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2021 Nebraska Wind and Solar Conference
Lincoln, Nebraska

Planning & Zoning Considerations for Commercial Solar Facilities

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BASIC CHARACTERISTICS OF SOLAR ENERGY CONVERSION SYSTEMS

SOLAR CONVERSION SYSTEMS

- Individual
- Community
- Commercial or "Utility-Scale"

SOLAR CONVERSION SYSTEMS

INDIVIDUAL SOLAR CONVERSION SYSTEMS

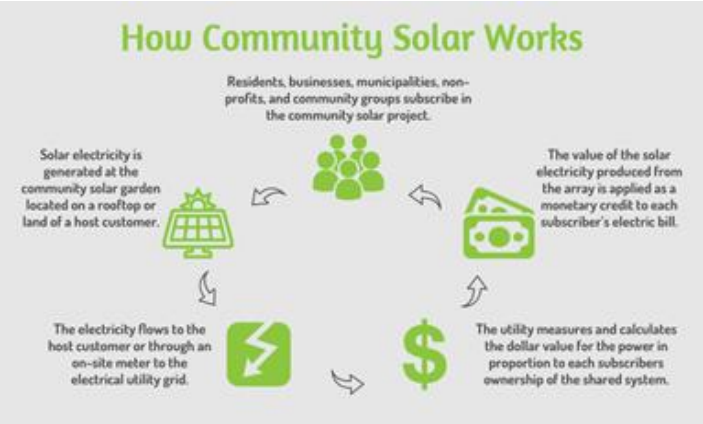
- Support an individual business or private property
- Usually only generate what is needed for the property
- Rooftop, ground mount, farm use (well pump, fencing etc)
- May or may not be connected to the Grid.

Source: EcoWatch

SOLAR CONVERSION SYSTEMS

COMMUNITY SOLAR CONVERSION SYSTEMS

- Generally considered a "shared" solar system
- Used where individual solar systems may not be possible or practical
- Users of Community Solar may buy their panels and own them (transferring ownership of them with their home when sold) or subscribe to a number of panels
- Typically between 20kW and 5MW in size.



Source: Prairie Rivers Network

SOLAR CONVERSION SYSTEMS

COMMERCIAL OR "UTILITY-SCALE" SOLAR CONVERSION SYSTEMS

- Typically systems larger than 5 MW (Consider defining by land use in regulations)
- Generally direct connect to the grid
- Utility support
- Customers = larger commercial users (Google, Facebook, Amazon, Smuckers) or utilities (OPPD, NPPD, Etc)

Amazon Solar (VA) – 100MW

NorthStar Solar (MN)–100 MW

Comanche Solar (CO) -120 MW

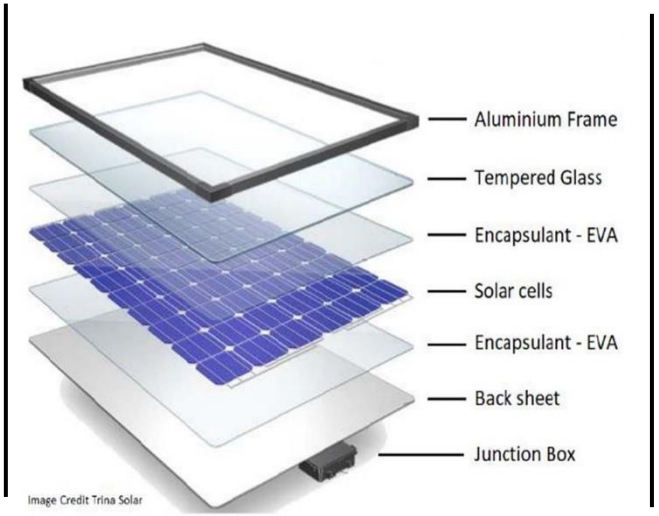
Source: Desri

PHYSICAL CHARACTERISTICS

PANELS

Commonly Used Solar panels are made of simple materials, including:

- Glass (+/- 85%)
- Aluminum (+/- 8%)
- Silicon (+/- 6%)
- Wiring (+/- 1%)



77 x 39 inches (approx. 6.5 x 3.25 feet)

PHYSICAL CHARACTERISTICS

RACKING

PHYSICAL CHARACTERISTICS

SCALE

REGULATION OF COMMERCIAL SOLAR ENERGY CONVERSION SYSTEMS

REGULATORY BODIES

Who regulates commercial solar conversion systems?

- Federal Energy Regulatory Commission (FERC)
- Nebraska Power Review Board
- Local Government

NEBRASKA POWER REVIEW BOARD

"Qualifying" solar facilities, or those that meet statutory requirements for decommissioning, interconnection, and environmental compliance, are exempt from discretionary approval by Nebraska Power Review Board.

LOCAL ZONING REGULATIONS

- A MAJORITY OF REGULATION OCCURS AT THE LOCAL LEVEL.

- WHAT ZONING REGULATIONS SHOULD MUNICIPALITIES HAVE?

PURPOSE

Well-written regulations should balance the interests of "participating" and "non-participating" landowners

- Participating Landowners (Landowners who entered into leases, easements, or other agreements with the solar developer)
- Non-Participating Landowners
- Developers (Yes, developers too!)

Clear and concise regulations reduce landowner disputes and therefore reduce headaches for municipalities

MUNICIPALITIES HOLD THE KEYS

- Don't be scared!
- Remember that a municipality's passage of regulations does not authorize unlimited solar development
- Any proposed project is subject to municipal approval of a conditional (or special) use permit
- Regulations provide a framework to evaluate individual conditional use permit applications

CONDITIONAL USE PERMIT & ZONING DISTRICTS

First, the municipality must decide where to allow commercial solar facilities

- Solar facilities typically require a conditional use permit
- Solar facilities are typically located in agricultural or transitional agricultural zoning districts, but are often a permitted conditional use in commercial and industrial zoning districts as well

SETBACKS

- Setbacks are an important tool to balance the interests of participating and non-participating landowners. Setbacks should not be so large that they infringe on landowners' rights to develop their property, if they wish to.
- Municipalities should specify setbacks from the following:
  - Non-participating property lines and/or residences
  - Participating property lines and/or residences (typically no setback)
  - Public right of ways

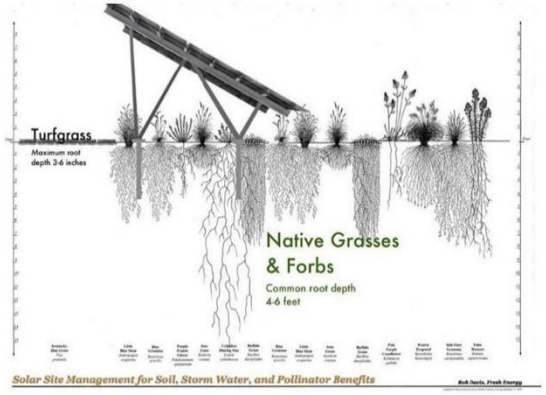
VISUAL SCREENING

- Visual screening is the practice of using fences, walls, berms, or landscaping to obstruct the view of the solar facilities, typically from non-participating residences
- Regulations should authorize the use of natural features, topography, and vegetation for cost efficiency and aesthetics
- Be wary of the "property line" screening requirement
  - Agricultural parcels can have a property line of a half-mile, well beyond the residence to be screened
  - Limit screening requirement to necessary area
  - An overly burdensome screening requirement will disturb land and/or discourage development
- Speaking of land disturbance, a screening requirement should authorize adjacent landowners to waive the requirement, if they prefer

SITE CONSIDERATIONS

- Fencing
  - Chain link or wildlife fencing
- Screening / Landscaping
- Revegetation after Construction
  - Deep Rooted Grasses to Stabilize Soil Long Term
- Activate Use of Undeveloped Areas
  - Pollinators

Source: DESRI



DECOMMISSIONING

- Decommissioning is the practice of removing the project at the end of its lifecycle and restoring the underlying land
- Basic decommissioning regulations:

- Regulations should define when a developer must decommission a project
  - Typically required after six months or a year without energy production
  - It is a good idea to allow extension of this time period at the municipality's discretion
- Regulations should define how long a developer has to decommission the project once required (again, typically a period of six months to a year)
- Regulations should require removal of project improvements (typically to a depth of four feet) and restoration of the underlying land

DECOMMISSIONING PLAN / DECOMMISSIONING AGREEMENT

- Regulations should require the developer to provide a "decommissioning plan" specifying the means of decommissioning the project
- The decommissioning plan should include a "decommissioning cost estimate" prepared by a licensed engineer or other qualified professional
  - The decommissioning cost estimate should be for the "net decommissioning cost" (i.e. the total cost less resale or salvage value of project components)
  - Regulations typically require the developer to provide an updated decommissioning cost estimate every five years
- The developer and municipality typically enter into a short "decommissioning agreement" incorporating the decommissioning plan and providing the municipality with financial security for the obligations therein

DECOMMISSIONING SECURITY

- Municipalities often voice concern about getting "stuck" with the bill to remove an abandoned solar project in the event the developer becomes insolvent. There is good news. That should never happen!
- Regulations should require a developer to provide financial security in the form of a bond, letter of credit, or other equivalent instrument for the cost to decommission the project
    - Typically, the decommissioning security requirement is delayed until a period of 10 to 15 years following the commercial operation date of the project. The reason for this is that the net decommissioning cost is negative until well into the life of the project (i.e. the salvage value of the components significantly outweighs the cost to decommission the project)
    - Another approach is to require the decommissioning security upon the five-year interval when the decommissioning cost estimate is positive
    - Why not require decommissioning security right from the start? It discourages development. Developers pay expensive premiums which do not benefit the county
    - For context, the Nebraska Power Review Board requires decommissioning security 10 years following the commercial operation date of the project if a municipality does not have regulations in place

DECOMMISSIONING - THE THREE LAYERS OF PROTECTION

1. Landowner Agreements
2. County Regulations
3. Nebraska Statutes - Neb. Rev. Stat. § 70-1014.02 requires the Power Review Board to enforce a decommissioning plan and decommissioning security requirement if a municipality does not have regulations in place. The State statute acts as a "backstop."

ROAD USE AND MAINTENANCE

- The developer and municipality typically enter into a "road use and maintenance agreement" giving the developer authority to use or construct specified roads for equipment transport and construction
- The road use and maintenance agreement requires the developer to repair any damage done to municipal roads during the construction, operation, and maintenance of the project
- The road use and maintenance agreement may require a bond, letter of credit, or other equivalent instrument to guarantee availability of funds for any such repairs

You can't replace an old road with an old road.

NEW ROADS FOR THE MUNICIPALITY!

Questions?

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SIDEBAR: REAL PROPERTY TAXES

Municipalities often ask us about real property taxes for solar projects. They are taxed as follows:

- The landowner pays real property tax on the underlying parcel at the same rate and same valuation as before
- The developer pays a statutory tax called the "Nebraska nameplate capacity tax." Neb. Rev. Stat. § 77-6203 requires the developer to pay $3,518 per year, per megawatt of the project's energy producing or "nameplate" capacity
- The developer pays real property tax on project real property items such as roads, fences, inverter pads, and leasehold interests.

A GOOD RULE OF THUMB: A SOLAR PROJECT WILL PAY APPROXIMATELY $4,000 PER YEAR IN TAXES FOR EACH MEGAWATT

REAL PROPERTY TAX ALLOCATION

- Nameplate capacity taxes and real property taxes from solar facilities are both allocated according to the local levy
- Approximately two-thirds of the taxes from solar facilities go to the school district(s) in which the project is located
- Below is a sample tax allocation from a real parcel in Nebraska for a hypothetical 200 MW solar project:

Taxing Entity	Levy Rate	Annual Tax Received (approx.)
County	0.364651	$178,377
School District	1.084362	$530,438
Fire Department	0.018645	$9,121
Fire Department Bond	0.019784	$9,678
Agricultural Society	0.006487	$3,173
Cemetery	0.002767	$1,354
Community College	0.093700	$45,835
Educational Service Unit	0.015000	$7,338
NRD	0.030024	$14,687
APPROX. TOTAL	**1.635420**	**$800,000**

OTHER ECONOMIC BENEFITS

- Landowner payments
- Economic growth through local spending and new jobs
- Energy diversification – particularly in response to increasing federal regulation and consumer demand

Solar Energy

Utility Scale Solar Farm Rules & Regs

Why Solar?

- Diversified farming income
- “Retire” less profitable farmland
- Eliminate irrigation on tracts with solar arrays
- Eliminate nutrient runoff
- Reduce chemical usage
- Increase pollinator habitat
- No noise or flashing lights
- Small structures (out of sight, out of mind)

Pierce County Zoning Rules & Regs

- 2019 Pierce County Adopted Rules & Regs for solar
- Kept it simple
- Relied on Google and my Zoning Administrator for Rules & Regs
- No member of the general public appeared before the Planning Commission or County Commissioners for the Public Hearing

Section 6.04 Solar Energy

1. A solar panel which is attached to an integral part of the principal building may project two feet into the front yard; six feet into the rear yard; and two feet into the side yard.

2. A solar panel which is freestanding may be located only in the required rear yard provided it is not less than five feet from the rear lot line and not closer than one foot to any existing structure as measured from the closest point of the structure including its foundation and anchorage's, nor shall the solar panel be located in the required side yard or front yard.

No solar panel shall be constructed within the zoning jurisdiction of Pierce County unless a Zoning Permit therefore is approved and is constructed in conformance with the state building codes and the following requirements. For those devices that include electrical, plumbing and heating constructions, the applicable permits shall also be obtained. Solar panels shall meet the following requirements:

Lot and Height Requirements:

Solar panels shall conform to the required front, side and rear lot setback requirements except as provided herein:

Structural Requirements:

The physical structure and connections to existing structures shall conform to the applicable state building codes.

Plot Plan:

The application for a permit shall be accompanied by a plot plan drawn to scale showing property lines, existing structures on the lot, proposed solar panel location with respect to property lines, and dimensions of the proposed solar panel.

Permit Fees:

Permit fees are required. This permit fee shall be paid prior to the issuance of the zoning permit.

Preexisting Solar Panels:

Notwithstanding noncompliance with the requirements of this section, a solar panel erected prior to the adoption of these Regulations, pursuant to a valid building permit issued by the County, may continue to be utilized so long as it is maintained in operational condition.

6.04.01 Solar Farms:

Applicability

The purpose of this subsection is to provide standards for fixed-panel photovoltaic solar farms consisting of ground-mounted solar panels that capture energy from the sun and convert it to electricity. The provisions of this section are based on a ground-mounted photovoltaic facility using a rammed post construction technique and panels that support the flow of rainwater between each module and the growth of vegetation beneath the arrays and limiting the impacts of storm water runoff. The rammed post construction technique allows for minimal disturbance to the existing ground and grading of the site. Based on the assumed solar farm design, Pierce County finds the use to be low intensity with minimal trip generation, low amounts of impervious cover, and low emission thus the use is compatible in non-urbanized, low-density areas with other agricultural and scattered industrial uses.

Definitions

The following definitions pertain specifically to this section of the Resolution.

Solar Access: A property owner's right to have sunlight shine on his land.

Solar Collector: An assembly, structure, or design, including passive elements, used for gathering, concentrating or absorbing direct or indirect solar energy, specifically designed for holding a substantial amount of useful thermal energy and to transfer that energy to a gas, solid or liquid or to use that energy directly; this may include, but is not limited to, a mechanism or process used for gathering solar energy through thermal gradients, or a component used to transfer thermal energy to a gas, solid or liquid or to convert into electricity.

Solar Energy: Solar energy device or design features of a building used for the collection, storage, and distribution of solar energy for space heating, space cooling, lighting, electric generation, or water heating

Solar Energy System: A system that uses the power of the sun to capture and store energy and reduce on site consumption of utility power.

Solar Energy System, Freestanding: A solar energy system that is not attached to another structure and is ground mounted.

Solar Energy System, Joint: A solar energy collector or storage mechanism that supplies energy for structures or processes on more than one lot or in more than one dwelling unit or leasehold, but not to the general public and involves at least two owners or users.

Solar Sky space: The maximum three-dimensional space extending from a solar collector to all positions of the sun necessary for efficient use of the collector.

(A) Where a solar energy system is used for heating purposes only, solar sky space shall mean the maximum three-dimensional space extending from a solar energy collector to all positions of the sun between nine o'clock (9:00) A.M. and three o'clock (3:00) P.M. local apparent time from September 22 through March 22 of each year.

(B) Where a solar energy system is used for cooling purposes only, solar sky space shall mean the maximum three-dimensional space extending from a solar collector to all positions of the sun between eight o'clock (8:00) A.M. and four o'clock (4:00) P.M. local apparent time from March 23 through September 21 of each year.

Solar Sky space Easement: A right, expressed as an easement, covenant, condition, restriction or other property interest in any deed, will or other instrument executed by or on behalf of any landowner or in any order of taking, appropriate to protect the solar sky space of a solar collector at a particularly described location to forbid or limit any or all of the following where detrimental to access to solar energy: structures on or above ground; vegetation on or above ground; or other activities. Such right shall specifically describe a solar sky space in three-dimensional terms in which the activity, structures or vegetation are forbidden or limited or in which such an easement shall set performance criteria for adequate collections of solar energy at a particular location.

Solar Storage Mechanism: Equipment or elements such as piping and transfer mechanisms, containers, heat exchangers or controls thereof and gases, solids, liquids or combinations thereof that are utilized for storing solar energy, gathered by a solar collector, for subsequent use.

6.04.02 Site Development Standards:

1. Lot coverage: No more than five percent of the gross site area shall be occupied by enclosed buildings.

2. Setbacks: Setbacks: A thirty-foot side and rear setback shall apply only to the setback area measured from a lot line that abuts a residential use or residential zoning district. Setbacks shall be applied as 83' from center of the road, 15 'side and 25' rear property lines and applicable intersection setbacks as per Pierce County regulations.

3. Height: The average height of the solar panel arrays shall not exceed 12 feet.

4. Landscaping Buffer: The primary use of the property shall determine the buffer requirement. Where a ground-mounted photovoltaic solar farm is the primary use the property shall be considered agricultural for the purposes of buffer requirements. There is no requirement for screening from public streets.

5. Signage: Signage shall conform to Article 6 of this Resolution as well as any sign limitations of the zoning district.

6. Customer owned on-site power lines shall be buried except where connecting to existing overhead utility lines or substations. This requirement shall not apply to fiber optic connections.

7. Fencing: Due to the unique security requirements of this land use, and to facilitate the educational value of seeing this land use, fencing up to eight (8) feet in height is permitted provided the fencing material is predominantly open as defined in Appendix A.

8. All State and Federal codes and provisions not specified in this subsection are required including but not limited to tree preservation, traffic impact analysis and historic preservation.

6.04.03 Districts

Ground-mounted fixed-panel photovoltaic solar farms may be allowed upon the approval of a Conditional Use Permit as established in Article 5 of this Resolution.

6.04.04 Submittal Requirements:

Conditional Use Permits are required for solar farms. Plans shall contain the following:

1. A plot plan, drawn to scale, of the property indicating the total site acreage, landscape and buffer areas, tree preservation, location of all structures, the proposed location of the solar panels, the distances of the solar panels to structures on the property as well as distances to the property lines,

2. The plot plan shall include any roads, electric lines and/ or overhead utility lines.

3. A description of the electrical generating capacity and means of interconnecting with the electrical grid as coordinated and pre-approved with the appurtenant Power District.

4. A copy of the interconnection agreement with the local electric utility or a written explanation outlining why an interconnection agreement is not necessary.

5. Drawings or blueprints of solar panels and arrays in conjunction with the application for a building permit for a solar farm/solar power plant.

6. Structural engineering analysis for a solar panel, array and its foundation, as applicable.

7. Manufacturer's recommended installations, if any.

8. Documentation of land ownership and/or legal authority to construct on the property.

9. A decommissioning plan shall be required to ensure that facilities are properly removed after their useful life. Decommissioning of solar panels must occur in the event they are not in use for 12 consecutive months. The plan shall include provisions for removal of all structures and foundations, restoration of soil and vegetation and a plan ensuring financial resources will be available to decommission the site. The Board may require the posting of a bond, letter of credit or the establishment of an escrow account to ensure proper decommissioning.

6.04.05 Compliance with Other Regulations:

1. Zoning permit applications for solar farms shall be accompanied by a line drawing of electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the State's adopted electrical code and that has been pre-approved by the associated power district meeting their Distribution Generation Requirements and Guidelines; and

2. This subsection does not waive any requirements of any state or Federal codes, electrical codes or other technical codes as applicable.

6.04.06 Discontinuation.

A solar farm shall be considered abandoned after one year without energy production. The property owner shall remove all solar farm equipment and appurtenances within 90 days of abandonment.

Results?

- February of 2020 NextEra received a CUP for the solar farm
- Planning Commission and County Commissioners hearings went very smoothly
- Roughly 20-30 people in audience with only 1 neighboring landowner being opposed

- Long Term results are still To Be Determined

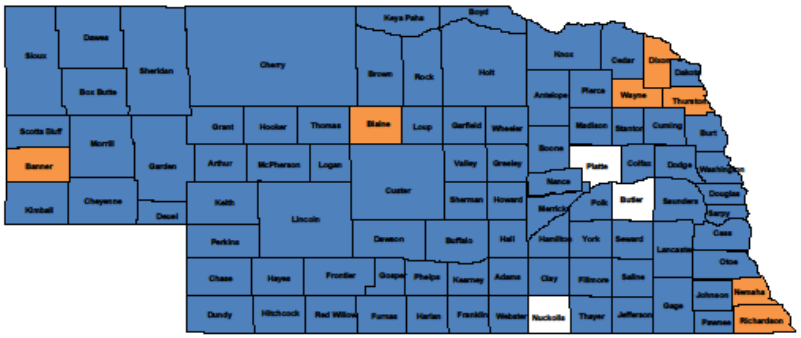
Wind Power

Wind and Solar Zoning

Statutory Framework

- Chapter 23 for Zoning
  - Sections 23-114 – 23-114.05, 23-168.01 – 23-168.04, 23-172 – 23-174, 23-174.02, 23-373, and 23-376.
- Chapter 66 for Wind and Solar
  - Sections 66-914 and 66-914.

Zoning Status of Nebraska Counties



Legend

- Counties with Zoning (83)
- Counties with adopted comprehensive plan (7)
- Counties with no zoning or comprehensive plan (3)

Source: Legislative Research Office and updated by the Nebraska Association of County Officials - May 2019

For a summary of Nebraska Statutes Pertaining to Nebraska County zoning -- go to www.nacone.org, Counties, County Issues, County Zoning Statutes

Counties without Zoning

- Banner (comp. plan)
- Blaine (comp. plan)
- Butler
- Dixon (comp. plan)
- Nemaha(comp. plan)
- Nuckolls
- Platte
- Richardson (comp. plan)
- Thurston (comp. plan)
- Wayne (comp. plan)

Counties without Zoning (cont.)

- Counties with comprehensive development plans have undertaken a necessary first step toward having zoning
- These counties do not have zoning until they have adopted regulations.

Counties with Zoning

- The remaining 83 counties

Zoning

- Have to have it in order to regulate wind and/or solar
- Have to have a comprehensive plan and a resolution
- Must have a Planning Commission
- May have a Zoning Administrator
- Must have a Board of Adjustment

Planning Commission

- In order to implement zoning, the county board must appoint a planning commission
- Members must be county residents
- Prepares and adopts zoning regulations and plans
- Holds hearings
- County boards may not take action on zoning-related issues until receiving a recommendation from the planning commission
- May authorize conditional use permits and special exceptions

Zoning Administrator

- May be appointed
- May also be a building inspector!

Board of Adjustment

- May take appeals of any decision of either the planning and zoning commission or the county board
- May authorize variances to the zoning regulations in exceptional cases
- Appeals go to District Court

Observations

- The comprehensive plan is only a first step
- Zoning is becoming more of a battlefield for hot topics
- Wind and solar in particular have becoming more politicized
- County boards are willing to put decisions on hold until they receive sufficient information

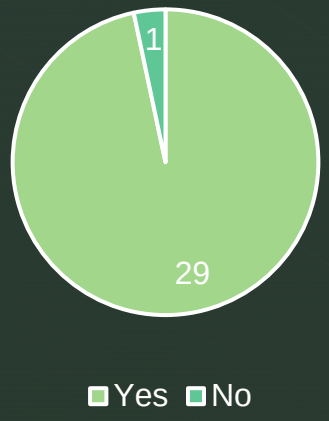
Best Practices

- Get community input and involvement
- Accurate information is necessary

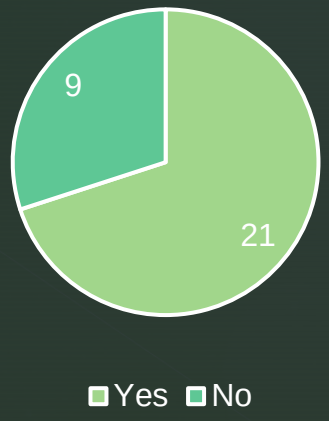
Counties with solar/wind regs in place

* (30 of 83 zoned counties responding to survey)

Counties with Wind Energy Regulations



Counties with Solar Energy Regulations



Solar and Wind

- All counties with zoning are authorized to include considerations related to solar and/or wind energy:
- May include, but not be limited to:
  - Regulation of height, location, and setback
  - Regulation of use of structures, height and location of vegetation, type and location of energy systems and components, and use of districts to encourage use of solar and/or wind systems

Solar and Wind (cont.)

- When zoning regulations would prevent or unduly restrict the use of solar and/or wind, the governing body may authorize variances and exceptions.

Additional Resources

- https://nacone.org/pdfs/counties/planning&zoning_statutes.pdf
- https://www.npza.org/

Questions?

Thank you!

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