Sunsprint Engineering

Solar Projects Showcase

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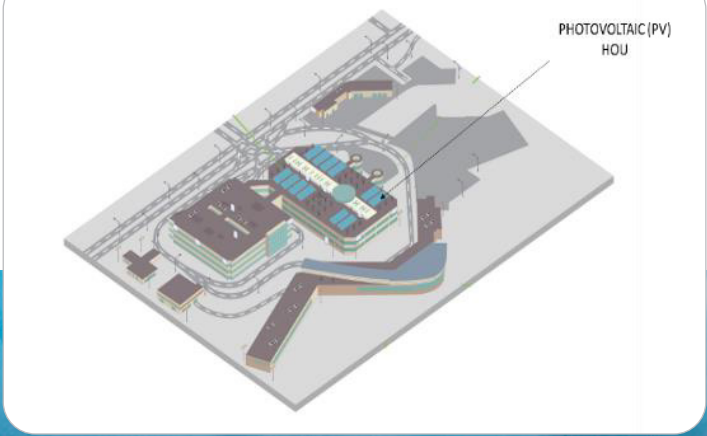
HOUSTON AIRPORT SYSTEM

HOUSTON, TEXAS

The Outcome

Annual Energy Savings	Annual Cost Savings	Implementation Cost	System Capacity	Simple Payback
1,620,925 kWh/Yr	$83,355	$ 3,421,827	986.04 kW DC (830 kW AC)	25 Years



Project Insights

As one of the busiest airports in the U.S., Houston's George Bush Intercontinental Airport (IAH) spans 10,000 acres and serves millions of passengers annually. With rising energy demands and operational costs, the Houston Airport System (HAS) prioritized the integration of renewable energy to enhance long-term resiliency.

A major part of this initiative was the deployment of a rooftop solar PV system—an undertaking requiring precision execution in a live airport environment. IKIO, in collaboration with METCO Engineering, We led the design and delivery of a 986.04 kW solar installation atop the Red Parking Garage, forming a key component of HAS's broader efficiency strategy.

IKIO's Problem-Solving Approach

IKIO engineered a solar deployment strategy specific to aviation-grade infrastructure constraints. Installation was sequenced around airport traffic windows, with work zones isolated per FAA and HAS safety protocols. Custom-fabricated canopy frames enabled modular assembly with minimal rooftop disruption. Electrical routing was designed to align with garage load centers and utility interconnection points.

All phases—from racking to commissioning—were coordinated with HAS facilities to ensure safe execution, uninterrupted access, and maximum energy capture post-deployment.

Opportunity

The project called for a solar solution that could be deployed without disrupting critical airport operations or compromising safety.

- Deployment of a high-performance rooftop PV system on the Red Parking Garage
- Structural load analysis and electrical capacity review to validate system compatibility
- Elevated canopy design to preserve vehicular flow and ensure wind, seismic, and corrosion resistance
- PV array layout and inverter selection for diurnal generation, shading avoidance, and maintenance access
- Execution plan under HAS-mandated schedules, access controls, and zone-specific compliance standards

Solution Delivered

The solar PV deployment was engineered to meet energy generation goals while aligning with site-specific constraints.

- 986.04 kW DC (830 kW AC) solar PV system installed on Red Parking Garage rooftop
- Steel canopy structure engineered for wind loading, drainage, and long-span module support
- Sequenced electrical tie-ins for grid integration under HAS interconnection protocols
- Worksite access, staging, and construction planned around secure-zone limitations
- Final commissioning integrated with airport monitoring systems for performance tracking and compliance

Technical Breakdown

Challenge	Before	After	Result
Lack of renewable energy	100% reliance on utility-supplied electricity	986.04 kW DC solar PV array installed on Red Garage rooftop canopy	**Over 1.6 million kWh of on-site renewable generation annually**
Structural constraints	Rooftop load limits and limited usable area	Canopy structure engineered for long-span coverage and load tolerance	**Preserved rooftop utility while supporting system capacity**
Operational disruption	Active terminal traffic and access restrictions	Installation phased under HAS-secured, low-traffic windows	**No disruption to passenger flow or airport operations**
Grid integration	No existing interconnection framework	Sequenced tie-ins to match utility load centers and panel capacity	**Stable power delivery and interconnection compliance**
Performance visibility	No real-time tracking of renewable output	PV system integrated with airport monitoring tools	**Live yield monitoring and long-term performance transparency**

Areas Covered

- **Red Parking Garage rooftop**
- **Inverter tie-in points at electrical load centers**
- **Secure equipment access pathways**
- **Monitoring and control integration panel**

CLIENT PERSPECTIVE

"Given the nature of our operations, system reliability and disciplined execution were essential. IKIO delivered a technically sound solution that integrated smoothly with our infrastructure and supported our long-term efficiency goals."

— **Facilities Project Lead, City of Dallas**

HOUSTON PERMITTING CENTER

HOUSTON, TEXAS

The Outcome

Annual Energy Savings	Annual Cost Savings	Implementation Cost	System Capacity	Simple Payback
159,237 kWh/Yr	$17,516	$259,900	113 kW DC (102 kW AC)	25 Years

Project Insights

The Houston Permitting Center, a four-story, 185,214 sq ft municipal facility, operates as a central hub for office activity, stakeholder engagement, and public services. Originally constructed as a Type 2A warehouse and later converted to Type 2B occupancy, the building faced escalating energy costs and aging lighting infrastructure.

The City of Houston engaged us to design and implement a rooftop solar PV system paired with real-time performance monitoring. The system was engineered for compatibility with legacy infrastructure and executed without disrupting public operations. A public-facing energy dashboard was also introduced to support transparency and civic engagement.

IKIO's Problem-Solving Approach

We supported a solar-focused execution plan that balanced structural integrity with photovoltaic efficiency. A steel canopy system was constructed to support 113 kW DC modules above the main roofline, avoiding direct rooftop load.

Panel strings were optimized for tilt and azimuth to align with Houston's irradiance profile. Electrical interconnection was routed through existing infrastructure without impacting internal operations. A public-facing kiosk was deployed in the atrium, featuring a live Microsoft Power BI dashboard integrated with a 3D BIM model to display system metrics and engage stakeholders in sustainability education.

Opportunity

The retrofit needed to complement the building's existing Type 2B configuration while minimizing disruption to ongoing permitting operations.

- Install rooftop solar on structurally viable canopy zones without modifying base roof system
- Deliver performance monitoring via a publicly accessible digital interface
- Avoid battery-based storage to simplify integration and maintenance
- Ensure accurate BIM-linked reporting for energy data visualization

Solution Delivered

A fully integrated rooftop PV solution was deployed with public performance visibility.

- 113 kW DC (102 kW AC) solar PV array mounted on elevated steel canopy
- Grid-tied inverter system with low THD and Power BI integration
- Real-time energy monitoring kiosk integrated with 3D BIM model
- Site-specific module layout based on shading and structural mapping
- Maintenance-light system with no storage dependency

Technical Breakdown

Challenge	Before	After	Result
Rooftop constraints	Type 2B building with limited structural load capacity	Elevated steel canopy structure installed above roofline	**Enabled PV deployment without altering original roof**
Energy inefficiency	High lighting-related energy demand	113 kW DC PV system powering lighting and HVAC	**159,237 kWh annual solar generation, $17,516 in savings**
Public visibility gap	No public-facing performance interface	Kiosk with live Power BI dashboard and BIM integration	**Real-time energy data accessible to occupants and visitors**
Maintenance overhead	Conventional systems with recurring O&M	Static, battery-free solar configuration	**Lower long-term servicing needs and minimal system upkeep**

Areas Covered

- **Main rooftop canopy installation**
- **Tie-ins at central electrical distribution panels**
- **Atrium zone featuring public performance kiosk**
- **Panel layout optimized using irradiance mapping**

CLIENT PERSPECTIVE

"The solar system isn't just efficient—it's transparent. We can see our energy production in real time and showcase sustainability to everyone who walks in."

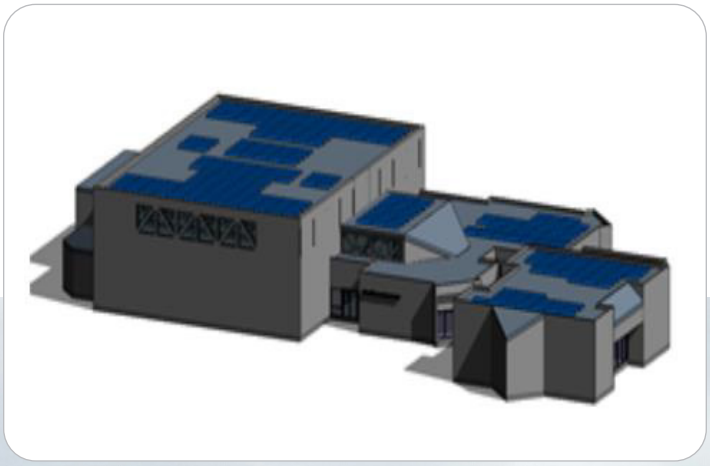
— Project Coordinator, City of Housto

KIEST RECREATION CENTER

DALLAS, TEXAS

The Outcome

Annual Energy Savings	Annual Cost Savings	Solar Panels Commissioned	Implementation Cost	System Capacity	Simple Payback
124,123 kWh/Yr	$14,929	324	$ 1/4 M	90.1 kW	23 Years



Project Insights

Located within a historically significant recreational zone of Dallas, the Kiest Recreation Center has 32 facilities with continuous energy needs. Rising summer loads and aging infrastructure placed pressure on the utility grid, increasing the risk of service disruptions and high energy costs. To address this, the City of Dallas partnered with IKIO and METCO Engineering to design a rooftop solar PV system that could reliably offset electrical demand while serving as a replicable model for other public-use buildings.

The system was engineered to balance efficiency, durability, and architectural integration without disrupting ongoing community programs.

IKIO's Problem-Solving Approach

We initiated the project with a load profile and irradiance assessment to align solar generation with peak recreational demand. The team identified shading constraints and structural limitations, selecting 324 monocrystalline panels optimized for high conversion efficiency and reduced derate factors. A grid-tied inverter system was configured for low total harmonic distortion (THD) and seamless utility sync.

A battery-free architecture was adopted to reduce system complexity and long-term O&M. Custom racking and weather-rated junction boxes were deployed to withstand Dallas' variable climate and ensure installation longevity.

Opportunity

The project required a solar deployment aligned with operational, structural, and compliance goals.

- Offset peak daytime electrical loads from HVAC, lighting, and equipment-intensive zones.
- Achieve optimal photovoltaic yield within a structurally constrained rooftop footprint.
- Exclude battery storage to reduce capital expenditure, structural loading, and lifecycle servicing.
- Integrate directly with utility infrastructure to enable stable, real-time energy export.
- Ensure long-term generation stability with minimal performance degradation over time.
- Facilitate non-disruptive installation during continuous facility occupancy and use.

Solution Delivered

IKIO delivered a grid-tied solar energy system comprised of:

- 324 high-performance Tier-1 solar panels with up to 20% efficiency.
- 90.1 kW AC inverter system with <3% THD and rapid-shutdown compliance.
- AC-coupled, battery-free grid integration with automatic feed-in
- Energy modeling and string configuration to optimize panel performance per tilt and azimuth.
- System designed to offset 50% of daily energy requirements and deliver 25+ year output stability with minimal servicing needs.

Technical Breakdown

Challenge	Before	After	Result
High daytime demand	Full reliance on utility grid	50% load offset by rooftop PV	**$14,929 in annual savings and stabilized power intake**
Structural limitations	Limited roof area and shading risk	High-density layout using custom string planning	**124,123 kWh clean energy delivered annuall**
Maintenance load	Risk of downtime with traditional generator	Passive, low-maintenance PV with no moving parts	**Minimal O&M and long operational life**
Backup requirement	No provision for energy redundancy	Live-grid tie-in with safety shut-off functions	**Auto-regulated power flow with no generator load**

Areas Covered

- **Main recreation block rooftop**
- **Gymnasium rooftop**
- **Multipurpose center rooftop**
- **Shading-optimized zones near structural edges**

CLIENT PERSPECTIVE

"Having a system that just works, quietly in the background, has changed how we manage energy. No batteries to check, no fuel to refill. It's a solution that's clean, smart, and built for the long term."

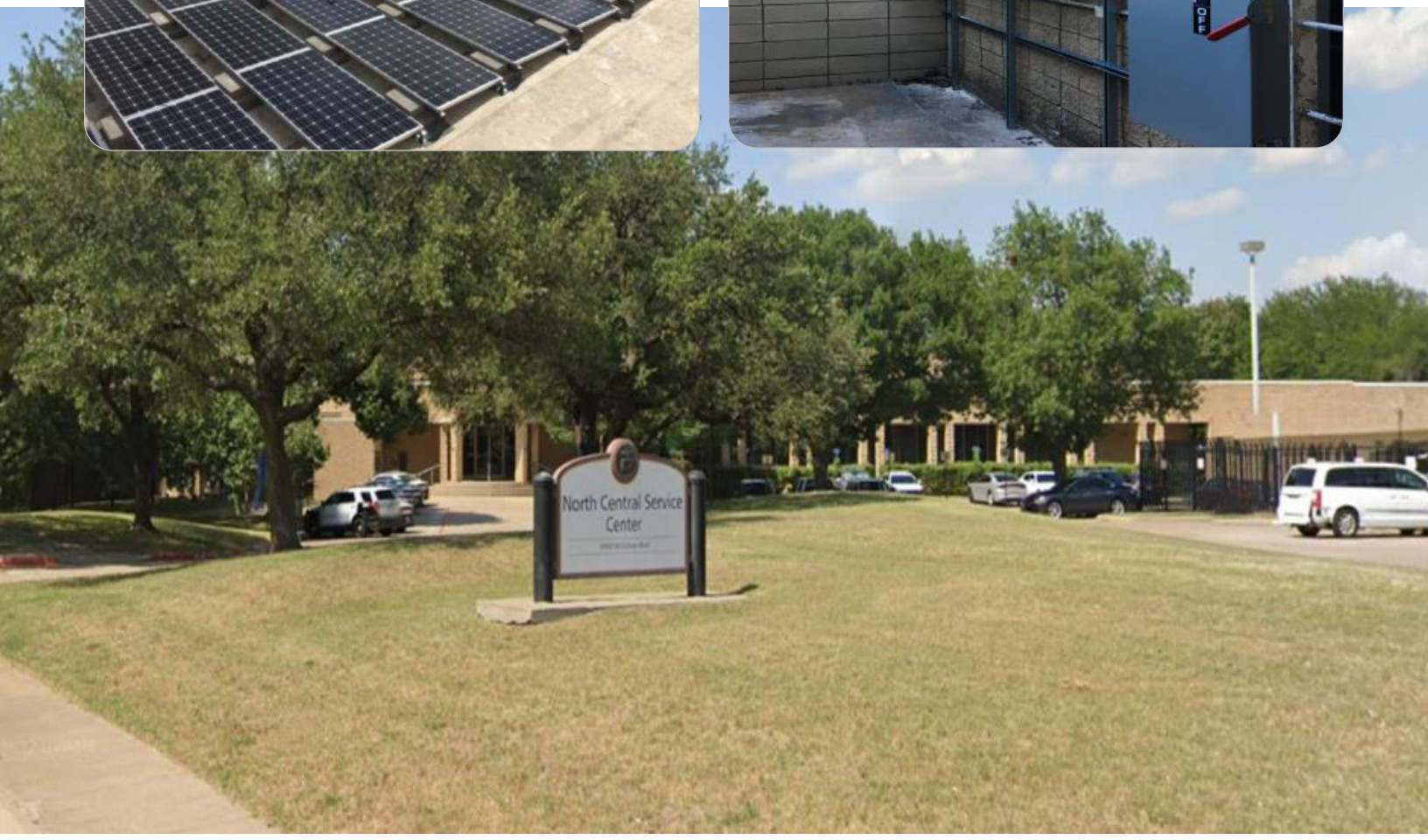
— **Energy Efficiency Coordinator, City of Dallas Parks & Rec**

NORTH CENTRAL POLICE STATION

DALLAS, TEXAS

The Outcome

Annual Energy Savings	Annual Cost Savings	Implementation Cost	System Capacity	Simple Payback
703,259 kWh/Yr	$35,034	$ 700,000	98.8 kW	5.89 Years



Project Insights

The North Central Police Station is a mission-critical facility in Dallas, operating 24/7 to support emergency response, administrative functions, and surveillance systems. Continuous HVAC use, lighting, and digital infrastructure imposed a sustained load on the utility grid, leading to increased operational costs.

To mitigate this, the City of Dallas partnered with IKIO to implement a low-maintenance, grid-tied solar PV system. Designed to reduce grid dependency and deliver stable energy output without the complexity of storage, the system ensures long-term reliability and resilience under variable load conditions.

IKIO's Problem-Solving Approach

IKIO began with a detailed feasibility study addressing the operational constraints of an active police facility. This involved rooftop structural assessments, irradiance mapping, and electrical interface checks to ensure alignment with HVAC, surveillance, and communications systems. High-efficiency monocrystalline modules were chosen for thermal stability and low derating.

Hardware was selected for environmental resilience and low visual impact. Conduit paths were routed to avoid surveillance lines and access points. Installation followed secure protocols and was executed during off-peak hours to ensure uninterrupted public safety operations.

Opportunity

The project scope required a system that aligned with the facility's critical operations and 24/7 service needs.

- Support uninterrupted critical loads from HVAC, surveillance, comms, and data systems with no shutdown tolerance
- Maintain integration integrity with existing power distribution—no reconfiguration permitted
- Account for rooftop structural constraints through optimized load distribution and panel density
- Facilitate installation within occupied premises using low-impact, access-controlled procedures
- Exclude energy storage or mechanical redundancy to streamline long-term system upkeep and reliability

Solution Delivered

IKIO delivered a fully engineered solar PV system tailored to the facility's operational and structural parameters.

- A 98.8 kW rooftop-mounted solar array configured for optimal orientation and yield
- Grid-tied inverter system with low THD, surge protection, and fault isolation
- AC-coupled architecture without battery storage, streamlining performance and maintenance
- Panel strings arranged to reduce mismatch loss and support output consistency under variable shading conditions
- Electrical integration with existing distribution infrastructure, designed for non-disruptive deployment

Technical Breakdown

Challenge	Before	After	Result
High energy demand	100% dependency on utility supply	PV generation offsetting 703,259 kWh annually	**$35,034 annual savings, improved energy cost stability**
Electrical sensitivity	Fluctuations affecting sensitive electronics	Inverters with <3% THD and integrated voltage regulation	**Stable input power for critical law enforcement systems**
Structural load limits	Limited roof area with load considerations	Custom mounting and string layout for optimized coverage	**Optimized generation yield within structural tolerances**
Operational continuity	No disruption permissible to active services	Installation during low-access periods under secure coordination	**Continuous station operation with no service degradation**
Maintenance complexity	Routine servicing of backup systems	Static PV setup requiring minimal ongoing intervention	**Reduced O&M overhead and lower risk of system failure**

Areas Covered

- **Main station rooftop zones**
- **Secure perimeter building sections**
- **Surveillance and dispatch infrastructure blocks**
- **Emergency systems and HVAC service areas**

CLIENT PERSPECTIVE

"Given the nature of our operations, system reliability and disciplined execution were essential. IKIO delivered a technically sound solution that integrated smoothly with our infrastructure and supported our long-term efficiency goals."

— Facilities Project Lead, City of Dallas

SOUTHEAST POLICE STATION

DALLAS, TEXAS

The Outcome

Annual Energy Savings	Annual Cost Savings	Implementation Cost	System Capacity	Simple Payback
703,259 kWh /Yr	$35,034	$700,000	98.8 kW	5.89 years

Project Insights

The Southeast Police Station in Dallas is a facility with an energy-intensive load profile due to 24/7 operations. While the building was already high-performance, rising utility costs and sustainability goals prompted a shift toward on-site energy generation. To address this, we installed a grid-connected rooftop solar PV system designed to reduce utility dependency and improve operational cost-efficiency.

The system was deployed without batteries or backup generators, reflecting a deliberate choice to minimize complexity and avoid the parasitic energy draw associated with battery charging cycles.

IKIO's Problem-Solving Approach

The installation began with detailed planning to ensure optimal rooftop usage and seamless tie-in with the building's electrical distribution system. We deployed 304 solar panel modules across structurally viable rooftop zones, configured for a total capacity of 98.8 kW.

The design was intentionally battery-free, eliminating storage overhead and ensuring that all PV output could be fed directly into the facility or exported to the grid as needed. This approach preserved building uptime, reduced parasitic losses, and supported a predictable long-term savings trajectory.

Opportunity

The project scope was improving efficiency in a high-performance building without adding system complexity.

- Offset baseline daytime loads from HVAC, lighting, and digital infrastructure using rooftop-mounted PV
- Deploy a grid-synchronized solar array designed for direct facility load integration without storage buffering
- Avoid battery or generator-based redundancy to reduce parasitic energy draw and system maintenance
- Configure system to allow seamless load sharing between PV output and the utility grid
- Maintain full-service continuity during implementation through non-intrusive rooftop deploy

Solution Delivered

Delivered a high-efficiency, grid-tied solar PV system engineered for simplicity, reliability, and cost efficiency.

- 304 Tier-1 solar modules configured for 98.8 kW AC output, mounted on structurally viable rooftop areas
- Grid-interactive inverter architecture with real-time synchronization, surge protection, and fault isolation
- Battery-free AC-coupled system enabling continuous power injection with no additional storage maintenance
- String design tailored to irradiance mapping and shading patterns for peak yield and module longevity
- Direct electrical tie-in with facility switchgear, engineered for minimal reconfiguration and long-term resilience

Technical Breakdown

Challenge	Before	After	Result
High electricity cost	Full reliance on grid power	50% load offset via rooftop solar	**Reduced energy bills, increased savings**
System complexity	Backup systems with maintenance needs	Battery-free, generator-free setup	**Simplified operations, minimal servicing**
Daytime load peaks	HVAC and daytime equipment peaks	Solar output aligned with usage peaks	**Enhanced efficiency during active hours**

Areas Covered

- **Main building rooftop**
- **Inverter installation zones**
- **AC distribution pathways**
- **Utility access areas**

CLIENT PERSPECTIVE

"The system does exactly what we need without any added maintenance. It's efficient, cost-saving, and simple—everything you'd want in a public-use facility upgrade."

— Facilities Coordinator, City of Dallas

NORTH EAST POLICE STATION

DALLAS, TEXAS

The Outcome

Annual Energy Savings	Annual Cost Savings	Implementation Cost	System Capacity	Simple Payback
703,259 kWh /Yr	$35,034	$700,000	98.8 kW	5.89 years

Project Insights

The North East Police Station is one of Dallas' active public safety facilities, requiring uninterrupted power for critical systems such as surveillance and communication and HVAC. Despite the building's relatively recent infrastructure, rising energy expenses prompted a decision to pursue solar energy. We implemented a rooftop solar PV system that could deliver a reliable energy offset while integrating seamlessly with existing power infrastructure.

The solution focused on performance consistency, operational simplicity, and long-term energy cost reduction—without the need for battery or generator-based backups.

IKIO's Problem-Solving Approach

We engineered a solar array that would support half of the facility's total energy load. A total of 304 modules were mounted across structurally capable rooftop sections, with system design focused on grid interaction and efficient generation during peak daylight hours. All components were chosen to ensure year-round stability and avoid complexity—no batteries or mechanical backups were included.

The solution emphasized energy simplicity, improved predictability in utility consumption, and a reduction in recurring operating costs for the city.

Opportunity

The scope required a solar deployment that would mitigate utility cost escalation while preserving the operational integrity of a mission-critical facility:

- Persistent daytime demand from HVAC loads, security lighting, and critical building systems.
- Grid-tied configuration optimized for reduced dependency without introducing battery charge/discharge inefficiencies .
- Omission of ancillary backup components to minimize CAPEX and long-term O&M exposure.
- Passive system architecture requiring no user-side intervention post-commissioning.
- Seamless electrical integration with existing distribution panels and load centers without upstream redesign.

Solution Delivered

We engineered a passive, utility-integrated PV system tailored to the station's operational profile:

- 83.2 kW rooftop-mounted PV system utilizing 304 high-efficiency monocrystalline modules.
- Grid-tied AC architecture enabling real-time feed-in without battery interface.
- System engineered to offset 50% of peak operational load across core facility systems.
- Low-impact installation with passive design requiring minimal ongoing maintenance.
- Deployed under live-site constraints in adherence with municipal electrical codes and access protocols.

Technical Breakdown

Challenge	Before	After	Result
Energy cost burden	100% grid power dependency	83.2 kW rooftop solar system	**$35,034 in annual electricity savings**
Renewable energy use	No on-site renewable generation	Solar array supports daytime loads	**703,259 kWh annual clean energy generated**
Long-term ROI	Rising power bills	Solar system with no battery backup	**Payback achieved in under 6 years**
Sustainability goal	No alternate energy contribution	PV system integrated with main grid	**Enhanced supply stability, reduced load**

Areas Covered

- **Main facility rooftop**
- **Load-bearing electrical distribution zones**
- **Surveillance and communications equipment blocks**
- **HVAC and emergency service areas**

CLIENT PERSPECTIVE

"We were looking for a straightforward, cost-efficient energy solution. This system delivers without complicating our operations—and that's exactly what we needed."

— Energy Operations Manager, City of Dallas

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