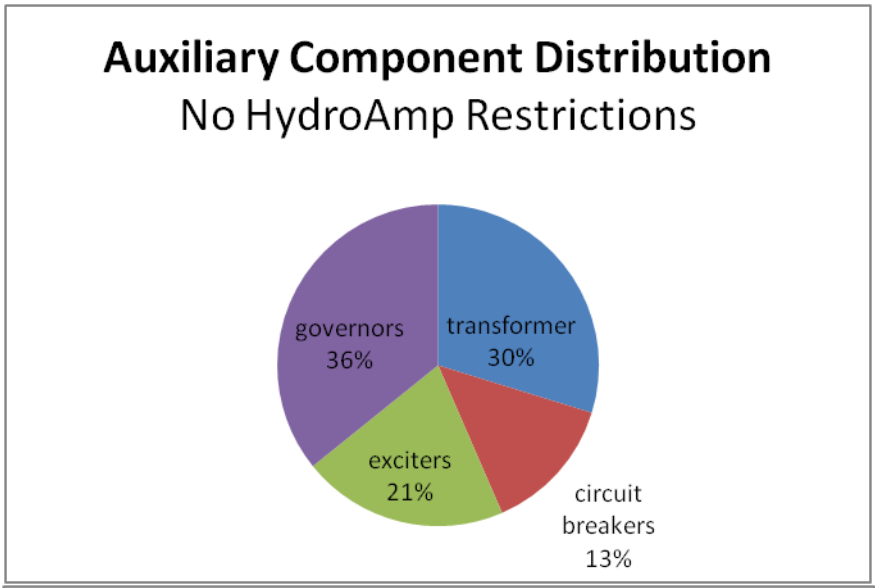
The auxiliary components include governors, exciters, transformers, and circuit breakers. It is assumed that the replacement of these components can be completed without significant impact on a particular plant or energy system. In that regard, there is no system or unit constraint on the implementation of these projects. Under no financial constraints, this assumption implies that all the auxiliary component replacement will be done in FY 2013. However, it is inevitable that some financial and operational schedule constraints exist.

Selection of Proposed Auxiliary Component Replacements

The auxiliary components require no design and manufacturing stage and can be implemented as soon as FY 2013. Therefore, the tool's 2013 risk value, BCR, and HydroAMP conditional rating are used for the selection criteria. The following selection criteria are chosen:

- BCR > 1
- Risk Value > 0
- HydroAMP Condition < 6

The first two selection criteria resulted in about 300 components needing replacement in 2013. The additional HydroAMP constraint reduced the total to 109 components. This constraint significantly reduced the number of all asset types with the most notable reductions in the number of transformers and circuit breakers (Figure 2). Three additional components with HydroAMP ratings near six were also included in the 5-year plan by the HMI Implementation Team.



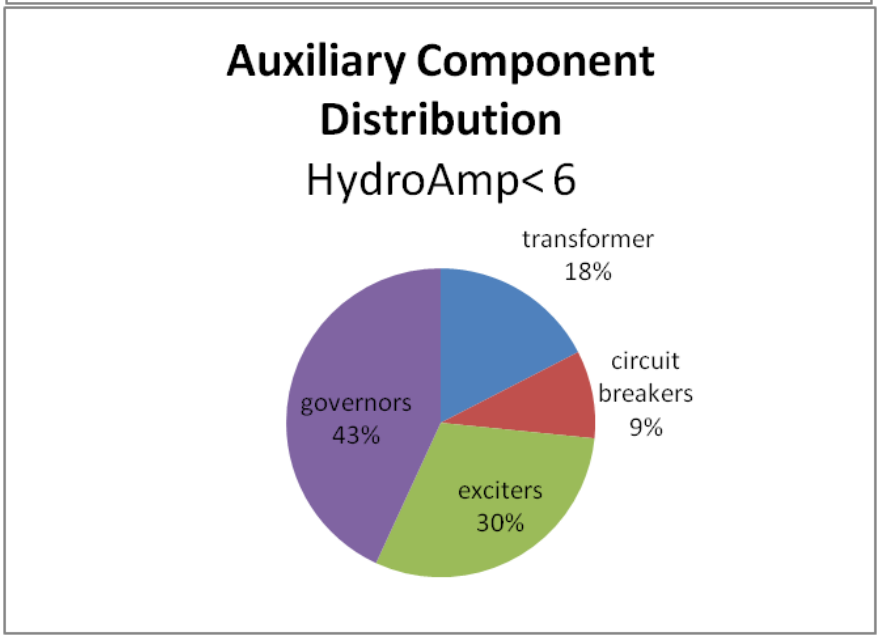


Figure 2: Distribution of Auxiliary Component Need With and Without HydroAMP Restrictions

Auxiliary Component Investment

Under no financial or operational constraints, the replacement of all auxiliary components can, theoretically, occur in FY 2013. The total expenditure for auxiliary components is $30 million Plants with both auxiliary and major component work can be coupled together to prevent unnecessary disruption in the plant. Auxiliary work in the coupled plants is completed in a 4-year time frame. Table 2 shows the auxiliary component replacement schedule.

Plant	*Year*
WLC	2018-2023
CHL	2013
OFR	2016-2023
OFP	2013
OOA	2013
KEY	2016-2017
BRK	2016-2019
OHK	2013
RSK	2018-2021
CTM	2013
MLF	2018-2020
RFH	2013
DHL	2013
TKF	2013
JPP	2013
ALT	2016-2017
LRL	2013
EUF	2013
CDH	2013
BB	2013
	Coupled with Major Components

Table 2: Auxiliary Component Replacement Schedule

Total Five-Year Investment Plan

The complete 5-year investment plan consists of the combination of the investment strategies for both the major and auxiliary components. Figure 3 shows the percent of risk reduction when compared to the no component replaced case. After 2017, the auxiliary components not connected with major components are completely funded representing about a 10 percent reduction in overall risk (Figure 3). The major component part of the 5-year investment strategy, completed in 2023, reduces the risk an additional 25 percent, with an overall reduction of 35 percent when compared to the no component replaced case.

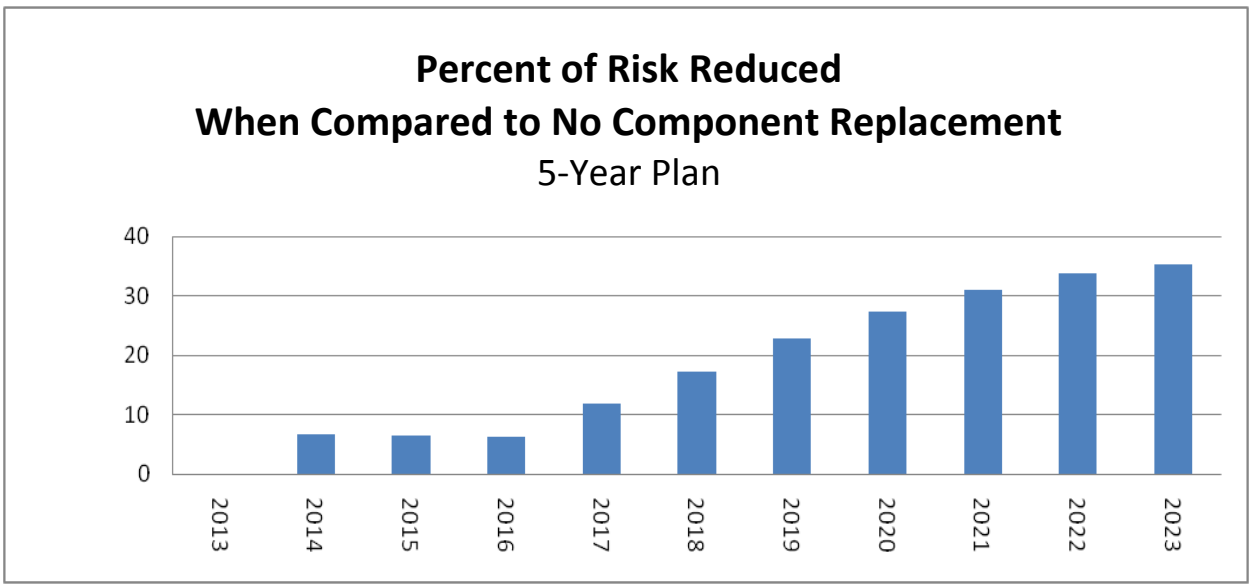


Figure 3: Percent of Risk Reduced - Major and Auxiliary components

Schedule and Budget for FY 2013

To begin implementation of the 5-year investment strategy, the 2013 budget would include funding of auxiliary components, the design phase of all major components scheduled to be replaced in 2016, and a set of special on-going projects as described in Table 3. These special projects represent the activities initiated in prior years and have residual funding requirements.

Plant	*Year*	*Estimated Cost ($)*
Stockton EDC and S&A	2013	$ 1,500,000
Barkley-rewind EDC and S&A	2013	$ 700,000
Ozark-turbine-completion	2013	$ 8,000,000
	Total	$ 10,200,000

Table 3: On-going Projects Proposed for Continued Funding in FY 2013

The FY 2013 funding for the auxiliary components includes all auxiliary components at all plants that meet the selection criteria and do not have a major component replacement scheduled in the 5-year investment strategy. A total of 12 plants are proposed to have work done on the auxiliary components in FY 2013. This will result in a reduction of almost 8 percent of the overall risk for the USACE hydropower system when compared to the no component replaced case (Figure 3).

To meet the 5-year investment strategy schedule for major components, the design phase for these components must begin in 2013. A cost of $2 million is estimated for each design. A total of eight plants are scheduled for design in the FY 2013 budget.

The total investment amount for 2013 is shown in Table 4.

Plant	*Asset*	*Cost $ million*
ALT	Design (turbine)	$2.0
BB	Governors	$0.7
BLS	Design (turbine)	$2.0
BRK	Design (turbine and generator)	$2.0
CDH	Exciters	$1.2
CHL	Transformers, Governors, Exciters	$6.9
CTM	Exciters	$1.7
DHL	Transformers, Governors, Exciters	$4.9
EUF	Exciters	$2.7
JPP	Exciters	$0.9
KEY	Design (turbine and generator)	$2.0
LRL	Exciters	$1.6
OFP	Transformers,Design	$3.6
OFR	Design (turbine and generator)	$2.0
OHK	Exciters	$3.7
OOA	Governors	$3.0
PHI	Design (turbine and generator)	$2.0
RFH	Governors	$1.0
SMF	Design (turbine)	$2.0
TKF	Governors	$0.5
WPT	Design (turbine)	$2.0
Total		$48.4

Table 4: Proposed New Projects for FY 2013

Breaking down the expenditure distribution for the FY 2013 budget (Figure 4), over half of the funding is directed at new auxiliary components. By asset type, replacement of exciters is the most common need with 8 of the 12 funded plants needing this work, making up about a quarter of the FY 2013 budget. The remaining FY 2013 budget is split between design work for the 2016 major components and the on-going projects from previous years.

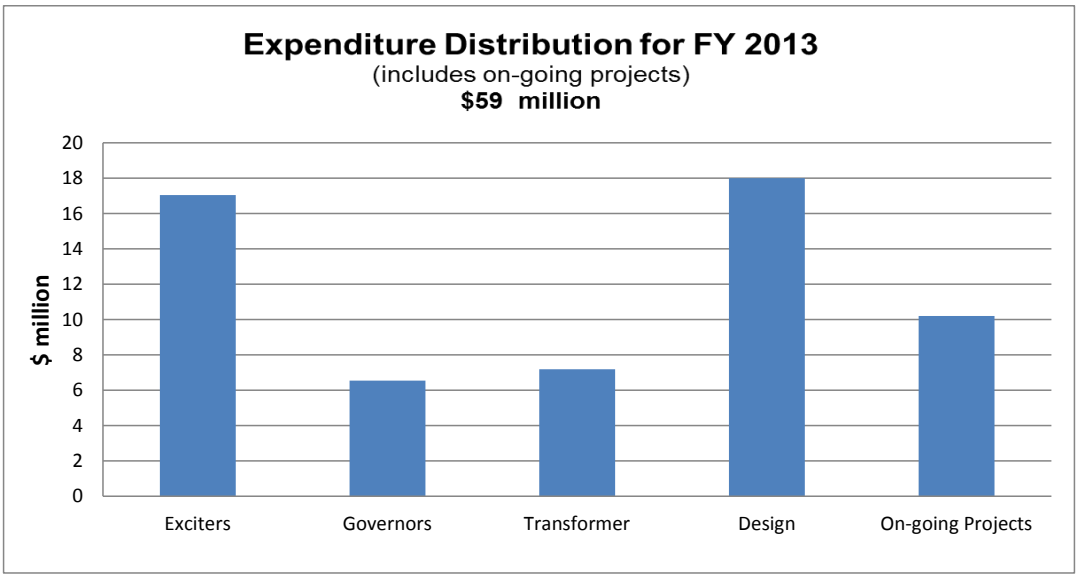


Figure 4: Expenditure Distribution for FY 2013 Budget by Asset Type

Five-Year Investment Strategy

The work beyond FY 2013 for the 5-year investment strategy consists of the major component design and replacement along with the remaining auxiliary components. Major components (turbines and generators) require two years of lead time for design and procurement. Funds for these major components must be available for obligation at least two years prior to actual implementation of the major component replacement during the contract stage. These obligated funds are then expended as work progresses. Figure 5 shows both the obligations and expenditures associated with all components identified for funding in the 5-year plan (2013-2017). Expenditures for these components continue through 2023 and are shown for reference.

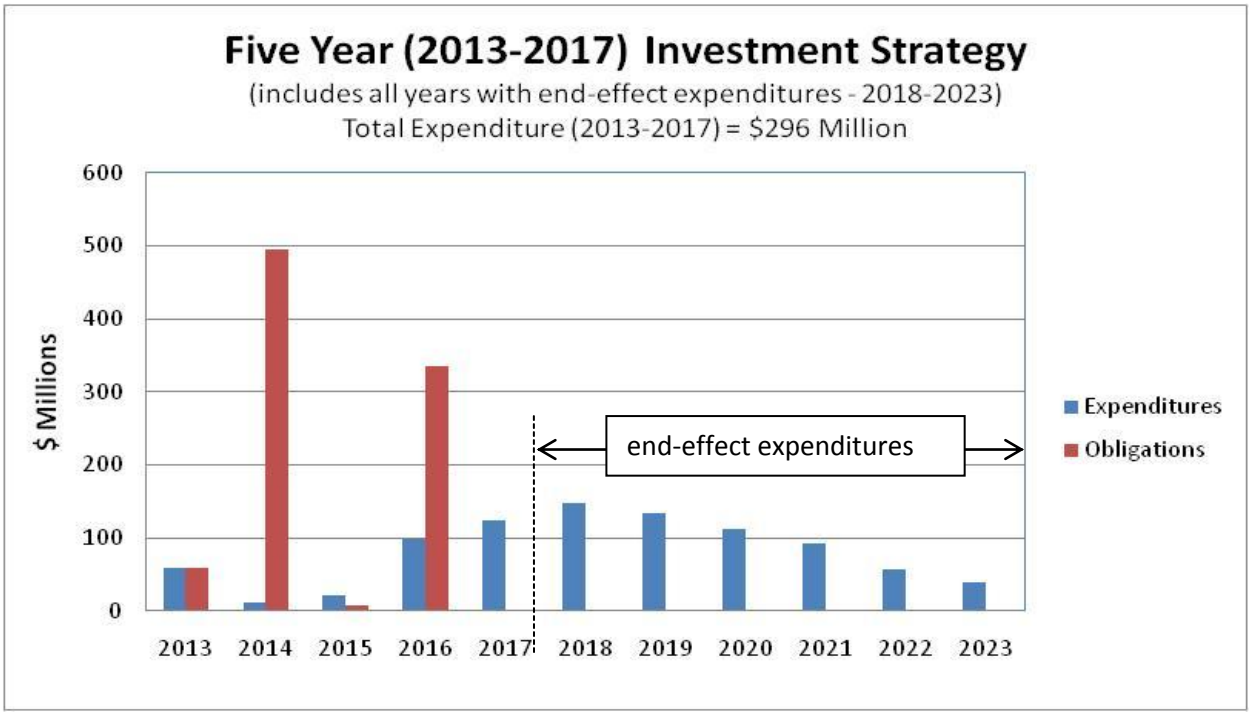


Figure 5: 5-year Investment Strategy

TWENTY-YEAR INVESTMENT STRATEGY

The goal of the 20-year investment strategy is to identify the plants with the highest investment needs over a 20-year period and to estimate a funding stream that that will reduce the overall risk exposure. While the objective is to reduce the overall risk by focusing on assets with the highest BCR it is also important to consider efficient implementation at a given plant. To accomplish this, a ranking system based on an Average Annual Risk Reduced (AARR) was used to prioritize needs and opportunities at each plant.

Method for Ranking Proposed Replacements Using the AIP Tool

The following steps are taken to rank proposed projects:

a. For AARR ranking, the total sum of the risk for an individual plant is calculated for a given year (2018).

b. The combined risk is divided by the number of years required to complete the entire asset replacement. For auxiliary components, this is assumed to be 1 year, while for major components, this is assumed to be the number of units (1 unit=1 year) that require a major component replacement. The end result is an Average Annual Risk Reduction for the given plant.

c. With the AARR ranking in place, investment strategies under different financial constraints are developed using the following algorithm:

> *Create a financially unconstrained strategy that considers all of the system outage constraints*
>
> *Beginning with the highest-ranking AARR project, fund the project the first year it does not violate any system constraints*
>
> *Starting with the financially unconstrained strategy, put financial constraints on strategy*
>
> *For year = beginning year to final year*
>
> *Define maximum annual budget for year*
>
> *If funded projects costs are greater than the constrained annual budget*
>
> *Starting from the lowest ranking AARR project remove projects until the funded project cost is less than the annual budget*
>
> *End if*

If funded project costs are less than the constrained annual budget

Starting from the highest ranked AARR project, fund project if it does not violate any of the financial or system outage constraints

End if

Next Year

The output of this process is a set of funding scenarios (Figure 7) that have differing risk reduction potential.

Most of the plants remaining after the first 5-year period had some significant risk remaining in both the major and auxiliary components. For example, in Gavin's Point (Figure 6), most of the risk remaining is due to forced outages from either turbine or generator failures, although the governors also carried some risk. The approach taken to reduce risk was to combine the major and auxiliary components for a given plant. This approach may reduce the significance of risk for plants where auxiliary components carry the bulk of risk since auxiliary components can be addressed in one year, while major components carry a unit outage restriction, possibly reducing the AARR.

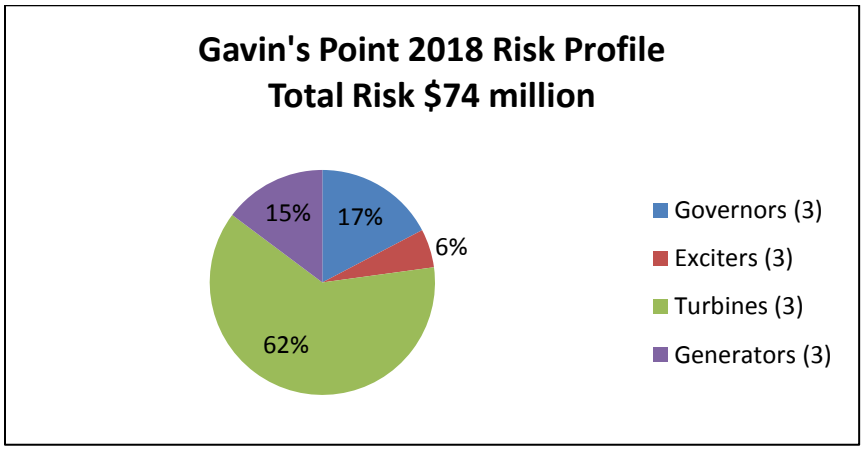


Figure 6: Risk Profile Example

A limitation of the algorithm described above is that lower ranking AARR projects may push out higher ranking AARR projects by many years, if their cost is lower to meet both the financial and system outage constraints. Another aspect of this approach is that a plant with a large number of medium-risk assets may outrank a plant that has a single, high risk asset that requires immediate attention. This concern highlights an area that team members take into consideration when compiling a final strategy.

Funding Scenarios

A final 20-year plan is a composite of a single 5-year plan and the initial 20-year plan assuming a given funding level. For years 2018-2032 three funding scenarios were modeled. Each scenario assumed a different maximum level of funding associated with the post 5-year portion of the strategy (see Figure 7). Two of the scenarios show an overlap in expenditures between the 5-year and 20-year portions. This overlap is the result of the end effect expenditures of the 5-year strategy and the new projects that are started with funding available within the three scenarios. In the unconstrained scenario (Scenario 1) the expenditures are limited by the system constraints described in Appendix D, rather limited funding.

Funding scenarios are described in Tables 5-6 and Figures 7-9. Table 1 shows the overall replacement schedule of the highest ranked components. Table 6 and Figure 8 show the distribution of expenditures for all three scenarios. This distribution reflects a manual adjustment of 2016 costs into years 2013-14 in order to reflect the design phase for 2016 projects. The unconstrained scenario had a maximum annual budget of $444 million for FY 2020. Even without any financial constraints, there are two projects that could not be funded due to system outage constraints.

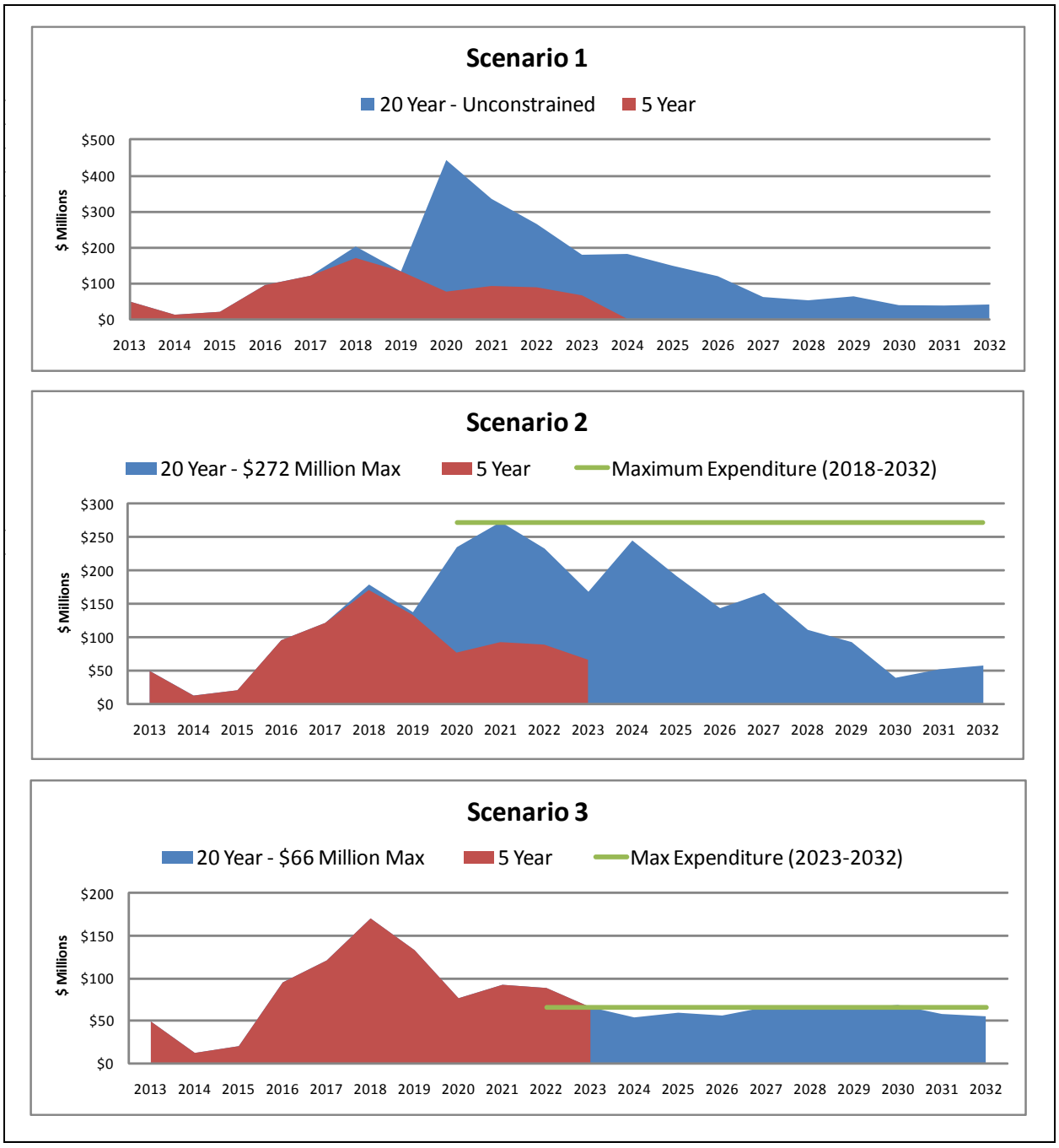


Figure 7: Funding Scenarios

			Scenario 1		Scenario 2		Scenario 3	
Ranking	***Plant***	***TYPE***	***Beginning***	***End***	***Beginning***	***End***	***Beginning***	***End***
1	OGP	Major	2020	2022	2020	2022	2024	2026
2	DAR	Major	2022	2023	2022	2023	2024	2025
3	CTM	Major	2020	2022	2020	2022	2026	2028
4	OHK	Major	2020	2023	2021	2024	2027	2030
5	BRK	Auxiliary	2020	2020	2020	2020	2024	2024
6	DEN	Auxiliary	2020	2020	2020	2020	2024	2024
7	LRL	Major	2023	2023	2024	2024	2033	2033
8	BLS	Auxiliary	2020	2020	2023	2023	0	0
9	EUF	Major	2024	2026	2024	2026	2029	2031
10	FTG	Major	2024	2027	2024	2027	2031	2034
11	CHL	Major	2020	2022	2022	2024	2030	2032
12	WFG	Major	2024	2024	2023	2023	2032	2032
13	TB R	Major	2028	2031	2028	2031	0	0
14	BEA	Major	2032	2033	2032	2033	0	0
15	GRF	Major	0	0	2024	2025	0	0
16	NOR	Major	0	0	2026	2027	0	0
17	OOA	Major	2020	2026	2024	2030	0	0
18	TKF	Major	2020	2021	2027	2028	0	0
19	JHK	Major	2020	2021	2024	2025	0	0
20	SRB	Major	2020	2021	2025	2026	0	0
21	197	Major	2024	2025	0	0	0	0
22	WPT	Major	2020	2020	2023	2023	2025	2025
23	JPP	Major	2024	2024	2025	2025	0	0
24	RSK	Auxiliary	2020	2020	2020	2020	2024	2024
25	DHL	Major	2024	2026	2025	2027	2027	2029
26	OZK	Major	2026	2030	2028	2032	2031	2035
27	KEY	Auxiliary	2020	2020	2024	2024	2024	2024
28	OBB	Major	2020	2027	2025	2032	0	0
29	CLC	Major	2026	2027	0	0	0	0
30	MLF	Major	2020	2020	2024	2024	0	0
31	ALT	Auxiliary	2020	2020	2026	2026	2026	2026
32	SMF	Auxiliary	2020	2020	2021	2021	2025	2025
33	CDH	Major	2024	2026	2026	2028	0	0
34	WBF	Auxiliary	2020	2020	2024	2024	2025	2025
35	BB	Major	0	0	0	0	0	0
36	RFH	Major	2020	2023	2026	2029	0	0
37	HTW	Major	2020	2024	2027	2031	0	0
38	187	Major	2031	2032	0	0	0	0
39	RDW	Major	2020	2021	2027	2028	2032	2033
40	HST	Auxiliary	2020	2020	2027	2027	0	0
41	195	Major	2020	2022	2027	2029	0	0
42	RBR	Major	2020	2027	2028	0	0	0
43	PHI	Auxiliary	2020	2020	2024	2024	0	0

Table 5: 20-year Asset Replacement Schedule

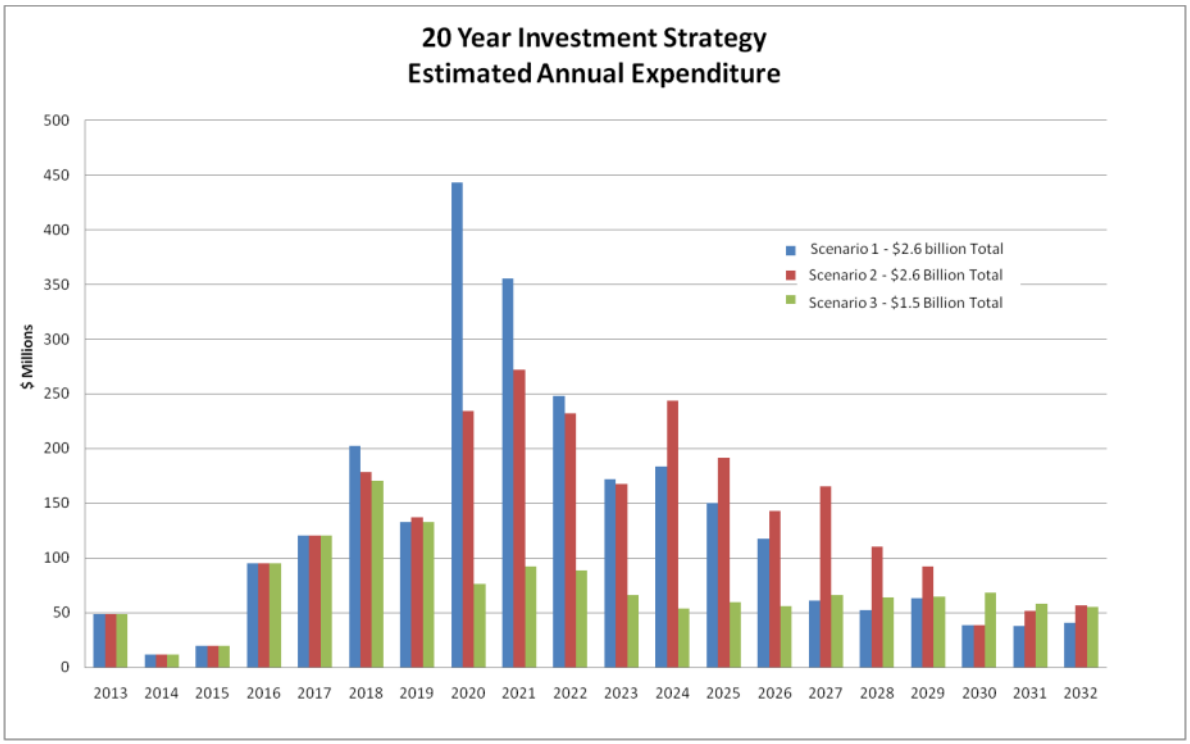


Figure 8: Estimated Annual Expenditure for 20-year Plan

Year	*Scenario 1*	*Scenario 2*	*Scenario 3*
2013	$ 48.8	$ 48.8	$ 48.8
2014	$ 11.9	$ 11.9	$ 11.9
2015	$ 19.9	$ 19.9	$ 19.9
2016	$ 94.8	$ 94.8	$ 94.8
2017	$ 120.6	$ 120.6	$ 120.6
2018	$ 202.1	$ 178.1	$ 170.1
2019	$ 132.8	$ 136.8	$ 132.8
2020	$ 443.2	$ 234.2	$ 76.2
2021	$ 334.9	$ 271.8	$ 92.1
2022	$ 264.9	$ 232.0	$ 88.2
2023	$ 179.1	$ 167.3	$ 65.7
2024	$ 181.2	$ 244.0	$ 53.7
2025	$ 148.4	$ 191.2	$ 59.2
2026	$ 119.3	$ 142.7	$ 55.8
2027	$ 61.2	$ 165.7	$ 65.8
2028	$ 52.0	$ 110.3	$ 64.0
2029	$ 63.1	$ 91.9	$ 64.6
2030	$ 38.5	$ 38.5	$ 68.3
2031	$ 37.4	$ 51.3	$ 57.7
2032	$ 40.3	$ 56.9	$ 55.0
total	$ 2,594.3	$ 2,608.6	$ 1,465.1

Table 6: Estimated Annual Expenditure for 20-year Plan

				Funding (million $, in current-year dollars)																		
Division	District	Plant Code	Plant Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
LRD	LRE	SMF	ST MARYS FALLS	-	-	-	-	8.8	8.9	9.3	-	-	0.9	-	-	-	-	-	-	-	-	-	-
LRD	LRN	BRK	BARKLEY	-	-	-	-	26.8	27.3	26.4	19.5	0.7	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CHL	CENTER HILL	-	7.2	-	-	-	-	-	-	-	-	9.0	19.7	20.4	-	-	-	-	-	-	-
LRD	LRN	CTM	CHEATHAM	-	1.7	-	-	-	-	-	-	19.8	20.2	20.6	-	-	-	-	-	-	-	-	-
LRD	LRN	CDH	CORDELL HULL	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	20.8	21.2	21.6	-	-	-
LRD	LRN	DHL	DALE HOLLOW	-	4.9	-	-	-	-	-	-	-	11.6	-	-	-	12.5	-	12.9	-	-	-	-
LRD	LRN	JPP	J PERCY PRIEST	-	0.9	-	-	-	-	-	-	-	-	-	-	-	19.5	-	-	-	-	-	-
LRD	LRN	LRL	LAUREL	-	1.6	-	-	-	-	-	-	-	-	-	-	24.1	-	-	-	-	-	-	-
LRD	LRN	OHK	OLD HICKORY	-	3.7	-	-	-	-	-	-	-	45.9	8.7	-	27.0	-	-	-	-	-	-	-
LRD	LRN	WLC	WOLF CREEK	-	-	-	-	-	-	27.8	28.3	28.8	27.9	20.0	20.4	-	-	-	-	-	-	-	-
MVD	MVK	197	BLAKELY MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	187	DE GRAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5
MVD	MVK	195	NARROWS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.9	6.0	-	6.0	-
MVD	MVS	CLC	CLARENCE CANNON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWK	HST	HARRY S TRUMAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.0	-	-	-	-
NWD	NWK	STK	STOCKTON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OBB	BIG BEND	-	-	-	-	-	-	-	-	-	-	-	-	-	16.8	-	-	47.2	48.1	18.4	18.7
NWD	NWO	OFP	FORT PECK	-	1.6	-	-	7.7	7.8	24.6	8.7	5.8	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OFR	FORT RANDALL	-	-	-	-	18.5	18.9	19.2	18.3	19.9	19.0	19.3	19.7	-	-	-	-	-	-	-	-
NWD	NWO	OGA	GARRISON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OGP	GAVINS POINT	-	-	-	-	-	-	-	-	26.0	26.4	26.9	-	-	-	-	-	-	-	-	-
NWD	NWO	OOA	OAHE	-	3.0	-	-	-	-	-	-	-	-	-	-	37.6	37.6	16.6	39.0	37.5	-	80.0	-
SAD	SAC	STS	ST STEPHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	ALT	ALLATOONA	-	-	-	-	13.7	13.9	-	-	-	-	-	-	-	-	4.9	-	-	-	-	-
SAD	SAM	BUF	BUFORD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	CRT	CARTERS	-	-	-	-	-	-	8.8	11.0	9.9	10.1	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WDF	JIM WOODRUFF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	MLF	MILLERS FERRY	-	-	-	-	-	-	16.3	12.9	14.4	-	-	-	3.6	-	-	-	-	-	-	-
SAD	SAM	RFH	RF HENRY	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	17.0	15.7	33.6	-	-	-
SAD	SAM	WFG	WALTER F GEORGE	-	-	-	-	-	-	-	-	-	-	-	15.7	-	-	-	-	-	-	-	-
SAD	SAM	WPT	WEST POINT	-	-	-	-	11.4	11.6	-	-	-	-	-	8.9	-	-	-	-	-	-	-	-
SAD	SAS	HTW	HARTWELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5	12.7	16.9	13.2	13.4
SAD	SAS	JST	J STROM THURMOND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	RBR	RICHARD B RUSSELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5	12.8	16.2	16.5
SAD	SAW	JHK	JOHN H KERR	-	-	-	-	-	-	-	-	-	-	-	-	30.6	6.9	-	-	-	-	-	-
SAD	SAW	PHI	PHILPOTT	-	-	-	-	6.4	6.5	-	-	-	-	-	-	1.9	-	-	-	-	-	-	-
SWD	SWF	RDW	RD WILLIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.1	5.1	-	-	-
SWD	SWF	SRB	SAM RAYBURN	-	-	-	-	-	-	-	-	-	-	-	-	-	24.7	25.0	-	-	-	-	-
SWD	SWF	WHT	WHITNEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BEA	BEAVER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BLS	BULL SHOALS	-	-	-	-	8.1	8.2	9.1	8.5	11.9	8.8	18.0	12.9	-	-	-	-	-	-	-	-
SWD	SWL	DAR	DARDANELLE	-	-	-	-	-	-	-	-	-	-	13.7	14.0	-	-	-	-	-	-	-	-
SWD	SWL	GRF	GREERS FERRY												-	23.6	24.0	-	-	-	-	-	-
SWD	SWL	NOR	NORFORK												-	-	-	21.4	21.8	-	-	-	-
SWD	SWL	OZK	OZARK												-	-	-	-	-	6.9	14.6	17.2	-
SWD	SWL	TBR	TABLE ROCK												-	-	-	-	-	27.4	24.1	28.4	24.9
SWD	SWT	BB-	BROKEN BOW	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	DEN	DENISON	-	-	-	-	-	-	-	-	4.1	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	EUF	EUFAULA	-	2.7	-	-	-	-	-	-	-	-	-	-	20.5	20.4	20.8	-	-	-	-	-
SWD	SWT	FTG	FORT GIBSON	-	-	-	-	-	-	-	-	-	-	-	-	14.2	14.4	13.8	14.0	-	-	-	-
SWD	SWT	KEY	KEYSTONE	-	-	-	-	17.1	17.4	-	-	-	-	-	-	4.3	-	-	-	-	-	-	-
SWD	SWT	RSK	ROBERT S KERR	-	-	-	-	-	-	28.7	25.6	26.1	26.2	-	-	-	-	-	-	-	-	-	-
SWD	SWT	TKF	TENKILLER FERRY	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	16.1	15.3	-	-	-
SWD	SWT	WBF	WEBBERS FALLS	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-
			Total Funding by year	-	30.8	-	-	118.5	120.6	170.1	132.8	167.3	197.1	136.2	111.2	209.7	176.8	140.2	171.1	225.9	116.4	179.2	86.0
			Breaker:	-	-	-	-	-	-	3.0	0.3	0.7	0.9	0.7	3.1	0.4	0.7	1.0	1.2	1.6	1.1	1.1	0.4
			Transformer:	-	7.2	-	-	3.2	3.2	19.5	1.3	6.3	1.0	4.7	13.5	19.9	9.1	7.9	12.2	8.0	1.6	8.0	2.1
			Governor:	-	6.5	-	-	1.0	1.0	3.9	1.3	3.7	2.3	2.4	4.7	2.9	1.0	1.4	3.0	1.4	0.4	0.8	0.9
			Turbine:	-	-	-	-	90.8	92.4	110.8	105.5	115.2	137.8	78.6	39.7	93.9	102.3	91.7	99.7	148.9	76.7	93.2	69.8
			Excitation System:	-	17.0	-	-	1.1	1.1	4.9	2.5	7.1	2.8	6.1	15.0	8.3	5.8	9.3	6.0	7.3	2.7	11.6	1.8
			Generator:	-	-	-	-	22.6	23.0	28.0	21.8	34.2	52.3	43.7	35.2	84.3	57.9	29.0	49.0	58.7	34.0	64.5	11.0

This chart does not show design costs. Refer to Figure 8 and Table 6 for total costs.

Figure 9: 20-year Investment Plan Summary-Scenario 2 (nominal dollars)

RISK

Many of the USACE hydropower infrastructure assets are approaching the end of their original design or service life. An age profile map for the USACE hydropower assets, an output of the AIP tool, shows that in the year 2013 there are 16 turbines, 4 transformers, and 9 generators that have exceeded 150 percent of the assets typical life, which all carry over $10 million in consequences due to asset failure (Figure 10). If no projects are completed in the next 20 years, this number increases to 45 generators, 12 transformers, and 79 turbines (Figure 11).

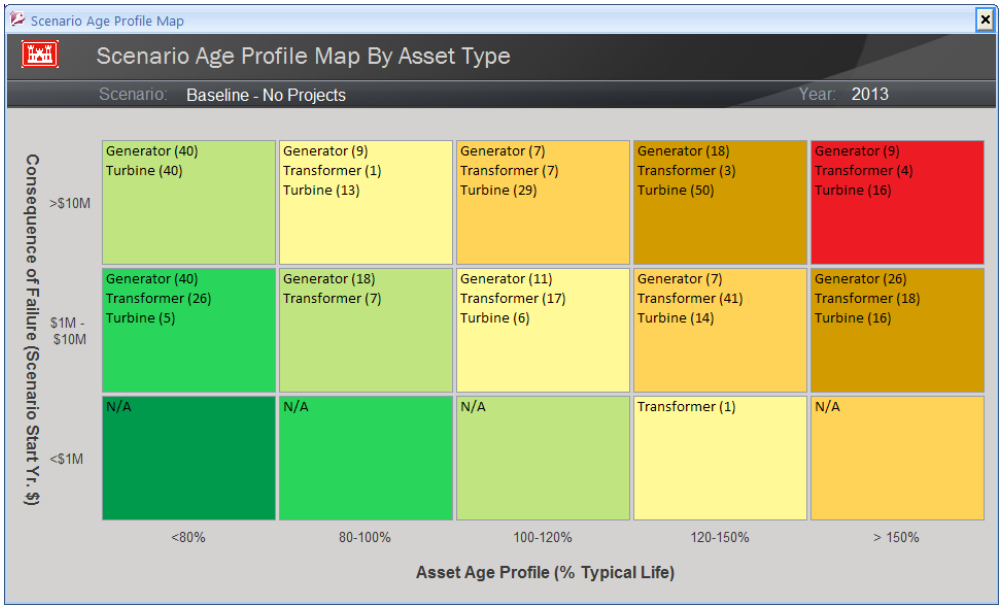


Figure 10: Current Asset Age Profile for FY 2013

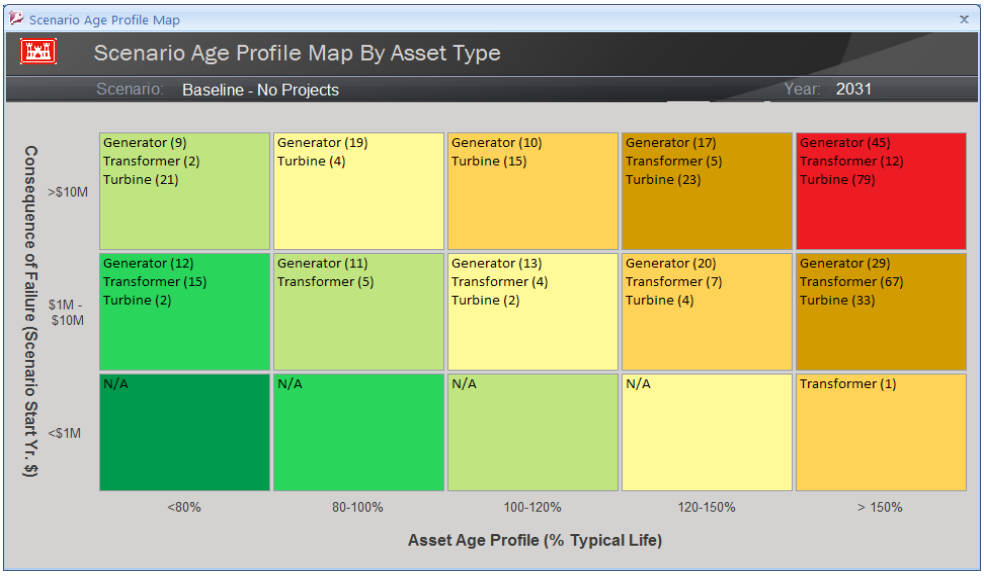


Figure 11: Asset Age Profile for FY 2031 Assuming No Components Replaced

The consequence of failure (COF) for an asset is the sum total of the replacement cost of the asset and the value of the energy that the final unit at a plant would produce during the time required replacing the asset. Taking into consideration the asset's age and the current HydroAMP conditional ratings, a likelihood of failure (LOF) for each asset can be calculated resulting in an asset risk for a given year.

Risk =COF * LOF

In general, the major components carry a much higher risk because the asset requires a design and manufacturing stage that may take up to 3 years before a replacement is available. For the 20-year strategy, the 5-year plan, and the 2013 program year, the risk was calculated as a percent reduction when compared to the no project (no investment) scenario (Figure 12).

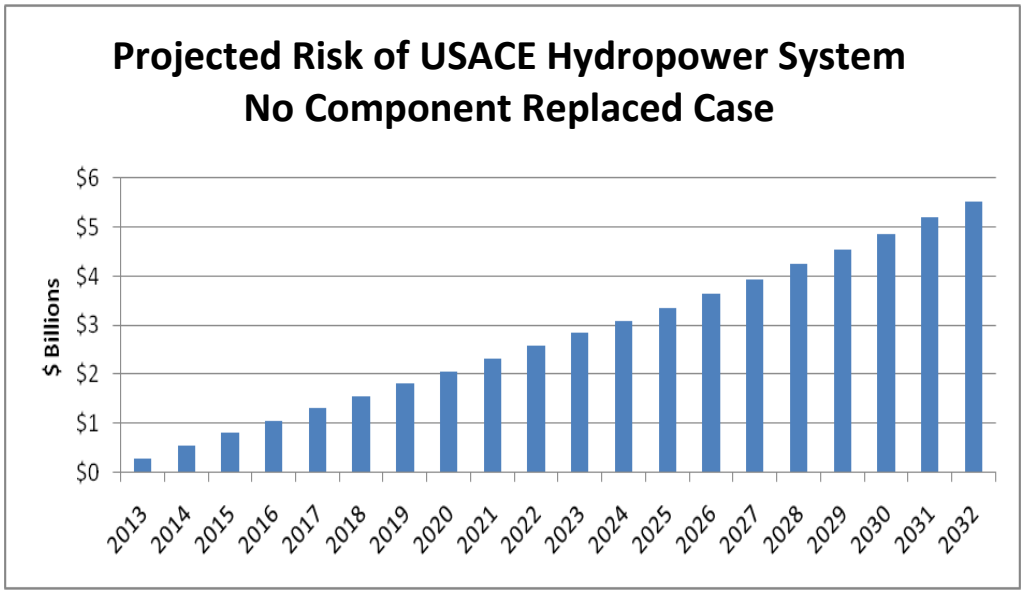


Figure 12: Projected Risk for USACE – No Component Replaced Case

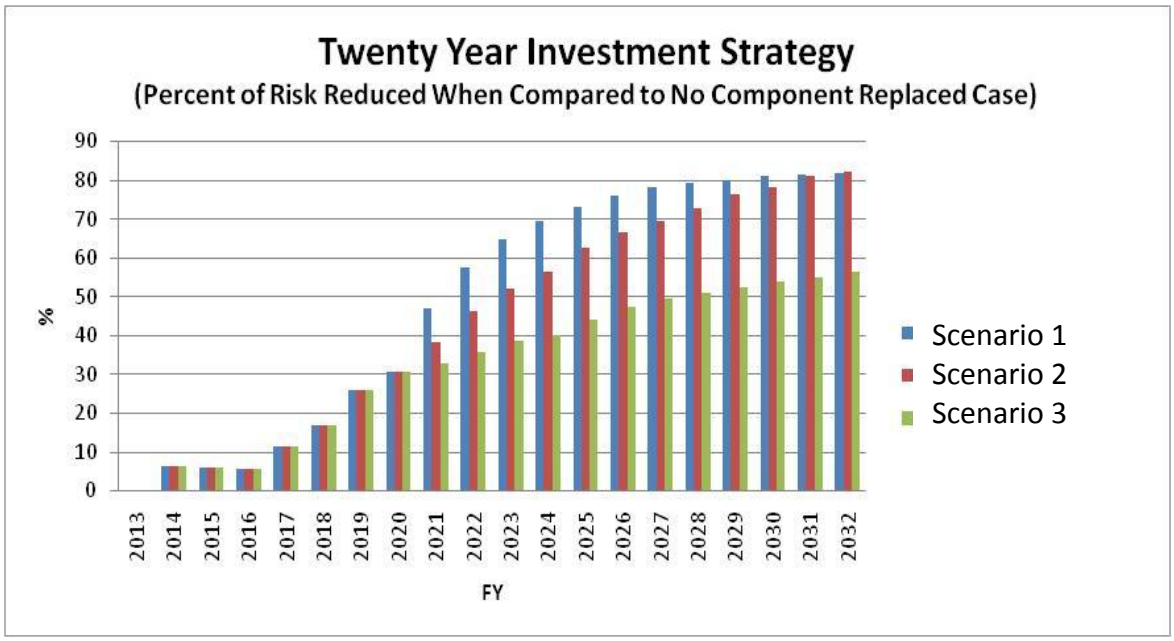


Figure 13: Risk Reduction for 20-year Plan

ENVIRONMENTAL BENEFITS

A key environmental benefit of hydropower production is the lack of greenhouse gas emissions (GHG). The GHG emissions reductions are quantified as metric tons of CO_2e. The CHG benefits for hydropower come from two sources: (1) a reduction of forced outages by planning replacements before outages, and (2) additional (incremental) generation due to capacity increases (based on the difference between the existing unit generation and the increases in generation from rehabilitated and/or new units). The incremental energy generated from the turbine-generator units will offset energy that would need to be generated from an alternate source, such as a fossil fuel-based power plant, and subsequently supplied to the grid. The incremental energy for the first year following the rehabilitation or installation of the new unit is quantified and used to calculate the GHG reductions/offsets (Figure 14).

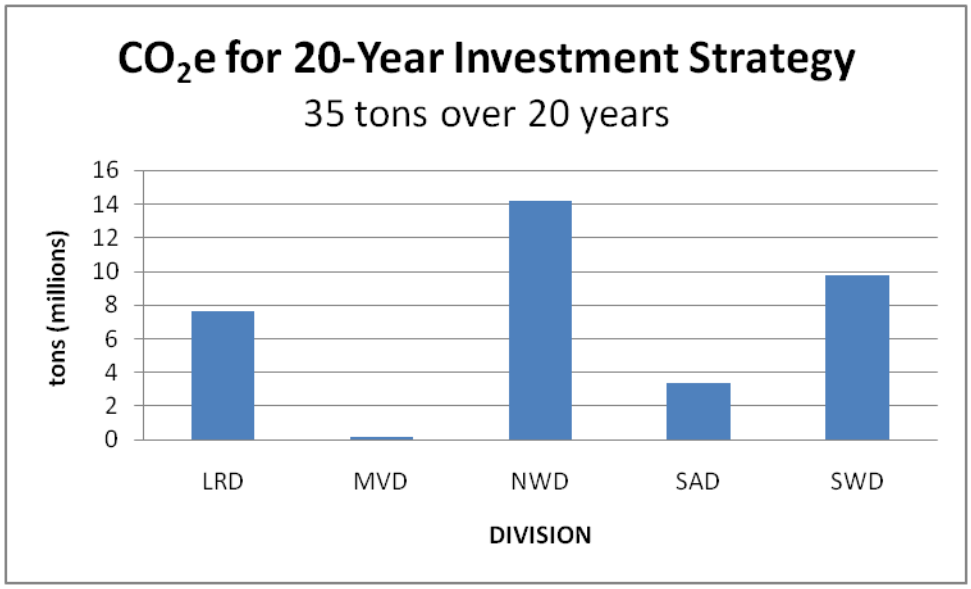


Figure 14: Environmental Benefit – 20-year Strategy

PMA/REGIONAL PRIORITIZATION

The Scenario 2 funding level ($2.61 Billion) 20-year investment strategy for the 54 plants analyzes was broken down by PMA (see Appendix B) in order to display a regional investment perspective. For each PMA the following results are displayed in the associated figures (16-33) and tables (7-9):

- Percent of risk reduced over 20 years.
- Estimated expenditure over 20 years.
- Component age profiles for 2013 and 2031 assuming no projects are funded.

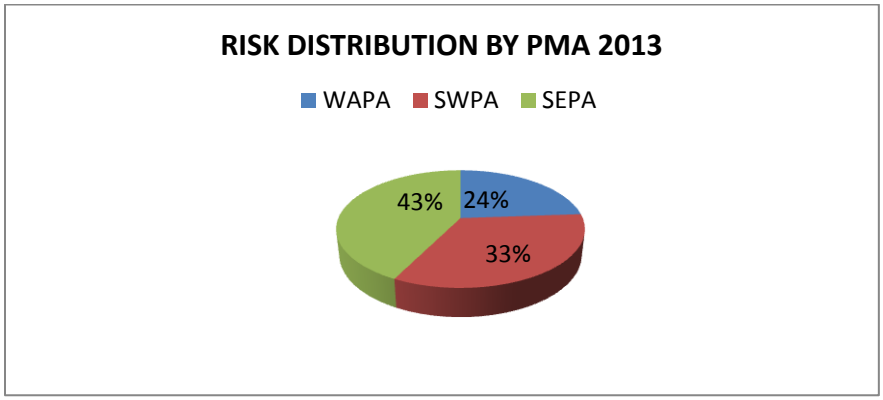


Figure 15: Risk Distribution by PMA in Year 2013

Twenty-Year Investment Strategy - WAPA

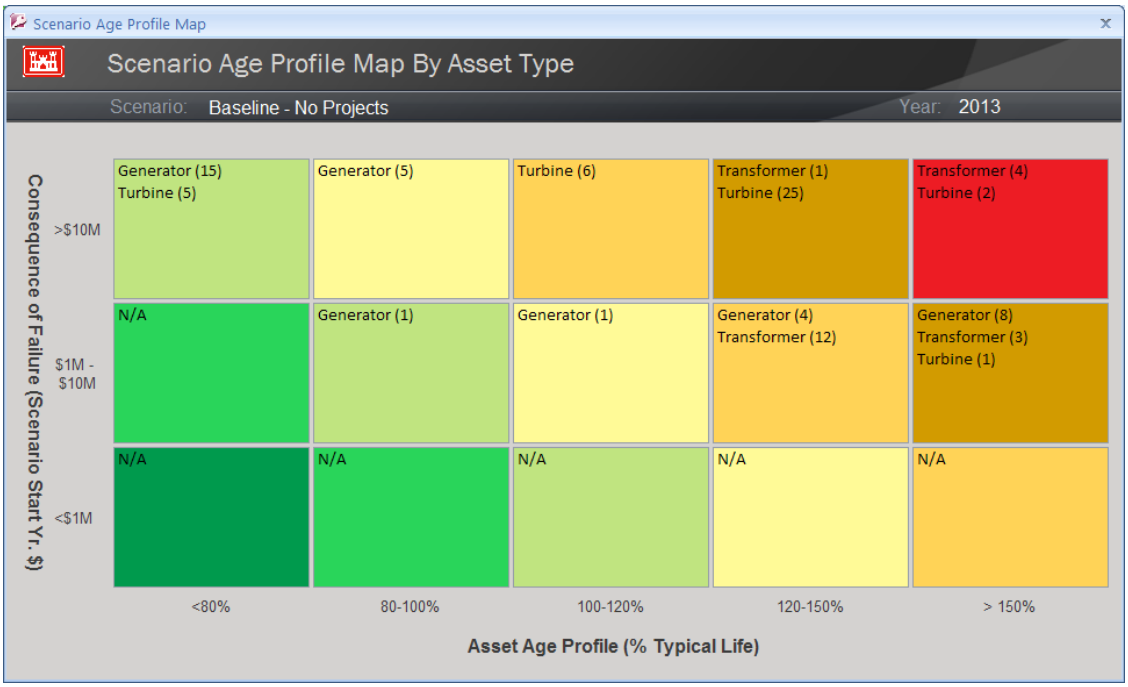


Figure 16: WAPA Age Profile - 2013

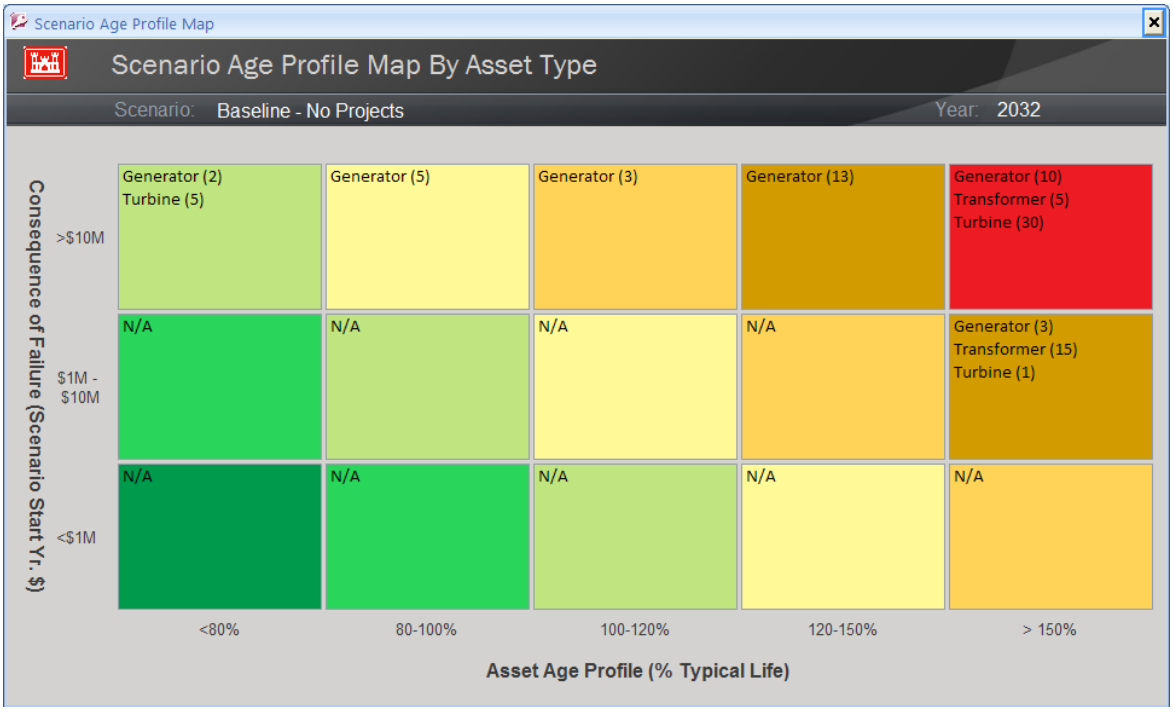


Figure 17: WAPA Age Profile - No Investment - 2032

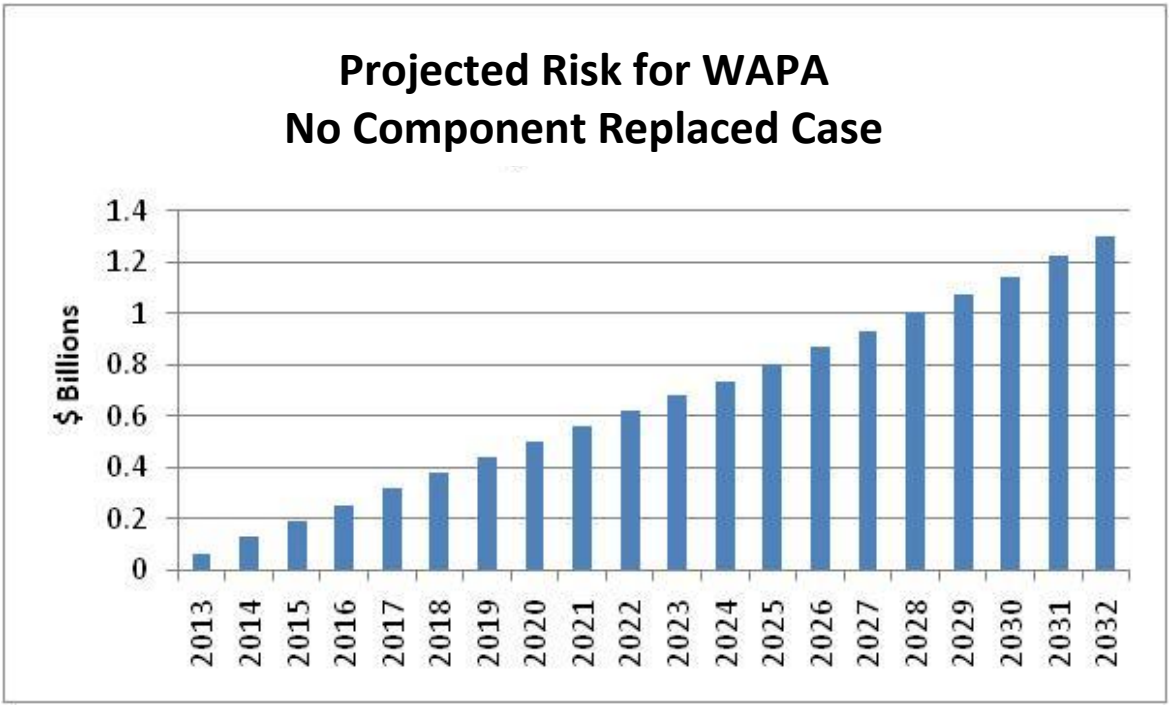


Figure 18: Percentage of Risk Reduced – No Component Replaced Case

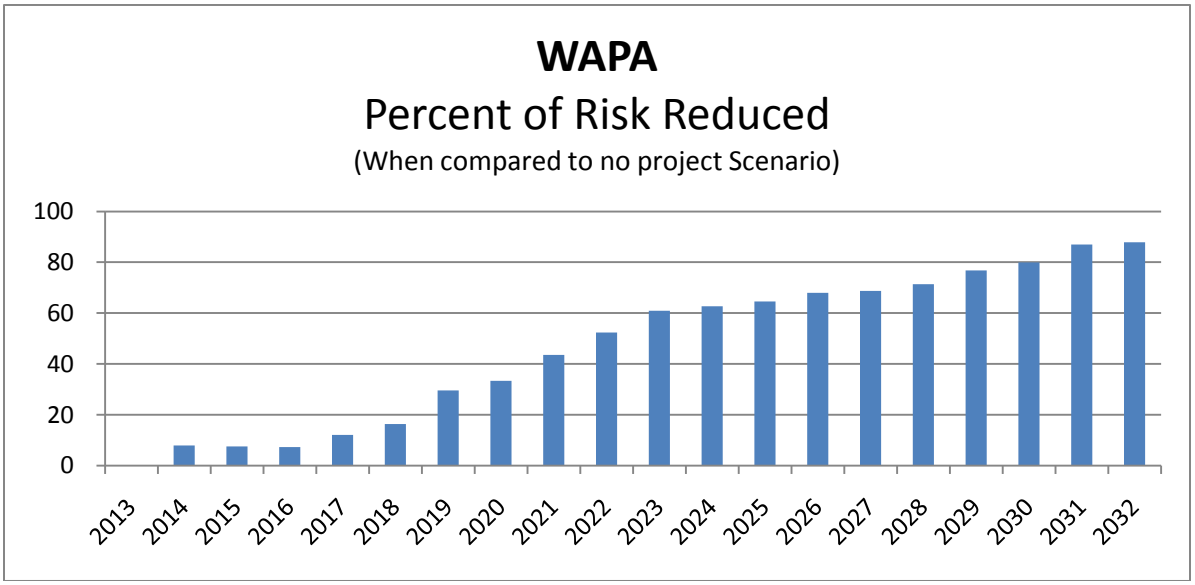


Figure 19: WAPA Risk Reduction

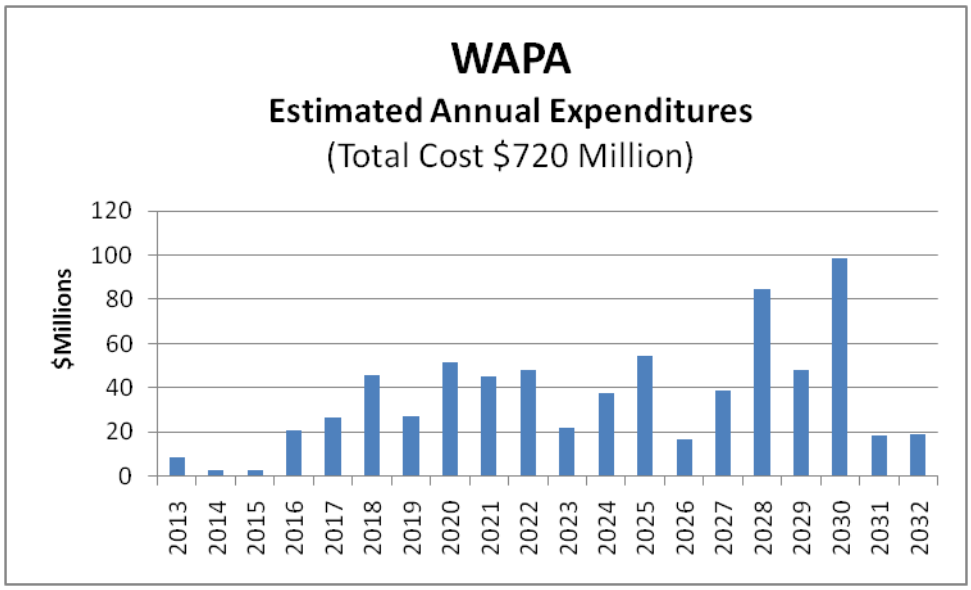


Figure 20: WAPA Annual Expenditures

Year	$ million
2013	$8.6
2014	$2.6
2015	$2.6
2016	$21.0
2017	$26.7
2018	$45.8
2019	$27.0
2020	$51.7
2021	$45.4
2022	$48.2
2023	$21.7
2024	$37.6
2025	$54.4
2026	$16.6
2027	$39.0
2028	$84.7
2029	$48.1
2030	$98.4
2031	$18.7
2032	$19.0
Total	$717.6

Table 7: WAPA Annual Expenditures

Division	District	Plant Code	Plant Name	Funding (million $, in current-year dollars)																			
				2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
LRD	LRE	SMF	ST MARYS FALLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	BRK	BARKLEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CHL	CENTER HILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CTM	CHEATHAM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CDH	CORDELL HULL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	DHL	DALE HOLLOW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	JPP	J PERCY PRIEST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	LRL	LAUREL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	OHK	OLD HICKORY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	WLC	WOLF CREEK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	197	BLAKELY MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	187	DE GRAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	195	NARROWS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVS	CLC	CLARENCE CANNON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWK	HST	HARRY S TRUMAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWK	STK	STOCKTON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OBB	BIG BEND	-	-	-	-	-	-	-	-	-	-	-	-	-	16.8	-	-	47.2	48.1	18.4	18.7
NWD	NWO	OFP	FORT PECK	-	1.6	-	-	7.7	7.8	24.6	8.7	5.8	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OFR	FORT RANDALL	-	-	-	-	18.5	18.9	19.2	18.3	19.9	19.0	19.3	19.7	-	-	-	-	-	-	-	-
NWD	NWO	OGA	GARRISON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OGP	GAVINS POINT	-	-	-	-	-	-	-	-	26.0	26.4	26.9	-	-	-	-	-	-	-	-	-
NWD	NWO	OOA	OAHE	-	3.0	-	-	-	-	-	-	-	-	-	-	37.6	37.6	16.6	39.0	37.5	-	80.0	-
SAD	SAC	STS	ST STEPHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	ALT	ALLATOONA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	BUF	BUFORD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	CRT	CARTERS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WDF	JIM WOODRUFF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	MLF	MILLERS FERRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	RFH	RF HENRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WFG	WALTER F GEORGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WPT	WEST POINT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	HTW	HARTWELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	JST	J STROM THURMOND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	RBR	RICHARD B RUSSELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAW	JHK	JOHN H KERR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAW	PHI	PHILPOTT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWF	RDW	RD WILLIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWF	SRB	SAM RAYBURN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWF	WHT	WHITNEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BEA	BEAVER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BLS	BULL SHOALS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	DAR	DARDANELLE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	GRF	GREERS FERRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	NOR	NORFORK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	OZK	OZARK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	TBR	TABLE ROCK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	BB-	BROKEN BOW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	DEN	DENISON	-												-	-	-	-	-	-	-	-
SWD	SWT	EUF	EUFAULA	-												-	-	-	-	-	-	-	-
SWD	SWT	FTG	FORT GIBSON	-												-	-	-	-	-	-	-	-
SWD	SWT	KEY	KEYSTONE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	RSK	ROBERT S KERR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	TKF	TENKILLER FERRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	WBF	WEBBERS FALLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Total Funding by year	-	4.6	-	-	26.2	26.7	43.8	27.0	51.7	45.4	46.2	19.7	37.6	54.4	16.6	39.0	84.7	48.1	98.4	18.7
			Breaker:	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-
			Transformer:	-	1.6	-	-	1.2	1.2	11.7	-	1.3	-	-	-	2.6	2.0	-	2.1	-	-	2.2	-
			Governor:	-	3.0	-	-	0.3	0.3	1.9	0.3	0.7	0.7	0.7	0.4	-	-	-	-	-	-	-	-
			Turbine:	-	-	-	-	17.6	17.9	18.8	19.1	32.5	27.2	27.7	11.2	12.9	29.9	13.4	13.6	49.3	36.1	47.1	18.7
			Excitation System:	-	-	-	-	-	-	2.4	-	1.4	1.4	1.4	-	3.1	3.2	3.2	3.3	3.3	-	6.9	-
			Generator:	-	-	-	-	7.1	7.2	7.4	7.5	15.8	16.1	16.4	8.0	18.9	19.3	-	20.0	32.1	12.0	42.2	-

This chart does not show design costs. Refer to Table 7 for total costs.

Figure 21: 20-year Investment Plan Summary (nominal dollars) - WAPA

Twenty-Year Investment Strategy - SWPA

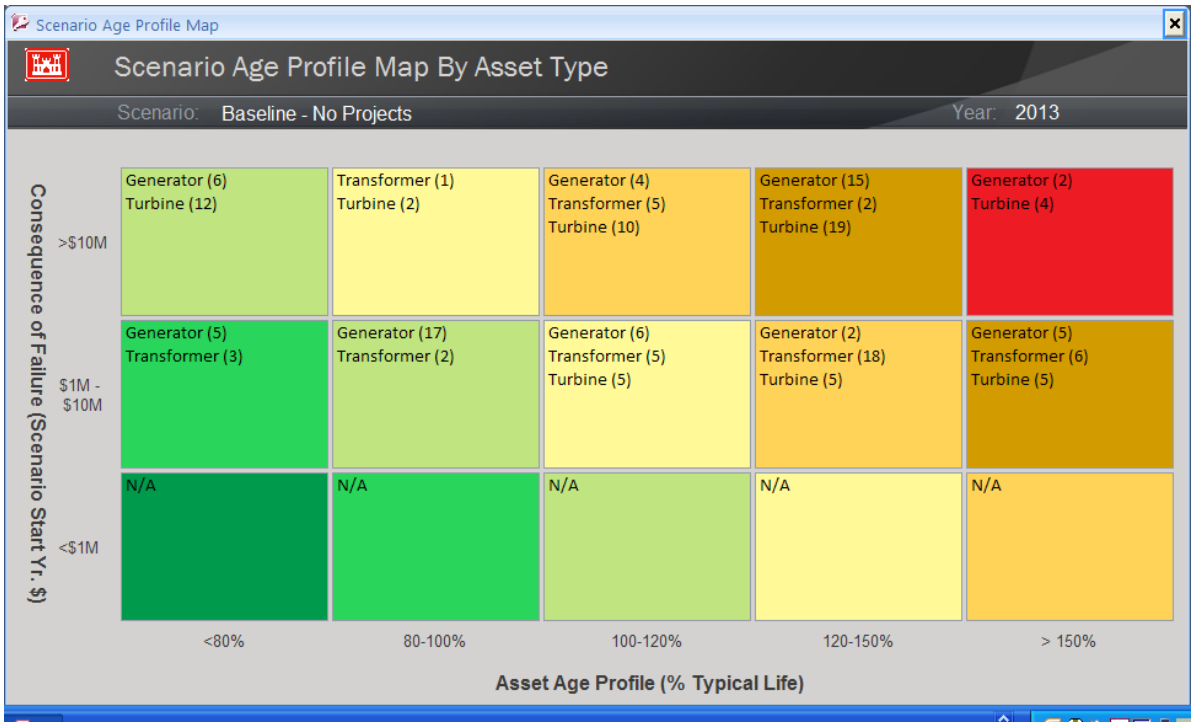


Figure 22: SWPA Age Profile - 2013

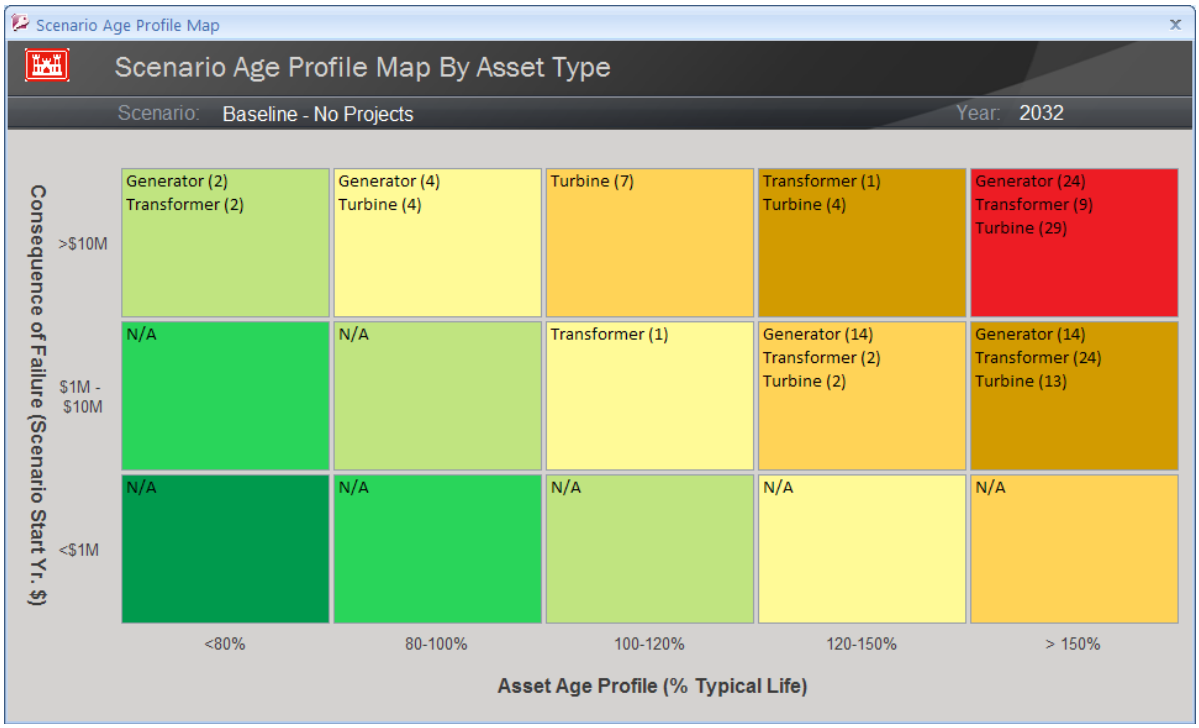


Figure 23: SWPA Age Profile – No Investment - 2032

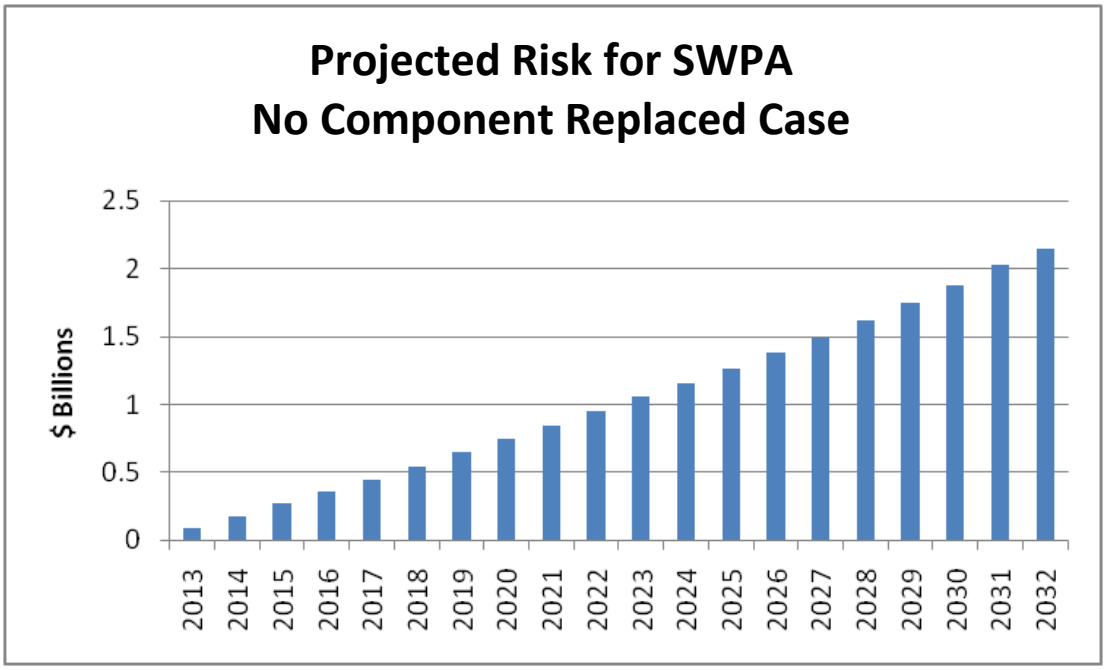


Figure 24: Percentage of Risk Reduced – No Component Replaced Case

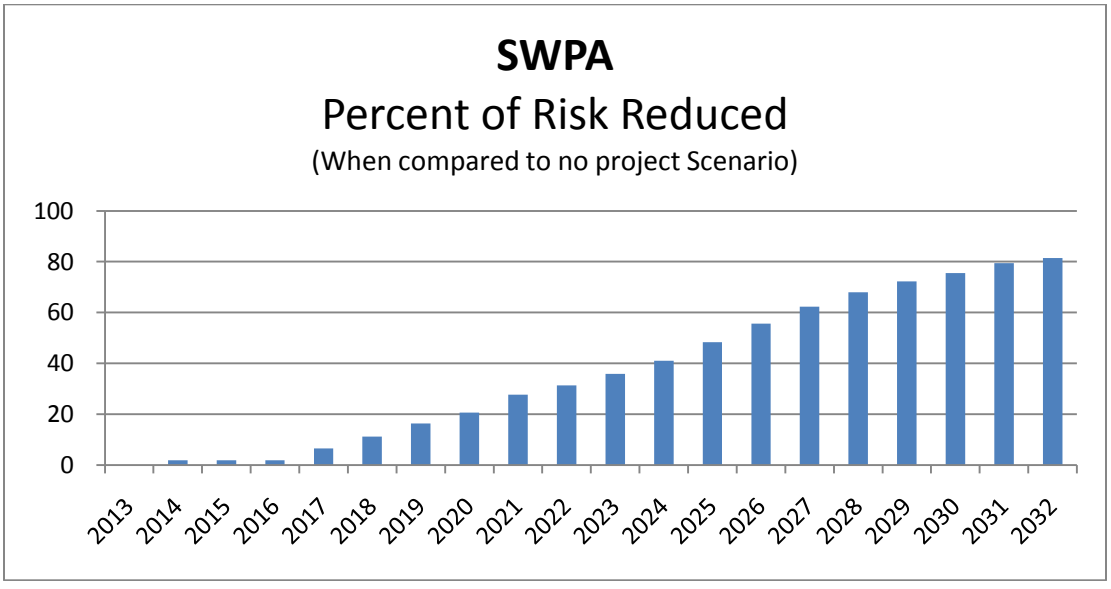


Figure 25: SWPA Risk Reduction

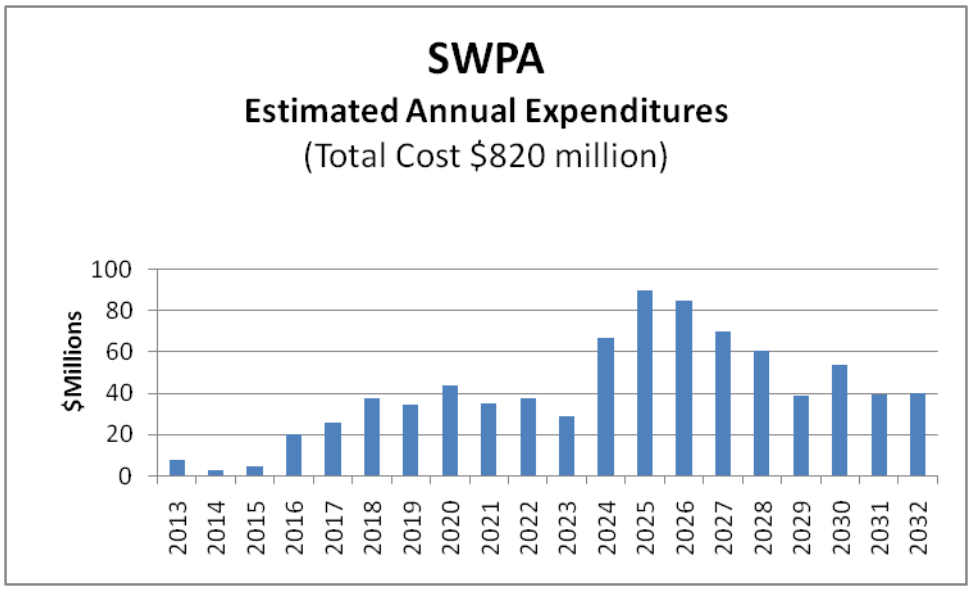


Figure 26: SWPA Annual Expenditures

Year	$ million
2013	$7.9
2014	$2.5
2015	$4.5
2016	$20.2
2017	$25.7
2018	$37.8
2019	$34.2
2020	$44.0
2021	$35.1
2022	$37.7
2023	$28.8
2024	$66.7
2025	$89.5
2026	$84.9
2027	$69.8
2028	$60.7
2029	$38.7
2030	$53.5
2031	$39.4
2032	$40.3
Total	$822.0

Table 8: SWPA Annual Expenditures

				Funding (million $, in current-year dollars)																			
Division	District	Plant Code	Plant Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
LRD	LRE	SMF	ST MARYS FALLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	BRK	BARKLEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CHL	CENTER HILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CTM	CHEATHAM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CDH	CORDELL HULL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	DHL	DALE HOLLOW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	JPP	J PERCY PRIEST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	LRL	LAUREL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	OHK	OLD HICKORY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	WLC	WOLF CREEK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	197	BLAKELY MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	187	DE GRAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5
MVD	MVK	195	NARROWS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.9	6.0	-	6.0	-
MVD	MVS	CLC	CLARENCE CANNON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWK	HST	HARRY S TRUMAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.0	-	-	-	-
NWD	NWK	STK	STOCKTON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OBB	BIG BEND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OFP	FORT PECK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OFR	FORT RANDALL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OGA	GARRISON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OGP	GAVINS POINT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OOA	OAHE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAC	STS	ST STEPHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	ALT	ALLATOONA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	BUF	BUFORD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	CRT	CARTERS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WDF	JIM WOODRUFF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	MLF	MILLERS FERRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	RFH	RF HENRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WFG	WALTER F GEORGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WPT	WEST POINT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	HTW	HARTWELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	JST	J STROM THURMOND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	RBR	RICHARD B RUSSELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAW	JHK	JOHN H KERR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAW	PHI	PHILPOTT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWF	RDW	RD WILLIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.1	5.1	-	-	-
SWD	SWF	SRB	SAM RAYBURN	-	-	-	-	-	-	-	-	-	-	-	-	-	24.7	25.0	-	-	-	-	-
SWD	SWF	WHT	WHITNEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BEA	BEAVER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BLS	BULL SHOALS	-	-	-	-	8.1	8.2	9.1	8.5	11.9	8.8	18.0	12.9	-	-	-	-	-	-	-	-
SWD	SWL	DAR	DARDANELLE	-	-	-	-	-	-	-	-	-	-	13.7	14.0	-	-	-	-	-	-	-	-
SWD	SWL	GRF	GREERS FERRY	-	-	-	-	-	-	-	-	-	-	-	-	23.6	24.0	-	-	-	-	-	-
SWD	SWL	NOR	NORFORK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.4	21.8	-	-	-	-
SWD	SWL	OZK	OZARK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.9	14.6	17.2	-
SWD	SWL	TBR	TABLE ROCK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.4	24.1	28.4	24.9
SWD	SWT	BB-	BROKEN BOW	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	DEN	DENISON	-	-	-	-	-	-	-	-	4.1	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	EUF	EUFAULA	-	2.7	-	-	-	-	-	-	-	-	-	-	20.5	20.4	20.8	-	-	-	-	-
SWD	SWT	FTG	FORT GIBSON	-	-	-	-	-	-	-	-	-	-	-	-	14.2	14.4	13.8	14.0	-	-	-	-
SWD	SWT	KEY	KEYSTONE	-	-	-	-	17.1	17.4	-	-	-	-	-	-	4.3	-	-	-	-	-	-	-
SWD	SWT	RSK	ROBERT S KERR	-	-	-	-	-	-	28.7	25.6	26.1	26.2	-	-	-	-	-	-	-	-	-	-
SWD	SWT	TKF	TENKILLER FERRY	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	16.1	15.3	-	-	-
SWD	SWT	WBF	WEBBERS FALLS	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-
			Total Funding by year	-	3.9	-	-	25.2	25.7	37.8	34.2	42.0	35.1	31.7	26.8	64.7	83.5	80.9	69.8	60.7	38.7	51.5	37.4
			Breaker:	-	-	-	-	-	-	1.2	0.3	0.7	-	0.7	1.5	0.4	0.7	0.7	1.2	1.6	1.1	1.1	0.4
			Transformer:	-	-	-	-	-	-	3.0	-	1.5	-	1.7	7.5	8.6	5.6	3.9	8.5	4.7	1.6	5.8	2.1
			Governor:	-	1.2	-	-	0.3	0.3	0.7	0.3	1.4	0.3	0.7	2.9	0.7	0.7	0.7	2.6	1.0	0.4	0.8	0.9
			Turbine:	-	-	-	-	18.7	19.0	27.2	27.7	28.2	28.7	18.0	-	30.9	47.3	46.9	34.1	25.9	10.9	16.7	21.2
			Excitation System:	-	2.7	-	-	-	-	-	-	4.3	-	2.6	6.9	3.9	2.6	2.5	2.8	3.9	2.7	4.7	1.8
			Generator:	-	-	-	-	6.2	6.3	5.7	5.8	5.9	6.0	7.9	8.1	20.1	26.7	26.2	20.7	23.6	22.0	22.4	11.0

This chart does not show design costs. Refer to Table 8 for total costs.

Figure 27: 20-year Investment Plan Summary (nominal dollars)-SWPA

Twenty-Year Investment Strategy - SEPA

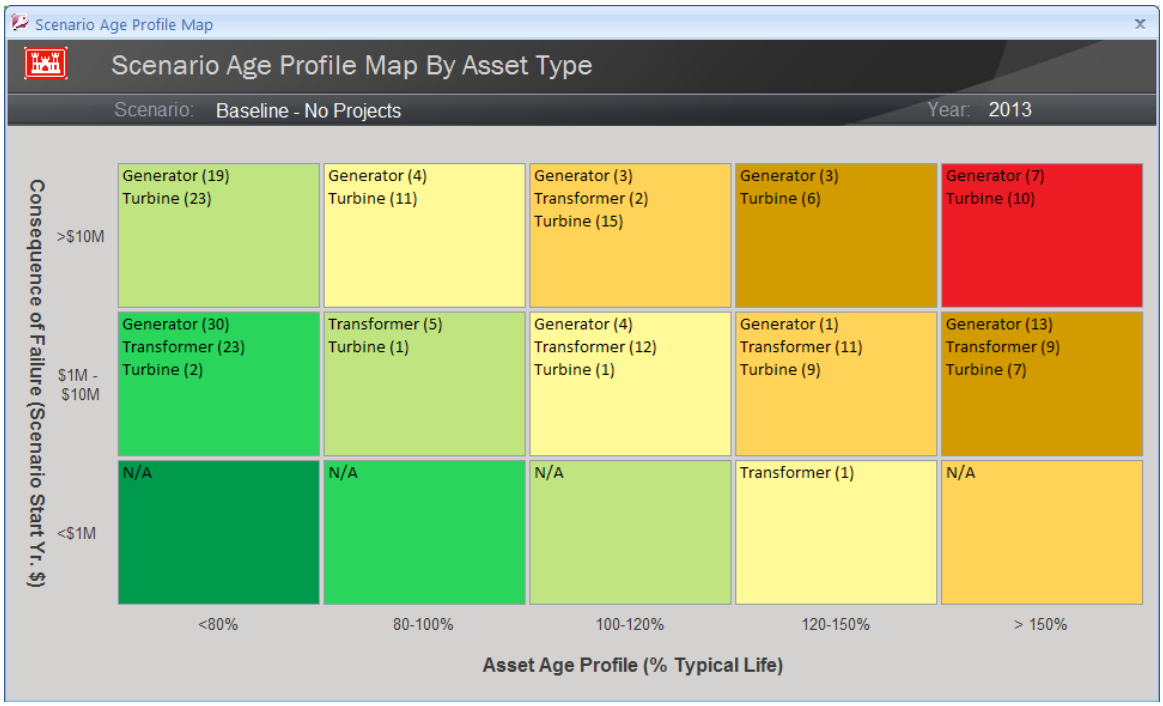


Figure 28: SEPA Age Profile - 2013

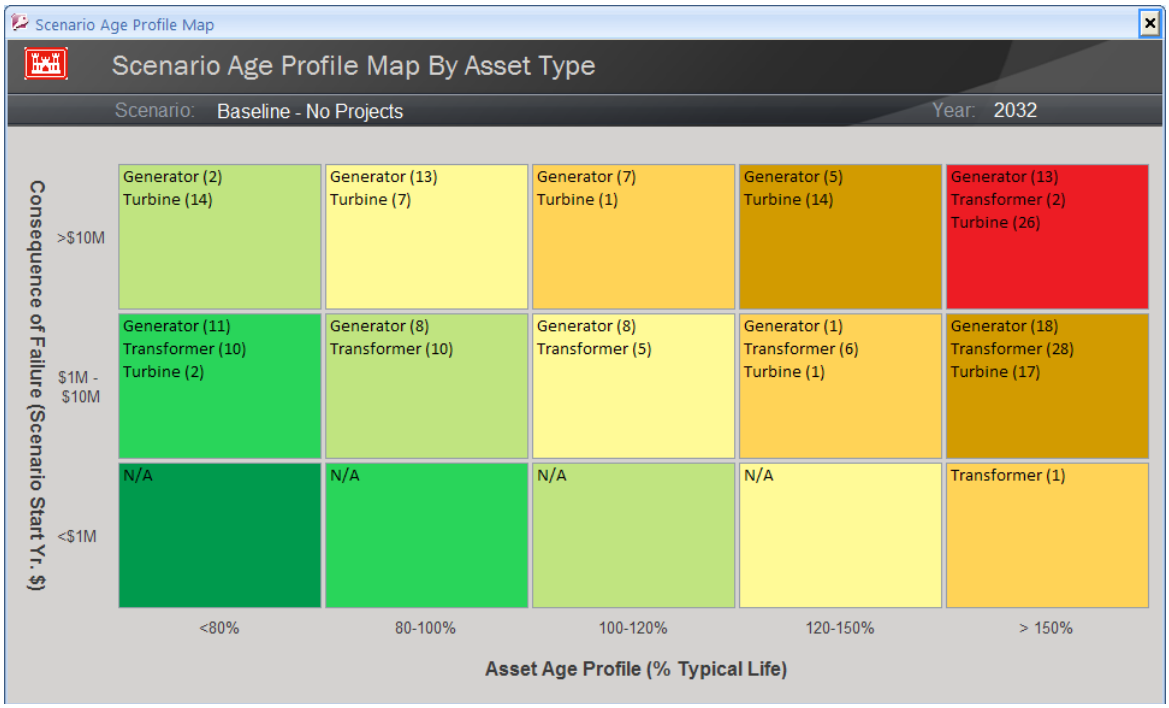


Figure 29: SEPA Age Profile – No Investment - 2032

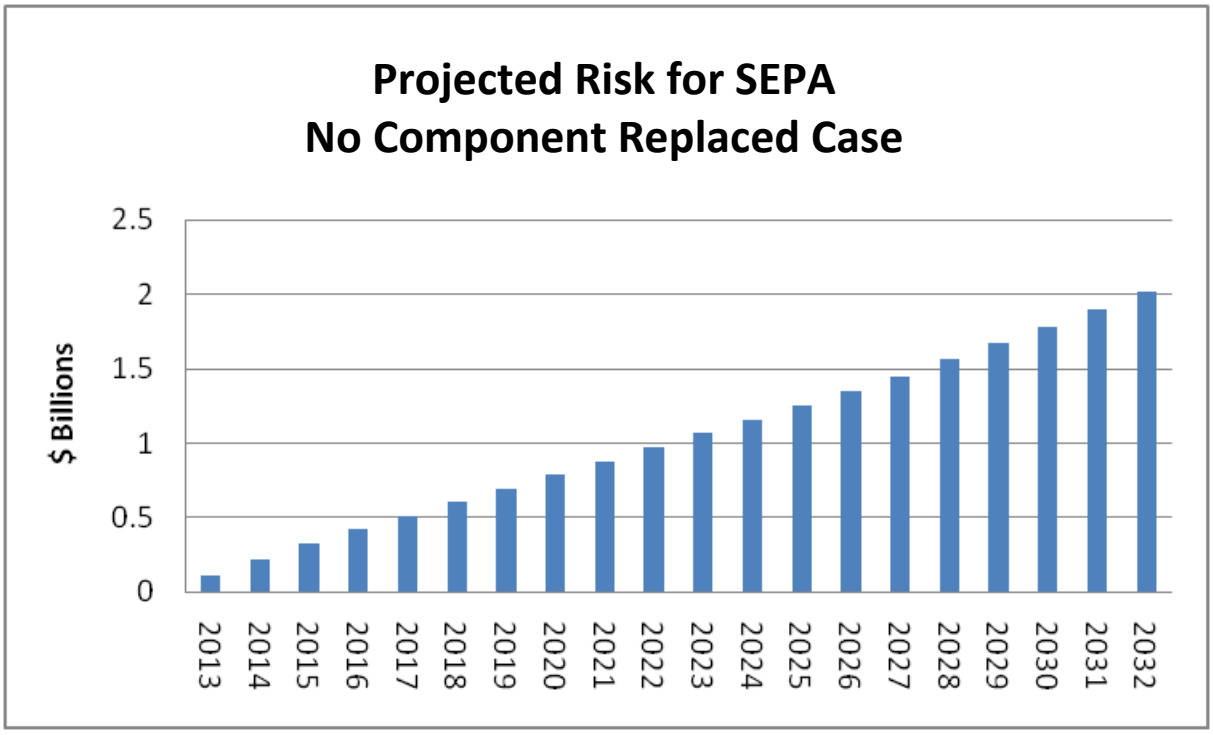


Figure 30: Percentage of Risk Reduced – No Component Replaced Case

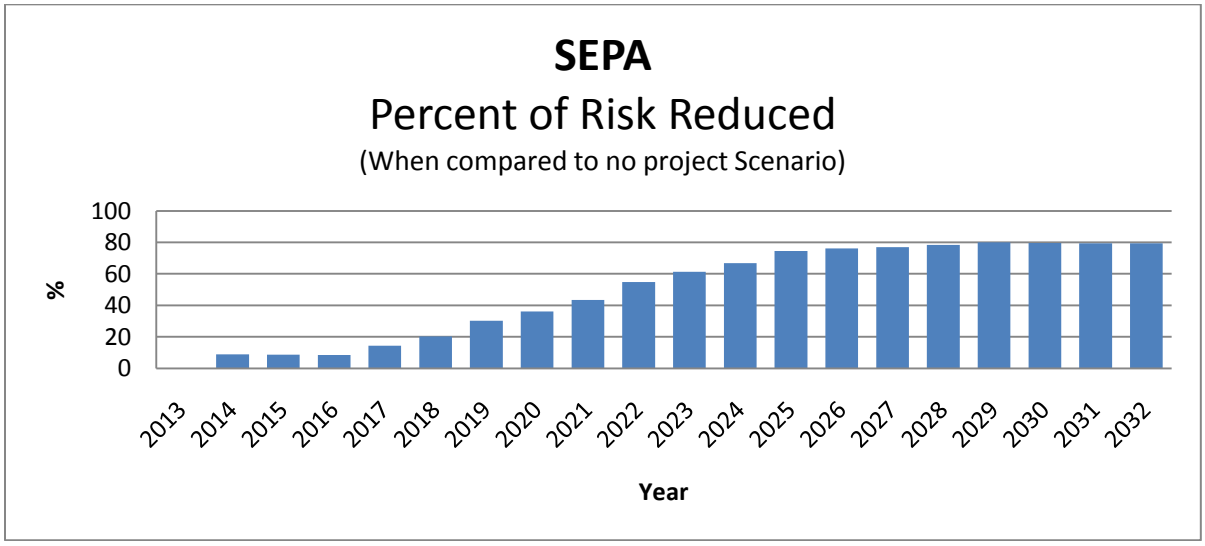


Figure 31: SEPA Risk Reduction

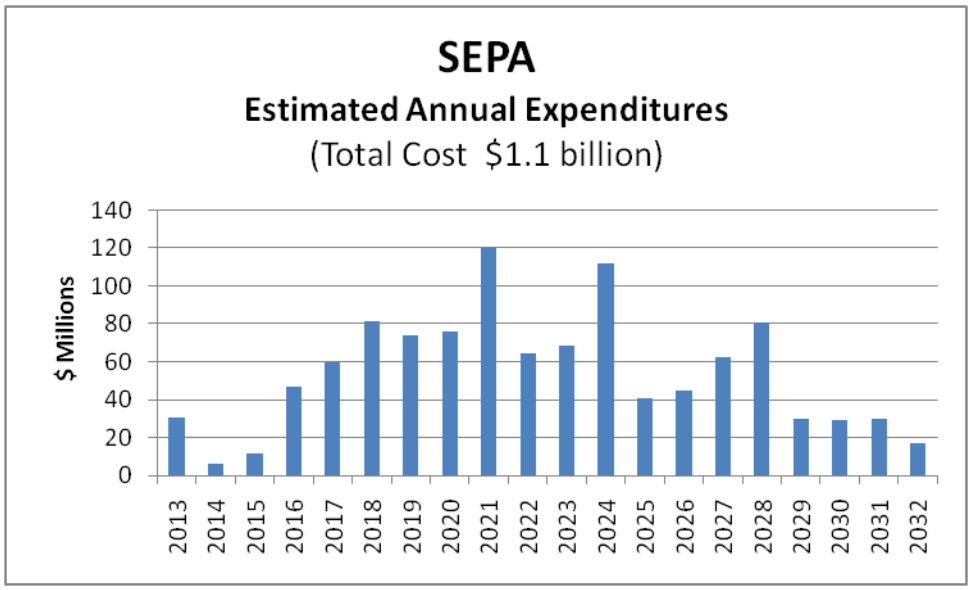


Figure 32: SEPA Annual Expenditures

Year	$ million
2013	$30.3
2014	$5.8
2015	$11.8
2016	$46.6
2017	$59.4
2018	$81.2
2019	$73.7
2020	$75.6
2021	$119.7
2022	$64.3
2023	$68.7
2024	$111.5
2025	$40.9
2026	$44.7
2027	$62.3
2028	$80.4
2029	$29.7
2030	$29.4
2031	$29.9
2032	$16.8
Total	$1,082.6

Table 9: SEPA Annual Expenditures

Division	District	Plant Code	Plant Name	Funding (million $, in current-year dollars)																			
				2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
LRD	LRE	SMF	ST MARYS FALLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	BRK	BARKLEY	-	-	-	-	26.8	27.3	26.4	19.5	0.7	-	-	-	-	-	-	-	-	-	-	-
LRD	LRN	CHL	CENTER HILL	-	7.2	-	-	-	-	-	-	-	-	9.0	19.7	20.4	-	-	-	-	-	-	-
LRD	LRN	CTM	CHEATHAM	-	1.7	-	-	-	-	-	-	19.8	20.2	20.6	-	-	-	-	-	-	-	-	-
LRD	LRN	CDH	CORDELL HULL	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-	20.8	21.2	21.6	-	-	-
LRD	LRN	DHL	DALE HOLLOW	-	4.9	-	-	-	-	-	-	-	11.6	-	-	-	12.5	-	12.9	-	-	-	-
LRD	LRN	JPP	J PERCY PRIEST	-	0.9	-	-	-	-	-	-	-	-	-	-	-	19.5	-	-	-	-	-	-
LRD	LRN	LRL	LAUREL	-	1.6	-	-	-	-	-	-	-	-	-	-	24.1	-	-	-	-	-	-	-
LRD	LRN	OHK	OLD HICKORY	-	3.7	-	-	-	-	-	-	-	45.9	8.7	-	27.0	-	-	-	-	-	-	-
LRD	LRN	WLC	WOLF CREEK	-	-	-	-	-	-	27.8	28.3	28.8	27.9	20.0	20.4	-	-	-	-	-	-	-	-
MVD	MVK	197	BLAKELY MT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	187	DE GRAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVK	195	NARROWS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MVD	MVS	CLC	CLARENCE CANNON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWK	HST	HARRY S TRUMAN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWK	STK	STOCKTON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OBB	BIG BEND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OFP	FORT PECK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OFR	FORT RANDALL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OGA	GARRISON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OGP	GAVINS POINT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NWD	NWO	OOA	OAHE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAC	STS	ST STEPHENS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	ALT	ALLATOONA	-	-	-	-	13.7	13.9	-	-	-	-	-	-	-	-	4.9	-	-	-	-	-
SAD	SAM	BUF	BUFORD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	CRT	CARTERS	-	-	-	-	-	-	8.8	11.0	9.9	10.1	-	-	-	-	-	-	-	-	-	-
SAD	SAM	WDF	JIM WOODRUFF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAM	MLF	MILLERS FERRY	-	-	-	-	-	-	16.3	12.9	14.4	-	-	-	3.6	-	-	-	-	-	-	-
SAD	SAM	RFH	RF HENRY	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	17.0	15.7	33.6	-	-	-
SAD	SAM	WFG	WALTER F GEORGE	-	-	-	-	-	-	-	-	-	-	-	15.7	-	-	-	-	-	-	-	-
SAD	SAM	WPT	WEST POINT	-	-	-	-	11.4	11.6	-	-	-	-	-	8.9	-	-	-	-	-	-	-	-
SAD	SAS	HTW	HARTWELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5	12.7	16.9	13.2	13.4
SAD	SAS	JST	J STROM THURMOND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD	SAS	RBR	RICHARD B RUSSELL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5	12.8	16.2	16.5
SAD	SAW	JHK	JOHN H KERR	-	-	-	-	-	-	-	-	-	-	-	-	30.6	6.9	-	-	-	-	-	-
SAD	SAW	PHI	PHILPOTT	-	-	-	-	6.4	6.5	-	-	-	-	-	-	1.9	-	-	-	-	-	-	-
SWD	SWF	RDW	RD WILLIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWF	SRB	SAM RAYBURN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWF	WHT	WHITNEY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BEA	BEAVER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	BLS	BULL SHOALS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	DAR	DARDANELLE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	GRF	GREERS FERRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	NOR	NORFORK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	OZK	OZARK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWL	TBR	TABLE ROCK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	BB-	BROKEN BOW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	DEN	DENISON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	EUF	EUFAULA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	FTG	FORT GIBSON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	KEY	KEYSTONE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	RSK	ROBERT S KERR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	TKF	TENKILLER FERRY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWD	SWT	WBF	WEBBERS FALLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Total Funding by year	-	22.3	-	-	58.3	59.4	79.2	71.7	73.6	115.7	58.3	64.7	107.5	38.9	42.7	62.3	80.4	29.7	29.4	29.9
			Breaker:	-	-	-	-	-	-	-	-	-	-	-	1.7	-	-	0.2	-	-	-	-	-
			Transformer:	-	5.6	-	-	2.0	2.0	4.8	1.3	3.6	1.0	3.0	6.0	8.7	1.5	4.0	1.6	3.3	-	-	-
			Governor:	-	2.4	-	-	0.3	0.3	1.3	0.7	1.6	1.3	1.0	1.4	2.2	0.4	0.7	0.4	0.4	-	-	-
			Turbine:	-	-	-	-	45.7	46.5	55.6	58.7	54.5	81.8	32.9	28.4	50.1	25.1	31.4	52.0	73.7	29.7	29.4	29.9
			Excitation System:	-	14.3	-	-	1.1	1.1	2.5	2.5	1.4	1.5	2.0	8.1	1.2	-	3.5	-	-	-	-	-
			Generator:	-	-	-	-	9.2	9.4	15.0	8.5	12.5	30.2	19.4	19.1	45.3	11.9	2.9	8.3	3.0	-	-	-

This chart does not show design costs. Refer to Table 9 for total costs.

Figure 33: 20-year Investment Plan Summary (nominal dollars)-SEPA

APPENDICES

Appendix A: Plant Codes

Plant Code	*Plant Name*
ALT	ALLATOONA
BRK	BARKLEY
BEA	BEAVER
OBB	BIG BEND
197	BLAKELY MT
BB	BROKEN BOW
BUF	BUFORD
BLS	BULL SHOALS
CRT	CARTERS
CHL	CENTER HILL
CTM	CHEATHAM
CLC	CLARENCE CANNON
CDH	CORDELL HULL
DHL	DALE HOLLOW
DAR	DARDANELLE
187	DE GRAY
DEN	DENISON
EUF	EUFAULA
FTG	FORT GIBSON
OFP	FORT PECK
OFR	FORT RANDALL
OGA	GARRISON
OGP	GAVINS POINT
GRF	GREERS FERRY
HST	HARRY S TRUMAN
HTW	HARTWELL
JPP	J PERCY PRIEST

Plant Code	*Plant Name*
JST	J STROM THURMOND
WDF	IM WOODRUFF
JHK	JOHN H KERR
KEY	KEYSTONE
LRL	LAUREL
MLF	MILLERS FERRY
195	NARROWS
NOR	NORFORK
OOA	OAHE
OHK	OLD HICKORY
OZK	OZARK
PHI	PHILPOTT
RDW	RD WILLIS
RFH	RF HENRY
RBR	RICHARD B RUSSELL
RSK	ROBERT S KERR
SRB	SAM RAYBURN
SMF	ST MARYS FALLS
STS	ST STEPHENS
STK	STOCKTON
TBR	TABLE ROCK
TKF	ENKILLER FERRY
WFG	WALTER F GEORGE
WBF	WEBBERS FALLS
WPT	WEST POINT
WHT	WHITNEY
WLC	WOLF CREEK

Appendix B: List of Covered Projects

CORPS OF ENGINEERS
HYDROPOWER PROJECTS

	PROJECT	Units	Rated MW	Max MW	On-line Date	PMA	STATE	Corps District	River System	Nav. Lock
MVD	CLEARENCE CANNON	2	58.0	63.0	84	SWPA	MO	MVS	Salt	No
	BLAKELY MT.	2	75.0	86.0	55	SWPA	AR	MVK	Ouachita	No
	DEGRAY	2	68.0	78.2	72	SWPA	AR	MVK	Caddo	No
	NARROWS	3	29.1	29.1	50	SWPA	AR	MVK	Lower Mississippi	No
NWD	BIG BEND	8	468.0	468.0	64	WAPA	SD	NWO	Missouri	No
	FT PECK	5	165.0	189.8	43	WAPA	MT	NWO	Missouri	No
	FT RANDALL	8	320.0	368.0	54	WAPA	SD	NWO	Missouri	No
	GARRISON	5	400.0	460.0	56	WAPA	ND	NWO	Missouri	No
	GAVINS POINT	3	100.0	115.0	56	WAPA	SD	NWO	Missouri	No
	OAHE	7	595.0	684.3	62	WAPA	SD	NWO	Missouri	No
	HARRY S TRUMAN	6	161.8	186.3	79	SWPA	MO	NWK	Osage	No
	STOCKTON	1	45.2	52.0	73	SWPA	MO	NWK	Sac	No
	BIG CLIFF	1	18.0	18.0	54	BPA	OR	NWP	North Santiam	No
	BONNEVILLE	20	1076.6	1154.4	38	BPA	OR	NWP	Columbia	Yes
	COUGAR	2	25.0	28.8	64	BPA	OR	NWP	McKenzie	No
	DETROIT	2	100.0	115.0	53	BPA	OR	NWP	North Santiam	No
	DEXTER	1	15.0	17.3	55	BPA	OR	NWP	Willamette	No
	FOSTER	2	20.0	23.0	68	BPA	OR	NWP	South Santiam	No
	GREEN PETER	2	80.0	92.0	67	BPA	OR	NWP	Santiam	No
	HILLS CREEK	2	30.0	34.5	62	BPA	OR	NWP	Willamette	No
	JOHN DAY	16	2160.0	2484.0	68	BPA	OR	NWP	Columbia	Yes
	LOOKOUT POINT	3	120.0	138.0	54	BPA	OR	NWP	Willamette	No
	LOST CREEK	2	49.0	56.4	77	BPA	OR	NWP	Rogue	No
	THE DALLES	24	1779.8	2066.0	57	BPA	WA	NWP	Columbia	Yes
	ALBENI FALLS	3	42.6	49.0	55	BPA	ID	NWS	Pend Oreille	No
	CHIEF JOSEPH	27	2069.0	2177.9	55	BPA	WA	NWS	Columbia	No
	LIBBY	5	525.0	600.0	75	BPA	MT	NWS	Kootenai	No
	DWORSHAK	3	402.0	402.0	73	BPA	ID	NWW	Clearwater	No
	ICE HARBOR	6	634.6	634.6	62	BPA	WA	NWW	Snake	Yes
	LITTLE GOOSE	6	810.0	931.5	70	BPA	WA	NWW	Snake	Yes
	LOWER GRANITE	6	810.0	931.5	75	BPA	WA	NWW	Snake	Yes
	LOWER MONUMENTAL	6	810.0	931.5	69	BPA	WA	NWW	Snake	Yes
	MCNARY	14	980.0	1127.0	53	BPA	OR	NWW	Columbia	Yes
LRD	BARKLEY	4	130.0	170.0	66	SEPA	KY	LRN	Cumberland	Yes
	CENTER HILL	3	135.0	156.0	50	SEPA	TN	LRN	Caney Fork	No
	CHEATHAM	3	36.0	40.5	58	SEPA	TN	LRN	Cumberland	Yes
	CORDELL HULL	3	100.0	100.0	73	SEPA	TN	LRN	Cumberland	Yes
	DALE HOLLOW	3	54.0	55.9	48	SEPA	TN	LRN	Obey	No
	J PERCY PRIEST	1	28.0	30.0	70	SEPA	TN	LRN	Stones	No
	LAUREL	1	61.0	70.0	77	SEPA	KY	LRN	Laurel	No
	OLD HICKORY	4	100.0	116.0	57	SEPA	TN	LRN	Cumberland	Yes
	WOLF CREEK	6	270.0	345.0	52	SEPA	KY	LRN	Cumberland	No
	ST MARYS FALLS	5	215	215	51	NONE	MI	LRE	St Mary's	Yes
	STONEWALL JACKSON	1	0.3		94	Decommissioned				

	PROJECT	Units	Rated MW	Max MW	On-line Date	PMA	STATE	Corps District	River System	Nav. Lock
SAD	ST STEPHEN'S	3	84.0	84.0	84	Note 3	SC	SAC	Santee/Cooper	No
	ALLATOONA	3	74.0	85.1	50	SEPA	GA	SAM	Etowah	No
	BUFORD	3	86.0	98.9	57	SEPA	GA	SAM	Chattahoochee	No
	CARTERS	4	500.0	575.0	75	SEPA	GA	SAM	Coosawattee	No
	J WOODRUFF	3	30.0	34.5	57	SEPA	GA	SAM	Apalachicola	Yes
	MILLERS FERRY	3	75.0	86.3	70	SEPA	GA	SAM	Alabama	Yes
	RF HENRY	4	68.0	75.0	75	SEPA	GA	SAM	Alabama	Yes
	WEST POINT	3	73.4	84.4	75	SEPA	GA	SAM	Chattachoochee	Yes
	WF GEORGE	4	130.0	149.5	63	SEPA	GA	SAM	Chattahoochee	Yes
	HARTWELL	5	420.0	420.0	62	SEPA	GA	SAS	Savannah	No
	JS THURMOND	7	364.0	364.0	53	SEPA	GA	SAS	Savannah	No
	RB RUSSELL	8	600.0	692.0	84	SEPA	GA	SAS	Savannah	No
	JH KERR	7	204.0	234.6	52	SEPA	VA	SAW	Roanoke	No
	PHILPOTT	3	15.6	17.9	53	SEPA	VA	SAW	Smith	No
SWD	RD WILLIS	2	7.4	8.0	89	SWPA	TX	SWF	Neches	No
	SAM RAYBURN	2	52.0	52.0	65	SWPA	TX	SWF	Angelina	No
	WHITNEY	2	30.0	30.0	53	SWPA	TX	SWF	Brazos	No
	BEAVER	2	112.0	128.0	65	SWPA	AR	SWL	White	No
	BULL SHOALS	8	340.0	376.0	52	SWPA	AR	SWL	White	No
	DARDANELLE	4	160.0	160.0	65	SWPA	AR	SWL	Arkansas	Yes
	GREERS FERRY	2	96.0	110.0	64	SWPA	AR	SWL	Little Red	No
	NORFORK	2	80.6	92.0	44	SWPA	AR	SWL	White	No
	OZARK	5	100.0	115.0	72	SWPA	AR	SWL	Arkansas	Yes
	TABLE ROCK	4	200.0	228.0	59	SWPA	MO	SWL	White	No
	BROKEN BOW	2	100.0	115.0	70	SWPA	OK	SWT	Mountain Fork	No
	DENISON	2	80.5	80.5	44	SWPA	TX/OK	SWT	Red	No
	EUFAULA	3	90.0	103.4	64	SWPA	OK	SWT	Canadian	No
	FT GIBSON	4	45.0	50.6	53	SWPA	OK	SWT	Grand Neosho	No
	KEYSTONE	2	70.0	80.5	68	SWPA	OK	SWT	Arkansas	No
	ROBERT S KERR	4	110.0	126.5	71	SWPA	OK	SWT	Arkansas	Yes
	TENKILLER FERRY	2	39.1	45.0	53	SWPA	OK	SWT	Illinois	No
	WEBBERS FALLS	3	60.0	69.0	73	SWPA	OK	SWT	Arknasas	Yes
	TOTALS	354	20473.8	22867.4						

NOTES:

1. Purpose: from "authorized and Operating Purposes of Corps of Engineers Reservoirs " July 1992, HQUSACE (Report to Congress required by the Water Development Resources Act 1990, Section 311, PL 101-640).

These are the eight general purposes of Corps projects.

Fish/Wildlife - FW Navigation - NV Flood Risk Management -FRM Recreation - RE
Hydropower - HP Water Quality - WQ Water Supply - WS Re-regulation - RR

2. Corps Distrtricts: MVS - St. Louis, MVK - Vicksburg, NWK - Kansas City, NWO - Omaha, LRN - Nashville, LRP - Pittsburg, LRE - Detroit, NWP - Portland, NWS - Seattle, NWW - Walla Walla, SWF - Fort Worth, SWL - Little Rock, SWT - Tulsa, SAC - Charleston

3. St. Stephen's is not marketed by SEPA, it is marketed by the local power company.

Updated: 11/27/2007

Appendix C: MWH Reference Documents

Hydropower Modernization Initiative, Phase 1 Needs and Opportunities Evaluation and Ranking Asset Investment Planning Program, Volume One: HMI Asset investment Planning Program. Contract No. W9127N-08-D-0003, Task Order 0013, October 2009.

Hydropower Modernization Initiative Asset Investment Planning Program, Volume One: HMI Asset investment Planning Program. Contract No. W9127N-10-D-0004, Task Order 0001, October 2010.

Hydropower Modernization Initiative Asset Investment Planning Program, Volume Two: Scenario Reports. Contract No. W9127N-10-D-0004, Task Order 0001, October 2010.

Hydropower Modernization Initiative Asset Investment Planning Program, Volume Three: Tool Requirements Specification." Contract No. W9127N-10-D-0004, Task Order 0001, October 2010.

Hydropower Modernization Initiative Asset Investment Planning Tool Energy Value Input Review with Power Marketing Administrations." Contract No. W9127N-10-D-0004, Task Order 0001, April 2011.

Appendix D: Program Implementation Guidance and PMA Project Selection Rules

U.S. ARMY CORPS OF ENGINEERS
HYDROPOWER MODERNIZATION INITIATIVE

PROGRAM IMPLEMENTATION GUIDANCE

1. PURPOSE. The purpose of this document is to establish the processes by which the Hydropower Modernization Initiative (HMI) program will be administered. This document contains the HMI process, selection criteria, timeline and business rules that govern this program.

2. HMI PROGRAM TOOLS.

a. The Asset Investment Planning (AIP) tool will be utilized for the following components:
   (1) Generator
   (2) Turbine
   (3) Governor
   (4) Exciter
   (5) Breakers
   (6) Transformers

b. HydroAMP will be the condition assessment tool utilized for the components listed above.

c. Balance of plant components will utilize the evaluation document for submission of consideration for funding.

3. HMI ANNUAL PROCESS.

a. The AIP tool will be updated with the current HydroAMP condition assessment data in early January. HydroAMP data should be updated throughout the year at the conclusion of each routine inspection or any event that changes the condition of the component. HydroAMP data shall be reviewed by the District for accuracy no later than 31 December for inclusion in the Program Year (PY) HMI.

b. An updated list of funding that has been provided by other sources for the equipment listed above shall be provided to the HMI Implementation Team Lead by 31 December.

c. For balance of plant components and other non-routine projects, the items in the list below will be the criteria considered for PY priority funding. The balance of plant components and other non-routine projects shall be submitted in evaluation document format. To be considered in the PY budget, the evaluation document must be received by HMI Implementation Team Lead by 31 January.

(1) Life Safety
(2) Environmental Compliance
(3) Reliability
(4) Forced Outage/Consequence of Failure
(5) NERC Compliance

d. All evaluation documents for previous PY funded projects will be updated annually and submitted to the HMI Implementation Team Lead by 31 January. An increase in scope requires HMI Implementation Team review and approval.

e. The HMI Implementation Team will meet during the month of February to establish the PY priorities from the AIP tool and the evaluation documents in accordance with the HMI and PMA Project Selection Rules.

f. The HMI Implementation Team shall work directly with the Districts to ensure all approved PY projects are entered into the USACE budget system (currently P2-OFA) in a consistent manor when the USACE budget system is opened.

g. For components derived from the AIP tool that are in the PY priority list, the MSC will notify the District of the inclusion of that project in the PY budget. An evaluation document shall be completed by the District and submitted to the HMI Implementation Team no later than 31 May.

h. The HMI Implementation Team will meet during the month of June to review the evaluation documents for significant changes in cost, scope, etc. The HMI Implementation Team will develop the final PY priority list and submit it to the HQ Hydropower Program Manager.

i. The HQ Hydropower Program Manager will finalize the PY priority list.

j. The HMI Implementation Team shall work directly with the Districts to ensure the USACE budget system is updated to reflect the final PY priority list.

4. PROJECT SELECTION RULES.

a. For the purpose of this section, the following definitions shall be used:

(1) Major Equipment
    1. Turbine
    2. Generator
(2) Auxiliary Equipment
    1. Governor
    2. Exciter
    3. Generator Breaker
    4. Transformer
(3) Balance of Plant
    1. Crane
    2. All other components not listed above

b. In general, a component with a condition index lower than six shall not be eligible for funding in the PY.

c. Priority funding shall take into account first to minimize the overall system risk followed then by the BCR of the individual plant components. A minimum of 1.0 BCR will be required to be eligible for funding in the PY.

d. If a major equipment component is within the priority for PY funding, strong consideration shall be given to the following guidelines:

(1) If that unit's other major equipment component is included in the annual AIP to be initiated within PY+5, it shall be included in the funded program. Example: Generator rewind shows current PY, turbine replacement is PY+3; both are to be included in the PY funding.

(2) If the other units of like equipment are included in the annual AIP to be initiated within PY+8, it shall be included in the funded program.

(3) Associated auxiliary equipment and crane rehabilitation will be evaluated and considered to be done in conjunction (if that work has not already been completed). Example: Turbine – complete governor, crane and possibly transformer (if upgraded turbine makes the plant generator step up (GSU) transformer limited); Generator – complete exciter, crane and possibly transformer (if upgraded turbine makes the plant GSU transformer limited).

(4) PY funding shall be for the plans and specifications development phase, PY+1 funding for construction phase.

(5) If the project includes multiple units as defined above, PY funding shall be for the plans and specifications development phase of the total project, funding for subsequent PYs shall be adequate to efficiently execute the project.

e. If a balance of plant component is within the priority for PY funding, it does not trigger major equipment rehab. Example: GSU Transformer does not trigger a generator rewind but may require an uprate study to properly evaluate the new GSU Transformer rating.

f. Funding may be provided to initiate project design in which construction will be funded by other means.

g. Just because a project has received funding prior to the establishment of the PY HMI, it does not automatically elevate the priority of the project in the PY HMI for funding.

5. PMA PROJECT SELECTION RULES.

a. Cumberland System

(1) The Cumberland System Projects are shown below:

1. Barkley (Nashville District)
2. Center Hill (Nashville District)
3. Cheatham (Nashville District)
4. Cordell Hull (Nashville District)
5. Dale Hollow (Nashville District)
6. J. Percy Priest (Nashville District)
7. Laurel (Nashville District)
8. Old Hickory (Nashville District)
9. Wolf Creek (Nashville District)

(2) The Cumberland System has a total outage limit of 140 MW. A new project that requires a planned outage cannot be scheduled in the PY if it causes this outage limit to be exceeded.

b. Georgia/Alabama/South Carolina System

(1) The Georgia/Alabama/South Carolina System Projects are shown below:

1. Allatoona (Mobile District)
2. Buford (Mobile District)
3. Carters (Mobile District)
4. Jones Bluff (RF Henry) (Mobile District)
5. Millers Ferry (Mobile District)
6. Walter F. George (Mobile District)
7. West Point (Mobile District)
8. Hartwell (Savannah District)
9. J. Strom Thurmond (Savannah District)
10. Richard B. Russell (Savannah District)

(2) The Georgia/Alabama/South Carolina System has a total outage limit of 400 MW. A new project that requires a planned outage cannot be scheduled in the PY if it causes this outage limit to be exceeded.

(3) Carters Units 1 and 2 are the pump starting units. Carters shall be limited to one pump starting unit out at a time. A new project that requires a planned outage for a second pump starting unit cannot be scheduled in the PY.

(4) Carters Units 3 and 4 are reversible pump/turbines. Carters shall be limited to one pump unit out at a time. A new project that requires a planned outage for a second pump unit cannot be scheduled in the PY.

(5) Russell Units 2 and 3 are the pump starting units. Russell shall be limited to one pump starting unit out at a time. A new project that requires a planned outage for a second pump starting unit cannot be scheduled in the PY.

(6) Russell Units 5-8 are reversible pump/turbines. Russell shall be limited to two pump units out at a time. A new project that requires a planned outage for a third pump unit cannot be scheduled in the PY.

(7) Walter F. George shall be limited to two unit outages at a time. A new project that requires a planned outage cannot be scheduled in the PY if two units are already out at this project.

(8) West Point shall be limited to one main unit outage if Walter F. George has any of their units out of service. A new project that requires a planned outage cannot be scheduled in the PY for West Point if Walter F. George has a unit outage during that PY.

c. Kerr/Philpott System

(1) The Kerr/Philpott System Projects are shown below:

1. John H. Kerr (Wilmington District)
2. Philpott (Wilmington District)

(2) The Kerr/Philpott System has a total outage limit of 91 MW. A new project that requires a planned outage cannot be scheduled in the PY if it causes this outage limit to be exceeded.

d. Woodruff System

(1) The Woodruff System (Jim Woodruff Project, Mobile District) shall be limited to one unit outage at a time. A new project that requires a planned outage cannot be scheduled in the PY if it causes this outage limit to be exceeded.

e. SWPA

(1) SWPA Interconnected System has a total outage limit of 90 MW. A new project that requires a planned outage cannot be scheduled in the PY if it causes this outage limit to be exceeded. A list of the SWPA Interconnected System plants are shown below:

1. Harry S. Truman (Kansas City District)
2. Stockton (Kansas City District)
3. Beaver (Little Rock District)
4. Bull Shoals (Little Rock District)
5. Dardanelle (Little Rock District)
6. Greers Ferry (Little Rock District)
7. Norfork (Little Rock District)
8. Ozark (Little Rock District)
9. Table Rock (Little Rock District)
10. Clarence Cannon (St. Louis District)
11. Broken Bow (Tulsa District)
12. Eufaula (Tulsa District)
13. Fort Gibson (Tulsa District)
14. Keystone (Tulsa District)
15. Robert S. Kerr (Tulsa District)
16. Tenkiller Ferry (Tulsa District)
17. Webbers Falls (Tulsa District)
18. Blakely Mt. (Vicksburg District)
19. Degray (Vicksburg District)

(2) SWPA White River plants shall be limited to one unit outage at a time for the entire group of plants. A new project that requires a planned outage cannot be scheduled in the PY if a unit is already out within this group of plants. A list of the White River plants are shown below:

1. Beaver (Little Rock District)
2. Bull Shoals (Little Rock District)
3. Greers Ferry (Little Rock District)
4. Norfork (Little Rock District)
5. Table Rock (Little Rock District)

(3) SWPA plants that are not a part of the Interconnected System shall be limited to one unit outage at a time per plant. A new project that requires a planned outage cannot be scheduled in the PY if a unit is already out at that plant. A list of the plants that are not a part of the Interconnected System are shown below:

1. Denison (Tulsa District)
2. Narrows (Vicksburg District)
3. R.D. Willis (Fort Worth District)
4. Sam Rayburn (Fort Worth District)
5. Whitney (Fort Worth District)

f. WAPA

(1) The WAPA Mainstem of the Missouri River Projects are shown below:

1. Big Bend (Omaha District)
2. Fort Peck (Omaha District)
3. Fort Randall (Omaha District)
4. Gavis Point (Omaha District)
5. Garrison (Omaha District)
6. Oahe (Omaha District)

(2) The Mainstem of the Missouri River has a total outage limit of 500 MW. A new project that requires a planned outage cannot be scheduled in the PY if it causes this outage limit to be exceeded.

(3) Big Bend, Gavis Point, Garrison and Oahe shall be limited to one unit outage at a time per plant. A new project that requires a planned outage cannot be scheduled in the PY if a unit is already out at that plant.

(4) Fort Peck shall be limited to one unit outage consisting of units 1, 2 or 3 at a time per plant. If the Miles City DC Converter Station is scheduled to be out of service for an extended period, then units 1, 2 or 3 shall not be taken out of service. A second unit may be removed from service as long as the second unit is unit 4 or 5. A new project that requires a planned outage cannot be scheduled in the PY if that outage exceeds these limits.

(5) Fort Randall shall be limited to two unit outages at a time. A new project that requires a planned outage cannot be scheduled in the PY if two units are already out at this plant.

Appendix E: Highest Priority Assets for 2013

Highest Priority Major Assets

GENERATORS	RISK ($1000)	BCR
PLNT-KEY-XF-T1-UNIT-2-GEN-2	$1,327	2.41
PLNT-KEY-XF-T1-UNIT-1-GEN-1	$1,327	2.41
PLNT-BRK-XF-T2-UNIT-3-GEN-3	$1,766	2.19
PLNT-BRK-XF-T1-UNIT-2-GEN-2	$1,766	2.19
PLNT-BRK-XF-T2-UNIT-4-GEN-4	$1,766	2.19

TURBINES	RISK ($1000)	BCR
PLNT-KEY-XF-T1-UNIT-2-TURB-2	$1,196	3.53
PLNT-KEY-XF-T1-UNIT-1-TURB-1	$1,196	3.53
PLNT-OFP-XF-AT-1-UNIT-1-TURB-1	$849	3.13
PLNT-OFP-XF-AT-1-UNIT-3-TURB-3	$743	3.02

Highest Priority Auxiliary Assets

CIRCUIT BREAKERS	RISK ($1000)	BCR
PLNT-RSK-XF-T2-UNIT-3-CB-SS2	$579	12.08
PLNT-RSK-XF-T1-UNIT-2-CB-SS1	$579	12.08
PLNT-RSK-XF-T2-UNIT-4-CB-4	$445	11.61
PLNT-RSK-XF-T1-UNIT-1-CB-SWITCHYARD-BREAKERS	$372	7.58
PLNT-197-UNIT-2-CB-2	$346	7.19
PLNT-197-UNIT-1-CB-1	$346	7.19

EXCITERS	RISK ($1000)	BCR
PLNT-BRK-XF-T2-UNIT-4-EXC-4	$903	5.33
PLNT-BRK-XF-T1-UNIT-1-EXC-1	$903	5.33
PLNT-BRK-XF-T1-UNIT-2-EXC-2	$903	5.33
PLNT-BRK-XF-T2-UNIT-3-EXC-3	$903	5.33

GOVERNERS	RISK ($1000)	BCR
PLNT-OGP-UNIT-1-GOV-1	$823	7.48
PLNT-OGP-UNIT-2-GOV-2	$823	7.48
PLNT-OGP-UNIT-3-GOV-3	$823	7.48
PLNT-BRK-XF-T1-UNIT-1-GOV-1	$644	6.5
PLNT-BRK-XF-T2-UNIT-3-GOV-3	$644	6.5
PLNT-BRK-XF-T1-UNIT-2-GOV-2	$644	6.5

TRANSFORMERS	RISK ($1000)	BCR
PLNT-OFP-XF-T3-4616	$1,714	12.58
PLNT-OFP-XF-T2-89558	$1,286	11.6
PLNT-OFP-XF-T4-89459	$862	10.49
PLNT-OFP-XF-T5	$1,080	9.73

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Appendix G: Five-Year Plan Spreadsheet

District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Great Lakes and Ohio River Division								
2013								
Nashville District	PLNT-CHL-UNIT-1-GOV-1 Replacement	Governor:	1950	5.23	7706.7	$1,755,959.90	6.3	$316,493
Nashville District	PLNT-CHL-UNIT-3-GOV-3 Replacement	Governor:	1951	5.53	6101.1	$1,722,008.14	6.2	$316,493
Nashville District	PLNT-JPP-UNIT-1-EXC-1 Replacement	Excitation System:	1970	5.03	12829.9	$4,525,818.53	5.4	$907,260
Nashville District	PLNT-CTM-UNIT-2-EXC-2 Replacement	Excitation System:	1958	4.34	7956.9	$2,159,226.86	4.4	$569,055
Nashville District	PLNT-CTM-UNIT-1-EXC-1 Replacement	Excitation System:	1958	4.34	7956.9	$2,159,226.86	4.4	$569,055
Nashville District	PLNT-CTM-UNIT-3-EXC-3 Replacement	Excitation System:	1958	4.34	7956.9	$2,159,226.86	4.4	$569,055
Nashville District	PLNT-LRL-UNIT-1-EXC-1 Replacement	Excitation System:	1977	3.23	10185.0	$3,484,534.22	2.9	$1,603,571
Nashville District	PLNT-CDH-UNIT-1-EXC-1 Replacement	Excitation System:	1973	4.06	2017.4	$720,339.92	2.9	$386,755
Nashville District	PLNT-CDH-UNIT-2-EXC-2 Replacement	Excitation System:	1972	4.06	2017.4	$720,339.92	2.9	$386,755
Nashville District	PLNT-CDH-UNIT-3-EXC-3 Replacement	Excitation System:	1972	4.06	2017.4	$720,339.92	2.9	$386,755
Nashville District	PLNT-CHL-UNIT-2-XF-T2 Replacement	Transformer:	1951	5.8	1892.9	$1,687,441.98	2.8	$928,380
Nashville District	PLNT-CHL-UNIT-1-XF-T1 Replacement	Transformer:	1951	5.8	1892.9	$1,687,441.98	2.8	$928,380
Nashville District	PLNT-CHL-UNIT-3-XF-T3 Replacement	Transformer:	1951	5.8	1892.9	$1,687,441.98	2.8	$928,380
Nashville District	PLNT-OHK-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1957	4.71	5257.0	$1,402,495.23	2.5	$909,918
Nashville District	PLNT-OHK-XF-T2-UNIT-3-EXC-3 Replacement	Excitation System:	1957	4.71	5257.0	$1,402,495.23	2.5	$909,918
Nashville District	PLNT-OHK-XF-T2-UNIT-4-EXC-4 Replacement	Excitation System:	1957	4.71	5257.0	$1,402,495.23	2.5	$909,918
Nashville District	PLNT-OHK-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1957	4.71	5257.0	$1,391,978.77	2.4	$998,980
Nashville District	PLNT-CHL-UNIT-1-EXC-1 Replacement	Excitation System:	1950	2.7	8517.9	$1,707,736.02	2.3	$1,265,973
Nashville District	PLNT-CHL-UNIT-2-EXC-2 Replacement	Excitation System:	1950	2.7	8517.9	$1,707,736.02	2.3	$1,265,973
Nashville District	PLNT-CHL-UNIT-3-EXC-3 Replacement	Excitation System:	1951	1.64	6625.0	$1,654,214.34	2.3	$1,265,973
Nashville District	PLNT-DHL-UNIT-2-GOV-2 Replacement	Governor:	1949	4.97	1244.9	$262,473.03	2.0	$253,195
Nashville District	PLNT-DHL-UNIT-1-GOV-1 Replacement	Governor:	1948	4.97	1244.9	$262,473.03	2.0	$253,195

These results represent a planning level distribution of funds across all USACE hydropower plants. They do not represent proposed allocation of funds for specific plants. Further analysis is needed to develop detailed implementation plans for specific projects.

District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Nashville District	PLNT-DHL-UNIT-3-GOV-3 Replacement	Governor:	1953	5.26	985.6	$253,637.94	2.0	$253,195
Nashville District	PLNT-DHL-UNIT-1-EXC-1 Replacement	Excitation System:	1948	3.54	1223.1	$231,221.54	1.3	$696,285
Nashville District	PLNT-DHL-UNIT-2-EXC-2 Replacement	Excitation System:	1949	3.54	1223.1	$231,221.54	1.3	$696,285
Nashville District	PLNT-DHL-UNIT-1-XF-T1 Replacement	Transformer:	1948	5.73	356.7	$224,441.91	1.2	$928,380
Nashville District	PLNT-DHL-UNIT-2-XF-T2 Replacement	Transformer:	1949	5.73	356.7	$224,441.91	1.2	$928,380
Nashville District	PLNT-DHL-UNIT-3-XF-T3 Replacement	Transformer:	1953	5.8	305.8	$160,805.85	1.2	$928,380
					124053.9			**$21,260,339**
2016								
Nashville District	PLNT-BRK-XF-T2-UNIT-4-EXC-4 Replacement	Excitation System:	1966	2.92	47338.5	$6,081,965.55	5.9	$1,057,327
Nashville District	PLNT-BRK-XF-T2 Replacement	Transformer:	1966	8.42	32052.3	$12,410,124.94	5.5	$1,976,649
Nashville District	PLNT-BRK-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Kaplan	1966	5.95	248007.8	$28,746,331.82	2.4	$17,383,280
Nashville District	PLNT-BRK-XF-T2-UNIT-4-GEN-4 Replacement	Generator:	1966	3.25	73819.4	$11,526,944.43	2.4	$6,368,695
Detroit District	PLNT-SMF-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1951	1.9	70046.5	$8,538,508.89	1.9	$8,770,390
					471264.3			**$35,556,342**
2017								
Nashville District	PLNT-BRK-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1966	2.42	56600.3	$6,396,641.53	6.1	$1,076,359
Nashville District	PLNT-BRK-XF-T1 Replacement	Transformer:	1966	6.56	42736.3	$14,158,596.66	6.1	$2,012,229
Nashville District	PLNT-BRK-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1966	5.1	254489.5	$30,436,603.81	2.5	$17,696,179
Nashville District	PLNT-BRK-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1966	2.81	88961.8	$12,257,831.95	2.5	$6,483,332
Detroit District	PLNT-SMF-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1952	2.31	69532.2	$8,607,636.78	1.9	$8,928,257
					512320.2			**$36,196,356**
2018								
Nashville District	PLNT-WLC-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1952	0.51	22399.4	$1,960,080.73	6.6	$346,022
Nashville District	PLNT-BRK-XF-T2-UNIT-3-EXC-3 Replacement	Excitation System:	1966	1.74	64833.1	$6,699,248.12	6.2	$1,095,733
Nashville District	PLNT-WLC-XF-T1 Replacement	Transformer:	1952	3.13	26844.9	$5,564,117.48	5.3	$1,297,582
Nashville District	PLNT-BRK-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1966	2.47	100318.6	$12,958,759.73	2.5	$6,600,032

These results represent a planning level distribution of funds across all USACE hydropower plants. They do not represent proposed allocation of funds for specific plants. Further analysis is needed to develop detailed implementation plans for specific projects.

District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Nashville District	PLNT-BRK-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Kaplan	1966	6.19	254916.5	$30,650,619.66	2.5	$18,014,710
Nashville District	PLNT-WLC-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1952	0.34	21731.4	$1,926,726.61	2.4	$1,384,087
Nashville District	PLNT-WLC-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1952	1.03	216008.9	$21,665,920.75	2.3	$16,372,979
Detroit District	PLNT-SMF-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1951	2.72	69599.2	$8,721,513.23	1.9	$9,088,966
Nashville District	PLNT-WLC-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1952	0.47	40476.1	$4,966,028.25	1.6	$8,362,194
					817128.2			**$62,562,305**
2019								
Nashville District	PLNT-WLC-XF-T3-UNIT-5-GOV-5 Replacement	Governor:	1951	0.88	22959.4	$2,020,578.81	6.6	$352,250
Nashville District	PLNT-BRK-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1966	1.67	71007.7	$6,990,132.80	6.4	$1,115,457
Nashville District	PLNT-WLC-XF-T3 Replacement	Transformer:	1951	2.84	31083.6	$5,832,237.41	5.4	$1,320,938
Nashville District	PLNT-BRK-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1966	6.02	261360.3	$32,361,680.82	2.5	$18,338,975
Nashville District	PLNT-WLC-XF-T3-UNIT-5-EXC-5 Replacement	Excitation System:	1951	0.26	23106.8	$2,005,271.98	2.4	$1,409,001
Nashville District	PLNT-WLC-XF-T3-UNIT-5-TURB-5 Replacement	Turbine: Francis	1951	3.25	204908.5	$19,365,953.73	2.1	$16,667,693
Nashville District	PLNT-WLC-XF-T3-UNIT-5-GEN-5 Replacement	Generator:	1951	0.68	40982.1	$5,095,481.49	1.6	$8,512,713
					655408.3			**$47,717,027**
2020								
Nashville District	PLNT-WLC-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1952	0.66	24079.4	$2,091,299.27	6.7	$358,591
Nashville District	PLNT-WLC-XF-T2 Replacement	Transformer:	1951	2.62	33909.4	$6,097,852.42	5.5	$1,344,715
Nashville District	PLNT-WLC-XF-T2-UNIT-3-EXC-3 Replacement	Excitation System:	1952	0.19	24207.1	$2,080,309.38	2.5	$1,434,363
Nashville District	PLNT-WLC-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Francis	1952	3.03	207060.0	$20,272,127.45	2.2	$16,967,711
Nashville District	PLNT-WLC-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1952	0.53	43005.9	$5,309,861.87	1.6	$8,665,942
					332261.7			**$28,771,322**
2021								
Nashville District	PLNT-WLC-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1952	0.54	25199.3	$2,160,726.33	6.8	$365,045
Nashville District	PLNT-WLC-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1952	0.15	25032.3	$2,152,512.79	2.5	$1,460,181
Nashville District	PLNT-WLC-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	2.84	209287.5	$21,180,139.34	2.2	$17,273,130

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Nashville District	PLNT-WLC-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1952	0.38	45029.7	$5,510,892.27	1.6	$8,821,929
					304548.8			**$27,920,286**
2022								
Nashville District	PLNT-WLC-XF-T3-UNIT-6-GOV-6 Replacement	Governor:	1951	0.37	25759.3	$2,228,335.66	6.9	$371,616
Nashville District	PLNT-WLC-XF-T3-UNIT-6-TURB-6 Replacement	Turbine: Francis	1951	1.66	217470.7	$23,191,399.52	2.3	$17,584,046
Nashville District	PLNT-WLC-XF-T3-UNIT-6-EXC-6 Replacement	Excitation System:	1951	0.11	25582.5	$2,236,045.69	2.1	$2,043,889
					268812.5			**$19,999,551**
2023								
Nashville District	PLNT-WLC-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1951	0.27	26319.3	$2,295,455.79	7.0	$378,305
Nashville District	PLNT-WLC-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Francis	1951	2.4	213744.5	$22,992,258.02	2.2	$17,900,559
Nashville District	PLNT-WLC-XF-T2-UNIT-4-EXC-4 Replacement	Excitation System:	1951	0.09	26132.6	$2,306,648.81	2.1	$2,080,679
					266196.5			**$20,359,543**
			Total Tons CO2e:		**3751994.3**	**Total Cost:**		**$300,343,070**
Northwestern Division								
2013								
Omaha District	PLNT-OFP-XF-T3-4616- Replacement	Transformer:	1950	4.81	43505.2	$22,856,475.28	12.6	$741,293
Omaha District	PLNT-OFP-XF-T4-89459 Replacement	Transformer:	1961	5.37	21752.6	$20,052,588.09	10.5	$879,153
Omaha District	PLNT-OOA-XF-T3-UNIT-5-GOV-5 Replacement	Governor:	1963	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T4-UNIT-7-GOV-7 Replacement	Governor:	1963	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T4-UNIT-6-GOV-6 Replacement	Governor:	1963	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T3-UNIT-4-GOV-4 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T2-UNIT-2-GOV-2 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-UNIT-1-GOV-1 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
					108714.2			**$4,615,739**

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
2016								
Omaha District	PLNT-OFR-XF-B-UNIT-4-GOV-4 Replacement	Governor:	1954	2.85	23503.4	$1,857,600.42	5.9	$324,990
Omaha District	PLNT-OFP-XF-AT-1 Replacement	Transformer:	1950	8.19	97886.7	$22,132,479.74	5.4	$3,784,126
Omaha District	PLNT-OFR-XF-B Replacement	Transformer:	1957	4.97	22435.2	$5,049,918.78	5.3	$1,174,192
Omaha District	PLNT-OFP-XF-AT-1-UNIT-1-CB-624-S/N-2801	Breaker: Vacuum	1986	8.39	6359.8	$1,196,618.97	4.6	$323,487
Omaha District	PLNT-OFP-XF-AT-1-UNIT-1-GOV-1 Replacement	Governor:	1943	3.47	27920.3	$1,713,051.21	3.5	$311,634
Omaha District	PLNT-OFP-XF-AT-1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1943	3.64	350328.8	$19,671,505.80	3.3	$7,669,324
Omaha District	PLNT-OFR-XF-B-UNIT-4-TURB-4 Replacement	Turbine: Francis	1954	5.19	310026.0	$15,877,110.36	2.5	$9,926,496
Omaha District	PLNT-OFR-XF-B-UNIT-4-GEN-4 Replacement	Generator:	1954	2.99	35880.7	$3,931,055.59	1.5	$7,102,526
					874340.8			**$30,616,775**
2017								
Omaha District	PLNT-OFR-XF-D-UNIT-7-GOV-7 Replacement	Governor:	1955	2.24	27150.5	$1,944,679.13	6.0	$330,839
Omaha District	PLNT-OFR-XF-D Replacement	Transformer:	1957	5.65	23454.9	$4,984,762.51	5.2	$1,195,327
Omaha District	PLNT-OFP-XF-AT-2 Replacement	Transformer:	1950	6.44	40082.1	$8,324,497.34	5.2	$1,726,710
Omaha District	PLNT-OFR-XF-C Replacement	Transformer:	1957	6.54	21415.4	$4,725,849.94	5.0	$1,195,327
Omaha District	PLNT-OFP-XF-AT-1-UNIT-3-CB-3 Replacement	Breaker: Vacuum	1986	7.93	8347.2	$1,288,184.60	4.8	$329,310
Omaha District	PLNT-OFP-XF-AT-1-UNIT-3-GOV-3 Replacement	Governor:	1951	3.32	28835.7	$1,767,534.70	3.6	$317,243
Omaha District	PLNT-OFP-XF-AT-1-UNIT-3-TURB-3 Replacement	Turbine: Francis	1951	3.42	346896.0	$19,584,135.25	3.3	$7,807,372
Omaha District	PLNT-OFR-XF-D-UNIT-7-TURB-7 Replacement	Turbine: Francis	1955	4.91	313139.9	$16,593,392.96	2.5	$10,105,173
Omaha District	PLNT-OFR-XF-D-UNIT-7-GEN-7 Replacement	Generator:	1955	2.51	41738.8	$4,237,790.20	1.5	$7,230,372
					851060.3			**$30,237,674**
2018								
Omaha District	PLNT-OFR-XF-C-UNIT-6-GOV-6 Replacement	Governor:	1955	1.7	30392.3	$2,027,564.96	6.1	$336,795
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-CB-5-S/N-94121535	Breaker: Vacuum	1993	8.25	6757.2	$1,205,459.44	4.5	$328,876
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-GOV-5 Replacement	Governor:	1961	3.79	26089.4	$1,757,386.54	3.5	$332,181
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-TURB-5 Replacement	Turbine: Francis	1961	4.05	371615.5	$20,451,289.09	3.2	$8,502,092

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Omaha District	PLNT-OFR-XF-C-UNIT-6-TURB-6 Replacement	Turbine: Francis	1955	4.65	317297.2	$17,331,520.87	2.6	$10,287,066
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-EXC-5 Replacement	Excitation System:	1993	7.1	7644.6	$1,027,253.80	1.8	$1,220,177
Omaha District	PLNT-OFR-XF-C-UNIT-6-GEN-6 Replacement	Generator:	1955	2.11	46864.6	$4,522,969.20	1.6	$7,360,518
					806660.9			**$28,367,704**
2019								
Omaha District	PLNT-OFR-XF-C-UNIT-5-GOV-5 Replacement	Governor:	1955	1.32	32823.7	$2,106,780.25	6.2	$342,857
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-CB-4-S/N-94121536	Breaker: Vacuum	1993	7.97	7949.7	$1,298,211.22	4.7	$334,795
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-GOV-4 Replacement	Governor:	1961	3.27	28835.7	$1,848,681.98	3.6	$338,160
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-TURB-4 Replacement	Turbine: Francis	1961	3.82	375594.7	$21,394,847.90	3.2	$8,655,130
Omaha District	PLNT-OFR-XF-C-UNIT-5-TURB-5 Replacement	Turbine: Francis	1955	4.38	320652.1	$18,073,526.38	2.6	$10,472,233
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-EXC-4 Replacement	Excitation System:	1993	6.85	8993.6	$1,148,375.42	1.9	$1,242,140
Omaha District	PLNT-OFR-XF-C-UNIT-5-GEN-5 Replacement	Generator:	1955	1.75	51258.1	$4,791,573.31	1.6	$7,493,008
					826107.6			**$28,878,323**
2020								
Omaha District	PLNT-OFR-XF-A-UNIT-1-GOV-1 Replacement	Governor:	1954	1.03	34444.6	$2,184,497.02	6.3	$349,028
Omaha District	PLNT-OFP-XF-AT-1-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1986	6.69	13117.0	$1,582,416.52	6.3	$287,675
Omaha District	PLNT-OFR-XF-A Replacement	Transformer:	1957	3.9	39771.4	$6,199,376.69	5.9	$1,261,044
Omaha District	PLNT-OFP-XF-AT-1-UNIT-2-GOV-2 Replacement	Governor:	1947	1.37	38905.3	$2,017,202.68	3.9	$277,310
Omaha District	PLNT-OFP-XF-AT-1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1948	2.7	172292.9	$12,768,083.97	2.9	$5,798,273
Omaha District	PLNT-OFR-XF-A-UNIT-1-TURB-1 Replacement	Turbine: Francis	1954	4.13	324176.0	$18,839,879.98	2.7	$10,660,733
Omaha District	PLNT-OFR-XF-A-UNIT-1-GEN-1 Replacement	Generator:	1954	1.46	54919.4	$5,051,905.93	1.6	$7,627,882
					677626.6			**$26,261,946**
2021								
Omaha District	PLNT-OFR-XF-B-UNIT-3-GOV-3 Replacement	Governor:	1954	0.75	36065.5	$2,261,509.18	6.4	$355,311
Omaha District	PLNT-OFR-XF-B-UNIT-3-TURB-3 Replacement	Turbine: Francis	1954	3.86	327458.8	$19,597,373.24	2.7	$10,852,627
Omaha District	PLNT-OFR-XF-B-UNIT-3-GEN-3 Replacement	Generator:	1954	1.23	57848.5	$5,294,809.51	1.6	$7,765,184

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
					421372.8			**$18,973,121**
2022								
Omaha District	PLNT-OFR-XF-D-UNIT-8-GOV-8 Replacement	Governor:	1956	0.83	35660.3	$2,319,060.05	6.4	$361,706
Omaha District	PLNT-OFR-XF-D-UNIT-8-TURB-8 Replacement	Turbine: Francis	1956	3.82	328068.3	$19,793,152.56	2.7	$11,047,974
Omaha District	PLNT-OFR-XF-D-UNIT-8-GEN-8 Replacement	Generator:	1955	1	60777.5	$5,523,628.28	1.7	$7,904,957
					424506.1			**$19,314,637**
2023								
Omaha District	PLNT-OFR-XF-A-UNIT-2-GOV-2 Replacement	Governor:	1954	0.44	38091.7	$2,412,435.33	6.6	$368,217
Omaha District	PLNT-OFR-XF-A-UNIT-2-TURB-2 Replacement	Turbine: Francis	1954	3.46	333177.1	$21,126,242.50	2.8	$11,246,837
Omaha District	PLNT-OFR-XF-A-UNIT-2-GEN-2 Replacement	Generator:	1954	0.79	63706.5	$5,749,859.72	1.7	$8,047,246
					434975.3			**$19,662,301**
			Total Tons CO2e:		**5425364.6**	**Total Cost:**		**$206,928,219**
South Atlantic Division								
2013								
Mobile District	PLNT-MLF-UNIT-2-GOV-2 Replacement	Governor:	1969	5.77	7387.8	$3,385,807.18	6.0	$268,386
Mobile District	PLNT-MLF-UNIT-3-GOV-3 Replacement	Governor:	1969	5.77	7387.8	$3,385,807.18	6.0	$268,386
Mobile District	PLNT-MLF-UNIT-1-GOV-1 Replacement	Governor:	1969	5.77	7387.8	$3,385,807.18	6.0	$268,386
Mobile District	PLNT-RFH-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
Mobile District	PLNT-RFH-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
Mobile District	PLNT-RFH-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
Mobile District	PLNT-RFH-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
					34406.8			**$1,807,675**
2016								
Mobile District	PLNT-ALT-UNIT-2-GOV-2 Replacement	Governor:	1950	2.79	8454.1	$858,803.98	3.0	$320,538
Mobile District	PLNT-ALT-UNIT-2-TURB-2 Replacement	Turbine: Francis	1950	1.14	98061.3	$12,010,587.78	1.9	$13,361,732

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Mobile District	PLNT-WPT-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1975	2.72	113009.1	$10,507,773.97	1.8	$11,413,167
Wilmington District	PLNT-PHI-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1952	2.84	16036.4	$1,973,036.04	1.5	$3,563,787
Wilmington District	PLNT-PHI-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1952	3.28	1599.5	$427,586.89	1.1	$2,865,919
					237160.4			**$31,525,142**
2017								
Mobile District	PLNT-ALT-UNIT-1-GOV-1 Replacement	Governor:	1950	2.15	9510.8	$900,363.90	3.1	$326,307
Mobile District	PLNT-ALT-UNIT-1-TURB-1 Replacement	Turbine: Francis	1950	0.95	100393.1	$12,590,365.03	1.9	$13,602,243
Mobile District	PLNT-WPT-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1975	3.64	113061.2	$10,062,476.72	1.8	$11,618,604
Wilmington District	PLNT-PHI-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	2.57	16290.3	$2,116,783.82	1.6	$3,627,935
Wilmington District	PLNT-PHI-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1952	2.76	1860.7	$498,780.58	1.2	$2,917,505
					241116.2			**$32,092,595**
2018								
Mobile District	PLNT-CRT-UNIT-1-TURB-1 Replacement	Turbine: Francis	1975	3.69	127985.8	$11,397,280.12	2.3	$8,834,074
Mobile District	PLNT-MLF-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1969	6.64	160747.6	$17,994,547.10	2.0	$12,423,493
					288733.4			**$21,257,567**
2019								
Mobile District	PLNT-CRT-UNIT-2-TURB-2 Replacement	Turbine: Francis	1975	3.41	128012.1	$12,250,345.96	2.1	$11,012,789
Mobile District	PLNT-MLF-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1969	6.45	165035.9	$19,122,236.02	2.0	$12,647,116
					293048.0			**$23,659,905**
2020								
Mobile District	PLNT-MLF-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1969	6.26	169311.3	$20,259,959.05	2.1	$12,874,764
Mobile District	PLNT-CRT-UNIT-4-TURB-4 Replacement	Turbine: Francis	1977	7.83	126954.8	$7,371,249.77	1.7	$9,904,850
					296266.1			**$22,779,614**
2021								
Mobile District	PLNT-CRT-UNIT-3-TURB-3 Replacement	Turbine: Francis	1977	8.2	125137.5	$6,085,530.62	1.6	$10,083,138

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
					125137.5			**$10,083,138**
				Total Tons CO2e:	**1515868.3**	**Total Cost:**		**$143,205,637**
Southwestern Division								
2013								
Tulsa District	PLNT-TKF-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1952	5.53	5705.3	$1,931,745.71	5.3	$250,663
Tulsa District	PLNT-TKF-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1952	5.53	5705.3	$1,931,745.71	5.3	$250,663
Tulsa District	PLNT-EUF-UNIT-2-EXC-2 Replacement	Excitation System:	1989	5.26	2532.4	$2,064,295.81	3.1	$916,166
Tulsa District	PLNT-EUF-UNIT-1-EXC-1 Replacement	Excitation System:	1989	5.26	2532.4	$2,064,295.81	3.1	$916,166
Tulsa District	PLNT-EUF-UNIT-3-EXC-3 Replacement	Excitation System:	1989	5.26	2532.4	$2,064,295.81	3.1	$916,166
Tulsa District	PLNT-BB-UNIT-2-GOV-2 Replacement	Governor:	1970	4.04	1579.4	$654,272.18	2.7	$327,465
Tulsa District	PLNT-BB-UNIT-1-GOV-1 Replacement	Governor:	1970	5.05	1579.4	$654,272.18	2.7	$327,465
					22166.7			**$3,904,754**
2016								
Tulsa District	PLNT-KEY-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1968	3.19	53134.8	$8,184,142.27	6.6	$309,853
Tulsa District	PLNT-KEY-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1968	2.3	215783.3	$39,063,789.77	3.8	$10,596,763
Tulsa District	PLNT-KEY-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1968	4.87	60531.5	$15,180,260.82	2.7	$6,232,678
Little Rock District	PLNT-BLS-XF-3-UNIT-4-TURB-4 Replacement	Turbine: Francis	1953	5.19	98789.7	$9,177,511.11	2.1	$8,087,251
					428239.3			**$25,226,545**
2017								
Tulsa District	PLNT-KEY-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1968	2.64	63530.7	$8,620,726.49	6.8	$315,430
Tulsa District	PLNT-KEY-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1968	2.11	231668.4	$40,934,368.52	3.8	$10,787,505
Tulsa District	PLNT-KEY-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1968	4.39	75142.5	$16,198,773.04	2.7	$6,344,866
Little Rock District	PLNT-BLS-XF-4-UNIT-6-TURB-6 Replacement	Turbine: Francis	1962	5.12	116672.7	$10,339,169.79	2.2	$8,232,821
					487014.3			**$25,680,623**
2018								

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-CB-4 Replacement	Breaker: Air	1971	3.49	40629.8	$5,479,684.81	13.8	$302,630
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1971	2.46	54271.6	$5,855,675.76	6.3	$315,572
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Kaplan	1971	1.22	215867.2	$33,206,757.32	2.6	$18,865,386
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-GEN-4 Replacement	Generator:	1971	4.32	62561.7	$10,562,037.66	2.4	$5,691,102
Little Rock District	PLNT-BLS-XF-4-UNIT-5-TURB-5 Replacement	Turbine: Francis	1962	4.88	117544.6	$10,875,146.44	2.3	$8,381,012
					490874.9			**$33,555,702**
2019								
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-CB-SS2 Replacement	Breaker: Air	1971	2.3	52818.8	$5,897,948.29	14.5	$308,077
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1971	2.07	60821.6	$6,135,985.12	6.5	$321,252
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Kaplan	1971	1.11	228815.1	$34,915,469.98	2.6	$19,204,963
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1971	3.94	72706.9	$11,248,412.22	2.4	$5,793,541
Little Rock District	PLNT-BLS-XF-3-UNIT-3-TURB-3 Replacement	Turbine: Francis	1952	4.38	101341.5	$10,716,370.56	2.2	$8,531,870
					516503.9			**$34,159,704**
2020								
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-CB-SS1 Replacement	Breaker: Air	1971	1.93	56881.8	$6,150,633.52	14.8	$313,623
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1971	1.74	65500.2	$6,405,520.57	6.5	$327,035
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1971	1.01	238151.9	$36,599,348.61	2.6	$19,550,652
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1971	3.64	79470.3	$11,914,121.24	2.5	$5,897,825
Little Rock District	PLNT-BLS-UNIT-2-TURB-2 Replacement	Turbine: Francis	1952	4.13	102092.4	$11,239,702.93	2.3	$8,685,444
					542096.6			**$34,774,579**
2021								
Tulsa District	PLNT-RSK-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1971	1.48	70178.8	$6,672,155.52	6.6	$332,921
Tulsa District	PLNT-RSK-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1971	0.92	249272.3	$38,286,949.97	2.7	$19,902,564
Tulsa District	PLNT-RSK-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1971	3.37	86233.7	$12,582,265.38	2.5	$6,003,986
Little Rock District	PLNT-BLS-XF-5-UNIT-8-TURB-8 Replacement	Turbine: Francis	1963	5.23	118205.6	$11,751,572.92	2.3	$8,841,782
					523890.4			**$35,081,253**

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
2022								
Little Rock District	PLNT-BLS-XF-5-UNIT-7-TURB-7 Replacement	Turbine: Francis	1963	5.04	118873.5	$12,329,216.51	2.3	$9,000,934
Little Rock District	PLNT-BLS-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	3.67	103397.3	$12,296,138.27	2.3	$9,000,934
					222270.8			**$18,001,868**
			Total Tons CO2e:		**3233056.9**	**Total Cost:**		**$210,385,028**
					13926284.			$860,861,954

These results represent a planning level distribution of funds across all USACE hydropower plants. They do not represent proposed allocation of funds for specific plants.
Further analysis is needed to develop detailed implementation plans for specific projects.

Appendix H: Twenty-Year Plan Spreadsheet

District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Great Lakes and Ohio River Division								
2013								
Nashville District	PLNT-CHL-UNIT-1-GOV-1 Replacement	Governor:	1950	5.23	7706.7	$1,755,959.90	6.3	$316,493
Nashville District	PLNT-CHL-UNIT-3-GOV-3 Replacement	Governor:	1951	5.53	6101.1	$1,722,008.14	6.2	$316,493
Nashville District	PLNT-JPP-UNIT-1-EXC-1 Replacement	Excitation System:	1970	5.03	12829.9	$4,525,818.53	5.4	$907,260
Nashville District	PLNT-CTM-UNIT-1-EXC-1 Replacement	Excitation System:	1958	4.34	7956.9	$2,159,226.86	4.4	$569,055
Nashville District	PLNT-CTM-UNIT-2-EXC-2 Replacement	Excitation System:	1958	4.34	7956.9	$2,159,226.86	4.4	$569,055
Nashville District	PLNT-CTM-UNIT-3-EXC-3 Replacement	Excitation System:	1958	4.34	7956.9	$2,159,226.86	4.4	$569,055
Nashville District	PLNT-LRL-UNIT-1-EXC-1 Replacement	Excitation System:	1977	3.23	10185.0	$3,484,534.22	2.9	$1,603,571
Nashville District	PLNT-CDH-UNIT-1-EXC-1 Replacement	Excitation System:	1973	4.06	2017.4	$720,339.92	2.9	$386,755
Nashville District	PLNT-CDH-UNIT-2-EXC-2 Replacement	Excitation System:	1972	4.06	2017.4	$720,339.92	2.9	$386,755
Nashville District	PLNT-CDH-UNIT-3-EXC-3 Replacement	Excitation System:	1972	4.06	2017.4	$720,339.92	2.9	$386,755
Nashville District	PLNT-CHL-UNIT-1-XF-T1 Replacement	Transformer:	1951	5.8	1892.9	$1,687,441.98	2.8	$928,380
Nashville District	PLNT-CHL-UNIT-2-XF-T2 Replacement	Transformer:	1951	5.8	1892.9	$1,687,441.98	2.8	$928,380
Nashville District	PLNT-CHL-UNIT-3-XF-T3 Replacement	Transformer:	1951	5.8	1892.9	$1,687,441.98	2.8	$928,380
Nashville District	PLNT-OHK-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1957	4.71	5257.0	$1,402,495.23	2.5	$909,918
Nashville District	PLNT-OHK-XF-T2-UNIT-4-EXC-4 Replacement	Excitation System:	1957	4.71	5257.0	$1,402,495.23	2.5	$909,918
Nashville District	PLNT-OHK-XF-T2-UNIT-3-EXC-3 Replacement	Excitation System:	1957	4.71	5257.0	$1,402,495.23	2.5	$909,918
Nashville District	PLNT-OHK-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1957	4.71	5257.0	$1,391,978.77	2.4	$998,980
Nashville District	PLNT-CHL-UNIT-1-EXC-1 Replacement	Excitation System:	1950	2.7	8517.9	$1,707,736.02	2.3	$1,265,973
Nashville District	PLNT-CHL-UNIT-2-EXC-2 Replacement	Excitation System:	1950	2.7	8517.9	$1,707,736.02	2.3	$1,265,973
Nashville District	PLNT-CHL-UNIT-3-EXC-3 Replacement	Excitation System:	1951	1.64	6625.0	$1,654,214.34	2.3	$1,265,973
Nashville District	PLNT-DHL-UNIT-2-GOV-2 Replacement	Governor:	1949	4.97	1244.9	$262,473.03	2.0	$253,195
Nashville District	PLNT-DHL-UNIT-1-GOV-1 Replacement	Governor:	1948	4.97	1244.9	$262,473.03	2.0	$253,195

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Nashville District	PLNT-DHL-UNIT-3-GOV-3 Replacement	Governor:	1953	5.26	985.6	$253,637.94	2.0	$253,195
Nashville District	PLNT-DHL-UNIT-1-EXC-1 Replacement	Excitation System:	1948	3.54	1223.1	$231,221.54	1.3	$696,285
Nashville District	PLNT-DHL-UNIT-2-EXC-2 Replacement	Excitation System:	1949	3.54	1223.1	$231,221.54	1.3	$696,285
Nashville District	PLNT-DHL-UNIT-1-XF-T1 Replacement	Transformer:	1948	5.73	356.7	$224,441.91	1.2	$928,380
Nashville District	PLNT-DHL-UNIT-2-XF-T2 Replacement	Transformer:	1949	5.73	356.7	$224,441.91	1.2	$928,380
Nashville District	PLNT-DHL-UNIT-3-XF-T3 Replacement	Transformer:	1953	5.8	305.8	$160,805.85	1.2	$928,380
					124053.9			**$21,260,339**
2016								
Nashville District	PLNT-BRK-XF-T2-UNIT-4-EXC-4 Replacement	Excitation System:	1966	2.92	47338.5	$6,081,965.55	5.9	$1,057,327
Nashville District	PLNT-BRK-XF-T2 Replacement	Transformer:	1966	8.42	32052.3	$12,410,124.94	5.5	$1,976,649
Nashville District	PLNT-BRK-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Kaplan	1966	5.95	248007.8	$28,746,331.82	2.4	$17,383,280
Nashville District	PLNT-BRK-XF-T2-UNIT-4-GEN-4 Replacement	Generator:	1966	3.25	73819.4	$11,526,944.43	2.4	$6,368,695
Detroit District	PLNT-SMF-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1951	1.9	70046.5	$8,538,508.89	1.9	$8,770,390
					471264.3			**$35,556,342**
2017								
Nashville District	PLNT-BRK-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1966	2.42	56600.3	$6,396,641.53	6.1	$1,076,359
Nashville District	PLNT-BRK-XF-T1 Replacement	Transformer:	1966	6.56	42736.3	$14,158,596.66	6.1	$2,012,229
Nashville District	PLNT-BRK-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1966	5.1	254489.5	$30,436,603.81	2.5	$17,696,179
Nashville District	PLNT-BRK-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1966	2.81	88961.8	$12,257,831.95	2.5	$6,483,332
Detroit District	PLNT-SMF-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1952	2.31	69532.2	$8,607,636.78	1.9	$8,928,257
					512320.2			**$36,196,356**
2018								
Nashville District	PLNT-BRK-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1966	3.02	58658.5	$6,288,842.09	7.7	$337,717
Nashville District	PLNT-BRK-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1966	3.02	58658.5	$6,288,842.09	7.7	$337,717
Nashville District	PLNT-WLC-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1952	0.51	22399.4	$1,960,080.73	6.6	$346,022
Nashville District	PLNT-BRK-XF-T2-UNIT-3-EXC-3 Replacement	Excitation System:	1966	1.74	64833.1	$6,699,248.12	6.2	$1,095,733

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Nashville District	PLNT-WLC-XF-T1 Replacement	Transformer:	1952	3.13	26844.9	$5,564,117.48	5.3	$1,297,582
Detroit District	PLNT-SMF-UNIT-2-CB-2 Replacement	Breaker: Air	1951	2.8	7885.0	$736,322.72	3.8	$228,551
Nashville District	PLNT-BRK-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1966	2.47	100318.6	$12,958,759.73	2.5	$6,600,032
Nashville District	PLNT-BRK-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Kaplan	1966	6.19	254916.5	$30,650,619.66	2.5	$18,014,710
Nashville District	PLNT-WLC-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1952	0.34	21731.4	$1,926,726.61	2.4	$1,384,087
Nashville District	PLNT-WLC-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1952	1.03	216008.9	$21,665,920.75	2.3	$16,372,979
Detroit District	PLNT-SMF-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1951	2.72	69599.2	$8,721,513.23	1.9	$9,088,966
Nashville District	PLNT-WLC-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1952	0.47	40476.1	$4,966,028.25	1.6	$8,362,194
					942330.3			**$63,466,290**
2019								
Nashville District	PLNT-WLC-XF-T3-UNIT-5-GOV-5 Replacement	Governor:	1951	0.88	22959.4	$2,020,578.81	6.6	$352,250
Nashville District	PLNT-BRK-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1966	1.67	71007.7	$6,990,132.80	6.4	$1,115,457
Nashville District	PLNT-WLC-XF-T3 Replacement	Transformer:	1951	2.84	31083.6	$5,832,237.41	5.4	$1,320,938
Nashville District	PLNT-BRK-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1966	6.02	261360.3	$32,361,680.82	2.5	$18,338,975
Nashville District	PLNT-WLC-XF-T3-UNIT-5-EXC-5 Replacement	Excitation System:	1951	0.26	23106.8	$2,005,271.98	2.4	$1,409,001
Nashville District	PLNT-WLC-XF-T3-UNIT-5-TURB-5 Replacement	Turbine: Francis	1951	3.25	204908.5	$19,365,953.73	2.1	$16,667,693
Nashville District	PLNT-WLC-XF-T3-UNIT-5-GEN-5 Replacement	Generator:	1951	0.68	40982.1	$5,095,481.49	1.6	$8,512,713
					655408.3			**$47,717,027**
2020								
Nashville District	PLNT-BRK-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1966	2.2	71228.2	$6,859,564.82	7.9	$349,985
Nashville District	PLNT-BRK-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1966	2.2	71228.2	$6,859,564.82	7.9	$349,985
Nashville District	PLNT-WLC-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1952	0.66	24079.4	$2,091,299.27	6.7	$358,591
Nashville District	PLNT-CTM-UNIT-1-GOV-1 Replacement	Governor:	1958	1.65	34100.9	$2,868,892.76	6.2	$277,310
Nashville District	PLNT-WLC-XF-T2 Replacement	Transformer:	1951	2.62	33909.4	$6,097,852.42	5.5	$1,344,715
Nashville District	PLNT-CTM-UNIT-1-XF-T1 Replacement	Transformer:	1958	6.59	11307.2	$2,705,208.59	3.5	$984,929
Nashville District	PLNT-WLC-XF-T2-UNIT-3-EXC-3 Replacement	Excitation System:	1952	0.19	24207.1	$2,080,309.38	2.5	$1,434,363

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Nashville District	PLNT-CTM-UNIT-1-GEN-1 Replacement	Generator:	1958	2.97	49296.8	$5,738,972.21	2.2	$3,840,507
Nashville District	PLNT-WLC-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Francis	1952	3.03	207060.0	$20,272,127.45	2.2	$16,967,711
Nashville District	PLNT-CTM-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1958	2.03	142757.8	$17,590,480.82	2.0	$14,734,091
Nashville District	PLNT-WLC-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1952	0.53	43005.9	$5,309,861.87	1.6	$8,665,942
					712180.8			**$49,308,128**
2021								
Nashville District	PLNT-WLC-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1952	0.54	25199.3	$2,160,726.33	6.8	$365,045
Nashville District	PLNT-OHK-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1957	0.63	24501.5	$2,109,548.54	6.8	$311,505
Nashville District	PLNT-OHK-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1957	0.63	24501.5	$2,109,548.54	6.8	$311,505
Nashville District	PLNT-CTM-UNIT-3-GOV-3 Replacement	Governor:	1958	1.3	35806.0	$2,970,216.59	6.2	$282,302
Detroit District	PLNT-SMF-UNIT-3A-CB-3A Replacement	Breaker: Air	1954	1.42	9687.3	$826,093.45	4.4	$208,337
Detroit District	PLNT-SMF-UNIT-10-CB-10 Replacement	Breaker: Air	1951	1.42	9687.3	$826,146.86	4.3	$213,590
Detroit District	PLNT-SMF-UNIT-1-CB-1 Replacement	Breaker: Air	1951	1.42	9687.3	$826,426.75	4.0	$241,116
Detroit District	PLNT-SMF-UNIT-3-CB-3 Replacement	Breaker: Air	1952	1.42	9687.3	$826,432.91	4.0	$241,722
Nashville District	PLNT-CTM-UNIT-3-XF-T3 Replacement	Transformer:	1958	6.33	12563.5	$2,859,332.15	3.6	$1,002,658
Nashville District	PLNT-WLC-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1952	0.15	25032.3	$2,152,512.79	2.5	$1,460,181
Nashville District	PLNT-OHK-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Kaplan	1957	0.05	216715.8	$24,581,169.30	2.4	$16,344,482
Nashville District	PLNT-OHK-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1957	2.43	195075.1	$23,051,747.73	2.4	$16,344,482
Nashville District	PLNT-CTM-UNIT-3-GEN-3 Replacement	Generator:	1958	2.51	53918.4	$6,005,888.97	2.2	$3,909,636
Nashville District	PLNT-WLC-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	2.84	209287.5	$21,180,139.34	2.2	$17,273,130
Nashville District	PLNT-CTM-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1958	1.72	147909.0	$18,290,331.60	2.0	$14,999,305
Nashville District	PLNT-DHL-UNIT-3-TURB-3 Replacement	Turbine: Francis	1953	3.86	56222.6	$5,424,196.75	1.8	$6,788,273
Nashville District	PLNT-OHK-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1957	0.64	42747.9	$4,853,016.59	1.7	$6,312,242
Nashville District	PLNT-OHK-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1957	2.33	35623.2	$4,440,612.21	1.6	$6,312,242
Nashville District	PLNT-WLC-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1952	0.38	45029.7	$5,510,892.27	1.6	$8,821,929
Nashville District	PLNT-DHL-UNIT-3-GEN-3 Replacement	Generator:	1953	1.23	7404.9	$1,386,203.95	1.3	$4,806,430

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
					1196287.4			**$106,550,114**
2022								
Nashville District	PLNT-WLC-XF-T3-UNIT-6-GOV-6 Replacement	Governor:	1951	0.37	25759.3	$2,228,335.66	6.9	$371,616
Nashville District	PLNT-OHK-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1957	0.56	25064.7	$2,177,672.88	6.8	$317,112
Nashville District	PLNT-CTM-UNIT-2-GOV-2 Replacement	Governor:	1958	1.02	37511.0	$3,068,075.24	6.2	$287,383
Nashville District	PLNT-OHK-XF-T2 Replacement	Transformer:	1957	4.66	36153.7	$7,563,344.50	4.7	$1,991,863
Nashville District	PLNT-CTM-UNIT-2-XF-T2 Replacement	Transformer:	1958	6.01	14238.6	$3,015,466.51	3.7	$1,020,706
Nashville District	PLNT-WLC-XF-T3-UNIT-6-TURB-6 Replacement	Turbine: Francis	1951	1.66	217470.7	$23,191,399.52	2.3	$17,584,046
Nashville District	PLNT-CTM-UNIT-2-GEN-2 Replacement	Generator:	1958	2.14	56999.4	$6,255,891.59	2.3	$3,980,009
Nashville District	PLNT-WLC-XF-T3-UNIT-6-EXC-6 Replacement	Excitation System:	1951	0.11	25582.5	$2,236,045.69	2.1	$2,043,889
Nashville District	PLNT-CTM-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1958	1.47	152208.3	$18,944,137.64	2.0	$15,269,292
Nashville District	PLNT-OHK-XF-T2-UNIT-4-GEN-4 Replacement	Generator:	1957	0.32	45292.4	$5,068,258.32	1.7	$6,425,863
Nashville District	PLNT-CHL-UNIT-1-GEN-1 Replacement	Generator:	1950	0.27	53963.6	$6,192,376.89	1.6	$8,980,724
					690244.2			**$58,272,503**
2023								
Nashville District	PLNT-WLC-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1951	0.27	26319.3	$2,295,455.79	7.0	$378,305
Nashville District	PLNT-WLC-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Francis	1951	2.4	213744.5	$22,992,258.02	2.2	$17,900,559
Nashville District	PLNT-WLC-XF-T2-UNIT-4-EXC-4 Replacement	Excitation System:	1951	0.09	26132.6	$2,306,648.81	2.1	$2,080,679
Nashville District	PLNT-CHL-UNIT-3-GEN-3 Replacement	Generator:	1951	0.27	54543.8	$6,352,693.76	1.7	$9,142,377
Nashville District	PLNT-CHL-UNIT-3-TURB-3 Replacement	Turbine: Francis	1951	1.55	150886.0	$29,158.09	1.0	$10,528,050
					471626.3			**$40,029,970**
2024								
Nashville District	PLNT-CHL-UNIT-2-GOV-2 Replacement	Governor:	1950	0.3	30826.7	$2,693,502.63	7.6	$385,115
Nashville District	PLNT-OHK-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1957	0.28	26472.8	$2,313,705.67	7.0	$328,631
Nashville District	PLNT-LRL-UNIT-1-GOV-1 Replacement	Governor:	1977	2.31	57416.7	$5,494,832.41	5.3	$458,030
Nashville District	PLNT-OHK-XF-T1 Replacement	Transformer:	1957	4.21	41862.2	$8,301,234.52	4.9	$2,064,215

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Nashville District	PLNT-LRL-UNIT-1-XF-T1 Replacement	Transformer:	1977	7.06	20370.0	$4,600,247.83	2.9	$2,172,047
Nashville District	PLNT-OHK-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1957	0.42	213246.7	$26,148,699.79	2.5	$17,243,066
Nashville District	PLNT-LRL-UNIT-1-TURB-1 Replacement	Turbine: Francis	1977	3.4	127609.5	$17,692,210.36	2.5	$9,626,484
Nashville District	PLNT-LRL-UNIT-1-GEN-1 Replacement	Generator:	1977	1.27	103752.9	$12,362,765.64	1.9	$11,817,349
Nashville District	PLNT-CHL-UNIT-2-GEN-2 Replacement	Generator:	1950	0.07	56864.8	$6,592,278.40	1.7	$9,306,940
Nashville District	PLNT-OHK-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1990	7.23	14249.3	$1,824,614.35	1.2	$7,321,545
Nashville District	PLNT-CHL-UNIT-3-TURB-3 Replacement	Turbine: Francis	1951	10	150910.0	($46,986.03)	1.0	$10,717,555
					843581.5			**$71,440,976**
2025								
Nashville District	PLNT-JPP-UNIT-1-GOV-1 Replacement	Governor:	1970	1.31	79286.7	$7,128,290.33	7.4	$350,647
Nashville District	PLNT-JPP-UNIT-1-XF-T1 Replacement	Transformer:	1970	6.26	31158.3	$7,103,395.97	5.2	$1,521,769
Nashville District	PLNT-JPP-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1970	4.58	159815.0	$22,527,544.66	2.1	$10,856,030
Nashville District	PLNT-DHL-UNIT-1-TURB-1 Replacement	Turbine: Francis	1948	2.39	58699.2	$6,954,119.22	1.9	$7,290,384
Nashville District	PLNT-JPP-UNIT-1-GEN-1 Replacement	Generator:	1998	8.86	18541.1	$4,979,761.76	1.5	$6,759,018
Nashville District	PLNT-DHL-UNIT-1-GEN-1 Replacement	Generator:	1948	0.28	8904.6	$1,695,463.68	1.3	$5,161,950
					356404.8			**$31,939,797**
2026								
Nashville District	PLNT-CDH-UNIT-2-GOV-2 Replacement	Governor:	1972	1.93	12636.8	$1,332,242.26	4.3	$389,951
Nashville District	PLNT-CDH-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1972	7.59	164274.5	$16,734,250.99	2.0	$15,982,964
Nashville District	PLNT-CDH-UNIT-2-GEN-2 Replacement	Generator:	1972	2.73	18838.8	$2,614,130.23	1.8	$2,869,555
Nashville District	PLNT-CDH-UNIT-2-XF-T2 Replacement	Transformer:	1973	6.47	4966.0	$1,017,669.38	1.6	$1,593,488
					200716.1			**$20,835,958**
2027								
Nashville District	PLNT-CDH-UNIT-3-GOV-3 Replacement	Governor:	1972	1.66	13110.6	$1,380,086.46	4.3	$396,970
Nashville District	PLNT-CDH-UNIT-3-TURB-3 Replacement	Turbine: Kaplan	1972	7.34	165129.4	$17,656,199.96	2.1	$16,270,657
Nashville District	PLNT-DHL-UNIT-2-TURB-2 Replacement	Turbine: Francis	1949	2.03	59197.4	$7,493,984.90	2.0	$7,555,200

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Nashville District	PLNT-CDH-UNIT-3-GEN-3 Replacement	Generator:	1972	2.5	19695.1	$2,743,422.01	1.9	$2,921,207
Nashville District	PLNT-CDH-UNIT-3-XF-T3 Replacement	Transformer:	1973	6.2	5431.6	$1,099,257.65	1.7	$1,622,171
Nashville District	PLNT-DHL-UNIT-2-GEN-2 Replacement	Generator:	1949	0.02	9279.5	$1,805,490.32	1.3	$5,349,452
					271843.6			**$34,115,658**
2028								
Nashville District	PLNT-CDH-UNIT-1-GOV-1 Replacement	Governor:	1973	1.39	13584.5	$1,427,380.58	4.4	$404,115
Nashville District	PLNT-CDH-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1973	6.72	166039.8	$18,576,001.70	2.1	$16,563,529
Nashville District	PLNT-CDH-UNIT-1-GEN-1 Replacement	Generator:	1973	1.77	21693.1	$2,972,538.36	1.9	$2,973,789
Nashville District	PLNT-CDH-UNIT-1-XF-T1 Replacement	Transformer:	1973	5.97	5742.0	$1,181,377.63	1.7	$1,651,370
					207059.4			**$21,592,803**
			Total Tons CO2e:		**7655321.0**	**Total Cost:**		**$638,282,262**
Mississippi Valley Division								
2027								
Vicksburg District	PLNT-195-XF-T Replacement	Transformer:	1960	2.81	16858.3	$4,406,500.92	4.3	$970,569
Vicksburg District	PLNT-195-XF-T-UNIT-3-GOV-3 Replacement	Governor:	1969	0.99	1258.4	$182,313.04	1.6	$296,861
Vicksburg District	PLNT-195-XF-T-UNIT-3-CB-3 Replacement	Breaker: Vacuum	1993	2.97	680.0	$117,367.34	1.4	$291,162
Vicksburg District	PLNT-195-XF-T-UNIT-3-TURB-3 Replacement	Turbine: Francis	1969	5.51	11359.4	$1,642,692.90	1.3	$5,353,776
					30156.0			**$6,912,369**
2028								
Vicksburg District	PLNT-195-XF-T-UNIT-2-GOV-2 Replacement	Governor:	1950	0.11	1384.2	$195,609.06	1.6	$302,204
Vicksburg District	PLNT-195-XF-T-UNIT-2-TURB-2 Replacement	Turbine: Francis	1950	3.48	12030.4	$2,804,328.90	1.5	$5,450,144
Vicksburg District	PLNT-195-XF-T-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1993	2.68	728.5	$127,636.58	1.4	$296,403
					14143.2			**$6,048,752**
2030								
Vicksburg District	PLNT-195-XF-T-UNIT-1-GOV-1 Replacement	Governor:	1950	0.07	1384.2	$205,874.01	1.6	$313,182

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Vicksburg District	PLNT-195-XF-T-UNIT-1-TURB-1 Replacement	Turbine: Francis	1950	3.08	12164.7	$3,120,496.66	1.5	$5,648,115
					13548.9			**$5,961,297**
2031								
Vicksburg District	PLNT-187-XF-T1 Replacement	Transformer:	1960	4.14	39093.8	$10,896,437.51	4.5	$2,124,974
Vicksburg District	PLNT-187-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1972	0.84	3722.1	$633,441.43	2.4	$438,899
Vicksburg District	PLNT-187-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1972	5.25	45746.7	$7,115,508.59	1.7	$9,907,573
					88562.6			**$12,471,446**
2032								
Vicksburg District	PLNT-187-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1972	0.73	3803.9	$651,767.61	2.6	$401,551
Vicksburg District	PLNT-187-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1972	5.07	33048.9	$5,621,978.80	1.6	$9,204,865
					36852.8			**$9,606,416**
			Total Tons CO2e:		**183263.5**	**Total Cost:**		**$41,000,279**
Northwestern Division								
2013								
Omaha District	PLNT-OFP-XF-T3-4616- Replacement	Transformer:	1950	4.81	43505.2	$22,856,475.28	12.6	$741,293
Omaha District	PLNT-OFP-XF-T4-89459 Replacement	Transformer:	1961	5.37	21752.6	$20,052,588.09	10.5	$879,153
Omaha District	PLNT-OOA-XF-T3-UNIT-4-GOV-4 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T2-UNIT-2-GOV-2 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T3-UNIT-5-GOV-5 Replacement	Governor:	1963	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T4-UNIT-6-GOV-6 Replacement	Governor:	1963	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-UNIT-1-GOV-1 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1962	4.75	6208.0	$1,462,437.00	3.6	$427,899
Omaha District	PLNT-OOA-XF-T4-UNIT-7-GOV-7 Replacement	Governor:	1963	4.75	6208.0	$1,462,437.00	3.6	$427,899
					108714.2			**$4,615,739**
2016								

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Omaha District	PLNT-OFR-XF-B-UNIT-4-GOV-4 Replacement	Governor:	1954	2.85	23503.4	$1,857,600.42	5.9	$324,990
Omaha District	PLNT-OFR-XF-B Replacement	Transformer:	1957	4.97	22435.2	$5,049,918.78	5.3	$1,174,192
Omaha District	PLNT-OFP-XF-AT-1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1943	3.64	350328.8	$19,671,505.80	3.3	$7,669,324
Omaha District	PLNT-OFR-XF-B-UNIT-4-TURB-4 Replacement	Turbine: Francis	1954	5.19	310026.0	$15,877,110.36	2.5	$9,926,496
Omaha District	PLNT-OFR-XF-B-UNIT-4-GEN-4 Replacement	Generator:	1954	2.99	35880.7	$3,931,055.59	1.5	$7,102,526
					742174.0			**$26,197,528**
2017								
Omaha District	PLNT-OFR-XF-D-UNIT-7-GOV-7 Replacement	Governor:	1955	2.24	27150.5	$1,944,679.13	6.0	$330,839
Omaha District	PLNT-OFR-XF-D Replacement	Transformer:	1957	5.65	23454.9	$4,984,762.51	5.2	$1,195,327
Omaha District	PLNT-OFP-XF-AT-1-UNIT-3-TURB-3 Replacement	Turbine: Francis	1951	3.42	346896.0	$19,584,135.25	3.3	$7,807,372
Omaha District	PLNT-OFR-XF-D-UNIT-7-TURB-7 Replacement	Turbine: Francis	1955	4.91	313139.9	$16,593,392.96	2.5	$10,105,173
Omaha District	PLNT-OFR-XF-D-UNIT-7-GEN-7 Replacement	Generator:	1955	2.51	41738.8	$4,237,790.20	1.5	$7,230,372
					752380.0			**$26,669,083**
2018								
Omaha District	PLNT-OFP-XF-T2-89558 Replacement	Transformer:	1945	4.85	174020.9	$27,483,950.74	13.7	$826,602
Omaha District	PLNT-OFP-XF-T5 Replacement	Transformer:	1950	6.8	141392.0	$25,021,107.44	11.6	$1,014,997
Omaha District	PLNT-OFR-XF-C-UNIT-6-GOV-6 Replacement	Governor:	1955	1.7	30392.3	$2,027,564.96	6.1	$336,795
Omaha District	PLNT-OFP-XF-AT-1-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1986	7.51	9937.1	$1,396,342.23	5.8	$277,591
Omaha District	PLNT-OFP-XF-AT-1 Replacement	Transformer:	1950	7.36	141392.0	$24,725,584.50	5.7	$3,921,581
Omaha District	PLNT-OFP-XF-AT-2 Replacement	Transformer:	1950	6.04	49191.6	$8,831,113.38	5.3	$1,757,791
Omaha District	PLNT-OFR-XF-C Replacement	Transformer:	1957	6.24	25494.5	$5,020,741.03	5.1	$1,216,843
Omaha District	PLNT-OFP-XF-AT-1-UNIT-1-CB-624-S/N-2801	Breaker: Vacuum	1986	7.51	9937.1	$1,380,452.88	5.0	$335,237
Omaha District	PLNT-OFP-XF-AT-1-UNIT-3-CB-3 Replacement	Breaker: Vacuum	1986	7.51	9937.1	$1,380,452.88	5.0	$335,237
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-CB-4-S/N-94121536	Breaker: Vacuum	1993	8.25	6757.2	$1,205,459.44	4.5	$328,876
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-CB-5-S/N-94121535	Breaker: Vacuum	1993	8.25	6757.2	$1,205,459.44	4.5	$328,876
Omaha District	PLNT-OFP-XF-AT-1-UNIT-2-GOV-2 Replacement	Governor:	1947	2.19	34328.2	$1,878,009.79	3.9	$267,590

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Omaha District	PLNT-OFP-XF-AT-1-UNIT-1-GOV-1 Replacement	Governor:	1943	2.19	34328.2	$1,877,614.63	3.7	$322,954
Omaha District	PLNT-OFP-XF-AT-1-UNIT-3-GOV-3 Replacement	Governor:	1951	2.66	32039.7	$1,852,723.22	3.6	$322,954
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-GOV-4 Replacement	Governor:	1961	3.79	26089.4	$1,757,386.54	3.5	$332,181
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-GOV-5 Replacement	Governor:	1961	3.79	26089.4	$1,757,386.54	3.5	$332,181
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-TURB-5 Replacement	Turbine: Francis	1961	4.05	371615.5	$20,451,289.09	3.2	$8,502,092
Omaha District	PLNT-OFR-XF-C-UNIT-6-TURB-6 Replacement	Turbine: Francis	1955	4.65	317297.2	$17,331,520.87	2.6	$10,287,066
Omaha District	PLNT-OFP-UNIT-5-XF-UT5 Replacement	Transformer:	1951	6.15	11691.7	$2,023,765.22	2.3	$1,467,132
Omaha District	PLNT-OFP-UNIT-4-XF-UT4 Replacement	Transformer:	1951	6.15	11691.7	$2,023,765.22	2.3	$1,467,132
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-EXC-4 Replacement	Excitation System:	1993	7.1	7644.6	$1,027,253.80	1.8	$1,220,177
Omaha District	PLNT-OFP-XF-AT-2-UNIT-5-EXC-5 Replacement	Excitation System:	1993	7.1	7644.6	$1,027,253.80	1.8	$1,220,177
Omaha District	PLNT-OFR-XF-C-UNIT-6-GEN-6 Replacement	Generator:	1955	2.11	46864.6	$4,522,969.20	1.6	$7,360,518
					1532533.8			**$43,782,580**
2019								
Omaha District	PLNT-OFR-XF-C-UNIT-5-GOV-5 Replacement	Governor:	1955	1.32	32823.7	$2,106,780.25	6.2	$342,857
Omaha District	PLNT-OFP-XF-AT-2-UNIT-4-TURB-4 Replacement	Turbine: Francis	1961	3.82	375594.7	$21,394,847.90	3.2	$8,655,130
Omaha District	PLNT-OFR-XF-C-UNIT-5-TURB-5 Replacement	Turbine: Francis	1955	4.38	320652.1	$18,073,526.38	2.6	$10,472,233
Omaha District	PLNT-OFR-XF-C-UNIT-5-GEN-5 Replacement	Generator:	1955	1.75	51258.1	$4,791,573.31	1.6	$7,493,008
					780328.6			**$26,963,228**
2020								
Omaha District	PLNT-OGP-UNIT-1-GOV-1 Replacement	Governor:	1956	2.11	118576.4	$7,297,185.36	9.0	$342,335
Omaha District	PLNT-OFR-XF-A-UNIT-1-GOV-1 Replacement	Governor:	1954	1.03	34444.6	$2,184,497.02	6.3	$349,028
Omaha District	PLNT-OFR-XF-A Replacement	Transformer:	1957	3.9	39771.4	$6,199,376.69	5.9	$1,261,044
Omaha District	PLNT-OGP-UNIT-1-EXC-1 Replacement	Excitation System:	1994	4.87	45985.3	$5,640,304.37	4.9	$1,357,316
Omaha District	PLNT-OGP-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1956	1.33	551434.0	$41,060,470.17	3.2	$16,063,540
Omaha District	PLNT-OFP-XF-AT-1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1948	2.7	172292.9	$12,768,083.97	2.9	$5,798,273
Omaha District	PLNT-OFR-XF-A-UNIT-1-TURB-1 Replacement	Turbine: Francis	1954	4.13	324176.0	$18,839,879.98	2.7	$10,660,733

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Omaha District	PLNT-OGP-UNIT-1-GEN-1 Replacement	Generator:	1989	4.5	73302.8	$9,517,020.65	1.9	$8,195,101
Omaha District	PLNT-OFR-XF-A-UNIT-1-GEN-1 Replacement	Generator:	1954	1.46	54919.4	$5,051,905.93	1.6	$7,627,882
					1414902.9			**$51,655,252**
2021								
Omaha District	PLNT-OGP-UNIT-3-GOV-3 Replacement	Governor:	1957	1.76	124817.3	$7,577,252.10	9.2	$348,497
Omaha District	PLNT-OFR-XF-B-UNIT-3-GOV-3 Replacement	Governor:	1954	0.75	36065.5	$2,261,509.18	6.4	$355,311
Omaha District	PLNT-OGP-UNIT-3-EXC-3 Replacement	Excitation System:	1996	6.38	33722.6	$5,374,198.07	4.7	$1,381,748
Omaha District	PLNT-OGP-UNIT-3-TURB-3 Replacement	Turbine: Kaplan	1957	1.06	572414.8	$42,383,243.29	3.2	$16,352,683
Omaha District	PLNT-OFR-XF-B-UNIT-3-TURB-3 Replacement	Turbine: Francis	1954	3.86	327458.8	$19,597,373.24	2.7	$10,852,627
Omaha District	PLNT-OGP-UNIT-3-GEN-3 Replacement	Generator:	1987	4.31	81760.8	$10,319,005.33	2.0	$8,342,612
Omaha District	PLNT-OFR-XF-B-UNIT-3-GEN-3 Replacement	Generator:	1954	1.23	57848.5	$5,294,809.51	1.6	$7,765,184
					1234088.3			**$45,398,661**
2022								
Omaha District	PLNT-OGP-UNIT-2-GOV-2 Replacement	Governor:	1956	1.45	131058.2	$7,850,439.47	9.2	$354,770
Omaha District	PLNT-OFR-XF-D-UNIT-8-GOV-8 Replacement	Governor:	1956	0.83	35660.3	$2,319,060.05	6.4	$361,706
Omaha District	PLNT-OGP-UNIT-2-EXC-2 Replacement	Excitation System:	1995	4.24	56715.2	$6,371,275.06	5.3	$1,406,619
Omaha District	PLNT-OGP-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1956	0.79	587871.1	$43,658,042.90	3.2	$16,647,032
Omaha District	PLNT-OFR-XF-D-UNIT-8-TURB-8 Replacement	Turbine: Francis	1956	3.82	328068.3	$19,793,152.56	2.7	$11,047,974
Omaha District	PLNT-OGP-UNIT-2-GEN-2 Replacement	Generator:	1988	4.11	90218.8	$11,112,779.59	2.0	$8,492,779
Omaha District	PLNT-OFR-XF-D-UNIT-8-GEN-8 Replacement	Generator:	1955	1	60777.5	$5,523,628.28	1.7	$7,904,957
					1290369.4			**$46,215,837**
2023								
Omaha District	PLNT-OFR-XF-A-UNIT-2-GOV-2 Replacement	Governor:	1954	0.44	38091.7	$2,412,435.33	6.6	$368,217
Omaha District	PLNT-OFR-XF-A-UNIT-2-TURB-2 Replacement	Turbine: Francis	1954	3.46	333177.1	$21,126,242.50	2.8	$11,246,837
Omaha District	PLNT-OFR-XF-A-UNIT-2-GEN-2 Replacement	Generator:	1954	0.79	63706.5	$5,749,859.72	1.7	$8,047,246
					434975.3			**$19,662,301**

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
2024								
Omaha District	PLNT-OOA-UNIT-1-TURB-1 Replacement	Turbine: Francis	1962	3.67	546187.3	$33,354,777.72	3.4	$12,892,117
Omaha District	PLNT-OOA-UNIT-1-XF-T1 Replacement	Transformer:	1962	4	16772.6	$2,799,117.17	2.1	$2,621,348
Omaha District	PLNT-OOA-UNIT-1-EXC-1 Replacement	Excitation System:	1994	4.08	17153.8	$1,633,548.90	1.5	$3,116,349
Omaha District	PLNT-OOA-UNIT-1-GEN-1 Replacement	Generator:	1962	4.55	25240.6	$1,840,691.41	1.1	$18,937,376
					605354.4			**$37,567,189**
2025								
Omaha District	PLNT-OOA-XF-T4 Replacement	Transformer:	1953	1.66	85087.6	$10,948,848.75	6.1	$2,040,392
Omaha District	PLNT-OOA-XF-T4-UNIT-7-TURB-7 Replacement	Turbine: Francis	1963	4.44	542460.5	$33,258,930.64	3.4	$13,124,175
Omaha District	PLNT-OBB-XF-T4-UNIT-8-TURB-8 Replacement	Turbine: Propeller	1966	4.58	165832.2	$17,250,370.36	2.0	$16,802,703
Omaha District	PLNT-OOA-XF-T4-UNIT-7-EXC-7 Replacement	Excitation System:	1994	3.8	18678.6	$1,789,229.48	1.6	$3,172,443
Omaha District	PLNT-OOA-XF-T4-UNIT-7-GEN-7 Replacement	Generator:	1963	3.52	35056.4	$4,253,799.26	1.2	$19,278,248
					847115.3			**$54,417,962**
2026								
Omaha District	PLNT-OOA-XF-T4-UNIT-6-TURB-6 Replacement	Turbine: Francis	1963	4.16	545904.0	$34,514,269.34	3.4	$13,360,411
Omaha District	PLNT-OOA-XF-T4-UNIT-6-EXC-6 Replacement	Excitation System:	1994	3.54	19822.2	$1,943,935.53	1.6	$3,229,547
					565726.2			**$16,589,957**
2027								
Omaha District	PLNT-OOA-XF-T3 Replacement	Transformer:	1963	1.75	82509.2	$11,377,412.25	6.1	$2,114,507
Omaha District	PLNT-OOA-XF-T3-UNIT-4-TURB-4 Replacement	Turbine: Francis	1962	3.11	554152.7	$37,120,588.82	3.6	$13,600,898
Kansas City District	PLNT-HST-XF-T1 Replacement	Transformer:	1979	6.39	10784.7	$3,051,791.29	2.1	$2,708,583
Kansas City District	PLNT-HST-XF-T2 Replacement	Transformer:	1979	6.39	10784.7	$3,051,791.29	2.1	$2,708,583
Omaha District	PLNT-OOA-XF-T3-UNIT-4-EXC-4 Replacement	Excitation System:	1994	3.31	21347.0	$2,099,044.49	1.6	$3,287,679
Kansas City District	PLNT-HST-XF-T2-UNIT-6-GOV-6 Replacement	Governor:	1979	1.35	566.3	$80,237.04	1.3	$270,858
Kansas City District	PLNT-HST-XF-T1-UNIT-3-GOV-3 Replacement	Governor:	1979	2.45	524.9	$71,829.57	1.3	$270,858
Kansas City District	PLNT-HST-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1979	2.45	524.9	$71,829.57	1.3	$270,858

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Kansas City District	PLNT-HST-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1979	2.45	524.9	$71,829.57	1.3	$270,858
Kansas City District	PLNT-HST-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1979	2.45	524.9	$71,829.57	1.3	$270,858
Kansas City District	PLNT-HST-XF-T2-UNIT-5-GOV-5 Replacement	Governor:	1979	2.45	524.9	$71,829.57	1.3	$270,858
Omaha District	PLNT-OOA-XF-T3-UNIT-4-GEN-4 Replacement	Generator:	1962	3.02	39964.3	$5,296,979.97	1.3	$19,978,512
					722733.4			**$46,023,912**
2028								
Omaha District	PLNT-OOA-XF-T3-UNIT-5-TURB-5 Replacement	Turbine: Francis	1963	3.79	550425.8	$37,120,866.48	3.5	$13,845,714
Omaha District	PLNT-OBB-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1964	2.37	166677.4	$20,960,350.65	2.2	$17,726,480
Omaha District	PLNT-OBB-XF-T3-UNIT-6-TURB-6 Replacement	Turbine: Propeller	1966	3.62	166375.9	$19,663,391.36	2.1	$17,726,480
Omaha District	PLNT-OOA-XF-T3-UNIT-5-EXC-5 Replacement	Excitation System:	1994	2.99	22871.8	$2,251,698.32	1.7	$3,346,857
Omaha District	PLNT-OOA-XF-T3-UNIT-5-GEN-5 Replacement	Generator:	1963	1.96	46975.6	$6,337,963.89	1.3	$20,338,125
Omaha District	PLNT-OBB-XF-T3-UNIT-6-GEN-6 Replacement	Generator:	1966	0.08	86.3	$1,935,020.07	1.2	$11,751,347
					953412.8			**$84,735,002**
2029								
Omaha District	PLNT-OBB-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1964	2.02	166803.3	$21,670,296.36	2.2	$18,045,556
Omaha District	PLNT-OBB-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Propeller	1965	2.02	166682.3	$21,657,092.51	2.2	$18,045,556
Omaha District	PLNT-OBB-XF-T2-UNIT-4-GEN-4 Replacement	Generator:	1965	0.03	88.1	$2,020,814.60	1.2	$11,962,871
					333573.7			**$48,053,984**
2030								
Omaha District	PLNT-OOA-XF-T2 Replacement	Transformer:	1962	1.48	92822.9	$12,685,047.22	6.4	$2,230,818
Omaha District	PLNT-OOA-XF-T2-UNIT-2-TURB-2 Replacement	Turbine: Francis	1962	2.57	561743.1	$41,117,787.59	3.7	$14,348,646
Omaha District	PLNT-OOA-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Francis	1962	2.57	561743.1	$41,117,787.59	3.7	$14,348,646
Omaha District	PLNT-OBB-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1965	1.74	166807.2	$22,352,157.57	2.2	$18,370,376
Omaha District	PLNT-OOA-XF-T2-UNIT-3-EXC-3 Replacement	Excitation System:	1994	2.58	24777.7	$2,549,780.66	1.7	$3,468,428
Omaha District	PLNT-OOA-XF-T2-UNIT-2-EXC-2 Replacement	Excitation System:	1994	2.58	24777.7	$2,549,780.66	1.7	$3,468,428
Omaha District	PLNT-OOA-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1962	2.31	46975.6	$6,753,901.58	1.3	$21,076,887

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Omaha District	PLNT-OOA-XF-T2-UNIT-2-GEN-2 Replacement	Generator:	1962	2.31	46975.6	$6,753,901.58	1.3	$21,076,887
					1526622.9			**$98,389,116**
2031								
Omaha District	PLNT-OBB-XF-T3-UNIT-5-TURB-5 Replacement	Turbine: Propeller	1965	1.47	166919.1	$23,035,265.85	2.2	$18,701,043
					166919.1			**$18,701,043**
2032								
Omaha District	PLNT-OBB-XF-T4-UNIT-7-TURB-7 Replacement	Turbine: Propeller	1966	2.45	166905.5	$22,826,323.66	2.2	$19,037,662
					166905.5			**$19,037,662**
			Total Tons CO2e:		**14178829.**	**Total Cost:**		**$714,676,036**
South Atlantic Division								
2013								
Mobile District	PLNT-RFH-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
Mobile District	PLNT-RFH-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
Mobile District	PLNT-RFH-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
Mobile District	PLNT-RFH-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1975	6.01	3060.8	$1,499,688.77	4.9	$250,629
					12243.3			**$1,002,516**
2016								
Mobile District	PLNT-ALT-UNIT-2-GOV-2 Replacement	Governor:	1950	2.79	8454.1	$858,803.98	3.0	$320,538
Mobile District	PLNT-ALT-UNIT-2-TURB-2 Replacement	Turbine: Francis	1950	1.14	98061.3	$12,010,587.78	1.9	$13,361,732
Mobile District	PLNT-WPT-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1975	2.72	113009.1	$10,507,773.97	1.8	$11,413,167
Wilmington District	PLNT-PHI-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1952	2.84	16036.4	$1,973,036.04	1.5	$3,563,787
Wilmington District	PLNT-PHI-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1952	3.28	1599.5	$427,586.89	1.1	$2,865,919
					237160.4			**$31,525,142**
2017								
Mobile District	PLNT-ALT-UNIT-1-GOV-1 Replacement	Governor:	1950	2.15	9510.8	$900,363.90	3.1	$326,307

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Mobile District	PLNT-ALT-UNIT-1-TURB-1 Replacement	Turbine: Francis	1950	0.95	100393.1	$12,590,365.03	1.9	$13,602,243
Mobile District	PLNT-WPT-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1975	3.64	113061.2	$10,062,476.72	1.8	$11,618,604
Wilmington District	PLNT-PHI-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	2.57	16290.3	$2,116,783.82	1.6	$3,627,935
Wilmington District	PLNT-PHI-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1952	2.76	1860.7	$498,780.58	1.2	$2,917,505
					241116.2			**$32,092,595**
2018								
Mobile District	PLNT-MLF-UNIT-1-GOV-1 Replacement	Governor:	1969	2.87	37610.7	$4,515,131.18	7.0	$293,426
Mobile District	PLNT-MLF-UNIT-1-XF-T1 Replacement	Transformer:	1967	6.77	12536.9	$4,169,041.15	4.2	$1,181,318
Mobile District	PLNT-MLF-UNIT-2-XF-T2 Replacement	Transformer:	1967	6.77	12536.9	$4,169,041.15	4.2	$1,181,318
Mobile District	PLNT-MLF-UNIT-3-XF-T3 Replacement	Transformer:	1967	6.77	12536.9	$4,169,041.15	4.2	$1,181,318
Mobile District	PLNT-CRT-UNIT-1-TURB-1 Replacement	Turbine: Francis	1975	3.69	127985.8	$11,397,280.12	2.3	$8,834,074
Mobile District	PLNT-MLF-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1969	6.64	160747.6	$17,994,547.10	2.0	$12,423,493
					363954.8			**$25,094,949**
2019								
Mobile District	PLNT-MLF-UNIT-2-GOV-2 Replacement	Governor:	1969	2.45	41640.4	$4,723,786.76	7.2	$298,708
Mobile District	PLNT-CRT-UNIT-2-TURB-2 Replacement	Turbine: Francis	1975	3.41	128012.1	$12,250,345.96	2.1	$11,012,789
Mobile District	PLNT-MLF-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1969	6.45	165035.9	$19,122,236.02	2.0	$12,647,116
					334688.5			**$23,958,613**
2020								
Mobile District	PLNT-MLF-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1969	6.26	169311.3	$20,259,959.05	2.1	$12,874,764
Mobile District	PLNT-CRT-UNIT-4-TURB-4 Replacement	Turbine: Francis	1977	7.83	126954.8	$7,371,249.77	1.7	$9,904,850
Mobile District	PLNT-MLF-UNIT-1-GOV-1 Replacement	Governor:	1969	10	0.0	($507,248.57)	0.4	$304,085
Mobile District	PLNT-MLF-UNIT-1-XF-T1 Replacement	Transformer:	1967	10	0.0	($1,159,780.28)	0.1	$1,224,229
					296266.1			**$24,307,928**
2021								
Mobile District	PLNT-CRT-UNIT-3-TURB-3 Replacement	Turbine: Francis	1977	8.2	125137.5	$6,085,530.62	1.6	$10,083,138

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
					125137.5			**$10,083,138**
2023								
Mobile District	PLNT-WPT-UNIT-1-CB-1 Replacement	Breaker: Air	1975	1.76	8686.7	$996,153.77	5.2	$226,240
Mobile District	PLNT-WFG-XF-T3-4-UNIT-3-CB-3 Replacement	Breaker: Vacuum	1994	1.25	6678.3	$873,859.23	3.3	$367,996
Mobile District	PLNT-WPT-UNIT-1-EXC-1 Replacement	Excitation System:	1975	1.72	9827.4	$1,097,380.01	3.2	$463,424
Mobile District	PLNT-WFG-XF-T3-4-UNIT-4-CB-4 Replacement	Breaker: Vacuum	1994	3.92	4416.3	$737,965.55	3.1	$347,319
Mobile District	PLNT-WPT-UNIT-3-GOV-3 Replacement	Governor:	1975	2.59	9213.2	$1,001,546.39	3.1	$356,111
Mobile District	PLNT-WPT-UNIT-2-GOV-2 Replacement	Governor:	1975	2.59	9213.2	$1,001,546.39	3.1	$356,111
Mobile District	PLNT-WFG-XF-T3-4 Replacement	Transformer:	1961	3.38	22416.9	$4,769,430.44	3.1	$2,221,913
Mobile District	PLNT-WFG-XF-T1-2 Replacement	Transformer:	1961	3.38	22416.9	$4,769,430.44	3.1	$2,221,913
Mobile District	PLNT-WFG-XF-T1-2-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1994	3.92	4416.3	$734,159.84	3.0	$367,996
Mobile District	PLNT-WFG-XF-T1-2-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1994	6.53	3770.0	$667,692.50	2.8	$367,996
Mobile District	PLNT-WPT-UNIT-1-GOV-1 Replacement	Governor:	1996	7.57	3158.8	$644,634.92	2.7	$263,099
Mobile District	PLNT-WFG-XF-T3-4-UNIT-4-EXC-4 Replacement	Excitation System:	1963	0.53	10845.5	$1,109,721.37	1.9	$1,197,714
Mobile District	PLNT-WFG-XF-T3-4-UNIT-3-EXC-3 Replacement	Excitation System:	1963	0.31	11211.1	$1,129,861.43	1.8	$1,436,047
Mobile District	PLNT-WPT-UNIT-1-GEN-1 Replacement	Generator:	1975	2.16	15697.1	$2,270,333.95	1.7	$2,726,950
Mobile District	PLNT-WPT-UNIT-2-EXC-2 Replacement	Excitation System:	1975	1.72	9827.4	$1,078,971.83	1.7	$1,467,824
Mobile District	PLNT-WPT-UNIT-3-EXC-3 Replacement	Excitation System:	1975	1.72	9827.4	$1,078,971.83	1.7	$1,467,824
Mobile District	PLNT-WPT-UNIT-3-XF-T3 Replacement	Transformer:	1973	5.79	4008.6	$853,720.67	1.5	$1,595,187
Mobile District	PLNT-WFG-XF-T3-4-UNIT-4-GEN-4 Replacement	Generator:	1963	0.97	18379.0	$3,077,739.15	1.4	$7,214,281
					184010.3			**$24,665,948**
2024								
Mobile District	PLNT-MLF-UNIT-3-GOV-3 Replacement	Governor:	1969	0.92	57759.3	$5,699,532.38	7.6	$326,577
Wilmington District	PLNT-PHI-XF-T1 Replacement	Transformer:	1953	3.42	12533.5	$2,625,397.79	3.0	$1,093,726
Wilmington District	PLNT-JHK-UNIT-3-TURB-3 Replacement	Turbine: Francis	1952	2.11	65660.4	$9,141,940.12	1.7	$12,520,770
Wilmington District	PLNT-PHI-UNIT-3-XF-T2 Replacement	Transformer:	1953	4.13	798.7	$210,899.41	1.3	$783,709

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Wilmington District	PLNT-JHK-UNIT-3-GEN-3 Replacement	Generator:	1952	0.6	606.3	$1,179,962.36	1.2	$7,267,179
Wilmington District	PLNT-JHK-UNIT-5-GEN-5 Replacement	Generator:	1952	0.6	606.3	$1,532,841.44	1.2	$9,589,357
Wilmington District	PLNT-JHK-UNIT-3-EXC-3 Replacement	Excitation System:	1952	0.09	355.3	$73,637.74	1.1	$1,206,680
Mobile District	PLNT-MLF-UNIT-2-GOV-2 Replacement	Governor:	1969	10	0.0	($85,533.42)	0.9	$326,577
Mobile District	PLNT-MLF-UNIT-3-GOV-3 Replacement	Governor:	1969	0.92	0.0	($240,388.86)	0.7	$326,577
Mobile District	PLNT-MLF-UNIT-2-XF-T2 Replacement	Transformer:	1967	10	0.0	($779,706.06)	0.5	$1,314,782
Mobile District	PLNT-MLF-UNIT-3-XF-T3 Replacement	Transformer:	1967	10	0.0	($779,706.06)	0.5	$1,314,782
					138319.8			**$36,070,717**
2025								
Wilmington District	PLNT-JHK-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	2.97	25072.4	$4,003,714.34	1.6	$6,944,074
					25072.4			**$6,944,074**
2026								
Mobile District	PLNT-RFH-XF-T1 Replacement	Transformer:	1960	4.28	39935.3	$8,635,136.94	6.0	$1,580,450
Mobile District	PLNT-ALT-UNIT-4-CB-4 Replacement	Breaker: Air	1950	0.23	11127.2	$1,145,220.74	5.8	$230,742
Mobile District	PLNT-ALT-UNIT-4-GOV-4 Replacement	Governor:	1984	3.21	8586.2	$1,063,271.69	3.6	$274,690
Mobile District	PLNT-ALT-UNIT-4-EXC-4 Replacement	Excitation System:	1950	0.06	12847.9	$1,290,298.33	3.6	$470,942
Mobile District	PLNT-ALT-UNIT-4-XF-T4 Replacement	Transformer:	1950	4.32	6748.4	$1,409,030.09	2.6	$844,769
Mobile District	PLNT-RFH-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Propeller	1975	4.63	116072.3	$16,459,973.47	1.9	$15,398,236
Mobile District	PLNT-ALT-UNIT-2-EXC-2 Replacement	Excitation System:	1993	5.01	5840.0	$766,419.85	1.5	$1,524,576
Mobile District	PLNT-ALT-UNIT-1-EXC-1 Replacement	Excitation System:	1992	5.01	5840.0	$766,419.85	1.5	$1,524,576
					206997.3			**$21,848,982**
2027								
Mobile District	PLNT-RFH-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Propeller	1975	4.4	118679.4	$17,394,673.75	1.9	$15,675,405
Savannah District	PLNT-HTW-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1962	3.11	92774.1	$11,098,794.63	1.9	$12,492,478
					211453.5			**$28,167,882**
2028								

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Mobile District	PLNT-RFH-XF-T2 Replacement	Transformer:	1960	3.78	44825.4	$9,368,626.69	6.2	$1,637,859
Mobile District	PLNT-RFH-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Propeller	1975	4.16	120671.8	$18,295,103.93	1.9	$15,957,562
Mobile District	PLNT-RFH-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Propeller	1975	4.16	120671.8	$18,295,103.93	1.9	$15,957,562
Savannah District	PLNT-HTW-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1962	2.93	92839.1	$11,581,271.29	1.9	$12,717,342
Savannah District	PLNT-RBR-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1985	6.13	64355.7	$6,957,184.49	1.6	$12,547,103
					443363.8			**$58,817,428**
2029								
Savannah District	PLNT-RBR-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1985	5.88	64355.8	$7,354,485.39	1.6	$12,772,951
Savannah District	PLNT-HTW-UNIT-5-TURB-5 Replacement	Turbine: Francis	1983	7.51	107864.6	$6,306,816.11	1.4	$16,919,421
					172220.4			**$29,692,372**
2030								
Savannah District	PLNT-HTW-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Francis	1962	2.57	92947.2	$12,544,916.23	2.0	$13,179,287
Savannah District	PLNT-RBR-XF-T3-UNIT-6-TURB-6 Replacement	Turbine: Francis	1992	7.25	64353.9	$5,149,767.65	1.3	$16,175,991
					157301.2			**$29,355,278**
2031								
Savannah District	PLNT-HTW-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Francis	1962	2.42	92988.6	$13,021,332.49	2.0	$13,416,514
Savannah District	PLNT-RBR-XF-T3-UNIT-5-TURB-5 Replacement	Turbine: Francis	1992	7.07	64355.0	$5,591,956.71	1.3	$16,467,159
					157343.6			**$29,883,673**
2032								
Savannah District	PLNT-RBR-XF-T4-UNIT-8-TURB-8 Replacement	Turbine: Francis	1993	6.86	64355.1	$6,044,323.07	1.4	$16,763,568
					64355.1			**$16,763,568**
			Total Tons CO2e:		**3371004.2**	**Total Cost:**		**$430,274,804**
Southwestern Division								
2013								
Tulsa District	PLNT-TKF-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1952	5.53	5705.3	$1,931,745.71	5.3	$250,663

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Tulsa District	PLNT-TKF-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1952	5.53	5705.3	$1,931,745.71	5.3	$250,663
Tulsa District	PLNT-EUF-UNIT-3-EXC-3 Replacement	Excitation System:	1989	5.26	2532.4	$2,064,295.81	3.1	$916,166
Tulsa District	PLNT-EUF-UNIT-2-EXC-2 Replacement	Excitation System:	1989	5.26	2532.4	$2,064,295.81	3.1	$916,166
Tulsa District	PLNT-EUF-UNIT-1-EXC-1 Replacement	Excitation System:	1989	5.26	2532.4	$2,064,295.81	3.1	$916,166
Tulsa District	PLNT-BB-UNIT-1-GOV-1 Replacement	Governor:	1970	5.05	1579.4	$654,272.18	2.7	$327,465
Tulsa District	PLNT-BB-UNIT-2-GOV-2 Replacement	Governor:	1970	4.04	1579.4	$654,272.18	2.7	$327,465
					22166.7			**$3,904,754**
2016								
Tulsa District	PLNT-KEY-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1968	3.19	53134.8	$8,184,142.27	6.6	$309,853
Tulsa District	PLNT-KEY-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1968	2.3	215783.3	$39,063,789.77	3.8	$10,596,763
Tulsa District	PLNT-KEY-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1968	4.87	60531.5	$15,180,260.82	2.7	$6,232,678
Little Rock District	PLNT-BLS-XF-3-UNIT-4-TURB-4 Replacement	Turbine: Francis	1953	5.19	98789.7	$9,177,511.11	2.1	$8,087,251
					428239.3			**$25,226,545**
2017								
Tulsa District	PLNT-KEY-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1968	2.64	63530.7	$8,620,726.49	6.8	$315,430
Tulsa District	PLNT-KEY-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1968	2.11	231668.4	$40,934,368.52	3.8	$10,787,505
Tulsa District	PLNT-KEY-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1968	4.39	75142.5	$16,198,773.04	2.7	$6,344,866
Little Rock District	PLNT-BLS-XF-4-UNIT-6-TURB-6 Replacement	Turbine: Francis	1962	5.12	116672.7	$10,339,169.79	2.2	$8,232,821
					487014.3			**$25,680,623**
2018								
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-CB-4 Replacement	Breaker: Air	1971	3.49	40629.8	$5,479,684.81	13.8	$302,630
Tulsa District	PLNT-RSK-XF-T1-UNIT-1-CB-SWITCHYARD-	Breaker: Oil	1971	5.33	34941.7	$5,259,169.53	9.2	$520,238
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-GOV-4 Replacement	Governor:	1971	2.46	54271.6	$5,855,675.76	6.3	$315,572
Tulsa District	PLNT-RSK-XF-T2 Replacement	Transformer:	1971	7.61	28022.2	$11,378,375.13	6.2	$1,499,428
Tulsa District	PLNT-RSK-XF-T1 Replacement	Transformer:	1971	7.61	28022.2	$11,378,375.13	6.2	$1,499,428
Little Rock District	PLNT-BLS-XF-4-UNIT-5-GOV-5 Replacement	Governor:	1962	3.79	5221.6	$781,060.18	3.3	$345,468

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Kaplan	1971	1.22	215867.2	$33,206,757.32	2.6	$18,865,386
Tulsa District	PLNT-RSK-XF-T2-UNIT-4-GEN-4 Replacement	Generator:	1971	4.32	62561.7	$10,562,037.66	2.4	$5,691,102
Little Rock District	PLNT-BLS-XF-4-UNIT-5-CB-5 Replacement	Breaker: Vacuum	1997	2.92	954.6	$468,451.73	2.4	$342,114
Little Rock District	PLNT-BLS-XF-4-UNIT-5-TURB-5 Replacement	Turbine: Francis	1962	4.88	117544.6	$10,875,146.44	2.3	$8,381,012
					588037.3			**$37,762,378**
2019								
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-CB-SS2 Replacement	Breaker: Air	1971	2.3	52818.8	$5,897,948.29	14.5	$308,077
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-GOV-3 Replacement	Governor:	1971	2.07	60821.6	$6,135,985.12	6.5	$321,252
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Kaplan	1971	1.11	228815.1	$34,915,469.98	2.6	$19,204,963
Tulsa District	PLNT-RSK-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1971	3.94	72706.9	$11,248,412.22	2.4	$5,793,541
Little Rock District	PLNT-BLS-XF-3-UNIT-3-TURB-3 Replacement	Turbine: Francis	1952	4.38	101341.5	$10,716,370.56	2.2	$8,531,870
					516503.9			**$34,159,704**
2020								
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-CB-SS1 Replacement	Breaker: Air	1971	1.93	56881.8	$6,150,633.52	14.8	$313,623
Tulsa District	PLNT-DEN-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1997	2.5	18503.3	$5,702,673.42	12.8	$360,172
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1971	1.74	65500.2	$6,405,520.57	6.5	$327,035
Tulsa District	PLNT-DEN-UNIT-2-GOV-2 Replacement	Governor:	1947	0.94	74999.9	$7,340,596.45	6.0	$346,160
Tulsa District	PLNT-DEN-UNIT-1-GOV-1 Replacement	Governor:	1943	0.94	74999.9	$7,340,596.45	6.0	$346,160
Tulsa District	PLNT-DEN-UNIT-2-EXC-2 Replacement	Excitation System:	1995	5.19	25119.6	$5,664,913.14	4.1	$1,509,667
Tulsa District	PLNT-DEN-UNIT-1-EXC-1 Replacement	Excitation System:	1995	5.19	25119.6	$5,664,913.14	4.1	$1,509,667
Little Rock District	PLNT-BLS-UNIT-2-GOV-2 Replacement	Governor:	1952	1.65	7420.2	$898,634.92	3.7	$338,510
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1971	1.01	238151.9	$36,599,348.61	2.6	$19,550,652
Tulsa District	PLNT-RSK-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1971	3.64	79470.3	$11,914,121.24	2.5	$5,897,825
Little Rock District	PLNT-BLS-UNIT-2-TURB-2 Replacement	Turbine: Francis	1952	4.13	102092.4	$11,239,702.93	2.3	$8,685,444
Little Rock District	PLNT-BLS-UNIT-2-XF-2 Replacement	Transformer:	1952	6.35	2700.0	$730,714.39	1.5	$1,520,425
Little Rock District	PLNT-BLS-UNIT-2-EXC-2 Replacement	Excitation System:	1988	4.82	3510.0	$490,021.34	1.4	$1,326,786

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
					774469.2			**$42,032,124**
2021								
Tulsa District	PLNT-RSK-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1971	1.48	70178.8	$6,672,155.52	6.6	$332,921
Tulsa District	PLNT-RSK-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1971	0.92	249272.3	$38,286,949.97	2.7	$19,902,564
Tulsa District	PLNT-RSK-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1971	3.37	86233.7	$12,582,265.38	2.5	$6,003,986
Little Rock District	PLNT-BLS-XF-5-UNIT-8-TURB-8 Replacement	Turbine: Francis	1963	5.23	118205.6	$11,751,572.92	2.3	$8,841,782
					523890.4			**$35,081,253**
2022								
Little Rock District	PLNT-DAR-XF-1-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1997	5.23	21857.7	$7,266,386.88	14.8	$353,702
Little Rock District	PLNT-DAR-XF-1-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1997	5.23	21857.7	$7,266,386.88	14.8	$353,702
Little Rock District	PLNT-DAR-XF-1 Replacement	Transformer:	1962	6.74	76911.0	$25,054,525.42	10.1	$1,731,731
Little Rock District	PLNT-DAR-XF-1-UNIT-2-GOV-2 Replacement	Governor:	1965	2.13	89237.1	$10,316,819.36	6.6	$357,445
Little Rock District	PLNT-DAR-XF-1-UNIT-1-GOV-1 Replacement	Governor:	1965	2.13	89237.1	$10,316,819.36	6.6	$357,445
Little Rock District	PLNT-DAR-XF-1-UNIT-2-EXC-2 Replacement	Excitation System:	1995	4.94	41587.8	$8,900,084.88	6.3	$1,316,294
Little Rock District	PLNT-DAR-XF-1-UNIT-1-EXC-1 Replacement	Excitation System:	1995	4.94	41587.8	$8,900,084.88	6.3	$1,316,294
Little Rock District	PLNT-BLS-XF-5-UNIT-7-TURB-7 Replacement	Turbine: Francis	1963	5.04	118873.5	$12,329,216.51	2.3	$9,000,934
Little Rock District	PLNT-BLS-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	3.67	103397.3	$12,296,138.27	2.3	$9,000,934
Little Rock District	PLNT-DAR-XF-1-UNIT-1-GEN-1 Replacement	Generator:	1997	9.35	12404.1	$6,427,071.25	1.6	$7,940,793
					616951.0			**$31,729,275**
2023								
Little Rock District	PLNT-DAR-XF-2-UNIT-3-CB-3 Replacement	Breaker: Vacuum	1997	4.96	25831.8	$7,726,846.78	15.3	$360,069
Little Rock District	PLNT-DAR-XF-2-UNIT-4-CB-4 Replacement	Breaker: Vacuum	1997	4.96	25831.8	$7,726,846.78	15.3	$360,069
Little Rock District	PLNT-DAR-XF-2 Replacement	Transformer:	1962	6.42	87519.4	$26,406,039.72	10.4	$1,762,902
Little Rock District	PLNT-DAR-XF-2-UNIT-3-GOV-3 Replacement	Governor:	1965	1.77	93813.4	$10,706,458.37	6.6	$363,879
Little Rock District	PLNT-DAR-XF-2-UNIT-4-GOV-4 Replacement	Governor:	1966	2.07	90381.2	$10,579,053.28	6.6	$363,879
Little Rock District	PLNT-DAR-XF-2-UNIT-4-EXC-4 Replacement	Excitation System:	1995	4.64	46083.8	$9,414,016.46	6.5	$1,339,987

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Little Rock District	PLNT-DAR-XF-2-UNIT-3-EXC-3 Replacement	Excitation System:	1995	4.64	46083.8	$9,414,016.46	6.5	$1,339,987
Little Rock District	PLNT-BLS-XF-3-UNIT-3-GOV-3 Replacement	Governor:	1952	0.8	8336.3	$1,002,038.34	3.8	$357,120
Little Rock District	PLNT-BLS-UNIT-1-GOV-1 Replacement	Governor:	1952	0.8	8336.3	$1,002,038.34	3.8	$357,120
Little Rock District	PLNT-BLS-XF-3-UNIT-4-GOV-4 Replacement	Governor:	1953	0.8	8336.3	$1,002,038.34	3.8	$357,120
Little Rock District	PLNT-BLS-XF-5-UNIT-8-GOV-8 Replacement	Governor:	1963	1.62	7511.8	$980,380.31	3.6	$377,700
Little Rock District	PLNT-BLS-XF-4-UNIT-6-GOV-6 Replacement	Governor:	1962	1.62	7511.8	$980,380.31	3.6	$377,700
Little Rock District	PLNT-BLS-XF-5-UNIT-7-GOV-7 Replacement	Governor:	1963	1.62	7511.8	$980,380.31	3.6	$377,700
Little Rock District	PLNT-BLS-XF-3 Replacement	Transformer:	1951	5.58	10026.5	$2,874,317.04	3.2	$1,321,546
Little Rock District	PLNT-BLS-XF-4 Replacement	Transformer:	1956	4.82	10818.1	$2,979,023.88	3.1	$1,397,460
Little Rock District	PLNT-BLS-XF-5 Replacement	Transformer:	1961	5.16	9498.8	$2,771,053.29	3.0	$1,397,460
Little Rock District	PLNT-BLS-XF-5-UNIT-8-CB-8 Replacement	Breaker: Vacuum	1998	2.04	3102.6	$667,442.95	2.8	$374,033
Little Rock District	PLNT-BLS-XF-4-UNIT-6-CB-6 Replacement	Breaker: Vacuum	1998	2.04	3102.6	$667,442.95	2.8	$374,033
Little Rock District	PLNT-DAR-XF-2-UNIT-3-GEN-3 Replacement	Generator:	1998	9.18	16538.8	$7,352,884.19	1.6	$8,083,727
Little Rock District	PLNT-BLS-UNIT-1-XF-1 Replacement	Transformer:	1952	5.58	3420.0	$944,173.07	1.6	$1,604,014
Little Rock District	PLNT-BLS-XF-3-UNIT-3-EXC-3 Replacement	Excitation System:	1988	3.89	4590.0	$674,892.33	1.5	$1,399,729
Little Rock District	PLNT-BLS-XF-3-UNIT-4-EXC-4 Replacement	Excitation System:	1988	3.66	4590.0	$674,892.33	1.5	$1,399,729
Little Rock District	PLNT-BLS-UNIT-1-EXC-1 Replacement	Excitation System:	1988	3.89	4590.0	$674,892.33	1.5	$1,399,729
					533366.7			**$26,846,694**
2024								
Tulsa District	PLNT-KEY-XF-T1 Replacement	Transformer:	1968	5.97	103670.2	$31,793,375.35	9.2	$1,920,439
Tulsa District	PLNT-FTG-XF-T2 Replacement	Transformer:	1953	4.55	37320.9	$9,629,623.31	8.4	$905,020
Tulsa District	PLNT-WBF-XF-T1 Replacement	Transformer:	1973	6.35	95141.8	$24,910,651.76	7.3	$2,074,998
Tulsa District	PLNT-EUF-UNIT-1-GOV-1 Replacement	Governor:	1964	1.3	36516.7	$4,336,358.81	6.7	$341,982
Little Rock District	PLNT-GRF-UNIT-1-GOV-1 Replacement	Governor:	1964	1.3	18124.4	$2,269,409.88	5.6	$392,920
Little Rock District	PLNT-GRF-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1992	3.66	8332.7	$1,675,199.61	5.4	$381,691
Tulsa District	PLNT-KEY-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	2003	9.49	5674.2	$6,100,380.84	4.7	$1,193,856

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Tulsa District	PLNT-KEY-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	2003	9.49	5674.2	$6,100,380.84	4.7	$1,193,856
Tulsa District	PLNT-EUF-UNIT-1-XF-T1 Replacement	Transformer:	1964	5.66	14772.5	$4,360,974.59	3.2	$1,848,551
Tulsa District	PLNT-EUF-UNIT-1-TURB-1 Replacement	Turbine: Francis	1964	3.32	182773.3	$25,336,335.43	2.9	$11,620,422
Tulsa District	PLNT-FTG-XF-T2-UNIT-4-TURB-4 Replacement	Turbine: Francis	1953	0.76	113194.1	$18,646,748.01	2.7	$9,265,180
Tulsa District	PLNT-FTG-XF-T2-UNIT-4-GEN-4 Replacement	Generator:	1953	1	59773.0	$8,177,571.63	2.6	$4,011,612
Little Rock District	PLNT-GRF-UNIT-1-TURB-1 Replacement	Turbine: Francis	1964	4.64	113100.5	$14,677,623.49	2.4	$10,050,112
Little Rock District	PLNT-GRF-UNIT-1-EXC-1 Replacement	Excitation System:	1990	3.52	11521.8	$1,904,752.62	2.2	$1,552,613
Tulsa District	PLNT-EUF-UNIT-1-GEN-1 Replacement	Generator:	1964	0.69	65986.3	$9,642,664.77	2.2	$6,705,733
Little Rock District	PLNT-GRF-UNIT-1-XF-1 Replacement	Transformer:	1962	6.16	7332.0	$2,138,710.82	2.2	$1,812,607
Little Rock District	PLNT-GRF-UNIT-1-GEN-1 Replacement	Generator:	1964	2.65	26971.5	$5,132,844.15	1.5	$9,381,215
					905880.1			**$64,652,806**
2025								
Tulsa District	PLNT-FTG-XF-T1 Replacement	Transformer:	1953	4.3	39809.0	$10,055,892.91	8.6	$921,310
Tulsa District	PLNT-EUF-UNIT-3-GOV-3 Replacement	Governor:	1964	1.04	37805.5	$4,490,400.49	7.5	$261,565
Fort Worth District	PLNT-SRB-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1995	5.83	6922.1	$1,935,039.28	6.7	$338,758
Little Rock District	PLNT-GRF-UNIT-2-GOV-2 Replacement	Governor:	1964	1.04	18764.1	$2,350,575.89	5.7	$399,992
Little Rock District	PLNT-GRF-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1992	3.41	9073.4	$1,766,159.08	5.5	$388,562
Tulsa District	PLNT-EUF-UNIT-3-XF-T3 Replacement	Transformer:	1964	4.76	18149.1	$4,857,785.65	4.1	$1,450,050
Fort Worth District	PLNT-SRB-UNIT-1-XF-1 Replacement	Transformer:	1965	3.82	8763.3	$3,085,072.05	3.3	$1,369,550
Tulsa District	PLNT-FTG-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1953	0.65	115397.3	$19,272,488.17	2.8	$9,431,953
Fort Worth District	PLNT-SRB-UNIT-1-EXC-1 Replacement	Excitation System:	1997	6.18	5220.7	$1,753,489.10	2.7	$1,035,819
Tulsa District	PLNT-FTG-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1953	0.83	61147.1	$8,463,037.16	2.6	$4,083,821
Little Rock District	PLNT-GRF-UNIT-2-TURB-2 Replacement	Turbine: Francis	1964	4.44	114435.4	$15,372,182.62	2.4	$10,231,014
Little Rock District	PLNT-GRF-UNIT-2-EXC-2 Replacement	Excitation System:	1990	3.25	12359.7	$2,019,362.39	2.3	$1,580,560
Fort Worth District	PLNT-SRB-UNIT-1-TURB-1 Replacement	Turbine: Kaplan	1965	4.48	71733.2	$20,779,824.92	2.3	$15,766,639
Little Rock District	PLNT-GRF-UNIT-2-XF-2 Replacement	Transformer:	1962	5.87	7960.5	$2,273,644.89	2.2	$1,845,234

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Tulsa District	PLNT-EUF-UNIT-3-GEN-3 Replacement	Generator:	1964	0.55	68315.3	$9,995,486.94	2.2	$6,826,437
Fort Worth District	PLNT-SRB-UNIT-1-GEN-1 Replacement	Generator:	1965	1.72	26406.5	$5,938,742.44	1.9	$6,221,103
Tulsa District	PLNT-EUF-UNIT-3-TURB-3 Replacement	Turbine: Francis	1964	3.15	36658.2	$11,584,450.55	1.9	$11,829,589
Little Rock District	PLNT-GRF-UNIT-2-GEN-2 Replacement	Generator:	1964	2.36	28127.4	$5,416,676.79	1.5	$9,550,077
					687047.8			**$83,532,035**
2026								
Fort Worth District	PLNT-SRB-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1995	5.53	7416.5	$2,042,998.36	7.0	$342,114
Little Rock District	PLNT-NOR-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1989	2.51	13596.3	$2,325,839.65	6.8	$384,635
Tulsa District	PLNT-EUF-UNIT-2-GOV-2 Replacement	Governor:	1964	0.82	39094.4	$4,641,598.03	6.8	$354,404
Little Rock District	PLNT-NOR-UNIT-1-GOV-1 Replacement	Governor:	1950	0.23	24494.6	$2,867,754.69	6.5	$355,468
Little Rock District	PLNT-NOR-UNIT-1-XF-1 Replacement	Transformer:	1949	2.76	15133.6	$3,507,015.05	4.2	$1,058,955
Tulsa District	PLNT-EUF-UNIT-2-XF-T2 Replacement	Transformer:	1964	5.16	17304.9	$4,857,726.07	4.1	$1,476,151
Fort Worth District	PLNT-SRB-UNIT-2-XF-2 Replacement	Transformer:	1965	4.56	8576.9	$3,000,811.96	3.2	$1,394,202
Little Rock District	PLNT-NOR-UNIT-1-TURB-1 Replacement	Turbine: Francis	1950	2.19	145950.0	$20,901,584.16	3.1	$9,214,482
Tulsa District	PLNT-EUF-UNIT-2-TURB-2 Replacement	Turbine: Francis	1964	3	188029.1	$27,477,927.78	3.0	$12,042,522
Fort Worth District	PLNT-SRB-UNIT-2-EXC-2 Replacement	Excitation System:	1997	6.22	5780.1	$1,897,269.45	2.8	$1,030,518
Tulsa District	PLNT-FTG-XF-T2-UNIT-3-TURB-3 Replacement	Turbine: Francis	1953	0.56	117597.5	$19,883,646.82	2.8	$9,601,728
Tulsa District	PLNT-FTG-XF-T2-UNIT-3-GEN-3 Replacement	Generator:	1953	0.67	62521.2	$8,733,713.23	2.6	$4,157,330
Fort Worth District	PLNT-SRB-UNIT-2-TURB-2 Replacement	Turbine: Kaplan	1965	4.15	73250.6	$21,811,488.38	2.3	$16,050,439
Tulsa District	PLNT-EUF-UNIT-2-GEN-2 Replacement	Generator:	1964	0.43	70644.2	$10,326,588.52	2.2	$6,949,313
Fort Worth District	PLNT-SRB-UNIT-2-GEN-2 Replacement	Generator:	1965	2.09	26063.5	$6,030,874.66	1.9	$6,186,745
Little Rock District	PLNT-NOR-UNIT-1-EXC-1 Replacement	Excitation System:	2003	8.91	2729.0	$1,153,322.21	1.8	$1,470,697
Little Rock District	PLNT-NOR-UNIT-1-GEN-1 Replacement	Generator:	1950	4.19	23728.2	$4,811,126.78	1.5	$8,876,730
					841910.7			**$80,946,434**
2027								
Tulsa District	PLNT-TKF-XF-T1 Replacement	Transformer:	1952	3.82	68124.8	$16,447,494.56	10.0	$1,021,136

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District	Project	Type	Online	Cond	Tons CO2e	NPV	BCR	Cost
Little Rock District	PLNT-NOR-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1989	2.32	14254.2	$2,429,082.83	7.0	$391,559
Little Rock District	PLNT-NOR-UNIT-2-GOV-2 Replacement	Governor:	1944	0.15	24747.2	$2,953,541.41	6.6	$361,867
Tulsa District	PLNT-TKF-XF-T1-UNIT-2-CB-2 Replacement	Breaker: Vacuum	2004	8.92	2868.4	$1,783,506.88	6.4	$305,113
Fort Worth District	PLNT-RDW-XF-T1-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1988	4.08	6567.7	$1,489,597.16	5.7	$249,560
Tulsa District	PLNT-TKF-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1995	3.31	16520.5	$3,037,844.12	4.8	$742,694
Little Rock District	PLNT-NOR-UNIT-2-XF-2 Replacement	Transformer:	1949	2.57	15877.9	$3,664,818.18	4.2	$1,096,976
Fort Worth District	PLNT-RDW-XF-T1-UNIT-2-EXC-2 Replacement	Excitation System:	1988	2.75	8185.7	$1,672,462.91	3.6	$514,620
Fort Worth District	PLNT-RDW-XF-T1-UNIT-2-GOV-2 Replacement	Governor:	1988	3.62	7562.8	$1,426,549.59	3.2	$270,858
Little Rock District	PLNT-NOR-UNIT-2-TURB-2 Replacement	Turbine: Francis	1944	1.75	149346.8	$21,926,139.83	3.1	$9,380,343
Tulsa District	PLNT-FTG-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1953	0.48	119064.3	$20,494,650.14	2.8	$9,774,559
Tulsa District	PLNT-TKF-XF-T1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1952	1.6	106915.7	$18,253,870.55	2.7	$9,560,156
Tulsa District	PLNT-FTG-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1953	0.55	63895.3	$9,002,343.08	2.6	$4,232,162
Tulsa District	PLNT-TKF-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1972	1.85	39610.3	$6,800,551.82	2.3	$4,425,825
Little Rock District	PLNT-NOR-UNIT-2-EXC-2 Replacement	Excitation System:	2003	8.61	3473.3	$1,305,767.86	1.8	$1,497,170
Fort Worth District	PLNT-RDW-XF-T1-UNIT-2-GEN-2 Replacement	Generator:	1988	6.35	8338.6	$2,386,128.85	1.6	$3,032,042
Little Rock District	PLNT-NOR-UNIT-2-GEN-2 Replacement	Generator:	1944	3.87	25553.5	$5,166,248.73	1.5	$9,036,512
					680907.0			**$55,893,151**
2028								
Little Rock District	PLNT-OZK-XF-2-UNIT-3-CB-3 Replacement	Breaker: Vacuum	1996	3.41	20916.0	$4,418,846.57	11.1	$338,125
Little Rock District	PLNT-TBR-XF-1-UNIT-2-GOV-2 Replacement	Governor:	1959	0.37	29295.4	$3,733,989.73	7.6	$425,733
Tulsa District	PLNT-TKF-XF-T1-UNIT-1-CB-1 Replacement	Breaker: Vacuum	2004	8.62	3650.7	$1,922,140.55	6.7	$310,605
Little Rock District	PLNT-TBR-XF-1-UNIT-2-CB-2 Replacement	Breaker: Vacuum	2003	8.25	4505.1	$2,038,694.32	5.9	$413,840
Fort Worth District	PLNT-RDW-XF-T1-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1988	3.74	7012.9	$1,558,222.19	5.8	$254,052
Tulsa District	PLNT-TKF-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1995	2.99	17700.6	$3,184,351.78	4.9	$756,062
Fort Worth District	PLNT-RDW-XF-T1 Replacement	Transformer:	1985	5.19	11021.1	$4,307,385.82	3.9	$998,984
Fort Worth District	PLNT-RDW-XF-T1-UNIT-1-EXC-1 Replacement	Excitation System:	1988	2.5	8563.5	$1,747,772.33	3.6	$523,883

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Little Rock District	PLNT-OZK-XF-2-UNIT-3-EXC-3 Replacement	Excitation System:	2007	8.81	2414.5	$2,719,869.29	3.4	$936,053
Little Rock District	PLNT-TBR-XF-1-UNIT-2-TURB-2 Replacement	Turbine: Francis	1959	2.69	178528.0	$26,442,052.24	3.2	$10,693,551
Fort Worth District	PLNT-RDW-XF-T1-UNIT-1-GOV-1 Replacement	Governor:	1988	3.31	8075.5	$1,490,661.13	3.2	$275,734
Little Rock District	PLNT-TBR-XF-1-UNIT-2-EXC-2 Replacement	Excitation System:	1989	2.36	20386.8	$3,402,170.27	3.0	$1,719,719
Tulsa District	PLNT-TKF-XF-T1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1952	1.45	108648.3	$18,885,544.03	2.7	$9,732,239
Little Rock District	PLNT-OZK-XF-2-UNIT-3-GEN-3 Replacement	Generator:	1973	3.07	59510.0	$10,669,258.48	2.4	$5,605,434
Tulsa District	PLNT-TKF-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1983	2.85	33099.0	$6,399,467.03	2.2	$4,505,490
Little Rock District	PLNT-TBR-XF-1 Replacement	Transformer:	2003	9.37	5773.0	$3,795,573.63	2.0	$3,722,406
Little Rock District	PLNT-TBR-XF-1-UNIT-2-GEN-2 Replacement	Generator:	1959	1.16	47974.4	$8,575,267.78	1.8	$10,394,502
Fort Worth District	PLNT-RDW-XF-T1-UNIT-1-GEN-1 Replacement	Generator:	1988	6	9265.1	$2,572,732.26	1.7	$3,086,619
					576340.0			**$54,693,030**
2029								
Little Rock District	PLNT-OZK-XF-1-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1996	3.18	22196.6	$4,630,565.31	11.4	$344,211
Little Rock District	PLNT-OZK-XF-2-UNIT-4-CB-4 Replacement	Breaker: Vacuum	1996	3.18	22196.6	$4,630,565.31	11.4	$344,211
Little Rock District	PLNT-TBR-XF-1-UNIT-1-GOV-1 Replacement	Governor:	1959	0.28	29600.5	$3,843,265.41	7.7	$433,396
Little Rock District	PLNT-OZK-XF-1 Replacement	Transformer:	1971	5.77	44180.8	$13,327,134.90	7.3	$1,555,342
Little Rock District	PLNT-TBR-XF-1-UNIT-1-CB-1 Replacement	Breaker: Vacuum	2003	7.97	5300.2	$2,186,313.71	6.2	$421,290
Little Rock District	PLNT-OZK-XF-2-UNIT-4-EXC-4 Replacement	Excitation System:	2007	8.57	3863.3	$2,982,492.99	3.6	$952,902
Little Rock District	PLNT-TBR-XF-1-UNIT-1-TURB-1 Replacement	Turbine: Francis	1959	2.5	180336.7	$27,381,643.53	3.3	$10,886,034
Little Rock District	PLNT-TBR-XF-1-UNIT-1-EXC-1 Replacement	Excitation System:	1989	2.08	21586.1	$3,556,428.17	3.0	$1,750,674
Little Rock District	PLNT-OZK-XF-1-UNIT-1-GEN-1 Replacement	Generator:	1972	2.72	63062.8	$11,114,629.29	2.5	$5,706,332
Little Rock District	PLNT-OZK-XF-2-UNIT-4-GEN-4 Replacement	Generator:	1973	2.72	63062.8	$11,114,629.29	2.5	$5,706,332
Little Rock District	PLNT-TBR-XF-1-UNIT-1-GEN-1 Replacement	Generator:	1959	0.97	49077.3	$8,866,791.09	1.8	$10,581,603
					504463.5			**$38,682,326**
2030								
Little Rock District	PLNT-OZK-XF-1-UNIT-2-CB-2 Replacement	Breaker: Vacuum	1996	2.97	23904.0	$4,844,122.04	11.6	$350,407

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Little Rock District	PLNT-OZK-XF-2-UNIT-5-CB-5 Replacement	Breaker: Vacuum	1996	2.97	23904.0	$4,844,122.04	11.6	$350,407
Little Rock District	PLNT-OZK-XF-2 Replacement	Transformer:	1971	3.98	94733.2	$26,005,990.86	9.4	$1,945,383
Little Rock District	PLNT-TBR-XF-2-UNIT-4-GOV-4 Replacement	Governor:	1961	0.34	29295.4	$3,941,553.97	7.7	$441,197
Little Rock District	PLNT-TBR-XF-2-UNIT-4-CB-4 Replacement	Breaker: Vacuum	2004	7.97	5300.2	$2,243,580.57	6.2	$428,873
Little Rock District	PLNT-OZK-XF-2-UNIT-5-EXC-5 Replacement	Excitation System:	2007	8.28	5312.0	$3,251,923.31	3.7	$970,054
Little Rock District	PLNT-OZK-XF-1-UNIT-1-EXC-1 Replacement	Excitation System:	2007	8.28	5312.0	$3,251,923.31	3.7	$970,054
Little Rock District	PLNT-OZK-XF-1-UNIT-2-EXC-2 Replacement	Excitation System:	2007	8.28	5312.0	$3,251,923.31	3.7	$970,054
Little Rock District	PLNT-TBR-XF-2-UNIT-4-TURB-4 Replacement	Turbine: Francis	1961	2.57	179700.5	$27,729,146.51	3.3	$11,081,983
Little Rock District	PLNT-TBR-XF-2-UNIT-4-EXC-4 Replacement	Excitation System:	1989	1.85	22485.5	$3,707,344.13	3.1	$1,782,186
Little Rock District	PLNT-OZK-XF-1-UNIT-2-GEN-2 Replacement	Generator:	1973	2.44	65727.4	$11,549,819.00	2.5	$5,809,045
Little Rock District	PLNT-OZK-XF-2-UNIT-5-GEN-5 Replacement	Generator:	1974	2.44	65727.4	$11,549,819.00	2.5	$5,809,045
Little Rock District	PLNT-TBR-XF-2 Replacement	Transformer:	2003	9.1	8659.5	$4,731,248.28	2.2	$3,857,619
Little Rock District	PLNT-TBR-XF-2-UNIT-4-GEN-4 Replacement	Generator:	1961	1.2	47423.0	$8,989,085.12	1.8	$10,772,072
					582796.0			**$45,538,380**
2031								
Little Rock District	PLNT-TBR-XF-2-UNIT-3-GOV-3 Replacement	Governor:	1961	0.28	29600.5	$4,051,007.67	7.7	$449,139
Little Rock District	PLNT-TBR-XF-2-UNIT-3-CB-3 Replacement	Breaker: Vacuum	2004	7.55	6360.2	$2,397,701.72	6.5	$436,592
Little Rock District	PLNT-TBR-XF-2-UNIT-3-TURB-3 Replacement	Turbine: Francis	1961	2.42	180923.0	$28,652,335.58	3.3	$11,281,459
Little Rock District	PLNT-TBR-XF-2-UNIT-3-EXC-3 Replacement	Excitation System:	1989	1.67	23384.9	$3,856,122.57	3.1	$1,814,265
Little Rock District	PLNT-TBR-XF-2-UNIT-3-GEN-3 Replacement	Generator:	1961	1	49077.3	$9,284,272.94	1.8	$10,965,970
					289345.8			**$24,947,425**
2032								
Little Rock District	PLNT-BEA-UNIT-1-CB-1 Replacement	Breaker: Vacuum	1992	3.51	11296.6	$2,156,803.66	5.6	$456,442
Little Rock District	PLNT-BEA-UNIT-1-GOV-1 Replacement	Governor:	1965	0.21	19612.4	$2,661,023.19	5.0	$479,492
Little Rock District	PLNT-BEA-UNIT-1-XF-1 Replacement	Transformer:	1962	3.92	10813.9	$3,065,013.97	2.3	$2,297,962
Little Rock District	PLNT-BEA-UNIT-1-TURB-1 Replacement	Turbine: Francis	1965	3.1	106511.0	$18,455,233.79	2.3	$13,253,645

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Little Rock District	PLNT-BEA-UNIT-1-EXC-1 Replacement	Excitation System:	1997	3.17	11796.9	$2,232,944.41	2.1	$2,015,227
Little Rock District	PLNT-BEA-UNIT-1-GEN-1 Replacement	Generator:	1965	0.24	34716.7	$7,106,724.17	1.5	$12,191,887
					194747.5			**$30,694,656**
				Total Tons CO2e:	**9754077.0**	**Total Cost:**		**$742,003,594**
					35142495.			$2,566,236,975

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