NEW MEXICO HIGHER EDUCATION DEPARTMENT

Capital Outlay Request Report

026 - Chiller and Cooling Tower Replacement Espina Campus

Business Case Status

Pending Start

Request

Institution NMSU - DA

Project Title Chiller and Cooling Tower Replacement Espina Campus

Building(s)

Building	Building Age	Building GSF
ALEX SANCHEZ HALL	0.00	0

Project Location See Site Plans and excerpt from Facilities MP

Project Map **Project Map Link**

FY Priority # 1

Master Plan Priority # 3

Total Project Cost $750,000

State Funding Request $650,000

Committed Match Funding $100,000

Match Funding Source DACC Local Funds

Construction Type Renovation

Previous Request Summary N/A

History of Facility The chilled water plant for the DACC Espina Campus provides chilled water for HVAC systems for four campus buildings on the NMSU Las Cruces (main campus building numbers): Alex Sanchez Hall (341) is 107,644 GSF; DACC references as DASH Learning Resources (479) is 23,415 GSF; DACC references as DALR Classroom Building (480) is 20,578 GSF; DACC references as DACL Health & Public Services (540) is 41,737 GSF; DACC references as DAHL The Espina Campus at NMSU is the oldest DACC campus, located on 15.5 acres on the southwest edge of NMSU's campus in Las Cruces. Also referred to as the Central Campus has ~233,000 GSF and is at its planned capacity serving about 1,400 student FTEs. All academic divisions offer programs at this site.

Current Condition The plant currently consists of two 300 Ton Rotary Screw Chillers. A Trane Chiller that was installed in 2014 to replace the original 1987 absorption chiller and a York Chiller that was installed in 2000 to replace two 1978 chillers that were the original chillers for Sanchez Hall. The York Chiller can only use R-22 refrigerant which is being phased out and will soon be illegal to sell or purchase in the United States. Due to age and refrigerant type, it is of the highest priority that this unit be replaced as soon as possible to maintain a viable redundant chiller system for this campus. Due to potential loss of the York chiller we are only using it on a limited basis when the Trane Unit needs servicing. The Marley Cooling tower that supports this unit also needs to be replaced at the same time due to age and corrosion issues to the tank which are causing leaks that cannot be repaired. Replacement of these components will provide the campus with reliable chilled water and assures that building cooling temperatures are properly maintained.

Renovation Information See current conditions of the infrastructure listed above.

Scope of Work Replace the existing cooling tower and chiller, components, and chilled water infrastructure at DACC Espina Campus. The budgetary estimate for the above reference includes the following: • Demolition of wall to mechanical room • Removal of chiller and cooling tower • Installation of new chiller and tower • Replacement of wall and door to mechanical room • Testing and commissioning NMSU-DACC hired a consultant engineering firm to evaluate the existing conditions, operational issues, and recommend for the replacement of the existing chiller and cooling tower. In RBM Engineering's report, Assessment of the Existing York Chiller and Marley Cooling Tower, Dona Ana Community College, Alex Sanchez Hall – Southeast Mechanical Room and Yard , dated May 26, 2021, the engineer has the following direction for replacement: Recommendations: The existing chiller and cooling tower must be replaced within the next few years. Our recommendation is to replace the existing 300 ton chiller with a new 300 ton variable speed water cooled chiller that will dramatically increase the chiller efficiency, overall system efficiency and provide a reliable chiller. The chiller will utilize currently approved, manufactured and available refrigerant to simplify maintenance and reduce costs. The cooling tower should be replaced with a new counter-flow tower with high efficiency media and polymer construction to minimize or avoid metallic parts prone to corrosion. We recommend the use of multiple variable speed fans located on the underside of the tower to draw outside air directly and not exposing the fans to the warm humid air discharged from the top. This significantly increases the life of the tower, the fans and also dramatically improves tower energy efficiency. The amount of tower water volume is also reduced improving water use efficiency. We recommend replacing the one older condenser water pump to provide back up for the newer pump.

Phases

Complete table if this project request contains multiple projects or if the project can be phased. List in priority order:

Phase #	Description	Part of Request	Amount	Start Date	End Date
1	Project	☐	$0.00	7/1/2023	10/31/2024

Students Impacted

Provide the instructional program majors being served by this project:

Major	HeadCount	FTE	% Growth Last Year	% Growth Average

Enrollment

Provide Fall Semester enrollment data per year as reported on the NMHED website/eDEAR:

Year	FTE	OFTE
2013	8923	1123
2014	8525	1073
2015	8333	1084
2016	8240	1115
2017	7951	1280
2018	7920	1273
2019	8067	1310
2020	7038	1053

B. Project Rationale and Need:

Measure B1: Projects promotion of enrollment growth, retention, and degree production

B1 Score Substantially

B1 Explanation The chilled water plant for the DACC Espina Campus provides chilled water for HVAC systems for four campus buildings DASH (107,000 sq. ft.) DAHL (42,000 sq. ft.) DACL (20,000 sq. ft.) and DALR (24,000 sq. ft.) The plant currently consists of two 300 Ton Rotary Screw Chillers. A Trane Chiller that was installed in 2014 to replace the original 1987 absorption chiller and a York Chiller that was installed in 2000 to replace two 1978 chillers that were the original chillers for Sanchez Hall. The York Chiller can only use R-22 refrigerant which is being phased out and will soon be illegal to sell or purchase in the United States. Due to age and refrigerant type, it is of the highest priority that this unit be replaced as soon as possible to maintain a viable redundant chiller system for this campus. Due to potential loss of the York chiller we are only using it on a limited basis when the Trane Unit needs servicing. The Marley Cooling tower that supports this unit also needs to be replaced at the same time due to age and corrosion issues to the tank which are causing leaks that cannot be repaired. Replacement of these components will provide the campus with reliable chilled water and assures that building cooling temperatures are properly maintained. This chilled water system replacement is the top priority for 2022-23 in the DACC institutional 5 year plan. The project is a key priority of the infrastructure improvement funds outlined in the DACC 2019-2026 Facilities Master Plan and supports the DACC strategic plan to enhance and support student success. Ensuring that we meet our mission, embrace our vision, and share our values has, and always will be, our primary goal. The DACC 2025 Strategic Plan focuses on helping students develop the skills and knowledge they need to function effectively in the workforce and in their communities; on ensuring that we use the things we know and teach to solve real-world problems in our communities; and on building a work environment that is effective, efficient, and empowering. As we worked to implement this plan, COVID-19 emerged and has created new challenges that have made the need for intentional and strategic action even more important. This chilled water project supports both the mission and strategic goals that are necessary to support and enhance enrollment growth. The necessity for support of the HVAC systems is key to the direct support of the educational programs conducted on the Espina Campus and has become even more critical as we seek to address air movement and replacement as a response to pandemic conditions. GOAL 1. Enhance Student Success and Social Mobility Student success at DACC is founded on the belief that DACC students can be agents of their own learning. In collaboration with faculty and staff, students learn to design their own pathways to success through critical thought, skills development, self-appraisal, decision-making, healthy independence, and respect for themselves and others. Upon graduation, DACC students can demonstrate that they have learned what it means to be engaged employees and citizens who can think critically and creatively in complex environments, and who can apply knowledge in a variety of contexts by applying tools effectively, working collaboratively, and acting ethically. Ongoing impacts as a result of the COVID-19 pandemic has had dampening impacts to the performance targets that were identified and set in the latter half of 2019, however, opportunities to attract workers for retraining as the economy struggles to rebound may allow for a quicker enrollment recovery once communities are fully open and operational. Additionally, DACC has several initiatives underway to assist and retain students during the closures and movement of courses to on-line modalities during the height of the pandemic as well as the implementation of enhanced teaching modalities identified, implemented, and improved in response to the pandemic. Initiatives include large scale campaigns to reach out to students and provide assistance, setting up parking lot Wi-Fi for students who cannot access Internet services from home; providing technology to students with demonstrated need to insure they have the capabilities to access learning management systems and classroom tools and support, moving all student support systems on-line to insure virtual access and support, planning and adjusting fall classroom schedules in order to provide Covid safe practices to allow for face-to-face instruction for those CTE programs where hands on training and evaluation is required as well as providing alternative hybrid and flex classroom models to maximize student safety wherever appropriate. Applicable key performance targets that were set prior to the pandemic include: Actual -Targets- Fall 2019 Fall 2020 Fall 2021 Fall 2022 Fall 2023 Fall 2024 Fall 2025 Fall Enrollment 8,172 8,335 8,502 8,672 8,846 9,023 9,203 Actual -Targets- Fall 2018 Fall 2019 Fall 2020 Fall 2021 Fall 2022 Fall 2023 Fall 2024 Fall 2025 FA to SP Persistence 80% 81% 82% 83% 84% 85% 86% 87% FA to FA Retention 58% 59% 60% 61% 62% 63% 64% 65% Actual -Targets- Fall 2015 Fall 2016 Fall 2017 Fall 2018 Fall 2019 Fall 2020 Fall 2021 Fall 2022 150% Graduation Rate 10% 11% 12% 13% 14% 15% 16% 17% 200% Graduation Rate 17% 18% 19% 20% 21% 22% 23% 24% note: graduation rates are based on cohort graduation and represent a lag in reporting.

Measure B2: Projects impact on education and workforce needs in local and regional economies

B2 Score Substantially

B2 Explanation This chilled water project supports both the mission and strategic goals that are necessary to support and enhance enrollment growth and student success. The necessity for support of the HVAC systems is key to the direct support of the educational programs conducted on the Espina Campus and has become even more critical as we seek to address air movement and replacement as a response to pandemic conditions. DACC also utilizes several additional mechanisms to insure we are integrated, relevant, and responsive to the local and regional workforce. 1) DACC contracts with a consulting firm, Gray's Associates, to assist with resource planning with a comprehensive plan that evaluates job market data in Dona Ana County to inform DACC individual program development and resource allocation. Gray's planning utilizes data from four primary areas to prioritize existing and new program growth and development. 1) Student demand data (i.e student inquires, google searches). 2) Employment data which includes job growth and market saturation. 3. Strategic fit which looks at degree levels and wages to identify the fit of programs to our institutional focus and market. 4) Competitive intensity which incorporates the density and saturation of competition. 2) DACC utilizes individual Career Technical Education (CTE) program advisory boards consisting of representatives from local industry and business leaders. Additionally, DACC actively works 3) DACC partners with community-based organizations in all areas of Dona Ana County to include but are not limited to: The Bridge of Southern New Mexico – The Bridge is an innovative public-private partnership connecting key leaders from business, economic development, government and education. The Bridge's success includes increased use of dual credit, improved retention rates in high school and the development of the Arrowhead Park Early College High School. Mesilla Valley Economic Development Alliance – As one of the leading economic development agencies in New Mexico, MVEDA is committed to providing premium site selection and business expansion services, without charge, to all qualified economic-based employers seeking assistance. The Borderplex Alliance - a nonprofit organization dedicated to economic development and policy advocacy in the El Paso, Las Cruces, and Cd. Juarez region. The Greater Las Cruces Chamber(s) of Commerce – DACC is an active participant in the Greater Las Cruces Chamber of Commerce, The Las Cruces Hispanic Chamber of Commerce, and the Las Cruces Green Chamber of Commerce. 4) DACC participates in local business and industry networks to secure placements in internships, cooperative education, as well as clinical and practicum opportunities. While many of these mechanisms have been limited as a result of the pandemic, DACC has continued to work with local and regional partners to promote student and community success.

Measure B3: Projects support of HEI Strategic Plan or Facility Master Plan

Demonstrate project alignment with institutional mission and how project advances the institution's strategic or facility master plan.

B3 Score Substantially **Master Plan** **Master Plan Link**

B3 Explanation This chilled water system replacement is the top priority for 2022-23 in the DACC institutional 5 year plan. The project is a key priority of the infrastructure improvement funds outlined in the DACC 2019-2026 Facilities Master Plan and and supports the DACC strategic plan to enhance and support student success. DACC maintains a BRR list a list of infrastructure systems and projected replacement schedules. The DACC Facilities Master Plan guided the capital improvement planning by identifying the specific and general needs anticipated from 2019 to 2026 through a planning process that is: • Inclusive – involves DACC

administration, staff, students, and NMSU facilities planning representatives. • Data Driven o DACC Strategic Planning o Enrollment projections based on demographic and peer analysis o Facilities utilization analysis • Supported and adopted by DACC Advisory Board and NMSU Board of Regents. The DACC master plan broke out major functional priorities based on the following primary categories: o Area Security/Safety Upgrades o Infrastructure Improvements o Classroom Upgrades/Facility Renewal/Renovations

Measure B4: Facilities Assessment

Provide the facility's most recent condition score and summarize the major structural and systems conditions that resulted in that score. Provide selected supporting documentation in appendices and reference them in the body of the proposal.

B4 Level of Study Completed	Somewhat	**Study**	**Study Link**
Cost to Repair	$0	**Cost to Replace**	$0
Replacement Cost Basis ($ per SF)	$0	**Cost to Repair AFTER Project**	$0

B4 Explanation For this project, the facility is the chilled water systems servicing multiple buildings on the DACC Espina Campus. In consultation with RBM Engineering Associates, see attached review, and based on the attached Budgetary Estimate provided by NMSU Project Development and Engineering, this is a high priority replacement and is identified as the number one priority for DACC 5 year plan.

Measure B5: Projects impact on On–campus and Off-campus Instruction

Provide information on how this project request will support both on-campus and off-campus instruction.

B5 Score Substantially

B5 Explanation In order to meet the increased demand for online/virtual modes of instruction as well as virtual student services, and business support and communication, the repair and maintenance of key building infrastructure systems supports both on-campus and off-campus instruction by serving the key institutional technology systems and equipment necessary to accomplish and serve these multiple modalities.

C. Green Screen for Buildings

Measure C1: Energy Audit or similar energy assessment

Document details of the audit to include who performed the audit, when it was completed, level of audit/assessment, improvements proposed, and benefits to this project

C1 Score	Substantially		
Energy Audit Completed	(•) Yes ( ) No	**Energy Audit**	**Energy Audit Link**

C1 Explanation In 2013 Ameresco preformed an investment grade audit of 46 of NMSU's buildings throughout the state, totaling nearly 2.7 million gross square feet. The audit included the facilities at Alamogordo, Carlsbad, Dona Ana Community College (DACC), Grants, remote Agricultural Science Centers, and all buildings on the main campus. NMSU also employees two Certified Energy Managers (CEM) who can look at the potential energy savings of projects. A goal of the upgrades to the Alex Sanchez Hall chiller and cooling tower replacement is to increase energy efficiency; a possible reduction in the coast of operating the building; and improve comfort to all occupants. Installation of an energy efficient cooling tower and chiller replacement, as budget allows. Although this project will not be LEED certified, it will be designed using any possible sustainability or energy-conserving techniques that could apply. In general, any improvement to the campus building infrastructure will result in increased efficiency and a corresponding reduction in energy costs. List of Green Screen strategies that will be incorporated in the project during construction include: • Construction waste management principles will be followed during the demolition. • Recycling of applicable materials. • Construction waste management principles followed during construction.

Measure C2: Projects impact on Energy / Utility Cost Reduction

Explain the impact of this project to the net energy / utility costs. Provide a justification if no operating budget impact is anticipated.

Current Energy Usage	$0	**Energy Usage AFTER Project**	$0

C2 Explanation NMSU's building guidelines includes policies to encouraging energy reduction with nearly every project. Additionally, there have been specific projects focusing on energy reduction such as the Ameresco projects. With each project resulting in energy savings there will also be a utility cost savings which can result in an observable change. When the equipment is replaced with more a system with increased efficiency there will be a reduction in costs. However, the equipment change can also change the system maintenance requirements as well and without knowing what the replacement system will be we are unable to make accurate predictions.

Measure C3: Executive Order (EO) 2019-003

Provide detailed information on how this project will address the goal of reducing Green House Gas (GHG) emissions by 45% as called for in the EO. Explain the steps taken to reduce the buildings energy demands.

C3 Score Somewhat

C3 Explanation For main campus over 95% of NMSU's scope 1 and 2 emissions are building emissions a similar distribution of emissions is expected for DACC as well. Reaching the goals within EO 2019 -003 for greenhouse gas emission reduction, remodeling and updating existing infrastructure will be required. NMSU building guidelines insure projects keep in mind sustainable infrastructure and planning, energy efficiency technologies, and more.

D. Stewardship - Detail how the HEI provides stewardship for its assets.

Measure D1: Project Estimates

Describe how this projects cost estimates were developed. Provide the total dollars attributed to inflation. Percentage increases MUST be defended in the narrative portion of the document, or 0% inflation will be assumed.

D1 Score	Substantially		
Base Project Estimate	$644,047	**Dollars Related to Inflation**	$23,421
Formal Estimate Provided	(•) Yes ( ) No	**Formal Estimate**	**Estimate Link**

D1 Explanation

The process for determining the capital outlay needs begins with the University Architect (UA), who stays in touch with the needs of the education enterprise through communication on various levels. Each year, the University Architect and Associate Vice President for Facilities and Services set up an in-person meeting with the Deans of the Colleges to review the capital outlay requests for the year. The Capital Outlay Briefing is presented to the University Administrative Council, and the flowchart that outlines the process for a project concept to become a priority on NMSU's Five Year Facilities Plan. Project champions (presidents, deans, and vice presidents) submit a Capital Project Proposal Form with justification, business plan, supporting data, and sketches/drawings. The Project Request Form (PRF) is generated; the project is reviewed for compliance with the campus master plan document; and forwarded to Project Development and Engineering (PDE) for a preliminary estimate. The estimate is then assigned directly to the in-house professional estimator, Senior Project Manager. The scope of work is determined with the relevant stakeholders and UA. Budgetary estimates are produced with the use of 2020 ProEst Estimating Software that is built using the current RS Means database. Note that the in-house professional estimator with Facilities and Services PDE must meet satisfactory evidence of the necessary qualifications as required by the Certifying Body of the American Society of Professional Estimators. The Executive Director for PDE reviews the proposed costs to confirm the estimate is reasonable and accurate. Then the AVP of Facilities reports to the Administration for further action and/or inclusion into Capital Outlay or University Capital Plans. Budgetary estimates older than a year are reviewed and adjusted for inflation as part of the capital outlay process, and incorporation to the current campus Five Year Facilities Plans.

Measure D2: Describe how this project addresses/reduces deferred maintenance on campus

Deferred Maintenance	$0	**Deffered Maintenance AFTER Project**	$0

D2 Explanation

The existing chiller has seen increased in maintenance costs over the last several years. Service records indicate a control panel failure, and increased evaporator cleaning and service. Tube leaks were repaired in 2018. Regular preventative and annual maintenance costs have increased significantly due to the use of R-22 refrigerant. This is a phased out refrigerant and availability is extremely limited. To do any service, it must be carefully captured and replacement of even a small amount is very expensive. Normal annual service for a unit this size is $3,000.00. The tower has significant issues with the water sump and media fill. The tower enclosure panels are showing corrosion at the seams and fasteners. The water sump is in the process of failing as continual leaks are observed around the base along the unit perimeter. Leaks are repaired as best as possible by DACC Facilities Techs and while not costly they do effect system efficiency. Corrective costs have decreased in FY20 and 21 due to the chiller and tower being "off-line" and used only for Emergency's or during maintenance on the systems primary "Trane Chiller" A new Chiller and tower will provide the redundancy that we require and significantly decrease Maintenance costs. A fully functioning redundant Chilled water plant is vital to provide for Campus cooling requirements. See attached maintenance analysis for DACC York Chiller and Marley Cooling Tower for preventive and corrective costs by fiscal year totaling $46,853.41 over the past four (4) years.

Measure D3: Asset Stewardship Provide information on how the HEI supports the ongoing operational and maintenance needs of current and proposed assets.

D3 Score	Substantially		
Level of Plan	Substantially	**BRR Plan**	

D3 Explanation

DACC maintains a lists of all building systems to include HVAC systems, fire systems, roofs, and major building envelope items for all buildings and systems on all campuses. Additionally, DACC tracks major infrastructure items such as parking lot surfaces, exterior lighting, and sidewalks/walkways. DACC uses this list to identify and plan for predicted maintenance and replacements based on age and condition of systems. DACC recognizes the importance of keeping up with deferred maintenance and planning for major system repairs and replacements. DACC continues to transfer previously identified amounts per previous formula calculations to BRR and equipment in spite of the relaxation of guidance that would allow DACC to utilize these funds for other operating costs. As these identified amounts do not adequately address ongoing BRR costs, DACC incorporates infrastructure projects and funds into local GO bond funding cycles. When possible, DACC utilizes BRR and Local GO funds to leverage the request and use of state funds for large building repair and maintenance projects such as roofs and cooling tower replacements.

Measure D4: Maintenance Cost Reduction

Describe in detail how this project will affect operating appropriations for the current year and all out-years. Provide a justification if no operating budget impact is anticipated.

Total O&M Budget	$0	**Total O&M Budget AFTER Project**	$0

D4 Explanation

It is anticipated that the replacement of the York Chiller, replaced in 2000, will provide several system efficiencies resulting in decreases to existing operating costs. First, this chiller operates on R-22 refrigerant. The procurement of this refrigerant over the past two years has been extremely difficult and costs have been exorbitant. Our vendors tell us we may no longer be able to purchase this refrigerant at any price as it is in such high demand due the fact it is being phased out and will soon be illegal to sell or purchase. Secondly, the other part of this project is the replacement of the cooling tower which will address cost inefficiencies currently experienced due to the age and corrosion causing leaks in the current tower. Finally, the update and replacement of these key systems will allow us to capture savings based on increases to energy efficiencies based on new and improved technologies as well as allow us to better distribute the workload between our two HVAC systems. With adequate redundancy we can ensure proper and timely maintenance of both systems thus increasing the lives of these systems.

Measure D5: Health, safety, and security

Describe how this project will address major health and safety issues/concerns on campus, including how it will improve physical safety and cybersecurity on campus. Provide selected supporting documentation and reference them in the body of the proposal.

D5 Score Two or more plans

Level of Plan Level 1

HSS Plan

D5 Explanation

Adopted as an appendix to the NMSU Campus Master Plan 2017-2027, the NMSU Dona Ana Community College 2019-2026 Facilities Master Plan, completed by Architectural Research Consultants, Inc. and dated March 2019, identifies Infrastructure Improvements, through data driven analysis, as a primary category. Infrastructure Improvements are specific projects in the master plan for funds for maintenance and repair, and site development to DACC sites. Chillers are essential to the heating, ventilation and air conditioning (HVAC) systems that dehumidify and cool an entire building. This system has the sole purpose of creating a comfortable interior environment. The use of chiller enhances human comfort and become a hazard if operated in the wrong way. The existing York chiller operations on R-22 refrigerant, also known as Freon and hydro-chlorofluorocarbon, or HCFC-22, has been banned in all 50 states, due to evidence that it damages the Earth's ozone layer and contribute to global warming. Replacing the older chiller with lead to better energy efficiency, better performance and balanced temperatures throughout the facility.

Appropriation Lanaguage $650,000 to plan, design, construct, renovate, furnish and equip cooling tower and chiller components and replacement for chilled water infrastructure at Espina Campus at New Mexico State University- Dona Ana Community College.

Follow up Questions

Starting Fiscal Year	2021	**Expense Type**	
Planned Project Start		**Planned Project Finish**	
Investment to Date	$0	**Funds Needed By**	
Discounting Switch	Off	**% Complete**	0%

	2022:	2023:	2024:	2025:
Discount Rates	0.00%	0.00%	0.00%	0.00%

Forecast

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total	Notes
Pre-Project							**Definition: Non-recurring cost to get to an approved and funded project.**
Internal Staff Labor $	$0	$0	$0	$0	$0	$0	
Internal Contract Labor $	$0	$0	$0	$0	$0	$0	
External Staff Labor $	$0	$0	$0	$0	$0	$0	
External Contract Labor $	$0	$0	$0	$0	$0	$0	
Software $	$0	$0	$0	$0	$0	$0	
Hardware $	$0	$0	$0	$0	$0	$0	
Facilities and Power $	$0	$0	$0	$0	$0	$0	
Internal Services $	$0	$0	$0	$0	$0	$0	
Outside Services $	$0	$0	$0	$0	$0	$0	
Telecom $	$0	$0	$0	$0	$0	$0	
Other $	$0	$0	$0	$0	$0	$0	
Total Pre-Project	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Project							**Definition: Non-recurring cost to implement and field the product or service.**
Internal Staff Labor $	$0	$0	$0	$0	$0	$0	
Internal Contract Labor $	$0	$0	$0	$0	$0	$0	
External Staff Labor $	$0	$0	$0	$0	$0	$0	
External Contract Labor $	$0	$0	$0	$0	$0	$0	
Software $	$0	$0	$0	$0	$0	$0	
Hardware $	$0	$0	$0	$0	$0	$0	
Facilities and Power $	$0	$0	$0	$0	$0	$0	
Internal Services $	$0	$0	$0	$0	$0	$0	
Outside Services $	$0	$0	$0	$0	$0	$0	
Telecom $	$0	$0	$0	$0	$0	$0	
Other $	$0	$0	$0	$0	$0	$0	
Total Project	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Post-Project							**Definition: Recurring cost to support the product or service through the end of the planning horizon.**
Internal Staff Labor $	$0	$0	$0	$0	$0	$0	
Internal Contract Labor $	$0	$0	$0	$0	$0	$0	
External Staff Labor $	$0	$0	$0	$0	$0	$0	
External Contract Labor $	$0	$0	$0	$0	$0	$0	
Software $	$0	$0	$0	$0	$0	$0	
Hardware $	$0	$0	$0	$0	$0	$0	
Facilities and Power $	$0	$0	$0	$0	$0	$0	
Internal Services $	$0	$0	$0	$0	$0	$0	
Outside Services $	$0	$0	$0	$0	$0	$0	
Telecom $	$0	$0	$0	$0	$0	$0	
Other $	$0	$0	$0	$0	$0	$0	
Total Post-Project	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	
Total Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	

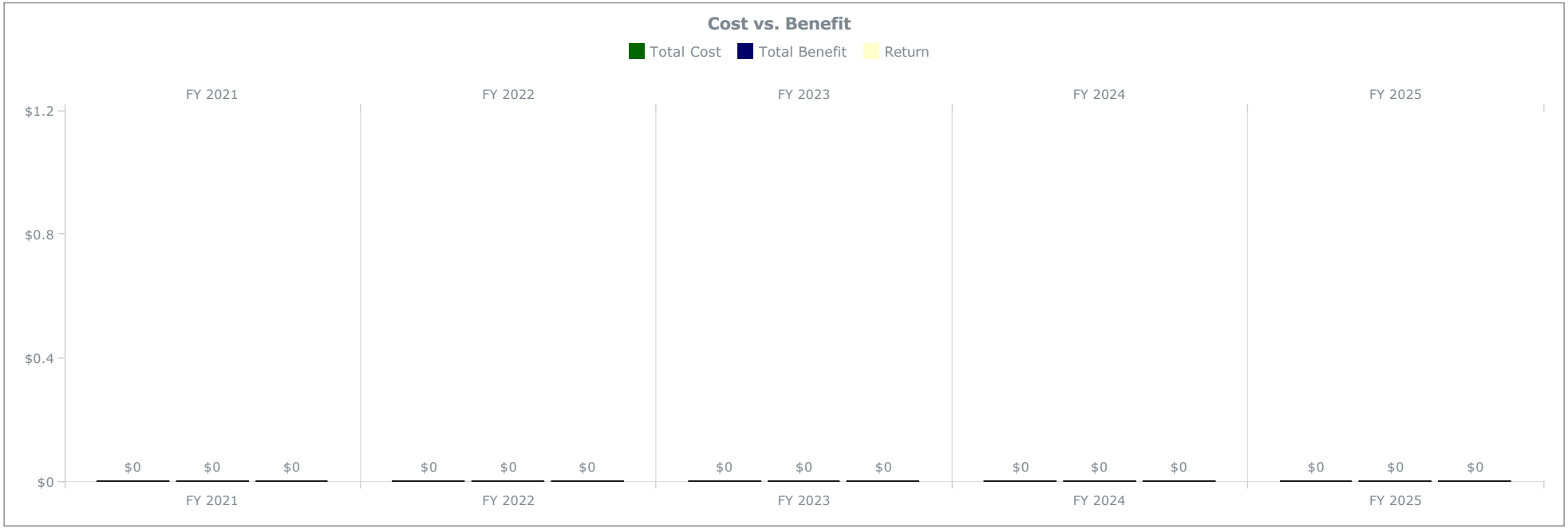
	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total	Notes
Revenue							Definition: Incoming revenue associated with the product or service.
<Source 1> $	$0	$0	$0	$0	$0	$0	
<Source 2> $	$0	$0	$0	$0	$0	$0	
<Source 3> $	$0	$0	$0	$0	$0	$0	
<Source 4> $	$0	$0	$0	$0	$0	$0	
<Source 5> $	$0	$0	$0	$0	$0	$0	
<Source 6> $	$0	$0	$0	$0	$0	$0	
<Source 7> $	$0	$0	$0	$0	$0	$0	
<Source 8> $	$0	$0	$0	$0	$0	$0	
Total Revenue	$0	$0	$0	$0	$0	$0	
Cost Reduction							Definition: Money saved that is being spent today. True cost take-out.
Internal Staff Labor $	$0	$0	$0	$0	$0	$0	
Internal Contract Labor $	$0	$0	$0	$0	$0	$0	
External Staff Labor $	$0	$0	$0	$0	$0	$0	
External Contract Labor $	$0	$0	$0	$0	$0	$0	
Software $	$0	$0	$0	$0	$0	$0	
Hardware $	$0	$0	$0	$0	$0	$0	
Facilities and Power $	$0	$0	$0	$0	$0	$0	
Internal Services $	$0	$0	$0	$0	$0	$0	
Outside Services $	$0	$0	$0	$0	$0	$0	
Telecom $	$0	$0	$0	$0	$0	$0	
Other $	$0	$0	$0	$0	$0	$0	
Total Cost Reduction	$0	$0	$0	$0	$0	$0	
Cost Avoidance							Definition: Preventing money from having to be spent that is not currently being spent today.
Internal Staff Labor $	$0	$0	$0	$0	$0	$0	
Internal Contract Labor $	$0	$0	$0	$0	$0	$0	
External Staff Labor $	$0	$0	$0	$0	$0	$0	
External Contract Labor $	$0	$0	$0	$0	$0	$0	
Software $	$0	$0	$0	$0	$0	$0	
Hardware $	$0	$0	$0	$0	$0	$0	
Facilities and Power $	$0	$0	$0	$0	$0	$0	
Internal Services $	$0	$0	$0	$0	$0	$0	
Outside Services $	$0	$0	$0	$0	$0	$0	
Telecom $	$0	$0	$0	$0	$0	$0	
Other $	$0	$0	$0	$0	$0	$0	
Total Cost Avoidance	$0	$0	$0	$0	$0	$0	
Total Benefit	$0	$0	$0	$0	$0	$0	

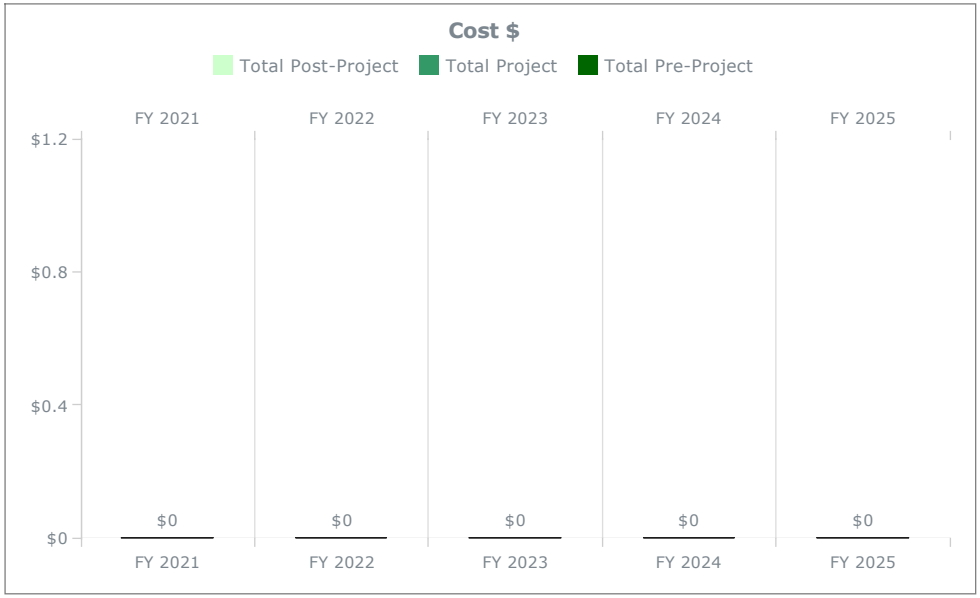
	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total
Total Pre-Project	$0	$0	$0	$0	$0	$0
Total Project	$0	$0	$0	$0	$0	$0
Total Post-Project	$0	$0	$0	$0	$0	$0
Total Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Revenue	$0	$0	$0	$0	$0	$0
Total Cost Reduction	$0	$0	$0	$0	$0	$0
Total Cost Avoidance	$0	$0	$0	$0	$0	$0
Total Benefit	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Return	$0	$0	$0	$0	$0	$0
Cumulative Return	$0	$0	$0	$0	$0	$0
ROI %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cumulative ROI %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

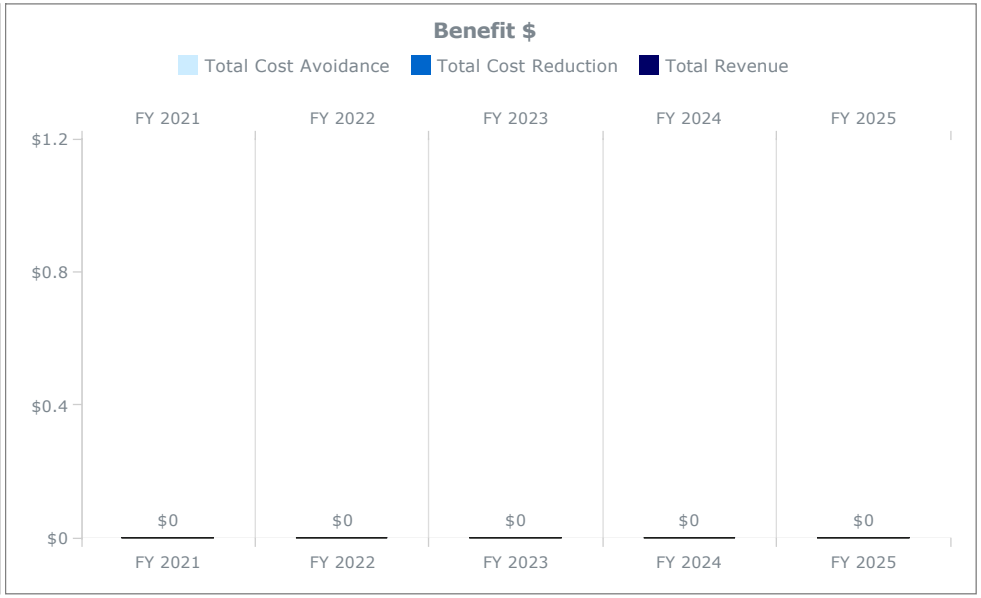
Results

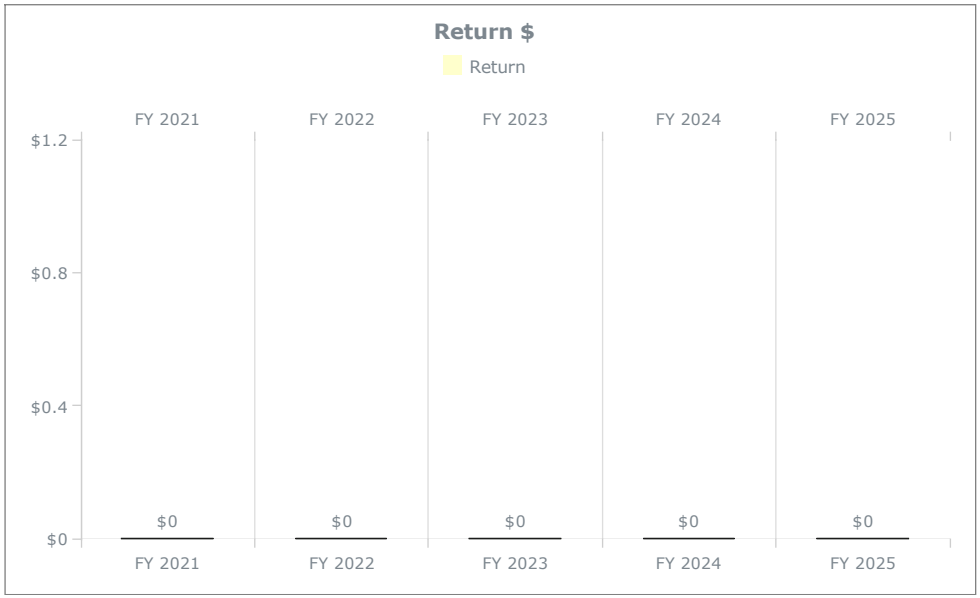
Total Investment Required (i.e. Total Cost):	**$0**	**Return $:**	**$0**	**Revenue % of Total Benefit:**	**0.00%**
Investment to Date: (i.e. $ Spent so far):	**$0**	**ROI %:**	**0.00%**	**Cost Reduction % of Total Benefit:**	**0.00%**
Investment Remaining to Go:	**$0**	**Payback Period (in Years):**	**0.00**	**Cost Avoidance % of Total Benefit:**	**0.00%**

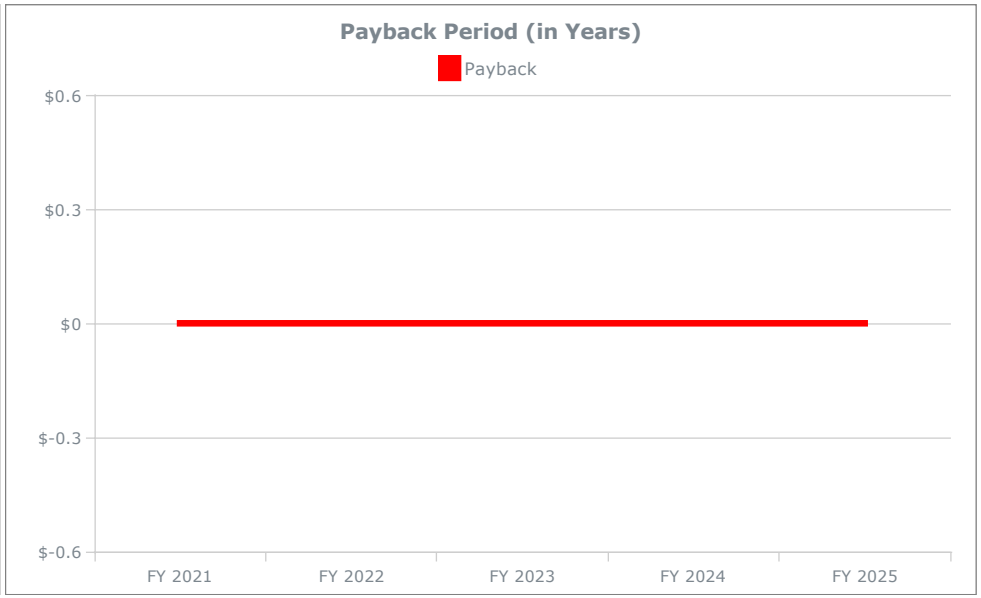
Notes: 1) These metrics are designed to depict the strength of the business case by the type of benefit. A business case that has its strength in cost avoidance, particularly in the out-years, is not as strong a business case as one that commits to benefits earlier or that delivers cost reduction. 2) The payback period is the length of time required to recover the cost of the investment.




Cost $
Total Post-Project
Total Project
Total Pre-Project
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025
$1.2
$0.8
$0.4
$0
$0
$0
$0
$0
$0
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025


Benefit $
Total Cost Avoidance
Total Cost Reduction
Total Revenue
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025
$1.2
$0.8
$0.4
$0
$0
$0
$0
$0
$0
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025


Return $
Return
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025
$1.2
$0.8
$0.4
$0
$0
$0
$0
$0
$0
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025


Payback Period (in Years)
Payback
$0.6
$0.3
$0
$-0.3
$-0.6
FY 2021
FY 2022
FY 2023
FY 2024
FY 2025