



# Utility-Scale Solar Site Construction Stormwater Management



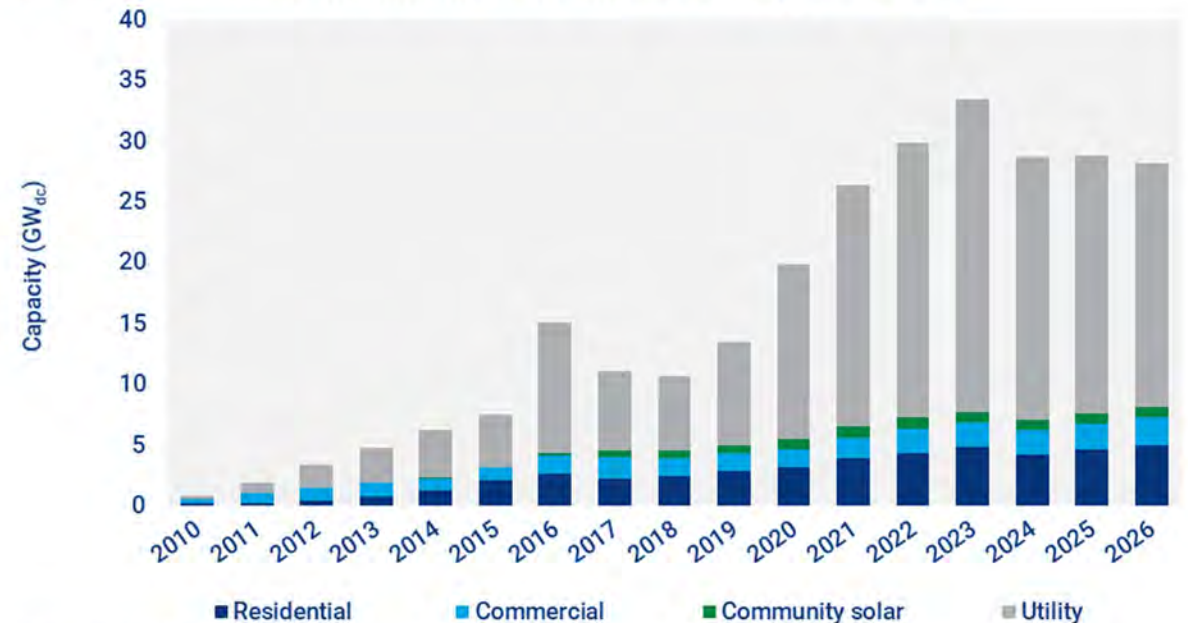
**Barry Fagan**, PE/PLS, ENV SP,  
CPMSM, CPESC, CESSWI

Vice President – Environment & Infrastructure  
Volkert, Inc.

# What's happening with solar?

- ▼ The US is a world leader in producing electricity generated by the sun.
- ▼ Solar capacity is expected to outpace wind for the first time in 2022.

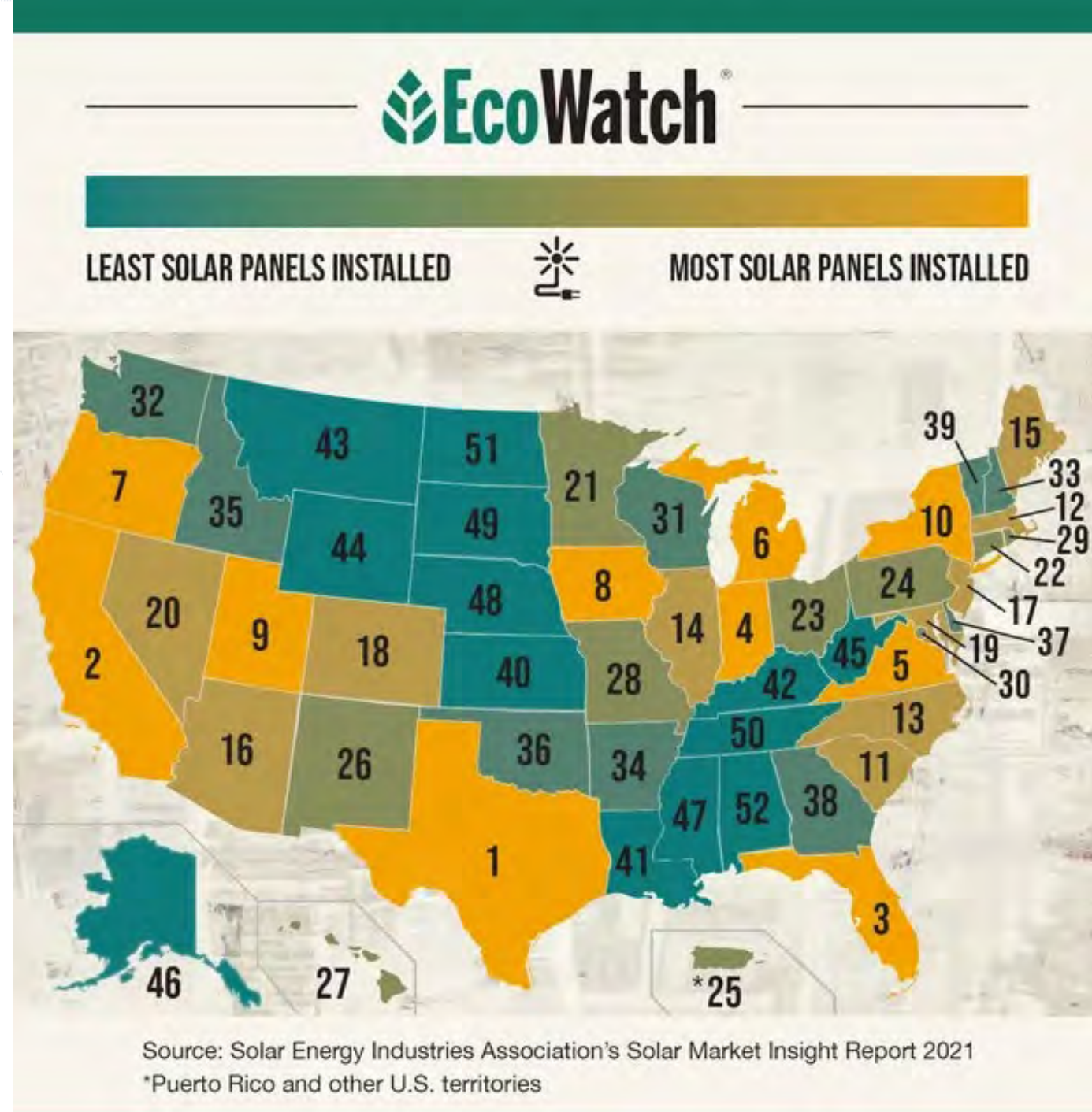
US PV installation historical data and forecast, 2010–2026



Source: Wood Mackenzie

# What's happening with solar?

- ▼ The contributions and growth of Solar in the eastern and mid-western US is significant.



# What's happening with solar?

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# What's happening with solar?

- ▼ Solar energy generation offsets +73 million metric tons of CO2 emissions/year (equivalent to planting  $\pm 1.2$  billion trees).



Offtaker	GW under contract	# of PPAs	% of market share (MW)
Facebook	2.2	24	14.1%
Google	2.1	15	13.7%
Amazon	1.1	14	7.3%
AT&T	0.8	4	5.2%
Walmart	0.8	10	5.1%
Apple	0.8	7	5.0%
Microsoft	0.6	5	4.1%
Exxon Mobil	0.5	2	3.2%
Equinix	0.4	3	2.4%
Zotos International	0.3	3	2.2%
Other	5.9	138.0	37.7%

# Sustainable *Finance*

*At Goldman Sachs*

BlackRock shakes up business to focus on sustainable investing

# Utility-Scale Solar Energy Production

Needs -

- ▼ Sunlight
- ▼ Connection to “the grid”
- ▼ Land



The land.

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▼ SB 52





The land.



**Solar + Farming**

The land.

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The land.

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The land.

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# Utility-Scale Solar Energy Production

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## Needs -

### ▼ Experienced Contractor -

"At [my company], we're used to building more on the west coast and in desert areas like California, Arizona, Utah, and some in Idaho. We're used to flat land and generally square to rectangular-shaped projects. Coming to [southeastern state] was quite the surprise. The topography was a lot more extreme for a solar site."

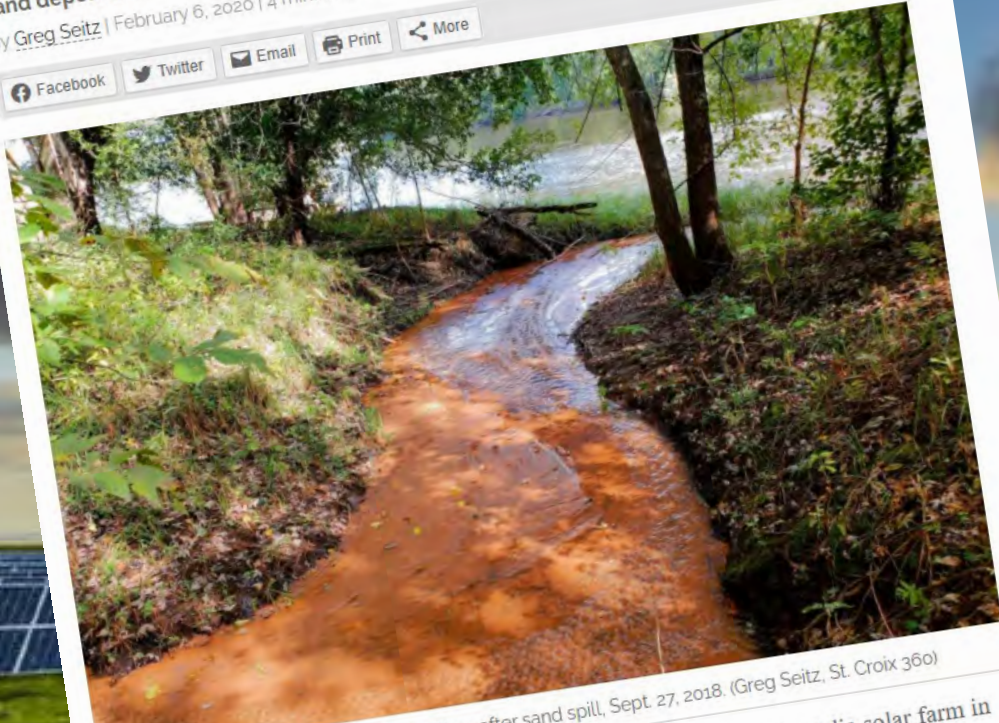


## Scandia sand spill: Solar company pays \$40,000 for 2018 stormwater damage

Solar farm operator will fund wetland restoration elsewhere to compensate for erosion and sand deposition.

By Greg Seitz | February 6, 2020 | 4 minute read

Facebook Twitter Email Print More



Sand spill, Sept. 27, 2018. (Greg Seitz, St. Croix 360)



News Releases from Region 01

### EPA Enforcement Ensures that Solar Company Follows Stormwater Discharge Requirements at Warren, Mass. Facility

**HELLO**  
my name is

*conflicted*

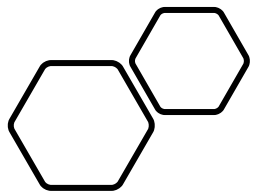
**Green solar farm is turning an Essex County watershed brown**

NEIGHBORS WANT BETTER OVERSIGHT

### Critics hot over work on massive Spotsylvania solar farm

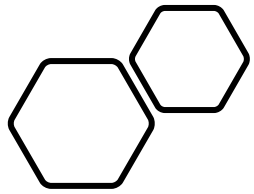


We're not in the desert anymore.



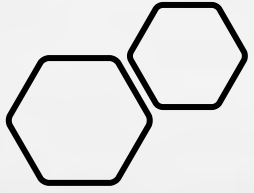
# The State of Practice?





# The Cost of Doing Business?

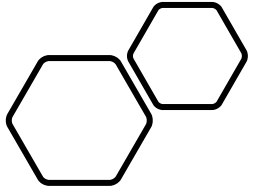




# Risk

- ▼ Regulatory
- ▼ Environmental
- ▼ Community Expectations
- ▼ Legal Expectations
- ▼ Operation and Maintenance
- ▼ Contractual

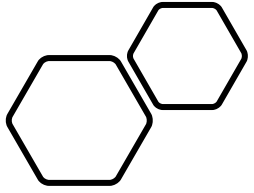




Risk

▼ Regulatory

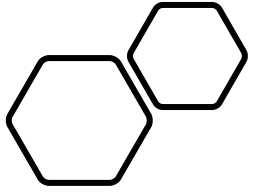




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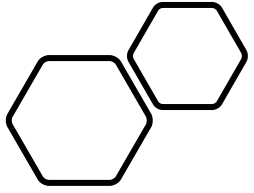




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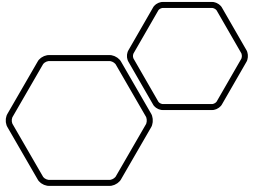




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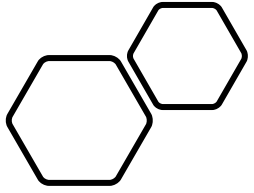




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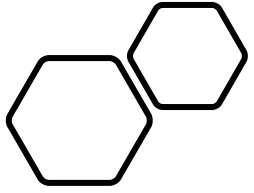




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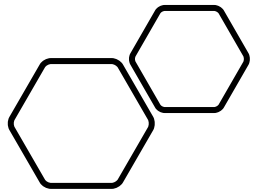




## Risk

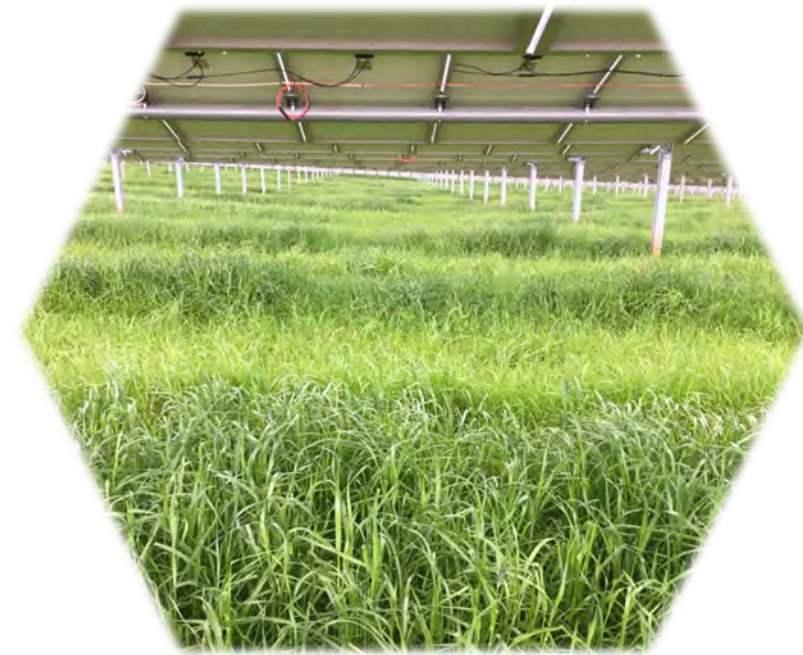
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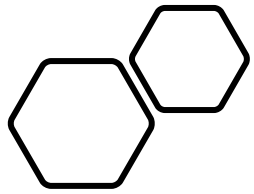




# The **Five Pillars** of Construction Stormwater Management

- ▼ **Manage Communication**
- ▼ **Manage Work**
- ▼ **Manage Water**
- ▼ **Manage Erosion**
- ▼ **Manage Sediment**

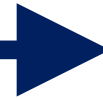




# The **Five Pillars** of Construction Stormwater Management

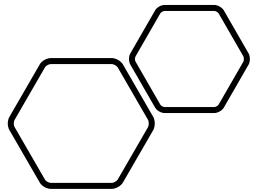
**Decreasing effectiveness**

**Increasing cost of implementation**



Putting first things first...



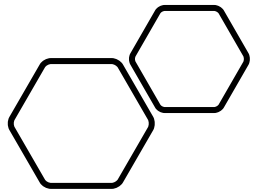


# The **Five Pillars** of Construction Stormwater Management

## 1. Managing Communication

includes all efforts to convey information among project stakeholders to increase effectiveness in project planning, design, and implementation.



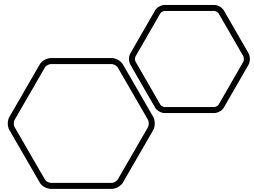


# The **Five Pillars** of Construction Stormwater Management

## 2. Managing Work

includes all operational efforts to ensure that work proceeds in a manner that is protective of the owner's interests and environmental responsibilities.





# The **Five Pillars** of Construction Stormwater Management

## 3. Managing Water

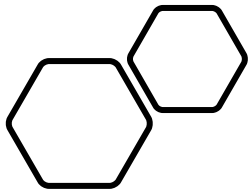
includes all efforts that address the flow of waters through the project to protect the work area and minimize the work of managing erosion and sediment.











# The **Five Pillars** of Construction Stormwater Management

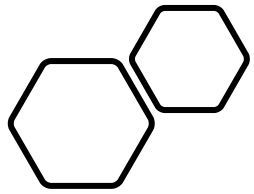
## 4. Managing Erosion

includes all efforts to minimize the displacement of soil particles by splash, sheet, rill, and channel erosion to minimize negative project impacts and reduce the work of managing sediment.









# The **Five Pillars** of Construction Stormwater Management

## 5. Managing Sediment

includes all efforts to influence the transport and deposition of suspended soil particles displaced by erosion.





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Thank you.



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