THE UNIVERSITY OF CHICAGO
Harris Public Policy
POLICY LABS

Procurement Strategies for 100% Renewable Electricity

Prepared for

Cook County Department of Environment and Sustainability

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I. Executive Summary

The University of Chicago Harris School of Public Policy Lab Team (Team), in collaboration with the Cook County Department of Environment and Sustainability (DES), worked to provide best practices for renewable energy procurement to support Cook County's goal of achieving 100 percent renewable electricity for all municipal buildings by 2025.

In order to identify best practices for procurement, the Team developed a template with details on all the requests for proposals (RFPs) and contracts collected and analyzed throughout the project period. The template includes high and low priority items, ranked according to Cook County's needs. Information provided in the template includes data on pricing, RFPs and contracting timelines, procurement types, and submission details (see summary table in Appendix A). With this data, we hope that the Cook County team will be able to streamline their renewable procurement processes.

A. Key Findings

The Team identified several key findings based on other cities' and counties' procurement processes:

1. Cities collaborate with neighboring cities on renewable energy goals;
2. There is a high degree of variation in what cities/counties mean by their 100% renewable energy goals and their timelines; and
3. Power purchase agreements (PPAs) and solar photovoltaic (PV) purchases were the most common means of achieving 100% renewable energy goals.

1. Variation in Renewable Energy Goals and Timeline

The Team found significant variation in each city/county's pursuit of "100% renewable energy". For example, some cities and counties, like Cook County, set 100% renewable energy goals that apply only to county or city-owned buildings, whereas others' goals apply to all homes and buildings in that area. While this variation does not have a huge impact on our data collection, it is important to note when researching procurement strategies, because some strategies may be less relevant, depending on the specifics of the city's or county's renewable energy goals.

We also identified significant variation in when renewable energy goals were established, when progress began, and when goals will be completed. For example, some cities, like Austin, started working towards their goals far earlier than others and have more publicly available data about their renewable procurement strategy. In contrast, some cities/counties have made the commitment but will not release RFPs for several more years (e.g., City of Santa Barbara).

2. PPAs are the Most Popular Strategy

Analysis of the RFPs collected revealed that the most popular strategy for renewable energy procurement is through PPAs. This key finding heavily influenced the Team's recommendations.

3. Solar is Most Common

The Team also found that solar PV purchases play a crucial role when it comes to reaching renewable energy goals. Most of the RFPs collected were for solar PV purchases. Because Cook County only has the capability to reach 8% renewable energy from on-site rooftop solar generation (installed on Cook County's buildings), procuring Renewable Energy Certificates/Credits (RECs) or electricity and RECs from off-site solar installations may be important options to consider.

B. Recommendations

Based on our research and case studies, the team has three recommendations for Cook County regarding this process:

1. Procurement

If possible, the Team recommends that Cook County enter into a single PPA to cover up to 92% of its renewable electricity goal. For the remaining 8%, the Team suggests that the County purchase RECs in the short-term and in the long-term gradually phase out these purchases in exchange for on-site rooftop solar installation as the County's buildings' energy efficiency upgrades are completed. The Team found that procurement through PPAs will encourage bidders to get creative about how the County can reach its goals at the most affordable price. The County can also rank the bids based on time effectiveness, cost efficiency, and additional goals it may have for its facilities.

2. Timeline

The Team recommends that Cook County set clear and specific deadlines for its energy transition because precise language can prevent issues that may come up during procurement. Based on the case study interviews, setting a clear timeline with specific requirements, not just goals, ensures that the procurement process is streamlined and efficient. It is important to work with other departments in setting deadlines to help ensure nothing gets lost or overlooked in the process.

3. Communication

The Team recommends that the County tracks its progress as clearly and specifically as possible and continues to engage with other cities/counties with similar renewable energy goals. Many jurisdictions stand to learn from each other as they work towards these goals. Cook County would benefit from actively engaging with these cities because they can learn from each other's experiences, processes and best practices. Furthermore, jurisdictions just beginning to make progress towards their goals can learn how to make their processes smoother and more efficient.

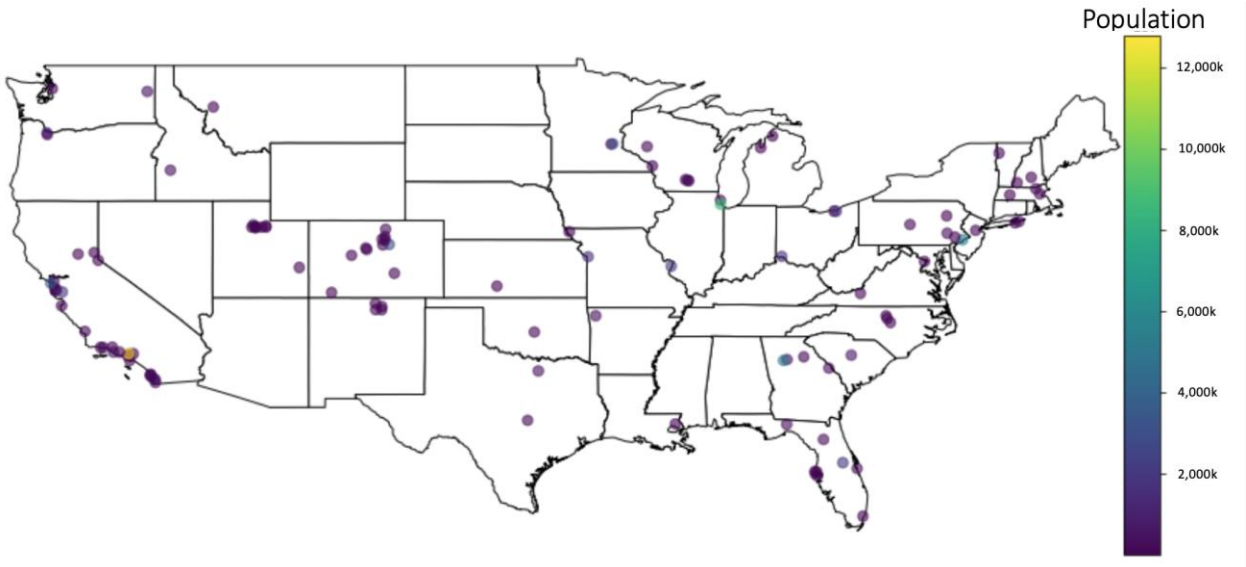
II. Introduction

With the looming effects of a warming climate, cities and counties across the United States are coming together to cut carbon emissions and transition to clean, renewable energy. Through the coalition that the Sierra Club has formed, over 90 cities and 10 counties have committed to 100% clean energy goals (Figure 1).

The Cook County Department of Environment and Sustainability oversees the regulation of air pollution, solid waste, and sustainability for County facilities and for residents and communities. The Bureau of Asset Management is responsible for all County facilities, and the Bureau of Administration currently procures power for County operations. These entities work closely together to create a better energy future. Cook County, with about 19 million square feet of facilities, is committed to being carbon neutral by 2050 and to develop a plan by the end of 2019 for 100% renewable electric power.

The County has already achieved a 30% reduction in greenhouse gas emissions (GHGs), primarily through implementation of energy efficiency measures. Future efforts to reduce Cook County's climate footprint will need to rely heavily on renewable energy integration. The 100% renewable and net zero plan will set a general direction. The County seeks to learn from the best practices of other jurisdictions by collecting specific information on current market conditions, costs and impacts in terms of jobs and other community benefits of different renewable options, and best practices.

Figure 1. Cities and Counties with 100 % Renewable Energy Goals



III. Methodology

The Team's preliminary searches yielded 24 RFPs and three contracts related to procuring renewable energy through publicly available bidding platforms on the Internet. The Team filtered the documents based on criteria requested by Cook County, including information such as requestor, procurement type, and project scope (see the complete list of criteria in Appendix A). We analyzed the RFP documents in our "Renewable Energy Procurement Summary Table" (Appendix A) for specific information the County highlighted as high priority. Additional searches for RFPs were conducted by emailing contacts from cities and counties with similar renewable energy goals as the Team was unable to find information through Internet searches for some of these cities/counties. For our three case study cities/counties, we conducted telephone interviews with the city/county representatives to better understand and describe their best practices and lessons learned.

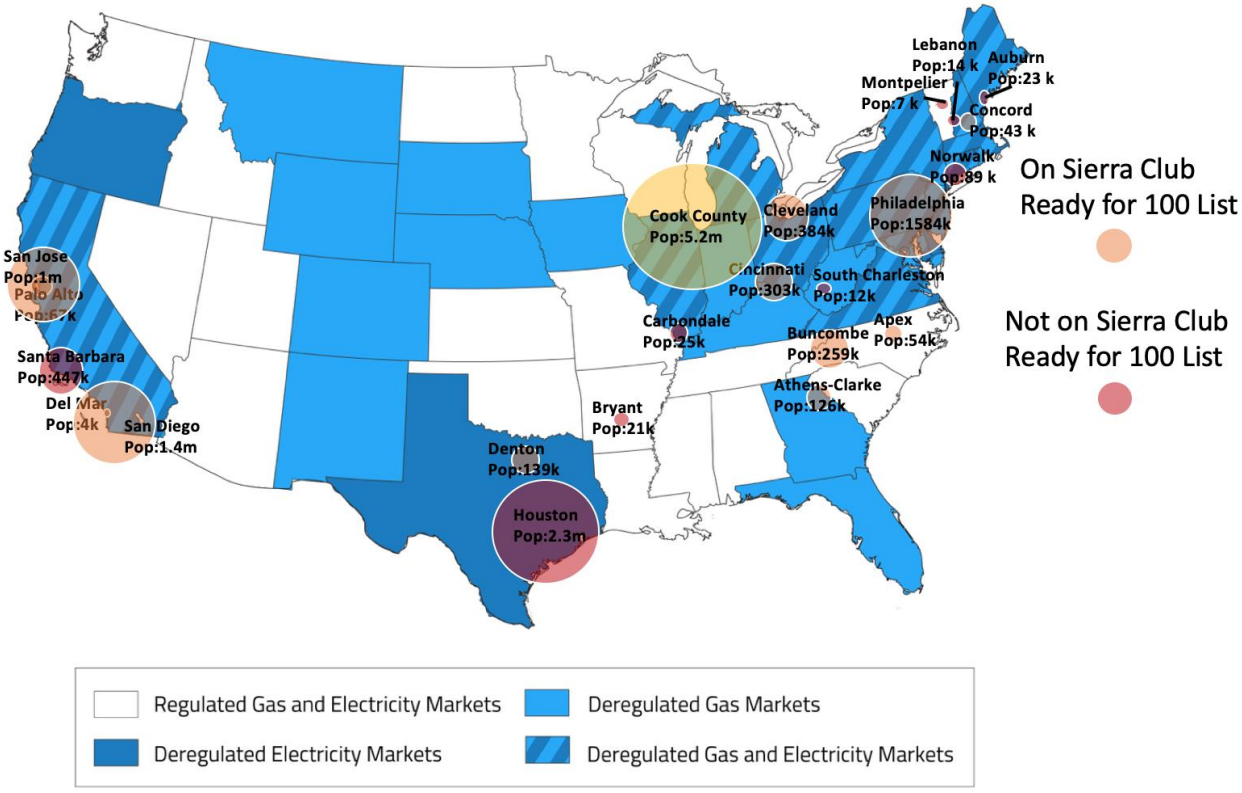
IV. Data Collection

This report uses data collected from 24 RFP documents and three contracts for renewable energy procurement by 21 municipal governments for their facilities (referred to as the "RFP Sample"). Appendix A summarizes these documents. This sample is made up of both RFPs from municipalities that have committed to 100% renewable energy goals (14 RFPs) and municipalities that have not made such commitments but are procuring renewable energy to meet their energy and sustainability goals. Results in this report are from the full sample; however, restricting the sample to only Sierra Club Ready for 100 municipalities does not substantively change the results or main findings.

Summary information on the restricted sample is included in Appendix B. Only RFPs for procurement of renewable energy directly by municipal governments are analyzed and included in Appendix A; this excludes RFPs issued by utility companies, energy authorities, community choice aggregators, and nonprofits. RFPs that did not meet the inclusion criteria will be provided to Cook County electronically. While these are not directly applicable to Cook County, they may provide additional insight into RFP best practices and standards.

This report also includes information from interviews with energy managers from the City of Cincinnati, the City of Philadelphia, and Santa Barbara County. These are discussed in Section VI, Case Studies. Audio and transcripts of these interviews will be provided to the County electronically.

Figure 2. Location and Population of Municipalities in Our Sample



RFPs found from 21 municipalities with populations ranging from 4,347 in Del Mar, CA, to 2,325,502 in Houston City, TX. Municipalities are largely in deregulated electricity markets. Basemap retrieved from Electric Choice. Population: US Census 2018 estimates, retrieved from census.gov

The municipalities represented by the RFP sample share a similar energy context with Cook County. Using state-level energy mix for electricity generation and regulated versus deregulated electricity market as proxies, similarities are apparent. The top three sources of electric generation in Illinois from 2001 and 2017 were nuclear, coal, and natural gas.[1] These were also the top three sources in ComEd's energy grid mix in 2017[2] (2018 Energy Benchmarking Report). The majority (67%) of municipalities in our sample are in

[1] https://www.nytimes.com/interactive/2018/12/24/climate/how-electricity-generation-changed-in-your-state.html

[2] Cook County Energy and Water Benchmarking Report 2018. (2018). Retrieved from https://www.cookcountyil.gov/content/energy-benchmarking-report

states where at least 77% of the energy generation comes from these three energy sources cumulatively. The only exceptions are municipalities in California, Maine, and Vermont. Therefore, like Cook County, most municipalities in this sample are unlikely to be able to rely on their state or their primary electric utility provider to meet their renewable energy goals.[3] Additionally, the majority of municipalities in this sample face a similar regulatory environment for electricity choice as Cook County, with 75% being in deregulated electricity markets (see Figure 2 above).

A. RFP Sample Trends

Table 1 summarizes key attributes of the RFP Sample, including procurement type, source type, supply capacity requirement, annual supply requirement, contract period length, RFP additional goals, and response window for the RFP (see Appendix [A] for more details). These items were selected for deeper analysis based on conversations with Cook County.

Table 1. Summary of Key RFP Attributes

RFP Attribute	Summary
Renewable Energy Procurement Type	PPA only: 13 Owned only: 3 Multiple options acceptable: 7 Not Specified: 1
Renewable Energy Source Type	Any/Multiple options acceptable: 4 Solar only: 17 Wind only: 2 Not Specified: 1
Supply Capacity Requirement	n = 8 Requesting 0.06MW to 100MW capacity
Annual Supply Requirement	n = 5 Requesting 1 to 280,000 MWh

[3] In California, 73% of the state's energy generation in 2001 came from natural gas and nuclear, down to 49% by 2017. In Maine, 51% of its energy generation in 2001 came from natural gas, down to 20% by 2017. Finally, in Vermont, 76% of its energy generation in 2001 came from nuclear, and in 2014 (the year of the one Vermont RFP in the sample) over 60% of its generation still came from nuclear, but by 2017 this was a non-significant portion of the energy mix, replaced by hydroelectric and biomass (Popovich, 2018).

Renewable Energy Contract Length (Maximum)	Mean: 21.2 years Mode: 20 years	
RFP Additional Goals	n = 11 *Goal* Pollution/GHG Emission Related: 6 Jobs/Economy Related: 6 Education, Outreach and/or Visibility Related: 4 Additionality: 1	*Number of Goals per RFP* One goal: 6 Two goals: 2 Three goals: 3
Response Window for RFP	Mean: 34 days	

Table 1 illustrates some common trends in the RFP Sample. For purchasing mechanism, PPAs are most commonly specified. In addition, solar is the most frequently requested renewable energy technology solution. The RFP Sample varies widely in terms of renewable energy project size and inclusion of additional goals. For example, the sample is nearly evenly divided on inclusion of additional goals, with 46% of RFPs explicitly or implicitly requiring additional goals, supplementing the best project type and price offer. The majority of these only require one additional goal. These results are discussed in more detail in the Results section below.

V. Results

This section describes the results of our analysis of the RFP Sample, including:

- primary renewable energy procurement and project financing strategies;
- pricing for RECs and PPAs;
- opportunities for achieving ancillary goals related to renewable energy procurement; and
- best practices for proposal and contract requirements.

A. Renewable Energy Procurement Strategies

1. Procurement

A majority of cities and counties pursued PPAs as a means to achieve renewable energy policy goals. For example, *54.2%* of cities and counties requested PPAs. In contrast, only *12.5%* of cities and counties requested proposals for on-site generation projects. In addition, a majority of cities and counties preferred solar to other renewable energy

technology solutions. For example, *70.8%* of cities and counties requested solar, as compared to *8.3%* that requested wind, and *16.7%* that requested multiple renewable energy technology solutions. Interestingly, while most cities and counties specifically requested solar projects, very few expressed a preference for rooftop or ground-mounted solar. See Table 2 below for a summary of renewable energy projects and technologies pursued by all cities and counties included within the RFP Sample.

As highlighted in Table 2, large variation exists in renewable energy system size across the RFP Sample. Among the seven RFPs that specify capacity requirements, these requirements range from requesting a minimum capacity of 600 KW for a single rooftop solar project in Del Mar, CA, to requiring a maximum of 100 MW for a large-scale PPA for Denton, TX. In addition, six RFPs specify annual supply requirements that range from a minimum requested supply of 3,000 MWh for multiple on-site owned projects in Apex, NC, to a maximum supply of 280,000 MWh in a PPA for Philadelphia, PA.

Table 2. RFP Renewable Energy Procurement Summary

City/ County	RE Project Type	RE Source Type	Supply Capacity Requirement	Annual Supply Requirement
Athens-Clarke County	Owned (on-site)	Solar	None specified	
Buncombe County and City of Asheville	PPA (off-site)	Solar		20,000 MWh
City of Auburn	Multiple (on-site or off-site)	Solar preferred	None specified	
City of Bryant	PPA (off-site)	Solar		≤1MWh
City of Carbondale	Multiple (on-site)	Solar	None specified	
City of Cincinnati	Multiple (on-site or off-site)	Solar	100 MW	
City of Cleveland	PPA (on-site)	Solar	≤ 5.8 MW	
City of Concord	PPA (on-site)	Solar	1- 4.2 MW	
City of Concord	PPA (on-site)	Solar	0.1 - 3 MW	
City of Del Mar	Owned (on-site)	Solar	≥0.062 MW	
City of Denton	PPA (off-site)	Wind	≥25 MW	
City of Denton	PPA (off-site)	Solar	≤100 MW	

City of Denton	PPA (off-site)	Wind	≤100 MW	
City of Houston	PPA (on-site or off-site)	Any	≥30 MW	
City of Lebanon	Multiple (on-site)	Solar	None specified	
City of Montpelier	PPA (on-site or off-site)	Solar	1 MW	
City of Norwalk	Multiple (on-site)	Solar and wind	None specified	
City of Palo Alto	PPA (on-site)	Solar preferred		30,000 - 80, 000 MWh
City of Philadelphia	PPA (off-site)	Solar, wind or other		140,000 - 280,000 MWh
City of San Diego*	None specified	None specified	None specified	
City of San Jose	Multiple (on-site)	Solar	None specified	
City of South Charleston	PPA (on-site)	Solar	None specified	
County of Santa Barbara	Multiple (on-site)	Solar, solar thermal, wind	None specified	
Town of Apex	Owned (on-site)	Solar		3076.4 MWh

**RFP soliciting alternative strategies from San Diego Gas & Electric Company to enable the City of San Diego to achieve 100% renewable energy. In 2018, the City decided to implement a Community Choice Aggregation (CCA), so this contract was not awarded.*

a. PPAs

The cities and counties in the RFP Sample did not exhibit a strong preference for on-site or off-site generation projects for PPAs. For example, 46.2% of cities and counties requested on-site PPAs, 38.5% requested off-site PPAs, and 15.4% did not identify a preference. In terms of contract duration, the longest PPA contract period was *30 years*, while a majority of cities and counties requesting PPAs requested a contract term of no more than 20 years.

b. On-Site Owned

All three cities and counties that requested on-site generation, requested rooftop solar systems (Athens-Clarke County, the City of Del Mar, and the Town of Apex; see Appendix A for details). As compared to PPA requests, on-site generation project requests included much smaller supply capacity requirements. For example, two out of the three on-site RFPs requested solar installations at a single site or public facility.

2. Financing

While not explicitly referenced in any of the RFPs or contracts, several cities and counties provided information in their climate action and/or renewable energy planning documents related to financing for renewable energy projects. Core financing mechanisms include PPAs, REC exchange, and local tax revenues. Additional potential financing mechanisms include the federal tax credit; however, there is mixed evidence on cities and counties using this strategy.

a. PPAs

As demonstrated through the Team's analysis, PPAs are an increasingly popular strategy for cities and counties to achieve their 100 % renewable energy goals (see Appendix A for details). Under this type of financial agreement, a developer agrees to oversee and finance the installation of a renewable energy project. This process substantially reduces or eliminates the upfront costs of renewable energy projects to cities and counties that may otherwise be prevented from moving forward with installation projects due to a lack of necessary capital.

b. REC Exchange

Other cities and counties are exploring more creative opportunities to recoup investment costs or cover power costs by selling RECs from on-site generation and purchasing cheaper non-local RECs. For example, in Burlington, Vermont (the first city in the US to achieve 100% renewable energy), the City sells RECs earned from the City's hydroelectric power plant to out-of-state utilities and purchases cheaper credits to cover the cost of power.[4] In the long-term, this type of strategy does not enable Cook County to count the benefits generated through a PPA towards both the County's carbon-neutral and renewable electricity goal. However, in the short-term, this type of strategy may be worth considering to alleviate any initial financial constraints.

c. Local Tax Revenues

Some cities and counties leverage local tax revenues to cover a portion or all of the cost of renewable energy installation projects. For example, in Georgia, cities and counties are able to use Special Purpose Local Option Sales Tax revenues for capital improvement projects such as renewable energy installations.[5]

[4] https://www.politico.com/magazine/story/2016/11/burlington-what-works-green-energy-214463
[5] https://accgov.com/8382/SPLOST-2020

d. Federal Tax Credits

The federal solar tax credit, also known as the investment tax credit (ITC), provides businesses and homeowners with a 30% federal tax credit for installing solar. Local governments are not eligible to apply for this credit; however, opportunities may exist for cities and counties to monetize this benefit through financial agreements with developers. For example, under a PPA, developers receive tax credits and other incentives generated by the renewable energy system. According to Michael Forrester, Energy Manager at the City of Cincinnati, pricing should reflect these additional benefits earned by developers. Cities and counties can also leverage the ITC to expedite the contracting process. For example, according to Adam Agalloco, Energy Manager at the City of Philadelphia, the City was able to leverage the ITC to push developers to sign the contract sooner for the City's solar PPA.

B. Pricing

Based on analysis of contracts and other pricing information from other sources, such as the Level 10 PPA Price Index[6] we were able to estimate the price Cook County could expect to pay for renewable electricity under a PPA. The team was able to obtain three contracts, namely Cincinnati, Santa Barbara, and San Diego. All three counties chose solar. It should be noted that since Santa Barbara and San Diego opted for on-site installation, the unit of measurement for them is $/kW, the price per capacity. In contrast, the price of a PPA, as in the case of Cincinnati, is denoted in $/MWh, which is the price per unit of electricity generated.

Table 3. Pricing Summary Table

City/ County	Procurement Type	Pricing
Cincinnati	Off site PPA	37.73 $/MWh
Philadelphia*	Off site PPA	Not willing to disclose
Santa Barbara	On site installation	2841 $/kW
San Diego	On site installation	4181 $/kW

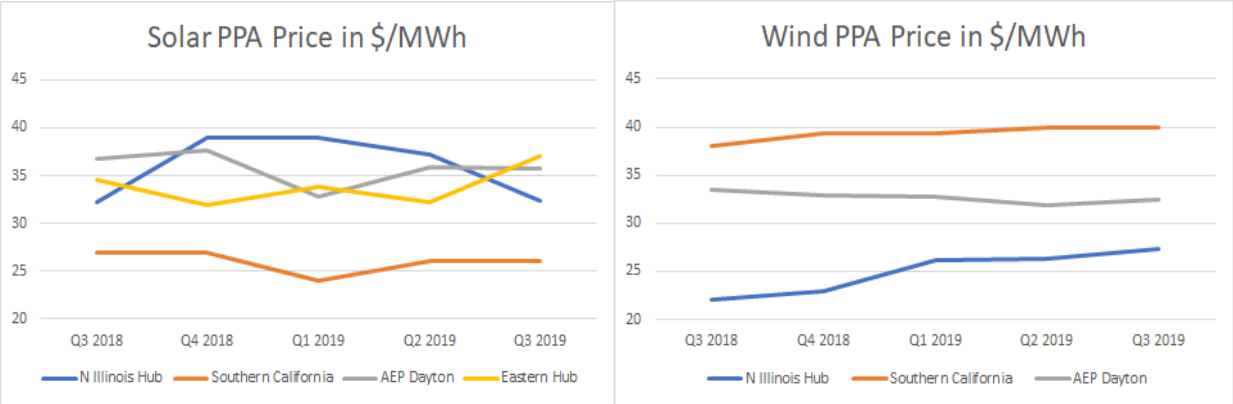
Based on the National Renewable Energy Laboratory's estimates of solar PV potential across the U.S. (see Figure 5 in Appendix [D.1], Southern California (Santa Barbara and San Diego) has the highest potential for solar energy, followed by Cincinnati and Philadelphia and then Cook County. In contrast, Cook County has the highest wind energy

[6] https://leveltenenergy.com/blog/ppa-price-index/

potential followed by Cincinnati, California and then Philadelphia (see Figure 6 in Appendix [D.1]).

Figure 3 below compares the solar PPA prices and wind PPA prices gathered from a survey of renewable energy market developers as part of the Level 10 PPA Price index[7]. As part of the first exercise, the four geographies of interest are analyzed, Northern Illinois (Cook County), Southern California (Santa Barbara and San Diego), AEP Dayton (Cincinnati) and Eastern Hub (Philadelphia).

Figure 3. Solar and Wind PPA Price Comparison (Case Study Regions)

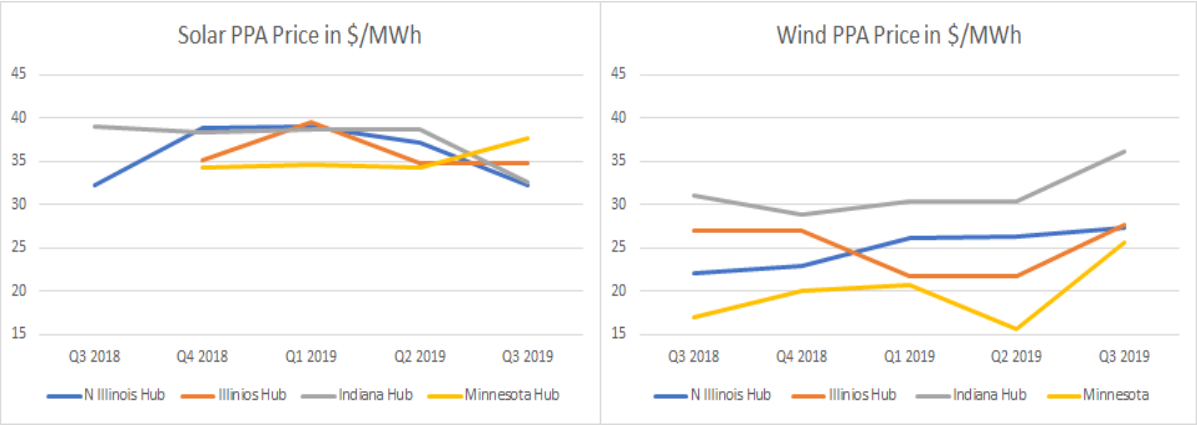


The figure shows that for Southern California, solar PPA is the cheaper option as prices are consistently higher for wind comparatively. For Cincinnati, Ohio prices were similar for both wind and solar. Interestingly, the price from the Cincinnati contract (37.7 $/MWh) is follows pricing in the Level 10 Solar Price Index. No wind PPA pricing was found for Philadelphia to effectively compare pricing across wind and solar. Northern Illinois (Cook County) is the only region where wind is significantly cheaper compared to solar PPA prices. Since these are downstream prices, the upstream source/location of the renewable energy is unknown.

Figure 4 reveals how Northern Illinois (Cook County) stands with respect to its neighboring regions when it comes to PPA pricing. Almost all regions have much cheaper wind PPA prices compared to solar prices with Indiana as the lowest difference between solar and wind PPA prices.

[7] https://leveltenenergy.com/blog/ppa-price-index/

Figure 4. Solar and Wind PPA Comparison (Neighboring Regions Only)



C. Ancillary Goals

While many cities and counties highlight ancillary goals in their RFPs for renewable energy projects, very few RFPs actually require bidders to provide a plan for achieving these goals. The most frequently noted ancillary goals are local job creation, reduced GHG emissions, and support for women and minority owned businesses. This report focuses on two of Cook County's ancillary goals, namely local job creation and education and outreach.

1. Local Jobs

Of the 24 RFPs we analyzed, 4 of them explicitly mentioned job creation as an additional goal (e.g. City Philadelphia, Buncombe County and City of Asheville, City of Norwalk and City of South Charleston). To measure the effect of renewable energy procurement, we conducted a literature survey of studies which measured the effect of investment in renewable energy on job creation.

The U.S. Bureau of Labor Statistics forecasts that the solar PV installer occupation will grow by 105% between 2016 and 2026, and that the demand for wind turbine service technicians will grow by 96% during the same period.[8] That makes these the first and second fastest growing occupations in the U.S. According to research by Garrett-Peltier at the Political Economy Research Institute, University of Massachusetts Amherst, 7.49 full time jobs (4.50 direct plus 2.99 indirect) are created on average for every $1 million spent

[8] https://www.bls.gov/ooh/fastest-growing.htm

in the renewable energy sector.[9] Jobs created by industry per $1 million spent are as follows (additional details in Appendix E):

- Wind: On average 7.52 jobs (4.06 direct; 3.46 indirect); and
- Solar: On average 7.24 jobs (4.26 direct; 2.98 indirect).

a. Quality of job creation

Research from the University of California, Berkeley,[10] estimates the effects on jobs in California by increasing its Renewable Portfolio Standard (RPS) to 50%. Between 2002 to 2015, California's RPS estimated that 25,500 blue-collar job-years (about 53 million hours of blue-collar construction work) and 7,200 white-collar construction job-years (about 15 million hours of white-collar construction work) would be created, almost 90% of which have been created since 2012. Full-time construction workers work about 80% of 2,080 hours per year (about 1,664 hours). The major beneficiaries of the growth in renewable energy generation were workers in very high unemployment, low-income counties.

b. Concerns of job losses

A report from IRENA (IRENA, 2018)[11] estimated that in 2017, the U.S. experienced its first job loss in the solar sector since 2010. The number of solar jobs fell by 3.8%. Most of this loss took place in the installation sector as a result of a 22% reduction in new solar capacity additions such as utility scale solar plants. More than 80% of all U.S. wind capacity is located in low-income rural counties. Land lease payments totaling $267 million in 2017 helped to stimulate these rural economies, through increased tax revenues and income earned. Since 95% of solar PV materials are imported, manufacturing accounts for a small percentage of total industry employment (just 15%). Project development represents another 14% of jobs, sales and distribution 12%, followed by research and development, government, and other activities.

2. Education and Outreach

Several cities and counties required bidders to propose strategies that addressed education and outreach for renewable energy technologies. For example, some cities and counties, such as the City of Del Mar, asked developers to install screens to monitor and

[9] https://www.sciencedirect.com/science/article/abs/pii/S026499931630709X#!
[10] http://laborcenter.berkeley.edu/pdf/2016/Link-Between-Good-Jobs-and-a-Low-Carbon-Future.pdf
[11] https://www.irena.org/publications/2018/May/Renewable-Energy-and-Jobs-Annual-Review-2018

visualize energy performance in municipal buildings with on-site solar energy systems (see Appendix A for details).

In the future, the County may want to consider deploying renewable energy technologies at public facilities to increase public awareness and acceptance of renewable energy technologies. While dependent on the availability of funds, the County may be able to leverage the Illinois Solar for All program to cover 100% of up-front costs for solar projects located at municipally-owned public facilities.

D. Best Practices in Renewable Procurement

A competitive procurement process can be achieved through a well-organized RFP that effectively solicits the required information from bidders. By collecting adequate information, Cook County will be in a good position to evaluate qualifying bids and execute contracts with winning bidders. Based on analysis of the RFP Sample, the Team developed best practices for renewable energy procurement, including common RFP requirements, specific requirements related to ancillary goals and annual supply, and contract period length.

1. General RFP Requirements

Most of the RFPs required the following information to be submitted:

- **Cover Letter or Executive Summary**. Typically includes a summary of the project approach, assurance of output quantity and quality, financing information, and other details related to the bidder's experience and qualifications.
- **Project Team Qualifications and Experience.** Bidders must provide references from various sources to prove their experience in accomplishing projects similar in size and scope. Bidders should provide team member qualifications, project history and client references, experience with coordinating with multiple clients especially city or county government. Most RFPs require at least three references.
- **Technical Scope of Work.** Usually consists of a plant description, site layout, location, development status of plant, monitoring plan, plant schedule and commercial date, renewable attributes, and expected output. The strength of the scope of work is usually a key component for the selection criteria. For example, some RFPs assigned weight toward each submission requirement. The "Technical submission" typically accounts for approximately 40% of the overall weight.

- **Financial Information.** Relates to the overall performance of the business in terms of their financial stability. Required financial documents include financial statements, operating budget, and bank statements. Also, bidders are required to submit a description of the proposer's financial strength and capabilities, descriptions of plant development risks and disclosure of conflicts.

- **Signed Documents.** Most RFPs require signed documents such as an acknowledgement form and confidentiality agreement.

2. Specific Requirements (Ancillary Goals, Annual Supply)

Some RFPs also included specific requirements for ancillary goals and/or chose not to include a specific supply capacity requirement:

- **Ancillary Goals Requirement.** Some cities and counties asked bidders to submit Equal Employment Opportunity Form, educational outreach plan, co-benefits analysis that could help achieve their sub-goals (See Appendix A).

- **Supply Capacity Requirement.** Not every city or county identified a specific annual supply requirement but instead asked bidders how much energy could be provided based on a specific budget amount (for example Athens-Clarke County did not specify a capacity requirement but included a budget instead). Providing a budget amount instead of a specific annual supply requirement may be an attractive strategy for getting competitive bids for smaller on-site generation projects (See Appendix A).

3. Procurement Period and Contract Length

The average PPA contract period length is 24 years, but the majority of RFPs requesting PPAs specified a contract period length less than or equal to 20 years (See Appendix A).

VI. Case Studies

In addition to the RFP and contract analysis, the Harris Team developed case studies for cities and counties of interest to Cook County. The Harris Team's final interviews were with representatives from the City of Cincinnati, the City of Philadelphia, and the County of Santa Barbara. These are all areas with deregulated markets with similar goals to Cook County.

Case Study 1. City of Cincinnati

We consulted with Michael Forrestor, the Energy Manager for the city of Cincinnati. He discussed the procurement process and made a number of suggestions that would be especially helpful to Cook County.

The City filed one single RFP that required bidders to submit a plan that would support their energy goals, in this case 25 MW of renewable energy. Forrestor mentioned that although government work is typically very prescriptive, this wasn't the case for this procurement process. In fact he mentioned it would be easier if you acknowledge from the beginning that it will not be a specific "this and that" ask.

The most important lesson Michael Forrestor learned from the process was making sure the language is clear and specific. For example, because the original Cincinnati RFP said they wanted off-site solar nearby and a bidder in Washington, DC said they were considered "nearby," Cincinnati issued a new RFP and with very specific language to eliminate bidders that weren't eligible for their procurement. Although the solution was relatively simple, the issue could have been avoided.

Forrestor also discussed the usefulness of communication with other cities. Throughout the procurement process, the Cincinnati team attended renewable energy bootcamps that allowed them to learn from other cities with the same goals. He was in close contact with the energy manager in Philadelphia to make sure their procurement process was as effective as possible.

Table 4. City of Cincinnati Case Study Summary

Category	Response
Renewable Energy Goal	100% Renewable Electricity for all City owned facilities by 2035
State Energy Mix	2017: 57% Coal, 24% Natural Gas, 15% Nuclear
Renewable Energy Procurement Strategies	One single RFP requesting a PPA with one of the following or a combination from bidder ● On-Site ● Off-Site on City Property ● Off-Site on Non-City Property
RFP Procurement Type	PPA (on site or off site)
Annual Supply	1,045,660 MWh
Additional RFP Goals	*Not Included in contract*
Contract Length & Start Date	Start date: by 6/30/2020; 10, 20, or 50 year terms
Total Project Dollar Amount	*Information unavailable*
Project ($/KWh)	$37.73 per MWh under a Gov Agg Retail Agreement or $41.48 per MWh if no Gov Agg Retail Agreement
Lessons Learned	● Be clear and specific in your language ● Work with other departments to avoid issues with approval later on ● Use an energy consultant ● Be comfortable with the process even though it is not prescriptive like government work usually is

Case Study 2. City of Philadelphia

We interviewed Adam Agalloco, the Energy Manager for the City of Philadelphia. He discussed the procurement process, from RFP creation to contract approval, and provided some helpful suggestions for Cook County.

The City issued a single RPF to meet 100% of their renewable electricity needs and selected a long-term large-scale solar PPA with RECs. Adam stressed the importance of education and strongly recommended that Cook County talk to national experts in renewable energy procurement. Adam also highlighted requirements for ancillary goals,

such as neighborhood benefits, job creation and diverse business participation, as areas that he wished the City had included in the original RFP. Finally, the City leveraged the 2020 Investment Tax Credit step-down from 30% to 26% to push developers to sign the contract this year.

Table 5. City of Philadelphia Case Study Summary

Category	Response
Renewable Energy Goal	100% clean renewable electricity in municipal operations by 2030, for electricity city-wide by 2035 or sooner, and for all energy (including heat and transportation city-wide) by 2050 or sooner.
State Energy Mix	2017: 39% Nuclear, 34% Natural gas, 22% Coal
Renewable Energy Procurement Strategies	• Long-term power purchase agreement (PPA) • Acquire the RECs from the output
RFP Procurement Type	• PPA (Off-site) • RECs
Annual Supply	140,000- 280,000 MWh
Additional RFP Goals	• Promote energy conservation and efficiency within City facilities by providing education, technical expertise and analysis of energy used • Strategically procure cost effective, reliable, safe, clean energy and conventional energy systems for city government • Develop and implement projects and programs that promote the efficient use of energy and reduce the City's environmental impact.
Contract Length & Start Date	*Confidential*
Total Project Dollar Amount	*Confidential*
Project ($/KWh)	*Confidential*
Lessons Learned	• Education is the key - talk to national experts and learn from their experience • Include ancillary goal requirements • Leverage step-down of ITC to expedite contracting process

Case Study 3. County of Santa Barbara

Based on an interview with Roy Hapeman, the Energy Manager for Santa Barbara County, the Santa Barbara County's approach to 100% renewable energy procurement is through on-site owned solar generation. Hapeman's key advice on renewables procurement is that counties include technical specialists in the RFP drafting process, investigate applicants that respond to the RFP, hire independent inspectors and contractors, plan to build for future growth, and use clear and specific technical language in the RFP to ensure selection of the highest quality panels.

Santa Barbara County's best practices in renewables procurement focus on owning solar installations to help align incentives for proper system maintenance. Hapeman recommends hiring local contractors because of the convenience of having the contractor nearby in case of emergency and being better able to hold the contractor accountable. Other key best practices include specifying technical details to ensure high quality proposals and to find the best fit for Santa Barbara's particular needs, as well as engaging employees inconvenienced by the installation to maintain community support. Ultimately, Hapeman emphasizes that cities and counties need to keep an open mind when approaching a 100% renewable energy transition so they don't limit the best offers. He strongly supports collaboration across jurisdictions to share and improve best practices.

Appendix E contains several materials tips for ensuring quality solar panels and batteries based on this conversation with Hapeman. Full audio interview and transcript will be provided.

Table 6. County of Santa Barbara Case Study Summary

Category	Response
Renewable Energy Goal	Zero Net Energy in municipal buildings by 2035[12]
State Energy Mix	2017: 41% Natural gas, 20% Hydroelectric, 16% Solar, 8% Nuclear, 6% Wind
Renewable Energy Procurement Strategies	• On-site solar installations owned by the county • Emphasis on employing local contractors and engaging community support • Use specific technical language in RFP to ensure quality
RFP Procurement Type	PPA (On-Site) or On-Site Owned

[12] At the time of writing, Roy Hapeman had not responded to our request for information on Santa Barbara's progress towards being Net Neutral.

Annual Supply for Municipal Facilities	18,000 mWh
Additional RFP Goals	Minimize cost
Contract Length & Start Date	20 years, Starts on Nov 2017
Total Project Dollar Amount	$2,237,537
Project ($/KWh)	2841 $/kW
Lessons Learned	• Build for future growth • Specify technical details in the RFP • Look for the best fit on quality, efficiency and long-term cost • Be open minded: financing and energy source

VII. Recommendations

Based on the analysis of available RFPs and contracts, as well as conversations with select jurisdictions currently pursuing 100% renewable electricity goals, the Team recommends that Cook County employ a procurement process that combines various types of purchases (PPA and on-site), articulate clear and specific requirements to guide the County's energy transition through an agreed-upon structured timeline, and communicate actively with other jurisdictions making progress towards their renewable energy goals.

The next steps for Cook County's renewable procurement process include deciding on specific language and deadlines to guide the county's energy transition and issuing RFPs for a combination of purchases as well as multiple on-site generation projects at a time.

Going forward, the County should consider the best practices in renewable procurement gathered from the RFPs, contracts, and interviews with other jurisdictions. The county should issue well-organized RFPs requiring submission of a cover letter, technical documents, financing stability proofs, and references. Based on the County's ancillary goals, other considerations could include specific RFP requirements to meet those goals and requirements regarding annual supply limits. The County also may consider preferring a 20-year contract length.

A. Procurement

Procurement should be a combination of purchases through different methods (on-site, off-site, etc.). Based on this report's findings, the County should consider meeting 92% of its renewable electricity goal with a PPA. The other 8% of the goal should be met with RECs, which would be phased out as building energy efficiency updates are completed and on-site rooftop solar is installed over the upcoming years. The number of 8% was previously determined by the County as its capacity for rooftop solar on municipal buildings. Additionally, we recommend that the County issue RFPs for multiple on-site generation projects at a time.

B. Timeline

The County's timeline for its transition to 100% renewable electricity should be articulated clearly and specifically, using language that leaves no room for misinterpretation or manipulation. Enforceable requirements are more effective than aspirational goals, so the County should determine these guidelines and deadlines early on in the process. Critically, the County may need to plan for potential delays and political roadblocks that could deter the progress of the energy transition.

Based on the RFPs and contracts analyzed in this report, another important timeline consideration is that the majority of PPA contracts cover a maximum span of 20 years. The County should consider this common practice when formulating RFPs.

C. Collaboration and Communication

Although joint agreements aren't necessarily desirable for Cook County, the County should continue to actively communicate and collaborate with other counties and cities and benefit from sharing best practices and lessons learned on renewable energy procurement.

For instance, Orange County, Florida, offers a prime example of the opportunities the county has to open lines of beneficial communication across jurisdictions. Below is a letter from the Planning, Environmental, and Development Services Department in Orange County regarding their process and the value communication has when reaching these goals:

"Thank you for reaching out on these important issues and for assisting Cook County in their efforts to eliminate carbon-polluting fuel sources. I believe, though, that you might be confusing the County's efforts with the City of Orlando, who has a specific 100% clean energy goal. I've taken the liberty of copying the City's Sustainability Director, Chris Castro, to assist you on those structural discussions. I'm excited about your work because Orange County is in the beginning stages of setting those types of clear goals and engaging the necessary strategic planning. A scope of services is being developed to begin the first data gathering/analysis phase, and that effort will take us for a few months where we then will contract to develop more extensive plans with significant community input.

We are fortunate to have the experiences, and lessons learned, of the City to guide us, and hopefully produce a faster and most productive process. I'd like to stay in touch with Cook County as they move through the process and potentially have a group of counties across the nation work together to solve common problems. Inherently, counties are different from cities, and face problems that cities may not encounter in the journey towards more sustainable communities.

Orange County has over 450 buildings, varying from the standard office types, to large corrections facilities, a massive convention center, and a skyscraper. It should be fun!" [13]

Finally, the County should track the progress of its renewable procurement process as clearly and specifically as possible in preparation for expansion and multiple purchase agreements.

VIII. Conclusions

The Team noted recurring trends from other cities and counties in our research as key findings. Specifically, cities collaborated with neighboring cities on renewable energy goals, variation exists in what was meant by 100% renewable energy and the timeline to begin this process, and PPAs were most common as were solar purchases in transitioning to 100% renewable energy.

Based on the research and case studies, the team has three recommendations for Cook County regarding this process. The Team recommends that Cook County pursue a phased approach to renewable energy procurement, set clear and specific deadlines for the project, and continue to communicate with other cities and counties also transitioning to 100% renewable energy.

The Team had two major limitations in this project. Although it's public information, it was particularly difficult to find information we needed without contacting someone from the office or considering a Freedom of Information Action (FOIA) request. Additionally, although 115 cities/counties committed to 100% Renewable Energy goal, many of the cities are only in the planning stages and have not yet begun or released information on their procurement process.

[13] https://drive.google.com/open?id=1adSWgbFLIrgPD4yzMwxV-stsDbomnlYu

IX. Appendix

A. Renewable Energy Procurement Summary Table

County/City Name	RFP Description	RE Procurement Type & Source Type	Supply Capacity Requirement (MW)	RE Contract Period Length	Additional RFP Goals & Scope of Work Requirements	Selection Criteria
Athens-Clarke County	Design & install a solar electric system at the Rocksprings Park Community Center Facility, for the Athens-Clarke County SPLOST Office	On-Site Owned, Solar	No supply requirement - wanted to see how much solar could be provided within given budget	60 days	Contractor shall provide remote & on-site solar system performance monitoring as a part of this project.	Understanding the project & proposed technical approach, Project value, Warranty & equipment, Qualifications & Experience, References & Reference Projects, Monitoring Platform
Auburn, ME	City is accepting written proposals for Power Purchase Agreements/ Credit Purchase Agreement (PPA) & Site Lease proposals for solar photovoltaic (PV) systems to be installed at multiple City-owned properties and/or other off-site locations. The City is interested in exploring various options for satisfying the City's electric purchases of approximately 5 million kWh per year.	PPA (On-Site or Off-Site), and/or Lease, Solar, Open to Sources		20		Select the bid that is conforming to the solicitation & will be most advantageous to the City considering price, completeness, financial stability of bidder & capabilities of meeting project requirements specified in the solicitation.

Bryant, AR	The City of Bryant is looking for a SPSA for up to 1,000kwh per year. The generation is to be built on a site located within the City of Bryant service territory. The project envisions a ground mounted solar energy generation facility capable of delivering up to 1.0 MWh annually.	SPSA, PPA(Off-Site), Solar	<=1		In the event that the actual savings are less than the guaranteed savings, the SPSA Contractor shall provide cash reconciliation of the difference.	Will be judged based on ability to meet The City of Bryant's need for economical & reliable renewable energy in the necessary timeframe. The principal criteria in evaluating proposals include, but are not limited to, total delivered cost of the energy over the contract term, the design & reliability of the project, & the financial & operational wherewithal of the respondent.
Buncombe County & City of Asheville	Seeks proposers willing to supply solar electric energy under a long-term power purchase agreement (PPA) from one or more solar power plant(s) located in the North Carolina DEP territory with a strong preference for a solar power plant (Plant) located as close to Buncombe as possible. The City/County intends to acquire the RECs from the output & either sell at market price or voluntarily retire in support of the City/County's sustainability goals at the option of the County	PPA (Off-Site) + RECs, Solar	20,000	20 years	reducing carbon pollution, creating local & clean energy jobs, creating opportunities for minority & women owned businesses	Best value based on review of cost proposal for proposed solution & strengths, weaknesses, opportunities, & threats Proposal's ability to meet the Project Objectives Qualifications of Proposer
Carbondale, IL	The City seeks proposals from firms capable of designing, engineering, installing, financing & maintaining solar PV projects at [4 municipal building sites]. The City hopes to: Reap the financial benefits of more affordable electricity at minimal cost, Reduce environmental impact, Provide an example of successful renewable energy generation and showcase the City as a leader in development of renewable energy sources.	PPA(On-Site), On-Site Owned, Lease, Community Solar Project or other, Solar			Visibility (showcase the city as a leader in renewable energy), savings, reduced environmental impact	Proposal Completeness (10 points) Cost/Best Value to the City (20 points) Financial Strength & Stability (10 points) Experience (20 points) Project engineering analysis (20 points): detailed description of estimated kWh generation Photovoltaic performance monitoring plan (10 points) Provider customer service & maintenance capabilities (10 points): ability to respond quickly to service calls

City of Cincinnati	RFP issued as part of an effort to complete a minimum of 25 MW of renewable energy generation. The Offeror shall provide proposals and services that deliver solar energy installations to offset the City electrical consumption and to provide renewable electricity to those facilities. This requirement may be met with a combination of on-site and off-site solar installations.	PPA (on-site or off-site) Virtual PPA Solar Lease (on-site or off-site) Sleeved PPA, Solar		10, 15 or 20 years		Solar Photovoltaic Development Experience/References Financial Strength & Stability Technical Strength of Site-Specific Proposals & Offeror Customer Services/Maintenance Capabilities Location & Project Completion Proposed PPA Terms & Arrangement Economic Inclusion Project Labor Agreement Other Advantages to the City
City of Cleveland	The City requests solicitations for on-site solar photovoltaic installation at up to 16 city facilities, under a PPA agreement to assist the City in meeting its municipal operational energy management and greenhouse gas reduction goals while saving the City money.	PPA (On-Site), Solar	5.8 MW estimated solar potential for 16 facilities, potential outputs for each site given but no requirements stated	10, 15, or 25 years	Save money on electricity (requirement) Additionality (requirement)	Quality of Proposal, Company Qualifications/Key Personnel Experience, Financing Terms & Price/Cost Effectiveness, Proposed Schedule / Demonstrated Ability, Compliance with the City of Cleveland's OEO goals for Design-Build services
City of Concord (2015)	The City seeks solar energy developers to lease City-owned parcels & install, own, operate, maintain & furnish the City with electricity from solar photovoltaic energy systems at the City-owned parcels under a PPA. This RFP is being issued to allow the City to evaluate multiple options & determine the Solar PV Systems & financial arrangements that best meet the City's interests with respect to technical, economic & environmental benefits, among other factors. The City seeks proposals for base projects for generation of 1MW AC each at any of	PPA (On-Site) net metering, Solar	1-4.2	<= 20 years	Educational/public outreach (requirement), the city requires that the bidder cover any shortfalls in electricity provision	Approach & Schedule, Respondent's Experience & Qualifications, Performance Record of Respondents, its affiliates, subsidiaries or partners. Project Understanding, Overall Solar PV Systems Plan & Optimization for the Site, Education & Outreach, Financing Plan, Carbon Reduction, overall environmental impact the Solar PV Systems provide.

	the 4 sites on offer & optional additional projects for a maximum of 100kW AC each at any of 2 sites.					
City of Concord (2019)	The City seeks solar energy developers to lease City-owned parcels & install, own, operate, maintain & furnish the City with electricity from solar photovoltaic energy systems at the City-owned parcels under a Solar Power Purchase Agreement (SPPA). Peak generation capacity must be greater than 100 kW with a maximum peak generation capacity of 1 MW per site (3 sites available). Initial term of the SPPA not to exceed twenty (20) years.	PPA (On-Site) net metering, Solar	0.1-3	<= 20	Educational/public outreach (requirement), the city requires that the bidder cover any shortfalls in electricity provision	Approach & Schedule, Respondent's Experience & Qualifications, Performance Record of Respondents, its affiliates, subsidiaries or partners. Project Understanding, Overall Solar PV Systems Plan & Optimization for the Site, Education & Outreach, Financing Plan, Carbon Reduction, overall environmental impact the Solar PV Systems provide.
City of Del Mar	RFP for the installation of a solar PV rooftop system onto the newly renovated, "solar-ready" city hall.	On-Site Owned, Solar	>= 0.062 (yield-DC)			Strength of the technical submittal of the Proposal Price
City of Denton (2016) (6187)	The City seeks a term contract for a Utility Scale Wind Purchase Power Agreement for approximately 200MW of wind energy to be purchased over the contract term. This is a physical product solicitation. Responders may submit responses for all or part of the total quantity, but no less than 25MW at a single delivery point.	PPA (Off-Site), Solar	>=25, approximately 200 mW of wind energy to be purchased over the contract term	20 or 10 (10 with option for another 10)		Preference will be given to projects located in areas that will result in lower congestion charges, Past performance & experience on projects of this magnitude & complexity, On-Peak Project Capacity Factor, Purchased Power Agreement Cost. Additional optional judgment criteria: (1) the extent to which the goods or services meet the City's needs, (2) the impact on the ability of the City to comply with the laws & rules related to contracting with historically underutilized businesses & non-profit organizations employing persons with disabilities, (3) the long term cost to the City to acquire the respondents' goods & services, & (4) any relevant criteria specifically listed in the solicitation by the City.

City of Denton (2018) (6890)	The City is seeking proposals for up to 100 MW of utility scale solar energy as part of its plan to obtain a 100% renewable power supply capacity for its native electric load of about 1,500 GWH per year.	PPA (Off-Site), Solar	<= 100	20		Preference will be given to projects located in areas that will result in lower congestion charges, Past performance & experience on projects of this magnitude & complexity, On-Peak Project Capacity Factor, Purchased Power Agreement Cost. Additional optional judgement criteria: (1) the extent to which the goods or services meet the City's needs, (2) the impact on the ability of the City to comply with the laws & rules related to contracting with historically underutilized businesses & non-profit organizations employing persons with disabilities, (3) the long term cost to the City to acquire the respondents' goods & services, & (4) any relevant criteria specifically listed in the solicitation by the City.
City of Denton (2018) (6891)	The City is seeking proposals for up to 100 MW of utility scale coastal wind energy as part of its plan to obtain a 100% renewable power supply capacity for its native electric load of about 1,500 GWH per year.	PPA (Off-Site), Wind	<= 100	20	The City is also requesting a FIXED price that contains a clause that relieves the purchaser of any obligation to receive energy at or below $0.00 ERCOT market settlement pricing for wind proposals.	Preference will be given to projects that are located in areas that will result in lower congestion charges, Past performance & experience on projects of this magnitude & complexity, On-Peak Project Capacity Factor, Purchased Power Agreement Cost. Additional optional judgement criteria: (1) the extent to which the goods or services meet the City's needs, (2) the impact on the ability of the City to comply with the laws & rules related to contracting with historically underutilized businesses & non-profit organizations employing persons with disabilities, (3) the long term cost to the City to acquire the respondents' goods & services, & (4) any relevant criteria specifically listed in the solicitation by the City.
City of Philadelphia	Seeks Proposers willing to supply the City of Philadelphia with renewable energy under a long-term PPA from one or more facility(ies) located in PJM with a strong	PPA (Off-Site), Solar, wind, or other	140,000 - 280,000	20	Reducing carbon pollution, creating local & clean energy jobs, creating opportunities for	Strength of the technical submittal of the Proposal, Strength of the financial offer in the Proposal, Financial strength of Proposer, Prior experience with projects & demonstration of completed similar

	preference for a Plant(s) located as close to Philadelphia as possible.				minority & women-owned businesses	projects Industry position, longevity, & recognition, Proposal's ability to meet the Project Objectives as outlined in section 2.2, Customer references Overall project team credentials & staffing, Responsiveness to Philadelphia antidiscrimination policy & Economic Opportunity Plan, Best value based on review of cost proposal for proposed solution & strengths, weaknesses, opportunities, & threats, Local/regional presence Proximity of the Plant(s) to Philadelphia
County of Santa Barbara	The County is soliciting proposals for Renewable Energy Systems (solar photovoltaic (PV), solar thermal, small wind, equipment upgrades, energy saving equipment), procured under a PPA or direct purchase & installed on County facilities. Renewable Energy Systems to be located at up to 4 County complexes. This purchase will help the County to achieve Zero-Net Energy (ZNE). This effort is a major step towards the County's goals of reducing its carbon footprint and, in turn, reducing costs paid for energy.	PPA(On-Site) or On-Site Owned, solar PV, solar thermal and/or small wind		20	Save money on electricity	Proposer Qualifications & Experience including customer satisfaction, success in maintaining project budget & schedules & financial stability Technical Proposal. Project Costs, Implementation Plan & Schedule, Other Factors As Deemed Pertinent by the Selection Committee
Houston, TX	The City seeks RFPs for 30MW of renewable energy generation on City owned property or elsewhere within the city limits. The City seeks a long-term PPA.	PPA (Off-Site) PPA(On-Site), All Source Types	>= 30	<= 20	Reduce the city's exposure to natural gas price changes, cleaner air, long-term price stability, encourage economic development.	Responsiveness, Technical Competence: technical proposal, financial capability, experience, contract terms, Price
Lebanon, NH	The City intends to engage one or more Developers to undertake development of solar sites on City-owned buildings & land,	PPA(On-Site) or Lease(On-Site), Solar			long-term savings, reduce greenhouse gases, & improve electricity cost stability	Experience, Technical Capabilities & Capacity, Total Value, References

	starting with those sites that are now or will in 2019 be most ready for solar & most likely to be cost-effectively developed. The City is looking to optimize long-term savings, reduce greenhouse gases, & improve electricity cost stability where systems offset load behind the meter & where there is substantial potential electricity generation surplus & help the community rely on as much local renewable energy as is possible.					
Montpelier, VT	seeking to offset 70% of the City's municipal electric metered usage with locally produced net-metered solar power (1000kw). The city will offer one city-owned site for development. The City is also interested in proposals to develop solar on privately owned land within the Green Mountain Power service territory	PPA(On-Site or Off-Site), Solar	1	City wants option to buy out between 7-10 years	Economic Benefit (multiplier effect & opportunities for community residents or private organizations to purchase panels at a discounted rate	Development Approach, Equipment & Installation Details, Financial Implications, Ongoing Operation & Maintenance, Risk Management, Purchasing Options, Economic Benefits, Knowledge & Skills
Norwalk, CT	The City is soliciting proposals from qualified firms to design, fabricate, deliver, install, operate & maintain a rooftop mounted array or ground mount solar photovoltaic electric generating system & a wind turbine (proposing Oyster Shell Park) under a PPA or other form of Financing/Programs.	PPA or Other, Solar & Wind			Support the local solar industry, good local jobs, support quality training programs, contract with sustainable suppliers	The firm's qualifications, experience, & demonstrated familiarity with municipality projects in general & specifically projects of a similar, size, scope, & nature. The firm's experience, & demonstrated familiarity with the State of Connecticut Renewable Energy program or other State & Federal Renewable Energy Programs. The project team's experience with projects of similar nature & scope. Previous oversight & experience in projects involving similar facilities. The proposed project approach & how staff & consultants will be organized and utilized throughout the key phases of the project. Extent of services offered, & depth & extent of overall resources that can be put to use to ensure the success of the project. Quality of references from previous clients.

						Preliminary schedule of time needed to initiate & complete the project and identifying the key phases. Proposal Response Forms & fees.
Palo Alto	To provide electric power generated by renewable resources to meet the City's long-term renewable portfolio needs. The City intends to negotiate & execute one or more Power Purchase Agreements (PPAs), for terms of 5 to 30 years, 1 with one or more selected bidders (Bidders or Selected Bidders) through this solicitation	Power Purchase Agreement (On-Site), Solar, Open to Other Source Types	30000 min, 80000 max	Min 5, Max 30	Seller may cure such Shortfall by paying or crediting Buyer liquidated damages based on the amount of such Shortfall in an amount according to 5 conditions	Total cost of Proposal & value to City, Project viability, Proposal's compatibility with City of Palo Alto's existing electric portfolio
San Diego	The City seeks a proposal to support the City's goal to provide electricity entirely from renewable generating sources by 2035 to the residents, businesses, & government operations within the City of San Diego.	Not specified				Responsiveness to the RFP, Scope of Services, Cost, Interview, Participation by Small Local Business Enterprise (SLBE) or Emerging Local Business Enterprise (ELBE) Firms
San Jose, CA	RFP to solicit proposals from & enter into contracts with qualified firms for solar installations on City facilities & land. The City intends to enter into contracts with one or more providers for each group of sites identified in this RFP. In addition, the City will reserve an option in each contract to add additional sites that will be assessed in the future. The City envisions having a master agreement with set terms & conditions for each contractor	Multiple including PPA & Lease, Solar	Potentials listed per site, but no requirement set			Cost Considerations, Experience, Technical, Local Business Enterprise Preference, Small Business Enterprise Preference, Oral Presentation, Cost, Final Design /Technical Clarifications, Local Business Enterprise Preference, Small Business Enterprise Preference
South Charleston, WV	The City is soliciting proposals from qualified Providers to design, own & operate, finance & maintain a solar	PPA (On-Site), Solar			Showcase the city as a leader in renewable energy, savings, reduced environmental impact,	Selection by Committee based on technical criteria, qualifications & information which will be gathered independently

	installation on one city owned site. The city hopes to reap the financial benefits of more affordable electricity at minimal cost, reduce environmental impact, provide an example of successful renewable energy generation & showcase the City as a leader in development of renewable energy sources.				local economic development & job creation	
Town of Apex	Soliciting proposals from a qualified contractor to design, fabricate, deliver, install, & maintain a rooftop utility-interactive solar photovoltaic (PV) system on several buildings owned by the Town (Purchasing & Inventory Warehouse, Town Hall, Fire Station 1, Fire Station 3, Fire Station 4, Police Headquarters, Public Works Administration, Community Center, Fire Station 5, Wastewater Treatment Plant Office)	On-Site Owned + RECs, Solar	3076.4		The PV systems installed shall provide for monitoring by the Town as well as by the general public on a vendor provided website. The public site is intended for education & outreach regarding renewable energy production & information on avoided greenhouse gas production. The public site shall be maintained for ten years. Contractor shall determine & select all incentives & benefits available to the project	Based on the lowest cost per kWh production bidder for all the buildings

B. Summary of Key RFP Attributes for Restricted Sample

Table 7. Summary of Key RFP Attributes for Restricted Sample (Ready for 100 Municipalities Only)

RFP Attribute	Summary	
Renewable Energy Procurement Type	PPA only: 9 Owned only: 3 Multiple options acceptable: 1 Not Specified: 1	
Renewable Energy Source Type	Any/Multiple options acceptable: 2 Solar only: 9 Wind only: 2 Not Specified: 1	
Supply Capacity Requirement	n = 6 Requesting 0.06MW to 100MW capacity	
Annual Supply Requirement	n = 4 Requesting 3,000MWh to 280,000 MWh	
Renewable Energy Contract Length (Maximum)	Mean: 21.5 years Mode: 20 years	
RFP Additional Goals	n = 5 *Goal* Pollution/GHG Emission Related: 2 Jobs/Economy Related: 3 Education, Outreach and/or Visibility Related: 2 Additionality: 1	*Number of Goals per RFP* One goal: 6 Two goals: 2 Three goals: 3
Response Window for RFP	Mean: 31.5 days	

C. Solar & Wind Potential in U.S.

Figure 5. Solar Photovoltaic Resources of the United States [14]

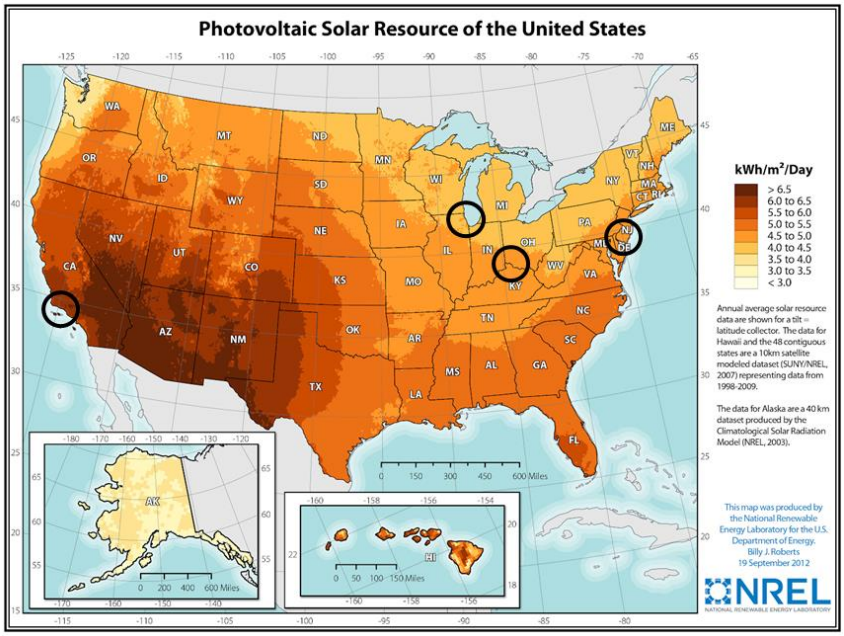
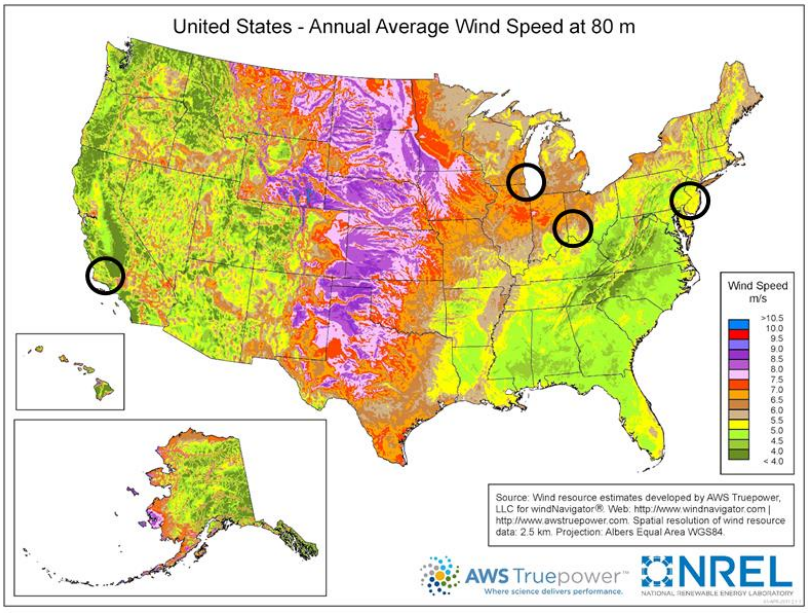


Figure 6. United States Annual Average Wind Speed [15]



[14] https://www.nrel.gov/gis/solar.html

[15] https://www.nrel.gov/gis/wind.html

D. Renewable Energy Job Data

Table 8. Renewable Energy Estimated Jobs Created

Industry	Direct FTE Jobs per $1 million	Indirect FTE Jobs per $1 million	Total FTE Jobs per $1 million
Wind[16]	3.91	3.53	7.45
Wind[17]	3.91	3.53	7.45
Wind[18]	3.88	3.61	7.48
Wind[19]	4.29	3.28	7.57
Wind (onshore)[20]	4.3	3.37	7.67
Average wind	**4.06**	**3.46**	**7.52**
Solar[15]	4.37	2.83	7.2
Solar[16]	4.31	2.94	7.25
Solar PV (central)[19]	4.16	3.44	7.6
Solar[21]	4.01	2.55	6.56
Solar[22]	4.46	3.12	7.58
Average solar	**4.26**	**2.98**	**7.24**

[16] https://www.amazon.com/Creating-Clean-Energy-Economy-Investments-Sustainable/dp/3844306455
[17] Link
[18] https://www.nrel.gov/docs/fy13osti/56266.pdf
[19] Link
[20] Link
[21] Link
[22] https://about.bnef.com/blog/sustainable-energy-in-america-2013-factbook/

E. Material Recommendations

Table 9. Material Recommendations from Roy Hapeman, Energy Manager for Santa Barbara County

Item	Material Recommendation
Solar Panels	• Monocrystal not polycrystal • Copper wires not aluminum wires
Battery	• Lithium Iron not Lithium Cobalt • Require a temperature gauge on the battery