

Energy Facility Siting Council

Solar PV Facilities
Rulemaking Advisory
Committee Meeting #3

Boardman
January 30, 2018



Photo credit: cablinginstall.com

Agenda

- Overview and Introductions
- Discussion of issues/potential standards specific to solar PV facilities
- Public comment
- Wrap up and next step

Overview of meeting

- All discussion is prospective, we are not proposing any changes at this time.
- We are seeking input, consensus is not required.
- Please identify yourself when providing comment for the record.
- An audio recording and notes of the meeting will be made available

Introductions

- Name
- Organization
- Interest in rulemaking

Issues/potential standards

The department is seeking input on potential issues related to solar PV facilities to determine if specific standards may be required.

- ✓ Toxicity and disposal of solar panels
- ✓ Impacts to wildlife and wildlife habitat
- Impacts related to glare from panels and system components
- Impacts related to changes in microclimate near solar facilities (e.g. the “heat island effect”)
- Any other issues identified by RAC members

Impacts related to glare

What is glare?

“Glare” includes a brief or extended flash of sunlight reflected from the surface of a solar panel or other system component.

Glare has the potential to cause discomfort or temporary blindness in an observer.



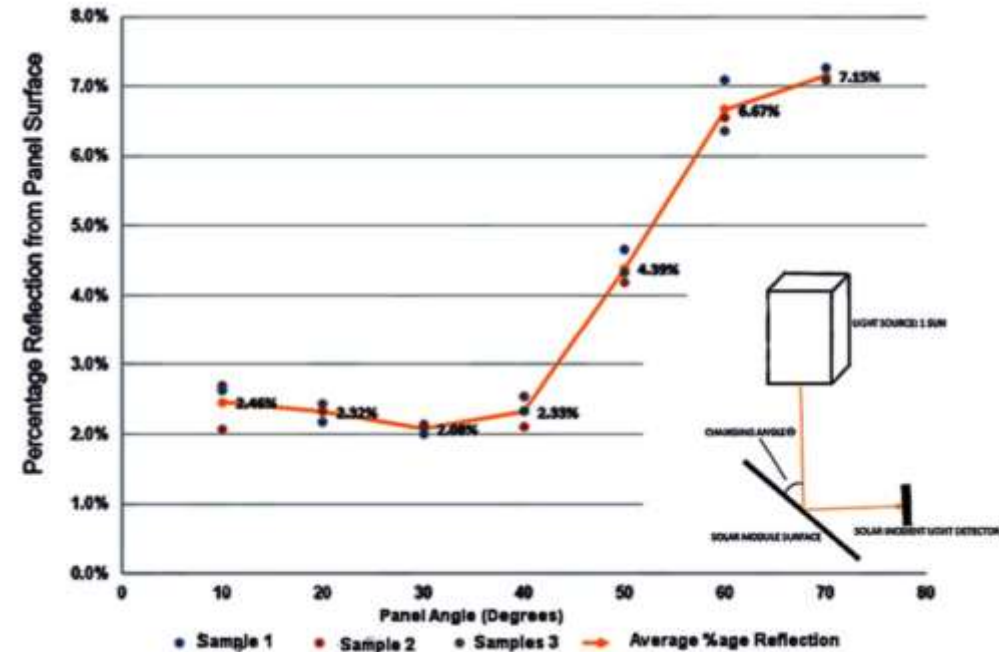
Sunlight reflects off of solar panels being assembled near the Pendleton airport (E.J. Harris, The East Oregonian.)

Impacts related to glare

Evidence suggests some potential for impacts.

With anti-reflective coating, the average solar panel reflects as little as 2% of incoming sunlight, similar to smooth water.

Intensity of glare is influenced by the arrangement of panels and angle of the sun.



Percentage of reflection light from the surface of a PV module as a function of angle. (Anurag et al., 2017)

Impacts related to glare



The Oregon Solar Highway Demonstration Project located at the interchange of I-5 and I-205 near Portland (ODOT, 2016.)

While concerns about impacts related to glare are common, few jurisdictions regulate it specifically.

ODOT and other jurisdictions have “solar highway” programs which have not impacted safety.

Solar facilities have also been successfully sited on airports. FAA regulations require glare analysis for airport-based facilities.

Impacts related to glare

Current standards may address some impacts:

- Public Service Standard (OAR 345-022-0110.)
- Recreation (OAR 345-022-0100)
- Scenic Resources (OAR 345-022-0080)
- Protected Areas (OAR 345-022-0040)

These standards do not apply to potential impacts to private residences or landowners.

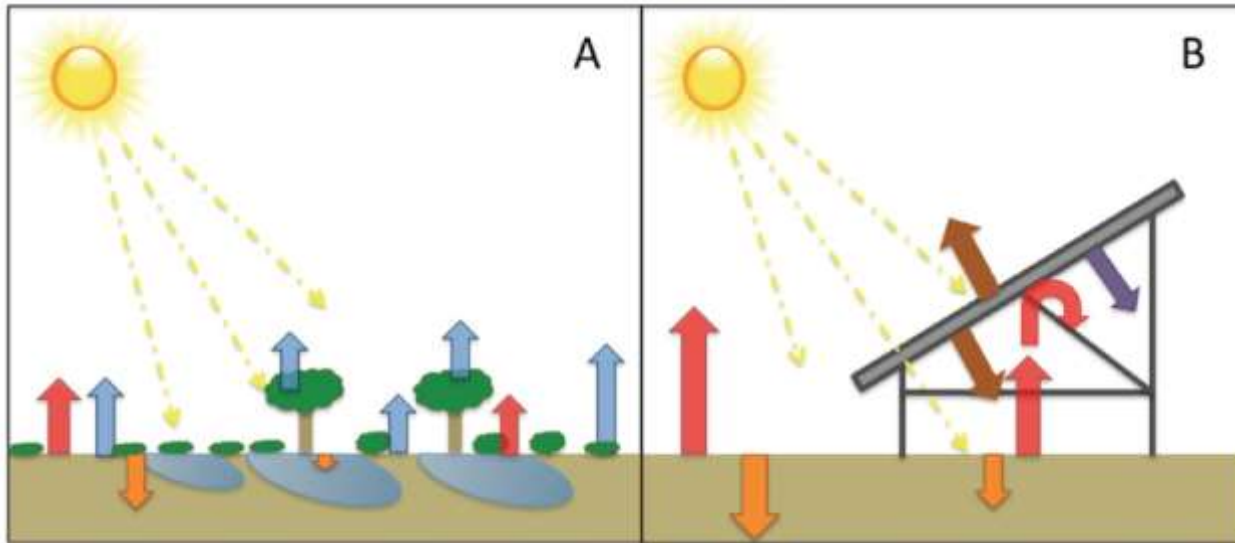
DISCUSSION

Are you aware of concerns related to this issue?

How are potential impacts currently being addressed?

What are best ways to mitigate or avoid adverse impacts?

Impacts related to microclimate effects



Theoretical differences between vegetated ecosystem (A) and solar facility (B). Heat is captured and stored in soils (orange arrows). Plants dissipate heat release (red) through evapotranspiration (blue). Solar panels convert some energy to electricity (purple) and reradiate some as heat (brown). (Barron-Gafford et al., 2016.)

Some evidence suggests large-scale solar PV facilities have the potential to effect local air temperatures, humidity, pressure, and wind speed.

Microclimate effects are driven by changes in surface reflectivity (albedo), shading, and roughness, as well as changes in vegetation.

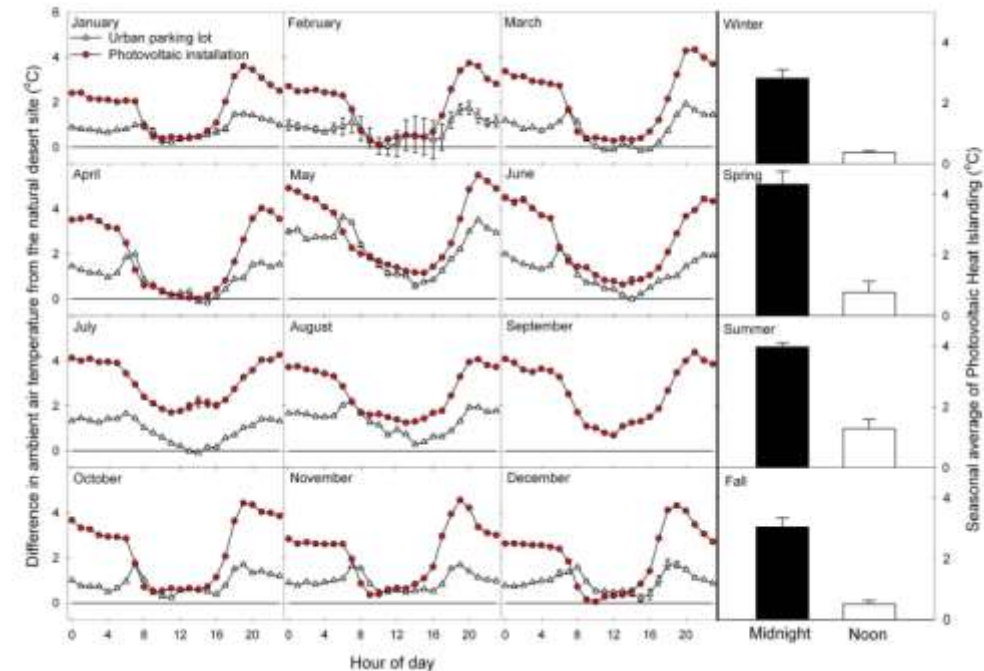
Some concerns have been raised about the impacts these microclimate effects may have on agriculture.

Impacts related to microclimate effects

Size and direction of impacts are highly site specific.

Several empirical studies have found small but statistically significant increases in air temperatures near large solar facilities in rural areas.

In urban areas, rooftop arrays and utility scale facilities may decrease ambient temperatures.



One study of a solar PV facility in Arizona found average temperatures near facility were 3-4 °C warmer at night than nearby desert lands (Barron-Gifford et al., 2016.)

Impacts related to microclimate effects



A dual-use solar facility and sheep pasture near OSU has found improved forage production under solar panels (Adeh, Selker & Higgins, 2018.)

Some practices may minimize adverse impacts.

These include:

- Creating setbacks from temperature sensitive areas
- Limiting vegetation losses during construction and operation of the facility

How do current standards address microclimate effects?

- Under ORS 215.296, a photovoltaic solar power generating facility may only be approved on EFU land if it does not force a significant change in or significantly increase the cost of accepted farm or forest practices on surrounding lands.
- In order to approve a goal exception, the Land Use Standard (OAR 345-022-0030) requires Council to find that the following standards are met:
 - The significant environmental, economic, social and energy consequences anticipated as a result of the proposed facility have been identified and adverse impacts will be mitigated in accordance with rules of the Council applicable to the siting of the proposed facility.
 - The proposed facility is compatible with other adjacent uses or will be made compatible through measures designed to reduce adverse impacts.

Impacts related to microclimate effects

Potential Discussion Items:

Are you aware of concerns related to this issue?

How are potential impacts currently being addressed?

What are best ways to mitigate or avoid adverse impacts?

Other issues?

Public comment

Wrap-up and next steps