Agenda

Jefferson County Planning Commission Meeting

and Comprehensive Plan Amendment Workshop

Tuesday, September 28, 2021 at 7:00 PM

All Citizens that desire to speak must sign-in prior to the Agenda Item being addressed. This meeting will NOT be a live broadcast on our website. Instead, it will be accessible through a live ZOOM Meeting only.

If you wish to make a public comment for one of the agenda items,
please type your name, address, and agenda item # in the chat function at the start of the meeting.

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1. ***Envision Jefferson 2035 Comprehensive Plan*** (approved 1/14/15)
   a. Overview of "Economic Development, Employment and Infrastructure Element" with particular focus on the Alternative Energy subsection under Infrastructure
2. **Round Table/Public Workshop**

   Input from Key Stakeholders and interested citizens (3 minutes for individual)
3. **Next Steps**

   Planning Commission Work Session: October 5, 2021 to finalize proposed language

   Planning Commission Public Hearing (tentative): November 16, 2021

There is no public comment for the following items.

4. **Review and Discuss**: Planning Commission discussion and direction to staff regarding proposed Comprehensive Plan text amendment

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MEMO

TO: **Planning Commission**

FROM: **Jennifer Brockman, County Planner**

DATE: **September 28, 2021**

RE: ***Envision Jefferson 2035 Comprehensive Plan* Amendment**

On September 14, 2021, the Jefferson County Planning Commission (PC) received the attached letter from the County Commission (CC) requesting that the Planning Commission consider amending the *Envision Jefferson 2035 Comprehensive Plan* (the *2035 Plan*) to clarify or state that solar facilities are Principal Permitted Uses in the rural and residential zoning districts.

An amendment to an existing comprehensive plan should include a review of the relevant goals, objectives and recommendations of the plan to determine if they need to be modified or strengthened to reflect the topic under consideration. The Goals and Objectives of the *Envision Jefferson 2035 Plan* can be found in Appendix D. Goal #10 primarily focuses on the Infrastructure and is attached for reference. This goal and its objectives should be reviewed to ensure they provide the overall vision for the solar facilities for Jefferson County.

The *2035 Plan* consists five primary Elements that discuss the various plan recommendations:

1. Land Use and Growth Management Element
2. Economic Development, Employment, and Infrastructure Element
3. Cultural, Historic, Natural Resources and Recreation Element
4. Education and Public Libraries Element
5. Finance and Public Safety Element

These Elements include discussion and policies related to each element that are tied to the relevant goals with the intent of guiding decision-making. Each Element also contains numerous recommendations intended to be action statements, which guide the implementation of the stated policies. Recommendations can be more specific statements that direct programs, regulations, operational procedures, or public investments.

Attached are the two sections of the "Economic Development, Employment, and Infrastructure Element" of the *2035 Plan* which related to the "Agricultural and Rural Economy" and "Infrastructure" that should be considered for possible revision to incorporate the direction provided by the County Commission related to solar facilities in the County.

While it should be noted that both the Planning Commission and County Commission found that the previous zoning text amendment related to solar energy facilities was consistent with the *Envision Jefferson 2035 Comprehensive Plan*, the CC direction is to clarify or strengthen the language related to permitting these facilities in the rural and residential districts in the County. For these reason, an amendment to the *2035 Plan* is being developed to address this topic.

Attachments:

- 9-9-21 Letter from County Commission
- Excerpts from *Envision Jefferson 2035 Comprehensive Plan*:
  - Goal #10 (pg. 196)
  - 2.B. "Agricultural and Rural Economy" (pgs. 72- 80)
  - 2.D. "Infrastructure" (pgs. 85 – 94)
- Excerpts of WV Code Chapter 8A related to Amending the Comprehensive Plan

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September 9, 2021

Mike Shepp, President
Jefferson County Planning Commission
104 E. Washington Street
Charles Town, WV 25414

Re: Jefferson County Comprehensive Plan

Dear Mr. Shepp:

As special legal counsel for the Jefferson County Commission ("Commission"), I am writing to inform you of an action taken by the Commission, pursuant to W.Va. Code §8A-3-11, at its meeting on September 2, 2021. By a duly adopted motion, please be advised that the Commission hereby requests that the Jefferson County Planning Commission consider amending the Jefferson County Comprehensive Plan to clarify and/or state that solar facilities are principal permitted uses (PPU's) in the rural and residential zoning districts.

The Commission further requests that the Planning Commission address this matter in an expedited manner.

Thank you for your consideration of the Commission's request.

Very truly yours,

s/William F. Rohrbaugh
WVSB No. 5048

Goal #10: Maintain and Enhance Community Services and Infrastructure Capacity for Water, Sanitary Sewer, Storm Sewer, and Other Utilities; and Enable the Provision of Orderly and Efficient Services and Advanced Technologies.

Objective #1: In coordination with public and private service providers serving Jefferson County, create a public service plan for the County that identifies specific standards (based on state and nationally accepted standards for communities), the applicability of enhancements to existing facilities, and potential locations of future infrastructure improvements.

Objective #2: Continue to coordinate between county and regional/state agencies in relation to information and activities related to meeting Chesapeake Bay Watershed Implementation Plan (WIP) goals.

Objective #3: Create and implement a means to require shared infrastructure between existing and proposed development.

Objective #4: Require that new utility facilities and/or extensions are located within Urban Growth Boundaries (UGBs), Preferred Growth Areas (PGAs), or Villages.

Objective #5: Identify and implement ways to provide utility services within and immediately adjoining Village areas.

Objective #6: Provide mechanisms to ensure that existing utility systems are upgraded to meet the needs of the residents and businesses throughout the County.

Objective #7: Private water and wastewater plants shall meet material and design standards set by local publicly owned service providers.

Objective #8: Work with appropriate local agencies and regional providers to extend natural gas services into Jefferson County.

Objective #9: Encourage the creation of and use of a variety of energy sources (including renewable energy) within Jefferson County in ways that respect the character of the County.

Objective #10: Adhere to the regulations included as part of the Jefferson County Stormwater Ordinance.

Objective #11: For water and sewer utilities to serve new developments and in areas currently not served by water and sewer where services have been deemed necessary by local or state health officials, allocate costs equitably so that new development or the development being served is responsible for the infrastructure cost, rather than existing ratepayers.

2.B. Agricultural and Rural Economy

One of the more significant issues expressed by County residents involved in the Envision Jefferson 2035 process was maintaining the rural economy and small town lifestyle of Jefferson County. It is important that this discussion not be framed by the concept of preservation but of creating opportunities for farms to be economically viable. This would include identifying ways to protect and enhance the farms and open spaces that provide the rural character along with the agribusinesses that have been the historical heart of the Jefferson County economy. One goal of this Plan is to maintain productive farmland soils and the rural character and economy of the County by reducing the conversion of farmland to non-agricultural based uses.

There must be a viable rural economy to maintain the rural landscape. The rural economy is much more than traditional farming. It includes innovative agriculture, horticulture, forestry, commercial and non-commercial equine industry, other forms of animal husbandry, tourism, rural based public and commercial recreation, ancillary rural business, and compatible rural institutional uses. Many of these sectors are growing and collectively contribute significantly to Jefferson County's economy and provide several thousand jobs. The County's citizens benefit from the proximity of rural based activities and services and the rural enterprises benefit from nearby markets for goods and services. With this potential, the rural areas of Jefferson County should be seen as ripe for investment and reinvestment.

A key aspect of the County's rural economy is recognizing the changes in the regional and national marketplace that might affect agricultural activities at the local level. In some instances, farm operators have adapted to these changes by diversifying into additional farm based activities, changing the types of farming activities taking place on a site, or seeking to include direct sales and on-site marketing, and value added processing of crops or products. The ability of a farm operator to diversify or change their operations to meet the needs of the marketplace is an important consideration in providing a framework for the continuation and enhancement of farm and agricultural activities in Jefferson County.

The enhancement of the rural economy is a central focus of the rural strategy of this Plan and requires the support of the Jefferson County Development Authority and other organizations which support the agricultural economy. A broad-based rural economy can be a net-revenue generator for the County because tax revenues generally exceed expenditures for rural properties. The County recognizes its fiscal responsibility to protect the land resource for the rural economy, to provide fundamental protection for rural businesses, to ensure prudent fiscal management of limited public resources, and to provide needed protection of the public health and safety.

Rural Economic Activities

The agricultural community in Jefferson County recommended the following priorities to strengthen the rural economy:

Agricultural Community Priorities
Diversify farm operations through the sale and marketing of value added products (such as the processing and marketing of products on-site);
Allow farm operators to work with nearby farm operators to market and sell each other's goods on each individual farm;
Allow a wider range of service activities to take place on agricultural properties.

The rural areas of Jefferson County include not only farms and residences, but also a variety of small artisan studios and other cottage industries. While the preservation of agriculture is essential to the protection of rural areas, it is also important to provide for the ability of appropriately scaled businesses to succeed. When permitting additional uses in the rural area, it is important that the size and scale of both the property and the business be correlated. The intensity of the activity permitted should directly relate to the size of the rural property which would enable larger rural properties to undertake more activities. By correlating scale and intensity of uses to the rural property size, it is anticipated that off-site impacts would be mitigated for the surrounding landowners. Some uses may require performance standards which should be incorporated into the local land use regulations.

By enabling farm operators to have more options and encouraging the creation of cottage industries that reflect the rural aesthetic, the viability of operating rural based businesses in the County's rural areas will be enhanced in the coming decades. While Jefferson County has modified its Zoning and Land Development Ordinance to allow for a greater variety of uses, additional steps might be needed to improve opportunities for farm operators to continue or expand their businesses, and for artisans and other individuals to operate small businesses that complement these activities. A streamlined process for uses with minimal impacts to surrounding neighbors should be developed.

The land use component of this Plan recognizes an example of a non-residential Conditional Use Permit (CUP) in the Rural area referred to as an Agricultural Based Economic Empowerment Area, defined as a commercial agricultural hub that is not located on a farm, but is located in a rural area and focuses on intensively supporting agricultural activity through the value added processing, holistic health and marketing of local goods. Other appropriate uses in the Rural district (some of which may require a CUP) include, but are not limited to, artisan activities; home based businesses; agricultural equipment sales, rental, and repair services; veterinary services; farm co-ops; product storage and seed supply; agri-tourism, bed-and-breakfast enterprises; farm markets, wayside stands, and similar types of uses, provided that these uses are designed in a manner compatible with the rural character of the area.

There are many creative people that live and work in Jefferson County, using their talents to create poetry, pottery, paintings, plays, performances, photographs, novels, fabric art, sculpture, carvings, installations, music and dance, and the fine art and culture of all forms. The County is home to numerous cultural and historical organizations as well as artist studios, galleries, museums, and theaters which host a number of activities and events throughout the year. These activities and organizations add to the cultural value in the County and provide economic resources for the artisan. This Plan supports the artisan community and its needs for developing a robust economic and cultural community.

While most of these types of Cottage Industries and Home Occupations are permitted by right in the Rural District, some more intense uses may require a CUP. This Plan recommends that the use of the CUP in the Rural District be limited to non-residential uses not permitted in the Rural District which are compatible in scale and intensity with the rural environment and that pose no threat to public health, safety, and welfare. Some non-agricultural/non-residential related rural CUPs should only be proposed on a small portion of a rural property to help preserve farmland and open space, and continue agricultural operations. This requires eliminating the Land Evaluation Site Assessment (LESA) system and modifying the CUP process. For additional discussion, see Rural Land Use Planning Section (page 34).

Agricultural Service Facilities

An issue expressed by members of Jefferson County's agricultural community during the planning of this document was the lack of agricultural service facilities located in Jefferson County. Farm operators currently travel to Winchester, Hagerstown, or Frederick to purchase farm machinery or to get their machinery repaired. Farmers raising livestock also need to travel out of state to sell or purchase animals at auctions. There are few large animal veterinarians in Jefferson County that can assist with maintaining the health of animals or be available in case of emergency. There are no meat processing facilities in the County and nearby out of state facilities are limited to mass production which excludes small farmers from receiving this service. The lack of service facilities could have a negative impact on the maintenance or expansion of agricultural activities in Jefferson County in the coming years.

Distribution and Marketing of the County's Agricultural Products

In recent years, there has been a change in the way farm products are marketed and sold in Jefferson County. In the past, a large number of farm products cultivated on Jefferson County farms were commodities, with little differentiation between the products of individual farm operators. Currently this is changing due to the increasing reliance of the local farm community on farmers' markets and direct sales to local and regional restaurants. There are several farmers' markets operating in Jefferson County on a weekly basis, during the growing season, at temporary sites. A permanent year-round farmers' market could provide opportunities for a winter market in a place that could also be used for the sales of arts and crafts, root crops, or value added products. Incorporating a farmers' market into a regional agricultural center

complex could serve as another means of selling the County's farm products and could include dining and/or commercial kitchen facilities.

While the farmers' markets have helped individual farm operators differentiate between their products, there is still a limited local or regional identity when it comes to agriculture in the Eastern Panhandle. In some cases, individual farms have addressed this concern through the creation of an identity for the farm and/or for the product being produced. It would be beneficial to the Jefferson County rural economy if a more unified effort occurred through a shared marketing mechanism, regional branding, or the creation of common distribution and marketing facilities.

An increasing movement toward smaller farming operations of less than 40 acres in size in the County should not be discounted, even though a number of farms in Jefferson County are located on large tracts of land. According to the 2012 U.S. Agricultural Census, over half of all farms in Jefferson County provide a limited income to farm operators; however, there are opportunities for expansion of smaller farming operations. The majority of the farms in Jefferson County have the opportunity to provide a viable range of income generating agricultural activities to an individual farm operator.

Enhance Farmland Protection Activities

In 2000, Jefferson County formed a Farmland Preservation Program that is funded by a portion of the transfer tax collected when a house or land is sold. To date, this program has purchased the development rights of 3,900 acres. As mentioned in the Land Use element, the funding that is available to support the County's farmland protection program is much less than the demand from farm operators to participate in it. Since the County's farmland protection program is funded by a portion of the transfer tax, the viability of the program is subject to a widely fluctuating real estate marketplace. In times when there is a great deal of real estate activity, revenue generated for the program is strong, enhancing the ability to purchase development rights and protect farmlands. Conversely, in times when the real estate market is slow, the amount of money available for protection efforts is limited. Therefore, it is important to establish reliable funding sources to support farmland protection activities. One option to protect farmland is to coordinate with the American Battlefield Protection program to make the most efficient use of funding resources.

To reduce the conversion of farmland, the Plan recommends that clustering should be the preferred method of any rural residential development. This would allow land owners to group lots in a traditional rural community pattern, while retaining a majority of the land for agricultural and rural economic uses. Even when the development of a residential cluster results in the loss of some farm land, the goal of the regulations related to cluster developments is to retain as much farmland as possible by adjusting the number and size of the lots in the cluster and requiring the balance of the farm (the residue) to be retained as a permanent agricultural use. Cluster developments on a property should minimize the use of high quality soils and maximize the use of less

productive agricultural land. In order to retain the maximum amount of land in farm use and rural economic activity, the open space requirement for residential cluster development shall be met by the residue which will retain no development rights.

Transportation in the Rural Environment

The County's rural road network originally evolved serving the needs of the farming community and is not intended to serve the needs associated with the higher traffic volumes and speeds required for large residential subdivisions. At certain seasons of the year conflict can be created between residential traffic and large pieces of slow moving farm equipment. The LESA/CUP system has not effectively protected the rural road network from this type of development pressure. As such, this Plan recommends utilizing cluster developments as the preferred form of residential development within the rural areas. Limiting suburban development in the rural area helps protect agricultural land use activities.

Most of the roads in the County's rural area are paved, but tend to have narrow widths, excessive horizontal and vertical curvatures, bridge and drainage problems, and poor intersection alignments. These conditions contribute to the safety concerns associated with increasing motor vehicle traffic on the rural roads. The increased residential densities that have occurred in the rural area in the past are producing additional traffic volume and requiring more maintenance of the rural road network of predominantly narrow, two-lane paved roads with existing design issues.

Agriculture Tourism

The rural areas of the County contribute to the local tourism economy in a variety of ways. Not least of these is the maintenance of attractive viewsheds to enhance the experience of visitors to battlefields, historic sites and villages. Tourism is addressed later in this Element on page 81.

The following recommendations provide action steps to foster and expand the diverse rural economy through a variety of policy, regulatory, incentive-based, and programmatic approaches that will protect the rural land, structures, and character necessary to advance the rural economy.

Agricultural and Rural Economy Recommendations (Goal 8)	
1.	Support West Virginia's and Jefferson County's "Right to Farm" policies which protect the rights of existing and future farms and farmers by developing zoning standards, other legislation, and educational programs designed to reduce potential conflicts arising from the proximity of agriculture to residential development (State Code § 19-19; Section 4.5 of the County's Zoning Ordinance).
	a. Identify and utilize a wider variety of funding sources that could serve to expand the County's farmland protection program.
	b. Create an educational pamphlet informing developers, realtors, and potential homeowners of the offsite impacts of living adjacent to farming activities.
2.	Enact Zoning Ordinance provisions to reduce the intensity of residential development in the Rural zone, other than by clustering, thereby protecting and increasing the investment potential and attractiveness of the agricultural lands for families, entrepreneurs, and businesses.
	a. Decrease the problems of rural traffic volume and the need for additional costly public infrastructure services in rural areas while conserving areas of the Rural zone for agricultural uses and the rural economy through support for rural cluster development vs large subdivisions of new home growth.
3.	Support the rural economy by amending the Subdivision Regulations to establish rural business site plan standards to include:
	a. performance criteria, including compatible size, scale, use, intensity, traffic capacity limits, employee limits, site design standards (i.e. buffering, siting), and standards that protect public health, safety, and welfare; and
	b. the adaptive reuse of existing historic and agricultural structures.
4.	Collaborate with the County's agricultural community to assess the current land use regulations and determine what opportunities for agriculture might currently exist and what additional opportunities might be able to succeed in Jefferson County.
5.	Amend the Zoning and Land Development Ordinance to permit additional non-residential rurally compatible uses.
	a. Incorporate into the zoning provisions innovative agricultural uses including the creation of standards which permit flexibility in the sale of farm products and related auxiliary products.
	b. Amend local land use regulations to permit non-agriculturally related commercial uses by the Conditional Use Permit (CUP) process in the Rural zone if the use is agriculturally and rurally compatible in scale and intensity, poses no threat to public health, safety, and welfare, and if the use helps to preserve farmland and open space and continue agricultural operations.

	c. Require that new non-rural commercial uses that are not compatible with the dominant agricultural land use pattern locate only in the Urban Growth Boundaries (UGBs) and Preferred Growth Areas (PGAs) as identified by the future land use recommendations of this Plan.
6.	Coordinate with local businesses and the Jefferson County Development Authority (JCDA) to brand and market Jefferson County farms and products by identifying and linking potential partnerships and matching suppliers with potential local and regional markets.
	a. Conduct market research on high-value agricultural products, ancillary farm businesses, and other rural economic uses such as farm agri-tourism, retreats, and country inns;
	b. Develop and expand, in conjunction with the Jefferson County Convention and Visitors Bureau, brand identification of Jefferson County farm products;
	c. Provide more alternatives to promote rural tourism and rural land uses.
7.	Work with Jefferson County's agricultural community to effectively distribute local agricultural products and encourage the growth of the market for local products.
	a. Facilitate the establishment of year round marketing outlets to support the farm community, such as farmers' markets or a product distribution center;
	b. Encourage the expansion of off-site farmers' markets to provide marketplaces for farmers and artisans to sell their goods within a variety of Jefferson County commercial venues;
	c. Promote products to Jefferson County based businesses.
8.	Coordinate with key agricultural and rural stakeholders to identify ways to expand marketing and value added production activities for farmers and artisans on their properties in rural areas of Jefferson County.
	a. Amend existing regulations in order to identify and facilitate ways to allow the sale of items grown, processed, crafted, or manufactured in Jefferson County on farms other than the farm where the product originated.
	b. Develop a streamlined process for such uses when there are minimal impacts to surrounding neighbors.
	c. Expand and improve high speed Information Technology (IT) connections in rural areas of Jefferson County with local internet or advanced technologies providers to enable residents to run businesses from home or to telecommute.
9.	Collaborate with the local artisan community and Jefferson Arts Council to review and amend the local land use regulations to promote and enhance the viability and livelihood of artisans in the rural areas of Jefferson County.
	a. Encourage local non-profit organizations and local and regional economic development agencies to create a regular forum where all County artisans, businesses, and members of the non-profit and arts communities can meet to network and collaborate.

	b. Work to improve connections between County businesses and artisans that may have products and services that can be sold in local stores or other businesses.
	c. Ensure that training and educational opportunities are available that would enable the success of such businesses.
	d. Establish and support an endowment for arts funding for rural crafted arts.
10.	Strengthen the Agricultural Committee of the JCDA by creating a public/private Rural Economic Development Council comprised of rural industry sector leaders. This organization will:
	a. link governmental, non-governmental, and regional organizations;
	b. link state and federal farm assistance programs to local farmers;
	c. receive and make grants;
	d. act as an advocacy group for rural issues; and
	e. promote activities that nurture the rural economy.
11.	Create a county or regional agricultural industrial park that could include sites for service providers such as farm equipment repair facilities, tractor and implement sales, meat processing facilities, and veterinarian services; as well as:
	a. A local or regional food hub that could be tied into Community Supported Agriculture (CSA) packaging and distribution, a regional food bank, and to serve as a marketing site for farms and farmers;
	b. A neighborhood based CSA or Development Supported Agriculture;
	c. A permanent, year-round farmers' market site;
	d. Sites for Industrial Agriculture such as Vertical Farming, Hydroponic Greenhouses, and Aquaponic Farming;
	e. Agriculture based training, research, and continuing education facilities created in conjunction with institutes of higher learning and research;
	f. Commercial aquaculture activities;
	g. A livestock auction facility;
	h. A Community Cold Storage/Meat Locker Facility that would allow county residents to rent space to purchase and store sides of meat; and/or
	i. Alternative Energy Production facilities, ranging from ethanol refining to algae production for biofuels.
12.	Promote and expand the commercial and recreational equine industry as a fundamental component of the rural economy by amending County ordinances to reflect the current practices and needs of the industry.
13	Collaborate with the County's culinary, artisan, and farm communities and JCDA to study the feasibility of establishing a Culinary Center that would provide exposure to and for marketing the goods that are produced in Jefferson County and the Eastern Panhandle.

	a. Collaborate with the West Virginia Extension Service, West Virginia Department of Agriculture, and local stakeholders to establish a regional commercial kitchen and packing facility in the Eastern Panhandle that could be used by farm operators in the manufacture of value added products.
14.	Expand vocational programs, either through the existing Future Farmers of America program in the County's high schools or through programs that combine classroom exercise with a co-op program exposing students to a variety of agricultural formats and opportunities.
	a. Advocate for Jefferson County Schools to partner with Berkeley and Morgan County schools to create a regional Agriculture Magnet School whose curriculum would be focused on agriculture and agribusiness fields.
	b. Encourage the Board of Education to provide equal vocational education programs in all middle schools and high schools throughout the County.
15.	Coordinate with Jefferson County Schools to encourage the following agricultural activities:
	a. Preserve and expand the Future Farmers of America programs that are in place at the County's middle and high schools.
	b. Coordinate with local artisans to improve accessibility and awareness of arts education and programming.
	c. In conjunction with local gardening organizations and Jefferson County Agricultural Development Office, expand school garden programs that could serve as a source of fresh foods for cafeterias.
	d. Encourage schools to use local agricultural products in cafeterias through partnerships with local farmers and CSA programs.
16.	Encourage the West Virginia University Extension Office to consider the creation of Mentoring/Training Programs similar to FarmLink programs that are in place in other states such as Maryland and Virginia.
17.	Support the County's rural economic strategy by working with the State Legislature to review the State Code and consider the following amendments:
	a. Tax credits on farm-related capital improvements;
	b. Tax abatement or deferral when a farmer makes an investment in high-value crops that do not turn a profit for several years (orchards, Christmas trees, vineyards, etc.);
	c. Assessment of farm worker housing on farms below residential market value;
	d. Additional reduction in the real estate tax rate on rurally zoned property that is under permanent conservation easement.

2.D. Infrastructure

Having adequate and quality infrastructure in Jefferson County is beneficial to residents, businesses, and the County's economy. Planning for the types of infrastructure needed and its location requires coordination with different entities that provide these services. The planning and coordination of where services are to be located maximizes efficiencies of these systems.

This Plan encourages infrastructure to be located in municipalities, Urban Growth Boundaries, Preferred Growth Areas, and Villages in a cost effective manner. In many places in rural areas, on-site private well and septic systems will be used.

Major Elements within Section 2.D. Infrastructure
Water and sewer
Stormwater
Alternative energy
Natural gas services
High-speed internet and advanced technology communications services

Water and Sewer Systems

Urban level development, which requires the provision of water and sewer systems, is defined as where more intense levels of residential, commercial, and industrial development activity occur. In West Virginia, by law, water and sewer providers are required to provide water and/or sewer service anywhere in a community so long as a developer pays to provide the initial infrastructure that would support the service(s). As a result, land use planning in West Virginia has to take a pro-active role in defining where urban level amenities and development will occur.

In order to take a pro-active role, it is the recommendation of this Plan to encourage the provision of infrastructure that allows for a higher level of development inside of the following areas: municipalities, Urban Growth Boundaries, Preferred Growth Areas, and Villages. In the rural area, it is anticipated that on-site private well and septic systems are to be utilized. In order for Jefferson County to retain its rural character and agricultural base, the expansion of water and sewer service into rural areas not designated as growth areas should not occur.

In the County's village areas, development and revitalization is limited by a lack of existing water and sewer infrastructure that would support village-level development. In these areas, minimum lot size requirements tied to well and septic spacing have played a factor in limiting redevelopment or reuse of existing buildings within village centers. If Jefferson County is to reinvigorate its villages, infrastructure improvements would need to be in place to serve the village areas. A specific component of this would be the provision of village scaled water and sewer facilities that would alleviate the need for individual property owners to locate a well and septic tank on small village

parcels. These improvements could be accomplished in a cost-effective manner that limits the fiscal impacts to residents and businesses of the newly served areas.

An issue expressed by the County's utility providers as part of the planning process for Envision Jefferson 2035 relates to the construction of sewer pump stations as part of new development. Typically, in other areas of the United States, sanitary sewer utility providers master plan the location of pump stations based on topography and watersheds. The utilization of these pumping stations that serve multiple subdivisions or areas is the most cost effective and efficient means for providing service. In West Virginia, state laws limit the ability of local utility providers to construct oversized infrastructure to serve future development because of the uncertainty of future development and cost to existing rate payers. Therefore, there is often one or more individual pump stations included as part of most new developments. The result of this has been higher rates for customers, due to the number of pump stations that must be maintained by the service providers.

Cost of Water and Sewer Service Extension

As new developments have occurred in the County, there have been concerns that the costs of water and sewer service extensions to the outlying areas are borne by both newly served homes and by existing customers of service agencies. While developers are required to extend the new services and each home is assessed a Capital Improvement Fee (CIF), the cost of additional maintenance, upkeep, and upgrades of the facilities are incurred by the existing customer base along with the new customers serviced by the new infrastructure. In areas served by the Charles Town sewage treatment plant, CIFs are being utilized to upgrade the treatment facilities.

For existing developments on well and septic systems that are failing or substandard, public water and sewer may need to be extended to these developments. In 2010, the Jefferson County Board of Health, together with the Jefferson County Water Advisory Committee, recommended to the County Commission that the County should begin to implement a program that requires owners of an on-site sewage treatment system to have the septic tank pumped out or inspected at least once every five years starting in July 2015. This program would reduce the number of failing septic systems in the County and protect the quality of groundwater resources for drinking water purposes. When septic systems fail to the extent that public systems need to be extended to these developments, it is anticipated that the capital cost associated with the new or extended services should be paid by the residents who will use these utilities. However, in many cases the upfront capital costs serve as a deterrent to a neighborhood or community that may require water or sewer services, even if warranted by existing environmental or public health conditions. Unfortunately, the ability for Jefferson County to obtain grant funding that would mitigate the costs of extending water and/or sewer service is limited due to Jefferson County income levels in relation to other areas of West Virginia.

Quality Standards for Package Plants and Small-Scale Infrastructure

As Jefferson County has grown in population over the last several decades, newer subdivisions and commercial developments are increasingly built to a level of density that requires water and sewer services. In some areas of the County the extension of water and sewer systems is not the best option as existing services are too far away, already near capacity, and/or their extension would be cost prohibitive. In these instances, developers have relied on small-scale private water and sewer systems.

There are two key concerns related to the use of privately built water or sewer facilities. In older neighborhoods, private water or sewer facilities were built to less than current industry-accepted standards and/or are unable to meet the demands of the existing neighborhood. In some communities, the substandard design of these systems has resulted in a variety of environmental issues, as well as liability issues for the developer and/or HOA. Second, once the development is complete and the HOA takes ownership, the HOA and its members may not have the expertise and funding needed for the maintenance of the water and/or sewer systems.

In some instances, the Jefferson County Public Service District (PSD) has assumed maintenance and ownership of private facilities which may require substantial upgrades. While the West Virginia Department of Environmental Protection (WVDEP) does review and approve small water and sewer facilities, the local PSD may have higher design and material standards. A requirement that small water and sewer facilities meet the local PSD standards could allow a local PSD to assume maintenance and possible ownership of these services in the future, with fewer upgrades and expenses. This policy could minimize potential issues related to neighborhood based water and/or sewage facilities.

Public Service Plan

There is a direct relationship between land use activity and the need for water and sewer infrastructure. Decisions made in land use plans and in water and sewer plans have a direct effect on the rate and location of development activity. For this reason, this Plan recommends that over the next 20 years urban level growth occur in the municipalities, Urban Growth Boundaries (UGB), Preferred Growth Areas (PGAs), and Villages. This will also enable utility providers to more effectively plan for the future growth of the utility systems in the above defined areas. The Shepherdstown Growth Management Boundary (GMB), as discussed in the Shepherdstown 2014 Comprehensive Plan, directly reflects their proposed expansion of the City water and sewer systems into annexed areas.

Jefferson County's residents and businesses expect infrastructure capacity, facilities, and services to be available to meet current needs while ensuring the ability to accommodate future expansion of the services. Businesses considering relocation or expansion to Jefferson County are able to better plan for their needs knowing that infrastructure and services are in place, or that documentation for plans to expand services exist. Coordination of future land use plans with water and sewer plans

allows local residential and business development to be targeted to areas where water and sewer services and other infrastructure and services are readily available. Local utility and service providers will have a reasonable expectation of where growth will occur and what the potential maintenance and operating costs of expanding services would be. Encouraging the utility and service providers to coordinate the creation of their service plans for infrastructure and service improvements with the growth areas identified in the Future Land Use Element would enhance the providers planning efforts and local land use planning efforts. For additional information about the Growth Areas, see the Land Use and Growth Management Element (page 16).

Maintenance and Upgrade of Existing Capital Facilities

The population growth of Jefferson County and the development pattern that has occurred has resulted in additional demands placed on the County's water resources and wastewater facilities. At the same time, federal and state regulations limit discharges into and from Jefferson County's water bodies, which eventually flow into the Chesapeake Bay. These guidelines and regulations have created additional demands for water and sewer suppliers to upgrade their facilities to meet the higher emission limits.

While many of the County's utilities have upgraded their facilities to meet Chesapeake Bay Watershed Protection program requirements, the financing of future upgrades to the County's water and sewer infrastructure may be difficult, particularly for the smaller scale utility providers that are present. This is because the federal funding sources that aid smaller and mid-sized communities in constructing or upgrading water and/or sewer facilities to meet newer requirements have been reduced in recent years, with further funding cuts foreseen.

Consolidation of Water and Sewer Providers

Over the years, there have been numerous efforts to consolidate the various public water and sewer providers to provide an economy of scale and efficiency to better serve the customer base. Efforts toward this end are multi-faceted and require a significant public policy based decision making process. Good land use planning is closely tied to the provision of public water and sewer services within defined service areas. The complexity of a variety of private and public providers throughout Jefferson County makes this difficult but the consolidation of water and sewer providers should continue to be pursued.

Stormwater Management

As land development occurs, the effect is an increase in impervious surfaces, which affects the ability of the land to absorb rainwater or snowmelt. This results in run-off on adjacent properties, into waterways, and/or directly into the groundwater through the karst topography. In order to mitigate this, Jefferson County adopted stormwater management standards in the Jefferson County Subdivision and Land Development Regulations that have effectively regulated the quantity of stormwater generated by local development. These regulations do not compel older stormwater systems, which

may not meet current standards, to be upgraded or maintained. Recently, the County adopted a new stand-alone Stormwater Management Ordinance that includes additional standards related to water quality and includes provisions for low impact design stormwater provisions such as rain gardens, bio-swales, permeable pavers, and permeable asphalt. These new standards help to minimize the impact of sediment and certain identified nutrients as required by the Chesapeake Bay Program.

In addition to land development activities, the following point and non-point source activities impact the water quality in waterways due to stormwater run-off:

Point and non-point source pollution
Over-fertilization and the use of chemicals to maintain lawns by homeowners
Use of salt and chemicals on roads in winter weather by the State Division of Highways
The fertilizers used to grow crops
Industrial emissions
Waste products (rubber, gasoline, and various other fluids) associated with auto use
Animal husbandry activities

The effect of stormwater run-off on the local waterways, particularly the Shenandoah and Potomac Rivers, has a significant impact on our local and regional recreational and heritage tourism, as well as drinking water quality. There are a number of watershed protection groups in the County that are actively seeking to improve the quality of the surface and groundwater within particular watersheds. These groups have made efforts to clean-up the waters and restore aquatic life to Jefferson County waterways. Such efforts have included, river clean ups, water monitoring, septic tank pumping and repair reimbursement programs, fencings of livestock to keep them out of streams, tree plantings, and outreach to residents and businesses to educate them about how to combat pollution. These efforts will ensure that high quality of water in Jefferson County continues.

Alternative Energy

It is widely recognized that many of the resources that we rely on to heat, cool, and light homes, power electronics, provide transportation fuel, and other daily needs are finite. Consequently, there has been an increasing need to assess the viability of alternative and renewable energy sources that may assist in maintaining the quality of life of Jefferson County's residents and businesses. In 2009, West Virginia adopted an Alternative and Renewable Energy Portfolio Standard that requires investor-owned electric utilities (such as Potomac Edison) with more than 30,000 residential customers to supply 25% of retail sales from eligible alternative and renewable energy resources by 2025.

Alternative and renewable energy sources are available, ranging from hydro (water), solar, and wind power to the use of various biofuels (algae, biomass, wood pulp, and other waste products), and plant crops (corn and switchgrass) that might be used to

complement or replace existing power sources. Another alternative energy source that may be applicable for the heating and cooling of buildings is the use of geothermal systems (drawing up groundwater and circulating it through pipes embedded in a building's walls).

There are efforts underway at the local and state level to encourage the conservation of energy and the utilization of alternative energy sources. The most notable of these are the projects that have been incorporated into the expansion of the American Public University System (APUS) in Charles Town and Ranson. These projects include the use of solar collectors that also serve as cover for parked cars, the installation of several electric car charging stations, and the utilization of building improvements and materials that limit the use of energy needed for heating, cooling, and lighting. The improvements undertaken by APUS can serve as a role model to new development in Jefferson County and to the redevelopment of existing structures and sites.

Several large-scale alternative and renewable energy projects have taken place in the County. Concern has been expressed that legislation prohibiting Cooperatives or Communities to create a solar panel system that would feed multiple houses is impacting the expansion and viability of implementing other solar projects in the County. As the cost of improvements decreases and the efficiency of various renewable energy materials improves, the reliance on current energy sources will be reduced as more families and businesses adopt these improvements.

Natural Gas Services

Jefferson County regional economic development officials and businesses identified the need for natural gas services to homes and businesses. At present the only area of the County served by natural gas lines is the former Kodak/3M plant in Middleway; however, the potential exists for the expansion of service capacity in the Eastern Panhandle and the extension of natural gas lines from the Berkeley/Jefferson County line along WV Route 9 to various parts of the County. The extension of natural gas into Jefferson County would aid County economic development efforts while providing an alternative to electricity for residential and commercial purposes.

One of the reasons this improvement is needed is because an increasing number of businesses are using natural gas in their manufacturing process, due to the lower costs and the cleaner emissions that result from its use. Natural gas, in a compressed or liquefied form, can also be used to fuel cars and buses. While natural gas has been primarily used as a fuel source for local and regional bus services in the US, it can also serve as a fuel source for both privately owned and County owned vehicles.

High-Speed Internet and Advanced Technology Communication Services

Over the last two decades**,** people have increasingly taken for granted the ability to be connected to the world via the internet. Internet uses include a variety of communication and media modes, conducting business, shopping for goods, staying abreast of local, national and world events, and have a plethora of entertainment

options. For a business, the ability to connect to customers and suppliers, and execute financial transactions in a timely manner is imperative to the success of their enterprises. Advanced and evolving technologies that are not yet broadly used or even invented, will be important to the competitive economic environment of Jefferson County.

In rural Jefferson County, households and small businesses are impacted by the quality of telecommunications options that are available to them. Due to the low residential densities of rural areas, it is not cost effective for telecommunications providers to provide service at an affordable rate. Therefore, areas of the County are not currently served or underserved by wireless services. These factors impact the ability of employees to work efficiently from home and home based commerce from thriving.

The Eastern Panhandle has seen a great deal of private investment in its technology infrastructure; however, there are some gaps in the overall system. In order to maintain a competitive edge, internet connectivity will need to be improved to support a variety of technology enabled services and businesses. As broadband and landline technology and connectivity has improved, Jefferson County's internet providers have steadily increased the maximum possible broadband speed available to their customers. As higher speed internet services or alternate advanced technologies develop and become more commonly used, the County can continue to attract new employers and entrepreneurs who rely on the creation and utilization of this advanced technology.

The following recommendations are related to the provision of public infrastructure in Jefferson County.

Infrastructure and Technology Recommendations (Goals 10 & 11)	
1.	Require key stakeholders to coordinate planning and investment for both local and countywide infrastructure improvements.
	a. Require members of the development community and utility and service providers to collaborate regularly to plan for future infrastructure needs, while considering the impact on the individual consumer rates.
	b. Provide and encourage mechanisms to have consolidated water and sewer providers in the County.
2.	Bring natural gas into Jefferson County to grow the economy and increase the quality of life for the residents.
	a. Identify partners and funding sources for the expansion of natural gas services.
	b. Ensure that one or more compressed or liquid natural gas fueling stations is built to serve Jefferson County residents, businesses, and visitors.
	c. In coordination with Hagerstown Eastern Panhandle Metropolitan Planning Organization (HEPMPO), Jefferson County Schools, and Eastern Panhandle Transit Authority (EPTA), advocate for the wider utilization of natural gas as a fuel source for school buses and for EPTA.
3.	Create opportunities for the County's water and sewer providers to share resources and better coordinate their systems and administration.
	a. Amend Subdivision and Land Development Regulations to require privately owned public water and sewer utilities to meet the local PSD standards, which would allow a local PSD to assume maintenance, and possible ownership in the future, with fewer upgrades and expenses.
	b. Provide opportunities for applicable homeowners associations and/or developers to enter into maintenance agreements for privately owned public water and/or sewer utilities with the applicable public utility providers in which the public utility providers will maintain new facilities.
	c. Coordinate with the County's utility providers to identify methods that would limit the expansion of water and sewer trunk lines to areas within the Urban Growth Boundary and/or Preferred Growth Areas.
	d. Encourage the PSDs to promote cooperation with the local development community to work toward cost sharing on infrastructure projects.
4.	Collaborate with Village residents, businesses and utility providers to identify ways to provide water and sewer utilities within Village and village expansion areas.
5.	Enact and enforce requirements for maintenance and inspection of individual, on-site septic systems on a regular basis.
	a. Initiate a dynamic education and informational program for County residents concerning well and septic maintenance and use practices.
	b. Pursue an amendment to the state code to allow residents who are required to connect to an extended water or sewer network to continue to utilize existing individual well and septic systems for the lifetime of the home system if there are no public health issues.

	c. Collaborate with local public utility providers to identify and provide incentives that would encourage property owners to transition from well and septic to a centralized system where and when needed to address public health issues.
	d. Find funding mechanisms to defray the costs of providing public utilities in areas where the provision of these utilities is necessary based on declining public health or environmental concerns.
6.	Coordinate with Region 9 and the County's public service providers to identify and seek additional funding sources that would aid in the construction of needed capital facilities and for the upgrading of existing facilities to meet newer federal standards.
	a. Continue to monitor and participate in planning efforts related to the implementation of the Chesapeake Bay Watershed Improvement Plan.
	b. Assess and evaluate the County's stormwater planning documents as best management practices in the field evolve.
7.	Identify ways that utility services can be regularly upgraded to meet the highest level of service and technology through coordination with local water, sewer, electric, gas, and telecommunications utility and service providers.
	a. Require all local electric, cable, and other utility providers to bury existing and new lines (serving new development) as a part of the regular maintenance and upgrading of their facilities.
8.	Encourage public entities to utilize alternative and renewable energy sources for a variety of energy needs.
	a. Enable the construction of renewable energy generation facilities by residents and businesses.
	b. Encourage County businesses and service stations to provide electric vehicle recharging stations within Jefferson County as soon as possible and use distinctive signage to guide residents and visitors to the charging stations.
	c. Develop regulations to enable cooperatives or communities to create a solar panel system that would feed multiple houses in the County.
9.	Collaborate with local economic development agencies and Information Technology (IT) providers to ensure that the current and future needs of small businesses within Jefferson County are met.
	a. Ensure that all areas of Jefferson County are served by high speed wireline and/or wireless services and other advanced technologies.
	b. Encourage private sector investment to improve wireless internet service availability in Jefferson County and the Eastern Panhandle.
	c. Ensure that, as next-generation wireless and cellular services are implemented, Jefferson County collaborates with providers, including any necessary regulatory changes, to ensure that providers are able to provide these services at the same time as other communities in the Washington, D.C. and Baltimore, MD Metropolitan Areas.

10.	Partner with IT providers, the Shepherd University Research Corporation (SURC), and the existing federal and state agencies located in Jefferson County to establish the feasibility and creation of an open access telecommunications network that could serve as a trunk line for regional services across the Eastern Panhandle.
	a. Market the availability of the established trunk line services across the Eastern Panhandle to potential businesses and organizations that are heavily reliant on a bandwidth intensive service and researching Jefferson County as a possible relocation site.
11.	Explore the creation of a reimbursement funding mechanism that would allow for pump stations and water mains that serve one subdivision to be oversized or expanded upon to serve nearby future development within the designated growth areas, not solely dependent on revenue from rate payers but also the development community.
12.	Explore policies in concert with the State legislature, Public Service District (PSD), and the municipalities to study and amend regulations related to water and sewer infrastructure development, including legislative options that would allow equitable distribution of cost sharing with entire development community along with rate paying base (i.e. Capital Improvement Fees).

WEST VIRGINIA CODE

CHAPTER 8A. LAND USE PLANNING.

ARTICLE 3. COMPREHENSIVE PLAN.

§8A-3-11. Amending comprehensive plan after adoption.

(a) After the adoption of a comprehensive plan by the governing body, the planning commission shall follow the comprehensive plan, and review the comprehensive plan and make updates at least every ten years.

(b) After the adoption of a comprehensive plan by the governing body, all amendments to the comprehensive plan shall be made by the planning commission and recommended to the governing body for adoption in accordance with the procedures set forth in **sections six, seven, eight and nine** of this article. The planning commission shall hold a public hearing prior to its recommendation to the governing body.

(c) If a governing body wants an amendment, it may request in writing for the planning commission to prepare an amendment. The planning commission must hold a public hearing within one hundred twenty days after the written request by the governing body to the planning commission is received.

(d) Within the latter of ninety days or three scheduled meetings after the submission of the recommended amendment to the comprehensive plan to the governing body, the governing body must act by either adopting, rejecting or amending the comprehensive plan.

§8A-3-6. Notice and public participation requirement for a comprehensive plan.

(a) Prior to recommending a new or amended comprehensive plan to a governing body for adoption, the planning commission shall give notice and hold a public hearing on the new or amended comprehensive plan.

(b) At least thirty days prior to the date set for the public hearing, the planning commission shall publish a notice of the date, time and place of the public hearing as a Class I legal advertisement in compliance with the provisions of article three, chapter fifty-nine of this code. The publication area shall be the area covered by the comprehensive plan.

(c) A planning commission shall include public participation throughout the process of studying and preparing a comprehensive plan and amending a comprehensive plan. A planning commission shall adopt procedures for public participation throughout the process of studying and preparing or amending a comprehensive plan.

(d) A planning commission shall request input from other affected governing bodies and units of government.

§8A-3-7. Submission of comprehensive plan.

(a) After the comprehensive plan is prepared and before it is approved, the planning commission shall hold a public hearing. After the public hearing and approval, the planning commission shall submit the recommended comprehensive plan to the applicable governing body for consideration and adoption.

(b) At the first meeting of the applicable governing body following the submission of the recommended comprehensive plan by the planning commission to the governing body, the planning commission shall present the recommended comprehensive plan to the governing body.

(c) After the presentation of the recommended comprehensive plan by the planning commission to the governing body and prior to adoption, the governing body shall hold a public hearing after giving notice.

(d) At least fifteen days prior to the date set for the public hearing, the planning commission shall publish a notice of the date, time and place of the public hearing as a Class I legal advertisement in compliance with the provisions of article three, chapter fifty-nine of this code. The publication area shall be the area covered by the comprehensive plan.

§8A-3-8. Adoption of comprehensive plan by governing body.

(a) Within the latter of ninety days or three scheduled meetings after the submission of the recommended comprehensive plan to the governing body, the governing body must act by either adopting, rejecting or amending the comprehensive plan.

(b) If the comprehensive plan is adopted by the governing body, then the governing body may adopt the comprehensive plan as an ordinance or designate what other effect the comprehensive plan may have.

(c) If the comprehensive plan is adopted by the governing body and an ordinance is published, the comprehensive plan may be incorporated by reference in the ordinance and the full text of the comprehensive plan does not have to be published.

§8A-3-9. Filing the comprehensive plan.

After the adoption of a comprehensive plan by a governing body, the governing body must file the adopted comprehensive plan in the office of the clerk of the county commission where the comprehensive plan applies. If an adopted comprehensive plan covers more than one county, a certified copy of the adopted comprehensive plan must be filed in the office of the clerk of the county commission of each county covered by the adopted comprehensive plan.

Public Input Received

*Input received from Doug Rockwell for 09/28/21 PC workshop. - jth

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Creating Great Communities for All

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PAS MEMO

Planning for Utility-Scale Solar Energy Facilities

By Darren Coffey, AICP

Solar photovoltaics (PV) are the fastest-growing energy source in the world due to the decreasing cost per kilowatt-hour—60 percent to date since 2010, according to the U.S. Department of Energy (U.S. DOE n.d.)—and the comparative speed in constructing a facility. Solar currently generates 0.4 percent of global electricity, but some University of Oxford researchers estimate its share could increase to 20 percent by 2027 (Hawken 2017). Utility-scale solar installations are the most cost-effective solar PV option (Hawken 2017).

Transitioning from coal plants to solar significantly decreases carbon dioxide emissions and eliminates sulfur, nitrous oxides, and mercury emissions. As the U.S. Department of Energy states, "As the cleanest domestic energy source available, solar supports broader national priorities, including national security, economic growth, climate change mitigation, and job creation" (U.S. DOE n.d.). As a result, there is growing demand for solar energy from companies (e.g., the "RE100," 100 global corporations committed to sourcing 100 percent renewable electricity by 2050) and governments (e.g., the **Virginia Energy Plan** commits the state to 16 percent renewable energy by 2022).

Federal and state tax incentives have accelerated the energy industry's efforts to bring facilities online as quickly as possible. This has created a new challenge for local governments, as many are ill-prepared to consider this new and unique land-use option. Localities are struggling with how to evaluate utility-scale solar facility applications, how to update their land-use regulations, and how to achieve positive benefits for hosting these clean energy facilities.

As a land-use application, utility-scale solar facilities are processed as any other land-use permit. Localities use the tools available: the existing comprehensive (general) plan and zoning ordinance. In many cases, however, plans and ordinances do not address this type of use. Planners will need to amend these documents to bring some structure, consistency, and transparency to the evaluation process for utility-scale solar facilities.

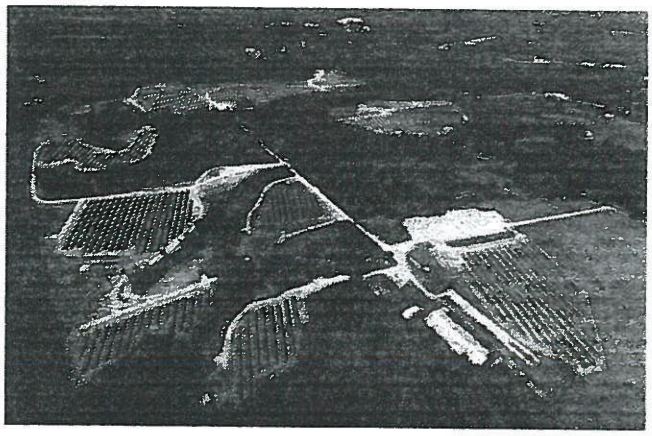

Figure 1. Utility-scale solar facilities are large-scale uses that can have significant land-use impacts on communities. Photo by Flickr user U.S. Department of Energy/Michael Faria.

Unlike many land uses, these solar installations will occupy vast tracts of land for one or more generations; they require tremendous local resources to monitor during construction (and presumably decommissioning); they can have significant impacts on the community depending on their location, buffers, installation techniques, and other factors (Figure 1); and they are not readily adaptable for another industrial or commercial use, hence the need for decommissioning.

While solar energy aligns with sustainability goals held by an increasing number of communities, solar industries must bring an overall value to the locality beyond the clean energy label. Localities must consider the other elements of sustainability and make deliberate decisions regarding impacts and benefits to the social fabric, natural environment, and local economy. How should a locality properly evaluate the overall impacts of a large-scale clean energy land use on the community?

This *PAS Memo* examines utility-scale solar facility uses and related land-use issues. It defines and classifies these facilities,

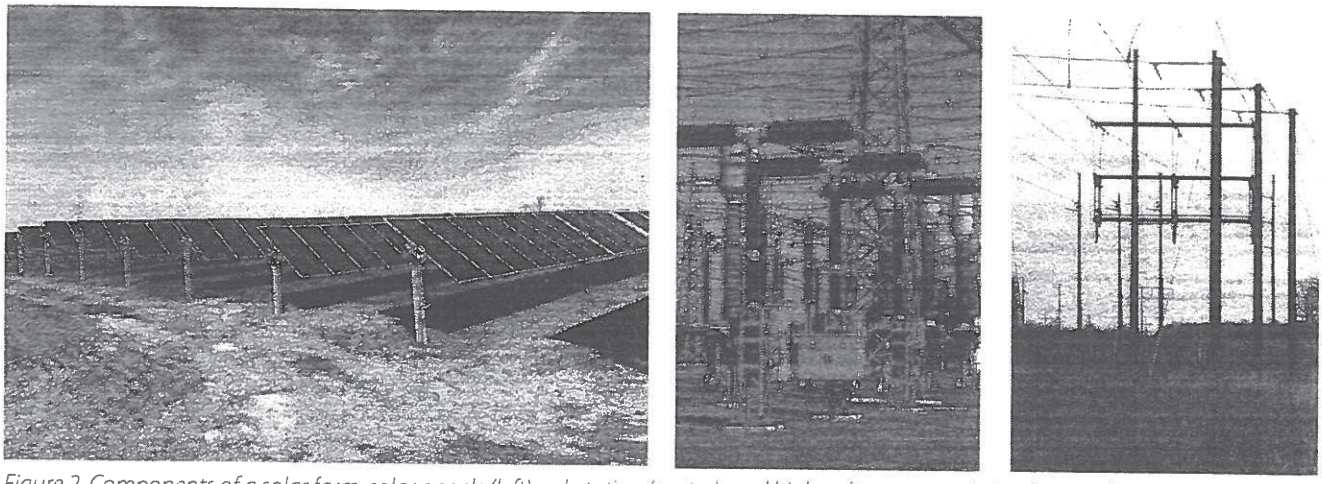

Figure 2. Components of a solar farm: solar panels (left), substation (center), and high-voltage transmission lines (right). Photos courtesy Berkley Group (left, right) and Pixabay (center).

analyzes their land-use impacts, and makes recommendations for how to evaluate and mitigate those impacts. While public officials tend to focus on the economics of these facilities and their overall fiscal impact to the community, the emphasis for planners is on the direct land-use considerations that should be carefully evaluated (e.g., zoning, neighbors, viewsheds, and environmental impacts). Specific recommendations and sample language for addressing utility-scale solar in comprehensive plans and zoning ordinances are provided at the end of the article.

The Utility-Scale Solar Backdrop

In contrast to solar energy systems generating power for on-site consumption, utility-scale solar, or a solar farm, is an energy generation facility that supplies power to the grid. These facilities are generally more than two acres in size and have capacities in excess of one megawatt; today's utility-scale solar facilities may encompass hundreds or even thousands of acres A solar site may also include a substation and a switchyard, and it may require generator lead lines (*gen-tie* lines) to *interconnect* to the grid (Figure 2).

From 2008 to 2019, U.S. solar photovoltaic (PV) installations have grown from generating 1.2 gigawatts (GW) to 30 GW (SEIA 2019). The top 10 states generating energy from solar PV are shown in Figure 3. For many of these initial projects, local planning staff independently compiled information through research, used model ordinances, and relied on professional networks to cobble together local processes and permit conditions to better address the adverse impacts associated with utility-scale solar.

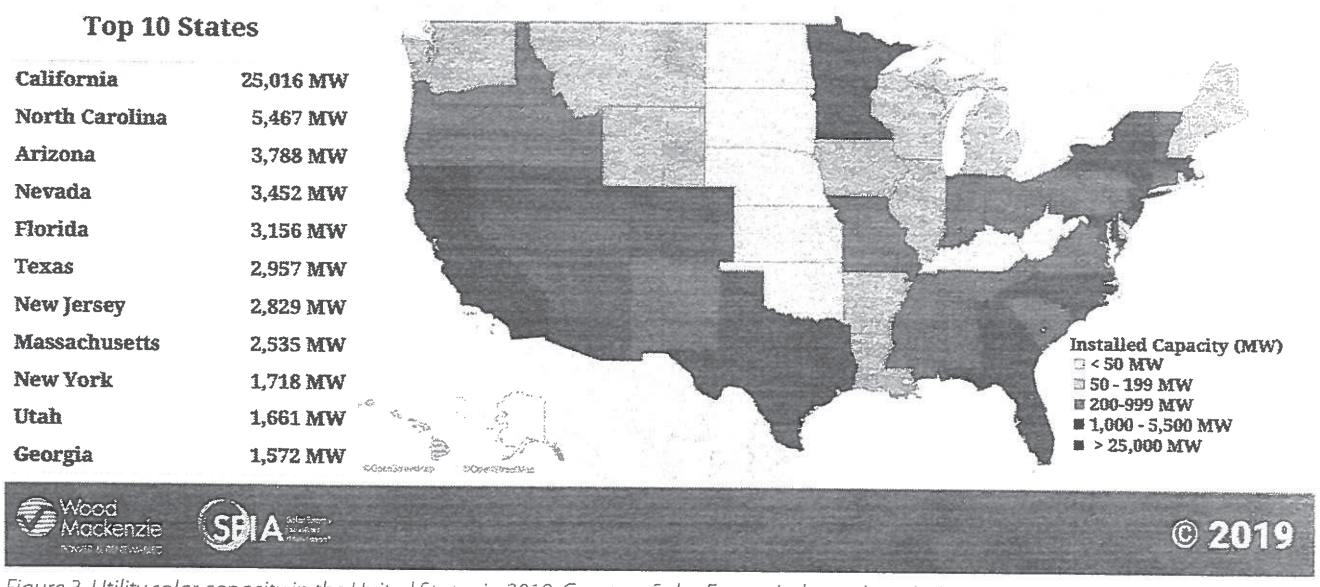

Figure 3. Utility solar capacity in the United States in 2019. Courtesy Solar Energy Industry Association.

However, each individual project brings unique challenges related to size, siting, compatibility with surrounding uses, mitigating impacts through setbacks and buffers, land disturbance processes and permits, financial securities, and other factors. This has proven to be a significant and ongoing challenge to local planning staff, planning commissions, and governing bodies.

Some localities have adopted zoning regulations to address utility-scale solar facilities based on model solar ordinance templates created by state or other agencies for solar energy facilities. However, these ordinances may not be sufficient to properly mitigate the adverse impacts of these facilities on communities. Many of these initial models released in the early 2010s aimed to promote clean energy and have failed to incorporate lessons learned from actual facility development. In addition, the solar industry has been changing at a rapid pace, particularly regarding the increasing scale of facilities. Planners should therefore revisit any existing zoning regulations for utility-scale solar facilities to ensure their relevance and effectiveness.

Rapid growth of utility-scale solar facilities has emerged for rural communities, particularly those that have significant electrical grid infrastructure. Many rural counties have thousands of acres of agricultural and forested properties in various levels of production. Land prices tend to be much more cost-effective in rural localities, and areas located close to high-voltage electric transmission lines offer significant cost savings to the industry. Figure 4 shows the extent of existing electric transmission lines in one rural Virginia county.

Federal and state tax incentives have further accelerated the pace of utility-scale solar developments, along with decreasing solar panel production costs. These factors all combine to create land-use development pressure that, absent effective and relevant land-use regulatory and planning tools, creates an environment where it is difficult to properly evaluate and make informed decisions for the community's benefit.

Solar Facility Land-Use Impacts

As with any land-use application, there are numerous potential impacts that need to be evaluated with solar facility uses. All solar facilities are not created equal, and land-use regulations should reflect those differences in scale and impact accordingly.

Utility-scale solar energy facilities involve large tracts of land involving hundreds, if not thousands, of acres. On these large tracts, the solar panels often cover more than half of the land area. The solar facility use is often pitched as "temporary" by developers, but it has a significant duration—typically projected by applicants as up to 40 years.

Establishing such a solar facility use may take an existing agricultural or forestry operation out of production, and resuming such operations in the future will be a challenge. Utility-scale solar can take up valuable future residential, commercial, or industrial growth land when located near cities, towns, or other

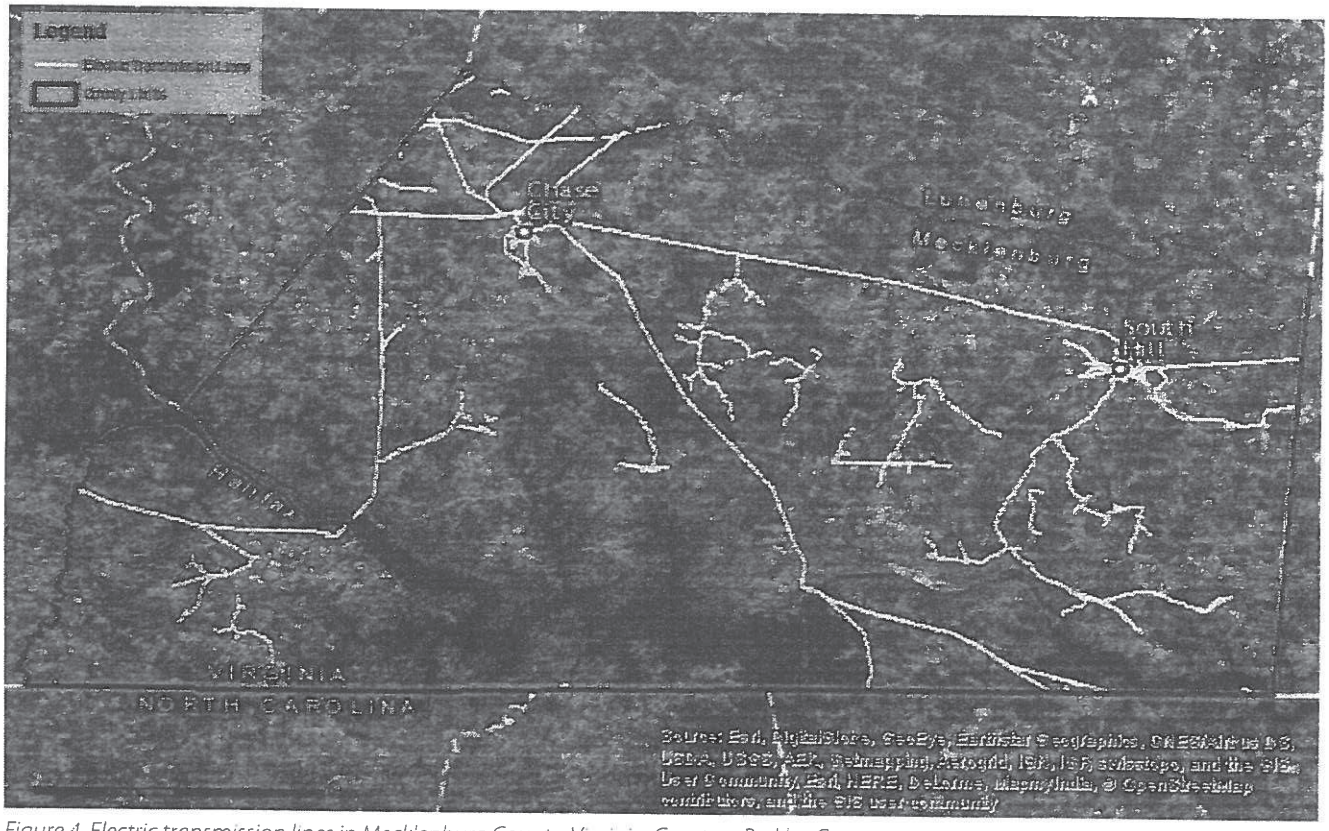

Figure 4. Electric transmission lines in Mecklenburg County, Virginia. Courtesy Berkley Group.

identified growth areas. If a solar facility is close to a major road or cultural asset, it could affect the viewshed and attractiveness of the area. Because of its size, a utility-scale solar facility can change the character of these areas and their suitability for future development. There may be other locally specific potential impacts. In short, utility-scale solar facility proposals must be carefully evaluated regarding the size and scale of the use; the conversion of agricultural, forestry, or residential land to an industrial-scale use; and the potential environmental, social, and economic impacts on nearby properties and the area in general.

To emphasize the potential impact of utility-scale solar facilities, consider the example of one 1,408-acre (2.2-square-mile) Virginia town with a 946-acre solar facility surrounding its north and east sides. The solar project area is equal to approximately 67 percent of the town's area. A proposed 332.5-acre solar facility west of town increases the solar acres to 1,278.5, nearly the size of the town. Due to its proximity to multiple high-voltage electrical transmission lines, other utility-scale solar facilities are also proposed for this area, which would effectively lock in the town's surrounding land-use pattern for the next generation or more.

The following considerations are some of the important land-use impacts that utility-scale solar may have on nearby communities.

Change in Use/Future Land Use

A primary impact of utility-scale solar facilities is the removal of forest or agricultural land from active use. An argument often made by the solar industry is that this preserves the land for future agricultural use, and applicants typically state that the land will be restored to its previous condition. This is easiest when the land was initially used for grazing, but it is still not without its challenges, particularly over large acreages. Land with significant topography, active agricultural land, or forests is more challenging to restore.

It is important that planners consider whether the industrial nature of a utility-scale solar use is compatible with the locality's vision. Equally as important are imposing conditions that will enforce the assertions made by applicants regarding the future restoration of the site and denying applications where those conditions are not feasible.

Agricultural/Forestry Use. Agricultural and forested areas are typical sites for utility-scale solar facility uses. However, the use of prime agricultural land (as identified by the USDA or by state agencies) and ecologically sensitive lands (e.g., riparian buffers, critical habitats, hardwood forests) for these facilities should be scrutinized.

For a solar facility, the site will need to be graded in places and revegetated to stabilize the soil. That vegetation typically needs to be managed (e.g., by mowing, herbicide use, or sheep grazing) over a long period of time. This prolonged vegetation management can change the natural characteristics of the soil, making restoration of the site for future agricultural use more difficult. While native plants, pollinator plants, and grazing options exist and are continually being explored, there are logistical issues with all of them, from soil quality impacts to compatibility of animals with the solar equipment.

A deforested site can be reforested in the future, but over an additional extended length of time, and this may be delayed or the land left unforested at the request of the landowner at the time of decommissioning. Clearcutting forest in anticipation of a utility-scale solar application should be avoided but is not uncommon. This practice potentially undermines the credibility of the application, eliminates what could have been natural buffers and screening, and eliminates other landowner options to monetize the forest asset (such as for carbon or nutrient credits).

For decommissioning, the industry usually stipulates removal of anything within 36 inches below the ground surface. Unless all equipment is specified for complete removal and this is properly enforced during decommissioning, future agricultural operations would be planting crops over anything left in the ground below that depth, such as metal poles, concrete footers, or wires.

Residential Use. While replacing agricultural uses with residential uses is a more typical land-use planning concern, in some areas this is anticipated and desired over time. "People have to live somewhere," and this should be near existing infrastructure typical of cities, towns, and villages rather than sprawled out over the countryside. This makes land lying within designated growth areas or otherwise located near existing population centers a logical location for future residential use. Designated growth areas can be important land-use strategies to accommodate future growth in a region. Permitting a utility-scale use on such land ties it up for 20–40 years (a generation or two), which may be appropriate in some areas, but not others.

Industrially Zoned Land. Solar facilities can be a good use of brownfields or other previously disturbed land. A challenge in many rural areas, however, is that industrially zoned land is limited, and both public officials and comprehensive plan policies place a premium on industries that create and retain well-paying jobs. While utility-scale solar facilities are not necessarily incompatible with other commercial and industrial uses, the amount of space they require make them an inefficient use of industrially zoned land, for which the "highest and best use" often entails high-quality jobs and an array of taxes paid to the locality (personal property, real estate, machinery and tool, and other taxes).

Location

The location of utility-scale solar facilities is the single most important factor in evaluating an application because of the large amount of land required and the extended period that land is dedicated to this singular use, as discussed above.

Solar facilities can be appropriately located in areas where they are difficult to detect, the prior use of the land has been marginal, and there is no designated future use specified (i.e., not in growth areas, not on prime farmland, and not near recreational or historic areas). Proposed facilities adjacent to corporate boundaries, public rights-of-way, or recreational or cultural resources are likely to be more controversial than facilities that are well placed away from existing homes, have natural buffers, and don't change the character of the area from the view of local residents and other stakeholders.

Figure 5. This scenic vista would be impacted by a solar facility proposed for the far knoll. Photo courtesy Berkley Group.

Concentration of Uses

A concentration of solar facilities is another primary concern. The large scale of this land use, particularly when solar facilities are concentrated, also significantly exacerbates adverse impacts to the community in terms of land consumption, use pattern disruptions, and environmental impacts (e.g., stormwater, erosion, habitat). Any large-scale homogenous land use should be carefully examined—whether it is rooftops, impervious surface, or solar panels. Such concentrated land uses change the character of the area and alter the natural and historic development pattern of a community.

The attraction of solar facilities to areas near population centers is a response to the same forces that attract other uses—the infrastructure is already there (electrical grid, water and sewer, and roads). One solar facility in a given geographic area may be an acceptable use of the land, but when multiple facilities are attracted to the same geography for the same reasons, this tips the land-use balance toward too much of a single use. The willingness of landowners to cooperate with energy companies is understandable, but that does not automatically translate into good planning for the community. The short- and medium-term gains for individual landowners can have a lasting negative impact on the larger community.

Visual Impacts

The visual impact of utility-scale solar facilities can be significantly minimized with effective screening and buffering, but this is more challenging in historic or scenic landscapes. Solar facilities adjacent to scenic byways or historic corridors may negatively impact the rural aesthetic along these transportation routes. Buffering or screening may also be appropriate along main arterials or any public right-of-way, regardless of special scenic or historic designation.

The location of large solar facilities also needs to account for views from public rights-of-way (Figure 5). Scenic or historic areas should be avoided, while other sites should be effectively screened from view with substantial vegetative or other types of buffers. Berms, for example, can provide a very effective screen, particularly if combined with appropriate vegetation.

Decommissioning

The proper decommissioning and removal of equipment and other improvements when the facility is no longer operational presents significant challenges to localities.

Decommissioning can cost millions in today's dollars. The industry strongly asserts that there is a significant salvage value to the solar arrays, but there may or may not be a market to salvage the equipment when removed. Further, the feasibility of realizing salvage value may depend on who removes the equipment—the operator, the tenant, or the landowner (who may not be the same parties as during construction)—as well as when it is removed.

Providing for adequate security to ensure that financial resources are available to remove the equipment is a significant challenge. Cash escrow is the most reliable security for a locality but is the most expensive for the industry and potentially a financial deal breaker. Insurance bonds or letters of credit seem to be the most acceptable forms of security but can be difficult to enforce as a practical matter. The impact of inflation over decades is difficult to calculate; therefore, the posted financial security to ensure a proper decommissioning should be reeval-

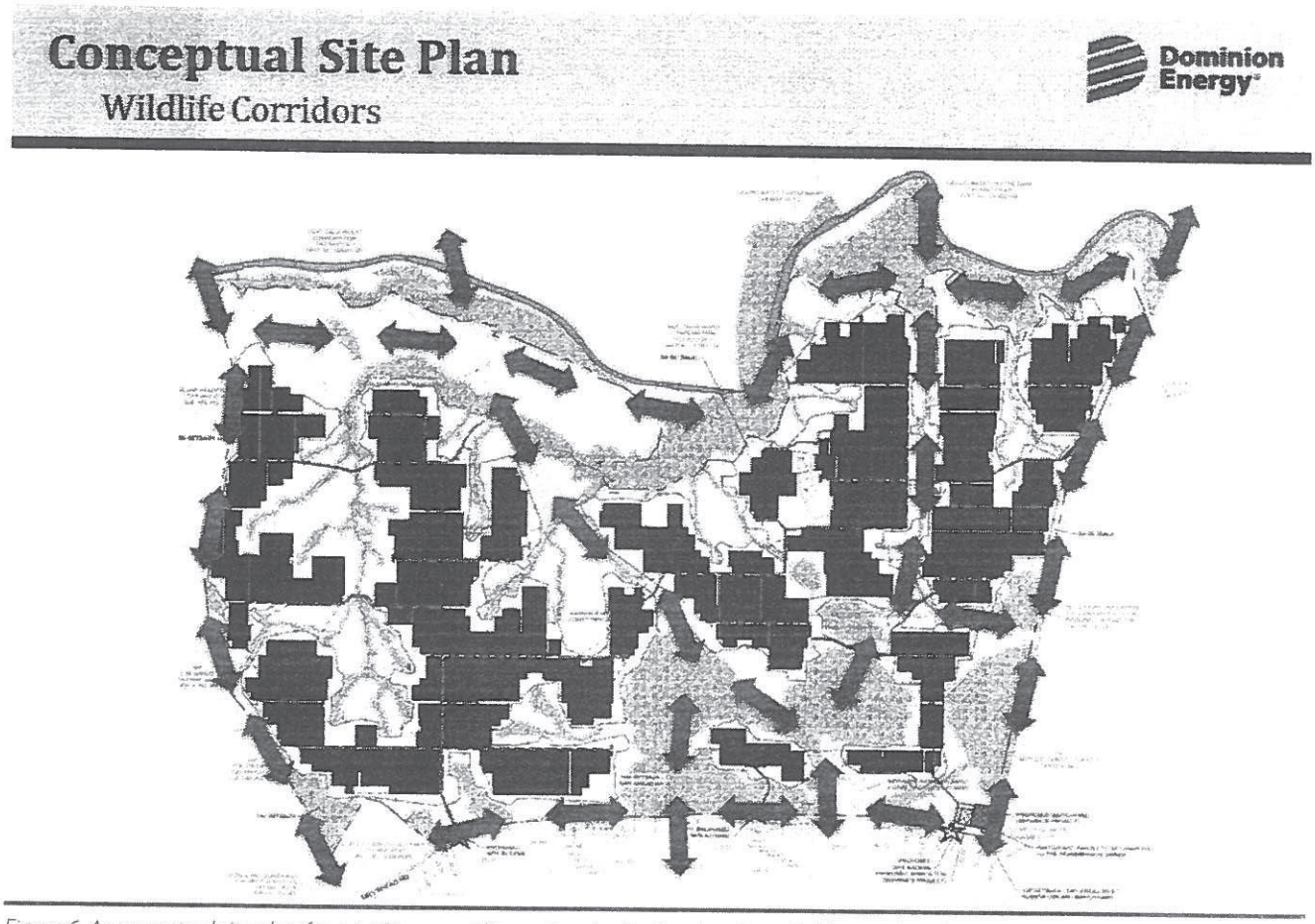

Figure 6. A conceptual site plan for a 1,491-acre utility-scale solar facility showing wildlife corridors throughout the site. Courtesy Dominion Energy.

uated periodically—usually every five years or so. The worst possible outcome for a community (and a farmer or landowner) would be an abandoned utility-scale solar facility with no resources available to pay for its removal.

Additional Solar Facility Impacts

In addition to the land-use impacts previously discussed, there are a number of significant environmental and economic impacts associated with utility-scale solar facilities that should be addressed as part of the land-use application process.

Environmental Impacts

While solar energy is a renewable, green resource, its generation is not without environmental impacts. Though utility-scale solar facilities do not generate the air or water pollution typical of other large-scale fossil-fuel power production facilities, impacts on wildlife habitat and stormwater management can be significant due to the large scale of these uses and the resulting extent of land disturbance. The location of sites, the arrangement of panels within the site, and the ongoing management of the site are important in the mitigation of such impacts.

Wildlife Corridors. In addition to mitigating the visual impact of utility-scale solar facilities, substantial buffers can act as wildlife corridors along project perimeters. The arrangement of panels within a project site is also important to maintain areas conducive to wildlife travel through the site. Existing trees, wetlands, or other vegetation that link open areas should be preserved as wildlife cover. Such sensitivity to the land's environmental features also breaks up the panel bay groups and will make the eventual restoration of the land to its previous state that much easier and more effective. A perimeter fence is a barrier to wildlife movement, while fencing around but not in between solar panel bays creates open areas through which animals can continue to travel (Figure 6).

Stormwater, Erosion, and Sediment Control. The site disturbance required for utility-scale solar facilities is significant due to the size of the facilities and the infrastructure needed to operate them. These projects require the submission of both stormwater (SWP) and erosion/sediment control (ESC) plans to comply with federal and state environmental regulations.

Depending on the site orientation and the panels to be used, significant grading may be required for panel placement, roads, and other support infrastructure. The plan review and submis-

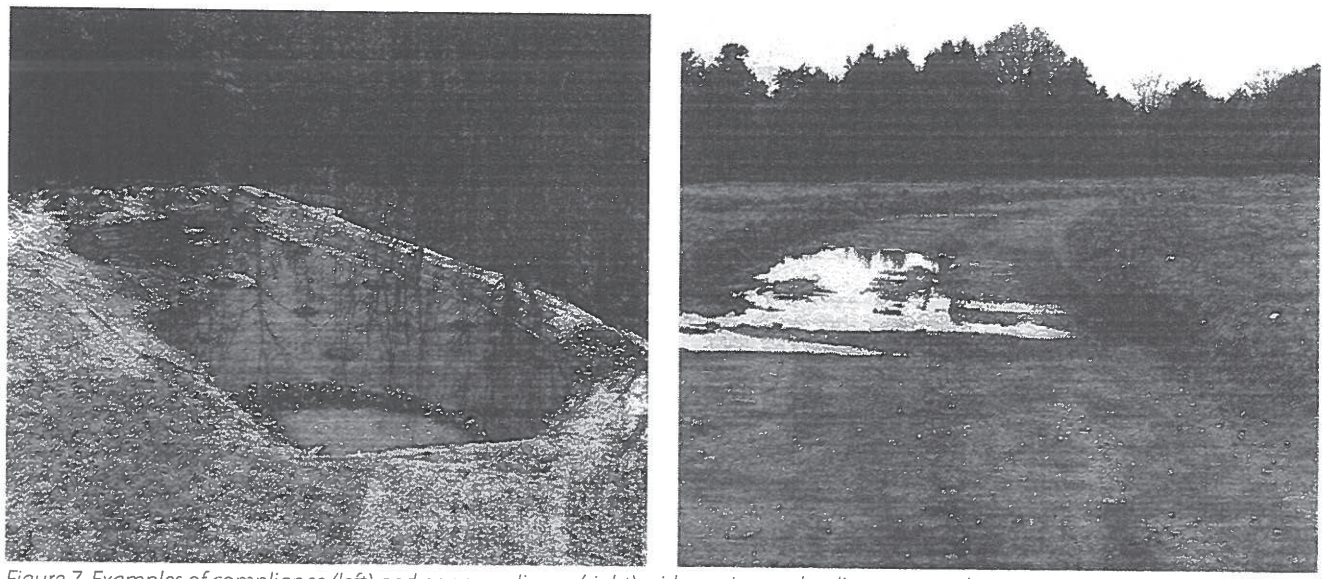

Figure 7. Examples of compliance (left) and noncompliance (right) with erosion and sediment control requirements. Photos courtesy Berkley Group.

sion processes are no different with these facilities than for any other land-disturbing activity. However, such large-scale grading project plans are more complex than those for other uses due primarily to the scale of utility solar. Additionally, the impervious nature of the panels themselves creates stormwater runoff that must be properly controlled, managed, and maintained.

Due to this complexity, it is recommended that an independent third party review all SWP and ESC plans in addition to the normal review procedures. Many review agencies (local, regional, or state) are under-resourced or not familiar with large-scale grading projects or appropriate and effective mitigation measures. It is in a locality's best interest to have the applicant's engineering and site plans reviewed by a licensed third party prior to and in addition to the formal plan review process. Most localities have engineering firms on call that can perform such reviews on behalf of the jurisdiction prior to formal plan review submittal and approval. This extra step, typically paid for by the applicant, helps to ensure the proper design of these environmental protections (Figure 7).

The successful implementation of these plans and ongoing maintenance of the mitigation measures is also critical and should be addressed in each proposal through sufficient performance security requirements and long-term maintenance provisions.

Cultural, Environmental, and Recreational Resources. Every proposed site should undergo an evaluation to identify any architectural, archaeological, or other cultural resources on or near proposed facilities. Additionally, sites located near recreational, historic, or environmental resources should be avoided. Tourism is recognized as a key sector for economic growth in many regions, and any utility-scale solar facilities that might be visible from a scenic byway, historic site, recreational amenity, or similar resources could have negative consequences for those tourist attractions.

Economic Impacts

This *PAS Memo* focuses on the land-use impacts of utility-scale solar facilities, but planners should also be aware of economic considerations surrounding these uses for local governments and communities.

Financial Incentives. Federal and state tax incentives benefit the energy industry at the expense of localities. The initial intent of industry-targeted tax credits was to act as an economic catalyst to encourage the development of green energy. An unintended consequence has been to benefit the solar industry by saving it tax costs at the expense of localities, which don't receive the benefit of the full taxable rate they would normally receive.

Employment. Jobs during construction (and decommissioning) can be numerous, but utility-scale solar facilities have minimal operational requirements otherwise. Very large facilities may employ one or two full-time-equivalent employees. During the construction phase there are typically hundreds of employees who need local housing, food, and entertainment.

Fiscal Impact. The positive fiscal impact to landowners who lease or sell property for utility-scale solar facilities is clear. However, the fiscal impact of utility-scale solar facilities to the community as a whole is less clear and, in the case of many localities, may be negligible compared with their overall budget due to tax credits, low long-term job creation, and other factors.

Property values. The impact of utility-scale solar facilities is typically negligible on neighboring property values. This can be a significant concern of adjacent residents, but negative impacts to property values are rarely demonstrated and are usually directly addressed by applicants as part of their project submittal.

Solar Facilities in Local Policy and Regulatory Documents

The two foundational land-use tools for most communities are their comprehensive (general) plans and zoning ordinances.

These two land-use documents are equally critical in the evaluation of utility-scale solar facilities. A community's plan should discuss green energy, and its zoning ordinance should properly enable and regulate green energy uses.

The Comprehensive Plan

The comprehensive plan establishes the vision for a community and should discuss public facilities and utilities. However, solar facilities are not directly addressed in many comprehensive plans.

If solar energy facilities are desired in a community, they should be discussed in the comprehensive plan in terms of green infrastructure, environment, and economic development goals. Specific direction should be given in terms of policy objectives such as appropriate locations and conditions. If a community does not desire such large-scale land uses because of their impacts on agriculture or forestry or other concerns, then that should be directly addressed in the plan.

Some states, such as Virginia, require a plan review of public facilities—including utility-scale solar facilities—for substantial conformance with the local comprehensive plan (see **Code of Virginia §15.2-2232**). This typically requires a review by the planning commission of public utility facility proposals, whether publicly or privately owned, to determine if their general or approximate locations, characters, and extents are substantially in accord with the comprehensive plan.

Most comprehensive plans discuss the types of industry desired by the community, the importance of agricultural operations, and any cultural, recreational, historic, or scenic rural landscape features. An emphasis on tourism, job growth, and natural and scenic resource protection may not be consistent with the use pattern associated with utility-scale solar facilities. If a plan is silent on the solar issue, this may act as a barrier to approving this use. Plans should make clear whether utility-scale solar is desired and, if so, under what circumstances.

This plan review process should precede any other land-use application submittal, though it may be performed concurrently with other zoning approvals. Planners and other public officials should keep in mind that even if a facility is found to be substantially in accord with a comprehensive plan, that does not mean the land-use application must be approved. Use permits are discretionary. If a particular application does not sufficiently mitigate the adverse impacts of the proposed land use, then it can and should be denied regardless of its conformance with the comprehensive plan.

Similarly, in Virginia, a utility-scale solar facility receiving use permit approval without a comprehensive plan review may not be in compliance with state code. The permit approval process is a two-step process, with the comprehensive plan review preferably preceding the consideration of a use permit application.

The Zoning Ordinance

While a community's comprehensive plan is its policy guide, the zoning ordinance is the regulatory document that implements that policy. Plans are advisory in nature, although often upheld in court decisions, whereas ordinance regulations are mandatory. In addition to comprehensive plan amendments, the zoning ordinance should specifically set forth the process and requirements necessary for the evaluation of a utility-scale solar application.

In zoning regulations, uses may be permitted either by right (with or without designated performance measures such as use and design standards) or as conditional or special uses, which require discretionary review and approval. Solar facilities generating power for on-site use are typically regulated as by-right uses depending on their size and location.

Utility-scale solar facilities, however, should in most cases be conditionally permitted regardless of the zoning district and are most appropriate on brownfield sites, in remote areas, or in agriculturally zoned areas. This is particularly true for more

The Virginia Experience

The recommendations presented in this *PAS Memo* are derived from research and the author's direct experience with the described planning, ordinance amendment, and application and regulatory processes in the following three Virginia localities, all rural counties in the southern or eastern parts of the state.

Mecklenburg County

When Mecklenburg County began seeing interest in utility-scale solar facilities, the county's long-range plan did not address solar facilities, and the zoning ordinance was based on an inadequate and outdated state model that did not adequately regulate this land use.

The town of Chase City is located near the confluence of several high-voltage utility lines, and all proposed facilities were located near or within the town's corporate limits. The county approved the first utility-scale solar facility application in the jurisdiction without any conditions or much consideration. When the second application for a much larger facility (more than 900 acres) came in soon after, with significant interest from other potential applicants as well, the county commissioned the author's consulting firm, The Berkley Group, to undertake a land-use and industry study regarding utility-scale solar facilities.

As Mecklenburg officials continued with the approval process on the second utility-scale solar facility under existing regulations, they received the results of the industry study and began considering a series of amendments to the comprehensive plan and zoning ordinance. Though county officials were particularly worried about the potential concentration of facilities around Chase City, town officials expressed formal support for the proposed land use. Other Mecklenburg communities expressed more concern and wanted the facilities to be located a significant distance away from their corporate boundaries. These dis-

The Virginia Experience (continued)

cussions led to standards limiting the concentration of facilities, encouraging proximity to the electrical grid, and establishing distances from corporate boundaries where future solar facilities could not be located.

Since the adoption of the new regulations, numerous other utility-scale solar applications have been submitted and while some have been denied, most have been approved. Solar industry representatives' concerns that the new regulations were an attempt to prevent this land use have therefore not been realized; these are simply the land-use tools that public officials wanted and needed to appropriately evaluate solar facility applications. Many of the examples and best practices recommended in this article, including the model language provided at the end of the article, are a result of the utility-scale solar study commissioned by the county (Berkley Group 2017) and the subsequent policies and regulations it adopted.

Sussex County

Sussex County is located east and north of Mecklenburg, and the interest in utility-scale solar projects there has been no less immediate or profound. The announcement of the new Amazon headquarters in Arlington, Virginia, along with the company's interest in offsetting its operational energy use with green energy sources furthered interest in this rural county more than 100 miles south of Arlington.

As in Mecklenburg County, local regulations did not address utility-scale solar uses, so public officials asked for assistance from The Berkley Group to develop policies and regulations appropriate for their community. Sussex County officials outlined an aggressive timeline for considering new regulations regarding solar facilities and, within one month of initiation, swiftly adopted amended regulations for solar energy facilities.

The same metrics and policy issues examined and adopted for Mecklenburg County were used for the initial discussion in Sussex at a joint work session between the board of supervisors (the governing body) and the planning commission. Public officials tailored the proposed standards and regulations to the county context based on geography, cultural priorities, and other concerns. They then set a joint public hearing for their next scheduled meeting to solicit public comment.

Under Virginia law, land-use matters may be considered at a joint public hearing with a recommendation from the planning commission going to the governing body and that body taking action thereafter. This is not a typical or recommended practice for local governments since it tends to limit debate, transparency, and good governance, but due to the intense interest from the solar industry, coupled with the lack of land-use regulations addressing the proposed utility-scale solar uses, county officials utilized that expedited process.

No citizens and only two industry officials spoke at the public hearing, and after two hours of questions, discussion, and some negotiation of proposed standards, the new regulations were adopted the same evening.

Since the new regulations have been put into place, no new solar applications have been received, but informal discussions with public officials and staff suggest that interest from the industry remains strong.

Greensville County

Greensville County, like Mecklenburg, lies on the Virginia-North Carolina boundary. The county has processed four solar energy applications to date (three were approved and one was denied) and continues to process additional applications. Concurrently, the county is in the process of evaluating its land-use policies and regulations, which were amended in late 2016 at the behest of solar energy interests.

The reality of the land-use approval process has proved more challenging than the theory of the facilities when considered a few years ago. As with other localities experiencing interest from the solar energy industry, the issues of scale, concentration, buffers/setbacks, and other land-use considerations have been debated at each public hearing for each application. Neighbors and families have been divided, and lifelong relationships have been severed or strained. The board of supervisors has found it difficult in the face of their friends, neighbors, and existing corporate citizens to deny applications that otherwise might not have been approved.

County officials have agreed that they do want to amend their existing policies and regulations to be more specific and less open to interpretation by applicants and citizens. One of their primary challenges has been dedicating the time to discuss proposed changes to their comprehensive plan and zoning ordinance. A joint work session between the board of supervisors and planning commission is being scheduled and should lead to subsequent public hearings and actions by those respective bodies to enact new regulations for future utility-scale solar applicants.

populated areas due to the more compact nature of land uses. There are, however, areas throughout the country where utility-scale solar might be permitted by right under strict design standards that are compatible with community objectives.

To better mitigate the potential adverse impacts of utility-scale solar facilities, required application documents should include the following:

- Concept plan
- Site plan
- Construction plan
- Maintenance plan
- Erosion and sediment control and stormwater plans

Performance measures should address these issues:

- Setbacks and screening
- Plan review process
- Construction/deconstruction mitigation and associated financial securities
- Signage
- Nuisance issues (glare, noise)

The model language provided at the end of this *PAS Memo* outlines specific recommendations regarding comprehensive plan and zoning ordinance amendments, the application process, and conditions for consideration during the permitting process.

Action Steps for Planners

There are four primary actions that planners can pursue with their planning commissions and governing bodies to ensure that their communities are ready for utility-scale solar.

Review and Amend the Plan

The first, and most important, step from a planning viewpoint is to review and amend the comprehensive plan to align with how a community wants to regulate utility-scale solar uses. Some communities don't want them at all, and many cities and towns don't have the land for them. Larger municipalities and counties around the country may have to deal with this land use at some point, if they haven't already. Local governments should get their planning houses in order by amending plans before the land-use applications arrive.

Review and Amend Land-Use Ordinances

Once the plan is updated, the next step is to review and amend land-use ordinances (namely the zoning ordinance) accordingly. These ordinances are vital land-use tools that need to be up to date and on point to effectively regulate large and complex solar facilities. If local governments do not create regulations for utility-scale solar facilities, applications for these projects will occupy excessive staff time, energy, and talents, resulting in much less efficient and more open-ended results.

Evaluate Each Application Based on Its Own Merits

This should go without saying, but it is important, particularly from a legal perspective, that each project application is evaluated based on its own merits. All planners have probably seen a project denied due to the politics at play with regard to other projects: "That one shouldn't have been approved so we're going to deny this one." "The next one is better so this one needs to be denied."

The focus of each application should be on the potential adverse impacts of the project on the community and what can be done successfully to mitigate those impacts. Whether the applicant is a public utility or a private company, the issues and complexities of the project are the same. The bottom line should never be who the applicant is; rather, it should be whether the project's adverse impacts can be properly mitigated so that the impact to the community is positive.

Learn From Others

Mecklenburg County's revised solar energy policies and regulations began with emails and phone calls to planning colleagues to see how they had handled utility-scale solar projects in their jurisdictions. The primary resources used were internet research, other planners, and old-fashioned planner ingenuity and creativity.

While it is the author's hope and intent that this article offers valuable information on this topic, nothing beats the tried and true formula of "learn from and lean on your colleagues."

Conclusion

The solar energy market is having major impacts on land use across the country, and federal and state tax incentives have contributed to a flood of applications in recent years. While the benefits of clean energy are often touted, the impacts of utility-scale solar facilities on a community can be significant. Applicants often say that a particular project will "only" take up some small percentage of agricultural, forestry, or other land-use category—but the impact of these uses extends beyond simply replacing an existing (or future) land use. Fiscal benefit to a community is also often cited as an incentive, but this alone is not a compelling reason to approve (or disapprove) a land-use application.

The scale and duration of utility-scale solar facilities complicates everything from the land disturbance permitting process through surety requirements. If not done properly, these uses can change the character of an area, altering the future of communities for generations.

Local officials need to weigh these land-use decisions within the context of their comprehensive plan and carefully consider each individual application in terms of the impact that it will have in that area of the community, not only by itself but also if combined with additional sites. The concentration of solar facilities is a major consideration in addition to their individual locations. A solar facility located by itself in a rural area, close to major transmission lines, not prominently visible from public rights-of-way or adjacent properties, and not located in growth areas, on prime farmland, or near cultural, historic, or recreational sites may be an acceptable land use with a beneficial impact on the community.

Properly evaluating and, to the extent possible, mitigating the impacts of these facilities by carefully controlling their

location, scale, size, and other site-specific impacts is key to ensuring that utility-scale solar facilities can help meet broader sustainability goals without compromising a community's vision and land-use future.

About the Author

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The author would like to thank Denise Nelson, PE, CFM, ENV SP, Berkley Group Environmental Engineer, for her contributions to this article.

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PAS MEMO ADDENDUM

Specific Planning and Zoning Recommendations for Utility-Scale Solar

This guidance and sample ordinance language for utility-scale solar facilities is drawn from actual comprehensive plan and zoning ordinance amendments as well as conditional (special) use permit conditions. These examples are from Virginia and should be tailored to localities within the context of each state's enabling legislation regarding land use.

THE COMPREHENSIVE (GENERAL) PLAN

The following topics should be addressed for comprehensive plan amendments:

- Identification of major electrical facility infrastructure (i.e., transmission lines, transfer stations, generation facilities, etc.)
- Identification of growth area boundaries around each city, town, or appropriate population center
- Additional public review and comment opportunities for land-use applications within a growth area boundary, within a specified distance from an identified growth area boundary, or within a specified distance from identified population centers (e.g., city or town limits)
- Recommended parameters for utility-scale solar facilities, such as:
  - maximum acreage or density (e.g., not more than two facilities within a two-mile radius) to mitigate the impacts related to the scale of these facilities
  - maximum percent usage (i.e., "under panel" or impervious surface) of assembled property to mitigate impacts to habitat, soil erosion, and stormwater runoff
  - location adjacent or close to existing electric transmission lines
  - location outside of growth areas or town boundary or a specified distance from an identified growth boundary
  - location on brownfields or near existing industrial uses (but not within growth boundaries)
  - avoidance of or minimization of impact to prime farmland as defined by the USDA
  - avoidance of or minimization of impact to the viewshed of any scenic, cultural, or recreational resources (i.e., large solar facilities may not be seen from surrounding points that are in line-of-sight with a resource location)
- Identification of general conditions to mitigate negative effects, including the following:
  - Concept plan compliance
  - Buffers and screening (e.g., berms, vegetation, etc.)
  - Third-party plan review (for erosion and sediment controls, stormwater management, grading)
  - Setbacks
  - Landscaping maintenance
  - Decommissioning plan and security

THE ZONING ORDINANCE

In addition to, or separate from, comprehensive plan amendments, the zoning ordinance should be amended to more specifically set forth the process and requirements necessary for a thorough land-use evaluation of an application.

Recommended Application Process

Pre-Application Meeting

The process of requiring applicants to meet with staff prior to the submission of an application often results in a better, more complete application and a smoother process once an application is submitted. This meeting allows the potential applicant and staff to sit down to discuss the location, scale, and nature of the proposed use and what will be expected during that process. The pre-application meeting is one of the most

effective tools planners can use to ensure a more efficient, substantive process.

Comprehensive Plan Review

As discussed in the article, a comprehensive plan review for public utility facilities, if required, can occur prior to or as part of the land-use application process. Any application not including the review would be subject to such review in compliance if required by state code. If the plan review is not done concurrently with the land-use application, then it should be conducted prior to the receipt of the application.

An application not substantially in accord with the comprehensive plan should not be recommended for approval, regardless of the conditions placed on the use. Depending on the location, scale, and extent of the project, it is difficult to sufficiently mitigate the adverse impacts of a project that does not conform with the plan.

Land-Use Application

If the comprehensive plan review is completed and the project is found to be in compliance with the comprehensive plan, then the use permit process can proceed once a complete application is submitted. Application completion consists of the submission of all requirements set forth in the zoning ordinance and is at the discretion of the zoning administrator if there is any question as to what is required or when it is required.

Applications should contain all required elements at the time of submittal and no components should be outstanding at the time of submittal.

Sample Ordinance Language

The following sample ordinance language addresses requirements for applications, public notice, development standards, decommissioning, site plan review, and other process elements.

1. Application requirements. Each applicant requesting a use permit shall submit the following:

    a. A complete application form.
    b. Documents demonstrating the ownership of the subject parcel(s).
    c. Proof that the applicant has authorization to act upon the owner's behalf.
    d. Identification of the intended utility company who will interconnect to the facility.
    e. List of all adjacent property owners, their tax map numbers, and addresses.
    f. A description of the current use and physical characteristics of the subject parcels.
    g. A description of the existing uses of adjacent properties and the identification of any solar facilities—existing or proposed—within a five-mile radius of the proposed location.
    h. Aerial imagery which shows the proposed location of the solar energy facility, fenced areas and driveways with the closest distance to all adjacent property lines, and nearby dwellings, along with main points of ingress/egress.
    i. Concept plan.

        The facility shall be constructed and operated in substantial compliance with the approved concept plan, with allowances for changes required by any federal or state agency. The project shall be limited to the phases and conditions set forth in the concept plan that constitutes part of this application, notwithstanding any other state or federal requirements. No additional phasing or reduction in facility size shall be permitted, and no extensions beyond the initial period shall be granted without amending the use permit. The concept plan shall include the subject parcels; the proposed location of the solar panels and related facilities; the location of proposed fencing, driveways, internal roads, and structures; the closest distance to adjacent property lines and dwellings; the location of proposed setbacks; the location and nature of proposed buffers, including vegetative and constructed buffers and berms; the location of points of ingress/egress; any proposed construction phases.
    j. A detailed decommissioning plan (see item 5 below).
    k. A reliable and detailed estimate of the costs of decommissioning, including provisions for inflation (see item 5 below).
    l. A proposed method of providing appropriate escrow, surety, or security for the cost of the decommissioning plan (see item 5 below).
    m. Traffic study modelling the construction and decommissioning processes. Staff will review the study in cooperation with the state department of transportation or other official transportation authority.
    n. An estimated construction schedule.
    o. [x number of] hard copy sets (11"× 17" or larger), one reduced copy (8½"× 11"), and one electronic copy of site plans, including elevations and landscape plans as required. Site plans shall meet the requirements of this ordinance.
    p. The locality may require additional information deemed necessary to assess compliance with this section based on the specific characteristics of the property or other project elements as determined on a case by case basis.
    q. Application fee to cover any additional review costs, advertising, or other required staff time.

2. Public notice.
    a. Use permits shall follow the public notice requirements as set forth in the zoning ordinance or by state code as applicable.
    b. Neighborhood meeting: A public meeting shall be held prior to the public hearing with the planning commission to give the community an opportunity to hear from the applicant and ask questions regarding the proposed project.
        i The applicant shall inform the zoning administrator and adjacent property owners in writing of the date, time, and location of the meeting, at least seven but

no more than 14 days in advance of the meeting date.

ii The date, time, and location of the meeting shall be advertised in the newspaper of record by the applicant, at least seven but no more than 14 days in advance of the meeting date.

iii The meeting shall be held within the community, at a location open to the general public with adequate parking and seating facilities which may accommodate persons with disabilities.

iv The meeting shall give members of the public the opportunity to review application materials, ask questions of the applicant, and make comments regarding the proposal.

v The applicant shall provide to the zoning administrator a summary of any input received from members of the public at the meeting.

3. Minimum development standards.
   a. No solar facility shall be located within a reasonable radius of an existing or permitted solar facility, airport, or municipal boundary.
   b. The minimum setback from property lines shall be a reasonable distance (e.g., at least 100 feet) and correlated with the buffer requirement.
   c. The facilities, including fencing, shall be significantly screened from the ground-level view of adjacent properties by a buffer zone of a reasonable distance extending from the property line that shall be landscaped with plant materials consisting of an evergreen and deciduous mix (as approved by staff), except to the extent that existing vegetation or natural landforms on the site provide such screening as determined by the zoning administrator. In the event that existing vegetation or landforms providing the screening are disturbed, new plantings shall be provided which accomplish the same. Opaque architectural fencing may be used to supplement other screening methods but shall not be the primary method.
   d. The design of support buildings and related structures shall use materials, colors, textures, screening, and landscaping that will blend the facilities to the natural setting and surrounding structures.
   e. Maximum height of primary structures and accessory buildings shall be a reasonable height as measured from the finished grade at the base of the structure to its highest point, including appurtenances (e.g., 15 feet). The board of supervisors may approve a greater height based upon the demonstration of a significant need where the impacts of increased height are mitigated.
   f. All solar facilities must meet or exceed the standards and regulations of the Federal Aviation Administration (FAA), State Corporation Commission (SCC) or equivalent, and any other agency of the local, state, or federal government with the authority to regulate such facilities that are in force at the time of the application.
   g. To ensure the structural integrity of the solar facility, the owner shall ensure that it is designed and maintained in compliance with standards contained in applicable local, state, and federal building codes and regulations that were in force at the time of the permit approval.
   h. The facilities shall be enclosed by security fencing on the interior of the buffer area (not to be seen by other properties) of a reasonable height. A performance bond reflecting the costs of anticipated fence maintenance shall be posted and maintained. Failure to maintain the security fencing shall result in revocation of the use permit and the facility's decommissioning.
   i. Ground cover on the site shall be native vegetation and maintained in accordance with established performance measures or permit conditions.
   j. Lighting shall use fixtures as approved by the municipality to minimize off-site glare and shall be the minimum necessary for safety and security purposes. Any exceptions shall be enumerated on the concept plan and approved by the zoning administrator.
   k. No facility shall produce glare that would constitute a nuisance to the public.
   l. Any equipment or situations on the project site that are determined to be unsafe must be corrected within 30 days of citation of the unsafe condition.
   m. Any other condition added by the planning commission or governing body as part of a permit approval.

4. Coordination of local emergency services. Applicants for new solar energy facilities shall coordinate with emergency services staff to provide materials, education and/or training to the departments serving the property with emergency services in how to safely respond to on-site emergencies.

5. Decommissioning. The following requirements shall be met:
   a. Utility-scale solar facilities which have reached the end of their useful life or have not been in active and continuous service for a reasonable period of time shall be removed at the owner's or operator's expense, except if the project is being repowered or a force majeure event has or is occurring requiring longer repairs; however, the municipality may require evidentiary support that a longer repair period is necessary.
   b. Decommissioning shall include removal of all solar electric systems, buildings, cabling, electrical components, security barriers, roads, foundations, pilings, and any other associated facilities, so that any agricultural ground upon which the facility or system was located is again tillable and suitable for agricultural uses. The site shall be graded and reseeded to restore it to as natural a condition as possible, unless the land owner requests in writing that the access roads or other land surface areas not be restored, and this request is approved by the governing body (other conditions might be more beneficial or desirable at that time).
   c. The site shall be regraded and reseeded to as natural condition as possible within a reasonable timeframe after equipment removal.

d. The owner or operator shall notify the zoning administrator by certified mail, return receipt requested, of the proposed date of discontinued operations and plans for removal.
e. Decommissioning shall be performed in compliance with the approved decommissioning plan. The governing body may approve any appropriate amendments to or modifications of the decommissioning plan.
f. Hazardous material from the property shall be disposed of in accordance with federal and state law.
g. The applicant shall provide a reliable and detailed cost estimate for the decommissioning of the facility prepared by a professional engineer or contractor who has expertise in the removal of solar facilities. The decommissioning cost estimate shall explicitly detail the cost and shall include a mechanism for calculating increased removal costs due to inflation and without any reduction for salvage value. This cost estimate shall be recalculated every five (5) years and the surety shall be updated in kind.
h. The decommissioning cost shall be guaranteed by cash escrow at a federally insured financial institution approved by the municipality before any building permits are issued. The governing body may approve alternative methods of surety or security, such as a performance bond, letter of credit, or other surety approved by the municipality, to secure the financial ability of the owner or operator to decommission the facility.
i. If the owner or operator of the solar facility fails to remove the installation in accordance with the requirements of this permit or within the proposed date of decommissioning, the municipality may collect the surety and staff or a hired third party may enter the property to physically remove the installation.

6. Site plan requirements. In addition to the site plan requirements set forth in the zoning ordinance, a construction management plan shall be submitted that includes:
   - Traffic control plan (subject to state and local approval, as appropriate)
   - Delivery and parking areas
   - Delivery routes
   - Permits (state/local)

   Additionally, a construction/deconstruction mitigation plan shall also be submitted including:
   - Hours of operation
   - Noise mitigation (e.g., construction hours)
   - Smoke and burn mitigation (if necessary)
   - Dust mitigation
   - Road monitoring and maintenance

7. The building permit must be obtained within [18 months] of obtaining the use permit and commencement of the operation shall begin within [one year] from building permit issuance.

8. All solar panels and devices are considered primary structures and subject to the requirements for such, along with the established setbacks and other requirements for solar facilities.

9. Site maintenance.
   a. Native grasses shall be used to stabilize the site for the duration of the facility's use.
   b. Weed control or mowing shall be performed routinely and a performance bond reflecting the costs of such maintenance for a period of [six (6) months] shall be posted and maintained. Failure to maintain the site may result in revocation of the use permit and the facility's decommissioning.
   c. Anti-reflection coatings. Exterior surfaces of the collectors and related equipment shall have a nonreflective finish and solar panels shall be designed and installed to limit glare to a degree that no after image would occur towards vehicular traffic and any adjacent building.
   d. Repair of panels. Panels shall be repaired or replaced when either nonfunctional or in visible disrepair.

10. Signage shall identify the facility owner, provide a 24-hour emergency contact phone number, and conform to the requirements set forth in the Zoning Ordinance.

11. At all times, the solar facility shall comply with any local noise ordinance.

12. The solar facility shall not obtain a building permit until evidence is given to the municipality that an electric utility company has a signed interconnection agreement with the permittee.

13. All documentation submitted by the applicant in support of this permit request becomes a part of the conditions. Conditions imposed by the governing body shall control over any inconsistent provision in any documentation provided by the applicant.

14. If any one or more of the conditions is declared void for any reason, such decision shall not affect the remaining portion of the permit, which shall remain in full force and effect, and for this purpose, the provisions of this are here by declared to be severable.

15. Any infraction of the above-mentioned conditions, or any zoning ordinance regulations, may lead to a stop order and revocation of the permit.

16. The administrator/manager, building official, or zoning administrator, or any other parties designated by those public officials, shall be allowed to enter the property at any reasonable time, and with proper notice, to check for compliance with the provisions of this permit.

EXAMPLE OF RECOMMENDED USE PERMIT CONDITIONS (In Virginia: conditional uses, special uses, special exceptions)

***Conditions** ([approved/revised] at the Planning Commission meeting on [date])*

If the Board determines that the application furthers the comprehensive plan's goals and objectives and that it meets the criteria set forth in the zoning ordinance, then the Planning Commission recommends the following conditions to mitigate the adverse effects of this utility-scale solar generation facility with any Board recommendation for permit approval.

1. The Applicant will develop the Solar Facility in substantial accord with the Conceptual Site Plan dated _____ included with the application as determined by the Zoning Administrator. Significant deviations or additions, including any enclosed building structures, to the Site Plan will require review and approval by the Planning Commission and Board of Supervisors.

2. Site Plan Requirements. In addition to all State site plan requirements and site plan requirements of the Zoning Administrator, the Applicant shall provide the following plans for review and approval for the Solar Facility prior to the issuance of a building permit:
   a. *Construction Management Plan.* The Applicant shall prepare a Construction Management Plan for each applicable site plan for the Solar Facility, and each plan shall address the following:
      i. Traffic control methods (in coordination with the Department of Transportation prior to initiation of construction), including lane closures, signage, and flagging procedures.
      ii. Site access planning directing employee and delivery traffic to minimize conflicts with local traffic.
      iii. Fencing. The Applicant shall install temporary security fencing prior to the commencement of construction activities occurring on the Solar Facility.
      iv. Lighting. During construction of the Solar Facility, any temporary construction lighting shall be positioned downward, inward, and shielded to eliminate glare from all adjacent properties. Emergency and safety lighting shall be exempt from this construction lighting condition.
   b. *Construction Mitigation Plan.* The Applicant shall prepare a Construction Mitigation Plan for each applicable site plan for the Solar Facility to the satisfaction of the Zoning Administrator. Each plan shall address, at a minimum, the effective mitigation of dust, burning operations, hours of construction activity, access and road improvements, and handling of general construction complaints.
   c. *Grading plan.* The Solar Facility shall be constructed in compliance with the County-approved grading plan as determined and approved by the Zoning Administrator or his designee prior to the commencement of any construction activities and a bond or other security will be posted for the grading operations. The grading plan shall:
      i. Clearly show existing and proposed contours;
      ii. Note the locations and amount of topsoil to be removed (if any) and the percent of the site to be graded;
      iii. Limit grading to the greatest extent practicable by avoiding steep slopes and laying out arrays parallel to landforms;
      iv. Require an earthwork balance to be achieved on-site with no import or export of soil;
      v. Require topsoil to first be stripped and stockpiled on-site to be used to increase the fertility of areas intended to be seeded in areas proposed to be permanent access roads which will receive gravel or in any areas where more than a few inches of cut are required;
      vi. Take advantage of natural flow patterns in drainage design and keep the amount of impervious surface as low as possible to reduce stormwater storage needs.
   d. *Erosion and Sediment Control Plan.* The County will have a third-party review with corrections completed prior to submittal for Department of Environmental Quality (DEQ) review and approval. The owner or operator shall construct, maintain, and operate the project in compliance with the approved plan. An E&S bond (or other security) will be posted for the construction portion of the project.
   e. *Stormwater Management Plan.* The County will have a third-party review with corrections completed prior to submittal for DEQ review and approval. The owner or operator shall construct, maintain, and operate the project in compliance with the approved plan. A stormwater control bond (or other security) will be posted for the project for both construction and post construction as applicable and determined by the Zoning Administrator.
   f. *Solar Facility Screening and Vegetation Plan.* The owner or operator shall construct, maintain, and operate the facility in compliance with the approved plan. A separate security shall be posted for the ongoing maintenance of the project's vegetative buffers in an amount deemed sufficient by the Zoning Administrator.
   g. The Applicant will compensate the County in obtaining an independent third-party review of any site plans or construction plans or part thereof.
   h. The design, installation, maintenance, and repair of the Solar Facility shall be in accordance with the most current National Electrical Code (NFPA 70) available (2017 version or later as applicable).

3. Operations.
   a. *Permanent Security Fence.* The Applicant shall install a permanent security fence, consisting of chain link, 2-inch square mesh, 6 feet in height, surmounted by three strands of barbed wire, around the Solar Facility prior to the commencement of operations of the Solar Facility.

Failure to maintain the fence in a good and functional condition will result in revocation of the permit.

b. *Lighting.* Any on-site lighting provided for the operational phase of the Solar Facility shall be dark-sky compliant, shielded away from adjacent properties, and positioned downward to minimize light spillage onto adjacent properties.

c. *Noise.* Daytime noise will be under 67 dBA during the day with no noise emissions at night.

d. *Ingress/Egress.* Permanent access roads and parking areas will be stabilized with gravel, asphalt, or concrete to minimize dust and impacts to adjacent properties.

4. Buffers.
   a. *Setbacks.*
      i. A minimum 150-foot setback, which includes a 50-foot planted buffer as described below, shall be maintained from a principal Solar Facility structure to the street line (edge of right-of-way) where the Property abuts any public rights-of-way.
      ii. A minimum 150-foot setback, which includes a 50-foot planted buffer as described below, shall be maintained from a principal Solar Facility structure to any adjoining property line which is a perimeter boundary line for the project area.
   b. *Screening.* A minimum 50-foot vegetative buffer (consisting of existing trees and vegetation) shall be maintained. If there is no existing vegetation or if the existing vegetation is inadequate to serve as a buffer as determined by the Zoning Administrator, a triple row of trees and shrubs will be planted on approximately 10-foot centers in the 25 feet immediately adjacent to the security fence. New plantings of trees and shrubs shall be approximately 6 feet in height at time of planting. In addition, pine seedlings will be installed in the remaining 25 feet of the 50-foot buffer. Ancillary project facilities may be included in the buffer as described in the application where such facilities do not interfere with the effectiveness of the buffer as determined by the Zoning Administrator.
   c. *Wildlife corridors.* The Applicant shall identify an access corridor for wildlife to navigate through the Solar Facility. The proposed wildlife corridor shall be shown on the site plan submitted to the County. Areas between fencing shall be kept open to allow for the movement of migratory animals and other wildlife.

5. Height of Structures. Solar facility structures shall not exceed 15 feet, however, towers constructed for electrical lines may exceed the maximum permitted height as provided in the zoning district regulations, provided that no structure shall exceed the height of 25 feet above ground level, unless required by applicable code to interconnect into existing electric infrastructure or necessitated by applicable code to cross certain structures (e.g. pipelines).

6. Inspections. The Applicant will allow designated County representatives or employees access to the facility at any time for inspection purposes as set forth in their application.

7. Training. The Applicant shall arrange a training session with the Fire Department to familiarize personnel with issues unique to a solar facility before operations begin.

8. Compliance. The Solar Facility shall be designed, constructed, and tested to meet relevant local, state, and federal standards as applicable.

9. Decommissioning.
   a. *Decommissioning Plan.* The Applicant shall submit a decommissioning plan to the County for approval in conjunction with the building permit. The purpose of the decommissioning plan is to specify the procedure by which the Applicant or its successor would remove the Solar Facility after the end of its useful life and to restore the property for agricultural uses.
   b. *Decommissioning Cost Estimate.* The decommissioning plan shall include a decommissioning cost estimate prepared by a State licensed professional engineer.
      i. The cost estimate shall provide the gross estimated cost to decommission the Solar Facility in accordance with the decommissioning plan and these conditions. The decommissioning cost estimate shall not include any estimates or offsets for the resale or salvage values of the Solar Facility equipment and materials.
      ii. The Applicant, or its successor, shall reimburse the County for an independent review and analysis by a licensed engineer of the initial decommissioning cost estimate.
      iii. The Applicant, or its successor, will update the decommissioning cost estimate every 5 years and reimburse the County for an independent review and analysis by a licensed engineer of each decommissioning cost estimate revision.
   c. *Security.*
      i. Prior to the County's approval of the building permit, the Applicant shall provide decommissioning security in one of the two following alternatives:
         1. Letter of Credit for Full Decommissioning Cost: A letter of credit issued by a financial institution that has (i) a credit Rating from one or both of S&P and Moody's of at least A from S&P or A2 from Moody's and (ii) a capital surplus of at least $10,000,000,000; or (iii) other credit rating and capitalization reasonably acceptable to the County, in the full amount of the decommissioning estimate; or
         2. Tiered Security:
            a. 10 percent of the decommissioning cost estimate to be deposited in a cash escrow at a financial institution reasonably acceptable to the County; and
            b. 10 percent of the decommissioning cost estimate in the form of a letter of credit issued by

a financial institution that has (i) a credit rating from one or both of S&P and Moody's of at least A from S&P or A2 from Moody's and (ii) a capital surplus of at least $10,000,000,000, or (iii) other credit rating and capitalization reasonably acceptable to the County, with the amount of the letter of credit increasing by an additional 10 percent each year in years 2–9 after commencement of operation of the Solar Facility; and

c. The Owner, not the Applicant, will provide its guaranty of the decommissioning obligations. The guaranty will be in a form reasonably acceptable to the County. The Owner, or its successor, should have a minimum credit rating of (i) Baa3 or higher by Moody's or (ii) BBB- or higher by S&P; and

d. In the tenth year after operation, the Applicant will have increased the value of the letter of credit to 100 percent of the decommissioning cost estimate. At such time, the Applicant may be entitled to a return of the 10 percent cash escrow.

ii. Upon the receipt of the first revised decommissioning cost estimate (following the 5th anniversary), any increase or decrease in the decommissioning security shall be funded by the Applicant or refunded to Applicant (if permissible by the form of security) within 90 days and will be similarly trued up for every subsequent five-year updated decommissioning cost estimate.

iii. The security must be received prior to the approval of the building permit and must stay in force for the duration of the life span of the Solar Facility and until all decommissioning is completed. If the County receives notice or reasonably believes that any form of security has been revoked or the County receives notice that any security may be revoked, the County may revoke the special use permit and shall be entitled to take all action to obtain the rights to the form of security.

d. *Applicant/Property Owner Obligation.* Within 6 months after the cessation of use of the Solar Facility for electrical power generation or transmission, the Applicant or its successor, at its sole cost and expense, shall decommission the Solar Facility in accordance with the decommissioning plan approved by the County. If the Applicant or its successor fails to decommission the Solar Facility within 6 months, the property owners shall commence decommissioning activities in accordance with the decommissioning plan. Following the completion of decommissioning of the entire Solar Facility arising out of a default by the Applicant or its successor, any remaining security funds held by the County shall be distributed to the property owners in a proportion of the security funds and the property owner's acreage ownership of the Solar Facility.

e. *Applicant/Property Owner Default; Decommissioning by the County.*

i. If the Applicant, its successor, or the property owners fail to decommission the Solar Facility within 6 months, the County shall have the right, but not the obligation, to commence decommissioning activities and shall have access to the property, access to the full amount of the decommissioning security, and the rights to the Solar Facility equipment and materials on the property.

ii. If applicable, any excess decommissioning security funds shall be returned to the current owner of the property after the County has completed the decommissioning activities.

iii. Prior to the issuance of any permits, the Applicant and the property owners shall deliver a legal instrument to the County granting the County (1) the right to access the property, and (2) an interest in the Solar Facility equipment and materials to complete the decommissioning upon the Applicant's and property owner's default. Such instrument(s) shall bind the Applicant and property owners and their successors, heirs, and assigns. Nothing herein shall limit other rights or remedies that may be available to the County to enforce the obligations of the Applicant, including under the County's zoning powers.

f. *Equipment/Building Removal.* All physical improvements, materials, and equipment related to solar energy generation, both surface and subsurface components, shall be removed in their entirety. The soil grade will also be restored following disturbance caused in the removal process. Perimeter fencing will be removed and recycled or reused. Where the current or future landowner prefers to retain the fencing, these portions of fence will be left in place.

g. *Infrastructure Removal.* All access roads will be removed, including any geotextile material beneath the roads and granular material. The exception to removal of the access roads and associated culverts or their related material would be upon written request from the current or future landowner to leave all or a portion of these facilities in place for use by that landowner. Access roads will be removed within areas that were previously used for agricultural purposes and topsoil will be redistributed to provide substantially similar growing media as was present within the areas prior to site disturbance.

h. *Partial Decommissioning.* If decommissioning is triggered for a portion, but not the entire Solar Facility, then the Applicant or its successor will commence and complete decommissioning, in accordance with the decommissioning plan, for the applicable portion of the Solar Facility; the remaining portion of the Solar Facility would continue to be subject to the decommissioning plan. Any reference to decommissioning the Solar Facility shall include the obligation to decommission all or a portion of the Solar Facility whichever is applicable with respect

to a particular situation.

10. Power Purchase Agreement. At the time of the Applicant's site plan submission, the Applicant shall have executed a power purchase agreement with a third-party providing for the sale of a minimum of 80% of the Solar Facility's anticipated generation capacity for not less than 10 years from commencement of operation. Upon the County's request, the Applicant shall provide the County and legal counsel with a redacted version of the executed power purchase agreement.

Planning Department

From: Christine Marshall <balmertmarshall@icloud.com>
Sent: Friday, September 24, 2021 12:53 PM
To: Planning Department
Subject: Workshop - Utility Scale Solar Facilities - Envision Jefferson 2035 Comprehensive Plan Amendments
Attachments: Untitled 7 1.pdf; ATT00001.htm

Hello Planning Commissioners,

I would like to submit this comment for the Planning Commission Workshop regarding changes to the Envision Jefferson 2035 Comprehensive Plan.

Please consider holding more then one, maybe three or more workshops regarding changes to the comprehensive plan to allow utility scale solar in the residential and rural zoning districts by principal permitted use. Well prior to the workshops, the public should be presented with maps by the Planning and Engineering (in agenda packets and on the county web page) that highlight the various zoning districts in which utility scale solar facilities will be permitted. Also emphasized should be the current utility infrastructure that will support these new projects and proposed new infrastructure required to support utility scale solar facilities.

There is currently 556.5 megawatts of energy in the PJM new service request queue for Jefferson County, which could amount to between 3,339 and 5,565 acres (6-10 acres/MW energy) of land currently proposed. How much land does Jefferson County want to designate to these facilities? Should there be any limits? Will you protect historic sites? Will the Planning Commission and Planners please provide maps that highlight the current locations of proposed Solar Energy Generating Facilities before making a final decision on changes to both the comprehensive plan and the zoning ordinances? Please provide maps as well to the public well before final public comments.

I believe that if the Planning Commission and County Commission works with the citizens of Jefferson County, as full partners, we can together arrive at a plan that works for the benefit of the county and more. Attached (and in link) is a planning document that touches on the many aspects of developing utility scale solar facilities within a county, including the siting of such facilities; all aspects deserve careful consideration before approving changes to the Envision Jefferson 2035 Comprehensive Plan and any zoning ordinances. https://www.planning.org/pas/memo/2019/sep/

Please work with the many stakeholders of Jefferson County, including residents, to build a better community.

Thank you,

Christine Marshall

PAS MEMO — SEPTEMBER/OCTOBER 2019

Planning for Utility-Scale Solar Energy Facilities

Download PDF version (pdf) (/publications/document/9184153/)

By Darren Coffey, AICP

Solar photovoltaics (PV) are the fastest-growing energy source in the world due to the decreasing cost per kilowatt-hour — 60 percent to date since 2010, according to the U.S. Department of Energy (U.S. DOE n.d.) — and the comparative speed in constructing a facility. Solar currently generates 0.4 percent of global electricity, but some University of Oxford researchers estimate its share could increase to 20 percent by 2027 (Hawken 2017). Utility-scale solar installations are the most cost-effective solar PV option (Hawken 2017).

Transitioning from coal plants to solar significantly decreases carbon dioxide emissions and eliminates sulfur, nitrous oxides, and mercury emissions. As the U.S. Department of Energy states, "As the cleanest domestic energy source available, solar supports broader national priorities, including national security, economic growth, climate change mitigation, and job creation" (U.S. DOE n.d.). As a result, there is growing demand for solar energy from companies (e.g., the "RE100 (http://there100.org/)," 100 global corporations committed to sourcing 100 percent renewable electricity by 2050) and governments (e.g., the Virginia Energy Plan (https://www.dmme.virginia.gov/DE/VirginiaEnergyPlan.shtml) commits the state to 16 percent renewable energy by 2022).

Federal and state tax incentives have accelerated the energy industry's efforts to bring facilities online as quickly as possible. This has created a new challenge for local governments, as many are ill-prepared to consider this new and unique land-use option. Localities are struggling with how to evaluate utility-scale solar facility applications, how to update their land-use regulations, and how to achieve positive benefits for hosting these clean energy facilities.

As a land-use application, utility-scale solar facilities are processed as any other land-use permit. Localities use the tools available: the existing comprehensive (general) plan and zoning ordinance. In many cases, however, plans and ordinances do not address this type of use. Planners will need to amend these documents to bring some structure, consistency, and transparency to the evaluation process for utility-scale solar facilities.

Unlike many land uses, these solar installations will occupy vast tracts of land for one or more generations; they require tremendous local resources to monitor during construction (and presumably decommissioning); they can have significant impacts on the community depending on their location, buffers, installation techniques, and other factors (Figure 1); and they are not readily adaptable for another industrial or commercial use, hence the need for decommissioning.

Figure 1. Utility-scale solar facilities are large-scale uses that can have significant land-use impacts on communities. Photo by Flickr user U.S. Department of Energy/Michael Faria.

While solar energy aligns with sustainability goals held by an increasing number of communities, solar industries must bring an overall value to the locality beyond the clean energy label. Localities must consider the other elements of sustainability and make deliberate decisions regarding impacts and benefits to the social fabric, natural environment, and local economy. How should a locality properly evaluate the overall impacts of a large-scale clean energy land use on the community?

This *PAS Memo* examines utility-scale solar facility uses and related land-use issues. It defines and classifies these facilities, analyzes their land-use impacts, and makes recommendations for how to evaluate and mitigate those impacts. While public officials tend to focus on the economics of these facilities and their overall fiscal impact to the community, the emphasis for planners is on the direct land-use considerations that should be carefully evaluated (e.g., zoning, neighbors, viewsheds, and environmental impacts). Specific recommendations and sample language for addressing utility-scale solar in comprehensive plans and zoning ordinances are provided at the end of the article.

The Utility-Scale Solar Backdrop

In contrast to solar energy systems generating power for on-site consumption, utility-scale solar, or a solar farm, is an energy generation facility that supplies power to the grid. These facilities are generally more than two acres in size and have capacities in excess of one megawatt; today's utility-scale solar facilities may encompass hundreds or even thousands of acres. A solar site may also include a substation and a switchyard, and it may require generator lead lines (*gen-tie* lines) to *interconnect* to the grid (Figure 2).

Figure 2. Components of a solar farm: solar panels (left), substation (center), and high-voltage transmission lines (right). Photos courtesy Berkley Group (left, right) and Pixabay (center).

From 2008 to 2019, U.S. solar photovoltaic (PV) installations have grown from generating 1.2 gigawatts (GW) to 30 GW (SEIA 2019). The top 10 states generating energy from solar PV are shown in Figure 3. For many of these initial projects, local planning staff independently compiled information through research, used model ordinances, and relied on professional networks to cobble together local processes and permit conditions to better address the adverse impacts associated with utility-scale solar.

However, each individual project brings unique challenges related to size, siting, compatibility with surrounding uses, mitigating impacts through setbacks and buffers, land disturbance processes and permits, financial securities, and other factors. This has proven to be a significant and ongoing challenge to local planning staff, planning commissions, and governing bodies.

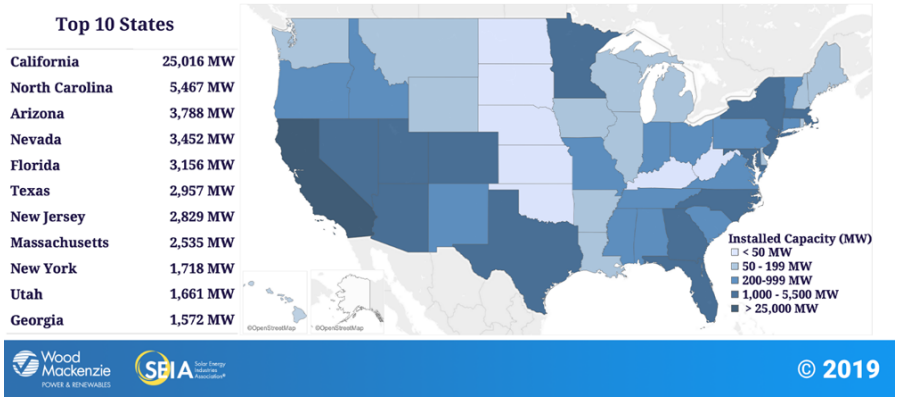

Figure 3. Utility solar capacity in the United States in 2019. Courtesy Solar Energy Industry Association.

Some localities have adopted zoning regulations to address utility-scale solar facilities based on model solar ordinance templates created by state or other agencies for solar energy facilities. However, these ordinances may not be sufficient to properly mitigate the adverse impacts of these facilities on communities. Many of these initial models released in the early 2010s aimed to promote clean energy and have failed to incorporate lessons learned from actual facility development. In addition, the solar industry has been changing at a rapid pace, particularly regarding the increasing scale of facilities. Planners should therefore revisit any existing zoning regulations for utility-scale solar facilities to ensure their relevance and effectiveness.

Rapid growth of utility-scale solar facilities has emerged for rural communities, particularly those that have significant electrical grid infrastructure. Many rural counties have thousands of acres of agricultural and forested properties in various levels of production. Land prices tend to be much more cost-effective in rural localities, and areas located close to high-voltage electric transmission lines offer significant cost savings to the industry. Figure 4 shows the extent of existing electric transmission lines in one rural Virginia county.

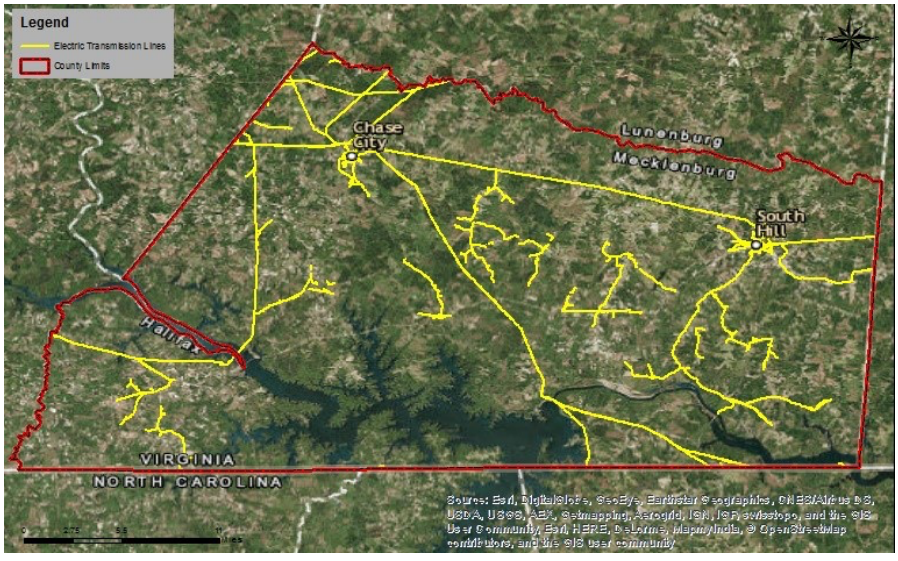

Figure 4. Electric transmission lines in Mecklenburg County, Virginia. Courtesy Berkley Group.

Federal and state tax incentives have further accelerated the pace of utility-scale solar developments, along with decreasing solar panel production costs. These factors all combine to create land-use development pressure that, absent effective and relevant land-use regulatory and planning tools, creates an environment where it is difficult to properly evaluate and make informed decisions for the community's benefit.

Solar Facility Land-Use Impacts

As with any land-use application, there are numerous potential impacts that need to be evaluated with solar facility uses. All solar facilities are not created equal, and land-use regulations should reflect those differences in scale and impact accordingly.

Utility-scale solar energy facilities involve large tracts of land involving hundreds, if not thousands, of acres. On these large tracts, the solar panels often cover more than half of the land area. The solar facility use is often pitched as "temporary" by developers, but it has a significant duration — typically projected by applicants as up to 40 years.

Establishing such a solar facility use may take an existing agricultural or forestry operation out of production, and resuming such operations in the future will be a challenge. Utility-scale solar can take up valuable future residential, commercial, or industrial growth land when located near cities, towns, or other identified growth areas. If a solar facility is close to a major road or cultural asset, it could affect the viewshed and attractiveness of the area. Because of its size, a utility-scale solar facility can change the character of these areas and their suitability for future development. There may be other locally specific potential impacts. In short, utility-scale solar facility proposals must be carefully evaluated regarding the size and scale of the use; the conversion of agricultural, forestry, or residential land to an industrial-scale use; and the potential environmental, social, and economic impacts on nearby properties and the area in general.

To emphasize the potential impact of utility-scale solar facilities, consider the example of one 1,408-acre (2.2-square-mile) Virginia town with a 946-acre solar facility surrounding its north and east sides. The solar project area is equal to approximately 67 percent of the town's area. A proposed 332.5-acre solar facility west of town increases the solar acres to 1,278.5, nearly the size of the town. Due to its proximity to multiple high-voltage electrical transmission lines, other utility-scale solar facilities are also proposed for this area, which would effectively lock in the town's surrounding land-use pattern for the next generation or more.

The following considerations are some of the important land-use impacts that utility-scale solar may have on nearby communities.

CHANGE IN USE/FUTURE LAND USE

A primary impact of utility-scale solar facilities is the removal of forest or agricultural land from active use. An argument often made by the solar industry is that this preserves the land for future agricultural use, and applicants typically state that the land will be restored to its previous condition. This is easiest when the land was initially used for grazing, but it is still not without its challenges, particularly over large acreages. Land with significant topography, active agricultural land, or forests is more challenging to restore.

It is important that planners consider whether the industrial nature of a utility-scale solar use is compatible with the locality's vision. Equally as important are imposing conditions that will enforce the assertions made by applicants regarding the future restoration of the site and denying applications where those conditions are not feasible.

Agricultural/Forestry Use. Agricultural and forested areas are typical sites for utility-scale solar facility uses. However, the use of prime agricultural land (as identified by the USDA or by state agencies) and ecologically sensitive lands (e.g., riparian buffers, critical habitats, hardwood forests) for these facilities should be scrutinized.

For a solar facility, the site will need to be graded in places and revegetated to stabilize the soil. That vegetation typically needs to be managed (e.g., by mowing, herbicide use, or sheep grazing) over a long period of time. This prolonged vegetation management can change the natural characteristics of the soil, making restoration of the site for future agricultural use more difficult. While native plants, pollinator plants, and grazing options exist and are continually being explored, there are logistical issues with all of them, from soil quality impacts to compatibility of animals with the solar equipment.

A deforested site can be reforested in the future, but over an additional extended length of time, and this may be delayed or the land left unforested at the request of the landowner at the time of decommissioning. Clearcutting forest in anticipation of a utility-scale solar application should be avoided but is not uncommon. This practice potentially undermines

the credibility of the application, eliminates what could have been natural buffers and screening, and eliminates other landowner options to monetize the forest asset (such as for carbon or nutrient credits).

For decommissioning, the industry usually stipulates removal of anything within 36 inches below the ground surface. Unless all equipment is specified for complete removal and this is properly enforced during decommissioning, future agricultural operations would be planting crops over anything left in the ground below that depth, such as metal poles, concrete footers, or wires.

Residential Use. While replacing agricultural uses with residential uses is a more typical land-use planning concern, in some areas this is anticipated and desired over time. "People have to live somewhere," and this should be near existing infrastructure typical of cities, towns, and villages rather than sprawled out over the countryside. This makes land lying within designated growth areas or otherwise located near existing population centers a logical location for future residential use. Designated growth areas can be important land-use strategies to accommodate future growth in a region. Permitting a utility-scale use on such land ties it up for 20–40 years (a generation or two), which may be appropriate in some areas, but not others.

Industrially Zoned Land. Solar facilities can be a good use of brownfields or other previously disturbed land. A challenge in many rural areas, however, is that industrially zoned land is limited, and both public officials and comprehensive plan policies place a premium on industries that create and retain well-paying jobs. While utility-scale solar facilities are not necessarily incompatible with other commercial and industrial uses, the amount of space they require make them an inefficient use of industrially zoned land, for which the "highest and best use" often entails high-quality jobs and an array of taxes paid to the locality (personal property, real estate, machinery and tool, and other taxes).

LOCATION

The location of utility-scale solar facilities is the single most important factor in evaluating an application because of the large amount of land required and the extended period that land is dedicated to this singular use, as discussed above.

Solar facilities can be appropriately located in areas where they are difficult to detect, the prior use of the land has been marginal, and there is no designated future use specified (i.e., not in growth areas, not on prime farmland, and not near recreational or historic areas). Proposed facilities adjacent to corporate boundaries, public rights-of-way, or recreational or cultural resources are likely to be more controversial than facilities that are well placed away from existing homes, have natural buffers, and don't change the character of the area from the view of local residents and other stakeholders.

CONCENTRATION OF USES

A concentration of solar facilities is another primary concern. The large scale of this land use, particularly when solar facilities are concentrated, also significantly exacerbates adverse impacts to the community in terms of land consumption, use pattern disruptions, and environmental impacts (e.g., stormwater, erosion, habitat). Any large-scale homogenous land use should be carefully examined — whether it is rooftops, impervious surface, or solar panels. Such concentrated land uses change the character of the area and alter the natural and historic development pattern of a community.

The attraction of solar facilities to areas near population centers is a response to the same forces that attract other uses — the infrastructure is already there (electrical grid, water and sewer, and roads). One solar facility in a given geographic area may be an acceptable use of the land, but when multiple facilities are attracted to the same geography for the same reasons, this tips the land-use balance toward too much of a single use. The willingness of landowners to cooperate with energy companies is understandable, but that does not automatically translate into good planning for the community. The short- and medium-term gains for individual landowners can have a lasting negative impact on the larger community.

VISUAL IMPACTS

The visual impact of utility-scale solar facilities can be significantly minimized with effective screening and buffering, but this is more challenging in historic or scenic landscapes. Solar facilities adjacent to scenic byways or historic corridors may negatively impact the rural aesthetic along these transportation routes. Buffering or screening may also be appropriate along main arterials or any public right-of-way, regardless of special scenic or historic designation.

The location of large solar facilities also needs to account for views from public rights-of-way (Figure 5). Scenic or historic areas should be avoided, while other sites should be effectively screened from view with substantial vegetative or other types of buffers. Berms, for example, can provide a very effective screen, particularly if combined with appropriate vegetation.

Figure 5. This scenic vista would be impacted by a solar facility proposed for the far knoll. Photo courtesy Berkley Group.

DECOMMISSIONING

The proper decommissioning and removal of equipment and other improvements when the facility is no longer operational presents significant challenges to localities.

Decommissioning can cost millions in today's dollars. The industry strongly asserts that there is a significant salvage value to the solar arrays, but there may or may not be a market to salvage the equipment when removed. Further, the feasibility of realizing salvage value may depend on who removes the equipment — the operator, the tenant, or the landowner (who may not be the same parties as during construction) — as well as when it is removed.

Providing for adequate security to ensure that financial resources are available to remove the equipment is a significant challenge. Cash escrow is the most reliable security for a locality but is the most expensive for the industry and potentially a financial deal breaker. Insurance bonds or letters of credit seem to be the most acceptable forms of security but can be difficult to enforce as a practical matter. The impact of inflation over decades is difficult to calculate; therefore, the posted financial security to ensure a proper decommissioning should be reevaluated periodically — usually every five years or so. The worst possible outcome for a community (and a farmer or landowner) would be an abandoned utility-scale solar facility with no resources available to pay for its removal.

Additional Solar Facility Impacts

In addition to the land-use impacts previously discussed, there are a number of significant environmental and economic impacts associated with utility-scale solar facilities that should be addressed as part of the land-use application process.

ENVIRONMENTAL IMPACTS

While solar energy is a renewable, green resource, its generation is not without environmental impacts. Though utility-scale solar facilities do not generate the air or water pollution typical of other large-scale fossil-fuel power production facilities, impacts on wildlife habitat and stormwater management can be significant due to the large scale of these uses and the resulting extent of land disturbance. The location of sites, the arrangement of panels within the site, and the ongoing management of the site are important in the mitigation of such impacts.

Wildlife Corridors. In addition to mitigating the visual impact of utility-scale solar facilities, substantial buffers can act as wildlife corridors along project perimeters. The arrangement of panels within a project site is also important to maintain areas conducive to wildlife travel through the site. Existing trees, wetlands, or other vegetation that link open areas should be preserved as wildlife cover. Such sensitivity to the land's environmental features also breaks up the panel bay groups and will make the eventual restoration of the land to its previous

state that much easier and more effective. A perimeter fence is a barrier to wildlife movement, while fencing around but not in between solar panel bays creates open areas through which animals can continue to travel (Figure 6).

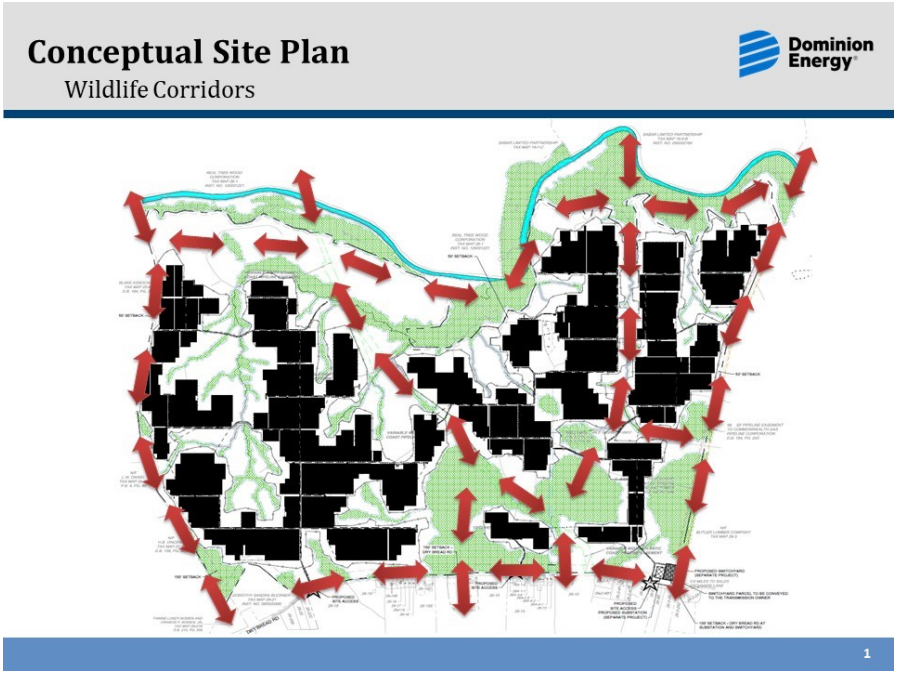

Figure 6. A conceptual site plan for a 1,491-acre utility-scale solar facility showing wildlife corridors throughout the site. Courtesy Dominion Energy.

Stormwater, Erosion, and Sediment Control. The site disturbance required for utility-scale solar facilities is significant due to the size of the facilities and the infrastructure needed to operate them. These projects require the submission of both stormwater (SWP) and erosion/sediment control (ESC) plans to comply with federal and state environmental regulations.

Depending on the site orientation and the panels to be used, significant grading may be required for panel placement, roads, and other support infrastructure. The plan review and submission processes are no different with these facilities than for any other land-disturbing activity. However, such large-scale grading project plans are more complex than those for other uses due primarily to the scale of utility solar. Additionally, the impervious nature of the panels themselves creates stormwater runoff that must be properly controlled, managed, and maintained.

Due to this complexity, it is recommended that an independent third party review all SWP and ESC plans in addition to the normal review procedures. Many review agencies (local, regional, or state) are under-resourced or not familiar with large-scale grading projects or appropriate and effective mitigation measures. It is in a locality's best interest to have the applicant's engineering and site plans reviewed by a licensed third party prior to and in addition to the formal plan review process. Most localities have engineering firms on call that can perform such reviews on behalf of the jurisdiction prior to formal plan review submittal and approval. This extra step, typically paid for by the applicant, helps to ensure the proper design of these environmental protections (Figure 7).

Figure 7. Example of compliance (left) and noncompliance (right) with erosion and sediment control requirements. Photos courtesy Berkley Group.

The successful implementation of these plans and ongoing maintenance of the mitigation measures is also critical and should be addressed in each proposal through sufficient performance security requirements and long-term maintenance provisions.

Cultural, Environmental, and Recreational Resources. Every proposed site should undergo an evaluation to identify any architectural, archaeological, or other cultural resources on or near proposed facilities. Additionally, sites located near recreational, historic, or environmental resources should be avoided. Tourism is recognized as a key sector for economic growth in many regions, and any utility-scale solar facilities that might be visible from a scenic byway, historic site, recreational amenity, or similar resources could have negative consequences for those tourist attractions.

ECONOMIC IMPACTS

This *PAS Memo* focuses on the land-use impacts of utility-scale solar facilities, but planners should also be aware of economic considerations surrounding these uses for local governments and communities.

Financial Incentives. Federal and state tax incentives benefit the energy industry at the expense of localities. The initial intent of industry-targeted tax credits was to act as an economic catalyst to encourage the development of green energy. An unintended consequence has been to benefit the solar industry by saving it tax costs at the expense of localities, which don't receive the benefit of the full taxable rate they would normally receive.

Employment. Jobs during construction (and decommissioning) can be numerous, but utility-scale solar facilities have minimal operational requirements otherwise. Very large facilities may employ one or two full-time-equivalent employees. During the construction phase there are typically hundreds of employees who need local housing, food, and entertainment.

Fiscal Impact. The positive fiscal impact to landowners who lease or sell property for utility-scale solar facilities is clear. However, the fiscal impact of utility-scale solar facilities to the community as a whole is less clear and, in the case of many localities, may be negligible compared with their overall budget due to tax credits, low long-term job creation, and other factors.

Property values. The impact of utility-scale solar facilities is typically negligible on neighboring property values. This can be a significant concern of adjacent residents, but negative impacts to property values are rarely demonstrated and are usually directly addressed by applicants as part of their project submittal.

Solar Facilities in Local Policy and Regulatory Documents

The two foundational land-use tools for most communities are their comprehensive (general) plans and zoning ordinances. These two land-use documents are equally critical in the evaluation of utility-scale solar facilities. A community's plan should discuss green energy, and its zoning ordinance should properly enable and regulate green energy uses.

THE COMPREHENSIVE PLAN

The comprehensive plan establishes the vision for a community and should discuss public facilities and utilities. However, solar facilities are not directly addressed in many comprehensive plans.

If solar energy facilities are desired in a community, they should be discussed in the comprehensive plan in terms of green infrastructure, environment, and economic development goals. Specific direction should be given in terms of policy objectives such as appropriate locations and conditions. If a community does not desire such large-scale land uses because of their impacts on agriculture or forestry or other concerns, then that should be directly addressed in the plan.

Some states, such as Virginia, require a plan review of public facilities — including utility-scale solar facilities — for substantial conformance with the local comprehensive plan (see *Code of Virginia* §15.2-2232 (https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2232/)). This typically requires a review by the planning commission of public utility facility proposals, whether publicly or privately owned, to determine if their general or approximate locations, characters, and extents are substantially in accord with the comprehensive plan.

Most comprehensive plans discuss the types of industry desired by the community, the importance of agricultural operations, and any cultural, recreational, historic, or scenic rural landscape features. An emphasis on tourism, job growth, and natural and scenic resource protection may not be consistent with the use pattern associated with utility-scale solar facilities. If a plan is silent on the solar issue, this may act as a barrier to approving this use. Plans should make clear whether utility-scale solar is desired and, if so, under what circumstances.

This plan review process should precede any other land-use application submittal, though it may be performed concurrently with other zoning approvals. Planners and other public officials should keep in mind that even if a facility is found to be substantially in accord with a comprehensive plan, that does not mean the land-use application must be approved. Use permits are discretionary. If a particular application does not sufficiently mitigate the adverse impacts of the proposed land use, then it can and should be denied regardless of its conformance with the comprehensive plan.

Similarly, in Virginia, a utility-scale solar facility receiving use permit approval without a comprehensive plan review may not be in compliance with state code. The permit approval process is a two-step process, with the comprehensive plan review preferably preceding the consideration of a use permit application.

THE ZONING ORDINANCE

While a community's comprehensive plan is its policy guide, the zoning ordinance is the regulatory document that implements that policy. Plans are advisory in nature, although often upheld in court decisions, whereas ordinance regulations are mandatory. In addition to comprehensive plan amendments, the zoning ordinance should specifically set forth the process and requirements necessary for the evaluation of a utility-scale solar application.

In zoning regulations, uses may be permitted either by right (with or without designated performance measures such as use and design standards) or as conditional or special uses, which require discretionary review and approval. Solar facilities generating power for on-site use are typically regulated as by-right uses depending on their size and location.

Utility-scale solar facilities, however, should in most cases be conditionally permitted regardless of the zoning district and are most appropriate on brownfield sites, in remote areas, or in agriculturally zoned areas. This is particularly true for more populated areas due to the more compact nature of land uses. There are, however, areas throughout the country where utility-scale solar might be permitted by right under strict design standards that are compatible with community objectives.

To better mitigate the potential adverse impacts of utility-scale solar facilities, required application documents should include the following:

- Concept plan
- Site plan
- Construction plan
- Maintenance plan
- Erosion and sediment control and stormwater plans

Performance measures should address these issues:

- Setbacks and screening

- Plan review process
- Construction/deconstruction mitigation and associated financial securities
- Signage
- Nuisance issues (glare, noise)

The model specific planning and zoning recommendations below outline comprehensive plan and zoning ordinance amendments, the application process, and conditions for consideration during the permitting process.

The Virginia Experience

The recommendations presented in this *PAS Memo* are derived from research and the author's direct experience with the described planning, ordinance amendment, and application and regulatory processes in the following three Virginia localities, all rural counties in the southern or eastern parts of the state.

MECKLENBURG COUNTY

When Mecklenburg County began seeing interest in utility-scale solar facilities, the county's long-range plan did not address solar facilities, and the zoning ordinance was based on an inadequate and outdated state model that did not adequately regulate this land use.

The town of Chase City is located near the confluence of several high-voltage utility lines, and all proposed facilities were located near or within the town's corporate limits. The county approved the first utility-scale solar facility application in the jurisdiction without any conditions or much consideration. When the second application for a much larger facility (more than 900 acres) came in soon after, with significant interest from other potential applicants as well, the county commissioned the author's consulting firm, The Berkley Group, to undertake a land-use and industry study regarding utility-scale solar facilities.

As Mecklenburg officials continued with the approval process on the second utility-scale solar facility under existing regulations, they received the results of the industry study and began considering a series of amendments to the comprehensive plan and zoning ordinance. Though county officials were particularly worried about the potential concentration of facilities around Chase City, town officials expressed formal support for the proposed land use. Other Mecklenburg communities expressed more concern and wanted the facilities to be located a significant distance away from their corporate boundaries. These discussions led to standards limiting the concentration of facilities, encouraging proximity to the electrical grid, and establishing distances from corporate boundaries where future solar facilities could not be located.

Since the adoption of the new regulations, numerous other utility-scale solar applications have been submitted and while some have been denied, most have been approved. Solar industry representatives' concerns that the new regulations were an attempt to prevent this land use have therefore not been realized; these are simply the land-use tools that public officials wanted and needed to appropriately evaluate solar facility applications. Many of the examples and best practices recommended in this article, including the model language provided at the end of the article, are a result of the utility-scale solar study commissioned by the county (Berkley Group 2017) and the subsequent policies and regulations it adopted.

SUSSEX COUNTY

Sussex County is located east and north of Mecklenburg, and the interest in utility-scale solar projects there has been no less immediate or profound. The announcement of the new Amazon headquarters in Arlington, Virginia, along with the company's interest in offsetting its operational energy use with green energy sources furthered interest in this rural county more than 100 miles south of Arlington.

As in Mecklenburg County, local regulations did not address utility-scale solar uses, so public officials asked for assistance from The Berkley Group to develop policies and regulations appropriate for their community. Sussex County officials outlined an aggressive timeline for considering new regulations regarding solar facilities and, within one month of initiation, swiftly adopted amended regulations for solar energy facilities.

The same metrics and policy issues examined and adopted for Mecklenburg County were used for the initial discussion in Sussex at a joint work session between the board of supervisors (the governing body) and the planning commission. Public officials tailored the proposed standards and regulations to the county context based on geography, cultural priorities, and other concerns. They then set a joint public hearing for their next scheduled meeting to solicit public comment.

Under Virginia law, land-use matters may be considered at a joint public hearing with a recommendation from the planning commission going to the governing body and that body taking action thereafter. This is not a typical or recommended practice for local governments since it tends to limit debate, transparency, and good governance, but due to the intense interest from the solar industry, coupled with the lack of land-use regulations addressing the proposed utility-scale solar uses, county officials utilized that expedited process.

No citizens and only two industry officials spoke at the public hearing, and after two hours of questions, discussion, and some negotiation of proposed standards, the new regulations were adopted the same evening.

Since the new regulations have been put into place, no new solar applications have been received, but informal discussions with public officials and staff suggest that interest from the industry remains strong.

GREENSVILLE COUNTY

Greensville County, like Mecklenburg, lies on the Virginia-North Carolina boundary. The county has processed four solar energy applications to date (three were approved and one was denied) and continues to process additional applications. Concurrently, the county is in the process of evaluating its land-use policies and regulations, which were amended in late 2016 at the behest of solar energy interests.

The reality of the land-use approval process has proved more challenging than the theory of the facilities when considered a few years ago. As with other localities experiencing interest from the solar energy industry, the issues of scale, concentration, buffers/setbacks, and other land-use considerations have been debated at each public hearing for each application. Neighbors and families have been divided, and lifelong relationships have been severed or strained. The board of supervisors has found it difficult in the face of their friends, neighbors, and existing corporate citizens to deny applications that otherwise might not have been approved.

County officials have agreed that they do want to amend their existing policies and regulations to be more specific and less open to interpretation by applicants and citizens. One of their primary challenges has been dedicating the time to discuss proposed changes to their comprehensive plan and zoning ordinance. A joint work session between the board of supervisors and planning commission is being scheduled and should lead to subsequent public hearings and actions by those respective bodies to enact new regulations for future utility-scale solar applicants.

Action Steps for Planners

There are four primary actions that planners can pursue with their planning commissions and governing bodies to ensure that their communities are ready for utility-scale solar.

REVIEW AND AMEND THE PLAN

The first, and most important, step from a planning viewpoint is to review and amend the comprehensive plan to align with how a community wants to regulate utility-scale solar uses. Some communities don't want them at all, and many cities and towns don't have the land for them. Larger municipalities and counties around the country may have to deal with this land use at some point, if they haven't already. Local governments should get their planning houses in order by amending plans before the land-use applications arrive.

REVIEW AND AMEND LAND-USE ORDINANCES

Once the plan is updated, the next step is to review and amend land-use ordinances (namely the zoning ordinance) accordingly. These ordinances are vital land-use tools that need to be up to date and on point to effectively regulate large and complex solar facilities. If local governments do not create regulations for utility-scale solar facilities, applications for these projects will occupy excessive staff time, energy, and talents, resulting in much less efficient and more open-ended results.

EVALUATE EACH APPLICATION BASED ON ITS OWN MERITS

This should go without saying, but it is important, particularly from a legal perspective, that each project application is evaluated based on its own merits. All planners have probably seen a project denied due to the politics at play with regard to other projects: "That one shouldn't have been approved so we're going to deny this one." "The next one is better so this one needs to be denied."

The focus of each application should be on the potential adverse impacts of the project on the community and what can be done successfully to mitigate those impacts. Whether the applicant is a public utility or a private company, the issues and complexities of the project are the same. The bottom line should never be who the applicant is; rather, it should be whether the project's adverse impacts can be properly mitigated so that the impact to the community is positive.

LEARN FROM OTHERS

Mecklenburg County's revised solar energy policies and regulations began with emails and phone calls to planning colleagues to see how they had handled utility-scale solar projects in their jurisdictions. The primary resources used were internet research, other planners, and old-fashioned planner ingenuity and creativity.

While it is the author's hope and intent that this article offers valuable information on this topic, nothing beats the tried and true formula of "learn from and lean on your colleagues."

Conclusion

The solar energy market is having major impacts on land use across the country, and federal and state tax incentives have contributed to a flood of applications in recent years. While the benefits of clean energy are often touted, the impacts of utility-scale solar facilities on a community can be significant. Applicants often say that a particular project will "only" take up some small percentage of agricultural, forestry, or other land-use category — but the impact of these uses extends beyond simply replacing an existing (or future) land use. Fiscal benefit to a community is also often cited as an incentive, but this alone is not a compelling reason to approve (or disapprove) a land-use application.

The scale and duration of utility-scale solar facilities complicate everything from the land disturbance permitting process through surety requirements. If not done properly, these uses can change the character of an area, altering the future of communities for generations.

Local officials need to weigh these land-use decisions within the context of their comprehensive plan and carefully consider each individual application in terms of the impact that it will have in that area of the community, not only by itself but also if combined with additional sites. The concentration of solar facilities is a major consideration in addition to their individual locations. A solar facility located by itself in a rural area, close to major transmission lines, not prominently visible from public rights-of-way or adjacent properties, and not located in growth areas, on prime farmland, or near cultural, historic, or recreational sites may be an acceptable land use with a beneficial impact on the community.

Properly evaluating and, to the extent possible, mitigating the impacts of these facilities by carefully controlling their location, scale, size, and other site-specific impacts is key to ensuring that utility-scale solar facilities can help meet broader sustainability goals without compromising a community's vision and land-use future.

Specific Planning and Zoning Recommendations for Utility-Scale Solar

This guidance and sample ordinance language for utility-scale solar facilities is drawn from actual comprehensive plan and zoning ordinance amendments as well as conditional (special) use permit conditions. These examples are from Virginia and should be tailored to localities within the context of each state's enabling legislation regarding land use.

The Comprehensive (General) Plan

The following topics should be addressed for comprehensive plan amendments:

- Identification of major electrical facility infrastructure (i.e., transmission lines, transfer stations, generation facilities, etc.)

- Identification of growth area boundaries around each city, town, or appropriate population center
- Additional public review and comment opportunities for land-use applications within a growth area boundary, within a specified distance from an identified growth area boundary, or within a specified distance from identified population centers (e.g., city or town limits)
- Recommended parameters for utility-scale solar facilities, such as:
- maximum acreage or density (e.g., not more than two facilities within a two-mile radius) to mitigate the impacts related to the scale of these facilities
- maximum percent usage (i.e., "under panel" or impervious surface) of assembled property to mitigate impacts to habitat, soil erosion, and stormwater runoff
- location adjacent or close to existing electric transmission lines
- location outside of growth areas or town boundary or a specified distance from an identified growth boundary
- location on brownfields or near existing industrial uses (but not within growth boundaries)
- avoidance of or minimization of impact to prime farmland as defined by the USDA
- avoidance of or minimization of impact to the viewshed of any scenic, cultural, or recreational resources (i.e., large solar facilities may not be seen from surrounding points that are in line-of-sight with a resource location)
- Identification of general conditions to mitigate negative effects, including the following:
- Concept plan compliance
- Buffers and screening (e.g., berms, vegetation, etc.)
- Third-party plan review (for erosion and sediment controls, stormwater management, grading)
- Setbacks
- Landscaping maintenance
- Decommissioning plan and security

The Zoning Ordinance

In addition to, or separate from, comprehensive plan amendments, the zoning ordinance should be amended to more specifically set forth the process and requirements necessary for a thorough land-use evaluation of an application.

RECOMMENDED APPLICATION PROCESS

Pre-Application Meeting

The process of requiring applicants to meet with staff prior to the submission of an application often results in a better, more complete application and a smoother process once an application is submitted. This meeting allows the potential applicant and staff to sit down to discuss the location, scale, and nature of the proposed use and what will be expected during that process. The pre-application meeting is one of the most effective tools planners can use to ensure a more efficient, substantive process.

Comprehensive Plan Review

As discussed in the article, a comprehensive plan review for public utility facilities, if required, can occur prior to or as part of the land-use application process. Any application not including the review would be subject to such review in compliance if required by state code. If the plan review is not done concurrently with the land-use application, then it should be conducted prior to the receipt of the application.

An application not substantially in accord with the comprehensive plan should not be recommended for approval, regardless of the conditions placed on the use. Depending on the location, scale, and extent of the project, it is difficult to sufficiently mitigate the adverse impacts of a project that does not conform with the plan.

Land-Use Application

If the comprehensive plan review is completed and the project is found to be in compliance with the comprehensive plan, then the use permit process can proceed once a complete application is submitted. Application completion consists of the submission of all requirements set forth in the zoning ordinance and is at the discretion of the zoning administrator if there is any question as to what is required or when it is required.

Applications should contain all required elements at the time of submittal and no components should be outstanding at the time of submittal.

SAMPLE ORDINANCE LANGUAGE

The following sample ordinance language addresses requirements for applications, public notice, development standards, decommissioning, site plan review, and other process elements.

1. Application requirements. Each applicant requesting a use permit shall submit the following:

a. A complete application form.
b. Documents demonstrating the ownership of the subject parcel(s).
c. Proof that the applicant has authorization to act upon the owner's behalf.
d. Identification of the intended utility company who will interconnect to the facility.
e. List of all adjacent property owners, their tax map numbers, and addresses.
f. A description of the current use and physical characteristics of the subject parcels.
g. A description of the existing uses of adjacent properties and the identification of any solar facilities — existing or proposed — within a five-mile radius of the proposed location.
h. Aerial imagery which shows the proposed location of the solar energy facility, fenced areas and driveways with the closest distance to all adjacent property lines, and nearby dwellings, along with main points of ingress/egress.
i. Concept plan.

> The facility shall be constructed and operated in substantial compliance with the approved concept plan, with allowances for changes required by any federal or state agency. The project shall be limited to the phases and conditions set forth in the concept plan that constitutes part of this application, notwithstanding any other state or federal requirements. No additional phasing or reduction in facility size shall be permitted, and no extensions beyond the initial period shall be granted without amending the use permit. The concept plan shall include the subject parcels; the proposed location of the solar panels and related facilities; the location of proposed fencing, driveways, internal roads, and structures; the closest distance to adjacent property lines and dwellings; the location of proposed setbacks; the location and nature of proposed buffers, including vegetative and constructed buffers and berms; the location of points of ingress/egress; any proposed construction phases.

j. A detailed decommissioning plan (see item 5 below).
k. A reliable and detailed estimate of the costs of decommissioning, including provisions for inflation (see item 5 below).
l. A proposed method of providing appropriate escrow, surety, or security for the cost of the decommissioning plan (see item 5 below).
m. Traffic study modelling the construction and decommissioning processes. Staff will review the study in cooperation with the state department of transportation or other official transportation authority.
n. An estimated construction schedule.
o. [x number of] hard copy sets (11"× 17" or larger), one reduced copy (8½"× 11"), and one electronic copy of site plans, including elevations and landscape plans as required. Site plans shall meet the requirements of this ordinance.
p. The locality may require additional information deemed necessary to assess compliance with this section based on the specific characteristics of the property or other project elements as determined on a case by case basis.
q. Application fee to cover any additional review costs, advertising, or other required staff time.

2. Public notice.

a. Use permits shall follow the public notice requirements as set forth in the zoning ordinance or by state code as applicable.
b. Neighborhood meeting: A public meeting shall be held prior to the public hearing with the planning commission to give the community an opportunity to hear from

the applicant and ask questions regarding the proposed project.

i. The applicant shall inform the zoning administrator and adjacent property owners in writing of the date, time, and location of the meeting, at least seven but no more than 14 days in advance of the meeting date.
ii. The date, time, and location of the meeting shall be advertised in the newspaper of record by the applicant, at least seven but no more than 14 days in advance of the meeting date.
iii. The meeting shall be held within the community, at a location open to the general public with adequate parking and seating facilities which may accommodate persons with disabilities.
iv. The meeting shall give members of the public the opportunity to review application materials, ask questions of the applicant, and make comments regarding the proposal.
v. The applicant shall provide to the zoning administrator a summary of any input received from members of the public at the meeting.

3. Minimum development standards.

a. No solar facility shall be located within a reasonable radius of an existing or permitted solar facility, airport, or municipal boundary.
b. The minimum setback from property lines shall be a reasonable distance (e.g., at least 100 feet) and correlated with the buffer requirement.
c. The facilities, including fencing, shall be significantly screened from the ground-level view of adjacent properties by a buffer zone of a reasonable distance extending from the property line that shall be landscaped with plant materials consisting of an evergreen and deciduous mix (as approved by staff), except to the extent that existing vegetation or natural landforms on the site provide such screening as determined by the zoning administrator. In the event that existing vegetation or landforms providing the screening are disturbed, new plantings shall be provided which accomplish the same. Opaque architectural fencing may be used to supplement other screening methods but shall not be the primary method.
d. The design of support buildings and related structures shall use materials, colors, textures, screening, and landscaping that will blend the facilities to the natural setting and surrounding structures.
e. Maximum height of primary structures and accessory buildings shall be a reasonable height as measured from the finished grade at the base of the structure to its highest point, including appurtenances (e.g., 15 feet). The board of supervisors may approve a greater height based upon the demonstration of a significant need where the impacts of increased height are mitigated.
f. All solar facilities must meet or exceed the standards and regulations of the Federal Aviation Administration (FAA), State Corporation Commission (SCC) or equivalent, and any other agency of the local, state, or federal government with the authority to regulate such facilities that are in force at the time of the application.
g. To ensure the structural integrity of the solar facility, the owner shall ensure that it is designed and maintained in compliance with standards contained in applicable local, state, and federal building codes and regulations that were in force at the time of the permit approval.
h. The facilities shall be enclosed by security fencing on the interior of the buffer area (not to be seen by other properties) of a reasonable height. A performance bond reflecting the costs of anticipated fence maintenance shall be posted and maintained. Failure to maintain the security fencing shall result in revocation of the use permit and the facility's decommissioning.
i. Ground cover on the site shall be native vegetation and maintained in accordance with established performance measures or permit conditions.
j. Lighting shall use fixtures as approved by the municipality to minimize off-site glare and shall be the minimum necessary for safety and security purposes. Any exceptions shall be enumerated on the concept plan and approved by the zoning administrator.
k. No facility shall produce glare that would constitute a nuisance to the public.
l. Any equipment or situations on the project site that are determined to be unsafe must be corrected within 30 days of citation of the unsafe condition.
m. Any other condition added by the planning commission or governing body as part of a permit approval.

4. Coordination of local emergency services. Applicants for new solar energy facilities shall coordinate with emergency services staff to provide materials, education and/or training to the departments serving the property with emergency services in how to

safely respond to on-site emergencies.

5. Decommissioning. The following requirements shall be met:

a. Utility-scale solar facilities which have reached the end of their useful life or have not been in active and continuous service for a reasonable period of time shall be removed at the owner's or operator's expense, except if the project is being repowered or a force majeure event has or is occurring requiring longer repairs; however, the municipality may require evidentiary support that a longer repair period is necessary.
b. Decommissioning shall include removal of all solar electric systems, buildings, cabling, electrical components, security barriers, roads, foundations, pilings, and any other associated facilities, so that any agricultural ground upon which the facility or system was located is again tillable and suitable for agricultural uses. The site shall be graded and reseeded to restore it to as natural a condition as possible, unless the land owner requests in writing that the access roads or other land surface areas not be restored, and this request is approved by the governing body (other conditions might be more beneficial or desirable at that time).
c. The site shall be regraded and reseeded to as natural condition as possible within a reasonable timeframe after equipment removal.
d. The owner or operator shall notify the zoning administrator by certified mail, return receipt requested, of the proposed date of discontinued operations and plans for removal.
e. Decommissioning shall be performed in compliance with the approved decommissioning plan. The governing body may approve any appropriate amendments to or modifications of the decommissioning plan.
f. Hazardous material from the property shall be disposed of in accordance with federal and state law.
g. The applicant shall provide a reliable and detailed cost estimate for the decommissioning of the facility prepared by a professional engineer or contractor who has expertise in the removal of solar facilities. The decommissioning cost estimate shall explicitly detail the cost and shall include a mechanism for calculating increased removal costs due to inflation and without any reduction for salvage value. This cost estimate shall be recalculated every five (5) years and the surety shall be updated in kind.
h. The decommissioning cost shall be guaranteed by cash escrow at a federally insured financial institution approved by the municipality before any building permits are issued. The governing body may approve alternative methods of surety or security, such as a performance bond, letter of credit, or other surety approved by the municipality, to secure the financial ability of the owner or operator to decommission the facility.
i. If the owner or operator of the solar facility fails to remove the installation in accordance with the requirements of this permit or within the proposed date of decommissioning, the municipality may collect the surety and staff or a hired third party may enter the property to physically remove the installation.

6. Site plan requirements. In addition to the site plan requirements set forth in the zoning ordinance, a construction management plan shall be submitted that includes:

- Traffic control plan (subject to state and local approval, as appropriate)
- Delivery and parking areas
- Delivery routes
- Permits (state/local)

Additionally, a construction/deconstruction mitigation plan shall also be submitted including:

- Hours of operation
- Noise mitigation (e.g., construction hours)
- Smoke and burn mitigation (if necessary)
- Dust mitigation
- Road monitoring and maintenance

7. The building permit must be obtained within [18 months] of obtaining the use permit and commencement of the operation shall begin within [one year] from building permit issuance.

8. All solar panels and devices are considered primary structures and subject to the requirements for such, along with the established setbacks and other requirements for solar facilities.

9. Site maintenance.

a. Native grasses shall be used to stabilize the site for the duration of the facility's use.
b. Weed control or mowing shall be performed routinely and a performance bond reflecting the costs of such maintenance for a period of [six (6) months] shall be posted and maintained. Failure to maintain the site may result in revocation of the use permit and the facility's decommissioning.
c. Anti-reflection coatings. Exterior surfaces of the collectors and related equipment shall have a nonreflective finish and solar panels shall be designed and installed to limit glare to a degree that no after image would occur towards vehicular traffic and any adjacent building.
d. Repair of panels. Panels shall be repaired or replaced when either nonfunctional or in visible disrepair.

10. Signage shall identify the facility owner, provide a 24-hour emergency contact phone number, and conform to the requirements set forth in the Zoning Ordinance.

11. At all times, the solar facility shall comply with any local noise ordinance.

12. The solar facility shall not obtain a building permit until evidence is given to the municipality that an electric utility company has a signed interconnection agreement with the permittee.

13. All documentation submitted by the applicant in support of this permit request becomes a part of the conditions. Conditions imposed by the governing body shall control over any inconsistent provision in any documentation provided by the applicant.

14. If any one or more of the conditions is declared void for any reason, such decision shall not affect the remaining portion of the permit, which shall remain in full force and effect, and for this purpose, the provisions of this are hereby declared to be severable.

15. Any infraction of the above-mentioned conditions, or any zoning ordinance regulations, may lead to a stop order and revocation of the permit.

16. The administrator/manager, building official, or zoning administrator, or any other parties designated by those public officials, shall be allowed to enter the property at any reasonable time, and with proper notice, to check for compliance with the provisions of this permit.

Example of Recommended Use Permit Conditions (In Virginia: Conditional Uses, Special Uses, Special Exceptions)

Conditions ([approved/revised] at the Planning Commission meeting on [date])

If the Board determines that the application furthers the comprehensive plan's goals and objectives and that it meets the criteria set forth in the zoning ordinance, then the Planning Commission recommended the following conditions to mitigate the adverse effects of this utility-scale solar generation facility with any Board recommendation for permit approval.

1. The Applicant will develop the Solar Facility in substantial accord with the Conceptual Site Plan dated _____ included with the application as determined by the Zoning Administrator. Significant deviations or additions, including any enclosed building structures, to the Site Plan will require review and approval by the Planning Commission and Board of Supervisors.

2. Site Plan Requirements. In addition to all State site plan requirements and site plan requirements of the Zoning Administrator, the Applicant shall provide the following plans for review and approval for the Solar Facility prior to the issuance of a building permit:

a. *Construction Management Plan.* The Applicant shall prepare a Construction Management Plan for each applicable site plan for the Solar Facility, and each plan shall address the following:

    i. Traffic control methods (in coordination with the Department of Transportation prior to initiation of construction), including lane closures, signage, and flagging procedures.

ii. Site access planning directing employee and delivery traffic to minimize conflicts with local traffic.
iii. Fencing. The Applicant shall install temporary security fencing prior to the commencement of construction activities occurring on the Solar Facility.
iv. Lighting. During construction of the Solar Facility, any temporary construction lighting shall be positioned downward, inward, and shielded to eliminate glare from all adjacent properties. Emergency and safety lighting shall be exempt from this construction lighting condition.

b. *Construction Mitigation Plan.* The Applicant shall prepare a Construction Mitigation Plan for each applicable site plan for the Solar Facility to the satisfaction of the Zoning Administrator. Each plan shall address, at a minimum, the effective mitigation of dust, burning operations, hours of construction activity, access and road improvements, and handling of general construction complaints.
c. *Grading plan.* The Solar Facility shall be constructed in compliance with the County-approved grading plan as determined and approved by the Zoning Administrator or his designee prior to the commencement of any construction activities and a bond or other security will be posted for the grading operations. The grading plan shall:

i. Clearly show existing and proposed contours;
ii. Note the locations and amount of topsoil to be removed (if any) and the percent of the site to be graded;
iii. Limit grading to the greatest extent practicable by avoiding steep slopes and laying out arrays parallel to landforms;
iv. Require an earthwork balance to be achieved on-site with no import or export of soil;
v. Require topsoil to first be stripped and stockpiled on-site to be used to increase the fertility of areas intended to be seeded in areas proposed to be permanent access roads which will receive gravel or in any areas where more than a few inches of cut are required;
vi. Take advantage of natural flow patterns in drainage design and keep the amount of impervious surface as low as possible to reduce stormwater storage needs.

d. *Erosion and Sediment Control Plan.* The County will have a third-party review with corrections completed prior to submittal for Department of Environmental Quality (DEQ) review and approval. The owner or operator shall construct, maintain, and operate the project in compliance with the approved plan. An E&S bond (or other security) will be posted for the construction portion of the project.
e. *Stormwater Management Plan.* The County will have a third-party review with corrections completed prior to submittal for DEQ review and approval. The owner or operator shall construct, maintain, and operate the project in compliance with the approved plan. A stormwater control bond (or other security) will be posted for the project for both construction and post construction as applicable and determined by the Zoning Administrator.
f. *Solar Facility Screening and Vegetation Plan.* The owner or operator shall construct, maintain, and operate the facility in compliance with the approved plan. A separate security shall be posted for the ongoing maintenance of the project's vegetative buffers in an amount deemed sufficient by the Zoning Administrator.
g. The Applicant will compensate the County in obtaining an independent third-party review of any site plans or construction plans or part thereof.
h. The design, installation, maintenance, and repair of the Solar Facility shall be in accordance with the most current National Electrical Code (NFPA 70) available (2017 version or later as applicable).

3. Operations.

a. *Permanent Security Fence.* The Applicant shall install a permanent security fence, consisting of chain link, 2-inch square mesh, 6 feet in height, surmounted by three strands of barbed wire, around the Solar Facility prior to the commencement of operations of the Solar Facility. Failure to maintain the fence in a good and functional condition will result in revocation of the permit.
b. *Lighting.* Any on-site lighting provided for the operational phase of the Solar Facility shall be dark-sky compliant, shielded away from adjacent properties, and positioned downward to minimize light spillage onto adjacent properties.
c. *Noise.* Daytime noise will be under 67 dBA during the day with no noise emissions at night.
d. *Ingress/Egress.* Permanent access roads and parking areas will be stabilized with

gravel, asphalt, or concrete to minimize dust and impacts to adjacent properties.

4. Buffers.

a. *Setbacks.*
   i. A minimum 150-foot setback, which includes a 50-foot planted buffer as described below, shall be maintained from a principal Solar Facility structure to the street line (edge of right-of-way) where the Property abuts any public rights-of-way.
   ii. A minimum 150-foot setback, which includes a 50-foot planted buffer as described below, shall be maintained from a principal Solar Facility structure to any adjoining property line which is a perimeter boundary line for the project area.

b. *Screening.* A minimum 50-foot vegetative buffer (consisting of existing trees and vegetation) shall be maintained. If there is no existing vegetation or if the existing vegetation is inadequate to serve as a buffer as determined by the Zoning Administrator, a triple row of trees and shrubs will be planted on approximately 10-foot centers in the 25 feet immediately adjacent to the security fence. New plantings of trees and shrubs shall be approximately 6 feet in height at time of planting. In addition, pine seedlings will be installed in the remaining 25 feet of the 50-foot buffer. Ancillary project facilities may be included in the buffer as described in the application where such facilities do not interfere with the effectiveness of the buffer as determined by the Zoning Administrator.

c. *Wildlife corridors.* The Applicant shall identify an access corridor for wildlife to navigate through the Solar Facility. The proposed wildlife corridor shall be shown on the site plan submitted to the County. Areas between fencing shall be kept open to allow for the movement of migratory animals and other wildlife.

5. Height of Structures. Solar facility structures shall not exceed 15 feet, however, towers constructed for electrical lines may exceed the maximum permitted height as provided in the zoning district regulations, provided that no structure shall exceed the height of 25 feet above ground level, unless required by applicable code to interconnect into existing electric infrastructure or necessitated by applicable code to cross certain structures (e.g. pipelines).

6. Inspections. The Applicant will allow designated County representatives or employees access to the facility at any time for inspection purposes as set forth in their application.

7. Training. The Applicant shall arrange a training session with the Fire Department to familiarize personnel with issues unique to a solar facility before operations begin.

8. Compliance. The Solar Facility shall be designed, constructed, and tested to meet relevant local, state, and federal standards as applicable.

9. Decommissioning.

a. *Decommissioning Plan*. The Applicant shall submit a decommissioning plan to the County for approval in conjunction with the building permit. The purpose of the decommissioning plan is to specify the procedure by which the Applicant or its successor would remove the Solar Facility after the end of its useful life and to restore the property for agricultural uses.

b. *Decommissioning Cost Estimate*. The decommissioning plan shall include a decommissioning cost estimate prepared by a State licensed professional engineer.
   i. The cost estimate shall provide the gross estimated cost to decommission the Solar Facility in accordance with the decommissioning plan and these conditions. The decommissioning cost estimate shall not include any estimates or offsets for the resale or salvage values of the Solar Facility equipment and materials.
   ii. The Applicant, or its successor, shall reimburse the County for an independent review and analysis by a licensed engineer of the initial decommissioning cost estimate.
   iii. The Applicant, or its successor, will update the decommissioning cost estimate every 5 years and reimburse the County for an independent review and analysis by a licensed engineer of each decommissioning cost estimate revision.

c. *Security.*
   i. Prior to the County's approval of the building permit, the Applicant shall provide decommissioning security in one of the two following alternatives:
      1. Letter of Credit for Full Decommissioning Cost: A letter of credit issued by a financial institution that has (i) a credit Rating from one or both of S&P and Moody's of at least A from S&P or A2 from Moody's and (ii) a

capital surplus of at least $10,000,000,000; or (iii) other credit rating and capitalization reasonably acceptable to the County, in the full amount of the decommissioning estimate; or

2. Tiered Security:
    a. 10 percent of the decommissioning cost estimate to be deposited in a cash escrow at a financial institution reasonably acceptable to the County; and
    b. 10 percent of the decommissioning cost estimate in the form of a letter of credit issued by a financial institution that has (i) a credit rating from one or both of S&P and Moody's of at least A from S&P or A2 from Moody's and (ii) a capital surplus of at least $10,000,000,000, or (iii) other credit rating and capitalization reasonably acceptable to the County, with the amount of the letter of credit increasing by an additional 10 percent each year in years 2–9 after commencement of operation of the Solar Facility; and
    c. The Owner, not the Applicant, will provide its guaranty of the decommissioning obligations. The guaranty will be in a form reasonably acceptable to the County. The Owner, or its successor, should have a minimum credit rating of (i) Baa3 or higher by Moody's or (ii) BBB- or higher by S&P; and
    d. In the tenth year after operation, the Applicant will have increased the value of the letter of credit to 100 percent of the decommissioning cost estimate. At such time, the Applicant may be entitled to a return of the 10 percent cash escrow.

ii. Upon the receipt of the first revised decommissioning cost estimate (following the 5th anniversary), any increase or decrease in the decommissioning security shall be funded by the Applicant or refunded to Applicant (if permissible by the form of security) within 90 days and will be similarly trued up for every subsequent five-year updated decommissioning cost estimate.

iii. The security must be received prior to the approval of the building permit and must stay in force for the duration of the life span of the Solar Facility and until all decommissioning is completed. If the County receives notice or reasonably believes that any form of security has been revoked or the County receives notice that any security may be revoked, the County may revoke the special use permit and shall be entitled to take all action to obtain the rights to the form of security.

d. *Applicant/Property Owner Obligation*. Within 6 months after the cessation of use of the Solar Facility for electrical power generation or transmission, the Applicant or its successor, at its sole cost and expense, shall decommission the Solar Facility in accordance with the decommissioning plan approved by the County. If the Applicant or its successor fails to decommission the Solar Facility within 6 months, the property owners shall commence decommissioning activities in accordance with the decommissioning plan. Following the completion of decommissioning of the entire Solar Facility arising out of a default by the Applicant or its successor, any remaining security funds held by the County shall be distributed to the property owners in a proportion of the security funds and the property owner's acreage ownership of the Solar Facility.

e. *Applicant/Property Owner Default; Decommissioning by the County*.
    i. If the Applicant, its successor, or the property owners fail to decommission the Solar Facility within 6 months, the County shall have the right, but not the obligation, to commence decommissioning activities and shall have access to the property, access to the full amount of the decommissioning security, and the rights to the Solar Facility equipment and materials on the property.
    ii. If applicable, any excess decommissioning security funds shall be returned to the current owner of the property after the County has completed the decommissioning activities.
    iii. Prior to the issuance of any permits, the Applicant and the property owners shall deliver a legal instrument to the County granting the County (1) the right to access the property, and (2) an interest in the Solar Facility equipment and materials to complete the decommissioning upon the Applicant's and property owner's default. Such instrument(s) shall bind the Applicant and property owners and their successors, heirs, and assigns. Nothing herein shall limit other rights or remedies that may be available to the County to enforce the obligations of the Applicant, including under the County's zoning powers.

f. *Equipment/Building Removal.* All physical improvements, materials, and equipment related to solar energy generation, both surface and subsurface components, shall be removed in their entirety. The soil grade will also be restored following disturbance caused in the removal process. Perimeter fencing will be removed and recycled or reused. Where the current or future landowner prefers to retain the fencing, these portions of fence will be left in place.
g. *Infrastructure Removal.* All access roads will be removed, including any geotextile material beneath the roads and granular material. The exception to removal of the access roads and associated culverts or their related material would be upon written request from the current or future landowner to leave all or a portion of these facilities in place for use by that landowner. Access roads will be removed within areas that were previously used for agricultural purposes and topsoil will be redistributed to provide substantially similar growing media as was present within the areas prior to site disturbance.
h. *Partial Decommissioning.* If decommissioning is triggered for a portion, but not the entire Solar Facility, then the Applicant or its successor will commence and complete decommissioning, in accordance with the decommissioning plan, for the applicable portion of the Solar Facility; the remaining portion of the Solar Facility would continue to be subject to the decommissioning plan. Any reference to decommissioning the Solar Facility shall include the obligation to decommission all or a portion of the Solar Facility whichever is applicable with respect to a particular situation.

10. Power Purchase Agreement. At the time of the Applicant's site plan submission, the Applicant shall have executed a power purchase agreement with a third-party providing for the sale of a minimum of 80% of the Solar Facility's anticipated generation capacity for not less than 10 years from commencement of operation. Upon the County's request, the Applicant shall provide the County and legal counsel with a redacted version of the executed power purchase agreement.

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