TO: Planning Commission, Johnson County, Kansas

FROM: Denise Nelson, PE, CFM, ENV SP, LEED AP

DATE: April 20, 2021

RE: Planning Commission Solar Work Session on April 27, 2021

Johnson County staff has requested a consultant review the Comprehensive Plan and Zoning Ordinance with consideration to additional amendments as may be appropriate regarding solar energy facilities, including ancillary battery storage facilities. The County may soon have to review solar energy facility applications, and the current policies are inadequate to address this new, complex land use.

Rural Comprehensive Plan

The Rural Comprehensive Plan for the unincorporated area of Johnson County, Kansas was adopted on June 3, 2004. The plan does not specifically mention solar or other energy generating or storage facilities. The plan does describe the general trends and future preferences for development with emphasis on maintaining the rural character, open space, and active agriculture production in the county.

Zoning Ordinance

The zoning ordinance does not specifically mention solar generating facilities, but it does set guidelines for development to maintain the rural character, open space, and active agriculture production in the county. The ordinance regulates "solar collectors" as accessory uses and provides requirements for Conditional Use Permits and Special Permits, both of which allow for power generation.

January 26 Planning Commission and March 11 Committee of the Whole

The Planning Commission meeting on January 26 and the Committee of the Whole meeting on March 11, 2021 kicked off The Berkley Group contract services. County staff facilitated introductions, discussed the need for amendments, and briefly introduced the status of the solar industry. The Berkley Group further presented on the status of the solar industry, the associated land use impacts, the status of the County's policies, and the types of amendments to consider.

April 27 Planning Commission

The Planning Commission work session on April 27, 2021 is scheduled for an open discussion of potential amendments. The discussion will focus on the following topics.

The Solar Industry

U.S. solar photo-voltaic (PV) installations have grown from generating 1.2 gigawatts (GW) in 2008 to 97 GW today according to the Solar Energy Industries Association (https://www.seia.org/). Most of that capacity is in California and a handful of other states. Kansas has approximately 82 MW of installed solar capacity, ranking in the bottom ten of all states. By comparison, Nebraska had 63 MW, Missouri had 293 MW, Oklahoma had 75MW, and Colorado had 1,700 MW of installed solar capacity.

The latest U.S. Solar Market Insight forecasts the market will grow four times by 2030 and reach over 419 GW. The growth in solar facilities will increase the workload of local governments and state agencies tasked with land use, permitting, and environmental decision making. Local governments must determine if solar facility applications are both in accord with their Comprehensive Plans and in compliance with their zoning regulations.

Solar Facilities

In general, solar PV energy generation can either be installed on structures (rooftop or integrated) or ground mounted. PV installation on structures of all shapes and sizes can produce adequate energy for onsite use and stimulate economic jobs related to manufacturing, installation, and maintenance. The County ordinance regulates these "solar collectors" as accessory uses.

Ground mounted solar is the topic for this work session and associated policy amendments. Ground mounted solar is typically defined with three categories:

- **Small-scale** is a solar facility with a solar PV panel coverage of **less than one (1) acre**. This size is approximately equivalent to a rated capacity of about ten kilowatts (kW) to 250 kW alternating current. Facilities are generally generating electricity from sunlight primarily to reduce onsite consumption of utility power for residential, agricultural, commercial, and industrial applications. For reference, one acre is just smaller than the size of a football field.
- **Medium-scale** is a solar facility with a solar PV panel coverage of **between one (1) acre and ten (10) acres.** This size is approximately equivalent to a rated capacity of about 250 kW to one megawatt (MW) alternating current. Facilities are generally generating electricity from sunlight primarily to reduce onsite consumption of utility power for commercial and industrial applications. For reference, a professional baseball field is approximate 4.5 acres.
- **Utility-scale** is a solar facility with a solar PV panel coverage of **more than ten (10) acres**. This size is approximately equivalent to a rated capacity of about one (1) MW alternating current or greater. Facilities are generally generating electricity from sunlight to provide electricity to a utility provider.

Ground mounted, utility-scale solar facilities (more than 10 acres and more than 1 MW generating capacity) are the primary focus of the topic for this work session and associated policy amendments. These facilities typically include Inverters, a Substation, a Switchyard, and a Generator lead line (gen-tie line) to interconnect to a grid Transmission line. They may include Battery storage.

There is a dozen or two constructed utility-scale solar facilities in the region. Most facilities in Kansas are 1 MW, excluding the 6 MW facility in the City of Pratt. A 20 MW facility is under construction in Johnson City.

Nebraska's utility-scale solar facilities are 1 to 8 MW. Missouri's largest facility is 8 MW, but most of them are under 3 MW. Oklahoma has facilities ranging from 3-15 MW with a 250 MW site under development. Colorado has many facilities, and one is 50 MW. They have a 120 MW facility under development.

Side note: the industry also has a classification for community solar (also known as shared solar or solar gardens) that refers to facilities up to 5 MW that provide power to those who choose to subscribe. For land use purposes, these are utility-scale solar facilities and should be permitted the same.

Utility-scale Solar Facility Development Considerations

Ground mounted solar facilities are large scale industrial/commercial facilities that can take up agricultural, industrial, or commercial land for at least twenty years or more. Any solar facility proposal needs to be weighed carefully against other potential uses of the same property. In addition, while solar facilities alone are generally a passive land use, battery storage facilities pose a greater potential hazard. The location and conditions for battery storage also need to be thoroughly evaluated.

Today's discussion will focus on permitting, decommissioning, and development standards. Based on the discussion, The Berkley Group will work with staff to prepare amendments to The Rural Comprehensive Plan and the Zoning Ordinance for your review.

1. Permitting

Both Zoning Article 23. Conditional Use Permits and Article 33. Special Permits allow for power generation:

- Article 23. Conditional Use Permits, Section 4 Conditional Uses Which May Be Approved in Certain Zoning Districts (p. 23-4) allows for Group A uses in most zoning districts including "Privately owned and not publicly or quasi-publicly owned utility substations, water treatment or distribution facilities, pipeline terminals, telephone switching or transmission stations, power plants, electrical distribution or transformer stations, wastewater treatment plants, and the like."
- Article 33. Special Permits, Section 4. Special Permits in Certain Zoning Districts (p. 33-2) allows for Utilities in most zoning districts including "Utility facilities that provide the infrastructure services of electricity, gas, water, or wastewater services, including ancillary uses and facilities."

Staff recommends solar be permitted by CUP. That will require adding a new section for utility-scale solar to Article 23. Conditional Use Permits. We may also need to clarify that utility-scale solar requires a CUP in Article 33. Special Permits.

2. Decommissioning

Decommissioning is removing something from service. It is rare to decommission facilities or infrastructure; usually they are reconstructed, rehabilitated, or repurposed. In this case, solar developers are proposing to construct solar facilities with an approximate 40 year lifespan. It is in the County's best interest to require decommissioning to remove and restore the site to the predevelopment condition. Deconstruction can be just as disruptive and expensive as construction. It is difficult to forecast the state of the industry in 40 years or the market for deconstruction services or salvage value.

We recommend following industry best practices in requiring a Decommissioning Plan, a decommissioning cost estimate, a security or escrow, and a mechanism for updating the decommissioning cost estimate and security regularly. The security or escrow is necessary to protect the County and landowners from liability if the development or developer goes out of business.

3. Development Standards

There are many development standards to address in the permitting process. Today's discussion will focus on these interrelated standards for utility-scale solar facilities: size, location, setbacks, screening, and wildlife corridors.

3a. Size

It is common to regulate facilities based on size. Utility-scale solar facilities are defined as larger than 10 acres, and the size could go beyond 10,000 acres if land is available. The maximum size allowable will impact the locations targeted for solar, the amount of land disturbance including erosion and sediment control and stormwater management, the duration of construction, and the movement of people and wildlife around the site. Too much of a single land use in one community, either by one facility or several nearby, can impact the character of the community.

For reference:

- One section of land is one square mile or 640 acres. If developed as a solar facility, that would likely generate approximately 64 MW. The panels themselves would cover approximately 380 acres (approximately 60% of the project area).
- Heritage Park complex is approximately 1,300 acres. That would likely generate 130 MW. The panels would cover approximately 780 acres.

For discussion, staff recommends:

- Limiting utility-scale solar facilities to 1,000 acres. Facilities of that size would likely generate 100 MW. That is a big jump from the 1 and 6 MW existing facilities in the state.
- Limiting panel coverage to 60% of the project area. This is a secondary metric to ensure providing adequate setbacks, stream buffers, and wildlife corridors.

3b. Location

Utility-scale solar facility proposals must be carefully evaluated regarding the conversion of agricultural, forested, or residential land to an industrial-scale use. These projects typically have a 35-40 year lifespan or more and may conflict with surrounding land uses or restrict growth in the community. Potential sites for solar may be sites near transmission lines, capped landfills, brownfields, or "invisible" areas. Sites to avoid include prime farmland; areas with cultural, historic, or environmental resources; or areas near cities, residential areas, Area Plan boundaries, or other solar facilities.

For discussion, staff recommends these parameters:

- Zoning districts: RUR, PEC-2, PEC-3, PEC-4, and PEC-LP.
- Distance to city limits >1 mile (potential waiver option).
- Distance to these Area Plan borders >1 mile.
    - Executive Airport Comprehensive Compatibility Plan
    - New Century Air Center Comprehensive Compatibility Plan
- Distance to other solar facilities >2 mile.

3c. Setbacks

Based on other County setback requirements, staff recommends these criteria:

1. The minimum setback from project fencing to exterior parcel lines shall be 150 feet.
2. The minimum setback from project fencing to dwellings shall be 250 feet.

3d. Screening

Based on other County setback requirements, staff recommends these criteria:

1. The minimum screening shall be ≥100 feet wide.
2. Screening shall be provided by landscaping and/or berming and may include existing vegetation and topography.
3. No screening shall be placed in the setback from the official street line.
4. Security fencing shall be placed interior to the screening.

3e. Wildlife corridors

Converting farms or forests to solar facilities may reduce wildlife mobility. The arrangement of panels within a project site should allow for wildlife corridors.

Staff recommends these criteria:

1. Security fencing shall be placed around sections of the infrastructure (not the entire site) to provide access corridors for wildlife to navigate through the facility.
2. Show proposed wildlife corridors on the development plan submitted.

Next Steps

Based on the discussion and recommendations from the Planning Commission, The Berkley Group will work with staff to prepare amendments to The Rural Comprehensive Plan and the Zoning Regulations for your review. The amendments will bring greater clarity and specificity for how the County reviews and potentially authorizes solar energy facilities. They will also provide further guidance to the solar industry on how to prepare future solar energy applications. These amendments will be presented to the Planning Commission for additional review and a public hearing will be scheduled to gather additional input from utility providers and citizens who may be interested in these facilities.