

Planning & Zoning for All Sizes of Solar Development

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12TH ANNUAL
Nebraska
Wind & Solar
CONFERENCE & EXHIBITION



SALT CREEK
S O L A R
A RANGER POWER PROJECT



October 29th, 2019 Nebraska Wind and Solar Conference

Ranger Power

- Ranger Power is a solar development company specializing in utility-scale projects
- Led by an experienced team of veteran developers with a proven track record of community-supported solar projects
- Midwestern US portfolio of 20+ projects across 7 states; 1,500 MWs of successfully permitted projects

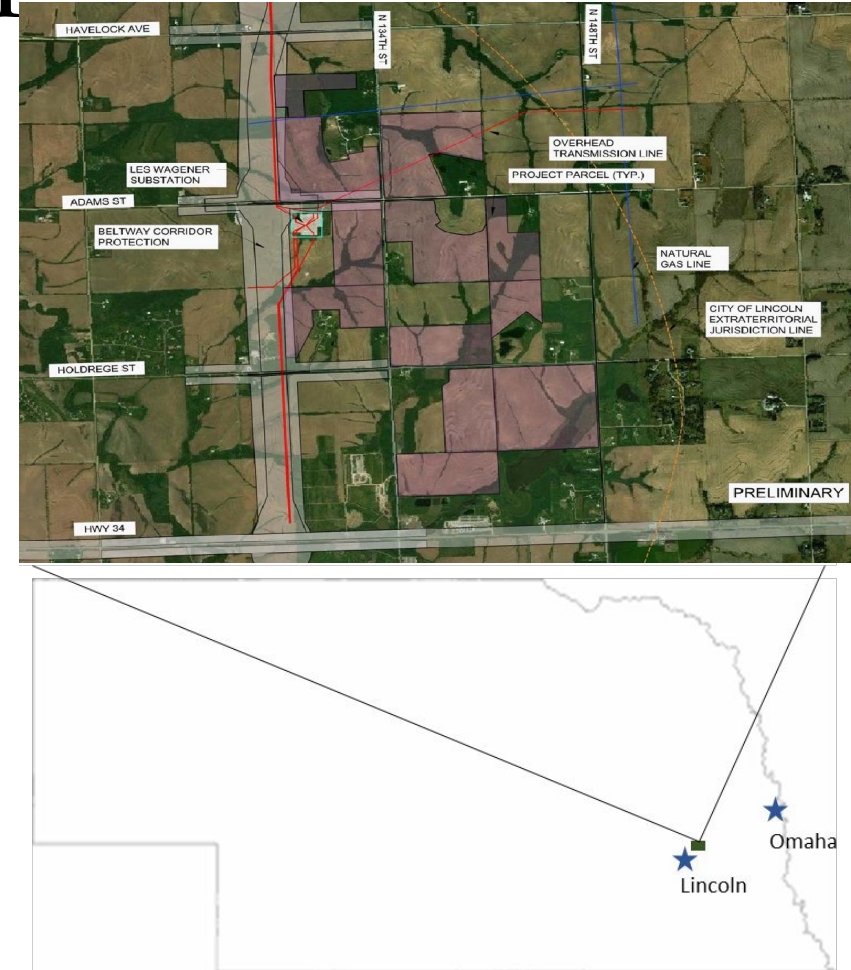


We are dedicated to community engagement, transparency, and responsible solar development

responsible solar development

Salt Creek Solar

- Salt Creek Solar is a fully permitted 230 MW Solar Project located on approximately 1,000 acres of privately-owned land in East Lincoln
- The project has the SPP Queue Position GEN-2017-055, established June 2017; Salt Creek represents the only project of its size in eastern Nebraska that may qualify for the ITC
- The project will take advantage of robust infrastructure and interconnect into the existing Wagener substation and will produce on-peak power close to the largest load centers in the state
- The Lincoln City Council unanimously approved Salt Creek Solar's Special Permit Application on 9/30/2019



Positive Permitting Environment

- A comprehensive plan that expressly promotes the responsible development of large-scale solar projects
- Room to work with individuals on specific concerns
- Simple, clear proscriptive ordinance that correspond to the comprehensive plan for the community
- Avoiding re-zoning land, e.g. Ag remains Ag
- Setback and buffering regulations that are respectful to public land and non-participating neighbors, but that allow developers Relying on fact-based findings to inform decisions
- Establishing a clear and reasonable timeline to file a permit
- A leadership that is informed on the laws and regulations of the town, county, state

Community Outreach

- Opened an office in Eagle, Nebraska
- Since December 2018, we have engaged in over 40 meetings with neighbors to the project
- Frequent outreach to local stakeholders and community leaders in Lincoln's businesses, schools and government
- Salt Creek Solar held an open house on July 22 and invited community members to solicit feedback on the project
- Incorporated feedback into the current site plan
- We have received over 140 letters of support for the project from the Lincoln/Lancaster County community





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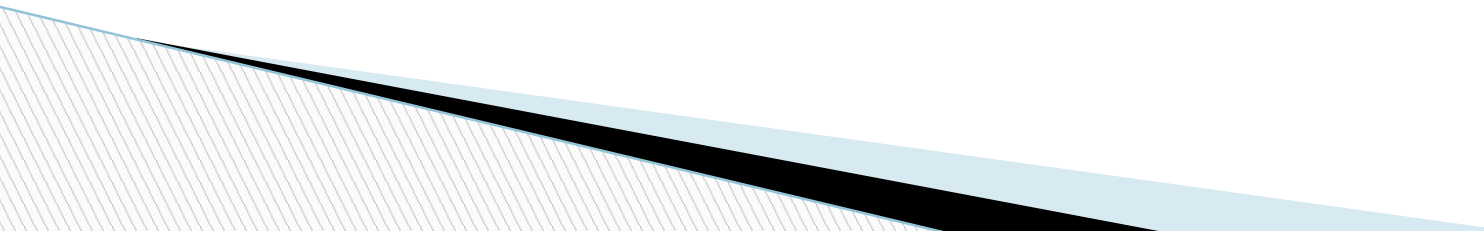
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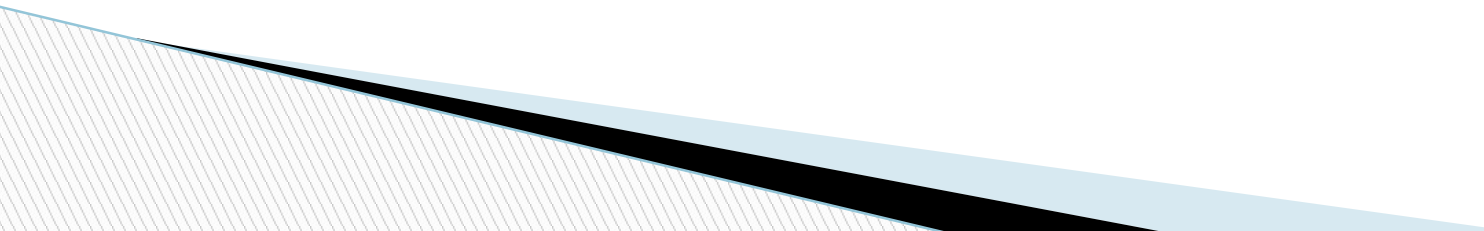
INTEGRATING WITH PUBLIC POWER

A Mesner – GenPro – Sol Systems Initiative

Community Solar Avoids Zoning Issues



Metering

- **Net Metering** requires that the solar be physically attached to the property
 - Community solar uses “**virtual net metering**” and is based on the concept that the solar is not physically attached to the property
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Virtual Net Metering

- General concept is to develop a solar array in an appropriate location
- Production is metered at that location
- Electricity produced is applied against individual homes or businesses

Real Estate Development

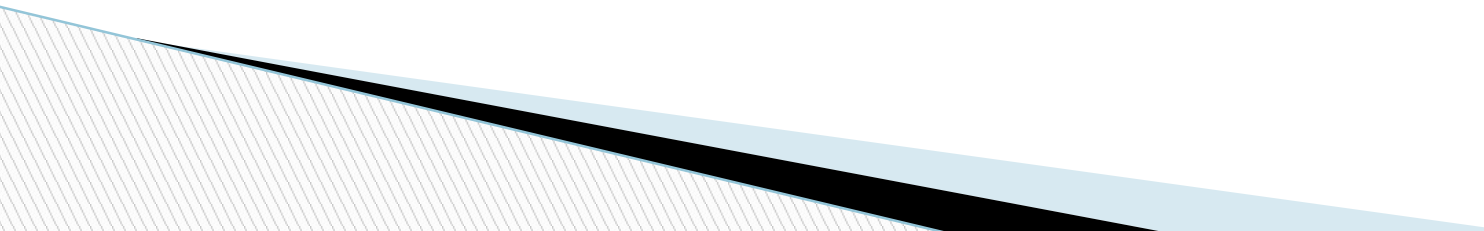
- Addition of solar is issue for housing development in two ways
 - Solar does not always add to the street appeal
 - Housing that does not have the ability to add solar becoming less and less desirable

Consumers will choose community solar over rooftop

- Don't have to change the appearance of the house
- Don't have to have a south facing location
- It is not in the way when reshingle a roof
- It is completely portable
- Consumer doesn't directly hire an installer
- Some programs don't require an initial investment
- Individuals don't have to maintain it
- Insured through the system

City vs Utility

- Zoning policies are made by the city
 - Solar policies are set by the utility
 - They do not share the same perspective and often do not come to the same conclusion

 - Example
- 

Keeping Public Power Whole

- Economies of scale allow us to develop community solar at half the cost per kW as rooftop solar
- The cost saved through community solar allow us to give the end user the same advantages as rooftop solar, while compensating public power for providing backup and managing the system



Solar Codes Overview for Residential - Commercial and Agriculture

**12th Annual Nebraska Wind &
Solar Conference**

October 29-30, 2019

Lincoln Marriott Cornhusker Hotel | Lincoln, NE

Solar Codes: Res-Coml-Ag



Code Wheel and Specific Orgs

Code Orgs and Bottom Line

Best Practices → Workflow

Examples of Installations

Highlights of NEC 2017 - 690



Solar Codes and Standards



Bottom Line



- Safety
- Meeting standards
- Keeping costs low
- Longevity of installation
- Reaching expectations



National Electric Code (NEC)
- 690, every three years

Intl Residential Code (IRC)
- PV and thermal

Intl Fire Code (IFC) - and -
Natl Fire Protection Assoc

Solar Codes: Rooftop



Intl Building Code:

Section 1507.17.1

- Material reqs

Section 1507.17.2

- Installation reqs

Section 1507.17.3

-Wind resistance

Bottom Line



Safety

Meeting standards

Keeping costs low

Longevity of installation

Reaching expectations

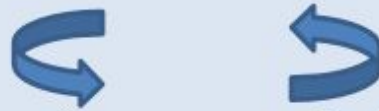
Workflow Approach



Simplest way to review

Start with Site Selection

System Design



Equipment Selection

Call your friendly Power Co.

Workflow Approach



Rack, Wire and Grounding

Inverter Placement

AC Disconnect → Main Panel

Labels and Aesthetics

Commissioning

Site Selection and Design



Where is the sun?

Shade tolerance

Micro vs Optimizer vs String

Wire route to inverter / panel

Wire calc \rightarrow $<2\%$ voltage drop

Equipment Selection and File



Balance equipment choices

How many modules?

What type of inverter?

Rack placement - Wire route

Contact your friendly Power Co.

Permit Application



Keep It Simple

Collect only what is needed

Compliance reduces with complexity and increased time

Keep fees low or none

Rapid turnaround and inspection

Rack



Roof considerations: 4'-6' max

Rail vs Rail-less

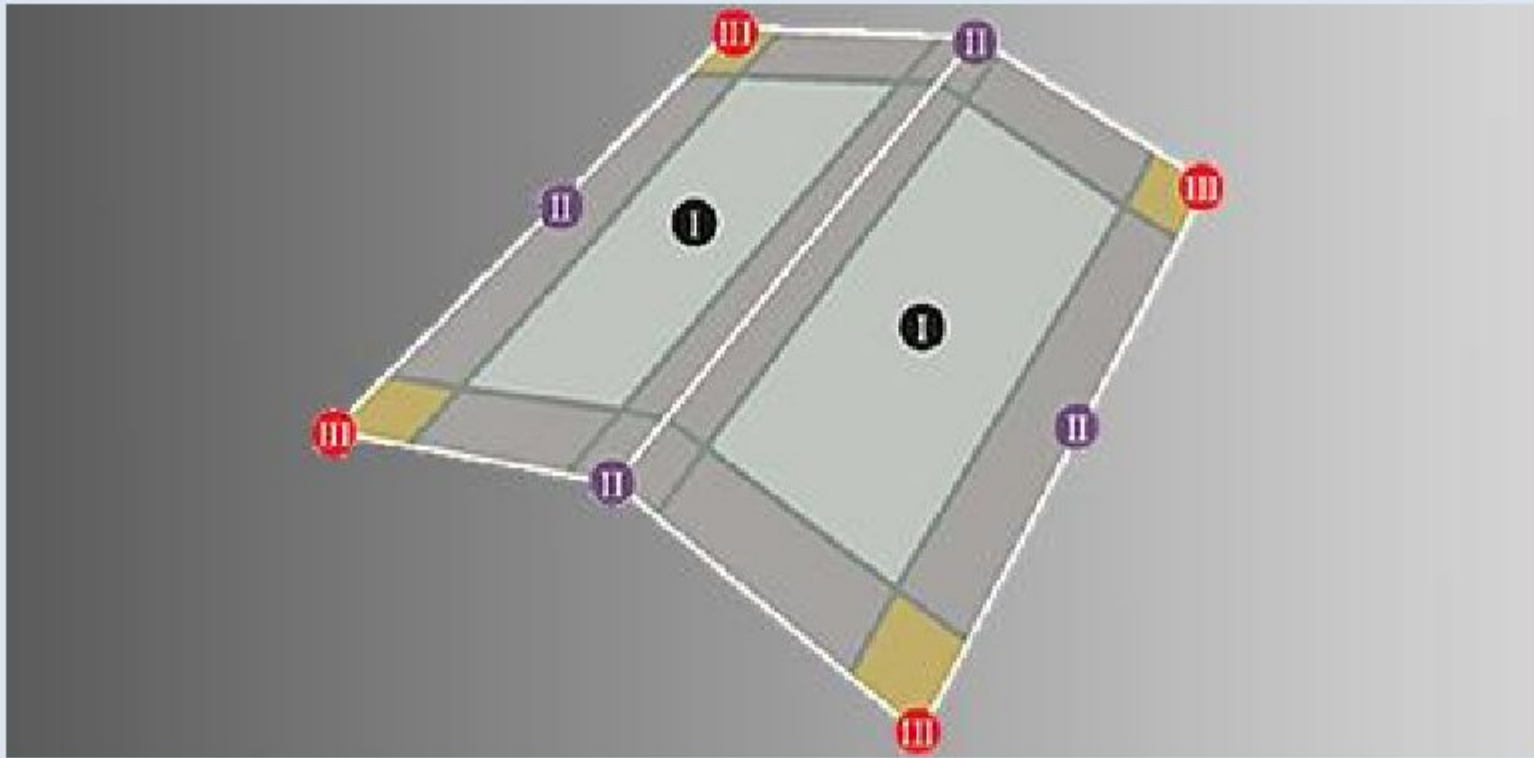
Ground mount options

Trenching: 2' deep, conduit

Expansion joints and supports

Rooftop Wind Loads

Stay 3' away from corners and edges!



Nebraska's First Solar-Assisted Irrigation System



Ron Rose and Michael Shonka install the last of 100 modules on the 25 kW PV system just west of Lindsay, NE on HWY 91. Michael Beller (farmer and landowner) took the picture; system started on July 28, 2013.



Legacy Systems

Required Elevation

Often exposed pipes

Not attractive



Modern Systems
Flush to roof line
Minimal pipes
Attractive



Examples of Installations Residential



Examples of Installations Commercial



Examples of Installations

Best option for roof mount was over skylights



Examples of Installations

Inverters



Wire in / out of inverter may be required to be in conduit.

Drip curve at bottom

Examples of Installations Interconnection

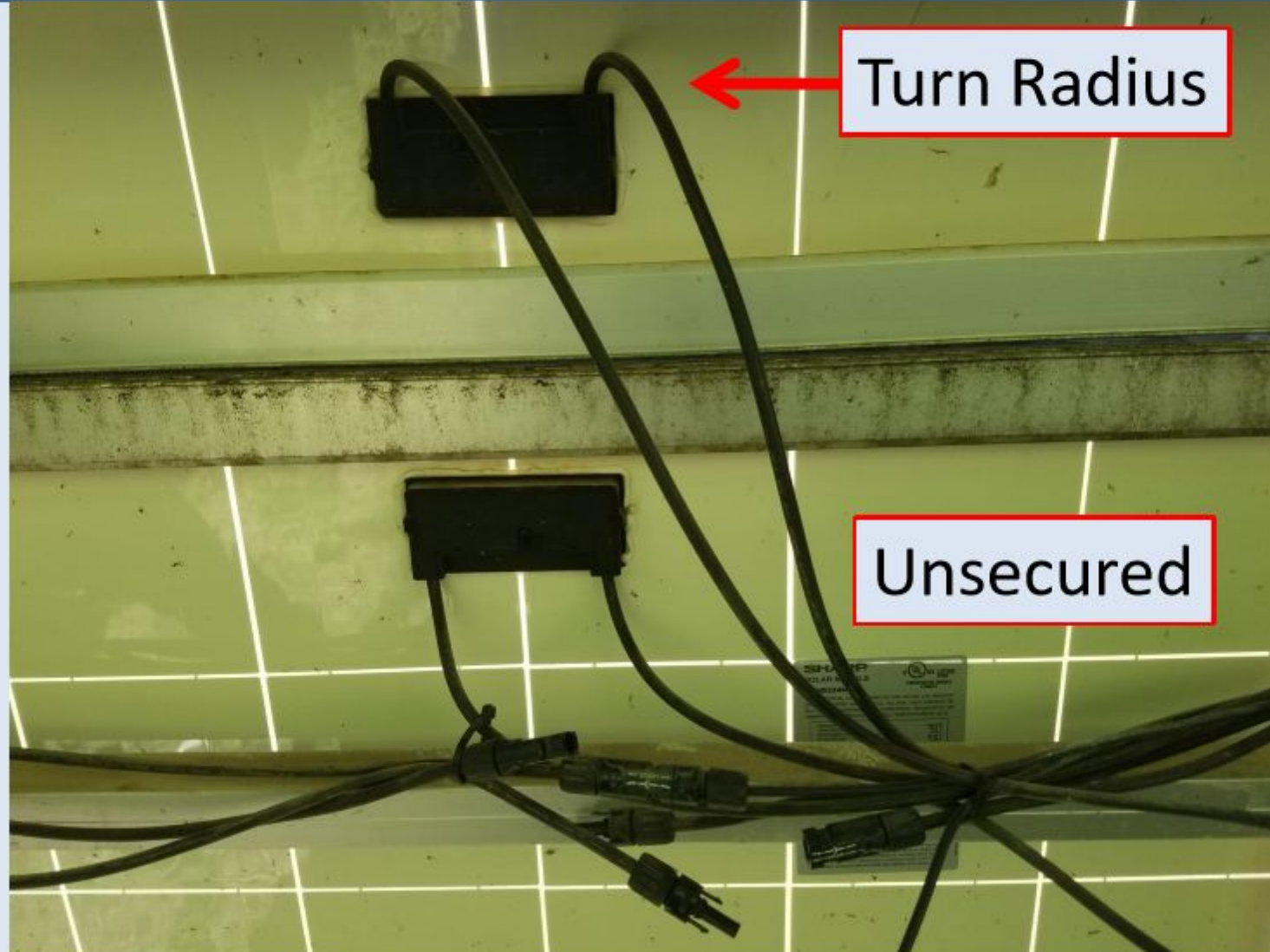


Product innovations are coming from many directions.

Connecting PV at the meter saves time and costs.

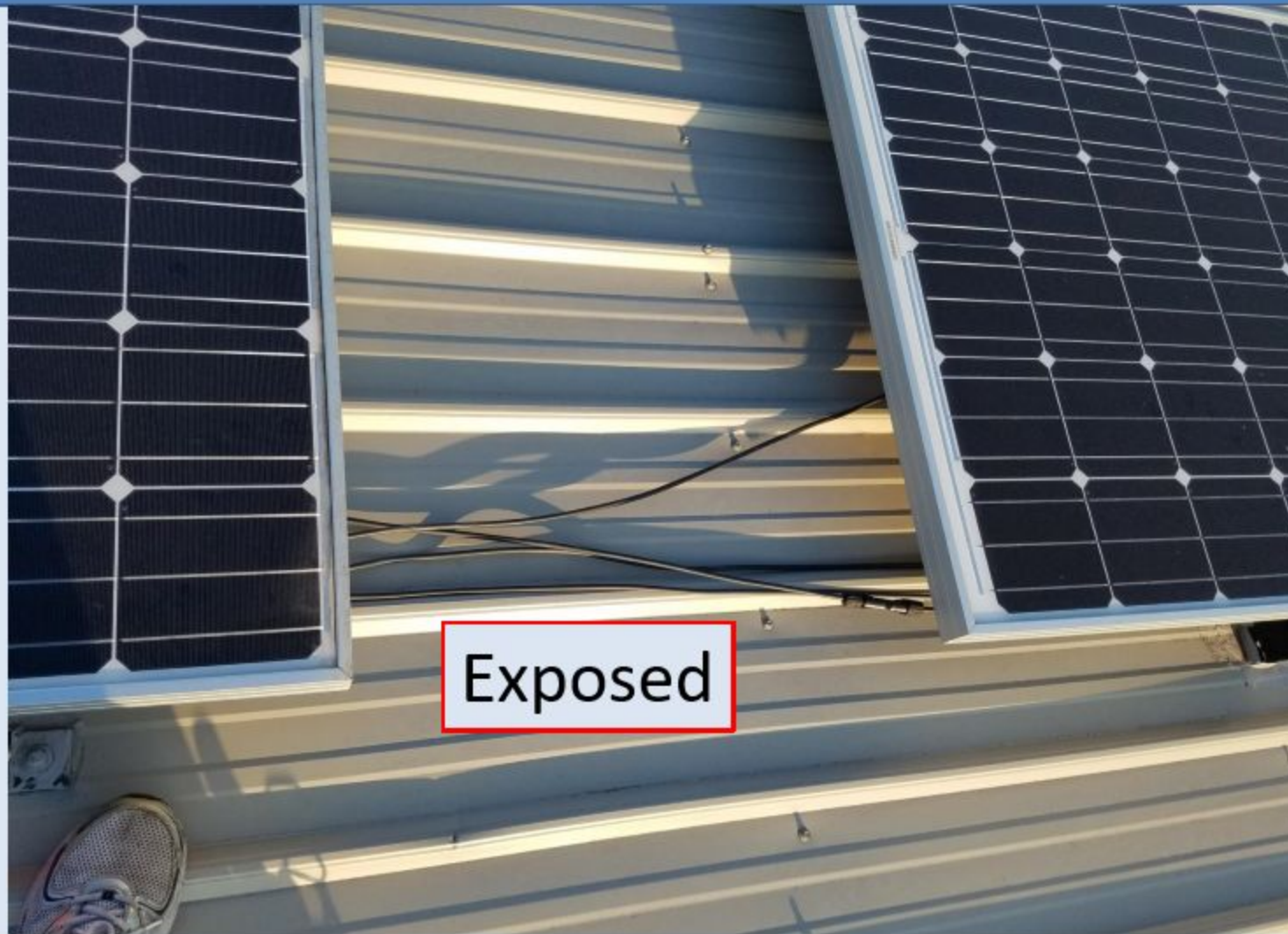
Examples of Installations

Secured Wiring



Examples of Installations

Exposed Wiring



Exposed

Examples of Installations

Wire Management



Examples of Installations Service Panel



Panel is usually maxed out
Need to make room
Double up smaller breakers

Solar breakers rated to be
backfed
Solar Breakers go in at
the bottom

What is on the horizon?

Solar-Ready homes (California in 2020)

Battery storage; small to utility

Microgrids

Innovations in equipment

Continued drop in soft costs

Code References

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Best Practices and NEC 2017



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