EXHIBIT 4

EXHIBIT 4(A)

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If Solar Panels Are So Clean, Why Do They Produce So Much Toxic Waste?

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Energy
I write about energy and the environment.

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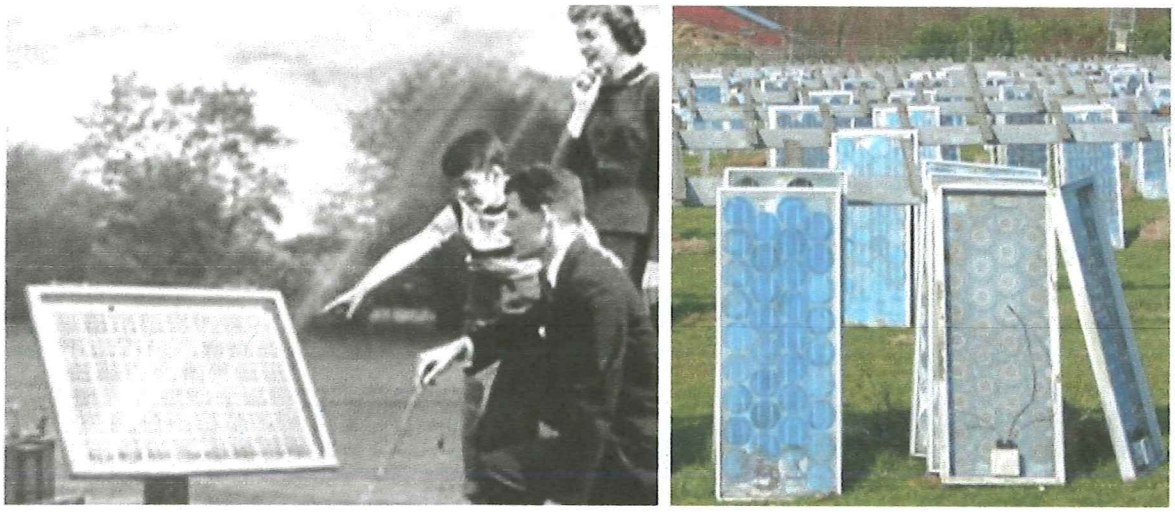


Bell Labs, 1954. Solar Panel Waste, 2014 BELL LABS & PV CYCLE

Para la traducción al español, haga clic aquí

Klik hier voor de Nederlandse versie

The last few years have seen growing concern over what happens to solar panels at the end of their life. Consider the following statements:

- The problem of solar panel disposal "will explode with full force in two or three decades and wreck the environment" because it "is a

huge amount of waste and they are not easy to recycle."

- "The reality is that there is a problem now, and it's only going to get larger, expanding as rapidly as the PV industry expanded 10 years ago."

- "Contrary to previous assumptions, pollutants such as lead or carcinogenic cadmium can be almost completely washed out of the fragments of solar modules over a period of several months, for example by rainwater."

Were these statements made by the right-wing Heritage Foundation? Koch-funded global warming deniers? The editorial board of the *Wall Street Journal*?

None of the above. Rather, the quotes come from a senior Chinese solar official, a 40-year veteran of the U.S. solar industry, and research scientists with the German Stuttgart Institute for Photovoltaics.

With few environmental journalists willing to report on much of anything other than the good news about renewables, it's been left to environmental scientists and solar industry leaders to raise the alarm.

"I've been working in solar since 1976 and that's part of my guilt," the veteran solar developer told *Solar Power World* last year. "I've been involved with millions of solar panels going into the field, and now they're getting old."

The Trouble With Solar Waste

The International Renewable Energy Agency (IRENA) in 2016 estimated there was about 250,000 metric tonnes of solar panel waste in the world at the end of that year. IRENA projected that this amount could reach 78 *million* metric tonnes by 2050.

Solar panels often contain lead, cadmium, and other toxic chemicals that cannot be removed without breaking apart the entire panel. “Approximately 90% of most PV modules are made up of glass,” notes San Jose State environmental studies professor Dustin Mulvaney. “However, this glass often cannot be recycled as float glass due to impurities. Common problematic impurities in glass include plastics, lead, cadmium and antimony.”

Researchers with the Electric Power Research Institute (EPRI) undertook a study for U.S. solar-owning utilities to plan for end-of-life and concluded that solar panel “disposal in “regular landfills [is] not recommended in case modules break and toxic materials leach into the soil” and so “disposal is potentially a major issue.”

California is in the process of determining how to divert solar panels from landfills, which is where they currently go, at the end of their life.

California's Department of Toxic Substances Control (DTSC), which is implementing the new regulations, held a meeting last August with solar and waste industry representatives to discuss how to deal with the issue of solar waste. At the meeting, the representatives from industry and DTSC all acknowledged how difficult it would be to test to determine whether a solar panel being removed would be classified as hazardous waste or not.

The DTSC described building a database where solar panels and their toxicity could be tracked by their model numbers, but it's not clear DTSC will do this.

"The theory behind the regulations is to make [disposal] less burdensome," explained Rick Brausch of DTSC. "Putting it as universal waste eliminates the testing requirement."

The fact that cadmium can be washed out of solar modules by rainwater is increasingly a concern for local environmentalists like the Concerned

Citizens of Fawn Lake in Virginia, where a 6,350 acre solar farm to partly power Microsoft data centers is being proposed.

"We estimate there are 100,000 pounds of cadmium contained in the 1.8 million panels," Sean Fogarty of the group told me. "Leaching from broken panels damaged during natural events — hail storms, tornadoes, hurricanes, earthquakes, etc. — and at decommissioning is a big concern."

There is real-world precedent for this concern. A tornado in 2015 broke 200,000 solar modules at southern California solar farm Desert Sunlight.

"Any modules that were broken into small bits of glass had to be swept from the ground," Mulvaney explained, "so lots of rocks and dirt got mixed in that would not work in recycling plants that are designed to take modules. These were the cadmium-based modules that failed [hazardous] waste tests, so were treated at a [hazardous] waste facility. But about 70 percent of the modules were actually sent to recycling, and the recycled metals are in new panels today."

And when Hurricane Maria hit Puerto Rico last September, the nation's second largest solar farm, responsible for 40 percent of the island's solar energy, lost a majority of its panels.

Many experts urge mandatory recycling. The main finding promoted by IRENA's in its 2016 report was that, "If fully injected back into the economy, the value of the recovered material [from used solar panels] could exceed USD 15 billion by 2050."

But IRENA's study did not compare the value of recovered material to the cost of new materials and admitted that "Recent studies agree that PV material availability is not a major concern in the near term, but critical materials might impose limitations in the long term."

They might, but today recycling costs more than the economic value of the materials recovered, which is why most solar panels end up in landfills. "The absence of valuable metals/materials produces economic losses," wrote a team of scientists in the *International Journal of Photoenergy* in their study of solar panel recycling last year, and "Results are coherent with the literature."

Chinese and Japanese experts agree. "If a recycling plant carries out every step by the book," a Chinese expert told *The South China Morning Post*, "their products can end up being more expensive than new raw materials."

Toshiba Environmental Solutions told Nikkei Asian Review last year that,

> Low demand for scrap and the high cost of employing workers to disassemble the aluminum frames and other components will make it difficult to create a profitable business unless recycling companies can charge several times more than the target set by [Japan's environment ministry].

Can Solar Producers Take Responsibility?

In 2012, First Solar stopped putting a share of its revenues into a fund for long-term waste management. "Customers have the option to use our services when the panels get to the end of life stage," a spokesperson told

Solar Power World. "We'll do the recycling, and they'll pay the price at that time."

Or they won't. "Either it becomes economical or it gets mandated. " said EPRI's Cara Libby. "But I've heard that it will have to be mandated because it won't ever be economical."

Last July, Washington became the first U.S. state to require manufacturers selling solar panels to have a plan to recycle. But the legislature did not require manufacturers to pay a fee for disposal. "Washington-based solar panel manufacturer Itek Energy assisted with the bill's writing," noted Solar Power World.

The problem with putting the responsibility for recycling or long-term storage of solar panels on manufacturers, says the insurance actuary Milliman, is that it increases the risk of more financial failures like the kinds that afflicted the solar industry over the last decade.

[A]ny mechanism that finances the cost of recycling PV modules with current revenues is not sustainable. This method raises the possibility of bankruptcy down the road by shifting today's greater burden of 'caused' costs into the future. When growth levels off then PV producers would face rapidly increasing recycling costs as a percentage of revenues.

Since 2016, Sungevity, Beamreach, Verengo Solar, SunEdison, Yingli Green Energy, Solar World, and Suniva have gone bankrupt.

The result of such bankruptcies is that the cost of managing or recycling PV waste will be born by the public. "In the event of company bankruptcies, PV module producers would no longer contribute to the recycling cost of their products," notes Milliman, "leaving governments to decide how to deal with cleanup."

Governments of poor and developing nations are often not equipped to deal with an influx of toxic solar waste, experts say. German researchers at the

Stuttgart Institute for Photovoltaics warned that poor and developing nations are at higher risk of suffering the consequences.

Maharashtra, India, 2014 DIPAK SHEELARE

> Dangers and hazards of toxins in photovoltaic modules appear particularly large in countries where there are no orderly waste management systems... Especially in less developed countries in the so-called global south, which are particularly predestined for the use of photovoltaics because of the high solar radiation, it seems highly problematic to use modules that contain pollutants.

The attitude of some solar recyclers in China appears to feed this concern. "A sales manager of a solar power recycling company," the *South China Morning News* reported, "believes there could be a way to dispose of China's solar junk, nonetheless."

"We can sell them to Middle East... Our customers there make it very clear that they don't want perfect or brand new panels. They just want them

cheap... There, there is lots of land to install a large amount of panels to make up for their low performance. Everyone is happy with the result."

In other words, there are firms that may advertise themselves as "solar panel recyclers" but instead sell panels to a secondary markets in nations with less developed waste disposal systems. In the past, communities living near electronic waste dumps in Ghana, Nigeria, Vietnam, Bangladesh, Pakistan, and India have been primary e-waste destinations.

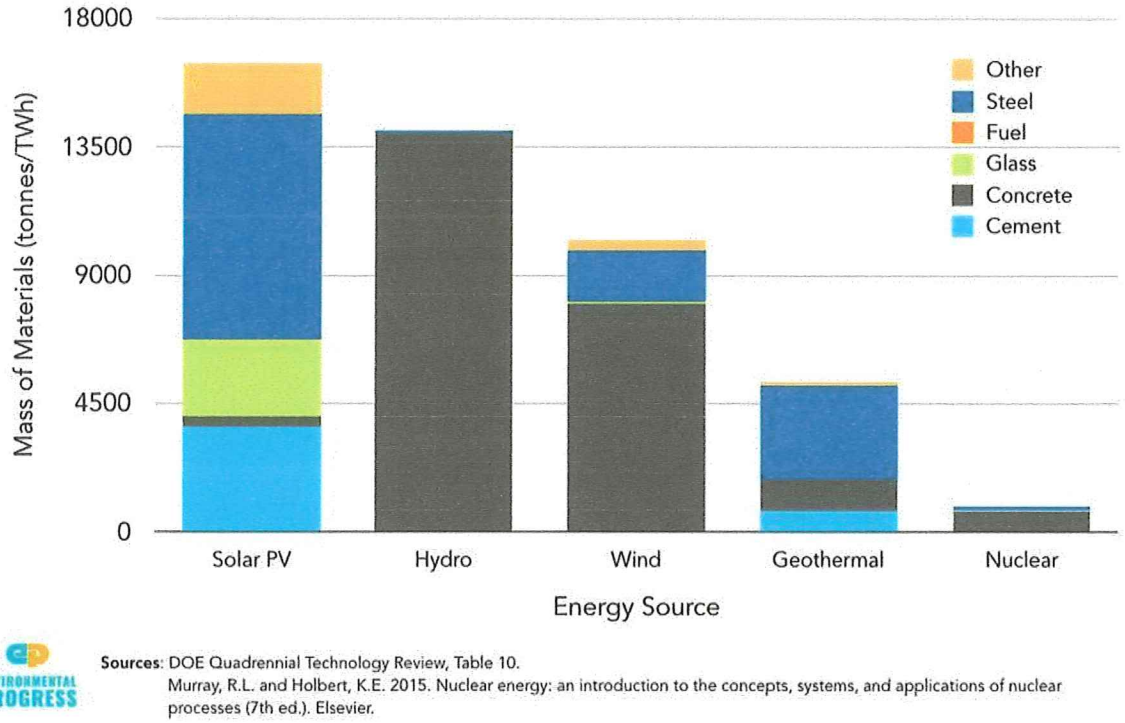
According to a 2015 United Nations Environment Program (UNEP) report, somewhere between 60 and 90 percent of electronic waste is illegally traded and dumped in poor nations. Writes UNEP:

> [T]housands of tonnes of e-waste are falsely declared as second-hand goods and exported from developed to developing countries, including waste batteries falsely described as plastic or mixed metal scrap, and cathode ray tubes and computer monitors declared as metal scrap.

Unlike other forms of imported e-waste, used solar panels can enter nations legally before eventually entering e-waste streams. As the United Nation Environment Program notes, "loopholes in the current Waste Electrical and Electronic Equipment (WEEE) Directives allow the export of e-waste from developed to developing countries (70% of the collected WEEE ends up in unreported and largely unknown destinations)."

A Path Forward on Solar Panel Waste

Perhaps the biggest problem with solar panel waste is that there is so much of it, and that's not going to change any time soon, for a basic physical reason: sunlight is dilute and diffuse and thus require large collectors to capture and convert the sun's rays into electricity. Those large surface areas, in turn, require an order of magnitude more in materials — whether today's toxic combination of glass, heavy metals, and rare earth elements, or some new material in the future — than other energy sources.



Solar requires 15x more materials than nuclear EP

All of that waste creates a large quantity of material to track, which in turn requires requires coordinated, overlapping, and different responses at the international, national, state, and local levels.

The local level is where action to dispose of electronic and toxic waste takes place, often under state mandates. In the past, differing state laws have motivated the U.S. Congress to put in place national regulations. Industry often prefers to comply with a single national standard rather than multiple different state standards. And as the problem of the secondary market for solar shows, ultimately there needs to be some kind of international regulation.

The first step is a fee on solar panel purchases to make sure that the cost of safely removing, recycling or storing solar panel waste is internalized into the price of solar panels and not externalized onto future taxpayers. An obvious solution would be to impose a new fee on solar panels that would go

into a federal disposal and decommissioning fund. The funds would then, in the future, be dispensed to state and local governments to pay for the removal and recycling or long-term storage of solar panel waste. The advantage of this fund over extended producer responsibility is that it would insure that solar panels are safely decommissioned, recycled, or stored over the long-term, even after solar manufacturers go bankrupt.

Second, the federal government should encourage citizen enforcement of laws to decommission, store, or recycle solar panels so that they do not end up in landfills. Currently, citizens have the right to file lawsuits against government agencies and corporations to force them to abide by various environmental laws, including ones that protect the public from toxic waste. Solar should be no different. Given the decentralized nature of solar energy production, and lack of technical expertise at the local level, it is especially important that the whole society be involved in protecting itself from exposure to dangerous toxins.

"We have a County and State approval process over the next couple months," Fogarty of Concerned Citizens of Fawn Lake told me, "but it has become clear that local authorities have very little technical breadth to analyze the impacts of such a massive solar power plant."

Lack of technical expertise can be a problem when solar developers like Sustainable Power Group, or sPower, incorrectly claim that the cadmium in its panels is not water soluble. That claim has been contradicted by the previously-mentioned Stuttgart research scientists who found cadmium from solar panels "can be almost completely washed out...over a period of several months...by rainwater."

Third, the United Nations Environment Programme's Global Partnership for Waste Management, as part of its International Environmental Partnership Center, should more strictly monitor e-waste shipments and encourage nations importing used solar panels into secondary markets to impose a fee to cover the cost of recycling or long-term management. Such a

recycling and waste management fund could help nations address their other e-waste problems while supporting the development of a new, high-tech industry in recycling solar panels.

None of this will come quickly, or easily, and some solar industry executives will resist internalizing the cost of safely storing, or recycling, solar panel waste, perhaps for understandable reasons. They will rightly note that there are other kinds of electronic waste in the world. But it is notable that some new forms of electronic waste, namely smartphones like the iPhone, have in many cases replaced things like stereo systems, GPS devices, and alarm clocks and thus reduced their contribution to the e-waste stream. And no other electronics industry makes being "clean" its main selling point.

Wise solar industry leaders can learn from the past and be proactive in seeking stricter regulation in accordance with growing scientific evidence that solar panels pose a risk of toxic chemical contamination. "If waste issues are not preemptively addressed," warns Mulvaney, "the industry risks repeating the disastrous environmental mistakes of the electronics industry."

If the industry responds with foresight, Mulvaney notes, it could end up sparking clean innovation including "developing PV modules without hazardous inputs and recycled rare metals." And that's something everyone can get powered up about.

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Michael Shellenberger

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Michael Shellenberger is the best-selling author of *Apocalypse Never: Why Environmental Alarmism Hurts Us All* (Harper Collins), a Time Magazine "Hero of the Environment,"... **Read More**

EXHIBIT 4(B)

CAROLINA JOURNAL

NEWS: CJ EXCLUSIVES

Big solar farms may be stressing agricultural ecosystem

N.C. State crop scientist Ron Heiniger says taking crop land out of production for solar has long-term impacts on overall ecosystem

Dan Way
in CJ Exclusives

May 25, 2017
4:05AM

Ron Heiniger isn't afraid to get his hands dirty. He has spent years as a crop and soil scientist helping hard-pressed farmers to get maximum yield and quality from their crops. The N.C. State Cooperative Extension Service professor says it's his calling in life.

These days Heiniger, who works at the Vernon G. James Research and Extension Center in Plymouth, worries that solar installations gobbling up prime farmland could do more to destabilize and diminish the agricultural economy of North Carolina than any naturally occurring threat that he deals with.

"We really don't recognize how fragile our agriculture system is. Today it's under stress," mostly from low prices, and to some degree due to young people abandoning the farming life of their fathers, Heiniger said.

Utility-scale solar energy facilities are increasing the pressure on farming by taking land out of production needed to maintain a delicate economy of scale, viability, and profitability. At some stage the system will start to break down,

but the question is when the decline reaches a point of no return, he said.

Some farmers struggling to make a living off the land yield to the temptation to enter a lucrative lease with solar companies, and take part or all of their fields out of production.

But many farmers depend on leasing neighboring land from absentee owners or non-farmers to grow crops and graze animals. Those landowners are increasingly finding it more profitable to lease to solar installations, cutting tenant farmers out of fields needed to stay in business.

For that reason, the spread of solar installations across the farm belt doesn't necessarily help farmers to remain viable, as the solar industry claims. Often it makes it more difficult, Heiniger argues.

If farmers lack sufficient land to remain viable, they will leave the field, literally. That will create a tumbling domino effect, Heiniger said.

"What's going to happen to the equipment dealer, feed retailers, fertilizer distributors, people who bring in limestone on rail cars and by the truckload?" Heiniger asked. "They're not going to be in the business."

If enough farmland is taken out of production, the infrastructure would collapse, and grain and animal production would move to other states or offshore. By the time 20-year solar installation leases expire it would be extremely difficult to recreate the agriculture infrastructure from scratch, Heiniger warns.

"Everybody tells me that that's the worst-case scenario. Perhaps it is, but we have lots of examples of that," Heiniger said, pointing quickly to the disappearance of most of North Carolina's dairy farms following a government buyout program as one example. The buyout program ended a decade ago, but small dairy farms never revived.

"I think it's a fear that needs to be addressed as they think about the solar industry disrupting the agriculture community," he said.

But many county commissioners lack sufficient knowledge about the complex interplay of solar installations on the economic, ecological, environmental, and cultural dynamics of a community as solar companies woo them for siting approvals with promises of jobs and revenue.

"Right now it's neighbor against neighbor, commissioner against solar that's sort of being played out in these little communities," Heiniger said. "I don't know if I've seen rural people get as upset about an issue as they have over these solar and wind issues. ... It's just a real battlefield out there."

Currituck County even enacted a solar installation ban after the issue blew up among residents there.

The solar industry minimizes environmental concerns, Heiniger said. While he is neither a solar opponent nor an alarmist, he said long-term issues must be addressed with dispassionate scientific research.

Many solar panels are supported by galvanized steel platforms. That steel oxidizes over time and releases zinc into the soil, which can be toxic to plants at certain levels.

That has been documented in cases where other types of galvanized steel structures were removed, and crops didn't grow, or didn't fare well, Heiniger said. Significant soil remediation had to take place to return that land to production.

It is uncertain if the solar panel structures would have that same effect, but it is something that demands study, he said.

Most cropland in North Carolina must be spread regularly with alkaline limestone to neutralize their inherently acidic nature. Solar installations do not perform that practice, and after 20 years or more of nonagricultural use the

acid content of soil would spike.

A farmer wanting to reclaim the land would have to make a significant investment in limestone and other nutrients. Whether that would be economically feasible would depend on agriculture prices being high enough to sustain the outlay, Heiniger said.

The data shows the solar panels "channelize water," causing it to leave the site faster, and infiltrate neighboring properties, Heiniger said. Some farmers have confirmed their fields became wetter than before the placement of a nearby solar facility, and they were having difficulty getting in to till their land to prepare it for the growing season.

Grass and plant cover at solar facilities would prevent a lot of erosion, but water leaving the site carries some particulate, Heiniger said.

Frequent mowing to control vegetation can make soil more compact, and more resistant to absorbing water. Wider buffering around the site can offset much of that runoff. Putting in a subsoil also would help, but that can't be done until the solar panels are removed at the end of their useful life, and cost to do so would be an issue.

Heiniger said some solar installations were placed above lakes or ponds, which become infiltrated with runoff. If runoff occurs in sufficient volume, spillways of overwhelmed ponds could be threatened.

"Right now we're just locating them next to the power substations," Heiniger said. He has been telling the solar industry scientific land use research is needed to determine best siting practices. "We've at least got a dialogue started."

categories: **Business and Regulations**, **City & County Government**, **CJ Exclusives**, **Energy & Environment**, **Land Use Planning**, **Local Government**, **North Carolina**, **State Government**

tags: **Currituck County**, **n.c. state university**, **solar energy**

EXHIBIT 4(C)

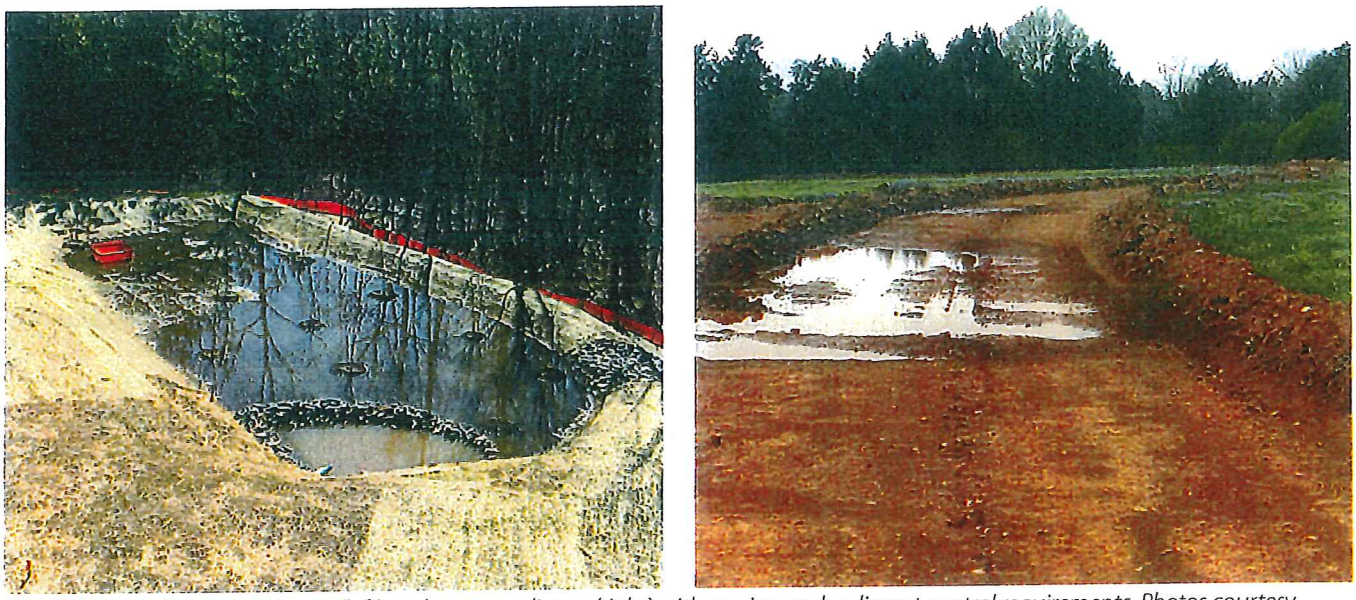

Figure 7. Examples of compliance (left) and noncompliance (right) with erosion and sediment control requirements. Photos courtesy Berkley Group.

sion processes are no different with these facilities than for any other land-disturbing activity. However, such large-scale grading project plans are more complex than those for other uses due primarily to the scale of utility solar. Additionally, the impervious nature of the panels themselves creates stormwater runoff that must be properly controlled, managed, and maintained.

Due to this complexity, it is recommended that an independent third party review all SWP and ESC plans in addition to the normal review procedures. Many review agencies (local, regional, or state) are under-resourced or not familiar with large-scale grading projects or appropriate and effective mitigation measures. It is in a locality's best interest to have the applicant's engineering and site plans reviewed by a licensed third party prior to and in addition to the formal plan review process. Most localities have engineering firms on call that can perform such reviews on behalf of the jurisdiction prior to formal plan review submittal and approval. This extra step, typically paid for by the applicant, helps to ensure the proper design of these environmental protections (Figure 7).

The successful implementation of these plans and ongoing maintenance of the mitigation measures is also critical and should be addressed in each proposal through sufficient performance security requirements and long-term maintenance provisions.

Cultural, Environmental, and Recreational Resources. Every proposed site should undergo an evaluation to identify any architectural, archaeological, or other cultural resources on or near proposed facilities. Additionally, sites located near recreational, historic, or environmental resources should be avoided. Tourism is recognized as a key sector for economic growth in many regions, and any utility-scale solar facilities that might be visible from a scenic byway, historic site, recreational amenity, or similar resources could have negative consequences for those tourist attractions.

Economic Impacts

This *PAS Memo* focuses on the land-use impacts of utility-scale solar facilities, but planners should also be aware of economic considerations surrounding these uses for local governments and communities.

Financial Incentives. Federal and state tax incentives benefit the energy industry at the expense of localities. The initial intent of industry-targeted tax credits was to act as an economic catalyst to encourage the development of green energy. An unintended consequence has been to benefit the solar industry by saving it tax costs at the expense of localities, which don't receive the benefit of the full taxable rate they would normally receive.

Employment. Jobs during construction (and decommissioning) can be numerous, but utility-scale solar facilities have minimal operational requirements otherwise. Very large facilities may employ one or two full-time-equivalent employees. During the construction phase there are typically hundreds of employees who need local housing, food, and entertainment.

Fiscal Impact. The positive fiscal impact to landowners who lease or sell property for utility-scale solar facilities is clear. However, the fiscal impact of utility-scale solar facilities to the community as a whole is less clear and, in the case of many localities, may be negligible compared with their overall budget due to tax credits, low long-term job creation, and other factors.

Property values. The impact of utility-scale solar facilities is typically negligible on neighboring property values. This can be a significant concern of adjacent residents, but negative impacts to property values are rarely demonstrated and are usually directly addressed by applicants as part of their project submittal.

Solar Facilities in Local Policy and Regulatory Documents

The two foundational land-use tools for most communities are their comprehensive (general) plans and zoning ordinances.

EXHIBIT 4(D)

1) address, general location, acreage, and parcel number(s) of subject property
2) name of subdivision in which property exists (if applicable)
3) location/key with north arrow
4) property dimensions
5) existing and proposed buildings, parking areas, and other natural and manmade features, including locations of any utilities, wells, drainage tiles, and/or waterways
6) existing and proposed building setbacks and separation
7) delineation of all requested variant development standards (if applicable)
8) approximate locations of neighboring uses and structures
9) brief description of neighboring uses and structures
10) map scale
11) dated signature of applicant and owner

3. Applications for Commercial SES (CSES) special exception hearings. In addition to the application requirements listed in Section 2.3 (R) (1), applications for CSES shall also include the following information:

a. A site layout plan. A Development Plan, drawn to scale, including distances and certified by a registered land surveyor. All drawings shall be at a scale not smaller than one inch equals 200 feet (1"=200') and not larger than one inch equals 50 feet (1"=50'). Any other scale must be approved by the Administrator. No individual sheet or drawing shall exceed twenty-four inches by thirty-six inches (24"x 36"). The plan should include the following:

1) address, general location, acreage, and parcel number(s) of subject property
2) name of subdivision in which property exists (if applicable)
3) location/key with north arrow
4) property dimensions
5) location of and distance to any substations or other means of connection to the electrical grid, including above-ground and underground electric lines, as well as a copy of the written notification provided to the utility company requesting interconnection
6) existing and proposed buildings and solar panels, with appropriate setbacks, parking areas, natural features, including vegetation (type and location) and wetlands, and other manmade features, including locations of any utilities, wells, drainage tiles, and/or waterways
7) Electrical cabling
8) Ancillary equipment
9) adjacent or on-site public or private streets/roads and alleys
10) existing and proposed ingress/egress
11) existing building setbacks and separation
12) delineation of all requested variant development standards (if applicable)
13) existing easements
14) approximate locations of neighboring uses and structures
15) brief description of neighboring uses and structures
16) existing and proposed landscaping, lighting, and signage
17) map scale
18) Dimensional representation of the structural components of the construction including the base and footings

19) dated signature of applicant and owner

20) Proof of a recorded memorandum of lease for each party contracted with a CSES developer to be recorded at the Pulaski County Courthouse within 60 days of special exception approval

b. Topographic Map. A USGS topographical map, or map with similar data, of the property and the surrounding area, including any other CSES, flood plains or wetlands within 1 mile, with contours of not more than five (5) foot intervals.

c. The CSES applicant shall certify that the applicant will comply with the utility notification requirements contained in Indiana law and accompanying regulations through the Indiana Public Utility Commission.

d. Any other item reasonably requested by the Board of Zoning Appeals.

e. A fire-protection and safety plan for the construction and operation of the CSES facility, which includes emergency access to the site. The developer will meet, as required, with township representatives such as trustees, Pulaski County EMS and/or its successor, and any and all fire departments providing services and/or mutual aid to address concerns about fire safety and emergency response and to coordinate safety planning and potential need for specialized equipment for extinguishing solar-panel/-equipment fires. Financial obligations incured by departments providing coverage in Pulaski County for solar-energy fire-suppression training purposes shall be negotiated as part of the development of this plan, and any such costs incurred by the developer may be considered during development of the Economic Development Agreement.

4. Aggregated Project Applications. Aggregated projects may jointly submit a single application and be reviewed under joint proceedings, including notices, hearing, and reviews and, as appropriate, approvals.

   a. Aggregated Projects. Permits for aggregated projects will be issued by construction phases and recorded separately, as prescribed in this Ordinance.

5. After a special exception has been awarded, but before any permits are approved, the CSES developer must provide

   a. Proof of correspondence and cooperation with wildlife/environmental agencies (i.e., DNR, IDEM, NRCS, etc) re: endangered species;

   b. (a) copy/ies of any communication study/ies providing evidence of compliance with state and federal agencies regarding interference with transmissions such as GPS, television, microwave, agricultural GPS, military defense systems, and radio reception.

S. Administrative Appeals

1. Purpose. The purpose of this section is to establish a procedure and standards for an aggrieved party, officer, department, or board of the county affected by any decision or determination by the Administrator, other Plan Commission staff members, or other administrative or board charged with enforcing and interpreting this Ordinance per IC 36-7-4-916 and IC 36-7-4-918. The decisions of the Board shall be appealed to the courts as provided by Indiana law.

2. Initiation. All questions of interpretations and enforcement shall be first presented to the Director. An appeal shall be initiated by filing a written notice of appeal with the Administrator within:

   a. Sixty days of the date the determination or decision being appealed is filed in the Zoning Department or office of the Administrator (except where otherwise specified in this Ordinance); or

   b. Thirty days of the date the notice of violation being appealed is issued.

3. Administrative Appeal Review Procedure.

   a. Appeals. Appeals to the Board concerning interpretation or administration of this Ordinance

EXHIBIT 4(E)

discretion.

B. APPLICATION REQUIREMENTS

Prior to the construction of a CSES, the Applicant shall obtain approval for the following: (1) an Application for an Exception Use from the Kosciusko County Board of Zoning Appeals ("BZA") to permit a CSES in any zone list under table A, (2) Request for Variance for any variances anticipated on the CSES Project, and (3) Drainage approval as required under the Kosciusko County Stormwater and Erosion Control Ordinance when deemed necessary, (4) an Improvement Location Permit from the Kosciusko County Area Plan Commission.

1. The Application for Exception Use

a. The application shall be filed with the Kosciusko County Area Plan Commission and include the following items:

1. A CSES Project summary, including, to the extent available: Each array's point location, including its name plate generating capacity; the make and model of the CSES that will be installed; the maximum height of the SES Array(s) measured from the base to the tip of the panel when at max height position and (2) a description of the Applicant, Owner, and Operator, including their respective business structures.

2. The name(s), address (es), and phone number(s) of the Applicant(s), Owner and Operator, and all property owner(s) with CSES or associated utility lines on their properties;. All leases for properties with CSES must be filed in the Kosciusko County Recorder's Office within 45 days of the contract being signed agreeing to a solar lease or said contract is null and void in Kosciusko County.

3. A topographic map of the project site and the surrounding area which shall encompass an area at least a quarter mile radius from the proposed project site with contours of not more than five foot intervals.

4. A site plan at an appropriate scale showing (standard sheet of 36 inches by 24 inches and individual tower site not greater than 1 inch equals 20 feet): the proposed location of the Solar Energy System (including planned locations of each CSES array, access roads; Substations; electrical cabling; and ancillary equipment). In addition, the site plan shall show: Primary Structures within one mile of any CSES; property lines, including identification of adjoining properties; setback lines; public roads; recognized historic or heritage sites as noted by the Division of Historic Preservation and Archeology of the

EXHIBIT 5

(a) The applicant shall also be charged the actual cost of the technical review conducted by an independent representative contracted by the Executive Director.

5) Development Plan

a) Prior to the issuance of any Improvement Location Permit for primary connected SES, the following shall be submitted to and reviewed by the Executive Director, who shall certify that the following are in compliance with all applicable regulations:

b) Decommissioning Plan

(1) A Decommissioning Plan as prescribed in this section.

c) Drainage and Erosion Control Plan

(1) The drainage and erosion control plan shall comply with section 80.08.05 Soil Survey - Drainage, Erosion and Sediment Control.

(2) All existing drainage fields shall be maintained as originally designed.

(3) No existing drainage field shall be disturbed or impede service to or from non-participating landowner.

(4) The site shall be scanned using ground penetrating radar (GPR) technology to locate and map any existing drainage tile or other unknown structures.

d) Ground Covering Plan

(1) Ground around and under solar panels and in project site buffer areas shall be planted, established, and maintained for the life of the solar project in perennial vegetated ground cover.

(2) To the maximum extent feasible and economical, perennial vegetation ground cover shall be based on a diverse seed mix of native species consistent with guidance specific to the local area based on guidance provided by the National Resources Conservation Service, Soil and Water Conservation District, or Conservation District.

(3) The site shall be planted and maintained to be free of all invasive species, as listed by the Indiana Invasive Species Council.

(4) No insecticide use is permitted on the site. This provision does not apply to insecticide use in on-site buildings, in and around electrical boxes, spot control of noxious weeds, or as otherwise may be deemed necessary to protect public health and safety.

(5) Plant material must not have been treated with systemic insecticides, particularly neonicontinoids.

e) Utility Plan

(1) A utility plan drawn to the same scale as the site plan illustrating the location of all underground utility lines associated with the total SES project shall be submitted to Executive Director.

f) Final Site Layout Plan

(1) Provide a copy of the Final Site Layout Plan illustrating the final location of all that is required in the preliminary site layout plan, as approved by the landowner.

g) Road Use and Maintenance Agreement

(1) A Road Use and Maintenance Agreement (construction and deconstruction) for all oversized loads must be drafted in accord with the Franklin County Highway Department and approved by the Franklin County Commissioners. Financial assurances may be required.

6) Project Description

a) The following documents shall be provided as part of the application for an Improvement Location Permit.

(1) Solar system specifications, including typical manufacturer and model.

(2) The manufacturer specifications for the key components of the solar energy system.

(3) Certification that layout design, and installation conform to and comply with all applicable industry standards.

EXHIBIT 6

EXHIBIT 6(A)

Google solar farm fire

 california
 east greenwich
 floating solar panels
 energy storage
 birds
 battery



solar power fires per year ...
pv-magazine-usa.com


floating PV plant catches fire ...
pv-magazine.com


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stopsolarfarms.com


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Brush fire at solar generating facility ...
wildfiretoday.com


Floating solar power farm catches fire ...
abcnews.go.com


Fire breaks out at Topa...
sanluisobispo.com


Major fire at solar-powered warehouse ...
pv-magazine.com


Solar farm sets 130 birds on FIRE mid ...
dailymail.co.uk


Solar Farm Fire at Sandridge Hill ...
pv-stop.com


Solar Panel Farm Fire Off ...
tacomafire.org


Solar Farm Fire In Celina ...
mercercountyoutlook.net


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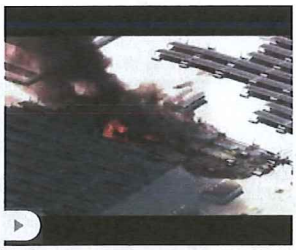
eastcountytoday.net


fire at a California solar farm ...
latimes.com


Solar panels catch fire atop Haywar...
youtube.com


Fire Safety with Solar Systems ...
energy.gov


Fire breaks out at Volusia County solar ...
fox35orlando.com


FIRE AT SOLAR FARM AT YARRANLE...
facebook.com


Brigalow solar farm caught ...
reneweconomy.com.au


Brigalow turn-on: 35 MW solar farm ...
pv-magazine-australia.com


Sust
solar

Solar farm sets 130 birds on FIRE mid ...
dailymail.co.uk

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solar **panel** fire

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Fire at Twin City Solar Farm | Emanuel ...
emanuelcountylive.com

Brush fire breaks out at s...
ksby.com

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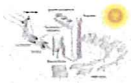
twitter.com

Solar fires
acsolarwarehouse.com

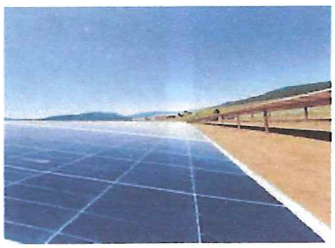


Solar Power 101 and the Fire Service ...
fireengineering.com

Finley solar farm fire ...
sheppnews.com.au

Preventing solar panel fires | If
if-insurance.com

Balearic Islands fire up 1st solar farm ...
renewablesnow.com



Another solar farm as New Mexico co-op ...
mountaintownnews.net

energy storage system in solar pow...
ajudaily.com

Topaz Fire stopped ...
ksby.com

Chinese Police Fire 'Warning Shots ...
rfa.org

Tesla Solar Panels Have Become ...
businessinsider.com

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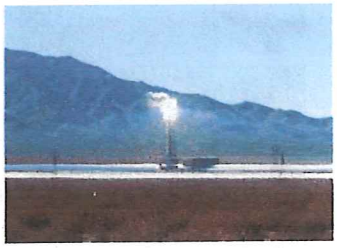
pinterest.at



A Huge Solar Plant Caught on Fire, and ...
wired.com

60 Acre Solar Farm Fire | Stop-Solar
stopsolarfarms.com

Nevada Does a California - WSJ
wsj.com

FIRE AT SOLAR FARM AT YARRANLEA ...
facebook.com

Biggest Solar Park ...
spectrum.ieee.org

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solar **inverter** fire

Was the First Solar Fire at Solar Ranch ...
greentechmedia.com

Solar farm sets 130 birds on FIRE ...
youtube.com

Reston and Great Falls Fire Stations
restonnow.com

EXHIBIT 6(B)

BUSINESS

How a bird started a fire at a California solar farm

A commercial solar project in San Bernardino County's Lucerne Valley. (Allen J. Schaben / Los Angeles Times)

BY BLOOMBERG

JUNE 24, 2019 5:15 PM PT

BLOOMBERG

It may be safe for a bird to land on an electrical wire, but not on two of them at once.

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RAMS

Los Angeles, you've got another champion. Make room for the Rams

A June 5 fire at a California solar farm that scorched 1,127 acres started when a bird flew into a pair of wires, creating an electric circuit and a shower of sparks, a California Department of Forestry and Fire Protection official said. It didn't end well for the power plant — or the bird.

"One wing touches each of the conductors, and they turn into a light bulb," said Zach Nichols, a Cal Fire battalion chief. "Happens all the time."

The company that owns the California Valley Solar Ranch solar farm, Clearway Energy Inc., had blamed the fire on an "avian incident" without saying what exactly happened at the remote facility in the arid grasslands between Los Angeles and San Francisco.

The blaze damaged power poles and wires at the 250-megawatt plant and knocked out 84% of its generating capacity, causing an estimated $8 million to $9 million in losses, the company said.

The California Valley project was built by SunPower Corp. and was funded in part with a $1.24-billion loan guarantee from the U.S. Energy Department. It was completed in 2013 and sells power to PG&E Corp Pacific Gas & Electric.

California is home to a different solar plant that's notorious for burning birds. But that facility — the Ivanpah Solar Electric Generating System in the Mojave Desert — uses another technology altogether. At Ivanpah, fields of mirrors concentrate sunlight onto centralized towers, posing a hazard to birds flying into the beams.

The California Valley fire, in contrast, occurred at a solar farm that uses photovoltaic panels, just like the ones on rooftops.

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Podcast: A labor union with your latte?

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EXHIBIT 6(C)

1) address, general location, acreage, and parcel number(s) of subject property
2) name of subdivision in which property exists (if applicable)
3) location/key with north arrow
4) property dimensions
5) existing and proposed buildings, parking areas, and other natural and manmade features, including locations of any utilities, wells, drainage tiles, and/or waterways
6) existing and proposed building setbacks and separation
7) delineation of all requested variant development standards (if applicable)
8) approximate locations of neighboring uses and structures
9) brief description of neighboring uses and structures
10) map scale
11) dated signature of applicant and owner

3. Applications for Commercial SES (CSES) special exception hearings. In addition to the application requirements listed in Section 2.3 (R) (1), applications for CSES shall also include the following information:

a. A site layout plan. A Development Plan, drawn to scale, including distances and certified by a registered land surveyor. All drawings shall be at a scale not smaller than one inch equals 200 feet (1"=200') and not larger than one inch equals 50 feet (1"=50'). Any other scale must be approved by the Administrator. No individual sheet or drawing shall exceed twenty-four inches by thirty-six inches (24"x 36"). The plan should include the following:

1) address, general location, acreage, and parcel number(s) of subject property
2) name of subdivision in which property exists (if applicable)
3) location/key with north arrow
4) property dimensions
5) location of and distance to any substations or other means of connection to the electrical grid, including above-ground and underground electric lines, as well as a copy of the written notification provided to the utility company requesting interconnection
6) existing and proposed buildings and solar panels, with appropriate setbacks, parking areas, natural features, including vegetation (type and location) and wetlands, and other manmade features, including locations of any utilities, wells, drainage tiles, and/or waterways
7) Electrical cabling
8) Ancillary equipment
9) adjacent or on-site public or private streets/roads and alleys
10) existing and proposed ingress/egress
11) existing building setbacks and separation
12) delineation of all requested variant development standards (if applicable)
13) existing easements
14) approximate locations of neighboring uses and structures
15) brief description of neighboring uses and structures
16) existing and proposed landscaping, lighting, and signage
17) map scale
18) Dimensional representation of the structural components of the construction including the base and footings

19) dated signature of applicant and owner

20) Proof of a recorded memorandum of lease for each party contracted with a CSES developer to be recorded at the Pulaski County Courthouse within 60 days of special exception approval

b. Topographic Map. A USGS topographical map, or map with similar data, of the property and the surrounding area, including any other CSES, flood plains or wetlands within 1 mile, with contours of not more than five (5) foot intervals.

c. The CSES applicant shall certify that the applicant will comply with the utility notification requirements contained in Indiana law and accompanying regulations through the Indiana Public Utility Commission.

d. Any other item reasonably requested by the Board of Zoning Appeals.

e. A fire-protection and safety plan for the construction and operation of the CSES facility, which includes emergency access to the site. The developer will meet, as required, with township representatives such as trustees, Pulaski County EMS and/or its successor, and any and all fire departments providing services and/or mutual aid to address concerns about fire safety and emergency response and to coordinate safety planning and potential need for specialized equipment for extinguishing solar-panel/-equipment fires. Financial obligations incured by departments providing coverage in Pulaski County for solar-energy fire-suppression training purposes shall be negotiated as part of the development of this plan, and any such costs incurred by the developer may be considered during development of the Economic Development Agreement.

4. Aggregated Project Applications. Aggregated projects may jointly submit a single application and be reviewed under joint proceedings, including notices, hearing, and reviews and, as appropriate, approvals.

   a. Aggregated Projects. Permits for aggregated projects will be issued by construction phases and recorded separately, as prescribed in this Ordinance.

5. After a special exception has been awarded, but before any permits are approved, the CSES developer must provide

   a. Proof of correspondence and cooperation with wildlife/environmental agencies (i.e., DNR, IDEM, NRCS, etc) re: endangered species;

   b. (a) copy/ies of any communication study/ies providing evidence of compliance with state and federal agencies regarding interference with transmissions such as GPS, television, microwave, agricultural GPS, military defense systems, and radio reception.

S. Administrative Appeals

1. Purpose. The purpose of this section is to establish a procedure and standards for an aggrieved party, officer, department, or board of the county affected by any decision or determination by the Administrator, other Plan Commission staff members, or other administrative or board charged with enforcing and interpreting this Ordinance per IC 36-7-4-916 and IC 36-7-4-918. The decisions of the Board shall be appealed to the courts as provided by Indiana law.

2. Initiation. All questions of interpretations and enforcement shall be first presented to the Director. An appeal shall be initiated by filing a written notice of appeal with the Administrator within:

   a. Sixty days of the date the determination or decision being appealed is filed in the Zoning Department or office of the Administrator (except where otherwise specified in this Ordinance); or

   b. Thirty days of the date the notice of violation being appealed is issued.

3. Administrative Appeal Review Procedure.

   a. Appeals. Appeals to the Board concerning interpretation or administration of this Ordinance

EXHIBIT 6(D)

2) Operation and Maintenance

a) Operator

(1) Unless otherwise specified through a contract or agreement, the property owner of record will be presumed to be the responsible party for owning and maintaining the Solar Energy System.

b) Insurance and Guarantees - Commercial SES

(1) The owner or operator of any commercial SES shall maintain a current general liability policy covering bodily injury and property damage, and cyber insurance to protect from data breaches and other cyber security issues. Franklin County shall be named as an additional insured with dollar amount limits per occurrence in the amount of ten million dollars ($10,000,000) minimum for all SES with a liability study by three (3) independent insurance companies to determine adequate coverage. Proof of liability insurance shall be sent to the Executive Director annually; failure to maintain said insurance shall result in cancellation of the Improvement Location Permit by the Executive Director.

(2) The owner or operator of any commercial SES shall provide a hold harmless agreement with all adjacent non-participating landowners with property boundaries adjacent to the site. To prevent moral hazard, such hold harmless provision shall only apply to negligence and not to willful, wanton, or reckless conduct and shall only hold the adjacent non-participating property owner harmless for damages greater than $100,000 per occurrence.

(3) The owner or operator of any commercial SES shall provide fixed site pollution liability insurance appropriate for the ownership structure of the site including contractor's pollution liability insurance. The amount of coverage shall be negotiated as part of the development planning process but shall include a minimum of $1 million in coverage per 200 acres of fenced project area.

(4) The owner or operator of any commercial SES shall agree to a property value guarantee agreement drafted by the County with the purpose of protecting against diminished value of a non-participating adjoining landowner with a residence located within one thousand (1000) feet of any commercial SES. Such agreement shall include at least the following:

(a) Within twelve (12) months of the completion of a SES system, an affected property owner may request an appraisal of their residential property based on similar properties located at least two miles away from the SES system. Such appraisal shall be conducted at the expense of said Owner/Operator and be conducted by a mutually agreeable appraiser. (If no agreement on an appraiser can be reached, the affected adjacent property owner and the project owner/operator shall each select an appraiser and those appraisers shall cooperatively select a third, independent appraiser to conduct the appraisal).

(5) It is the responsibility of the owner or operator listed in the application to inform the Executive Director of all changes in ownership of any insurance policy or guarantee agreement. during the life of the project, including the sale or transfer of ownership or policy cancellations. The county shall be named as a notified party by the insurance provider in the event there is a lapse in coverage.

(6) Cost adjustments: Terminology shall be included in any and all insurance policy or guarantee agreement that provides policy limit adjustments derived from the US Bureau of Labor Statistics Consumer Price Index (CPI) to protect against inflation. The Area Plan Commission (APC) may review coverage amounts as often as every Five (5) years and modify, as necessary, to determine if appropriate limits have drifted too far from the CPI adjusted level.

c) Fire Protection and Emergency Management

(1) The owner or operator shall provide fire suppression equipment, appropriate training and supplies necessary to enable the Fire Department and Emergency Medical Services to respond effectively to an emergency event such as fire or life-threatening event at the site. If the owner/operator and emergency services provider cannot reach an agreement on such

items, the County Commissioners shall review the facts and circumstances of the project and impose reasonable requirements.

d) Modifications
   (1) In general, any physical modification to any SES that alters the mechanical load, or major electrical components shall require re-certification. Like-kind replacements shall not require re-certification. Therefore, prior to making any physical modification, the owner or operator shall confer with the Executive Director and Board of Zoning Appeals to determine whether the physical modification requires re-certification.

e) Declaration of Public Nuisance
   (1) Any SES thereof declared to be unsafe by the Franklin County Executive Director by reason of inadequate maintenance, dilapidation, obsolescence, fire hazard, damage or abandonment is hereby declared to be a public nuisance and shall be abated by repair, rehabilitation, demolition or removal in accordance with the approved Decommissioning Plan.

f) Shadows
   (1) No solar apparatus shall cast an appreciable shadow on surrounding properties solar production facilities.

g) Change in Ownership - It is the responsibility of the owner or operator listed in the application to inform the Executive Director of all changes in ownership and operation during the life of the project, including the sale or transfer of ownership or operation.

h) Easements
   (1) Solar easements are not controlled or arbitrated by Franklin County

3) Decommissioning Plan

a) Prior to receiving approval under this Ordinance, the Board of Zoning Appeals and the applicant, County Commissioners, and owner and/or operator shall formulate a decommissioning plan approved and signed by the County Commissioners and the applicant, outlining the anticipated means and cost of removing a SES at the end of their serviceable life or upon becoming a discontinued or abandoned use to ensure that the SES is properly decommissioned.

b) Surety Bond-Commercial SES
   (1) Applicant for a commercial SES shall provide a bond, or other proof of financial responsibility that is of an amount determined by the County Commission to be sufficient to satisfy the decommissioning agreement requirements.
   (2) Other proof of financial responsibility may be:
      (a) Cash advance to county to be released upon completion of decommissioning plan.
      (b) An arrangement whereby the county would have access to the funds in an escrow account or other type of account held by a bank, until the completion of the decommissioning plan.
   (3) Bond shall be released upon receipt of a certificate of inspection by the office of the Area Planning Executive Director indicating that the decommissioning plan is complete with no unresolved issues related to the plan.

c) A decommissioning plan shall include, at a minimum, language to the following:
   (1) Assurance: Written assurance that the facilities will be properly decommissioned upon the project life or in the event that the facility is abandoned.
   (2) Cost estimates: The applicant shall provide a contractor cost estimate for demolition and removal of the SES facility which cost estimate shall include any offsetting effects of salvage value. The cost estimates shall be made by a competent party: such as a professional engineer, a contractor capable of decommissioning or a person with suitable expertise or experience with decommissioning SES.
   (3) Cost adjustments: Terminology shall be included in the plan that provides cost estimate adjustments derived from the US Bureau of Labor Statistics Consumer Price Indexes (CPI) to protect against inflation.