

COOK COUNTY'S CLEAN ENERGY PLAN

A plan for **100% renewable electricity** and a **carbon neutral footprint** for Cook County buildings



Dear Residents of Cook County:

The world is facing a climate emergency and we must do as much as we can as fast as we can to prevent irreversible impacts to our environment. While the climate crisis is a threat to us all, under-resourced communities and communities of color are disproportionately at-risk to increased climate impacts due to social, economic and health vulnerabilities.

The Cook County Clean Energy Plan is our response to this emergency, which also provides an opportunity to help us meet our responsibilities to address environmental injustices and mitigate climate change while promoting racial equity.

I am proud to release the Clean Energy Plan, which lays out how Cook County will make its facilities carbon neutral by 2050 and achieve 100% clean electricity in its buildings by 2030.

This Plan supports my goal to continue to make the County a leader in sustainability. Cook County has already reduced its harmful greenhouse gas emissions by a third since I took office in 2010. This Plan demonstrates how we can complete the journey to become carbon neutral and also switch to 100% renewable electricity. It is realistic, fiscally responsible and identifies actions that create a demand for local jobs, bolster the green economy and provide direct investment in renewable energy in our communities. I hope that it can serve as a model and inspiration for other local governments and entities to do the same.

This Plan supports the goals of justice, health, economic development and environment that are set forth in my Policy Roadmap for Offices Under the President of the Cook County Board. The Roadmap is founded on the principle that promoting equity, specifically racial equity, must guide and shape our work. Environmental justice is a key component of a healthy, thriving Cook County.

Sincerely,



Toni Preckwinkle, President
Cook county Board of Commissioners



Thank you to the following individuals and organizations for their contributions to Cook County's Clean Energy Plan:

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DEFINITIONS

100% Renewable Electricity - Using low- or no-carbon resources including but not limited to wind, solar, and geothermal for all electricity used in building operations. Cook County is not counting nuclear, waste-to-energy, or hydropower towards renewable energy, because of their other associated environmental impacts.

Electrification - Switching natural gas equipment such as boilers to equipment powered by electricity to allow substitution of renewable energy. Natural gas is a fossil fuel.

Building Automation System (BAS) - Building automation systems are the central control board of a building's operations. These systems use computer software programs to set and monitor schedules for heating, cooling, lighting, etc. in the building.

Building Footprint - The energy used to operate a building.

Carbon Neutral - The amount of human-produced carbon dioxide equivalent emissions is balanced by clean energy sources.

CO2E - Carbon Dioxide Equivalent emissions, the standard unit of measurement and way greenhouse gas emissions are tracked and accounted for.

Demand Management - Improving how a building uses energy efficiently throughout the day. Demand management includes saving measures such as lasting energy efficiency upgrades, using less energy at high usage (peak) times to reduce peak load usage or shifting high energy use activities to less expensive times of the day. This helps avoid the need for power plants to increase power production.

Demand Response - Reducing energy consumption at critical times in response to high demand. Demand response is a specific type of demand management where an organization is paid to respond to grid stress when electricity demand is greater than the supply active on the grid by reducing energy loads to a specific level within a set amount of time.

Energy Management Information System (EMIS) - A collection of tools/software programs to track energy use in one central location. This can include a dashboard to show how energy is operating in real time, billing data, benchmarking tools, Fault Detection and Diagnostics and scheduling and controls capabilities for the Building Automation System.

Energy Storage - Saving energy for use when it is needed by means such as batteries in a building (or in electric vehicles). Storage can improve system efficiency and improve resiliency, by storing excess generation from energy sources such as solar and wind that provide energy at specific times of the day.

Fault Detection and Diagnostics (FDD) - Real-time signals that can ensure that mechanical equipment is operating correctly and help staff see operational changes that fall outside routine checks. Examples include open dampers, constant fan operation, etc. This includes software that identifies anomalies in the performance of critical equipment such as boilers, chillers, motors, elevators, pumps, exhaust fans, etc.

Geothermal Energy - System that uses heat stored in the earth. The constant year-round temperature underground can also be used to provide heating and cooling to buildings.

Green Tariffs - Optional programs, offered by some utilities in regulated electricity markets, that allow larger commercial and industrial customers to buy bundled renewable electricity from a specific project through a special utility tariff rate.

Greenhouse Gas Emissions (GHGs) - gases that trap heat in the atmosphere. These gases can include carbon dioxide, nitrous oxides, methane, particulate matter, and fluorinated carbons. In this report, greenhouse gases are assigned a carbon dioxide equivalent emission value (CO2e) to incorporate the impacts different gases have on atmospheric warming into a unified unit of measure.

LEED -Leadership in Energy and Environmental Design is a certification program administered by the United States Green Building Council to recognize buildings that incorporate energy efficiency, indoor environmental quality, sustainable site development, water savings and material selection in construction and operations.

Microgrid - A group of interconnected electricity users and distributed energy resources, often with energy storage, within clearly defined electrical boundaries that acts as a single controllable entity with respect to the electrical grid. Microgrids can operate connected to the larger grid or be disconnected to operate independently ("island mode").

On-site Solar Energy - A solar photovoltaic energy project on or near the customer's site; generally, electricity is fed directly into the site ("behind the meter"). If the customer purchases the solar energy equipment and its installation, the solar installation is owned by the customer (as opposed to an on-site Power Purchase Agreement in which a third party owns the assets and sells power to the customer).

DEFINITIONS

Performance-Based Design - Designing a building to meet a specific energy use target.

Plug Load Management - Reducing the number of items plugged into a space and unplugging or shutting off electricity to devices when they are not in use. Items can include anything plugged in such as electric staplers, computers, heaters, fans, kitchen appliances, etc.

Power Purchase Agreement (PPA) - A financial agreement to purchase electricity generated by a specific renewable energy project. A third-party developer will own and operate the system and is responsible for installation, purchase of equipment, maintenance and financial transactions while the customer pays for energy. A PPA can be located on an organization's property or offsite. It is also possible to "sleeve" a PPA through a third party such as a utility or energy procurement company which enters into contracts with one or more PPAs and sells power associated with those projects to one or more customers.

Renewable Energy Certificate (REC) - A market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource. Buying and retiring RECs from a specific time period are what allow an energy user to claim to be using "green" or renewable energy for that time period. RECs are usually certified by a third-party organization such as Green-e or one of several regional REC tracking systems, which audit and verify the renewable aspects of the energy produced. RECs may be either "bundled" together with the purchase of electricity from a specific renewable energy project or sold separately from the electrons produced by the renewable energy source.

Renewable Portfolio Standard - State regulation that requires increased production of energy from renewable energy sources such as wind or solar. The mechanism that is used in Illinois to ensure that these requirements are met is the Renewable Energy Certificate.

Submetering - Additional energy meters looking at energy use readings from smaller spaces or specific categories (i.e. lighting, HVAC, plug load) to better understand how energy is specifically used.

Virtual Power Purchase Agreement - A financial arrangement between a renewable electricity generator and a customer, that enables both parties to hedge against electricity market price volatility. There is no physical delivery of power from the seller to the customer, but the customer is supporting the development of renewable energy.



Kilowatt and Megawatt - A kilowatt (kW) is 1,000 watts of electrical power, and a Megawatt (MW) is 1,000 kW's. A kilowatt hour (kWh) is the amount of electricity produced in one hour by a kW of power, and a Megawatt hour (MWh) is the amount of electricity produced in one hour by a MW of power.



Cook County used about 230,647,489 kWh of electricity in 2018. It would take about 900 to 1260 acres of solar panels to create electricity equal to the County's 2018 electricity use, depending on how the panels are arrayed on the land. If a football field including end zones is 1.32 acres, that would equal about 682 to 985 football fields. It would take about 30 to 42 football fields to serve the electricity needs of just the County Building at 118 N. Clark Street, and about 155 to 217 football fields to serve the electricity needs of the Stroger Hospital Campus.

EXECUTIVE SUMMARY

In 2013, President Preckwinkle convened the Sustainability Advisory Council that set a goal for the County to reduce its GHG emissions for County buildings by 80% from the 2010 baseline. By 2018, the County had reduced GHG emissions from County owned buildings by 32%, offset 20% of its electricity usage with renewable energy certificates (RECs) and saved taxpayers \$33 million in utility expenses.

GOALS

Cook County has already begun to feel the impacts of climate change and climate change will intensify issues that the region is already experiencing, such as more frequent heavy rains, causing more flooding or the increased occurrence and length of heat waves. Yet, the impacts will not be experienced by everyone equally. The burden most often falls on under-resourced communities and communities of color. Addressing climate change must also address racial inequities.

In October 2018, the Intergovernmental Panel on Climate Change concluded that limiting warming to 1.5°C is possible but would require global net human-caused emissions of CO₂ to fall by about 45% from 2010 levels by 2030, reaching net zero around 2050. In response to this, President Preckwinkle set the following goals for County-owned buildings:

1. Carbon reduction of 45% by 2030 from a 2010 baseline.
2. Carbon neutral by 2050.
3. 100% renewable electricity by 2030.

To meet these ambitious goals, the County has developed the Clean Energy Plan. This Plan applies to the 171 County buildings totaling approximately 19,000,000 square feet. As part of the decision-making process, this Plan will prioritize actions that are **urgent, additional** (new renewable energy that would not exist but for the County's efforts), **local, resilient and reliable** and **cost-conscious**. This Plan consists of four tracks the County intends to take to help reach the goals for County government buildings.

A reduction in
carbon emissions
by **45%** by **2030**



Achieving
carbon neutrality
by **2050**



100%
renewable electricity
by **2030**



THE PLAN



REDUCE – This track focuses on reducing carbon emissions across the building portfolio through energy efficiency projects that target all building systems, including lighting, heating, cooling, plug loads and building envelope.



MAINTAIN – Maintaining emissions reductions is just as important as the initial reductions. This track focuses on improvements in building monitoring, including upgrades to building automation systems and educating operators and employees on the importance of energy reduction and best practices in building operations and maintenance.



RENEW – The County's renewable energy strategy includes evaluating a mix of on-site generation, power purchase agreements, purchase of renewable energy certificates and storage. The preliminary focus of the Renew track is to meet the 2030 renewable electricity goal. The County will look first at all opportunities to generate its own energy, then at projects that are additional and local, and finally use power purchase agreements and renewable energy certificates (RECs) for meeting the 2030 goal. The County will prioritize those RECs and renewable energy projects that are additional, have a local impact on jobs and the economy, increase resiliency and minimize expenses for the County.

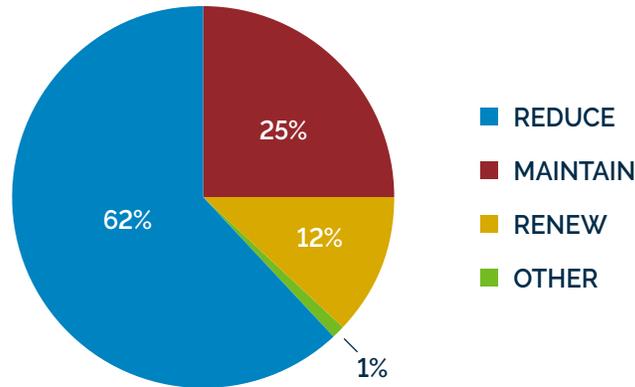
As the Reduce track continues beyond 2030 and alternative renewable energy sources are introduced, it is a goal of this Plan that the amount of renewable energy certificates needed to meet the 100% renewable electricity goal will decrease and a greater amount of on-site generation, power purchase agreements and storage will contribute toward renewable energy opportunities in Cook County.



SUPPORT – Policies and procedures will play an important role in the Clean Energy Plan. These elements provide the internal support needed to execute on the other three tracks as the Plan is implemented. It is important to create the right environment to execute this Plan. This includes new building standards, introducing solar generation potential as a decision factor in new buildings and land acquisitions and including an energy budget for County departments and agencies.

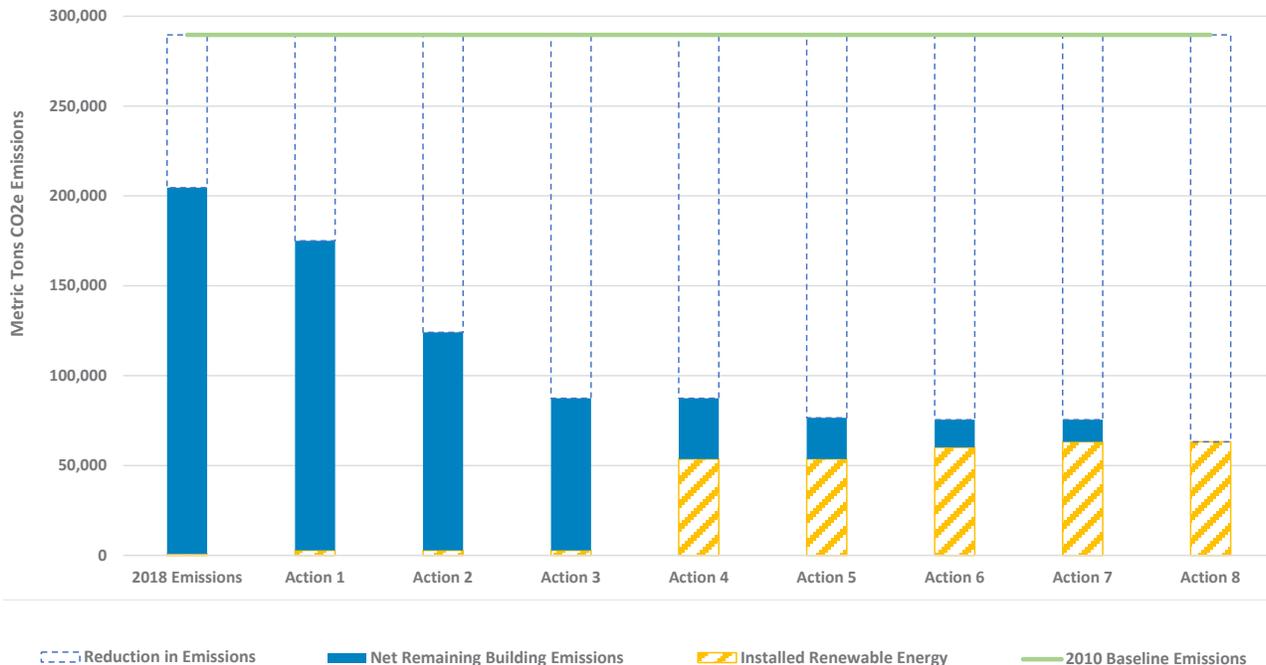
The chart below breaks down the impact each track is anticipated to have in the Clean Energy Plan. Most of the emissions savings comes from the REDUCE actions at 62%. MAINTAIN seeks to further reduce emissions by 25%, leaving RENEW with 12% of emissions needed to come from clean energy. The final 1%, OTHER, are different reductions or changes that will likely happen, including a cleaner grid, new technologies and County footprint reduction. Any of these would likely exceed the 1%, but since they are currently not quantifiable, they have been grouped together as part of the Plan.

ESTIMATED IMPACT TOWARD CARBON NEUTRAL



The graph below describes actions that will be taken in the four tracks and the relative impact of these actions to meet the Clean Energy Plan goals. These actions do not represent a sequence or timeline but are categorized based on the potential to meet the goal or known projects already scheduled to be implemented.

PROGRESS TOWARD CARBON NEUTRALITY



Action	Description
Action 1	Action 1 emissions savings come from understanding the energy profile of a building to complete retrofits of equipment, buildings and operations for an initial energy reduction. These major building energy retrofits are currently scheduled to occur or will be occurring in the next 5-10 years. Action 1 also includes a solar installation at the Skokie Courthouse and garage as the roof is scheduled to be replaced in the next 3 years making the facility viable for a solar install. Action 1 also includes installing solar on half of the Cicero Records Center roof.
Action 2	Action 2 emissions savings come from updating building automation systems and Fault Detection and Diagnostics to maintain energy savings and diagnose malfunctioning equipment. As smart building technology improves, the County expects to implement these improvements to increase savings.
Action 3	Action 3 emissions savings come from improvement of energy equipment to adopt recent technological advances as old equipment passes its useful life. Action 3 also includes solar on Markham, Rolling Meadows and Bridgeview Courthouse rooftops (i.e. The triplets).
Action 4	Action 4 emissions savings will be a result of high-performance building standards that will be implemented on facilities that are going through major renovations and/or new construction. By applying these standards and re-imagining the role of renewable energy in design, these types of projects can significantly reduce carbon emissions.
Action 5	Action 5 involves retiring old natural gas-powered mechanical equipment with electric-powered equipment to move away from fossil fuel dependence. Action 5 also involves incorporating battery storage with solar installations to maximize the energy available for use.
Action 6	Action 6 installed renewable energy comes from the estimated portfolio wide solar potential available on existing rooftops and land. This phase would be rolled out over several years as the rooftops are replaced.
Action 7	Action 7 represents the potential for a microgrid. This would promote resiliency and provide power during outages to County-owned and operated buildings or even to the community.
Action 8	Action 8 addresses areas of potential reduction that may occur as a result of actions beyond our direct control, the "Other" category above. These may include property disposition, a cleaner electrical grid, other renewable energy production and even the implementation of technologies not yet commercially available.

INVESTING IN THE FUTURE

Most energy efficiency improvements to buildings require capital funding. However, if planned properly, these investments can be part of the standard equipment replacement cycle and reduce operating expenses through reduced utility and maintenance expenses. This flexible approach to how and when improvements are made will help optimize taxpayer dollars.

The County will employ the following strategies when making investments related to the Clean Energy Plan.

1. Seek to replace mechanical and electrical equipment with energy efficient equipment when it has reached the end of its useful life.
2. Review building changes holistically, to maximize the energy savings of an energy efficiency remodel.
3. Seek grants and rebates to supplement County dollars used for these improvements.
4. Reinvest savings and rebates in technologies designed to reduce our carbon footprint.

In addition, business cases will be developed for energy efficiency projects to accurately predict rates of return to ensure proper investments. Investments that do not show a positive cash flow prior to the end of the project's useful life will be rejected.

The Clean Energy Plan is an investment for Cook County. Through thoughtful planning, reinvestment of revenue generated from energy efficiency projects and sound business cases, the added costs will be returned through operational savings that optimize taxpayer dollars.

NEXT STEPS

The County has already begun implementing elements of this Plan. A comprehensive building automation system upgrade will begin in 2020. Solar installations will be designed for Skokie Courthouse, Cicero Records Center and Markham Courthouse. An energy consultant will procure our electricity and natural gas and assist in purchasing RECs. Comprehensive building audits will be completed on the County's major facilities to determine how we use energy and how efficient we can make our buildings. Several lighting upgrades will be implemented as well.

Annual reports outlining progress towards the renewable electricity and carbon neutral goals will be provided. As technologies, policies or other factors evolve, the Plan will be updated to reflect these changes.

The Clean Energy Plan is not a blueprint for reaching carbon neutrality. It is a framework to act as a guide for how the County will move towards carbon neutrality. It is a living document that will evolve as the County and technologies evolve. The Clean Energy Plan will always represent the County's commitment to mitigate the impacts of climate change.

GOALS

BACKGROUND

Cook County is the heart of the nation's third largest metropolitan region and is the second largest county in America. It is home to 5.2 million people which is equal to more than 40% of Illinois's population. Cook County has a large immigrant population where nearly 35% of residents speak a language other than English at home. Cook County comprises 36% of Illinois economic activity with 2.56 million jobs and \$374 billion in annual output.

Cook County Government consists of eleven separately elected officials, including the President of the Board of Commissioners. While Cook County Government has many responsibilities, criminal justice and healthcare represent 87% of the total budget. Cook County's workforce is made up of more than 22,000 employees, 90% of whom work in healthcare, the justice system or public safety. The County owns and operates 171 buildings (19 Mft²), which are categorized into four sectors: public safety, corporate, health and hospitals and parking garages. Over 3,390,000,000 kBtu in energy were used in County buildings in 2018, which is the equivalent of 84,151 homes' energy use for one year. It cost Cook County approximately \$24.7 million to power all County owned and operated buildings in 2018.

Cook County has already begun to feel the impacts of climate change. There has been a 1-degree F increase in annual average temperature in Illinois since the beginning of the 20th century and based on current projections, annual temperatures will continue to rise. Additionally, climate change will intensify issues that the region is already experiencing such as more frequent heavy rains, causing more flooding or the increased occurrence and length of heat waves. However, climate change impacts are not experienced in a vacuum. High amounts of existing racial and economic segregation in Cook County has led to economic and resource disparities between Cook County communities. Poverty and existing environmental injustices will be exacerbated by climate change impacts.

Cook County Government has already been hard at work to reduce our contribution towards climate change. The County's first Chief Sustainability Officer was appointed in 2012 and shortly thereafter, all the County's building energy use was benchmarked, and our buildings' emissions were calculated, adding on the transportation, waste and water emissions in the following years. The County has reduced its buildings' Greenhouse Gas (GHG) emissions by approximately 30% since the baseline year of 2010 and was working towards the goal of 80% carbon reduction of GHG emissions by 2050 when two new goals were adopted in 2019. These new goals were created in response to the deep sense of urgency created by the Intergovernmental Panel on Climate Change's recommendations stating that we have less than 12 years to make major reductions in our greenhouse gas emissions to avoid the worst effects of climate change.

WHAT ARE THE GOALS?

The County has adopted a set of goals for its energy future.

As recommended by the Intergovernmental Panel on Climate Change and required by County Board Resolution:

1. A 45% carbon emission reduction from 2010 by 2030
2. Operations are carbon neutral for buildings by 2050 and, per President Preckwinkle:
3. 100% renewable electricity by 2030

A reduction in carbon emissions by **45%** by **2030**



Achieving carbon neutrality by **2050**



100% renewable electricity by **2030**



100% renewable electricity: Using low- or no-carbon resources including but not limited to wind, solar and geothermal for all electricity used in building operations. Cook County is not counting nuclear, waste-to-energy or hydropower towards renewable energy because of their other associated environmental problems.

Carbon neutral: The amount of human-produced carbon dioxide equivalent emissions (including CO₂, methane, nitrous oxides, etc.) is balanced by clean energy sources ¹

¹ Intergovernmental Panel on Climate Change, 2019. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_AnnexI_Glossary.pdf

GOALS

WHY ARE THESE OUR GOALS?

While many local and state governments, institutions and companies are setting similar clean energy targets, the reasons that they do so vary. It is important to understand the County's underlying values in order to choose the most effective path forward to fit our situation and desires.

[Cook County's Policy Roadmap](#) lays the foundation for the work of the Offices Under the Cook County Board President. The County's mission is to serve as a good steward of public resources by building equitable and sustainable communities for all residents. Values of equity, engagement and excellence inform the County's decisions. Climate change is an equity issue. Its impacts in this region, such as heat disasters, sewer backups and flooding, failed infrastructure, worsening air quality, new diseases and pests, water quality issues and others affect the poor, minority communities, linguistically isolated and vulnerable elderly and children hardest. One of the worst climate disasters in the United States was the 1995 heat wave in the Chicagoland region which killed 739 people, disproportionately isolated, elderly, minority and poor, who lived in disinvested communities.



Healthy
Communities



Vital
Communities



Safe and Thriving
Communities



Sustainable
Communities



Smart
Communities



Open
Communities

One of the six goals of the Policy Roadmap is to support healthy, resilient communities that thrive economically, socially and environmentally. Objectives include ensuring environmental justice and a healthy environment for all people and places in the County, promoting livable sustainable land use, transportation and economic development, reducing climate change and mitigating its effects, capturing the job growth potential of making Cook County more sustainable, and creating capacity in local municipalities and communities to build their own sustainable future.

Carbon neutrality and 100% renewable electricity are much more than simply numbers. The more we can choose paths towards those goals that also help us meet the mission, goals and objectives of the Policy Roadmap, the better we are serving the future of Cook County and its communities. An overarching principle of the Policy Roadmap is racial equity. Solutions that prioritize the needs of communities of color that are disproportionately affected by the impacts of climate change are essential to this work. Mitigating and adapting to climate change can create jobs in disinvested communities, improve the livability of our communities and address racial and social inequities – within the framework of urgency laid out by the Intergovernmental Panel on Climate Change that tells us to do as much as we can, as fast as we can, to forestall the worst effects of climate change here and globally.

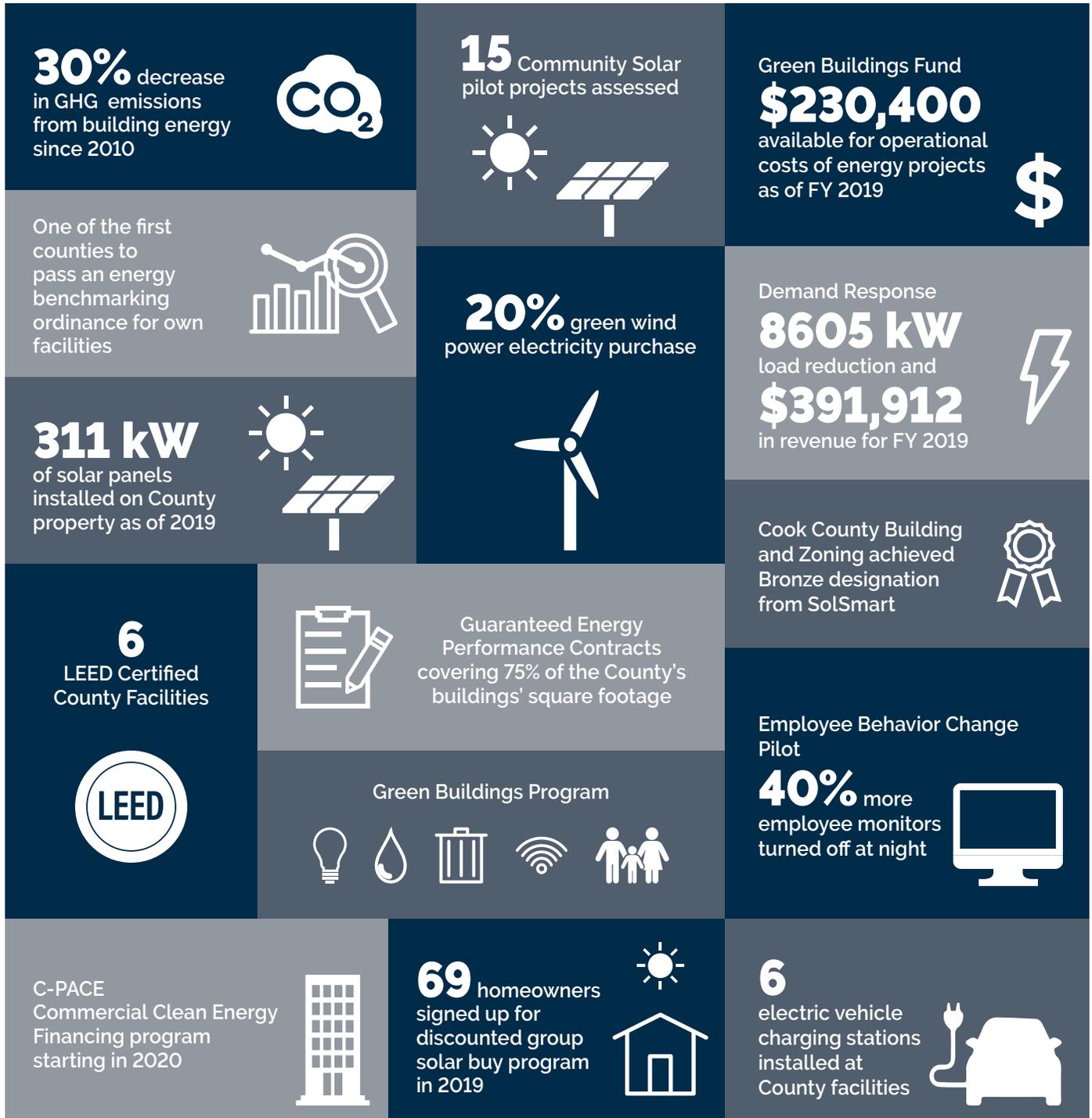
Climate Change is an Equity Issue. Climate change compounds existing inequities for low income and minority communities. Worsening air quality impacts children, the elderly and people with asthma and other respiratory and circulatory illnesses, which are more prevalent among minorities. Flooding damage to infrastructure is a bigger burden for municipalities with smaller tax bases to pay for infrastructure repair. And heat waves cause higher mortality among the elderly, disinvested communities and lower income populations.

*Toni Preckwinkle, Cook County Board President
From Remarks to the Association of Climate Change Officers
December 2019*

By moving as aggressively as possible towards carbon neutrality, Cook County acts as a model for the community as a whole and shows what is possible, leading and inspiring action across other local governments and the private sector.

ACCOMPLISHMENTS TO DATE

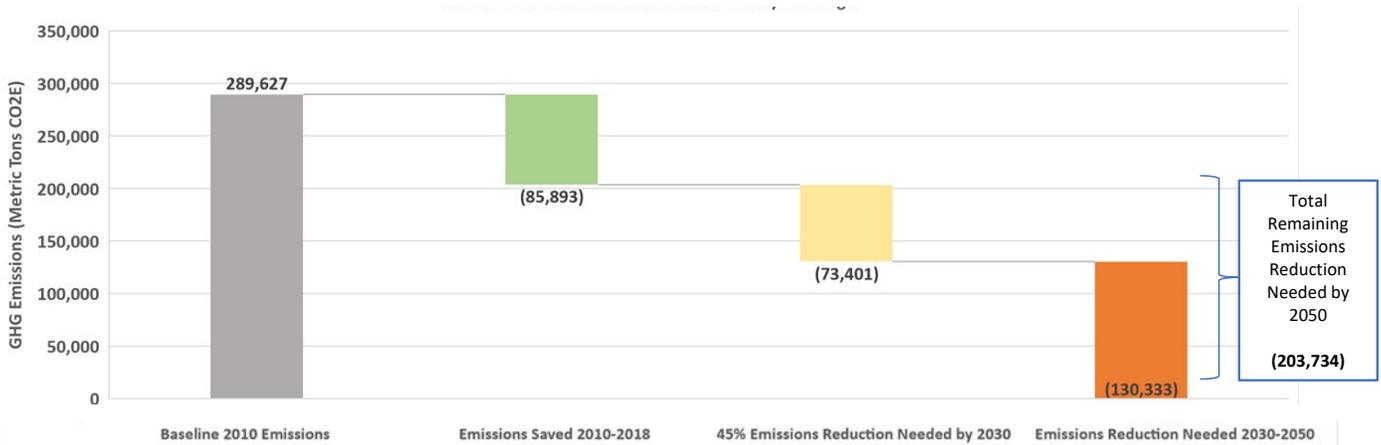
Cook County has already reduced greenhouse gas emissions from its facilities by approximately 30% since its baseline year of 2010. It has accomplished this through aggressive pursuit of energy efficiency and water conservation. The following are highlights of major projects and programs that reduced the County's carbon footprint and provide frameworks for the Clean Energy Plan as well as ways Cook County has helped residents and businesses reduce energy use and increase renewable energy, reduce greenhouse gases and other pollutants, increase local jobs and help businesses and residents save on their energy costs.



WHERE WE NEED TO GO FROM HERE

As a result of the actions outlined above, Cook County has already made significant strides towards the goal of County buildings being carbon neutral by 2050, moving beyond the County’s original goal of an 80% reduction by 2050. The County has already reduced its GHG emissions from buildings by 85,893 MT from the 2010 baseline, as seen in the graph below. This Plan builds on the successes of the above efforts by outlining the actions necessary to reduce emissions by 45% by 2030 and be carbon neutral by 2050. Coupled with this is the plan to have 100% renewable electricity by 2030. The Clean Energy Plan focuses on the means and methods to address the remaining 203,734 metric tons of CO₂e.

GREENHOUSE GAS EMISSIONS FOR COOK COUNTY BUILDINGS



THE PLAN

As part of the work of producing this Plan, Cook County reviewed carbon reduction and clean energy plans from several other counties and cities. Summaries can be found in the appendix. Many useful ideas were gathered from those plans and are incorporated here. However, no one plan can fit every local government's needs and there is no single 'magic bullet' to reach their clean energy and carbon reduction goals. Not all actions proposed in other places can be used in Cook County. Some, like the heavy reliance on hydroelectric power by Seattle are not technological options in the Midwest. Options that make sense or are legal in a regulated or vertically integrated utility market may not make sense in a deregulated market like Illinois, and vice versa.

Most of the reviewed plans start by acknowledging that the first step is to implement energy efficiency measures, to reduce emissions most cost-effectively and then to 'right size' renewable energy installations and purchases. Using this information as comparison as well as information and data from our own operations and building footprint, the County has developed a roadmap that will work to meet the renewable electricity and carbon neutral goals.

For Cook County as well as for sister counties and cities across the country, clean energy planning will be an ongoing process. New technologies are evolving and coming to market. Prices for many renewable energy options are constantly declining. The County's own needs for space and facilities evolves as its residents' and customers' needs change. This Plan is a living document and will be revisited frequently to account for changes outlined above.

In executing this Plan, the County wants to keep the following items as part of the decision-making process in all actions taken. Actions taken should aim to be:



Urgent: Reduce GHG emissions as much as we can as fast as we can, in line with the Intergovernmental Panel on Climate Change and reduce lasting impacts to the atmosphere.

Additional: Create new renewable energy projects that would not exist but for our efforts. By driving investment in clean energy, the electrical grid is cleaner and there is a reduced need for dirty sources of energy which disproportionately affect under-resourced communities and communities of color.

Local: Provide local economic support through job creation and revitalize areas where fossil fuel plants are currently located or have closed and have created environmental justice areas and disinvested economies. Communities of color have borne the burden of the dirty energy system and need to be at the focus of benefiting from a cleaner energy system. Possible benefits include improved air quality or new job opportunities in the clean energy economy.

Resilient and Reliable: Increase the reliability and resiliency of County properties while providing access to services for residents, specifically communities of color who are often the ones most affected by climate change impacts. An example would be a County facility acting as a resiliency hub and a cooling/warming center due to the reliability of its backup generation.

Cost-conscious: Create value for taxpayer dollars and mitigate the impact of climate change through fiscally responsible decisions.

"There are many possible pathways to achieving the 100 % clean energy goal, but all are a combination of three key strategies: consuming less electricity through investing in energy efficiency, generating electricity from renewable sources, and purchasing renewable energy credits."

Clean Energy Atlanta: A Vision for a 100% Clean Energy Future

Achieving carbon neutrality for a portfolio of buildings begins with the analysis of each individual building. First, determine how efficiently a building can operate to establish an energy production target. Second, develop a renewable energy plan to meet the building usage target. While simple in concept, there are multiple steps to be taken to reduce energy usage as well as creating and implementing a renewable energy plan. Cook County's Plan to be carbon neutral by 2050, and to reach 100% renewable electricity by 2030, involves many actions that fall into four tracks: Reduce, Maintain, Renew and Support.

THE PLAN



REDUCE – This track focuses on reducing carbon emissions across the building portfolio through energy efficiency projects that target all building systems, including lighting, heating, cooling, plug loads and building envelope.



MAINTAIN – Maintaining emissions reductions is just as important as the initial reduction. This track focuses on improvements in building monitoring, including upgrades to building automation systems and educating operators and employees on the importance of energy reduction as well as best practices in operations and maintenance.



RENEW – The County's renewable energy strategy includes evaluating a mix of on-site generation, power purchase agreements, purchase of renewable energy certificates and storage. The preliminary focus of the renew track is to meet the 2030 renewable electricity goal. The County will look first at all opportunities to generate its own energy, then at projects that are additional and local, and finally use power purchase agreements and renewable energy certificates (RECs) for meeting the 2030 goal. The County will prioritize those RECs and renewable energy projects that are additional, have a local impact on jobs and the economy, increase resiliency and minimize expenses for the County.

As the Reduce track continues beyond 2030 and alternative renewable energy sources are introduced, it is a goal of this Plan that the amount of renewable energy certificates needed to meet the 100% renewable electricity goal will decrease and a greater amount of on-site generation, power purchase agreements and storage will contribute toward renewable energy opportunities in Cook County.



SUPPORT – Policies and procedures will play an important role in the Clean Energy Plan. These elements provide the internal support needed to execute on the other three tracks as the Plan is implemented. It is important to create the right environment to execute this Plan. This includes new building standards, introducing solar generation potential as a decision factor in new building and land acquisitions and including an energy budget for County departments and agencies.

These tracks will not be sequential: energy efficiency will be aggressively but intelligently pursued as building audits are completed, equipment is ready for replacement and funding is available. New buildings will be constructed to high performance standards as outlined in the County's Green Building Standards. Implementation of on-site renewables will be phased in with other supporting improvements (such as roof repairs, land acquisition, etc.).



REDUCE

Recent studies have shown energy efficiency can bring the United States halfway to reaching 80-100% reduction of greenhouse gas emissions.² Understanding the detailed energy profiles of each building is the first step needed to make energy usage more efficient and to reduce unnecessary emissions from energy resources. With Cook County's wide-ranging building portfolio covering large campuses, small clinics, major office buildings, hospitals, courthouses and a range of other uniquely operated facilities, each building's performance requires analysis to determine where energy and emissions savings can be best realized. The following measures outline the process Cook County will use to reduce energy usage and design new buildings to a low energy usage/low GHG emissions standard.

1. BUILDING ENERGY USE ANALYSIS AND ASSESSMENT

In order to determine a target for energy efficiency and renewable energy, the County needs to not only know how much energy is used but also where it is used. To determine this, the County will begin in-depth energy use analysis on buildings in 2020. These assessments will first focus on the highest energy users and most energy use intensive facilities (energy per square foot) in Cook County's portfolio of owned and operated facilities, but all buildings will be included in this process. The audits will assess how energy is used in each of Cook County's buildings, broken down into key areas: lighting, heating, cooling, refrigeration, building envelope and plug load. In addition, operational schedules, equipment age and functionality, occupancy rate and expected disposition (or transfer of property) will be evaluated. Using this information, we will be able to determine how efficient we can make buildings, enabling us to more accurately project what our renewable energy needs will be.

Data from this analysis will generate a list of energy efficiency upgrades that will become capital projects. The timeline for these capital projects will be determined based on age, return on investment and other capital projects that may impact the building.

2. BUILDING ENERGY EFFICIENCY UPGRADES

Using data collected during the in-depth building assessments, the County will immediately begin to plan for and implement energy efficiency projects. These projects will include lighting retrofits, mechanical system upgrades, and building envelope upgrades. Using remaining useful life and simple payback calculations, the County will seek to use the most up-to-date technology to maximize savings and reduce greenhouse gas emissions.

Cook County's Guaranteed Energy Performance Contracts (GEPCs) cover about 75% of the County's building's square footage. The County is currently implementing projects in the remaining properties of the portfolio as well as elements that were not included in the GEPCs. This trend is expected to continue until systems that were part of the GEPCs start to reach the end of their useful lives. These systems will then begin to go through upgrades that will again target the latest technology.

As buildings begin to use less energy with the previous retrofits and monitoring practices, equipment can be right sized to meet current building energy load requirements and avoid wasted energy emissions from oversized equipment. In some cases, particularly with lighting, retrofits might be made prior to the end of useful life when the business case demonstrates a sound financial investment.

Reference Action 1, "Major Building Energy Retrofits" under "Action Steps"

3. NEW CONSTRUCTION

It is expected that the County will add facilities to the portfolio and measures must be taken to address these added emissions. To minimize the impact of these new facilities, the Green Building Standards were adopted to ensure energy efficient design. The current 2002 ordinance for new construction and major renovation will be updated to a performance-based design standard with the initial goal to be carbon neutral in operations where possible. Due to

² Unger, L. and S. Nadal (2019). Halfway There: Energy Efficiency Can Cut Energy Use and Greenhouse Gas Emissions in Half by 2050.

the wide variety of County buildings, using a performance-based design approach for each project will minimize the impact to our carbon footprint.

Due to the aging infrastructure, many facilities will likely undergo major renovations or replacement with new construction. Many large County facilities have building systems that will soon be at the end of their useful life. As these replacements occur, the high-performance building standards will prioritize energy conservation in the design of the new systems. These projects potentially provide a large source of carbon emissions reductions.

Reference Action 4, “High-Performance Building Design” under “Action Steps”

4. EMPLOYEE BEHAVIOR CHANGE AND PLUG LOAD MANAGEMENT

Behavior change can reduce electricity for items plugged in or left on throughout a building. By saving plug load electricity from employee energy use after work hours from sources such as lighting, computer monitors, printers, radios, calculators, etc., Cook County could save an estimated 2% electricity reduction or 4,075 metric tons CO₂e emissions.

Energy reduction through change in employee behavior will be ongoing. These behavior changes can include turning off lights when not needed, unplugging unused equipment, creating standard power management policies for IT equipment, prioritizing Energy Star-rated equipment in our procurement processes and eliminating personal printers.

The Cook County Department of Environment and Sustainability and the Bureau of Asset Management piloted a program to audit desk spaces to understand how employees use energy and what they need plugged in at their desk space. The first sites analyzed were the Maywood Courthouse, Domestic Violence Courthouse and the Cook County Building. The pilot encouraged employees to turn off their monitors at the end of the day to save energy and to adopt an attitude toward saving energy at work. Building off the pilot campaign’s success, a robust program will be rolled out to other Cook County facilities with the impact goal of portfolio wide plug load reduction.

Reference Action 3, “Behavior Change” under “Action Steps”

Countryside, IL’s Net Zero Municipal Complex:

The Countryside municipal complex, located in Cook County, houses both the city hall and police department. It was designed to generate as much energy as the facility uses, utilizing techniques such as energy efficiency measures, a geothermal heating and cooling system and 635 solar panels. Many of the solar panels are located on top of carports that also protect the police patrol cars. The complex opened in 2019 and was built to meet LEED Gold standards.



Janusz Gryglak
Jag International Photography

Wayne N. Aspinall Federal Building and US Courthouse (Grand Junction, CO):

Wayne N Aspinall Federal Building and U.S. Courthouse was built in 1918 and modernized in 2010. Through this process, this historic building was preserved, and the entire infrastructure was replaced with energy efficient systems. High-efficient lighting systems, advanced metering and building controls and geo-exchange system were all used to reduce the building's energy needs, while a solar array was placed on the roof of the elevated canopy, providing enough energy to power the entire building. It is LEED Platinum and the first site net-zero building listed on the National Register of Historic Places.



5. ELECTRIFICATION (SWITCH FROM NATURAL GAS)

Although cleaner than other fossil fuels such as coal, natural gas is still a fossil fuel. As natural gas boilers and mechanical equipment previously installed reach the end of their useful equipment life, replacements will shift to electric to take advantage of the availability of renewable electric energy.

Currently, natural gas is used at many Cook County facilities as an energy source. Berkeley and 50 other California cities/counties have realized these impacts increase climate risks and banned natural gas in future building operations. Cook County aims to address these emissions impacts and future natural gas price volatility by conducting a thermal decarbonization study to analyze the feasibility of all electric heating for buildings and to phase out natural gas over time.

Reference Action 5, "Switch from NG" under "Action Steps"

6. NEXT GENERATION ENERGY EFFICIENCY PROJECTS

It is anticipated that building technologies will continue to improve. Given that the goal for carbon neutral is 2050, most, if not all, major mechanical and electrical systems will have reached the end of their useful lives and will need to be replaced, sometimes more than once. Unless an entire building is replaced, most of these improvements will be made within the confines of the existing system parameters. While not a large source of emissions savings, it will still be a necessary reduction towards becoming carbon neutral. This section accounts for the second or third replacement of equipment or systems before 2050.

The table below highlights different systems and the potential number of times that this equipment will be replaced by 2050. For illustration purposes, this table assumes that all equipment is currently new. In nearly all buildings, this is not true. Therefore, additional replacements may occur beyond what is shown in the table, potentially increasing emissions reductions.

BUILDING SYSTEM REPLACEMENT CYCLE (Per ASHRAE) ³		
	Expected Life (years)	# of Replacements by 2050
Lighting	14	2
Chiller	23	1
Boiler	25	1
AHU	20	1
RTU	15	2
Windows	25-30	1
Roof	20	1
Pumps	15	2
BAS Software/hardware upgrade	5*	6
Fans	20	1

Reference Action 3, “Next Generation EE” under “Action Steps”

“The role of energy efficiency is strategically important to the feasibility and economics of renewable electricity efforts. Efficiency allows for ‘right-sized’ renewable energy additions, both for distributed and utility scale efforts. Efficiency also is an important means to reduce overall costs for energy, through the absolute reduction of energy consumption.”

Denver’s 80x50 Climate Action Plan, July 2018

³ American Society of Heating, Refrigerating and Air Conditioning Engineers. www.ashrae.org



MAINTAIN

Just as important as reducing energy is making sure the energy reductions stay in place. As building equipment ages or use of spaces changes, the original operating standards may not be applicable and could cause an increase in energy usage. In the Markham Courthouse, for example, the timer that shuts down the lighting malfunctioned causing the lights to remain on in an unoccupied courthouse all weekend. This breakdown, had it not been corrected, would have increased energy usage by over 300,000 kWh per year.

Maintaining reductions that were a result of energy projects will be an important part of the strategy to achieve carbon neutrality. Just as important is the proper operation of a building. To properly operate the building, training of building staff will be a necessary step as energy efficiency projects are implemented. To enable this, the Green Building Standards call for an integrative design process. This brings all users, including operating engineers, to the design process. This helps identify potential problems as well as improvements in the design of new systems.

1. BUILDING AUTOMATION SYSTEM UPGRADES

While reducing energy is important to meeting Cook County's goals, maintaining those reductions is just as important. To help maintain the capital improvements, the buildings need to develop smart technologies. The first step is to upgrade all the BAS in the County. Energy savings can be up to 15% in this category according to studies from the U.S. DOE's Better Buildings Smart Energy Analytics Campaign.⁴ If a 15% emissions improvement from 2018 building emissions were saved, that would be about 30,560 metric tons of CO₂e emissions. The BAS updates began in 2019 and continue through 2024.

After these installations begin, the introduction of Fault Detection and Diagnostics (FDD) will be integrated in as part of the second stage of the building automation system improvements. These systems will not only assist the building engineers in maintaining energy, but using AI, they will enable us to react faster to changes in operation, weather, occupancy and equipment failure. This rollout will begin in 2020 and continue until 2030.

The final stage would be to install Energy Management Information System software (EMIS) to visualize all energy information in one location including billing data, any sub metered sites, BAS information and schedules, and FDD signals. EMIS systems can communicate energy trend data to a wide variety of audiences to ensure the most savings are being realized to connect the great work building engineers conduct daily with the latest data and technology monitoring.

Reference Action 2, "BAS, FDD Upgrades" under "Action Steps"

2. ROLE OF ENERGY DATA IN BUILDING OPERATIONS

Maintaining energy use levels in our buildings will require a change in how energy data is used. The County will need to move from reactive to proactive when it comes to energy usage. Energy data will need to be analyzed on a regular basis in order to identify anomalies as soon as they appear in order to address them and reduce the energy waste. This will require new tools and software to monitor energy usage. Energy analytics software, upgrades to BAS and FDD software will all enable engineers and staff to better understand energy usage within our facilities. As technology advances, engineers may monitor buildings from a centralized location and work with local engineers to mitigate problems.

Another method of using energy data is through the participation in demand response programs. Demand response programs provide financial incentives to reduce energy during high usage times and improve overall system reliability. These events can include extremely hot or cold days, test events, power plant failures and natural disasters. Often reduction measures include quick changes such as turning off lights or reducing the number of elevators in use. Because the County participates in a demand response program, it raises awareness among engineers and staff about the importance of reducing energy usage that can carry over to other times of operation.

⁴ U.S. Department of Energy, Better Buildings, Smart Energy Analytics Campaign. <https://smart-energy-analytics.org/technical-faq>

PJM Interconnection is the operator of the grid that Cook County receives its power allocation from, and the capacity market looks at how much energy is available for use each day. By enrolling in demand response programs, grid operators (like PJM) can avoid turning on additional power plants during high usage times. There is an environmental benefit to avoid turning on these power plants as they produce additional fossil fuel emissions. Cook County receives financial incentives to participate in these programs which can be re-invested into other energy saving opportunities through the Green Buildings Fund.

3. BENCHMARKING

Maintaining and reducing energy requires thorough knowledge of current and historical energy usage. This can act as a status check on reduction trends as well as providing strategic guidance for the next efficiency investment. Energy use is tracked against a national standard metric, the ENERGY STAR Score, for all qualifying buildings. This score compares energy use and performance across similar building types from a large database of national buildings. Buildings are also benchmarked over time to track year to year improvements in energy, water, and greenhouse gas emissions. [Cook County's Energy and Water Benchmarking Report](#) which tracks annual energy, water and greenhouse gas emissions, will continue to act as the status check for progress towards our goals.



RENEW

Cook County's goal is to cover 100 % of its electricity needs using renewable energy by 2030. Cook County defines renewable energy as low- or no-carbon sources including wind, solar and geothermal, but not nuclear, waste-to-energy or hydropower because they have other associated environmental issues. Based on practical considerations, current technologies and the County footprint, solar energy will be the primary source of renewable electricity at County facilities. The dense urban setting of most County facilities limits on-site solar installation so the County will look to other renewable energy options, such as power purchase agreements and RECs.



The County has developed simple priorities that will guide for the renewable energy portion of this Plan.

1. **County-owned solar:** renewable photovoltaic energy systems on or near County facilities will be installed where feasible.
2. **Power Purchase Agreements (PPAs):** commonly used financial arrangement to purchase renewable power from specific renewable energy projects owned by third parties. The County will explore both direct PPAs, and PPAs that are "sleeved" through our energy procurer to spread out risk and allow shorter contracts.
3. **Renewable Energy Certificates (RECs):** certificates representing the renewable aspects of energy installations elsewhere will be purchased as needed to meet the County's 100% renewable electricity goal.
4. **Storage:** saving excess energy for use later through means such as batteries, as over time storage technologies are expected to become more efficient and less expensive. The County will explore storage to adjust to a growing renewable energy portfolio and having energy available when it is needed for use.
5. **Community Solar:** a solar project shared by residents, businesses, non-profits and public facilities from the community who receive credit on their electricity bills for their portion of power produced by the project. This type of arrangement will be analyzed to determine if it might be feasible to meet the County's Clean Energy Plan goals.

Market Background on Renewable Energy:

Illinois has a deregulated energy market: public utilities like ComEd are allowed to own and charge for a rate of return for the distribution and transmission facilities that deliver power, but are not allowed to own and charge for power generation sources, such as power plants or solar projects. This differs from regulated (or vertically integrated) markets in which public utilities may own and charge for both distribution/transmission services and for a return on the actual electrical generating facilities.

The state regulatory context can constrain or expand the set of options available. For instance, 'green tariffs' are applicable in regulated markets but not in Illinois, which is deregulated, and PPAs are possible within the ComEd territory of Illinois, generally.

The State of Illinois has a Renewable Portfolio Standard (RPS); the RPS target is 17.5% renewable energy by 2020-21, towards a 25% goal by 2025. However, the state agency responsible for meeting the RPS estimates that Illinois will not come close to the 2020-21 target. While there will likely be an increase over time in the percent of renewable energy on the grid in Illinois, we made a conservative assumption for the purposes of this document that there will be no change.

1. ON-SITE RENEWABLE ENERGY/COUNTY-OWNED SOLAR:

Cook County will prioritize solar installations on its own properties where feasible. The County has already done an extensive analysis for County-owned solar systems. This analysis looked at all County-owned and operated properties and distilled down which sites were feasible for a solar installation. A successful solar installation requires direct access to sunlight (minimal shading from trees or buildings), a flat roof or parking lot with minimal obstructions, a roof that can support the weight of the installed equipment and roof that is under 10 years old to avoid moving panels for roof replacement. Sites selected were expected to remain in operation for the future. Properties with existing design plans and those with an uncertain future were not included in this list of potential solar sites.

Based on this analysis, the immediate opportunity for solar energy is on County-owned rooftops and parking lots. Cook County currently has 312 kW of solar installed, which supports less than 1% of electricity required for the full portfolio footprint. The amount of electricity that a solar array can produce reduces inventory GHG emissions, because this new zero emission generation from a solar array decreases the amount of electricity needed from the grid's fossil fuel energy resources to meet building energy needs. The chart below shows the top 25 sites for feasible rooftop solar system installation. Based on initial estimates (Table 1), there could be an estimated 8% reduction in electricity use from the current annual electric load as of 2018 if all identified sites had solar installed, which is roughly 14 MW of solar capacity. However, given the economics of installing a solar system, the County will want to target properties that have roofs that are newer. Unfortunately, roof replacements are just beginning on County properties. Therefore, the County's strategy for solar installations is based on the roof replacement schedule. The next anticipated properties to get new roofs and will be available for a solar installation are Skokie and Markham Courthouses and the Cicero Records Center.

ROOFTOP SOLAR POTENTIAL ON COOK COUNTY-OWNED/OPERATED FACILITIES

25 facilities were identified for having rooftop solar potential



TABLE 1. LIST OF FEASIBLE SOLAR SITES

Building	Estimated Solar Output
County Building	110 kW
Department of Transportation and Highways Maintenance Facility District 1 - Site	446 kW
Department of Transportation and Highways Maintenance Facility District 2 - Building A	149 kW
Department of Transportation and Highways Maintenance Facility District 2 - Building B	138 kW
Department of Transportation and Highways Maintenance Facility District 2 - Building C	125 kW
Department of Transportation and Highways Maintenance Facility District 3 - Site	379 kW
Department of Transportation and Highways Maintenance Facility Dist. 4 - Site	213 kW
Department of Transportation and Highways Maintenance Fac. District 5 - Site	327 kW
Rockwell Warehouse	894 kW
Hawthorne Warehouse	1,793 kW
Hawthorne Warehouse Parking Lot	1,450 kW
Robert J. Stein Institute of Forensic Medicine	123 kW
Robbins Health Center	98 kW
Dr. Jorge Prieto Health Center	47 kW
Cottage Grove Medical Center	87 kW
Des Plaines TB Clinic	20 kW
Edward Piszczek TB Clinic	66 kW
Englewood Health Center	65 kW
Suburban Tuberculosis Sanitorium	428 kW
Markham Courthouse (6th District)	806 kW
Maywood Courthouse (4th District)	566 kW
Rolling Meadows Courthouse (3rd District)	814 kW
Skokie Courthouse and Parking Lot (2nd District)	1,319 kW
Cicero Records Center	2,556 kW
Bridgeview Courthouse (5th District)	890 kW
Bridgeview Courthouse (5th District) Parking Lot **Already Installed	202 kW
Domestic Violence Courthouse ** Already installed	110 kW
Total	14,221 kW = 14.2 MW

Table 1. Shows the estimated solar output for the identified rooftops and parking lots. These 25 rooftops and two surface parking lots were identified as feasible solar sites.

*Note: Sites with an uncertain future such as the Oak Forest Hospital campus were not included in this list.

Reference Action 6, “Portfolio Rooftop Solar Potential” under “Action Steps”

Examples of existing sites with new or upcoming roof replacements:

Skokie Courthouse Solar

With the Skokie Courthouse Roof Replacement completed in late 2019, the RFP for a turnkey solar solution will be issued in 2020. The potential emissions reduction from this project is 990 metric tons CO_{2e}.



Reference Action 1, "Skokie Solar" under "Action Steps"

Cicero Records Warehouse Solar

Cicero Records is a warehouse in Cicero, Illinois that has half of its roof space currently available for solar. The roof should be able to accommodate about 1.3 MW of solar, which could save about 972 metric tons of CO_{2e} emissions. Half of the roof area is being selected first because this facility can produce much more energy than it needs to operate and will then be able to accommodate future roof replacement needs.

Reference Action 1, "Cicero Records Solar" under "Action Steps"

Rolling Meadows, Bridgeview, Markham Courthouses ("the Triplets") Solar

Known as the Triplets because these three courthouses were built at the same time off the same basic design, Markham Courthouse is up for roof replacement in the next three years with Rolling Meadows and Bridgeview soon to follow. Since the County's strategy is to follow up roof replacement with solar installation, these courthouses will be candidates for rooftop solar installations within 5-10 years. These installations could save an estimated 1,991 metric tons CO_{2e} assuming a 4% improvement in panel efficiency within the next five years.



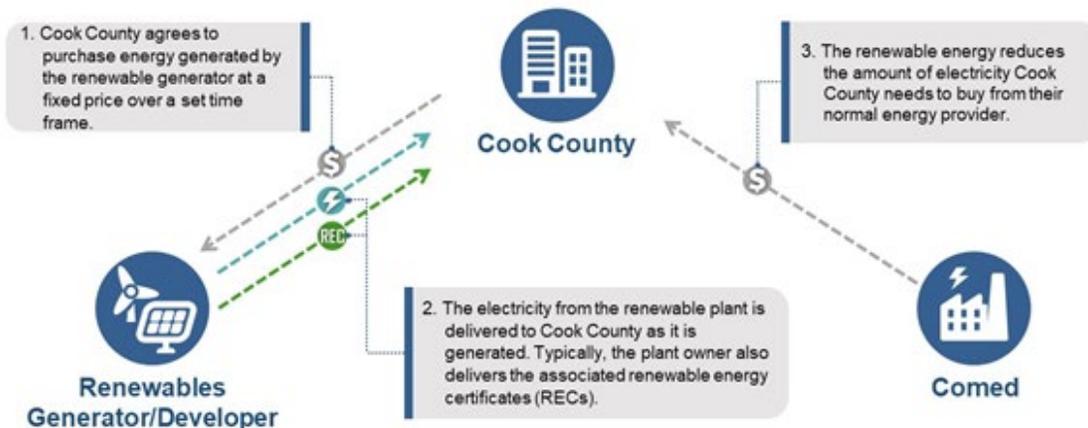
Markham Courthouse rooftop installation will be a pilot for the other two courthouses. The goal will be to enlist Cook County employees trained in solar installation and to create a method to adapt resources and planning to the Rolling Meadows and Bridgeview Courthouse layouts.

Reference Action 3, "Triplets Solar" under "Action Steps"

2. POWER PURCHASE AGREEMENT

A power purchase agreement (PPA) is a financial agreement to purchase electricity generated by a specific renewable energy project. A third party developer will own and operate the system and is responsible for installation, purchase of equipment, maintenance and financial transactions while the organization pays a specific electricity rate based on the amount of energy generated by the project (which is often a lower price than the market rate). It is also possible to 'sleeve' a PPA through a third party such as a utility or energy procurement company which enters into contracts with one or more PPAs but sells power associated with those projects to one or more customers.

In a physical power purchase agreement, a buyer purchases electricity from a large-scale, off-site renewable generator



As a tool to meet the 100% renewable electricity goal, offsite PPAs are an opportunity for Cook County to support renewable power generation at scale while entering a stable price hedge to pay for electricity. Advantages of an offsite PPA include being able to utilize larger plots of land for increased power generation, supporting local jobs and renewable energy generation, having the third party developer perform maintenance and upkeep on the solar array with their expertise and allowing a public sector entity the ability to lower costs for renewable energy since a third party can utilize tax credit savings while a public sector alone cannot.

The County aims to consider PPAs that allow the County to retain RECs in the agreement terms, to support our 100% renewable electricity goal as well as our carbon neutral goal. The County will continue to evaluate PPAs as a renewable energy strategy as part of the overall Clean Energy Plan.

3. RENEWABLE ENERGY CERTIFICATE (REC):

Ideally, the County would like to generate all the needed electricity to be carbon neutral on County-owned property. However, due to the developed environment of Cook County, physical space for these solar arrays is not feasible. Therefore, the County will need to supplement production with the purchase of renewable energy certificates. In 2019, Cook County covered 20% of its electricity usage through the purchase of RECs from Texas wind projects.

The County will, as funding permits, prioritize RECs from projects that are additional (would not exist except for our efforts), local (providing benefits such as jobs and cleaner air to County residents) and that help increase the resiliency of County communities.

Renewable Energy Certificate (REC): A market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource.

The County will prioritize on-site installations and power purchase agreements first and fill in with RECs where needed to meet the 100% electricity pledge by 2030. Between 2030 and 2050, as the County installs more solar on its own facilities and explores PPAs at scale, storage, and microgrid solutions to maximize renewable electricity output, and as efficiency projects reduce the amount of power needed by County facilities, the number of RECs purchased is anticipated to decrease.

4. STORAGE AND/OR MICROGRID

Storage can make renewable energy more economical by saving excess energy to use when it is needed, and provide resilience for critical facilities during power outages. Storage can reduce utility costs through the ability to island (function completely off the grid during outages or during expensive energy usage times), participation in demand response programs that provide compensation for reducing load during peak usage days, and balancing power spikes that may occur throughout the day. These storage benefits can make a renewable energy installation more cost effective and ensure Cook County facilities continue to operate reliably. Some examples of storage include batteries, fuel cell technologies and vehicle-to-grid solutions from electric vehicles.

The first step for storage in the Clean Energy Plan will be to explore the feasibility of solar plus storage for Cook County facilities at sites deemed viable for renewable energy installations. Facilities such as local Cook County health centers and clinics, which are located across suburban Cook County and are often in disadvantaged communities, would be an example of critical care facilities that might be candidates for exploring the benefits that solar plus storage can provide for resiliency and increased renewable energy output.

If available, additional land for ground mount solar arrays, wind turbines and combined heat and power solutions could be utilized along with storage as a microgrid or district energy system for improving energy reliability and resilience in the community near a County facility. Microgrids provide energy security during outages and disasters as the systems can work off the grid to provide energy during critical times.

Reference Action 5, "Storage" under "Action Steps"

Reference Action 7, "Microgrid" under "Action Steps"

5. COMMUNITY SOLAR

The County strives to provide enough renewable electricity to power its own facilities while positively impacting the communities in which it operates. One program under review is community solar, a solar project shared by residents, businesses, non-profits, and public facilities from the community who receive credit on their electricity bills for their portion of power produced by the project. There are two pathways for participation in a community solar program: The first allows an organization to host a solar project to be used by community members and enroll community subscribers for the remainder of the energy. The second is to act as a subscriber and use a portion of the renewable electricity generated by a local project offsite. Although by law only 40% of the solar output can be used by any single entity (whether host or subscriber), benefits exist as opportunities for the surrounding community's nonprofits, businesses, public facilities and homeowners to purchase electricity from a renewable source at a lower rate. Community solar is an essential element to advancing racial equity. Often access to renewable energy is limited to those who own property or who have access to capital and financing. Nationally, black and Hispanic households are twice as likely to rent as white households. Community solar is a clean energy option and also gives under-resourced communities and communities of color control over their own energy. Although this type of renewable electricity meets fewer of the criteria developed for Clean Energy Plan projects, it remains an option to empower the community and advance racial equity within Cook County where feasible.

Summary of Renewable Energy Generation and Procurement Options

Some parts of the Plan make use of 100% renewable electricity but do not count towards the carbon neutral emissions goal because they involve purchasing renewable energy or RECs offsite of County facilities. Other actions may help the County get to carbon neutral emissions but are not making use of 100% renewable electricity, for instance energy efficiency, demand reduction and demand management. These actions reduce the total amount of energy that is needed at County facilities. There may be other actions, such as subscribing to the output of a community solar project that does not count towards either goal for Cook County facilities because the subscribers do not get the RECs but may still be desirable policy goals for other reasons having to do with energy equity for County residents.

The table below is a summary of the renewable energy options being considered and how those align with the Plan's priorities.

Option	Urgent: Provides GHG reduction sooner	Additional	Local	Reliable/ Resilient	Time to Implement	Counts towards 100% RE goal?	Counts towards Carbon Neutral goal and 100% RE goal?
On-site solar	Yes	Yes	Yes	Yes	Varies by site	Yes	Yes, if RECs are retained
Offsite Power Purchase Agreement, Virtual PPA or Sleeved PPA	No	Yes, if new	In limited situations	No	Medium-term	Yes	Yes, if RECs are retained by the County and generation is produced within the ComEd/PJM territory; No if energy produced in another area
Renewable Energy Certificates (RECs)	No	No	No	No	Short to medium-term	Yes	Yes, if the generation supported is produced within the ComEd/PJM territory; No if energy produced in another geographic area
Storage	Yes, if on site and combined with RE	N/A	Potentially, if on site	Potentially, if on site	Medium (off-site) to long-term (on site)	Yes, if combined with RE	Yes
Community Solar	No	Yes	Potentially	No	Short to medium-term	No	No

This categorization is per the World Resources Institute's Greenhouse Gas Protocol.



SUPPORT

Policies are the drivers to implement building energy savings and codes, installed renewable energy and procurement opportunities to achieve carbon neutrality by 2050. They are needed to support proposed actions.

1. GREEN BUILDING STANDARDS FOR CAPITAL PROJECTS

Standards have been developed for incorporating green, energy efficient measures in all capital projects. These standards address lighting, heating, cooling, building automation and indoor air quality. They are designed to make all remodels and minor renovations not covered by the LEED or performance-based design building ordinance to be as efficient as possible as well as create consistency across County facilities to reduce maintenance costs. The full outline of Cook County's Green Buildings Standards will be published in 2020 on the Department of Capital Planning and Policy website. In addition, it will become the standard for all new leases and development agreements. Full implementation of this standard will begin in 2020.

2. PERFORMANCE-BASED DESIGN FOR NEW CONSTRUCTION

In 2002, Cook County was the first County to adopt an ordinance requiring new projects and major renovations able to be LEED certified. This ordinance helped build momentum for addressing sustainability in the built environment. However, with the adoption of the carbon neutral goal, the County needs to better prioritize energy savings as a goal for projects. To do this, the County will update the LEED ordinance to focus more on performance-based design. This process will set an energy use intensity (EUI) target at the beginning of the project that must be met. This is an energy usage per square foot measurement. By prioritizing energy conservation during design, we can keep any added facilities from having a large, negative impact to our GHG inventory.

3. ELECTRICITY BILLED BY DEPARTMENT THROUGH SUBMETERING FOR ACCOUNTABILITY

As energy use data becomes more readily available, the County will be able to see energy usage in individual departments and could institute an energy budget for departments. By instating a policy to hold individual departments accountable for their own utility usage, energy and water usage should decrease with heightened awareness. For example, the General Services Administration charges both rent and utilities to the different agencies that use space in GSA facilities. This policy could also allow for departments to use the monetary savings from reduced utility bills for other department operational needs.

4. LAND ACQUISITION POLICY TO ENCOURAGE SOLAR VIABILITY FOR NEW LEASED/PURCHASED REAL ESTATE

A potential policy to incorporate solar site assessments with new leases or land acquisitions can ensure 100% renewable electricity and carbon neutrality are met. These assessments, performed during the analysis of potential property acquisition, would include potential for ground/roof mount installations, potential generation vs. consumption analysis and shade impacts on solar installations. The solar potential would then be another factor that would be part of the overall evaluation of the feasibility study. For example, when comparing sites for acquisition, and the only difference between the sites is the amount of solar production, the County would be encouraged to pursue the property with the higher production potential.

5. GREENING THE PROCUREMENT PROCESS

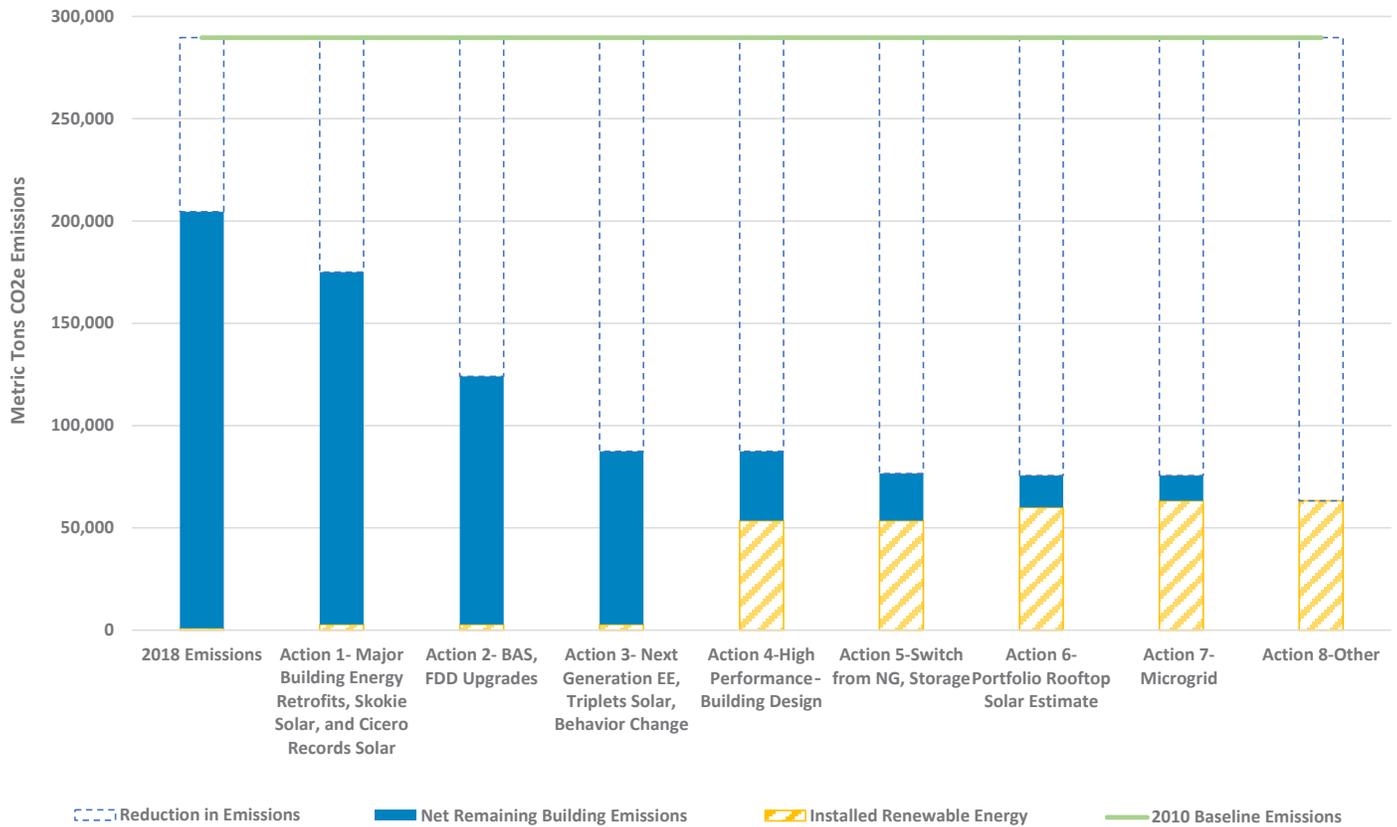
Since REC purchases, grants and other incentives are often time related and/or can change quickly, we will need to work with the procurement office to address the time sensitive nature of some of the steps outlined above. For example, renewable energy certificate prices can fluctuate, and we need to have a mechanism that will allow us to quickly respond to fluctuations to take advantage of savings.

ACTION STEPS

Building off the Clean Energy Plan tracks to Reduce, Maintain, Renew and Support, energy and emission reduction will happen through a series of specific action steps.

The graph below shows both reduction of greenhouse gas emissions and an increase of installed renewable energy as phases of actionable steps to meet Cook County's Clean Energy Plan goals. The dashed outline represents the reduction in emissions from the 2010 baseline by completing the action items. The blue bar represents the net remaining building emissions to reduce after the action is implemented. The yellow bar represents the estimated amount of installed renewable energy to be produced after the action is implemented.

PROGRESS TOWARD CARBON NEUTRALITY



Emissions savings from Clean Energy Plan actions will reduce energy use, and renewable energy investments (yellow) across Cook County buildings will ensure operations are resilient. As buildings will still require energy to operate, renewable resources will need to be used to power the portfolio by 2050. The goal of the Clean Energy Plan is for emissions reduction and renewable energy installations to meet a carbon neutral portfolio covered by all-renewable resources by 2050.

Baseline	Savings to date have come from ESCO projects and energy efficiency measures.
Action 1	Action 1 emissions savings come from understanding the energy profile of a building to complete retrofits of equipment, buildings and operations for an initial energy reduction. These major building energy retrofits are currently scheduled to occur or will be occurring in the next 5-10 years. Action 1 also includes a solar installation at the Skokie Courthouse and garage as the roof was recently replaced, making the facility viable for a solar install. Action 1 also includes installing solar on half of the Cicero Records Center roof. The solar installations are difficult to see on the graph as the impact of these installations is minimal (just under 2,000 metric tons).
Action 2	Action 2 emissions savings come from updating building automation systems and fault detection and diagnostics to maintain energy savings and diagnose malfunctioning equipment. As smart building technology improves, the County expects to implement these improvements to increase savings.
Action 3	Action 3 emissions savings come from improvement of energy equipment to adopt recent technological advances as old equipment passes its useful life. Action 3 also includes solar on Markham, Rolling Meadows and Bridgeview Courthouse rooftops (i.e. The Triplets). The solar installations are difficult to see on the graph as the impact of these installations is minimal (around 2,000 metric tons). Phase 3 also integrates behavior change for electric plug load reduction.
Action 4	Action 4 emissions savings will be a result of high-performance building standards that will be implemented on facilities that are going through major renovations and/or new construction. By applying these standards and re-imagining the role of renewable energy in design, these types of projects can significantly reduce carbon emissions.
Action 5	Action 5 involves retiring old natural gas-powered mechanical equipment with electric-powered equipment to move away from fossil fuel dependence. Action 5 also involves incorporating battery storage with solar installations to maximize the energy available for use.
Action 6	Action 6 installed renewable energy comes from the estimated portfolio wide solar potential available on existing rooftops and land. This phase would be rolled out over several years as the rooftops are replaced.
Action 7	Action 7 represents the potential for a microgrid. This would promote resiliency and provide power during outages to County-owned and operated buildings or even to the community.
Action 8	Action 8 addresses areas of potential reduction that may occur as a result of actions beyond our direct control. These include property disposition, a cleaner electrical grid, other renewable energy production and even the implementation of technologies not yet commercially available.

These actions do not represent a specific point in time, but consecutive actions do benefit from the order of measures taken on a building-by-building basis. For example, a building would receive an energy retrofit (Action 1) to reduce energy as much as possible first and ensure a roof is up to date, and then install a solar array that would be sized to accommodate as much of the remaining energy load in the building as possible (i.e. Action 3 Triplets Solar Installation). These suggested measures will be evaluated each year for economic, emissions reduction and implementation feasibility to select the top priority actions.

	Description	GHG Estimated Savings (metric tons CO ₂ e)
Savings from 2010-Present	ESCOs and 2010-2019 EE	85,030
Action 1	Major Building Energy Retrofits	40,750
	Skokie Solar and Cicero Records Solar	1,960
Action 2	BAS Upgrades	30,560
	FDD Upgrades	20,370
Action 3	Next Generation EE	30,560
	Triplets Solar	1,990
	Behavior Change	4,080
Action 4	High-Performance Building Design	50,720
Action 5	Switch from Natural Gas	750
	Storage	10,190
Action 6	Portfolio Rooftop Solar Estimate	6,510
Action 7	Microgrid	3,170
Action 8	Other	2,120

The table above shows estimated GHG savings by the outlined Clean Energy Plan actions. Estimates were based on previous studies, current trends and expected outcomes using current emissions rates and 2018 energy usage. These estimated values will be annually evaluated to best prioritize actions and predict how to meet the Plan goals.

The year-to-year Plan will need to be constantly reviewed and refreshed, as market costs change, and as new technologies come online and become cost-effective.

The actions to reduce and maintain energy consumption, while generating and procuring additional renewable energy will get the County within inches of the finish line for carbon neutrality. This section outlines additional factors that we expect will play a role in meeting our carbon neutral goal, but are variable, so their direct impact can't be calculated at this time. This section outlines additional factors that we expect will play a role in meeting our goals.

Property Disposition/Replacement

The current County footprint of nearly 19 million square feet is expected to change. In upcoming years, older buildings will be replaced with newer, more efficient buildings. This includes:

- The Logan Square Clinic is being replaced with a new clinic that is 45% more efficient in energy usage.
- Provident Hospital is being redesigned. Preliminary energy models lower the site EUI from 286 kBtu/SF to 92 kBtu/SF.
- The third largest source of emissions for the County, Oak Forest Hospital, is only 16% occupied and is currently going through a third-party analysis to determine the best use of the property. This may include demolition of large portions of the building stock and private redevelopment.

While most of these properties are being replaced with similar sized buildings, the increase in efficiency as well as the out-right disposition of square footage can be a source of emission savings. These new buildings are also being assessed for renewable energy potential and when possible, designed to be solar ready. The impact of future property dispositions is not known at this time and has not been included as an emissions reduction action in the Plan.

Increased Solar Production

As part of this Plan, solar energy production is limited to on-building production, except for the microgrid, which is anticipated to be a ground mount system. The County has not looked at other site options due to the anticipated costs of such systems. However, canopy mounted systems over parking lots, like the Bridgeview project or the Michigan State Solar Project, could be a source of renewable energy in the future.

Michigan State installed a 13.5MW parking canopy installation in 2017. It has a designed output of 15,269 MWh and uses an innovative canopy system that provides over 5,000 shaded parking spaces. It provides fixed pricing for 25 years and will save the university millions of dollars over the 25 years.



Other Renewable Energy Sources

Due to the urban setting, wind energy has never been a viable source of renewable energy on County properties. However, with changing technologies, small or medium size wind turbines might become a source the County would consider. In addition, a PPA for wind may be a viable option. The County will explore all opportunities that meet its priorities and goals.

Geothermal systems have not been considered in the expected savings from retrofit projects. However, the Skokie Courthouse has undergone a geothermal retrofit for heating and cooling that is showing real promise as a retrofit solution. The County will continue to study the Skokie Courthouse project and find applications that make sense for the County.

Cleaner Electrical Grid

In 2018, the County recognized some emissions savings from a cleaner electrical grid. It is the expectation and the State's policy that the grid will become cleaner over time, resulting in a power mix that has a lower emissions rate. The Future Energy Jobs Act approved by the Illinois legislature in November of 2016 has brought an influx of solar energy projects into Illinois, and future legislation could increase the deployment of renewables. This will aid in reducing our carbon emissions.

New Technology

Renewable energy and energy efficiency technologies are changing rapidly, and it is realistic to think that there will be new technologies that the County can employ that are only ideas right now. The urgency and need to fight climate change will continue to grow, and with that, will be new technologies to aid in mitigating the impact.

"...the energy ecosystem is changing. Renewable energy, energy storage and electric vehicle markets are undergoing rapid technological innovation and price declines. A balanced approach of investments in energy efficiency, transportation strategies and renewable energy installations, along with RECs and carbon offsets, is key to reaching the 100% renewable energy and zero net carbon goal quickly and cost effectively."

*100% Renewable Madison: Achieving 100% Renewable Energy & Zero Net Carbon for City Operations & Leading the Community
 November 2018*

The matrix below explains how the Clean Energy Plan actions and the four tracks (Reduce, Maintain, Renew, and Support) align.

Actions	Reduce	Maintain	Renew	Support
Action 1				
Major Building Retrofits	X	X		
Skokie and Cicero Solar			X	
Action 2				
BAS Upgrades	X	X		
FDD Upgrades	X	X		
Action 3				
Next Generation Energy Efficiency	X	X		
Rolling Meadows, Bridgeview, Markham Solar			X	
Behavior Change	X	X		X
Action 4				
High-Performance Building Design	X	X	X	
Action 5				
Switch from Natural Gas	X			
Storage	X		X	
Action 6				
Portfolio Rooftop Solar Estimate			X	
Action 7				
Microgrid	X	X	X	
Action 8: Other				
Green Buildings Standards for Capital Projects	X	X	X	X
Performance Based Design for New Construction	X	X		X
Electricity Billed by Department through Submetering for Accountability	X	X		X
Land Acquisition Policy to encourage solar viability for new leased/purchased real estate				X
Greening the Procurement Process				X
Cleaner Grid				X
Property Disposition/Replacement	X			
Offsite Solar Partnerships			X	

THE PLAN

Cook County can 'reduce' energy usage through major building retrofits, next generation energy efficiency technology improvements for future mechanical equipment replacements, behavior change to encourage employees to reduce plug load and be conscious of how they use energy at work, and switching from a natural gas fuel source to electricity to eliminate dependence on fossil fuels.

The County can 'maintain' reductions through improving BAS and FDD upgrades to ensure any equipment and energy failures are spotted quickly and energy is used as efficiently as possible.

Finally, renewable energy can 'renew' the remaining energy needed to power buildings with zero carbon resources through actions including solar installations (Skokie Courthouse solar, Triplet Courthouses solar, high-performance building design, portfolio rooftop solar estimate) and integration of technologies to use renewable energy at its maximum potential (storage and microgrid). These action steps to reduce, maintain and renew energy can save GHG emissions and increase renewable energy generation in Cook County owned and operated buildings.

Through energy reduction measures, increased monitoring of energy usage, solar installations and renewable energy procurement, and policies and procedures to support these actions, Cook County can meet its carbon neutral and 100% renewable electricity goals for County owned and operated buildings.

INVESTING IN THE FUTURE

Clean Energy Plan Represents an Investment

The Clean Energy Plan will require up-front resources to implement. However, through thoughtful planning, reinvestment of revenue generated from energy efficiency projects and sound business cases, the added costs will be returned through operational savings that optimize taxpayer dollars.

These investments will be supported by:

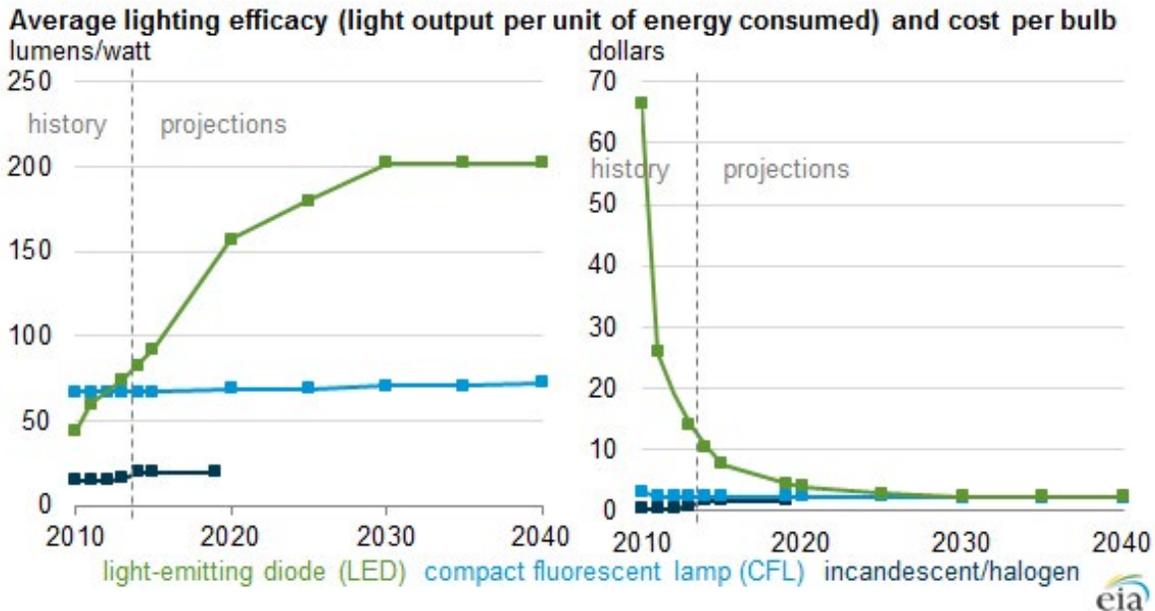
- Capital Improvement Plan – the way that construction projects (including energy efficiency projects) are currently budgeted and funded for County buildings to ensure they are maintained.
- Incentive dollars from utility energy efficiency programs and demand response savings
- Grants and partnerships where available

Energy efficiency projects can lower utility costs for the County. In addition, energy efficiency projects, along with demand response participation, bring in revenue through rebates and incentives. In 2019, rebates and demand response revenue were \$513,274. The energy efficiency projects that received rebates also reduced electricity costs. For example, a lighting retrofit project at the Department of Corrections received a rebate of \$42,187 and reduced electricity costs by \$35,172 per year. These two savings would have offset the additional cost of renewable energy certificates to cover 100% of the County's electricity use.

The Guaranteed Energy Performance Contracts entered into by the County beginning in 2012 cost approximately \$105 million. Of that investment, over 60% of the equipment replaced was at the end of its useful life and needed replacement. Instead of just replacing building equipment as it fails, the County took a holistic view of building systems and made replacement decisions based on systems working together to lower operating costs. Three years after the completion of construction, the County has net savings of over \$2.1 million.

Flexible Approach to Implementation Minimizes Costs

This Plan provides flexibility to keep costs within available resources and changing market conditions. Most of the work that will be done as it relates to energy efficiency will occur when a system is at or near the end of its useful life. In 2013, the County commissioned a study that provided a facilities condition index for each facility to help determine what systems needed replacement. For example, the windows at the Skokie Courthouse will be replaced in 2020 because they are over 30 years old, which is beyond their useful life. Because technology has improved so dramatically, the new windows will have much better performance that will reduce heating and cooling costs. Additionally, savings will come from changes in cost and increases in equipment efficiency. Lighting, HVAC and building controls continue to improve efficiency and decrease costs. The chart below highlights this trend for LED lighting.



Cost Control Measures

The County analyzes paybacks on energy efficiency projects. If the payback period of the measure exceeds the useful life of the project, it is rejected. In addition, energy efficiency standards have been established through the Green Building Standards. These standards mimic efficiency requirements established by the utility companies in their energy efficiency programs. Finally, when standards do not comply with the Green Building Standards or the Utility Energy Efficiency Programs, the systems to be installed are required to undergo a life cycle cost impact to determine the best solution.

The capital energy efficiency projects will be part of the Capital Improvement Plan (CIP). THE CIP is the primary vehicle for capital improvements to County facilities and is reviewed and approved by the Cook County Board of Commissioners each year. This is an additional review to verify that a project makes sense for the County.

To further decrease the cost of renewable energy installations, the County has engaged the local electrical union to provide training to County electricians on the installation, operation and maintenance of solar systems. Since these electricians are already County staff, the installation cost of solar systems can be reduced and the payback shortened. The County recently completed a major lighting retrofit project at the Department of Corrections campus that had a payback of only nine months using County electricians.

The Clean Energy Plan is an investment for Cook County. Through thoughtful planning, reinvestment of revenue generated from energy efficiency projects and sound business cases, the added costs will be returned through operational savings that optimize taxpayer dollars.

Cost Considerations

Energy Efficiency Upgrades

Many of the costs associated with the Plan are related to repairs and renewals of items throughout the County portfolio. Much of the building infrastructure is budgeted to be replaced in upcoming years and many of these items can be replaced using energy saving technology. The County is in the process of determining which items currently in the Capital Plan can be replaced with more energy efficient equipment. Due to the continuously changing costs for new technologies, it is difficult to accurately estimate the future cost for each of these items. Given the County will need to replace these items anyway, the overall costs for Reduce and Maintain are estimated to be a premium over what has already been budgeted. Additionally, these premium investments will result in operational savings over the lifetime of the equipment providing a better return on the investment than if the County were to use standard equipment.

Renewable Energy

The Renew section of the Clean Energy Plan includes on-site solar, PPAs and RECs. On-site solar involves incorporating up to 14MW of solar installations on County properties that the County would finance and own. 14MW could cost as much \$32 million based on costs from a National Renewable Energy Lab study.⁵ However, since the installation of solar on County buildings will be following the roof replacement schedule, these costs would be spread out over the next 30 years. Because the timeline is so long, the possibility of cost savings due to technology improvements and market conditions could substantially impact this price, likely lowering it.

PPAs, which do not require any capital from the County, could supplement some of the on-site solar and the remaining offsite renewable energy needed to achieve carbon neutrality. Like the overall Clean Energy Plan, the mix of owned solar and renewable energy through PPAs will be adjusted on a regular basis based on market conditions and optimizing taxpayer dollars.

RECs are also very dependent on market conditions, such as installation location and type of renewable energy. The number of RECs needed depends on the amount of owned solar and PPAs the County utilizes. These investments will also be made based on market conditions and optimizing taxpayer dollars.

The implementation of Reduce, Maintain and Renew sections of this Plan have the potential to produce substantial operational savings and reduce the County's carbon footprint. In 2019, electricity and natural gas costs were approximately \$25 million dollars. Depending on the mix of energy reduction, owned solar and PPAs, there is an opportunity to save up to \$25 million in operating costs for the County.



⁵ This cost is based on an estimate using the price of \$2.10 per DC watt installed, inclusive all costs, from the NREL study "U.S. Solar Photovoltaic System Cost Benchmark: Q1 2018."

NEXT STEPS

Cook County has already begun the process of implementing the Clean Energy Plan. The next section highlights steps in process, about to begin and necessary for the implementation of the Plan. The County will review these steps, along with the Plan, on a regular basis and adjust as necessary.

Currently Happening

- RFP for strategic energy procurement including bidding at the lowest prices while incorporating renewable energy procurement in these decisions.
- Finalize RFP for a turnkey solar solution for Skokie and Markham Courthouses and Cicero Records Center.
- Adopt and publish Green Buildings Standards for performance-based design, solar ready buildings and sustainability measures.
- Continuing education for Cook County Department of Facilities Management Employees on solar installation and upkeep.

Immediate (< 1 year)

- Issue an RFP for in-depth building audits and energy modeling for each facility in the proposal. The goal of this solicitation would be to determine the energy usage breakdown in each facility and create a list of energy efficiency upgrades that need to occur.
- Verify all meter readings are accurate and up-to-date with the utility companies.
- Building Automation System upgrades and fault detection and diagnostics integration.
- Finalize roof age list and work with the Department of Capital Planning and Policy to develop a roof replacement schedule.
- Incorporate Green Building Standards into all new leases, development projects, and Capital Improvement Plan projects.
- Explore the potential for off-site renewable energy owned by the County, power purchase agreements from off-site renewables.
- Issue a RFP for an energy intelligence software.

Short Term (1-5 years)

- Develop a building-by-building energy efficiency upgrade list. Include estimated costs and upgrade schedules.
- Update the current LEED ordinance for new construction and major renovations of Cook County owned and leased properties.
- Work with the ComEd energy efficiency program to select and implement a monitoring-based retro-commissioning project on a selected building.
- Roof replacements at Markham, Rolling Meadows and Bridgeview Courthouses (the Triplets).
- Begin solar installations at Markham, Rolling Meadows and Bridgeview Courthouses.
- Begin solar installation at Cicero Warehouse.
- Develop a policy and strategy for submetering by department.
- Provide annual progress on the Plan.
- Develop a strategy to reduce transportation emissions from Cook County operations and to transition away from fossil fueled vehicles.
- Assess opportunities for community solar either on site with the County as an anchor subscriber or through subscription only, especially if the County's action would help increase low-cost energy available to Cook County residents.
- Analyze and integrate battery storage to support renewable energy developments.

Intermediate (5-10 years)

- Implement submetering by department.
- Complete phased roof replacement and solar installation for County facilities.
- Procure RECs to cover the remainder of the County's electricity use.

Long Term (10+ years)

- Conduct a thermal decarbonization analysis to adjust how heating and cooling energy is used to effectively move away from fossil fuels by fuel switching from remaining natural gas (fossil fuel) equipment to electric mechanical equipment. A thermal study determines the best way to move away from fossil fuels used for heating and cooling and creating hot water.
- Switch fuel use away from natural gas to electric equipment based on analysis of equipment as it becomes time for replacement/retrofit.
- Install portfolio solar rooftops where feasible and accessible as rooftops are replaced.
- Integrate a Microgrid on DOC Campus.

CONCLUSION

The actions in this Plan will help implement the Clean Energy Plan. Through reducing our energy use, taking actions to maintain those reductions over time, installing and procuring energy from renewable sources such as solar and implementing policies to support these actions, the County can become carbon neutral by 2050, while moving to 100% renewable electric energy by 2030. A flexible approach that will be re-examined regularly will allow the County to achieve our goals, while remaining fiscally responsible and continuing to provide high quality services to our residents. Because of the severe effects of climate change for Cook County as well as for the world, and the urgency of the climate crisis as set forth by the Intergovernmental Panel on Climate Change, Cook County Government must be a leader and show that carbon neutrality is indeed possible.

APPENDICES

CASE STUDIES: CITY AND COUNTY CARBON REDUCTION AND CLEAN ENERGY PLANS

Location Name	Los Angeles County, California
Plan Name	OurCounty
Report Year	2019
Link	https://ourcountyla.org/
Goals	<ul style="list-style-type: none"> • County-wide carbon neutrality by 2050 • County facility carbon neutrality by 2045 • 100% renewable energy for county facilities and unincorporated county by 2025 • Zero emissions county fleet by 2045
Summary	<p>OurCounty LA is a cross-cutting regional sustainability plan that prioritizes equity and inclusion across multiple goals. The plan sets forth targets for county operations, unincorporated county areas, and hopes to influence decision-making entities on the state and local level. The plan lays out 12 goals, which were developed through deep stakeholder engagement, and range from healthy and thriving eco-systems and communities to aspirations for a fossil-fuel county. The plan also calls for a greater role for LA County in fostering a green economy and an overall call for more government accountability. Under each goal is a series of action items, 159 in total, which set LA County on a path toward sustainability.</p> <p>Strategies to achieve the goals laid out in OurCounty, include the implementation of a green building standard that surpasses LEED Gold and aims to achieve Passive House or Zero Net Energy for all new county buildings. The plan also includes collaborating with county municipalities to sunset all oil and gas operations, developing energy and emissions performance standards, expanding and maximizing solar + storage or community solar on county property wherever possible. The county also hopes to scale up the amount of EV charging stations at county facilities so that they can reach their goal and work with car manufacturers to develop electric pursuit vehicles, transport vehicles and fire engines.</p>
Cost	
Status of Adoption	Adopted by the board of Supervisors in August 2019.
Note:	<p>To expand on OurPlan, LA County plans to release a separate, but aligned, Community Climate Action Plan (CCAP) solely for unincorporated areas which they govern. The new CCAP will update the former plan, which was adopted in 2015 and is set to expire in 2020.</p> <p>To reach the goals laid out in OurCounty and the CCAP, the county will rely on a reduction in emissions based on state-level actions to enhance the California Renewable Portfolio Standard and California's Cap and Trade program.</p>

APPENDICES

Location Name	San Diego County, California
Plan Name	County of San Diego Climate Action Plan (CAP)
Report Year	2018
Link	https://www.sandiegocounty.gov/content/sdc/sustainability/climateactionplan.html
Goals	<ul style="list-style-type: none"> • 40% GHG Reduction by 2030 for unincorporated county and county operations • 90% renewable energy for unincorporated county by 2030 • 20% of the County's operational electricity generated on site with renewables by 2030
Summary	<p>The CAP describes how greenhouse gas emissions within the unincorporated county and county facilities can be reduced consistent with State of California emission reductions targets. The plan identifies 11 measures and 26 strategies related to the built environment and transportation; energy; solid waste; agriculture and conservation; and water and wastewater, to help reach its goals. The CAP is a living document which is intended to be updated every 5 years to adapt to changes in technologies, legislative changes and new program implementation.</p> <p>To advance the goals, the county is looking at several GHG reduction strategies including a cleaner fuel source for their fleet, investing in EV charging stations and creating multi-modal transportation options. The county is investing in on site renewable generation, efficiency measures for county buildings and aspiring for LEED Gold and Zero Net Energy for all new county buildings. For the unincorporated area, the County is moving forward with a feasibility study to explore the possible development of a Community Choice Aggregation Program to provide clean, reliable energy at competitive rates as one possible path toward 90% renewable power by 2030.</p>
Cost	The total estimated cost to implement CAP measures over the first six years is \$236 million. Annual implementation costs for both existing and new and expanded Programs are relatively steady at about \$40 million annually.
Status of Adoption	Approved by the San Diego Board of Supervisors in February 2018
Note:	<p>The CAP identifies strategies and measures to reduce the County's contribution of GHG emissions consistent with California's 2020 and 2030 targets. For now, the progress towards a 2050 GHG reduction goal is aspirational and has not been codified.</p> <p>The County is on track to meet its 2020 target with the help of existing legislation, such as the Renewables Portfolio Standard. However, to meet the 2030 target and 2050 goal, the County will need to achieve a reduction of legislative-adjusted projections. To address this, San Diego is proposing creating a Direct Investment Fund that will encourage development of carbon offset projects to capture the co-benefits locally.</p>

APPENDICES

Location Name	King County Washington
Plan Name	Strategic Climate Action Plan
Report Year	2015
Link	https://your.kingcounty.gov/dnrp/climate/documents/2015_King_County_SCAP-Executive_Summary.pdf
Goals	<ul style="list-style-type: none"> • 80% reduction in county-wide sources of GHG emissions by 2050. • 80% reduction of total GHG emissions from government operations 2050 with additional carbon neutral goals for some government operations including their divisions of Natural Resources and Parks, Wastewater Treatment and Solid Waste.
Summary	<p>The 2015 SCAP King County's 2015 Strategic Climate Action Plan (SCAP) maps out priority actions to reduce greenhouse gas emissions by 80% by 2050 in county operations and across the county geography. The SCAP includes strategies to green county operations including using 100% GHG-free electricity by 2025 and reducing energy use overall. External goals include planting one million trees county-wide, working with utilities to phase out coal and developing more renewable energy, doubling transit ridership by 2040 and increasing recycling rates 70% by 2020. The plan also includes the development of an internal 'cost of carbon' to be used in government processes and decision-making such as analyzing capital projects, major fuel and vehicle purchases, resource efficiency investments, and other County operations decisions.</p>
Cost	
Status of Adoption	GHG emissions reduction targets were adopted as countywide planning polices by the King County Growth Management Planning Council in 2014
Note:	<p>A 2020 Update of the SCAP is in progress and will be centered around Climate Change and Equity and Justice.</p> <p>In 2018, King County entered into a ten-year service agreement with Puget Sound Energy (PSE) to purchase wind-generated electricity from a wind facility in development in Western Washington. This voluntary renewable energy offering is called "Green Direct." The service agreement commits King County to purchase Green Direct electricity beginning in 2019 for 98% of the County's electricity needs in PSE's service territory.</p>

APPENDICES

Location Name	Denver, Colorado
Plan Name/ Year	Denver 80x50 Climate Action Plan
Link	https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/80x50/80x50%20ClimatePlan_FINAL_7.16.18.pdf
Goals	<ul style="list-style-type: none"> • 100% renewable electricity by 2025 for municipal facilities • 100% renewable electricity community-wide by 2030 • 80% reduction in GHG by 2050 • 100% of light duty vehicles, 100% of taxi and transportation network vehicles are electric by 2050 • 100% of public transit is carbon free by 2050
Summary	The Denver 80x50 Climate Action Plan identifies the top three sectors that will have the largest impact in reducing GHG emissions for the city. These sectors include buildings, electricity generation and transportation. Building-level reduction strategies include adopting the 2018 International Conservation Code, increasing building codes to net-zero for new construction and to be more stringent with existing buildings by 2035. The plan also underscores the importance of investing in energy efficiency for the residential and commercial sectors. The plan calls for a deeper partnership with Xcel energy to expand on renewable energy sources and to advocate for the enhancement overall of Colorado's Renewable Portfolio Standard, for an expansion of EV charging stations, and state-level Clean Car Standards.
Cost	
Status of Adoption	In April of 2017, the Denver City Council passed a proclamation "Reaffirming Denver's Commitment to Planet-Friendly Policies", which called for joining other cities in pledging to meet 100% of the city's electricity needs through renewable sources by 2030
Note:	The City of Denver, together with their local utility Xcel, entered a MOU to align around a set of values, shared principles and a commitment to working together to advance projects and policies that reduce carbon emissions. The Energy Future Partnership supports the city's carbon neutral goals by committing to strategies like the advancement of smart technology and an increased investment in local renewable energy projects, among others.

Location Name	Philadelphia, Pennsylvania
Plan Name	Powering Our Future: A Clean Energy Vision for Philadelphia
Report Year	2018
Link	https://www.phila.gov/media/20180821150658/Powering-Our-Future-Full-Report.pdf
Goals	<ul style="list-style-type: none"> • 20% reduction in electricity use, 50% reduction in carbon emissions and the sourcing 100% of clean electricity for municipal operations by 2030 • 80% reductions in carbon emissions city-wide by 2050
Summary	<p>Powering Our Future covers three major parts of Philadelphia's energy system: the built environment, local industry, and the regional electricity system which account for nearly 80% of carbon emissions. To reach their carbon reduction and clean energy goals the city's plan calls for action in five categories: a.) clean electricity supply, b.) City-wide solar, c.) energy efficiency for homes and building, d.) low-carbon thermal energy and e.) fostering a low-carbon economy. The plan calls for some state-level and city-level advocacy targets to make a clean energy transition including strengthening Pennsylvania's Alternative Energy Portfolio Standard and changing local law to better enable community choice aggregation. Other strategies include a large-scale power purchasing agreement to procure clean energy, updating residential and commercial building codes, investing in energy efficiency and exploring opportunities to promote geothermal and other emerging technologies to property owners.</p>
Cost	
Status of Adoption	
Note:	<p>Powering our Future builds off the City's 2017 Municipal Energy Master Plan that outlines how the City will better manage their own assets, including buildings and street lighting, while reducing energy use and greenhouse gas emissions. It also aligns with the Philadelphia Energy Authority's Philadelphia Energy Campaign which seeks to invest \$1 billion into energy efficiency and clean energy projects over ten years for both municipal and city-wide projects.</p> <p>In 2018, the city passed a bill to enter into a Power Purchase Agreement with a renewable energy developer to buy solar power. The agreement will result in the construction of a 70-Megawatt solar facility in rural Pennsylvania. Through the contract, the city will purchase all electricity produced at the site – about 22% of the city government's load – for 20 years at a fixed rate.</p>

APPENDICES

Location Name	Atlanta, Georgia
Plan Name	Clean Energy Atlanta
Report Year	2018
Link	100atl.com
Goals	<ul style="list-style-type: none"> • 100% clean energy for municipal operations by 2035 • 100% clean energy city-wide by 2035
Summary	<p>Clean energy Atlanta outlines both short and long-term goals that the City of Atlanta can take toward achieving 100% clean energy while advancing three priorities: equity, economic development and cost-effectiveness. The plan outlines and analyzes three scenarios to guide the city toward 100% by 2035: 1.) Business and usual, REC Procurement only, 2.) Achieving 50% of Atlanta's Clean Energy Potential, 3.) Maximizing Atlanta's Clean Energy Potential and found that scenario 2, Achieving 50%, was the most cost effective in return benefits for every dollar spent. On the municipal level, the plan calls for prioritizing energy efficiency in municipal buildings and at the airport, on-site solar generation and battery storage. The plan also identifies the electrification of the fleet, retrofitting the remaining streetlights and purchasing RECs as the best opportunities. To transform policy, the plan identifies the need to engage with Georgia Power and the Public Service Commission to overcome regulatory barriers and to establish a pathway to clean energy. On the citywide level, the plan identifies strategies such as developing policy recommendations to incentivize clean energy and energy efficiency, electric vehicle integration, large-scale renewable energy deployment including anaerobic digestion and community solar and incentivizing water efficiency measures.</p>
Cost	
Status of Adoption	The city council passed a resolution adopting the 100% clean energy plan for Atlanta in March of 2019
Note:	There are a couple of state-level barriers that have been identified in the report including the state of Georgia's lack of a Renewable Portfolio Standard, and the absence of any state-level energy efficiency or renewable energy incentives. These imitations will provide a challenge to Atlanta's clean energy goals.

APPENDICES

Location Name	Madison, Wisconsin
Plan Name	100% Renewable Madison
Report Year	2018
Link	https://www.madison100renewableenergy.com/
Goals	<ul style="list-style-type: none"> • 100 % renewable and zero net carbon for municipal operations between 2020-2030 • Broader goal of leading the City of Madison overall to 100% renewable and zero net carbon
Summary	<p>The 100% Renewable Madison Plan focuses on Madison's sustainability successes, three time-based scenarios that the city can take to achieve their renewable and net zero goals, and suggestions on how to accelerate progress toward reaching 100% renewable energy, zero net carbon goals for local government operations and for the larger Madison area community. The plan presents three timelines for achieving their goals. The first timeline with a goal of 2020, would rely heavily on the purchasing of RECS and carbon off-sets. The second target of 2023 would require more local investment totaling \$57 million combined with REC and carbon off-set purchasing. The final timeline, set for 2030, shows a substantially greater investment of \$95 million coupled with REC and carbon off-sets to reach the goals.</p> <p>The plan also spotlights projects that are already in the works including a plan by city officials to work with Madison Gas & Electric (MGE) on a large off-site solar array through MGE's Renewable Energy Rider program to provide renewable energy resources to business customers. The City of Madison is also investing in five solar arrays totaling 14 MW under development in western Wisconsin. This investment is procuring 25 years of renewable energy certificates (RECs) from these installations, which is equivalent to approximately 37% of the current electricity consumption from local government operations.</p>
Cost	\$7-95 million depending on the scenario
Status of Adoption	In March 2017 Madison formally set a goal of achieving 100% renewable energy and zero net carbon emissions. Unclear whether this plan will be formally adopted.
Note:	<p>The city has some regulatory constraints that make the pathway to 100% difficult. For example, the City of Madison must purchase its power from its current electricity providers; it cannot choose to purchase power from other providers.</p> <p>The state's net metering laws have limits including a cap on the amount credited to any one system (max 100kW). Many of the City's large electrical loads would require solar systems greater than 100 kW to meet their annual electrical loads. Without net metering, the economics of rooftop solar are not as favorable.</p> <p>Creating a municipal energy utility or franchise agreement is not feasible because currently Wisconsin state law does not allow for renewals of franchise agreements.</p>

APPENDICES

Location Name	San Jose, California
Plan Name	Climate Smart San Jose
Report Year	2017
Link	www.sanjoseca.gov/DocumentCenter/View/75035
Goals	<ul style="list-style-type: none"> • 100% renewable energy for San Jose Community Electric (SJCE) and all residents by 2050 • 100 % carbon-free electricity available as a base offering to all users in the city by 2021. • San Jose to become the world's first 1 GW solar city • 100% of new homes will be Zero Net Energy by 2020 • 25 % of existing homes will be energy efficient and all-electric by 2030
Summary	<p>Climate Smart San Jose focuses on three pillars, identified by residents, for what they would like San Jose including: 1.) A Sustainable & Climate Smart City, 2.) A Vibrant City of Connected & Focused Growth and 3.) An Economically Inclusive City of Opportunity. To make the pillars a reality, the plan identifies a wide range of actions including the adoption of city-wide renewable energy and the overall decrease of water consumption. The plan also includes aspirations for zero net energy and all electric buildings, wide adoption of electric vehicles and improvements to the transportation system to make it cleaner and more accessible. The city also identifies planned growth areas and creating jobs in closer proximity to residential communities as ways in which it can minimize vehicle miles traveled.</p> <p>The plan identifies numerous strategies to make implementation feasible including bond issuing, utility bill funds, residential feeder-tariffs, development impact fees, carbon tax, cap and trade, PACE financing, on-bill financing and community choice aggregation, among others.</p>
Cost	The plan will cost approximately \$264 billion between now and 2050.
Status of Adoption	Approved by City Council in February 2018
Note:	<p>In 2019 San Jose Community Electric (SJCE), a city owned program that enables San José to pool the electricity demand of the entire city and develop and/or bulk-purchase renewable power on behalf of the residents, businesses, and government electricity users within their jurisdiction, was launched. SJCE has a goal of making 100% carbon-free electricity available as a base offering to all users in the city by 2021.</p> <p>The State of California has set goals toward the use of renewable energy, such as the Renewable Portfolio Standard which will require regular utility providers, to increase their share of renewables to 33% and 50% by 2020 and 2030, respectively.</p> <p>The plan mentions the intent to explore and pass their intent to raise revenue for climate action by levying a tax on carbon emitters, like the City of Boulder.</p>

APPENDICES

Location Name	Chicago, Illinois
Plan Name	Resilient Chicago
Report Year	2019
Link	https://resilient.chicago.gov/download/Resilient%20Chicago.pdf
Goals	<ul style="list-style-type: none"> • 26-28% city-wide reduction of GHG by 2025 • 100% renewable for public buildings by 2025 • 25% EV passenger fleet by 2023
Summary	Resilient Chicago is a plan that outlines a strategy for urban resilience inclusive growth and equity. The plan identifies resilience challenges such as the stark disparities of its communities and the root causes of violence in the city as well as three resilience pillars - Strong Neighborhoods, Robust Infrastructure, and Prepared Communities. Under the pillars the plan lists 12 goals and 50 actions to help support them. Among the infrastructure goals are a plan to reduce city-wide GHG emissions through renewable energy generation, energy efficiency and increased mobility options.
Cost	
Status of Adoption	In April 2019 City Council unanimously passed a resolution introduced by the mayor committing to transition to 100% clean renewable energy community-wide, beginning with 100% renewable electricity in public buildings, by 2035 and complete electrification of CTA's bus fleet by 2040; and the development of a transition plan by December 2020, which will outline key strategies, set progression milestones, develop a timeline for reaching an equitable clean energy transition.
Note:	In April of 2019, The City of Chicago issued an RFI soliciting responses regarding supply and renewable generation resources to help facilitate a transition to 100% renewable for city facilities by 2025. This RFI is intended to inform the city as it will need to enter a new electricity supply contract once the current one sunsets in January 2020.

APPENDICES

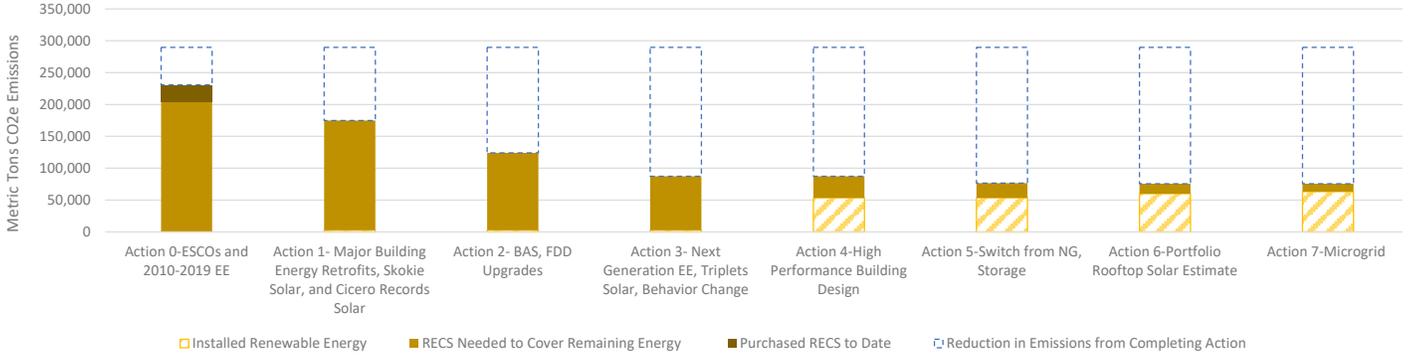
Location Name	Washington, District of Columbia
Plan Name	Clean Energy DC
Report Year	2018
Link	https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/Clean%20Energy%20DC%20-%20Full%20Report_0.pdf
Goals	<ul style="list-style-type: none"> • 80% internal reduction by 2050 • 50% reduction in energy use district-wide by 2032 • 50% increase in renewable energy for the district's energy supply by 2032
Summary	<p>Clean Energy DC is a plan to reduce the city's GHG emissions to meet the goal introduced by the mayor in 2017 to achieve carbon neutrality by 2050. The goal builds off their previous target which was established in 2013 and was called for an 80% reduction by 2050. The Plan also incorporates two goals identified in the 2013 plan which call for a 50% reduction in energy use district-wide by 2032 and an increase in the use of renewable energy to 50% of the city's supply by 2032. To achieve these goals, Clean Energy DC identifies 55 actions aimed at three areas: buildings, energy infrastructure and transportation, which are their main source of emissions. The plan is intended to compliment the Sustainable DCs efforts to address jobs, health and well-being, equity and climate change. Among the strategies to achieve these goals include ramping up building retrofit programs and requiring net-zero standards for new construction. Other strategies include shifting to clean energy by passing new RPS legislation to require 100% renewable energy by 2050, pursuing long-term power purchase agreements with renewable energy suppliers, and electrifying the bus system, among others.</p>
Cost	
Status of Adoption	Nov 2019 – first reading of the bill passed unanimously by City Council
Note:	Clean Energy DC identifies two approaches necessary to generate funding needed to advance the recommendations including the establishment of a green bank and the use of carbon pricing.

APPENDICES

Location Name	Cincinnati, Ohio
Plan Name	Green Cincinnati Plan
Report Year	2018
Link	
Goals	<ul style="list-style-type: none"> • 80x50 citywide by 2050 • All city facilities, fleets, and operations carbon neutral by 2035 • 100% renewable energy for city government by 2035 • Triple renewable energy generation for residents and businesses
Summary	<p>The 2018 Green Cincinnati Plans outlines 80 recommendations to reduce the city's carbon emissions 80% by 2050. The plan identifies 26 measurable goals that will be used to track their progress. Eight key focus areas were identified for the plan including the built environment, education and outreach, energy, food, natural systems, resiliency, transportation in waste.</p> <p>Within the realm of energy, the city has identified several tactics to completing their goals: large-scale solar constructions, purchasing RECs for city buildings, and entering a power-purchase agreement for their remaining electricity load. The city has also committed to achieving LEED Silver or better on all new facilities and has committed to overhauling their fleet using electric and alternative fuel vehicles, where possible.</p> <p>To address their city-wide goal, tactics include increasing outreach, particularly to energy burdened communities and expanding programs like PACE and Solarize. Additionally, the city plans to increase financing mechanisms particularly to low-income communities and to mandate benchmarking. The plan also places emphasis on the co-benefits of these investments including green job generation.</p>
Cost	
Status of Adoption	The 2018 Green Cincinnati Plan was adopted by City Council in May 2018
Note:	<p>The City has already signed a contract with Dynegy to procure RECs to power 100% of the City's buildings with carbon-free energy. In the Green Cincinnati Plan the city set a goal of owning the largest municipal solar array in order to reach its 100% renewable energy goal by 2035. Through the large-scale array, the city plans to add an additional 25 megawatts of solar to the already 1.8 MW of renewable generation on city facilities. The next step will be to purchase an additional 25+ MW of renewable energy with an offsite power purchase agreement, once their contract with Dynegy expires in 2020.</p> <p>Since this report has been completed, we know that the city agreed upon a large-scale PPA for 100 MW of solar being constructed 35 miles out of the city. 65MW will be used toward community choice aggregation, while the remaining will be used for city facilities and is expected to cover 20% of their load.</p> <p>There are some state-level policy barriers that Cincinnati has identified as priority issues to address including allowing virtual net metering, modifying or removing the setback requirement for wind turbines, support for the Ohio Renewable Energy Portfolio Standard, and opposing subsidies for inefficient power plants.</p>

The graph below shows the renewable energy that would be needed from REC purchases (solid gold) and renewable energy installations (dashed yellow) given reductions from the actions toward energy efficient operations.

RENEWABLE ELECTRICITY NEEDED TO MEET 100% GOAL



CARBON NEUTRAL CALCULATION METHODOLOGY FOR ESTIMATED GHG SAVINGS

Calculations for greenhouse gas emission reductions in this report were based on Cook County's 2018 energy usage profile and the grid composition for that same year.

- For the estimations, the eGrid conversion factor for emissions related to electricity was assumed to be: 1,251.5 lbs. CO₂e/MWH based on eGrid 2016
- For natural gas energy consumption, the conversion factor for emissions was assumed to be: 0.005311 metric tons CO₂e/therm

Each line item for energy efficiency was assumed as a total percent reduction from the 2018 emissions profile as specific measures are difficult to attribute to either electricity or natural gas savings as most projects will reduce both types of energy usage. These percentages were based on current research and trends, previous project savings, and case studies.

Each installed renewable energy estimate was calculated using the PV Watts tool and shading considerations outlined in NREL's solar siting guidelines. These are rough estimates and would be subject to detailed solar analysis during project design and construction.

RESOLUTION TO REDUCE COUNTY FACILITY GREENHOUSE GAS EMISSIONS

Passed by the Cook County Board of Commissioners January 24, 2019

WHEREAS, Cook County Government and the Forest Preserves of Cook County strive to be leaders in addressing climate change, and

WHEREAS, both entities are working to reduce harmful greenhouse gas emissions by 80 percent by the year 2050, a goal that is consistent with attempting to keep global temperatures from increasing more than 2°C (3.6°F) over preindustrial temperatures, per the 2012 Doha Amendment to the United Nations Kyoto Protocol, and

WHEREAS, Cook County Government is ahead of its target for reducing building energy emissions as a result of its Green Buildings Program that implemented successful energy efficiency, renewable energy, space reduction and other initiatives that have reduced greenhouse gas emissions from its building energy use by 32 percent since 2010, and

WHEREAS, with nearly 70,000 acres of land, Forest Preserves of Cook County ecosystems play an essential climate change mitigation role by absorbing over 1,544,000 tons of CO₂ annually, and further restoration projects will help sequester even more CO₂; and

WHEREAS, in October 2018, the Intergovernmental Panel on Climate Change (IPCC) released a new study of the impacts of global warming, and

WHEREAS, the report's findings predict ocean rise of an additional 10 cm with 2°C warming compared to 1.5°C, an arctic free of sea ice in Summer once per decade compared to once per century, complete eradication of coral reefs compared to a 90 percent decline, and the loss of many more ecosystems, and

WHEREAS, in November 2018, the U.S. Global Change Research Program released the U.S. National Climate Assessment, which predicted that climate change could reduce the size of the U. S. economy by 10 percent by the end of the century, and

WHEREAS, an estimated minimum 200 million people around the globe would be subject to inundation from rising seas, and several hundred million more to climate related risks and poverty, and

WHEREAS, the current effects of climate change on Cook County from the warming of over 1°C that has already occurred include increased flooding, heavier rain and snow storms, and more extreme summer heat, all affecting the region's people and economy, and

WHEREAS, the expected future impacts of global warming in Cook County include threats to food supply from impacts on agricultural crops and livestock; increase of invasive species; wildlife habitat destruction; extinction of native plant and insect species; increased incidence of pests and diseases; vulnerability of water supply and decreased quality of water; threats to infrastructure such as roads, rail, water supply and wastewater management; decreased air quality; threats of global unrest causing homelessness and immigration and disruption of business supply chains and markets; and, threats to many natural habitats and species, among others, and

WHEREAS, climate change impacts the low-income and vulnerable more heavily, through poorer air quality which impacts children, the elderly, and people with asthma and other respiratory and circulatory illnesses; flooding and heat-related damage to infrastructure which more heavily impacts municipalities with smaller tax bases to pay for infrastructure repair; and through heat-wave related mortality, which more heavily impacts the elderly, minorities and lower income populations, and in other ways.

WHEREAS, the IPCC concludes that limiting warming to 1.5°C is possible, but would require global net human-caused emissions of CO₂ to fall by about 45 percent from 2010 levels by 2030, reaching net zero around 2050, and

WHEREAS, limiting CO2 emissions to these levels would require change on an unprecedented scale, including rapid and far-reaching changes in land, energy, industry, buildings, transport and cities, and

WHEREAS, many of the actions required are already underway but would need to accelerate, and action across all fronts will need to proceed as fast as possible, and

WHEREAS, many of the actions required could either save money and resources or improve other aspects of quality of life and our ability to adapt successfully to the climate change that is already underway.

THEREFORE, BE IT RESOLVED, that the Board of Commissioners of Cook County does hereby adopt the following goal: to reduce greenhouse gas emissions by 45 percent by 2030 and to reach net zero greenhouse gas emissions by 2050, and

BE IT FURTHER RESOLVED, that a plan shall be developed to achieve this goal, and that progress towards this goal shall be reported publicly by the Cook County Department of Environment and Sustainability in its annual Sustainability Report, and

BE IT FURTHER RESOLVED, that other local government agencies and businesses within Cook County are urged to join with us in adopting this greenhouse gas reduction goal to counter the most harmful effects of climate change.

