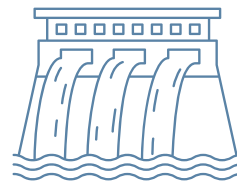
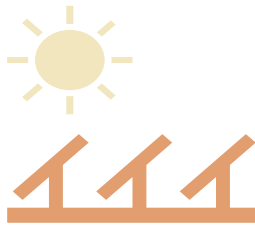
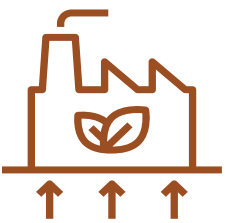


# Renewable Energy Chapter

## for the Adams County Comprehensive Plan



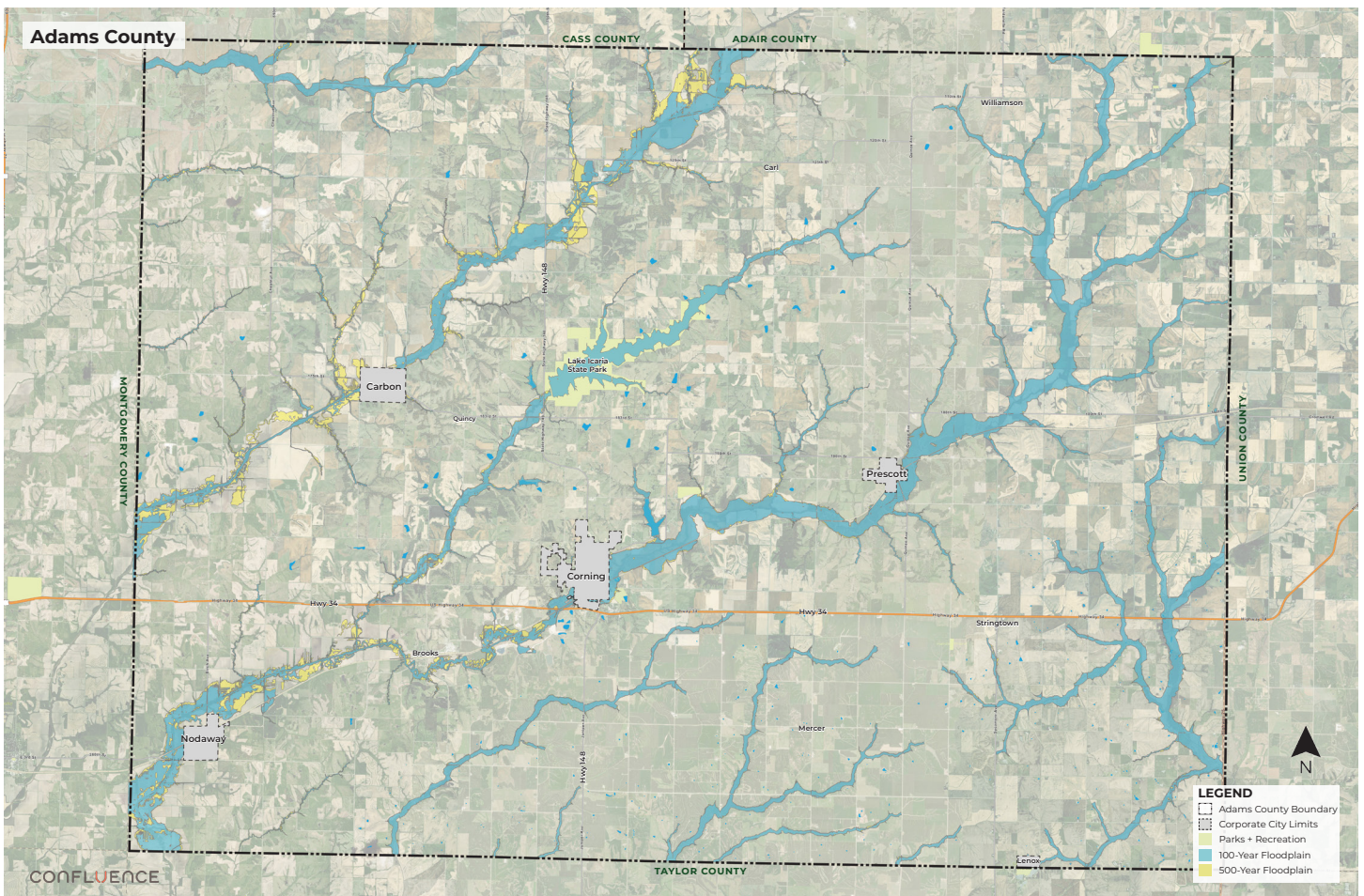
DRAFT JANUARY 2024

# Introduction

As it applies to the rest of this chapter, the study area in discussion encompasses all of unincorporated Adams County. Figure X.X illustrates the study area in greater detail to provide additional context. Lake Icaria State Park, 100-year and 500-year floodplains, and major roadways, such as Highways 34 and 148 are key features throughout the county.

The intent of this chapter is to present findings, summarize public input, and provide recommendations for the regulation of renewable energy developments in Adams County.

Figure x.x // Study Area Map

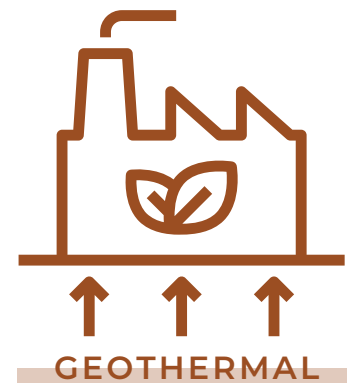
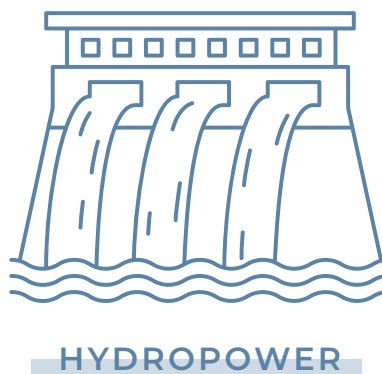
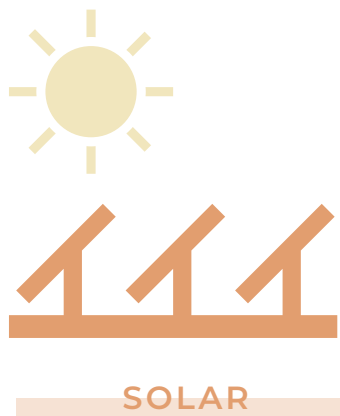


# Renewable Energy

Renewable energies include anything that is continuously resupplied by the sun or inexhaustible resources (geothermal energy). A common application in the State of Iowa is renewable wind energy through the use of wind turbines. These alternative methods of energy collection help reduce pollution and emissions into the atmosphere. The two types of renewable energy producers that will be discussed in this chapter include utility-scale solar and wind farms. Utility scale simply means that the installation is intended to generate power for off-site use and is connected to the power grid.

Due to Adams County’s sizable amount of open space and agricultural land, the area is conducive to alternative energy producers, such as utility scale solar and wind farms. Renewable energy developments can bring economic benefits to the county, such as attracting supportive industries or expanding job opportunities within the area and providing property tax revenue to the county and lease income to property owners.

## Types of Renewable Energy





# Renewable Energy

There are two levels of classification for developments of wind and solar energy conversion systems. These classifications include accessory and utility scales. Adams County’s zoning code currently defines an accessory use or structure as “a use or a structure subordinate to the principal use or building on the same lot and serving a purpose customarily incidental thereto (Adams County Code of Ordinance 21.2.A).”

Utility scale developments include one or more energy conversion systems located together and used for the production of electric power to be interconnected into the local utility electric grid.

For this chapter, all recommendations will be in relation to utility-scale developments.

**Figure x.x // Examples of Accessory (left) and Utility (right) Scale Solar Installations**



**Figure x.x // Examples of Accessory (left) and Utility (right) Scale Wind Installations**



# Utility Scale (Solar Farms)

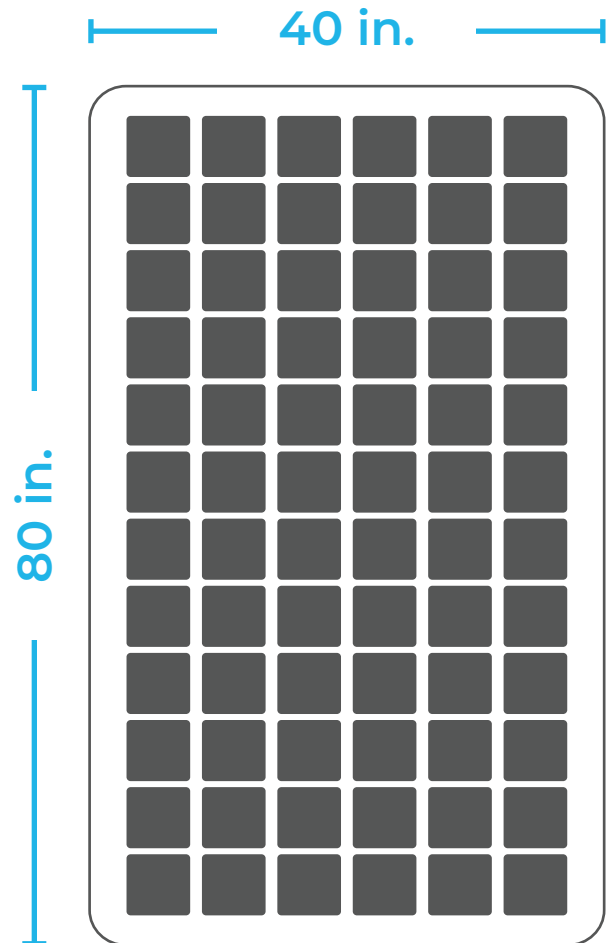
## Key Components

Solar farms typically utilize photovoltaic (PV) solar technology to convert solar energy into electric power.

To protect both the solar farm and surrounding neighbors, the perimeter of the operation has a security fence. Interior access roads allow maintenance workers to reach the panels as needed for repairs and service. On site, there are central power inverters and step-up transformers to convert and transfer the power to the electrical grid. Lastly, the key component to a solar farm - the solar panels. The PV panels are typically set up in a single axis row with the ability to rotate with the sun throughout the day.

## Land Impacts

The true impact on the land is a key difference between wind farms and solar farms.. Solar panels are typically less than 15 feet tall, supported by steel piles driven into the ground. These piles are less impactful to the land than the concrete bases used with wind farms. Whereas wind farms have turbines that can be several hundred feet tall and require intense, structural components to anchor into the ground

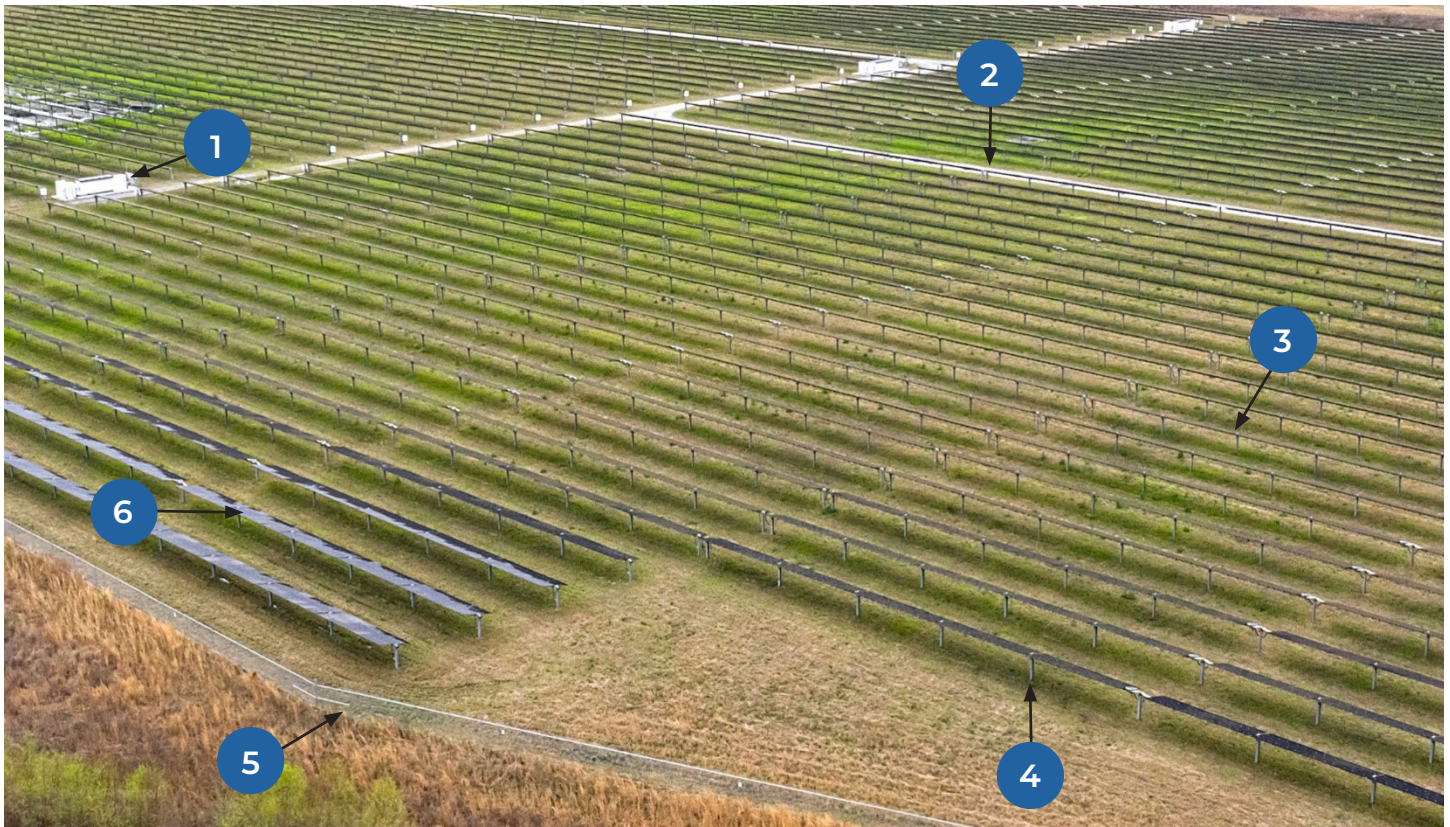


**Solar panel sizes are kept moderately small to allow a single worker to be able to perform maintenance as necessary.**



# Utility Scale (Solar Farms)

Figure x.x // Components of Utility Scale Solar Farms



1 Central power inverter and step-up transformer

2 Interior access road

3 Single axis tracker row

4 Driven steel piles

5 Perimeter security fence

6 PV panels

# Utility Scale (Solar Farms)

## Key Benefits

The operations of solar farms highlight some of the key benefits of this renewable energy. These include:

- No operational waste
- No water discharge
- No air emissions

## Life Cycles of Solar Farms

The lifetime of solar panels is estimated to be 25-40 years. Following the retirement of the panels or farm, the operation must follow a decommissioning plan.

## Decommissioning Plans

A decommissioning plan identifies the steps necessary to bring the land as close to its natural state as possible. These plans are required as part of the approval process for a solar farm to account for its operations from construction to deconstruction.

The solar panels are made out of recyclable materials, such as glass and aluminum. This recyclable component is part of reducing the footprint of the total farm operation.

## Zoning and Participation

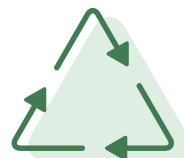
The intent of zoning regulations for solar farms is to balance the interests of both the “participating” and “non-participating” landowners. Participating landowners are those that enter into leases, easements, or other agreements with solar developers. Those that do not partake in such activities are classified as non-participating landowners. Ensuring the code is clear and concise reduces the potential for disputes or negative impacts on the property owners.

Prior to the approval process for any solar farm, the County must determine where they will allow solar farms to be constructed. Typically, these users are allowed in agricultural, transitional agricultural districts, and some industrial or commercial districts.

The approval process for solar facilities is recommended to utilize conditional use permits. These permits are used in place of rezonings for the greater flexibility they provide. Best practices for solar farms include conditional use permits to allow the governing bodies to analyze each instance of application to ensure it meets standards and will not negatively impact the greater county or residents.



**Decommissioning plans are required**



**Solar panels are recycled**



**Site is restored**



# Utility Scale (Solar Farms)

## Setbacks

Setbacks are part of the regulations for any land development practice. These are not exclusive to solar facilities, and can be found in everything from a residential block to an industrial park. These guidelines identify the amount of distance a building or structure must be from a road or property line. Setbacks act as a regulatory tool to protect adjacent properties from the proposed development; however, setbacks should not be so large that they infringe on a landowner's ability to develop their property.

Related to solar farms, counties and cities should specify setbacks from the following:

- Non-participating property lines and/or residences
- Participating property lines and/or residences (typically no setback)
- Public rights of way
- Sensitive areas such as parks and lakes
- City boundaries

## 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 for visual screenings should authorize the use of natural features, topography, and vegetation for cost efficiency and aesthetics.

Adams County should consider the likely impact of property line screening requirements. Agricultural parcels can have a property line extending a half-mile or more. This is well beyond the residence to be screened. Therefore, limit the screening requirements to a necessary area. If not reduced to a necessary screening area, the requirement may become overly burdensome, disturb land, and/or discourage development.

## Stormwater Management and Ground Cover

Any ordinance regulating solar farms should include a requirement that a stormwater management plan be developed to protect the site from soil erosion and ensure stormwater runoff is properly addressed to limit impact on downstream properties. Requirements to protect the agricultural value of the soil along with details for vegetation and establishment of ground cover are additionally important components.





# Utility Scale (Wind Farms)

## Key Components

Wind farms use large-scale turbines to convert the kinetic energy of wind into power that is supplied to the electrical grid.

Oftentimes, wind turbines stand several hundred feet tall, being composed of a tower, rotor and blades, and nacelle, which houses the generator. An access road leads to the wind turbine which allows maintenance workers to make on-site repairs.

## Key Benefits

Wind farms have several key benefits over conventional means of energy production, including:

- No water consumption
- Economic benefits for communities
- Job creation

## Life Cycles of Wind Farms

Wind turbines have an approximate lifespan of 30 years. Though many of the individual components that make up the turbine will need replaced or repaired during this time.

## Shadow Flicker

At times, a wind turbine may cause a shadow flicker when the blades of the turbine pass between the sun and the observer, this affect can only be seen from a distance of less than 4,600 feet during certain seasons and times of day.

Any ordinance regulating wind farms should include requirements to limit shadow flicker on existing structures.

## Obstruction Lights

The flashing red lights that can be seen on top of wind turbines at night are known as obstruction lights. Although these lights can be seen as a nuisance, they play an important role in protecting both the wind turbine and pilots traveling during nighttime and are mandated by the Federal Aviation Administration on structures exceeding 150 feet.

Subject to FAA approval, it may be possible for towers to utilize an aircraft detection lighting system (ADLS) where the aircraft safety lighting is only activated when an aircraft is in proximity to the wind farm.

## Noise

Unlike solar panels, wind turbines have moving parts, both externally and internally. While in operation, there is noise generated by the blades of the wind turbine moving through the air and by generator within the structure.

Noise levels from wind turbines at distances greater than 1300 feet is typically less than 40 decibels, which is comparable to the lowest limit of ambient sound in an urban environment.

# Utility Scale (Wind Farms)

## Setbacks

Setbacks are an important regulation to protect non-participating property owners - those who have not entered into leases, easements, or other agreements with wind developers - from sound and visual impacts during the development and operation of wind farms.

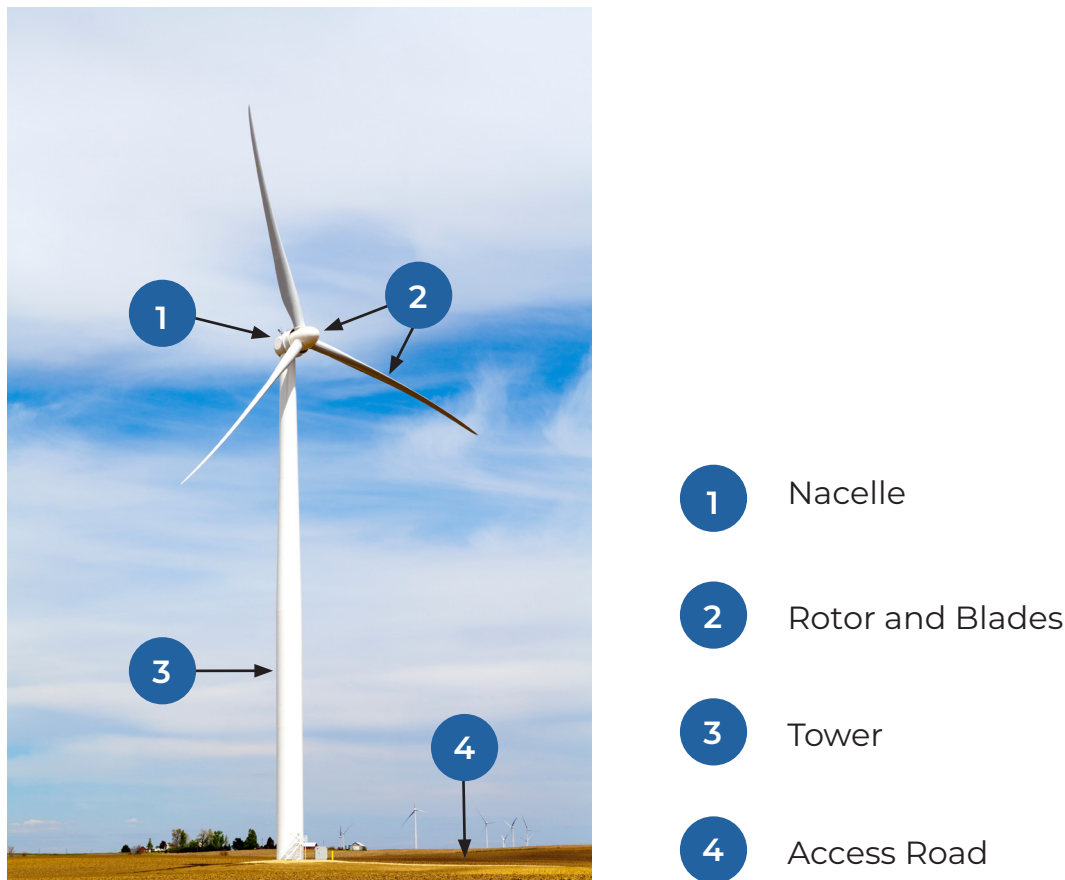
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- Sensitive areas such as parks and lakes
- City boundaries

## Decommissioning Plans

Once at the end of their lifespan, wind turbines must either be removed or replaced by a new turbine. Decommissioning plans layout how the owner of the turbine will handle this transition, how this work will be funded, and to what extent the land is returned to its original state. It is important to require some sort of financial security to ensure removal of the wind farm at the end of its lifespan.

Figure x.x // Components of Utility-Scale Wind Turbine



# Public Input

A kick-off meeting for the development of the renewable energy chapter was held on December 11, 2023. At this meeting, the consultant team provided information on renewable energy uses and their regulation. Those in attendance were asked to provide feedback on utility-scale wind and solar farms through a series of visioning questions. In total, there were 36 physical surveys and 152

online surveys completed by Adams County residents. Results from the visioning questions highlighted a few key themes, including:

- Consistent opposition to wind farms
- Support for the development of solar farms given there are adequate regulations in place
- Desire to preserve agricultural land

## Do you have any concerns about new wind farms in Adams County?

- Impact on land values
- Noise and visual pollution
- Reduction of agricultural land
- Inadequate setbacks
- Current decommissioning requirements
- Effects on wildlife
- Amount of existing wind turbines

## Do you have any concerns about new solar farms in Adams County?

- Glare from the reflection of sunlight
- Reduction of agricultural land
- Current decommissioning requirements
- Effects on wildlife

## What aspects of wind farms should be regulated in Adams County?

- Required setbacks should be increased to further protect non-participating landowners
- Enact height limits to reduce visual pollution
- Require new developments to have a decommissioning plan
- Limit the total number of wind turbines within the county

## What aspects of solar farms should be regulated in Adams County?

- Total size of utility-scale solar developments
- Require adequate setbacks
- Require new development to have a decommissioning plan
- Limit the total number of solar farms within the county



# Public Input

## Stakeholder Interviews

In addition to the visioning questions, the consultant team conducted several interviews with community stakeholders to better understand how wind and solar developments fit within Adams County. Based on the list provided by the County Zoning Commission, the consultant team was able to hold conference calls with the following:

- **Jason McManis**, Adams County Farm Bureau President and member of the Adams County Zoning Commission
- **Ray Gaesser**, board member of Solutions from the Land
- **Jeanne Jackson**, member of Adams County Priceless Land Coalition
- **Steve Morris, Kate Millar and Merlin Bartz**, Invenergy
- **Jamie McManis**, Liberty Realty
- **Scott Akin**, Adams County Supervisor and vice president of the Adams Community Economic Development Corporation

The comments expressed were diverse and summarized below.

### Comments regarding wind farms:

- No more wind farms
- Will devalue land
- Tower foundations may impact ground water
- Concerns with safety and impact from noise and lights
- Concerns with foreign ownership of wind farms
- Don't prohibit but establish standards for new wind farms
- Wind farms provide a large property tax benefit to the county and the local school districts, a significant percentage of their budgets
- Wind farms provide revenue to local property owners
- Concern with seeing new overhead powerlines and impact to power grid

### Comments regarding wind farm regulations:

- Need to balance zoning restrictions with free property owner rights
- Should measure wind turbine setbacks from property lines and not from existing homes or buildings
- Need to increase setbacks to minimum 2,250 feet or 3,280 feet

- Set a cap on maximum tower and blade height
- Require aircraft detection lighting system (ADLS)
- Increasing setbacks will limit or prevent property owners from having wind towers - keep at 1,200 feet or 1,500 feet from existing homes
- Require a decommission plan
- Setback from municipal limits should be 1-mile vs 2-mile
- Do not set a maximum height but use it as a basis for setbacks (height to setback ratio)

### Comments regarding solar farms:

- Do not allow new solar farms
- Property owner should have the right to have a solar farm
- Concern with loss of farmland
- Concern with water runoff and soil erosion

### Comments regarding solar farm regulations:

- Require a decommissioning plan
- Limit the overall size of a solar farm
- Need a plan to manage water runoff
- Require setbacks

# Strategies

## 1. Adopt a robust zoning code to appropriately regulate utility-scale solar and wind.

The zoning code should be updated to identify greater guidelines for utility-scale solar and wind in Adams County. These guidelines should consider setbacks, buffering, locations, and permits.

## 2. The location of utility-scale solar and wind should be restricted from sensitive areas.

Solar and wind developments should not be allowed in sensitive areas. Instead solar and wind farms should mostly be contained to land designated for agricultural use.

## 3. Buffering, complete with native species and visually-screening trees, should be a key requirement of the code.

To protect participating and non-participating landowner, the County should ensure there are adequate buffering standards written into the zoning code. These buffering requirements should help to reduce any negative impacts on adjacent properties and provide aesthetic features through native plantings.

## 4. A detailed decommissioning plan should be required for all utility-scale solar and wind projects.

At the end of the life cycle of solar and wind facilities, a thorough decommissioning plan should be followed to bring the land back to nearest its natural state. This decommissioning plan should be established as part of the permitting and approval process so that the developer and County are in alignment with procedures.

## 5. Include regulations for Battery Energy Storage Systems (BESS).

Battery energy storage systems are sometimes a component of a solar farm or wind farm and are used to store excess electrical power until it is needed by the power grid. BESS are also utilized in situations unrelated to a solar or wind farm to manage local issues with peaks in electrical power demand. The County should consider adding regulations to address special setbacks and siting standards typically desired for BESS.