SOLAR ENERGY DEVELOPMENT

INFORMATIONAL REPORT

TO THE

KANKAKEE COUNTY BOARD

By:

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Introduction

The following report is based on information gathered by staff through research, attendance at conferences and various meetings throughout the state, and in some cases speculation and educated guesses. It is meant to help educate the County Board about the various aspects and impacts of solar farm development.

Background

The impetus for the sudden rise in solar development projects centers on the Future Energy Jobs Act (FEJA) which was signed into law by Governor Rauner in 2016 and became effective June 1, 2017. The Act is an attempt to expand the state's renewable energy portfolio and requires, 3000MW of new solar installation and, 1300MW of new wind power generation to be built by 2030. These numbers sound like a lot but if you calculate it out on a statewide basis it comes out to between 8,000 and 15,000 acres of total land consumption which is between 12.5 and 23.5 square miles. If all counties were to receive an equal share, each county would lose between 78 and 147 acres of land to renewable energy development by the creation of solar farms.

The Act will accomplish this goal by providing tax credits or more specifically, renewable energy credits (REC) for four (4) different levels of solar installations in the amounts shown below:

- 50% will go towards small (less than 10kW, medium (10kW to 2MW), and community solar projects (less than 2MW).
- 40% will go towards utility scale solar projects greater than 2 MW.
- 2% will go towards brownfield development.
- 8% will go towards LT (lite) renewable projects (personal use projects).

Since the Act was passed, Kankakee County's planning staff has seen a flurry of activity from solar developers looking for sites in the county. As a result of this activity, planning staff developed a solar farm ordinance which was adopted by the County Board in May of 2017 as an amendment to its Zoning Ordinance. On a side note, this ordinance was one of the first to be developed in the State of Illinois and is being used as a model ordinance by many counties and municipalities.

Prior to the Act's passage, there was only one operating solar farm in the State of Illinois. It is located in LaSalle County northeast of the Village of Streator. This is a 20MW photovoltaic facility located on 160 acres of land in a predominately agricultural area. Staff strongly encourages the County Board to visit this site to see the impacts, or lack thereof, that the facility has on its surroundings.

Recently, additional solar farms have been approved and are under construction including the Shelbyville Solar Farm (500kW), the Soon River Solar Farm (500kW), the West Pullman Farm (10MW), and the University of Illinois Farm in Champaign (6MW).

Types of Solar Farms

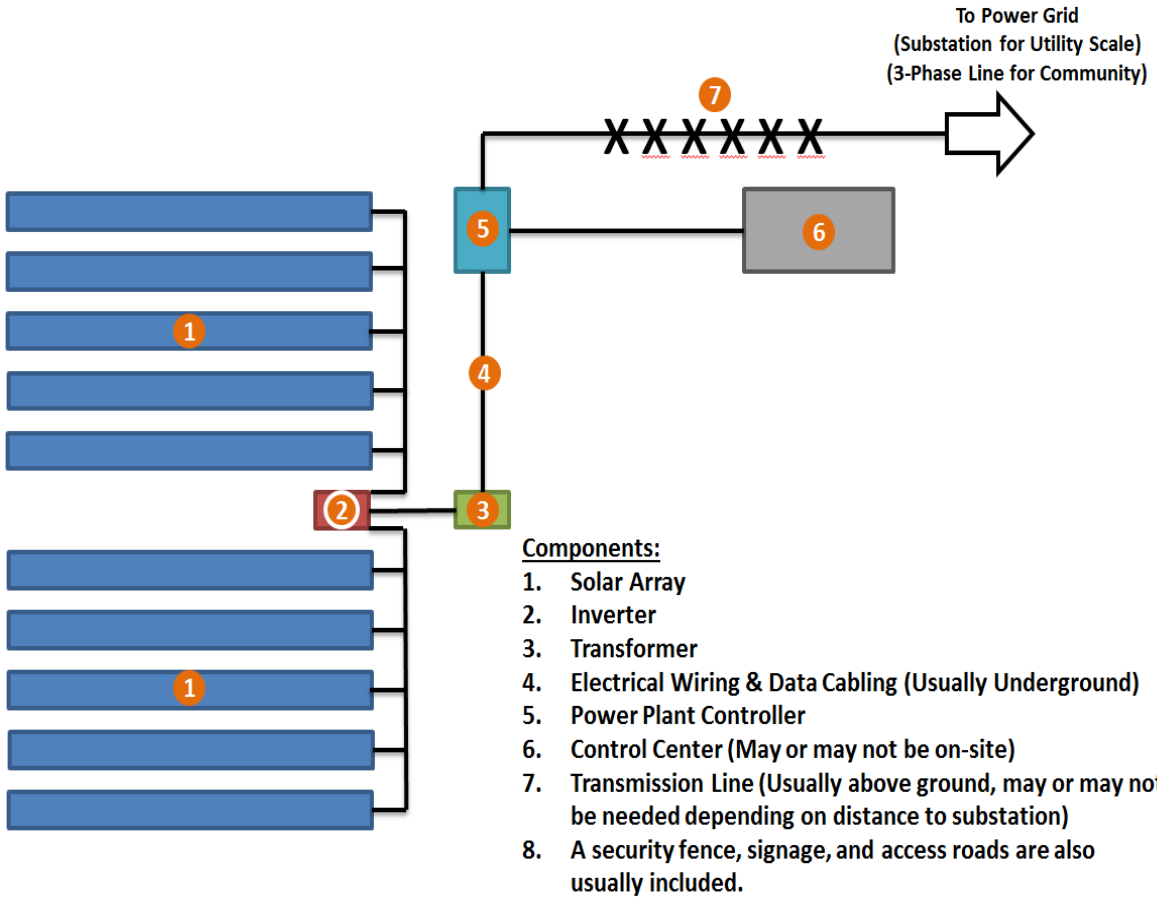
Basically, there are two types of solar farms. A photovoltaic solar farm uses solar panels that convert sunlight into electricity and a solar thermal power plant uses parabolic troughs that collect, reflect, and concentrate the suns energy to heat a fluid which is converted to electricity in a thermal engine. Solar thermal power plant technology is not suitable for use in Illinois' climate and therefore only the photovoltaic system will be employed here.

Additionally, there are two basic types of racking systems for photovoltaic solar arrays. One is a fixed tilt system where the panels are installed at a specific angle and the other is a solar tracking system where the solar array is affixed to a movable platform which can adjust its angle to the sun to maximize energy collection. All of the developers that staff has talked with are intending to use the fixed tilt system in Kankakee County.

Although solar tracking systems will likely not be used in Kankakee County, it is prudent that the Board know how they work just in case. As stated, these systems use a small electrical motor to move the platform to specific angles throughout the day. Typically these movements are extremely minor and virtually unnoticeable to the naked eye. In addition, the movement creates very minimal noise if any and would be comparable to a low clicking sound. Staff has been told that you would need to be standing under the platform to hear anything at all.

Components of a Solar Farm

The question has been raised recently as to what components are included in a solar farm. Components can vary by installation but there are some components which are common to all. Generally speaking, a solar farm has solar panels which are arranged together to form an array that sits on a foundation usually referred to as a racking system. These arrays are then wired, usually underground, to an inverter and then a transformer. From there it is connected to a power station controller and then to transmission lines which connect it to the utility grid. Depending on the size of the facility a control center may be necessary but it may or may not be on-site. Other common components include a security fence, signage, and access roads. The following illustration depicts the layout of these common components.



Construction and Design Standards

Just like the components, the type of construction and techniques used may vary depending on a particular installation however there are some common practices as outlined below:

Foundations / Racking Systems – These structures support the solar arrays and hold them in place and are typically built of steel although some treated lumber may be involved. The foundation supports are steel poles driven into the ground and unless the sites soil types warrant it, are not set into concrete. The picture on the right depicts a typical racking system. Kankakee County's ordinance requires the racking system to be designed and certified by a qualified professional and the system will be reviewed and approved by our independent review agency prior to the issuance of a building permit.

Wiring – The components of the solar farm are all wired together for both the transfer of power and communication between the various devices. Typically, these wires are buried underground with the exception of the transmission lines connecting the farm to the utility grid. Kankakee County's ordinance requires all wiring, with the exception of transmission lines, to be buried under ground.

Concrete – The use of concrete at a solar farm is usually avoided and typically the only concrete used on the site would be for support pads under the inverters, transformers, and power plant controllers. Each of these pads are typically about 8'x10' in size.

Fencing – Most installation have a security fence around their perimeter to protect the site and keep out unwanted guests. Typically this fence is an eight (8) foot chain link fence.

Ground Cover – The ground under the arrays and the remainder of the property is required to be well kept and maintained. This is generally accomplished by the planting of low maintenance grasses or other low vegetation that requires little care or upkeep.

Access Roads – Generally, access roads are kept to a minimum and are usually left in a natural state unless the use of gravel is warranted for a particular location.

A time lapsed video of a solar farm being built can be found here:

https://youtu.be/aVPlKsb-f00

Kankakee County's Zoning Ordinance

The Solar Farm amendment to the County's Zoning Ordinance was adopted in May 2017. This amendment outlines the requirement s which must be met before a building permit can be issued for a solar farm facility. Some of the highlights are listed below:

Zoning District – Solar Farms are only permitted in the A1-Agriculture District when a special use permit is approved by the County Board.

Minimum Lot Size – 5 acres.

Maximum Height – The maximum allowable height is 30' but in most cases these installation are between 8' and 14' in height.

Setbacks – Front setbacks are 100' and a setback of 50' is required from all other property lines with the exception that the solar farm shall be setback 100' from neighboring properties which contain an existing residence or are zoned for residential use. The security fence does not need to comply with this setback.

Screening and Fencing – An 8' security fence is required around the perimeter of the site and at the discretion of the County Board other screening techniques may be required. The requirement for screening will be considered on a case-by-case basis and is usually only required to mitigate issues with neighboring properties. Knox Boxes are also required at all entrances for use by emergency service personnel.

Lighting – Solar farms do not operate at night. Lighting is usually only installed for security purposes and Kankakee County's ordinance requires that it be shielded.

Noise – Like all uses in Kankakee County, noise is limited to 50 decibels measured at the property line.

Signage – Solar farms are limited to signage for safety and for contact purposes.

Taxation

Prior to discussing estimates of property tax amounts to be collected regarding solar energy farms, it is important to understand that the property must first be assessed for tax purposes. At present time there is only one example of a completed and assessed solar farm of notable utility-grade size in the State of Illinois.

Due to the lack of existing statutory language and procedures within the Illinois Property Tax Code to adequately and uniformly value these specialized and unique projects, Erich led the

task to form a subcommittee of concerned Supervisors of Assessments across the State. This subcommittee was formed in May of 2017 to address the matter. After some deliberation, the subcommittee felt the best course of action would be to pursue a legislative initiative to emulate the mechanics of the existing statutory language within the Illinois Property Tax Code concerning the valuation and procedures for assessing wind energy devices (35 ILCS 200/10-600 through 10-620).

In addition, an effort has been made to recognize the differences between wind and solar projects. Primarily, land valuation should be handled differently with solar farms when compared to wind farms. The current wind energy statutes include the valuation of the land component within the formulated assessment. Because solar farms necessitate a large footprint; typically at least five (5) to six (6) acres per Megawatt, our proposed legislation would require the land component of the project to be valued at a commercial rate separate from the formula. The formula itself is intended to value only the assessable improvements of the project. The following is an example of an assessment and property tax estimate, based solely on the formula as it currently exists in our legislative draft:

"EXAMPLE"

Suppose a 10 Megawatt solar farm is constructed on an 80 acre parcel of farmland. As referenced above, each Megawatt requires five (5) to six (6) acres of land. For the purposes of the example, the project will use 60 of the 80 acres. The remaining 20 acres of the parcel would be eligible to retain its preferential farmland assessment provided those 20 acres continue to be farmed. I have selected a representative 80 acre farmland parcel within the unincorporated area of the county to illustrate the current assessed value and estimated tax bill prior to any construction on the site. The 2017 assessed value of this parcel is 9,821. The most recent applicable tax rate in this case is 7.8997%. The resulting estimated tax due for the parcel would be $775.83. Upon construction of the above mentioned solar farm, the total estimate of assessed value for the project, including the 60 acres of land needed for the project would be 2,599,740. Combining this estimated assessed value with the representative tax rate of 7.8997% results in an estimated tax obligation of $205,371.66 for the solar energy project itself. Adding in the 20 acres of farmland which remained in production agriculture in this example provides a complete evaluation of the estimated tax bill for the 80 acre parcel. By prorating the original bill at 25% of the initial tax estimate for the 80 acres being entirely farmed ($775.83 x 0.25), the result adds an additional $193.96 to the estimated tax bill for the solar farm. Given these calculations, the total estimate of property tax owed on the 80 acre parcel after the construction of a solar farm would be ***$205,565.62****. In this example, the increase in overall taxation to the property amounts to $204,789.79 ($205,371.66 - $775.83).*

It is important to note that the above calculations are based upon the current structure of our draft legislation. As the bill potentially passes through the State Senate and House of Representatives, the valuation components of our formula are subject to change, leaving this,

and any other property tax estimate to be highly speculative at this juncture. In the absence of new legislation regarding solar farms, the only other viable option is to perform a cost approach to value utilizing an itemized cost list from the solar energy company. This itemized cost list is currently required to be provided to the Kankakee County Building Department at the time of permitting for the construction of a solar farm.

As with any other proposed legislation, we have no way of knowing the final outcome and can only give our best guess, as outlined above, at this time

Additional Financial Benefits

Besides the real estate tax generated by these facilities, Kankakee County, as the regulatory permitting agency, will also see revenue from building permits, special use permits, and possibly other permits depending on the size and scope of the project. Of course, solar farms located in an enterprise zone would be entitled to all of the benefits of the zone which could reduce these sources of revenue.

Impacts

A common question that keeps reoccurring when discussing solar farms is "What are the impacts and negative affects imposed by a solar farm and how can they be mitigated?". Staff has looked into this question and offers the following answers:

Noise – The construction phase of a solar project would likely create noise but staff feels that the noise generated would not be any greater than that of any other construction project. Once operational, only two (2) source of noise should exist on the site. One would be a low hum from the inverters that according to research would not be noticeable more than 50' from the device and the other would be the low periodic clicking sound produced by the tilting motors if a solar tracking system were used. Because of Kankakee County's setbacks and the industry practice of placing the inverters at the center of the site there should be no discernable noise from these devices that would affect neighboring properties. As stated previously, staff does not believe a solar tracking system will be used at all.

Interference and Electro-Magnetic Fields -Solar facilities generate electro-magnetic fields similar to household appliances within close proximity, which dissipate with increasing distance and pose no health risk to neighboring residents.
https://www.ncbi.nlm.nih.gov/pubmed/26023811

Water – Solar Farms do not use water on any regular basis. In fact, the only time water would be used on the site would be too clean the panels which, according to industry professionals, would be rare as normal rainfall in Illinois would adequately perform this task.

Odors – A solar farm would not produce any discernable odors that staff is aware of or that our research would indicate.

Glare – Solar farms are designed to absorb light to convert it to energy. Light particles reflecting off of these devices would defeat this purpose, thus solar farms do not produce any glare that would be of concern. A testament to this is the fact that solar arrays are installed at airports with no negative impacts.

Heat – Due to the absorption of sunlight, solar panels produce a small amount of heat which is enough to keep the panels free of ice and snow.

Aesthetics – "Beauty is in the eye of the beholder". You likely could find as many people that would think solar farms are beautiful as would that would find them ugly which is why it is very difficult to regulate the aesthetic attributes of a project. However, the Kankakee County ordinance does provide the County Board with the ability to require some mitigation techniques such as berming, screening, plantings, and other landscaping measures to lessen any aesthetical impacts perceived by neighbors. In addition, the ordinance also has provisions for the maintenance of the site and how ground cover will be addressed.

Property Values - Solar Farms are being newly introduced into the State of Illinois. Due to this fact, insufficient data exists to derive any meaningful conclusion pertaining to a solar farm's impact on the market value of surrounding, or nearby properties. Across the country there is limited research on the impact of utility scale solar projects on property values. As such, an alternative approach may be needed to address these concerns; one possible option would be to look at the impact of large-scale wind projects on property values although the differences between these two types of power generation facilities may be too great to make an adequate comparison.

The existing research regarding wind farms, which examined the property values of residential homes located near or with views of wind turbines, provides little or no evidence that home values are affected (positively or negatively) before or after the construction of a facility.

Furthermore, a study conducted by Hoen et al in 2013, analyzed data from more than 50,000 home sales across 27 (mostly rural) counties in nine states that were within 10 miles of wind facilities. The study found no statistically significant evidence that home prices near wind

turbines were affected in post-announcement, pre-construction or post-construction periods. The study concluded that if effects do exist, the average impacts are relatively small and/or sporadic, impacting only a very small subset of homes.

The above referenced market data conclusions were obtained at the following web address:

https://training.ny-sun.ny.gov/88-resources/faqs/general-faqs/272-do-solar-installations-have-an-impact-on-property-values

Drainage - The minimal amount of grading and earth moving required by a solar farm development should have little impact on drainage of the site or the surrounding area. However, the Kankakee County ordinance requires that the developer provide information and maps on floodplains, wetlands, waterways, surface water drainage patterns, and drainage tiles on the site. The County Board, at its discretion, can address any concerns it has with drainage on a case-by-case basis.

Roadways – Once the facility is constructed and operational there should be virtually no impact to the roadways as there will not be any on-site employees. Their staff, in most cases, would only visit the site when maintenance or repairs are required. However, there would be some impacts during the construction process but those impacts would be addressed by the Road Use Agreement as required by the County Code.

Environmental Impacts - The collection and use of solar energy releases no CO_2, SO_2, or NO_2 gases and does not contribute to global warming. Photovoltaic is now a proven technology which is inherently safe as opposed to some dangerous electricity generating technologies. As projects are reviewed, the Board will need to decide if any environmental impacts exist based on the aspects of each individual project.

Comprehensive Plan

The Kankakee County Comprehensive Plan was last adopted on November 8, 2005. This Plan sets forth Goals and Objectives for the growth and development of Kankakee County in the following categories.

- Land Use and Development
- Transportation
- Natural Resources, Open Space, & Recreation
- Public Facilities
- Economic Development

The Plan identified three possible future development scenarios and the Board chose the "Urban / Rural" scenario for its future plans. In this scenario, developments that were best suited for urban settings would be concentrated in or near existing urban developments while developments best suited for rural settings would be permitted in the other, more rural, areas of the County. The Plan then established Goals and Objectives to help guide the County in making this scenario a reality. The Goals and Objectives that may pertain to solar farm development are list below along with the staff's interpretation of how they might apply.

Land Use and Development

Goal 1: Provide locations for adequate urban development in Kankakee County while minimizing impacts to natural resources (prime agricultural soils, forests, and riparian areas) and maximizing available public services (roads, sewer, water, and police and fire protection).

Objective 1.1: Focus growth and development within the County's municipalities.

The underlying point of this objective means that developments that can be in municipalities should be in municipalities and therefore should not be approved in the rural areas. Solar farms, while not an agricultural use, do not appear to hinder surrounding agricultural uses in any substantial way. Further, solar farms are subject to locational limitations as they need to be next to, or in close proximity to transmission infrastructure such as substations and three-phase transmission lines. Therefore, solar farms may not be able to be located in or near a municipality.

Objective 1.3: Support agricultural conservation including limiting non-agricultural development to densities and development patterns that are consistent with the continuation of agriculture.

This Objective does not prohibit the development of non-agricultural uses in the rural areas but rather warns the County Board to limit the amount of uses that may have an impact to the continuation of agricultural pursuits. The amount of this type of development and whether it has an impact to agriculture is for the County Board to decide on a case-by-case basis.

Objective 1.4: In planning for future community growth areas, seek to avoid unnecessary conversion of agricultural land to non-agricultural land-uses.

The key word here is "unnecessary". The County Board will need to decide whether the location of any particular solar farm is necessary and outweighs the potential loss of farm land.

Objective 1.5: Allocate adequate commercial, industrial, and residential acreage to meet future needs.

The County Board needs to allocate an adequate amount of land for solar farm development. How much is entirely up to the Board.

Objective 1.6: Approve development projects subject to the availability of adequate public facilities and utilities.

Since solar farm developments require very little in the realm of public services and utilities once they are constructed, most locations in the County would be adequate once you get beyond their need for adequate connection to the power grid.

Goal 2: Preserve the County's distinctive rural, natural, and cultural resources.

Objective 2.3: Protect and enhance the extensive open space areas that are essential to the overall image and character of Kankakee County and its municipalities.

Areas of particular natural beauty and character should be avoided for all developments and not just solar farm development. The Board will need to consider the natural beauty or character of each proposal as they move through the approval process and how the development of a solar farm in a particular area might affect the natural beauty and character of that particular area.

It should be noted that a Comprehensive Plan is merely a guide for local officials to follow and is not regulations, ordinance, or law and can be changed or followed as the County Board sees fit.

Approval Process

Solar farm developments in Kankakee County are not permitted anywhere by right and **ALL** must be approved by the Kankakee County Board through the issuance of a special use permit which has gone through the proper process which would include public hearings.

Because of this fact, staff would caution the County Board against having any contact with developers, objectors, or land owners, as this may harm the aforementioned entities right to due process. The County Board must examine each case individually and render their decision based on the facts of the case as presented at the public hearing(s) and not public or political opinion, conjecture, outside research, feelings, or pressure from other sources. The inclusion of any outside information into the decision making process is prohibited and must be avoided at all times.

Solar Projects in Kankakee County

As stated previously, since the passage of the Future Energy Jobs Act last year the Planning Department has been inundated with inquiries concerning solar farm development. While many of these inquiries were merely speculative some will likely become real projects. Although no project has actually applied for a solar farm as of the date of this report, there are 14 proposals (11 in unincorporated Kankakee County) that have a strong potential of becoming actual projects.