Five Years of Energy & Water Conservation Success

A Review of Energy Efficiency & Water Conservation Efforts Since the Adoption of the June 2012 Will County Energy Efficiency & Conservation Plan

April 2018

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SECTION 1: INTRODUCTION

Prelude

In June 2012, the Will County Board adopted the Will County Energy Efficiency & Conservation Plan (hereinafter referred to as "the Plan") to promote increased resource conservation, exploration of emerging technologies, including renewable energy resources and more efficient use of energy and water across Will County facilities and the Will County Community. In the Plan, it is offered that, **"the County should continue to reevaluate best available technologies for energy efficiency and conservation."** The Plan speaks to report-out measures for sharing the progress of the various goals offered in the Plan.

Given limited formal reporting and review of the Plan's goal progress since its adoption in June 2012, the Resource, Recovery, and Energy Division of the Will County Land Use Department decided to compile **a review of efforts taken in the past 5 years** associated in one or more ways to the Plan's objectives. This Review will **primarily focus on the energy efficiency and water conservation measures taken in County facilities** because building efficiency has been a partial focus of the Energy & Conservation Specialist since the role's inception in 2011, and became the primary focus of the role in June 2017. Further, Will County's hiring of the first-ever Facility Management Director in July 2017 and the acquisition and construction of several new facilities from 2016-2020 creates context that **Will County's leadership is focused on the built environment**.

More specifically, **this Review looks at facility investment and related investment gain** via reduction of operating expenses as well as opportunities for revenue generation. By understanding wholly the investment into the efficient operation of Will County buildings, staff and leadership may work together to expand upon successful projects and **identify opportunities that remain**.

The Resource, Recovery, and Energy Division of the Will County Land Use Department is offering this Review as **a preview to the re-write of the Plan** into a more focused and streamlined document that most accurately reflects the current goals of Will County. This review will not address every measure offered in the Plan, but rather will **create space for conversation around the future plan** and will supplement the lack of reporting in years past.

Some projects included in this Review that have or will contribute to the energy and/or water usage and cost savings of Will County **may use estimated data or may not be eligible for an accurate, full life-cycle savings analysis due to the absence of sufficient data** about existing equipment that is required to properly conclude potential savings. Going forward, Will County's **implementation of a computerized maintenance management system (CMMS) will capture all data necessary** for Will

County staff to accurately conduct full life-cycle cost and savings analyses for use in future progress reports.

Beyond building efficiency, this review offers **snapshots of significant achievements, analyses, reports, and policies** that have come about in the last 5 years and have shaped how Will County will pursue, or serve as a demonstration of, Will County's commitment to increased energy efficiency, renewable energy, community outreach and education, and more.

History

Energy Efficiency & Conservation Block Grant (EECBG) Program

As a result of the 2009 American Recovery and Reinvestment Act (ARRA), the U.S. Department of Energy's (DOE's) Energy Efficiency and Conservation Block Grant (EECBG) Program provided $3.2 billion in block grants to entities across the United States to **develop, promote, implement, and manage energy efficiency and conservation projects**. The EECBG Program presented the largest nationwide direct investment in energy efficiency and renewable energy at the community level in U.S. communities.

In 2009, **Will County was awarded $3 million in EECBG Program funding**. This grant set into motion the **Resource, Recovery, and Energy (RR&E) Division's name change from Waste Services** and **sparked the prioritization of energy-related efforts** that save Will County tax dollars and generate revenue. Using EECBG funding, Will County was able to complete several energy and conservation projects such as:

- Sunny Hill Nursing Home
  - Low-Emissivity Windows & Revolving Door (~1,704 square feet)
  - High Efficiency, Tankless Hot Water Heaters[1]
- Will County Court Annex (EMCO)
  - Low-Emissivity Windows (~697 square feet)
  - Addition of 6-8 inches of Roof Insulation (~12,500 square feet)
  - Cool Roof Installation (~12,500 square feet)
  - Elevator Modernization (2 carts, 4 motors)
- Will County Office Building
  - Modular Green Roof (~5,950 square feet)
  - Double Pane Window Installation (~1,420 square feet)
- Will County Division of Transportation (Joliet)- Administrative Building
  - Reballast Lighting[2]
  - Higher Efficiency Multi-Zone Rooftop Air Handling Units
  - Higher Efficiency Hot Water Heater
- Will County Division of Transportation (Joliet)- Maintenance Garage
  - T8 Lighting Retrofit
  - Low-Emission Windows (~110 square feet)

Will County also used a portion of the EECBG Funding to **contribute $1 million to the Waste Management, Inc. and Will County gas-to-energy facility** at the Prairie View Landfill.

These projects continue to produce energy usage and cost savings and revenue for Will County. Though **this Review will serve to highlight those efforts taken from June 2012-December 2017**, it is important to note these efforts that serve as the beginning of the work Will County continues to accomplish in energy efficiency and water conservation.

[1] No longer in use due to incompatibility with onsite hard water

[2] Project ultimately paid for using County funds rather than EECBG Program funding

Benchmarking Utilities & the Better Buildings Challenge (BBC)

Will County's receipt and use of EECBG Program funding triggered **an invitation from the U.S. Department of Energy (DOE) for Will County to join the Better Buildings Challenge (BBC)** in 2012. As a requirement of the BBC, **Will County began using the U.S. EPA's EnergyStar Portfolio Manager benchmarking program to track water, electric, and gas usage** for owned facilities. This milestone marks Will County's beginning use of **data-driven decisions** in evaluating energy efficiency and water conservation projects.

Resource, Recovery, and Energy Division

In May 2012, the Resource, Recovery, and Energy Division **welcomed a full-time Energy & Conservation Specialist to its team**. This position focused on pursing energy efficiency rebates through state-run programs, such as the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Illinois Energy Now (IEN) and Public Sector Energy Efficiency (PSEE) Programs and other efforts such as development of local food systems and community gardens. It wasn't until June 2017 that the Energy & Conservation Specialist position became solely focused on energy efficiency and water conservation as well as revenue opportunities through renewable/alternative energy resources. Through the re-dedication of this role, Will County is now more proactively **monitoring energy and water usage and identifying opportunities for improvements.** These activities are being performed in collaboration with ComEd, Nicor, and other partnering organizations like the Smart Energy Design Assistance Center (SEDAC), which, since 2012, has provided **nearly $235,000 in free facility assessments** to Will County. Collectively, since the inception of the Energy & Conservation Specialist Role in 2012, excluding operating and maintenance expense savings resulting from energy and water conservation projects,

RR&E has worked with Will County Officials to generate more than $3,414,748.89 in cash incentives, free products, facility assessments, and gas-to-energy revenue.

Pro-Active Planning & Capital Equipment Replacement Fund

In 2016, the Energy & Conservation Specialist worked with the Capital Improvements Committee, Will County Board, staff, and the Will County Finance Department to **create a Capital Equipment Replacement Fund**, dedicated to capital improvements, especially large-scale retrofits and training for facilities staff. The creation of this fund was a monumental step towards **pro-active planning and life-cycle cost analysis of capital equipment**, allowing staff and leadership to **plan for rather than react** to necessary capital improvements. Further, the increased collaboration across facility maintenance and energy staff since the **creation of the Facility Management Director role in July 2017** has created space for **detailed and comprehensive facility project planning** that will aid in accurate funding and use of the Capital Equipment Replacement Fund.

SECTION 2: RENEWABLE/ALTERNATIVE ENERGY

Prairie View Landfill Gas-to-Energy Facility

On April 6, 2010, Will County executed an agreement with Waste Management Renewable Energy, LLC and Waste Management Illinois, Inc. **to build and operate a gas-to-energy facility**. This facility contains **3-1.6 megawatt (MW) engines that generate 4.8MW of electricity**, enough electricity to **power nearly 4,000 U.S. homes**[1], using methane gas from the County's own Prairie View Landfill (PVL) that would otherwise be emitted into the atmosphere.

Will County contributed $1 million of the ~$9 million total project cost of building the gas-to-energy facility. Waste Management Renewable Energy, LLC operates the gas-to-energy facility. A gas purchase agreement (GPA) between Waste Management Renewable Energy, LLC and Will County stipulates that Will County is to be **compensated via electric energy payments, capacity payments, and renewable energy credits** (RECs). More specifically, Will County receives a **base gas payment of $12/Megawatt hour** (MWh) produced, which has yielded **more than $470,000 in revenue each year on average, totaling $2,832,635.89 since January 2012**.

The GPA also includes a revenue sharing payment that stipulates **parties share 50/50 the amount of revenue received from all power products above a strike price of $53/MWh**. The formula takes into account the variable times at which Waste Management Renewable Energy, LLC may be paid for any particular MWh of power products. This means that for a power product price of under $53, Will County receives no revenue beyond the base gas payment. For example, if the power product price is $57 per MWh, Will County receives 50% of the $4 difference between the strike price of $53 and the sales price of $57. If, in an average month, 3,000 MWh are sold at $57 that means Will County would receive $6,000 in addition to the base gas payment. Will County also receives **$10 annually for a ground lease** at the site of the gas-to-energy facility.

Though there is excess gas currently being produced by the landfill, nearly equal to the amount of gas currently being used to produce electricity, **low electric prices in Illinois make it unlikely that additional engines will be added to the gas-to-energy facility**. However, consideration is being given by Waste Management Renewable Energy, LLC and Will County to a **potential natural gas pipeline that would carry landfill gas to a nearby transmission pipeline**. In this way, the landfill's methane gas can be an even greater revenue-generating resource, taking advantage of more economically attractive natural gas markets as opposed to stagnant electric prices. See Tables 1.1-1.6 for Will County year-by-year revenue resulting from the Will County and Waste Management Renewable Energy, LLC GPA.

[1] Using 2010 data, the average U.S. household demands approximately 10,812 kilowatt hours (kWh) annually.

Table 1.1
2012 PVL Gas-to-Energy Facility Revenue

Month	Year	Revenue
January	2012	$38,076.00
February	2012	$36,401.34
March	2012	$39,624.00
April	2012	$40,560.00
May	2012	$38,112.00
June	2012	$10,542.66
July	2012	$35,196.00
August	2012	$41,652.00
September	2012	$40,248.00
October	2012	$31,584.00
November	2012	$42,708.00
December	2012	$39,900.00
Total		**$434,604.00**

Table 1.2
2013 PVL Gas-to-Energy Facility Revenue

Month	Year	Revenue
January	2013	$24,912.00
February	2013	$37,776.00
March	2013	$37,956.00
April	2013	$40,320.00
May	2013	$39,396.00
June	2013	$38,460.00
July	2013	$41,952.00
August	2013	$38,244.00
September	2013	$38,940.00
October	2013	$38,128.27
November	2013	$40,284.00
December	2013	$45,630.95
Total		**$461,999.22**

Table 1.3 2014 PVL Gas-to-Energy Facility		
Month	**Year**	**Revenue**
January	2014	$80,903.34
February	2014	$67,915.06
March	2014	$27,009.46
April	2014	$37,770.52
May	2014	$45,488.93
June	2014	$38,503.00
July	2014	$41,810.24
August	2014	$32,038.52
September	2014	$38,077.62
October	2014	$41,461.56
November	2014	$39,516.00
December	2014	$44,505.80
Total		**$535,000.05**

Table 1.4 2015 PVL Gas-to-Energy Facility		
Month	**Year**	**Revenue**
January	2015	$37,131.70
February	2015	$49,188.92
March	2015	$37,201.84
April	2015	$36,804.18
May	2015	$36,017.48
June	2015	$35,305.04
July	2015	$41,423.59
August	2015	$42,410.34
September	2015	$51,944.37
October	2015	$41,175.38
November	2015	$40,389.25
December	2015	$43,296.88
Total		**$492,288.97**

Table 1.5 2016 PVL Gas-to-Energy Facility Revenue		
Month	**Year**	**Revenue**
January	2016	$35,878.92
February	2016	$38,845.46
March	2016	$38,743.07
April	2016	$38,061.66
May	2016	$43,053.11
June	2016	$35,473.03
July	2016	$38,399.84
August	2016	$30,705.19
September	2016	$40,491.78
October	2016	$37,044.08
November	2016	$44,524.36
December	2016	$40,256.54
Total		**$461,477.04**

Table 1.6 2017 PVL Gas-to-Energy Facility Revenue		
Month	**Year**	**Revenue**
January	2017	$43,894.70
February	2017	$35,677.57
March	2017	$34,065.53
April	2017	$36,134.11
May	2017	$40,182.66[2]
June	2017	$32,714.98[2]
July	2017	$35,904.79[2]
August	2017	$39,892.27[2]
September	2017	$37,200.00[3]
October	2017	$37,200.00[3]
November	2017	$37,200.00[3]
December	2017	$37,200.00[3]
Total		**$447,266.61**

[2] *Monies received but annual report will not be received until mid-2018—values will be validated for accuracy upon receipt of annual report.*

[3] *Estimated values due to meter read errors—values will be trued-up mid-2018.*

Prairie View Landfill United States Environmental Protection Agency Renewable Energy Assessment Summary

In December 2013, Will County engaged the United States Environmental Protection Agency (U.S. EPA) to conduct a renewable energy assessment of Will County's Prairie View Landfill (PVL). Prairie View Landfill is an active, Will County-owned, non-hazardous waste landfill operated by Waste Management Illinois, Inc. Portions of PVL are being considered for renewable energy technologies. As such, a renewable energy assessment was sponsored by U.S. EPA Region 5 to support Will County and local stakeholders in assessing renewable energy opportunities for the site. The assessment **summarizes reuse considerations, resource availability, site suitability, and financial considerations for a set of pilot innovation projects to advance hybrid gas-to-energy and solar photovoltaic (PV) generation at the site.**

Reuse Considerations

LANDFILL PHASING:

Prairie View Landfill will **remain in operation until 2027[1] with a permitted 223-acre footprint** [expansion considerations being discussed in late 2017-early 2018]. Phased landfill construction was underway on the western half of the landfill at the time of this assessment and since has received its final cover.

LONG-TERM STEWARDSHIP AND REUSE:

After the landfill's closure, the **Forest Preserve District of Will County will become the caretaker** of the landfill.

RENEWABLE ENERGY:

Waste Management Illinois, Inc. **currently operates a 4.8 megawatt (MW) gas-to-energy plant** that generates electricity from landfill gasses at the site. There is potential to expand generation capacity to 12.8 MW[2].

Resource Availability Screening

INFRASTRUCTURE:

To accommodate the plant's [previously] anticipated 12.8 MW generation capacity, a 34-kilovolt (kV) electrical connection was installed from the site to an existing Commonwealth Edison substation. **Discussions regarding the possibility of using this interconnection to support small-scale renewable energy facilities at this site are in process[3]**.

[1] Amended to 2042 in late 2014.

[2] 2017-2018 evaluation shows that exploring natural gas sales via connection to a transmission pipeline may be more profitable than adding additional gas-to-energy facility engines given lower electric prices in Illinois.

[3] According to a ComEd Distributed Energy Resource Interconnection Pre-Application Report Request performed in late 2017, ComEd indicates there is 8MW of available capacity for on-site lines.

WIND:
Will County area's wind resource, measured by wind speed at an elevation of 80 meters, is approximately 6.5 meters per second (m/s) , which is in the Class 2 to 3 category, **suggesting poor to fair wind resource relative to other areas in Illinois**. Class 3 to 7 is considered fit for utility-scale wind power development. **Wind energy development is not a desirable option** due to the site's location within a migratory bird pathway and limited wind resource.

SOLAR:
Will County has relatively good solar energy resources as measured by irradiance level (4.5 – 5 kilowatt hours per square-meter per day [kWh/m2/day]). Irradiance levels of 6 kWh/m2/day and higher are considered excellent. **Solar is the most desirable renewable energy technology for the Prairie View Landfill site.**

Financial Assessment

The renewable energy assessment **identified opportunities for solar PV generation at the site on two different scales: small-scale and large-scale.**

SMALL-SCALE SOLAR PV:
Possible locations for small-scale solar PV systems include **Waste Management's maintenance building's roof and surrounding areas of the landfill office building**. The assessment evaluated a hypothetical 40 kilowatt (kW) solar PV system owned and financed by Will County. The low price of electricity and high cost solar technology[4] means for less viability for this small-scale solar system unless the goal of the system would be for educational, demonstration, or research purposes.

LARGE-SCALE SOLAR PV:
12 acres located outside of the landfill footprint could potentially accommodate a 2MW solar PV system.

Project Ownership Scenarios:
1. Direct Ownership
2. **Land lease**
3. Third-Party Power Purchase Agreement (PPA)

Land lease models provide the least financial risk and could offer the most viable way to host a solar PV project at the site. A lease agreement could be negotiated with a third-party solar developer and generate revenue from annual rent payments. Low cost of electricity in Illinois and low demand for utilities to purchase from renewable energy projects until 2018 negatively impact viability of direct ownership and third party PPA models.

[4] The cost to install solar has dropped by more than 70% since 2010 according to the Solar Energy Industries Association (SEIA), including significant decreases in costs since the release of this assessment in 2013.

Current Exploration

While this summary serves as an assessment of viable renewable energy opportunities at PVL in 2013, **it is important to note that the financial viability of a third-party PPA will need to be reassessed** considering 2018 solar incentives and electric rates to accurately determine the present-day financial viability of this scenario. Additionally, and perhaps most importantly, **this assessment was conducted and written before the passing of the Future Energy Jobs Act (FEJA) in December 2016**. FEJA dramatically increases the economic attractiveness of solar in Illinois, creating a variety of incentives.

Consistent with the assessment, **Will County staff is currently analyzing and preparing a request for qualifications (RFQ) for a land-lease solar array** developer to install solar on up to 40 acres of the final-covered area of this active landfill. Given the **minimal risk associated with entering into a land-lease**, Will County will be able **to maximize the revenue-generating capacity of this land resource**. Because such a project would be the first of its kind for Will County, a land-lease scenario provides the most manageable opportunity to explore solar as a revenue source, especially given that portions of the landfill property already participate in land-leases for agricultural purposes.

An RFQ is being pursued due to the regulatory nature of solar in the State of Illinois. Because final incentive figures will not be released until at least June 2018 and renewable energy credit (REC) processes are still being finalized, **basing a developer selection on an RFP process as opposed to an RFQ process poses the risk for estimated rent price options,** meaning the intended results of best available lease payment value may not be achieved.

Based on extensive conversation with industry professionals and peers, RFQ processes are the best option for entities looking to explore solar deployment in 2018 because it **ensures the cooperation of only landfill-experienced, mature, cooperative developers**, highlighting the minimization of risk and the maximization of collaboration to ensure a smooth development and maintenance process, which is extremely valuable given the long-term (20-year minimum) contractual relationship between the County and a chosen developer.

Will County is also engaging Waste Management Illinois, Inc. regarding the release of this RFQ and the qualifications necessary in order for Waste Management Illinois, Inc. to deem a chosen developer and the proposed project **feasible and in alignment with the operations of this active landfill**. Given the active nature of this landfill, the RFQ will include disclaimers that include mobility of panels (using a ballast system that does not penetrate the ground or the final cover and increases the mobility of the panels). **Will County staff plans to release this RFQ in late April 2018 and present findings to the County Board in June 2018.**

Will County Receives SolSmart Designations

SolSmart is a national designation program funded by the U.S. Department of Energy's (DOE's) Solar Technologies Office led by the International City/County Management Association (ICMA) and The Solar Foundation along with a team of partners with expertise in solar energy and local governments.

Excessive paperwork, red-tape, burdensome fees, and **incoherent regulations at the local level can make it difficult for residents to install solar** and repel solar companies from pursuing investment. The SolSmart Program is open to all counties and municipalities across the United States to participate and become designated as a Bronze, Silver, or Gold SolSmart Community, which provides **no cost technical assistance to local governments** who want to streamline solar-related requirements and encourage solar deployment in their community. Since the Program's launch in 2016, more than 190 counties and municipalities have been designated nationwide; **Will County was the first entity designated in the State of Illinois**.

Will County achieved its Bronze Designation in July 2017 primarily by gaining support from Will County Leadership and streamlining permitting processes for residential solar. In Fall 2016, **County Executive Lawrence M. Walsh signed a SolSmart Statement that expressed Will County's support** of expanding and exploring new technologies like solar, especially in areas where land is underutilized. Will County also received credits towards designation for **best practices already in place such as the Public Portal** that allows residents to apply for, pay for, check the status of, and receive building permits online. New initiatives included the **creation of the Will County Residential Solar Permitting Checklist & Guide** that helps residents know exactly what is required for a solar array building permit application and a **comprehensive zoning review by the National Renewable Energy Laboratory** (NREL). Outreach and education, allowing solar by right, meaning only a building permit is required for a residential solar array, a new **"Alternative Energy" option on the Will County Building Permit Application**, and more contributed to Will County's Bronze success.

Just 5 short months later, Will County was designated as a Gold SolSmart Community for additional measures taken since the July 2017 designation. These measures included, most prominently, the **creation of the Will County Solar Source webpage**—a hub where residents, developers, businesses, and more can find educational, consumer protection, funding, legislative, and more resources to support solar deployment done the right way. This solar landing page and its associated resources supplied a significant amount of the credits required to achieve Gold designation. Other efforts included **training of permitting and inspection staff** so that as solar deployment increases in Will County, staff is prepared to best serve residents and ensure safe development. Other efforts included a **review of solar permitting fees** for residential and commercial solar, **training of fire and safety staff** on solar photovoltaic (PV), **updated zoning codes** to reflect those suggested changes offered in the NREL zoning

review, and **design guidelines for solar PV aligned with the National Electric Code (NEC) and the International Fire Code (IFC)**.

Will County's devoutness to simplifying the permitting process and educating its staff has **qualified Will County for special awards in the Permitting and Most Points Awarded categories** of the SolSmart Program. Will County will still continue to work closely with The Solar Foundation to increase preparedness for solar deployment and looks forward to **educating peers about the SolSmart Program**. For a full summary of actions awarded to Will County under the SolSmart Program, see Tables 1.7-1.8.

Table 1.7 Will County SolSmart Bronze Designation Actions		
Credit #	**Credit Description**	**Points**
Prerequisite		
PR-1	Post a public statement of solar goals in the form of a SolSmart commitment letter.	0[1]
Permitting		
P-1	Create and make available an online checklist detailing the steps of your community's solar permitting process.	0[1]
P-2	Provide a streamlined permitting pathway for small PV systems with turn-around time of no more than 3 days.	20[2]
P-4	Require no more than one application form for a residential rooftop PV project.	5
P-6	Review permitting process for efficiency improvements and reduce processing time to 10 days or less.	10
P-7	Adopt a standard solar permit form aligned with best practices.	10
P-11	Offer an online process for permitting submission and approval.	20
Planning, Zoning, and Development Review		
PZD-1a	Review zoning requirements and identify restrictions that intentionally or unintentionally prohibit solar PV development. Compile findings in a memo.	0[1]
PZD-2	Allow solar by-right and as an accessory use in all major zones, and implement any zoning ordinance adjustments.	20
PZD-5	Integrate solar and/or shared solar into relevant local plans (e.g. energy plan, climate plan, comprehensive plan).	10
PZD-8	Incentivize solar development on parking lots, vacant lots, landfills, buffer lands around uses with nuisances, etc.	20
Community Engagement		
CE-1	Active energy task force or working group which meets at least three times per year.	10
CE-5b	Creation and distribution of educational materials at relevant community events and through local government channels.	5
CE-7	Conduct feasibility analysis for solar on brownfields, landfills, formerly contaminated lands and/or other underutilized properties.	10
Market Development & Finance		
MDF-4	Conduct feasibility analysis for solar PV installations on public facilities.	10
Bronze Points Awarded		**150**

[1] Bronze prerequisite. No points awarded.

[2] Gold prerequisite.

Table 1.8 Will County SolSmart Gold Designation Actions		
Credit #	**Credit Description**	**Points**
Permitting		
P-3	Distinguish between systems qualifying for streamlined or standard review.	5
P-5a	Conduct a review of solar permit fees for residential and commercial solar.	5
P-5b	Demonstrate that permit fees reflect national best practices ($400 or less for residential and based on cost-recovery for commercial).	5
P-9	Train fire and safety staff on solar PV.	10
Planning, Zoning, and Development Review		
PZD-1b	Formally present zoning review memo findings to planning commission or relevant zoning body.	5
PZD-1c	Draft proposed language for changes to zoning code based on zoning review memo. Involve planners and/or local zoning experts in the creation of the draft language.	5
PZD-9	Train planning staff on best practices in planning and zoning for solar PV (must have occurred within the past 5 years).	10
PZD-10a	Ensure that the ordinance clarifies regulations for small ground-mounted PV.	5
PZD-10c	Ensure that the ordinance exempts rooftop solar PV from certain restrictions on accessory uses.	5
PZD-10d	Ensure that the ordinance exempts small ground-mounted solar PV from certain restrictions	5
Inspections		
I-1	Provide cross-training of inspection and permitting staff on solar PV via in-person or online resources	20
I-6	Provide an online process for scheduling and responding to inspection requests.	20
Construction Codes		
CC-3	Offer design guidelines from PV aligned with NEC and fire code.	20
Solar Rights		
SR-2	Provide consumer protection resources on solar.	5
Utility Engagement		
U-2	Discuss community or shared solar programs with local utility.	10
Community Engagement		
CE-2	Create a solar landing page on local government's website with information on community's solar goals and local resources for solar development.	10
CE-10	Demonstrate activity in state-level conversations regarding solar PV.	20
CE-11	Create and share an interactive solar map for your community.	20
Market Development & Finance		
MDF-1	Provide resources on active installers and/or local incentives for solar.	5
MDF-1	Provide information to consumers about different solar PV financing options, including commercial options, such as property-assessed clean energy (PACE) financing.	5
Gold Points Awarded		**195**
Total Points Awarded		**345**

SECTION 3: POLICY

Future Energy Jobs Act Passes December 2016

FEJA (P.A. 099-0906) changed the economic landscape in Illinois significantly regarding energy efficiency and renewable energy following its passage in December 2016. To put the act into three words, it will **(1) stimulate, (2) enhance, and (3) preserve** by creating jobs and new investment, positioning Illinois as a leader in the clean energy economy and maintaining low energy rates for residents and businesses.

Energy Efficiency

The State of Illinois, and thus Will County, will see lower base incentive rates for standard energy efficiency projects than before received under state-ran energy efficiency programs—about **40% lower for electric-saving projects and 70% lower for gas-saving projects**, mirroring the private sector utility customer incentives. Illinois utilities will now administer and pay-out to all sectors energy efficiency programs and incentives. New program administration **will only incentivize those projects approved before any improvements are made, creating space for Will County to develop standard capital improvement procedures ensuring all eligible projects performed by Will County maximize available incentives**. The Act requires ComEd to cut electricity waste by 21.5% and expand its energy efficiency programs, which is **expected to lower Illinois power bills by billions of dollars** through 2030 and could directly impact Will County's cost of operations. ComEd is incentivized to meet their targeted efficiency goals with bonuses for exceeding goals or penalties for falling short. This bill also **requires that 10% of the overall energy efficiency program budget be used to incentivize local governments** to save energy and lower overhead costs.

Renewable Energy

FEJA creates a bounty of incentives for new solar and wind developed in Illinois after 2017. Some of these incentives will be provided in exchange for **renewable energy credits** (RECs), which are environmental assets that correspond to the production of 1 megawatt hour (MWh) of renewable energy production. These RECs may be purchased by organizations attempting to meet renewable energy goals that cannot or do not want to install renewable energy on organization property. These RECs may also be purchased by the utility, ComEd in Will County's case, to **help meet the Illinois Renewable Portfolio Standard (RPS) that maintains that by 2025, 25% of Illinois' total energy demand must be met by renewable energy with a minimum requirement from new (post-2017) solar and wind projects. By 2030, there will be 4,300 MW for new solar and wind deployed in the State of Illinois.** While weather in Will County is not highly conducive to wind energy production, 56% agriculturally zoned districts and an abundance of available land and rooftops means **the solar portion of this legislation has been of high importance to Will County staff and elected officials**. The creation of a **community solar program means all residents and businesses can take part in the**

deployment of solar energy in Illinois, even those who cannot install solar on their properties for any reason (e.g. shading, lack of physical property, etc.). Community solar allows residents to purchase electricity generated by an offsite, ComEd territory solar array. Another incentive for solar deployment includes **rebates from ComEd in the amount of $250/kW of installed capacity** for commercial customers and community solar projects up to a maximum of 2,000 kW per project.

Job Training & Home Efficiency

FEJA dedicates **$750 million to new energy job-training programs and to help low-income residents and disabled veterans pay utility bills**. It also **improves on-bill financing to pay for efficiency home improvements** through power bills.

Safeguard Tariffs on Solar Cells and Modules[1]

On January 22, 2018, the Trump Administration levied a 30% tariff on solar imports, including both solar cells, a main component in the manufacturing of solar modules, and solar modules, or solar panels, into the United States. This **tariff was issued in response to a petition** filed with the United States International Trade Commission (ITC) on April 26, 2017 by a solar cell and panel manufacturer, **Suniva, Inc.**, after declaring bankruptcy asking the ITC to cut the scale of the United States Solar Market. On May 25, 2017, **SolarWorld Americas**, another solar cell and panel manufacturer, joined Suniva, Inc. as co-petitioner.

From 2012 to 2016, the volume of solar generation capacity in the United States more than tripled, which was instigated by **artificially low-priced solar cells and modules from China**. China has been **providing subsidies and financing to its solar companies** in an effort to dominate the global supply chain. **China produces 60 percent of the world's solar cells and 71 percent of solar modules.** In 2011, China had subsidized its producers to the extent that those **producers were selling their goods in the United States for less than their fair market value**. In 2012, antidumping and countervailing measures were taken, but China relocated production to Taiwan.

From 2012 to 2016, **imports grew by about 500 percent and prices for solar cells and modules fell by 60 percent** to the point where most United States producers closed their doors, moved countries, or ceased domestic production. **Twenty-five United States solar companies closed by 2017.** All that remained were eight firms that produced modules using imported solar cells and two producers of both solar cells and modules. **In 2017, of the two remaining United States producers of solar cells and modules, one, Suniva, Inc., declared bankruptcy and stopped producing.** At this point, Suniva, Inc. filed a petition, later joined by SolarWorld, that triggered the **ITC investigation under Section 201 of the Trade Act of 1974**, which authorizes the president to take action in the form of tariffs, and by other methods, in response to an ITC determination that increased imports are a substantial cause of serious injury to domestic producers.

The ITC determined that increased solar cell and module imports are, in fact, **substantial cause of serious injury to the domestic industry**. Commissioners did not arrive at single remedy for recommendation, but rather generally agreed upon an **increase in duties with a carve-out for a specified quantity of imported cells**. The Office of the United States Trade Representative (USTR) recommended and the President chose to take action by applying the following additional duties provided in Table 1.1.

Table 1.1
Safeguard Tariffs on Imported Solar Cells and Modules[2]

Year	2018	2019	2020	2021
Tariff	30%	25%	20%	15%

[1] Information in this subsection has been paraphrased from the United States Office of the Trade Representative's fact sheet, "Section 201 Cases: Imported Large Residential Washing Machines and Imported Solar Cells and Modules."

[2] The first 2.5 gigawatts of solar cells imported each year will be exempt from the duties in Table 1.1.

These duties will last for 4 years as depicted in Table 1.1, and will cease in 2022 unless action is taken to extend the duties. As a result of these 4-year duties, **residential solar installations will increase in cost an estimated 3%** and **commercial installations will increase in cost an estimated 10%**. Industry and solar supporters across Illinois say that with the advent of the Future Energy Jobs Act (FEJA) legislation and existing Federal Investment Tax Credits, this tariff will not hault solar development in Illinois.

SECTION 4: DEMAND RESPONSE

Estimating Battery Project Potential at Sunny Hill Nursing Home

Will County partnered with the National Renewable Energy Lab (NREL) research staff in 2017 to support analysis of battery potential at Sunny Hill Nursing Home of Will County (SHNH) for use in a demand response program.

Community Data Analysis Question

Will batteries be able to help reduce electricity costs for SHNH in the near future?

Data and Analysis

To conduct this analysis, **NREL staff chose the System Advisor Model (SAM)**—an open-source, publically accessible simulation tool used for assessing potential projects that include energy generation/storage.

Battery costs and performance characteristics are variable, so **NREL staff conducted analysis where key cost and sizing inputs are varied**:

- **Total battery system installed cost per unit of battery rated capacity ($/kWh)**
- **Battery rated capacity (kWh)**
- **Ration of battery rated power to battery rated capacity (kW/kWh)**

For these parameters, representative values were chosen to provide Will County staff with initial assessment of battery potential:

- **NREL team selected peak demand reduction as the representative battery application** and compared control options available in SAM and selected the **"automated grid power target"** option to be representative for this application. This models a controller that tries to keep the site's electricity demand below the user-specified control threshold. **500 kW was selected as the control threshold.**
- **Lithium-ion nickel manganese cobalt oxide (NMC) battery model** from SAM was selected as the representative candidate technology.
- **Inflation was set at a rate of 2.5%/year**. Utility rates were modeled as rising with inflation, but **no extra rate escalation was applied**.
- The project financing was modeled as **county-purchased with a real discount rate of 3%/year**.

SHNH was selected as the site for the analysis because of its large electricity demands year-round that make this site ideal for demand response program participation. Fifteen-minute-interval

electricity load data from ComEd was used. NREL staff selected one year of load data to use in the SAM analysis.

To prepare for SAM data entry:

- The SAM simulation is sensitive to anomalous extreme values in demand, therefore **the NREL team manually checked for outliers and replaced one identified extreme point and replaced with linear interpolation**.
- **A data gap from daylight savings was filled by the NREL team** by replicating data from an adjacent hour.
- SAM treats the first analysis day as Monday. **Team entered 365 days of data starting with first Monday of 2016.**

Based on data in SHNH'S ComEd electricity bill, electricity charges are divided into 3 categories:

1. Monthly peak demand charge
    - Demand charges ($/kW) include a "distribution facility charge" and "capacity charge." In SAM, these **charges were combined into an overall effective monthly peak demand rate** and applied to each month of year.
2. Hourly energy charge
    - Hourly energy supply charges ($/kWh) for ComEd BES-H rate change each hour of the year. As a starting point, the NREL team downloaded one year of hourly rates (2016) from ComEd's website. SAM allows the user to define up to 12 energy rate periods so the **NREL team consolidated hourly data into 12 time categories**. The **NREL team calculated the average hourly rate for each category.**
3. Monthly fixed charge
    - The **monthly fixed charge inputted into SAM is constant throughout the year** and equal to the sum of "customer charge," "standard metering charge," and "meter lease fee."
    - **Variable charges and taxes were omitted due to negligible effect on results.**

Findings

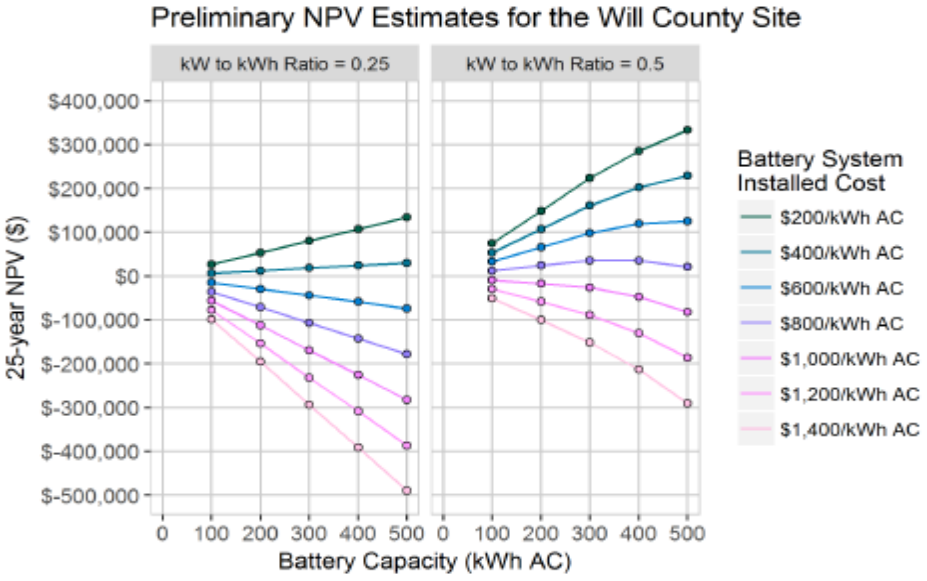


Figure 1. Preliminary NPV estimates for the Will County site. *Cost and sizing parameters are varied to identify combinations that are likely to have a positive 25-year NPV.*

Figure 1 shows the results of the analysis. **By varying battery cost and sizing parameters, it's possible to estimate cost and size range for which a battery project would have greater potential to yield favorable 25-year net present value (NPV). Batteries with installed cost greater than $1,000/kWh AC are unlikely to obtain positive 25-year NPV.**

NPVs in Figure 1 would have been lower if battery replacement had been triggered within the 25-year analysis period. Battery capacities degraded over time, but **they did not reach the user-specified replacement threshold.** Battery degradation rates are sensitive to multiple model inputs, including site load profile, control strategy, battery size, and battery type. **This analysis did not include maintenance costs or end-of-life disposal costs, which may differ between products.**

Based on the long-term payback period for battery usage at SHNH under the analysis of the NREL team, **Will County will not be pursuing use of batteries for the purpose of demand response program participation at this time.** Will County may re-explore the economics of battery usage at SHNH or other Will County facilities in the future.

Exploring Load Curtailment at Sunny Hill Nursing Home

Will County is working with Patten Power Systems of Caterpillar, Inc. to receive preliminary estimates for the building and installation of an exhaust filter for the onsite diesel generator at Sunny Hill Nursing Home (SHNH). Demand response programs **incentivize customers to be able to curtail their electric demand when requested by the utility** (ComEd) to alleviate grid stress when needed.

In order to participate in a demand response program, **a facility must be able to forgo electric usage in a particular area of the facility for a given amount of time, or, rely on another, non-grid-tied source of electric service** for the duration of the curtailment period. Other eligibility factors include size of non-heating, ventilation, and air conditioning (HVAC) dependent loads, and more. In SHNH's case, the generator onsite supports those most critical loads, but not all functions of the nursing home. With the aid of an electrical engineer, **Will County will be able to use the generator onsite to power the components tied to the generator, while remaining on-grid for those components that cannot be electrified by the generator.** In this way, **curtailment and test periods would be seamless and unknown to building occupants**, but create the opportunity to generate revenue from an otherwise, emergency use-only piece of equipment. It is important to note that **an emergency event for curtailment has not been called in over 15 years**, and Will County **will receive revenue simply for being available to act in the event of a grid emergency and testing the generator once per month** when instructed to do so by ComEd—a practice SHNH must perform already to comply with the Illinois Department of Public Health (IDPH).

Because SHNH's generator is diesel-fueled, it **must meet EPA emission standards before Will County can participate in a demand response program.** For this reason, Patten Power Systems is working with energy and facilities staff to design and quote the cost for an exhaust filter that would bring the generator into emission compliance. All costs associated with bringing the generator into compliance can be financed at a 0% interest rate and paid by demand response program participation payments.

Several public and private agencies participate in demand control, **including those with critical loads like detention centers and hospitals** in the Chicagoland area. This proves the **seamlessness of load-shedding in operations at participating facilities**. The potential for **sizable revenue generation** motivates Will County to continue to explore this opportunity at SHNH and its other large-scale facilities. **A full proposal will be submitted to the Will County Executive and the Will County Board in 2018.**

SECTION 5: ENERGY EFFICIENCY EFFORTS

Better Buildings Challenge

In 2011, the U.S. Department of Energy (DOE) rolled out the Better Buildings Initiative aimed at **making 20% more energy efficient all building sectors** including residential, commercial, industrial, and public. This effort will **save billions of dollars in energy costs and create thousands of jobs**. The Better Buildings Initiative is especially focused in 4 areas:

- Developing innovative, replicable solutions with market leaders
- Making energy efficiency investment easier
- Developing a skilled clean energy workforce
- Leading by example in federal government

One component of this initiative is the Better Buildings Challenge (BBC), which commits an organization to reduce total building portfolio-wide energy usage by 20%. Organizations must select a baseline year, either the current year or any year up to three years in arrears from which to benchmark improvements in energy efficiency. **In 2012, Will County Executive Lawrence M. Walsh signed Will County into the BBC with a baseline year of 2009[1].**

Will County has been benchmarking its utility usage and costs for all owned and rented facilities since joining the BBC in 2012. Using the U.S. Environmental Protection Agency's (U.S. EPA's) free Energy Star Portfolio Manager, Will County can track its progress towards the 20% reduction goal, generate analyses, and more.

As Will County's building portfolio evolves through demolition and new construction to better accommodate operational needs, Will County can adjust its committed portfolio of buildings, which includes **owned facilities and limited rental facilities[2]**. Each March, Will County conducts a comprehensive data review with the U.S. DOE's BBC Team. **As of March 2018, Will County expects a ~8% portfolio-wide energy reduction with 4 years remaining from the 2018 review to achieve its 20% reduction goal**. Will County also receives an abundance of energy and water efficiency resources solely for being a participant of the BBC. These resources may be in the form of technical documents and case studies, project analysis tools, webinars, in-person summits and forums, and more that contribute to the ability of Will County's facilities and energy staff to support energy and water efficiency.

[1] Of all eligible baseline years, 2009 had the greatest portfolio-wide energy usage, which is why it was chosen as the baseline year, giving Will County the greatest opportunity for improvement.

[2] In 2018, Will County will include long-term rental properties for which Will County is responsible for the majority or all energy costs. While it can be difficult to make physical capital improvements to leased facilities depending on the constraints of a lease, a great deal of energy usage, and associated cost, reduction is dependent on building occupant behavior and consciousness. Long-term rentals will remain part of the BBC so long as lease renewals and funding sources do not alter Will County's accountability for utility expenses of committed facilities.

It is important to note that there **is no financial obligation or penalty for not reaching the BBC 20% reduction goal**. Some of the obstacles to reaching the 20% reduction goal can be explained by the fact that before committing to the BBC's, Will County was unaware of its facilities' energy demand. This plays a crucial role in understanding how feasible it is to reduce a given amount of energy. Will County now **measures its energy data closely** and better understands the **investment and staff commitment** required to reduce even small amounts of energy. An **aging building portfolio and frequently transitioning property use** to that which is other from a building's originally intended use also poses unique challenges to achieving reduction goals.

Additionally, **changing operations and overall staff mentality about energy is necessary** to reduce energy usage. It is common in many commercial buildings for occupants to feel a lack of ownership for the energy used at work because there is no direct cost implication to the occupants, such as a line item on a paycheck. As a result, many times **workplaces experience common space energy waste**. The best example is lights left on in empty offices, break rooms, and bathrooms—a behavior most individuals would not exhibit at home because this results in high energy costs. The **2018 Energy & Conservation Plan Update will offer solutions to addressing employee engagement** in energy usage reduction and BBC engagement.

While the BBC measures success based on reduced energy usage, it is important to note that this directly relates to **decreases in energy expenditures that save Will County taxpayer dollars**. For this reason, this Review highlights the progress of each participating facility in the BBC. Further, the BBC creates the opportunity for Will County to lead by example through its efforts taken to monitor operations that pose potential for energy and/or water reduction.

The following buildings will be participating in the BBC in 2018:

1. Adult Detention Facility (ADF)
2. Adult Detention Video Visitation Facility
3. Child Advocacy Center (CAC)
4. Community Health Center (CHC)
5. County Office Building (COB)
6. Court Annex (EMCO)
7. Courthouse
8. Division of Transportation (DOT) (Joliet)
9. Division of Transportation (DOT) (Monee)
10. Division of Transportation (DOT), Sheriff's Office, and Coroner (Lockport)
11. Emergency Management Agency (EMA) Radio Garage/Training Facility
12. Health Department (Eastern Branch)[4]
13. Health Department (Main Branch)
14. Health Department (Northern Branch)[4]
15. Julie Ann House
16. Miller Taylor House
17. Land Use Department (Bay's Executive Center)[3,4]
18. Public Safety Complex & Sheriff's Department
19. Recorder of Deeds' and Coroner's Office
20. Records Archive Center
21. River Valley Juvenile Detention Center (RVJC)
22. Sheriff Substation (Crete)
23. Sunny Hill Nursing Home (SHNH)
24. The Sunny Hill Tuberculosis Clinic

[3] Pending confirmation of utility cost responsibility.

[4] Rentals will remain part of the BBC so long as lease renewals and utility funding do/does not alter Will County's accountability for utility expenses.

Will County Facilities

OWNED

- Adult Detention Facility (ADF)
- Adult Detention Video Visitation Facility
- Children's Advocacy Center (CAC)
- Community Health Center (CHC)
- County Office Building (COB)
- Court Annex (EMCO)
- Courthouse
- Division of Transportation (DOT) (Joliet)
- Division of Transportation (DOT) (Monee)
- Division of Transportation (DOT) (Wilmington)
- Division of Transportation (DOT), Sheriff Substation, & Morgue (Lockport)
- Emergency Management Agency (EMA) Radio Garage & Training Facility
- Emergency Management Agency (EMA) Radio Towers:
    - 16911 West Laraway Road (Joliet)
    - 22365 South Owens Rd (Frankfort)
- Health Department (Main Branch)
- Joliet Storage Garage
- Julie Ann House
- Miller Taylor House
- Public Safety Complex & Sheriff's Department
- Recorder of Deeds and Coroner's Office
- Records Archive Center
- River Valley Juvenile Center
- Sheriff Maintenance Garage
- Sheriff Substation (Crete)
- Sheriff Training Center & Range
- Specialty Courts (Beach Building)
- Sunny Hill Nursing Home
- The Sunny Hill Tuberculosis Clinic

LEASED AS OF MARCH 2018

- Animal Control
- Emergency Management Agency (EMA) Radio Towers:
    - 13809 High Road (Lockport)
    - 15600 West Bruns Road (Manhattan)
    - 20269 West County Road (Wilmington)
    - 24137 West 111th Street (Plainfield)
    - 26270 South Ridgeland Avenue (Monee)
    - 308 Prairie Road (Lockport)
    - 333 North Madison Street (Joliet)
    - 851 West New Monee Road (Crete)
- Health Department (Eastern Branch)
- Health Department (Northern Branch)
- Land Use Department (Bays Executive Center)
- Regional Office of Education (ROE)
- Sheriff Special Weapons and Tactics (SWAT) Storage Garage
- Veterans Assistance Commission (VAC) (Glenwood Building)
- Workforce Services Division (Glenwood Building)

NO NOTABLE ENERGY-RELATED IMPROVEMENTS SINCE JUNE 2012

- Adult Detention Video Visitation Facility
- Animal Control
- Division of Transportation (DOT) (Wilmington)
- Emergency Management Agency (EMA) Radio Towers:
    - 13809 High Road (Lockport)
    - 15600 West Bruns Road (Manhattan)
    - 16911 West Laraway Road (Joliet)
    - 20269 West County Road (Wilmington)
    - 22365 South Owens Rd (Frankfort)
    - 24137 West 111th Street (Plainfield)
    - 26270 South Ridgeland Avenue (Monee)
    - 308 Prairie Road (Lockport)
    - 333 North Madison Street (Joliet)
    - 851 West New Monee Road (Crete)
- Health Department (Eastern Branch)
- Health Department (Northern Branch)
- Joliet Street Storage Garage
- Land Use Department (Bays Executive Center)
- Regional Office of Education (ROE)
- Sheriff Maintenance Garage
- Sheriff Training Center & Range
- Sheriff Special Weapons and Tactics (SWAT) Storage Garage
- Sheriff Substation (Crete)
- Specialty Courts (Beach Building)
- The Sunny Hill Tuberculosis Clinic
- Veterans Assistance Commission (VAC) (Glenwood Building)
- Workforce Services Division (Glenwood Building)

DEMOLISHED, SCHEDULED FOR DEMOLITION, OR TRANSFERRED SINCE JUNE 2012

- Courthouse (Original Building – Jefferson Street) [Spring 2020[1]]
- Joliet Street Storage Garage (Temporary Facility) [Spring 2020[1]]
- Sheriff's Administration (Eagle Building) [March 2017]
- Sheriff's Administration (First Midwest Bank) [Winter/Spring 2018[1]]
- Sheriff's Department (Original Building & Trailer – Laraway Road) [Winter/Spring 2018[1]]
- Specialty Courts (Temporary Facility – Beach Building) [Spring 2020[1]]
- State's Attorney's Office (Original Building – Chicago Street) [March 2018[2]]

TERMINATED LEASES SINCE JUNE 2012 OR LEASES TO BE TERMINATED AS OF MARCH 2018

- Emergency Management Agency (EMA) Radio Lab
- Emergency Management Agency (EMA) Storage Garage
- Health Department Storage Garage
- Health Department (Eastern Branch - University Park)
- Sheriff's Forensic Garage
- Sheriff Intake Facility
- Veterans Assistance Commission (VAC - Bays Executive Center)

TO BE CONSTRUCTED AS OF MARCH 2018

- Animal Control [Winter 2018/2019[3]]
- Courthouse [Fall 2020[3]]
- Division of Transportation (DOT) (Wilmington) Cold Storage [Spring/Summer 2018[3]]
- Health Department (Main Branch) [Fall 2020[3]]

[1] Estimated demolition period

[2] Approximate month and year of property transfer to the City of Joliet

[3] Estimated construction completion period

Facility Contributions

The following subsection will **showcase various energy and water conservation efforts taken since the release of the June 2012 Energy Efficiency & Conservation Plan**. These efforts demonstrate **Will County's commitment to reducing energy and water usage that reduces operational expenses and increasing operating efficiencies**. Each facility that has received notable assessments, replacements, retrofits, or streamlined operations and has therefore influenced the use of energy or water is discussed, identifying for each project the **measurable impacts in usage and cost as well as value added through public sector incentive programs**. By analyzing these projects, Will County can use this information to **make decisions about future energy and water efficiency-related projects based on the results past projects have offered**.

It is important to note that while **most energy and water related projects are offered in this report, not all projects or all project data is fully available** herein. While energy and water efficiency efforts have long been a priority for Will County leadership, it was not until recently that a full-time staff person was dedicated to the tracking of facility as well as energy and water use data. As a result, some data is not readily available for full analysis of various facility projects. In order to provide the most accurate information despite the estimated nature of future projected savings, **data that could be reasonably estimated is included** where necessary in the subsequent analyses, and, in some cases, **projects that are lacking greater amounts of data are evaluated, but may not include extensive energy and waste cost savings impact figures.**

Will County has been proactive in acknowledging the difficulties limited data can pose in assessing the successfulness and impact of facility maintenance and capital improvements as **demonstrated by the 2018 implementation of a computerized maintenance management system** (CMMS) that will allow Will County to track facility maintenance and improvement-related data more closely than ever has before. As a result of CMMS implementation**, future Will County energy and water efficiency progress reports will be able to offer complete life-cycle cost analyses for most all facility improvements and maintenance**, and will ensure better tracking of project success in commissioning and producing anticipated results, but also in identifying unforeseen projects earlier so that leadership and staff may work together to more efficiently and accurately update project master plans to meet facility needs.

Furthermore, this Review **focuses specifically on the following data** in its facility project analyses:

- Total Will County investment
- Cash incentives
- No cost granted products and equipment
- Energy and water usage savings
- Energy and water cost savings

In the future, Will County will be able to **add the following metrics** to its facility project analyses:

- Maintenance labor cost savings
- Warranty cost & related maintenance cost savings
- Proper maintenance's impact on increased equipment efficiency and useful life

For the purposes of this Review's facility analyses, the **electric and gas rates are taken from an average of those rates paid in 2016 and 2017** as provided in Table 1.1. Table 1.1 also includes a **snapshot of each qualifying facility's progress in the BBC**, comparing 2017 year-end energy usage data to baseline year 2009. **Percentage of energy cost reduced as compares to 2009 data is also provided**.

Table 1.1
Facility Metrics

Gas and Electric Rates for Will County Facilities			BBC	
Name of Facility	**Rate per kWh**	**Rate per Therm**	**% Source EUI Reduced**	**% Energy Cost Reduced**
Adult Detention Facility (ADF)	$0.0718	$0.4072	12.24%	9.43%
Adult Detention Video Visitation[2]	$0.0969	$0.6881	25.45%	26.92%
Children's Advocacy Center (CAC)	$0.0800[1]	$0.5000[1]	N/A	N/A
Community Health Center (CHC)	$0.0816	$0.6521	15.16%	30.96%
County Office Building (COB)	$0.0792	$0.5100	5.61%	25.68%
Court Annex (EMCO)	$0.1319	$0.8600	21.56%	39.32%
Courthouse	$0.0786	$0.4496	6.87%	11.92%
Division of Transportation (DOT) (Joliet)	$0.1112	$0.5112	21.15%	31.21%
Division of Transportation (DOT) (Monee)	$0.1326	$0.5475	20.88%	24.84%
Division of Transportation (DOT), Sheriff's Office, and Coroner (Lockport)	$0.0963	$0.6982	+23.10%	29.30%
Emergency Management Agency (EMA) Radio Garage & Training Facility	$0.1172	$0.8072	<1%	13.31%
Health Department (Main Branch)	$0.0847	$0.4557	6.21%	27.54%
Julie Ann House	$0.1267	$0.5900	N/A	N/A
Miller Taylor House	$0.1228	$0.5932	N/A	N/A
Public Safety Complex & Sheriff's Department	$0.0800[1]	$0.5000[1]	N/A	N/A
Recorder of Deeds and Coroner's Office	$0.0994	$0.5744	+74.24%	+4.99%
Records Archive Center	$0.2825	$0.5473	14.81%	22.35%
River Valley Juvenile Detention Center (RVJC)	$0.0653	$0.4339	<1%	26.68%
Sheriff Substation (Crete)	$0.1000	$0.7436	+219.38%	+218.43%
Sunny Hill Nursing Home (SHNH)	$0.0688	$0.4216	<1%	6.57%

[1] Two-year data (2016-2017) unavailable due to acquisition in 2017; regional average rates used
[2] Most improved facility based on 2017 baseline data comparison


WILL COUNTY
ADULT DETENTION FACILITY
SHERIFF PAUL J. KAUPAS

Adult Detention Facility

The Adult Detention Facility (ADF) originally opened its doors in March of 1989 and since has completed a $70 million expansion in May 2009. The original 156,000 square foot building was expanded to 318,000 square feet, adding 10 new housing units and increasing capacity of the jail from 322 detainees to over 1,000 detainees. The facility is located in the downtown Joliet area of Will County. The facility is constructed in an architectural style called "podular." The podular architecture clusters inmate cells around a common day room, exercise area, and visitation room. Over the last 5 years, ADF has made several improvements in energy efficiency and wastewater reduction including facility assessments, cooling tower cleaning and evaporation credit identification, variable speed drive (VSD) installation, operational adjustments, hot water heater replacement, and more. As a result, ADF will contribute a ***~$942,004.64 financial benefit[1]*** *to Will County.*

Better Buildings Challenge

ADF started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 223.8 in 2009 decreased to 196.4 in 2017. This is a **moderate decrease in EUI of 12.24%.** ADF has **decreased energy cost by 9.43%** since baseline year 2009. These decreases demonstrate that those energy efficient measures taken at ADF have been properly commissioned and are yielding their expected return. ADF has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	223.8	$ 536,257.60
11/30/2017	196.4	$ 485,672.44
Energy Expenditure Increase/Decrease		**$ (50,585.16)**
EUI Increase/Decrease		**(27.4)**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy and water cost savings and cash incentives.

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In January 2015, **ADF participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report **highlighted 10 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost. ADF proactively **implemented ECRMs #1, #3, and a variation of #4 to-date**. See Table 1.2.

Table 1.2
SEDAC Level 2 Energy Assessment & Feasibility Report ECRMs

ECRM #	Description	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Install LED Exit Signs	5,256	0	**X**
2	Retrofit Exterior Lighting with LEDs	38,715	0	
3	Install New High Efficiency Hot Water Boilers	0	38,171	**X**
4	Install New High Efficiency Chillers	222,143	0	**X (VARIATION)**
5	Repair Compressed Air Leaks	12,840	0	
6	Install Premium Efficiency Motors	26,982	0	
7	Optimize Walk-in Freezer	23,980	0	
8	Install Low Flow Showerheads	0	5,572	
9	Install Vending Misers	6,761	0	
10	Solar Thermal Water Heating	0	16,000	

Smart Energy Design Assistance Center (SEDAC) Retro-Commissioning Plan

In April 2015, ADF participated in **a Retro-Commissioning Assessment performed by SEDAC**. This assessment **identified 10 opportunities to modernize equipment and streamline operations** saving energy usage and costs. In exchange for engineering expertise and a complete Retro-Commissioning Plan, **participants must agree to complete at least $10,000[2] worth of the proposed retro-commissioning measures (RCxM). Will County has fulfilled that obligation through completion of RCxM #s 2, 6, 7, and 10.** See Table 1.3.

Table 1.3
SEDAC Retro-Commissioning Assessment

RCxM #	Description	Estimated Annual Facility Savings			
		Measure Interaction	Electricity (kWh)	Natural Gas (Therms)	Complete
1	Schedule Air Handling Units		114,622	3,933	
2	Repair Outdoor Air Dampers	1	112,075	28.858	**X**
3	Static Pressure Reset	1	13,737	0	
4	Adjust Mixed-Air Temperature Setpoint	1,2	0	25,787	
5	Minimum Outdoor Air Reduction	1,2,4	35,554	7,738	
6	Chilled Water Temperature Reset		19,720	0	**X**
7	Condenser Water Temperature Reset	6	54,736	0	**X**
8	Hot Water Temperature Reset		0	3,250	
9	Pump Staging		78,677	0	
10	Install Occupancy Sensors in Non-Secure Locations		53,684	0	**X**

Installation of LED Exit Signs

In June 2015, ADF **installed 11 LED exit signs** that will reduce electricity demanded as a result of lower wattage for a 24-hour, 7-days-per-week operational piece of equipment. Because **exit signs are mandatory and always operational, LED versions can have a measurable impact on energy usage and cost reduction**. See Table 1.4.

[2] Internal and external labor as well as cost of materials are all eligible costs in fulfillment of the $10,000 Retro-Commissioning Program participant matching requirement.

Table 1.4 Installation of LED Exit Signs						
Product	**Quantity**	**Direct Equipment Cost (Including Materials & External Labor)**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Lifetime kWh Savings**	**Lifetime Electric Cost Savings**
LED Exit Signs	11	$262.91	~54,593.73	~$3,919.83	~272,968.65[3]	~$19,599.15[3]

Total LED Exit Sign Installation Value (Lifetime Energy Cost Savings) = ~$19,599.15

Outdoor Air (OA) Damper Adjustment

In July 2015, **ADF had OA damper linkages adjusted for proper close-off** following the April 2015 SEDAC Retro-Commissioning Assessment that identified issues with OA damper sequences. The correct sequence was in place and operational when outdoor air temperature (OAT) was below 40 degrees Fahrenheit. However, the OA dampers were opening fully in heating mode and causing the hot water valve to open wider and waste natural gas. Sometimes, the OA damper and hot water valve were fully open at the same time and for several days per occurrence. Humidity issues in the building forced the OA damper fully open during periods when OAT rose over 80 degrees Fahrenheit. Maintenance management took action immediately following receipt of this report. If this adjustment had not been identified and made, added **energy usage of ~112,075 kWh and related energy costs of ~$8,046.99 per year would have been experienced**. The $954.00 cost associated with this project contributed to Will County's $10,000 commitment for the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Illinois Energy Now (IEN) Retro-Commissioning Program.

Total OA Damper Adjustment Value (Energy Cost Savings Since July 2015 Adjustment) = ~$21,458.63

[3] *~5-year manufacturer useful life*

Installation of Occupancy Sensors

In July and August 2015, ADF **installed 77 wall switch occupancy sensors** throughout the facility to reduce unnecessary lighting of unoccupied spaces. The $6,231.68 cost associated with this project **contributed to Will County's $10,000 commitment for the Illinois DCEO's IEN Retro-Commissioning Program.** See Table 1.5.

Table 1.5
Installation of Wall Switch Occupancy Sensors

Product	Quantity	Direct Equipment Cost (Including Materials & Internal Labor)	Annual kWh Savings	Annual Electric Cost Savings	Lifetime kWh Savings	Lifetime Electric Cost Savings
Wall Switch Occupancy Sensor	77	$6,231.68	~16,607.58	~$1,192.42	~166,075.85[4]	~$11,924.24[4]

Total Wall Switch Occupancy Sensors Value (Lifetime Energy Cost Savings) = ~$11,924.24

Boiler Tune-Up

In 2015, ADF performed tune-ups to its 2 heating boilers that included the following tasks to ensure optimal operation and decreased energy usage and cost:

1. Measure combustion efficiency using an electronic flue gas analyzer.
2. Adjust burner and gas input, manual or motorized draft control.
3. Check for proper venting.
4. Complete visual inspection of system piping and insulation.
5. Check safety controls.
6. Check adequacy of combustion air intake.
7. Clean fireside surfaces.
8. Inspect all refractory. Patch and wash coat as required.
9. Inspect gaskets on front and rear doors and replace as necessary.
10. Remove all hand hole and man hole plates. Flush boiler with water to remove loose scale and sediment.
11. Replace all hand hole and man hole plates with new gaskets.
12. Clean burner and burner pilot.
13. Check pilot electrode and adjust or replace.

[4] ~10-year manufacturer useful life

14. Clean air damper and blower assembly.
15. Clean motor starter contacts and check operation.
16. Make necessary adjustments to burner for proper combustion.
17. Perform all flame safeguard and safety trip checks.
18. Check all hand hole plates and man hole plates for leaks at normal operating temperatures and pressures.
19. Troubleshoot any boiler system problems as requested by on-site personnel.

The cost of this project was $9,925.00 and was **incentivized by Illinois DCEO's IEN Public Sector Energy Efficiency (PSEE) Program at $3,000.** Through proactive measures such as these tune-ups, Will County is able to slow the degradation of equipment—these boilers still operate between 80-85% thermal efficiency and are original to the facility.

Total Boiler Tune-Up Value (Incentive) = $3,000.00

Variable Speed Drive (VSD) Installations

In September 2015, **ADF retrofitted its two York chillers to include Variable Speed Drives (VSDs) as opposed to maintaining use of a solid state starter in order to save energy costs and extend the lives of the chillers**. The cost for this project was ~$145,030.00 with **remaining useful lifetime[5] energy usage and cost savings of ~1,033,050 kWh and ~$74,172.99**. This project was **incentivized together with ADF's hot water heater (HWH) replacement by Illinois DCEO's IEN PSEE Program at ~$37,525.44[6].**

Total VSD Installation Value (Lifetime Energy Cost Savings and Incentives) = ~$111,698.43[6]

Evaporation Credit Implementation

In August 2016, **ADF maintenance management worked with the City of Joliet to address sewer charges for the cooling tower at ADF**. Engineering knowledge enabled management to identify that ADF was being charged for sewer consumption for cooling tower water usage. Because **cooling towers do not put water used into the sewer, but rather evaporate the water** used into the air due to high temperatures inside the towers, the **City of Joliet began crediting the sewer consumption charges for the cooling towers back to Will County** beginning September 2016. This alteration has saved tens of thousands of dollars, estimated at ~$30,000.00, for Will County and exact savings will be presented in the 2018 Will County Energy & Conservation Progress Report[7].

[5] Assumes a remaining useful life of 10 years

[6] Incentive included in this figure represents the incentive value for both VSD installations and HWH replacement.

[7] During the writing of this report, a billing credit issue was discovered for the evaporation account credits. This issue was being investigated and rectified as this Review went to Committee.

Total Evaporation Credit Value (To-Date Sewer Charge Savings) = ~$30,000.00

Cooling Tower Cleaning & Disinfection

In October 2016, **ADF conducted a cleaning and disinfection of 3, or 3,900 cubic feet, of its cooling towers and related systems**. The cost for this service was $3,800.00. This voluntary cleaning **qualified for $1,567.46 in incentives** through DCEO's IEN Public Sector Energy Efficiency (PSEE) Program because of the **increased efficiency cooling towers gain when properly cleaned though the increased health and safety of the cooling towers' operation is the primary purpose of cleaning and disinfection**. This project **will save ~26,124[8] kWh in energy usage and associated energy costs of $1,875.70[8]**. This service included pre-disinfection of cooling tower prior to physical cleaning, physical cleaning of tower decks, fan housing area, distributing devices, tower fill, and water sump, post-disinfection of the cooling water system, and a summary report and Cooling Tower Cleaning & Disinfection Certificate.

Total Cooling Tower Cleaning & Disinfection Value (Lifetime Energy Cost Savings and Incentives) = ~$3,443.16

Hot Water Heater Replacement

In 2016, ADF **replaced 3 inefficient, facility-original hot water heaters (HWHs) with 99% thermal efficiency HWHs**. The cost of this project is estimated at ~$200,000.00. This project was **incentivized together with ADF's VSD installation by Illinois DCEO's IEN program at ~$37,525.44[9].** This energy efficient HWH will **save energy usage and costs of ~76,462 therms and ~$31,135.33 annually, and ~1,529,240 therms and ~$622,706.53[10] over the lifetime[11] of the HWH.**

Total Hot Water Heater Replacement Value (Lifetime Energy Cost Savings) = ~$622,706.53

[8] These values represent savings over a two-year period as cooling tower cleanings are conducted every two years.

[9] Incentive included in this figure represents the incentive value for both VSD installations and HWH replacement

[10] Incentive not included in this figure—incentive was bundled for VSD installation and HWH replacement. Incentive represented in values provided under "Variable Speed Drive (VSD) Installation."

[11] Assumes a 20-year useful life

Chilled and Condenser Water Temperature Reset

In February 2017, ADF **adjusted the sequence of operations to automatically reset the chilled water setpoint based on outdoor air temperature**. The chilled water setpoint would now reset linearly with 45 degree Fahrenheit chilled water when the outdoor air temperature is 95 degrees Fahrenheit or greater, and 51 degree Fahrenheit chilled water when the outdoor air temperature is at 55 degrees Fahrenheit. As for the chiller system condenser water temperature reset**, lowering the condenser water temperature setpoint decreases the pressure differential between the evaporator and condenser**. The **lowered pressure differential would lead to more efficient chiller operation and would yield electrical energy savings**. The condenser water setpoint should be reset so that it is the greater of 7 degrees Fahrenheit above the wet bulb temperature of 25 degrees Fahrenheit above the chilled water supply temperature setpoint. These resets contribute to energy usage and cost **savings over the remaining useful lifetime[12] of the equipment of ~744,560 kWh and ~$53,459.41**. The **$1,506.00 cost associated with this project contributed to Will County's $10,000 commitment for the Illinois DCEO's IEN Retro-Commissioning Program**.

Total Chilled and Condenser Water Temperature Reset Value (Lifetime Energy Cost Savings) =~$53,459.41

Dishwasher Replacement

In April 2017, **ADF installed a Champion Model No. 64 ENERGY STAR dishwasher,** at a direct material and external labor cost of $58,446.74, including a heat recovery unit add-on that comprises $3,725.00 of the total cost and removal of the existing dishwashing unit. **The dishwasher incentive through DCEO's IEN program was $2,200.00 and increased by $3,301.26 with the addition of the heat recovery unit, totaling $5,501.26.** The Champion Model No. 64 dishwasher **saves energy and water by processing more dishes per hour than the pre-existing dishwasher** using vent fan control, and energy sentinel (idle pump shut off). The Champion Model NO. 64 dishwasher **will use ~426,104 less gallons of water and cost ~$3,408.83 less than its predecessor per year, saving ~4,261,040 gallons of water and ~$34,088.32 over the lifetime[12] of the dishwasher**. The Champion Model No.64 dishwasher also **uses ~466.43 therms less and costs $189.93 less annually and uses ~4,664.30 therms less and costs ~$1,899.30 less over the lifetime[10] of the dishwasher**. As for electric savings, the **dishwasher uses ~25,503.46 less kWh and costs ~$1,831.15 less annually to operate, which translates to ~255,034.60 less kWh demanded and ~$18,311.50 less spent to operate the dishwasher over its useful life[12]**. One of the advantages of the heat recovery unit addition is that it is fed with cold water and **the exhaust heat turns the water going into the booster into hot water using waste heat to generate hot water for the dishwasher**. This heating serves as the primary water heating, **saving ~190.32 therms and ~$77.50 every year or ~1,903.20 therms and ~$775.00 over the lifetime[13] of the dishwasher**.

[12] Assumes a remaining useful life of ~10 years

[13] ~10-year manufacturer useful life

Dishwasher Replacement Value (Lifetime Energy Cost Savings, Water Cost Savings, and Incentives) = ~$60,575.38

Compressor Overhaul & Purge Equipment

In April 2017, ADF **overhauled aging chiller compressors and purge equipment to increase efficiency** of its chillers and extend their useful life. The estimated cost of this project is ~$140,000.00. The following summary of benefits will contribute to increased chiller efficiency:

1. Improvement to operating efficiency and life cycle of equipment.
2. Performing an overhaul to each compressor allows for each of the compressor gaskets to be replaced.
3. Operating components inspected internal to the compressor.
4. New gaskets installed seal the equipment, significantly eliminating/reducing refrigerant from leaking outside of equipment and reducing air from entering (causing corrosion) and additional energy consumption.
5. Operating equipment with the proper amount of refrigerant charge improves the operating efficiency of the equipment and extends the life cycle of its operation by eliminating surge conditions (caused by low refrigerant or leaks).
6. External purge prevents false purges.
7. Maximum purge pump out safety prevents refrigerant loss.
8. Remove purging allows for immediate identification that a leak is present and can be addressed prior to it becoming an emergency.
9. Energy saving mode shuts down the unit if non-condensibles are absent.
10. Automatically purges air from idle chillers for most efficient start-up procedures, allowing chiller to start-up more efficiently by eliminating additional work to motor and compressor components.
11. Replacement of required components, which were found to be out of tolerance allows for extended bearing life and improved mechanical operation.

Energy Efficient Trash Compactor

In August 2017, ADF **installed an energy efficient, 3-horsepower trash compactor** at a cost of $19,132.12. This trash compactor **will save ~3,828.52 kWh and ~$274.89 per year, and ~38,285.20 kWh and ~$2,748.90 over the lifetime[14] of the compactor**. DCEO's IEN PSEE Program **incentivized this project at $1,390.80.**

Energy Efficient Trash Compactor Value (Lifetime Energy Cost Savings and Incentives) = ~$4,139.70

[14] ~10-year manufacturer useful life

Table 1.6 Summary of Total Impact for ADF	
Total Investment=	~$585,288.45
Total Cash Incentives=	$48,984.96
Total Gallons of Water Saved=	~4,261,040
Total Water-Related Cost Savings=	~$64,088.32
Total Lifetime kWh Usage Savings=	>2,554,777.46[15]
Total Lifetime Electric Cost Savings=	>~$203,550.53[15]
Total Lifetime Therm Usage Savings=	~1,535,807.50
Total Lifetime Natural Gas Cost Savings=	~$625,380.83
Total Financial Benefit=	**~$942,004.64**

[15] *Due to a lack of efficiency and other specification necessary for energy use and cost savings calculation regarding equipment at the time of its removal and replacement, these figures are intentionally conservative and likely less than their true values.*


WILL COUNTY
ADULT DETENTION FACILITY
VISITATION CENTER

Adult Detention Video Visitation

Adult Detention Video Visitation is a smaller facility at just over 4,000 square feet. This facility is for detainees at the Adult Detention Facility (ADF). It is comprised of several closed circuit television monitors, cameras, and phones. The detainee remains located in the visiting area of the ADF, while the visitor is located approximately 1 block away in the Adult Detention Video Visitation Facility. This facility is profiled under this subsection to showcase its progress in the Better Buildings Challenge.

Better Buildings Challenge

The Adult Detention Video Visitation facility started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 314.3 in 2009 decreased to 234.3 in 2017. This is a **significant decrease of 25.45%**. The Adult Detention Video Visitation facility has **decreased energy costs by 26.92%** since baseline year 2009. The Adult Detention Video Visitation facility has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	314.3	$11,431.24
11/30/2017	234.3	$8,354.05
Energy Expenditure Increase/Decrease		**$ (3,077.19)**
EUI Increase/Decrease		**(80)**


WILL COUNTY
Children's
ADVOCACY CENTER
HOPE, HEALING, AND JUSTICE FOR ABUSED CHILDREN.
304

Children's Advocacy Center

In September 2017, Will County acquired the Children's Advocacy Center's (CAC's) dedicated facility. The CAC, the only agency of its kind in Will County, is a private, 501(c)(3) non-profit organization providing hope, healing, and justice for children who are sexually abused, severely physically abused, or have witnessed a violent crime. At around 7,000 square feet, the newly acquired space's use is primarily office-oriented. The CAC has several private and cubicle-style offices. There are 4 bathroom amenities and a break room. The CAC has some unique operations equipment, such as camera and video equipment that is used to surveillance interviews with clients. When Will County acquired this new facility, proactive decisions to retrofit lighting and incorporate energy and water conservation measures were made to ensure efficient operations that will contribute a ***~$29,690.90 financial benefit[1]*** *to Will County. See Table 1.4.*

Better Buildings Challenge

Will County will be adding the CAC to its participation in the BBC. This will commit the CAC to be an active contributor to Will County's goal of a 20% source energy usage intensity reduction portfolio-wide by 2022.

Lighting Retrofit & Ceiling Mount Occupancy Sensors

In October 2017, **all interior lighting was retrofitted** from fluorescent T12s and T8s to high efficiency LED Direct Lit 2x2 and 2x4 troffers, and the **total number of lamps were reduced by 220%** from 66 to 30. The Will County CAC **will now demand ~21,630 kWh less** than it did prior to the retrofit **saving ~$1,730.40 in electric costs annually, and demand ~216,300 kWh and ~$17,304 less over the lifetime[2] of the fixtures**. To accompany the October 2017 lighting fixture retrofit, 6 Sensor Switch CMR 9 Series Standard Range 360 degree **ceiling-mount occupancy sensors were installed** in commonly lit spaces. These sensors will turn off sections of common space lighting that is unnecessarily lit during periods of vacancy, **saving approximately ~517.60 kWh and ~$41.41 annually, and ~5,176.00 kWh and ~$414.08 over the lifetime[3] of the sensors**. The collective cost of these projects was $23,109.00 and it **was incentivized at $8,024.28** through ComEd's Public Sector Energy Efficiency (PSEE) Program. See Table 1.1.

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

[2] ~20-year useful life

[3] ~10-year useful life

Table 1.1 Interior Lighting Retrofit Specifications & Wattage Reduction							
Existing Fixture Type	**Fixture Quantity**	**Existing Fixture Actual or Typical Wattage[4]**	**Existing Total Wattage**	**New Lighting Type**	**Fixture Quantity**	**New Fixture Actual Wattage[4]**	**New Total Wattage**
T12 (75W) lamp, Fixture	80	106.9	8,552	Troffer 2x4, 3000-4500 lumens, LED	31	*40*	1,240
T12 (75W) lamp, Fixture	1	323	323	Troffer 2x2, 2000-3500 lumens, LED	2	*27*	54
T8 3 (32W) lamp, Fixture, Standard T8	48	84.48	4,055.04	Troffer 2x4, 3000-4500 lumens, LED	31	*40*	1,240
T8 2 (32W) lamp, Fixture, Standard T8	1	57	57	Troffer 2x2, 2000-3500 lumens, LED	2	*27*	54
Total Watts Reduced						**10,399.04**	

Total Lighting Retrofit Value (Lifetime Energy Cost Savings and Incentives) = ~$25,742.36

[4] Actual or typical watts are used in the calculation of watt reduction, actual verses typical figure use depends on the type of fixture, to include ballast demands in addition to the wattage demands of the lamp(s).

Savings Through Efficient Products (STEP) Program Participation

In November 2017, the CAC participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA). Through this program, the CAC received **13 wall switch occupancy sensors, 4 bathroom faucet aerators, and 4 new LED exit signs at no material cost to Will County**. See Tables 1.2 and 1.3.

Table 1.2
STEP Program Product Retail Value

Product	Quantity	Retail Price Per Item	Cost to Will County[5]
Wall Switch Occupancy Sensor	13	~$41.30	$0.00
Faucet Aerator (Standard)	4	~$2.13	$0.00
LED Exit Sign	4	~$13.00	$0.00
Total Product Retail Value			**~$597.42**
Total Cost to Will County[5]			**$0.00**

[5] *Internal labor cost for install of products not included*

Table 1.3 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electricity Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
Wall Switch Occupancy Sensors	13	~2,803.88	~$224.31	0	$0.00
Faucet Aerators (Standard)	4	0	$0.00	~23.08	~$11.54
LED Exit Signs	4	~2,481.53	~$198.52	0	$0.00
Total Lifetime kWh Savings					**~40,446.45[6,7]**
Total Lifetime Electric Cost Savings					**~$3,235.72[6,7]**
Total Lifetime Therm Savings					**~230.80[8]**
Total Lifetime Natural Gas Cost Savings					**~$115.40[8]**

[6] *Wall switch occupancy sensors have a ~10-year useful life*

[7] *LED Exit Signs have a ~5-year useful life*

[8] *Faucet aerators have a ~10-year useful life*

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$3,948.54

Table 1.4 Summary of Total Impact for CAC	
Total Investment=	~$23,109.00
Total Cash Incentives=	$8,024.28
Total STEP Product Retail Value=	~$597.42
Total Lifetime kWh Usage Savings=	~261,922.45
Total Lifetime Electric Cost Savings=	~$20,953.80
Total Lifetime Therm Usage Savings=	~230.80
Total Lifetime Natural Gas Cost Savings=	~$115.40
Total Financial Benefit=	**~$29,690.90**

Community Health Center

The Community Health Center (CHC) is one of Will County's newer buildings constructed in 2005. At just over 38,000 square feet, this property was designed and built according to the standards set forth by the Illinois Department of Public Health (IDPH). CHC physicians and dentists provide health and dental care at this location. Like many facilities, the CHC possesses some operational nuances specific to its use. The CHC sees approximately 55,000 to 60,000 residents per year and uses electronic record keeping in each exam room adding to electrical load demands. And, due to the strict Health Insurance Portability and Accountability Act (HIPAA) requirements, there is a high per employee use of printers for clerical staff also contributing to additional electrical demands. Despite limitations implicated by compliance standards with IDPH, HIPAA, and more, facilities staff has identified opportunities to reduce energy and water usage and costs, especially by eliminating energy waste and inefficient fixtures as pertains to lighting. Since 2012, the energy and water related improvements CHC will contribute a ***~$17,721.52 financial benefit[1]*** *to Will County. See Table 1.6.*

Better Buildings Challenge

CHC started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 238.1 in 2009 decreased to 202 in 2017. This is a **moderate decrease in EUI of 15.16%.** CHC has **decreased energy cost by 30.96%** since baseline year 2009. These decreases prove that those energy efficient measures taken at CHC have been properly commissioned and are yielding their expected return. CHC has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	238.1	$71,587.04
11/30/2017	202	$49,423.88
Energy Expenditure Increase/Decrease		**$(22,163.16)**
EUI Increase/Decrease		**(36.1)**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In July 2014, CHC **participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report highlighted **13 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost, and the **CHC implemented ECRMs #4 and #6 and partially implemented ECRMs #2-#3 and #13.** The CHC also installed a **variation of ECRM #12 via a thermal barrier ceiling and LED lighting** to combat an energy-robbing skylight. See Table 1.2.

Table 1.2
SEDAC Level 2 Energy Assessment & Feasibility Report

ECRM #	Description	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Retrofit Linear Fluorescent Lighting with 28W T8	15,008	-183	
2	Retrofit Interior Lighting with LED	8,678	-106	**X (PARTIALLY)**
3	Retrofit Interior CFL and Halogens with LED	33,991	-415	**X (PARTIALLY)**
4	Install Occupancy Sensors	8,514	-105	**X**
5	Retrofit Exterior Lighting with LED	11,093	0	
6	Install Vending Machine Controls	2,636	-32	**X**
7	Employ Computer Power Management	8,179	-122	
8	Employ Thermostat Setpoint Management	3,317	612	
9	Install Destratification Fans	3,411	0	
10	Install Demand Control Ventilation	12,530	1,750	
11	Install Energy Recovery Ventilation	6,242	4,181	
12	Install Low-E Coating to Atrium Skylights	4,048	-398	**X (VARIATION)**
13	Replace Old RTUs with New Efficient RTUs	30,138	299	**X (PARTIALLY)**

Savings Through Efficient Products (STEP) Program Participation

In December 2017, the CHC participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy usage. Through this program, the CHC received **12 faucet aerators (standard), 48 wall switch occupancy sensors, 1 vending machine miser (refrigerated), and 1 snack machine miser at no material cost to Will County**. See Tables 1.3 and 1.4.

Table 1.3
STEP Program Product Retail Value

Product	Quantity	Retail Price Per Item	Cost to Will County[2]
Faucet Aerator (Standard)	12	~$2.13	$0.00
Wall Switch Occupancy Sensor	48	~$41.30	$0.00
Vending Machine Miser	1	~$189.00	$0.00
Snack Machine Miser	1	~$160.00	$0.00
Total Product Retail Value			**~$2,356.96**
Total Cost to Will County			**$0.00**

[2] Not including internal labor costs for install of products

Table 1.4 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
Faucet Aerator (Standard)	12	0	$0.00	~69.24	~$45.15
Wall Switch Occupancy Sensor	48	~10,352.64	~$844.78	0	$0.00
Vending Machine Miser	1	~1,189.55	~$97.07	0	$0.00
Snack Machine Miser	1	~1,189.55	~$97.07	0	$0.00
Total Lifetime kWh Savings					**~115,421.90[3]**
Total Lifetime Electric Cost Savings					**~$9,418.43[3]**
Total Lifetime Therms Savings					**~692.40[4]**
Total Lifetime Gas Cost Savings					**~$451.50[4]**

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$12,226.89

[3] Wall switch occupancy sensor useful life is ~10 years; vending and snack machine misers useful lives are ~5 years.

[4] Faucet aerator (standard) useful life is ~10 years.

Various Lighting Upgrades

Since June 2012, **CHC has replaced several compact fluorescent (CFL), high-pressure sodium (HPS), and other less efficient light lamps, fixtures, and products (i.e. exit signs and emergency light fixtures) to LEDs**. These retrofits will contribute to **annual savings of ~7,530.34 kWh and ~$614.48, and ~67,336.15 kWh and ~$5,494.63**, assuming ~10-year useful lives for LED Plug-In and Vertical LED fixtures and ~5-year useful lives for LED Exit Signs. The cost of these retrofits totals $2,296.87, not including internal labor costs. These replacements and their reduction in wattage are summarized in Table 1.5.

Table 1.5
Various Lighting Upgrades

Description	Quantity	Wattage of New	Total Wattage New	Wattage of Old	Total Wattage Old
LED 4 Pin Plug-in	12	10.5	126	42	504
LED 4 Pin Plug-in	30	10.5	315	42	1,260
Emergency Egress Lighting	39	3.6	140.4	28.8	1,123.20
Lithonia LED Exit Light	12	0.8	9.6	16	192
Vertical LED	20	26	520	60	1200
Total Wattage Reduced			**3,336.20**		

Total Various Lighting Upgrades Value (Lifetime Energy Cost Savings) = ~$5,494.63

Roof Top Unit (RTU) Air Handler Replacements[5]

Since June 2012, CHC has replaced 3 RTUs, 1 York and 2 Carrier, with new, more efficient units. These replacements will contribute to kWh usage reduction and cost savings. The cost of these replacements totals $23,470.00 not including internal labor costs.

[5] Due to lack of information regarding the efficiency level and other specifications of existing equipment at time of replacement, lifetime energy savings and energy cost savings could not be accurately calculated.

Table 1.6 Summary of Total Impact for CHC	
Total Investment=	~$25,766.87
Total STEP Product Retail Value=	~$2,356.96
Total Lifetime kWh Usage Savings=	~182,758.05
Total Lifetime Electric Cost Savings=	~$14,913.06
Total Lifetime Therm Usage Savings=	~692.40
Total Lifetime Natural Gas Cost Savings=	~$451.50
Total Financial Benefit=	**~$17,721.52**


WILL COUNTY OFFICE BUILDING
WILL COUNTY
OFFICE BUILDING

County Office Building

The County Office Building (COB) houses the administrative offices for several Will County offices. This facility serves the public in several capacities, such as being the main hub for public meetings, County Clerk-related services like birth and marriage certificates, property tax services, voting, and more. The COB also has energy demands unique from other Will County facilities due to its housing of the Will County ICT Department and data center as well as its high visitor traffic, seeing anywhere between 500-2,000 residents per day depending on current events such as tax or voting seasons. Built in 1947 and at nearly 80,000 square feet, the COB boasts several energy and water conservation measures, including those made before June 2012 with the use of U.S. Department of Energy (DOE) Energy and Conservation Block Grant (EECBG) funding, described in the Introduction, including a 5,950 square foot green roof and double paned windows installed throughout the building in 2010. Other efforts taken before June 2012 include some LED lighting in the Committee Room and LED lighting in the County Board Room. Additionally, ceiling-mount occupancy sensors were installed in common space areas of the 1st and 2nd floors of the COB. The COB has been a leading example of energy and usage reduction in Will County facilities. Improvements made since June 2012 will contribute a ***~$24,860.24 financial benefit[1]*** *to Will County. See Table 1.6.*

Better Buildings Challenge

The COB started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 210.4 in 2009 decreased to 198.6 in 2017. This a **moderate reduction in source EUI of 5.61%**. COB has **decreased its energy costs by 25.68% since baseline year 2009**. It is important to note that **high energy demands such as Will County's data center for ICT purposes and high visitor traffic can contribute to decreased realized energy usage and cost savings**. Measures in 2018 will be taken to sub-meter the data center use of the COB to better analyze EUI based on use. The COB has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	210.4	$ 145,438.55
11/30/2017	198.6	$ 108,082.67
Energy Expenditure Increase/Decrease		**$ (37,355.88)**
EUI Increase/Decrease		**(11.8)**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report 2017

In October 2017, the COB **participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report **highlighted 8 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost. Of those 8 ECRMS, **ECRMS #6-7, have been implemented.** See Table 1.2

Table 1.2
2017 SEDAC Level 2 Energy Assessment & Feasibility Report

ECRM #	Description	Estimated Annual Energy Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Outdoor Soffit Lighting Upgrade	3,900	0	
2	Parking Lot Lighting Upgrade	10,696	0	
3	Stairwell Bi-level Lighting	4,153	-66	
4	VFDs on AHUs	64,151	0	
5	DCV on AHUs	38,486	2,194	
6	Occupancy Sensors	1,017	0	**X**
7	Vending Misers	5,863	0	**X**
8	CRAC Unit Replacement	175,726	0	

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report 2013

In May 2013, the COB **participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report **highlighted 6 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost. See Table 1.3.

Table 1.3 2013 SEDAC Level 2 Energy Assessment & Feasibility Report				
ECRM #	**Descriptions**	**Estimated Annual Facility Savings**		
		Electricity (kWh)	**Natural Gas (Therms)**	**Complete**
1	Parking Lot Lighting	11,038	0	
2	Outdoor Soffit Lighting	2190	0	
3	Stairwell Bi-level Lighting	2,845	-50	
4	VFDs on AHUs	56,823	0	
5	DCV on AHUs	67,520	2,718	
6	DDC on HVAC Equipment	140,948	1,903	

Savings Through Efficient Products (STEP) Program Participation

In December 2017, the COB participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy usage. Through this program, the COB received **108 wall switch occupancy sensors, 2 vending machine misers, and 1 snack machine misers at no material cost** to Will County. See Tables 1.4 and 1.5.

Table 1.4 STEP Product Retail Value			
Product	**Quantity**	**Retail Price Per Item**	**Cost to Will County[2]**
Wall Switch Occupancy Sensor	108	~$41.30	$0.00
Vending Machine Miser	2	~$189.00	$0.00
Snack Machine Miser	1	~$160.00	$0.00
Total Product Retail Value			**~$4,998.40**
Total Cost to Will County[2]			**$0.00**

[2] Not including internal labor costs for install of products

Table 1.5 STEP Program Energy & Cost Savings			
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**
Wall Switch Occupancy Sensor	108	~23,293.76	~1,844.87
Vending Machine Miser	2	~2,379.09	~188.42
Snack Machine Miser	1	~1,189.55	~$94.21
Total Annual kWh Savings			**~26,862.40**
Total Annual Electric Cost Savings			**~$2,127.50**
Total Lifetime kWh Savings			**~250,780.80[3]**
Total Lifetime Electric Cost Savings			**~$19,861.84[3]**

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$24,860.24

Table 1.6 Summary of Total Impact for COB	
Total Investment=	~$0.00
Total Cash Incentives=	~$0.00
Total STEP Product Retail Value=	~$4,998.40
Total Lifetime kWh Usage Savings=	~250,780.80
Total Lifetime Electric Cost Savings=	~$19,861.84
Total Financial Benefit=	**~$24,860.24**

[3] *Useful life for vending and snack machine misers is ~5 years and for wall switch occupancy sensors is ~10 years*

Court Annex

The Court Annex (EMCO) serves as a courthouse and office space for several Will County court-related operations. At nearly 50,000 square feet, EMCO is the combination of two buildings into one. The Ottawa Street side was built in 1957 and the Jefferson Street side was built in 1903. A complete remodel of the 5th floor occurred in 2015, and the 4th floor complete remodel occurred in 2015-2016. The 1st and 3rd floors were remodeled in 2003 and 2010. Energy and water conservation as a result of these remodels will be discussed in this section. Will County can expect to experience a ***~$84,800.37 financial benefit[1]*** *as a result of energy efficiency measures taken at this facility since June 2012. See Table 1.6.*

Better Buildings Challenge

EMCO started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 300.6 in 2009 decreased to 235.8 in 2017. This is a **significant decrease in EUI of 21.56%.** EMCO has **decreased energy cost by 39.32%** since baseline year 2009. These increases are being investigated by facility and energy staff to identify the cause. EMCO has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	300.6	$ 168,565.92
11/30/2017	235.8	$ 102,292.36
Energy Expenditure Increase/Decrease		**$ (66,273.56)**
EUI Increase/Decrease		**(64.8)**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In May 2013, Will County Court Annex (EMCO) **participated in a Level 2 Energy Assessment & Feasibility Report performed by SEDAC**. This report **highlighted 4 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost. Of the 4 ECRMs offered, **ECRM #1 was fully implemented.** See Table 1.2.

Table 1.2
SEDAC Level 2 Energy Assessment & Feasibility Study

ECRM #	Descriptions	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Occupancy Sensors	52,800	-528	X
2	Courtroom Lighting Upgrades	17,600	-141	
3	Variable Frequency Drives on Air Handler Motors	60,000	0	
4	Demand Control Ventilation	54,049	224	

Lighting Retrofits: 4th and 5th Floor Remodels

In 2016 and 2017, the 4th and 5th floors of EMCO were remodeled, which included retrofitting old lighting and adding lighting controls as well as delamping, or reducing the number of lighting fixtures, where possible. The **number of fixtures was reduced by 31.81%**. **Thirty-two wall switch and 12 ceiling mount occupancy sensors were also installed**, which will save ~**9,490.05 kWh and ~$1,251.74 annually, and ~94,900.50 kWh and ~$12,517.38 over the lifetime of the sensors**. As for the lighting retrofit illustrated in Table 1.3, **savings total ~13,803.40 kWh and ~$1,820.67 annually, and ~138,034 kWh and ~$18,206.68 over the ~10-year lifetime of the fixtures**.

Table 1.3
Various Lighting Retrofits

Description	Quantity	Wattage of Old	Total Wattage of Old	Description	Quantity	Wattage of New	Total Wattage of New
25W T8 3 Lamp 2x4	385	25	9,625	**17W LED Fixtures**	260	17	4,420
Fluorescent Exit Sign	8	16	128	**LED Exit Sign**	8	3	24
Total Wattage Reduced				**5,309**			

Total Lighting Retrofits: 4th & 5th Floor Remodels Value (Lifetime Energy Cost Savings) = ~$30,724.06

Other Energy Efficient Efforts During 4th& 5th Floor Remodels[2]

Facilities staff also took measures during 4th and 5th floor remodels to install a new condensing unit and air handlers for both floors. Fifth floor Jefferson Street side received all new R32 roof and wall insulation and a new building automation system (BAS) just for the 5th floor Jefferson Street Side new rooftop unit (RTU) air handler. These measures should yield notable reductions in energy usage and cost.

Savings Through Efficient Products (STEP) Program Participation

In December 2017, EMCO participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy usage. Through this program, EMCO received **86 faucet aerators (standard), 150 wall switch occupancy sensors, 2 vending machine misers, and 1 snack machine misers at no material cost** to Will County.

Table 1.4
STEP Product Retail Value

Product	Quantity	Retail Price Per Item	Cost to Will County[3]
Faucet Aerator (Standard)	86	~$2.13	$0.00
Wall Switch Occupancy Sensor	150	~$41.30	$0.00
Vending Machine Miser	2	~$189.00	$0.00
Snack Machine Miser	1	~$160.00	$0.00
Total Product Retail Value			**~$6,916.18**
Total Cost to Will County[3]			**$0.00**

[2] Due to lack of information regarding the efficiency level and other specifications of existing equipment at time of replacement, lifetime energy savings and energy cost savings could not be accurately calculated.

[3] Not including internal labor costs for install of products

Table 1.5 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
Faucet Aerator (Standard)	86	0	$0.00	~496.22	~$426.75
Wall Switch Occupancy Sensor	150	~32,352.44	~$4,267.29	0	$0.00
Vending Machine Miser	2	~2,379.09	~$313.80	0	$0.00
Snack Machine Miser	1	~1,189.55	~$156.90	0	$0.00
Total Annual kWh Savings					**~35,921.08**
Total Annual Electric Cost Savings					**~$4,737.99**
Total Annual Therm Savings					**~496.22**
Total Annual Natural Gas Cost Savings					**~$426.75**
Total Lifetime kWh Savings					**~341,367.58[4]**
Total Lifetime Electric Cost Savings					**$45,026.38[4]**
Total Lifetime Therm Savings					**~2,481.10[5]**
Total Lifetime Natural Gas Cost Savings					**$ 2,133.75[5]**

[4] Useful life of wall switch occupancy sensor is ~10 years; useful life of vending and snack machine misers is ~5 years

[5] Useful life of faucet aerator (standard) is ~5 years

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$54,076.31

Table 1.6 Summary of Total Impact for Court Annex (EMCO)	
Total Investment=	N/A[6]
Total STEP Product Retail Value=	~$6,916.18
Total Lifetime kWh Usage Savings=	>~574,302.08[7]
Total Lifetime Electric Cost Savings=	>~$75,750.44[7]
Total Lifetime Therm Usage Savings=	~2,481.10
Total Lifetime Natural Gas Cost Savings=	~$2,133.75
Total Financial Benefit=	**~$84,800.37**

[6] No cost data was provided for the work described herein (except for the STEP Program Participation for which there is no cost) from facilities staff as the remodels that included the lighting retrofits were bundled into a master project plan.

[7] Due to lack of information regarding the efficiency level and other specifications of existing equipment at time of replacement, lifetime energy savings and energy cost savings could not be accurately calculated. Only known data included in these figures.

Courthouse

The Will County Courthouse was built in 1968 and is equipped with jury deliberation rooms, courtrooms, judges' chambers, holding cells, and offices spanning approximately 140,000 square feet. The Courthouse is a high-traffic facility serving over 500,000 people on average per year not including judges, employees, and other officials. This facility has seen few equipment-related improvements due to the construction of a new Will County Courthouse to be completed Fall 2020. Shortly after, the current Will County Courthouse will be demolished. Despite lack of significant energy and water efficiency equipment improvements, proper facility maintenance and energy efficiency-minded staff has contributed to measurable energy usage and cost reductions that will contribute a ***~$4,532.45 financial benefit[1]*** *to Will County. See Table 1.8.*

Better Buildings Challenge

The Courthouse is one of Will County's facilities that participates in the United States Department of Energy's (DOE) Better Buildings Challenge (BBC), which commits organizations to reduce 20% of their overall building profile usage by 2022 with a baseline year of 2009. The Courthouse started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 285.1 in 2009 decreased to 265.5 in 2017. This is a **moderate decrease of 6.87%**. The Courthouse has **decreased energy cost by 11.92%** since baseline year 2009. The Will County Courthouse has 2.5 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	285.1	$ 280,270.51
11/30/2017	265.5	$ 246,871.87
Energy Expenditure Increase/Decrease		**$ (33,398.64)**
EUI Increase/Decrease		**(19.6)**

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In September 2014, the Courthouse **participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report **highlighted 8 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost. Of the 8 ECRMs offered, **ECRM #4 was completed**. See Table 1.2.

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Table 1.2 SEDAC Level 2 Energy Assessment & Feasibility Report				
ECRM #	Description	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Retrofit Fluorescent Lighting	42,914	-535	
2	Retrofit Interior Metal Halide Lighting to LED	20,706	-256	
3	Install Occupancy Lighting Controls	19,540	-274	
4	Install Vending Machine Controls	5,780	-71	**X**
5	Retrofit Exterior Lighting	18,693	0	
6	Install Demand Control Ventilation	55,168	2,176	
7	Upgrade Thermostat System with Direct Digital Controls	19,368	6,235	
8	Upgrade To Condensing Boilers	0	19,689	

Savings Through Efficient Products (STEP) Program Participation

In October 2015, the Will County Courthouse participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA). This program **awards free products** to public sector entities that will help reduce energy usage. Through this program, the Will County Courthouse received **7 vending machine misers at no material cost** to Will County. See Tables 1.3 and 1.4.

Table 1.3 STEP Program Product Retail Value			
Product	**Quantity**	**Retail Value Per Item**	**Cost to Will County[2]**
Vending Machine Miser	7	~$180.00	$0.00
Total Product Retail Value			**~$1,260.00**
Total Cost to Will County[2]			**$0.00**

[2] Not including internal labor costs for install of products

Table 1.4 STEP Program Energy & Cost Savings			
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**
Vending Machine Miser	7	~8,326.85	~$654.49
Total Lifetime kWh Savings			**~41,634.25[3]**
Total Lifetime Electric Cost Savings			**~$3,272.45[3]**

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$4,532.45

SEDAC Remodel Suggestions

In April 2017, the Will County **Capital Improvements Committee began considering the future of the current Courthouse upon beginning design of the 2020 Will County Courthouse**. The two primary explored options were **(1) demolition** or **(2) retrofit** and remodel to serve other Will County office space needs. In an effort to support this decision making process, the Resource, Recovery, and Energy Division of the Will County Land Use Department **engaged SEDAC to complete a high-level overview of what would be required to make the current Courthouse a high performance, energy efficient office space**. The **three main suggestions** offered in SEDAC's report include retrofitting of **(1) envelope, (2) LPD space-by-space method, and (3) retrofitting of mechanical equipment**, summarized in the Tables 1.5-1.7.

[3] Assumes an ~5-year useful life

Table 1.5 SEDAC Courthouse Retrofit Recommendations: Envelope			
Project's Current Condition	**Code Requirement [ASHRAE 90.1-2013]**	**High Performance Standard [ASHRAE 189.1-2014]**	**SEDAC Recommendations**
Roof: Low-slope w/ insulation (R-value unknown	Min. Assembly R-31.3	Min. Assembly R-34.5	**Min. Assembly R-35**
Wall: Concrete structure w/ CMU (R-value unknown)	Min. Assembly R-11.1	Min. Assembly R-12.3	**Min. Assembly R-12.5**
Window: Single pane fixed-closed window. No Low-e coating. (U-factor & SHGC unknown)	Metal framing, Fixed: Max. Assembly U-0.42 Max. SHGC-0.40 Metal framing, Operable: Max. Assembly U-0.50 Max. SHGC-0.40	Metal framing, Fixed: Max. Assembly U-0.38 Max. SHGC00.40 (S), 0.36 (E& W), 0.50 (N) Metal framing, Operable: Max. Assembly U-0.45 Max. SHGC-0.40 (S), 0.36 (E& W), 0.50 (N)	**Metal framing, Fixed:** **Max. Assembly U-0.38** **Max. SHGC 0.36** **Metal framing, Operable:** **Max. Assembly U-0.45** **Max. SHGC-0.35**

Table 1.6 SEDAC Courthouse Retrofit Recommendations: (Space-by-Space Method)			
Project's Current Condition	**Code Requirement [ASHRAE 90.1-2013]**	**High Performance Standard [ASHRAE 189.1-2014]**	**SEDAC Recommendations**
LPD unknown	Enclosed Office: Max. 1.11 W/sf Open-plan Office: Max. 0.98 W/sf	Enclosed Office: Max. 1.05 W/sf Open-plan Office: Max. 0.83 W/sf	**Enclosed Office:** **Max. 0.90 W/sf** **Open-plan Office:** **Max. 0.75 W/sf**

Table 1.7 2017 SEDAC Courthouse Retrofit Recommendations: Mechanical Equipment			
Project's Current Equipment	**Code Requirement [ASHRAE 90.1-2013]**	**High Performance Standard [ASHRAE 189.1-2014]**	**SEDAC Recommendations**
Natural gas fired boilers: Clever Brooks 350MBH, 80% AFUE	Min. 82% AFUE (<300 MBH) Min. 80% Et (≥ 300 and ≤ 2,500MBH)	Min. 89% AFUE (<300 MBH) Min. 89% Et (≥ 300 and ≤ 2,500MBH)	**Min. 95% AFUE (<300 MBH)** **Min. 95% Et (≥ 300 and ≤ 2,500MBH)**
Water-cooled screw chillers. 180 tons, unknown efficiency	Min. 0.718 FL kW/ton & Min. 0.540 IPLV kW/ton (≥ 150 and < 300 tons)	Min. 5.177 FL COP & Min. 8.001 IPLV COP (≥ 528 and < 1055 kW)	**Min. 0.680 FL kW/ton & Min. 0.440 IPLV kW/ton** **(≥ 150 and < 300 tons)**

Table 1.8 Summary of Total Impact for Courthouse	
Total Investment=	~$0.00
Total STEP Product Retail Value=	~$1,260.00
Total Lifetime kWh Usage Savings=	~41,634.25
Total Lifetime Electric Cost Savings=	~$3,272.45
Total Financial Benefit=	**~$4,532.45**


WILL COUNTY
DIVISION OF TRANSPORTATION

Division of Transportation (Joliet)

The Division of Transportation (DOT) (Joliet) houses a maintenance garage, fuel pumps, salt crib, cold storage, an EMA Garage & Training Facility (see individual property profile), DOT (Joliet) office, and an administrative building. This DOT location sees the most public visitors and overall foot traffic. The primary property uses of this campus are vehicle maintenance and storage, roadway signage storage and maintenance, office space, and other storage. The facilities on the DOT (Joliet) campus are a combination of cold storage and heated facilities. The greatest energy efficiency effort this site has experienced was a retrofit of interior and exterior lighting in 2013. The energy efficiency efforts taken at this facility will contribute a ***~$92,510.85 financial benefit[1]*** *to Will County. See Table 1.5.*

Better Buildings Challenge

The DOT (Joliet) started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 99.3 in 2009 decreased to 78.3 in 2017. This is a **significant reduction in source EUI of 21.15%**. The DOT (Joliet) has **decreased energy cost by 31.21%** since baseline year 2009. The DOT (Joliet) has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	99.3	$ 39,264.89
11/30/2017	78.3	$ 27,010.75
Energy Expenditure Increase/Decrease		**$ (12,254.14)**
EUI Increase/Decrease		**(21)**

Interior & Exterior Lighting Retrofit

In October 2013, the DOT (Joliet) **retrofitted inefficient high-intensity discharge (HID) lighting with lower-wattage, more efficient LED lighting**. Total **wattage reduced was 6,662W. Savings totaled ~24,249.68 kWh and ~$2,696.56 annually, and ~666,866.2 kWh and ~$74,155.52 over the lifetime[2] of the fixtures**. Total project cost was ~$42,575.26. These projects were **incentivized at a total of $10,578.00** under the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Public Sector Energy Efficiency (PSEE) Program.

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

[2] Assumes a daily burn time of 10 hours with 100,000 burn hours. ~27.5-year useful life for fixtures.

Table 1.2 Interior & Exterior Lighting Retrofit Specifications & Wattage Reduction							
Existing Fixture Type	**Fixture Quantity**	**Existing Fixture Actual or Typical Wattage[3]**	**Existing Total Wattage**	**New Lighting Type**	**Fixture Quantity**	**New Fixture Actual Wattage[3]**	**New Total Wattage**
1,000 W Metal Halide Pole & Building Fixtures	2	1,075	2,150	LED Fixture	2	275	550
250 W Metal Halide Fixture	2	29	590	DSX1 LED Area Luminaire 40C 1000 50K T3M MVOLT SPA DDBXD	2	138	276
250 W Metal Halide Fixture	3	295	885	LED DSXF3 LED 6 A530/50K FL MVOLT IS DDBXD	3	115	345
250 W Metal Halide Fixture	2	295	590	LED DSXF3 LED 8 A530/50K FL MVOLT IS DDBXD	2	158	316
70 W Metal Halide Wall Pack	4	295	1,180	LED TWR1 LED 2 50K MVOLT M2	4	41	164
70 W Metal Halide Wall Pack	10	95	950	LED TWS LED 1 50K 120 PE M4	10	19	190
70 W Metal Halide Wall Pack	5	95	475	LED DSXF1 LED 1 A530/50K FL MVOLT THK DDBXD	5	21	105
150 W Metal Halide Wall Pack	12	190	2,280	LED TWR1 LED 2 50K MVOLT M2	12	41	492
250W Metal Halide Fixture	28	295	8,260	4 Foot T5 Lamps and Electronic Ballast	28	176	4,928
2F96 110W	1	257	257	T8 Lamps and Reflector	1	49	49
2F96 60W	16	138	2,208	T8 Lamps and Reflector	16	49	784
2x2 U	2	80	160	4 Foot T5 Lamps and Electronic Ballast	4	234	936
4F40 Wrap	20	160	3,200	Program Start Ballast and T8 Lamps	20	113	2,260
				Add Occupancy Sensors	6	0	0
Total Wattage Reduced				**11,790**			

[3] Actual or typical watts are used in the calculation of watt reduction, actual verses typical figure use depends on the type of fixture, to include ballast demands in addition to the wattage demands of the lamp(s).

Total Interior & Exterior Lighting Retrofit Value (Lifetime Energy Cost Savings and Incentives) = ~$84,733.52

Savings Through Efficient Products (STEP) Program Participation

In December 2017, the DOT (Joliet) campus participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy and water usage. Through this program, the DOT (Joliet) campus received **4 faucet aerators (standard), 3 faucet aerators (junior), 10 PAR38 16W outdoor screw-in LEDs, 2-6W A19 LED lamps, 1 ultra-low flow showerhead, and 12 wall switch occupancy sensors at no material cost** to Will County. External labor was used to install these products at a cost of $810.00. See Tables 1.3 and 1.4.

Table 1.3
STEP Product Retail Value

Product	Quantity	Retail Price Per Item	Cost to Will County[4]
Faucet Aerator (Standard)	4	~$2.13	$0.00
Faucet Aerator (Junior)	3	~2.13	$0.00
PAR38 16W Outdoor Screw-In LED	10	~$14.54	$0.00
6W A19 LED Lamp	2	~$10.00	$0.00
Ultra-Low Flow Showerhead	1	~$15.00	$0.00
Wall Switch Occupancy Sensor	12	~$41.30	$810.00
Total Product Retail Value			**~$690.91**
Total Cost to Will County[4]			**$810.00**

[4] Not including internal labor costs for install of products

Table 1.4 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
Faucet Aerator (Standard)	4	0	$0.00	~23.08	$11.80
Faucet Aerator (Junior)	3	0	$0.00	~17.31	$8.85
PAR38 16W Outdoor Screw-In LED	10	~4,047.03	~$450.03	0	$0.00
6W A19 LED Lamp	2	~149.55	~$16.63	0	$0.00
Ultra-Low Flow Showerhead	1	0	$0.00	~66.23	~$33.86
Wall Switch Occupancy Sensor	12	$2,588.20	$287.81	0	$0.00
Total Annual kWh Savings					**~6,784.78**
Total Annual Electric Cost Savings					**~$754.47**
Total Annual Therm Savings					**~106.62**
Total Annual Natural Gas Cost Savings					**~$54.50**
Total Lifetime kWh Savings					**~59,753.74[5]**
Total Lifetime Electric Cost Savings					**~$6,644.62[5]**
Total Lifetime Therm Savings					**~864.25[6]**
Total Lifetime Natural Gas Cost Savings					**~$441.80[6]**

[5] Assumes useful life for PAR38 16W outdoor screw-in LED of ~8 years; 6W A19 LED Lamp ~10 years; wall switch occupancy sensor ~10 years

[6] Assumes useful life for faucet aerators of ~5 years and ultra-low flow showerhead at ~10 years

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$7,777.33

Table 1.5 Summary of Total Impact for DOT (Joliet)	
Total Investment=	~$43,385.26
Total Cash Incentives=	~$10,578.00
Total STEP Product Retail Value=	~$690.91
Total Lifetime kWh Usage Savings=	~726,619.94
Total Lifetime Electric Cost Savings=	~$80,800.14
Total Lifetime Therm Usage Savings=	~864.25
Total Lifetime Natural Gas Cost Savings=	~$441.80
Total Financial Benefit=	**~$92,510.85**

Division of Transportation (Monee)

Will County's Division of Transportation (DOT) (Monee) is one of Will County's older facility campuses built in 1960. The main building is approximately 10,000 square feet and has offices, restrooms, a kitchen area, and a large, heated vehicle service area. There are two cold storage buildings (~6,000 square feet each) and the third structure is a salt crib (~4,000 square feet). This campus serves the eastern portion of Will County's highways and provides DOT storage, vehicle holding and maintenance, and more. Given the operational nature of this facility campus as mostly cold storage, lighting retrofits are the greatest contributors to energy usage and cost reduction. Improvements made at this facility will contribute a ***~$26,397.96 financial benefit***[1] *to Will County. See Table 1.4.*

Better Buildings Challenge

The DOT (Monee) started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 84.3 in 2009 decreased to 66.7 in 2017. This a **significant decrease in source EUI of 20.88%**. The DOT (Monee) has **decreased energy cost by 24.84%** since baseline year 2009. The DOT (Monee) has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	84.3	$ 12,644.84
11/30/2017	66.7	$ 9,503.80
Energy Expenditure Increase/Decrease		**$ (3,141.04)**
EUI Increase/Decrease		**(17.6)**

Garage Bay Interior Lighting Retrofit

In February 2017, **existing lighting in the main garage bay of the DOT (Monee) was retrofitted from high pressure sodium (HPS) lights to 96in LED striplights, saving ~9,442 kWh and ~$1,252.01 annually, and ~94,420 kWh and ~$12,520.09 over the ~10-year life of the lights**. The cost of this project was ~$12,705. This **project was incentivized at $1,267.44** by the Illinois Department of Economic Opportunity's (DCEO's) Public Sector Energy Efficiency (PSEE) Program.

[1] *Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.*

Total Garage Bay Interior Lighting Retrofit Value (Lifetime Energy Cost Savings) = ~$13,787.53

Savings Through Efficient Products (STEP) Program Participation

In December 2017, the DOT (Monee) participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy and water usage. Through this program, the DOT (Monee) received **18-16 W-PAR38 outdoor screw-in LEDs, 7-6W A19 LED lamps, and 11 wall switch occupancy sensors at no material cost** to Will County. External labor was used to install wall switch occupancy sensors at a cost of $675. See Tables 1.2 and 1.3.

Table 1.2
STEP Product Retail Value

Product	Quantity	Retail Price Per Item	Cost to Will County[2]
PAR 38 16W Outdoor Screw-In LED	18	~$14.54	$0.00
6W A19 LED Lamp	7	~$10.00	$0.00
Wall Switch Occupancy Sensor	11	~$41.30	$0.00
Total Product Retail Value			**~$786.02**
Total Cost to Will County[2]			**$0.00**

[2] Not including internal labor costs for install of products

Table 1.3 STEP Program Energy & Cost Savings			
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**
PAR 38 16 W Outdoor Screw-In LEDs	18	~7,284.65	~$965.94
A19 6 W LED Lamp	7	~523.42	~$69.41
Wall Switch Occupancy Sensor	11	~2,372.51	~$314.60
Total Annual kWh Savings			**~10,180.58**
Total Annual Electric Cost Savings			**~$1,349.94**
Total Lifetime kWh Savings			**~89,173.5[3]**
Total Lifetime Electric Cost Savings			**~$11,824.41[3]**

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$12,610.43

Table 1.4 Summary of Total Impact for DOT (Monee)	
Total Investment=	~$13,380.00
Total Cash Incentives=	~$1,267.44
Total STEP Product Retail Value=	~$786.02
Total Lifetime kWh Usage Savings=	~183,593.50
Total Lifetime Electric Cost Savings=	~$24,344.50
Total Financial Benefit=	**~$26,397.96**

[3] Assumes ~8-year life for PAR38-16 W outdoor screw-in LEDs; ~13.7-year life for A19 6 W LED Lamps; ~10-year life for wall switch occupancy sensors

Division of Transportation, Sheriff's Office, & Coroner (Lockport)

The Division of Transportation (DOT), Sheriff's Office, & Coroner facility is a complex which houses the Highway Department maintenance garage and staff offices, a newer, unheated storage building, a salt house, Will County Sheriff's Department and the Will County Coroner's Office's morgue and in-take office. All of the office uses are in the improved portion of the maintenance garage. There are little to no public visitors to this facility. The main energy draw at this facility is lighting, which was addressed in 2017 and 2018. As a result, Will County can expect to experience a ***~$59,202.75 financial benefit***[1].

Better Buildings Challenge

The Division of Transportation (DOT), Sheriff's Office, & Coroner (Lockport) started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 44.6 in 2009 increased to 67.7 in 2017. **It is not entirely known why the source EUI has increased 23.10%, but facility and energy staff are investigating this increase presently.** One **possible cause could be increased occupancy or operations**. The Division of Transportation (DOT), Sheriff's Office, & Coroner (Lockport) facility has **decreased energy cost by 29.30%** since baseline year 2009. The Division of Transportation (DOT), Sheriff's Office, & Coroner (Lockport) facility has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	44.6	$ 17,564.15
11/30/2017	67.7	$ 12,418.13
Energy Expenditure Increase/Decrease		**$ 5,146.02**
EUI Increase/Decrease		**23.1**

[1] *Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.*

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In April 2017, the Division of Transportation (DOT), Sheriff's Office, & Coroner (Lockport) facility **participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report **highlighted 5 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost all related to lighting retrofits. Of those 5 ECRMS, **ECRMS #1 and #4-#5 have been implemented**. See Table 1.2.

Table 1.2
SEDAC Level 2 Energy Assessment & Feasibility Study

ECRM #	Location	Fixture type	Number of Fixtures	Lamp Type	Existing Lamp Wattage	Existing Lamp + Ballast Wattage	Proposed LED Wattage
1	Tall poles at perimeter of lot	Box	24	MH	400	452	300
2	North wall on exterior of building	Box	4	MH	250	290	155
3	Wall packs on exterior of building	Wall Pack	6	HPS	250	290	155
4	Fuel pump fixtures on poles	Box	2	MH	250	290	155
5	Interior Lo-Bay Vehicle maintenance	Ceiling Hung	12	MH	400	452	134

Exterior Pole Lighting Retrofit

In 2017, the Division of Transportation (DOT), Sheriff's Office, & Coroner (Lockport) facility **retrofitted exterior lot pole lighting from inefficient, high-intensity discharge lighting to lower-wattage LED lamps**. Total **wattage reduced was 1,464 W**. Total **savings are equal to ~5,328.96 kWh and ~$513.18 annually, and ~146,386.53 kWh and ~$14,097.02 over the lifetime[2] of the fixtures**. The multi-phase project cost totaled $33,975.00. Under ComEd's Public Sector Energy Efficiency (PSEE) Program, this project was **incentivized at $5,262.25**. See Table 1.3.

Table 1.3
Exterior Pole Lighting Retrofit Specifications & Wattage Reduction

Existing Fixture Type	Fixture Quantity	Existing Fixture Actual or Typical Wattage[3]	Existing Total Wattage	New Lighting Type	Fixture Quantity	New Fixture Actual Wattage[3]	New Total Wattage
HID (400W) Lamp Fixture	12	455	5,460	Lot Pole Fixture >15,000 Lumens LED	212	22	4,664
HID (400W) Lamp Fixture	2	455	910	Lot Pole Fixture 10,001-15,000 Lumens LED	121	2	242
Total Wattage Reduced				**1,464**			

Total Exterior Pole Lighting Retrofit Value (Lifetime Energy Cost Savings and Incentives) = ~$19,359.27

Interior Garage Bay Lighting Retrofit

In October 2017, the Division of Transportation (DOT), Sheriff's Office, & Coroner (Lockport) facility **retrofitted inefficient high bay light fixtures with low-wattage, 96in LED striplights**. Total **wattage reduced was 3,660 W and total savings are ~7,612.8 kWh and ~$733.11 annually, and ~366,023.42 kWh and ~$35,247.93 over the lifetime[4] of the fixtures**. This project's cost was $8,848. Under ComEd's Public Sector Energy Efficiency (PSEE) Program, this project was **incentivized at $3,306.00**. See Table 1.4.

[2] Useful life is ~27.47 years assuming a 10-hour per day burn time every day and a maximum burn time of 100,000 hours.

[3] Actual or typical watts are used in the calculation of watt reduction, actual verses typical figure use depends on the type of fixture, to include ballast demands in addition to the wattage demands of the lamp(s).

[4] Useful life is ~48.08 years assuming an 8-hour per day burn time 5 days per week and a maximum burn time of 100,000 hours.

Table 1.4 Interior Garage Bay Lighting Retrofit Specifications & Wattage Reduction							
Existing Fixture Type	**Fixture Quantity**	**Existing Fixture Actual or Typical Wattage[5]**	**Existing Total Wattage**	**New Lighting Type**	**Fixture Quantity**	**New Fixture Actual Wattage[5]**	**New Total Wattage**
HID (400W) Lamp Fixture	12	455	5,460	Linear Ambient >7500 Lumens LED	104	18	2,520
T12 4 (95-110W) Lamp, 8-Foot High-Output Fixture	2	464	928	Linear Ambient >7500 Lumens LED	104	2	208
Total Wattage Reduced				**3,660**			

Total Garage Bay Interior Lighting Retrofit Value (Lifetime Energy Cost Savings and Incentive) = ~$38,553.93

Savings Through Efficient Products (STEP) Program Participation

In December 2017, the Division of Transportation (DOT), Sheriff's Office, and Coroner facility participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy usage. Through this program, the Division of Transportation (DOT), Sheriff's Office, and Coroner facility received **2 faucet aerators (standard) and 5 wall switch occupancy sensors at no material cost** to Will County. External labor was used to install these products at a cost of $425.00. See Tables 1.5 and 1.6.

[5] Actual or typical watts are used in the calculation of watt reduction, actual verses typical figure use depends on the type of fixture, to include ballast demands in addition to the wattage demands of the lamp(s).

Table 1.5 STEP Product Retail Value			
Product	**Quantity**	**Retail Price Per Item**	**Cost to Will County[6]**
Faucet Aerator (Standard)	2	~$2.13	$0.00
Wall Switch Occupancy Sensor	5	~$41.30	$425.00
Total Product Retail Value			**~$210.76**
Total Cost to Will County[6]			**$425.00**

Table 1.6 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
Faucet Aerator (Standard)	2	0	$0.00	~11.54	$8.06
Wall Switch Occupancy Sensor	5	~1,078.41	~$103.85	0	$0.00
Total Lifetime kWh Savings					**~10,784.10[7]**
Total Lifetime Electric Cost Savings					**~$1,035.50[7]**
Total Lifetime Therm Savings					**~57.70[8]**
Total Lifetime Natural Gas Cost Savings					**~$40.30[8]**

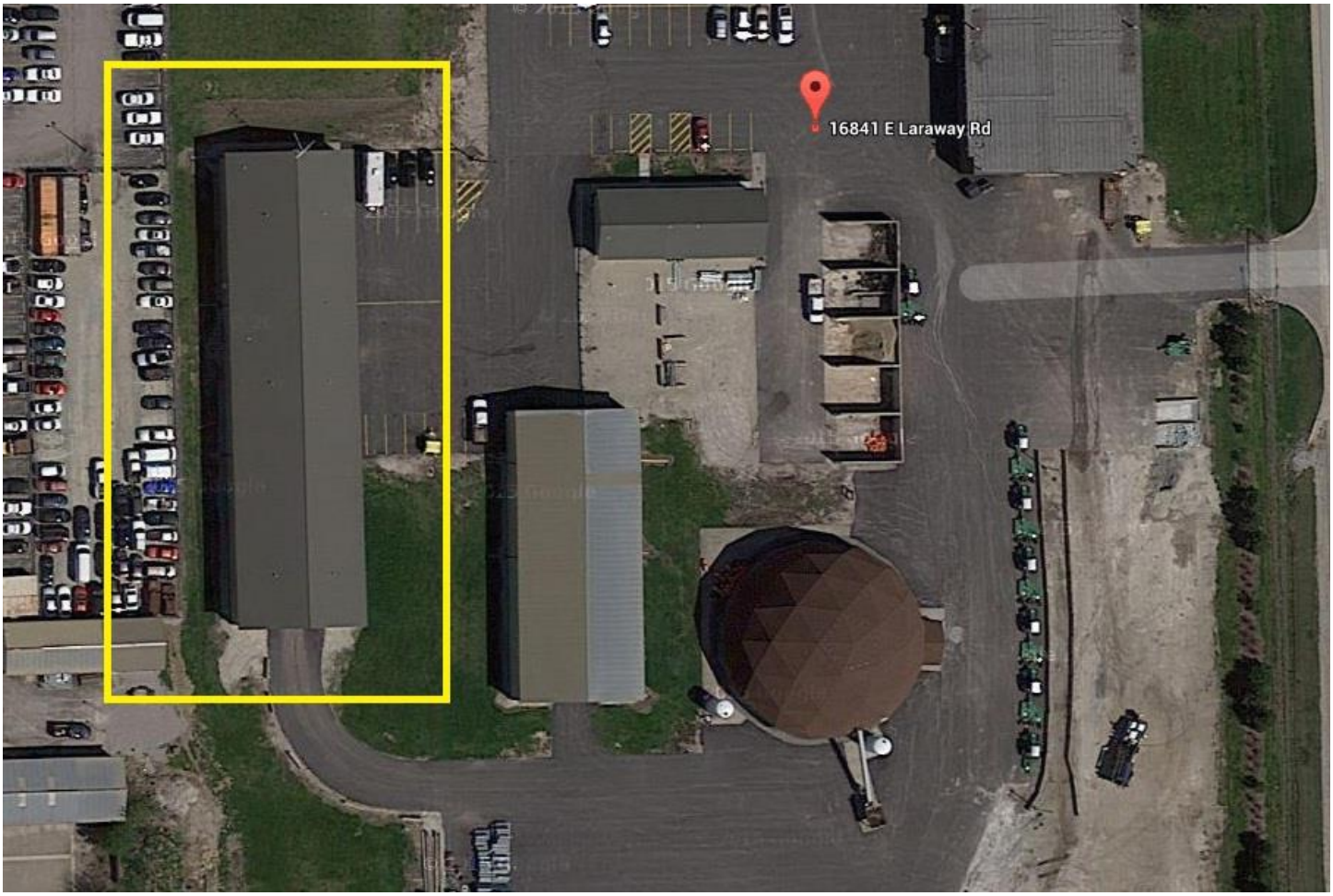
Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$1,289.55

[6] Not including internal labor costs for install of products

[7] Assumes wall switch occupancy sensor useful life of ~10 years

[8] Assumes aerator useful life of ~5 years

Table 1.7 Summary of Total Impact for Division of Transportation, Sheriff's Office, and Coroner (Lockport)	
Total Investment=	~$43,248.00
Total Cash Incentives=	~$8,568.25
Total STEP Product Retail Value=	~$210.76
Total Lifetime kWh Usage Savings=	~523,194.05
Total Lifetime Electric Cost Savings=	~$50,383.45
Total Lifetime Therm Usage Savings=	~57.70
Total Lifetime Natural Gas Cost Savings=	~$40.29
Total Financial Benefit=	**~$59,202.75**


16841 E Laraway Rd

EMA Radio Garage & Training Facility

The Will County EMA Radio Garage & Training Facility is an approximately 6,500 square foot, pre-fabricated facility that has a large vehicle storage space as well as a small furnished office space and training room. An oversized EMA bus is stored here and must plug into a high voltage charger to ensure that all equipment inside is charged in the case of an emergency. Space heaters are used throughout the EMA garage during winter to prevent freezing of certain fluids and pipes. This facility's lighting was updated following a 2013 Level 2 Energy Assessment & Feasibility Study.

Better Buildings Challenge

The EMA Radio Garage & Training Facility started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 136.8 in 2009 decreased to 135.9 in 2017. This is an insignificant **decrease in EUI of less than 1%**. The EMA Radio Garage & Training Facility has **decreased energy cost by 13.31%** since baseline year 2009. The Will County EMA Radio Garage & Training Facility has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	136.8	$ 8,400.06
11/30/2017	135.9	$ 7,281.62
Energy Expenditure Increase/Decrease		**$ (1,118.44)**
EUI Increase/Decrease		**(0.9)**

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In May 2013, EMA Garage & Training Facility **participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report **highlighted 5 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost. Of those 5 ECRMS, **ECRMS #1-#4 have been implemented, all pertaining to the retrofit of lighting**. See Table 1.2.

Table 1.2
SEDAC Level 2 Energy Assessment & Feasibility Report

ECRM #	Description	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Replace 250W Metal Halide Lamps	42,914	-535	**X**
2	Install Occupancy Sensors	20,706	-256	**X**
3	Replace T12 Lamps With T8 Lamps	19,540	-274	**X**
4	Replace Exterior Metal Halide Lamps with LED Lamps	5,780	-71	**X**
5	Implement Methods to Reduce Heating Costs	18,693	0	

Lighting Retrofits

Since the receipt of the SEDAC Level 2 Energy Assessment & Feasibility Report in May 2013, the EMA Garage & Training Facility has **replaced interior metal halide (MH) and T12 lighting and exterior MH lamps with more efficient LEDs**. Since **lighting is one of the primary electric demands** at this facility, these retrofits **should have been impactful on EUI reduction**. However, this facility's **less than 1% EUI reduction suggests that this facility should be further investigated** to identify additional load demands that may have arisen since the initial SEDAC Level 2 Energy Assessment & Feasibility Report that would offset kWh reduction progress from lighting retrofits. **Lighting retrofits at the DOT (Joliet) campus were bundled** with other onsite interior and exterior lighting retrofits and submitted for incentive by the Illinois Department of Commerce and Economic Opportunity's (DECO's) Illinois Energy Now (IEN) and Public Sector Energy Efficiency (PSEE) Programs. For this reason, please see the "Division of Transportation (Joliet)" facility profile to find collective specifications on lighting retrofits and incentives received.

For a Summary of Total Impact for EMA Garage & Training Facility, please see Division of Transportation (Joliet).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Health Department (Main Branch)

The Health Department (Main Branch) is the 65,000 square foot main office location and offers several programs, including Behavioral Health, Adult & Teen Health, Family Services, Women, Infants, Children (WIC), Immunizations, Vision and Hearing, Healthy Families Illinois, Genetics, Food Safety, Environmental Health, and more. The Health Department Main (Main Branch) is scheduled for demolition and reconstruction, beginning Spring 2019 in an effort to better serve Will County's growing population. Efforts, however, to reduce energy usage and cost have been prioritized throughout the life of this facility. Primarily lighting retrofits have led this facility's commitment to energy reduction, and will contribute a ***~$55,093.81 financial benefit[1]*** *to Will County. See Table 1.4.*

Better Buildings Challenge

The Health Department (Main Branch) started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 225.3 in 2009 decreased to 211.3 in 2017. This is a **moderate decrease in source EUI of 6.21%.** The Health Department (Main Branch) has **decreased energy cost by 27.54%** since baseline year 2009. The Health Department (Main Branch) has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	225.3	$ 123,348.21
11/30/2017	211.3	$ 89,375.30
Energy Expenditure Increase/Decrease		**$ (33,972.91)**
EUI Increase/Decrease		**(14)**

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In May 2013, the Health Department (Joliet) **participated in a Level 2 Energy Assessment & Feasibility Report performed by SEDAC**. This report **highlighted 8 energy cost reduction measures** (ECRMs) that would decrease energy usage and cost. Of those 8 ECRMS, **ECRMS #1-#3, #6, and #8 have been implemented.** See Table 1.2.

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Table 1.2 SEDAC Level 2 Energy Assessment & Feasibility Report					
ECRM #	Description	Estimated Annual Facility Savings			
		Electricity (kWh)	Natural Gas (Therms)	Energy Cost Savings ($)	Complete
1	T8 Lighting	112,337	-2,537	$6,455	X
2	Occupancy Sensors	43,055	-972	$2,474	X
3	LED Exit Signs	13,245	-299	$761	X
4	Computer Management	35,251	-796	$2,026	
5	High Efficiency Boiler	0	10,116	$4,842	
6	Steam Line Insulation	0	695	$333	X
7	DDC with Night Setback	6,780	2,615	$1,714	
8	Exterior Induction Lighting	41,610	0	$2,841	X

Lighting Retrofits 2013[2]

In October 2013, the Health Department (Main Branch) **retrofitted and maximized available lighting sources for several fixtures and installed thousands of occupancy sensors**. In order to maximize lighting and "delamp," or reduce the number of fixtures necessary to sufficiently light a facility, **234 4-foot and 6 8-foot lamp reflectors were added**. Additionally **1,751 new 4-foot T8 lamps and ballasts were installed and 180 T8 lamps (no ballasts) were installed**. **Other T8 lamps and ballasts were installed including 24 2-foot lamps and ballasts and 4 3-foot lamps and ballasts**. To support the lifespan of the retrofitted fixtures and to further reduce energy ~**50 wall switch occupancy sensors were installed**. The cost of these retrofits totaled $63,973.53. This **project was incentivized at $32,430.24** by the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Illinois Energy Now (IEN) Public Sector Energy Efficiency (PSEE) Program.

Various Lighting Retrofits Since 2012

Since June 2012, the Health Department (Main Branch) has **retrofitted various lighting fixtures**. As seen in Table 1.3, **total wattage reduced as a result of these retrofits is 4,599.85 W**. Total project cost equals $3,994.63. Savings total **~13,691.50 kWh and ~$1,159.67 annually[3,4]** and **~267,574.6 kWh and ~$22,663.57 over the lifetime[3-5] of the fixtures**.

[2] Due to lack of information regarding the efficiency level and other specifications of existing equipment at time of replacement, lifetime energy savings and energy cost savings could not be accurately calculated.

[3] Assumes a burn time for all common space and office fixtures of 56 hours per week and a burn time of 168 hours per week for Exit Signs.

[4] Egress emergency lighting is not included in savings calculations due to very limited burn time.

[5] Assumes useful lives of 34.34 years for LED fixtures, 8 years for CFLs and fluorescents, and 11.45 years for exit signs

Table 1.3 Various Lighting Retrofits Since 2012 Wattage Reduction					
Description	**Quantity**	**New Wattage**	**Total New Wattage**	**Old Wattage**	**Total Old Wattage**
LED R20 Medium Base	10	7	70	100	1000
LED Par 38 Wide Angle Flood	10	16	160	120	1200
LED Emergency Egress Lighting	3	1.8W per head (2 heads per fixture)	10.80	~14.4W per head (2 heads per fixture)	86.4
LED Emergency Egress Light	35	1.5 per light head	105	~12 W per head (2 heads per fixture)	840
LED Exit Sign	10	0.62	6.2	~16	~160
LED Exit Sign	5	0.71	3.55	~16	~80
T8 3 Lamp Troffer	2	17	34	34	68
T3 Medium Base CF	10	26	260	150	1500
T3 Medium Base CF	5	15	60	75	375
Total Wattage Reduced			**4,599.85**		

Total Various Lighting Retrofit Value (Lifetime Energy Cost Savings) = ~$22,663.57

Condensing Unit and Roof Top Unit (RTU) Air Handler Replacements[6]

Since June 2012, the Health Department (Joliet) has replaced 5 condensing units, and 3 air handlers with new, more efficient units. These replacements will contribute to energy usage reduction and cost savings. The cost of these replacements totals $21,889.00 not including internal labor costs.

[6] Due to lack of information regarding the efficiency level and other specifications of existing equipment at time of replacement, lifetime energy savings and energy cost savings could not be accurately calculated.

Table 1.4 Summary of Total Impact for Health Department (Main Branch)	
Total Investment=	~$89,857.16
Total Cash Incentives=	~$32,430.24
Total Lifetime kWh Usage Savings=	>~267,574.60[7]
Total Lifetime Electric Cost Savings=	>$22,663.57 [7]
Total Financial Benefit=	**~$55,093.81**

[7] *Due to a lack of efficiency and other specification necessary for energy use and cost savings calculation regarding equipment at the time of its removal and replacement, these figures are intentionally conservative and likely less than their true values.*

Julie Ann House

The Julie Ann House serves as the female recovery home for participants of the Will County Problem Solving Courts. This home allows women going through the Will County Drug Court to regain control of their lives and reintegrate themselves back into their community. At just over 1,000 square feet, this residential property is limited in its eligibility to participate in public sector energy efficiency programs given its residential nature, however, since 2012, it was able to take advantage of the Savings Through Efficient Products (STEP) Program offered by the Midwest Energy Efficiency Alliance (MEEA). As a result, the Julie Ann House will contribute a ***~$2,260.71 financial benefit[1]*** *to Will County. See Table 1.3.*

Savings Through Efficient Products (STEP) Program Participation

In January 2017, the Julie Ann House participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that awards free products to public entities that will help reduce energy and water usage. Through this program, the Julie Ann House **received 13-6W LED A19 Lamps and 1 wall switch occupancy sensor at no material cost to Will County**. This effort combined with participation in this program by Julie Ann's brother house, Miller Taylor, received positive press. See Tables 1.1 and 1.2.

Table 1.1
STEP Program Product Retail Value & Cost to Will County

Product	Quantity	Retail Price Per Item	Cost to Will County[2]
6W LED A19 Lamp	13	~$10.00	$0.00
Wall Switch Occupancy Sensor	1	~$41.30	$0.00
Total Product Retail Value			**~$171.30**
Total Cost to Will County[2]			**$0.00**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings, cash incentives, and retail value of products received at no cost to Will County.

[2] Not including internal labor cost for install of materials

Table 1.2 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Lifetime kWh Savings**	**Lifetime Electric Cost Savings**
6W LED A19 Lamp	13	~1,046.29	~$132.56	~14,334.16[3]	~$1,816.14[3]
Wall Switch Occupancy Sensor	1	~215.68	~$27.33	~2,156.80[4]	~$273.27[4]
Total Lifetime kWh Savings					**~16,490.96[3,4]**
Total Lifetime Electric Cost Savings					**~$2,089.41[3,4]**

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$2,260.17

Table 1.3 Summary of Total Impact for Julie Ann House	
Total Investment=	$0.00
Total STEP Product Retail Value=	~$171.30
Total Lifetime kWh Usage Savings=	~16,490.96
Total Lifetime Electric Cost Savings=	~$2,089.41
Total Financial Benefit=	**~$2,260.71**

[3] Assuming a ~15,000-hour, manufacturer-provided useful life based on an average 3-hour/day burn time 7 days per week (~13.7 years)
[4] ~10-year manufacturer useful life

Miller Taylor House

The Miller Taylor House serves as the male recovery home for participants of the Will County Problem Solving Courts. This home allows men going through the Will County Drug Court to regain control of their lives and reintegrate themselves back into their community. At just over 2,300 square feet, this residential property is limited in its eligibility to participate in public sector energy efficiency programs given its residential nature, however, since 2012, it was able to take advantage of the Savings Through Efficient Products (STEP) Program offered by the Midwest Energy Efficiency Alliance (MEEA). As a result, the Miller Taylor House will contribute a ***~$5,963.18 financial benefit[1]*** *to Will County. See Table 1.3.*

Savings Through Efficient Products (STEP) Program Participation

In January 2017, the Miller Taylor House participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy usage. Through this program, the Miller Taylor House **received 3 ultra-low flow (1.5 GPM) showerheads[2] and 38-6W LED A19 Lamps at no material cost to Will County**. This effort combined with participation in this program by Miller Taylor's sister house, Julie Ann, received positive press. See Tables 1.1 and 1.2.

Table 1.1
STEP Program Product Retail Value & Cost to Will County

Product	Quantity	Retail Price Per Item	Cost to Will County[3]
6W LED A19 Lamp	38	~$10.00	$0.00
Ultra-Low Flow Showerhead	3	~$15.00	$0.00
Total Product Retail Value			**~$425.00**
Total Cost to Will County[3]			**$0.00**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings, cash incentives, and retail value of products received at no cost to Will County.

[2] Uses 40% less water than standard showerheads

[3] Not including internal labor cost for install of materials

Table 1.2 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electricity Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
6W LED A19 Lamp	38	~3,058.38	~$375.57	0	$0.00
Ultra-Low Flow Showerhead	3	0	$0.00	~66.23	~$39.29
Total Lifetime kWh Savings					**~41,899.84[4]**
Total Lifetime Electric Cost Savings					**~$5,145.30[4]**
Total Lifetime Therm Savings					**~662.30[5]**
Total Lifetime Natural Gas Cost Savings					**~$392.88[5]**

[4] Assuming a 15,000-hour, manufacturer-provided useful life based on an average 3-hour/day burn time 7 days a week (~13.7 years).

[5] ~10-year manufacturer useful life.

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$5,963.18

Table 1.3 Summary of Total Impact for Miller Taylor House	
Total Investment=	$0.00
Total STEP Product Retail Value=	~$425.00
Total Lifetime kWh Usage Savings=	~41,899.84
Total Lifetime Electric Cost Savings=	~$5,145.30
Total Lifetime Therm Usage Savings=	~662.30
Total Lifetime Natural Gas Cost Savings=	~$392.88
Total Financial Benefit=	**~$5,963.18**

Public Safety Complex & Sheriff's Facility

The Public Safety Complex & Sheriff's Facility (PSC) was constructed in 2017 and consolidated several Will County Sheriff offices in one facility. This facility is approximately 85,000 square feet and was incentivized at $63,053 for measures taken beyond the Illinois Energy Conservation Code (IECC) in construction that will contribute to sizable energy efficiency savings each month. The following information discusses the measures that were incentivized and anticipated energy usage and cost savings as a result. Assuming a 50-year life, the PSC will provide a ***~$694,371.00 financial benefit[1]*** *to Will County through its initial incentive award and its projected annual savings, assuming the building maintains the same or a greater level of efficiency throughout its useful life. See Table 1.7.*

Better Buildings Challenge

Will County will be adding the PSC to its participation in the BBC. This will commit the PSC to be an active contributor to Will County's goal of a 20% source energy usage reduction portfolio-wide by 2022.

ComEd and Nicor New Construction Program

Through the New Construction Program, Will County was awarded $63,053 for energy efficient measures taken in the design and construction of the PSC that go beyond the minimum requirements of the IECC. For a table of qualifying measures that were awarded and incentive breakdowns, see Tables 1.1-1.5.

Table 1.1
Calculated Incentives

Parameter	Incentive Type	Recommended Incentives
Envelope Measures	Prescriptive	$44,844
Lighting Measure: LPD Reduction	Prescriptive	$5,159
Mechanical Measures	Prescriptive	$13,050
Total Incentives		**$63,053**
Total Incentives per sf		**$0.73/sf**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Table 1.2 Annual Energy Cost Savings			
	Electricity	**Natural Gas**	**Total Savings**
Total Energy Savings	109,892 kWh	7,670 therms	1,141,951 kBtu
Total Energy Cost Savings ($)	$10,989	$5,369	$16,358

Table 1.3 Lighting Power Density				
Building Area	**Required LPD**	**Proposed LPD**	**Gross Building Area**	**Incentive**
Police Station	0.87	0.67	86,390	$5,159
Total				**$5,159**

Table 1.4 Envelope Measures				
Envelope Description	**Proposed R-Value**	**Required R-Value**	**Area of Building Component (sf)**	**Incentive**
Roof				
Insulation Entirely Above Deck	R-36.7	R-31.3	50,410	$21,777
Walls				
Mass	R-20.6	R-11.1	50,410	$4,513
Opaque Doors				
Roll-Up or Sliding	R-2.7	R-2.00	608	$851
Windows & Skylights				
Metal Framing (Fixed)	R-2.56	R-2.38	9,078	$8,170

Windows-SHGC				
SHGC	SHGC-0.19	SHGC-0.40	9,078	$9,533
Total				**$44,844**

Table 1.5 HVAC Measures				
HVAC Equipment Type	**Make & Model**	**Unit Efficiency**	**Unit Size (kBtuh)**	**Incentive**
Natural Gas Boiler	Aerco Benchmark 750	93%	750kBtuh	$13,050
Total				**$13,050**

Table 1.6 Incentive Summary	
Section	**Incentive**
Lighting Power Density	$5,159
Envelope	$44,844
HVAC	$13,050
Total	**$63,053**

Table 1.7 Summary of Total Impact for Public Safety Complex & Sheriff's Department	
Total Investment=	$33,616,057.00
Total Cash Incentives=	$63,053.00
Total Lifetime kWh Usage Savings=	~5,494,600.00[2]
Total Lifetime Electric Cost Savings=	~$439,568.00[2]
Total Lifetime Therm Usage Savings=	~383,500.00[2]
Total Lifetime Natural Gas Cost Savings=	~$191,750.00[2]
Total Financial Benefit=	**~$694,371.00[2]**

[2] Based on a 50-year facility life


158 N. SCOTT ST.
HOURS
8:30 to 4:30

Recorder of Deeds' and Coroner's Office

The Recorder of Deeds' and Coroner's Office originally served as the Will County Social Security Office and was renovated in 2014 for increased energy efficiency and occupation by the Recorder of Deeds' and Coroner's Offices. The following equipment was added for improved energy efficiency: 2 energy-efficient, Dyna Force Series, Camus Hydronics Ltd., boilers, RTU air handlers with natural gas (pre-heats system), LED lighting, RTUs (1 for Coroner's Office and 1 for Recorder of Deeds), LED parking lot lighting with motion detection dimming, low flow toilets, 2 AOSmith Takagi tank-less water heaters, and lighting occupancy sensors. The primary use of this property is office use for service to the public. The energy efficiency efforts taken at this facility will contribute a ***~$27,315.96 financial benefit[1]*** *to Will County. See Table 1.4.*

Better Buildings Challenge

The Recorder of Deeds' and Coroner's Office started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 121.5 in 2015 increased to 211.7 in 2017. This is a **significant increase in source EUI of 74.24%. It is not yet known why this facility's EUI has increased significantly, but facility and energy staff are working to investigate the cause.** The Recorder of Deeds' and Coroner's Office has **increased energy cost by 4.99%** since baseline year 2015. The Recorder of Deeds' and Coroner's Office has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
02/28/2015[2]	121.5	$ 22,388.54
11/30/2017	211.7	$ 23,504.78
Energy Expenditure Increase/Decrease		**$ 1,116.24**
EUI Increase/Decrease		**90.2**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

[2] 02/28/2015 is used as the baseline year for this property because it is the closest available 1 year's data to 2009, as this facility was not serving its current use in 2009 and therefore cannot use a 2009 baseline year.

Interior & Exterior Lighting Retrofit

In December 2014, the Recorder of Deeds' and Coroner's Office **retrofitted lighting from fluorescents and halogen fixtures to energy efficient LED light fixtures including exit signs and emergency lights**. Total **wattage reduced was 8,605.19 W**. **Savings totaled ~17,898.8 kWh and ~$1,779.14 annually, and ~178,987.95 and ~$17,791.40 over the lifetime[3] of the fixtures**. The total cost to this project was $74,235. This **project was incentivized at $5,274.56** through the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Illinois Energy Now (IEN) Public Sector Energy Efficiency (PSEE) Program. See Table 1.2.

Table 1.2
Interior & Exterior Lighting Retrofit Specifications & Wattage Reduction

Existing Fixture Type	Fixture Quantity	Existing Fixture Actual or Typical Wattage[4]	Existing Total Wattage	New Lighting Type	Fixture Quantity	New Fixture Actual Wattage[4]	New Total Wattage
4 Foot 3 Bulb T8 Fixture	135	32	12,960	F1 2x4 Troffer LED Module-Step Dimming	56	49.1	2749.6
4 Foot 2 Bulb T8 Fixture	1	32	64	F1A 2x4 Troffer LED Module-Dimming Driver	29	49.1	1423.9
Exterior Halogen Fixture	5	400	2,000	F2 2x4 Troffer LED Module-Dimming Driver	20	49.1	982
Exit Sign	7	16	112	F3 8 Foot Suspended LED Fixture	5	45.4	227
2 Bulb Emergency Lights	13	3	39	F4 2x4 General Recessed LED Troffer	9	49	441
				F5 1500 Lumen LED Downlight	7	22.4	156.8
				4 Foot LED Downlight	5	9	45
				EX Polycarbonate LED Exit	17	1.03	17.51
				OL1 Exterior LED Lighting	1	14	14
				OL2 Exterior LED Lighting	1	36	36
				OL3 Exterior LED Lighting	3	27	81
				OL4 Exterior LED Lighting	4	99	396
Total Wattage Reduced				**8,605.19**			

[3] ~10-year LED fixture life and ~40 hour per week burn time

[4] Actual or typical watts are used in the calculation of watt reduction, actual verses typical figure use depends on the type of fixture, to include ballast demands in addition to the wattage demands of the lamp(s).

Total Interior & Exterior Lighting Retrofit Value (Lifetime Energy Cost Savings and Incentive Value) = ~$23,065.96

Rooftop Unit Retrofit

In December 2014, the Recorder of Deeds' and Coroner's Office **replaced less efficient rooftop units (RTUs) with new, fewer, and higher efficiency RTUs**. **Total reduction in tonnage was 5, and total increase in average energy efficiency ratio was 2.02**. This **project was incentivized at $4,250** by DCEO's IEN PSEE Program.

Table 1.3
Rooftop Unit Retrofit Specifications & Wattage Reduction

Existing			New		
Manufacturer	**Tons**	**Energy Efficiency Ratio**	**Manufacturer**	**Tons**	**Energy Efficiency Ratio**
Carrier	12.5	9.0	Trane	25	10.6
Carrier	8.5	9.0	Trane	12.5	12.1
Carrier	7.5	8.9			
Carrier	5	9.7			
Carrier	5	9.7			
Carrier	4	9.7			
Total Decrease in Tons			**5**		
Total Increase in Average Energy Efficiency Ratio			**2.02**		

Total RTU Retrofit Value (Incentive Only[5]) = ~$4,250.00

[5] Due to a lack of efficiency and other specification necessary for energy use and cost savings calculation regarding equipment at the time of its removal and replacement, these figures are intentionally conservative and likely less than their true values.

Table 1.4 Summary of Total Impact for Recorder of Deeds' and Coroner's Office	
Total Investment=	>~$74,235.00[6]
Total Cash Incentives=	$9,524.56
Total Lifetime kWh Usage Savings=	>~178,987.95[6]
Total Lifetime Electric Cost Savings=	~$17,791.40[6]
Total Financial Benefit=	**~$27,315.96[6]**

[6] *Due to a lack of efficiency and other specification necessary for energy use and cost savings calculation regarding equipment at the time of its removal and replacement, these figures are intentionally conservative and likely less than their true values.*

Records Archive Center

The Records Archive Center houses Records Management, a Circuit Clerk Archives office, archive vaults, print shop, and warehouse storage. This Records Archive Center is a warehouse facility with some office operations. The Records Archive Center has long been a leader in energy efficient measures primarily in its expansive per-fixture occupancy sensors that save significant amounts of electric. Recent small-scale projects will contribute a ***~$1,372.90 financial benefit[1]*** *to Will County. See Table 1.4.*

Better Buildings Challenge

The Records Archive Center started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 92.5 in 2009 decreased to 78.8 in 2017. This is a moderate **decrease in source EUI of 14.81%**. The Records Archive Center has **decreased energy cost by 22.35%** since baseline year 2009. The Records Archive Center has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	92.5	$ 27,356.34
11/30/2017	78.8	$ 21,242.70
Energy Expenditure Increase/Decrease		**$ (6,113.64)**
EUI Increase/Decrease		**(13.7)**

Savings Through Efficient Products (STEP) Program Participation

In December 2017, the Records Archive Center participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **awards free products** to public entities that will help reduce energy and water usage. Through this program, the Records Archive Center received **4 faucet aerators (standard) and 2 wall switch occupancy sensors at no material cost to Will County**. See Tables 1.2 and 1.3.

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Table 1.2 STEP Product Retail Value			
Product	**Quantity**	**Retail Price Per Item**	**Cost to Will County[2]**
Faucet Aerator (Standard)	4	~$2.13	$0.00
Wall Switch Occupancy Sensor	2	~$41.30	$0.00
Total Product Retail Value			**~$91.12**
Total Cost to Will County[2]			**$0.00**

Table 1.3 STEP Program Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Annual Therm Savings**	**Annual Gas Cost Savings**
Faucet Aerator (Standard)	4	0	$0.00	~23.08	~$12.63
Wall Switch Occupancy Sensor	2	~431.37	~$121.86	0	$0.00
Total Lifetime kWh Savings					**~4,313.70**
Total Lifetime Electric Cost Savings					**~$1,218.62**
Total Therm Savings					**~115.40**
Total Gas Cost Savings					**~$63.16**

[2] Not including internal labor costs for install of products

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$1,372.90

Table 1.4 Summary of Total Impact for Records Archive Center	
Total Investment=	~$0.00
Total STEP Product Retail Value=	~$91.12
Total Lifetime kWh Usage Savings=	~4,313.70
Total Lifetime Electric Cost Savings=	~$1,218.62
Total Lifetime Therm Usage Savings=	~115.40
Total Lifetime Natural Gas Cost Savings=	~$63.16
Total Financial Benefit=	**~$1,372.90**


NO
TRUCKS

River Valley Juvenile Detention Center

River Valley Juvenile Detention Center (RVJC) serves the Will County and Kankakee County area as an over 100,000 square foot juvenile detention, court, and administrative facility. Because children reside in the facility and due to the facility's correctional use, there are strict guidelines RVJC must follow to maintain compliance with American Correctional Association (ACA). Some of these guidelines limit energy and water reduction efforts, but facility maintenance and management staff has collaborated tirelessly regarding all feasible energy and water reduction opportunities. Some energy reduction measures include partial lighting retrofits, a heating, ventilation, and air conditioning (HVAC) overhaul, a properly managed building automation system, water fixture replacements, and more. As a result, RVJC will contribute a ***~$347,920.54 financial benefit***[1] *to Will County. See Table 1.8.*

Better Buildings Challenge

RVJC started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 298.9 in 2009 decreased to 297.1 in 2017. While the **less than 1% decrease in EUI is nominal**, it is important to note that **significant capital equipment replacements were made in early 2016 that are not being reflected**. This may be an **opportunity to reassess the commissioning of this equipment to ensure proper operation**. If lack of realized savings is attributed to commissioning, savings would be reflected in 2018 year's end data. RVJC has **decreased energy cost by 26.68%** from $239,422.31 in 2009 to $175,547.59 in 2017. Because RVJC is billed for electricity under a commercial hourly rate, adjustments to operations such as shifting major electrical loads like cooling to off peak times, such as cooling a building early in the morning during the summer except during the heat of the day can shift loads and therefore shift rates to lower values. RVJC has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	298.9	$239,422.31
11/30/2017	297.1	$175,547.59
Energy Expenditure Increase/Decrease		**$(63,874.72)**
EUI Increase/Decrease		**(1.8)**

[1] *Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.*

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report

In September 2014, RVJC participated in an Energy Assessment performed by SEDAC. This report highlighted 10 energy cost reduction measures (ECRMs) that would decrease energy usage and cost. Of the **10 ECRMs offered, #5 and #9 ECRMs were fully implemented, an upgrade to condensing boilers and installation of vending machine misers, and a variation of ECRM #10 was implemented, replacement of HVAC equipment (boilers and chillers)** in lieu of installation of a combined heat and power (CHP) system. See Table 1.2.

Table 1.2
SEDAC Energy Assessment & Feasibility Report ECRMs

ECRM #	Description	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Retrofit Lighting with 28W T8	79,837	-986	
2	Retrofit Interior Lighting with LED	6,629	-82	
3	Install Occupancy Sensors	24,502	-303	
4	Retrofit Exterior Lighting with LED	19,732	0	
5	Install Vending Controls	3,449	-43	**X**
6	Program Computer Power Management	5,981	-90	
7	Install Demand Control Ventilation	30,056	1,196	
8	Retrofit Thermostat System with Direct Digital controls	12,937	6,825	
9	Upgrade to Condensing Boilers	0	9,526	**X**
10	Install Combined Heat and Power System	1,365,000	-83,852	**X (VARIATION)**

Saving Through Efficient Products (STEP) Program Participation

In October 2015, RVJC participated in the STEP Program offered through the Midwest Energy Efficiency Alliance (MEEA) that **provides free products** to public sector entities. **Three vending machine misers and 3 ultralow-flow shower fixtures[2] were installed.** While only 3 staff showers could be equipped with the ultralow-flow shower fixtures at the time, there was no better alternative product for inmate shower facilities available that would decrease water and gas usage and maintain compliance with ACA, however, these three shower fixtures will still create impact. Further, the 3 vending machine misers will stop unnecessary lighting of vending machines when not in use via a motion detector. Inmate shower facilities remain a future, low-priority opportunity for retrofit from low-flow to ultralow-flow shower fixtures, saving approximately 1 gallon per minute (GPM). See Tables 1.3 and 1.4.

[2] Uses 40% less water than standard showerheads

Table 1.3 STEP Product Retail Value & Cost to Will County			
Product	**Quantity**	**Retail Price Per Item**	**Cost to Will County[3]**
Vending Machine Misers	3	~$189.00	$0.00
Ultra-Low Flow Showerhead	3	~$15.00	$0.00
Total Product Retail Value			**~$612.00**
Total Cost to Will County[3]			**$0.00**

Table 1.4 STEP Product Energy & Cost Savings					
Product	**Quantity**	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
Vending Machine Misers	3	~1,612.94	~$105.32	0	$0.00
Ultra-Low Flow Showerhead	3	0	$0.00	~66.23	~$28.74
Total Lifetime kWh Savings					**~8,064.70[4]**
Total Lifetime Electric Cost Savings					**~$526.62[4]**
Total Lifetime Therm Savings					**~662.30[5]**
Total Lifetime Natural Gas Cost Savings					**~$287.37[5]**

[3] Not including internal labor costs for install of equipment

[4] ~5-year manufacturer useful life

[5] ~10-year manufacturer useful life

Total STEP Program Value (Lifetime Energy Cost Savings and Product Retail Value) = ~$1,425.99

Combined Heat and Power (CHP) Feasibility Analysis

In November 2014, RVJC received a CHP Feasibility Analysis from the United States DOE CHP Technical Assistance Partnership. **CHP uses wasted heat from combustion boiler heating to turn a turbine and produce electricity for facility use. This effort was not pursued upon receipt and review of this report due to financing limitations.** This capital equipment improvement is no longer necessary or possible after the HVAC overhaul in 2016.

HVAC Overhaul

A major heating, ventilation, and air conditioning (HVAC) upgrade project was completed in early 2016 to replace existing boilers, chiller system, and pumps. **Three up to 99% thermal efficiency, Dynaforce gas-fired condensing boilers replaced 3 inefficient boilers** estimated at 25 years old and less than 60% thermal efficiency at time of replacement**. Four master and 4 slave chiller modules and air cooled condensing units replaced an inefficient chiller system** estimated at 25 years old and less than 60% thermal efficiency at the time of replacement**.** The project included a **new building automation system (BAS) controller and front-end for hydronic systems**. **A new up to 99% thermal efficiency, Dynaforce gas-fired condensing boiler replaced an inefficient domestic hot water heater (HWH) and re-circulating pumps were installed.** Boiler and chiller upgrades totaled ~$1,460,000.00 in project costs, including equipment, labor, and related upgrades to electrical, plumbing, and other infrastructure to support the new equipment. This project was collectively **incentivized at $99,143.40** through the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Illinois Energy Now (IEN) Public Sector Energy Efficiency (PSEE) Program. See Tables 1.5 and 1.6.

Table 1.5 HVAC Overhaul Incentives & Cost		
Equipment	**Quantity**	**Direct Equipment Cost (Including Materials & Labor)[6]**
Modular Remote Air Cooled Chiller	1 (4 Master Modules; 4 Slave Modules)	$392,700.00
Roof Mounted Air Cooled Condensers	4	Included in Direct Equipment Cost for Modular Remote Air Cooled Chiller
Condensing Boilers (Model 3500)	3 (1 Master Boiler; 2 Slave Boilers)	$399,200.00
Condensing Boiler (Model 1200)	1	Included in Direct Equipment Cost for Condensing Boilers (Model 3500)
Total Cost		**~$1,460,000**
Total Project Incentive		**$99,143.40**

[6] Associated costs of installation including equipment, labor, and other related upgrades to electrical, plumbing, and other infrastructure to support the new equipment is not included in the "Direct Equipment Cost" and totals approximately $668,100.00.

Table 1.6 HVAC Overhaul Energy & Cost Savings				
Equipment	**Annual kWh Savings**	**Annual Electric Cost Savings**	**Annual Therm Savings**	**Annual Natural Gas Cost Savings**
Modular Remote Air Cooled Chiller & Roof Mounted Air Cooled Condensers	~49,568	~$3,236.79	0	$0.00
Condensing Boilers	0	$0.00	~17,070	~$7,406.67
Total Lifetime kWh Savings				**~1,065,712[7]**
Total Lifetime Electric Cost Savings				**~$69,590.99[7]**
Total Lifetime Therm Savings				**~409,680[8]**
Total Lifetime Natural Gas Cost Savings				**~$177,760.15[8]**

[7] ~21.5-year useful life according to American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) "Equipment Life Expectancy Chart"

[8] ~24-year useful life according to American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) "Equipment Life Expectancy Chart"

Total HVAC Overhaul Value (Lifetime Energy Cost Savings and Incentives) = ~$346,494.54

Retro-Commissioning Evaluation

In April 2017, RVJC voluntarily participated in a retro-commissioning evaluation performed by Farnsworth Group, Inc. **This evaluation noted no significant barriers to energy efficiency in the facility's current equipment or operations other than lighting retrofit opportunities.** The report also nodded to successful operations and maintenance as well as proper commissioning of new HVAC equipment installed in early 2016. Because this evaluation noted that the new HVAC equipment was commissioned properly, this evaluation supports efforts taken to investigate lack of realized energy usage savings in recent years since the 2016 installation of the HVAC equipment.

Light Fixture Inventory

In May 2017, **a lighting inventory of the current type and amount of lighting fixtures within RVJC was conducted**. This inventory **will aid in the prioritization of future lighting retrofits**, such as the replacement of all remaining metal halide (MH) lighting, biax compact fluorescent lamps (CFL), incandescent lamps, and fluorescent T8 and T5 lighting in order of priority. Early 2018 projects are expected to include replacement of gymnasium lighting and consideration of upgrading courtroom lighting from 400 W MH fixtures to low-wattage LEDs, creating consistency across all Will County courtrooms by selecting the same fixtures for RVJC as are planned for installation in the to-be constructed Will County Courthouse. There is also future consideration for retrofitting 400 W MH parking lot lighting and other outdoor 250 W MH lighting, such as wallpacks and spotlight poles, to low-wattage LEDs. A significant presence of efficient T8 and T5 lighting exists presently, which poses a lower priority opportunity for near future retrofit to LEDs. See Table 1.7.

Table 1.7 2017 RVJC Lighting Fixture Inventory				
Fixture Type: Metal Halide				
Total	**Description**	**A-Pod**	**B-Pod**	**Exterior**
37 - 400 W	-	11	0	26
66 - 250 W	-	0	58	8
20 - 175 W	-	0	20	0
1 - 150 W	-	0	0	1
26 - 100 W	-	10	0	16
14 - 70 W	-	0	0	14
Fixture Type: Biax CFL				
Total	**Description**	**A-Pod**	**B-Pod**	**Exterior**
11 - 50 W	-	11	0	0
18 - 26 W	-	18	0	0
6 - 13 W	-	0	6	0
108 - 9 W	-	0	108	0
Fixture Type: Incandescent				
Total	**Description**	**A-Pod**	**B-Pod**	**Exterior**
91 - 60 W	-	0	91	0
614 - F32 T8	2 Lamp	8	606	0
158 - F32 T8	4 Lamp U	155	3	0
390 - F32 T8	4 Lamp	320	70	0
40 - F25 T8	2 Lamp	16	24	0
24 - F25 T8	3 Lamp	0	24	0
2 - F54 T5	2 Lamp	0	2	0

Low-Flow Inmate Shower Fixtures

RVJC's inmate shower fixtures release water at 2.5 GPM at full flow, classifying these fixtures as low-flow. Will County may have the opportunity in 2018 to receive **ultralow-flow (1.5 GPM) shower fixtures** dependent on utility-ran program availability similar to the STEP Program[9]. These **fixtures will be pursued if they can be obtained at no material cost to Will County** through a distributor of shower fixtures **specifically designed for detention facilities** in order to maintain ACA compliance.

Table 1.8 Summary of Total Impact for RVJC	
Total Investment=	~$1,469,000.00
Total Cash Incentives=	$99,143.40
Total STEP Product Retail Value=	~$612.00
Total Lifetime kWh Usage Savings=	~1,073,776.70
Total Lifetime Electric Cost Savings=	~$70,117.62
Total Lifetime Therm Usage Savings=	410,342.30
Total Lifetime Natural Gas Cost Savings=	~$178,047.52
Total Financial Benefit=	**~$347,920.54**

[9] STEP Program through MEEA concluded at the end of 2017.


WILL COUNTY
SHERIFF'S DEPARTMENT
SHERIFF PAUL J KAUPAS
SHERIFF

Sheriff Substation (Crete)

The Sheriff Substation (Crete) is a small facility at just under ~3,000 square feet with a vehicle storage pole building in the rear of the primary property, which is ~1,200 square feet. This facility is used as a rest and office area for Will County police officers on patrol in the eastern portion of Will County, and for lock-up use in the evening hours. Because of the low impact of this facility on Will County's energy usage and cost profile given its small size, energy efficiency capital improvements have not been common at this facility. However, energy staff works with officers to discuss conscious operations that can reduce energy consumption and cost. In 2017, some heating, ventilation, and air-conditioning (HVAC) improvements were made that may increase energy efficiency. This facility is profiled under this subsection to showcase its progress in the Better Buildings Challenge.

Better Buildings Challenge

The Sheriff Substation (Crete) started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 48 in 2009 increased to 153.3 in 2017. This is a **significant increase of 219.38%**. It is currently **unknown why this significant increase has occurred, however, facility and energy staff are currently investigating this increase**. The Sheriff Substation (Crete) has **increased energy cost in proportion to its increase in usage by 218.43%** since baseline year 2009. The Sheriff Substation (Crete) has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	48	$1,722.46
11/30/2017	153.3	$5,484.88
Energy Expenditure Increase/Decrease		**$3,762.42**
EUI Increase/Decrease		**105.3**


SUNNYHILL

Sunny Hill Nursing Home

Sunny Hill Nursing Home of Will County (SHNH) is a full service, skilled nursing facility, certified by Medicare and Medicaid services, which is owned and operated by Will County. Constructed in 1969, this 137 room, 238 bed, ~131,400 square foot facility provides nursing and residential services 24 hours per day, 7 days per week to support Will County's rapidly growing geriatric population. SHNH of Will County's mission is to provide the highest quality resident-centered care possible. This mission is practiced every day as 99% of SHNH's population has no discharge potential, and the average resident age is 87 years old. The facility has an upper and lower level, separated into 6 avenues with common spaces like the large main dining room, visiting spaces, Sweets & Treats Ice Cream Shop, and office uses. Other spaces include a beauty/barber shop, housekeeping/laundry, maintenance, activity spaces, and rehabilitation spaces. Some of the additional improvements include: new court yard addition with LED lighting and wheel chair friendly garden beds, LED and induction lighting outside, LED interior lighting in 4 of the 6 avenues and some common and office spaces, low-e windows that prevent heat gain during cooling months, a revolving door at the main entry that decreases air exchange year-round, and partial reflective roof coating that reduces cooling demands in warmer months. SHNH has seen massive renovations in the last 10 years that contribute to the mission of SHNH and more efficient operations that reduce energy and water demand and save costs. As a result, SHNH will contribute a ***~$123,703.02 financial benefit[1]*** *to Will County. See Table 1.5.*

Better Buildings Challenge

SHNH started with a source energy usage intensity (EUI), or total source energy consumed per square foot, of 256.3 in 2009 decreased to 254.4 in 2017. While the **less than 1% decrease in EUI is nominal,** it is important to note that **significant capital equipment replacements and building renovations were made from 2009-2017 that will be better demonstrated in 2018 year's end energy data** when 1 year's energy consumption data is available following the completion of improvements. SHNH has **decreased energy cost by 6.57%** since baseline year 2009. SHNH has 4 years to continue its contribution to a 20% reduction in total, profile-wide energy demand. See Table 1.1.

Table 1.1
BBC Baseline Data Comparison

Year Ending	Source EUI (kBtu/ft²)	Energy Cost ($)
11/30/2009	256.3	$208,743.43
11/30/2017	254.4	$195,024.50
Energy Expenditure Increase/Decrease		**$(13,718.93)**
EUI Increase/Decrease		**(1.9)**

[1] Financial benefit to Will County is to be realized over the useful life of each improvement outlined for this facility and includes the sum of all applicable energy cost savings and cash incentives.

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report (2013)

In May 2013, SHNH **participated in a Level 2 Energy Assessment & Feasibility Report** performed by SEDAC. This report highlighted **10 energy cost reduction measures (ECRMs)** that would decrease energy usage and cost. Of the 10 ECRMs offered, two ECRMs, **#2 and #3, were fully implemented** and a **variation of one ECRM, #6**, was implemented in the form of high efficiency washers and dryers as opposed to the use of Ozone technology. See Table 1.2.

Table 1.2
2013 SEDAC Level 2 Energy Assessment & Feasibility Report ECRMs

ECRM #	Description	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	High Efficiency Boilers	0	27,656	
2	High Efficiency Chiller	171,904	0	**X**
3	Upgraded Kitchen Equipment	30,101	7,373	**X**
4	EC Evaporative Fan Motors in Walk-in Coolers	13,910	0	
5	Variable Frequency Drives for Pumps and Fans	352,888	0	
6	Ozone Laundry System	0	14,930	**X (VARIATION)**
7	Bi-Level Controls on Stairwell Lighting	8,114	(136)	
8	Vending Energy Management	9,672	(162)	
9	Upgraded Lighting in Avenue Six	136,840	(2,121)	
10	Increased Insulation Level for Roof on Avenue Six	6,069	2,256	

Interior Lighting Retrofit (2014)

In March 2014, **SHNH retrofitted a significant portion of the facility's interior lighting**, **reducing the number of fixtures in the areas retrofitted by nearly 21%.** Total kWh savings for this retrofit, assuming a 16-hour per day burn time 7 days per week, are **56,457.86 kWh annually and approximately $3,884.30 per year**. Assuming the useful life of these fixtures are ~100,000 burn hours, the lifetime energy savings are **~969,400.07 kWh and $66,694.72**. This project cost is estimated at minimum ~$20,000.00. This project was **incentivized at $15,002.80** by the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Illinois Energy Now (IEN) Public Sector Energy Efficiency (PSEE) Program. See Table 1.3.

Table 1.3 2014 SHNH Interior Lighting Retrofit Specifications & Wattage Reduction									
Area	**Existing Fixture Type**	**Fixture Quantity**	**Existing Fixture Wattage**	**Existing Total Wattage**	**New Lighting Type**	**Fixture Quantity**	**New Fixture Wattage**	**New Total Wattage**	**Reduced Watts**
Administrative Area	F40T12 2 Lamp	43	100	4300	2 X 4 Recessed LED 2RT	38	49	1,862	2,438
-	F40T12 2 Lamp	2	100	200	2 X 2 Recessed LED 2RT	2	38	76	124
Corridors (50, 58, & 67)	F40T12 2 Lamp	22	100	2,200	2 X 2 Recessed LED 2RT	17	38	646	1,554
Housekeeping Office	F40T12 2 Lamp	2	100	200	2 X 4 Recessed LED 2RT	4	49	196	4
Clean Linen Storage	F40T12 2 Lamp	2	100	200	2 X 4 Recessed LED 2RT	3	49	147	53
Resident Laundry	F40T12 2 Lamp	3	100	300	2 X 4 Surface LED 2RTLX	3	49	147	153
Rehab Director Office	F40T12 2 Lamp	2	100	200	2 X 4 Recessed LED 2RT	2	49	98	102
Inventory Control	F40T12 2 Lamp	5	100	500	2 X 4 Recessed LED 2RT	3	49	147	353
-	F40T12 2 Lamp	1	100	100	2 X 2 Recessed LED 2RT	1	38	38	62
OT/ST Therapy	F40T12 2 Lamp	33	100	3,300	2 X 4 Recessed LED 2RT	11	49	539	2,761
Training Apartment	60 w Incandescent	2	60	120	CFL Fixture	2	13	26	94
Rehab Office	F40T12 2 Lamp	3	100	300	2 X 4 Recessed LED 2RT	4	49	196	104
PT Rehab	F40T12 2 Lamp	13	100	1,300	2 X 4 Recessed LED 2RT	16	49	784	516
-	F40T12 4 Lamp	3	220	660	F32T8 4 Lamp SP8	3	132	396	264
Fitness Room	F40T12 2 Lamp	8	100	800	2 X 4 Recessed LED 2RT	8	49	392	408
Woman's Locker	F40T12 2 Lamp	6	100	600	2 X 4 Recessed LED 2RT	3	49	147	453
Men's Therapy Toilet	F40T12 2 Lamp	3	100	300	2 X 4 Recessed LED 2RT	1	49	49	251
Total Watts Reduced									**9,694**

Total Interior Lighting Retrofit (2014) Value (Lifetime Energy Cost Savings and Incentives) = ~$81,697.52

Kitchen Retrofit[2]

In 2013, **SHNH retrofitted freezer doors and installed one automatic freezer door closer**, specifically, 21 cubic feet of ENERGY STAR® Door Freezers and 5 cubic feet of ENERGY STAR® Freezer Glass Door, to decrease the amount of air exchange between freezers and the kitchen. By **reducing the amount of air exchange, less cooling is required by the freezers** reducing energy usage. This project's cost is estimated at a minimum of ~$10,000.00. This equipment was **incentivized at $235.00 through**. In addition to these efforts, an energy efficient vent hood was installed.

Total Kitchen Retrofit Financial Benefit (Incentives Only) = $235.00

Chiller Replacement[2]

In 2013, SHNH **installed a new air-cooled chiller**. The project was **incentivized at $31,185.00** through the Illinois Department of Commerce and Economic Opportunity's (DCEO's) Illinois Energy Now (IEN) program. The total cost of the project was $207,360.00.

Total Chiller Replacement Financial Benefit (Incentives Only) = $31,185.00

Installation of Gas Pulser Meter

In February 2015, **Will County signed an agreement with Nicor Gas to install a gas pulser meter** than would provide **30-minute interval gas usage data**. Interval data allows more accurate tracking of energy usage throughout the day to understand better peak usage times and better equip decision makers with the information necessary to plan retrofits that affect gas usage. This meter install was **necessary to participate in SEDAC's Dashboard Enhanced M&V Program**, which encourages the use of energy dashboards in facilities so that its occupants may be kept apprised of energy demands and the factors that affect usage such as weather and recent facility improvements. The cost for this project was $2,000.00. While it is difficult to appropriately calculate the return on investment (ROI) as a result of this project, it is logical to conclude that **this cost has recovered itself many times over in the quality of data it has made available** to track usage changes as a result of large-scale renovations that increase energy efficiency at SHNH.

[2] Due to lack of information regarding the efficiency level and other specifications of existing equipment at time of replacement, lifetime energy savings and energy cost savings could not be accurately calculated.

Interior Lighting Retrofit (2016)[3]

In 2016, **SHNH retrofitted additional interior lighting.** SHNH is divided into 6 resident avenues with several additional common areas. All lighting in the 5th and 6th avenues was retrofitted to LEDs that have an anticipated useful life of ~100,000 burn hours and will contribute to significant energy savings **estimated[3] at ~9,050.50 kWh and ~$622.67 saved annually, or ~153,858.50 kWh and ~$10,585.50 over the lifetime of the fixtures**. This project's cost is estimated at a minimum of ~$10,000.00.

Total Interior Lighting Retrofit (2016) Value (Lifetime Energy Cost Savings) = ~$10,585.50

Expansion of Reflective Roof[3]

In early 2017, ~**60,000 square feet of reflective coating was added to SHNH's roof**. Approximately 20,000 square feet of SHNH's roof received a reflective coating in 2014. This reflective coating **reinforces the roof while also providing reflective properties that help reduce heat absorption** on average keeping SHNH about 3 degrees Fahrenheit cooler at internal ceiling temperature than those areas without the reflective coating during cooling months. This reduces the amount of cooling required in summer months, saving energy and costs. These projects' costs are estimated at a minimum of ~$3,000.00.

Roof Top Unit (RTU) Air Handler Replacements[3]

Since 2012, SHNH has replaced 4 RTUs with high efficiency RTUs. These more efficient RTUs will contribute to year-round HVAC-related electric savings. These replacements' costs are estimated collectively at a minimum of ~$21,000.00.

Dashboard Enhanced Measurement & Verification Analysis

In May 2017, SEDAC performed an analysis that focused on **how energy cost savings may be realized by reducing lighting and HVAC loads when the building has low occupancy**. Thirty-minute interval electric data from February 8, 2015 through January 16, 2017 was analyzed from logging equipment that was installed as part of SEDAC's Dashboard Enhanced M&V Program. This analysis found that **present equipment scheduling was optimized** and necessary changes to the schedule be made at that time. Conversely, opportunities to decrease energy usage presented themselves in the form of building improvements that had been made in recent years to **HVAC controls; these controls should help realize, likely at 2018 year's end data, at least 10% reduction in energy costs**. Other opportunities and observations included reducing nighttime base load of 150 kW, which is higher than expected. Some possible explanations for this higher nighttime load includes **reducing to a minimum nighttime ventilation and lighting** without breaking compliance with the Illinois Department of Public Health (IDPH) regulations, **decreasing lighting or dimming lighting in common spaces, especially**

[3] Because this project was bundled with other projects in a large-scale renovation at SHNH from 2014-2017, there is a lack of information regarding the efficiency level and other specifications of existing equipment at time of replacement, lifetime energy savings and energy cost savings could not be accurately calculated.

[4] ~17-year useful life

hallways, and installation of variable fan drives (VFDs) to scale down AHU motor operation at night as well as **demand control ventilation (DCV) implementation to reduce ventilation at night** and thus unnecessary heating and cooling. If the latter improvements are not possible, **those motors that must run at full capacity even into evening hours should be replaced with premium grade motors**. The analysis also proposes **implementation of submetering particularly in the kitchen and laundry room** because these two spaces are energy intensive and offer numerous opportunities for electrical, natural gas, and water savings. Submetering these spaces will prove more accurate measurements of said usages allowing more thoughtful retrofit and operational improvements to reduce demand. Additionally, **energy recovery may be used by capturing waste heat from the chiller, energy recovery wheels on AHUs, and capture of waste heat from laundry and dishwasher water discharge**—these measures will reduce energy waste. The report concludes that while several positive energy efficiency measures have been made, **there is less improvement in energy reduction than expected**. As a result, **the baseload for SHNH should be more closely examined** to identify what is contributing to year-round above-average source EUI.

Smart Energy Design Assistance Center (SEDAC) Level 2 Energy Assessment & Feasibility Report (2017)

In May 2017, **SHNH participated in a second Level 2 Energy Assessment & Feasibility Report performed by SEDAC** when staff recognized that energy usage and costs for SHNH had not reduced measurably since 2009 despite significant capital investment in energy efficient equipment. This report **highlighted 10 energy cost reduction measures (ECRMs) that would decrease energy usage and cost**. See Table 1.4.

Table 1.4
2017 SEDAC Level 2 Energy Assessment & Feasibility Report ECRMs

ECRM #	Description	Estimated Annual Facility Savings		
		Electricity (kWh)	Natural Gas (Therms)	Complete
1	Replace Hot Water Boilers	0	22,777	
2	Demand Control Ventilation	43,626	6,093	
3	Variable Speed Drives for Supply Fans	192,371	17,111	
4	Variable Speed Drives for Hydronic Pumps	32,033	0	
5	Kitchen Vent Hood Controls	4,486	12,960	
6	Vending Machine Controllers	8,736	-147	
7	Smart Strips for TVs	27,791	0	
8	Evaporator Controls for Walk-In Coolers	962	0	
9	Boiler Outside Air Reset	0	14,577	
10	Space Heating Boiler Tune-up	0	7,497	

Table 1.5 Summary of Total Impact for SHNH	
Estimated Partial Investment=	~$273,360.00[5]
Total Cash Incentives=	$46,422.80
Total Lifetime kWh Usage Savings=	>~1,123,258.57[6]
Total Lifetime Electric Cost Savings=	>~$77,280.22[6]
Total Financial Benefit=	**~$123,703.02**

[5] A "Total Investment" figure was not provided for this facility's Table 1.5 "Summary of Total Impact" due to the lack of available invoice data to accurately present a "total" investment figure.

[6] Due to a lack of efficiency and other specification necessary for energy use and cost savings calculation regarding equipment at the time of its removal and replacement, these figures are intentionally conservative and likely less than their true values.

SECTION 6: CONCLUSION

Success Summary

Over the last 5 years, Will County has made incredible strides in energy efficiency that will reduce over **8,317,491.89 kWh** and **2,334,753.75 therms** totaling over **$2,128,521.48** in energy cost savings. Will County has accumulated over **$327,996.93** in cash-in-hand incentives, and over **$19,116.07** in energy efficiency products at no cost. Will County will have reduced no less than **4,261,040 gallons** of water and associated costs of **$64,088.32**. Will County has generated **$2,832,635.89** in gas-to-energy facility revenue and has received over **$235,000** in no-cost, comprehensive facility assessments with…

all efforts totaling over **$5.6 million dollars.**

Because of these successes, Will County can look forward to continued success and ensuring the success of peers and residents in achieving goals to reduce energy and water usage and associated costs. Will County will continue to explore the revenue-generating potential of various renewable and alternative energies, energy curtailment programs, and more that can save tax-payer dollars.

Looking forward, Will County will use this information to make decisions, weigh projects, analyze successful implementation of energy and water reduction measures, and identify how to reduce even further. That which can't be measured, can't be tracked. By measuring success numerically, Will County can be data-driven when making decisions about how to improve facilities. This means identifying new ways to more accurately and specifically analyze energy and water reduction projects by building a life-cycle model that includes labor, maintenance, societal and employee impact, and more.

TOTAL IMPACT	
kWh Reduced=	~8,317,491.89
Therms Reduced=	~2,334,753.75
Energy Costs Saved=	~$2,128,521.48
Cash Incentives=	~$327,996.93
Retail Value of Granted Energy Products=	~$19,116.07
Gallons of Water Saved=	~4,261,040
Water Costs Saved=	~$64,088.32
Gas-to-Energy Revenue=	~$2,832,635.89
Value of Engineer Facilities Assessments=	$235,000
Total Financial Benefit=	**~$5,607,358.69**