Utah Department of Corrections

BUSINESS SERVICES OPERATIONS RESEARCH EVENT

April 25th, 2026

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I. EXECUTIVE SUMMARY

Utah Department of Corrections Disclaimer

This report, titled "Business Services Operations Research Event," was authored and prepared by independent student interns. The views, findings, conclusions, and strategic proposals expressed herein are solely those of the student authors and do not necessarily reflect the official policy, position, or endorsement of the Utah Department of Corrections or the Utah Department of Government Operations.

INTRODUCTION

Overview of Organization

The State of Utah ("the State")

As the overarching authority for Utah's regulatory and environmental operations, the State is actively addressing the region's unique air quality challenges. Utah's geography—characterized by mountain-rimmed valleys—frequently triggers thermal inversions that trap pollutants until cleared by weather fronts. As the host of the 2034 Winter Olympic Games, Utah's air quality will be showcased on screens around the world. The State has implemented a Climate-Positive Olympics initiative, promising to improve air quality and environmental health throughout Utah with the intent that a positive climate impact will improve public health and tourism.

Government Operations ("GovOps")

The State's GovOps department provides central administrative and operational support to all state agencies, managing infrastructure construction, finance, procurement, and fleet services.

The Utah Department of Corrections ("Corrections")

Corrections operates the State's prisons with a dedicated workforce of over 2,000 employees, overseeing operations, custody, health services, education, and vocational training for over 3,000 incarcerated persons.

The Utah State Correctional Facility ("the Prison")

The Prison is Utah's largest correctional facility, housing general population, maximum security, and mental health units. The newly constructed Prison is state-of-the art and technologically advanced.

Corporate Social Responsibility (CSR) Overview

Corrections' current CSR efforts include **environmental sustainability**, through water conservation, habitat restoration, greenhouse operations; and **reduced recidivism**, by training incarcerated persons to become certified automotive and maintenance technicians. Its new facility is designed to **reduce energy demand** with efficient landscaping, natural lighting, and advanced technology. Corrections is considering transitioning to **solar power** to cut costs and emissions further. Employee electric vehicle (EV) use is at 15%; however, limited charging access inhibits further EV adoption, thereby limiting reductions in commuting-related emissions.

Objective of Plan

The AIR Initiative is designed to eliminate the Prison's reliance on traditional gas and electrical utilities by transitioning to a rooftop **solar** microgrid. This system uses end-of-life **EV batteries** repurposed from the state fleet to **store surplus energy** for off-peak use, lowering both **operational costs** and CO_2/$PM_{2.5}$ **emissions**. The microgrid will also power 4 new **solar-charging stations** to encourage EV adoption among staff. The Prison will serve as a **pilot** for possible statewide adoption, providing a scalable model for government-led energy independence.

RESEARCH METHODS USED IN THE STUDY

Primary Research

State Employee Meetings: Held **5** in-person and **13** virtual meetings, and exchanged **40+** emails with State, Corrections, and Prison contacts, discussing Prison operations, budgets, CSR efforts, employee satisfaction, and solar feasibility.

Expert Meetings: Met virtually with experts in CSR and EV battery storage for insights on supply chain sustainability, solar conversion, associated cost savings, and using recycled EV batteries for solar energy storage.

Surveys: Surveyed **150** Utah taxpayers to gauge public sentiment on recycling waste materials for Prison use and received a **43%** response rate.

Prison Tour: In-person, guided tour of the Prison to learn about facility planning, staffing, inmate programs, existing power sources, and solar viability.

Secondary Research

Solar: Reviewed government reports on costs, space requirements, and maintenance for converting the Prison to solar with EV battery storage. Researched Utah solar projects for accurate cost and labor data relevant to our initiative.

Costs: Analyzed commercial solar costs, Utah electricity rates, savings from repurposed EV batteries, and applicability of federal tax incentives using state reports and online resources.

Energy Storage: Assessed online data for feasibility and land requirements of EV battery storage systems.

Air: Examined similar initiatives, Utah air quality data, research on the upcoming Olympics, and Prison employee EV survey results to evaluate the feasibility of our plan.

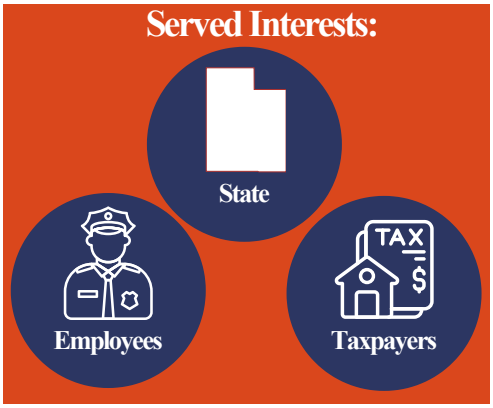
Research Timeline 2025-2026

FINDINGS AND CONCLUSIONS OF THE STUDY

Findings	Conclusions
Utah's $PM_{2.5}$ levels are well above safe exposure and can cause asthma, low birth weight, increased mortality rates, and other respiratory conditions such as COPD.	Utah's air quality poses a threat to tourism for the upcoming Olympics and contributes to increased respiratory disease among state residents.
In terms of solar energy, the Prison has available land, taxpayer interest, and possible inmate training programs for solar maintenance.	The Prison is well-suited for solar panels and can serve as a pilot program for replication in other State agencies.
Repurposed EV battery storage lowers costs, improves energy reliability, increases long-term savings, and is economically feasible for the Prison.	Repurposed EV battery storage is a feasible alternative to regular battery storage for solar energy at the prison.
The upfront investment for solar energy is significant but will result in long-term energy savings over its 25 year useful life.	Solar yields a 100% return on initial capital, delivering ongoing savings to Utah taxpayers.

PROPOSED STRATEGIC PLAN

The AIR Initiative is a three-part plan to address the State's interest in improving air quality, lowering operational costs, and exploring solar power, the taxpayers' interest in reducing government spending, and the Prison employees' interest in additional EV chargers. The AIR Initiative reduces the Prison's natural gas and electricity use by adding solar power and storing excess energy in repurposed end-of-life EV batteries from State fleet vehicles. The AIR Initiative significantly **reduces energy costs while improving the Prison's energy reliability and the State's air quality.** This proposal is a pilot project for review by the State, with the intent of replication in other state agencies. To simplify our plan, we split it into three phases: Assess, Implement, and Reflect.



Assess

In the first phase, we **ASSESS** the feasibility of adding a solar microgrid at the Prison by evaluating site conditions, energy demand, operational constraints, and the use of repurposed EV batteries for energy storage. State policies and comparable projects are reviewed to ensure regulatory alignment, identify cost-saving opportunities, and determine whether the project should advance. The project is then designed and opened to bids in accordance with GovOps procurement policy to ensure regulatory compliance.

Implement

The **IMPLEMENT** phase moves the project from planning to execution through construction and installation while minimizing operational disruption and maintaining safety. The installation, integration, and testing of the solar microgrid, repurposed EV battery storage, and solar-powered EV charging stations will take approximately 6 months. This enables the proper implementation of energy storage and backup power, resulting in reduced operating costs. Incarcerated persons will also be trained and certified on proper solar installation and maintenance and guards trained on related safety precautions.

Reflect

The final phase **REFLECTS** on system performance through ongoing data collection and tracking of energy production, battery efficiency, cost savings, and operational impacts throughout the first year of operation. Results are compiled into performance and cost analyses to support replication at other state facilities and inform future renewable energy initiatives statewide.

Desired Key Metrics

To evaluate the project's overall effectiveness, four key performance indicators were established to measure project success.

40% | **Prison Energy Cost Reduction**
Reduce the Prison's annual energy costs by 40%

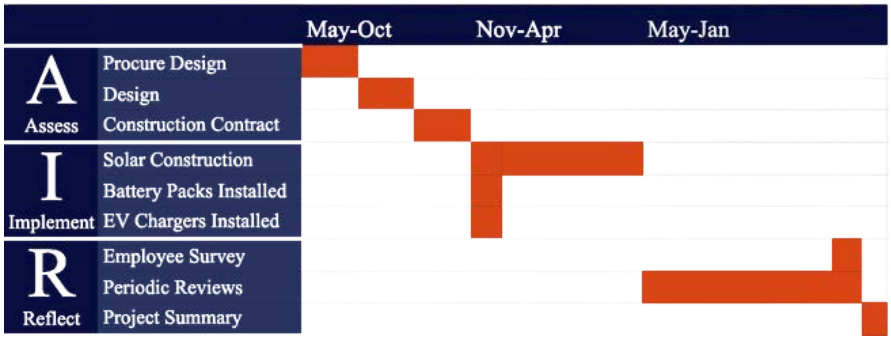
35% | **EV Charger Use**
Increase use of onsite EV chargers by 35%

9,000 | **CO_2 Reduction**
Decrease the Prison's Carbon Dioxide output by 9,000 tons

70% | **Employee Satisfaction**
Boost Corrections employee satisfaction rate to 70%

Timeline

The AIR Initiative follows a phased timeline beginning with assessment, design, and procurement, including construction contracting and system planning. Implementation includes installing solar panels, battery storage, and EV chargers, followed by ongoing evaluation through employee surveys, periodic reviews, and a final project summary.

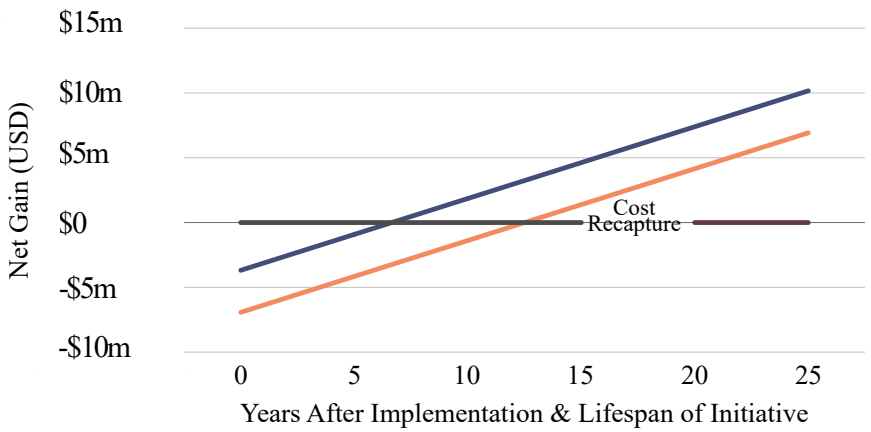


PROPOSED BUDGET

The AIR Initiative costs $3.68 million, just **0.7% of Corrections' predicted 2026 budget**. The majority of the funds are used to acquire solar panels, which trained incarcerated persons will maintain. The plan reduces the Prison's total energy costs by 35%, generating approximately **$550,000 in annual savings**. The initiative has a 7–13 year payback period (dependent on federal tax credits), at which point the cumulative cost savings will fully offset the initial capital outlay. Federal tax credits cover **6%–50%** of costs, depending on construction completion date. The Bipartisan Infrastructure Law could potentially cover additional costs if the project is completed by December 31, 2027.

Activity	Cost
Planning/Design/Scoping	$610,295
EV Battery Conversion	$725,000
Solar Panels	$6,025,500
EV Chargers	$5,600
Data Collection	$3,000
Subtotal	**$7,369,395**
Federal Tax Credits	($400k-3.7million)
Total Cost	**$3.7-6.9 million**

Break-Even Analysis



Return on Investment

Year	Cumulative Investment	Net Savings	Net Gain	Return on Investment
2027	$3,684,697.50	$0	-$3,684,697.50	-100%
2031	$3,684,697.50	$2,216,244	-$1,468,453.50	-39.8%
2035	$3,684,697.50	$4,432,488	+$747,790.50	+20.3%
2039	$3,684,697.50	$6,648,732	+$2,964,034.50	+80.4%

Return on investment is calculated by comparing net annual energy savings against total project costs, accounting for available incentives and reduced battery storage expenses. Savings will reduce ongoing energy costs after the project is paid off.

II. INTRODUCTION

A. Description of the business or organization

The State of Utah ("the State")

The State of Utah ("the State") acts as the overarching governmental authority that defines and directs the state's regulatory, economic, and environmental priorities. As host of the 2034 Winter Olympic Games, the State has committed to a "Climate-Positive" Olympics by improving air quality and environmental health throughout Utah, prioritizing sustainability and community benefits. These benefits include investments in renewable energy, emissions-reduction targets, and conservation efforts. In 2024, the State issued the "Beehive Emissions Reduction Plan," which aims to reduce pollution and greenhouse gas emissions through programs that emphasize electric vehicles (EVs), charging infrastructure, and solar power generation.

Utah Department of Government Operations ("GovOps")

The Department of Government Operations ("GovOps") serves as the central administrative hub for the State's executive branch, providing essential operational support to agencies whose functions are pertinent to this analysis, including the Utah Department of Corrections. GovOps oversees facilities and infrastructure, financial management, purchasing, and fleet management.

Utah Department of Corrections ("Corrections")

The Department of Corrections ("Corrections") manages the State's prison system and is responsible for custody, facility operations, health services, education, vocational training, and reentry programs. As a provider of essential public safety services, Corrections operates under a business services model, delivering rehabilitation and public safety services to its primary customer: Utah taxpayers. In recent years, the department expanded its focus to include efficiency, workforce development, and, recently, air quality management. Corrections created an electric-vehicle (EV) program in partnership with GovOps that provides EV charging stations, converts a large percentage of fleet vehicles to electric power, and trains incarcerated persons to become certified EV maintenance technicians.

Utah State Correctional Facility ("the Prison")

The Prison is Utah's primary state correctional complex. It houses, supervises, and rehabilitates 3,112 male and female incarcerated persons. The Prison is operated by over 2,300 employees who also oversee its maximum-security and mental-health units. In 2022, the Prison relocated from a 70-year-old facility in Draper City to a new, state-of-the-art, 190-acre complex located 20 miles away in Salt Lake City. This relocation was supported by a multimillion-dollar investment that improved physical capacity, maintenance, utilities, and sustainability. The facility relocation significantly impacted the staff, who now face substantially longer commutes.

2,300+
Employees

3,100+
Inmates

190+
Acres of Land

B. Description of the target market (demographics and psychographics)

The Prison, operated by Corrections, functions within a nontraditional market in which its funding and performance evaluation come primarily from Utah taxpayers with additional accountability to the employees who manage and depend on its operations.

Primary Profile

Terri Taxpayer

- 32 years old
- Married with one child
- Marketing Consultant
- Income $93,000
- Owns two cars (one EV)
- Life-long asthma

Secondary Profile

Chris Corrections

- 38 years old
- Single
- Correctional Officer
- Income $79,000
- Owns an EV
- Lives 25 miles from the Prison

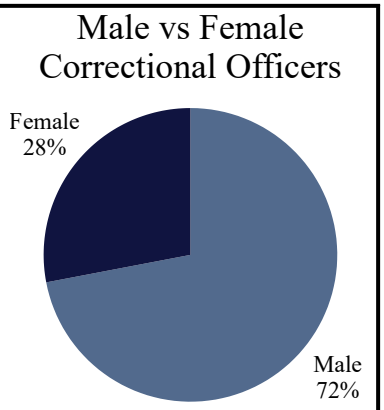
Demographics

Primary

The Prison's primary target market is Utah's 1.4 million taxpayers, who have a median household income of $93,400 and are subject to a 4.5% flat income tax. Married-couple families represent 59.5% of households, single-adult households account for 35.3%, and non-family households comprise 19.4%. Utah households average 2.9 people, have high vehicle ownership and rising EV adoption, and have elevated asthma rates, indicating increasing air-quality concerns.

Secondary

The secondary market is the 2,300 Prison employees, mainly aged 29 to 44, of whom 72% are male. Among these employees, 15.2% regularly commute using EVs or plug-in hybrid vehicles. Prison employees are paid hourly, with pay ranging from $19.75 to $52.83.



Geographics

Primary

Approximately 82.6% of Utah residents live in valleys prone to thermal inversion, which worsens air quality and increases multiple respiratory illnesses, including asthma. Salt Lake City is currently ranked the worst U.S. city for air pollution.

Figure 1a: Utah Mountains on Poor Air Quality Days

Secondary

Most Prison employees reside in Utah County, near the Prison's old location. Since the Prison moved, more than 75% of its employees now have a round-trip commute of 52 miles or more. This additional commuting time reduces productivity and adds to the employees fuel cost burden.

Figure 1b:Old vs New Prison Location

Psychographics

Primary

Utah taxpayers value family, education, and community, and often support fiscally conservative policies. Many support environmental protection, with poor air quality being a primary concern. 73.8% of taxpayers surveyed favor using existing waste materials to lower the cost of operating government buildings, and 61.5% of respondents support programs to cut operating costs at the Prison.

Secondary

Prison employees prioritize safety and community but experience high levels of burnout. In recent years, the Prison has experienced staffing shortages, with employees reporting a "negative organizational culture" and an "us vs. them" mentality. While addressing these issues requires broader changes, providing workplace benefits, such as EV chargers, can show employees they are valued and supported.

C. Overview of the business or organization's current business strategy relating to corporate social responsibility initiatives

Figure 2a: Current sustainability programs include vegetation planting

Brief CSR Overview

The Prison's current CSR efforts focus on environmental sustainability and community impact, including water and resource conservation, and planting native vegetation, with assistance from incarcerated individuals, in partnership with the Utah Department of Environmental Quality (DEQ), to support local deer populations. In addition, the Prison offers incarcerated persons training programs such as greenhouse work and gardening, as well as technical pathways that prepare participants for certifications in fields such as computer science and EV maintenance.

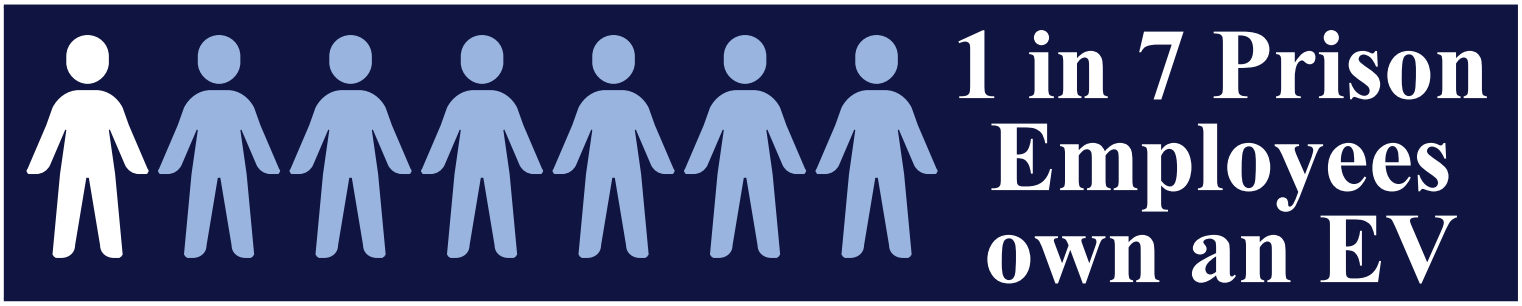
Current Solar Efforts

The design of the new Prison reflects the State's commitment to sustainability and operational efficiency. The new facility was intentionally designed to reduce overall energy demand through strategic landscaping and architectural choices, including eliminating traditional turf grass to minimize irrigation and energy use. Additionally, the building design prioritizes natural lighting through skylights and large windows, reducing reliance on artificial lighting and lowering energy consumption. As one of the most technologically advanced prisons in the United States, the Prison incorporates modern infrastructure that supports future sustainability initiatives, including the potential transition from natural gas and electricity to solar energy, which would further reduce environmental impact and long-term operating costs.

Figure 2b: Corrections certification programs train inmates as certified maintenance technicians

Current EV Efforts

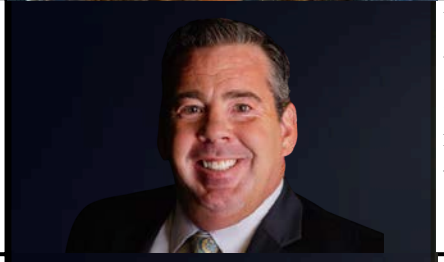
The Prison has also demonstrated progress in transportation sustainability by installing EV charging stations at its new location, where employees were encouraged to charge their vehicles at no cost. This initiative resulted in measurable adoption, with approximately **15.2%** of staff using electric or plug-in hybrid vehicles. However, as both EV adoption and commuting distance increased with the new facility, having only 2 charging stations has led to demand for additional chargers. This trend underscores the need for increased charging capacity at the new facility and the importance of integrating renewable energy solutions that support both efficiency and employee needs.



III. RESEARCH METHODS USED IN THE STUDY

A. Description and rationale of the research methodologies selected to conduct the research study

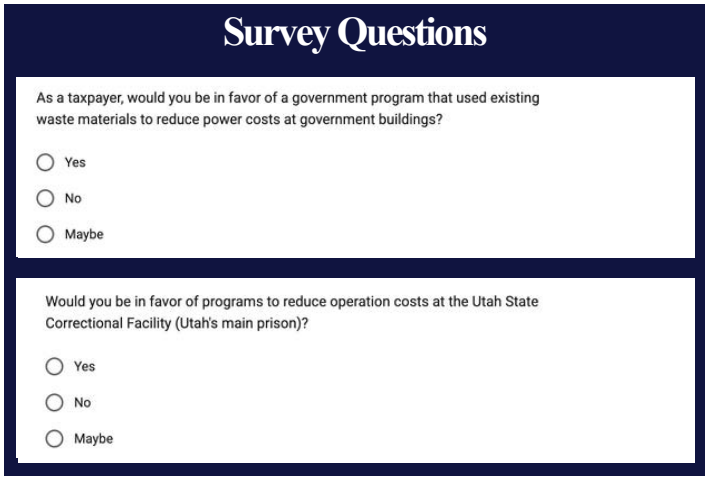
Primary Research

Description		Rationale
In-Person and Virtual Meetings with Michelle Brown (State Coordinator of Resource Stewardship): Organized weekly meetings with Brown, who acted as our State liaison to discuss project status and arrange meetings with State employees. Brown also facilitated the state-level reviews of our analysis and served as our primary contact.		These meetings were critical to understanding how the State, Corrections, and GovOps function and how best to navigate its unique policies and procedures. Brown also provided access to primary State data, addressed encryption issues, and facilitated access to State employees and an onsite tour of the Prison to complete our research.
Virtual Meeting and Text Messages with Wendy Bangerter (CSR Expert): Met with Bangerter, Manager of CSR at Circulor, to discuss the potential to develop environmental policies as cost-saving measures. We also consulted Bangerter on the impact of electrically powered buildings on air quality, the potential for using EV batteries for solar power storage, and the associated costs.		Bangerter is an independent expert in developing CSR policies in corporate environments, specializing in mitigating climate impact, so her views were critical to our understanding of the true cost of our plan. She also helped us understand the impact of high electricity consumption on air quality and how EV batteries can have a second life by serving as energy storage for solar-generated power.
In-Person Meeting with Cory Weeks (Utah GovOps Director of Fleet Operations): Consulted with Weeks to learn more about the State's fleet policies and operations, as well its current EV policies.		Weeks provided insight into the State's fleet vehicle programs, including expected EV lifetimes and its policies on EV battery recycling, as well as offering support for understanding of various secondary research.
In-Person Meeting and Emails with Liam Truchard (Corrections Information Specialist): Met Truchard at the Prison and received a guided tour. Emailed Truchard to request primary operational data and to request insights into daily workflows, security practices, and facility governance for our plan.		Truchard provided an overview of the Prison operations, including employee benefits, incarcerated person populations, and power sources. Truchard also provided access to data about the Prison's current electricity use and employee to incarcerated person ratio.

Description		Rationale
Virtual Meeting with Dr. Hongjie Wang, PhD (Professor of Electrical and Computer Engineering at Utah State University): Spoke with Dr. Wang via Zoom. Dr. Wang's expertise and direct work with EV battery storage systems provided insight into the process and costs of converting EV batteries to solar storage and their use in facilities like the Prison.		Dr. Wang is an expert in EV battery conversion and continues to actively work with the systems. He clarified the process of creating battery storage container converters, the costs of the conversion, and provided a range of resources to strengthen our secondary research.
Virtual Meeting and Emails with Christopher Cox and Sawyer Hill (Utah Division of Facilities Construction & Management (DFCM)): As solar energy became central to our initiative, we consulted Cox and Hill, who oversee Utah's state solar projects, on installation timelines, costs, logistics, and training requirements.		Contacting the State's solar panel experts enabled us to obtain real cost, time, space, and labor estimates that informed our plan. Cox and Hill also provided critical information to our initiative, as well as further research, logistics, and incarcerated person training requirements.
Virtual Meeting with Jennifer Eden (Senior Climate & Clean Energy Associate at Utah Clean Energy): To gain a better understanding of the State's Climate-Positive initiative and its goals, we met virtually with Eden, who is an expert in air quality management and works with Utah Clean Energy on the Climate-Positive initiative for the upcoming Olympics.		Eden provided us with a better understanding of the specific and measurable effects of poor air quality, and different strategies for mitigation. She also aided in calculating the impact of the proposed microgrid on reduced CO_2 and $PM_{2.5}$ before the upcoming Olympics.

Utah Taxpayer Survey: Created and sent a digital survey distributed to a random sample of 150 Utah taxpayers. The survey achieved a 65% response rate, providing a 95% confidence level with a 10% margin of error. This level of participation ensures that the data accurately reflects the broader taxpayer sentiment regarding state-led environmental investments, government spending, environmental policies, and Prison operating costs. Because the Prison is taxpayer-funded, this survey was a crucial step in determining whether taxpayers would support a large initial investment in a solar-powered prison. This data also helped outline the structure of our initiative.

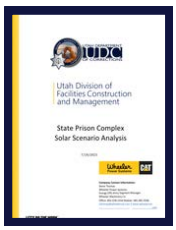
Survey Questions



Research Timeline

2025-2026

Secondary Research

Description	Research	Report Analyzed
State of Utah Reports: 14 State documents were reviewed to inform fleet composition, Prison infrastructure, purchasing requirements, cost strategies, and existing EV recycling policies.	This information was used to evaluate whether existing EV battery management practices could support solar energy storage while complying with existing state policies. We needed reliable data on the electricity consumption of the new Prison's operations in order to assess the impact on air quality and whether converting to solar power would be economically justified.	• Corrections Fleet Overview Reports • 2026 Fleet Purchasing Guide • 2026 ATV Rollout Plan • State Solar Scenario Analysis • Corrections Employee Demographics • PEV Outreach Resources for Your Employees • Alternative Fuels Data Center: Electricity Laws and Incentives in Utah • Maps and Data - Electric Vehicle Laws and Incentives by State • Division of Facilities and Construction Management Architectural/Engineer Fees • October 2024 Purchasing Flow Chart Guide • UDC Employee Demographic Survey • Coordinator of Resource Stewardship Report Prepared in Compliance with Utah Code • Alternative Fuels Data Center: Maps and Data – Electric Vehicle Laws and Incentives by State • 2025 State Vehicle Report
Utah Air Quality Projects: We analyzed existing projects benefitting Utah's air quality, including projects focused on reducing $PM_{2.5}$ emissions and recycling EV batteries.	Our initiative uses research on renewable energy models, Utah's air quality, and EV battery recycling to guide emissions reduction and solar feasibility. These initiatives demonstrate that large-scale renewable energy systems can operate in Utah's fiscally conservative policies and procedures.	• Rocky Mountain Power Blue Sky Project • Utah Clean Energy Projects • Natural Ventures • US DOE Connected Communities • Utah's Public Health Crisis • Health and Environmental Effects of Particulate Matter (PM) • Statewide Poll Identifies Utahns' Top Environmental Concerns
Solar: Guided by our primary interviews, we consulted government and online reports to learn more about acquisition costs, space requirements, and the ongoing maintenance required to convert the Prison to full solar power with EV battery storage.	This research was necessary to determine whether solar power would be a viable option for the Prison's physical location and the financial costs for the construction and maintenance. It was also important to research whether EV battery storage can be integrated into a large correctional facility like the Prison and whether the required resources align with its operational capacity.	• CAT Feasibility Study • PacifiCorp Pre-application Report • Smartville • PacifiCorp Combines Solar PV, Batteries, and Appliances in Buildings across Utah into an Automated Grid Resource • Repurposing EV Batteries for Storing Solar Energy • Commercial Solar + EV Charging: 2026 Guide   Figure 3: State report exemplars providing raw data used in the research analysis
Cost Savings of Solar Energy: We reviewed commercial solar costs, Utah electricity rates, potential savings from repurposed EV batteries, and employee EV survey results to ensure we aligned with State budgetary requirements.	We needed a data-driven understanding of the financial feasibility of a solar and battery storage system at the Prison. Reviewing these reports ensured that our cost projections are accurate, realistic, and aligned with current State energy policies.	• Clean Energy Tax Incentives: Elective Pay Eligible Tax Credits • Elective Pay Overview • Prison PV scenario analysis Wheeler Power Systems • Prison Energy Consumption 2023-2024 • Budgetary Proposal-SLC State Prison Solar Array • Department of Corrections Certified Pay Plan FY2020 HOURLY RATE • Commercial Customer Price Comparison • Solar Photovoltaic System Cost Benchmarks • A Performance Audit of the Utah State Correctional Facility • Prison Operations: Utah State Correctional Facility

B. Process used to conduct the selected research methods

Meetings with Michelle Brown

We originally connected with Brown via email, then met weekly either in person or virtually via Google Meet. Brown served as our primary liaison to the State and helped us coordinate meetings, research activities, and manage follow-up requests throughout the project. Brown provided background information during expert discussions and reviewed materials, allowing us to focus on gathering accurate data while complying with state requirements.

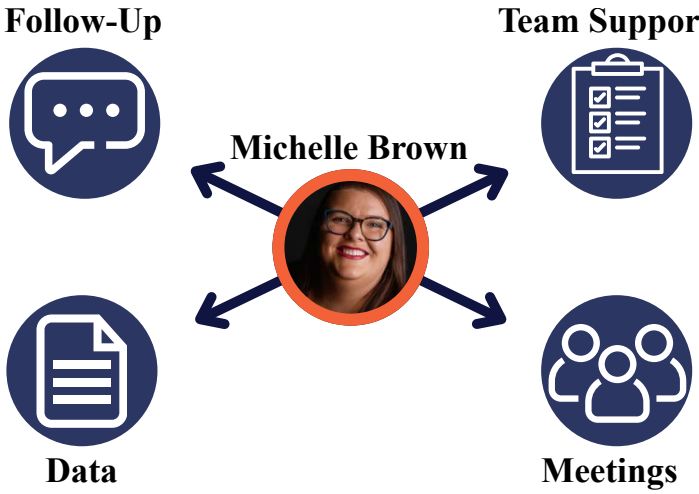


Figure 4a: In-Person Prison Tour with Liam Truchard

Meetings with Liam Truchard

Liam Truchard invited us to tour the Prison, and after passing background checks, we were cleared to enter. Truchard shared valuable insights on employee experiences, the Prison operations, and the creative ways staff adapted to the Prison's move. As our research progressed, we needed further information about the Prison's power generation and usage, so we followed up with Truchard via email to obtain the necessary data. Truchard also completed a final review of our analysis to confirm the accuracy of our data, negotiated the wording of the disclaimer, and ensured that the report aligned with the State's guidelines.

Figure 4b: Meeting with Cory Weeks

Meetings with Cory Weeks

During our initial research, we found that much of the information we had received about the Utah fleet was either protected or difficult to access, and that much of it was unreadable due to strong encryption. Weeks helped us clarify the data and interpret its meaning. Weeks also provided us with a clear understanding of the policies and processes currently used by the State fleet regarding EV battery life and current fleet recycling practices.

Meetings with Chris Cox and Sawyer Hill

Once we learned that the Prison was open to exploring solar energy through Truchard, we contacted Brown to ask about the State's existing solar projects. She connected us to Cox and Hill, who are responsible for all solar projects for the State. To accommodate their schedule, we met via Zoom and subsequently sent follow-up emails with additional questions.

Meetings with Wendy Bangerter

We connected with Wendy Bangerter, a local CSR industry expert, through Zoom and briefed her on the scope of our research, Corrections and GovOps' concerns, and our planned initiative. She explained industry standards for EV supply chains and shared resources on the second life of EV batteries, which helped us refine our approach and further advance our proposed solution.

Meetings with Hongjie Wang

We contacted Dr. Wang over email and held a Zoom meeting. As a Utah State University professor specializing in EV battery conversion, Wang detailed the complex engineering of the conversion process and helped us understand costs, labor, and space requirements.

Figure 5a: Zoom Meeting with Dr. Wang

Meetings with Jennifer Eden

We reached out via email and connected for a Zoom meeting, where we explained our initiative. She offered to aid us in various calculations and provided resources for further study.

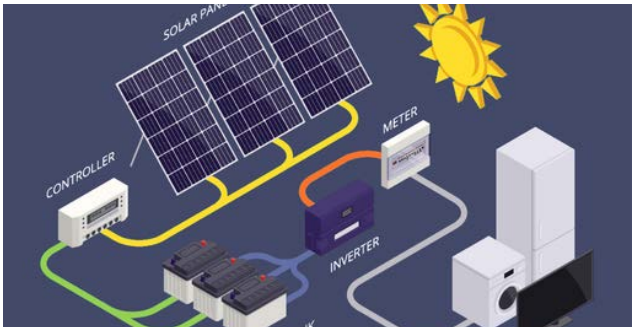


Figure 5b: EV Battery Storage System Conversion Process

Figure 5c: EV Battery Storage System

Utah Taxpayer Survey

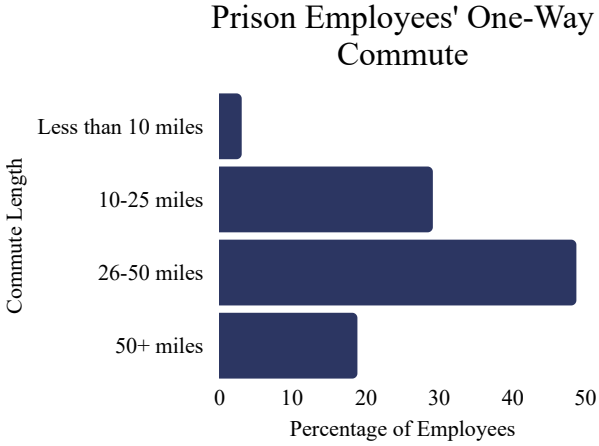
On November 25, 2025, we surveyed 150 Utah taxpayers via email and Google Forms to employees of Jordan School District, asking for a one-day response time. We received 65 responses for a 43% response rate. Survey participants were asked to answer questions to the best of their ability, with an incentive for completing the survey.

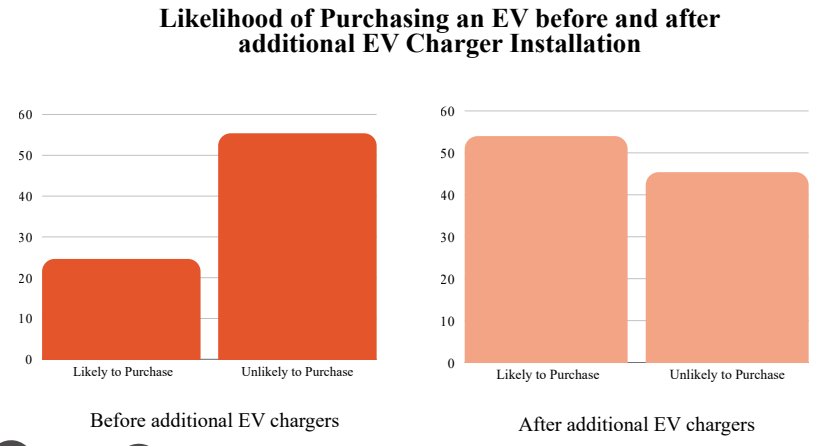
Survey Questions:

- As a taxpayer, would you be in favor of a government program that used existing waste materials to reduce power costs at government buildings?
- Would you be in favor of programs to reduce operational costs at the Utah State Correctional Facility (Utah's main prison)?
- As a taxpayer, I support government programs that require upfront investment if the end result is a net-zero or better payout.
- On a scale of one to ten, please rank the importance of government efficiency (10 most important, 1 take all money as needed)

Secondary Research

For our secondary research, we examined Rocky Mountain Power's Blue Sky Project, Utah Clean Energy initiatives, Natural Ventures' EV battery recycling, and the costs of commercial solar and battery storage. These sources provided insight into renewable energy deployment, battery reuse, and the feasibility of converting EV batteries for solar energy storage. We also evaluated labor, installation, and space requirements, confirming our findings with Christopher Cox and Sawyer Hill. Additionally, a 2025 survey of Prison employees informed our understanding of attitudes toward EVs, charging infrastructure, and travel patterns. We selected sources to reflect current energy markets, Prison operations, and proven renewable energy practices in Utah's climate.





IV. FINDINGS AND CONCLUSIONS OF THE STUDY

A. Findings of the research study

Primary: Interview Findings

Michelle Brown

During our research, the potential for the Prison to serve as a pilot for a statewide solar energy conversion program became a central focus. We found that previous State air pollution grants have supported similar initiatives, and that on-site energy generation could help offset high implementation costs. It became clear that securing funding would allow Corrections to demonstrate feasibility, support expansion to other state agencies, and increase EV charging capacity at the facility. We also identified operational considerations, including the need for supervision and ongoing training of incarcerated individuals, as Prison turnover requires continuous skill development.

Figure 6a: Prison Correctional Officer with Graduating Incarcerated Person

Wendy Bangerter

Upon meeting with Bangerter, she informed us that EV batteries retain about 70% of their capacity after 8–10 years, making them viable for second-life energy storage.

Hongjie Wang

After contacting Bangerter, the use of retired EV batteries for energy storage emerged as a key opportunity. We found that these batteries can be assembled into 500–600 kilowatt-hour packs at a cost of approximately $150,000–$200,000. While assembly requires electrical engineering oversight, much of the installation and maintenance labor could be supported by trained incarcerated individuals. Each battery system takes about 1 week to install, making this a scalable, time-efficient solution.

Cory Weeks

During our meeting with Weeks, we learned that 95% of an EV battery can be recycled and used to make new EV batteries; even after they are no longer useful in vehicles, these batteries can still be repurposed for large-scale energy storage in solar fields, supporting mass energy projects. Additionally, many manufacturers that the State partners with have joined battery recycling programs. Weeks also explained that on inversion days in Utah, the air quality is so poor that the air entering a car's engine is actually dirtier than the air leaving it. Because fleets contribute significantly to emissions, the State is encouraging agencies to reduce their emissions. There is also a statute, the Energy Policy Act, that aims to replace fleet vehicles with alternative-fuel or advanced-technology vehicles.

Chris Cox & Sawyer Hill

Cox and Hill examined the requirements for solar implementation, showing that projects typically require 4–8 acres per megawatt and have a lifespan of 20–25 years. Storage costs average around $500 per kilowatt-hour, and installations under the State generally take about six months to complete. These projects may also incorporate trained incarcerated individuals to support installation and ongoing maintenance.

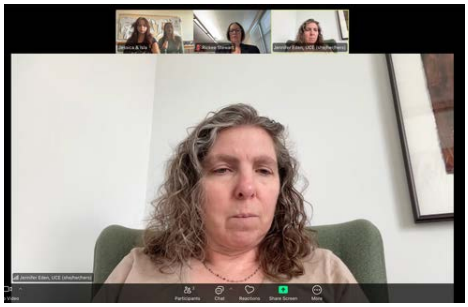
Figure 6b: Incarcerated Persons Working With EV Cars

Jennifer Eden

There is no safe level of exposure to $PM_{2.5}$ and its effects—including increased mortality, low birth weight, and respiratory illness—make air quality a critical concern for Utah residents. With the 2034 Olympics approaching during inversion season, improving air quality is both urgent and measurable. Large-scale, state-supported projects play a key role in advancing these efforts by demonstrating feasibility and setting a precedent for broader adoption. The Prison presents a unique opportunity to lead by example. A 3.5 MW microgrid could eliminate an average of 5,000 tons of CO_2 and 550 pounds of $PM_{2.5}$ annually from the Salt Lake Valley, supporting both public health and the State's clean air goals.

	Original	Post Change	Change
Generation (MWh)	119,763,580	119,751,030	-12,550
Total Emissions from Fossil Generation Fleet			
SO_2 (lb)	57,900,670	57,895,240	-5,430
NO_X (lb)	94,802,500	94,792,230	-10,270
Ozone season NO_X (lb)	38,074,260	38,069,010	-5,250
CO_2 (tons)	87,035,670	87,026,690	-8,980
$PM_{2.5}$ (lb)	10,570,180	10,569,130	-1,050
VOCs (lb)	3,423,340	3,422,980	-360
NH_3 (lb)	2,695,780	2,695,520	-250

Figures 7a & 7b:
Calculated Emissions Reductions with Support from Eden (left)
&
Zoom Meeting with Eden (right)



Primary: In-Person Visits

Tour

The new Prison campus is surrounded by extensive undeveloped land, which serves as a security perimeter to reduce escape risk. Support resources, such as gas and vehicle maintenance, are located up to 25 miles away and are accessible only through highways. This isolation highlights both operational challenges and opportunities, as the available land could be strategically repurposed for expansion or infrastructure improvements. Combined with the Prison's consistently high energy demand—exceeding $1,000,000 in 2024—this creates a strong case for on-site energy solutions.

Figure 7c: Aerial Map of the Prison

Liam Truchard

The Prison is exploring a solar energy program but has not finalized battery storage, despite having a highly advanced infrastructure. The Prison operates like a small city, serving over 3,000 people. Still, it relies heavily on electricity and natural gas and has implemented various CSR measures, such as reduced landscaping, advanced technology, and natural lighting.

Primary: Survey Findings

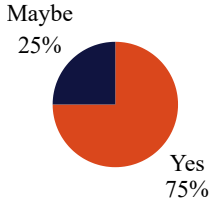
Our survey of 150 Utah taxpayers revealed support for government spending that creates long-term cost savings:

- 73.8% of taxpayers favor using existing waste materials to lower government building energy costs.
- 61.5% of respondents support programs to cut operating costs at the Prison.
- Taxpayers rated government cost efficiency as very important, with an average importance score of 8.33/10.

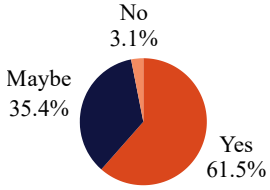
These findings indicate a strong desire for a cost-saving program at the Prison, and that taxpayers would likely approve the costs of an expansion if the program generated cost savings for Prison operations.

As a taxpayer, I support government programs that require upfront investment if the end result is a net-zero or better payout.

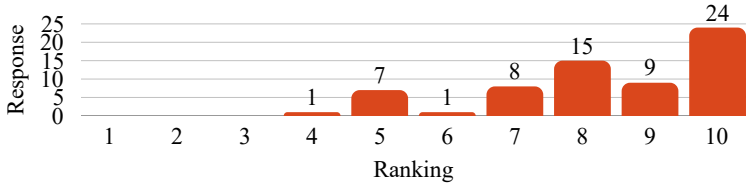
As a taxpayer, would you be in favor of a government program that used existing waste materials to reduce power costs at government buildings?



Would you be in favor of programs to reduce operational costs at the Utah State Correctional Facility (Utah's main prison)?



On a scale of one to ten, please rank the importance of government efficiency (10 most important, 1 take all money as needed)



Secondary: Data

Cost

Utah's electricity prices rose 15.2% from May 2024 through May 2025, the third-highest spike in the nation, and an additional 4.7% increase in price has been approved for 2026. The construction of several large data centers for AI processing justified this increase. Solar panel systems are typically categorized as residential, commercial, or utility-scale, with the Prison best aligned to the commercial cost-estimation. According to the U.S. Department of Energy, commercial solar installation costs range from $1,300 to $1,500 per kilowatt, with a levelized cost of approximately $75/megawatt-hour over the system's lifespan. Rocky Mountain Power's current average commercial electricity rate is $1,337 per kilowatt. Utilizing repurposed EV batteries instead of newly manufactured storage systems further reduces the levelized cost of electricity by an estimated 35%.

Our review of comparable initiatives shows that solar power facilities are practical and well-suited to Utah's distinctive climate. Natural Ventures, Blue Sky, and Utah Clean Energy all have substantial budgets and clear results. They provide models similar to our initiative that include measurable environmental benefits, defined deployment timelines, and tangible economic returns.

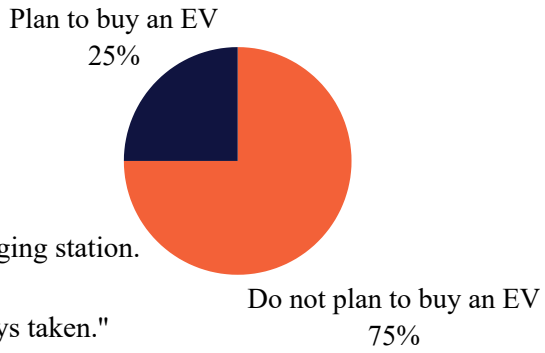
Solar

EV batteries retain 70% of their original capacity after they can no longer be used in a vehicle. Second-life EV battery storage has been successfully implemented in large commercial buildings in California and Belgium. Furthermore, the U.S. Department of Energy enacted the Bipartisan Infrastructure Law, which centers on EV battery repurposing and funds projects to develop second-life applications. The Infrastructure Law provides funding for projects through December 31, 2027. Solar-powered EV charging reduces energy costs and is common for commercial EV chargers.

Figure 8: Smog in the Salt Lake Valley Due to Winter Inversion

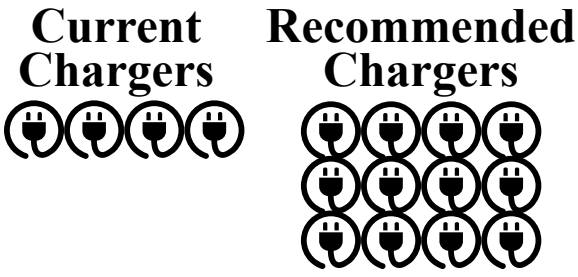
Prison Employee Survey

- 15.5% of respondents drive an EV to work
- 24.6% plan to buy an EV in the future
- Many open-ended responses expressed that there were too few chargers:
  - "I do not usually drive my car to work, because I work days and I cannot find a charging station. They need more charging stations."
  - "I do not drive my electric car to work because I can never get to a charging station. They are always full, and it appears the cars have been there for days."
  - "I quit bringing my electric car to work because the chargers were always taken."



Numerous respondents indicated that increased workplace charging capacity would motivate them to purchase an EV. One employee recommended that the Prison provide a minimum of 12 staff chargers, rather than the current 2 charging stations/4 chargers.

Of the 263 surveyed employees, 40 drive EVs. With 40 employees driving EVs and only 4 chargers available, the charging ratio is 10:1. If the lack of workplace charging forces just 5 staff members to drive gas cars instead of EVs, the environmental impact is significant: each car contributes an additional 45 pounds of CO_2 per commute. Over a year, that's 58,660 pounds of extra CO_2 from only 5 additional gas vehicles.



Air

Utah will host the 2034 Winter Olympics at a time when Utah is more prone to inversion. This is when air pollution is trapped in the Salt Lake Valley, raising State concerns about tourism, public health, and visibility. Poor air quality can pose numerous public health concerns, as shown in Figure 10. Additionally, it may negatively impact Utah's massive tourism industry. Gas-powered vehicles account for over half of Utah's $PM_{2.5}$ emissions, and commercial buildings fueled by natural gas are the second-largest source. Another concern is photochemical smog, which is also common in the Salt Lake Valley. By switching to EVs, the number of internal combustion engine vehicles will be reduced, thereby reducing nitrogen dioxide emissions. This reduction is especially important, as nitrogen dioxide is the primary initiator of photochemical smog. Due to the increased risk of heart and lung disease from particle pollution, Utah's Olympic bid includes a commitment to a "Climate-Positive" approach and improved air quality.

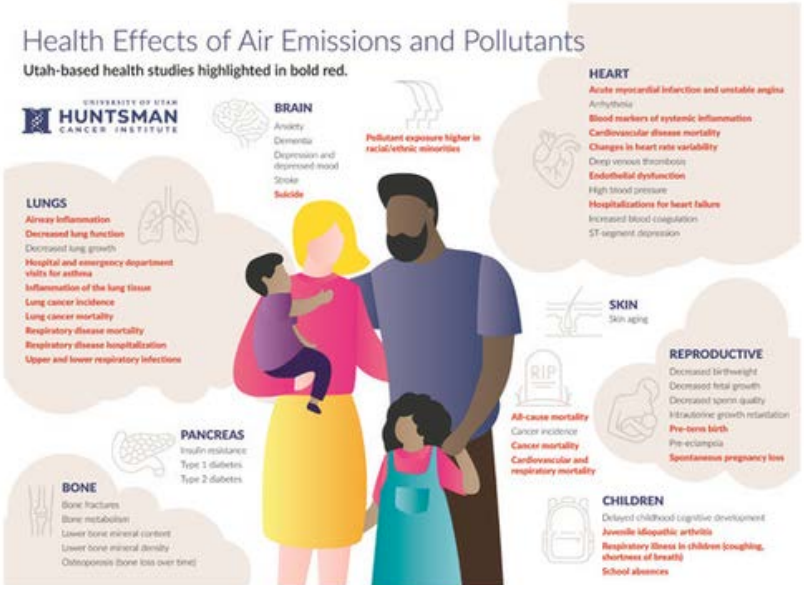


Figure 9: Deleterious Health Effects of Poor Air Quality

B. Conclusions based on the findings

Air Quality:

Utah's air quality presents a growing concern with both economic and public health implications. This issue is particularly relevant in light of the upcoming **2034 Winter Olympics**, as continued poor air quality could **negatively affect tourism** and the State's public image. Prolonged exposure to poor air quality is also associated with adverse health outcomes, including higher rates of asthma and other respiratory illnesses among Utah residents.

Solar Readiness:

The Prison is **well-suited for solar** energy installation, and its infrastructure was built to support solar. Taxpayers are interested in solar technology, and the surrounding undeveloped land provides sufficient space for installing solar panels. Additionally, existing **inmate training programs** could include solar panel maintenance, **reducing long-term operational costs.** Employees have also expressed a significant need to add more EV chargers.

EV Battery Storage:

EV Battery storage systems significantly **reduce energy costs** by capturing excess generation for later use, lowering reliance on grid electricity during peak pricing periods. For the Prison, battery storage **improves energy reliability**, **enhances cost savings** over time, and is **economically feasible** given the Prison's consistently high energy demand, its ability to use **repurposed EV batteries**, and available tax incentives.

Solar Capital Costs:

Although the initial capital investment required for solar conversion is high, the Prison's ongoing operational costs justify this expenditure. Research indicates that long-term energy savings and reduced reliance on natural gas can **offset upfront costs**, making solar power a **financially viable** option for the Prison's large-scale operations.

V. PROPOSED STRATEGIC PLAN

A. Objectives and rationale of the proposed strategic plan

The AIR Initiative is a three-step strategic plan designed to integrate solar panels, battery storage systems, and solar-powered EV chargers as an alternative power source for the Prison's energy needs. Based on feedback from 73.8% of surveyed taxpayers supporting waste-reduction, we pivoted the CSR strategy from standard battery storage to repurposed EV batteries. The core objectives of the AIR Initiative are to reduce energy costs, decrease $PM_{2.5}$ and CO_2 emissions, and improve energy reliability. We will also use the collected data to evaluate system performance, identify areas for improvement, and develop a model for future solar conversion projects at other state facilities. The Prison is an ideal pilot site for the AIR Initiative because of its high energy demand, available land, and controlled environment. Compared to grid reliance, this system reduces utility costs and improves air quality ahead of the 2034 Olympics.

Objectives & Rationale

Assess	**Objective:** To comply with government procurement requirements, we first need to **ASSESS** the Prison's site-specific needs, including available space, current power supply, and the feasibility of incarcerated persons' labor. This preliminary research will confirm the specifications within the project's ideal scope, allow us to fairly compare bids, and define the project's final budget. This phase will also ensure compliance with GovOps design and procurement processes. **Rationale:** A solar project of this scale requires careful planning; defining the project's scope, selecting panel locations, ensuring compliance with government procurement rules, and determining the viability of training incarcerated persons for long-term panel maintenance.
Implement	**Objective:** The **IMPLEMENT** phase will include the construction of a 3.5-megawatt microgrid with integrated EV battery storage systems to enhance energy reliability, as well as the installation of solar-powered EV charging stations. Incarcerated persons will be trained in operations and maintenance, such as dust-cleaning procedures, and officers will be trained in supervision under these new conditions. **Rationale**: This phase ensures that the site is properly prepared, the new equipment is fully installed and integrated into the facility's operations, and that inmates are well trained and securely supervised during both installation and maintenance. Proper installation maximizes efficiency and energy savings, enabling the facility to receive power benefits as quickly as possible. While our original intent was standard battery storage, taxpayer findings led us to pivot to second-life EV batteries as our core storage solution.
Reflect	**Objective:** The final phase requires us to **REFLECT** on the system performance, using tracked energy production, CO_2 emissions, cost savings, and EV charger utilization. Key findings will be compiled into a comprehensive analysis to evaluate the Initiative's effectiveness and inform future statewide implementation. **Rationale**: By gathering and analyzing data, the Prison can verify whether the project met its goals. This insight helps identify operational improvements, informs decision-making for future sustainability initiatives, and provides a model for other state departments to replicate similar energy initiatives.

B. Proposed activities and timelines

ASSESS

The first phase of the AIR Initiative assesses the feasibility of a solar energy system at the Prison by evaluating site-specific conditions. This phase is fulfilled through the research and analysis conducted in this paper. These conditions include available land, structural capacity, electrical infrastructure, energy demand, and security or operational constraints. A key focus is the use of repurposed EV batteries for energy storage, with consideration of availability, capacity, safety standards, monitoring needs, and space requirements. Excess energy generated during daylight hours will be stored in the EV battery systems for use during off-peak hours. Existing state research, policies, and resource stewardship practices are also reviewed to ensure the system aligns with regulatory frameworks. Supplemental research identifies cost-saving opportunities and operational efficiencies by examining comparable projects, alternative models, and maintenance strategies. Findings from this phase guide whether the project moves to design and procurement, with preliminary system design, procurement review, and construction contract planning, each estimated to take approximately six weeks before implementation, due to government procurement processes. Government procurement timelines are lengthy, and projects of this scale require a formal solicitation process through the Utah Division of Purchasing. Contract submissions must undergo review and approval across multiple state divisions to ensure compliance, coordination, and successful implementation.

IMPLEMENT

The implementation phase transitions the project from planning to execution through construction and installation at the Prison. This step focuses on turning approved designs and contracts into reality. All work is scheduled and managed to minimize disruption to daily operations while complying with safety protocols. Solar construction takes approximately six months and includes site preparation, panel mounting, electrical integration, and system testing. Battery pack installation is scheduled for the first week of solar construction to ensure smooth integration with the solar array. Excess generated solar energy will be stored in repurposed, end-of-life EV batteries acquired from the State's fleet. This reduces energy costs while offloading some of the Prison's energy demand. The final step of the implementation phase involves installing solar-powered EV charging stations to improve employee morale. The Prison's powers these chargers. Consistent with Corrections' training directives, the **educational offerings for incarcerated persons will be expanded to include certification in solar mechanics, offsetting the costs of installing and maintaining the microgrid.** The budget will include related costs for proper guard supervision, as well as ancillary costs for security, supervision, stipends, training time, and licensure. These costs can include, for example, the need for a guard to supervise an inmate assigned to a work location outside the Prison's secure perimeter.

Phased Implementation Plan

Step 1: Solar Panel Installation

↓

Step 2: Battery Pack Installation

↓

Step 3: Solar-powered EV Chargers

Proposed Changes to Current Power Structure

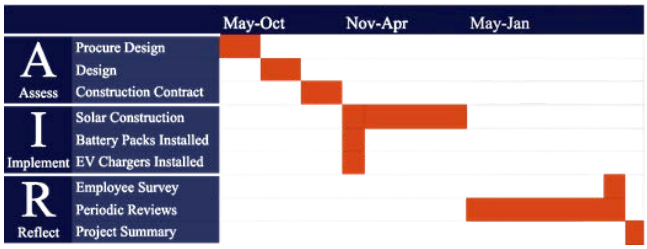
Existing Power (Natural Gas and Electricity)

- **4 Electronically-powered EV Chargers**
- **Rooftop Microgrid with EV Battery Storage**
- **4 Solar-powered EV Chargers**

REFLECT

The final phase focuses on evaluating system performance by analyzing the collected data. Key metrics are tracked monthly during the first year, with multiple reviews. Operational impacts, maintenance needs, and system reliability are assessed, and staff feedback is collected throughout the year to ensure effective performance. A primary goal of this phase is to compile a report for future state projects. After the first year, data is compiled into performance summaries, cost analyses, and guidelines to support replication. Financial impact, energy savings, CO_2 reductions, and system durability are reviewed annually to guide future renewable energy initiatives statewide.

Timeline



C. Proposed metrics or key performance indicators to measure plan effectiveness

To evaluate the project's overall effectiveness, we established key metrics to measure the initiative's success. We aim to remain in the "excellent" range to indicate the pilot is successful and should be replicated across the State.

Metric 1 - Energy Cost Reduction: Financial performance will be measured by analyzing changes in the Prison's annual electricity costs before and after implementation, reflecting the impact of solar production, battery storage, and decreased grid dependence. This analysis will also consider reductions in peak energy pricing and overall cost stability over time. Achieving a 40% or greater decrease in total energy expenses will be classified as excellent performance, with lower reductions used to evaluate progress and guide future improvements.

Metric 2 - CO_2 Emissions Reduction: Environmental impact will be evaluated by estimating avoided CO_2 emissions from both renewable energy generation and increased EV commuting enabled by expanded charging infrastructure at the Prison. Solar production will reduce reliance on fossil fuel-based electricity, while improved charger availability is expected to support higher EV adoption among employees, further lowering transportation-related emissions. Reductions will be evaluated in tons of CO_2 avoided and tracked over time to measure sustained impact. An annual reduction of 9,000 tons or more indicates excellent performance and, as above, lower reductions are used to assess progress and identify opportunities to reduce emissions further.

Metric 3 - EV Charger Utilization: Workplace charging success will be evaluated by analyzing charging station utilization rates. Data collected from charging equipment will track frequency, duration, and peak usage patterns, while employee feedback will provide insight into accessibility, convenience, and overall satisfaction. Increased employee adoption of electric and plug-in hybrid vehicles will indicate that expanded infrastructure is effectively supporting behavioral change. Consistent utilization at or above 35% indicates strong engagement and demand, while lower rates signal gaps in accessibility, awareness, or capacity.

Metric 4 - Employee Retention: Employee responses to the initiative are measured through survey feedback on satisfaction, charging access, and perceptions of workplace sustainability. It is measured through the percentage of positive responses. This metric reflects morale and long-term engagement rather than system output. The AIR Initiative also has the potential to reduce burnout and improve morale, thereby avoiding long-term recruitment and training costs.

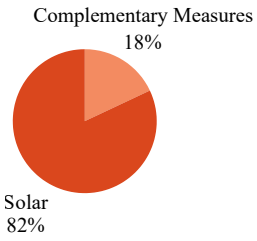
KPI Expectations

Key Performance Indicator	Poor	Fair	Good	Excellent
Cost Reduction	0-10%	10-25%	25-40%	40%+
CO_2 Reduction (tons)	0-2,000	2,000-4,000	4,000-5,000	5000+
EV Charger Use	<14%	15-24%	25-34%	35%+
Employee Retention	<30%	30-49%	50-69%	70%+

KPI Accountability Matrix (RAS Model)

Performance Metric	Target Benchmark	Responsible	Accountable	Support
Cost Reduction	40%	Facilities (Cox & Hill)	State Energy Lead	Operations (Truchard)
CO_2 Reduction (tons)	9,000	Environmental Lead	State Coordinator (Brown)	Utah DEQ Experts
EV Charger Use	35%	Operations (Truchard)	Project Manager (Weeks)	Equipment Vendor
Employee Satisfaction	70%	HR Manager	Warden	Project Authors (Hanson, Homer, Smiley)

VI. PROPOSED BUDGET



The AIR Initiative represents a strategic capital investment of **$3,684,697**, representing just **0.7%** of the Department's 2026 budget. By incorporating taxpayer feedback, which showed 73.8% support for repurposing waste, the project uses second-life EV batteries to achieve immediate **capital savings of $656,900** compared to traditional storage units. Operational efficiency is further enhanced through an **incarcerated-person labor model**. By utilizing trained incarcerated persons for maintenance, the UDC avoids high-cost external service contracts (~$150/hr) and reduces ongoing maintenance costs to a nominal **$435.48 annually** for guard supervision. This "low-overhead" model ensures that **82%** of the budget remains focused on high-yield solar infrastructure, saving the Prison a projected **$2.9 million** by 2039.

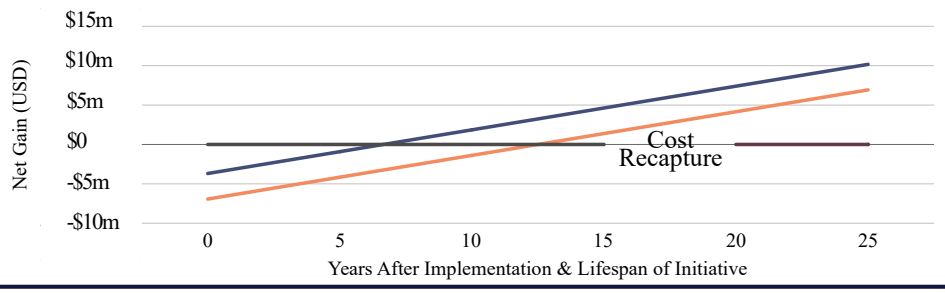
Activity	Calculation	Cost
Planning/Design/Scoping[1]	(9.8%) x ($6,227,500) **9.8% of Construction Costs**	$610,295
EV Battery Solar Energy Storage[2]	($250/kWh) x (1680 kWh) **Battery** (25%) x ($420,000) **Balance of System** ($200,000) **Installation**	$725,000
Solar Panels[3]		$6,025,500
EV Chargers[4]	($900/charger) x (4 chargers) **Chargers** ($500/charger) x (4 chargers) **Installation**	$5,600
Data Collection[5]		$3,000
SUBTOTAL BEFORE TAX CREDITS		$7,369,395
Less Federal Tax Credits[6]	(6%-50%) x ($7,369,395) ($442,163-$3,684,697)	($442,163) to ($3,684,697)
TOTAL AFTER CREDIT		**$3,684,697**

[1] Planning/Design/Scoping: Bid at 9.8% of construction budget based on DFCM estimates
[2] EV Battery Solar Energy Storage: Cost to convert EV batteries, balance of system, and installation provided by Sawyer Hill and Hongjie Wang
[3] Solar Panels: Gardner Energy bid cost
[4] EV Chargers: 4 solar charging stations @ $900 ea. + installation @ $500 ea, provided by GovOps
[5] Approximation of data collection costs based on estimates from DFCM and Sawyer Hill
[6] Total budget depends on the applicability of federal tax credits, covering from 6%-50% of final costs

Costs for the **Assess** phase include planning, design, and project scoping, with estimates provided by Hill and Associates at DFCM based on the defined project scope. These costs are calculated at 9.8% of total construction expenses, aligning with standard state procurement benchmarks. The **Implement** phase costs are derived from bid-based estimates specific to the Prison. Solar installation costs are sourced directly from Gardner Energy's budgetary proposal, while EV battery storage estimates are based on bids from Gardner Energy, Sawyer Hill, and Hongjie Wang. EV charger costs are based on existing state contracts, with data provided by Michelle Brown in coordination with GovOps. During the **Reflect** phase, data collection and evaluation costs are estimated using additional Cx contract expenses, as provided by Sawyer Hill, ensuring accurate tracking of system performance and outcomes.

Break-Even Analysis

The AIR Initiative is expected to be paid off within 7-13 years. Annual savings from solar energy are projected at $554,000. The EV battery storage system and solar panels have a 25-year lifespan, providing many years of low-cost energy. By stabilizing energy costs, improving resilience, and reducing emissions, the AIR Initiative converts a fixed operational expense into a long-term strategic asset.



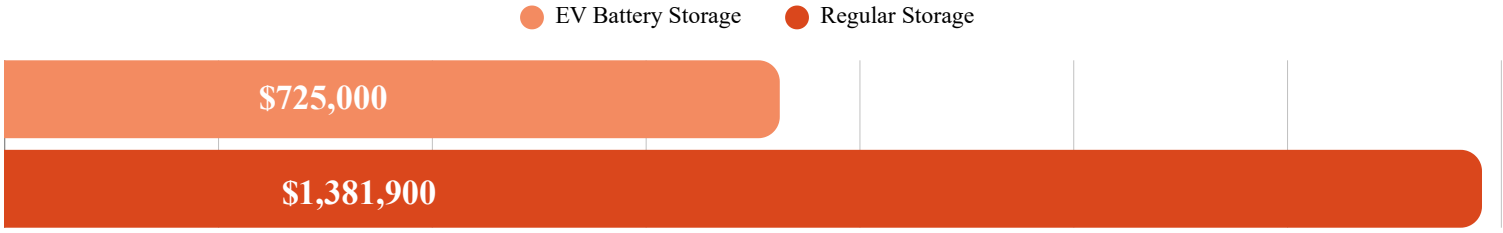
Return on Investment

Return on investment is calculated by comparing net annual energy savings against total project costs, accounting for available incentives and reduced battery storage expenses. Savings will reduce ongoing energy costs after the project is paid off.

Years	Cumulative Investment	Net Savings	Net Gain	Return on Investment
2027	$3,684,697.50	$0	-$3,684,697.50	-100%
2031	$3,684,697.50	$2,216,244	-$1,468,453.50	-39.8%
2035	$3,684,697.50	$4,432,488	+$747,790.50	+20.3%
2039	$3,684,697.50	$6,648,732	+$2,964,034.50	+80.4%

Immediate Capital Efficiency

Recycled EV battery energy storage costs $725,000, **saving $656,900** compared to a traditional energy storage unit, which would cost $1,381,900.



Tax Incentives

The Initiative qualifies for many federal tax credits that would offset **6%-50%** of the capital cost. The tax credits for battery storage currently extend through 2034, but construction of the project must be completed and placed in service by December 31, 2027, to qualify for the Bipartisan Infrastructure Law. Below are a list of applicable tax credits as of 2026:

Manufacturing	Vehicles	Energy Generation and Carbon Capture
• Advanced Energy Project Credit • Advanced Manufacturing Project Credit	• Credit for Qualified Commercial Clean Vehicles • Alternative Fuel Vehicle Refueling Property Credit	• Clean Electricity Production Tax Credit • Investment Tax Credit for Energy Property • Clean Electricity Investment Tax Credit • Production Tax Credit for Electricity from Renewables

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