

STRATEGIC ASSET MANAGEMENT PLAN

February 17, 2022

*For Fleet
Management*

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1.0 EXECUTIVE SUMMARY

The Bonneville Power Administration's Fleet Management (FM) organization was established in October 2011 after an independent study conducted found that fleet management at BPA was highly fragmented, resulting in differing and conflicting priorities. The study also determined that maintenance practices were not standardized, and replacement criteria were not in place to optimize vehicle and equipment purchases. The study indicated that a centrally managed FM organization could better manage compliance with regulatory requirements, fleet assets safety and availability, maintenance and replacement practices, and staffing level. A centralized FM organization with standardized practices in place would also financially benefit BPA. Furthermore, the decision to centralize BPA's fleet management was made to move away from the practice of reactive and emergency response-driven operation to a proactive and preventive maintenance strategy-driven operation.

The centralized FM organization, known today also as NSF, operates under the Supply Chain umbrella and consists of three departments: 1) NSFE – Procurement Policy and Analysis; 2) NSFM – Heavy Mobile Equipment Maintenance; and 3) NSFP – Loan Pool. FM has 15 fleet maintenance garages and 57 personnel throughout BPA's service territory. It manages BPA's fleet assets which is comprised of approximately 2,550 assets and 700 components ranging from light to heavy duty vehicles, emergency generators, and construction, mobile and material handling equipment. Approximately 1,440 assets are BPA owned, approximately 1,100 are leased from the General Services Administration (GSA). The net value of BPA owned assets is approximately \$90 million dollars.

Since FM's inception in 2011, it has matured, being added as a BPA asset category in 2019 as part of the agency's strategic asset management plan. As an asset category, FM is reviewing BPA's fleet assets inventory, condition, health, cost of maintenance, capital investments, and overall fleet management practices through the lens of asset management.

In FM's assessment of BPA's fleet assets, we discovered that areas of BPA's fleet are well past their life expectancy and/or have outdated safety features. The replacement pace of these aging assets is currently set at 45 years to rotate out aging vehicles and equipment. This trajectory does not support BPA's strategic asset management goals, specifically, strengthening its financial health, and providing competitive power products and services. In the simplest terms, the older the asset the more costly it is to maintain and the more labor hours needed to perform maintenance. Aged assets indubitably will have longer downtimes, or lack of availability, which will negative impact FM's expense budget, and more importantly, will cause project and outage restoration delays.

FM's mission is to provide effective and efficient fleet assets to internal customers, mainly Transmission Services, in a cost effective manner. The purpose of FM's strategic asset management plan (SAMP) is to communicate how we will meet our mission within the framework of BPA's overall strategic asset management strategy. The SAMP aims to define FM's asset management goals and activities; key initiatives that support the delivery of BPA's asset management policies; and provide a high-level overview of resources and timelines for implementation.

It is worth noting that since FM's initial FY2020 SAMP, we have secured permanent FM leadership as well as the procurement of a capital asset management (CAM) software program. We believe the new FM leadership will provide the stability that was needed to improve BPA's fleet management program. Furthermore, the new CAM software will improve FM's data allowing us to make better business decisions based on analytics and metrics.

2.0 ACKNOWLEDGEMENTS

2.1 Senior ownership

Our mission in the Supply Chain organization is to deliver best value through collaborative partnerships utilizing effective and efficient processes. We ensure investments in fleet and the delivery of business services are aligned with BPA's strategic business objectives, and support the safe performance of core business activities across the agency. We will demonstrate our commitment to asset management practices in the following ways:

- Align asset investments in accordance with organizational objectives to support BPA's core business;
- Make risk-informed decisions to maximize the value of our people and fleet assets while improving safety and environmental stewardship; and
- Continuously improve awareness of asset management activities in order to execute day-to-day operations in a cost effective manner.

The future holds incredible opportunities with change as the only constant. We look forward to these opportunities and will continue to find ways to improve the service we provide by tempering change with fiscal restraints. As electric and autonomous vehicles become the norm, the adaptability of our organization will continue to post positive results.

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by Robin R. Furrer
Date: 2022.02.16
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Trudy W. Linson
Chief Supply Chain Officer

Robin R. Furrer
Chief Administrative Officer

2.2 Strategy Development Approach

2.2.1 Key Contributors

The key contributors to the revision of this SAMP were the FM Manager, FM Database Administrator, FM Business Analyst, and FM Material purchasing and Training Coordinator. The revision of this SAMP was also provided to the Chief Supply Chain Officer for final review and feedback.

2.2.2 Key Activities

The key activities involved in this SAMP refresh included:

- Multiple work sessions to review FM's initial FY2020 SAMP to identify any discrepancies between what was previously communicated and FM's current reality;
- Identifying areas of improvement and/or data sets that FM needs to start tracking/recording to be able to set milestones in future SAMP refresh;
- Regular engagement with customers and stakeholders such as Transmission Services and CAO; and
- Documenting files and resources that support the information provided in this SAMP.

3.0 STRATEGIC BUSINESS CONTEXT

3.1 Alignment of SAMP with Agency Strategic Plan

The Fleet Management (FM) program's SAMP defines the strategic direction for the procurement, ownership, maintenance, replacement, and lease of BPA's fleet assets. The SAMP was developed with consideration of the Agency's four strategic goals set forth in the BPA 2018-2023 Strategy Plan: 1) strengthen financial health, 2) modernize assets and system operations, 3) provide competitive Power products and services, and 4) meet Transmission customer needs efficiently and responsively. The FM program's goals and initiatives set forth in the SAMP are aligned with BPA's strategic objective to improve cost management, and administer an industry-led asset management program as follow:

- Asset Management Objective #1: Improve fleet data management
 - Invest in system operations that will allow us to better collect and store asset information that will help us make business decisions based on real data. In doing so, we can streamline our purchasing and maintenance practices that will financially be more beneficial while also meeting the agency's business needs.
- Asset Management Objective #2: Manage BPA's fleet assets in a sustainable and economical manner
 - Optimize and modernize BPA's fleet assets to move from a 45 year replace schedule to a 20 year replace schedule. This effort will help to reduce cost of maintaining an aging fleet, and increase the availability of assets to meet our Transmission customer needs.

3.2 Scope

BPA's FM program procures and manages its fleet assets in a manner that is sustainable and economical while ensuring the Agency is equipped with the vehicles and equipment it requires to perform mission-critical assignments. BPA's fleet portfolio includes both BPA-owned assets and leased assets through the General Services Administration (GSA).

BPA-owned assets include mission-critical equipment such as man-lifts, cranes, digger derricks, wire stringing equipment, work/crew trucks, pole trucks, and equipment/material hauling trailers and trucks (semi-trucks/flatbed trucks) for maintaining and restoring BPA's electrical system. The less critical but necessary support equipment, which becomes mission-critical and depends on inclement weather, are Sno-Cats, mobile generators, dozers, excavators, backhoes, railcars, and other specialized equipment. The assets leased through GSA range from passenger-type vehicles used by BPA's management, finance/support staff to heavy-duty pickups and service trucks used by the agency's electrical, construction and field crews.

All of the assets mentioned above are covered under the scope of this plan; however the maintenance of the GSA leased vehicles does not fall under the responsibility of BPA. Furthermore, FM does not oversee aircraft maintenance or replacement including helicopters, airplanes, or drones.

This FM strategic asset management plan covers a ten-year planning period and it provides a high level overview of BPA's fleet assets program. The strategic asset management plan serves as the foundation for FM to develop its Asset Management Plan (AMP) which will provide further details on our SAMP's initiatives and execution strategies. The SAMP will be revisit every two years as a measure to evaluate FM's progress or if we need to change direction.

3.3 Asset Description and Delivered Services

BPA owns and operates a wide variety of vehicles and equipment. Its fleet consists of approximately 2550 assets and 700 components, of which around 1440 are BPA owned, 1,100 are GSA leased, and 135 emergency generators (see table 3.3-1 below).

FM is responsible for the overall asset management of BPA’s fleet assets from acquisition, maintenance, (less aircrafts assets and GSA vehicles) to asset retirement. Fleet provides and support’s equipment assets to transmission, warehouse, and transportation as well as maintain the engine generators that support substations and radio sites throughout the BPA system. Additionally, the Equipment and Tool Loan Pool division of FM is responsible for meeting the Agency’s equipment shortfall needs, which is accomplished by utilizing centrally managed assets that are operated, tracked, and controlled by Loan Pool personnel, or through the use of third party rentals.

Table 3.3-1 Summary of Assets (Leased and BPA Owned Assets)

ASSET NAME	DESCRIPTION OF FUNCTION OR USAGE	TOTAL
Aerial Cart	Motorized man-basket that goes on the power lines for spacer maintenance	28
Boom Equipment	Material handler, telescopic boom to reach up and out	63
Cab and Chassis		81
Class 5-7 Truck	Medium duty work truck	4
Class 8 Tractor	Heavy duty work truck	18
Construction EQ		78
Dump Truck	Dump trucks used by Transmission Line Maintenance and construction crews	32
EG	Emergency generators – both diesel and propane	135
Forklift	Electric forklift –used mostly inside buildings; rider forklift – non-electric forklift; boom forklift – material handler, telescopic boom to reach up and out	133
Light Tower	Used for night work	17
Loan Pool Rental		8
Manlift	Over the road man-lifts: less than 55ft; between 55-75ft; over 125ft	87
Mobile Generator	Trailer generators less than 50KW and more than 50KW	29
Pick Up		406
Platform	Self-propelled boom lift less than 55ft; self-propelled boom lift 55-75ft; self-propelled boom lift over 75ft	34
Pole Truck	Used by Transmission Line Maintenance crews to haul wood poles to jobsites	13
Route Van	Used by maintenance and construction crews for carrying tools/materials	45
Sedan		28
Small Electric Vehicle	Electric vehicle used around complexes - Ross	54
Small Gas Vehicle	Passenger vehicle	68
Snow EQ	Snow cat used to carry persons in the snow	34
Stake Bed		68
Stringing EQ	Pullers and tensions used for power line maintenance	14
SUV	Small utility vehicle	251
Trailer	Used to haul equipment and materials	612
Utility Body		78
Utility Tractor	<30 Small tractors used mostly by facility maintenance workers; >30 tractors over 30 HP mostly used to clear brush around substations and on ROW	7
Van		37
Vehicle Lift	A lift for the maintenance of vehicles	53
Vertical Person Lift		8
Winch Truck	Used by Transmission Line Maintenance crews for the maintenance of power lines	14
Miscellaneous		13
Grand Total		2550

3.4 Demand Forecast for Services

Multiple agency programs use the Fleet assets for operational, emergency, business continuity, and project-specific needs. However, Transmission Services is the major user and heavily influences the composition of BPA's assets. Future demand will likely be influenced by the scope of sustain programs and construction projects. Furthermore, future demand may also be influenced by Executive Orders that promote environmental stewardship, i.e. the adoption of electric vehicles. Our first priority is to optimize fleet assets to ensure we have the correct assets to meet mission needs. Most heavy equipment is on a 20-year life cycle. Given FTE allocations, a minimum of 5% of our equipment will need to be replaced per year to ensure the user's safety and preserve repair maintenance at a sustainable level. Trailers are the exception. Due to the large number and variety, large trailers (40ft and above) are on a 30-year replacement cycle, while many small utility trailers are ten years or as needed.

Market factors affecting the delivery of Fleet services include the following:

- Manufacturer lead times for procurement of replacement assets significantly impact Fleet's ability to deliver high-quality assets in a timely manner.

The high demand for skilled technicians across the country creates additional challenges, primarily due to the salary and incentive offers made in private industry.

- Ongoing supply chain disruptions and logistic issues are the results of the pandemic.

3.5 Strategy Duration

The SAMP documents asset management strategic initiatives over ten years. It provides:

- A long-term view that takes into consideration organizational needs
- External expectations
- The current state of existing assets
- The agency's asset management capabilities

While the SAMP is reviewed in two-year cycles, Fleet intends to be cognizant of any new business or policy requirements that may prompt a change to our SAMP. . Additionally, the refresh is coordinated with the Integrated Program Review (IPR) cycle to support the IPR.

4.0 STAKEHOLDERS

4.1 Asset Owner and Operators

As mentioned in section 3.3 Asset Description and Delivered Services, BPA's fleet consists of approximately 2550 assets of which approximately 1440 are BPA owned and 1,100 are GSA leased. Of these assets, the mission critical equipment are the majority of the BPA-owned assets while passenger-type vehicles and heavy duty pickups are GSA leased assets. FM acts as the designated owner/asset center representative (ACR) of all mobile equipment including railcars. We provide maintenance support for all BPA-owned fleet assets and stationary generators. Maintenance for GSA leased assets are handled by the GSA.

The Heavy Mobile Equipment Maintenance Division within FM is responsible for maintaining and repairing the Agency’s fleet asset and emergency generators. This division is staffed by Heavy Mobile Equipment Maintenance (HMEM) technicians who are stationed across approximately fourteen FM locations throughout BPA’s service territory. These technicians support the agency’s operations by managing preventative maintenance, compliance inspections, mobile maintenance (in the field), and vended services. Maintenance levels range from basic lube and oil filter work to major overhauls performed on chassis and aerial equipment/cranes and corrective repairs ranging from parts failure, damage repair, factory recalls, and facilitation of warranty repairs and equipment modifications. Technicians are also responsible for providing subject matter expertise related to GSA vehicle maintenance and vehicle up-fitting requirements, and damage assessments. In addition to vehicle maintenance, technicians service the agency’s 150-plus engine generators, some of which provide critical power needs at remote sites, ensuring that substation and communication network systems remain operational year-round.

The vehicles and equipment (assets) are assigned to multiple operators (custodians) in many departments throughout BPA’s service territory. The operators are both Federal and Contractor personnel of BPA. The usage of BPA’s fleet assets are for various needs from travel between job locations; transportation of materials and equipment; and overall maintenance of the electrical system.

4.2 Stakeholders and Expectations

FM’s stakeholders are identified as anybody directly, or indirectly, impacted by the program. When Fleet uses capital dollars, we consult with the custodians associated with the asset. Our primary stakeholders are the Transmission Services organization followed by support organizations such as Warehouse and Transportation. These stakeholders play crucial roles in ensuring that the necessary field work is/can be accomplished to support BPA’s high voltage electrical system.

Table 4.2-1, Stakeholders

Stakeholders	Expectations	Current Data Sources	Measures
Customers	Fair Price	Fleet program budget, financial system actuals	Cost per mile
	Reliability	Rental pool records	Request to rental time/rental cost/rental usage/ cost per hour
		Service records	Availability/out of service time
	Communications	Fleet Council meetings	Customer satisfaction
Regulators	Regulatory compliance	DOT and traffic laws	Enforcement incidences
		DOE requirements and Executive Orders	Compliance reporting
Staff	Health and Safety	Safety database	Incident statistics
	Job Security and Satisfaction	Administrative database	FEVS survey results, turnover figures
	Training	Administrative database	Agreed professional development
	Safety	Industry regulations and standards	Incident report statistics and non-compliances

5.0 EXTERNAL AND INTERNAL INFLUENCES

Table 5.0-1, External and Internal Influences

External Influences	Affects and Actions
<p>Energy Policy</p>	<p>From the time of its inception in October 2011, FM’s asset management and overall maintenance practices were driven by two executive orders that require fleet optimization, environmental and economic sustainability:</p> <ul style="list-style-type: none"> • Executive Order 13514, <i>Federal Leadership in Environment, Energy, and Economic Performance</i>, signed on October 5, 2009, “Federal fleets must reduce greenhouse gas (GHG) emissions while meeting mission-critical needs and complying with all Federal goals and mandates.” • Executive Order 13693, <i>Planning for Federal Sustainability in the Next Decade</i>, signed on March 19, 2015, “It...continues to be the policy of the United States that agencies shall increase efficiency and improve their environmental performance.” <p>Recently Executive Order 13834, <i>Efficient Federal Operations</i>, signed on May 17, 2018 revoked E.O. 13693. Per Section 8 of E.O. 13834, “<i>Revocations</i>. Executive Order 13693 of March 19, 2015 (Planning for Federal Sustainability in the Next Decade), is revoked.” However, FM will continue to move forward with its fleet optimization in support of BPA’s initiatives to strengthen its financial health and its environmental stewardship to the region it serves.</p> <p>Furthermore, the Department of Energy’s Office of Energy Efficiency & Renewable Energy’s <i>Agency Strategic Sustainability Performance Plan</i> under 42 U.S.C. § 6374e(b) “says that through their petroleum reduction plan, agencies can employ strategies such as using alternative fuels, acquiring high fuel-economy vehicles (such as hybrid, neighborhood electric, electric, and plug-in hybrid electric vehicles) if they are commercially available, substituting cars for light trucks, increasing vehicle load factors, decreasing vehicle miles traveled, and decreasing fleet size.” These regulations will influence the types of vehicles Fleet will procure in the future, and the size of BPA’s fleet.</p>
<p>Global Supply Chain</p>	<p>The current global COVID-19 pandemic has caused widespread and complicated supply chain issues which has impacted both businesses and consumers. It’s predicted that the current supply chain crisis will continue into 2022. This has already hindered, and will continue to hinder, our ability to secure adequate parts and replacement assets.</p>
<p>Skilled Heavy Mobile Equipment Mechanics Availability</p>	<p>Heavy mobile equipment mechanics (HMEM) are difficult to hire. There is a nationwide shortage of competent workers within this craft. BPA has a highly diverse and complex set of assets, which require a high level of understanding and skills, making it difficult to find qualified HMEM. Additionally, some of BPA’s service territory is located in remote areas, which potentially can be less attractive for someone to want to relocate to.</p>
Internal Influences	Affects and Actions
<p>Customers/Business Partners</p>	<p>BPA’s programs, projects/constructions, and mission critical assignments dictate what kind of assets (vehicles and equipment) are needed, when and where.</p>
<p>Data Mining and Analysis</p>	<p>Inability to analyze data trends, reducing ability to make strategic, equipment/location-specific recommendations. FM is currently investing in implementing a Capital Management software program to address this barrier.</p>
<p>Limited Capital Funds</p>	<p>Historically, FM either underspent or did not have adequate capital funding to maintain BPA’s fleet. This resulted in an aging fleet which required securing increased capital funding in order to begin retiring and replacing old assets. Capital funding has increased in the last year; however, the same level of capital funding will need to be sustained in order to meet the SAMP’s 10 year asset management plan.</p>

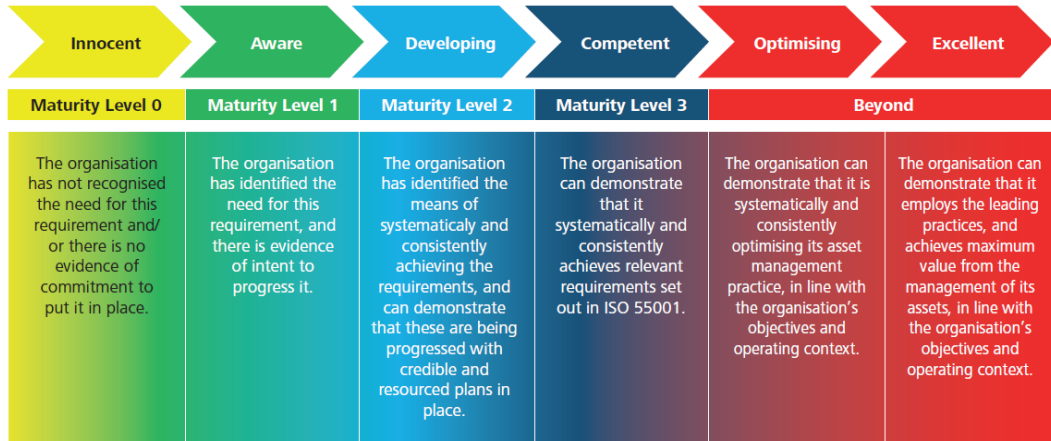
5.1 SWOT Analysis

Table 5.1-1: SWOT

<i>Favorable</i>	<i>Unfavorable</i>
<i>Strengths</i>	<i>Weaknesses</i>
<ul style="list-style-type: none"> • Fleet personnel possesses substantial years of experience in this industry; many are subject matter experts. • 14 FM garages strategically located in BPA's service territory to be able to respond to mission critical assignments, and perform daily maintenance of assets. • Recently implemented AssetWorks Enterprise Asset Management (EAM) software program to better track and record asset information; establish and track maintenance schedule, cost, issues, and parts; and manage assets. • Streamlined parts purchasing program to standardized inventory, save money, and create efficiency. 	<ul style="list-style-type: none"> • Age and condition of BPA fleet assets. • Outdated facility design for a majority of our FM garages. • Lack of telematics. • Nationwide shortage of qualified technicians. • Limited funding for Fleet personnel training on emerging industry technology. • Lack of craft-specific standard vehicle configuration for some but not all vehicle. • Personnel retirement – loss of industry working knowledge and experience.
<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> • Craft-specific standard vehicle configurations can reduce up-fit costs. • Implement AssetWorks Capital Asset Management (CAM) software program to optimize fleet asset through right-sizing and lifecycle cost analysis. • Upgrades to sites and new construction of remaining Fleet garages. • Streamlining accounting. 	<ul style="list-style-type: none"> • Global supply chain and logistic issues to secure adequate parts and replacement assets. • Current and possible future inflation will negatively impact FM's expense and capital budget. • Department of Energy's green emission mandate and order to reduce fleet size. • Due to aging workforce through attrition, FM poses to lose a significant experience and industry knowledge.

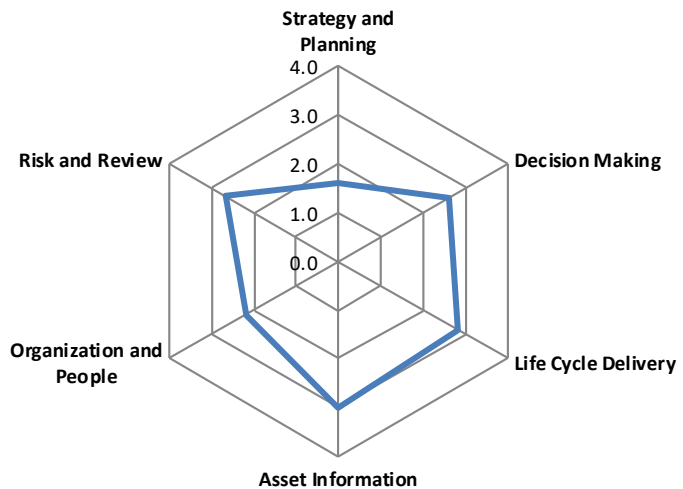
6.0 ASSET MANAGEMENT CAPABILITIES AND SYSTEM

FM needs a true assessment of the maturity level of our asset management program since we have had to re-exam our overall strategic asset management plan to determine whether or not past/current initiatives and approaches were/are still relevant. The need is, in part, driven by the Agency asset management team’s FY22 SAMP refresh schedule as well as FM acquiring new leadership. That said, the IAM Maturity Model Radar Plots tool and ISO 55001 Maturity Scale were used to help FM evaluate the maturity level of our asset management program.



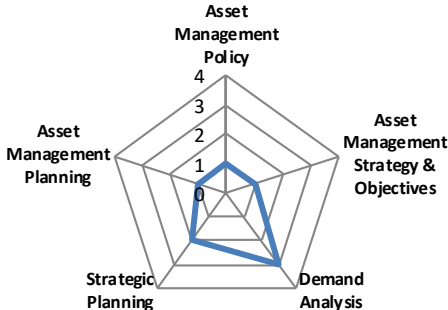
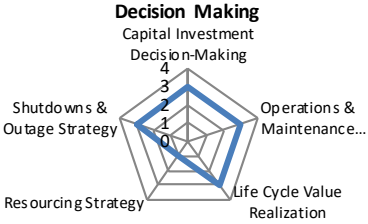
The IAM Maturity Model Radar Plots tool helped us determined where we landed on the maturity scale in the areas of: Strategy and Planning, Decision Making, Life Cycle Delivery, Asset Information, Organization and People, and Risk and Review (see section 6.1). The ISO 55001 Maturity Scale provided the definitions to explain in context where we are based on a number rating in the respected area. Overall, FM scored an average of 2.5 on its asset management program maturity level. This average score of 2.5 reflects the effort to-date that FM has taken towards improving its capabilities to gather and store its assets information and developing its strategy to managing BPA’s aging fleet. We acknowledge that our asset management capabilities are still maturing in the areas of optimizing BPA’s fleet and lifecycle management.

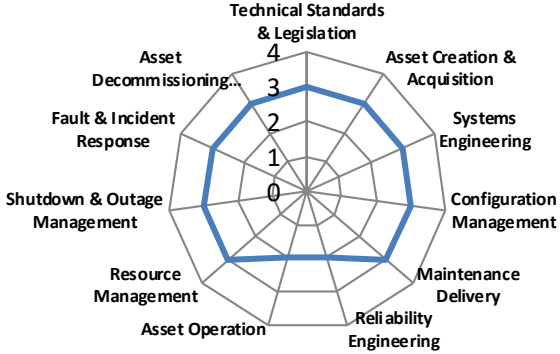
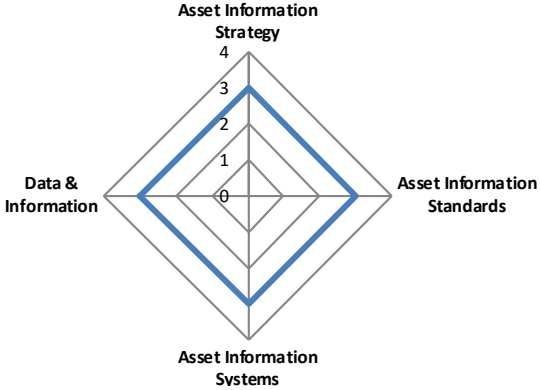
Group	Average
Strategy and Planning	1.6
Decision Making	2.6
Life Cycle Delivery	2.8
Asset Information	3.0
Organization and People	2.2
Risk and Review	2.7
Average	2.5



6.1 Current Maturity level

Table 6.1-1 Maturity Level

Subject Area	Maturity Level
<p>Strategy & Planning</p>	<p>Strengths: Information about demand is available and NSF has an idea about what assets need to be replaced. We have implemented the use of EAM which has helped us to schedule maintenance work and track maintenance cost, labor and time. This is one part of a major step NSF is taking in curating data points to help make better business and strategic decisions. We are currently in the process of implementing CAM to use in conjunction with EAM to further assist with life cycle analysis, and to help solidify our strategic direction and assets replacement program.</p> <p>Weaknesses: NSF is still in the early stages of adopting the agency’s strategic assets management goals and objectives since we were added as an Asset Category in 2018. There has been recent changes in NSF leadership which resulted in the new NSF manager needing to assess FM’s current asset management practices and evaluate the maturity of the program against the Agency’s strategic goals. FM’s strategic asset management plan will evolve and mature over time as we implement standard practices to meet the Agency’s asset management goals.</p> <div style="text-align: center;"> <p>Strategy and Planning</p>  </div>
<p>Decision Making</p>	<p>Strengths: NSF has defined models for evaluating capital investments, considering asset maintenance, replacement and procurement.</p> <p>Weaknesses: Limited staffing resources with necessary industry knowledge to make decisions regarding the best type of assets for replacement and new purchase that brings the most value to BPA. As well, the current purchasing process presents challenges that inhibits execution on the decision making.</p> <div style="text-align: center;"> <p>Decision Making</p>  </div>

Subject Area	Maturity Level
<p>Life Cycle Delivery</p>	<p>Strengths: BPA has high quality assets that either meet or exceed utility asset standards. Fleet assets are safe, reliable, and efficient for end users. Additionally, NSF updates its asset standards to ensure the agency has the most up to date assets to support its mission.</p> <p>Weaknesses: BPA’s capital replacement program has not kept up with fleet industry standards replacement schedule. Therefore, we have an aging fleet that will require significant attention in the near future to ensure safety, reliability and efficiency.</p> <p style="text-align: center;">Life Cycle Delivery</p> 
<p>Asset Information</p>	<p>Strengths: The asset information is based in a robust system (EAM) that facilitates advancements in maintenance programming and asset usage and optimization decisions. Information owners from Asset Suite, Cascade, Sunflower and EAM conduct monthly team meetings to capitalize on strengths and eliminate duplication of efforts across the four systems.</p> <p>Weaknesses: Analytics of asset information is limited due to vacancies and the delay in the implementation of CAM. Additionally, Maintenance Repair Units are not developed which impacts work planning and overall organization structure.</p> <p style="text-align: center;">Asset Information</p> 

Subject Area	Maturity Level																				
<p>Organization & People</p>	<p>Strengths: NSF leadership is committed to life cycle management, and optimizing the balance of safety, reliability and cost.</p> <p>Weaknesses: In the coming years, NSF poses to lose significant experience and industry knowledge due to retirement. The threat NSF might face in replacing this portion of its staff is the nationwide shortage of qualified technicians.</p> <p style="text-align: center;">Organization and People</p> <table border="1"> <caption>Organization and People Maturity Level Data</caption> <thead> <tr> <th>Category</th> <th>Maturity Level</th> </tr> </thead> <tbody> <tr> <td>Procurement and supply chain management</td> <td>4</td> </tr> <tr> <td>Asset Management Leadership</td> <td>2</td> </tr> <tr> <td>Organizational Structure</td> <td>2</td> </tr> <tr> <td>Organizational Culture</td> <td>2</td> </tr> <tr> <td>Competence Management</td> <td>2</td> </tr> </tbody> </table>	Category	Maturity Level	Procurement and supply chain management	4	Asset Management Leadership	2	Organizational Structure	2	Organizational Culture	2	Competence Management	2								
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Asset Management Leadership	2																				
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Organizational Culture	2																				
Competence Management	2																				
<p>Risk & Review</p>	<p>Strengths: NSF understands the risks associated with not having the right assets available to support BPA's mission critical assignments and daily operations. We have the necessary tools to understand static and evolving risks at any given time.</p> <p>Weaknesses: BPA's capital replacement program lack of funding has resulted in excessive aging of assets which can cause additional maintenance activities and increased assets downtime.</p> <p style="text-align: center;">Risk and Review</p> <table border="1"> <caption>Risk and Review Maturity Level Data</caption> <thead> <tr> <th>Category</th> <th>Maturity Level</th> </tr> </thead> <tbody> <tr> <td>Risk Assessment and Management</td> <td>2</td> </tr> <tr> <td>Contingency Planning & Resilience Analysis</td> <td>2</td> </tr> <tr> <td>Sustainable Development</td> <td>2</td> </tr> <tr> <td>Management of Change</td> <td>2</td> </tr> <tr> <td>Assets Performance & Health Monitoring</td> <td>2</td> </tr> <tr> <td>Asset Management System Monitoring</td> <td>2</td> </tr> <tr> <td>Management Review, Audit and Assurance</td> <td>2</td> </tr> <tr> <td>Asset Costing and Valuation</td> <td>2</td> </tr> <tr> <td>Stakeholder Engagement</td> <td>2</td> </tr> </tbody> </table>	Category	Maturity Level	Risk Assessment and Management	2	Contingency Planning & Resilience Analysis	2	Sustainable Development	2	Management of Change	2	Assets Performance & Health Monitoring	2	Asset Management System Monitoring	2	Management Review, Audit and Assurance	2	Asset Costing and Valuation	2	Stakeholder Engagement	2
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6.2 Long Term Objectives

BPA adopted an industry-leading asset management planning standard with the overall purpose to optimize the life-cycle cost of acquiring, operating, maintaining, and disposing of assets to preserve reliability and value, and prioritize limited resources. The planning standard help inform capital investment level requirements by using assets' criticality, health and risk; establishing risk-based asset performance objectives; and using leading analytical methods to prioritize maintenance activities and capital investments for safe, reliable asset performance.

To that end, FM's long term asset management objectives are to improve the management, availability, and integrity of BPA's fleet assets information for better decision making and long term planning; and to manage BPA's fleet assets in a manner that is sustainable and economical to ensure the agency is equipped with the vehicles and equipment it requires to perform mission-critical assignments.

OBJECTIVE 1: IMPROVE FLEET DATA MANAGEMENT

Historically, it has been a challenge for FM to obtain accurate and easily retrievable operation, and maintenance trends and costs, due to lack of accurate fleet data management and reporting. This challenge prevented FM from having an accurate picture of our assets and their respective conditions. Therefore, FM's decisions were not based on realized data but more on immediate needs. However, in the last few years FM has made significant progress in data management with the implementation of EAM. EAM has allowed us to establish a method to collect, centralize and maintain data of BPA's fleet assets. The need to have quality data associated with the age, condition, cost and maintenance of an asset, which was once a "nice to have" option, is now a must for better decision making and long term planning going forward. Improved fleet data management will allow FM to better perform lifecycle and optimization analysis, forecast capital and O&M spending, and develop maintenance schedule and asset replacement plan. We need to continue to accumulate information, invest in CAM for data analytics to make more informed decisions.

- **Specific:** Utilize asset management software programs (EAM and CAM) to perform fleet assets lifecycle analysis; to record and track capital and O&M spending.
- **Measurable:** EAM was implemented in 2016. Since then FM has been collecting maintenance, assets history and information, cost of parts and types of parts for maintenance, condition and age, and time to complete maintenance. CAM is currently being implemented with a target go-live date of EOY FY2022.
- **Achievable:** Implementation of assets management software programs; data accuracy continuity to EAM.
- **Relevant:** Real and accurate data helping Fleet to forecast maintenance cost, schedule, and record assets information.
- **Time Bound:** By the end of FY 2023 we should have a year of relevant data (EAM and CAM) to perform optimization of our assets.

OBJECTIVE 2: MANAGE BPA'S FLEET ASSETS IN A SUSTAINABLE AND ECONOMICAL MANNER

This long term objective serves to meet two of the agency's strategic goals: 1) strengthen financial health, and 2) modernize assets and system operations. BPA has a fleet that is significantly past industry standard lifecycles and a replacement pace of 45 years to rotate out aging equipment (our oldest asset still in service is 66 years old). The older the asset the more costly it is to maintain due to limited supply of older parts, and more labor hours required to perform maintenance. Aged assets have longer downtime, or lack of availability, and can cause project and outage restoration delays. As well, aged assets will not have enhanced safety features to prevent work place injuries. For example, an outrigger interlocks safety feature could have prevented the bucket truck roll over that occurred in 2018.

Move to industry standard replacement cycle to improve cost performance and safety. Right-size BPA's fleet in an effort to meet BPA's environmental goals and program needs. Right-sizing is a management practice that builds and maintain a sustainable, fuel-efficient fleet by optimizing fleet size and composition. As such, FM can minimize vehicle use, conserve fuel, save money and ensure the proper equipment replacement.

- **Specific:** Develop a robust capital replacement program; move from a 45 year replacement cycle to a more manageable 20 year cycle. Right-size BPA's fleet size and composition, and determine proper mix of owned and leased assets that has the best value to BPA.
- **Measurable:** Replacement will decrease overtime from 45 to 20 year cycle schedule.
- **Achievable:** The decrease in replacement timeline is achievable dependent upon the capital budget.
- **Relevant:** Will allow us to follow industry standard replacement cycle – asset will be available more often because they are newer and less downtime for maintenance.
- **Time Bound:** 10 years (estimated) to optimize our fleet assets to realize the 20 year replacement cycle, dependent upon capital budget.

6.3 Current Strategies and Initiatives

Strategy and Planning

In this first year, the process for determining optimal levels is being developed and will be based on the three factors of asset criticality, health and risk (CHR). While optimization often translates to reductions, this is not necessarily our primary objective. This process will help FM discover an asset's utilization rate and if it's being used in the right setting. For instance, low utilization rates for some equipment types are likely due to the asset being the wrong equipment type for the application. To that end, this will also help FM determine if an asset truly needs to be replaced, or if new vehicles and equipment types need to be procure, within the framework of BPA's goals of strengthening its financial health, modernizing its assets, and being environmental steward to this region.

Decision Making

Foster business-driven decisions using analytics and metrics measured against risk to ensure the agency's needs are met in a cost-effective manner. Currently FM has two SMEs who are handling the asset replacement life cycle from need identification to sourcing and purchasing. Their process involves considering the criticality as determined by the agency's need, health as it relates to the condition of the asset, and overall risk of not having the assets available for field crews or BPA workforce. Their decision is also based on what is available on the market for purchase. Additionally, the two SMEs gather asset information from EAM to perform assessments of an asset's age, condition, and overall importance of the asset (usage). To streamline the process and minimize data errors, FM is investing in EAM and CAM to record asset information (condition, usage, and risk) and perform life cycle analysis. CAM will be able to help us transition to an industry standards replacement schedule versus are current practice of replacing assets when the need is communicated. Current practice has led to being past due on replacing certain assets past lifecycle. Furthermore, older assets may cause safety issues. CAM will provide the data analytics to evaluate CHR.

Life Cycle Delivery

To successfully manage BPA's fleet assets consistent with agency's overall strategic goals, FM will need to develop competency to prepare life cycle analysis that take into consideration asset usage, condition, failure rates, maintenance costs, overall costs, etc. FM plans on utilizing two asset management software programs simultaneously to achieve competency in performing life cycle analysis, Enterprise Asset Management (EAM) and Capital Asset Management (CAM). These two programs will assist FM with improving tracking and reporting expenditures, asset performance, cost triggers – essentially building data quality and availability associated with

asset cost, operations and maintenance. Without quality data, FM will not be successful in utilizing EAM and CAM to perform life cycle analysis.

Asset Information

In 2016, FM begin collecting basic asset information, i.e. make, model, vehicle/asset identification number, and developed standardized reporting. As the FM program begins to mature, there is a significant need to expand on the type of asset information we collect. Therefore, identifying what type of asset information to capture and record is necessary in order to build the data FM needs to perform analysis, develop performance metrics, and standardize reporting.

Furthermore, FM needs to establish optimal replacement criteria that works with our goal of cycling our fleet assets an average of every 20 years. The benefit of establishing an optimal replacement criteria will allow BPA to receive the maximum usage and value of an asset before it is at its lowest value right before its retirement.

Organization and People

Asset information will provide the ability for data driven decision making to determine the level of staffing and resources needed to successfully operate and maintain the fleet management program. This process will involve evaluating our current HMEMs' skills sets, identify any gaps in knowledge and experience, as well as identifying needs for any additional support staff for FM. Presently, FM leadership has identified a need for more support staff to effectively manage the FM program responsibilities such as fuel reporting, data analytics, and creating reports for the Department of Energy.

6.4 Resource Requirements

In order for FM to execute on its asset management initiatives, we will need the following resources:

- **Financial:** Continued adequate amount of capital investment for each fiscal year to keep BPA's fleet assets aligned with industry standard replacement cycle.
- **Personnel:** Personnel with an appropriate level of training to handle fast moving and agile group of assets. This requirement calls for heavy equipment maintenance personnel who not only have industry experience but also the education to handle complex and diverse assets as technology continues to evolve and change how newer equipment and vehicles are built. Additionally, FM needs personnel who can assist NSF with navigating government and environmental directives that require us to change how we operate and maintain BPA's fleet assets.
- **Data and Technology:** A robust capital asset management database system is a requirement for FM to cost effectively manage BPA's fleet assets. A capital asset management database system is essential to store all of BPA's fleet assets in centralized repository, allowing FM to have access to accurate data and reporting for decision making, planning, and maintaining fleet assets in a cost effective manner.

7.0 ASSET CRITICALITY

7.1 Criteria

Fleet asset criticality was developed with the consideration of our internal customers’ needs and maintenance priorities. The primary factor used to determine criticality levels are as follow:

1. The impact that the asset has on BPA’s ability to restore power during outages or other emergency situations.
2. The availability of the asset on the open market whether it be through, lease, rental or available for purchase.
3. Assets that may be critical during specific times during the year, i.e. snow removal.
4. The availability of adequate maintenance services commercially or internally.

The criticality levels were determined in a joint effort between Transmission Field Service (the largest asset user group) and Fleet Management. Collectively we developed a three tier system with the following definitions:

Level 1	Mission Critical	Mission critical assets are assets that are crucial to the daily operations and maintenance of BPA’s electrical system. In addition, they are assets that are not readily available for lease or rental in the market place.
Level 2	Seasonal	Season assets that are critical during specific time of the year and less critical at other times. An example, of this would be Sno-Cats. A Sno-Cats are the only means of reaching some locations during winter months. They are not available on the rental market. Therefore, they are essential to BPA’s mission during the winter months. During the summer months they are non-critical to BPA’s mission.
Level 3	Non-Critical	Assets that are easily available for rent, lease or purchase as needed and are considered non-critical to BPA’s mission.

7.2 Usage of Criticality Model

Criticality is one of five factors used during replacement and optimization analysis; others include age, usage, cost threshold, and conditions assessments as needed. It allows us to complete a deep dive into our most critical assets to ensure limited capital dollars are spent where they are most needed. The criticality codes are part of the electronic record of each asset. This allows for prioritization of maintenance activities as well as how maintenance is performed, i.e. vended (outsourced) services versus internal services based on the number of critical assets down for maintenance. In this scenario critical assets take internal priority over less critical assets. Those deemed less critical may be vended while those assets that are deemed critical are typically repaired internally so long as they are within internal capabilities.

8.0 CURRENT STATE

8.1 Historical Costs

Program	Historical Spend (in thousands) With Current Rate Case						
	2017	2018	2019	2020	2021	2022	2023
Capital Expend (CapEx)						Current Forecast or rate case	
Total Capital	5,456,030	7,026,125	5,844,164	5,799,110	3,920,690	10,000,000	12,000,000
Expense (O&M)							
Total Expense	10,304,177	11,141,565	11,046,880	11,017,766	12,327,310	12,500,000 (Estimation)	12,700,000 (Estimation)

Table 8.1 - 1 Historical Spend

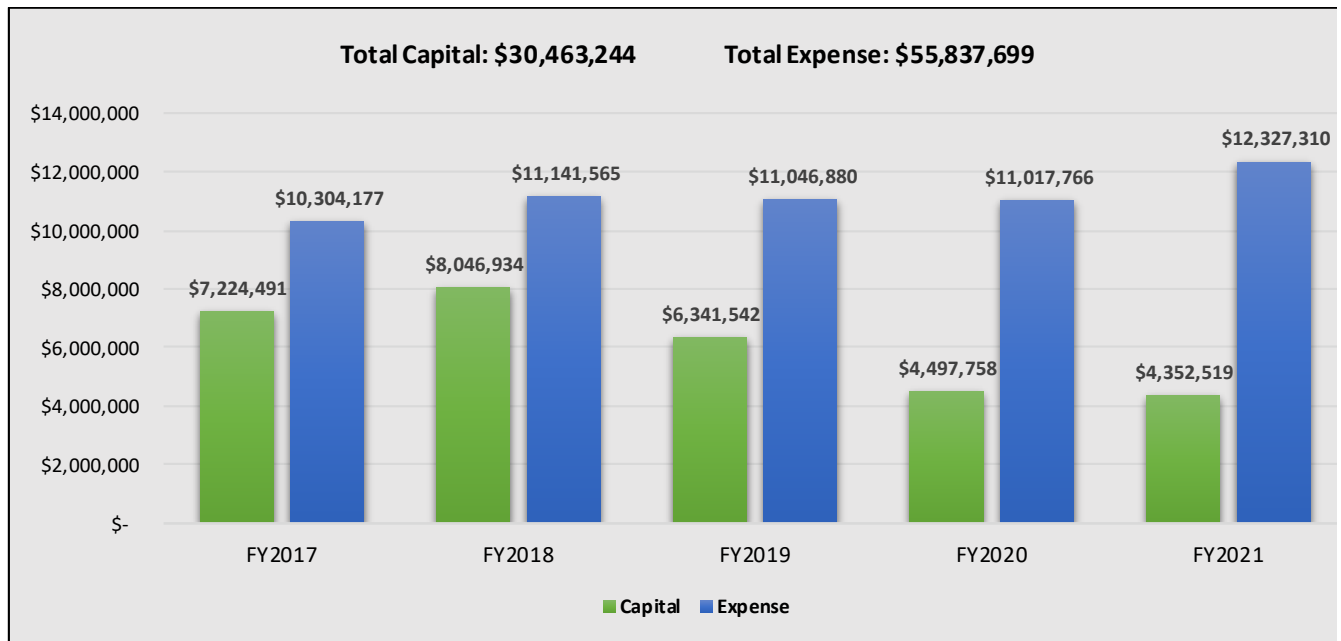


Figure 8.1-2 Historical Expenditures

Through benchmarking, we discovered BPA-owned fleet has a vast number of aged equipment beyond industry standards for equipment lifecycles. With an increased in Tool, Equipment, Acquisition Program (TEAP) funding, and the addition of a second Fleet Equipment Specialist, FM was able to start addressing the aging fleet assets which resulted in an increase of our capital spending.

Increased spending over the last year is directly related to inflation, volatile markets, imposed surcharges, and fluctuations in pricing for materials and components to build specialized equipment utilized by the utility industry. The supply chain for all commodities once thought to be readily available are currently volatile due to the pandemic.

8.2 Asset Condition and Trends

The general condition of equipment identified for replacement is at or beyond usable lifecycle. Although assets are regularly assessed for their condition during inspections or services, a formal asset condition assessment of the entire fleet has not been completed since 2018. Aerial assets and cranes are high priority due to liability of continuing service and safety. The mission critical equipment identified by BPA crafts and FM would fall in line as second priority for replacement.

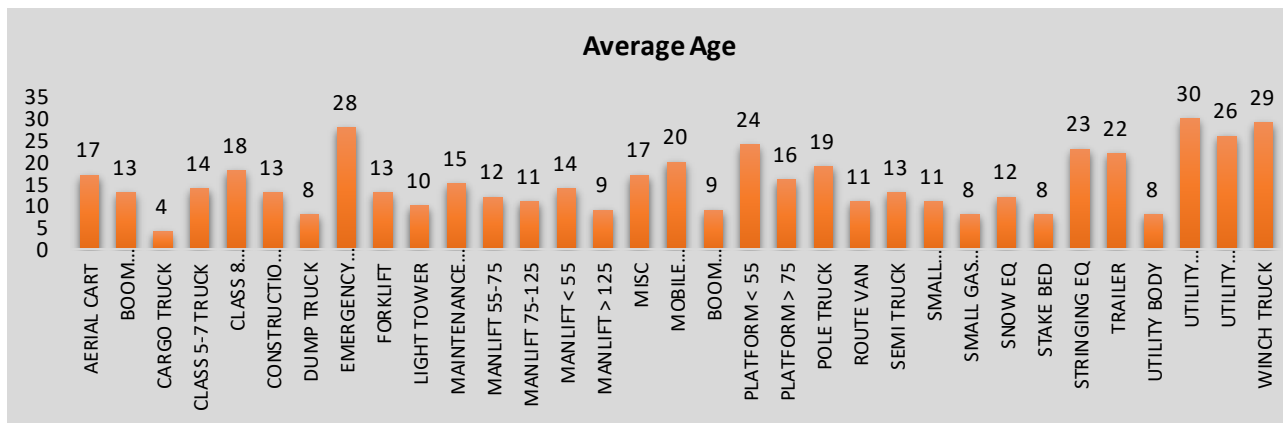


Figure 8.2-1, Current Asset Age by Classification*

*Due to the high numbers of BPA’s fleet assets, we are unable to capture the actual age of each asset without making the numbers ineligible. Therefore, the chart below reflects the average age by asset classification. The average age includes only BPA owned fleet as we do not have the information of when GSA procured their fleet assets.

Figure 8.2-2, Current Asset Age by Asset Type

Please see Appendix A for current asset age by asset type. Appendix A only includes BPA owned fleet assets.

8.3 Asset Performance

Historically FM has underspent capital dollars in relation to maintaining a healthy level of assets. It was not until recently with the addition of Asset Works EAM, the system of record for BPA’s fleet assets, that FM was able to capture real data to assess the composition of BPA’s fleet assets. The data captured shows BPA has a rapidly aging fleet, and in many cases the asset is far behind industry standard levels of replacement. Our current model for replacement objectives is defined by several criteria, one of which is safety. Is the asset safe for our users to

use, along with age and maintenance activities? With increased capital spending in FY 22 and beyond, FM can make progress on reducing high maintenance areas, right size the number of assets, and set some \performance objectives in place.

In the future FM plans on having a robust set of data analytic tools to help understand the significance of whether to hold onto an asset or to buy new. FM is in the early stages of testing a new software program, Asset Works CAM, which will assist with all of the data points in the lifecycle of our assets. These data points will allow us to make better decisions about when to excess the asset, how maintenance activities increase as the asset ages, and improve alignment with the utility industries average lifecycle per asset type.

While EAM has improved asset information and data for maintenance planning, we realized that it does not capture the needs of our capital replacement program in an efficient and effective manner. CAM is a bolt-on software program to EAM that assists with analyzing data beyond reporting capabilities. CAM has the capabilities to perform asset lifecycle analysis to assist FM with optimizing BPA's fleet assets. Another challenge for FM is the result of underspending capital dollars for so many years. There is a significant amount of aged assets that have caused increased maintenance resulting in a decrease of their availability for BPA's crews when those assets are in need. In order to mitigate this issue, we need to streamline the procurement process as well as establish long term procurement contracts with suppliers and manufacturers. Capital dollars need to be maintained at a level close to FY 22 capital spend (\$10M) plus inflation. Furthermore, our data needs to reflect very real lifecycle curves of our assets in order to make a better informed decision, helping to create efficiencies and overall better decision making.

Required Table 8.3-1 Historical Asset Performance Summary

Historical asset performance summary data is not available. With the addition of CAM, FM will be able to realize this type of information in a couple of years.

8.4 Performance and Practices Benchmarking

FM's future state is to utilize industry standard benchmarking as it pertains to a high voltage utility. That said, the data in which we use to establish benchmarking and create a real apples to apples comparison is still being assessed, and the data has not been able to mature enough for FM to realize these benefits.

9.0 RISK ASSESSMENT

Risk Category	Risk Name: Risk Description, Mitigation	Likelihood	Consequence
Safety	Functionality: As vehicles and equipment ages, it results in outdated safety functionality as improved technology is implemented in industry. As well, aging assets are more prone to breakdowns which can result in increased likelihood of accidents that may cause injuries or fatality. To mitigate this risk, aging assets will need to be removed from service and replaced with newer assets.	Likely	Extreme
Reliability	Labor: As vehicles and equipment ages, the required maintenance and upkeep of the equipment results in increased labor hours, labor costs, and longer asset downtime. As well, replacement parts become sparse which can result in decreased reliability and further asset downtime. To mitigate the risk of an asset being unavailable for a long period of time, we can rely on vehicles and equipment rentals. However, this will have a financial impact on increased rental costs.	Moderate	Major
Financial	Financial Costs: It becomes more expensive to maintain assets as they age.	Almost Certain	Moderate
Environmental	Environmental Hazards: As vehicles and equipment ages, the gap between the greenhouse gas emissions standards of when the asset was built, and what the current standards are today, widens. This gap results in higher pollution. Furthermore, the larger the asset/greater the capacity, the less efficient the fuel economy is which can result in a greater environment footprint. Less fuel efficiency also means increased fuel cost. If FM doesn't explore more environmental friendly asset BPA could possibly face EPA fines and program scrutiny from DOE.	Possible	Moderate
Compliance	Program Compliance: As asset ages, the more difficult it is to achieve and maintain compliance with applicable OSHA, etc., regulations which can result in increased hazards to operating personnel.	Likely	Moderate

Likelihood Scale

Level 1 – Rare: This event could happen once every 30 years

Level 2 – Unlikely: The event could happen at some time (maybe once in every 10 years)

Level 3 – Possible: The event should happen at some time (probably once in every 5 years)

Level 4 – Likely: The event will probably happen in most conditions (about once in every 2 years)

Level 5 – Almost Certain: Once a year or more frequently

Level 6 – Descriptor: Frequency

Consequence Scale

Extreme: Aging asset can increase likelihood of accidents that may cause injuries or fatality.

Major: Aging asset can decrease the reliability and availability of an asset, result in a high maintenance cost, and a greater negative environment footprint.

Moderate: Aging asset can result in a high maintenance cost, and leave a greater negative environment footprint.

Minor: No impact

Insignificant: No impact

Figure 9.0-1, Risk Assessment, Safety

Likelihood	Almost Certain					69
	Likely					
	Possible				1059	
	Unlikely		348	283		
	Rare	724				
		Insignificant	Minor	Moderate	Major	Extreme
Consequence						

Please note that the placement of the number of assets on a border line indicates the assets are moving towards the next level of Likelihood and Consequence. This applies to all the heat map in sections 9.0-1 thru 9.0-5.

Figure 9.0-2, Risk Assessment, Reliability

Likelihood	Almost Certain					
	Likely				527	
	Possible					
	Unlikely		605	483		
	Rare	868				
		Insignificant	Minor	Moderate	Major	Extreme
Consequence						

Figure 9.0-3, Risk Assessment, Financial

Likelihood	Almost Certain					
	Likely					
	Possible			827		
	Unlikely			496		
	Rare	627	484			
		Insignificant	Minor	Moderate	Major	Extreme
		Consequence				

Figure 9.0-4, Risk Assessment, Environmental/Trustworthy/Stewardship

Likelihood	Almost Certain					
	Likely					
	Possible					
	Unlikely		756		924	
	Rare	803				
		Insignificant	Minor	Moderate	Major	Extreme
		Consequence				

Figure 9.0-5, Risk Assessment, Compliance

Likelihood	Almost Certain					
	Likely					
	Possible					806
	Unlikely				397	
	Rare	720		560		
		Insignificant	Minor	Moderate	Major	Extreme
Consequence						

10.0 STRATEGY AND FUTURE STATE

The results of the risk assessment illustrate that a significant number of BPA’s fleet assets has a major to catastrophic impact in the areas of safety and financial. Approximately 57% of our fleet assets are lacking in safety, and approximately 55% are costing BPA financially with maintenance and repairs.

10.1 Future State Asset Performance

FM’s future asset performance goal is to provide an 85% in-service (availability) rate in a manner that is cost effective to BPA, safe, in compliance with regulatory requirements, and supports BPA’s daily operations. We believe this goal can be achieved through the optimization of our current fleet that will align our maintenance and replacement practices with industry standards as well as move us from a 45 year replacement schedule to a 20 year replacement schedule. Retiring assets that are outdated and lacking in safety will benefit BPA financially as less labor and cost will be spent on older assets. The goal of this approach is to also increase assets availability.

Table 10.1-1 Future Asset Performance Objectives

Objective	This Year	Year +1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Increase assets availability	75%	76%	77%	78%	79%	80%	81%	82%	83%	84%	85%
Measure total cost of ownership	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Explore benchmarks for asset performance	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

10.2 Strategy

Increase Capital Funding to reduce average life of assets. FM will need to increase capital investment to reach appropriate levels of asset replacement that align with industry standards and practices. Based on our risk assessment, a significant numbers of BPA's fleet assets are failing in safety and/or beyond/close to its lifecycle. This has a major impact on the asset performance of our fleet's asset availability. Older assets cost more to maintain and are out of service longer due to the need of finding replacement parts that are not readily available for purchase.

FM's biggest internal customer, the Transmission Field Services organization, defines non-availability as, "not in the field (NIF)," whereas FM defines non-availability as "down for maintenance". Since FM cannot consistently know when an asset is not available unless the asset is down for maintenance and/or repair, we will use this as the definition. Furthermore, FM does not have an accurate assessment of each asset condition.

Implement data analytics tool to provide better information and inform optimal size of fleet. A key initiative FM is undertaking to improve information is to implement CAM to help establish systems for monitoring and managing BPA's fleet assets. CAM has the capability to store more data fields such as asset condition and downtime and industry standards measurements. CAM will help us minimize safety risk, increase reliability, reduce costs, and improve lifecycle performance, by pinpointing when to service and replace an asset.

Currently, CAM is undergoing the implementation process with a target date of going live at the beginning of FY2023. The benefits of CAM is anticipated to be realized at the end of FY2023.

10.2.1 Sustainment Strategy

In order to meet our asset performance objectives, FM must increase our capital investments in an effort to move from a 45 year replacement cycle to a 20 year replacement cycle. This strategy would entail:

- Increasing capital spending to accommodate 5% fleet assets replacement annually, approximately \$14M per year
- Executing longer term procurement contracts where applicable to decrease lead times in securing assets
- Standardizing assets based on agreed upon standards with each user group
- Data mining of applicable assets information through the use of EAM and CAM

10.2.2 Growth (Expand) Strategy

FM growth strategy is to optimize BPA's fleet assets by gathering relevant data to make informed decision on any particular asset. Optimization will most likely lead to a smaller up-dates fleet that meets BPA's mission critical assignments, projects and daily operation needs.

The motivation behind this new strategy is to have solid and real time data to present to stakeholders to explain fleet optimization. FM will need to work with customers to ensure that the process of fleet optimization does not impale their ability to perform their jobs. However, FM is aware that there may be unforeseen work stoppage during our fleet optimization which we will need to address with customers if it occurs.

10.2.3 Strategy for Managing Technological Change and Resiliency

The current focus of FM is to optimize and modernize BPA's Fleet. Long-term planning is challenging with changing and shifting priorities from internal and external sources. For instance, Executive Orders (EO) affecting the composition of government fleets to include electric vehicles (EV) need to be taken into account

when considering the acquisition of new vehicles. These EO's are important, but they're a moving target and subject to change. Many of BPA's Fleet vehicles and equipment operate in remote areas where no infrastructure is in place to support EVs. The GSA will upgrade vehicles through attrition.

FM building resiliency into our program through redundancies in assets, modernizing assets, and maintaining a loan pool of equipment for use. With the increased capital budget, FM will purchase new, safer assets that will require less down time and maintenance. Therefore, increasing availability of assets for emergency or standard use.

There are significant and regular advances in vehicle and equipment technologies that improve safety, reduce emissions, improve fuel economy, and will improve the FM's resiliency by modernizing the fleet. Having a modern fleet will reduce the cost of repair, service, maintenance, and operation of BPA's fleet assets.

While FM modernizes its assets base, it will continue to collect relevant data in order to make informed decisions on future assets purchases and maintenance of existing equipment. Using increased capabilities in asset data collection will allow a more streamlined and usable asset base for our customers, helping us minimize down time, adding to the assets availability when needed.

A technology FM wants to explore implementing is telematics. Telematics combines telecommunications and informatics to send, receive, and store data connected with fleet vehicles. Data generated by telematics provides direct vehicle data that can better help to optimize our fleet. Optimization can achieve cost savings in maintenance, driver behavior, reporting, fuel use, idling, and inventory management. BPA should continue to explore the implementation, use, and integration of telematics into the FM's overall strategy and asset management.

10.3 Planned Future Investments/Spend Levels

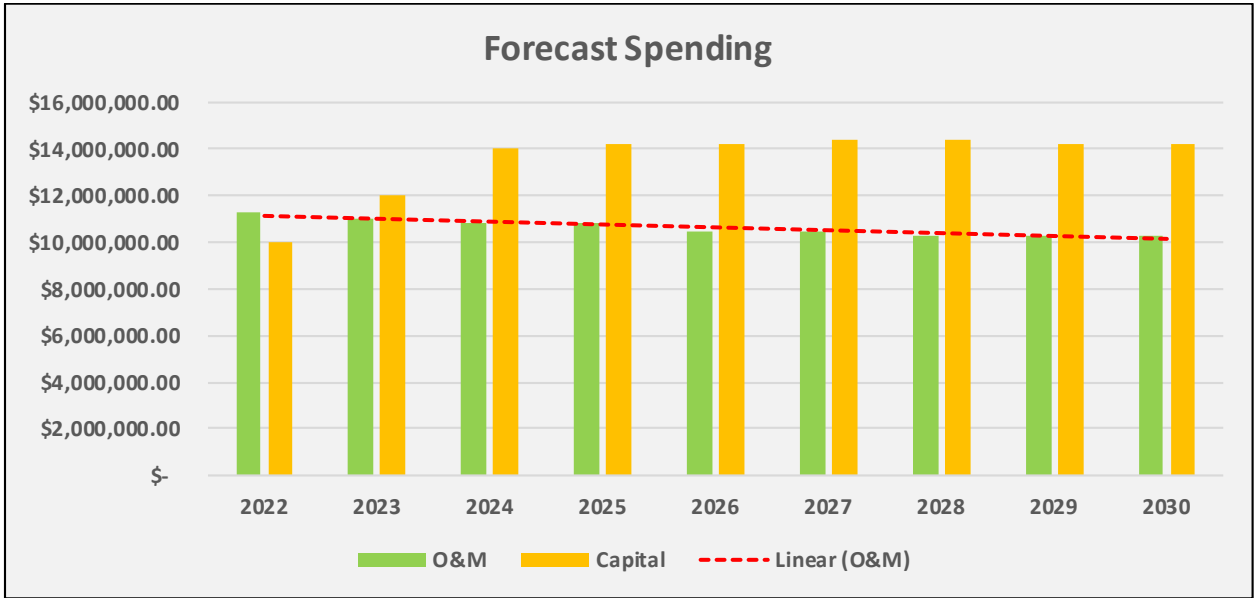


Table 10.3-1 Future Expenditures (in thousands)

Program	Rate Case FY's		Future Fiscal Years									
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Capital Expand (CapEx)												
Total Capital Expand & Sustain	10,000	12,000	14,000	14,200	14,200	14,400	14,400	14,200	14,200	14,200	14,200	14,200
Expense (OpEx)												
O&M Expense	11,300	11,000	10,800	10,800	10,500	10,500	10,300	10,300	10,300	10,300	10,300	10,300
Total Expense	21,300	23,000	24,800	25,000	24,700	24,900	24,700	24,500	24,500	24,500	24,500	24,500

Figure 10.3-2 Future Spend (Figure unavailable at this time due to lack of data to determine future spending.)

To modernize BPA’s fleet assets, capital spending will need to increase to procure newer assets for replacement and to reach the 20 year lifecycle plan. In previous years, FM spent approximately \$5M per year for asset replacement which projected 45 years to replace outdated assets. As our capital investment dollars increase our assets’ availability should also increase while the O&M dollars decreases.

10.4 Implementation Risks

The implementation risks that FM faces, or might face, are as follows:

- Lack of funding beyond FY 2033 to adequately keep our assets from falling into disrepair.
- Staffing to account for the maintenance of our fleet. There is a nationwide shortage of qualified HMEM mechanics. The shortage in this field combined with FM’s personnel approaching retirement could lead to increase in maintenance downtime, and decrease in reliability due to the lack of qualified personnel.
- Federal fleet management mandates - sustainability and other initiatives may change procurement strategies and maintenance activities.

Table 10.4-1, Implementation Risks

Risk	Impact	Mitigation Plan
Lack of continuous capital funding	<ul style="list-style-type: none"> Negative impact on the ability to move from a 45 year replacement plan to a 20 year replacement plan. Total cost of ownership and vended services will increase overtime. 	Accept actualized risks, longer downtime, project delays, outage restoration delays, and lack of availability.
Inadequate Staffing Levels	<ul style="list-style-type: none"> The ability to respond to regular maintenance activities and emergency maintenance. Limited staffing will affect assets availability. 	Increase third-party vendor services for maintenance.
Changes in Federal mandates for types of Fleet assets	<ul style="list-style-type: none"> May change the trajectory on the composition of the types of vehicles and equipment we procure for replacement. 	Participate in information sessions/meetings to understand the <i>why's</i> of Federal directives so that we can explain to stakeholders why certain types of assets are being replaced/procured.

10.5 Asset Conditions and Trends

With increased capital spending, FM will meet and sustain a more industry average 20 year replacement cycle as well as reduce the Total Cost of Ownership (TCO) by 10%. The outcome will be increased availability for the end users due to newer assets being less prone to breakdowns. A secondary benefit will be a reduction in vended services from 35% to 15%. Vended services typically cost 2-3 times the cost of in-house service by task (this doesn't include overhead cost). The goal is to replace approximately 50% of BPA's fleet assets by 2030. With more fuel efficient assets, and enhanced safety features, BPA's fleet will meet compliance standards and reliability needs to meet business objectives while also ensuring the safety of the end users.

10.6 Performance and Risk Impact

With increased capital spending, BPA's fleet will gradually become more reliable in the terms of availability due to less downtime and fewer unplanned maintenance activities. Newer safety features of our assets will well protect our human capital as well. Along with a more up to date asset base, our software and data capturing abilities will also increase. This will allow FM to continue to make better, informed decisions when it comes to asset utilization and additions. For instance, we will capture labor hour data to help plan for future staffing needs. FM plans to have a more proactive asset management program and incorporate efficiencies, making data driven decisions that make sense for the agency

Figure 10.6-1, Strategy, Risk Assessment Safety

Likelihood	Almost Certain					
	Likely					
	Possible		605			
	Unlikely			868	1000	
	Rare					
		Insignificant	Minor	Moderate	Major	Extreme
		Consequence				

Please note that the placement of the number of assets, i.e. 605, on a border line indicates the assets are moving towards the next level of Likelihood and Consequence. This applies to all the heat map in sections 10.6-1 thru 10.6-5.

Figure 10.6-2, Strategy Risk Assessment Reliability

Likelihood	Almost Certain					
	Likely					
	Possible	925				
	Unlikely			868	680	
	Rare					
		Insignificant	Minor	Moderate	Major	Extreme
		Consequence				

Figure 10.6-3, Strategy Risk Assessment Financial

Likelihood	Almost Certain					
	Likely		527			
	Possible			483		
	Unlikely				868	
	Rare					605
		Insignificant	Minor	Moderate	Major	Extreme
Consequence						

Figure 10.6-4, Strategy Risk Assessment Environmental

Likelihood	Almost Certain					
	Likely					
	Possible		1000			
	Unlikely			868	605	
	Rare					
		Insignificant	Minor	Moderate	Major	Extreme
Consequence						

Figure 10.6-5, Strategy Risk Assessment Compliance

Likelihood	Almost Certain					
	Likely					
	Possible		868		527	
	Unlikely		483			605
	Rare					
		Insignificant	Minor	Moderate	Major	Extreme
Consequence						

11.0 Addressing Barriers to Achieving Optimal Performance

External Barriers

The most prominent external barrier facing FM is the global supply chain and logistic issues that arose due to the COVID-19 pandemic that began in 2019. The ongoing issues that have impacted FM are two-folds, 1) limited our ability to secure adequate parts for maintenance and replacement assets, and 2) increased the price of available supply (due to inflation), which will negatively impact FM’s overall budget.

The FM’s parts department has been bolstering parts inventory levels to help mitigate temporary supply chain disruptions. For many of the everyday routine maintenance parts, we have 2-3 or more suppliers. We can supply parts when needed to the other fleet maintenance garages, or assist in locating hard-to-find parts as inventory diminishes worldwide. However, due to the specialized nature of many of BPA’s fleet assets, we need parts and services that are from proprietary sources (manufacturer). This becomes a challenge because the suppliers of the parts and services are experiencing the same difficulties and challenges we are facing as a result of the global pandemic.

Another external barrier is that vendor services are taking a longer time to complete their services. FM works with third-party vendors to order needed materials and schedule maintenance and repair services when and where appropriate to minimize asset downtime. However, vendor services are taking more time to complete their services than usual because they are also facing the same supply chain and logistics issues. To mitigate this issue, FM plans, schedules, and utilizes back-up parts and equipment to meet BPA’s demands.

Internal Barriers

Staffing – Emerging technology being installed in new vehicles and equipment, staff retirement, and a nationwide shortage of qualified HMEM presents challenges that FM foresees as possible barriers to adequately staff the program.

We will need a workforce that not only has industry knowledge but also can maintain newer vehicles and equipment. With staff retirement FM poses to lose a significant amount of industry as well as BPA working knowledge. Through data mining, we will build a business case to advocate for additional staffing for both fleet maintenance garages and the administration side of the program.

Fleet maintenance garages - An estimated 10 out of 14 of BPA's fleet maintenance garages are outdated and cannot accommodate today's vehicles and equipment. The Facility organization and the Chief Supply Chain Officer need to discuss what is possible within Facility's plan and resources for potential new garages.

Delays in software implementation - The delay in implementing CAM is another possible internal barrier. The implementation of CAM is being led by BPA's Technology Planning organization. Unforeseeable delays could be caused by limited resources and bandwidth, data migration issues, etc.

Temporary pause on program growth - As the result of COVID-19, the federal government guidelines and policies have hampered the ability of the FM Parts Department to become fully operational BPA territory-wide. The Parts Department program requires regular travels to all of BPA's fleet maintenance to stock, monitor, and track inventory levels. However, current travel restrictions are preventing this from occurring. FM has to be flexible and fluid to the ever-changing environment.

12.0 DEFINITIONS

Capital Asset Management (CAM): CAM is a software tool that helps to manage the overall lifecycle of an asset. The CAM module is integrated with the Enterprise Asset Management (EAM) application and includes three core modules: Analytics, Planning and Budgeting, Procurement, and Asset Disposal.

Compliance: An executive order/directive requiring specific investments must be made, and that the investment as proposed includes only the minimum required to comply with the directive. For example, an executive order to replace a certain amount of existing gas fuel fleet vehicles with electrical vehicles.

Custodian(s): Federal or Contract employee who operates a BPA fleet asset.

Enterprise Asset Management (EAM): EAM is a combination of software, systems and services used to maintain and control operational assets and equipment to include creating and tracking maintenance work orders, assets information, and creating standardized reporting.

Heavy Mobile Equipment Mechanic (HMEM): A Heavy Mobile Equipment Mechanic repairs and maintains construction and surface mining equipment such as bulldozers, cranes, motor graders, dump trucks, fork lifts, heavy duty pickup trucks, backhoes, loaders, and other diesel and gas-powered construction equipment.

Telematics: Telematics is a device installed on vehicles and mobile equipment that allows for remote access to the on-board computer systems data cache which contains odometer or engine hours, diagnostic issues, location data and fuel mileage thorough a wireless interface, this is standard practice in government and commercial fleets.