From: PSC Public Comment
To: [redacted]
Subject: RE: Case number 2021-00235
Date: Monday, July 11, 2022 7:54:00 AM

Case No. 2021-00235

Thank you for your comments on the application of Russellville Solar, LLC. Your comments in the above-referenced matter have been received and will be placed into the case file for the Commission's consideration. Please cite the case number in this matter, 2021-00235, in any further correspondence. The documents in this case are available at View Case Filings for: 2021-00235 (ky.gov).

Thank you for your interest in this matter.

From: PSC Public Information Officer <PSC.Info@ky.gov>
Sent: Thursday, July 7, 2022 4:28 PM
To: PSC Public Comment <PSC.Comment@ky.gov>
Subject: FW: Case number 2021-00235

From: Sheryl Speck <[redacted]>
Sent: Thursday, June 30, 2022 2:17 AM
To: PSC Public Information Officer <PSC.Info@ky.gov>
Subject: Case number 2021-00235

Kentucky State Siting Board for Russellville Solar
PO Box 615
211 Sower Boulevard
Frankfort, KY 40601-0615

Regarding case number 2021-00235

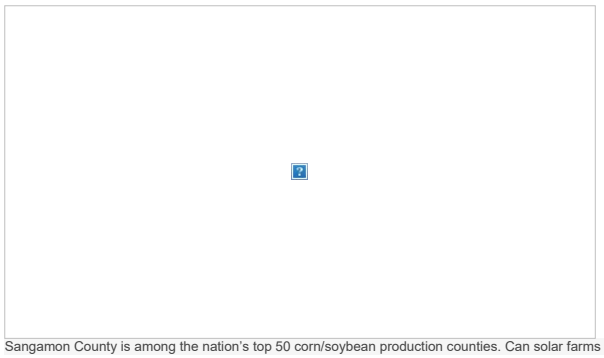
Articles for submission to support my request in asking the Kentucky Public Service Commission to please say no to the Russellville Solar Project. Due to the current world situation, feeding America is more important than ever. I understand the need for solar energy but I feel that we need to rethink how to responsibly locate renewable energy projects to minimize adverse impacts to prime farmland.

[redacted]

[redacted]

[redacted]

[redacted]



Sangamon County is among the nation's top 50 corn/soybean production counties. Can solar farms be sited on more marginal lands?

The renewable energy boom is either a boon to some or a boondoggle to others. The billions of dollars being spent on renewable energy today is causing disruptions throughout the ag economy that we are still trying to understand.

I'm a trustee for the Sangamon Conservancy Trust, which is a land trust established in 2000 to protect prime farmland in Sangamon and surrounding counties with the use of conservation easements. We recently testified against the siting of two Sangamon County solar farms because of the negative impact on prime farmland and the lack of responsible zoning criteria for industrial-sized projects.

Our board is currently working with the local Farm Bureau and the Sangamon County Board to tweak current zoning requirements to encourage future solar projects to be sited on more marginal lands. We also believe there needs to be a cap on the number of acres devoted to solar projects in our county. Our trust's easement agreements prohibit wind and solar energy projects on acreage we currently have a conservation easement on.

My farm in eastern Sangamon County is located near an operational wind farm and another prospective wind/solar project. I have personally been solicited by energy companies to participate, but I have refused despite lucrative financial offers.

My objections to these projects include:

• Once prime farmland is converted to power production, it likely will never be restored to its original productivity despite promises to do so.

• There is a finite supply of Class A (133+ Productivity Index) farmland available in the Midwest. Renewable energy projects should be sited in less productive areas.

• Fewer acres available for farming will likely increase cash rents and land values for the remaining acres in a county. That means less opportunities are available for young people wanting to enter farming.

• Uncertainty over potential pollution problems (recycling panels and heavy metals) with current solar technology.

Other states are beginning to rethink how to responsibly locate renewable energy projects to minimize adverse impacts to farmland and ranchlands.

The power density of renewable power is one to two orders of magnitude lower than for fossil fuel power, meaning renewable power requires at least 10 times more land area per unit of power produced, according to a report in the Kansas Reflector.

In Hawaii, there are efforts to have solar and wind projects sited on hillsides to protect finite agricultural lands in the islands. If nothing more is done to protect agricultural lands from development, a recent white paper predicts that Oahu is poised to lose half of its Class B agricultural lands and up to 20% of its Class C agricultural lands to solar development. Hawaii already has a goal of doubling its local food production by 2030.

The state of Indiana is working with local farmers in the northwestern part of the state to create a 13,000-acre solar farm that protects farmland. Much of the land has forests and wetlands on them, which all will stay. There also will be a lot of green space for the setbacks from the edge of property lines and farm ditches as well as the area in between panels. Only 2,500 acres will be covered by solar panels.

According to the American Farmland Trust, between 2001 and 2016, 11 million acres of U.S. farmland andOther ranchland were converted to urban and highly developed land use (4.1 million acres) or low-density residential land use (nearly 7 million acres). That's equal to all the U.S. farmland devoted to fruit, nut and vegetable production in 2017 – or 2,000 acres a day paved over, built up, and converted to uses that threaten the future of agriculture.

Here in Sangamon County, we have roughly 531,000 acres of cropland. The county is among the top 50 in corn/soybean production nationally, and in the top six counties in Illinois. The recently approved solar projects will take away at least one to two percent of cropland acreage.

Central Illinois is also known around the world as the "Golden Triangle." The most productive farmland in the U.S. and the world is in a triangle bounded by Springfield, Bloomington and Champaign-Urbana. It remains a vital resource deserving protection from unbridled development.

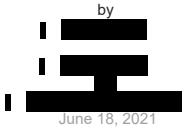
As we testified during the recent Sangamon County Board meeting, we are not opposed to renewable energy projects in central Illinois. However, we are against placing these projects in areas of prime farmland already being encroached by urban development and electric power distribution lines.

We support any efforts by local leaders to responsibly locate future renewable energy projects in the county, so local residents have reliable electricity and local farmers can produce food for the world.

John Hawkins is a current trustee of the Sangamon Conservancy Trust and a farmowner in Buffalo Hart Township.

The Dark Side of Solar Power

by



June 18, 2021

Summary.

Solar energy is a rapidly growing market, which should be good news for the environment. Unfortunately there's a catch. The replacement rate of solar panels is faster than expected and given the current very high recycling costs, **there's a real danger that all used panels will go straight to landfill** (along with equally hard-to-recycle wind turbines). Regulators and industry players need to start improving the economics and scale of recycling capabilities before the avalanche of solar panels hits.

It's sunny times for solar power. In the U.S., home installations of solar panels have fully rebounded from the Covid slump, with analysts predicting more than 19 gigawatts of total capacity installed, compared to 13 gigawatts at the close of 2019. Over the next 10 years, that number may quadruple, according to industry research data. And that's not even taking into consideration the further impact of possible new regulations and incentives launched by the green-friendly Biden administration.

Solar's pandemic-proof performance is due in large part to the Solar Investment Tax Credit, which defrays 26% of solar-related expenses for all residential and commercial customers (just down from 30% during 2006–2019). After 2023, the tax credit will step down to a permanent 10% for commercial installers and will disappear entirely for home buyers. Therefore, sales of solar will probably burn even hotter in the coming months, as buyers race to cash in while they still can.

Tax subsidies are not the only reason for the solar explosion. The conversion efficiency of panels has improved by as much as 0.5% each year for the last 10 years, even as production costs (and thus prices) have sharply declined, thanks to several waves of manufacturing innovation mostly **driven by industry-dominant Chinese panel producers.** For the end consumer, this amounts to far lower up-front costs per kilowatt of energy generated.

This is all great news, not just for the industry but also for anyone who acknowledges the need to transition from fossil fuels to renewable energy for the sake of our planet's future. But there's a massive caveat that very few are talking about.

Panels, Panels Everywhere

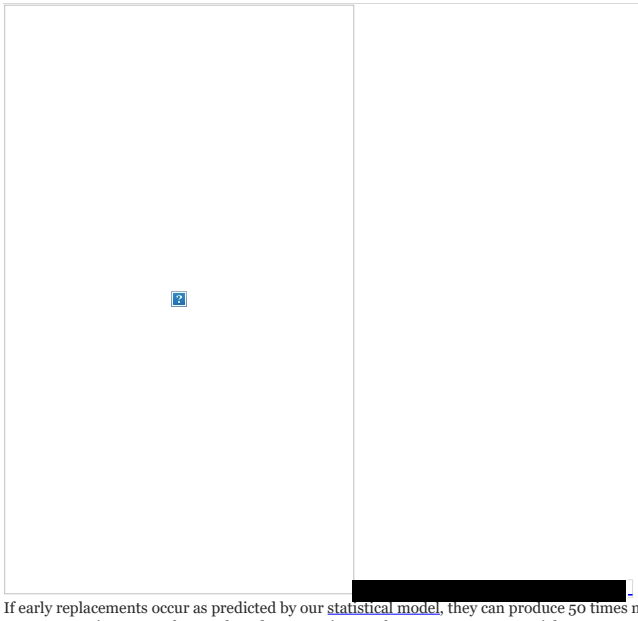
Economic incentives are rapidly aligning to encourage customers to trade their existing panels for newer, cheaper, more efficient models. In an industry where circularity solutions such as recycling remain woefully inadequate, the sheer volume of discarded panels will soon pose a risk of existentially damaging proportions.

To be sure, this is not the story one gets from official industry and government sources. The International Renewable Energy Agency (IRENA)'s official projections assert that "large amounts of annual waste are anticipated by the early 2030s" and could total 78 million tonnes by the year 2050. That's a staggering amount, undoubtedly. But with so many years to prepare, it describes a billion-dollar opportunity for recapture of valuable materials rather than a dire threat. The threat is hidden by the fact that IRENA's predictions are premised upon customers keeping their panels in place for the entirety of their 30-year life cycle. They do not account for the possibility of widespread early replacement.

Our research does. Using real U.S. data, we modeled the incentives affecting consumers' decisions whether to replace under various scenarios. We surmised that three variables were particularly salient in determining replacement decisions: installation price, compensation rate (i.e., the going rate for solar energy sold to the grid), and module efficiency. If the cost of trading up is low enough, and the efficiency and compensation rate are high enough, we posit that rational consumers will make the switch, regardless of whether their existing panels have lived out a full 30 years.

As an example, consider a hypothetical consumer (call her "Ms. Brown") living in California who installed solar panels on her home in 2011. Theoretically, she could keep the panels in place for 30 years, i.e., until 2041. At the time of installation, the total cost was $40,800, 30% of which was tax deductible thanks to the Solar Investment Tax Credit. In 2011, Ms. Brown could expect to generate 12,000 kilowatts of energy through her solar panels, or roughly $2,100 worth of electricity. In each following year, the efficiency of her panel decreases by approximately one percent due to module degradation.

Now imagine that in the year 2026, halfway through the life cycle of her equipment, Ms. Brown starts to look at her solar options again. She's heard the latest generation of panels are cheaper and more efficient — and when she does her homework, she finds that that is very much the case. Going by actual current projections, the Ms. Brown of 2026 will find that costs associated with buying and installing solar panels have fallen by 70% from where they were in 2011. Moreover, the new-generation panels will yield $2,800 in annual revenue, $700 more than her existing setup when it was new. All told, upgrading her panels now rather than waiting another 15 years will increase the net present value (NPV) of her solar rig by more than $3,000 in 2011 dollars. If Ms. Brown is a rational actor, she will opt for early replacement. And if she were especially shrewd in money matters, she would have come to that decision even sooner — our calculations for the Ms. Brown scenario show the replacement NPV overtaking that of panel retention starting in 2021.



If early replacements occur as predicted by our statistical model, they can produce 50 times more waste in just four years than IRENA anticipates. That figure translates to around 315,000 metric tonnes of waste, based on an estimate of 90 tonnes per MW weight-to-power ratio.

Alarming as they are, these stats may not do full justice to the crisis, as our analysis is restricted to residential installations. With commercial and industrial panels added to the picture, the scale of replacements could be much, much larger.

The High Cost of Solar Trash

The industry's current circular capacity is woefully unprepared for the deluge of waste that is likely to come. The financial incentive to invest in recycling has never been very strong in solar. While panels contain small amounts of valuable materials such as silver, they are mostly made of glass, an extremely low-value material. The long life span of solar panels also serves to disincentivize innovation in this area.

As a result, solar's production boom has left its recycling infrastructure in the dust. To give you some indication, First Solar is the sole U.S. panel manufacturer we know of with an up-and-running recycling initiative, which only applies to the company's own products at a global capacity of two million panels per year. With the current capacity, it costs an estimated $20–$30 to recycle one panel. Sending that same panel to a landfill would cost a mere $1–$2.

The direct cost of recycling is only part of the end-of-life burden, however. Panels are delicate, bulky pieces of equipment usually installed on rooftops in the residential context. Specialized labor is required to detach and remove them, lest they shatter to smithereens before they make it onto the truck. In addition, some governments may classify solar panels as hazardous waste, due to the small amounts of heavy metals (cadmium, lead, etc.) they contain. This classification carries with it a string of expensive restrictions — hazardous waste can only be transported at designated times and via select routes, etc.

The totality of these unforeseen costs could crush industry competitiveness. If we plot future installations according to a logistic growth curve capped at 700 GW by 2050 (NREL's estimated ceiling for the U.S. residential market) alongside the early-replacement curve, we see the volume of waste surpassing that of new installations by the year 2031. By 2035, discarded panels would outweigh new units sold by 2.56 times. In turn, this would catapult the LCOE (levelized cost of energy, a measure of the overall cost of an energy-producing asset over its lifetime) to four times the current projection. The economics of solar — so bright-seeming from the vantage point of 2021 — would darken quickly as the industry sinks under the weight of its own trash.

Who Pays the Bill?

It will almost certainly fall to regulators to decide who will bear the cleanup costs. As waste from the first wave of early replacements piles up in the next few years, the U.S. government — starting with the states, but surely escalating to the federal level — will introduce solar panel recycling legislation. Conceivably, future regulations in the U.S. will follow the model of the European Union's WEEE Directive, a legal framework for the recycling and disposal of electronic waste throughout EU member states. The U.S. states that have enacted electronics-recycling legislation have mostly cleaved to the WEEE model. (The Directive was amended in 2014 to include solar panels.) In the EU, recycling responsibilities for past (historic) waste have been apportioned to manufacturers based on current market share.

A first step to forestalling disaster may be for solar panel producers to start lobbying for similar legislation in the United States immediately, instead of waiting for solar panels to start clogging landfills. In our experience drafting and implementing the revision of the original WEEE Directive in the late 2000s, we found one of the biggest challenges in those early years was assigning responsibility for the vast amount of accumulated waste generated by companies no longer in the electronics business (so-called orphan waste).

In the case of solar, the problem is made even thornier by new rules out of Beijing that shave subsidies for solar panel producers while increasing mandatory competitive bidding for new solar projects. In an industry dominated by Chinese players, this ramps up the uncertainty factor. With reduced support from the central government, it's possible that some Chinese producers may fall out of the market. One of the reasons to push legislation now rather than later is to ensure that the responsibility for recycling the imminent first wave of waste is shared fairly by makers of the equipment concerned. If legislation comes too late, the remaining players may be forced to deal with the expensive mess that erstwhile Chinese producers left behind.

But first and foremost, the required solar panel recycling capacity has to be built, as part of a comprehensive end-of-life infrastructure also encompassing uninstallation, transportation, and (in the meantime) adequate storage facilities for solar waste. If even the most optimistic of our early-replacement forecasts are accurate, there may not be enough time for companies to accomplish this alone. Government subsidies are probably the only way to quickly develop capacity commensurate to the magnitude of the looming waste problem. Corporate lobbyists can make a convincing case for government intervention, centered on the idea that waste is a negative externality of the rapid innovation necessary for widespread adoption of new energy technologies such as solar. The cost of creating end-of-life infrastructure for solar, therefore, is an inescapable part of the R&D package that goes along with supporting green energy.

It's Not Just Solar

The same problem is looming for other renewable-energy technologies. For example, barring a major increase in processing capability, experts expect that more than 720,000 tons worth of gargantuan wind-turbine blades will end up in U.S. landfills over the next 20 years. According to prevailing estimates, only five percent of electric-vehicle batteries are currently recycled — a lag that automakers are racing to rectify as sales figures for electric cars continue to rise as much as 40% year-on-year. The only essential difference between these green technologies and solar panels is that the latter doubles as a revenue-generating engine for the consumer. Two separate profit-seeking actors — panel producers and the end consumer — thus must be satisfied in order for adoption to occur at scale.

. . .

None of this should raise serious doubts about the future or necessity of renewables. The science is indisputable: Continuing to rely on fossil fuels to the extent we currently do will bequeath a damaged if not dying planet to future generations. Compared with all we stand to gain or lose, the four decades or so it will likely take for the economics of solar to stabilize to the point that consumers won't feel compelled to cut short the life cycle of their panels seems decidedly small. But that lofty purpose doesn't make the shift to renewable energy any easier in reality. Of all sectors, sustainable technology can least afford to be shortsighted about the waste it creates. A strategy for entering the circular economy is absolutely essential — and the sooner, the better.

Disadvantages of Solar Energy Written by Aris Vourvoulias,

1. Cost

The initial cost of purchasing a solar system is fairly high. This includes paying for solar panels, inverter, batteries, wiring, and the installation. Nevertheless, solar technologies are constantly developing, so it is safe to assume that prices will go down in the future.

2. Weather-Dependent

Although solar energy can still be collected during cloudy and rainy days, the efficiency of the solar system drops. Solar panels are dependent on sunlight to effectively gather solar energy. Therefore, a few cloudy, rainy days can have a noticeable effect on the energy system. You should also take into account that solar energy cannot be collected during the night.

For a breakdown of how effective solar panels are in the winter, check out our video:

Are Solar Panels Effective in the Winter?

3. Solar Energy Storage Is Expensive

Solar energy has to be used right away, or it can be stored in large batteries. These batteries, used in off-the-grid solar systems, can be charged during the day so that the energy is used at night. This is a good solution for using solar energy all day long but it is also quite expensive.

In most cases, it is smarter to just use solar energy during the day and take energy from the grid during the night (you can only do this if your system is connected to the grid). Luckily your energy demand is usually higher during the day so you can meet most of it with solar energy.

4. Uses a Lot of Space

The more electricity you want to produce, the more solar panels you will need, as you want to collect as much sunlight as possible. Solar PV panels require a lot of space and some roofs are not big enough to fit the number of solar panels that you would like to have.

5. Associated with Pollution

Although pollution related to solar energy systems is far less compared to other sources of energy, solar energy can be associated with pollution. Transportation and installation of solar systems have been associated with the emission of greenhouse gases.

There are also some toxic materials and hazardous products used during the manufacturing process of solar photovoltaic systems, which can indirectly affect the environment.

Other concerns exist with the traffic safety for the residents, loss of jobs and erosion. Watermelon Road experiences a high volume of traffic daily. This project would cause many problems and issues with delays, road blockage and road destruction.

The increase in jobs would only be temporarily, however the loss of farmland will adversely affect the agriculture economy in Logan County and hurt jobs to those in the community such as farmers, farm supplies and parts, equipment, grain elevators, fertilizer and seed companies, insurance, etc.

All area farmers constantly battle erosion issues, gullies, sinkholes, and the washing away of land created by the weather. How will

this be addressed?

Thank you Kentucky Public Service Commission and KY State Siting Board for your time and consideration.

Respectfully submitted,

Sheryl Speck

6671 Morgantown Road

Franklin, KY 42134

From: PSC Public Comment
To: [redacted]
Subject: RE: Public Comments for Case: 2021-00235 - Russellville Solar LLC
Date: Monday, July 11, 2022 7:54:00 AM

Case No. 2021-00235

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Thank you for your interest in this matter.

From: KY Public Service Commission Public Comments <psc.comment@ky.gov>
Sent: Thursday, July 7, 2022 8:24 AM
To: PSC Public Comment <PSC.Comment@ky.gov>
Subject: Public Comments for Case: 2021-00235 - Russellville Solar LLC

Public Comments for Case 2021-00235 submitted by [redacted]) on Thursday, July 7, 2022 at 8:24 AM

Name: hall , kari
Address: 604 montgomery road
City: russellville
State: ky
Zip Code: 42276
Phone number where you can be reached: [redacted]
Home phone:
Comments: Hello, I wanted to share that I have talked with Hardin Co. Farmers group regarding issues in their county. Their zoning and planning ruled against solar but are reconsidering it. Zoning and planning have initially ruled against it because concerns were brought up that the plan laid out was not vaild. I would like to attach an article that explains some of the concerns I still have regarding the safety for the continued use of agriculture and wildlife issues.

From: PSC Public Comment
To: [redacted]
Subject: RE: Public Comments for Case: 2021-00235 - Russellville Solar LLC
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Thank you for your interest in this matter.

From: KY Public Service Commission Public Comments <psc.comment@ky.gov>
Sent: Wednesday, July 6, 2022 9:12 PM
To: PSC Public Comment <PSC.Comment@ky.gov>
Subject: Public Comments for Case: 2021-00235 - Russellville Solar LLC

Public Comments for Case 2021-00235 submitted by ([redacted]) on Wednesday, July 6, 2022 at 9:12 PM

Name: John Mason and Gwen Barnes
Address: 122 Barnes Road
City: Adairville
State: KY
Zip Code: 42202
Phone number where you can be reached: (270) 542-9056
Home phone:
Comments: After watching the June 30th hearing in its entirety, there are still many unanswered questions concerning this project. 1. No supplier for the panels has been selected, and hopefully a US manufacturer would be chosen. 2. No DECOMMISSIONING plan has been submitted. Silicon Ranch employees were asked about this multiple times during the hearing and had no answer for this. If a company is experienced in this type of construction, I would hope they would have a plan on how to remove the panels by this point in planning and developing a project. 3. Silicon Ranch mentioned that they would use Logan Todd Regional Water as their source of water. This is not possible as Logan Todd is a wholesale supplier to local municipalities and districts. As evidenced by this, Silicon Ranch has not communicated with the water suppliers. 4. No traffic plan has been created for the time during construction. 5. During questioning, employees of Silicon Ranch mentioned that minimal grading of topsoil would be done, but yet mentioned during later questioning of the environmental person that piles of dirt would be watered down to limit dust. Where do these piles of dirt come from if minimal grading of soil is done? 6. During the hearing, the question came up about how many water wells, either in use or abandoned were on the site. Silicon

Ranch did not know the number and had no plan as to what would be done with these wells. I would think this should be a priority to know this as to not directly contaminate our ground water. 7. It was mentioned during the hearing that there was not a report from the Kentucky Fish and Wildlife Department concerning this proposed project. 8. The Karst Topography of this area was discussed during the hearing and we are concerned about what damage could be caused by all the Pile Drivers being used. We fear these machines could cause more Karst formations to form as well as the water runoff from the panels. 9. It was mentioned by Mr. Lyons that Silicon Ranch had not submitted a storm water management plan. This plan or lack thereof could greatly affect soil transfer and the Karst situation mentioned in number 8. 10. Mr. Casey who testified about the noise levels mentioned that at 102 decibels, these machines would sound like a locomotive horn at 50 feet. Another representative from Silicon Ranch mentioned that it wouldn't be any worse than when tractors were running in the fields. We farm and I don't think the comparison between Diesel engines running and pile drivers is an accurate comparison. This will be very loud and inconvenient to local residents. 11. Mr. Cooms from the University of Louisville testified about the cash rents for ground in Logan County. He mentioned that the average was $205. Let us not forget that this is prime farmland, not the average and cash rent in this area goes from $300-$325 per acre. 12. Mr. Kirkland who testified that property values in the area would not be affected. However, his studies were done using subdivisions and industrial areas. Neither of which would be applicable to this rural farming area. As you can see and heard in the testimonies, there are still too many unanswered questions and concerns regarding this project. Please consider the citizens of Logan County and the neighbors to this project who will have to live and deal with this matter for many years. Thank you for your time and attention to this matter, John Mason and Gwen Barnes

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