



# Oregon

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**Date:** November 1, 2018

**To:** Oregon Energy Facility Siting Council (EFSC or “the Council”) Appointed  
Solar PV Rulemaking Advisory Committee (RAC)

**From:** Luke May, Siting Analyst  
Todd Cornett, ODOE Assistant Director

**Subject:** RAC Meeting #2 Staff Report

**Agenda:**

Thursday, November 8, 2018

10:30 am – 2:20 pm

City of Prineville (City Hall), Council Chambers

387 NE Third Street, Prineville, Oregon 97554

Start:	End:	Topic:
10:30 a.m.	10:35 a.m.	Introductions
10:35 a.m.	10:40 a.m.	Overview of Meeting
10:40 a.m.	2:00 p.m.	Issues/Potential Standards specific to Solar PV facilities (Includes a provided working lunch)
2:00 p.m.	2:10 p.m.	Follow Up to Questions Raised During RAC Meeting #1
2:10 p.m.	2:25 p.m.	Public Comment
2:25 p.m.	2:30 p.m.	Wrap Up and Next Meeting

See actual agenda for more details.

***To participate by teleconference, please call toll-free:***

1-877-873-8017 and enter participant code 799345.

***To register for the meeting’s webinar:***

<https://connect9.uc.att.com/service32/meet/?ExEventID=8799345>

### **Issues/Potential Standards Agenda Item**

Attachment A includes all of the information provided in the staff report for RAC meeting #1.

### **Response to Questions Posed in First RAC Meeting**

During the August 30, 2018 EFSC Solar Rulemaking meeting, the following comments elicited further response from the Department:

1. The “fifteen questions” relating to whether a facility is considered one “facility,” as previously discussed in the context of wind facilities, are guidance; however, the commenter noted that the procedural history relating to the 15 questions is not clear from the record.

Staff Response: Staff conducted additional research on the application of the “fifteen questions;” Energy Facility Siting Council meeting minutes from April 18, 2008 and May 30, 2008 discussed the “fifteen questions.” The portions of the meeting minutes that discuss the “fifteen questions” are included as Attachment B. The minutes contain some of the same issues that have been raised relating to solar PV facilities. These include but are not limited to: whether multiple local jurisdictional projects could aggregate in a manner that is functionally equivalent to one EFSC jurisdictional project; if answered in the affirmative, whether evaluative criteria should apply; whether EFSC Staff or the Council should issue a determination on a case by case basis; whether the “fifteen questions” should be incorporated by rule; and discussions relating to cumulative impacts.

Meeting minutes from May 30, 2008 indicate that the Council voted on whether the Star Point wind facility was a “single” local jurisdictional facility or a part of the Klondike III wind facility (and therefore functionally aggregated as an EFSC jurisdictional facility). The Council determined that the Star Point facility was an individual local jurisdictional facility.

Staff is still conducting research as to whether other determinations utilized or discussed the “fifteen questions” as evaluative criteria.

2. A commenter requested the Department to conduct research on whether the Oregon Public Utility Commission administers statutes or rules that relate to the aggregation of PURPA projects.

Staff Response: Staff reviewed the Oregon Administrative Rules and has discussed the question with a relevant contact at the Oregon Public Utility Commission. Oregon Administrative Rules, Division 29 implements regulations imposed under Section 210 of the Federal Public Utility Regulatory Policies Act of 1978 (PURPA).

OAR 860-029-0010(22) defines a “qualifying facility” as a “cogeneration facility or a small power production facility as defined by these rules.” OAR 860-029-0010(25) defines a “small power production facility” to include “small power production facilities, with any other facilities located at the same site...” The Oregon Administrative Rules do not specifically define what facilities would be considered “located at the same site.” However, 18 CFR 292.204(a) indicates that, for PURPA facilities, “...facilities are considered to be located at the same site as the facility for which qualification is sought if they are located within one mile of the facility for which qualification is sought...”

Thus, the Oregon Public Utility commission considers facilities, located within 1 mile of the facility for which “qualified facility” status is sought, to be one energy facility for PURPA purposes.

3. Commenters requested examples of local jurisdictional solar PV projects that have aggregated to be functionally equivalent to an EFSC jurisdiction project, or to otherwise substantiate the practical validity of the rulemaking.

**Staff Response:** Staff concurs that a compelling reason is required to justify any new rules or amendments to existing rules. One potential justification is if the Department could demonstrate specific circumstances in which numerous local projects have aggregated to be functionally equivalent to an EFSC jurisdiction facility. As a corollary example, the EFSC Fish and Wildlife Habitat standard was recently amended to add specific sage grouse protections to address prior documented impacts. A second potential justification is if the Department could demonstrate circumstances, which may not have occurred, but which should be avoided in the future. As a corollary example, the Retirement and Financial Assurance standard was established to ensure that sufficient funds are available for the Department to restore an energy facility to a useful non-hazardous condition; this standard was adopted even though there was no prior history of an energy developer abandoning a facility. The Retirement and Financial Assurance standard was established to proscriptively address potential future harm; as such, this standard was developed to avoid an undesirable result rather than in response to prior documented impacts.

In response to RAC member requests to demonstrate the practical “need” for the rulemaking, Staff procured empirical data relating to solar PV projects that are not regulated by EFSC. However, given that neither Staff nor EFSC have established guidelines, policies or rules to determine whether two or more local jurisdiction solar PV projects may aggregate to be functionally equivalent to one EFSC jurisdiction project, the Department is unable to provide specific examples. Rather, Staff evaluated whether projects are being proposed at or near relevant regulatory thresholds.

The data was provided by the Department of Land Conservation and Development. This following table summarizes data in relation to LCDC Goal exception thresholds and EFSC jurisdictional thresholds\*:

Total # of Projects	158
# of Projects at or just under the LCDC 12 Acre Goal Exception Threshold	68
# of Projects at or just under the LCDC 20 Acre Goal Exception Threshold	4
# of Projects at or just under the EFSC 100 Acre Jurisdictional Threshold	10
# of Projects at or just under the EFSC 320 Acre Jurisdictional Threshold	8
Percent of Total Projects at or just under all Thresholds	57%
Percent of Total Project at or just under EFSC Jurisdictional Thresholds	11%

\*Note that the data does not include projects from every County in Oregon. The dataset was developed in August of 2018 and contains solar facilities from Baker, Clackamas, Crook, Deschutes, Gilliam, Harney, Jackson, Jefferson, Klamath, Lake, Malheur, Marion, Morrow, Polk, Sherman, Umatilla, Wallowa, Washington, and Yamhill counties.

This summary indicates that over one-half of the identified projects are at or just under goal exception or EFSC thresholds, and 11 percent are at or just under near EFSC jurisdictional thresholds. Given the Council’s prior concern about the potential for multiple local jurisdictional wind facilities to aggregate into one EFSC jurisdictional facility with regards to wind energy projects, and given the data above which shows that solar PV facilities are being proposed just under EFSC jurisdictional thresholds in a similar manner to numerous wind energy proposals, Staff believes that there is justification to continue to evaluate this issue within this current rulemaking. The purpose for this rulemaking is to assess, hypothetically and empirically, whether numerous local facilities could aggregate to be functionally equivalent to an EFSC jurisdiction project and whether impacts could arise from answering the question in the affirmative. If so, then it is within the purview of the Council to either adopt rules or to direct Staff that rules are not

warranted. If the Council were to adopt rules, it is within the Council's purview to adopt rules that either address current harm, or to adopt proscriptive rules.

4. A commenter requested that the Department clarify the results of the ONDA petition for rulemaking (cited to within the Department's first Staff Report for this rulemaking).

Staff Response: Due to staffing constraints, Staff does not have a response to this comment for this RAC meeting. However, the Department will review and respond to this comment in a future Staff Report.

5. Questions Posed to other RAC Members

Staff Response: During the EFSC Solar Rulemaking meeting on August 30, 2018, commenters also requested information relating to infrastructure [ostensibly, substation and transmission infrastructure]; customer need and "leveled" growth projections; and the identity of energy purchasers. Due to staffing constraints, Staff has not coordinated this response with developers but will do so for a future RAC meeting.

#### **Request for Legal Opinion**

On October 25, 2018, Renewable Northwest, the Association of Oregon Counties, and the Oregon Solar Energy Industries Association, submitted a letter to EFSC Council, which (1) requested an Attorney General opinion on whether local projects may aggregate to become EFSC jurisdictional projects and; (2) to stay future RAC meetings until the opinion is issued. The Council directed the Department of Justice Contact Counsel to conduct legal research; however, the Council did not stay future RAC meetings.

## **ATTACHMENT A – ISSUES/POTENTIAL STANDARDS AGENDA ITEM INFORMATION**

The “third” question posed by EFSC as part of this rulemaking project is to explore the potential development and adoption of specific standards or rules related to solar PV facilities. As part of preparation for the first RAC meeting, the Department researched four potential issues related to solar PV facilities. The summary of this research is presented below. The Department is not proposing specific rules related to these topic areas at this time; rather, the Department presents findings for RAC discussion.

### ***Toxicity and Safe Disposal***

#### **Summary:**

Literature suggests that the risks to human health from solar PV panels is extremely low and that panels are only dangerous if toxic constituents are ingested or inhaled. The risk to ingest or inhale constituents is very low because these solids are normally contained within “encapsulated” layers. Regardless, a solar PV panel may still be classified as “hazardous” waste due to the levels of toxic constituents contained within the panels. If a panel is considered “hazardous,” then hazardous waste regulations dictate the special handling, transportation, and disposal of panels.

Some states, as well as the EU, have considered the logistical challenges and waste concerns relating to an increase in waste generated from solar PV installations. The proper disposal of solar PV panels is not settled policy because panels must currently be assessed on a “model by model” basis as to determine whether the specific panel is considered “hazardous” under EPA leachate classifications. Currently, there are no specific Federal laws relating to solar PV; however, solar PV panels are managed under the Resource Conservation and Recovery Act (RCRA), which regulates both hazardous and non-hazardous solid waste. RCRA separates hazardous waste into “characteristic” waste and “listed” waste. Solar PV panels are not “listed,” therefore, they must be evaluated under the characteristic hazardous waste method. EPA Method 1311 measures whether the leachate from waste contains substances above regulated levels. States may require additional procedures; California maintains additional leaching procedures and threshold limit concentrations. The Oregon DEQ regulates hazardous materials under OAR Chapter 340, Title 100, which expressly adopts relevant provisions of the Code of Federal Regulations. The Department has contacted Oregon DEQ for further discussion as to potential concerns relating to the safe disposal of solar PV panels.

#### **Washington:**

Washington Revised Statute 70.355.0101(3) requires the Department of Ecology “to develop guidance for a photovoltaic module stewardship and takeback program to guide manufacturers in preparing and implementing a self-directed program to ensure the convenient, safe, and environmentally sound takeback and recycling of photovoltaic modules and their components and materials.” The requirements imposed by statute are effective January 1, 2020. A stewardship plan requires the manufacturer to: finance a takeback and recycling system; accept all panels sold into the state after 2017; describe a program to minimize the release of

hazardous substances; and establish recycling performance goals (at least 85% of panels by weight must be recycled). Washington is currently following an “interim enforcement policy,” which classifies solar PV as electrical waste. This classification places solar PV panels within the same category as a cathode ray tube television, computer monitor, and other electronic equipment.

#### **California:**

California recently passed Senate Bill 489, which is codified in the Health and Safety Code, Division 20, Chapter 6.5, Article 17, Section 25259 “Photovoltaic Modules.” The statute allows the California Department of Toxic Substances Control to designate end-of-life photovoltaic modules as universal waste. Note that “universal” waste is a subset of the “hazardous” waste category.

The Assembly Committee on Environmental Safety and Toxic Materials noted that the purpose of BS 489 is to allow “for a universal waste designation for hazardous waste PV modules, which will provide flexibility for companies or third-parties to develop more effective and cost efficient methods of handling PV modules within a take-back and recycle program. Universal waste designation relieves the burden of meeting some of the state’s rigorous hazardous waste laws and allows the waste to be streamlined in existing systems for proper management similar to electronic devices, batteries, or CRVs [cathode ray tubes].” This statement suggests that California is also moving towards a recycling and takeback program, similar to Washington.

#### **European Union:**

Currently, the EU regulates the disposal of electrical and electronic equipment under the Waste from Electrical and Electronic Equipment Directive (WEEE, 2012/19/EU). The WEEE dictates that “producers” are liable, through financial guarantees, to cover the cost of collection and recycling as relating to private home solar PV panels. Producers are also required to provide information to waste companies relating to collection, storage, dismantling, and treatment. The ultimate policy goal of the WEEE is the 85% recovery and 80% recycling, by weight, of panels by 2018. Under the WEEE, Potentially harmful substances, including lead, cadmium, mercury, would be removed and contained during treatment. Rare materials, such as silver, tellurium, and indium may be recovered and made available for future use. Silicon and glass would be recycled.

#### **Toxicity and Safe Disposal – next steps**

The Department seeks comments from stakeholders relating to the safe disposal of solar PV panels; the Department is also interested in gaining knowledge relating to current PV disposal methods and processes, and whether there are suggestions that could result in streamlining disposal efforts. The Department’s goal is to ensure that solar PV panels are disposed of in a manner that protects public health and the environment. The existing EFSC waste minimization standard may be sufficient to addresses issues related to solar module disposal as related to EFSC jurisdiction.

### ***Glare and Glint***

Glint is considered to be a brief flash, while glare is considered to be an extended flash of light. The FAA states that “flash blindness” may occur for a period of 4-12 seconds when 7-11 W/m<sup>2</sup> (650-1,100 lumens) reaches the eye. The FAA indicates that 1000 W/m<sup>2</sup> is often assumed to be the amount of light interacting with a panel; panels reflect “as little as” 2% of incoming sunlight depending on the angle of the sun and assuming anti-reflective coatings.” Therefore, an average solar PV panel may reflect approximately 20 W/m<sup>2</sup>. However, the FAA Solar Guide notes that although the amount of light reflected from a surface is important, “the nature of the reflected light is even more important when assessing the potential for flash blindness.” Light reflection is either “diffuse” or “specular.” Specular reflection is concentrated reflection arising from smooth surfaces; diffuse reflection is less concentrated and arises from rough surfaces, such as pavement. Water reflects 2% of light but may cause glare due to specular reflection; however, vegetation may reflect up to 50% of light but does not present a glare risk because its reflection is diffuse. The angle of the sun, which varies by time of year, may also affect glare. The FAA indicates that the distance required to avoid flash blindness is “directly proportional to the size of the array” but that “further research” is still required. Other literature suggests that the impacts relating to glare is not a concern to the public; the “Solar and Glare” factsheet, developed by Meister Consultants Group,<sup>1</sup> states that it is a “common misconception... that they [PV panels] inherently cause or create ‘too much glare’”

The FAA requires the use of software, Solar Glare Hazard Analysis Tool (SGHAT), to procure an impact analysis to demonstrate that glare or glint will not affect traffic control towers or flight approach paths. Furthermore, some local jurisdictions, including local jurisdictions in North Carolina mandate conditions relating to glare. These include but are not limited to: the use of glare-resistant panels; confirmation from an engineer that a facility will not “offend” a residence or traffic; and the use of the SGHAT to demonstrate no impact to local airports.

At least one model ordinance advises against glare regulation. The Delaware Valley Regional Planning Commission (DVRPC) model solar ordinance advises against regulating glare because causation is difficult to prove, and because “modern” solar PV panels only reflect 2% of light, and are equipped with anti-reflective coatings. A New York Model Solar level law, set forth by NYSERDA, merely suggests that “all solar panels shall have anti-reflective coating(s).”

### **Glare and Glint – next steps**

The Department notes that public complaints have arisen relating to glare on highways, a recent example includes concerns arising from an existing solar PV facility sited near Pendleton. The Department welcomes comments that will allow it to assess the scope of concern relating to glare, and is interested in discussing processes that could minimize glare to public highways.

### ***Wildlife and Wildlife Habitat***

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<sup>1</sup> The factsheet notes that the material is “based upon work supported by the U.S. Department of Energy under Award Number DE-EE0003525” and was prepared as an account of work sponsored by an agency of the United States Government.”

The Department notes that solar PV facilities may impact wildlife directly, such as fatalities, and indirectly, such as through habitat displacement.

Some impacts to wildlife may be avoided through careful siting, and minimized via best management practices. However, some direct impact and loss to wildlife is unavoidable, particularly when facilities are constructed in relatively undisturbed habitats. During the construction of solar PV facilities, land is usually cleared of vegetation, and in some cases, is graded to minimize slope. Trenching also occurs within the site boundary to run electrical wiring, and the boundary of the facility is fenced. The use of machinery for clearing, grading, and trenching can crush or trample wildlife (primarily rodents, nesting birds, reptiles, and amphibians). During operation, mortality can occur when wildlife (primarily birds) collide with facility features such as PV panels and transmission lines, and when wildlife become entangled in fencing or collide with vehicles on facility service roads (primarily deer, elk, and pronghorn).

The body of knowledge relating wildlife mortality with solar PV facility operation is still limited. Wildlife fatality monitoring at solar facilities in Oregon has yet to be reported. Because solar PV is still a relatively new land use in the western United States, the wildlife fatality monitoring reports from operational solar PV facilities have only recently begun to emerge. A handful of publicly-available monitoring reports from solar PV facilities in California are documenting avian collisions with solar PV panels and associated transmission lines. Whether documented losses of individuals are significant at the population level deserves further investigation. Walston et al. conducted a comparative analysis of solar facilities in southern California and found that fatality rates at existing PV facilities were measurably lower than fatality rates at wind facilities. However, this study did not contain wildlife fatality reports included for solar PV facilities in Oregon.

Observations at solar PV facilities in California have led to hypotheses that solar PV arrays may create a “lake effect,” whereby nocturnal migratory waterfowl mistake reflective surfaces as water bodies, and attempt to land. Whether this behavior results in significant mortalities has yet to be determined, but studies in California are addressing this concern.

While wildlife collision rates with solar PV facility components is unclear, the removal of habitat may be empirically examined. Because solar PV facilities are fenced and vegetation is often removed, lands occupied by solar PV facilities are not available to most wildlife, with the exception of some smaller fauna (birds, rodents, and reptiles) that may recolonize post-construction. Those individuals displaced by the solar PV facility may adapt to available habitat elsewhere, or they may succumb to competition, starvation, or predation. Additionally, wildlife displaced by solar PV development may transition towards adjacent agricultural lands to meet foraging and cover needs, which often creates human-wildlife conflicts as wildlife damage to crops intensifies.

The Oregon Department of Fish and Wildlife has indicated that the most important impact to wildlife from solar PV is the loss of habitat connectivity for wide-ranging species. Wildlife, including deer and elk, cover hundreds of square miles over a given year. Connected habitats



can support population viability for rare species such as pygmy rabbits, Washington ground squirrels, and sage-grouse, which require connected natural areas for dispersal of young and the establishment of new colonies. Connectivity allows for dispersal of wildlife, helps maintain genetic diversity, and is a frequently proposed strategy to aid wildlife in adapting to changing climates.

The EFSC Site Certificate process currently addresses wildlife habitat loss through its Fish and Wildlife Habitat Standard, OAR 345-022-0060, and the Threatened and Endangered Species Standard, OAR 345-022-0070. These siting standards effectively identify, avoid, minimize, and mitigate the potential impacts to wildlife and wildlife habitats through siting design as well as implementation of the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0000 through -0025). A concern, cited by ODFW, is that these standards do not consider cumulative effects. Currently the EFSC siting standards do not address the cumulative effect of solar PV development on wildlife habitat connectivity and migration corridors within the context of other nearby solar PV facilities or other surrounding land uses. A potential standard specific to solar PV could attempt to address the cumulative effect of habitat loss and fragmentation, given that solar PV creates more of a barrier to wildlife use and movement than other types of energy development (such as wind, natural gas pipelines, and transmission lines). ODFW will be presenting on this topic at the first RAC meeting.

The Council's Fish and Wildlife Habitat standard requires that EFSC jurisdictional energy facilities comply with the ODFW Fish and Wildlife Habitat Mitigation Policy, which includes requirements to mitigate a facility's impacts to wildlife habitat, including compensatory mitigation if necessary. However, non EFSC-jurisdictional facilities may or may not implement similar requirements.

### ***Heat island effect***

The Department notes that concerns have been raised as to whether a solar facility could increase the ambient temperature to adjacent areas, which could result in impacts to farming operations if such farming operations are temperature dependent. Specifically, there is a concern that a solar heat island could affect alfalfa production.

A study published in *Scientific Reports* titled "*The Photovoltaic Heat Island Effect: Larger solar power plants increase local temperatures*" is widely cited, and appears to be the only study that empirically examined the heat island effect arising from solar PV modules in a desert environment. This study demonstrated that temperatures in the immediate vicinity of a solar facility were 3-4 degrees Celsius warmer, at night, than nearby unaffected desert lands. The study states that "the results ... demonstrate that the PVHI [photovoltaic heat island] effect is real and can significantly increase temperatures over PV power plant installations relative to nearby wildlands." The sites were located in Arizona, and were all within 1 km of one another. Whether solar facilities would result in less of a temperature difference in Oregon is unknown. It is believed that the effect of heat island would dissipate at 100 feet. Other studies suggest that solar facilities may reduce a heat island effect, however; such literature is limited to built urban environments.

While the Department is unaware of any specific temperature regulations, Currituck County in North Carolina has imposed a condition related to avoiding heat transference to adjacent lands in a recent solar facility project. (See: PB 16-04 Ecoplexus Goose Creek project in the source list)

### **Heat Island – next steps**

The Department notes that public concern has arisen relating to a heat island effect and potential concerns to alfalfa farming. The Department welcomes comments that will allow it to assess the scope of concern relating to farming operations, and welcomes suggestions to mitigate potential harm.

### **Toxicity and Safe Disposal Sources**

- California Department of Toxic Substances Control: Photovoltaic Modules- Universal Waste Management Regulations webpage. Available at <https://www.dtsc.ca.gov/HazardousWaste/PVRegs.cfm>
- California Legislative Counsel's Digest [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201520160SB489](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB489)
- California Senate Committee on Environmental Quality Analysis. Available at [https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill\\_id=201520160SB489](https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201520160SB489)
- California Assembly Environmental Safety and Toxic Materials 06/26/15. Available at [https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill\\_id=201520160SB489](https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201520160SB489)
- EPA Hazardous Waste information. Available at <https://www.epa.gov/hw/defining-hazardous-waste-listed-characteristic-and-mixed-radiological-wastes#PandU>
- First Solar. *CdTE module technology – performance, life cycle, health and safety impact assessment* (2015).
- Fthenakis, V.M., *Practical Handbook of Photovoltaics: Fundamentals and Applications. Overview of Potential Hazards* (2003).
- International Renewable Energy Agency, *End-of-Life Management: Solar Photovoltaic Panels* (2016).
- International Energy Agency. *Life Cycle Inventories and Life Cycle Assessments of Photovoltaic Systems* (2015).
- Sinhga et. al. *Evaluation of Potential Health and Environmental Impacts from End-of-Life Disposal of Photovoltaics*, Photovoltaics (2014)
- Washington Statutes (Revised Code) Section 70.355
- Washington Department of Ecology: Interim Enforcement Policy, *Conditional Exclusion for Electronic Wastes*. Available at <https://fortress.wa.gov/ecy/publications/documents/0204017.pdf>

### **Glare and Glint Sources**

- Currituck County, North Carolina. Public Hearing and Action: PB 16-04 Ecoplexus (Goose Creek). Planning & Community Development, Staff Report. Available at [https://currituckcountync.igam2.com/Citizens/Detail\\_LegiFile.aspx?Frame=&MeetingID=1358&MediaPosition=&ID=1474&CssClass=](https://currituckcountync.igam2.com/Citizens/Detail_LegiFile.aspx?Frame=&MeetingID=1358&MediaPosition=&ID=1474&CssClass=)
- Delaware Valley Regional Planning Commission, Renewable Energy Ordinance Framework: Solar PV (2015) at p 19. Available at [https://www.dvrpc.org/EnergyClimate/ModelOrdinance/Solar/pdf/2016\\_DVRPC\\_Solar\\_REOF\\_Reformatted\\_Final.pdf](https://www.dvrpc.org/EnergyClimate/ModelOrdinance/Solar/pdf/2016_DVRPC_Solar_REOF_Reformatted_Final.pdf)
- Lovelady, Adam. Planning and Zoning for Solar in North Carolina (2014). Available at <https://sogpubs.unc.edu/electronicversions/pdfs/pandzsolar2014.pdf>
- FAA Solar Guide. Available at [https://www.faa.gov/airports/environmental/policy\\_guidance/media/airport-solar-guide-print.pdf](https://www.faa.gov/airports/environmental/policy_guidance/media/airport-solar-guide-print.pdf)
- Federal Register, Vol. 78, No. 205, p 63276 (10/23/2013). Available at <https://www.gpo.gov/fdsys/pkg/FR-2013-10-23/pdf/2013-24729.pdf>
- Solar and Glare Factsheet. Available at [https://icma.org/sites/default/files/306952\\_Solar%20PV%20and%20Glare.pdf](https://icma.org/sites/default/files/306952_Solar%20PV%20and%20Glare.pdf)

#### Heat Island Effect Sources

- Barron-Gafford, Greg; et al. Scientific Reports. *The Photovoltaic Heat Island Effect: Larger solar power plants increase local temperatures* (2016).
- Coakley, J.A., Oregon State University, *Reflectance and Albedo, Surface*, p. 1920 (2003). Available at [http://curry.eas.gatech.edu/Courses/6140/ency/Chapter9/Ency\\_Atmos/Reflectance\\_Albedo\\_Surface.pdf](http://curry.eas.gatech.edu/Courses/6140/ency/Chapter9/Ency_Atmos/Reflectance_Albedo_Surface.pdf)
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- Large Solar Power Plants Increase Local Temperatures. Solar Novus. Available at [http://www.solarnovus.com/photovoltaic-heat-island-effect-large-solar-power-plants-increase-local-temperatures\\_N10518.html](http://www.solarnovus.com/photovoltaic-heat-island-effect-large-solar-power-plants-increase-local-temperatures_N10518.html)
- Masson, V et. al. *Frontiers in Environmental Science. Solar panels reduce both global warming and urban heat island* (2014). Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5062079/>

#### Wildlife Sources

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- Beier, P. and R. F. Noss. 1998. Do Habitat Corridors Provide Connectivity? *Conservation Biology* 12:1241–1252.
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- US Department of Energy. *A Review of Avian Monitoring and Mitigation Information at Existing Utility-Scale Solar Facilities* (April 2015).
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- Walston, Jr., L.J, K.E. Rollins, K.P. Smith, K.E. LaGory, K. Sinclair, C. Tuchi, T. Wendelin, and H. Souder. 2015. A review of avian monitoring and mitigation information at existing utility-scale solar facilities. Prepared for US Department of Energy, Sunshot Initiative and Office of Energy Efficiency and Renewable Energy, April.
- Walston, Jr., L.J, K.E. Rollins, K.E. LaGory, K.P. Smith, and S.A. Meyers. A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States. *Renewable Energy* 92:405-414.

## ATTACHMENT B – “FIFTEEN QUESTIONS” RESEARCH

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### Portion of Approved Minutes for the April 18, 2008 Energy Facility Siting Council Meeting

#### Agenda Item C. Defining Separate Wind Projects

Tom Stoops, Council Secretary, referred to the map given to Council members showing jurisdictional projects sited by EFSC and also sub-jurisdictional projects sited by the local county land use process. He also discussed the Department’s new guidance document listing fifteen “Questions for Determining When Energy Projects are Separate Projects” (“Questions”), which staff have been using to determine an applicant’s jurisdiction (i.e., county or state).

John White, Oregon Department of Energy (ODOE), stated that this is being brought to the Council’s attention because, although being used as guidance, it is a question of policy. ODOE staff is not supposed to make policy, only carry out policy that EFSC sets. For the time being, however, staff is using the “Questions” as guidance to assist in the review process and to determine jurisdiction.

Mr. White explained the background of the “Questions” and why there is a concern. State policy requires that development of energy facilities must protect the environment. Impacts must be mitigated. The process begins by determining applicant jurisdiction. In 2001, the Legislature raised the jurisdictional threshold for Siting Council jurisdiction of wind-powered energy facilities from 25 megawatts average to 35 megawatts average (105 megawatts peak). This meant that some wind facilities no longer received the scrutiny of the Siting Council. The Stateline facility is an example of a project that would not have been under EFSC jurisdiction under the new legislation. Jurisdiction that is outside of EFSC jurisdiction (“sub-jurisdictional”) is usually reviewed by counties, using local land-use laws. Counties have different considerations, however, and issues of local interests. Their focus is on their land use standards, as opposed to EFSC review in which land use is only one of the standards used.

In 2005, a request for expedited review was received for the Klondike III facility. Klondike I, which consisted of 16 turbines in Sherman County, had been permitted by the county and was up and operating. Klondike II also had been permitted by Sherman county and was under construction. One of the first questions ODOE staff had to answer when the request for expedited review was received for Klondike III was whether Klondike III should be treated as a separate facility. To help answer this question, the list of fifteen questions was compiled.

Subsequently, there have been a number of cases where a sub-jurisdictional facility existed and the developer wanted to build a second sub-jurisdictional facility next to it, geographically. Developers asked whether these fifteen questions might be used to find that the two facilities are separate.

This scenario is an issue because if the two sub-jurisdictional projects are combined as one facility, that “complex” would need an EFSC site certificate. If they are treated separately, each 104-megawatt facility, standing by itself, is below EFSC jurisdiction, and both energy facilities avoid the requirement for site certificate.

Mr. White stated there are a number of these requests before ODOE right now. Staff has discussed this as a policy question. Are these the right questions, or should other questions be asked? Staff needs to know what latitude should be given to allow two sub-jurisdictional projects, being developed by the same corporate parent next to each other. If the fifteen questions and answers find that the geographically-related projects are one facility, a site certificate is required and if not, the developer needs to show that the finding is incorrect.

Mr. White referred to the list of facility projects each Council member received in their packet and pointed out that there are more facilities being developed that are not under EFSC jurisdiction than are under EFSC jurisdiction.

Chair Bob Shiprack asked if there were any questions. Lori Brogoitti asked whether the 15 questions were in rule or whether they were a working document. Mr. White stated this is not rule, it is a working document.

(Martha Dibblee commented – could not hear on recording)  
(Also had trouble hearing any comments of Chair Bob Shiprack)

Jan Prewitt stated that from a legal standpoint, by the Staff, potential rulemaking needs to be considered at some point. Ms. Prewitt further stated that to what extent, if Council adopts policy, that policy needs to be promulgated through rulemaking with opportunity for notice and comment.

Bryan Wolfe raised a concern about the cumulative effects of the wind projects and suggested that the issue of cumulative effects could drive the Council’s direction.

Lori Brogoitti asked if the issue is only for wind projects, or if there are similar issues with non-jurisdictional facilities for are ethanol or some other type of facility. Tom Stoops said that right now the focus is wind, because the ethanol facilities tend to be industrial facilities that go through the exemption process.

Martha Dibblee asked if a question sixteen will be added to the list concerning cumulative effects since this has been discussed extensively over the last few years.

Mr. White stated that part of the problem is that cumulative effects are not known unless comparable impact data has been collected. If projects are not going through EFSC jurisdiction they don’t have the same studies conducted or reports to compare.

Chair Bob Shiprack asked if there were any public comments.

Jesse Gronner, PPM Energy, introduced himself. He stated he was the developer involved with Klondike III and these questions were posed at that time. As projects are planned, each will be reviewed against the fifteen questions to help determine whether they are subjurisdictional (separate projects) or within EFSC jurisdiction.

Dave Filippi, Attorney with Stoel Rives, representing PPM, introduced himself. As a broad overview, even if there are two projects side by side and the parent company is PPM, those projects are owned by different LLCs. There are separate power purchase agreements for each project and each project can operate on its own. He further stated that in answering the question of whether each can be operated separately, and are not dependent on one another, the view is that those projects can be permitted separately.

Mr. Filippi referred to Ms. Dibblee's comment about adding question sixteen to cover cumulative impacts and stated that it is a question worth inquiry; it doesn't have anything to do with jurisdiction, however, since the projects could be permitted separately.

Lori Brogoitti commented that some sub-jurisdictional facilities have the look of being an attempt to subvert the EFSC process and asked what PPM (and others) was doing to alleviate that.

Mr. Filippi replied that projects being planned as stand alone do have cumulative impacts looked at in a county process. He said that developers might choose to go through the EFSC process if a wind project had significant local opposition.

Lori Brogoitti commented that it does look like there is an effort to avoid EFSC jurisdiction. Mr. Filippi replied that the question of jurisdiction is a legal threshold.

Sara Parsons, Biologist with PPM, discussed some of the work they are doing to protect the environment. She also noted that PPM is a member of the Oregon-Washington Task Force to look at cumulative impacts.

Jesse Gronner said that if you look at question 15, "What other information would support a conclusion that the proposed project would be a separate wind energy project and not an expansion of a nearby wind energy project? In what other ways would the projects be operated or otherwise treated as separate projects...", PPM has addressed the issue to show that they have exceeded the minimum requirements, and they expect other applicants to do so also.

Chair Shiprack asked for further comments.

Jesse Gronner said he wanted to comment regarding Sara's remarks. He stated there is incentive to meet or exceed the EFSC standard whether sub-jurisdictional or not because at some time in the future the project might expand to exceed the EFSC threshold (i.e., 35 Mw average and 105 Mw peak). This is part of the reason PPM wants a project that can withstand the Council's review at any time.

Chair Shiprack commented about legislative decisions on jurisdiction.

John White said he didn't feel the legislators were faced with the question whether the same corporate developer wanted to build two 104-megawatt facilities right next to each other.

Mr. White also stated he doesn't agree that the same level of scrutiny or work goes into a conditional use permit application as a site certificate application. If you will do the same amount of work anyway, why not get a site certificate to begin with then a new permitting process will not be necessary if expansion or amending is in the future.

Adam Bless, Oregon Department of Energy, said a real life illustration between an EFSC project and a sub-jurisdictional project is the Cascade Wind Project. The scenic and aesthetic standard is a concern with this project, being hundreds of yards away from a national scenic area, but not in the scenic area. The EFSC scenic and aesthetic standards allows for consideration of an adverse impact for the facility near the scenic area. The Columbia Gorge Commission, which would be the sub-jurisdictional authority, has stated they do not have authority outside their boundaries. This is a protection that EFSC can offer but the Columbia Gorge Commission could not.

Tom Stoops talked about more information becoming available that will be distributed to Council members. He also referred to Sara Parson's comments on the studies of birds and bats and that as soon as those guidelines are available they also will be distributed.

Mike Haglund noted that the Cascade Wind project has a capacity of 60 megawatts, and asked why it is under EFSC jurisdiction.

Adam Bless answered by saying that Wasco County's land use and zoning ordinance limits their jurisdiction to 25 megawatts, so anything above that falls to EFSC by default.

Mr. Bless also mentioned that another difference between an EFSC project and a non-EFSC project would be the noise standard. The Department of Environmental Quality (DEQ) has noise standards that apply to all industrial facilities, whether they are EFSC jurisdictional or not. DEQ noise standards are enforceable by EFSC for EFSC jurisdictional facilities, and by the county for sub-jurisdictional facilities. Applicants for a site certificate are expected to do noise studies. Staff has available a noise consultant, one of the best in the state, who does an independent study, rather than relying on the applicant's noise study., Most counties do not have the resources to independently check the applicants' noise studies. The EFSC process provides extra assurance that DEQ standards will be met.



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## **Portion of Approved Minutes for the May 30, 2008 Energy Facility Siting Council Meeting**

### Agenda Item D. Confirmation of Sub-jurisdiction Facility Criteria

Tom Stoops, Council Secretary, referred to the last meeting regarding the discussion about the 15 questions currently being used to determine whether single owner facilities with geographic relations are sub-jurisdiction facilities. A follow-up memo was given to all EFSC members. A meeting has been scheduled tentatively for June 3<sup>rd</sup> to discuss the issue with the Columbia Basin counties and review the questions.

John White, ODOE, said this discussion mixes together many items. One he discussed is the cumulative impact, in particular to wind turbines. There has been concern about cumulative impacts in particular on avian species. He stated the 15 questions will not directly address that issue; jurisdictional review will cover this, sub-jurisdictional will not.

Mr. White further stated if the Council feels that geographically related sub-104 megawatt projects by the same corporate parent should be combined and treated as one energy facility and require a site certificate, rulemaking may be necessary to define that.

Another alternative is to continue as the Council has done, if there is a separation shown. Whatever is decided the projects at hand need to have answers. There was discussion about the rulemaking process among Staff and Council members.

Jan Prewitt, Oregon Department of Justice, clarified that the Staff is not asking for a decision on Star Point, but a ratification of the process the Staff has gone through so far so they may continue to work with the developers. At the same time, Mr. White has proposed a need for more specific policy direction.

Michael Haglund, EFSC member, stated he thought there was a mixed feeling from the last meeting regarding the 15 questions. He felt the question is "should the 15 questions be rigorously applied?" He also stated the Council should err on the side of being cautious.

Bryan Wolfe, EFSC member, said he felt the Council should proceed the way it is set down and also work together with the County. In the end, EFSC should take the responsibility to protect the state. Chair Bob Shiprack agreed.

Martha Dibblee, EFSC member, said the builder is eager to pursue the project and feels Staff has done the analysis and determined there is a common owner and boundary and therefore is a jurisdictional facility. In the future if some of other details need worked out that should be done, but Star Point should not be held up while this process takes place.

Lori Brogoitti, EFSC member, asked about the projects currently being reviewed. Chair Shiprack said it was mentioned they be grandfathered in as they are being done.

Ms. Prewitt clarified there are two points of view – 1) allow the Staff to continue to make the decisions based on the 15 questions and 2) the other view is that the Council should specifically make the decision on the facility that is before the Council at this point.

Mr. Stoops reviewed the process and discussed this with Council members.

David Filippi, Stoel Rives, on behalf of Iberdrola, discussed Iberdrola's views on the Council's jurisdiction on Star Point. He stated this is the third meeting in the last six weeks and appreciates the attention to this issue. He also said there is nothing in the rules that would require Iberdrola to come forward and answer the question. This has been based on the advice of legal counsel that it would be good to get an understanding upfront as to whether the Council and the State has the jurisdiction of the Star Point project, or whether, as they believe, the County has jurisdiction.

Mr. Filippi reviewed some of the process Iberdrola has gone through, two and a half months ago answering the 15 questions showing the project is separate. Star Point does touch one corner of Klondike III and part of viewing these as separate is that they can be stand-alone projects and they have separate financing with each project. If the Council determines it is not separate, they need to know which project is connected. The financing is different and to tack on financing to another project may preclude the project from going forward.

Ms. Brogoitti asked if the project has different customers. Mr. Filippi said it is unknown at this time because there will be separate power purchase agreements that will go with each project.

Edmund Clark, Project Manager for Star Point, stated the output of the existing projects has been sold. Mr. Clark discussed the separation from Star Point from a fiduciary standpoint also. In regards to the border that is touching at the corner, it is kiddy corner so there would be no utilization of land possible to share, not even for a line to go from one property to the next.

Mr. Haglund asked about surrounding property eventually being operated as sub-jurisdictional. Mr. Filippi discussed other projects going in and the possibility of them having completely separate parent companies. There is no way to require those two projects to be under one site certificate.

Jake Polvi, EFSC member, asked about the close proximity and whether they would be sharing transmission lines. Mr. Filippi said there is a common ring bus located between the various projects transformers. There is a sharing of a portion of the kV line into the grid.

Mr. Haglund asked what an "indirect wholly owned subsidiary" means. Mr. Filippi discussed the entities that are involved between the parent company and the LLC. There was also discussion about the option of Star Point being an amendment to another project, but at some point they would need to be separated due to the ownership.

Mr. Stoops discussed the details of the project and that the policy direction needed from the Council just happened to come up at this time. Ms. Prewitt also said that because of the way the 15 questions are posed they necessarily require the exercise of judgment, which Staff has been exercising on Council's behalf. The Staff would like to continue with this, but needs input from the Council.

Lori Brogoitti asked for clarification on the motion.

Michael Haglund made the motion to determine Star Point is a sub-jurisdictional facility, subject to the commitment they have made to work with Sherman County, ODOE and EFSC to develop an MOU among all parties for the purposes of dealing with the EFSC standards that are set out in Mr. Linehan's letter; Martha Dibblee seconded the motion, Council was polled and unanimously approved:

<b>Martha Dibblee</b>	<b>Yes</b>	<b>Jake Polvi</b>	<b>Yes</b>
<b>Lori Brogoitti</b>	<b>Yes</b>	<b>Bob Shiprack</b>	<b>Yes</b>
<b>Michael Haglund</b>	<b>Yes</b>	<b>Bryan Wolfe</b>	<b>Yes</b>

Ms. Brogoitti asked about a timeline on in the future regarding common owners and sub-jurisdictional projects. Mr. Stoops stated they will discuss that further after meeting with the counties.