

## **CASE NO. 895-AT-18**

SUPPLEMENTAL MEMORANDUM #13

May 3, 2018

**Petitioner:** Zoning Administrator

**Request:** Amend the Champaign County Zoning Ordinance to add “Solar Farm” as a new principal use under the category “Industrial Uses: Electric Power Generating Facilities” and indicate that Solar Farm may be authorized by a County Board Special Use Permit in the AG-1 Zoning District and the AG-2 Zoning District; add requirements and fees for “Solar Farm”; add any required definitions; and make certain other revisions are made to the Ordinance as detailed in the full legal description in Attachment A.

**Location:** Unincorporated Champaign County

**Time Schedule for Development:** As soon as possible

**Prepared by:** **Susan Burgstrom**  
Senior Planner

**John Hall**  
Zoning Administrator

Brookens Administrative Center  
1776 E. Washington Street  
Urbana, Illinois 61802

(217) 384-3708

[zoningdept@co.champaign.il.us](mailto:zoningdept@co.champaign.il.us)

[www.co.champaign.il.us/zoning](http://www.co.champaign.il.us/zoning)

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### **STATUS**

Public comments received by P&Z Staff since April 26, 2018, can be found in the Attachments.

Please see the following sections for more information that may impact final determination of the text amendment:

- Justification for Minimum Required Separation to Dwellings
- Revision to Alternative Decommissioning Requirements
- Revision to Required Screening
- Exception for Substation Location Within One-Half Mile of a Municipality

### **JUSTIFICATION FOR MINIMUM REQUIRED SEPARATION TO DWELLINGS**

Minimum separation between solar farm equipment and dwellings has been revised several times over the course of this case’s public hearing process. As of the April 26, 2018 public hearing, discussion focused on a 200 feet separation between the solar farm perimeter fence and residential lots 5 acres or less, and 250 feet separation between the solar farm perimeter fence and a residential structure for lots 5 acres or larger. This does not include the proposed requirement of at least 275 feet separation between the solar farm perimeter fence and the inverter. This increase was offered in recognition of the likelihood of multiple community solar farms and/or large solar farms.

Using an online tool, “Estimating Sound Levels with the Inverse Square Law”, found at <http://hyperphysics.phy-astr.gsu.edu/hbase/Acoustic/isprob2.html>, P&Z Staff estimated the following sound level:

- **200 feet from property line to fence + 275 feet from fence to inverter (current amendment revision).** At this separation, the approximate calculated noise level of the SMA central inverter Model SC2750EV is 41.09 dB.

If the Board is not convinced that this separation is adequate, other possible separations and related justifications are:

- **240/290 feet + 275 feet to inverter.** 240 feet is a dimension that fits current large-scale agricultural equipment such as allowing four passes of a 60 feet wide planter, two passes of a 120 feet wide sprayer, and 6 passes of a 40 feet wide combine header. At this separation, the approximate calculated noise level of the SMA central inverter Model SC2750EV is 40.38 dB.
- **260/310 feet + 275 feet to inverter.** At this separation, the approximate calculated noise level of the SMA central inverter Model SC2750EV is 40.05 dB.
- **300/350 feet + 275 feet to inverter.** At this separation, the approximate calculated noise level of the SMA central inverter Model SC2750EV is 39.43 dB. This is the same separation as for a meat processing plant, per the table listing the separations in the current Ordinance distributed as Attachment F to Supplemental Memo #7 dated April 5, 2018.
- **330/ 380 feet.** At this separation, the approximate calculated noise level of the SMA central inverter Model SC2750EV is 38.98 dB.

P&Z Staff has attached copies of each sound level listed above (Attachment K).

## REVISION TO ALTERNATIVE DECOMMISSIONING REQUIREMENTS

At the April 26, 2018 ZBA meeting, the Board discussed revising the Alternative Decommissioning Plan to require conversion of a Letter of Credit to an escrow account over a 5 year period, from year 15 to year 20. This alternative was proposed because there was a concern that the solar modules would continue to degrade through years 20 through 25. However, the limited warranty guarantees that the solar modules will be at no less than 80% nominal power output by year 25.

Staff provided solar module warranty information from two Tier 1 companies in Supplemental Memo #5 Attachment E dated March 29, 2018. Both warranties state there will be at least 80% efficiency at year 25 (see attached excerpts of those warranties).

The Board may want to reconsider whether it would be sufficient to have the letter of credit converted to an escrow account in years 20 through 25 given that the limited warranty guarantees not less than 80% nominal power output by year 25.

## REVISION TO REQUIRED SCREENING

Through this text amendment process, it has become clear that there are a variety of options and preferences for screening solar farm equipment. Knowing that each potential solar farm case and its impacted residents are unique, staff proposes a revision to the screening requirements that allows the Zoning Board of Appeals to choose screening from a range of options on a case by case basis. The following revisions are proposed to section 6.1.5 M.(2) of the amendment. Note: underlined/ strikeout text was proposed at the April 26, 2018 meeting, and new revisions are in yellow highlight.

(2) Screening

a. A visual screen shall be provided around the perimeter of the PV SOLAR FARM as follows:

(a) The visual screen shall be provided for any part of the PV SOLAR FARM that is visible to and located within 1,000 feet of a DWELLING or residential DISTRICT. However, the visual screen shall not be required if the PV SOLAR FARM is not visible to a DWELLING or residential DISTRICT by virtue of the existing topography.

(b) The visual screen shall be waived if the owner(s) of a relevant DWELLING(S) have agreed in writing to waive the screening requirement and a copy of the written waiver is submitted to the BOARD or GOVERNING BODY.

(c) The visual screen shall be a vegetated buffer as follows:

i. A vegetated visual screen buffer shall include a continuous line of native evergreen foliage and/or native shrubs and/or native trees and/or any existing wooded area. ~~and/or tallgrass prairie~~ plantings of tall native grasses and other native flowering plants and/or an area of agricultural crop production that will conceal the PV SOLAR FARM from view from adjacent abutting property may be authorized as an alternative visual screen subject to specific conditions.

ii. Any vegetation that is part of the approved visual screen buffer shall be maintained in perpetuity of the PV SOLAR FARM. If the evergreen foliage below a height of 7 feet disappears over time, the screening shall be replaced.

iii. The continuous line of native evergreen foliage and/or native shrubs and/or native trees shall be planted at a minimum height of 5 feet tall and shall be planted in multiple rows as required to provide a 50% screen within 2 years of planting. The planting shall otherwise conform to Natural Resources Conservation Service Practice Standard 380 Windbreak/Shelterbreak Establishment except that the planting shall be located as close as possible to the PV SOLAR FARM fence while still providing adequate clearance for maintenance.

iv. A ~~tallgrass prairie~~ planting of tall native grasses and other native flowering plants may be ~~used~~ authorized as an alternative visual screen buffer for any PV module installation that is no more than 8 feet tall provided that ~~and~~ the width of planting shall be at least 10 30 feet wide in depth as authorized by the BOARD and the planting shall otherwise

be planted and maintained per the recommendations of the Natural Resources Conservation Service Practice Standard 327 Conservation Cover and further provided that the PV SOLAR FARM perimeter fence is opaque.

- v. An area of agricultural crop production that is at least 30 feet in depth and may also be authorized by the BOARD as an alternative visual screen buffer with a width of planting as authorized by the BOARD provided that the PV SOLAR FARM perimeter fence is opaque. Any area of crop production that is used as a vegetated visual screen shall be planted annually and shall be replanted as necessary to ensure a crop every year regardless of weather or market conditions.
- vi. Any vegetated screen buffer shall be detailed in a landscape plan drawing that shall be included with the PV SOLAR FARM SPECIAL USE permit application.

**EXCEPTION FOR SUBSTATIONS LOCATED WITHIN ONE-HALF MILE OF A MUNICIPALITY**

The most recent revision of the solar farm amendment states that solar equipment cannot be located within one-half mile of a municipality with zoning. Staff suggests that it is important to discuss the difference between solar equipment and substations in terms of their desired distance from a municipality. Most electrical substations are located within or adjacent to the corporate limits of a municipality, with no required separation distance. Staff offers the following revision to section 6.1.5 B.(2) of the amendment to recognize substations not needing such a separation:

- (2) The PV SOLAR FARM County Board SPECIAL USE permit shall not be located in the following areas:
  - a. Less than one-and-one-half miles from an incorporated municipality that has a zoning ordinance unless the following is provided:
    - (a) No part of a PV SOLAR FARM shall be located within a contiguous urban growth area (CUGA) as indicated in the most recent update of the CUGA in the Champaign County Land Resource Management Plan, and there shall be a separation of one-half mile from the proposed PV SOLAR FARM to any municipal boundary at the time of application for the SPECIAL USE Permit, except for any power lines of 34.5 Kva or less and except for any proposed PV SOLAR FARM substation and related proposed connection to an existing substation.

## **ATTACHMENTS**

- A Legal advertisement
- B Email from Ted Hartke received April 23, 2018, with attachment:
  - Dr. Schomer testimony before the Illinois Pollution Control Board
- C Email from Tom Sinder received May 1, 2018
- D Email from Scott Willenbrock received May 1, 2018
- E Emails from Terry McFall received April 12, April 26, and May 2, 2018
- F Email #1 from Ted Hartke received May 3, 2018
- G Email #2 from Ted Hartke received May 3, 2018
- H Email from Jonathan Livengood received May 3, 2018
- I Basi, Mindy. "Solar Developer: We Listened." *The County Star*, May 3, 2018
- J Basi, Mindy. "Champaign County Zoning Board of Appeals Continues Solar Energy Ordinance Debate." *The County Star*, May 3, 2018
- K Sound level estimates by P&Z Staff using online tool, "Estimating Sound Levels with the Inverse Square Law", found at <http://hyperphysics.phy-astr.gsu.edu/hbase/Acoustic/isprob2.html>
- L Same as Attachment E to Supplemental Memo #5 dated March 22, 2018: Example Specifications Sheets and Warranties for two Tier 1 solar modules, received from Patrick Brown on March 20, 2018

**LEGAL PUBLICATION: WEDNESDAY, FEBRUARY 14, 2018**

**CASE: 895-AT-18**

**NOTICE OF PUBLIC HEARING REGARDING A PROPOSED AMENDMENT TO THE  
CHAMPAIGN COUNTY ZONING ORDINANCE.**

CASE: 895-AT-18

The Champaign County Zoning Administrator, 1776 East Washington Street, Urbana, has filed a petition to change the text of the Champaign County Zoning Ordinance. The petition is on file in the office of the Champaign County Department of Planning and Zoning, 1776 East Washington Street, Urbana, IL.

A public hearing will be held **Thursday, March 1, 2018, at 6:30 p.m.** prevailing time in the Lyle Shields Meeting Room, Brookens Administrative Center, 1776 East Washington Street, Urbana, IL, at which time and place the Champaign County Zoning Board of Appeals will consider a petition to:

Amend the Champaign County Zoning Ordinance as follows:

Part A. Amend Section 3 by adding definitions including but not limited to “NOXIOUS WEEDS” and “SOLAR FARM”.

Part B. Add paragraph 4.2.1 C.5. to indicate that SOLAR FARM may be authorized by County Board SPECIAL USE permit as a second PRINCIPAL USE on a LOT in the AG-1 DISTRICT or the AG-2 DISTRICT.

Part C. Amend Section 4.3.1 to exempt SOLAR FARM from the height regulations except as height regulations are required as a standard condition in new Section 6.1.5.

Part D. Amend subsection 4.3.4 A. to exempt WIND FARM LOT and SOLAR FARM LOT from the minimum LOT requirements of Section 5.3 and paragraph 4.3.4 B. except as minimum LOT requirements are required as a standard condition in Section 6.1.4 and new Section 6.1.5.

Part E. Amend subsection 4.3.4 H.4. to exempt SOLAR FARM from the Pipeline Impact Radius regulations except as Pipeline Impact Radius regulations are required as a standard condition in new Section 6.1.5.

Part F. Amend Section 5.2 by adding “SOLAR FARM” as a new PRINCIPAL USE under the category “Industrial Uses: Electric Power Generating Facilities” and indicate that SOLAR FARM may be authorized by a County Board SPECIAL USE Permit in the AG-1 Zoning DISTRICT and the AG-2 Zoning DISTRICT and add new footnote 15. to exempt a SOLAR FARM LOT from the minimum LOT requirements of Section 5.3 and paragraph 4.3.4 B. except as minimum LOT requirements are required as a standard condition in new Section 6.1.5.

Part G. Add new paragraph 5.4.3 F. that prohibits the Rural Residential OVERLAY DISTRICT from being established inside a SOLAR FARM County Board SPECIAL USE Permit.

Part H. Amend Subsection 6.1.1 A. as follows:

1. Add SOLAR FARM as a NON-ADAPTABLE STRUCTURE and add references to the new Section 6.1.5 where there are existing references to existing Section 6.1.4.
2. Revise subparagraph 6.1.1 A.11.c. by deleting reference to Section 6.1.1A. and add reference to Section 6.1.1A.2.

Part I. Add new subsection 6.1.5 SOLAR FARM County Board SPECIAL USE Permit with new standard conditions for SOLAR FARM.

Part J. Add new subsection 9.3.1 J. to add application fees for a SOLAR FARM zoning use permit.

Part K. Add new subparagraph 9.3.3 B.8. to add application fees for a SOLAR FARM County Board SPECIAL USE permit.

All persons interested are invited to attend said hearing and be heard. The hearing may be continued and reconvened at a later time.

Catherine Capel, Chair  
Champaign County Zoning Board of Appeals

**TO BE PUBLISHED: WEDNESDAY, FEBRUARY 14, 2018 ONLY**

Send bill and one copy to: Champaign County Planning and Zoning Dept.  
Brookens Administrative Center  
1776 E. Washington Street  
Urbana, IL 61802  
Phone: 384-3708



**Susan Burgstrom**

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**From:** Ted Hartke <tedhartke@hartke.pro>  
**Sent:** Saturday, April 28, 2018 2:56 PM  
**To:** John Hall; Susan Burgstrom  
**Subject:** Noise measurement devices  
**Attachments:** Schomer 2005 comments to IPCB.pdf

**RECEIVED**

APR 30 2018

CHAMPAIGN CO. P & Z DEPARTMENT

Dear Mr. Hall and Mrs. Burgstrom,

I was doing research and found that measuring noise using a "radio shack" noise meter or any other device besides a calibrated high-quality noise receptor device is not appropriate. Furthermore, an untrained person using a noise measuring device is as Dr. Schomer says: *"Add to this, the lack of on-site calibration verification and the result is a measurement with virtually zero probability of acceptable accuracy."*

Although cellphones are amazing tools with some really useful features, results of noise measurements from a cell phone will be rejected. Our phones were not manufactured with any intent to use them as scientific measurement tools. The use of a cell phone to record the noise level of a "snoring dog" at 39 dBA as an excuse to allow humming noise from solar inverters or rumbling noise of a wind turbine to be 40 dBA (and above) can be described using words such as:

ludicrous or insane,  
inappropriate or unacceptable or useless  
harmful, mistaken, and wrong  
stupid and gullible or naive

The following Illinois Pollution Control Board submittal from Dr. Paul Schomer needs to be distributed to the ZBA members as a supporting document to my claim that a ZBA member who is untrained in noise measurement while using a cell phone which was not designed as a noise measuring device shall be rejected as being any sort of consideration of allowing more than 39 dBA of noise levels crossing property lines.

Our Champaign County Ordinance needs to protect health, safety, and welfare of citizens. The use of insane, ludicrous, inappropriate, unacceptable, useless, harmful, mistaken, wrong, stupid, gullible, and naive assumptions has no merit while making rules to be in place for protecting citizens. Once again, I cannot stress enough that the suffering from noise pollution inside our home at 1665' and 2225' from industrial wind turbines was devastating to the health of my family, physically, emotionally, and financially. It was no fun to abandon our perfectly wonderful home. I am embarrassed and ashamed for ignoring the cautionary warnings about noise, and we indeed paid the price for the mistakes of unbelieving/uncaring public servants.

Hiring a qualified person with the proper tools to prove there is an IPCB noise violation will be a very cumbersome and expensive proposition for neighbors. Perhaps all noise complaints need to be paid for by the developer to prove compliance. I suspect the uncertainty of the costs for proving there is no noise violation will create a situation that the developer will design his projects to mitigate the inverter noise during the design to keep it below the 39 dBA max standard

Please see the attachment from Dr. Paul Schomer to the IPCB

Best regards,  
Ted Hartke

Special message: **My email was hacked Dec 30, 2016.** If you received a message that looks like it came from me and it asks you to click a link to share files, **DO NOT CLICK ON LINKS OR ICONS.** I will never send you a link or ask you to download anything unless I include a detailed project-specific correspondence. To protect yourself, never attempt to download files or click links which seem random or out of the ordinary.

Theodore P. Hartke, PE, PLS  
President  
Hartke Engineering and Surveying, Inc.  
117 S. East Avenue P.O. Box 123  
Ogden, Illinois 61859 217.840.1612  
[tedhartke@hartke.pro](mailto:tedhartke@hartke.pro)



**BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**

<b>IN THE MATTER OF:</b>	)	
	)	
<b>PROPOSED NEW AND UPDATED</b>	)	
<b>RULES FOR MEASUREMENT AND</b>	)	R 03-09
<b>NUMERICAL SOUND EMISSIONS</b>	)	(Rulemaking – Noise)
<b>STANDARDS</b>	)	
<b>AMENDMENTS TO 35 ILL. ADM.</b>	)	
<b>CODE 901 AND 910</b>	)	

**NOTICE OF FILING**

<b>TO: Ms. Dorothy M. Gunn</b>	<b>Division of Legal Counsel</b>
<b>Clerk of the Board</b>	<b>Illinois Environmental Protection Agency</b>
<b>Illinois Pollution Control Board</b>	<b>1021 North Grand Avenue East</b>
<b>100 West Randolph Street</b>	<b>Post Office Box 19276</b>
<b>Suite 11-500</b>	<b>Springfield, Illinois 62794-9276</b>
<b>Chicago, Illinois 60601</b>	<b>(VIA FIRST CLASS MAIL)</b>
<b>(VIA ELECTRONIC FILING)</b>	

**(PERSONS ON ATTACHED SERVICE LIST)**

PLEASE TAKE NOTICE that on October 3, 2005, I filed with the Office of the Clerk of the Illinois Pollution Control Board by electronic filing the FURTHER COMMENTS BY PAUL SCHOMER on behalf of the Village of Bridgeview, a copy of which is hereby served upon you.

Dated: October 3, 2005

Respectfully submitted,

By: /s/ Patricia F. Sharkey  
One of its Attorneys

Patricia F. Sharkey  
Mayer, Brown, Rowe & Maw LLP  
71 South Wacker Drive  
Chicago, Illinois 60606-4637  
(312) 782-0600

**RECEIVED**

APR 30 2018

CHAMPAIGN CO. P & Z DEPARTMENT

**CERTIFICATE OF SERVICE**

I, Patricia F. Sharkey, an attorney, hereby certify that I have served the attached **Further Comments by Dr. Paul Schomer, Ph.D., P.E.**, upon:

Dorothy M. Gunn  
Clerk of the Board  
Illinois Pollution Control Board  
100 West Randolph Street  
Suite 11-500  
Chicago, Illinois 60601  
(Electronic Mail)

Marie Tipsord  
Hearing Officer  
Illinois Pollution Control Board  
100 West Randolph Street  
Suite 11-500  
Chicago, Illinois 60601  
(U.S. Mail)

Howard O. Chinn  
Chief Engineer  
Office of the Attorney General  
188 West Randolph Street, 20<sup>th</sup> Floor  
Chicago, Illinois 60601  
(U.S. Mail)

Kyle Rominger  
Division of Legal Counsel  
Illinois Environmental Protection Agency  
1021 North Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276  
(U.S. Mail)

Thomas G. Safley  
Hodge, Dwyer, Zeman  
3150 Roland Avenue  
P.O. Box 5776  
Springfield, IL 62705-5776  
(U.S. Mail)

Robert C. Wells  
Wells Environmental Systems  
2225 Sanctuary Court  
Gurnee, IL 60031  
(U.S. Mail)

N. LaDonna Driver  
Illinois Environmental Regulatory Group  
3150 Roland Avenue  
Springfield, IL 62703

as indicated above, by electronic mail or by depositing said document in the United States Mail, postage prepaid, in Chicago, Illinois on October 3, 2005.

/s/ Patricia F. Sharkey

Patricia F. Sharkey

Patricia F. Sharkey  
Mayer, Brown, Rowe & Maw LLP  
71 South Wacker Drive  
Chicago, Illinois 60606-4637  
(312) 782-0600

BEFORE THE  
ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED NEW AND UPDATED RULES	)	
FOR MEASUREMENT AND NUMERICAL	)	R 03-09
SOUND EMISSIONS STANDARDS	)	(Rulemaking - Noise)
AMENDMENTS TO 35 ILL. ADM. CODE	)	
901 AND 910	)	

October 3, 2005

Further comments by Paul Schomer

Due to illness, I was unable to attend the recent hearing on this matter in Springfield, but the following is the gist of what my testimony would have been.

I was asked by the City of Bridgeview to perform an analysis of the Board's proposed rule changes and, frankly, had given little thought to the technical issues involved prior to this present undertaking. I have used scientific curiosity and engineering skills to delve into these issues in a rigorous fashion. I find that there are several incontrovertible points:

My first point deals with qualifications. There is one way to correctly perform measurements and a multitude of ways to mess them up. Good measurements are not an accident. They must follow ANSI approved procedures using ANSI approved methods and instrumentation. The technician or engineer must understand the physics and mathematics of sound. They must be trained and experienced, and they must be properly supervised. There is a means to determine whether an engineer has the training and experience to perform or supervise accurate acoustical measurements: Board Certification by the Institute of Noise Control Engineering. This is the closest vehicle there is to a license in Acoustical Engineering. A wastewater plant analysis requires a licensed civil engineer, a bridge analysis requires a licensed structural engineer, an HVAC analysis requires a licensed mechanical engineer, etc. Acoustical engineering has similar complexities. Minimally, a Board Certified Noise Control Engineer should be required to perform or supervise measurements. Who would accept an analysis that a bridge was safe by an untrained layman? No court would allow purported factual and objective scientific data into a legal record without assuring itself of the credentials of the person who obtained the data. Acoustical engineering is one more engineering discipline. It requires the same rigor and respect -- no more, but certainly no less.

My second point deals with instrumentation. Measurements made with a "Radio Shack" type of device are worthless. It is only the naïve layman who would choose such an instrument. These instruments, by their specifications and features, are clearly best used for indoor measurements

of sound levels that may cause hearing damage. Indoors there is no wind and the levels of concern are 80 dB and above. But what about outdoor environmental noise measurements? The Radio Shack meter has an electrical noise floor of 50 dB. This noise floor renders all readings below about 55 dB as worthless. Lack of a windscreen further limits the "acceptable range" to still higher levels. Add to this, the lack of on-site calibration verification and the result is a measurement with virtually zero probability of acceptable accuracy. In most cases there is NO accuracy at all; the measurement result is simply not correlated with the sound in question.

My third point deals with maintaining the efficacy of the Board's rules. Many valid nuisance noise instances may not be detected by poor instruments. "Radio Shack" type instruments do not measure sound in individual octave bands. But there may be excess noise in low-frequency bands such as 31 or 63 Hz that barely measure on the A-scale. This excess noise will be missed because of the A-weighting. So inaccurate measurements, typically made by the naïve using a "Radio Shack" type of meter, can result in either overstating or understating true noise levels by many decibels and mislead the Board as to the noise source. Accepting a report of 50 dBA (which is the Radio Shack instrument floor rather than an actual noise measurement) does nothing to address the Board's procedures or validate its decisions. It also does nothing to diagnose the true problem, which is the only way to get to a valid engineering solution. The octave-band nature of the Board's rules is a positive feature not to be squandered by substituting A-weighted measurements of questionable validity. Octave-band noise levels are measurable and distinguishing octave band noise allows tailored and effective engineering solutions to nuisance problems. The nuisance provision works best for all parties when objective, reproducible and accurate information supports or rebuts the nuisance claim. Inaccurate noise measurements only mislead and make finding the true facts harder.

I hope you find these thoughts useful. My former written comments for the record provide more background on the above. I regret having missed the opportunity to address the Board directly at the September 1, 2005 hearing. I will be pleased to respond with further written comments to any questions that may arise within the Board based on these or my earlier comments.

Very sincerely,  
Paul Schomer, Ph.D., P.E.,

Member, Board Certified, Institute of Noise Control Engineering

**Susan Burgstrom**

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**From:** Lori Busboom  
**Sent:** Tuesday, May 01, 2018 10:24 AM  
**To:** John Hall; Susan Burgstrom  
**Subject:** FW: Solar farms

**RECEIVED**

**MAY 01 2018**

CHAMPAIGN COUNTY ZONING DEPARTMENT

**From:** Tom Sinder <[TSinder@premiercooperative.net](mailto:TSinder@premiercooperative.net)>  
**Sent:** Tuesday, May 01, 2018 10:24 AM  
**To:** zoningdept <[zoningdept@co.champaign.il.us](mailto:zoningdept@co.champaign.il.us)>  
**Subject:** Solar farms

Good morning, I was listing to John Hall on WDWS this morning. He said that there was no concrete to support the panels on the proposed Sidney solar farm. Just posts in the ground? I find it hard to believe that the panels will stay aligned after wind and freezing and thawing. Could I have some confirmation of this?

Thank you

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**Tom Sinder**  
Regional Operations Manager  
Premier Cooperative, Inc.  
Location: Sidney  
Office: (217) 688-2307  
Mobile: (217) 202-2555

The content of this e-mail (including any attachments) is strictly confidential and may be commercially sensitive. If you are not, or believe you may not be, the intended recipient, please advise the sender immediately by return e-mail, delete this e-mail and destroy any copies.



**Susan Burgstrom**

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**From:** John Hall  
**Sent:** Wednesday, May 02, 2018 8:07 AM  
**To:** Susan Burgstrom  
**Subject:** FW: Solar Farm

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

**RECEIVED**  
**MAY 01 2018**

CHAMPAIGN CO. P & Z DEPARTMENT

**From:** Willenbrock, Scott S [<mailto:willen@illinois.edu>]  
**Sent:** Tuesday, May 1, 2018 1:22 PM  
**To:** John Hall <[jhall@co.champaign.il.us](mailto:jhall@co.champaign.il.us)>  
**Cc:** Patsi Petrie <[patsi2@gmail.com](mailto:patsi2@gmail.com)>  
**Subject:** Solar Farm

John,

Here is some information I got from Jordan Macknick at the National Renewable Energy Laboratory (NREL) in Golden, Colorado, that I thought would be useful.

Scott Willenbrock

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**From:** Macknick, Jordan [<mailto:Jordan.Macknick@nrel.gov>]  
**Sent:** Tuesday, May 01, 2018 11:48 AM  
**To:** Willenbrock, Scott S  
**Subject:** Solar Farm

Hi Scott,

These are pretty common questions that we get. Here are some resources to help respond:

1. End-of-life
  - a. Short answer is that PV panels can be recycled at the end of their useful production time, and it is likely to be a very large and lucrative market. See here for example:  
<https://www.solarpowerworldonline.com/2017/08/can-solar-panels-recycled/>
2. Hazardous waste
  - a. No, solar modules are not considered to be hazardous waste. Some types of models (not commonly deployed in the US) contain Cadmium Telluride compounds. While Cadmium can be toxic, in its form in the solar panels it is so stable that it cannot be released from solar panels, even due to a fire. But nearly all panels going in are made of silicon. See a recent "Farmer's Guide to Solar" that we recently developed in conjunction with DOE.  
<https://www.energy.gov/eere/solar/farmers-guide-going-solar>

Does this help? That me know if you'd like more.  
Jordan

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**From:** Willenbrock, Scott S <[willen@illinois.edu](mailto:willen@illinois.edu)>  
**Sent:** Tuesday, May 01, 2018 10:00 AM  
**To:** Macknick, Jordan <[Jordan.Macknick@nrel.gov](mailto:Jordan.Macknick@nrel.gov)>  
**Subject:** Solar Farm

Jordan,

Our county has been working on an ordinance for solar PV farms in the last few months. The county is concerned about a variety of things, including end-of-service issues. One question is what happens to the solar modules at the end of their life? We have also had people argue that solar modules are considered hazardous waste. Can you help?

**Susan Burgstrom**

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**From:** Lori Busboom  
**Sent:** Wednesday, May 02, 2018 2:51 PM  
**To:** Susan Burgstrom; John Hall  
**Subject:** FW: \*UPDATE\* SAY NO TO SOLAR FARM IN CHAMPAIGN COUNTY!

**RECEIVED**

**MAY 02 2018**

**From:** McFall, Terry L <[tlmcfall@illinois.edu](mailto:tlmcfall@illinois.edu)>  
**Sent:** Wednesday, May 02, 2018 2:50 PM  
**To:** zoningdept <[zoningdept@co.champaign.il.us](mailto:zoningdept@co.champaign.il.us)>  
**Subject:** Fwd: \*UPDATE\* SAY NO TO SOLAR FARM IN CHAMPAIGN COUNTY! **CHAMPAIGN CO. P & Z DEPARTMENT**

Good Afternoon,  
First, let me say I appreciate the long hours you have spent on solar farm ordinances. I was appalled to hear on Penny for Thoughts that a set back of less than 500 feet is being considered. If this was allowed many people in this county could severely have their daily lives disrupted. I have have noted in previous emails the financial devastation that "could" happen. Please protect this counties precious farm land and the quality of life to this counties property owners. Thank you,  
Terry McFall

Sent from my iPad

Begin forwarded message:

**From:** "McFall, Terry L" <[tlmcfall@illinois.edu](mailto:tlmcfall@illinois.edu)>  
**Date:** April 26, 2018 at 2:13:03 PM CDT  
**To:** "[zoningdept@co.champaign.il.us](mailto:zoningdept@co.champaign.il.us)" <[zoningdept@co.champaign.il.us](mailto:zoningdept@co.champaign.il.us)>  
**Subject:** Fwd: \*UPDATE\* SAY NO TO SOLAR FARM IN CHAMPAIGN COUNTY!

Good Afternoon,  
I sent the email below 2 weeks ago. Last night solar developer was in Sidney to answer questions. HE REFUSED TO PROVIDE PROPERTY VALUE PROTECTION OR NEGOTIATE WAIVERS WITH NEIGHBORS!  
PLEASE take this developers statement into consideration when righting ordinances. Property owners in Champaign County need ordinances to protect them from these aggressive solar developers. I will say again this will be devastating to the unfortunate who could have property near a solar farm.  
Thank you,  
Terry McFall

Sent from my iPad

Begin forwarded message:

**From:** <[tlmcfall@illinois.edu](mailto:tlmcfall@illinois.edu)>  
**Date:** April 12, 2018 at 1:05:35 PM CDT  
**To:** <[zoningdept@co.champaign.il.us](mailto:zoningdept@co.champaign.il.us)>  
**Subject:** SAY NO TO SOLAR FARM IN CHAMPAIGN COUNTY!



PLEASE do not let a solar farm in Champaign County. This will negatively affect all who live near. PLEASE stop this for any site in Champaign County. It is the American dream to own a home, especially in rural areas for many. How devastating to have the fear of this popping up next to your (American dream) property. Many people could also face a financial disaster with a large loss of home equity. Day to day living would be greatly harmed living next or near to a solar farm.

PLEASE SAY NO TO SOLAR FARMS ANYWHERE IN CHAMPAIGN COUNTY

Thank you for your time,

Terry McFall

Philo, IL

Sent from my iPad

**Susan Burgstrom**

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**From:** Ted Hartke <tedhartke@hartke.pro>  
**Sent:** Wednesday, May 02, 2018 9:18 PM  
**To:** John Hall; Susan Burgstrom  
**Subject:** Disposal "dumping" fees for solar panels

The emails (below) were used by Ted Hartke during Champaign County Solar Ordinance Testimony. (April, 2018.) The ZBA requested Hartke to provide the entire email "for the record and for review and consideration. Hartke emailed this to John Hall and Susan Burgstrom on May 2, 2018. Hartke removed the contact information for "Julie." If "Julie" must be identified, please contact Ted Hartke 217.840.1612

**From:** Kyle Amann <[kyle.amann@cleanlites.com](mailto:kyle.amann@cleanlites.com)>  
**Subject: RE: Solar panels**  
**Date:** April 25, 2018 at 2:02:40 PM CDT

Julie many of the solar panels are failing TCLP for RCRA metals. What this means is if they choose to landfill these items, they would have to go to a permitted hazardous waste landfill. You or the county need a sample of the panel be taken in the glass area and sent out for analysis. Being in the industry, we can confirm around 90+% of panels will fail this test. We are able to accept as non-hazardous waste because we are recovering the metals and recycling the material.

I would be very cautious should they choose to landfill these items as it could open them up to increased liability should the panels fail the analysis. This would be a very large fine from not following the RCRA Act. If you have any more questions I can set up a phone call with Tim Kimmel who is very knowledgeable on the solar panels.

Thanks  
Kyle Amann  
Facility Manager



[7806 Anthony Wayne Ave.  
Cincinnati, OH 45216](http://7806 Anthony Wayne Ave. Cincinnati, OH 45216)  
513.641.4155 Phone  
513.508.7229 Cell  
513.641.4156 Fax  
[www.cleanlites.com](http://www.cleanlites.com)  
[kyle.amann@cleanlites.com](mailto:kyle.amann@cleanlites.com)

**RECEIVED**

**MAY 03 2018**

CHAMPAIGN CO. P & Z DEPARTMENT



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**Sent:** Wednesday, April 25, 2018 2:50 PM  
**To:** Kyle Amann <[kyle.amann@cleanlites.com](mailto:kyle.amann@cleanlites.com)>  
**Subject:** Re: Solar panels

Thank you Kyle,  
I believe I have everything I need.

What I am frustrated about it that solar companies want to put this panels in our landfills- which does not seem to be a green energy industry then.

Do you happen to know if all solar panels can be thrown in the local dump?

Julie

On Apr 25, 2018, at 1:46 PM, Kyle Amann <[kyle.amann@cleanlites.com](mailto:kyle.amann@cleanlites.com)> wrote:

Julie I am following up with you on the solar panels. If you would like more information from us I am more than willing to assist.

Thanks

**Kyle Amann**  
**Facility Manager**

< >

[7806 Anthony Wayne Ave.](http://www.cleanlites.com)

[Cincinnati, OH 45216](http://www.cleanlites.com)

513.641.4155 Phone

513.508.7229 Cell

513.641.4156 Fax

[www.cleanlites.com](http://www.cleanlites.com)

[kyle.amann@cleanlites.com](mailto:kyle.amann@cleanlites.com)



Please consider the environment before printing this e-mail

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**From:** Kyle Amann

**Sent:** Thursday, April 19, 2018 9:26 AM

**Subject:** RE: Solar panels

Good morning Julie,

Cleanlites can accept the solar panels. Attached you will find our flow chart and our containerization sheet with our requirements. We can accept these for \$0.48/lb charge. Let me know if you would like to proceed and I will send you forms that we will need filled out in order to ship to us.

Thanks

**Kyle Amann**  
**Facility Manager**

< >

[7806 Anthony Wayne Ave.](http://www.cleanlites.com)

[Cincinnati, OH 45216](http://www.cleanlites.com)

513.641.4155 Phone

513.508.7229 Cell

513.641.4156 Fax

[www.cleanlites.com](http://www.cleanlites.com)

[kyle.amann@cleanlites.com](mailto:kyle.amann@cleanlites.com)



Please consider the environment before printing this e-mail



**Susan Burgstrom**

---

**From:** Ted Hartke <tedhartke@hartke.pro>  
**Sent:** Wednesday, May 02, 2018 9:40 PM  
**To:** John Hall; Susan Burgstrom  
**Subject:** [SPAM] Solar disposal info article dated April 2nd, 2018

**RECEIVED**

**MAY 03 2018**

Remember, in Illinois, we don't have any hazmat landfills which will accept solar panels. This article below was an eye-opener for me. The cost to get rid of solar panels is really high.

CHAMPAIGN CO. P & Z DEPARTMENT

The original link is here:

<https://www.solarpowerworldonline.com/2018/04/its-time-to-plan-for-solar-panel-recycling-in-the-united-states/>

This is the text from the article in case the link disappears or fails:

### It's time to plan for solar panel recycling in the United States

By Kelly Pickerel | April 2, 2018

*End-of-life panels might not need recycling for another 15 years, but that doesn't mean we should ignore the growing issue today.*

In 2017, the United States installed 10.6 GW of new solar energy. Using rough math (if every panel was 300 W), that's 35.3 million new solar panels installed last year. In about 30 years, a wave of 35.3 million panels may reach the end of their lifespans, not counting the hundreds of millions of panels that flooded the U.S. market in the last decade that may need to be disposed of sooner.

What to do with this future solar waste has been bothering many in the industry, especially Sam Vanderhoof, owner of consulting firm Solar CowboyZ and former president of Schott Solar.



Photo courtesy of PV Cycle

"I've been working in solar since 1976. I've been doing it a long time, and that's part of my guilt. I've been involved with millions of solar panels going into the field, and now they're getting old," he said. "The industry seems to think—myself included—that there isn't a problem yet. The reality is that there is a problem now, and it's only going to get larger, rapidly expanding as the PV industry expanded 10 years ago."

Solar panel disposal and recycling isn't a huge issue right now in 2018 because there isn't a big enough volume to cause concern. Solar panels are warranted to perform more than 25 years, and once the warranty expires, panels will still produce energy, albeit

not at their advertised peak. Solar installations in the United States didn't really take off until 2010. Any influx of panels needing replaced today happens after freak weather events or other accidents.

But where are those damaged panels going now? With no dedicated national program or requirement to safely dispose of solar panels, some unfortunately find their way to landfills. If the system owner is green-minded and has the money, panels may get shipped to a recycling facility. Other industry players are warehousing damaged or old panels until a practical recycling program is established.

That's why Vanderhoof and a few colleagues recently started a new recycling program in the United States—Recycle PV—modeled after Europe's successful program. The program is still in its early stages, but Vanderhoof hopes his efforts will start a movement.

"Who is responsible for it? In the U.S., nobody is," he said of solar panel recycling guidelines. "It is important for the industry to step up to address it. Solar is supposed to be renewable and clean energy, but there is this dirty side to it. There is a waste stream after time that hasn't been addressed."

Vanderhoof isn't alone in these concerns. There are many U.S. players trying to get plans in place before safe panel disposal becomes a national issue. Determining guidelines now will make things easier when panels reach the end of their useful lives.

#### Economics vs. regulations

Cara Libby, senior technical leader of solar energy at the Electric Power Research Institute (EPRI), has been doing solar PV recycling research on behalf of the organization's utility members. Libby said utilities asked for EPRI's help understanding the feasibility of recycling in the United States since many own solar arrays approaching 20 years old. Libby and her research partners have been looking at various recycling technologies, whether modules should be classified as hazardous waste and how other countries have already approached recycling regulations.

"It's still a little premature for dedicated PV recycling facilities [in the United States]," Libby said. "In the future, maybe around 2030, there will be a surge in PV waste volumes. Then we'll have to start thinking about a better way to collect and recycle efficiently."



*Photo courtesy of PV Cycle*

EPRI found that most panel recycling in Europe through the Waste Electrical and Electronic Equipment (WEEE) Directive—which established rules for solar panel recycling in 2012—happens at glass recyclers. Panels are crushed or shredded and then glass and metals are separated. Other chemical and thermal processes may be used to recover high-value material like silver or copper.

System owners recycle their panels in Europe because they are required to. Panel recycling in an unregulated market (like the United States) will only work if there is value in the product. The International Renewable Energy Agency (IRENA) detailed solar panel compositions in a 2016 report and found that c-Si modules contained about 76% glass, 10% polymer (encapsulant and backsheet), 8% aluminum (mostly the frame), 5% silicon, 1% copper and less than 0.1% of silver, tin and lead. As new technologies are adopted,



the percentage of glass is expected to increase while aluminum and polymers will decrease, most likely because of dual-glass bifacial designs and frameless models.

CIGS thin-film modules are composed of 89% glass, 7% aluminum and 4% polymers. The small percentages of semiconductors and other metals include copper, indium, gallium and selenium. CdTe thin-film is about 97% glass and 3% polymer, with other metals including nickel, zinc, tin and cadmium telluride.

There's just not a large amount of money-making salvageable parts on any type of solar panel. That's why regulations have made such a difference in Europe.

"In Europe, we've seen that when it's mandated, it gets done," Libby said. "Either it becomes economical or it gets mandated. But I've heard that it will have to be mandated because it won't ever be economical."

There's nothing yet mandated at a national level, but there are a few states trying to get the required recycling ball moving. In July 2017, Washington became the first state to pass a solar stewardship bill (ESSB 5939), requiring manufacturers selling solar products into the state to have end-of-life recycling programs for their own products. Manufacturers that do not provide a recycling program or outline will not be able to sell solar modules into the state after Jan. 1, 2021. Regional takeback locations will be set up to accept solar panels at no cost to the system owner, and the state may charge manufacturers for the program. Final plans are still being decided.



*A PV Cycle recycling drop-off point in Europe*

Washington-based solar panel manufacturer Itek Energy assisted with the bill's writing.

"Most of us here at the company feel strongly about being strong environmental stewards," said Evan Bush, special programs coordinator at Itek. "It's important to spearhead these efforts before there's a big volume that will need to be disposed. With this in place, we'll be more prepared."

Itek's modules are already in compliance with the new bill; the company uses a recycling partner in Idaho to take damaged panels and manufacturing scrap. Itek has been accepting back other brands of modules just to keep them out of landfills.

"There are reasons beyond just doing the right thing that should encourage others to [recycle panels]," Bush said. "Given the value of the component materials in modules, this shouldn't be a burden to us or other participants."

New York has a similar bill on the Senate calendar this year. Bill S2837A would require solar panel manufacturers to collect end-of-life panels for recycling. Critics argue that panel manufacturers should not bear the burden of recycling panels alone, although that is how the WEEE Directive works in Europe.

California SB 489 passed in 2015 and encourages safe disposition of old panels. California designates end-of-life solar panels as universal waste, a type of hazardous waste that is widely used in homes and businesses (like TVs or batteries). By California law, universal waste cannot be trashed or landfilled, but no guidelines are given on the proper way to recycle solar panels.

**A U.S. recycling veteran**



One U.S. company that has recycling figured out is CdTe thin-film module manufacturer First Solar. In 2005, the company made a commitment to extended producer responsibility. First Solar execs understood that in order for a renewable energy technology to truly be green, it was important to consider its end-of-life management. First Solar's recycling program was established at the beginning of production to responsibly recycle manufacturing scrap, warranty returns and end-of-life panels. This environmental decision also had a financial perspective—tellurium doesn't just grow on trees.



*First Solar's current recycling line*

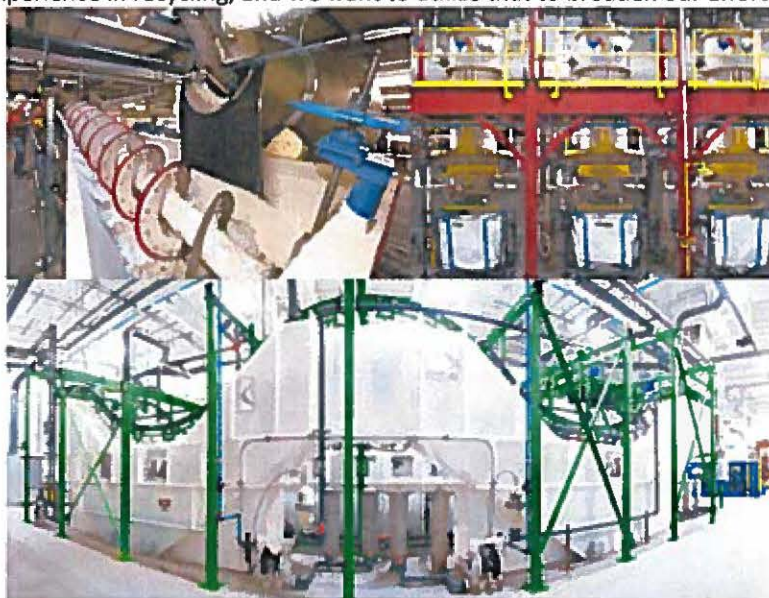
"There is a finite amount of tellurium," said First Solar global recycling director Sukhwant Raju. "They wanted to make sure there was a way to recover the valuable stuff so it becomes sustainable growth for First Solar. It's not just about being green, but how do we stay sustainable in the long term?"

First Solar recycling plants are attached to its manufacturing facilities—in Ohio, Malaysia and under construction in Vietnam. There's also a stand-alone recycling plant in Germany.

"We have the capacity to recycle 2 million panels globally on an annual basis," Raju said. "As more panels start reaching the end of their 25-year lifetimes, recycling will increase drastically."

The company only recycles CdTe panels currently, even if the panels are not manufactured by First Solar (other CdTe panel manufacturers include Calyxo of Germany and Advanced Solar Power (ASP) of China). Raju said the company may develop techniques to handle crystalline silicon panels.

"We have a decade's worth of experience in recycling, and we want to utilize that to broaden our efforts," he said.





*The progression of First Solar recycling advancements. The first photo (top left) shows the first version of recycling, the second photo (top right) shows the second version, and finally the bottom photo shows the current recycling process used in First Solar facilities.*

As with the decommissioning of other energy technologies, there's still a financial obligation on behalf of the system owner. The company's initial recycling program was pre-funded. When a First Solar panel was sold, a portion of that money went into a fund that could only be used for end-of-life recycling. In 2012, the company switched gears but continues to honor historical commitments under the prefunded module collection and recycling program.

"We realized we were not doing anyone any favors by charging customers 20 to 30 years in advance for end of life recycling," Raju said. "The better approach was to do pay-as-you-go since it is more cost-efficient to finance PV recycling through later-year project cash flows instead of upfront funding. Now when we sell our panels, we offer a global recycling services agreement. Customers have the option to use our services when the panels get to the end of life stage. We'll do the recycling, and they'll pay the price at that time."

This customer-funded recycling effort is dependent on system owners willing to pay the price to do the right thing. Raju thinks that as volume increases, recycling costs will come down and the greener option will be more attractive than just throwing panels away. First Solar is also taking steps to reduce recycling costs to ensure recycling becomes the preferred end-of-life management approach.

"Limited land availability and regulatory requirements will only increase the costs of landfilling," he said. "Meanwhile, recycling costs will continue to go down. While customers may only be sending 100 panels today for recycling, by the time most of their panels get to end of life, our cost ratio will be way lower. They see the value in getting on the recycling bandwagon."

"But at the end of the day," Raju continued, "there is nothing to force them, other than in places where there are regulations."

#### **The need for crystalline recycling**

For c-Si modules needing recycling now in the United States, there are a few scattered options. Various glass and electronics recyclers have taken on solar panel recycling, but usually not on dedicated lines or on a grand scale. Industry advocacy group SEIA has begun organizing recycling efforts through its PV Recycling Working Group. SEIA will choose preferred recycling partners that offer benefits to SEIA members. ECS Refining and Cleanlites Recycling have recently been approved as SEIA recycling partners.

Cleanlites began in the early 1990s as a light bulb recycler, taking on other items like batteries and electronics, until it found a niche with "difficult to recycle" items. It has been catering to a solar crowd for the last few years and recycled 1.5 million lbs of solar panels last year (again, using rough math of 50 lbs per panel, that's 30,000 panels).

"I saw the impending need for solar panel [recycling]. Those coming out of commission from now to the next 10 years is astronomical," said Tim Kimmel, Cleanlites vice president.



*Photo courtesy of PV Cycle*

Cleanlites uses optical, magnetic and hand sorting to separate aluminum, other metals and electronics from c-Si solar panels at its Cincinnati-based facility. The company is hesitant to accept other types of panels right now until it can determine safe processes. The leftover glass and silicon wafers (which may also have copper and silver mixed in) are sent to a smelter for further extraction. The process works for now, but it could be improved.

"We're looking to put a new process line in that will be able to separate all the components and recover the silicon wafers and recycle the units 100%," Kimmel said. "The goal is to avoid landfilling all these units, which is going to be a vast number here shortly."

As solar panels are processed on the current lines, Cleanlites collects the scrap and sends 45,000-lb loads out at a time.

"At times, we get thousands of panels in a month, and on those times, we process twice a week, making the material and sending to the smelter on a consistent basis," Kimmel said. "Other times, they come in slowly and we build them up until we are able to process a whole shipment."

It costs money to send "solar scrap" to a smelter, and Cleanlites incorporates that cost and the cost of transportation into its recycling prices.

"There is a cost, so you have to weigh... do you want to be an environmentally sustainable company, or do you want to landfill thousands of pounds of material and have that show up?" Kimmel said. "The benefit of sending it to us, we're able to receive it, ensure that the metals are recovered, and we recycle it. You're not creating any waste or hazardous waste."

A solar panel's level of hazardous waste is up for debate. If panels are just old, there are usually no reasons to worry. EPRI research found the chance of chemical leaching grows if panels are damaged.

"We've conducted some toxicity testing on modules, and we have seen results showing that the presence of lead is higher than the threshold allowed by the TCLP (toxicity characteristic leaching procedure). There is a lot of variation between module types," Libby said. "There is a potential for leaching of toxic materials such as lead in landfill environments. If modules are intact, it's a low risk, but as soon as they're broken or crushed, then the potential for leaching is increased."

Recycling panels is the safest way to dispose of them, and SEIA and recycling centers are trying to make it easy to do the right thing.

### Planning for future volume

There are clearly recycling options available now to U.S. solar owners, but their fragmented nature is what led Vanderhoof to form Recycle PV.

"There's a little effort for sure, but it's not concentrated. The information isn't out there," he said. "There's not a good, simple flow of information and processes and procedures to deal with the waste stream."

Recycle PV went straight to the pros, partnering with [PV Cycle](#) (the successful non-profit organization that offers waste management help to solar companies in Europe) and German panel refurbisher [Rinovasol](#) for the U.S. market. Slightly damaged or underperforming panels can find a second life on the refurbished market. Rinovasol will take care of those, and PV Cycle sets up memberships to get recyclable panels to partner facilities. Thus far, Recycle PV has shipped two containers of panels to Germany for recycling, which is expensive but the only way to fully take advantage of the PV Cycle process right now.

The plan for Recycle PV is to get volumes large enough to build a dedicated solar recycling plant in the United States. Vanderhoof said once Recycle PV is processing 10,000 panels a month, a U.S. facility will make more sense.

"It's not an outrageous goal," he said. "Right now in Europe, they can recycle that much a day, but it's been going on for a long time already."

It's a lofty goal for Vanderhoof and his partners to start a brand new operation, but he felt he had to do something.

"We've gone to a lot of waste management and EPA meetings. You look around the room and it's all waste management people, not solar people," he said. "Those guys are in there trying to work on the policies that affect all of us, and they'd like it to be a more expensive policy because they make more money off it. The solar guys aren't as engaged as they could be."

The most promising solution for the United States is if SEIA can successfully tap into the PV Cycle model and pick up recycling plants across the nation willing to invest in solar processing. If more states adopt Washington's requirements to have all panels backed by recycling programs, national recycling plans might automatically form. A big solar name may be willing to forgo Washington sales, but it'd have a harder time losing out on California sales just because it doesn't have a recycling plan in place.

Time is ticking. The United States has about 15 years before solar panel recycling becomes a major issue. Plenty of time to figure out the best course of action, but also plenty of time to procrastinate. Here's hoping we set early deadlines.

### ABOUT THE AUTHOR

Kelly Pickerel is managing editor of Solar Power World.

Special message: **My email was hacked Dec 30, 2016.** If you received a message that looks like it came from me and it asks you to click a link to share files, DO NOT CLICK ON LINKS OR ICONS. I will never send you a link or ask you to download anything unless I include a detailed project-specific correspondence. To protect yourself, never attempt to download files or click links which seem random or out of the ordinary.

Theodore P. Hartke, PE, PLS

President

Hartke Engineering and Surveying, Inc.

117 S. East Avenue P.O. Box 123

Ogden, Illinois 61859 217.840.1612

[tedhartke@hartke.pro](mailto:tedhartke@hartke.pro)



**Susan Burgstrom**

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**From:** Lori Busboom  
**Sent:** Thursday, May 03, 2018 8:04 AM  
**To:** John Hall; Susan Burgstrom  
**Subject:** FW: [SPAM] Comments on the Solar Ordinance for the Record

**From:** Jonathan Livengood <[jonathan.livengood@gmail.com](mailto:jonathan.livengood@gmail.com)>  
**Sent:** Wednesday, May 02, 2018 10:36 PM  
**To:** zoningdept <[zoningdept@co.champaign.il.us](mailto:zoningdept@co.champaign.il.us)>  
**Subject:** [SPAM] Comments on the Solar Ordinance for the Record

To the Members of the Board,

I am writing to encourage the Board to actively support solar projects, including the development of large solar farms, in the county. The county government ought to have as one of its goals the elimination of reliance on fossil fuels and other non-renewable sources of energy.

Specifically with respect to the proposed amendment to the Champaign County Zoning Ordinance now before the Board, I urge you to take two steps.

First, I urge you to *reduce* or *eliminate* the required set-back distances. Proposed revisions increasing the set-back distances are ill-advised. According to documents I have in hand, earlier language for 6.1.5 D.3 required 100 feet of set-back, but new suggested language increases the set-back to 200 feet or 250 feet in the case of dwellings on lots of 5 acres or more. Again, I urge you to reduce or eliminate these off-set distances. In my opinion, 100 feet was already too large a required set-back distance. I also recommend *rejecting* the suggested addition of paragraph 6.1.5 D.5.

Second, I urge you to *reduce* or *eliminate* the regulatory burdens on solar facilities. Proposed additions of noise analyses at 6.1.5 I.3 as part of the special use permit should be rejected. The noise produced by solar facilities is negligible. Adding regulatory burden for such negligible issues is unwarranted and sets bad precedent. In addition, I urge the Board to reject the addition of a new paragraph 6.1.5 F.9 minimizing disturbance to "BEST PRIME FARMLAND."

In general, as I have read through concerns raised by residents and as I listened to concerns delivered to the Board at its previous meeting, it has struck me that objections to solar installations are the products of problematic not-in-my-backyard attitudes that retard urgently needed development of green energy sources. One letter to the Board urged that the installation of solar facilities is not urgent. Citing a recent study on energy returned on energy invested in solar in regions of moderate insolation, the letter writer argued that solar technology is a net sink for energy, having an energy return on investment of about 0.8. But the letter writer failed to point out that several other recent studies suggest substantially larger values. For example, Bhandari et al. (2015) estimate a value between 8.7 and 34.2; Rauegi et al. (2017) estimate a lower-bound of 7; and Pickard (2017) gives a very conservative lower-bound of 5. Moreover, the letter writer fails to mention that average insolation in Champaign County is considerably greater than average insolation in Germany, since we are at significantly different latitudes. Hence, the results of the cited study do not apply here.

Sincerely,

Jonathan Livengood  
1220 W University Ave  
Champaign, IL

**RECEIVED**

**MAY 03 2018**

**CHAMPAIGN CO. P & Z DEPARTMENT**



# Solar developer: We listened

by Mindy Basi editor

BayWa representative Patrick Brown met on April 26 with the Sidney board of trustees and concerned residents to present a redesigned plan for his company's solar farm installation. Attorney Pat Fitzgerald from Meyer Capel was also present to discuss the tax impact of the solar farm on the area, which BayWa has named the "Prairie Solar" project.

Residents of Sidney have been very vocal at local meetings about their objection to many of the solar farm's intended plans, and indignant the project developer had not met with the village residents as a group. This face-to-face question and answer session held at the Sidney fire station - in anticipation of a large crowd - was the first of its kind since the project was proposed.

Brown said he had been in contact with the village for almost a year, and even though there is no ordinance in place for the installation - which means the project cannot go forward - he felt it was a good time for a public meeting.

One of the biggest changes was the proposed land designated for Prairie Solar is now gone from the west side, and now stretches further east. The changes were made in direct response to homeowners who were surrounded on all sides by the proposed farm.

Brown admitted that he has changed his mind about some aspects of the project. "I have learned about local issues. We heard the community and went back to redesign," Brown told the assembled crowd. "We pulled away from Sidney on the west side. I looked at the plan and realized the residents had a point. We never intended to surround on four sides. We took out all the big blocks of land in areas by the houses. We are doing setbacks that

are more than the county requires, a few hundred feet," he said.

Trustee Leroy Schluter was glad to hear about the new design. "I am glad to hear you have changed the project so the solar farm is not right up to the village. But in 10 years, will you decide to build to the West?"

Brown assured him that BayWa had no plans to do another phase of the project.

At this meeting, Brown narrated a power point presentation designed to answer questions typically posed. An accompanying packet was distributed.

Brown said he has options to lease around 1500 acres, although not all of that land may end up as part of the solar installation. The project is valued at \$200 million, Brown said, and they plan on having it last at least 35 years, because that's what investors expect.

The project will be a 2-3 year process, he explained, assuming the county zoning board of appeals passes zoning ordinances so they can go ahead. They anticipate the solar farm to be operational by 2021. The project will have an owner and investors. BayWa will maintain it as an operator, Brown said, and it is possible they will hire local crew if they are qualified.

Pat Fitzgerald explained some of the numbers involved with such a project. "It would have a real and meaningful impact on taxing districts," he said. There are three bills currently on the floor in Springfield that deal with taxing renewable energy, he said, but presently they are using valuations of wind energy as an example of what kind of revenue solar would bring to the area. Lawmakers have been working with local assessors and the Farm Bureau to determine how to value solar power. "Wind is assessed at \$360,000 per megawatt," Fitzgerald said. "The state

has said they will treat all renewable energy similarly." This translates to around \$785,000 dollars a year for schools, roads, and other infrastructure as a

direct result of the project. The noise issue is one that causes a great deal of speculation. It is unclear how much noise solar installations make, and

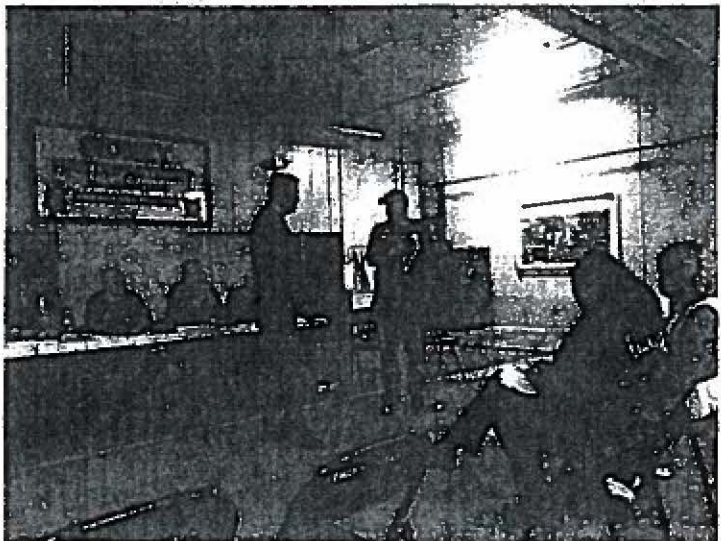
how much residents can hear from various distances. Brown stood firm in his position that regulating noise just causes more issues than it solves. "I

will never agree to a number [of dba limitation]. I have done a lot of noise studies. There won't be a complaint from anyone."

One issue that is not easily resolved is the value of properties near the solar installation. People attending the meeting were not satisfied with Brown's explanation that it was impossible to determine what makes up a home valuation. Resident Ted Hartke put it directly to Brown: "What is your plan to help people sell these houses?" Brown admitted there was no plan. Hartke suggested that BayWa should buy out the homes, or at least give a property guarantee to the neighbors of the solar installation. The crowd seemed to be in favor of such a plan, but how that might be carried out was not resolved on Thursday night.

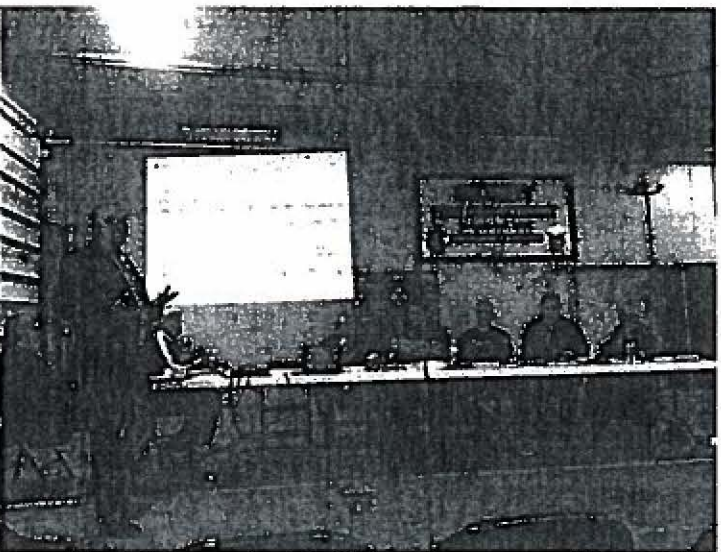
One of the misconceptions about the Sidney Prairie Solar project is that it will supply power to the surrounding community. One of the aspects of the project is that the substation located in the area is very large and powerful, and can send power all over the country. It will not go for local power needs. Brown confirmed. "We want to sell wholesale, not to residential homes."

Brown presented other information that was commonly misconceived about the project. "The facility lighting is very minimal," he said. "Its not like it's fully lit up and you can see it for miles." There are no hazardous materials used, Brown explained. The transformers are made of glass, aluminum and silicon, and use biodegradable oil. The project planners will follow all state guidelines for erosion control, seek out all drainage tiles and avoid them (including district and local tiles), and do research on panel glare to make sure there are no hazardous situations with traffic or low flying aircraft.



MINDY BASI/THE COUNTY STAR

Patrick Brown speaks to Tim Osterbur about the solar farm installation on April 26 at the Sidney fire station.



MINDY BASI/THE COUNTY STAR

Patrick Brown of BayWa presents at the question-and-answer session.

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CHAMPAIGN CO. P & Z DEPARTMENT



SOLAR ENERGY

Champaign County Zoning Board of Appeals continues solar energy ordinance debate

by Mindy Baal editor

The Champaign County Zoning Board of Appeals... The Champaign County Zoning Board of Appeals

more hazy when the purpose isn't for housing... The ambiguity in the county's land preservation plan

would be in the Champaign County area... Normally, real estate appraisals compare similar homes

A study done in North Carolina was given to the board as evidence that property values seem unaffected by the proximity of a solar installation

Jim Randol agreed... This was in a different county, out of state, he said. It may not change the value, but if I was looking at a piece of property near a solar farm, I would not buy it.

Brad Passalacqua also concurred... I think there would be a negative effect on property values, he said. He wanted the burden of making up the possible loss of sales revenue to fall to the solar company.

A second study in Illinois, which also showed no impact to property values, was deemed by the board members too small to be relevant.

The board agreed that the ordinance should state that the two studies presented showed no impact, but the samples were small and at least one was in a very different environment, so they could not say they settled the question.

if and when the solar installation is built, the county wants a guarantee they won't be left with a field full of solar panels and no money for cleaning it out and reclaiming it as farmland.

Champaign County is a leader in requiring steps for decommissioning of industrial land use, specifically for wind farms. Requiring an escrow payment is another way the county expects to protect itself from a company

abandoning a facility without a means to pay for its removal and conversion back to farmable land.

Questions of soil compaction and even soil contamination by glass shards from broken panels are of concern to the zoning board members. Solar farms, unlike wind, have a small footprint with concrete and can be easily removed, although disposal of the unwanted panels could be problematic if no landfills are available to take them or the county has to pay to recycle them, which could potentially be very costly.

There are benefits to leaving the land fallow for 20 or 30 years, DiNovo pointed out. The vegetative cover around the solar panels can prevent erosion and improve soil till, he said, and there will be no heavy equipment compacting the soil. The soil could be in better condition, he said.

The current plan for decommissioning is to have the solar companies submit both a letter of credit and place money in escrow, starting in year one and continuing until year 25 under a graduated schedule that follows the decline in productivity of the equipment. The amounts are still under discussion. Some of the board members worried that if the escrow amount was too high too early, Champaign County would be less competitive than its neighbors and lose

out to other counties.

Passalacqua stood firm on the conditions the board will impose, even if they are restrictive. We are making an ordinance that will be unique to Champaign County, he said. If [developers] can't agree, they can go to a different county with different circumstances. We are the only county that has 210% escrow for wind farm decommissioning, and they came anyway. This one criteria is not an Achilles heel for the project.

A letter of credit is only as good as the company that guarantees it, so a well-funded escrow account was very appealing to most of the board members. The escrow requirements also prevents a developer from taking advantage of subsidies and then abandoning the project, Passalacqua pointed out.

Director John Hall cautioned the board on being too restrictive. I am getting a strong message from the Environmental and Land Use Committee that we don't want to seem uncompetitive for no reason, he said. DiNovo imagined a darker scenario, where the big energy players might encourage the state of Illinois to move in and preempt local authority, which they have done in the past with cell towers and coal mines. We want our own rules, he warned.

The public did weigh in at the end of the meeting, although some people had

left before the public comment portion due to the lateness of the hour. Larry Wood of Mahomet, who teaches agriculture at Parkland College, suggested that planting pollinating plants in the solar farm area could be the impetus for honey production on surrounding land. You can get 400-500 lbs of honey per acre, Wood said. There's a revenue stream there.

Jonah Messinger of Champaign wanted to address the issue of noise. He explained that sound travels logarithmically, and diminishes by a factor of 10 as it travels. It's an outrageous claim that you could hear the inverters off the site, Messinger testified.

Ted Hartke of Sidney also testified. Hartke presented his well-researched points to the board during his testimony. The noise should be limited to 39 dba and not go past the property line, he said. Continuous noise over 40 dba has been shown in studies to cause harm. He also presented the board with a scenario that if during decommission they needed to recycle the solar panels, at present rates it could cost \$23 million, a sum that seemed to surprise the board members.

The Zoning Board of Appeals plans to meet again on May 3 at 7:00 p.m. to continue the discussion.

The board spent a good deal of time discussing the issue of conversion of prime farmland to other uses, which some members were very much opposed to.

Deb Griest and Marilyn Law were adamant that good farmland be used for farming and not taken out of production for other purposes. As zoning board members, Griest and Law both felt they had a mandate to preserve the use of land for farming purposes above any other application, such as a solar farm.

Law argued for the preservation of farmland as a priority for the board. This is for the future, she said. We may not be able to produce enough food to serve the world's needs. Take a long view, not the shortsighted view. The land must be preserved for production. I have studies that show how much farmland has been lost since 1976. The board shared data showing that in 1984 there were 582,000 acres of land assessed for farming in Champaign County. By 2016, only 216,000 acres remained.

Currently there are no limitations in Champaign County on how many acres of prime ground can be used for projects that are non-residential. The land use plan in place is very clear that agricultural use takes precedence over residential development - only three acres can be used for any residential project - but gets much

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## Estimating Sound Levels With the Inverse Square Law

In the real world, the [inverse square law](#) is always an idealization because it assumes exactly equal sound propagation in all directions. If there are reflective surfaces in the sound field, then reflected sounds will add to the directed sound and you will get more sound at a field location than the inverse square law predicts. If there are barriers between the source and the point of measurement, you may get less than the inverse square law predicts. Nevertheless, the inverse square law is the logical first estimate of the sound you would get at a distant point in a reasonably open area.

If you measure a sound level  $I_1 = 64.3$  dB

at distance

$d_1 = 10$  m = 32.80839 ft

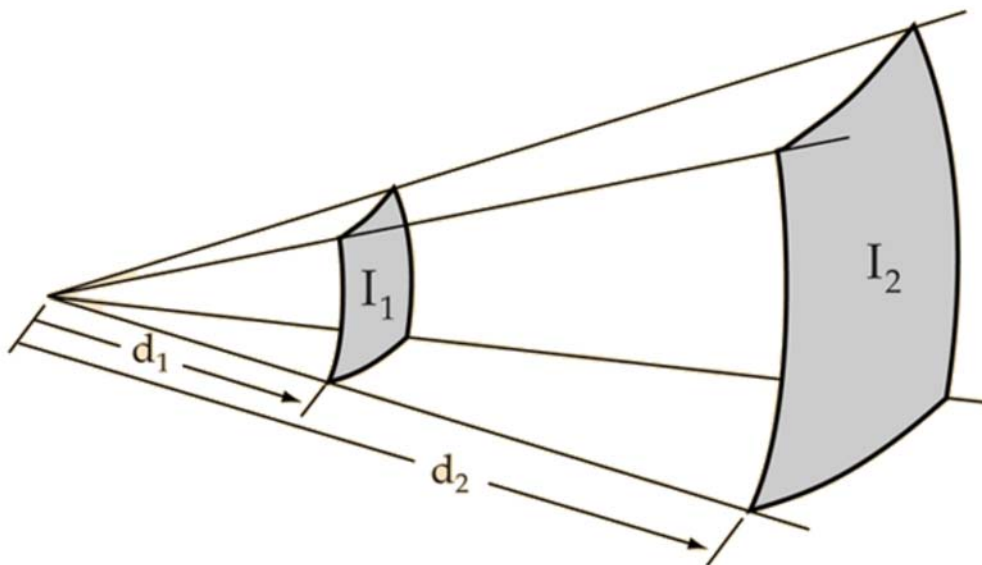
$$\frac{I_2}{I_1} = \left[ \frac{d_1}{d_2} \right]^2$$

then at distance

$d_2 = 144.78$  m = 475 ft

the inverse square law predicts a sound level

$I_2 = 41.08582$  dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

[Decibel definition](#) [Decibel calculation](#)

[Calculating dB for distance ratios](#)

[Calculating dB from source power](#)

Champaign County  
alternative: **41.09 dB**  
achieved at **475 feet**

200 feet separation  
from residential  
property line to solar  
farm perimeter fence  
+ 275 feet from fence  
to inverter

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If you measure a sound level  $I_1 = 64.3$  dB

at distance

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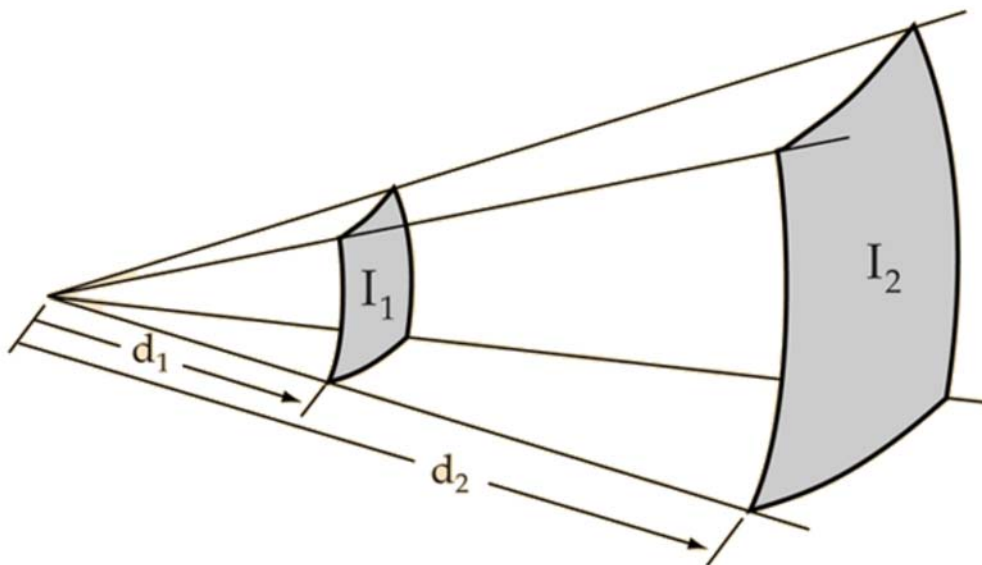
$$\frac{I_2}{I_1} = \left[ \frac{d_1}{d_2} \right]^2$$

then at distance

$d_2 = 156.972$  m = 515 ft

the inverse square law predicts a sound level

$I_2 = 40.3835$  dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

[Decibel definition](#) [Decibel calculation](#)

[Calculating dB for distance ratios](#)

[Calculating dB from source power](#)

Champaign County  
alternative: **40.38 dB**  
achieved at **515 feet**

240 feet separation  
from residential  
property line to solar  
farm perimeter fence  
+ 275 feet from fence  
to inverter

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If you measure a sound level  $I_1 = 64.3$  dB

at distance

$d_1 = 10$  m = 32.80839 ft

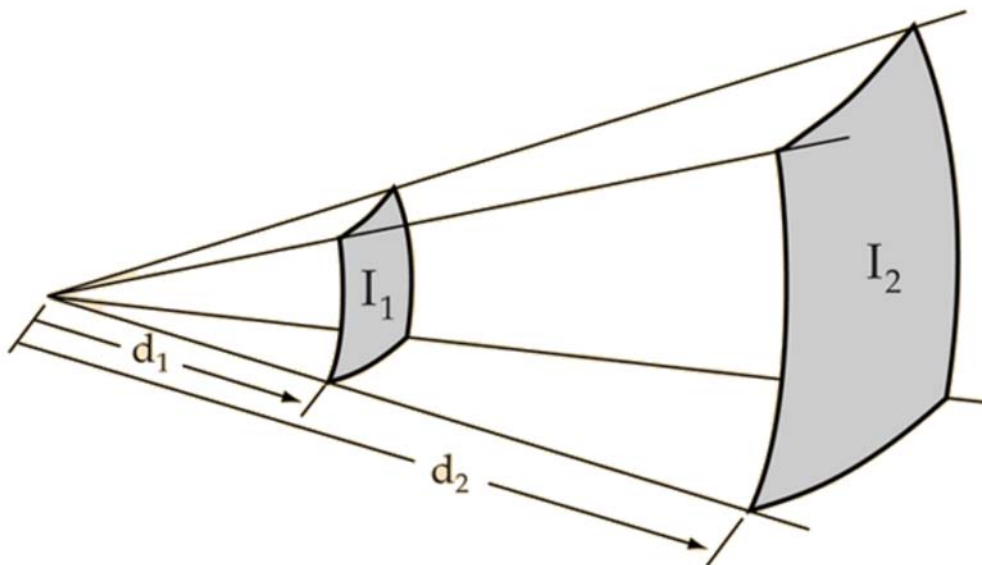
$$\frac{I_2}{I_1} = \left[ \frac{d_1}{d_2} \right]^2$$

then at distance

$d_2 = 163.068$  m = 535 ft

the inverse square law predicts a sound level

$I_2 = 40.05262$  dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

[Decibel definition](#) [Decibel calculation](#)

[Calculating dB for distance ratios](#)

[Calculating dB from source power](#)

Champaign County  
alternative: **40.05 dB**  
achieved at **535 feet**

260 feet separation  
from residential  
property line to solar  
farm perimeter fence  
+ 275 feet from fence  
to inverter

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## Estimating Sound Levels With the Inverse Square Law

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If you measure a sound level  $I_1 = 64.3$  dB

at distance

$d_1 = 10$  m = 32.80839 ft

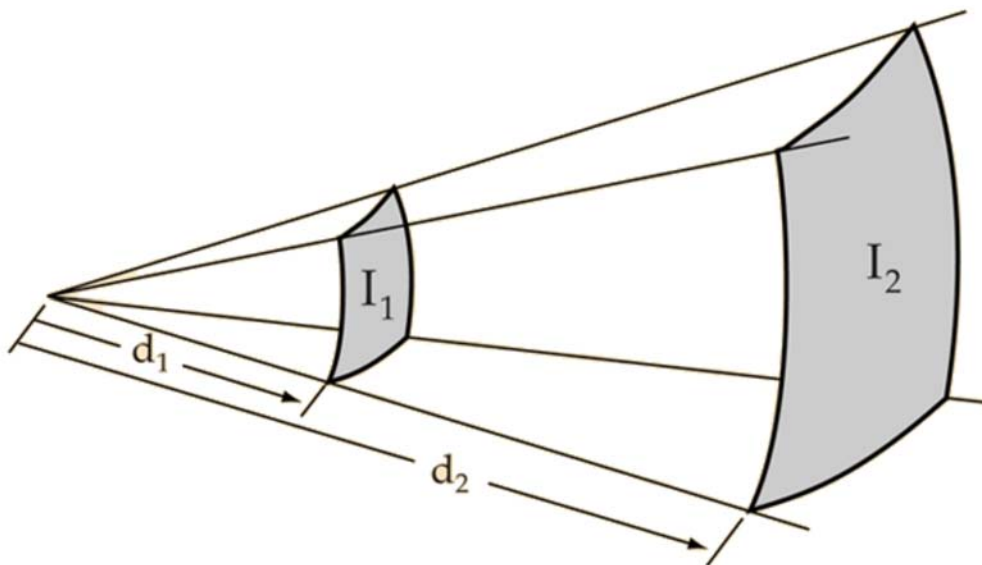
$$\frac{I_2}{I_1} = \left[ \frac{d_1}{d_2} \right]^2$$

then at distance

$d_2 = 175.2600$  m = 575 ft

the inverse square law predicts a sound level

$I_2 = 39.42634$  dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

[Decibel definition](#) [Decibel calculation](#)

[Calculating dB for distance ratios](#)

[Calculating dB from source power](#)

Champaign County  
alternative: **39.43 dB**  
achieved at **575 feet**

300 feet separation  
from residential  
property line to solar  
farm perimeter fence  
+ 275 feet from fence  
to inverter

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## Estimating Sound Levels With the Inverse Square Law

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If you measure a sound level  $I_1 = 64.3$  dB

at distance

$d_1 = 10$  m = 32.80839 ft

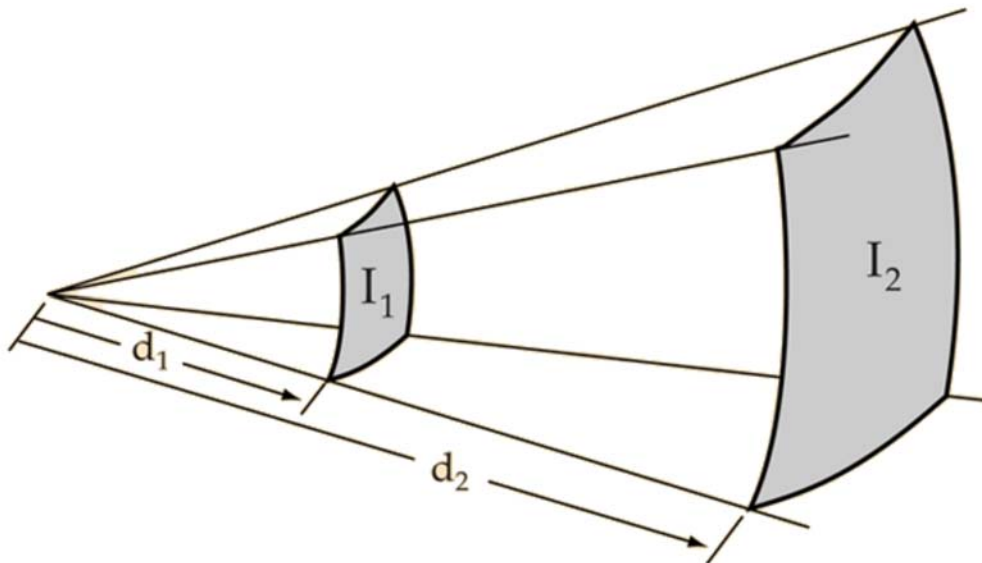
$$\frac{I_2}{I_1} = \left[ \frac{d_1}{d_2} \right]^2$$

then at distance

$d_2 = 184.404$  m = 605 ft

the inverse square law predicts a sound level

$I_2 = 38.98459$  dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

[Decibel definition](#) [Decibel calculation](#)

[Calculating dB for distance ratios](#)

[Calculating dB from source power](#)

Champaign County  
alternative: **38.98 dB**  
achieved at **605 feet**

330 feet separation  
from residential  
property line to solar  
farm perimeter fence  
+ 275 feet from fence  
to inverter

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**LIMITED WARRANTY FOR TRINA SOLAR BRAND CRYSTALLINE SOLAR PHOTOVOLTAIC MODULES**  
**PS-M-0020 Rev. U January 16<sup>th</sup>, 2018**

**2) Warranty**

**a) 10 Year Limited Product Warranty**

Trina Solar warrants that for a period of ten years commencing on the Warranty Start Date (as defined below)

- There will be no defects in design, material, workmanship or manufacture that materially impede the functioning of the Product(s), and
- the Product(s) will conform to the specifications and the drawings applicable thereto.

This Limited Product Warranty covers glass breakage provided that there was no external cause of breakage (i.e. only breakage caused by the glass itself or the module is covered).

Any deterioration in the appearance of the Product(s) (including, without limitation, any scratches, stains, mechanical wear, rust, or mold) or any other changes to the Product(s) which occur after delivery (Incoterm 2010) to the Buyer, do not constitute a defect under this Limited Warranty. The rights of the Buyer under Sec. 2 b) shall remain unaffected.

**b) 25 Year Limited Power Output Warranty**

In addition, Trina Solar warrants that for a period of twenty-five years commencing on the Warranty Start Date, the loss of power output relating to the initial guaranteed power which is defined as Peak Power Watts  $P_{max}(Wp)$  plus Peak Power Watts  $P_{max}(Wp)$  multiplied by the lower limit of the Power Output Tolerance  $P_{max}(\%)$ —as specified in the relevant Product Data Sheet and measured at Standard Test Conditions (STC) for the Product(s) shall not exceed

- For Polycrystalline Products (as defined in Sec. 1 a): 2.5% in the first year, thereafter 0.7% per year, ending with 80.7% in the 25<sup>th</sup> year after the Warranty Start Date,
- For Monocrystalline Products (as defined in Sec. 1 b): 3.0% in the first year, thereafter 0.68% per year, ending with 80.68% in the 25<sup>th</sup> year after the Warranty Start Date.
- The actual power output shall be determined for verification using STC only and measurement shall either be carried out by Trina Solar or by a Trina Solar recognized third-party testing institute. (Remark: According to STC, Measurement system uncertainty will be applied to all actual power output measurements.)

**3) Warranty Start Date**

The Warranty Start Date is the date of installation of the Product(s) or three months after the delivery (Incoterms 2010) of the Product(s) to the Buyer, whichever date is earlier.

**4) Exclusions and Limitations**

The aforementioned "Limited Warranty" does not apply to any Products which have been subjected to

- a) Failure to pay the purchase price towards Trina Solar or its subsidiaries which have put the modules on the market even though (i), the payment was due and (ii) the direct customer who



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	<b>LIMITED WARRANTY</b> REV. 050114-LINEAR
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MAR 20 2018

CHAMPAIGN COUNTY P & Z DEPARTMENT

Jinko Solar Import and Export Co., Ltd. ("Jinko") generally provides the Warranties set forth herein to the original purchaser and its permitted successors and assigns ("Customer") with respect to all solar photovoltaic modules sold by Jinko under purchase agreements signed on or after May 1, 2014 ("Modules"), subject to the terms and conditions herein ("Limited Warranty"). Jinko and Customer may hereinafter be referred to each as a "Party" and collectively as the "Parties".

1. **WARRANTY START DATE.** Jinko provides the Warranties set forth herein commencing upon the earlier of delivery of Modules to the original purchaser thereof or that date which is one hundred and eighty (180) days following the Module manufacture date, as indicated by the serial number [digit no. 7 – 12 (YYMMDD), starting from the left side of the serial number] for such Module ("Warranty Start Date").

2. **LIMITED PRODUCT WARRANTY.** Beginning on the Warranty Start Date and terminating on that date which is one hundred and twenty (120) months thereafter, Jinko warrants that the Modules and their respective DC connectors and cables, if any, shall be free from material defects in design, materials and workmanship that affect the performance of the Module ("Limited Product Warranty"). Material defects shall not include normal wear and tear.

3. **LIMITED POWER WARRANTY.** Jinko warrants that the Degradation Rate shall not exceed the following for the periods identified following the Warranty Start Date: (a) for mono-crystalline Modules: (i) 3.0% in the first year; (ii) 0.7% each year thereafter until that date which is twenty-five (25) years following the Warranty Start Date, at which time the Actual Power Output shall be not less than 80.2% of the Nominal Power Output; and (b) for poly-

crystalline Modules: (i) 2.5% in the first year; (ii) 0.7% each year thereafter until that date which is twenty-five (25) years following the Warranty Start Date, at which time the Actual Power Output shall be not less than 80.7% of the Nominal Power Output ("Limited Power Warranty").

4. **POWER DEFINITIONS.** "Nominal Power Output (PO<sub>0</sub>)" means the original manufactured nameplate specification of the Module, expressed in Watts, as certified by Jinko and indicated on the Module, excluding any specified positive tolerance. "Actual Power Output (PO<sub>t</sub>)" means the power output of the Module, expressed in Watts, at Watt peak that a Module generates at a given point in time in a year after the Warranty Start Date (t) in its 'Maximum Power Point' under Standard Test Conditions, corrected for any measurement error ("STC"). STC are as follows, measured in accordance with IEC 61215: (a) light spectrum of AM 1.5; (b) an irradiation of 1000W per m<sup>2</sup>; and (c) a cell temperature of 25 degrees centigrade at right angle irradiation. The "Degradation Rate (DR)" shall be any positive amount calculated in accordance with the following formula, expressed as a percent:

$$DR = 1.00 - [(PO_t) / (PO_0)]$$

5. **CLAIMS.** Customer shall bear the burden of establishing a breach of the Warranties hereunder. If Customer believes there has been a breach of the Limited Product Warranty or Limited Power Warranty (collectively, "Warranties"), then Customer shall promptly, and not later than thirty (30) days after knowledge thereof, provide notice to Jinko setting forth the following information related to the claim: (a) party making claim; (b) detailed description; (c) evidence, including photographs and data; (d) relevant serial numbers; (e)