

## Minutes - Woodbury County Zoning Commission – January 22, 2024

The Zoning Commission (ZC) meeting convened on the 22<sup>nd</sup> of January, at 5:00 PM in the Board of Supervisors' meeting room in the basement of the Woodbury County Courthouse, 620 Douglas Street, Sioux City, IA. The meeting was also made available via teleconference.

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### Meeting Audio:

For specific content of this meeting, refer to the recorded video on the Woodbury County Zoning Commission "Committee Page" on the Woodbury County website:

- County Website Link:
  - o [https://www.woodburycountyiowa.gov/committees/zoning\\_commission/](https://www.woodburycountyiowa.gov/committees/zoning_commission/)
- YouTube Direct Link:
  - o [https://youtu.be/0yF9t1AqEVk?si=WoQYr\\_-luP1s77rK&t=13](https://youtu.be/0yF9t1AqEVk?si=WoQYr_-luP1s77rK&t=13)

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ZC Members Present:

Chris Zant, Barb Parker, Tom Bride, Jeff Hanson, Corey Meister

County Staff Present:

Dan Priestley, Dawn Norton

Public Present:

Alan McGaffin, Terri McGaffin, Renee Weinberg, Jane Hey, Dan Bittinger, Cindy Hammann, Steve Corey, Amiee Krogh, Brian Sadler, JoAnn Sadler, Amber Widman, Sylvia Widman, Peter Widman, David Linn, Eric Nelson, Dolf Ivener, Bill Jochum, Scott Hennings, Naomi Widman, Christopher Widman, William Widman, Ezra Widman, Aliza Widman, Eliyanah Widman, Lew Weinberg, Ben Nesselhuf, Genise Hallowell, Will Dougherty, Jacob Joliet, Greg Jochum, Dale Lynam, Lynn Lynam, Melvia (?), Bob Fritzmeier, Roger & Gwen Brink, Rex & Jennifer Barber, Elizabeth Widman, Shari Zenor Kiple, Tom Jochum, Emily Segura, Daniel Segura, Wallace Wagner, Deb Harpenau, Kalyn Heetland, Doyle Turner, Cendejas family, Rebekah Moerer  
Tom Treharne,

Telephone:

### Call to Order

Chair Chris Zellmer Zant formally called the meeting to order at 5:02 p.m. All Commissioners were present.

### Public Comment on Matters Not on the Agenda

Scott Hennings spoke regarding family-owned land, approximately 135 acres near Highway 20 that will be open for development.

### Approval of Previous Meeting Minutes

- November 27, 2023 - Regular Meeting
  - o Motion by Bride. Second by Meister. Approved 4-0. 1 Abstention (Hanson)
- January 17, 2024 - Special Meeting Work Session
  - o Motion by Hanson. Second by Bride. Approved 5-0.

### Zoning Commission Public Hearing for Proposed Utility-Scale Solar Energy Systems Zoning Ordinance Amendment(s).

The public hearing was opened by Zellmer Zant and Priestley read the staff comments into the record by offering an explanation of the purpose of the public hearing and made referenced to the work session that was held on January 17. The following considerations to address the permitting of utility-scale solar energy systems were offered:

#### Consideration 1 –

Consider updating the General Development Plan and/or Future Land Use Map to facilitate the potential expansion of the General Industrial (GI) and Limited Industrial (LI) Zoning Districts and consider adding additional requirements to the conditional use permitting process to make expectations clear for the applicants, area landowners, and the general public.

#### Consideration 2 –

Consider retaining the current permitting procedures in the Woodbury County Ordinance but add additional requirements to the conditional use permitting process to make exceptions clear for the applicants, area landowners, and the general public. Consider retaining the General Industrial (GI) Zoning District as the only allowed location for the consideration of a conditional use.

**Consideration 3 –**

Consider establishing a utility-scale solar energy systems overlay zoning district that requires a rezone application to be reviewed by the Zoning Commission and considered for approval by the Board of Supervisors that must meet specific criteria for the appropriateness of whether a particular area in the Agricultural Preservation (AP) Zoning District is suitable for utility-scale solar energy systems. Consider adding additional requirements to the conditional use permitting process to make expectations clear for the applicants, area landowners, and the general public.

Priestley introduced material received from MidAmerican Energy. Motion to receive Bride. Second by Hanson. Approved 5-0. (See Appendix).

Priestley introduced a letter received from the City of Sioux City. Motion to receive by Hanson. Second by Bride. Carried 5-0. (See Appendix).

**Public Comment:**

The Chair Zellmer Zant welcomed the public present to offer any comments they might have about the permitting of utility-scale solar energy systems. The following addressed the Commission:

**PUBLIC COMMENTS TRANSCRIPT – TIMESTAMP BEGINS AT 12:06 or 5:06 PM CT**

The following transcript is provided “as is” and was generated via YouTube with some minor grammatical corrections to items such as addresses. For the most accurate account, please listen to the full audio hosted on the YouTube serves and linked via the Woodbury County website:

- o [https://www.woodburycountyiowa.gov/committees/zoning\\_commission/](https://www.woodburycountyiowa.gov/committees/zoning_commission/)

**David Linn**

12:06  
David Lynn 1410 Michigan Correctionville  
12:14  
I just wanted to stand in opposition of the solar in the AG  
12:20  
preservation land I think solar is very well suited to be in the industrial  
12:25  
ground and I wouldn't oppose that at all but in reading through a lot of the literature there uh from your last  
12:31  
packet you also stated that it would be there was one deal in there where was up to 5% slopes I think where where you  
12:39  
thought it would be appropriate and if you put a solar panel farm you know where they're right next to each other  
12:44  
on a 5% slope and we get a 2-inch rain you're going to have a mess I mean so I  
12:50  
really think this needs to be in the industrial area with the ground is pretty well flat or in river and creek  
12:56  
bottoms and that's why I it I think it should be in industrial area and not in the ag  
13:01  
Preservation. Thank you.

**Dolf Ivener**

13:15  
hello my name is Dolf Ivener I live at 3400 Talbot Road and I would like to  
13:20  
speak for solar installations in our county um I'm a solar  
13:27  
installer uh not on massive scale on little scales to address your concern um  
13:33  
I have really steep hills yellow dirt and I put solar systems on them they don't wash um there's plenty of sun that  
13:41  
goes underneath the solar system effectively it's

13:47

sun it hits the ground it's no different than photosynthesis it's effectively the

13:53

same thing now some neighbors don't like to look at it but I'm afraid is this a slippery slope where my neighbor who

13:58

grows beak seeds tell me oh no we got to just grow beak seeds here right we're not no you know we don't we don't want

14:05

Dick Cal or Pioneer this is this doesn't increase traffic this just sits on the land it

14:12

doesn't sit any taller than a corn plant I mean I raise good corn get 12 feet tall top of a solar panel isn't over 12

14:19

feet tall so and another issue I think there's a lot of

14:25

complaints about taxes right I mean if these guys were to put a big system in I

14:30

mean what would the tax base be like to all the neighbors be a significant amount of money um and another issue is

14:38

and I saw it happen with the wind turbines it's just pretty difficult I think uh I work pretty hard to pay my

14:44

mortgage payments on my farms and the idea my neighbor gets to take the right away from me for what I want to grow on

14:51

my ground because they're going to look at it it's it's a pretty steep it's you

14:56

know it's a pretty steep price for me to pay for my neighbors to take the rights away from me so um in closing solar will

15:04

be a good deal it'll bring money to our economy it won't create road traffic I

15:09

mean nobody goes to I mean they just sit there in the Sun and collect the Sun so anyways I'm for it as a member of the community.

#### **Renee Weinberg**

15:38

My name is Renee Weinberg 3905 Country Club Boulevard um I know people are concerned

15:46

about agriculture um or agricultural land being used um I think the proposal

15:52

was that they would be planting grasses and plants underneath which would be

15:58

helping the ground even if it had the solar on it so that eventually um that

16:03

dies down and fertilizes the land so it doesn't hurt the land there's nothing hurting the land or taking it away from

16:10

the future if this is ever moved solar panels can be moved and I believe it's also a proposal to have a fence around

16:18

the entire area which would block off the view if this upset somebody or is

16:23

concern with you know this being something that's going to block their view something um it's supposed to bring

16:31

it's a \$440 million project so I would think that would be a huge um tax

16:40

increase uh job increases um clean jobs clean energy which is kind of the future

16:47

that we're trying to work towards thank you.

#### **Daniel Segura**

17:09

hello my name is Daniel Segura I'm from uh 3114 Pierce Street uh Sioux City, Iowa

17:16

and I don't live in the area I have family that lives in the area um the way I see it um there's a reason uh why uh

17:24

there's this um ag conservation uh land how it's been zoned that way um I think

17:31

um for many the perspective of many and I I included in that um I think there there would need to be a very good

17:37

reason to change it um after so many years of um people in the public relying

17:43

on that I know that there's um in in many ways a shortage of of farmers

17:48

mainly because there's lower incentives when we have um not all land is suitable

17:55

for use and farm uh we have a lot of land that the soil is just not good enough um and so I think to just slowly

18:02

be eating away at the soil and and um we we also know a few things that have been brought up in the past about how um

18:09

there's a question how these solar panels would be disposed of um I think there is a significant risk that um

18:16

since they don't know how to dispose of them properly a lot of that would end up um in the earth at some point um but uh

18:24

I think with the current uh situation that we have with ag conservation land uh that's necessary to

18:31

incentivize um current farmers from buying more land and utilizing it as well as uh up and coming Farmers for

18:37

the next generation uh to want to continue farming um and I think that's an invaluable uh resource to have uh lots

18:44

of Farmland in use in Iowa that's all I have thank you.

### **Will Dougherty**

19:08

I'll go quick uh my name is Will Dougherty 1499 Northwest Urbandale Drive Urbandale

19:13

Iowa I work for Mid-American Energy um I've been at a few of these solar hearings and workshop sessions over the

19:19

past few months um I'll keep it brief uh a lot of the comments that we have for

19:25

the proposed um overlay districts ordinance that was in the packet for tonight um you all just accepted into

19:32

the the minutes for tonight's meeting so um I will have you know if you have any questions coming out of that as well um

19:39

I'd be more than happy to you know kind of answer why we we put some of those comments in there um overall I think just kind of after reviewing the

19:46

ordinance um we do just have some concerns if that is the path that the county wants to go down um just

19:53

with um some of the regulations within the the draft ordinance as it stands right now um

19:58

it appears that the draft ordinance was pulled largely from Linn County um Linn

20:04

County over the past prior to when they adopted this they spent a little over a year in the drafting process um with

20:11

several Community um volunteers industry experts um they brought in different

20:16

government agencies as well and they're they're a fairly um highly staffed County um the only concern that I really

20:22

have with is that the county that ordinance has not been uh vetted yet to to a full extent they do have two

20:27

projects there in the county that did get approved uh through a permit process over by the Dwayne Arnold plant that was

20:33

prior to the adoption of this ordinance that they have performed today um that's

20:38

really my only concern is just um I guess administratively how the county plans on keeping up with some of these

20:44

regulations that are in here um it is definitely one of the most thorough ordinances that I've seen across the state of Iowa for sure um I'm not saying

20:51

that you know this is an undevelopable ordinance by any means it's just kind of wanting to have a little bit of dialogue

20:56

with the county to see how some of these things are going to be enforced um to see what agencies or you know what

21:02

government uh staff is going to be in charge of either auditing it or reviewing the process and kind of the

21:08

administrative portions of it as well um but if you do have any questions regarding as you kind of go through your

21:13

drafting process reviewing the comments um any other comments here today you know from an operational side or a signing

21:20

side as well um I'd be more than happy to answer any of those questions for you so thank you.

### **Eric Nelson**

21:51  
Eric Nelson 1514 Jasper Avenue Merville, a couple points to make um I'm  
21:58  
kind of bookends on these hearings I was at the first one and um and now I'm at  
22:03  
this one and it looks like that the the number of participants um has doubled  
22:10  
from one to two I mean I think active people that are that are wanting to to  
22:16  
build is my understanding and now there's been some a few additional comments but not from people that are  
22:22  
actively wanting to build and so I just from where I'm sitting it looks like to me that the industrial zone that's  
22:29  
already been established with a lot of acres um is more than inclusive enough  
22:34  
for um a project or two um to be built on that property the other comment I  
22:41  
have is that it would look like to me you would set kind of a maybe a nasty  
22:47  
precedent to not do that when there's only a couple people that are asking to do the project and so you just think  
22:53  
about maybe kicking the door open to other projects that only have one or two people that are really interested um  
23:01  
and and and obviously there have been hundreds that have shown opposition over time to the same to the  
23:07  
same projects and then thirdly uh I think it's kind of uh ingenious to have someone from the city um telling the  
23:14  
county what to do but I'm guessing that if the county tried to tell uh a city official what to do that they would  
23:20  
probably take offense at that so I think that uh uh where the county authority  
23:26  
lies the county Authority lies and where the city authority lies the city authority lies thank you.

**Doyle Turner**

23:52  
Doyle Turner 2738 200th Street um  
24:01  
I think it makes a whole lot of sense at this point to wait for the development  
24:06  
plan um this is kind of going away from what our development plan says and if  
24:13  
we're going to do something that would make a lot more sense from a legal standpoint to deal with it with the  
24:19  
development plan first we're kind of getting the cart ahead of the horse here the other thing that I'd like to say is  
24:25  
people like to talk about tax revenue you cannot compare property taxes to the  
24:31  
taxes off of a solar farm because you're you're paid based off of  
24:38  
what that solar farm produces uh Will Dougherty had said before that I believe it  
24:43  
was 24 to 25% efficient is what the solar is at in this  
24:48  
area um the real thing that these these things are after is the transmission  
24:56  
lines and we pay get paid off of what goes through that transmission line uh I  
25:01  
know I've read articles that Mid-American is actually looking at some nuclear across the state we would be  
25:08  
much better to have something that was a lot more efficient going through those  
25:13  
utility transmission lines paying on a lot more than 24 to  
25:19  
25% so in order to truly get an apples to apples comparison on this you can't  
25:25  
compare it to farm property tax you have to compare it to what we could make off those transmission lines if we were  
25:31  
using a more efficient source of energy thank you  
25:38

Chair Chris Zellmer Zant: Doyle Doyle you may want to disclose that you're on the Board of Adjustment Turner: what?

25:46

Zellmer Zant: do you want to disclose that you're on the board of adjustment. Turner: yeah that's fine okay. Zellmer Zant: I I just thought I'd want to make that public yeah that's fine thank you

**Tom Treharne**

26:02

yes this is Tom Treharne with Nextera Energy to can you hear me Zellmer Zant: we have someone on the phone you

26:09

get phone first yeah okay phone first please thank you so my name's

26:17

Tom yes my name's Tom Treharne with Nextera Energy um just one thing I in reading

26:25

the packet I wanted to clarify um if the recommendation of staff is to proceed

26:31

with the a retention of the current policy which is to allow um solar in the

26:37

as a conditional use only in the general industrial district or district I'd like to if that could be clarified at some point

26:45

um also I'm just as it relates to the proposal

26:51

ordinance that's been identified in the packet I would agree with what Mr. Dougherty

26:56

said and that you know the the overlay zone does

27:02

provide the opportunity for a project to move forward um the proposal does have a

27:08

lot of requirements um in it that were vetted to a longer process and I'm not

27:14

going to repeat everything he said but I do agree with that and um it's my

27:21

understanding that even coming out of this public hearing the recommendation would be how to proceed and there would

27:26

be additional time for comments relative to the ordinance so I'll save my

27:32

comments relative to a future ordinance for another time but I guess I I would like that clarification what staff's

27:39

recommendation is on moving this forward if I could ask that question thank

Dan Priestley:

27:53

you um we we'll kind of continue with the public hearing and I'll I'll uh

27:58

clarify that at the end for a note so we can move on to the next

**Bob Fritzmeier**

28:05

next okay I'm Bob Fritzmeier and at uh

28:13

2933 Leech here in Sioux City and I was I was authorized by the

28:20

executive committee of the Northwest Iowa Sierra Club to um speak on their

28:27

behalf also so actually there are five other members of that with myself and so

28:33

I'm speaking for the other six of us one of the most significant

28:40

uh benefits of of solar which I'm in favor of would be to reduce the

28:47

emissions of the carbon dioxide and that that has been uh proven

28:53

to be necessary you know for the good and the well-being of our community um

29:01

Woodbury County and the wider you know wider country

29:07

too carbon dioxide is and those kind of dangerous pollutants are come from you

29:14

know don't don't come from solar energy and by lowering those those

29:20

concentrations we'd be helping the future generations that are coming and  
29:25  
that need our help now and planning for the future another aspect of this is that  
29:33  
solar energy systems are conservative in the use of water they don't need the large volumes  
29:39  
of cooling water that's needed for the fossil fuels that are currently in use  
29:48  
you know here in in Woodbury County I think that the board would be well to adopt that overlay  
29:56  
system because it would help to conserve those precious water resources and we  
30:01  
know I mean just just in the last few months uh we've had drought conditions  
30:07  
not only here in this part of Iowa but in other you know states around here too  
30:14  
so that would help the situation and one one of the speakers  
30:20  
made a reference to the the soil underneath the these these  
30:25  
panels and those actually would would foster with the with solar panels in  
30:31  
there the grasses that would be allowed to grow there would be you know have the  
30:36  
rainfall soaking in absorbing and really rejuvenating the soil so that when you  
30:43  
know 30 years if in 30 years the the solar installation would be retired then  
30:49  
the land could just well be restored then and returned to you know the  
30:56  
agricultural thank you for being here to listen to us

**Alan McGaffin**

31:15  
My name is Alan McGaffin I live at 1122 South Paxton in Sioux City and I'm a  
31:22  
proponent of solar Farms as well I want to tag on what Bob just said I think and  
31:28  
this was mentioned earlier the portability of a solar farm  
31:34  
is above and beyond what we think of of of a power source you can't pick up a  
31:40  
Coal fired plant or a uranium fired plant and move it it just doesn't happen  
31:48  
the same with a wind turbine a wind turbine can be deconstructed and torn  
31:54  
down raised and and moved relocated if necessary but not as easily as a solar  
32:01  
panel can now I know an industrial solar farm would be sizable but nevertheless  
32:07  
as Bob said if we wish to convert that land in 20 or 30 years that land is  
32:12  
suitable it's undamaged and it can be used for other purposes it's not even been paved over so I think the  
32:19  
portability Factor the water conservation Factor as Bob pointed out  
32:24  
are just uh solar panels aren't pretty but  
32:30  
neither are our other power sources we've just got to make a a choice of uh  
32:36  
of what what we can tolerate and what we can't and uh I I would like  
32:43  
to have your board look favorably on solar panels thank you very  
32:48  
much thank

**Peter Widman**

32:54

you anyone else my name is Peter Widman I live on 1847  
33:01  
Old Highway 141 rural Sergeant Bluff and I just want to thank you for this opportunity to speak with you a little  
33:06  
bit um I think this ties in nicely to what the last two guys said I want to talk about Virginia a little bit and the  
33:12  
reason I want to talk about Virginia they're on The cutting edge of solar and where solar could be potentially going  
33:17  
and um and just as a fact I'm not for putting solar large industrial  
33:24  
solar complexes on ag land I think they should be in the industrial in Virginia in 2020 the  
33:32  
Virginia General Assembly and the governor signed the Virginia clean economic economy act um and in that act  
33:41  
their largest utilities by 2045 and 2050 need to be carbon neutral um by  
33:48  
2021 in the state there was more than 2,000 acres a week that would be take that were being taken out of a land and  
33:55  
put into solar farms and there's some more points I want to bring up here too  
34:01  
um you know the the a lot of the solar developers are  
34:07  
courting state and local leaders wanting to put on a land  
34:13  
um they want to focus on the short-term benefits some mention taxes  
34:19  
um and uh and they don't want to think about the future ramifications of allowing the industrial power plants on  
34:25  
land that is supposed to be res for ag ag use trading one form of environmental degradation for  
34:32  
another um Dr Rattan Lal distinguished professor of soil science at Ohio State  
34:38  
University points out that soil sequesters more than three times the amount of carbon locked in all the plants and animals on the earth yet  
34:45  
construction and maintenance of industrial size solar facilities prevent the natural process of soil replenishing from occurring they're taking out  
34:51  
thousands of acres of trees crop land acres that that sequester carbon dioxide  
34:56  
so if carbon dioxide is a pro is a problem some would say what about the  
35:01  
crops that are taking that out um it's it's ironic in in in Virginia um  
35:10  
to be become carbon free in less than 25 years means there would be a lot more carbon sequestering farmland loss to the  
35:15  
commonwealth how much solar farms require as much as six to eight acres to produce just one megawatt of electricity  
35:20  
up to 104,000 acres of forest and farmland would need to be sheathed in solar panels made of glass and highly  
35:25  
toxic metals like lead and cadmium toride to produce about 13,000 megawatts of electricity and that's only when the  
35:32  
Sun's shining um Chinese government is subsidizing  
35:38  
solar panels to make them cheaper they're using dirty coal to make  
35:43  
them and they're using forced labor to produce them less than 1% of the solar  
35:48  
panels in the United States are made in the US and over 85% of them are made in  
35:53  
China some to think about um  
35:59  
um if you think about it some of the solar farms are erected if in 2021 in Virginia they will become head way sites  
36:05  
by 2036 and that's even before the Virginia clean economy act carbon free mandate kicks in uh once you deal with  
36:13  
the cost of waste electricity from solar ends up being four times higher than they had anticipated Virginia is on track to lose  
36:19  
a massive amount of food growing and carbon carbon sequestering farmland for inefficient and intermittent technology  
36:25  
that would quadruple electricity prices and create thousands of acres of toxic waste local officials who are thinking  
36:32



about approving special use permits to allow more industrial size solar facilities to be built on a land in  
36:37  
their jurisdictions owe it to their constituents to think about all I also  
36:42  
would like to submit these two articles here for you guys just to read can I do  
36:52

Motion to accept two articles by Meister. Second Bride. Motion approved 5-0. Documents available in the appendix.

### **Amber Widman**

37:25  
Hi my name is Amber Widman I live at 1847 Old Hwy 141 and I'm here today to  
37:34  
tell you why I oppose changing the current regulations for ag preservation to allow um the large use uh scale  
37:41  
utility solar on ag land um I studied agricultural engineering at Iowa State University and I was in the soils and  
37:48  
structures department so this is kind of like my area I love technology I really do but um if you look at the things that  
37:56  
have been talked about in the meetings we've been talking about solar panels that fold up or um planting  
38:01  
pollinator things under them or alternative crops I have Purdue they're they're they are experimenting with this  
38:08  
stuff right now they're trying to get patents this is not in effect anywhere in the world okay the Iowa State they  
38:15  
are trying to do the alternative crops underneath and this is the first they said it is the first um of its kind and  
38:23  
they say this is unbiased research we will report on what we find and people can decide whether this is a system that  
38:29  
is feasible or not um here we've got uh get myself out of over here um  
38:37  
the costs of the agrivoltaics tend to be higher than traditional solar development due to modified system  
38:42  
structures and more complex design and installation so all these people are talking about this is going to be ag and energy at the same time it's  
not  
38:49  
there yet the technology is not there yet we cannot be making regulations for  
38:54  
something that hasn't even been figured out how they're going to do it they're still engineering it they're still  
38:59  
coming up with it they're still doing the research they're still they're they're building these research facilities and they're measuring what  
39:06  
does happen to the soil when we have these here what is the carbon what happens to the carbon what about these  
39:11  
pollinator farms do they actually increase the the bees and do they actually um help the crops that are on  
39:17  
there's a lot of claims out there guys that people are just putting out there they're still being researched and I  
39:23  
just um my engineering mind says let's not jump the gun here let's not get  
39:28  
the cart ahead of the horse let's not make regulations before we know what they are um one thing that's been  
39:35  
mentioned is to you know allow them this is a very specific thing like allow them up to 15 feet so that cattle can graze  
39:41  
on them nowhere do they let cattle graze under these because they damaged them cattle are too big that's what they  
39:48  
found out so if we have in our regulation where they can be up to 15 feet high that's on based on something  
39:55  
that's not even real yet and think about a 15 foot high solar panel and think  
40:00  
about the winds that we have in Iowa how much do you think is under the ground to hold it up I know they like to say that  
40:06  
these are movable but really what do they think they're on wheels they're not something has to hold them up right okay  
40:14  
and then just another point I got in trouble last time I got up here with some of our neighbors who  
40:19  
are for it and I just want to say that my position is not against their personal property rights okay the the  
40:26  
way I look at this I am not telling them what they can do with their land they are not just trying to build a greenhouse or hog confinement on their

40:33

property there are large utility companies trying to come into our county and install thousands of acres of

40:39

industrial solar panels these large projects would not happen without government subsidies and just to wind up real

40:46

quickly don't be deceived it's not agriculture it's not good for the county thank

40:52

you oh and can I submit some documents too thank you.

Motion to accept documents by Parker. Second Meister. Motion approved 5-0. Documents available in the appendix.

**Elizabeth Widman**

41:55

My name is Elizabeth Widman and I live at 1665 220th Street Sergeant

42:01

rural Sergeant Bluff and I've been before uh this committee already and one

42:08

of the reasons I came up here is because I want to make a correction on something that I said at one of the meetings I had

42:14

looked at a plat map and took the people that spoke at the meeting and I said

42:20

there were signed agreements uh down by me and Sergeant Bluff which is correct but then I said there were signed

42:26

agreements by Rock Branch and that was not correct because there are not signed agreements right now so I just want to

42:33

correct that there there's interest in putting large utility out there but I

42:38

just wanted to correct that and uh the reason I found that out is because I discovered that in Dan Priestley's

42:45

office they have uh information on all the signed agreements that have been

42:50

done and there's 2,230.72 Acres that have been

42:57

signed up in rural Sergeant Bluff by where I live which is a would be a

43:02

huge uh utility facility put on agriculture land and uh at the last meeting your

43:10

work session you talked about there are unintended consequences to um things that you do

43:18

and in looking online one of the things that happens when you uh change these is

43:24

lawsuits you have lawsuits from people who want to put one in and you didn't

43:31

let them do it with your regulations you have people that don't want them in that

43:37

your regulations made and I think that has to be a consideration because it does cost money for the

43:44

taxpayers to um have legal help to you know defend on these

43:51

lawsuits and uh another unintended consequence um you're basically picking

43:58

and choosing uh among the farmers if you let you know this is just the start

44:03

2,230 Acres go into solar you have um those people that farm they're going to

44:09

be looking for new places to farm and they're going to have an infusion of money from uh these companies that want

44:16

to put in solar and they're going to be looking for new land to rent new land to buy and this will be detrimental for small

44:24

and medium family farmers and new farmers and um so I guess I never stated

44:32

I'm opposed to putting utility solar on ag preservation land I think it belongs

44:39

in the industrial the the way you have it right now and like I said it it kind

44:46

of tires me out to hear people say well in 30 years this can be put back into

44:53

farming I live out in the country I love being out in the country and I said in

44:58

time I will be 97 years old if I'm still around before this would be considered  
45:04  
put back in ag so thank you for all you do and I just ask that you leave um  
45:09  
industrial solar where it belongs and in industrial land  
45:24  
already

### **Jesus Cendejas**

45:35  
Jesus Cendejas, Salix, IA, um just I've been here once before and kind of want to  
45:41  
make the same appeal to you guys today um as a lesser magistrates yourselves and those making this decision as you  
45:47  
guys are informing them um it is it's your it's your duty and and this shows it right there's been a lot of a lot of  
45:53  
discussion on on how we can make this work with the overlays and all that um but  
45:59  
one of the things I would still like for you guys to consider is you know some of us live in morningside some of us live out  
46:05  
in the country so the ones most affected by this are the people that are going to going to be there I know it's been  
46:11  
brought up to you guys the effects on on soil you know if if there is degradation  
46:16  
um you know top soil takes doesn't take a couple of years to restore that takes a long time there's regenerative  
46:22  
practices that could be exercised to speed up that process but it's not going to be overnight um scripture talks about  
46:29  
leaving an inheritance to our children which is not just monetary that's important uh but it's also dealing with  
46:35  
what we have and making it better um so the idea of of again 20 30 years 40  
46:41  
years even depending on if you extend the use of these solar panels like it's not going to be the same thing they're working with right now and so  
46:49  
as you  
46:49  
consider these things um again I know if I don't have to look at it it doesn't bother me because I'm I'm not living  
46:55  
there but there there are many who are there um so again just keep considering that as as not just as how you have this  
47:01  
project come into being but the fact that there are people I mean there's most of them are here a lot of them  
47:07  
aren't um but again there's different interests you know I understand if if I was approached and I had hundreds  
47:13  
thousands of acres and I said we'll give you 20 times more than than leasing it out there's a temptation there I  
47:18  
understand that and again love my neighbors that's one of the things I'm called to do but I just ask that you  
47:24  
would please consider um that it's it's not working around it again someone mentioned these are all models and and  
47:31  
and theoretical concepts that have not been proven and so you cannot alter the the life of people who live there based  
47:38  
on a theoretical concept or a model that's not been proven to be um again you're you're changing much and again  
47:45  
whether you're raising crops for for feed or or for ethanol whatever may be  
47:50  
those things that that are wasted they're actually not wasted a lot of that stuff that's that comes out of you know making an goes to to feeding  
47:58  
animals you know things that that we enjoy eating I like steak you know I like all these things so that's stuff  
48:03  
still being used so it's not just about energy it's about what are we taking away also right you're taking food you  
48:10  
know and we've seen that we've looked at the news when you know all of a sudden all these factories of chickens you know  
48:16  
caught fire or you know or things were destroyed like we know there's there's an attack in our food and again  
48:22  
ultimately um there's there is a I'm not saying that that my neighbors are are  
48:27  
being influenced by this but there is are you guys familiar with the song rich Richmond North of Richmond if not you  
48:33

should go listen to it well there is this idea that there there are ideologies being pushed right and this  
48:39  
whole go green you know that belch and cows are the enemy that's not true but  
48:44  
there is an agenda that that that we're facing there and sub subsidizing these types of things that the government's  
48:51  
paying for would just tell us that it's it's much greater than how we how can we better Woodbury County right so if you  
48:58  
back this up you're also backing up these ideologies that are not just affecting us here but other counties are  
49:04  
attempting to do the same and ultimately a country so consider that as you're making decisions for this and again um  
49:11  
thank you for for your time and um for for listening hearing us  
49:16  
out

**Amy Krogh**

49:38  
My name is Amy Krogh 2381 Port Neal Road Sergeant Bluff Iowa um I'm not  
49:45  
here to say that I'm opposed to solar energy solar energy has its place solar  
49:51  
energy does not have its place on ag preservation ground my husband's family  
49:56  
is a fifth generation farmer we raise cow calf we also do row crop in this area  
50:03  
um so to say that a in Woodbury County is on a decline is not  
50:08  
true um when you take ground and take it out of its intended use which in this  
50:14  
case ag use very rarely does it ever go back into ag use planting cover crops  
50:21  
underneath solar panels is not ag use that might be soil conservation purpose  
50:28  
but it is not AG use I can tell you we raise cattle and there's no way that we  
50:35  
would put cattle underneath of solar panels absolutely no way it's a  
50:41  
non-starter it's not beneficial for the cattle they're going to get hurt it's not beneficial for the solar panels to  
50:47  
have you know 1,500 to 2,000 pound animals running around underneath solar  
50:52  
panels that's actually quite ludicrous to think that anybody would want to do that I would tell you that once ad  
51:00  
ground is gone you guys are worried about tax revenue and the increased revenue when ground comes out of tax  
51:06  
usage you're not only affecting the farmers' income you're affecting the implement dealers the seed dealers the  
51:13  
fuel producers the chemicals the fertilizer companies everybody that goes into making ag work you're dep you're a  
51:21  
detriment to their income and as far as if I'm if correct the way that the tax  
51:27  
revenue comes back to the county is regulated on these solar panels and these solar implementations by the state  
51:34  
in a formula that is state controlled it's not controlled at the county level so at any given time the county or the  
51:41  
state can choose that regulation to change how much actual revenue comes back to Woodbury County that's not in  
51:48  
our control that's at the state level it's no different if if some other state  
51:54  
government group has some special interest and chooses to choose to take that tax revenue and reappropriate it to  
52:01  
another project special pet project than Woodbury County is out when you take ag  
52:07  
ground and take it out of its intended purpose the people that lose is all of  
52:12  
us that choose to have food to eat gas to drive your cars all sorts of  
52:19  
different revenues that would be impacted by taking this and changing this ordinance to allowing this to be on

52:24  
ag ground thank you

**Naomi Widman**

53:01  
okay sorry I had to pass my baby off um Naomi widman 1866 220th Street um rural  
53:09  
Bronson I um my family farms and we also  
53:15  
live right in the area where the proposed um where easements have been  
53:20  
signed for these large scale utility solar farms and so I am not necessarily opposed to solar  
53:28  
I want to make that clear but I want to specifically address um putting overlays  
53:34  
on agricultural protected land so I one thing that is um was  
53:42  
interesting to me I've been to a meeting before and then since then have done a little more research on how solar farms  
53:49  
affect the surrounding um properties and homeowners  
53:55  
um so I just wanted to discuss that a little bit um there was a recent large scale study done in the United States um  
54:02  
it was in 2022 and it shows that solar farms large solar farms do decrease surrounding home  
54:09  
values the study shows that the decrease is not as significant when you average in coastal areas like California  
54:15  
Connecticut when solar farms in your large urban areas so they pulled all of that data and if you Google it it'll say  
54:22  
it doesn't decrease it that much it's only slightly but when you look at the specific data for rural areas in the  
54:30  
midwest from this study where agricultural land was converted into solar farms the decrease in residential  
54:37  
property values is incredibly significant there was a 4 to 5% decrease in values so if you own a \$400,000  
54:46  
acreage out in the country your value could decrease by almost \$20,000 and this decrease in value was noted for  
54:52  
homes within a half mile of the solar farms it wasn't until you got over two  
54:58  
miles away that there was no effect seen and because of this potentially damaging effect it's crucial that Woodbury County  
55:04  
developed solar energy strategically so as to have minimal impact on the  
55:09  
surrounding homeowners and residents so I would encourage you guys to not grant overlays on ag produced land  
55:16  
particularly when it's benefiting a few select individuals and  
55:22  
I think we are all aware of that the easement that of been signed or are by a very small maybe two or three forgive me  
55:30  
if I'm wrong if it's four um people in in our area it's a very  
55:36  
small amount so to to affect all of the surrounding home  
55:41  
owners um and acreage owners just to benefit financially these couple of  
55:48  
individuals or families I think it is is not fair I don't think it's strategic development of solar utilities in our in  
55:56  
our county um so if the county feels it is in the best interest of the general  
56:02  
public um to bring solar energy in and develop that I think it needs to be  
56:08  
strategically developed and not just handpicked out areas in the middle of  
56:14  
Ag land and Grant overlays to these people because they requested them I I don't personally think that makes sense  
56:21  
we have a 20-year development plan that's going to be finished this spring if I would encourage you guys to wait  
56:28  
until that's been finished and then we can visit it in the next development plan and see what would be best for the  
56:34

county and the general public Zellmer Zant: Mrs Whitman your time is up I'm sorry. Widman: okay thank  
56:42  
you

### **Christopher Widman**

57:06  
Ill go I'm Christopher Whitman uh 1866 210th Street Bronson Iowa 51007  
I'm a fifth generation farmer um I love living in the country and I have boys that lord willing I'll put my farm  
57:20  
on to later when they grow up and whatnot and I love that preservation land  
57:25  
and I don't I stand up here saying I don't think that solar utility has a place in ag preservation land um I think  
57:33  
one thing that's kind of stuck out to me is that there's two different kinds of people in the county there's the people  
57:38  
that live in the cities and they're getting their power from MidAmerican Energy there's the other citizens in the  
57:44  
county that they're connected to REC and the reality is you need I mean I haven't  
57:50  
heard anything about what REC is talking about this whether Rec wants it or not some people have gotten up here and said  
57:56  
this is going to save residents money but the reality is if they hook into MidAmerican MidAmerican already has two power plants  
58:04  
in the county and they already have cheap electric if they don't hook into REC basically what we're going to do is  
58:11  
the REC residents they're not going to save any money because they're not getting power from it and so I think  
58:17  
that we just don't need it an ag land because the reality is REC is getting their power from NIPCO and NIPCO needs  
58:23  
to say whether they want this or not um and that the only thing that's really  
58:28  
going to go down for these individuals are their property values and not their power bills and it's not beneficial for  
58:34  
the people out in the county to do this the other thing I would like to also point out is the people that have come to these meetings in the past  
that the  
58:41  
people speaking in for this are the people that have signed contracts that's the reality at the last two meetings on  
58:48  
the 27th there was 13 people that got up and spoke six of them were in favor  
58:55  
one said they like solar but didn't say anything about ag preservation land one said they lived they were for it but  
59:00  
they lived in Monona County there were two representatives from energy companies and there were two land owners  
59:08  
and those land owners have signed contracts that I have right here that are public  
59:13  
information then the next meeting came on January 17th those two same land  
59:19  
owners showed up for it and here's their signed contracts again and the reality  
59:26  
is the public isn't really for this we don't have a lot of people showing up saying we want utility solar and a  
59:32  
preservation land the reality is we have these few residents that have signed  
59:38  
contracts and they want to make big out of it I think we need to tell them we have a 20 years owning plan let's stick  
59:44  
to it they need to sell their a land and go buy industrial land and if they love solar so much then they need to do that  
59:52  
and I'm sure that these individuals are going to come back up here after m tonight and they're going to tell you how great it is for the county but I  
59:59  
would like to submit this to the record these are public information's signed easement contracts with names of who has  
1:00:08  
these easements signed I'd like to Smith this to the  
1:00:13  
record

Motion to accept documents by Meister. Second Bride. Motion approved 5-0. Documents available in the appendix.

### **Tom Jochum**

1:00:49

Good afternoon I'm Tom Yokum 422 Huntington Drive Sergeant Bluff

1:00:55

Iowa and uh you know you've got a big decision there's a lot of pros and a lot of cons to this um I'm for

1:01:03

it okay as at the September 26 Board of Supervisors meeting Supervisor Taylor

1:01:09

and Nelson revisited considering allowing utility scale solar and discuss the two

1:01:16

different options were explored the discussion began with the possibility of reclassifying certain farmland to light

1:01:22

industrial which could basically take land out of agricultural preservation Mr

1:01:28

Priestley introduced the concept of renewable energy overlay which he stated would be situational and on a case by

1:01:35

case basis Mr Priestley also stated that this would allow for the preservation of farmland while still

1:01:41

allowing for solar while the supervisor's consideration for the light industrial could be applied I think the

1:01:48

overlay concept would be more appropriate especially at a time when research at our land grant

1:01:54

universities are studying the possibility of certain agricultural practices within the solar arrays

1:02:00

additionally when the solar lease expires the land and the overlay will revert back to agricultural production

1:02:07

in reality this is very similar to the 10 15 or 30-year CRP contracts that the

1:02:13

Farm Services Agency offers which is that when the CRP lease

1:02:19

expires the Farmland can go back into agricultural production the same as when a the solar lease expires according to

1:02:26

the map that was published in the packet there are about 330 Acres that are in the CRP program and are already out of

1:02:34

production so I do support adopting the renewable energy overlay for the AP Zone

1:02:40

as it will also allow for the land to return to production thank

1:02:48

you

### **Greg Jochum**

1:03:30

uh Greg Yokum 1629 270th Street um I'm

1:03:36

in favor of the overlay on ag preservation uh main reason once if it

1:03:43

is zoned industrial or anything else it cannot go back into agricultural

1:03:48

production everything else can be um it can be changed if it if it stays ag

1:03:55

preservation with an overlay I think that would be the optimum uh for the

1:04:02

county um I am uh a farmer I have um as

1:04:07

you probably will be looking at uh those leases I have a signed lease um it

1:04:14

doesn't say it's going to go in it still has to go through many many steps of approval before it can get approved um

1:04:22

this is just a first step in the process um I guess uh um there is power

1:04:31

lines transmission lines that go through my property two ways it goes through all the properties that's what they look at

1:04:39

and you know with Mid America looking at there being here in support of it with

1:04:44

the two power plants that they have and eventually um they'll be shutting one of

1:04:50

them down for sure um there is going to be a need for power power and uh um I

1:04:57

see as a great um benefit for the county to have

1:05:04  
this um and that's all I have to say thank you for your time and your consideration thank  
1:05:15  
you

**Elizabeth Cendejas**

1:05:34  
I'm Elizabeth Cendejas from Salix Iowa um and  
1:05:41  
I just want to read an article here by Robert Bryce you can find it on Forbes website it's called build it and they  
1:05:47  
won't come and Iowa farmer explains backlash against big solar it explains  
1:05:53  
some of the concerns that I have about big solar farming in this article we hear from Jessica Peterson a sixth  
1:05:59  
generation farmer from Benton County Iowa she talks about her family fight against solar project being pushed by  
1:06:06  
Chicago based in energy she says the land that this project is proposed on is  
1:06:11  
in the top 10 to 15% of farmland in the state of Iowa and is recognized as  
1:06:16  
nationally significant which the state of Iowa possesses a large amount of when it  
1:06:22  
comes to nationally significant prime agricultural land they are project  
1:06:27  
projecting this to be the largest utility scale solar project in the state as well as the largest battery storage  
1:06:32  
facility in the state of Iowa this project will most likely set a precedent for the entire state of Iowa  
1:06:39  
when it comes to utility scale solar there is strong opposition to this project from the community for a large  
1:06:45  
number of reasons there are people who have concerns about property value losses lack of mindfulness when it comes  
1:06:51  
to sifting uh sighting of the plant and the productivity of the soil they are citing solar panels on choking out small  
1:06:58  
town growth wildlife concerns taking away land from farmers who rent land for their livelihoods of farming drainage  
1:07:04  
issues while with tile damage lack of fire and disaster recovery plans lack of  
1:07:10  
proper setbacks from people's properties the county requires minimum of 50 feet from a property line the mental health  
1:07:17  
component with the construction phase and those who live amongst the project hurting small businesses and towns and so on homes in and  
around the small  
1:07:24  
towns are already not selling as quickly as they once were due to the possibility of this project coming to fruition  
1:07:30  
renewable promoters claim that industrial scale solar will not hurt property values or the growth of the towns it will impact but we are already  
1:07:37  
seeing the re repercussions of it even before the project has been started people in the area are truly truly  
1:07:44  
living through a nightmare knowing that this may be the largest solar plant project in our beautiful state of Iowa  
1:07:51  
there are some that are finding out that they have the possibility of being being surrounded by solar panels on two three  
1:07:56  
if not all four sides of their properties we do see this as a community station statewide and nationwide  
1:08:03  
crisis the World Bank reports that the US has 18% arable land to grow crops on  
1:08:09  
our productive soil is Iowa's biggest asset and our most important natural resource that we have in this state and  
1:08:14  
to see industrial scale solar proposed on such rich soil is incredibly heartbreaking and  
1:08:20  
irresponsible they proposed that the land will be farmable when a project is decommissioned in 35 to 50 years but  
1:08:27  
there is no proof that that of that as there is not a solar project that has been decommissioned from productive  
1:08:33  
farmland after that long we also do not believe that industrial scale solar  
1:08:38  
projects belong where people live in surrounding communities that want to grow and prosper we are fighting for



1:08:44

much more than that we are fighting for the potential of the future of farming in Linn County and in our state the

1:08:49

ability for our community to live in a symbiosis with each other again the growth of smalltown Iowa the businesses

1:08:55

they want that want to stay successful in small communities the mental and physical health and safety of the people

1:09:01

who live here and their overall well-being the access of affordable energy to Consumers and so much more

1:09:07

Elizabeth thank you those are some concerns that that community had and I believe there are some that we have as

1:09:14

well thank you

#### **Ann Johnston**

1:09:50

Ann Johnston Salix, Iowa um someone made a reference to CRP

1:09:59

land as CRP land does not have millions of ugly solar panels that need to be

1:10:05

disposed of when the years out of production are

1:10:10

up and may I also remind the panel and the people here that the solar

1:10:18

panels are made by women and children who who are

1:10:24

physically and sexually molested in the Chinese Communist land of

1:10:34

China

#### **Shari Zenor Kiple**

1:11:22

Hi I'm Shari Zenor Kiple I live at 811 Cottonwood Trail in Sergeant Bluff

1:11:27

my parents uh farm south of Merville and really wanted to be here tonight but could not so I would just like to

1:11:33

reiterate all of the things that from that Forbes article fully agree with that and I would just like to say that just because you call it a solar farm

1:11:41

doesn't mean that it has any like calling it a farm is crazy because you

1:11:46

can't and saying that it can go back into ag use after 30 or so years

1:11:52

doesn't mean you can wave a magic wand and then all of the damage that's been done or all of the the things that have

1:12:00

been um introduced into that Farmland that those will just go away that will still be there right it doesn't just it

1:12:07

doesn't just go away and it's not really a fair comparison as she had just stated too to compare it to CRP and say oh you

1:12:13

can have CRP ground and it you know after its lifespan it goes back into ag ground it's natural things that are in

1:12:21

the ground as I understand my dad farms and I'm not fully into farming as much as uh he

1:12:26

probably wished that I would have been but I do get that and I think that that that comparison to um to say that a

1:12:33

solar a solar farm can be converted back into ag use after that time it's not a

1:12:40

comparison um to CRP at all um because you can't just wave a magic wand and have all that damage undone so I think

1:12:47

all of the things that were have been stated about small small town life and

1:12:53

all the things that make our state and our county so rich you know this is all

1:12:58

about integrity and it's about the Legacy we want to leave for our kids and is

1:13:04

it is that really worth um is it really worth it I guess would be something to

1:13:10

consider I thank you for your time

#### **Chris Zellmer Zant**

thank  
1:13:17  
you anyone else  
1:13:33  
going once going  
1:13:39  
twice going three times we need a motion to go out of the  
1:13:46  
public hearing

Parker motioned to close public hearing. Second by Hanson. Carried 5-0.

Bride inquired with Priestley about the overlay process. Priestley explained that the overlay would be reviewed by the Zoning Commission and considered for approval by the Board of Supervisors to determine if a particular area of ag land was suitable or not for solar. Bride explained he prefers the conditional use permit (CUP) option which would give more review from rural board members. The two Boards (Zoning Commission and Board of Adjustment) are, by law, composed of members residing in the rural, unincorporated areas of Woodbury County. A CUP review by both boards would be done by all committee members residing in the unincorporated areas of community, as opposed to the Board of Supervisors which has all but one member from the rural community. Although there has been leases for land, no companies have submitted applications for permits to the zoning department. Bride is aware that land in General Industrial (GI) may be limited, a 2-mile setback from the city limits would take some available land for commercial scale solar.

Zellmer Zant also pointed out an overly district would only involve Zoning Commission and Board of Supervisors.

Priestley addressed Tom Treharn's comments and offered an extended explanation about the utility-scale solar debate. Priestley touched on a number of issues including a history of the 2005 comprehensive plan and the development of the 2008 zoning ordinance which placed emphasis on the permitting of electrical energy generation facilities in industrial zones. Priestley discussed the lead up to the 2040 comprehensive plan which has included minimal input about the permitting of renewable energy assets. Priestley discussed how the proposed map most reflects the 2005 comprehensive plan. He also discussed the challenges with changing zoning ordinance with a different permitting mechanism that is much different than the existing conditional use process. Priestley summarized the rationale for the debate and pointed to the importance of appreciating the possibility of unintended consequences. Priestley pointed to the importance of the comprehensive plan in the creation of ordinance and the assessment of what the public wants.

Zellmer Zant pointed out that 14 counties in Iowa have utility-scale ordinances and this is new grounds with a lot of information to still be learned.

Bride stated the future land use map that was put together in 2005 must have been fairly accurate, since the new draft map is virtually the same. When looking ahead 20 years, there will probably be a need to allow solar or community solar, although how it will fit and where it will need to be determined. Setbacks will be one factor in where they could be placed. The concern with the overlay plan is that it takes the decision-making away from the unincorporated residents who could serve on the board and places it with the Supervisors who might reside in the incorporated areas.

Meister remarked it has been a long process, many have been brave and spoke up. It is a hard decision, dealing with new information to review. Meister cited his previous service on the Board of Adjustment and indicated that he trusts the conditional use permit process and agrees it should also be involved in the review and permitting process. He indicated a preference toward the first option that facilitates the conditional use permit procedures.

Parker offered her appreciation for the public comments. Parker would like to see the process continue as it is with the first conditional use permit option. She indicated that there is a lot to be learned and we need to move forward and follow the comprehensive plan to assure compatibility.

Hanson thanked the public in attendance and referenced his recent appointment to the Zoning Commission by the Board of Supervisors and stated this is his first regular meeting in addition to the works session that was held on January 17. Hanson indicated that he is not in favor of only allowing utility-solar in the industrial areas. The decision will impact not only direct agriculture but also ag related goods and services. Land in GI that solar may

take would possibly be needed for other uses. Hanson indicated that going into the meeting he considered the overlay district as a way to go but would like to wait until the new development plan is reviewed and possibly modified to determine the best path. With the Land Use Map of 2005 being virtually the same as proposed new map, the overlay district for utility solar farms may change the environment for future land use maps. With public involvement, more information needs to be discussed.

Zellmer Zant pointed out much work has been put into the new comprehensive plan. Two-three years and several public hearings. Zellmer Zant indicated that it was a long process and the public has been encouraged to provide comment.

Erin Berzina and Corinne Erickson from SIMPCO stated the planning for the Comprehensive Plan began with a public survey, they attended Woodbury County Fair collecting surveys. They have received 400-450 responses. Started developing goals and objectives. Published and hosted open houses to discuss the plan in Hornick, Anthon, Merville, and Sergeant Bluff. Turnout was low. Have continued to accept public comments.

Bride has seen issues destroy connections with neighbors and friends, such as with the wind turbine debate. Does not want that to happen with this issue.

Zellmer Zant asked Commissioners, after all the information presented and public comment, if they were ready to make a motion.

Bride stated a CUP in AP district was first talked about, now he would recommend approval of the conditional use permit for industrial areas only. He indicated that he doesn't believe we are ready to make the change above that without some further thought and information.

Bride made a motion to approve the conditional use permit for industrial areas only and strengthen that with some other conditions including that it be sent back to the Zoning Commission prior to being officially approved and the opportunity for the county attorney to review. Priestley asked for clarification that the motion entails a conditional use permit in the general industrial with the condition that staff and the county attorney's office go through it and bring it back to the Zoning Commission for another public hearing. Parker seconded the motion. Motion carried 4-1. Hanson made a statement that "I don't disagree that they should be allowed in industrial zoned properties. I also think they can be allowed in other zoning districts with further analysis..."

### **Public Hearing for Proposed Woodbury County Comprehensive Plan 2040**

Erin Berzima and Corinne Erickson presented an overview of the goals and priorities of the 2040 Comprehensive Plan. The public has been highly encouraged to provide input. The plan is a vision for the future of Woodbury County, not policy, and will be in place. They have met with a steering committee, county departments and public to assemble goals and objectives for the next 20 years. Meeting attendees were encouraged to pick up a summary of the information they have put together.

David Linn stated he feels the green, (open space for parks) is excessive.

Doyle Turner stated acreages that are on farm to market roads (residential) are turning into city streets. There needs to a limit to residential on farm to market routes.

### **Motion to Close Public Hearing**

Motion by Hanson close the public hearing. Second by Parker. Carried 5-0.

Bride thanked SIMPCO for their time and consideration. Wants to clarify that Map is not Zoning, just potential Land Use.

### **Items Not on Agenda**

None

### **Commissioner Comment of Inquiry**

None

**Staff Update**

Priestley noted that a public hearing about the comprehensive plan will be schedule at a later date. Once approved by the Zoning Commission, the Board of Supervisors will likely schedule three public hearings for the considerations. Priestley announced that the draft floodplain maps will take effect on July 17, 2024. This will required the county to undertake some amendments to the floodplain regulations in the zoning ordinance.

**Adjourn**

Motion to adjourn by Meister. Second by Parker. Approved 5-0.

# APPENDIX

**Daniel Priestley**

---

**From:** Dougherty, William (MidAmerican) <William.Dougherty@midamerican.com>  
**Sent:** Friday, January 19, 2024 11:00 AM  
**To:** Daniel Priestley  
**Subject:** RE: [INTERNET] Revised Comments Requested on Utility-Scale Solar for Public Hearing and Work Session  
**Attachments:** 2024-01-17\_DRAFT Solar Ordinance\_packet\_zoning\_commission\_MEC Comments.pdf

**CAUTION:** This email originated from **OUTSIDE** of the organization. Please verify the sender and use caution if the message contains any attachments, links, or requests for information as this person may NOT be who they claim. **If you are asked for your username and password, please call WCICC and DO NOT ENTER any data.**

Dan,

Please see MidAmerican's attached comments to the draft section addressing Utility-Solar Energy Systems Overlay District. Please let me know if you have any questions. I will be in attendance at the meeting on Monday, January 22. Thanks and take care.

Will Dougherty, P.E.  
Project Developer  
O: 515-242-4383  
C: 515-587-7255



**From:** Daniel Priestley <dpriestley@woodburycountyiowa.gov>  
**Sent:** Wednesday, January 10, 2024 12:48 PM  
**To:** Daniel Priestley <dpriestley@woodburycountyiowa.gov>  
**Subject:** [INTERNET] Revised Comments Requested on Utility-Scale Solar for Public Hearing and Work Session  
**Importance:** High

**THIS MESSAGE IS FROM AN EXTERNAL SENDER.**

Look closely at the **SENDER** address. Do not open **ATTACHMENTS** unless expected. Check for **INDICATORS** of phishing. Hover over **LINKS** before clicking. [Learn to spot a phishing message](#)

**To:** Woodbury County Stakeholders

**From:** Daniel J. Priestley, MPA – Woodbury County Zoning Coordinator

**Date:** January 10, 2023

**Subject:** Zoning Commission Public Meetings for Consideration of Utility-Scale Solar Energy Systems in Unincorporated Woodbury County

**Due to a change, please disregard the previous email. This email has the correct hyperlinks. Please disregard the previous email.**

Please offer any written comments or concerns you might have about utility-scale solar energy systems zoning ordinance amendment proposals that are going before the

Woodbury County Zoning Commission for consideration. You can access information about the proposals by visiting the following link:

[https://www.woodburycountyiowa.gov/files/committees/meetings/2024-01-17\\_packet\\_zoning\\_commission\\_958.pdf](https://www.woodburycountyiowa.gov/files/committees/meetings/2024-01-17_packet_zoning_commission_958.pdf). Beginning on page 2, you will find a preliminary staff report that is inclusive of the contents of the utility-solar discussions up through this date. Below, please find the meeting schedule. If you wish to submit written comments, please send them to us no later than January 19 before 11:00 AM CST. Please let me know if you have questions at 712-279-6609 or by replying to this email.

The **Woodbury County Zoning Commission** will hold a **“Work Session”** on **January 17, 2023** and a **“Public Hearing”** on **January 22, 2023** to consider zoning ordinance amendments about the regulation of utility-scale solar energy systems in the unincorporated areas of **Woodbury County**. Both meetings will start at **5:00 PM** at the **Woodbury County Courthouse, 620 Douglas Street, Basement Board of Supervisors Meeting Area**.

#### **Meetings:**

- **Work Session** – Wednesday, January 17, 2023, 5:00 PM, Woodbury County Courthouse, 620 Douglas Street, Basement - Board of Supervisors Meeting Area.
  - Meeting Agenda and Backup Materials (Download):
    - [https://www.woodburycountyiowa.gov/files/committees/meetings/2024-01-17\\_packet\\_zoning\\_commission\\_958.pdf](https://www.woodburycountyiowa.gov/files/committees/meetings/2024-01-17_packet_zoning_commission_958.pdf)
- **Public Hearing** - Monday, January 22, 2023, 5:00 PM, Woodbury County Courthouse, 620 Douglas Street, Basement - Board of Supervisors Meeting Area.
  - Meeting Agenda and Backup Materials (Download):
    - [https://www.woodburycountyiowa.gov/files/committees/meetings/2024-01-22\\_packet\\_zoning\\_commission\\_6695.pdf](https://www.woodburycountyiowa.gov/files/committees/meetings/2024-01-22_packet_zoning_commission_6695.pdf)

**Again, please respond to this email with any comments or documentation that you would like to offer the Zoning Commission on the subject.**

Please let me know if you have questions via email reply or via phone at 712-279-6609.

**Please reply with your comments on or before January 19, 2024 before 11:00 AM.**

Respectfully,

-----

**Daniel J. Priestley, MPA - Zoning Coordinator**  
**Woodbury County Community & Economic Development**  
620 Douglas Street, 6<sup>th</sup> Floor  
Sioux City, IA 51101  
Office: (712) 279-6609  
Fax: (712) 279-6530  
Email: [dpriestley@woodburycountyiowa.gov](mailto:dpriestley@woodburycountyiowa.gov)  
Web: [www.WoodburyCountyCED.com](http://www.WoodburyCountyCED.com)

## Section 5.09: Utility-Scale Energy Systems Overlay Districts

### 1. Utility-Scale Solar Energy Systems Overlay District (US-SESOD)

- A. **Purpose and Intent.** The Utility-Scale Solar Energy Systems Overlay District (US-SESOD) is intended to be mapped as an overlay of the Agricultural Preservation (AP) Zoning District. The US-SESOD zone is intended to allow for the orderly development of utility-scale energy projects including utility-scale solar energy systems, community solar systems, and agrisolar or agrivoltaic systems. This section establishes an overlay district that serves the following purposes:
- (1) To provide a reasonable and thoughtful balance to limited development and use of utility-scale energy systems in the AP Zoning District.
  - (2) To encourage the continued role of agriculture as the primary economic sector in the unincorporated areas of Woodbury County and the continued preservation of its rural character.
  - (3) To encourage development that conforms to the vision, goals, and policies in the Woodbury County Development Plan.
  - (4) To encourage sustainable and energy efficient development and reasonable access to renewable energy not limited to solar.
  - (5) To maintain or enhance soil health for future agricultural use after project decommissioning.
- B. **Jurisdiction.** This Ordinance is adopted by the Woodbury County Board of Supervisors and governs all lands within the unincorporated areas of Woodbury County, Iowa. This Ordinance and its provisions shall not apply to those properties or projects occurring within the incorporated cities of Woodbury County.
- C. **Applicability.** It shall be unlawful to construct, erect, install, alter or locate any US-SES within unincorporated Woodbury County, without first obtaining a Conditional Use Permit from the Woodbury County Board of Adjustment and the associated agreements from the Woodbury County Board of Supervisors or obtaining rezoning to the US-SESOD as outlined in this Ordinance.
- (1) No application for a US-SESOD shall be granted without first submitting all required information and documentation, and paying all associated fees to the County.





- D. **Zoning Ordinance Map Amendment (Rezone) Required.** In addition to all submittal requirements of Section 2.02.4 of this Ordinance for a Zoning Ordinance Map Amendment, this Section sets the requirements specific to the US-SESOD.
- E. **Geographic Location and Area Limitations.** The US-SESOD shall be geographically located in those areas currently zoned Agricultural Preservation (AP). The US-SESOD shall be capped to 9,500 acres over the Agricultural Preservation (AP) Zoning District. No more than 9,500 acres shall be established as the overlay of the Agricultural Preservation (AP) Zoning District. Each granted Zoning Ordinance Map Amendment (rezone) shall reduce the cap by the number of acres approved in each rezone until the original cap is reduced to 0.
- F. **Allowed Uses.** The specific land uses allowed as principal allowed, conditional and accessory in the AP Zoning District are allowed in the US-SESOD in addition to the following use(s) which are hereby established as allowed uses:
- (1) Utility-Scale Solar Energy Systems (US-SES)
  - (2) Community Solar Systems
  - (3) Utility Agrisolar Systems
- Concentrating solar power systems are prohibited.
- G. **Dimensional Standards.** Section 3.04 includes a table of comparative dimensional standards for all zones. The dimensional standards of the AP Zoning District shall apply to the US-SESOD unless otherwise stated in this Ordinance.
- H. **Supplemental regulations.** All pertinent provisions of Article 5, Supplemental Regulations, shall apply to uses and development in the US-SESOD.
- I. **Major Site Plan Required.** A major site plan shall be submitted and reviewed prior to the approval of a utility-scale solar installation. The area to be used for the utility scale solar installation shall require rezoning to the US-SESOD.
- J. **Notification Requirements.** To assist in providing adequate notice to interested parties, the application for a Zoning Ordinance Map Amendment (Rezone) to the US-SESOD shall:
- (1) Within 14 days of filing the rezoning application with the Woodbury County Community and Economic Development Department, mail a notice via first class mail to property owners and tenants within one (1) mile of the subject site explaining the request and identifying the subject property.

- (2) Prior to the application being heard at the Planning and Zoning Commission meeting, the applicant shall host a public informational meeting held at a location reasonably accessible to all identified property owners.
- (3) Applicants must mail a notice of the public informational meeting via first class mail to property owners and tenants within one (1) mile of the subject site.
- (4) Applicants must submit a certified abstractor listing of the names and mailing addresses of all owners of real property lying within one (1) mile from the subject property with their application materials as required in this Ordinance.

#### **K. Review and Decision-Making Process**

- (1) **Evaluation Criteria.** The Planning and Zoning Commission shall base their recommendation and the Board of Supervisors shall base their decision on the requested zoning ordinance map amendment to the US-ESO on the following criteria:
  - (a) The proposed US-SESOD will be in harmony with the general purpose and intent of this Ordinance and the goals, objectives and standards of the general plan.
  - (b) The proposed US-SESOD will not have a substantial or undue adverse effect upon adjacent property, the character of the neighborhood, traffic conditions, parking, utility facilities, and other factors affecting public health, safety and general welfare.
  - (c) The proposed US-SESOD will be located, designed, constructed and operated in such a manner that it will be compatible with the immediate neighborhood and will not interfere with the orderly use, development and improvement of surrounding property.
  - (d) Essential public facilities and services will adequately serve the proposed US-SESOD.
  - (e) The proposed US-SESOD will not result in unnecessary adverse effects upon any significant natural, scenic or historic features of the subject property or adjacent properties.
  - (f) The proposed use or development, at the particular location is necessary or desirable to provide a service or facility that is in the public interest or will contribute to the general welfare of the

neighborhood or community.


- (g) All possible efforts, including building and site design, landscaping and screening have been undertaken to minimize any adverse effects of the proposed use or development.
- (h) Compatibility and conformance with the policies and plans of other agencies with respect to the subject property;
- (i) <sup>1</sup> Consideration of the Corn Suitability Rating 2 (CSR2) of the <sup>2</sup>  <sub>3</sub> property;
- (j) Consideration of a slope no greater than 10%;
- (k) Compatibility with other physical and economic factors affecting or affected by the proposed US-SESOD;
- (l) Conformance with Woodbury County Utility Scale Solar Scorecard. All projects shall meet the minimum passing threshold of 100 Points in the Woodbury County Utility Scale Solar Scorecard, as enumerated below:
  - (i) Planned percent of native species of the entire site's vegetative cover:
    1. 25-35%, +12 points
    2. 36-50%, +20 points
    3. 51-65%, +28 points
    4. 66-80%, +36 points
    5. >80%, + 40 points
    6. <25%, + 0 points
  - (ii) Planned number of species in entire site's vegetative cover:
    1. 5-9 species, +8 points
    2. 10-15 species, +12 points
    3. 16-19 species, +16 points
    4. >20 species, +20 points
  - (iii) Site Planning and Management
    1. Site has approved vegetation management plan, +20 points
    2. Site has approved agricultural impact mitigation plan, +20 points
  - (iv) <sup>4</sup> Percent of site in a medium (65-82) CSR2 area <sup>5</sup> 
    1. 10-15%, -2 points
    2. 26-50%, -3 points

# Summary of Comments on 2024-01-17\_packet\_zoning\_commission\_958.pdf


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 Number: 1 Author: t26100 Subject: Highlight Date: 1/17/2024 10:47:03 AM


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 Number: 2 Author: t26100 Subject: Sticky Note Date: 1/17/2024 9:20:14 AM

MidAmerican would recommend striking CSR2 as a consideration. The draft 2040 Comp Plan does not contain any mention of CSR2, or what an objective cutoff for consideration may be. This consideration is highly subjective and could be contested by any submitting or opposing party that disagrees with the Zoning Commission's or Board's view.

 Number: 3 Author: t26100 Subject: Highlight Date: 1/17/2024 10:47:05 AM

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 Number: 4 Author: t26100 Subject: Highlight Date: 1/17/2024 10:47:09 AM

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 Number: 5 Author: t26100 Subject: Sticky Note Date: 1/17/2024 9:35:13 AM

There is no grading system for if there are portions of land over a CSR2 of 82. How will the county handle any project that contains lands of CSR2 over 82, no matter the percentage of the overall site?

 Author: t26100 Subject: Sticky Note Date: 1/19/2024 10:46:09 AM

Again, MidAmerican would recommend striking CSR2 as a consideration.

---

3. 51-75%, -4 points

4. >75%, -5 points

(v) Percent of site in a low (<65) CSR2 area

1. 10-15%, +6 points

2. 26-50%, +8 points

3. 51-75%, +10 points

4. >75%, +12 points

(vi) Number of agrivoltaics practices on site

1. 1 practice, +5 points

2. 2 practices, +10 points

3. >2 practices, + 15 points

4. No practices, 0 points

(vii) Planned percentage of the entire site's vegetative cover than includes flowering plants

1. 10-25%, +4 points

2. 26-50%, +8 points

3. 51-75%, +12 points

4. >75%, +16 points

5. No flowering plants, -15 points

(viii) Planned seasons with at least three blooming species present

1. Spring (April – May), +5 points

2. Summer (June – August), +5 points

3. Fall (September – October), +5 points

(ix) Percentage of site that is graded

1. 0-10%, +20 points

2. 10-30%, +10 points

3. 30-50%, 0 points

4. >50%, -10 points

(x) Increased Setbacks

1. No non-participating dwellings within 300' of project boundaries, 0 Points

2. No non-participating dwellings within 500' of project boundaries, +30 points

3. No non-participating dwellings within 750' of project boundaries, +35 points

4. No non-participating dwellings within 1000' of project boundaries, +40 points

5. No non-participating dwellings within 1250' of project boundaries, +45 points

(xi) Average Solar Height

1. >24", +5 points
2. >26", +10 points
3. >28", +15 points
4. >30", +20 points
5. >32", +25 points

(xii) Exceptional Good Neighbor Practices

1. Good neighbor payments for adjacent non-participating landowners, +10 points
2. Good neighbor payments for tenant farmers displaced by the project, +10 points
3. Agreement to source labor locally, +15 points.

(m) Any other relevant factors.

- (2) **Planning and Zoning Commission Recommendation.** The Planning and Zoning Commission shall review and make a recommendation on the proposed US-SESOD to the zoning district map as follows:

(a) **Hearing required.** The Planning and Zoning Commission shall conduct a public hearing on the proposed US-SESOD in accordance with this Ordinance.

(b) **Notification.** Public notification of the Planning and Zoning Commission hearing on the proposed US-SESOD of the official zoning map shall be as required by subsection 2.02-1. B(1). Such notices shall provide information on the time, date, and location of the hearing and a brief description of the proposed change to the US-SESOD.

(c) **Time Limit for Recommendation.** A recommendation to the Board of Supervisors for approval, approval with conditions or disapproval on the proposal, shall be made within 35 days of the conclusion of the public hearing unless the petitioner consents to an extension of time. If no recommendation is made within 35 days from the conclusion of the public hearing, the issue will be forwarded to the Board of Supervisors with no recommendation.

- (3) **Board of Supervisors Action.** Following receipt of the recommendation of the Planning and Zoning Commission, the Board of Supervisors shall consider and act upon a proposed amendment to the zoning district map

as follows:

- (a) **Hearing Required.** The Board of Supervisors shall conduct a public hearing on the proposed US-SESOD in accordance with the procedures outlined in this Ordinance.
- (b) **Notification.** Public notification of the Board of Supervisors hearing on the proposal shall be as required in this Ordinance.
- (c) **Decision.** Following the public hearing, the Board of Supervisors may:
  - (i) Defer consideration of the proposal; or
  - (ii) Reject the proposal; or
  - (iii) Proceed subject to subsections (iv) and (v) below, to adopt an ordinance approving the amendment to the zoning district map.
  - (iv) **Super majority required.** A 60 percent majority of the Board of Supervisors shall be required to adopt the proposed amendment of the US-SESOD if the owners of more than 20 percent of either (a) the area of the subject property or (b) the area or real property lying within 500 feet of the subject property file a written objection prior to the conclusion of the public hearing.
  - (v) The Board of Supervisors may impose restrictive conditions upon approval of an amendment to the US-SESOD if, before the conclusion of the public hearing, the owner agrees to the conditions in writing.

**L. Application Materials.** In addition to all submittal requirements of a major site plan, the Zoning Ordinance Map Amendment (Rezone) application, and the US-SESOD, the application for a utility scale solar installation shall include the following information on the site plan or in narrative form, supplied by the utility scale solar installation owner, operator or contractor installing the structures:

- (1) The name and address of the applicant, as well as the proposed owners or operators of the project, including the contact information (name, address, telephone and email) of their authorized representatives. The application shall designate the entity who would be the permit holder of the conditional use permit and building permit.

- (2) Documentation of the applicant's legal control over the private property necessary for the project, signed by the property owner. Such legal control must vest in the permit holder of the Conditional Use Permit at the time of its issuance.
- (3) A certified abstractor listing of the names and mailing addresses of all owners of real property lying within one (1) mile from the subject property shall be provided with the application.
- (4) A plat of survey showing the parcels on which the utility-scale solar structures and associated assets will be included in the project area.
- (5) Legal descriptions of all properties, leased and/or owned, identified to be part of the project area.
- (6) A Development Plan including:
  - (a) Project timeline. Project timeline showing how the site will be developed from beginning to end.
  - (b) Site plan. A professionally prepared site plan drawn to scale shall showing the location and spacing of every solar panel/array, all other facilities to be constructed and associated with the project, and all existing assets located in the project area. Specifically, the site shall include:
    - (i) North arrow and scale.
    - (ii) Property lines and physical dimensions of the project area.
    - (iii) Setback locations from the property line locations clearly marked for the applicable Zoning District.
    - (iv) Location of the right-of-way.
    - (v) Location and layout of vehicle parking, loading and queuing areas, street accesses, and driveways.
    - (vi) Easements present on the property including those for utilities.
    - (vii) Total number, location and spacing with dimensions (length, width, & height) of solar panels/arrays and all other supporting structures including the distances from the property lines and other structures.



- (viii) Location with dimensions (length, width, & height) of existing structures and distances from the property lines and other structures.
  - (ix) Location of underground and/or overhead electric lines.
  - (x) Location of field tile.
  - (xi) Location of well.
  - (xii) Location of the sanitary infrastructure (e.g. – Septic tank and system).
  - (xiii) Location of topography lines (2 foot contours).
  - (xiv) Flood hazard area designations.
  - (xv) Such other information as the Zoning Director may require to determine compliance with the provisions of this and other Woodbury County Ordinances.
- (c) Structure Plans. Architectural and/or engineer plans and specifications prepared pursuant to the acceptable professional standards.
- (d) A map showing the separation distances of the project area from adjacent property lines; occupied residences; unoccupied non-residential buildings; public rights-of-way; public drainage districts; public conservation areas; cemeteries; city limits; airports (public and private); lakes; and permanent water courses.
- (e) Setback analysis showing the minimum setback requirements, or any agreed on greater setback provisions, are met by the project.
- (f) Grading plan. This plan shall include all proposed changes to the landscape of the site (e.g., clearing, grading, topographic changes, tree removal, etc.). The plan shall include soil erosion and sediment control considerations and storm water management practices as referenced in this Ordinance. A storm water pollution prevention plan (SWPPP) and permits from the Iowa Department of Natural Resources and other applicable government bodies must be submitted.
- (g) Geotechnical report. A site-specific geotechnical report shall be submitted by a professional licensed engineer qualified in the field of geotechnical engineering, registered in the State of Iowa, and

prepared in accordance with generally accepted geotechnical and environmental engineering practices to assess the potential risk of slope instability or landslide for the proposed development in its existing and post developed state.





- (h) Floodplain data. Development within the Special Flood Hazard Area (SFHA) shall comply with federal, state, and local regulations. Proposals for the US-SESOD shall include base flood elevation data for the footprint of the project area. Proposals shall also include the elevation of the proposed development site (natural ground).
- (i) Utility plan. Planned location of all utilities, including underground or overhead electric lines.
- (j) Landscaping/Screening plan. Planned location of all plants and screening.
- (k) Road Impact Analysis. An inventory of the existing road network to be utilized for construction and maintenance of the facility and details on how the project will impact those roads over the life of the project, including during installation and decommissioning.
- (l) Interconnection agreement. Provide the interconnection agreement with the utility company.
- (m) Operation and Maintenance Plan.
- (n) Decommissioning plan.
- (o) Agricultural Impact Mitigation Plan.
- (p) Vegetative Management Plan.
- (q) Wildlife/Biological Habitat Assessment & Mitigation Plan.
- (r) Setback analysis showing the minimum setback requirements, or any agreed on greater setback provisions, are met by the project.
- (s) Emergency Response Plan.
- (t) Any Federal Aviation Administration (FAA), or other federal, state, or local permits or approvals that are necessary for the project. Applicant shall submit a copy of the actual permit, or proof that the permit has been filed with the appropriate agency.

- (u) Such additional information as the County may request due to the unique circumstances with the project.
- (v) Any other information necessary to describe the intended development plan. Applicants are encouraged to have on-going discussions with the county zoning staff, county engineer, and other associated county departments during the preparation of the application.

**M. Site and Structure Requirements.**

(1) Setbacks. Setbacks for all structures (including solar arrays) must adhere to the minimum principal setback standards for the zoning district where the project is located in addition to dwelling and stream corridor setbacks unless otherwise specified in this Ordinance.

Separation Distances (Setbacks). All US-SES, accessory structures and any upgrades to existing solar energy systems shall observe the following setbacks, to be measured from the edge of the solar panels and equipment (not underground facilities such as cable or fencing):

Protected Area TBD	Setback Requirement TBD
Adjacent Property Lines	50 feet* TBD?  <sup>2</sup>  <sup>3</sup>
<sup>1</sup> Occupied Residence	1000 feet TBD?  <sup>2</sup>  <sup>3</sup>
Unoccupied Non-Residential Building	100 feet TBD?
Public Road Right-of-Way	100 feet TBD?
Public Drainage District Right-of-Way	100 feet TBD?
Public Conservation Area	1 mile TBD?
Cemetery	600 feet TBD?
City Limits	2 miles TBD?
Airports (public and private)	FAA consultation and determination required. TBD?

\* US-SES to be built on more than one parcel and parcels are abutting, a zero (0) side or rear setback shall be permitted to the property line in common with the abutting parcel(s).

Setback Waivers. Property owners and municipalities may require a waiver from the setbacks as established in this Section, except for the following protected areas: airports, cemeteries, public conservation areas, and public road rights-of-way.

PROVIDED, a waiver shall not alter any other non-waived setback requirement.

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Number: 1 Author: t26100 Subject: Highlight Date: 1/17/2024 10:47:28 AM

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Number: 2 Author: t26100 Subject: Sticky Note Date: 1/19/2024 10:48:41 AM

This Occupied Residence Setback would nullify section K.1.1.x - Increased Setbacks. A setback of 1000 feet from all non-participating dwellings receives 40 points on the scorecard. The setback minimum should be aligned with the lowest scoring option (i.e. 300 feet = Zero points). A three hundred foot setback from occupied residences, along with Evaluation Criteria (b) [the US-ESO will not have substantial or undue adverse effect upon adjacent property] and the vegetative screening requirements are effective.

Author: t26100 Subject: Sticky Note Date: 1/17/2024 9:51:49 AM

Also, the Protected Area titles (i.e. occupied residence) should be reflected in the scorecard (where dwelling is used instead of occupied residence).

Number: 3 Author: t26100 Subject: Sticky Note Date: 1/19/2024 10:49:42 AM










The Center for Rural Affairs recommends a occupied residence setback between 100 and 200 feet.

<https://www.cfra.org/sites/default/files/publications/iowa-solar-siting-resource-guide.pdf>

To effectuate such a waiver, the applicant must provide the Zoning Director with a recordable instrument signed by all owner(s) (or the controlling governmental entity) of the affected protected area that specifically identifies the nature and extent of the waiver. All waivers must be reviewed by the Board of Supervisors for compliance with this Section; and if deemed compliant, it shall be recorded in the office of the Woodbury County Recorder by the applicant. No waiver shall be granted for setbacks less than the required minimums for the Zoning District.

- (a) Solar panels, structures, and electrical equipment, excluding fences and power lines for interconnection, shall be kept a minimum of one thousand (1000) feet from dwellings, unless the property owner waives the setback. Waiver must be in writing and recorded.
- (b) Solar panels, structures, and electrical equipment, excluding fences and power lines for interconnection, shall be kept a minimum of one hundred and twenty (120) feet from the centerline of all stream corridors and open ditches containing perennial flow throughout the majority of the growing season.
- (2) Screening. Project shall provide vegetative screening for all dwellings within 1,000 feet of the project boundaries.
- (a) Applicant shall submit a screening plan for each dwelling within 1,000 feet of the project boundaries.
- (b) Screening may be waived by the owner of a dwelling. Waiver must be in writing and recorded.
- (c) Screening may be waived by the Zoning Administrator upon submission of a viewshed study from the applicant demonstrating that the project is not within the viewshed of the dwelling due to topography, existing vegetation, or other factors. The point of reference used in the viewshed study shall be as close to the dwelling as possible.
- (d) Any vegetative screening within the project boundaries shall be maintained throughout the life of the project by the project owner. Any screening on the dwelling property shall be maintained by the project owner for no less than twelve months.
- (e) Deciduous trees shall have a minimum caliper of 1.5" when planted, shall be at least six (6) feet tall within three (3) years of installation, and shall have a minimum mature height of twelve

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 Number: 2	Author: t26100	Subject: Sticky Note	Date: 1/19/2024 10:49:55 AM
<p>This is higher than most ordinances MidAmerican has reviewed. If screening/landscaping requirements are implemented, this setback may be excessive (i.e. if a dwelling unit is shielded from visual impacts with vegetative screening, what is the purpose of the additional distance).</p>			
 Number: 3	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:47:36 AM
 Number: 4	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:47:38 AM
 Number: 5	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:47:41 AM
 Number: 6	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:47:42 AM
 Number: 7	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:47:46 AM
 Number: 8	Author: t26100	Subject: Sticky Note	Date: 1/19/2024 10:50:05 AM
<p>Screening requirements are measured from the project boundary but dwellings (occupied residence) setbacks are measured from solar panels, structures, and electrical equipment.</p>			
 Number: 9	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:47:49 AM

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(12) feet.

(f) Screening plans shall use no less than two varieties of tree.

- (3) Utility connections. Reasonable efforts shall be made to place all utility connections from the solar installation underground, depending on appropriate soil conditions, shape and topography of the site, distance to the connection, or other conditions or requirements.
- (4) Grading plan. A grading plan shall be submitted and shall include all proposed changes to the landscape of the site (e.g., clearing, grading, topographic changes, tree removal, etc.).
- (5) Glare minimization. All solar panels must be constructed to minimize glare or reflection onto adjacent properties and adjacent roadways and must not interfere with traffic, including air traffic, or create a safety hazard.
- (6) Compliance with local, state and federal regulations. Utility scale solar installations shall comply with applicable local, state and federal regulations.
- (7) Appurtenant structures. All appurtenant structures shall be subject to bulk and height regulations of structures in the underlying zoning district.
- (8) Floodplain considerations. Utility scale solar installations are considered to be maximum damage potential structures and facilities for purposes of the floodplain district regulations.
- (9) Fencing/security. A security fence must be installed along all exterior sides of the utility scale solar installation and be equipped with a minimum of one gate and locking mechanism on the primary access side. Security fences, gates and warning signs must be maintained in good condition until the utility scale solar installation is dismantled and removed from the site.
- (10) Panel Height. To encourage the establishment of a diverse native seed mix, panels shall be installed a minimum of 24" from the lower edge of the panel at maximum tilt to the ground.

**N. Avoidance and mitigation of damages to public infrastructure.**

- (1) Roads. Applicants shall adhere to the Woodbury County Road Use and Repair Agreement, and in doing so, shall identify all roads to be used for the purpose of transporting batteries, parts, cement, and/or equipment for

construction, operation or maintenance of the US-BESSOD and obtain applicable weight and size permits from the impacted road authorities prior to construction.

- (2) Existing road conditions. Applicant shall conduct a pre-construction survey, in coordination with the impacted local road authorities to determine existing conditions of roads identified pursuant to Section 5.09.1 L(1). The survey shall include photographs or video and written documentation of the condition of the identified road facilities. The applicant is responsible for on-going road maintenance and dust control measures identified by the Woodbury County Engineer during all phase of construction.
- (3) Drainage system. The applicant shall be responsible repair of damage to public drainage systems stemming from construction, operation or maintenance of the solar installation. Applicant shall acknowledge any damage to public drainage systems and the responsibility for repair in a timely manner within 72 hours of damage discovery.

O. **Operation and maintenance plan.** The applicant shall submit a plan for the operation and maintenance of the solar installation including all necessary services, frequency of service, preventative maintenance measures, and monitoring. The operation and maintenance plan should include at a minimum:

- (1) Preventative maintenance practices and schedules for all on-site equipment including but not limited to: inverters, panels, equipment pads, tracking systems, transformers, access entrances, internal roads, gates, fencing, security systems, stormwater management installations.
- (2) Annual reporting and verification to county on the status or changes to ongoing service schedule.
- (3) Schedule of all other monthly, annual, or semiannual reporting requirements for other submittals including: agricultural impact mitigation plan, decommissioning plan, and vegetation management plan.
- (4) Noise. No operating solar energy equipment shall produce noise exceeding any of the following limitations, with the exception of initial construction and routine maintenance. Adequate setbacks and effective noise mitigating equipment shall be used to comply with these limitations:
  - (a) An hourly average noise level of fifty-five (55) dBA during the day (between sunrise and sunset), and an hourly average noise level of fifty (50) dBA at night (between sunset and sunrise), as measured



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Number: 2	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:48:02 AM
Number: 3	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:48:04 AM
Number: 4	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:48:06 AM
Number: 5	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:48:08 AM
Number: 6	Author: t26100	Subject: Sticky Note	Date: 1/19/2024 10:50:37 AM

Within 72 hours of discovery may not be feasible in all cases (i.e. weather conditions, scheduling delays with laborers). MidAmerican would suggest striking the 72 hour repair requirement and instead add in that the project owner must notify the county for expected repair timeline within a 3 days of discovery.

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at the occupied dwelling of any adjacent property containing an existing residential structure. If the ambient sound pressure level exceeds 55 dBA during the day or 50 dBA at night, the standard shall be the ambient Leq (equivalent continuous sound pressure level) plus 5 dBA.

- (b) A baseline noise evaluation shall be completed by a board certified professional by the Institute of Noise Control Engineering (INCE), or an appropriately licensed Professional Engineer (PE) prior to construction of the proposed solar site.
  - (c) A post-construction noise evaluation shall be performed by a third-party board certified professional by the Institute of Noise Control Engineering (INCE), or an appropriately licensed Professional Engineer (PE) following commencement of commercial operation of the project to verify compliance with the County's standards.
  - (d) The owner(s) of an adjacent property may voluntarily agree, by written and recorded waiver, to a higher noise level.
- (5) Issue resolution protocols. Contact information for responsible party to address issues that may arise (damaged equipment causing excessive noise, etc.).
  - (6) Disposal/recycling plan for damaged or obsolete facility equipment or hazardous waste. No storage of inoperable or obsolete equipment shall be allowed to remain on-site. Site operator shall be responsible for the cleanup of debris related to storm damage.
  - (7) Cleaning chemicals and solvents. During operation of the proposed installation, all chemicals or solvents used to clean photovoltaic panels should be low in volatile organic compounds and the operator should use recyclable or biodegradable products to the extent possible. Any on-site storage of chemicals or solvents shall be referenced.
  - (8) Maintenance, repair, or replacement of facility. Maintenance shall include, but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to emergency response officials. Any retrofit, replacement or refurbishment of equipment shall adhere to all applicable local, state and federal requirements.
  - (9) Repowering. At the discretion of the zoning administrator, proposals to replace more than twenty five percent (25%) of the panels in a facility within a twelve (12) month period may be required to submit a plan for review and approval. A repowering event does not include replacement

of panels in previously approved locations due to weather damage, equipment failure, or a force majeure event.

- (a) The plan shall include updated information for some or all of the reports and plans required by this section, as determined necessary by the zoning administrator.
- (b) The zoning director shall review and approve, conditionally approve, or deny the repowering plan.

**P. Decommissioning, abandonment, and site restoration plan.**

- (1) The application must include a decommissioning plan that describes the following:
  - (a) The anticipated life of the utility scale solar installation.
  - (b) The anticipated manner in which the project will be decommissioned, including plans to recycle components and dispose of any hazardous materials.
  - (c) The anticipated site restoration activities.
  - (d) The estimated decommissioning costs in current dollars.
  - (e) The method for ensuring that funds will be available for decommissioning and restoration of the site.
- (2) Decommissioning cost considerations. The applicant shall provide the basis for estimates of net costs for decommissioning the site. Site restoration activities as described later in this section.
  - (a) Removal of any hazardous materials at the facility, as determined by a Toxic Characteristic Leaching Procedure (TCLP) or other similar test approved by Woodbury County and as described in the facility's Operations and Maintenance Plan. TCLP testing shall be performed prior to any ground disturbance at the project site.
  - (b) Salvage value shall not be included in the cost estimate.
  - (c) The cost basis shall include a mechanism for calculating adjusted costs over the life of the project.
- (3) Site restoration activities. Restoration activities shall include, but not be limited to, the following:

- (a) Removal of all components and equipment.
- (b) Soil in project area shall be decompacted and seeded with a cover crop, unless otherwise specified in the approved vegetation plan and/or agricultural impact mitigation plan.
- (c) For any part of the energy project on leased property, the plan may incorporate agreements with the landowner regarding leaving access roads, fences, gates or repurposed buildings in place or regarding restoration of agricultural crops or forest resource land. Any use of remaining structures must be in conformance with the regulations in effect at that time.

(d) 1 performance agreement and proof of financial surety. At the time 2  
 3 of permitting, the applicant, facility owner, or site operator shall  
 4 provide a Performance Agreement and accompanying financial  
 5 surety instrument to cover the cost of decommissioning in  
 6 accordance with the following:

- (i) Decommissioning funds shall be an amount equal to the total costs for decommissioning the site, plus a ten percent (10%) contingency.
- (ii) Decommissioning funds shall be maintained in the form of a performance bond, surety bond, bank letter of credit, stable parent company guarantee, or other form of financial assurance as approved by the County. Any financial document evidencing the maintenance of the decommissioning funds shall include provisions for releasing the funds to the County in the event decommissioning is not completed in a timely manner.
- (iii) Prior to any ground disturbance, grading or construction activity on the site, twenty-five percent (25%) of total estimated decommissioning costs shall be provided by any of the means listed above. An additional twenty five percent (25%) shall be provided within five (5) years and ten (10) years of the date of initial approval, and the remaining twenty five percent (25%) of the total reestimated decommissioning costs shall be provided within fifteen (15) years of the date of initial approval. From that point forward, 100% of the total estimated decommissioning costs as determined by the most recent reestimation shall be maintained in the decommissioning fund until the end of the functional life of the project.

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- Number: 1 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:16 AM

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  - Number: 2 Author: t26100 Subject: Sticky Note Date: 1/17/2024 10:12:29 AM  
MidAmerican would recommend adding language to allow for a bond to be waived by the county if the project owner "maintains not less than an investment grade credit rating or (2) is a public utility regulated by the Iowa Utilities Board"

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  - Number: 3 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:18 AM

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  - Number: 4 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:20 AM


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  - Number: 5 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:22 AM

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  - Number: 6 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:24 AM

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- (iv) Financial surety shall be maintained for the life of the project.
  - (v) Proof of recertification of the financial surety instrument must be submitted to the County annually.
  - (vi) Every five (5) years, the facility owner or operator shall retain an independent Licensed Iowa Engineer approved by the County to re-estimate the total cost of decommissioning and attest that the value of the financial surety instrument is appropriate. This report shall be filed with the County and shall incorporate any new industry information learned since the last cost determination.
  - (vii) The required amount of the decommissioning fund shall match the re-estimated cost of decommissioning. Within ninety (90) days of filing the reestimation report with the County, the facility owner or operator shall cause the fund balance of the financial surety instrument to be adjusted to ensure that it matches the re-estimated decommissioning cost.
- (e) **1** escrow Account. At the time of permitting, the applicant, facility **2** owner, or site operator shall provide at least \$100,000 per **3** megawatt of project in an escrow account in addition to the total **4** decommissioning funds that shall remain in the account up until **5**  one year after the last day of the decommissioning upon successful **6** completion will be returned to the application/owner/operator. Any **7** interest earned in the account shall belong to the County. **8**
- (f) Commencement of site decommissioning. Decommissioning of the site shall commence at the time identified in the project decommissioning plan or performance agreement, or when the facility is determined to have been abandoned.
    - (i) Decommissioning shall be completed in accordance with the approved decommissioning plan.
    - (ii) The landowner or tenant shall notify the Zoning Administrator both when the project is discontinued and when decommissioning is complete.
    - (iii) Third-party verification, as well as County verification of completed decommissioning will be required before the financial surety may be released.

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Number: 2 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:45 AM

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Number: 3 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:48 AM

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Number: 4 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:50 AM

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Number: 5 Author: t26100 Subject: Sticky Note Date: 1/17/2024 10:17:55 AM  
Why would the county require both a Decommissioning Fund and a Escrow Account for decommissioning? These requirements, when combined, are excessive and would negatively impact ratepayers for any regulated utility that would operate a project in the county.

Author: t26100 Subject: Sticky Note Date: 1/17/2024 10:18:31 AM  
MidAmerican recommends striking the entirety of the Escrow Account requirement.

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Number: 6 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:53 AM

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Number: 7 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:55 AM

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Number: 8 Author: t26100 Subject: Highlight Date: 1/17/2024 10:48:58 AM

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(iv) The facility will be considered abandoned in the following circumstances:

1. Upon termination or expiration of the solar farm leases/easements or
2. After one year without production, storage of energy, or use as a backup facility.
3. Exceptions could be made for:
  - (a) A force majeure event that has occurred or is occurring, which will prevent the facility from resuming operation within 12 months.
  - (b) If the facility is in the process of being repowered.
  - (c) The project is pending completion of construction of the facility due to a backlog of cases or service requests in the MISO queue.
  - (d) A situation in which the project owner can provide evidence to the county board of supervisors, that the facility's period of continuous inactivity is due to circumstances beyond the project owner's control and that the facility has not been abandoned.
  - (e) Appeal of the notice of abandonment from the county within a set time of the project owner's receipt of the notice in which the project owner explains the reasons for operational difficulty and provides a timeframe for corrective action that the county deems reasonable.

**Q. Agricultural Impact Mitigation Plan (AIMP)**

- (1) The applicant shall submit an AIMP detailing strategies to avoid or mitigate detrimental impact to agricultural land resulting from the construction, operation, maintenance and/or decommissioning of the solar project. The primary goal of the AIMP is long-term protection of soil health to ensure the project area can be used for productive agricultural use both during, and at the end of the functional life of the



project.

(2) The AIMP shall include, but not be limited to, the following information:

(a) Project overview. Provide general background, list of project components, and construction timeline.

(b) Environmental/Agricultural Monitoring

(i) On-site monitoring to be conducted by third party environmental/agricultural professional during construction.

(ii) Report of findings to be submitted to county every 30 days during construction.



(iii) Responsible for verification and monitoring during and post construction of:

1. Soil segregation, stockpiling, backfilling, respreading methods
2. Trenching, & foundation installation
3. Compaction avoidance and decompaction practices
4. Grading Plan adherence
5. Wet weather conditions planning
6. Drain tile system
7. Erosion and sediment control measures
8. Installation and effectiveness of stormwater management structures
9. Invasive species prevention and mitigation

(c) Best Management Practices During Construction and Operation

(i) Best Management Practices (BMPs) shall be included that demonstrate Low Impact Development (LID) measures the applicant will take during construction to minimize

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Number: 1 Author: t26100 Subject: Highlight Date: 1/17/2024 10:29:06 AM

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Number: 2 Author: t26100 Subject: Sticky Note Date: 1/19/2024 10:55:31 AM  
What county department will be in charge of reviewing these reports?

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Number: 3 Author: t26100 Subject: Highlight Date: 1/17/2024 10:29:08 AM

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negative impact to long-term soil health and future agricultural viability. BMPs should preserve topsoil, reduce or eliminate compacted soils, test and design the project with regard for protection of existing soil profile below 12 inches, include robust long-term soil health monitoring protocols, invasive species prevention, and establish and maintain native, deep-rooted vegetative ground cover.

(d) Subsurface Drain Tile Survey, Avoidance & Mitigation Plan

- (i) Documentation and mapping of existing drain tile systems within the entire project area including elevation, location, and size of tile inlet and outlets
- (ii) Plan for relocation, removal or restoration of tile damaged during construction
- (iii) Description of long-term maintenance and plan for ongoing review of existing and newly constructed tile systems (if applicable).

(e) <sup>1</sup>Pre-construction Soil Health Analysis and Long-Term Soil <sup>2</sup>  
<sup>3</sup>Monitoring Plan

- (i) Prior to construction, a soil analysis shall be conducted and assessed by a third-party professional to establish baseline soil health.
- (ii) Required sampling protocol:
  - I. Pre-Construction and Post- Construction Baseline Surveys
    - (a) One sampling location per zone shall be created based on random sample method or soil type, with each zone not to exceed 20 acres.
    - (b) Two samples shall be collected from each sampling location (for example, the plow layer from 0 to 8 inches and subsoil from 8 to 16 inches).
    - (c) Each sample shall consist of a minimum of 10 subsamples collected from disparate

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Number: 1	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:26:27 AM
Number: 2	Author: t26100	Subject: Sticky Note	Date: 1/19/2024 10:56:23 AM
Does the county have any similar requirements for other development or businesses in the county?			
Number: 3	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:26:30 AM

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locations surrounding the sample location in each zone. Samples shall be analyzed for soil health and soil chemical parameters during the same seasonal period and at the same sampling locations once prior to construction and once postconstruction to establish a baseline.

- (d) In-field assessment resource evaluations shall be performed in conjunction with soil health testing for the purpose of tracking compaction, soil organic matter and aggregate stability indicators.
- (e) Soil sample analyses shall utilize a laboratory testing program that includes standard chemical analysis for Phosphorous, Potassium, Calcium, Sulfur, pH, Cation Exchange Capacity (CEC), base saturation, and organic matter, and soil health analyses for soil respiration, wet aggregate stability, and active (permanganate oxidizable) carbon.

2. Year 5 through end of project life

- (a) Same sampling protocol as above except frequency shall occur once every five years.
- (b) Third-party evaluation and report on soil condition changes against baseline data throughout the lease period. Frequency of reporting shall match sampling protocol.

(f) Soil Protection and Compaction Avoidance

- (i) Plan should include, at a minimum, a narrative or plan for LID construction practices and methods to be used during each stage of construction for protecting and preserving topsoil. Practices and methods should address, at a minimum, topsoil removal, segregation, stockpiling, replacement during backfill, and respreading, grading minimization, compaction prevention, wet weather conditions, and postconstruction decompaction.

1. All project areas in agricultural production at the time of permit issuance, shall be seeded with temporary cover within three months of commencement of pre-construction/civil activities (mobilization) if disturbance is not intended to occur within two months.

(g) Erosion and Sediment Control

- (i) The applicant agrees to conduct all roadwork and other site development work in compliance with a national pollutant discharge elimination system (NPDES) permit as required by the state department of natural resources and comply with requirements as detailed by jurisdictional authorities during the plan submittal. If subject to NPDES requirements, the applicant must submit the permit for review and comment, and an erosion and sediment control plan before beginning construction. The plan must include both general "best management practices" for temporary erosion and sediment control both during and after construction and permanent drainage and erosion control measures to prevent damage to local roads or adjacent areas and to prevent sediment-laden run-off into waterways.

(h) Stormwater Management Plan

- (i) For the purposes of pollutant removal, stormwater rate and runoff management, flood reduction and associated impacts, the applicant shall provide a detailed analysis of pre- and post-development stormwater runoff rates for review by local jurisdictional authorities. Such review may incorporate infiltration components consistent with practices as detailed in the state stormwater management manual.

**R. Vegetation Management Plan.** The application must include a vegetation management plan with the primary function of promoting long term soil health, through plant stand persistence, plant diversity, and use of deep-rooted perennials by utilizing recognized establishment and maintenance practices for native vegetation. The Vegetation Management Plan shall include:

- (1) A description of the site characteristics including project location, size of the project in terms of acres, existing vegetation, current land uses, soils on and adjacent to the site using, topography with and adjacent to project site using 2' contours, and a description of the general hydrologic conditions of the site and adjoining areas noting any significant features

(public waters, water bodies, drainage ways, wetlands, farmed wetlands, restorable wetlands, sinks, hydric soils, etc.).

- (2) A description of the management areas with maps including but not limited to the following: areas under the arrays, perimeter plantings, and any other designated management areas within or adjacent to the site.
- (3) A description of the management objectives for each management area including:
  - (a) Short-term management objectives for each area (seed establishment 0-5 years). The emphasis will be on management strategies used during the vegetation establishment phase such as: cover crop and soil stabilization, weed and non-native species management, targeted re-seeding, etc.
  - (b) Long term management objectives for each area (5 years after establishment to end of permit) such as: target goals such as the percentage of the site covered by native species, development of a monitoring plan, and management strategies such as supplemental seeding.
- (4) Establishment and management practices including:
  - (a) Site preparation (schedules/sequence of planned construction, planting, and management activities).
  - (b) Eliminating soil compaction prior to seeding.
  - (c) Seedbed preparation.
  - (d) Invasive species prevention.
  - (e) Cover crop planting and temporary covers.
  - (f) Establishment methods in years 0-5.
  - (g) Management methods in year 6 and beyond.
  - (h) Grazing practices (if applicable).
- (5) Seeding and planting practices including:
  - (a) Seed mixes (names, ounces/acre in Pure Live Seed), seeds per sq ft., % of mix based on seeds per sq ft). A complete list of seeds shall be provided as well as a map denoting the seed mix areas.

Prior to seed procurement, seed origin shall be added to the list of seeds.

- (i) At a minimum, ground under and around the solar array shall be planted with a perennial vegetated ground cover that includes a mix of perennial grasses and wildflowers that will preferably result in short stature prairie with a diversity of forbs and flowering plants that bloom throughout the growing seasons. Perennial vegetation (grasses and forbs) used shall be native on a regional basis (preferably to Iowa) but where appropriate to the ground cover plan goals, may also include other naturalized and non-invasive species which limit noxious and invasive species encroachment, provide habitat for pollinators and wildlife, build soil health, and/or provide other ecosystem services (i.e. clovers). Non-native species shall be limited to the following: legumes, not exceed 20 seeds per square foot and grasses, not to exceed 15 seeds per square foot.
- (ii) Wherever native vegetation is discussed, including in the Woodbury County Utility Scale Solar Scorecard, native vegetation shall be defined as seed mix plan that meet criteria as described within the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Iowa 327 Conservation Cover Standard and supporting reference documents developed through the use of the Iowa NRCS Native Seed Calculator, or any other similar standard as approved.
- (iii) Cover Crop and other short-term seeding methods shall be utilized for the purpose of site stabilization for all areas in agricultural production within three months of commencement of pre-construction/civil activities (mobilization) if planned disturbance is not intended to occur within 2 months of the time of permit issuance, preventing growth of noxious and invasive species, and aide in long term vegetative establishment. In addition to seed criteria specified above cover crop choice(s) shall meet or exceed 80% by volume of Pure Live Seed at time of use, be seeding date and zone appropriate for the selected species and be based on minimum thresholds as described within the USDA - NRCS Iowa 340 Cover Crop Standard, or other similar standard as approved.



- (b) If visual screening is part of the project, provide a complete list of plantings as well as the size of the plantings.
  - (c) Summarize steps taken to ensure that any pesticides used at or near the site will not drift and impact native vegetation.
  - (d) Describe how planting will be conducted in each area (array, perimeter, detention area, etc.) including the sequence of planting, time of planting, and planting method.
- (6) Vegetation monitoring and adaptive management practices to be used on site including:
- (a) Construction monitoring. For compliance with the Agricultural Impact Mitigation Plan, a third-party qualified site monitor shall be required to be present on site during construction to ensure soil health is maintained.
  - (b) Vegetation establishment and monitoring plan. A qualified third-party independent monitor shall complete vegetation monitoring activities and provide reports to Woodbury County staff. Reports shall be submitted annually during the establishment phase (first 5 years) and every three years afterwards. Reports shall include: summary of site conditions and management activities, description of adaptive management actions implemented, description of any management challenges, an evaluation on whether the project is meeting stated management objectives.
  - (c) Adaptive management practices. Adaptive management approach shall use the results of the annual report and other site visits to determine measures necessary to achieve the stated management objectives.

#### **S. Wildlife and Habitat Assessment and Mitigation Plan**

- (1) The applicant shall submit a Wildlife and Habitat Assessment and Mitigation Plan detailing strategies to avoid, or mitigate for, detrimental impact to existing habitat and wildlife resulting from the construction, operation, maintenance and/or decommissioning of the solar project. Consideration of established migration patterns, emphasis on habitat fragmentation avoidance, and allowance for limited wildlife movement into and through the array zones via wildlife friendly fencing design shall be considered.

- (2) <sup>1</sup> fenced array areas are limited to 160 <sup>2</sup> acres <sup>3</sup> before establishment of a <sup>2</sup> wildlife corridor shall be required.
- (3) Solar panels, structures, electrical equipment, and fencing, excluding power lines for interconnection, through established drainageways. Drainageways shall be defined as stream corridors and open ditches containing perennial flow throughout the majority of the growing season.

#### T. Emergency Response Plan.

- (1) The applicant shall submit an emergency response plan prior to any ground disturbance at the project site detailing the planned response actions that will be taken by the solar facility operator, including any battery energy storage systems in the event of an emergency situation. These actions are intended to minimize health risks to personnel and people in the surrounding community, as well as minimize adverse impacts to the environment.
- (a) The plan shall include, but is not limited to, a detailed narrative of response procedures and the facility representatives responsible for management of the following plausible contingencies that could occur at the facility: natural disaster/severe weather, fire, security incident, capacity/transmission, environmental, chemical, pipeline (if applicable), and medical. It shall include procedures for a site evacuation, designated egress routes and emergency staging areas.
- (b) The plan shall include a stand-alone section detailing the emergency response protocols specific to battery energy storage areas (if applicable).
- (c) The plan shall be developed in coordination with local first responders, Woodbury County Emergency Management & Woodbury County Public Health personnel.

U. **Future Operators.** Future operators, successors, assignees, or heirs shall agree in writing to accept and to conform to all conditions of approval in the staff report. Prior notice to the County of the intent to sell or transfer ownership shall be done in a timely manner. Such agreement shall be filed with and accepted by the County before the transfer to a new operator, successor, assignees, or heirs shall be effective.

## 2. Utility-Scale Battery Energy Storage Systems Overlay District (US-BESSOD)

A. **Purpose and Intent.** The Utility-Scale Battery Energy Storage Systems Overlay District (US-BESSOD) is intended to be mapped as an overlay of the Agricultural

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Number: 1 Author: t26100 Subject: Highlight Date: 1/17/2024 10:35:18 AM

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Number: 2 Author: t26100 Subject: Highlight Date: 1/17/2024 10:35:20 AM

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Number: 3 Author: t26100 Subject: Sticky Note Date: 1/17/2024 10:39:31 AM

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Limiting fencing to 160 acre blocks will add a substantial amount of additional fencing to a solar project and would not guarantee wildlife would adhere to man-made 'wildlife corridors'.

Preservation (AP) Zoning District. The US-BESSOD zone is intended to allow for the orderly development of utility-scale battery energy storage projects. This section establishes an overlay district that serves the following purposes:

- (1) To provide a reasonable and thoughtful balance to limited development and use of utility-scale battery energy storage systems in the AP Zoning District.
- (2) To encourage the continued role of agriculture as the primary economic sector in the unincorporated areas of Woodbury County and the continued preservation of its rural character.
- (3) To encourage development that conforms to the vision, goals, and policies in the Woodbury County Development plan.
- (4) To encourage sustainable and energy efficient development and reasonable access to renewable energy.

- B. **Jurisdiction.** This Ordinance is adopted by the Woodbury County Board of Supervisors and governs all lands within the unincorporated areas of Woodbury County, Iowa. This Ordinance and its provisions shall not apply to those properties or projects occurring within the incorporated cities of Woodbury County.
- C. **Applicability.** It shall be unlawful to construct, erect, install, alter or locate any US-SESOD within unincorporated Woodbury County, without first obtaining a Conditional Use Permit from the Woodbury County Board of Adjustment and the associated agreements from the Woodbury County Board of Supervisors or obtaining a Zoning Ordinance Map Amendment (Rezone) to the US-SESOD as outlined in this Ordinance.
- (1) No application for a US-SESOD shall be granted without first submitting all required information and documentation, and paying all associated fees to the County.
- D. **Zoning Ordinance Map Amendment (Rezone) Required.** In addition to all submittal requirements of Section 2.02.4 of this Ordinance for a Zoning Ordinance Map Amendment, this Section sets the requirements specific to the US-BESSOD.
- E. **Geographic Location and Area Limitations.** The US-BESSOD shall be geographically located in those areas currently zoned Agricultural Preservation (AP). The US-BESSOD shall be capped to 9,500 acres over the Agricultural Preservation (AP) Zoning District. No more than 9,500 acres shall be established as the overlay of the Agricultural Preservation (AP) Zoning District. Each granted Zoning Ordinance Map Amendment (rezone) shall reduce the cap by the

number of acres approved in each rezone until the original cap is reduced to 0.

F. **Allowed Uses.** The specific land uses allowed as principal allowed, conditional and accessory in the AP Zoning District are allowed in the US-BESSOD in addition to the following use(s) which are hereby established as allowed uses:

(1) Utility-Scale Battery Energy Storage Systems Overlay District (US-BESSOD)

G. **Dimensional Standards.** Section 3.04 includes a table of comparative dimensional standards for all zones. The dimensional standards of the AP Zoning District shall apply to the US-BESSOD unless otherwise stated in this Ordinance.

H. **Supplemental regulations.** All pertinent provisions of Article 5, Supplemental Regulations, shall apply to uses and development in the US-BESSOD.

I. **Notification Requirements.** To assist in providing adequate notice to interested parties, the application for a Zoning Ordinance Map Amendment (Rezone) to the US-BESSOD shall:

(1) Within 14 days of filing the rezoning application with the Woodbury County Community and Economic Development Department, mail a notice via first class mail to property owners and tenants within one (1) mile of the subject site explaining the request and identifying the subject property.

(2) Prior to the application being heard at the Planning and Zoning Commission meeting, the applicant shall host a public informational meeting held at a location reasonably accessible to all identified property owners.

(3) Applicants must mail a notice of the public informational meeting via first class mail to property owners and tenants within one (1) mile of the subject site.

(4) Applicants must submit a certified abstractor listing of the names and mailing addresses of all owners of real property lying within one (1) mile from the subject property with their application materials as required in this Ordinance.





J. **Review and Decision-Making Process**

(1) **Evaluation Criteria.** The Planning and Zoning Commission shall base their recommendation and the Board of Supervisors shall base their decision on the requested zoning ordinance map amendment to the US-











ESO on the following criteria:

- (a) The proposed US-BESSOD will be in harmony with the general purpose and intent of this Ordinance and the goals, objectives and standards of the general plan.
- (b) The proposed US-BESSOD will not have a substantial or undue adverse effect upon adjacent property, the character of the neighborhood, traffic conditions, parking, utility facilities, and other factors affecting public health, safety and general welfare.
- (c) The proposed US-BESSOD will be located, designed, constructed and operated in such a manner that it will be compatible with the immediate neighborhood and will not interfere with the orderly use, development and improvement of surrounding property.
- (d) Essential public facilities and services will adequately serve the proposed US-BESSOD.
- (e) The proposed US-BESSOD will not result in unnecessary adverse effects upon any significant natural, scenic or historic features of the subject property or adjacent properties.
- (f) The proposed use or development, at the particular location is necessary or desirable to provide a service or facility that is in the public interest or will contribute to the general welfare of the neighborhood or community.
- (g) All possible efforts, including building and site design, landscaping and screening have been undertaken to minimize any adverse effects of the proposed use or development.
- (h) Compatibility and conformance with the policies and plans of other agencies with respect to the subject property;
- (i) Consideration of the Corn Suitability Rating 2 (CSR2) of the property;
- (j) Consideration of a slope no greater than 10%;
- (k) Compatibility with other physical and economic factors affecting or affected by the proposed US-BESSOD;
- (l) Conformance with Woodbury County Utility Scale Solar Scorecard. All projects shall meet the minimum passing threshold

of 100 Points in the Woodbury County Utility Scale Solar Scorecard, as enumerated below:

- (i) **1** Planned percent of native species of the entire site's **2** vegetative cover 
1. 25-35%, +12 points
  2. 36-50%, +20 points
  3. 51-65%, +28 points
  4. 66-80%, +36 points
  5. >80%, + 40 points
  6. <25%, + 0 points
- (ii) **4** Planned number of species in entire site's vegetative cover **5** 
1. 5-9 species, +8 points
  2. 10-15 species, +12 points
  3. 16-19 species, +16 points
  4. >20 species, +20 points
- (iii) Site Planning and Management
1. Site has approved vegetation management plan, +20 points
  2. Site has approved agricultural impact mitigation plan, +20 points
- (iv) Percent of site in a medium (65-82) CSR2 area
1. 10-15%, -2 points
  2. 26-50%, -3 points
  3. 51-75%, -4 points
  4. >75%, -5 points
- (v) Percent of site in a low (<65) CSR2 area
1. 10-15%, +6 points
  2. 26-50%, +8 points
  3. 51-75%, +10 points
  4. >75%, +12 points
- (vi) **6** Number of agrivoltaics practices on site **7** 
1. 1 practice, +5 points
  2. 2 practices, +10 points
  3. >2 practices, + 15 points
  4. No practices, 0 points
- (vii) **8** Planned percentage of the entire site's vegetative cover **9** 
- 10** Plan includes flowering plants
1. 10-25%, +4 points
  2. 26-50%, +8 points

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 Number: 1	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:41:57 AM
 Number: 2	Author: t26100	Subject: Sticky Note	Date: 1/17/2024 10:43:19 AM
This should not apply to BESS. BESS are much more concentrated facilities, more akin to a substation than a solar array.			
 Number: 3	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:41:59 AM
 Number: 4	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:43:40 AM
 Number: 5	Author: t26100	Subject: Sticky Note	Date: 1/17/2024 10:43:34 AM
Same comment as above.			
 Number: 6	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:43:48 AM
 Number: 7	Author: t26100	Subject: Sticky Note	Date: 1/17/2024 10:43:58 AM
Not applicable to BESS.			
 Number: 8	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:44:17 AM
 Number: 9	Author: t26100	Subject: Sticky Note	Date: 1/17/2024 10:44:13 AM
Not applicable to BESS.			
 Number: 10	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:44:20 AM

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3. 51-75%, +12 points
4. >75%, +16 points
5. No flowering plants, -15 points

(viii) **Planned seasons with at least three blooming species** 

**3** Present

1. Spring (April – May), +5 points
2. Summer (June – August), +5 points
3. Fall (September – October), +5 points

(ix) Percentage of site that is graded

1. 0-10%, +20 points
2. 10-30%, +10 points
3. 30-50%, 0 points
4. >50%, -10 points

(x) Increased Setbacks

1. No non-participating dwellings within 300' of project boundaries, 0 Points
2. No non-participating dwellings within 500' of project boundaries, +30 points
3. No non-participating dwellings within 750' of project boundaries, +35 points
4. No non-participating dwellings within 1000' of project boundaries, +40 points
5. No non-participating dwellings within 1250' of project boundaries, +45 points

(xi) **Average Solar Height** 

1. >24", +5 points
2. >26", +10 points
3. >28", +15 points
4. >30", +20 points
5. >32", +25 points






(xii) Exceptional Good Neighbor Practices

1. Good neighbor payments for adjacent non-participating landowners, +10 points
2. Good neighbor payments for tenant farmers displaced by the project, +10 points
3. Agreement to source labor locally, +15 points.

(m) Any other relevant factors.

(2) **Planning and Zoning Commission Recommendation.** The Planning and Zoning Commission shall review and make a recommendation on the

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 Number: 1	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:44:24 AM
 Number: 2	Author: t26100	Subject: Sticky Note	Date: 1/17/2024 10:44:38 AM
Not applicable to BESS.			
 Number: 3	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:44:26 AM
 Number: 4	Author: t26100	Subject: Highlight	Date: 1/17/2024 10:44:31 AM
 Number: 5	Author: t26100	Subject: Sticky Note	Date: 1/17/2024 10:44:44 AM
Not applicable to BESS.			

proposed US-BESSOD to the zoning district map as follows:

- (a) Hearing required. The Planning and Zoning Commission shall conduct a public hearing on the proposed US-BESSOD in accordance with this Ordinance.
  - (b) Notification. Public notification of the Planning and Zoning Commission hearing on the proposed US-BESSOD of the official zoning map shall be as required by subsection 2.02-1. B(1). Such notices shall provide information on the time, date, and location of the hearing and a brief description of the proposed change to the US-BESSOD.
  - (c) Time Limit for Recommendation. A recommendation to the Board of Supervisors for approval, approval with conditions or disapproval on the proposal, shall be made within 35 days of the conclusion of the public hearing unless the petitioner consents to an extension of time. If no recommendation is made within 35 days from the conclusion of the public hearing, the issue will be forwarded to the Board of Supervisors with no recommendation.
- (3) Board of Supervisors Action. Following receipt of the recommendation of the Planning and Zoning Commission, the Board of Supervisors shall consider and act upon a proposed amendment to the zoning district map as follows:
- (a) Hearing Required. The Board of Supervisors shall conduct a public hearing on the proposed US-BESSOD in accordance with the procedures outlined in this Ordinance.
  - (b) Notification. Public notification of the Board of Supervisors hearing on the proposal shall be as required in this Ordinance.
  - (c) Decision. Following the public hearing, the Board of Supervisors may:
    - (i) Defer consideration of the proposal; or
    - (ii) Reject the proposal; or
    - (iii) Proceed subject to subsections (iv) and (v) below, to adopt an ordinance approving the amendment to the zoning district map.
    - (iv) Super majority required. A 60 percent majority of the Board of Supervisors shall be required to adopt the

proposed amendment of the US-BESSOD if the owners of more than 20 percent of either (a) the area of the subject property or (b) the area of real property lying within 500 feet of the subject property file a written objection prior to the conclusion of the public hearing.

- (v) The Board of Supervisors may impose restrictive conditions upon approval of an amendment to the US-BESSOD if, before the conclusion of the public hearing, the owner agrees to the conditions in writing.

**K. Application Materials.** Utility scale battery energy storage systems that are meant to store and/or supply energy for the primary purpose of wholesale or retail sales of generated electricity, and that are proposed either as part of a utility scale solar project or wind farm or as a standalone project requires rezoning to the US-BESSOD. A complete application shall include the following:

- (1) Major site plan required. A major site plan shall be submitted and reviewed prior to the approval of a utility scale battery energy storage system. This site plan shall also include the following in addition to other requirements in this Ordinance:
  - (a) Power and communications lines.
  - (b) A preliminary equipment specification sheet that documents the proposed battery energy storage system components, inverters and associated electrical equipment that are to be installed. A final equipment specification sheet shall be submitted prior to the issuance of building permit.
- (2) Additional information. In addition to all submittal requirements of a major site plan and rezoning application, the application for the battery energy storage system shall include the following:
  - (a) Property legal descriptions. Legal descriptions shall be submitted for the subject property (leased and/or owned) on which the battery energy storage system will be located.
  - (b) Pre-construction survey of nearby roads that may be impacted by construction of the facility.
  - (c) Interconnection agreement.
  - (d) Operation and maintenance plan.

- (e) Title investigation report.
  - (f) Emergency response plan.
  - (g) Decommissioning plan.
  - (h) Setback analysis showing the minimum setback requirements, or any agreed on greater setback provisions, are met by the project.
- (3) Site and structure requirements.
- (a) Setbacks.
    - (i) All components of the battery energy storage system shall be setback at least two hundred (200) feet from a property line or right-of-way.
    - (ii) All components, except the interconnection point, installed as part of the battery energy storage system shall be setback at least five (500) hundred feet from the nearest property line including an occupied structure not located on the subject property. However, if the developer of the facility can obtain and record with the County Recorder a written, signed, and notarized statement from the owner of the property containing said structure waiving this setback, the minimum setback from may be reduced to two hundred (200) feet.
    - (iii) If the battery energy storage system is to be installed in conjunction to a new utility-scale solar facility, the battery energy storage system shall be sited so as to be located within the interior of said facility, with the banks of solar panels lying between the battery energy storage system and the edges of the facility.
    - (iv) All components of the battery energy storage systems shall be setback a minimum of one hundred and twenty (120) feet from the centerline of all stream corridors and open ditches containing perennial flow throughout the majority of the growing season.
  - (b) Height. Battery energy storage system shall not exceed the maximum height for the zoning district in which it is located.
  - (c) Fencing Requirements. The battery energy storage system including all mechanical equipment, shall be enclosed in fencing,

with a self-locking gate, and shall be a primarily woven wire or agricultural style fencing. The fence shall contain appropriate warning signage that is posted such that is clearly visible on the site. The warning signage shall include the type of technology associated with the battery energy storage system, any special hazards associated, the type of suppression system installed in the area of the battery energy storage system, and 24-hour emergency contact information, including reach-back phone number. Security fences, gates and warning signs must be maintained in good condition until the installation is dismantled and removed from the site.

- (d) Landscape buffer and screening. In an effort to mitigate any potential negative effects and reduce the visual impact of the facility, the perimeter of the facility shall be landscaped to create a visual screen from neighboring properties. Landscaping shall be installed within a planting area around the facility, in accordance with the following standards:
- (i) The landscaping buffer shall preferably use trees, shrubs, grasses and forbs that are native to Iowa, or where appropriate may include naturalized and noninvasive species.
  - (ii) The landscaping buffer shall use a combination of trees and plants to provide a vegetative screen. Trees shall be at least six (6) feet tall within three (3) years of installation and shall have a minimum mature height of twelve (12) feet or the height of any fencing, whichever is taller.
  - (iii) The planting area shall be located immediately adjacent to and outside the use area and shall extend no further than fifty (50) feet beyond the outside of the use area, which includes the security fence, required parking areas, required stormwater infrastructure, or other structures or infrastructure required or proposed with the development.
  - (iv) At the discretion of the approving authority, the minimum mature height of vegetative screening may be modified where the applicant can show good cause or practical difficulty.
  - (v) If the battery energy storage system is being constructed within the interior of a utility-scale solar facility, Planning and Zoning staff may waive or modify the requirements in

this subsection specific to battery energy storage systems.

- (e) Floodplain considerations. Utility scale battery energy storage systems are considered to be maximum damage potential structures and facilities for purposes of the floodplain district regulations.
- (4) Avoidance and Mitigation of Damages to Public Infrastructure.
- (a) Roads. Applicants shall adhere to the Woodbury County Road Use and Repair Agreement, and in doing so, shall identify all roads to be used for the purpose of transporting batteries, parts, cement, and/or equipment for construction, operation or maintenance of the US-BESSOD and obtain applicable weight and size permits from the impacted road authorities prior to construction.
  - (b) Existing road conditions. Applicant shall conduct a pre-construction survey, in coordination with the impacted local road authorities to determine existing conditions of roads identified pursuant to Section 5.09.2 A(4)(b). The survey shall include photographs or video and written documentation of the condition of the identified road facilities. The applicant is responsible for on-going road maintenance and dust control measures identified by the Woodbury County Engineer during all phase of construction.
  - (c) Drainage system. The applicant shall be responsible for repair of damage to public drainage systems stemming from construction, operation or maintenance of the installation.
- (5) Operation and maintenance plan. The applicant shall submit a plan for the operation and maintenance of the battery energy storage system, including all necessary services, frequency of service, preventative maintenance measures, and monitoring. The operation and maintenance plan should include at a minimum:
- (a) Preventative maintenance practices and schedules for all on-site equipment.
  - (b) Annual reporting and verification to county on the status or changes to ongoing service schedule.
  - (c) Noise. The one (1) hour average noise generated by from the battery energy storage system, components, and associated ancillary equipment shall not exceed a noise level of fifty-five (55) dBA as measured from the occupied dwelling of any adjacent property containing an existing residential structure. Applicants may submit equipment and component manufacturer noise ratings

at the time of application to demonstrate compliance. If the ambient sound pressure level exceeds 55 dBA, the standard shall be the ambient Leq (equivalent continuous sound pressure level) plus 5 dBA.

- (i) At the discretion of the approving authority, the applicant may be required to provide a baseline noise evaluation study completed by a board certified professional by the Institute of Noise Control Engineering (INCE), or an appropriately licensed Professional Engineer (PE) prior to construction of the proposed solar site.
  - (ii) To document decibel level if there is a complaint on an operational system, at the discretion of the Zoning Administrator, the owner shall commission a report providing Operating Sound Pressure Level measurements from a reasonable number of sampled locations at the property line of any adjacent property containing an existing residential structure or any property zoned residential to demonstrate compliance with this standard. Report shall be completed by a board certified professional by the Institute of Noise Control Engineering (INCE), or an appropriately licensed Professional Engineer (PE).
  - (iii) The owner(s) of an adjacent property may voluntarily agree, by written waiver, to a higher noise level.
- (d) Issue resolution protocols. Contact information for responsible party to address issues that may arise (damaged equipment causing excessive noise, etc.).
  - (e) Disposal/recycling plan for damaged or obsolete facility equipment or hazardous waste. No storage of inoperable or obsolete equipment shall be allowed to remain on-site. Site operator shall be responsible for the cleanup of debris related to storm damage.
  - (f) Fire safety compliance. The applicant shall document and describe how the fire safety system and its associated controls will function and be maintained in proper working order.
  - (g) Storm water management considerations.
    - (i) A run-off catch basin or other similar facility may be required to prevent contaminants from leaving the project area. If required, the applicant shall describe how the basin



will be maintained for the life of the project.

- (ii) Applicant shall contact the Iowa Department of Resources and Woodbury Soil and Water Conservation District to request recommendations for stormwater management practices to be used on the site. These recommendations may be considered by the Planning & Zoning Commission and the Board.
- (6) **Tile Investigation Report.** The applicant must submit a tile investigation report for the entire project area, identifying all drain tiles located therein. The applicant shall maintain and protect all drain tiles located within the project area and shall repair or replace any drain tiles damaged as a consequence of the installation or removal of the battery energy storage system and/or associated components.
- (7) **Emergency Response Plan.** A copy of the approved emergency response plan shall be given to the system owner, the local fire department, and local fire code official. A permanent copy shall also be placed in an approved location to be accessible to facility personnel, fire code officials, and emergency responders. The emergency operations plan shall include the following information:
  - (a) Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.
  - (b) Procedures for inspection and testing of associated alarms, interlocks, and controls.
  - (c) Procedures to be followed in response to notifications from the battery energy storage system, when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous conditions in the event of a system failure.
  - (d) Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department and Woodbury County Emergency Management, de-energizing equipment, and controlling and extinguishing the fire.

- (e) Procedures for dealing with battery energy storage system equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged battery energy storage system equipment from the facility.
  - (f) Other procedures as determined necessary by the County to provide for the safety of occupants, neighboring properties, and emergency responders.
  - (g) Procedures and schedules for conducting drills of these procedures and for training local first responders on the contents of the plan and appropriate response procedures.
- (8) Decommissioning and site restoration plan. The decommissioning and site restoration plan shall address and/or ensure the following standards:
- (a) Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations.
  - (b) The anticipated life of the battery energy storage system.
  - (c) The estimated decommissioning costs and method of ensuring funds will be available. Estimates for the total cost for decommissioning the site shall be determined by a Licensed Engineer. Salvage value shall not be included in the cost estimate. Cost estimate shall include a mechanism for calculating adjusted costs over the life of the project.
  - (d) The manner in which the site will be restored, including a description of how any changes to the surrounding areas and other systems adjacent to the battery energy storage system, such as, but not limited to, structural elements, building penetrations, means of egress, and required fire detection suppression systems, will be protected during decommissioning and confirmed as being acceptable after the system is removed.
  - (e) A listing of any contingencies for removing an intact operational energy storage system from service, and for removing an energy storage system from service that has been damaged by a fire or other event.
  - (f) Following a continuous one-year period in which no energy is stored, or if substantial action on construction or repairs to the project is discontinued for a period of one year, the permit holder will have one year to complete decommissioning of the battery energy storage system. At the discretion of the zoning

administrator, the continuous one-year period that triggers decommissioning may be extended if the applicant demonstrates ongoing commitment to the project through activities such as but not limited to making lease payments or documentation of ongoing maintenance or repairs.

- (i) Decommissioning shall be completed in accordance with the approved decommissioning plan.
  - (ii) The landowner or tenant shall notify the Zoning Director both when the project is discontinued and when decommissioning is complete.
- (g) At the discretion of the approving authority, financial surety may also be required.
- (9) Future Operators. Future operators, successors, assignees, or heirs shall agree in writing to accept and to conform to all conditions of approval in the staff report. Prior notice to the County of the intent to sell or transfer ownership shall be done in a timely manner. Such agreement shall be filed with and accepted by the County before the transfer to a new operator, successor, assignees, or heirs shall be effective.
- (10) Compliance with local, state and federal regulations. Utility scale battery energy storage systems shall comply with applicable local, state and federal regulations.



January 22, 2024

Dan Priestly  
Zoning Administrator  
Woodbury County

Re: Proposed Utility-Scale Solar Energy Systems

Dear Dan,

I am writing on behalf of the City of Sioux City ("City"). The City has reviewed the *Preliminary Staff Report for the Considerations for the Permitting of Utility-Scale Solar Energy Systems in Unincorporated Woodbury County, Iowa revision dated January 10, 2024*. The City would like to express several concerns regarding the proposed utility-scale solar energy systems zoning:

1. The City of Sioux City and Woodbury County have been working extensively together to develop the Southbridge Industrial Park and the area south of the airport to bring new industry, job growth, and investment to Sioux City and Woodbury County. This effort has included significant taxpayer investment in streets, utilities, and rail in this area.

As a critical part of this effort the City of Sioux City, City of Sgt. Bluff, and Woodbury County have also partnered to plan and construct a new I-29 interchange that will increase access and marketability of the Southbridge Industrial Park and the surrounding area.

Page 48 of the Preliminary Staff Report states:

*It is imperative to note that multi-acre utility-solar sites can reduce the amount of available land in the General Industrial (GI) areas for other developmental purposes. Acres taken out for utility-solar could impact the benefits of services ran to industrial areas such as sewer and water.*

The City shares this concern and believes that large utility-scale solar energy systems in this area may hamper these efforts and create an obstacle to further industrial development in the area, and we request a setback be required in this critical area.

2. An additional concern relates to Sioux Gateway Airport. FAA review is required for many types of development that may impact pilot safety. Large-scale solar panels may present a potential risk. We request any approvals include a required FAA review and approval within 2 miles of the airport.
3. At the same time the City is experiencing growth of new residential and commercial areas. The shortage of available quality housing continues to provide major challenges in attracting business and workforce growth in Iowa communities. A recent study indicated housing demand in Iowa is

expected to grow by 42,000 households by 2030. We have a concern that large industrial-scale solar-energy systems located too close to the City may impede this beneficial community growth.

To address these concerns the City respectfully requests a setback be required from City corporate boundaries. The City would support the creation of a protected area of two (2) miles from a city's corporate boundary and also a requirement of FAA consultation and approval. These protected areas would be similar to the recently approved requirements for wind turbines located in Woodbury County.

The City of Sioux City supports the efforts of Woodbury County to provide renewable energy sources. The City also supports solar energy systems as an accessory use to industrial development. However, there are significant concerns that the location of industrial-scale solar-energy systems may have a substantial negative impact on the potential growth of the City's residential and industrial areas. Therefore, I urge you to consider a revised version of this proposal that includes a protected setback area from a City's corporate boundary. If City Staff can be of any assistance as you work on these proposals, please feel free to contact us. Thank you for your consideration.

Sincerely,

A handwritten signature in blue ink, appearing to read "R. Scott", written over the word "Sincerely,".

Robert E. Scott  
Mayor  
City of Sioux City



## SOLAR ENERGY TECHNOLOGIES OFFICE

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Solar Energy Technologies Office

# The Potential of Agrivoltaics for the U.S. Solar Industry, Farmers, and Communities

APRIL 17, 2023

Solar Energy Technologies Office »

The Potential of Agrivoltaics for the U.S. Solar Industry, Farmers, and Communities




**MICHELE BOYD**

Michele Boyd is the program manager of the Strategic Analysis and Institutional Support team within the Solar Energy Technologies Office.

**MORE BY THIS AUTHOR**



 A farmer harvests crops at Jack's Solar Garden, a 1.2 megawatt community solar garden and agrivoltaics research site in Colorado. Photo by Werner Slocum / National Renewable Energy Laboratory

*This blog post was originally published as an article in **PV Tech POWER**.*

Large-scale solar energy installations are a relatively new form of development in many rural areas. Solar energy development can create clean energy, jobs, and other economic benefits in these communities. At the same time, the conversion of agricultural land, which tends to be flat and sunny, to solar energy development can raise local concerns that delay or derail projects. Agrivoltaics - the co-location of solar energy installations and agriculture beneath or between rows of photovoltaic panels - has the potential to help ease this land-use conflict.

To address climate change, the Biden-Harris Administration set a goal to decarbonize the electricity sector by 2035. Solar energy, which currently provides about 4% of U.S. electricity supply, has a key role in this decarbonization. According to the U.S. Department of Energy's *Solar Futures Study*, solar energy could supply as much as 40% of U.S. electricity by 2035.

This level of solar deployment could require about 5.7 million acres, or 0.3% of the U.S. contiguous land area. While this is a small percentage of U.S. land, it is in addition to other types of infrastructure development that are also leading to the conversion of farmland. Moreover, large-scale solar energy is not going to be evenly distributed across the landscape, because it must be located near transmission lines. Combining agriculture and solar on the same piece of land might be a solution, which is why DOE is funding \$15 million in research on how agrivoltaics could work for farmers, the solar industry, and communities.

Agrivoltaics is still a nascent business model. Based on data collected so far by the National Renewable Energy Laboratory, there are over 2.8 GW of agrivoltaic sites in the U.S., the majority of which involve sheep grazing and/or pollinator habitat. Growing crops under solar panels has been largely confined to research test plots, though this is beginning to change. At least five commercial solar-crop sites are operating in Colorado, Massachusetts, and Maine.

A few states are encouraging the construction of agrivoltaics through incentives or research. Massachusetts has enacted a feed-in tariff adder of \$0.06/kWh for agrivoltaic projects through its Solar Massachusetts Renewable Target (SMART) program. New Jersey authorized an agrivoltaics pilot program of up to 200 MW on unreserved farmland and funded an R&D system at the Rutgers New Jersey Agricultural Experiment Station. Colorado has also funded agrivoltaics research.

Agrivoltaics has the potential to help farmers adapt to climate change and diversify their income through land lease payments or other business structures. Research in the drylands of Arizona found that farming under solar panels can decrease evaporation of water from the soil and potentially reduce irrigation requirements. Agrivoltaics can also improve crop yield and crop resistance in extreme weather, such as droughts. Adding farming to existing solar energy sites is being explored as an approach to increase access to land for historically disadvantaged groups, such as Black and immigrant farmers. At the same time, questions remain for farmers about how to do agrivoltaics, including which crops are suitable in a shaded environment.

For the solar industry, agrivoltaics has the potential to facilitate siting of solar installations, improve solar PV panel performance by cooling the panels, and lower



operations and maintenance costs by limiting the need for mowing. Yet the capital costs of agrivoltaics tend to be higher than traditional solar development due to modified system structures and more complex design and installation. To make agrivoltaics a widely available option for developers, questions about cost, worker safety, liability, and other business, legal, and regulatory issues will need to be addressed.

For communities, agrivoltaics could help keep farmland in production - and help sustain rural farmland economies. More research is needed, however, to understand whether - and under what conditions - communities are likely to support solar development if it combines both energy and agriculture.

All agrivoltaic stakeholder groups - from developers to farmers to financiers and insurers - will need to understand each other's priorities and establish common goals to realize the potential benefits. Communities will need to see tangible benefits from agrivoltaics.

To help bring agrivoltaics to maturity, DOE's research is examining how agrivoltaics can impact both agriculture and energy production and how agrivoltaics can fit into agricultural communities and economies, including public perceptions. Our projects, like the **AgriSolar Clearinghouse**, are providing technical assistance and developing resources to lower the barrier of entry for agricultural producers and solar developers. We are collaborating with the U.S. Department of Agriculture on foundational research to help understand the economic value and tradeoffs and ecological impacts of agrivoltaics projects. DOE is also funding the development of new technologies that could facilitate agrivoltaics and help lower the cost premium.

Agrivoltaics is not a panacea for all farmland conservation or solar development needs, but it is a potential tool in the toolbox for meeting our climate goals, supporting farmers by keeping farmland in production, and supporting the economies of rural communities.

**Learn more about agrivoltaics research** funded by the U.S. Department of Energy Solar Energy Technologies Office.

## FARM FOOD NEWS

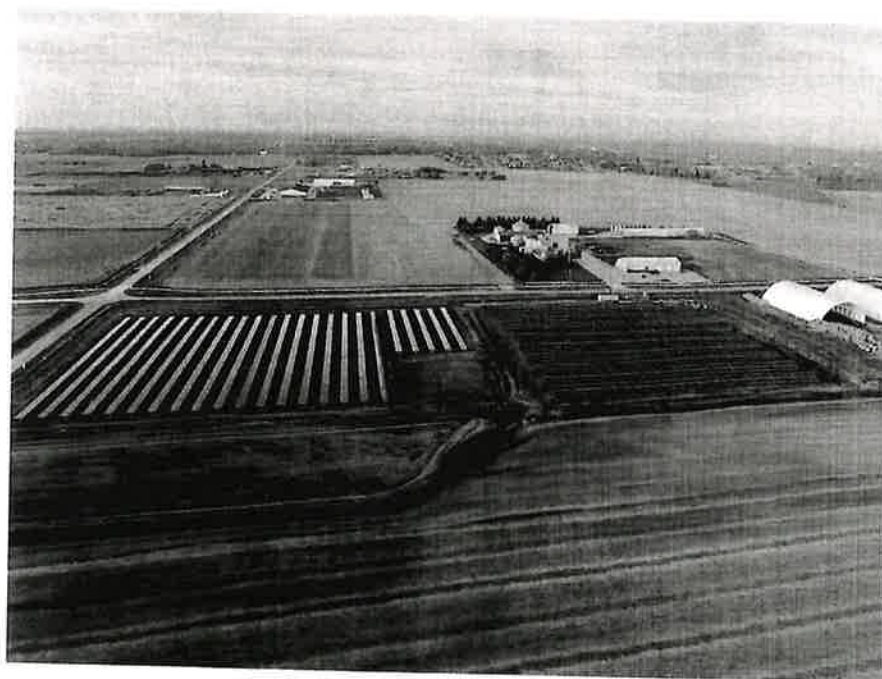
### RESEARCH, TECHNOLOGY

# Crop and Energy Production Merge in Iowa Project

JAN 04, 2024

Terri Queck-Matzie

A new study underway at Iowa State University explores how farming and solar energy might coexist.



The 10-acre Alliant Energy Solar Farm at Iowa State University is the first utility scale agrivoltaics research project in the Midwest.

Photography courtesy of Alliant Energy.

Solar power may be the answer to the world's future energy needs. **But its benefit is limited if it hampers our ability to produce food.**

Using farmland for solar panels, especially in the agriculture-heavy Midwest, is fraught with controversy. "There is concern that solar energy will prevent land from being used for farming," says Matt O'Neal, professor of entomology and Henry A. Wallace Chair for Sustainable Agriculture at Iowa State University.



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A new study underway at Iowa State University seeks to answer that question.

“Solar panels don’t have to be disruptive. It doesn’t mean farming the land has to stop,” says O’Neal. “We want to look at possibilities and profitability.”

A multi-disciplinary team of ISU professors, graduate and undergraduate students is working with Alliant Energy through a public-private partnership to study the potential of agrivoltaics, the simultaneous use of areas of land for both solar panels and agriculture. The team includes horticulturalists, economists, environmentalists, sociologists, engineers and even entomologists.

The project is the first of its kind. “There has been research conducted, but not on a utility scale,” says Nick Peterson, Strategic Partnerships Manager with Alliant Energy, “and not in a public/private partnership with a land grant university.”

There has also been little research conducted in the Midwest, the heart of agriculture, where farmland is gold.

## The solar farm

Alliant Energy completed construction on the 10-acre Alliant Energy Solar Farm on the ISU research farms near Ames, Iowa in the fall of 2023. Managed by the ISU College of Agriculture and Life Sciences, the research farms are used to study livestock production and the agriculture industry.

Alliant designed, built, owns and will operate and maintain the 3,300 solar panels and 16 inverters at an ultimate estimated cost of around \$4 million.

The ISU team will plant fruits and vegetables beneath and among the panels to measure not only plant growth but the effect on energy production.

“One of the questions before the electrical engineers is the effect of the vegetation on the panels,” says Peterson. “Engineers know from previous study, particularly out of Colorado, that panels that are cooled can absorb more energy. What we’re studying now is how different types of panels and vegetation impact energy production.”

The solar array consists of two types of panels—fixed and single access tracker.

Fixed panels are like those often found on rooftops. As the name implies, they stay in one fixed position. For scientific method purposes, the lowest edge of the panel sits at two heights, five feet or 2.5 feet.

Tracker panels move with the sun. They are placed at five or eight feet. All panels are bi-facial, meaning they absorb sunlight on both sides.

Horticulturalists are growing raspberries, strawberries, summer squash, peppers and broccoli, along with control grasses. The first of the raspberries and the grass mix went in this fall. The remainder of the crops will be planted in the spring.

Traditional Iowa crops such as corn and soybeans were avoided due to the need for large equipment and the small acreage.

Issues such as harvest timing and growing season will be studied, as well as climatic impacts. O'Neal sees specific varieties eventually being developed for the environment.

The harvested crops will be sold to the university's dining halls.

The crops, along with flowering perennials, were chosen with natural attraction of pollinators in mind, and the project will include beehives, with researchers studying how the bees develop and what kind of honey they produce. Other projects in various parts of the country have utilized sheep grazing in their agrivoltaics, but livestock was ruled out at ISU due to limited area and water availability.

"Bees are livestock, too," says O'Neal.

## More questions

While the bees, plants and energy production are under study, sociologists and economists will weigh in.

Sociologists will study public perception of agrivoltaics and solar power in general. Researchers will look at how such a project could affect a community and will track how information based on science leads to future community decisions.

“There are valid concerns about how land will be used in the future,” says O’Neal. “People are leery about ag land being used for recreation, urban development or energy production.” Wildlife conservation is a concern, including pollinators. Some see solar arrays as disruptive to agriculture, Iowa’s top industry. “This project will give the public a chance to see if various modifications to a solar farm make these sitings more palatable.”

“The bottom line is this is Iowa, and we should be growing things,” says Peterson. “For us to be good stewards of our customers, we need to be looking at how we can maximize land use.”

For Alliant Energy, the economics of power production are front and center. Peterson says 52 percent of Alliant’s energy comes from a mix of renewable sources such as wind and solar. The rest comes from natural gas and a few remaining coal plants set to retire by 2040.

A three-person economics team will study the cost and profitability of the solar farm. “Every step can be costly,” says Hongli Feng, assistant professor at the ISU Department of Economics, “from the land to the ground preparation, to the seeds and equipment and labor.”

Based on the cost tracking, the team will create an enterprise budget tool for farmers and solar field developers.

The basic business model is based on reality.

“The land lease agreement between ISU and Alliant Energy follows what landowners might experience if the energy company chooses a site on their land,” says O’Neal. “We want to look at what that relationship would be like.”

“Much of the existing research is regionally specific,” adds Feng. “We need to see how it applies to Iowa and the Midwest.”

## **The partnership**

Alliant Energy has been active in research conducted by ISU’s Electric Power Resource Center for more than 60 years. According to EPRC director Anne Kimber, the center’s research focuses on integrating renewable energy into the existing structure that wasn’t designed for it.

In addition to the ongoing research, Iowa State University has a five-year strategic plan for operational sustainability, which includes goals for tripling the use of renewable energies and ultimately, carbon neutrality.

“ISU called Alliant to explore what sustainable energy production on the research farm might look like,” says Peterson. “ISU has added several new facilities to its research farm in recent years, including a feed mill and a turkey teaching and research facility. These projects give students the opportunity to learn agriculture and the agriculture industry firsthand, but they come with operating costs.”

The Alliant Energy Solar Farm will produce 1.375 MW of power at maximum capacity, enough to power the equivalent of around 200 homes. The renewable energy ISU receives will offset a portion of the university’s annual carbon emissions.

That alone is a pragmatic goal. But Ray Klein, director of partnerships at Iowa State University’s College of Agriculture and Life Sciences, saw more opportunity. He proposed leveraging the project for academic and ag industry research.

The result was a four-year, \$1.8-million grant from the US Department of Energy, the largest grant awarded by the agency for such a project.

## The research

Iowa State University is a land-grant teaching college, and the project includes surveys, seminars and field days to share findings with agriculture producers and the public through Iowa State University Extension and Outreach.

“When we first started this, ISU’s priority was that they be able to share what we learned,” says Peterson.

The information may be especially useful in the growing farm-to-table sector of ag production, where producers often operate on smaller tracts of land and sell locally, and food produced in agrivoltaics systems may more immediately go into local food systems impacting food availability.

“Local food systems are the next level of diversity in ag,” says Peterson. “This opens up a new avenue for farming that is coupled with renewable energy. I’m hoping we can develop the research base

to show if agrivoltaics is viable, profitable and sustainable for this part of the world.”

“This is unbiased research,” adds Ajay Nair, an ISU professor of horticulture. “We will report what we find, and people can decide whether this is a system that is feasible or not.”

Kimber sees benefits beyond food and energy. “There are a lot of communities who are thinking about community solar arrays,” she says. “Imagine if the community also gets to have gardens associated with those arrays? You’re starting to build community around that. I think that’s worth working on.”

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**4 COMMENTS**



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**Mike N.** 15 days ago

There seems to be a lot of hostility to utility scale solar in Iowa right now. A large solar project near Palo IA has become a lightning rod for the anti solar crowd. Meanwhile suburban sprawl metastasizes from around urban areas swallowing up vastly more farmland, yet there seems to be little outcry over that. I do agree that any solar project put on decent farmland should at a minimum integrate some form of agrovoltaics, even if it is to

# Purdue agrivoltaic farming structures and software harvest solar power at lower cost and with minimal impact on crop yield



Purdue University researchers in the colleges of Agriculture and Engineering have created agrivoltaic structures that optimize the amount of electricity generated by solar farms. The modules are mounted lower than traditional solar structures and rotate to form a near-vertical structure when farm equipment needs to pass. (Purdue University photo/Mitch Tuinstra)

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<https://www.purdue.edu/uns/images/2023/agrivoltaic-structuresLO.jpg>



## ***Innovative modules created at the College of Agriculture and College of Engineering are mounted low and rotate to allow farm equipment to pass***

WEST LAFAYETTE, Ind. – Purdue University researchers have improved upon traditional solar energy structures used in agrivoltaic farming, a sustainable system that generates electricity from the sun while row crops like corn, rice, soybeans and wheat concurrently grow on the same land.

The patent-pending Purdue structures and software optimize food production for farmers and maximize solar energy production. Research about the improved agrivoltaic panels was published in the **January 2023 issue of the peer-reviewed IEEE Journal of Photovoltaics** (<https://ieeexplore.ieee.org/document/9928413>). It also has been published in the Journal of Photovoltaic Technology and Nature Sustainability and presented at IEEE Photovoltaic Specialists conferences.

**Rakesh Agrawal** (<https://engineering.purdue.edu/ChE/people/ptProfile?id=3942>), the Winthrop E. Stone Distinguished Professor of Chemical Engineering from Purdue's **Davidson School of Chemical Engineering** (<https://engineering.purdue.edu/ChE>), said farmland in the United States already is used to generate energy from wind.

"But wind farms depend on the availability of wind energy and are limited to certain regions of the world," Agrawal said, "whereas sunlight is available at most locations where farming is done, and photovoltaics, or PV, can be deployed at a much larger scale. However, use of PV panels on agriculture farmland requires sharing solar photons between food and energy that must be carefully optimized."

Traditional agrivoltaic structures cast shadows, which decrease crop yield. **Mitch Tuinstra** (<https://ag.purdue.edu/department/agry/directory.html#/mtuinstr>) is a Purdue University professor of plant breeding and genetics, the Wickersham Chair of Excellence in Agricultural Research and scientific director of the **Institute for Plant Sciences** (<https://ag.purdue.edu/plantsciences/>) in the **College of Agriculture**

[\(https://ag.purdue.edu/\)](https://ag.purdue.edu/). He said traditional structures are incompatible with large-scale agriculture because they are mounted high to allow farm equipment to freely move around them.

"The increased height requires a deeper foundation for the structures, which dramatically increases the cost of the solar farms," Tuinstra said. "Our modules are mounted much lower, comparable to traditional solar farms, which makes our system more affordable and decreases the time needed for a return on investment."

The Purdue agrivoltaic structures use a dual, off-axis rotation system and sensors to optimize the amount of electricity generated and the amount of light that crops receive.

"The key idea is that when farm equipment needs to pass, the modules will rotate to form a near-vertical structure," Tuinstra said. "At other times, the modules will track the sun as usual."

### **Muhammad Ashraf Alam**

[. \(https://engineering.purdue.edu/ECE/People/Archives/ptProfile?resource\\_id=3171\)](https://engineering.purdue.edu/ECE/People/Archives/ptProfile?resource_id=3171), the Jai N. Gupta Professor of Electrical and Computer Engineering in the **Elmore Family School of Electrical and Computer Engineering**

[. \(https://engineering.purdue.edu/ECE\)](https://engineering.purdue.edu/ECE), said the Purdue agrivoltaic structures can be implemented for full-scale farming and use current farm equipment.

"The system is designed with row crops in mind like corn, soybeans, wheat and rice," Alam said. "The dimensions of these structures have been fine-tuned to allow sunlight, rain and shadows to reach plants as needed. They also withstand harsh weather conditions including heavy rain and strong wind."

Agrawal, Alam and Tuinstra created the structures and software and disclosed them to the **Purdue Research Foundation Office of Technology Commercialization**

[. \(https://otc.prf.org/\)](https://otc.prf.org/), which applied for a patent on the intellectual property. Industry partners seeking to further develop the inventions should contact **Will Buchanan** [. \(https://otc.prf.org/staff/will-buchanan/\)](https://otc.prf.org/staff/will-buchanan/), [wdbuchanan@prf.org](mailto:wdbuchanan@prf.org)

<mailto:wdbuchanan@prf.org>) about **2020-AGRA-68784**  
**(<https://inventions.prf.org/innovation/7392>)** and **2021-AGRA-69267**  
**(<https://inventions.prf.org/innovation/7877>)**.

The next steps to bring these improved agrivoltaic structures to market include partnering with a solar energy developer.

"This is translational research. An industrial partnership or partnership with solar farm installation companies, preferably in Indiana, is the next step," Tuinstra said.

### **About Purdue University**

Purdue University is a top public research institution developing practical solutions to today's toughest challenges. Ranked in each of the last five years as one of the 10 Most Innovative universities in the United States by U.S. News & World Report, Purdue delivers world-changing research and out-of-this-world discovery. Committed to hands-on and online, real-world learning, Purdue offers a transformative education to all. Committed to affordability and accessibility, Purdue has frozen tuition and most fees at 2012-13 levels, enabling more students than ever to graduate debt-free. See how Purdue never stops in the persistent pursuit of the next giant leap at <https://stories.purdue.edu> (<https://stories.purdue.edu>).

### **About Purdue Research Foundation Office of Technology Commercialization**

The **Purdue Research Foundation Office of Technology Commercialization** (<https://otc.prf.org/>) operates one of the most comprehensive technology transfer programs among leading research universities in the U.S. Services provided by this office support the economic development initiatives of Purdue University and benefit the university's academic activities through commercializing, licensing and protecting Purdue intellectual property. In fiscal year 2021, the office reported 159 deals finalized with 236 technologies signed, 394 disclosures received and 187 issued U.S. patents. The office is managed by the Purdue Research Foundation, which received the 2019 Innovation and Economic Prosperity Universities Award for Place from the Association of Public and Land-grant Universities. In 2020, IPWatchdog Institute ranked Purdue third nationally in

startup creation and in the top 20 for patents. The Purdue Research Foundation is a private, nonprofit foundation created to advance the mission of Purdue University. Contact [otcip@prf.org](mailto:otcip@prf.org) (<http://otcip@prf.org>) for more information.

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## Research Foundation News

- **Treating diseases by eliminating protein aggregation in the brain, pancreas** (<http://www.purdue.edu/newsroom/releases/2024/Q1/treating-diseases-by-eliminating-protein-aggregation-in-the-brain-pancreas.html>)
- **Quantum Research Sciences receives U.S. Air Force's first Quantum Computing Phase III contract** (<http://www.purdue.edu/newsroom/releases/2024/Q1/quantum-research-sciences-receives-u.s-air-forces-first-quantum-computing-phase-iii-contract.html>)
- **NutraMaize receives three-year, \$460,455 USDA NIFA research grant to address heat stress in laying hens** (<http://www.purdue.edu/newsroom/releases/2024/Q1/nutramaize-receives-three-year-460,455-usda-nifa-research-grant-to-address-heat-stress-in-laying-hens.html>)
- **USDA determines Insignum AgTech corn plants can be sold and grown without restriction** (<http://www.purdue.edu/newsroom/releases/2023/Q4/usda-determines-insignum-agtech-corn-plants-can-be-sold-and-grown-without-restriction.html>)

- **Purdue University wins patent infringement lawsuit against STMicroelectronics**  
**(<http://www.purdue.edu/newsroom/releases/2023/Q4/purdue-university-wins-patent-infringement-lawsuit-against-stmicroelectronics.html>)**

LOCAL COVERAGE

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## 'Pollinator-friendly' solar farms can be a boon for bees. In Mass., they're not always easy

05:01  

November 06, 2023 By Barbara Moran



The pollinator garden blooming with foxglove beardtongue at the Weld Research Building of the Arnold Arboretum. (Jesse Costa/WBUR)

On a sunny day last June, Brendan Keegan walked down a mulch path at the Arnold Arboretum, unlocked a chain-link fence and stepped into a jungle.

The jungle was a wildflower meadow in early summer bloom, with blossoms of foxglove beardtongue, common yarrow and wild bergamot — some nearly chin-high — swaying in the breeze. The plants grew so thick in places that it was hard to walk through.

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"If you just look at a couple square feet, you can really get a sense of the abundance that we have growing within this meadow," said Keegan, a horticulturist at the Arboretum and chief caretaker of the meadow. "We're hoping to attract as many pollinators as possible, and to make a good habitat for as wide a variety of species as possible."

It seemed to be working; bees, flies and other insects bobbed and weaved among the petals. It was a veritable pollinator paradise.

But what makes this meadow truly remarkable is its location: it's growing (mostly) underneath solar panels. The 1.2-acre solar farm at the Arnold Arboretum's Weld Hill research facility was one of the first "pollinator-friendly" solar farms built in Massachusetts.

The state now promotes the concept as a way to encourage both renewable energy and biodiversity — specifically, native pollinating insects, many of which are in decline. In 2020, Massachusetts began offering a small incentive to commercial solar farms that grew successful pollinator meadows amid the panels. It's a lesser-known, less-intensive form of so-called "agri-voltaics" — growing food or grazing animals on solar farms. The state developed the criteria for "pollinator-friendly" solar in partnership with the University of Massachusetts, Amherst's Clean Energy Extension.



Wildflowers growing beneath the solar arrays in the pollinator meadow at the Weld Research Building of the Arnold Arboretum. (Jesse Costa/WBUR)

For the Arboretum, the idea blossomed when its leaders decided to build a new solar array over an existing lawn. They wanted something more ecologically valuable than the typical gravel or turf grass underneath — what Arboretum Director William “Ned” Friedman called “the antithesis of biodiversity.”

“We saw this as an opportunity to change a monoculture of grass into something that supports the ecosystem of an urban environment,” said Friedman, who is also a biology professor at Harvard.

But building a meadow under a solar farm is a lot of work, even for an army of botanists. Arboretum experts came up with a list of native shade-tolerant plants, then hand-collected wild seed from more than 40 species. They cultivated the most stubborn seedlings in greenhouses, then planted the flowers into dirt that had been prepared by months of weed suppression. After the plants went in, Keegan spent years hand-weeding invasive species — a job that will never actually end.





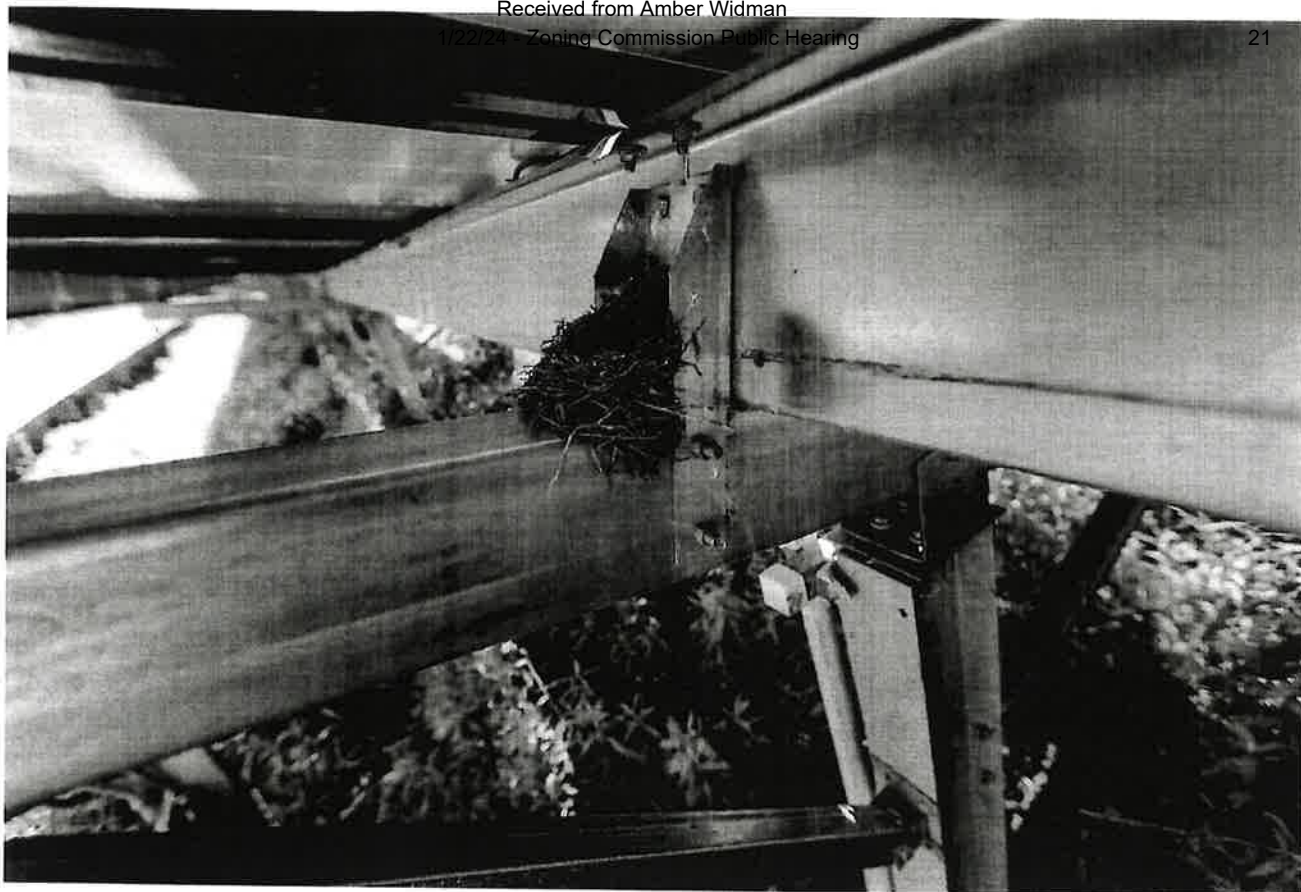
Brendan Keegan, horticultural expert at the Arnold Arboretum, looks for signs of insect activity under rotting wood he placed beneath the solar arrays in the pollinator meadow. (Jesse Costa/WBUR)

**Three years in, the meadow is just getting established,** and the Arboretum plans to do a full plant and wildlife census next year. But they've already documented many species of pollinating insects, along with rabbits, foxes, voles, red-backed salamanders, and 20 species of birds — including four nesting among the solar panels.

Friedman calls it “magnificent.”

“It is just a buzzing hum of insects going nuts,” he said. “I would love to see this along the interstates. All these places where we have these panels — how beautiful would it be if you had this instead of grass?”

Friedman isn't the only one thinking like this: more than a dozen states currently have some sort of pollinator-friendly solar program. In Massachusetts, 45 planned projects have been certified so far, and about 17 of those have been built.



A finch nest beneath one of the solar arrays in the pollinator garden at the Weld Research Building of the Arnold Arboretum. (Jesse Costa/WBUR)

**But the Arboretum's success can be tough to replicate for commercial solar farms that don't have an army of botanists on hand.**

"Wildflowers — you would think, you just throw the seed down and they would grow," said Lawrence Cook, the senior project manager with PureSky Energy. "They're wildflowers! They grow everywhere! Unfortunately, they need a little bit of encouragement."

PureSky Energy operates 11 solar farms in Massachusetts and is building more; two of the sites have pollinator meadows. Cook gave a tour of a 30-acre farm in Douglas. Walking around, there's a sea of blue solar panels with some occasional flowers and a couple bees.

It looks more pollinator-friendly than, say, gravel, but not quite pollinator nirvana. That's partly because the meadow was recently mowed to suppress weeds, a standard practice while native plants are still getting started. Pollinator meadows can take three to five years to establish, and this one has a few years to go.



Wallum Lake Solar Farm in Douglas consists of 22,400 solar panels on 30 acres. (Jesse Costa/WBUR)

Getting the pollinator-friendly stamp of approval in Massachusetts is not easy. The Douglas site's "silver" certification, for instance, requires that 50% of a solar farm's footprint be planted with native seeds, which must include at least three species of blooming wildflowers each season. To welcome wildlife, the farm should also include bee boxes, bird houses and gaps in the fence to let turtles and other critters through. Regular inspections keep developers honest.

"We have pretty strict requirements," said Zara Dowling, a research fellow at the UMass Clean Energy Extension. Dowling convened the team of experts who designed the criteria, and said that the Massachusetts rules are tougher than most other states'.

"You could put a lot of clover down, that's cheap," she said. "That's going to help some generalist bee species. But we're really focused on the native pollinators."



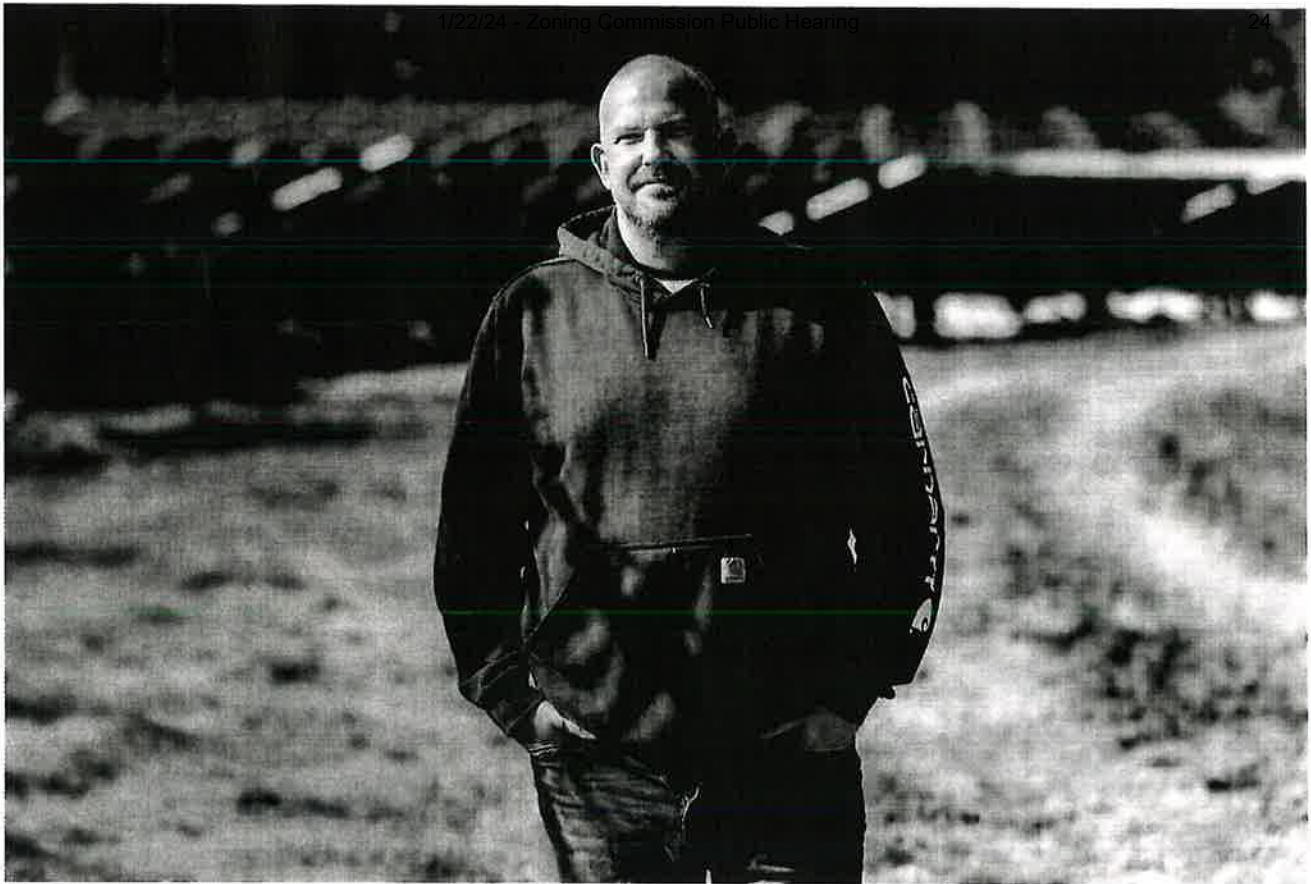
A bumble bee pulls itself into a foxglove beardtongue flower at the Weld Hill Research Building of the Arnold Arboretum. (Jesse Costa/WBUR)

For all this work, certified farms earn a fraction of a cent more per kilowatt-hour for their solar energy. The extra money is designed to help developers recoup the costs of creating the meadow — things like seed, topsoil and labor — within the lifetime of the solar farm.

"It was done as a way to cover your costs, and for the most part it does that," Cook said. "But if there's any issues in the establishment, it doesn't cover any of the additional costs."

Cook said the meadow in Douglas has struggled with erosion; workers had to haul in new topsoil and seed to replant a couple washed-out sections. For some developers, the meadow becomes "a real millstone around the neck," Cook said.

In fact, some solar farms in the state have withdrawn from the program over financial concerns.



Lawrence Cook of PureSky Energy at Wallum Lake Solar Farm in Douglas. (Jesse Costa/WBUR)

Some developers are also skittish, said Dowling, because the state is currently reviewing its solar incentives; there's concern that the pollinator program could diminish or disappear.

This seems unlikely, given that Massachusetts' 2022 climate law requires the state's solar incentive program to include a rebate for pollinator-friendly solar. A spokesperson for the Massachusetts Department of Energy Resources said that the agency is now working on a proposal to finalize the pollinator incentive, but did not provide details.

Cook said they're sticking with their pollinator farm in Douglas regardless, because "it's the right thing to do."

Building the farm in Douglas — like many in Massachusetts — required cutting down acres of forest. The project was contentious, and Cook said he hopes the meadow can address some of the habitat loss.

"If you're going to do solar and you have to cut down trees, then I think 'pollinator' is the least you can do, to kind of reset the balance with nature," he said. "It's a different habitat. But it is a needed and important habitat, nonetheless."

While some argue that cutting down forest for a solar farm is never a good idea, pollinator meadow or no, the state has set ambitious goals for solar energy, and where to put all those solar panels will continue to be controversial.

Massachusetts wants to move from about 4 gigawatts of solar capacity today to around 30 gigawatts by 2050, while preserving the most valuable land and forest. Some solar will go onto rooftops, but some will be built on land.

Proponents say pollinator meadows could offer a way to preserve — or even create — wildlife habitat by turning barren solar farms into living ecosystems, and could make green energy a little greener.

*This segment aired on November 6, 2023.*

### Related:

- Want to help local pollinators? Here are 15 tips
- Want to help the planet? Rethink your lawn
- Mass. can expand solar without chopping so much forest, report says
- Farms Will Harvest Food And The Sun, As Mass. Pioneers 'Dual-Use' Solar
- The world's insect population is in decline — and that's bad news for humans



**Barbara Moran** Correspondent, Climate and Environment  
Barbara Moran is a correspondent on WBUR's environmental team.  
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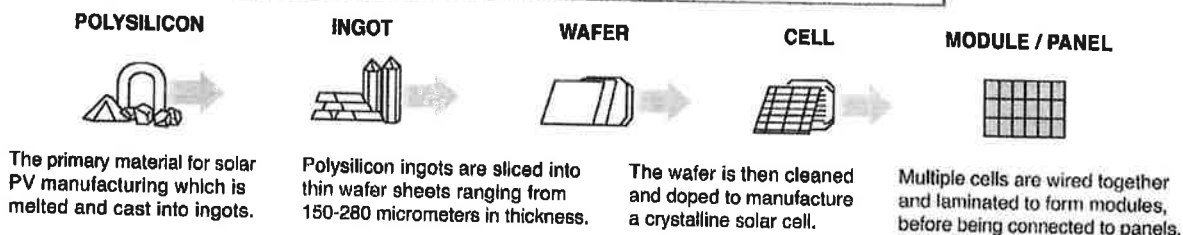
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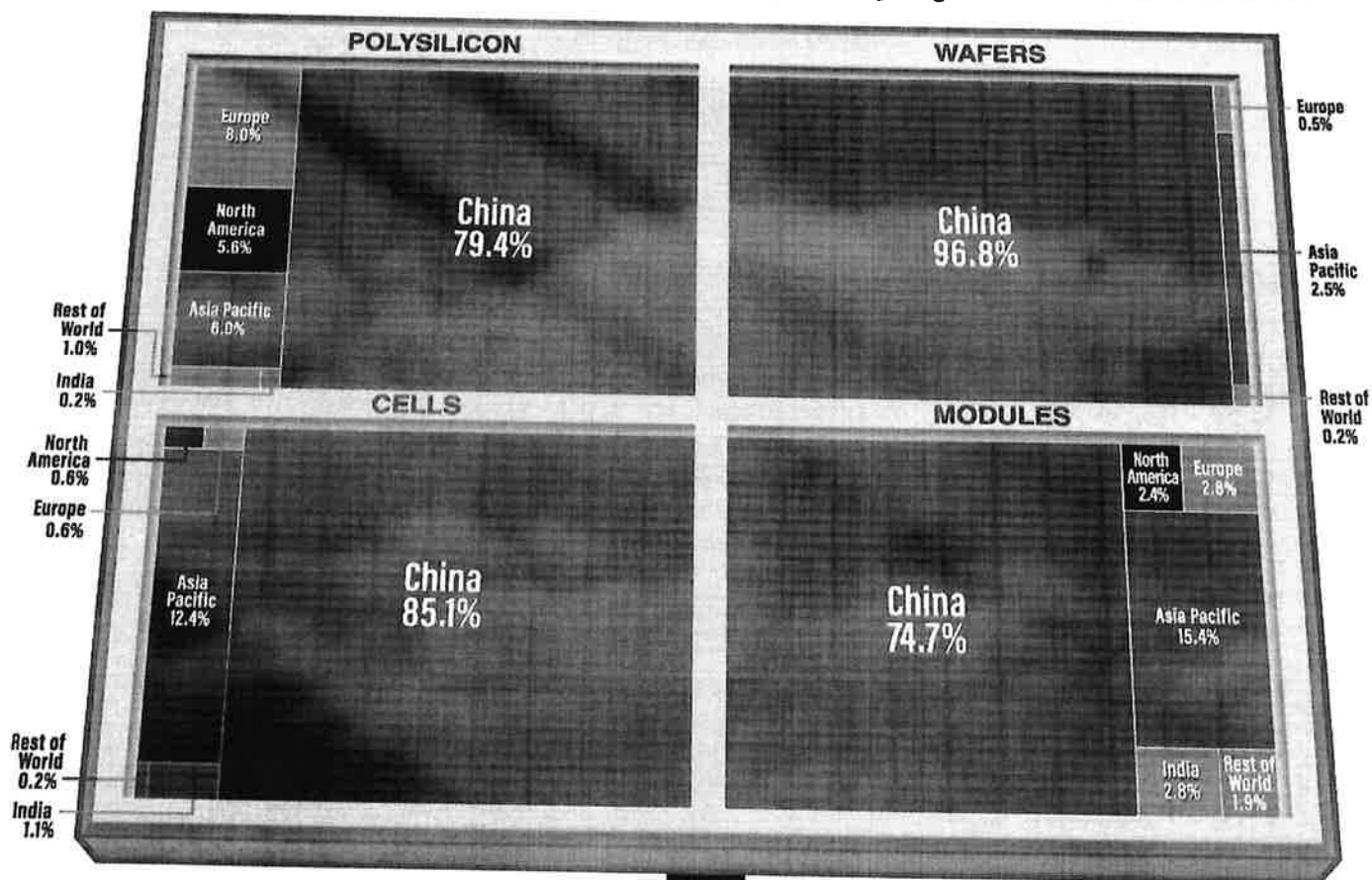


# Who Controls the Solar Panel Supply Chain?

## The Manufacturing Process for Solar PV Panels



## Share of Manufacturing Capacity by Country/Region in 2021



China made up 55% of global solar panel manufacturing capacity in 2010, with its share rising to 84% in 2021.



The total value of global solar PV related trade increased by more than 70% YoY to reach over \$40B in 2021.

# China's Dominance in the Solar Panel Supply Chain

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Many governments are investing in renewable energy sources like solar power, but who controls the manufacturing of solar photovoltaic (PV) panels?

Receive updates when new visuals go live:

As it turns out, China owns the vast majority of the world's solar panel supply chain, controlling at least 75% of every single key stage of solar photovoltaic panel manufacturing and processing.

This visualization shows the shares held by different countries and regions of the key stages of solar panel manufacturing, using data from the International Energy Agency (IEA).

## Solar Panel Manufacturing, by Country and Stage

From polysilicon production to soldering finished solar cells and modules onto panels, China has the largest share in every stage of solar panel manufacturing.

Even back in 2010, the country made the majority of the world's solar panels, but over the past 12 years, its average share of the solar panel supply chain has gone from 55% to 84%.

China also continues to lead in terms of investment, making up almost two-thirds of global large-scale solar investment. In the first half of 2022, the country invested \$41 billion, a 173% increase from the year before.

Country/Region	Solar Panel Demand	Average Share of Solar Panel Manufacturing Capacity
China	36.4%	84.0%
Europe	16.8%	2.9%
North America	17.6%	2.8%
Asia-Pacific	13.2%	9.1%
India	6.9%	1.3%
Rest of the World	9.1%	0.8%

Source: IEA

Note: Percentages may not add up to 100% due to rounding

After China, the next leading nation in solar panel manufacturing is India, which makes up almost 3% of solar module manufacturing and 1% of cell manufacturing. To help meet the country's goal of 280 gigawatts (GW) of installed solar power capacity by 2030 (currently 57.9 GW), in 2022 the Indian government allocated an additional \$2.6 billion to its production-linked incentive scheme that supports domestic solar PV panel manufacturing.

Alongside China and India, the Asia-Pacific region also makes up significant amounts of solar panel manufacturing, especially modules and cells at 15.4% and 12.4% respectively.

While Europe and North America make up more than one-third of the global demand for solar panels, both regions make up an average of just under 3% each across all stages of actually manufacturing solar panels.

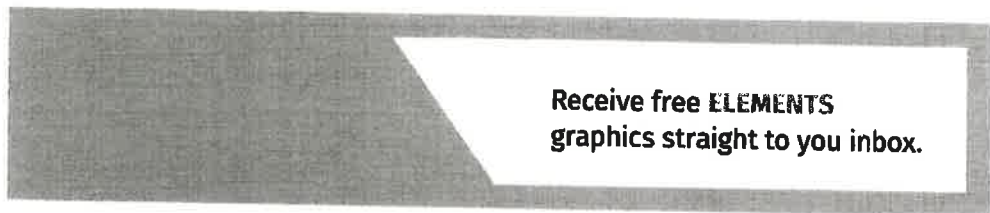
## Too Little Too Late to Diversify?

China's dominance of solar photovoltaic panel manufacturing is not the only stranglehold the country has on renewable energy infrastructure and materials.

When it comes to wind, in 2021 China built more offshore wind turbines than all other countries combined over the past five years, and the country is also the leading producer and processor of the rare earth minerals essential for the magnets that power turbine generators.

In its full report on solar panel manufacturing, the IEA emphasized the importance of distributing global solar panel manufacturing capacity. Recent unexpected manufacturing halts in China have resulted in the price of polysilicon rising to 10-year highs, revealing the world's dependence on China for the supply of key materials.





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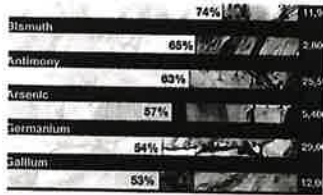
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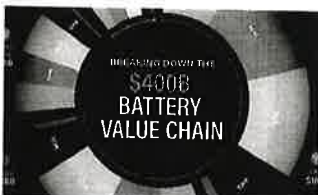
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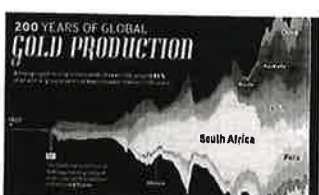
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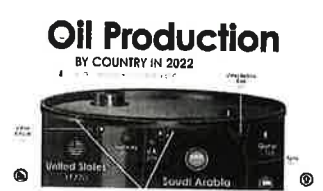
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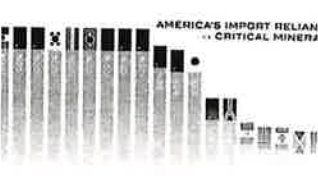
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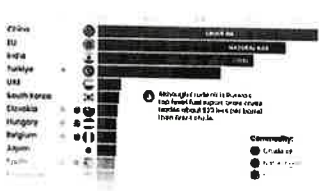
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**Ranked: The World's Biggest Oil Producers**



**Charted: America's Import Reliance of Critical Minerals**



**Who's Still Buying Russian Fossil Fuels in 2023?**

ENERGY SHIFT

# China Dominates the Supply of U.S. Critical Minerals List

China was the world's leading producer of 30 out of 50 entries on the U.S. critical minerals list, according to the U.S. Geological Survey.

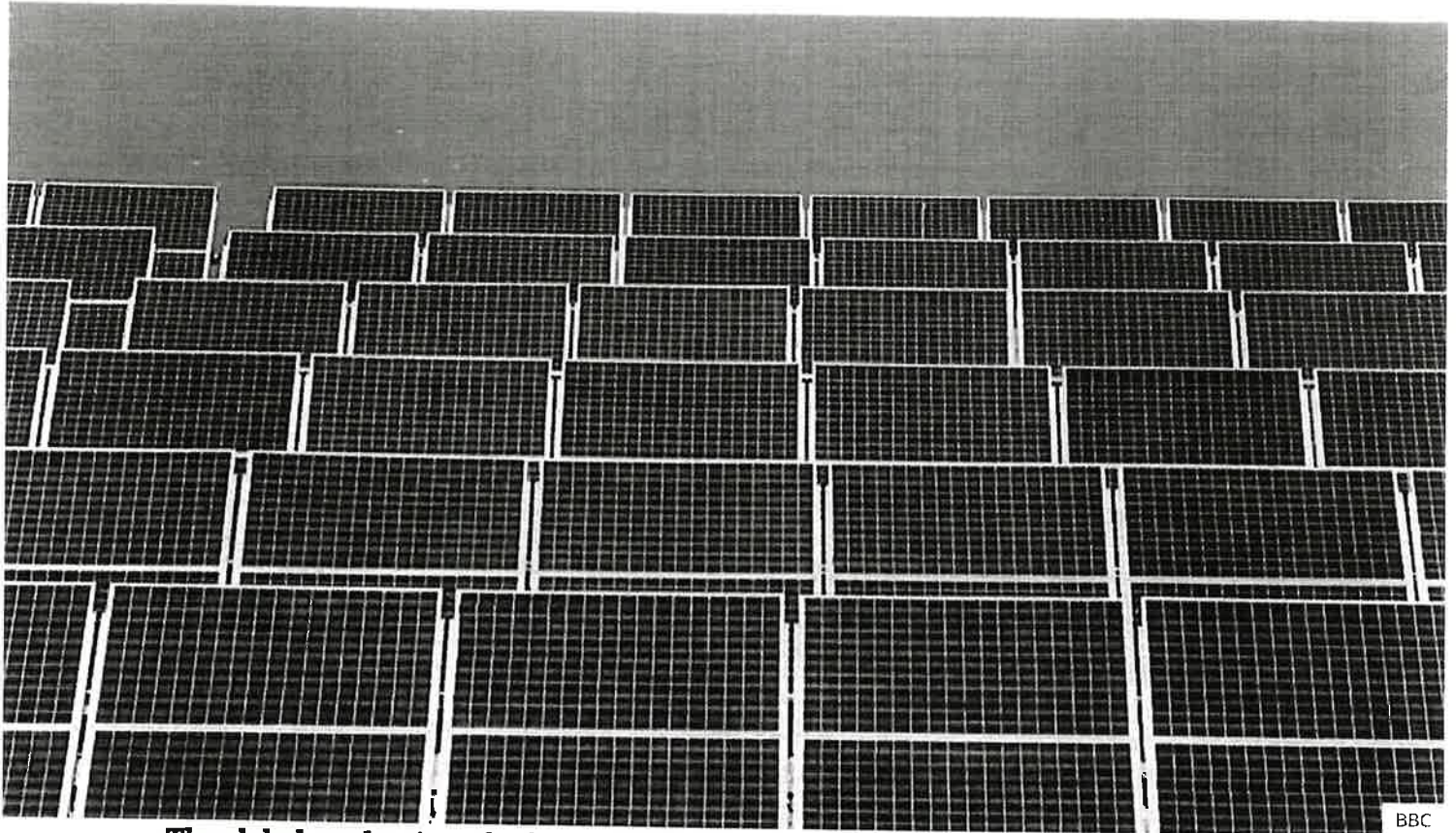


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# China uses Uyghur forced labour to make solar panels, says report

14th May 2021, 05:45 CDT

Share



BBC

**The global production of solar panels is using forced labour from China's Uyghur Muslims in Xinjiang province, an investigation has found.**

**Xinjiang produces about 45% of the world's supply of the key component, polysilicon, the research by the UK's Sheffield Hallam University says.**

**It says the material is obtained under a massive system of coercion, a claim denied by the Chinese authorities.**

The report urges top panel makers to source the component elsewhere.

Solar panels are in huge demand because of climate change.

Polysilicon is extracted from mined quartz, and the research says **the world's four biggest manufacturers use materials tainted by a massive system of coercion.**

"The [Chinese] government claims that these programmes are in accordance with PRC [the People's Republic of China] law and that workers are engaged voluntarily, in a concerted government-supported effort to alleviate poverty," the report says.

**"However, significant evidence - largely drawn from government and corporate sources - reveals that labour transfers are deployed in the Uyghur Region within an environment of unprecedented coercion, undergirded by the constant threat of re-education and internment."**

- **China's hidden camps**
- **Uyghur imams targeted in China's Xinjiang crackdown**
- **Who are the Uyghurs?**

China is facing mounting criticism from around the world over its treatment of the mostly Muslim Uyghur population in the north-western Xinjiang autonomous region. Human rights groups believe China has detained more than a million Uyghurs over the past few years in what the state defines as "re-education camps".

There is evidence of Uyghurs being used as forced labour and of women being forcibly sterilised.



The BBC visits the camps where China's Muslims have their "thoughts transformed"

The US is among several countries to have accused China of committing genocide and crimes against humanity through its repression of the Uyghurs.

China denies such allegations, saying it has been combatting separatism and Islamist militancy in the region.



## Our Mission

Woodbury County Rural Electric Cooperative (REC) strives to deliver safe, reliable, affordable, and environmentally responsible power to our member-consumers.

Woodbury County Rural Electric Cooperative is a consumer-owned electric cooperative with headquarters in Merville, Iowa, and serves power to 3,500 farms, homes, and businesses with approximately 1,200 miles of line in Northwest Iowa.



Electricity that is supplied to the members of Woodbury County Rural Electric Cooperative is produced by two main fuel sources:

One source is falling water from the dams (Hydropower) on the Missouri River. These dams are operated by a branch of the government called Western Area Power Administration (WAPA). Hydropower is some of the cheapest power available to the members of Woodbury County REC.

The second source is coal from the mines in North Dakota and Wyoming. The coal is burned in power plants operated by Basin Electric Power Cooperative in Bismarck North Dakota. Basin Electric has some of the most efficient power plants in the industry which provides 60% of power supplied to Woodbury County REC members.

Although most of the county is now served, Woodbury County REC is in an area of steady growth. This growth is from new business and housing development moving into the metro Sioux City, Iowa, area. Because of these growth areas, Woodbury County REC must continually upgrade and expand its electric system to meet these needs.

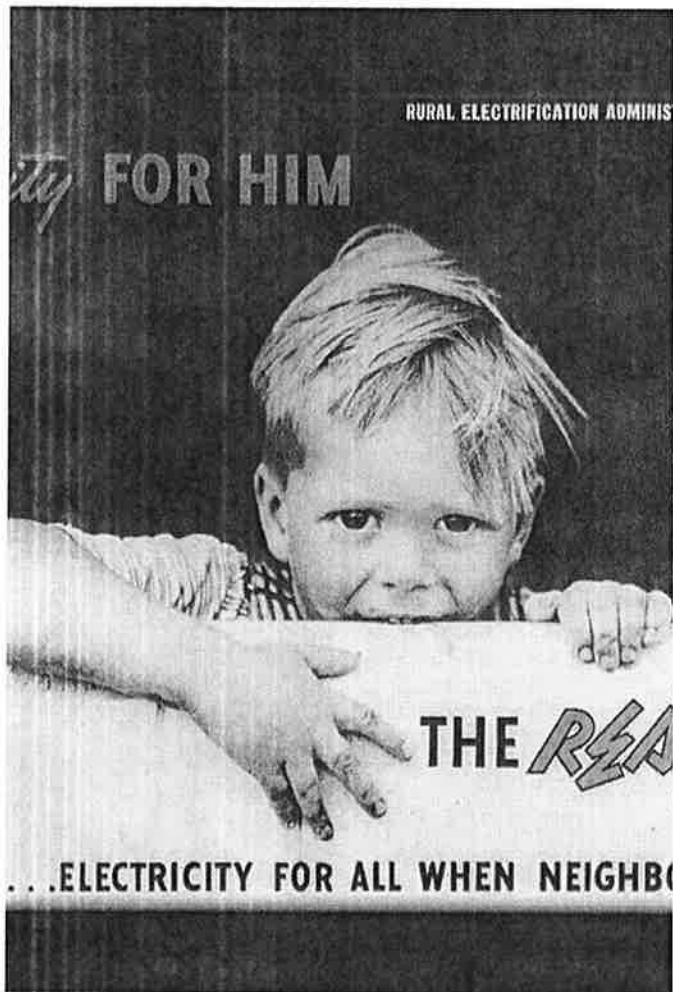
Rural Electric Cooperatives strive to continue our work to meet the needs of our members and look to the future to identify areas to improve our service.





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# Woodbury County REC History

In 1935, less than 11% of all American farms had high line electric service available or any prospects of obtaining it at any time soon at a cost they could pay. In Woodbury County there were between two and three thousand farms without such service.

Recognizing this outstanding weakness in an otherwise great industrial nation, congress in 1936, through the Rural Electrification Act, attempted to find a solution to this problem. The act created a government agency called the Rural Electrification Administration (REA). REA made funds available on a loan basis, repayable over a period of years at interest, to private power companies, municipalities, cooperatives or other organizations who would use the funds to build power lines in rural areas that had no other source of central station electric service available.

It was assumed that these funds would be used largely by the then existing power companies to extend their rural service. However, few of them took advantage of the opportunity, probable because they doubted the potential for business in the area.

Finally a group of farmers in Indiana became disgusted with the lethargy and decided they were going to have the advantages of electricity on their farm even if they had to build the lines themselves, which they did. These farmer groups forming rural electric cooperatives and building their electric systems with the REA funds.

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## Back in Woodbury County, Iowa

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Articles of Incorporation were drawn up and were approved by the Secretary of State on July 19, 1938. The cooperative was then a legal entity as a private corporation under the laws of the state of Iowa.

On the 23rd day of July, 1938, the incorporators met to elect a Board of Directors as representatives of the members and to guide the course of the cooperative. Those elected were C.L. Brown, Merle Reed, A.S. Wendel, Loyd Baker, Ross Spencer, N.W. Topf and George Mohrhauser. The first meeting of the board was held that day and the following officers were elected: Brown, President; Mohrhauser, Vice-President; Reed, Secretary and Wendel, Treasurer.

Plans were then formulated for the building of the first section of line. On March 9, 1939, the board employed Dale Schreiner as Project Superintendent and later named him General Manager.

The first contract for construction was let in the spring of 1939 to the Hoak Construction Company of Des Moines. The entire system was then served from one substation located about one mile east of Merville on highway 20. The office of the Cooperative was established at Merville, where it still remains, and the first of the line was energized on November 30, 1939. Wholesale power was purchased from the Iowa Public Service Company.

With the reality of power now available in the rural areas, the cooperative was besieged with applications to extend the service. Hardly had the first section been completed when a new contract was let for an additional one hundred miles. This expansion continued until 1942 when World War II practically stopped all further building. During this period, from 1942 to 1946, the manager was given leave of absence to serve with the U.S. Engineer District Office in Omaha. During that time, George Rice of Mapleton, the system attorney, took over as acting manager. In 1946, the regular manager returned and expansion continued as material became available.

In 1956, power became available on a wholesale basis from the Bureau of Reclamation; this power was brought to the substation near Hinton, Iowa. Woodbury REC together with ten other rural electric cooperatives in Northwest Iowa formed the Northwest Iowa Power Cooperative (NIPCO). NIPCO was incorporated and borrowed funds from REA to build some 750 miles of 69,000 volt transmission line from the Bureau substation to serve the eleven member cooperatives. This resulted in a material reduction in wholesale power costs.

Woodbury County Rural Electric Cooperative has approximately 1,123 miles of line serving 3,247 meters. The operation is strictly non-profit. Any revenues over and above the actual cost of delivering the power to their members is pro-rated back to these members on the basis of business done with the Cooperative. To date the Cooperative has paid out over \$3.2 million in capital credits to the membership. Today, Woodbury RECs total electric system is worth about \$20.7 million.

Although most of the county is now served, Woodbury County REC is in an area of steady growth. This growth is from new business and housing moving into the metro Sioux City, Iowa area. Because of the areas growth, Woodbury County REC must continually upgrade and expand its electric system to meet these needs. The work of rural electric cooperatives will never be completed.



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Email: [helpdesk@woodburyrec.com](mailto:helpdesk@woodburyrec.com)

Tel: 1-800-469-3125

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*→ with signed Solar Easements*

Landowner	Acres
* Leo Jochum	719.72
* Gregory Jochum	543.74
Wagner Farm Enterprises	192.5
* Anthony Harpenau	189.33
Wood Ward Douglas	119
* William Jochum	115
* Bradley Jochum	79
Ronald Wood	79
Matthew Topf	76.2
Russell Peterson	39.5
Gwendolyn Hodges	39.5
* Stephen Jochum	37.9

*Acres with Solar Easements  
on A6 Preservation Land*

*\* See attached easements.*

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Recorded: 8/5/2022 at 3:12:48.0 PM  
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Iowa E-Filing Fee: \$3.60  
Combined Fee: \$35.60  
Revenue Tax:  
PATRICK F GILL AUDITOR & RECORDER  
Woodbury County, Iowa

Prepared by: ~~and return for~~

Adam M. Runkle  
Starkey & Runkle, LLC  
638 West Maple Street  
Hartville, OH 44632

~~330.444. 9077~~ MEMORANDUM OF SOLAR OPTION AND LAND LEASE

THIS MEMORANDUM OF SOLAR OPTION AND LAND LEASE ("Memorandum") executed as of the 29 day of July, 2022 by and between **BRADLEY R. JOCHUM AND ANGELA M. JOCHUM**, HUSBAND AND WIFE, AS JOINT TENANTS WITH FULL RIGHTS OF SURVIVORSHIP, AND NOT AS TENANTS IN COMMON ("Lessor" or "Grantor"), whose address is 2498 Carroll Ave, Salix, IA 51052, and RENEWABLE ENERGY EQUITY PARTNERS 1, LLC, a Delaware limited liability company ("Lessee" or "Grantee"), whose address is 638 West Maple St., Hartville, OH 44632. Lessor and Lessee may hereafter be referred to as, together, the "Parties".

RECITALS

- A. Lessor and Lessee have entered into a certain a Solar Option and Land Lease ("Lease"), dated 7/29/2022 ("Effective Date"), whereby Lessor has agreed to lease to Lessee certain real property, together with access easement rights and an easement for the free and unobstructed collection and conversion of solar energy across said premises in Woodbury County, Iowa, and being more particularly described on the attached Exhibit A ("Premises").
- B. The Parties desire to enter into and record this Memorandum so that third parties will have notice of the interests of the Lessee in the Premises. Capitalized terms used in this, but not otherwise defined in this Memorandum shall have the meanings ascribed to them in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants and obligations of the Parties contained in this Memorandum and in the Lease, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Lessor and Lessee have entered into the Lease to lease and demise the Premises for solar energy purposes and to grant access and solar easements, which include prohibiting any obstruction to the open and unobstructed access to the sun ("Solar Easement") throughout the entire

Premises to and for the benefit of the area existing horizontally three hundred and sixty degrees (360°) from any point where any "Solar Facility" is or may be located at any time from time to time (each such point referred to as a "Site") and for a distance from each Site to the boundaries of the Premises, together vertically through all space located above the surface of the Premises, that is, one hundred eighty degrees (180°) or such greater number or numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface from each point along the exterior boundary of the Premises through each Site to each point and on and along such line to the opposite exterior boundary of the Premises. Pursuant to the Lease, Lessee has the exclusive right to use the Premises for solar energy purposes, together with certain related solar, access and other easement rights and other rights related to the Premises, all as more fully described in the Lease.

2. The initial term of the Lease ("Option Period") commences on the Effective Date and continues for a period of five years. If, prior to the expiration of the Option Period, Lessee has provided written notice to Lessor that it elects to extend the Lease term, the Lease shall be automatically extended for the Extended Term. The Extended Term shall commence on the Extended Term Date included in the Option Notice and continue until a date that is 30 years after the Extended Term Date unless sooner terminated in accordance with the terms of the Lease. Lessee has the right and option to extend the Extended Term for four additional periods of five years (each a "Renewal Term").

3. Subject in all respects to the terms and conditions of the Lease, Lessor has agreed that, from and after the Effective Date of the Lease, any right, title or interest created by Lessor in favor of or granted to any third party shall be subject to (i) the Lease and all of Lessee's rights, title and interests created thereby, (ii) any lien of any lender of Lessee's then in existence on the leasehold estate created by the Lease, and (iii) Lessee's right to create a lien in favor of any lender of Lessee's.

4. Lessee and any successor or assign of Lessee has the right under the Lease, without need for Lessor's consent, to do any of the following, conditionally or unconditionally, with respect to all or any portion of Lessee's right, title or interest in the Lease: hypothecate, mortgage, grant or pledge, or assign, sublease, transfer, or convey, provided that (i) any such assignment, transfer or conveyance shall not be for a period beyond the Term of the Lease; (ii) the assignee or transferee shall be subject to all of the obligations, covenants and conditions applicable to the Lessee; and (iii) Lessee shall be fully relieved from liability as to the rights, title and interest and obligations so assigned.

5. The Premises shall be held, conveyed, assigned, hypothecated, encumbered, leased, used and occupied subject to the covenants, terms and provisions set forth in this Memorandum and in the Lease, which covenants, terms and provisions shall run with the Premises, and shall be binding upon and inure to the benefit of the Parties, and the Parties' respective heirs, executors, administrators, successors and assigns.

6. The terms and conditions of the Lease are incorporated by reference into this Memorandum as if set forth fully herein at length. In the event of any conflict between the terms and provisions of the Lease and this Memorandum, the Lease shall control.


7. This Memorandum may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same document.

[SIGNATURE PAGE FOLLOWS]



**LESSEE**

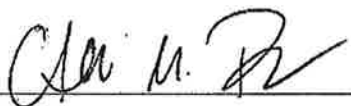
RENEWABLE ENERGY EQUITY PARTNERS 1,  
a Delaware limited liability company

By:   
Name: Erik Klein  
Title: President

STATE OF OHIO            )  
                                  )  
COUNTY OF STARK        )        SS:

BEFORE ME, the undersigned authority, a Notary Public in and for said state, on this day personally appeared before me ERIK KLEIN, President, known or proved on acceptable evidence to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 29 day of July, 2022.

  
Name: \_\_\_\_\_  
County of Residence \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



**ADAM M. RUNKLE**  
Attorney at Law  
NOTARY PUBLIC, STATE OF OHIO  
My Commission Has No Expiration Date  
Section 147.03 O.R.C.

## EXHIBIT A

### Legal Description of Property

All of the following tracts or parcels of land, situated in Woodbury County, State of Iowa, consisting of 79 acres, more particularly described as follows:

**The West Half of the Northwest Quarter (W<sub>2</sub>-NW<sub>4</sub>) of Section Twelve (12), Township Eighty-seven (87) North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa.**

Deed Reference: Volume 731, Page 3031 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874712100003 (40.00 acres) and 874712100001 (39.00 acres)

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Iowa E-Filing Fee: \$3.97  
Combined Fee: \$55.97  
Revenue Tax:  
PATRICK F GILL AUDITOR & RECORDER  
Woodbury County, Iowa

Prepared by: *and refer to:*

Adam M. Runkle  
Starkey & Runkle, LLC  
638 West Maple Street  
Hartville, OH 44632

~~330.499.9077~~ MEMORANDUM OF SOLAR OPTION AND LAND LEASE

THIS MEMORANDUM OF SOLAR OPTION AND LAND LEASE ("Memorandum") executed as of the 29 day of July, 2022 by and between GREGORY J. JOCHUM AND KRISTA D. JOCHUM, HUSBAND AND WIFE, AS JOINT TENANTS WITH FULL RIGHTS OF SURVIVORSHIP, AND NOT AS TENANTS IN COMMON, A.K.A. GREGORY J. JOCHUM AND KRISTA D. JOCHUM, HUSBAND AND WIFE, AS JOINT TENANTS WITH RIGHT OF SURVIVORSHIP ("Lessor" or "Grantor"), whose address is 1629 270<sup>th</sup> St., Salix, IA 51052, and RENEWABLE ENERGY EQUITY PARTNERS 1, LLC, a Delaware limited liability company ("Lessee" or "Grantee"), whose address is 638 West Maple St., Hartville, OH 44632. Lessor and Lessee may hereafter be referred to as, together, the "Parties".

RECITALS

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- B. The Parties desire to enter into and record this Memorandum so that third parties will have notice of the interests of the Lessee in the Premises. Capitalized terms used in this, but not otherwise defined in this Memorandum shall have the meanings ascribed to them in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants and obligations of the Parties contained in this Memorandum and in the Lease, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Lessor and Lessee have entered into the Lease to lease and demise the Premises for solar energy purposes and to grant access and solar easements, which include prohibiting any



obstruction to the open and unobstructed access to the sun ("Solar Easement") throughout the entire Premises to and for the benefit of the area existing horizontally three hundred and sixty degrees (360°) from any point where any "Solar Facility" is or may be located at any time from time to time (each such point referred to as a "Site") and for a distance from each Site to the boundaries of the Premises, together vertically through all space located above the surface of the Premises, that is, one hundred eighty degrees (180°) or such greater number or numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface from each point along the exterior boundary of the Premises through each Site to each point and on and along such line to the opposite exterior boundary of the Premises. Pursuant to the Lease, Lessee has the exclusive right to use the Premises for solar energy purposes, together with certain related solar, access and other easement rights and other rights related to the Premises, all as more fully described in the Lease.

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3. Subject in all respects to the terms and conditions of the Lease, Lessor has agreed that, from and after the Effective Date of the Lease, any right, title or interest created by Lessor in favor of or granted to any third party shall be subject to (i) the Lease and all of Lessee's rights, title and interests created thereby, (ii) any lien of any lender of Lessee's then in existence on the leasehold estate created by the Lease, and (iii) Lessee's right to create a lien in favor of any lender of Lessee's.

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7. This Memorandum may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same document.

[SIGNATURE PAGE FOLLOWS]



**LESSEE**

RENEWABLE ENERGY EQUITY PARTNERS 1,  
a Delaware limited liability company

By: [Signature]  
Name: Erik Klein  
Title: President

STATE OF OHIO            )  
  )  
  )        SS:  
COUNTY OF STARK        )

BEFORE ME, the undersigned authority, a Notary Public in and for said state, on this day personally appeared before me ERIK KLEIN, President, known or proved on acceptable evidence to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 29 day of July, 2022.

[Signature]  
Name: \_\_\_\_\_  
County of Residence \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



ADAM M. RUNKLE  
Attorney at Law  
NOTARY PUBLIC, STATE OF OHIO  
My Commission Has No Expiration Date  
Section 147.03 O.R.C.

## EXHIBIT A

### DESCRIPTION OF PREMISES

All of the following tracts or parcels of land, situated in Woodbury County, State of Iowa, consisting of **441.33** acres, more particularly described as follows:

#### Parcel 1:

The Northwest Quarter of the Southeast Quarter (NW 1/4 SE 1/4) of Section Thirty-four (34), Township Eighty-seven (87) North, Range Forty-seven (47) West of the 5th P.M., Woodbury County, Iowa, Except the West One Thousand Two Hundred Ninety-one and Seven Tenths (1291.7) Feet of the North Two Hundred Forty-one and Seven Tenths (241.7) Feet thereof.

Deed Reference: Volume 621, Page 841 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874734401006 (32.79 acres)

#### Parcel 2:

The West Half (W $\frac{1}{2}$ ) of the Southwest Quarter (SW $\frac{1}{4}$ ) of Section Twenty-six (26), Township Eighty-seven (87) North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa.

LESS AND EXCEPT the Southwest Quarter (SW  $\frac{1}{4}$ ) of the Southwest Quarter (SW  $\frac{1}{4}$ ) of Section Twenty-Six (26), Township Eighty-seven (87) North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa.

Deed Reference: Volume 657, Page 312 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874726300001 (40.00 acres)

**Parcel 3:**

All that part of the Northeast Quarter (NE1/4) of the Southeast Quarter (SE1/4) of Section Thirty-four (34) described as follows: Beginning at the Southeast corner of said NE1/4 of the SE1/4, of said Section 34; thence West 1311.2 feet; thence North 278 feet; thence East 1311.2 feet to the East line of said NE1/4 of the SE1/4; thence South 278 feet to the place of beginning,

Excepting therefrom that part of said premises described as follows: Beginning at the Southeast corner of the said NE1/4 of the SE1/4, of said Section 34; thence North 278 feet; thence West 33 feet; thence South 88 feet; thence West 150 feet; thence South 6 feet; thence West 73 feet; thence South 74 feet; thence East 223 feet; thence South 110 feet; thence East 33 feet to the place of beginning, all in Township 87, North, Range 47, West of the 5th P.M., in the County of Woodbury and State of Iowa;

And also excepting therefrom that part of said premises described as follows: All that part of Lot One (1) of the Auditor's Plat in the Northeast Quarter of the Southeast Quarter (NE1/4-SE1/4) of Section Thirty Four (34), Township Eighty Seven (87) North, Range Forty Seven (47) West of the Fifth (5th) Principal Meridian, Woodbury County, Iowa, described as commencing at the Southeast (SE) corner of the NE1/4-SE1/4; thence North 00°00'00" East along the East line of the NE1/4-SE1/4 a distance of 189.60 feet; thence North 89°02'03" West a distance of 33.00 feet to the Point of Beginning, thence continuing North 89°02'03" West a distance of 150.02 feet; thence South 00°00'00" West a distance of 6.00 feet; thence North 89°02'03" West a distance of 73.01 feet, thence North 00°00'00" East a distance of 94.34 feet; thence South 88°57'27" East a distance of 223.04 feet; thence South 00°00'00" West a distance of 88.04 feet to the Point of Beginning. Tract contains 0.46 acres.

Note: The East line of the Northeast Quarter of the Southeast Quarter (NE1/4-SE1/4) of Section 34-87-47 is assumed to bear North 00°00'00" East.

Deed Reference: Volume 686, Page 9387 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874734426014 (7.3 acres)

**Parcel 4:**

The Southeast Quarter (SE¼) of the Northwest Quarter (NW¼) and the Northeast Quarter (NE¼) of the Southwest Quarter (SW¼) of Section Twenty-Three (23), Township Eighty-Seven (87), North, Range Forty-Seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa.

Deed Reference: Volume 692, Page 1409 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874723100004 (39.00 acres), 874723300002 (39.00 acres)

**Parcel 5:**

The Northeast Quarter of the Southwest Quarter (NE $\frac{1}{4}$  SW $\frac{1}{4}$ ), and the Northwest Quarter (NW $\frac{1}{4}$ ) of Section Twenty-six (26), Township Eighty-seven (87) North, Range Forty-seven (47), West of the 5th Principal Meridian, in the County of Woodbury and State of Iowa, except that part described as:

All that part of the Southeast Quarter (SE $\frac{1}{4}$ ) of the Northwest Quarter (NW $\frac{1}{4}$ ) of Section Twenty-six (26), Township Eighty-seven (87) North, Range Forty-seven (47) West of the Fifth (5th) Principal Meridian, Woodbury County, Iowa, commencing at the North Quarter (N $\frac{1}{4}$ ) corner of said Section Twenty-six (26), Township Eighty-seven (87) North, Range Forty-seven (47), thence South along the North-South Half Section Line of said Section, One Thousand Three Hundred Fifteen and Seventy Hundredths feet (1,315.70') to the North One-sixteenth (N  $\frac{1}{16}$ ) corner on said Half Section Line, being the Point of Beginning, thence continuing South along said North-South Half Section Line, Six Hundred Sixty-three feet (663.00'), thence North Eighty-eight Degrees, Twenty-two minutes, Five seconds (N 88° 22' 05") West parallel with the North line of the Southeast Quarter (SE $\frac{1}{4}$ ) of the Northwest Quarter (NW $\frac{1}{4}$ ) of said Section Twenty-six (26), Township Eighty-seven (87) North, Range Forty-seven (47), Three Hundred Sixty-two feet (362.00'), thence North parallel with said North-South Half Section Line, Six Hundred Sixty-three feet (663.00') to the North line of said Southeast Quarter (SE $\frac{1}{4}$ ) of the Northwest Quarter (NW $\frac{1}{4}$ ), thence South Eighty-eight Degrees, Twenty-two minutes, Five seconds (S 88° 22' 05") East along said North line, Three Hundred Sixty-two feet (362.00') to the Point of Beginning.

Deed Reference: Volume 697, Page 6682 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874726100001 (39.00 acres), 874726100002 (38.00 acres), 874726100003 (40.00 acres), 874726100004 (33.99 acres), 874726300003 (19.5 acres), 874726300004 (19.5 acres)

**Parcel 6:**

The East Half of the East Half of the Northeast Quarter (E $\frac{1}{2}$ -E $\frac{1}{2}$ -NE $\frac{1}{4}$ ) of Section Eleven (11), Township Eighty-seven (87) North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa.

Deed Reference: Volume 731, Page 3035 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874711200006 (19.5 acres), 874711200008 (20.00 acres)

**Parcel 7:**

Lot Ten (10), except the Northeast Eight (8) acres thereof, in the Auditor's Plat of Sections Thirty-four (34) and Thirty-five (35), Township Eighty-seven (87) North, Range Forty-seven (47), Town of Salix, West of the 5th P.M., Woodbury County, Iowa, also known as Part of Lot Ten (10), Auditor's Plat of Salix, Section Thirty-four (34) and Section Thirty-five (35), Township Eighty-seven (87) North, Range Forty-seven (47), West of the 5th P.M., Woodbury County, Iowa, also known and described as:

All that part of the South half (S 1/2) of the Southwest Quarter (SW 1/4) of Section Thirty-Five (35), Township Eight-Seven (87), North Range Forty-Seven (47), West of the 5th P.M., in the County of Woodbury, State of Iowa, lying West of a line parallel with and 50 feet distant westerly at right angles from the center line of the Sioux City & Pacific Rail Road as said rail road is constructed and operated over and across the South Half (S 1/2) of the Southwest Quarter (SW 1/4) of said Section 35, and south of the South line of that tract of land conveyed by Missouri Valley Land Company to John Hennessy, Bishop, by warranty deed filed May 8, 1889, recorded in Deed Record 29, Page 392, and also south of the South line of Walnut Street in the Town of Salix, as said street is laid down and described in the Plat of the Second Addition to said Town recorded in Plat Book 9, Page 1.

EXCEPTING therefrom the un-vacated part of Harrington's Addition to the Town of Salix, Iowa, recorded in Plat Book 10, Page 29 (Certificates of Vacation filed October 3, 1892 in Book 57, Page 117 and filed April 15, 1893 in Book 57, Page 319) and

ALSO EXCEPTING therefrom that tract conveyed by Michael Harrington and Jane J. Harrington, husband and wife to Consolidated Independent School District of Salix, by warranty deed filed May 6, 1920, recorded in Deed Record 75, Page 415, described as follows:

Commencing at a point 60 feet south of the North line of the Southwest Quarter (SW 1/4) of the Southwest Quarter (SW 1/4) of Section 35, Township 87, North Range 47, West of the 5th P.M., and 968.3 feet east of the Northwest corner of said SW 1/4 of the SW 1/4 of said Section 35, said point being on the South line of Walnut Street, where the West line of Talbot Street projects south and intersects the said South line, in the Town of Salix, Iowa; thence south on the said West line of Talbot Street projected, 372 feet, thence east on a line parallel with the said South line of said Walnut Street 1045 feet to the West line of the highway which parallels the Chicago and Northwestern Railway and known as the King of Trails; thence Northwesterly along said West line of said highway 430 feet to the said South line of said Walnut Street; thence west along said South line of said Street 830 feet to the place of beginning.

Deed Reference: Instrument No. 2021-17984 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874735351010 (52.00 acres)



**Parcel 8:**

That part of the NE $\frac{1}{4}$  of the SE $\frac{1}{4}$  of Section 34, Township 87 North, Range 47 West of the 5th P.M., in Woodbury County, Iowa described as follows: Commencing at the Southeast corner of said NE $\frac{1}{4}$  of the SE $\frac{1}{4}$ , thence North 00°00'00" East for a distance of 278.0 feet; thence North 90°00'00" West for a distance of 33.0 feet; thence continuing North 90°00'00" West for a distance of 670.0 feet to the point of beginning; thence North 00°00'00" East for a distance of 118.5 feet; thence North 90°00'00" West for a distance of 641.20 feet; thence South 00°00'00" West for a distance of 118.5 feet; thence South 90°00'00" East for a distance of 641.20 feet to the point of beginning.

Deed Reference: Volume 683, Page 11317 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874734426006 (1.75 acres)

Document Number: 2022-09653  
Recorded: 8/5/2022 at 3:12:48.0 PM  
County Recording Fee: \$32.00  
Iowa E-Filing Fee: \$3.60  
Combined Fee: \$35.60  
Revenue Tax:  
PATRICK F GILL AUDITOR & RECORDER  
Woodbury County, Iowa

Prepared by: *and return to:*

Adam M. Runkle  
Starkey & Runkle, LLC  
638 West Maple Street  
Hartville, OH 44632

~~330.494-9077~~ MEMORANDUM OF SOLAR OPTION AND LAND LEASE

THIS MEMORANDUM OF SOLAR OPTION AND LAND LEASE ("Memorandum") executed as of the 21 day of July, 2022 by and between **KRISTA DIANE JOCHUM AND GREGORY J. JOCHUM**, WIFE AND HUSBAND, AS JOINT TENANTS WITH FULL RIGHTS OF SURVIVORSHIP, AND NOT AS TENANTS IN COMMON ("Lessor" or "Grantor"), whose address is 1629 270<sup>th</sup> St. Ave, Salix, IA 51052, and RENEWABLE ENERGY EQUITY PARTNERS 1, LLC, a Delaware limited liability company ("Lessee" or "Grantee"), whose address is 638 West Maple St., Hartville, OH 44632. Lessor and Lessee may hereafter be referred to as, together, the "Parties".

RECITALS

- A. Lessor and Lessee have entered into a certain a Solar Option and Land Lease ("Lease"), dated 7/21/2022 ("Effective Date"), whereby Lessor has agreed to lease to Lessee certain real property, together with access easement rights and an easement for the free and unobstructed collection and conversion of solar energy across said premises in Crawford County, Iowa, and being more particularly described on the attached Exhibit A ("Premises").
- B. The Parties desire to enter into and record this Memorandum so that third parties will have notice of the interests of the Lessee in the Premises. Capitalized terms used in this, but not otherwise defined in this Memorandum shall have the meanings ascribed to them in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants and obligations of the Parties contained in this Memorandum and in the Lease, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Lessor and Lessee have entered into the Lease to lease and demise the Premises for solar energy purposes and to grant access and solar easements, which include prohibiting any obstruction to the open and unobstructed access to the sun ("Solar Easement") throughout the entire

Premises to and for the benefit of the area existing horizontally three hundred and sixty degrees (360°) from any point where any "Solar Facility" is or may be located at any time from time to time (each such point referred to as a "Site") and for a distance from each Site to the boundaries of the Premises, together vertically through all space located above the surface of the Premises, that is, one hundred eighty degrees (180°) or such greater number or numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface from each point along the exterior boundary of the Premises through each Site to each point and on and along such line to the opposite exterior boundary of the Premises. Pursuant to the Lease, Lessee has the exclusive right to use the Premises for solar energy purposes, together with certain related solar, access and other easement rights and other rights related to the Premises, all as more fully described in the Lease.

2. The initial term of the Lease ("Option Period") commences on the Effective Date and continues for a period of five years. If, prior to the expiration of the Option Period, Lessee has provided written notice to Lessor that it elects to extend the Lease term, the Lease shall be automatically extended for the Extended Term. The Extended Term shall commence on the Extended Term Date included in the Option Notice and continue until a date that is 30 years after the Extended Term Date unless sooner terminated in accordance with the terms of the Lease. Lessee has the right and option to extend the Extended Term for four additional periods of five years (each a "Renewal Term").

3. Subject in all respects to the terms and conditions of the Lease, Lessor has agreed that, from and after the Effective Date of the Lease, any right, title or interest created by Lessor in favor of or granted to any third party shall be subject to (i) the Lease and all of Lessee's rights, title and interests created thereby, (ii) any lien of any lender of Lessee's then in existence on the leasehold estate created by the Lease, and (iii) Lessee's right to create a lien in favor of any lender of Lessee's.

4. Lessee and any successor or assign of Lessee has the right under the Lease, without need for Lessor's consent, to do any of the following, conditionally or unconditionally, with respect to all or any portion of Lessee's right, title or interest in the Lease: hypothecate, mortgage, grant or pledge, or assign, sublease, transfer, or convey, provided that (i) any such assignment, transfer or conveyance shall not be for a period beyond the Term of the Lease; (ii) the assignee or transferee shall be subject to all of the obligations, covenants and conditions applicable to the Lessee; and (iii) Lessee shall be fully relieved from liability as to the rights, title and interest and obligations so assigned.

5. The Premises shall be held, conveyed, assigned, hypothecated, encumbered, leased, used and occupied subject to the covenants, terms and provisions set forth in this Memorandum and in the Lease, which covenants, terms and provisions shall run with the Premises, and shall be binding upon and inure to the benefit of the Parties, and the Parties' respective heirs, executors, administrators, successors and assigns.

6. The terms and conditions of the Lease are incorporated by reference into this Memorandum as if set forth fully herein at length. In the event of any conflict between the terms and provisions of the Lease and this Memorandum, the Lease shall control.


7. This Memorandum may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same document.

[SIGNATURE PAGE FOLLOWS]



**LESSEE**

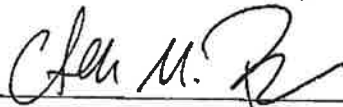
RENEWABLE ENERGY EQUITY PARTNERS 1,  
a Delaware limited liability company

By:   
Name: Erik Klein  
Title: President

STATE OF OHIO            )  
                                  )  
COUNTY OF STARK        )        SS:

BEFORE ME, the undersigned authority, a Notary Public in and for said state, on this day personally appeared before me ERIK KLEIN, President, known or proved on acceptable evidence to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 29 day of July, 2022.

  
Name: \_\_\_\_\_  
County of Residence \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



**ADAM M. RUNKLE**  
Attorney at Law  
NOTARY PUBLIC, STATE OF OHIO  
My Commission Has No Expiration Date  
Section 147.03 O.R.C.

## EXHIBIT A

### Legal Description of Property

All of the following tracts or parcels of land, situated in Woodbury County, State of Iowa, consisting of 156.16 acres, more particularly described as follows:

The Northeast Quarter (NE1/4) of Section Thirty-one (31), Township Eighty-seven (87) North, Range Forty-six (46), West of the 5th P.M., in the County of Woodbury and State of Iowa, EXCEPT for the following 2.11 acres described below:

That portion of the Northwest Quarter (NW1/4) of the Northeast Quarter (NE1/4) of Section Thirty-one (31), Township Eighty-seven (87) North, Range Forty-six (46) West of the Fifth Principal Meridian, Woodbury County, Iowa, described as follows: Beginning at the North quarter (N 1/4) corner of said Section Thirty-one (31); thence North Ninety Degrees Zero Minutes Zero Seconds (N 90°00'00") East along the north line of the Northeast Quarter (NE1/4) of said Section Thirty-one (31) for a distance of Three Hundred Fifty-six and Eighty-three Hundredths feet (356.83'); thence South Four Degrees Thirty-nine Minutes Thirty-seven Seconds (S 04°39'37") East for a distance of Two Hundred Fifty-nine and Twenty-four Hundredths feet (259.24'); thence North Eighty-seven Degrees Forty-four Minutes Sixteen Seconds (N 87°44'16") West for a distance of Three Hundred Seventy-seven and Fifty-one Hundredths feet (377.51') to the west line of said Northeast Quarter (NE1/4); thence North Zero Degrees Nine Minutes Thirty-one Seconds (N 00°09'31") West along said west line for a distance of Two Hundred Forty-three and Forty-eight Hundredths feet (243.48') to the Point of Beginning, containing 2.11 acres, including 0.27 acres of public right-of-way.

Note: The North line of said Section 31 is assumed to bear North 90°00'00" East.

Deed Reference: Volume 753, Page 1849 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874631200002 (39.00 acres), 874631200003 (40.00 acres), 874631200004 (40.00 acres), and 874631200006 (37.16 acres),

Document Number: 2022-09654  
Recorded: 8/5/2022 at 3:12:48.0 PM  
County Recording Fee: \$37.00  
Iowa E-Filing Fee: \$3.69  
Combined Fee: \$40.69  
Revenue Tax:  
PATRICK F GILL AUDITOR & RECORDER  
Woodbury County, Iowa

---

Prepared by: *and return to:*

Adam M. Runkle  
Starkey & Runkle, LLC  
638 West Maple Street  
Hartville, OH 44632  
*330.494.9077*

#### MEMORANDUM OF SOLAR OPTION AND LAND LEASE

THIS MEMORANDUM OF SOLAR OPTION AND LAND LEASE ("Memorandum") executed as of the *29* day of *July*, 2022 by and between LEO R. JOCHUM AND BEVERLY A. JOCHUM, HUSBAND AND WIFE, AS TENANTS IN COMMON ("Lessor" or "Grantor"), whose address is 1691 250<sup>th</sup> St., Salix, IA 51052, and RENEWABLE ENERGY EQUITY PARTNERS 1, LLC, a Delaware limited liability company ("Lessee" or "Grantee"), whose address is 638 West Maple St., Hartville, OH 44632. Lessor and Lessee may hereafter be referred to as, together, the "Parties".

#### RECITALS

- A. Lessor and Lessee have entered into a certain a Solar Option and Land Lease ("Lease"), dated *7/29/2022* ("Effective Date"), whereby Lessor has agreed to lease to Lessee certain real property, together with access easement rights and an easement for the free and unobstructed collection and conversion of solar energy across said premises in Crawford County, Iowa, and being more particularly described on the attached Exhibit A ("Premises").
- B. The Parties desire to enter into and record this Memorandum so that third parties will have notice of the interests of the Lessee in the Premises. Capitalized terms used in this, but not otherwise defined in this Memorandum shall have the meanings ascribed to them in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants and obligations of the Parties contained in this Memorandum and in the Lease, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Lessor and Lessee have entered into the Lease to lease and demise the Premises for solar energy purposes and to grant access and solar easements, which include prohibiting any



obstruction to the open and unobstructed access to the sun ("Solar Easement") throughout the entire Premises to and for the benefit of the area existing horizontally three hundred and sixty degrees (360°) from any point where any "Solar Facility" is or may be located at any time from time to time (each such point referred to as a "Site") and for a distance from each Site to the boundaries of the Premises, together vertically through all space located above the surface of the Premises, that is, one hundred eighty degrees (180°) or such greater number or numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface from each point along the exterior boundary of the Premises through each Site to each point and on and along such line to the opposite exterior boundary of the Premises. Pursuant to the Lease, Lessee has the exclusive right to use the Premises for solar energy purposes, together with certain related solar, access and other easement rights and other rights related to the Premises, all as more fully described in the Lease.

2. The initial term of the Lease ("Option Period") commences on the Effective Date and continues for a period of five years. If, prior to the expiration of the Option Period, Lessee has provided written notice to Lessor that it elects to extend the Lease term, the Lease shall be automatically extended for the Extended Term. The Extended Term shall commence on the Extended Term Date included in the Option Notice and continue until a date that is 30 years after the Extended Term Date unless sooner terminated in accordance with the terms of the Lease. Lessee has the right and option to extend the Extended Term for four additional periods of five years (each a "Renewal Term").

3. Subject in all respects to the terms and conditions of the Lease, Lessor has agreed that, from and after the Effective Date of the Lease, any right, title or interest created by Lessor in favor of or granted to any third party shall be subject to (i) the Lease and all of Lessee's rights, title and interests created thereby, (ii) any lien of any lender of Lessee's then in existence on the leasehold estate created by the Lease, and (iii) Lessee's right to create a lien in favor of any lender of Lessee's.

4. Lessee and any successor or assign of Lessee has the right under the Lease, without need for Lessor's consent, to do any of the following, conditionally or unconditionally, with respect to all or any portion of Lessee's right, title or interest in the Lease: hypothecate, mortgage, grant or pledge, or assign, sublease, transfer, or convey, provided that (i) any such assignment, transfer or conveyance shall not be for a period beyond the Term of the Lease; (ii) the assignee or transferee shall be subject to all of the obligations, covenants and conditions applicable to the Lessee; and (iii) Lessee shall be fully relieved from liability as to the rights, title and interest and obligations so assigned.

5. The Premises shall be held, conveyed, assigned, hypothecated, encumbered, leased, used and occupied subject to the covenants, terms and provisions set forth in this Memorandum and in the Lease, which covenants, terms and provisions shall run with the Premises, and shall be binding upon and inure to the benefit of the Parties, and the Parties' respective heirs, executors, administrators, successors and assigns.

6. The terms and conditions of the Lease are incorporated by reference into this Memorandum as if set forth fully herein at length. In the event of any conflict between the terms and provisions of the Lease and this Memorandum, the Lease shall control.

7. This Memorandum may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same document.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties have executed this Memorandum as of the date set forth above.

**LESSOR**

  
\_\_\_\_\_  
LEO R. JOCHUM

  
\_\_\_\_\_  
BEVERLY A. JOCHUM

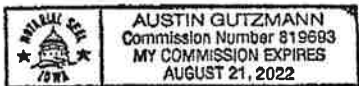
STATE OF IOWA                    )  
  )  
COUNTY OF WOODBURY        )        SS:

Before me, a Notary Public in and for the personally appeared LEO R. JOCHUM AND BEVERLY A. JOCHUM, HUSBAND AND WIFE, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument, the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of Iowa that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

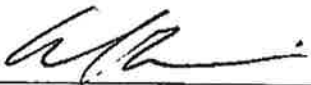
GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 25<sup>th</sup> day of July, 2022.



Signature  
  
\_\_\_\_\_  
Austin Gutzmann (seal)

**LESSEE**

RENEWABLE ENERGY EQUITY PARTNERS 1,  
a Delaware limited liability company

By:   
Name: Erik Klein  
Title: President

STATE OF OHIO            )  
                                  )  
COUNTY OF STARK        )        SS:

BEFORE ME, the undersigned authority, a Notary Public in and for said state, on this day personally appeared before me ERIK KLEIN, President, known or proved on acceptable evidence to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 29 day of July, 2022.

  
Name: \_\_\_\_\_  
County of Residence \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



ADAM M. RUNKLE  
Attorney at Law  
NOTARY PUBLIC, STATE OF OHIO  
My Commission Has No Expiration Date  
Section 147.03 O.R.C.

## EXHIBIT A

### Legal Description of Property

All of the following tracts or parcels of land, situated in Woodbury County, State of Iowa, consisting of 719.72 acres, more particularly described as follows:

#### Parcel 1:

**The Southeast Quarter (S.E. ¼) of Section 14, Township Eighty-Seven (87) North, Range Forty Seven west of the Fifth Principal Meridian**

LESS AND EXCEPT the following as recorded in Volume 92, Page 1471 of the Office of the Recorder of Woodbury County, Iowa:

**The South West Quarter (SW¼) of the South West Quarter (SW¼) of the South East Quarter (SE¼) Section Fourteen (14), Township Eighty-seven (87), North Range 47, West of the 5th P.M.**

**consisting of 10 acres more or less**

Deed Reference: Volume 84, Page 901 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874714400001 (39.00 acres), 874714400002 (40.00 acres), 874714400004 (29.00 acres) and 874714400005 (39.00 acres)

#### Parcel 2:

**The Southeast Quarter (SE 1/4) of Section Two (2), Township Eighty-seven (87) North, Range Forty-seven (47), West of the 5th P.M., Woodbury County, State of Iowa**

Deed Reference: Volume 117, Page 1830 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874702400001 (19.5 acres), 874702400002 (19.5 acres), 874702400003 (38.00 acres), 874702400005 (20 acres), 874702400006 (39 acres) and 874702400042 (19.53 acres)

#### Parcel 3:

The South Half (S $\frac{1}{2}$ ) of the Southeast Quarter (SE $\frac{1}{4}$ ) of Section Thirty-four (34), Township Eighty-seven (87) North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa, except 5.34 acres, more or less, conveyed to the State of Iowa in the Warranty Deed recorded in Book 859, Page 602.

Deed Reference: Volume 601, Page 1230 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874734452001 (34.39 acres) and 874734476001 (39.00 acres)

**Parcel 4:**

The Northeast Quarter (NE $\frac{1}{4}$ ) and the North Forty (40) acres of the West Half (W $\frac{1}{2}$ ) of the Southeast Quarter (SE $\frac{1}{4}$ ) of Section Twenty-Three (23), Township Eighty-Seven (87), Range Forty-Seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa, except the following described tract: Commencing at the North  $\frac{1}{4}$  corner of said Section 23; thence South 0°00'00" West along the West line of the Northeast  $\frac{1}{4}$  of said Section 23 for 2099.66 feet to the point of beginning; thence South 0°00'00" West along said West line for 476.25 feet; thence South 88°59'56" East for 411.00 feet; thence North 0°00'00" East for 476.25 feet; thence 88°59'56" West for 411.00 feet to the point of beginning. Said described parcel contains 4.493 acres, more or less.

Subject to and together with all easements, covenants and restrictions of record, if any.

Deed Reference: Volume 694, Page 6250 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874723200002 (38.26 acres), 874723200001 (37.27 acres), 874723200004 (40.00 acres), 874723200005 (34.87 acres), and 874723400001 (39.00 acres)

**Parcel 5:**

The West Half of the Northeast Quarter (W  $\frac{1}{2}$  - NE  $\frac{1}{4}$ ) and the West Half of the East Half of the Northeast Quarter (W $\frac{1}{2}$ -E $\frac{1}{2}$ -NE $\frac{1}{4}$ ) of Section Eleven (11), and the East Half of the East Half of the Northwest Quarter (E $\frac{1}{2}$ -E $\frac{1}{2}$ -NW $\frac{1}{4}$ ) of Section Twelve (12), (except the right-of-way of the Chicago, Milwaukee, St. Paul & Pacific Railroad across the East Half (E $\frac{1}{2}$ ) of the Northwest Quarter (NW $\frac{1}{4}$ ) of said Section Twelve (12)), all in Township Eighty-seven (87) North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa, subject to easements and restrictions of record.

Deed Reference: Volume 731, Page 3027 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874711200001 (38.00 acres), 874711200003 (39.00 acres), 874711200005 (19.5 acres), 874711200007 (20.00 acres), 874712100007 (17.90 acres), and 874712100009 (20.00)

Document Number: 2022-09655  
Recorded: 8/5/2022 at 3:12:48.0 PM  
County Recording Fee: \$32.00  
Iowa E-Filing Fee: \$3.60  
Combined Fee: \$35.60  
Revenue Tax:  
PATRICK F GILL AUDITOR & RECORDER  
Woodbury County, Iowa

---

Prepared by: *and return to:*  
Adam M. Runkle  
Starkey & Runkle, LLC  
638 West Maple Street  
Hartville, OH 44632  
*330.444.9077*

### MEMORANDUM OF SOLAR OPTION AND LAND LEASE

THIS MEMORANDUM OF SOLAR OPTION AND LAND LEASE ("Memorandum") executed as of the 29 day of July, 2022 by and between **STEPHEN J. JOCHUM, A SINGLE PERSON** ("Lessor" or "Grantor"), whose address is 2498 Carroll Ave, Salix, IA 51052, and RENEWABLE ENERGY EQUITY PARTNERS 1, LLC, a Delaware limited liability company ("Lessee" or "Grantee"), whose address is 638 West Maple St., Hartville, OH 44632. Lessor and Lessee may hereafter be referred to as, together, the "Parties".

#### RECITALS

- A. Lessor and Lessee have entered into a certain a Solar Option and Land Lease ("Lease"), dated 7/29/2022 ("Effective Date"), whereby Lessor has agreed to lease to Lessee certain real property, together with access easement rights and an easement for the free and unobstructed collection and conversion of solar energy across said premises in Woodbury County, Iowa, and being more particularly described on the attached Exhibit A ("Premises").
- B. The Parties desire to enter into and record this Memorandum so that third parties will have notice of the interests of the Lessee in the Premises. Capitalized terms used in this, but not otherwise defined in this Memorandum shall have the meanings ascribed to them in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants and obligations of the Parties contained in this Memorandum and in the Lease, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Lessor and Lessee have entered into the Lease to lease and demise the Premises for solar energy purposes and to grant access and solar easements, which include prohibiting any obstruction to the open and unobstructed access to the sun ("Solar Easement") throughout the entire Premises to and for the benefit of the area existing horizontally three hundred and sixty degrees

(360°) from any point where any "Solar Facility" is or may be located at any time from time to time (each such point referred to as a "Site") and for a distance from each Site to the boundaries of the Premises, together vertically through all space located above the surface of the Premises, that is, one hundred eighty degrees (180°) or such greater number or numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface from each point along the exterior boundary of the Premises through each Site to each point and on and along such line to the opposite exterior boundary of the Premises. Pursuant to the Lease, Lessee has the exclusive right to use the Premises for solar energy purposes, together with certain related solar, access and other easement rights and other rights related to the Premises, all as more fully described in the Lease.

2. The initial term of the Lease ("Option Period") commences on the Effective Date and continues for a period of five years. If, prior to the expiration of the Option Period, Lessee has provided written notice to Lessor that it elects to extend the Lease term, the Lease shall be automatically extended for the Extended Term. The Extended Term shall commence on the Extended Term Date included in the Option Notice and continue until a date that is 30 years after the Extended Term Date unless sooner terminated in accordance with the terms of the Lease. Lessee has the right and option to extend the Extended Term for four additional periods of five years (each a "Renewal Term").

3. Subject in all respects to the terms and conditions of the Lease, Lessor has agreed that, from and after the Effective Date of the Lease, any right, title or interest created by Lessor in favor of or granted to any third party shall be subject to (i) the Lease and all of Lessee's rights, title and interests created thereby, (ii) any lien of any lender of Lessee's then in existence on the leasehold estate created by the Lease, and (iii) Lessee's right to create a lien in favor of any lender of Lessee's.

4. Lessee and any successor or assign of Lessee has the right under the Lease, without need for Lessor's consent, to do any of the following, conditionally or unconditionally, with respect to all or any portion of Lessee's right, title or interest in the Lease: hypothecate, mortgage, grant or pledge, or assign, sublease, transfer, or convey, provided that (i) any such assignment, transfer or conveyance shall not be for a period beyond the Term of the Lease; (ii) the assignee or transferee shall be subject to all of the obligations, covenants and conditions applicable to the Lessee; and (iii) Lessee shall be fully relieved from liability as to the rights, title and interest and obligations so assigned.

5. The Premises shall be held, conveyed, assigned, hypothecated, encumbered, leased, used and occupied subject to the covenants, terms and provisions set forth in this Memorandum and in the Lease, which covenants, terms and provisions shall run with the Premises, and shall be binding upon and inure to the benefit of the Parties, and the Parties' respective heirs, executors, administrators, successors and assigns.

6. The terms and conditions of the Lease are incorporated by reference into this Memorandum as if set forth fully herein at length. In the event of any conflict between the terms and provisions of the Lease and this Memorandum, the Lease shall control.



7. This Memorandum may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same document.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the undersigned have caused this Solar Option and Land Lease to be executed as of the Effective Date.

LESSOR:

  
\_\_\_\_\_  
STEPHEN J. JOCHUM

STATE OF IOWA                    )  
  )        SS:  
COUNTY OF WOODBURY        )


Before me, a Notary Public in and for the personally appeared STEPHEN J. JOCHUM who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument, the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of Iowa that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 27 day of July, 2022.



Signature  
 (seal)

**LESSEE**

RENEWABLE ENERGY EQUITY PARTNERS 1,  
a Delaware limited liability company

By: 


Name: Erik Klein

Title: President

STATE OF OHIO            )  
  )       SS:  
COUNTY OF STARK        )

BEFORE ME, the undersigned authority, a Notary Public in and for said state, on this day personally appeared before me ERIK KLEIN, President, known or proved on acceptable evidence to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 29 day of July, 2022.

  
Name: \_\_\_\_\_  
County of Residence \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



**ADAM M. RUNKLE**  
Attorney at Law  
NOTARY PUBLIC, STATE OF OHIO  
My Commission Has No Expiration Date  
Section 147.03 O.R.C.

## EXHIBIT A

### Legal Description of Property

All of the following tracts or parcels of land, situated in Woodbury County, State of Iowa, consisting of 37.9 acres, more particularly described as follows:

The West Half of the East Half of the Northwest Quarter ( $W\frac{1}{2}-E\frac{1}{2}-NW\frac{1}{4}$ ) of Section Twelve (12), Township Eighty-seven (87) North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa.

Deed Reference: Volume 731, Page 3039 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874712100006 (17.9 acres) and 874712100008 (20.00 acres)

Document Number: 2022-09656  
Recorded: 8/5/2022 at 3:12:48.0 PM  
County Recording Fee: \$32.00  
Iowa E-Filing Fee: \$3.60  
Combined Fee: \$35.60  
Revenue Tax:  
PATRICK F GILL AUDITOR & RECORDER  
Woodbury County, Iowa

Prepared by: *and return to:*

Adam M. Runkle  
Starkey & Runkle, LLC  
638 West Maple Street  
Hartville, OH 44632

*330.494. 9077* MEMORANDUM OF SOLAR OPTION AND LAND LEASE

THIS MEMORANDUM OF SOLAR OPTION AND LAND LEASE ("Memorandum") executed as of the 24 day of July, 2022 by and between **WILLIAM P. JOCHUM** ("Lessor" or "Grantor"), whose address is 4620 Polk St., Sioux City, IA 51108, and RENEWABLE ENERGY EQUITY PARTNERS 1, LLC, a Delaware limited liability company ("Lessee" or "Grantee"), whose address is 638 West Maple St., Hartville, OH 44632. Lessor and Lessee may hereafter be referred to as, together, the "Parties".

#### RECITALS

- A. Lessor and Lessee have entered into a certain a Solar Option and Land Lease ("Lease"), dated 7/24/2022 ("Effective Date"), whereby Lessor has agreed to lease to Lessee certain real property, together with access easement rights and an easement for the free and unobstructed collection and conversion of solar energy across said premises in Woodbury County, Iowa, and being more particularly described on the attached Exhibit A ("Premises").
- B. The Parties desire to enter into and record this Memorandum so that third parties will have notice of the interests of the Lessee in the Premises. Capitalized terms used in this, but not otherwise defined in this Memorandum shall have the meanings ascribed to them in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants and obligations of the Parties contained in this Memorandum and in the Lease, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Lessor and Lessee have entered into the Lease to lease and demise the Premises for solar energy purposes and to grant access and solar easements, which include prohibiting any obstruction to the open and unobstructed access to the sun ("Solar Easement") throughout the entire Premises to and for the benefit of the area existing horizontally three hundred and sixty degrees (360°) from any point where any "Solar Facility" is or may be located at any time from time to

time (each such point referred to as a "Site") and for a distance from each Site to the boundaries of the Premises, together vertically through all space located above the surface of the Premises, that is, one hundred eighty degrees (180°) or such greater number or numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface from each point along the exterior boundary of the Premises through each Site to each point and on and along such line to the opposite exterior boundary of the Premises. Pursuant to the Lease, Lessee has the exclusive right to use the Premises for solar energy purposes, together with certain related solar, access and other easement rights and other rights related to the Premises, all as more fully described in the Lease.

2. The initial term of the Lease ("Option Period") commences on the Effective Date and continues for a period of five years. If, prior to the expiration of the Option Period, Lessee has provided written notice to Lessor that it elects to extend the Lease term, the Lease shall be automatically extended for the Extended Term. The Extended Term shall commence on the Extended Term Date included in the Option Notice and continue until a date that is 30 years after the Extended Term Date unless sooner terminated in accordance with the terms of the Lease. Lessee has the right and option to extend the Extended Term for four additional periods of five years (each a "Renewal Term").

3. Subject in all respects to the terms and conditions of the Lease, Lessor has agreed that, from and after the Effective Date of the Lease, any right, title or interest created by Lessor in favor of or granted to any third party shall be subject to (i) the Lease and all of Lessee's rights, title and interests created thereby, (ii) any lien of any lender of Lessee's then in existence on the leasehold estate created by the Lease, and (iii) Lessee's right to create a lien in favor of any lender of Lessee's.

4. Lessee and any successor or assign of Lessee has the right under the Lease, without need for Lessor's consent, to do any of the following, conditionally or unconditionally, with respect to all or any portion of Lessee's right, title or interest in the Lease: hypothecate, mortgage, grant or pledge, or assign, sublease, transfer, or convey, provided that (i) any such assignment, transfer or conveyance shall not be for a period beyond the Term of the Lease; (ii) the assignee or transferee shall be subject to all of the obligations, covenants and conditions applicable to the Lessee; and (iii) Lessee shall be fully relieved from liability as to the rights, title and interest and obligations so assigned.

5. The Premises shall be held, conveyed, assigned, hypothecated, encumbered, leased, used and occupied subject to the covenants, terms and provisions set forth in this Memorandum and in the Lease, which covenants, terms and provisions shall run with the Premises, and shall be binding upon and inure to the benefit of the Parties, and the Parties' respective heirs, executors, administrators, successors and assigns.

6. The terms and conditions of the Lease are incorporated by reference into this Memorandum as if set forth fully herein at length. In the event of any conflict between the terms and provisions of the Lease and this Memorandum, the Lease shall control.

7. This Memorandum may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same document.

[SIGNATURE PAGE FOLLOWS]





**LESSEE**

RENEWABLE ENERGY EQUITY PARTNERS 1,  
a Delaware limited liability company

By: [Signature]  
Name: Erik Klein  
Title: President

STATE OF OHIO            )  
                                  )  
COUNTY OF STARK        )        SS:

BEFORE ME, the undersigned authority, a Notary Public in and for said state, on this day personally appeared before me ERIK KLEIN, President, known or proved on acceptable evidence to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 29 day of July, 2022.

[Signature]  
Name: \_\_\_\_\_  
County of Residence \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



**ADAM M. RUNKLE**  
Attorney at Law  
NOTARY PUBLIC, STATE OF OHIO  
My Commission Has No Expiration Date  
Section 147.03 O.R.C.

## EXHIBIT A

### Legal Description of Property

All of the following tracts or parcels of land, situated in Woodbury County, State of Iowa, consisting of 115 acres, more particularly described as follows:

The West Half (W ½) of the Southeast Quarter (SE ¼), (except the North forty (40) acres thereof), of Section Twenty-three (23) and the West Half (W ½) of the Northeast Quarter (NE ¼) of Section Twenty-six (26), Township Eighty-seven (87), North, Range Forty-seven (47), West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa.

Deed Reference: Volume 1213, Page 11 AND Volume 725, Page 6184 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874723400003 (38.00 acres) and 874726200001 (38.00 acres), 874726200003 (39.00 acres)

Document Number: 2022-09649  
Recorded: 8/5/2022 at 3:12:48.0 PM  
County Recording Fee: \$32.00  
Iowa E-Filing Fee: \$3.60  
Combined Fee: \$35.60  
Revenue Tax:  
PATRICK F GILL AUDITOR & RECORDER  
Woodbury County, Iowa

Prepared by: *and return to:*

Adam M. Runkle  
Starkey & Runkle, LLC  
638 West Maple Street  
Hartville, OH 44632  
*330.494.9077*

#### MEMORANDUM OF SOLAR OPTION AND LAND LEASE

THIS MEMORANDUM OF SOLAR OPTION AND LAND LEASE ("Memorandum") executed as of the *29* day of *July*, 2022 by and between **ANTHONY J. HARPENAU AND DEBORAH L. HARPENAU**, HUSBAND AND WIFE, AS JOINT TENANTS WITH FULL RIGHTS OF SURVIVORSHIP, AND NOT AS TENANTS IN COMMON ("Lessor" or "Grantor"), whose address is 2498 Carroll Ave, Salix, IA 51052, and RENEWABLE ENERGY EQUITY PARTNERS 1, LLC, a Delaware limited liability company ("Lessee" or "Grantee"), whose address is 638 West Maple St., Hartville, OH 44632. Lessor and Lessee may hereafter be referred to as, together, the "Parties".

#### RECITALS

- A. Lessor and Lessee have entered into a certain a Solar Option and Land Lease ("Lease"), dated *7/09/2022* ("Effective Date"), whereby Lessor has agreed to lease to Lessee certain real property, together with access easement rights and an easement for the free and unobstructed collection and conversion of solar energy across said premises in Woodbury County, Iowa, and being more particularly described on the attached Exhibit A ("Premises").
- B. The Parties desire to enter into and record this Memorandum so that third parties will have notice of the interests of the Lessee in the Premises. Capitalized terms used in this, but not otherwise defined in this Memorandum shall have the meanings ascribed to them in the Lease.

NOW, THEREFORE, in consideration of the mutual covenants and obligations of the Parties contained in this Memorandum and in the Lease, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Lessor and Lessee have entered into the Lease to lease and demise the Premises for solar energy purposes and to grant access and solar easements, which include prohibiting any

obstruction to the open and unobstructed access to the sun ("Solar Easement") throughout the entire Premises to and for the benefit of the area existing horizontally three hundred and sixty degrees (360°) from any point where any "Solar Facility" is or may be located at any time from time to time (each such point referred to as a "Site") and for a distance from each Site to the boundaries of the Premises, together vertically through all space located above the surface of the Premises, that is, one hundred eighty degrees (180°) or such greater number or numbers of degrees as may be necessary to extend from each point on and along a line drawn along the surface from each point along the exterior boundary of the Premises through each Site to each point and on and along such line to the opposite exterior boundary of the Premises. Pursuant to the Lease, Lessee has the exclusive right to use the Premises for solar energy purposes, together with certain related solar, access and other easement rights and other rights related to the Premises, all as more fully described in the Lease.

2. The initial term of the Lease ("Option Period") commences on the Effective Date and continues for a period of five years. If, prior to the expiration of the Option Period, Lessee has provided written notice to Lessor that it elects to extend the Lease term, the Lease shall be automatically extended for the Extended Term. The Extended Term shall commence on the Extended Term Date included in the Option Notice and continue until a date that is 30 years after the Extended Term Date unless sooner terminated in accordance with the terms of the Lease. Lessee has the right and option to extend the Extended Term for four additional periods of five years (each a "Renewal Term").

3. Subject in all respects to the terms and conditions of the Lease, Lessor has agreed that, from and after the Effective Date of the Lease, any right, title or interest created by Lessor in favor of or granted to any third party shall be subject to (i) the Lease and all of Lessee's rights, title and interests created thereby, (ii) any lien of any lender of Lessee's then in existence on the leasehold estate created by the Lease, and (iii) Lessee's right to create a lien in favor of any lender of Lessee's.

4. Lessee and any successor or assign of Lessee has the right under the Lease, without need for Lessor's consent, to do any of the following, conditionally or unconditionally, with respect to all or any portion of Lessee's right, title or interest in the Lease: hypothecate, mortgage, grant or pledge, or assign, sublease, transfer, or convey, provided that (i) any such assignment, transfer or conveyance shall not be for a period beyond the Term of the Lease; (ii) the assignee or transferee shall be subject to all of the obligations, covenants and conditions applicable to the Lessee; and (iii) Lessee shall be fully relieved from liability as to the rights, title and interest and obligations so assigned.

5. The Premises shall be held, conveyed, assigned, hypothecated, encumbered, leased, used and occupied subject to the covenants, terms and provisions set forth in this Memorandum and in the Lease, which covenants, terms and provisions shall run with the Premises, and shall be binding upon and inure to the benefit of the Parties, and the Parties' respective heirs, executors, administrators, successors and assigns.

6. The terms and conditions of the Lease are incorporated by reference into this Memorandum as if set forth fully herein at length. In the event of any conflict between the terms and provisions of the Lease and this Memorandum, the Lease shall control.

7. This Memorandum may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same document.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties have executed this Memorandum as of the date set forth above.

**LESSOR**

  
ANTHONY J. HARPENAU

  
DEBORAH L. HARPENAU

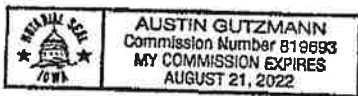
STATE OF IOWA                                    )  
  )  
COUNTY OF WOODBURY                    )       SS:

Before me, a Notary Public in and for the personally appeared ANTHONY J. HARPENAU AND DEBORAH L. HARPENAU, HUSBAND AND WIFE who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument, the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of Iowa that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.


GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 25<sup>th</sup> day of July, 2022.



Signature  
 (seal)  
Austin Gutzmann

**LESSEE**

RENEWABLE ENERGY EQUITY PARTNERS 1,  
a Delaware limited liability company

By:   
Name: Erik Klein  
Title: President

STATE OF OHIO            )  
                                  )        SS:  
COUNTY OF STARK        )

BEFORE ME, the undersigned authority, a Notary Public in and for said state, on this day personally appeared before me ERIK KLEIN, President, known or proved on acceptable evidence to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this 29 day of July, 2022.

  
Name: \_\_\_\_\_  
County of Residence \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_



**ADAM M. RUNKLE**  
Attorney at Law  
NOTARY PUBLIC, STATE OF OHIO  
My Commission Has No Expiration Date  
Section 147.03 O.R.C.

## EXHIBIT A

### Legal Description of Property

All of the following tracts or parcels of land, situated in Woodbury County, State of Iowa, consisting of 189.66 acres, more particularly described as follows:

The Southeast Quarter (SE 1/4) and the East Half (E 1/2) of the East Half (E 1/2) of the Southwest Quarter (SW 1/4) of Section Thirty-six (36), Township Eighty-seven (87) North, Range Forty-seven (47) West of the Fifth Principal Meridian, in the County of Woodbury and State of Iowa, except that part described as follows: All that part of the Southeast Quarter (SE 1/4) of the Southwest Quarter (SW 1/4) of Section Thirty Six (36), Township Eighty Seven (87) North, Range Forty Seven (47) West of the Fifth Principal Meridian, Woodbury County, Iowa, described as commencing at the South Quarter (S 1/4) corner of said Section Thirty Six (36), Township Eighty Seven (87) North, Range Forty Seven (47), thence due West along the South line of the Southwest Quarter (SW 1/4) of Section Thirty Six (36), Township Eighty Seven (87), Range Forty Seven (47), Two Hundred Eighty-seven and Twenty Hundredths feet (287.20') to the Point of Beginning, thence continuing due West along said South line Three Hundred Sixty One and Fifty Hundredths feet (361.50'), thence North One Degree Fifty-two Minutes Zero Seconds (N 01°52'00") West Three Hundred Sixty One and Fifty Hundredths feet (361.50'), thence due East parallel with the South line of the Southwest Quarter (SW 1/4) of Section Thirty Six (36), Township Eighty Seven (87), Range Forty Seven (47), Three Hundred Sixty One and Fifty Hundredths feet (361.50'), thence South One Degree Fifty-two Minutes Zero Seconds (S 01°52'00") East Three Hundred Sixty One and Fifty Hundredths feet (361.50') to the Point of Beginning. Tract contains 3.00 acres including Public Road, and 2.38 acres, excluding Public Road.

Note: The South line of the Southwest Quarter (SW 1/4) of Section 36-87-47 is assumed to bear due West.

Deed Reference: Volume 722, Page 9076 of the Office of the Recorder of Woodbury County, Iowa.

PPN: 874736400002 (39.00 acres), 874736400003 (37.58 acres), 874736400004 (36.62 acres), 874736300005 (36.46 acres), and 874736400001 (40.00 acres)



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JUL.  
**26**  
2022

# Solar installations hasten loss of Virginia farmland

by [Barbara Hollingsworth](#) posted under [Agriculture](#), [Energy](#), [Energy / Environment](#), [News](#)

Virginia lost about 2,000 acres of productive farmland per week in 2021, according to data released in February by the U.S. Department of Agriculture. There are many reasons why farmers sell off their land, including development pressures, lack of interest by younger members of farming families, and the difficulties of turning a profit in the face of ever-changing market and weather conditions.

But there is now a new threat to Virginia's agricultural base, which has a \$70 billion economic impact on the commonwealth annually, according to the [Virginia Farm Bureau](#).

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In 2015, there were no utility-sized solar farms in Virginia. Now there are 44, with more on the drawing boards.

That's because in 2020, the Virginia General Assembly passed, and then Gov. Ralph Northam signed, the Virginia Clean Economy Act, which requires the two largest electric utilities in the state, Dominion Energy and Appalachian Power, to become "carbon free" by 2045 and 2050 respectively. The law sparked a flurry of multi-million-dollar investments in solar installations throughout the commonwealth.

But has this rapid rush to install solar panels on thousands of acres of Virginia countryside been wise, given the fact that Virginia's population is growing, solar facilities require a huge amount of rural land that could be used for agriculture, and due to a variety of factors including drought, military incursions overseas and supply chain failures, even President Joe Biden has said that the United States is now facing a potential food shortage?

Only three states had more solar energy installations than Virginia in 2021, according to Bill Shobe, energy economist at the University of Virginia. But it's still a fraction of the total electricity used by Virginians.

According to the U.S. Energy Information Administration, as of January 2022, natural gas accounted for nearly half (48 percent) of all utility-scale electricity generation in Virginia, followed by nuclear (33 percent), coal (10 percent) and renewables (8 percent) – of which solar accounted for only 4 percent. So the real-life effects of a massive switch to solar energy has yet to be felt by most Virginians living in urban and suburban areas.

But rural Virginians are already seeing the effects of allowing industrial-size solar "farms" to replace real farms.

Not surprisingly, the vast majority of these new solar installations are being built in rural communities, particularly in Southside and Central Virginia where land is more plentiful than money and local public officials often struggle to pay the bills.

According to the Virginia Solar Initiative, a statewide survey released in April by U.Va.'s Weldon Cooper Center and the Virginia Department of Energy, 51 local governmental authorities have been approached for



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permission to erect large-scale solar installations in their jurisdictions, and 44 have already approved such applications.

The latest was the Charlotte County Board of Supervisors' approval in July of a conditional use permit to allow a gigantic 877-megawatt solar installation to be erected on 21,000 acres, which will be one of the largest such facilities east of the Mississippi River. Dominion Energy, which plans on purchasing the solar farm from Reston-based Randolph Solar after it's built, sweetened the deal by promising the county that it would accelerate its \$1 million payment for a previously approved solar project.

A 1,330-acre solar "farm" got the green light in King William County, as did a smaller 268-acre solar facility approved by the Henry County Board of Zoning Appeals.

Rural officials are being courted by solar developers, many from out of state, who offer financial incentives if they vote for special use permits to allow these industrial facilities to be built on land zoned for agriculture. In fact, one of the Virginia Solar Initiative survey participants wrote that local leaders "are keenly aware that solar energy production is highly land-consumptive and that solar energy providers want the lower cost farmland with no development improvements" – in other words, land that is already producing food or could quickly be converted to crop production.

"Once the facility is built, it's paying into the tax base without making any substantial demands on local services," Shobe told Virginia Public Radio. "For localities rich in land resources, this can be a very substantial contribution."

But when local officials focus on the short-term financial benefits without thinking about the future ramifications of allowing these industrial power plants on land that is supposed to be reserved for agriculture, they may be trading one form of environmental degradation for another.

For example, Dr. Rattan Lal, Distinguished Professor of Soil Science at Ohio State University, points out that soil sequesters more than three times the amount of carbon locked in all the plants and animals on Earth. Yet construction and maintenance of industrial-size solar facilities prevents the natural process of soil replenishment from occurring.

And as the Essex County Conservation Alliance points out, "farmland lost is farmland lost forever."

So ironically, the legislature's requirement that the largest utilities in Virginia become "carbon free" in less than 25 years means that there will be a lot more carbon-sequestering farmland lost in the commonwealth.

How much? Solar farms require as much as six to eight acres to produce just one megawatt of electricity. Up to 104,000 acres of forest/farmland would have to be sheathed in solar panels made of glass and highly toxic metals like lead and cadmium telluride to produce about 13,000 megawatts of electricity. And that's only when the sun shines.

Soil degradation is not the only problem. Denuded landscape is more prone to erosion, meaning that nutrients are more likely to be washed into the watershed and wind up in Chesapeake Bay, which the commonwealth is already spending millions of dollars to prevent. In March, the Virginia Department of Environmental Quality announced that starting in 2025, solar panels would be considered "unconnected impervious areas when performing post-development water quality calculations" of stormwater runoff, which will likely increase the cost of these installations.

Earlier this year, Gov. Glenn Youngkin signed House Bill 206, which says that if the DEQ finds a potential "significant adverse impact on wildlife, historic resources, prime agricultural soils, or forest lands," the solar facility in question would be required to submit a mitigation plan for public comment. The bill states that disturbing more than 10 acres of prime agricultural land, 50 acres of contiguous forest, and registered forest land automatically requires a mitigation plan.

These mitigation efforts will raise the price of solar-generated power for Virginia consumers even though the cost of the solar panels themselves, most of which are now made in China, have come down in recent years.

Michael Shellenberger, author of "Apocalypse Never," told the Thomas Jefferson Institute's Virginia Energy Consumer Conference last October that solar panels are cheaper now due to multi-billion-dollar subsidies by the Chinese government, which uses dirty coal and forced labor to produce them. He also noted that "there is no plan" to deal with the huge amount of hazardous waste from obsolete solar panels once they have reached the end of their 15-to-25-year life span.



OPINION  
GUEST ESSAY

# Are There Better Places to Put Large Solar Farms Than These Forests?

By Gabriel Popkin

Mr. Popkin is an independent journalist who writes about science and the environment. He has written extensively about threats to trees and forests.

Sept. 21, 2022

CHARLOTTE COURT HOUSE, Va. — In Charlotte County, population 11,448, forests and farms slope gently toward pretty little streams. The Roanoke River, whose floodplain includes one of the most ecologically valuable and intact forests in the Mid-Atlantic, forms the county's southwestern border.

On a recent driving tour, a local conservationist, P.K. Pettus, told me she's already grieving the eventual loss of much of this beautiful landscape. The Randolph Solar Project, a 4,500-acre project that will take out some 3,500 acres of forest during construction, was approved in July to join at least five other solar farms built or planned here thanks to several huge transmission lines that crisscross the county. When built, it will become one of the largest solar installations east of the Rocky Mountains. Although she is all for clean energy, Ms. Pettus opposed the project's immense size, fearing it would destroy forests, disrupt soil and pollute streams and rivers in the place she calls home.

"I was so excited and hoped to see solar canopies over parking lots, solar panels on rooftops, solar panels on big box stores" after Virginia passed a 2020 law requiring the elimination of fossil fuels from its power sector by 2050, Ms. Pettus says. "I never dreamed it would involve so much deforestation and grading in a place I deeply care about."

The conflict Ms. Pettus described is becoming increasingly common in rural Virginia, where a recent boom in solar farm construction has given many people pause. Conservationists and farmland advocates argue that the solar gold rush is displacing valuable forests and farms when panels could instead be going on already developed or degraded land, including abandoned industrial sites and landfills. Some even warn that a decades-long push to protect the Chesapeake Bay could be undermined by panel-driven forest loss.

Since approving Randolph and another large installation, Charlotte County has put a hold on any new solar projects until at least 2024. Measures like these, which have been imposed in at least 31 states, may become a major hindrance to carrying out the Inflation Reduction Act, recently signed into law by President Biden. For the great promise of renewable energy to be realized, states like Virginia must create an environment where solar, nature and people can peaceably coexist.

"It's very unsettling from our side to see the hardening on the sides of the issue," says Judy Dunscomb, a senior conservation scientist with the Nature Conservancy, which supports both renewable energy and forest conservation. "Folks are trying to push through these really big projects on the one hand, and localities are becoming increasingly anxious about the potential impacts of those projects."



The Amazon Solar Farm, developed by Dominion Energy, in Climax, Va., a 1,500-acre, 120-megawatt project. Melissa Lyttle for The New York Times

The ambitious targets in Virginia's 2020 Clean Economy Act make it an early mover in the Eastern United States, but nearly every state could face some version of this conflict. In every conceivable scenario that avoids catastrophic climate change, solar energy must play a central role in shifting our economy off fossil fuels. For example, a recent report from Net-Zero America, a research group at Princeton University, found that for the U.S. economy to be fully decarbonized by 2050, U.S. solar production may need to grow more than 20-fold, potentially occupying an aggregate area the size of West Virginia.

Utility-scale solar is now as cheap as or cheaper than any other form of power, but it is space-intensive. The American Farmland Trust projects that to meet renewable energy targets, many Eastern states, which have relatively high population densities, may need to devote between 1.5 percent and 6 percent of their undeveloped land to solar panels.

Still, there's plenty of space for those panels, even in a future in which most or all of our electricity comes from clean sources and in which widespread deployment of electric cars and heat pumps ratchets up demand for electricity. Several independent estimates suggest the country could power itself with roughly the acreage currently dedicated to land most everyone would agree is already degraded. And up to 39 percent could be met by putting panels on roofs. "We have tremendous opportunity on rooftops, on parking lots, on other areas like that," says Garrett Nilsen, the deputy director for the U.S. Department of Energy's Solar Energy Technologies Office.

Yet rooftops and parking lots are not where most panels are going in Virginia, or elsewhere in the United States. A 2021 study found that most solar panels in Virginia end up in forests and on farmland. And nationwide, about half of new solar power plants are built in deserts; more than four-fifths of the rest go on farmland, forestland or grasslands, according to a separate analysis.

That makes sense; such land is often cheap and easy to build on. Public and corporate policies are also driving big solar development to such spaces. The 2020 Virginia Clean Economy Act has converged with the needs of one of the state's fastest-growing industries: data centers. Many of these facilities are operated by tech giants, such as Amazon, Google and Microsoft, that have committed to renewable energy. The centers will soon gobble up two gigawatts of power, a recent report estimated — almost one-sixth of the state's total power consumption.

Neither the state nor the tech giants determine where new solar projects go. Siting is instead left up to developers, who often seek out large, flat parcels near transmission lines, and to local governments and planning and zoning boards, which are often unprepared to assess solar's environmental impacts. And Virginia offers relatively few incentives to encourage development on rooftops, parking lots or other developed or degraded areas.

The solar installations that are coming online will help reduce carbon emissions from fossil fuels. But the forests and farms they often replace help the climate too. Virginia's forests absorb about one-fifth of the state's emitted carbon dioxide, and it will need every bit of those trees' carbon-sucking power to offset emissions from hard-to-decarbonize sectors such as transportation and heavy industry, Ms. Dunscomb says.

Forests also support wildlife, prevent erosion and keep pollutants from running off into waterways. Deforested land loses some of its ability to absorb storm water, leading to increased flood risk and dirtier water downstream. At the same time that Virginia is attempting to add some 30,000 acres of forest annually to meet its obligations under the Chesapeake Bay Agreement, which requires that states in the bay's watershed reduce the pollution they send into the bay, it may be losing close to that amount to new solar arrays, estimates Chris Miller of the Piedmont Environmental Council in Warrenton.

Farmland's environmental impact is more mixed — farmland can be a carbon sink or source, an absorber or source of water pollution and a stronghold or destroyer of biodiversity, depending on how it's managed. But it has another obvious and important use; growing food. Solar panels typically take farmland out of production, and it's not yet clear whether these conversions are temporary or permanent.

These issues came to a head during the multiyear debate over the Randolph Solar Project, which will deliver a whopping 800 megawatts to the grid, nearly as much as a typical nuclear plant.

Ms. Pettus fears that Randolph, along with several other large projects that have already been approved in the county, will send soil and storm water streaming into Roanoke Creek, which includes several pristine wetlands and ultimately drains into the Roanoke River. Runoff from deforested slopes could harm water quality and aquatic life, Ms. Pettus says.

Francis Hodsoll, the chief executive of SolUnesco, the developer of the Randolph Solar Project, has promised to preserve 6,000 acres of trees on the 13,000-acre site, create wildlife corridors and ensure that the project doesn't harm water quality — something he acknowledges certain earlier projects did not do. "I think everybody who wants solar to continue in Virginia has gotten very serious about this issue," he says.

Aaron Ruby, a media relations manager for Dominion Energy, which plans to buy the project and complete its construction, promises that the company will maintain protective buffers around wetlands and waterways, capture storm water and minimize grading and topsoil loss. Still, 3,500 acres of forest will be removed to make room for the panels. Much of that would likely have been cut anyway at some point, but the solar project will prevent new trees from regrowing and absorbing carbon.

After numerous hearings the county's board of supervisors gave the project a conditional use permit in July, enticed by hundreds of millions of dollars in projected revenue that the officials hope will allow them to lower property taxes.

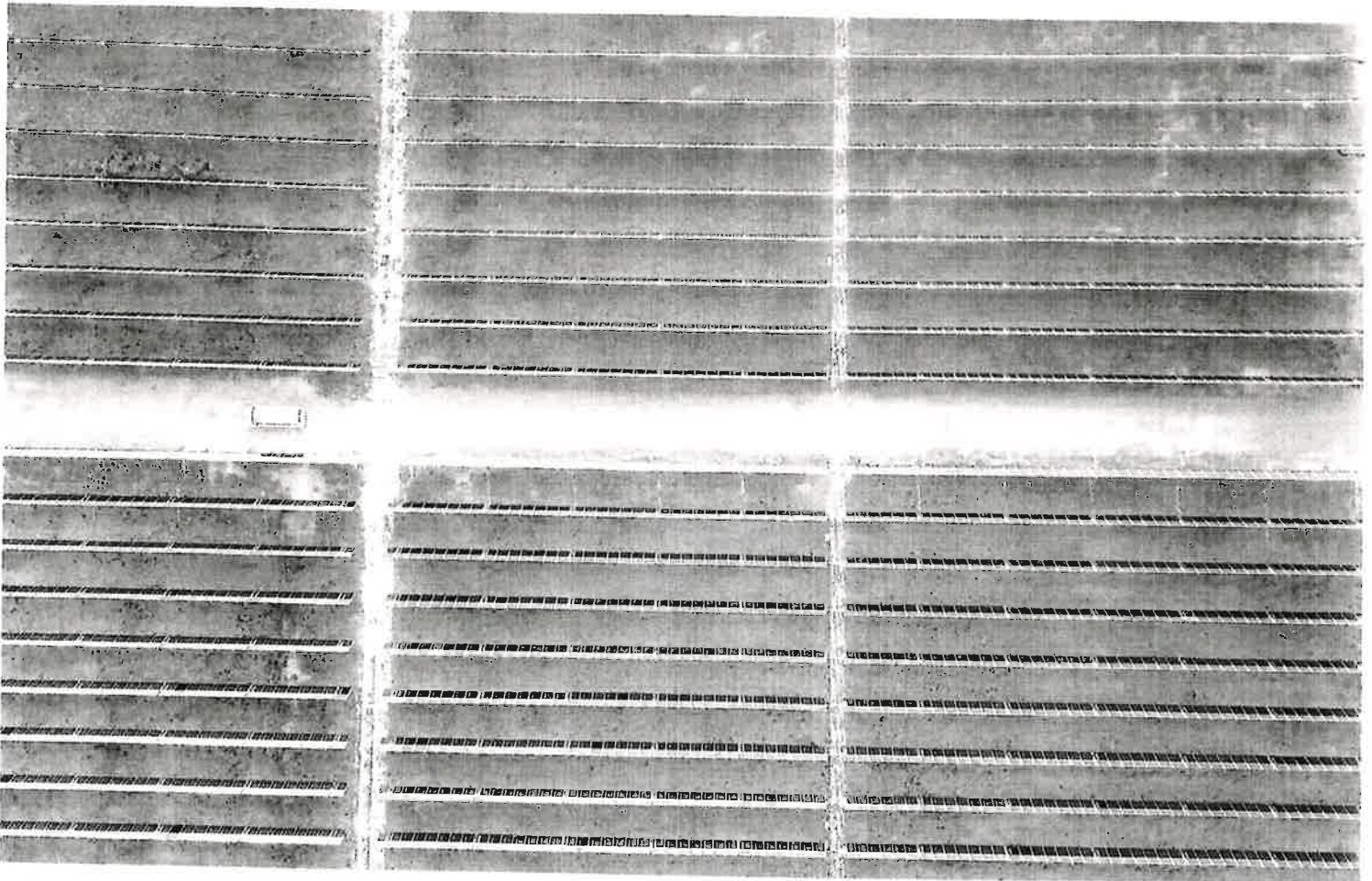


The solar boom has created new alliances. Environmental groups such as the Piedmont council and the Chesapeake Bay Foundation, while supporting clean energy generally, have found themselves joining farm bureaus to call for measures to reduce large-scale solar's impacts on nature and farmland. Last spring, the Virginia legislature passed a bill acknowledging that utility-scale solar can have a "significant adverse impact" on forests and farmland and creating an advisory panel to develop measures to reduce this impact.

Meanwhile, libertarians and free-market conservatives have allied with the solar industry to back property owners' rights to use their land as they wish.

There are also softer values at play. Solar panels can have a futuristic beauty, but for many people they're a blight. Much of the opposition to large solar projects has centered less on nature than on aesthetics, historical preservation, property values and rural character. Some of it has also been fueled by misinformation.

Motivated residents can scuttle projects, as happened last year when the Culpeper County board of supervisors nixed a proposed solar installation in central Virginia in response to citizen opposition. Other counties have revised zoning rules to restrict the size of new projects or even ban them altogether. And again, it's not just happening in Virginia: Researchers from M.I.T. found that between 2008 and 2021, 53 utility-scale renewable energy projects were delayed or blocked in the United States, leading to a loss of almost 4,600 megawatts of generating capacity — enough to power nearly a million homes.



A Dominion Energy solar field on former farmland in Pittsylvania County, Virginia. Melissa Lyttle for The New York Times

If today's relatively modest solar rollout is already facing such strong headwinds, imagine what will happen when states and companies move toward going 100 percent renewable. The Inflation Reduction Act's tax credits and other incentives could quintuple the amount of solar power generating capacity installed annually by 2025, according to Princeton's Zero Lab, but only if developers and installers win approval for projects.

There are plenty of places where solar energy could be developed without triggering conflicts with natural resources or concerns about rural landscapes. Rooftops and parking lots combined could, in theory, meet nearly 80 percent of the nation's electricity needs, according to the Department of Energy. But absent incentives, such sites are generally more expensive to develop than forest or farmland.

Dominion, in partnership with The Nature Conservancy, will also be developing a solar farm in southwestern Virginia on a flattened mountaintop that was blasted away for coal. Projects like this one hit a sweet spot: big enough to realize economies of scale, sited on already degraded land and poised to boost the economy of a region that sorely needs it.

More such former industrial sites are available — on landfills, for example — but they are often far from transmission lines. And the surfaces of such sites can be unstable, making construction complicated and expensive. “We can’t really brownfield our way out of this,” Ms. Dunscomb acknowledges.

But an analysis she recently conducted also delivered good news: With careful planning, Virginia can meet its solar needs while protecting the most valuable forests, wetlands and other ecosystems. Marginal farmland with poor soil, typically used for hay or pasture rather than crops, could be a better option than forest or prime farmland, for example. While some places are too steep or too far from high-voltage transmission lines to be potential solar sites, a more equitable, transparent and environmentally sensitive distribution of solar energy is possible.

States that are still ramping up their solar efforts should learn from what’s happening in Virginia. Because just about the worst thing that could happen to the climate is for one of its best allies to be seen as such a bad neighbor that nobody wants it around.

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