



U.S. Solar System Decommissioning Policies

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U.S. Solar Decommissioning Policies: *What, Who, When*

What are they?

- Federal, state, and/or local legal mandates/requirements, or voluntary guidance

When do they apply?

- Most often at the time of initial project development

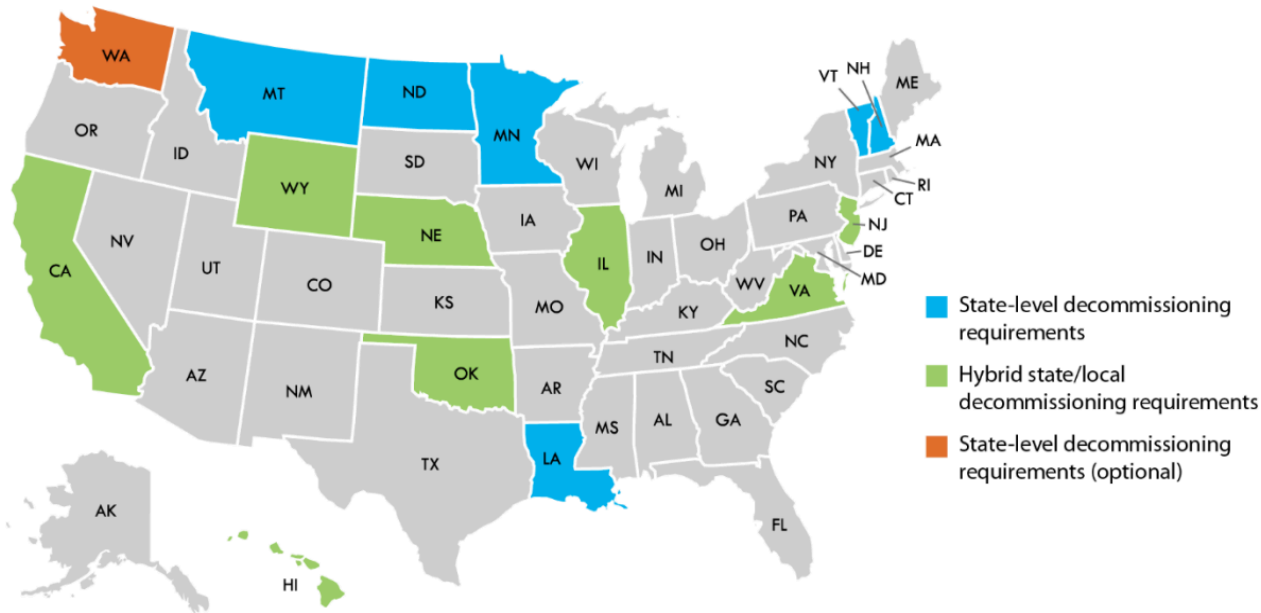
Who do they apply to?

- Typically, utility-scale solar developers



Fort Carson array 50% damage from hailstorm in May 2019.
Photo by Dennis Schroeder/NREL

U.S. Solar Decommissioning Policies: *Where*



Bureau of Land Management

***State-Level** (NH, LA, MN, MT, ND, VT)

***Hybrid State/Local** (CA, IL, NE, OK, VA, WY)

***State-level (optional)** (WA)

***Pending** (ME, PA, WV, TX)

* = as of April 2021

Figure 1. Map of state solar decommissioning policies in the United States

U.S. Solar Decommissioning Policies: *Requirements/Responsibilities*

- Submission of decommissioning plan prior to construction or operation
- Acknowledgement of asset owner decommissioning responsibilities and what constitutes abandonment
- Proof of financial assurance (e.g., surety bond, trust, guarantee)
- Notice/application prior to decommissioning
- Submission of updated plan closer to decommissioning
- Detailed cost estimate
- Removal of equipment
- Site restoration
- Post-decommissioning monitoring, reporting, assurance, and closure requirements



St Thomas hurricane damage. Dec. 2017. Photo by Eliza Hotchkiss/NREL

Requirements to remove equipment, but no specified disposition

U.S. Solar Decommissioning Policies: *Impacts*

- Impact to development/construction, operation, and decommissioning
- Some hybrid state/local policy frameworks require approval at both levels of government which can impact project timelines and increase capital costs
- Some policies require that facility owners update and resubmit decommissioning plans, costs estimates, and financial assurance instruments which can improve decommissioning projections and increase operating costs

Liability

Penalties for violating decommissioning requirements vary by jurisdiction

- Civil penalty (e.g., up to \$25,000 per day)
- Criminal charges
- Forfeiture of financial assurance

High perceived risk may result in deployment delays, prescriptive decommissioning requirements, higher-cost performance guarantees, and even project cancellation.

U.S. Solar Decommissioning Policies: *Impacts*

Financial Assurance Policy Impacts

- Some policy frameworks dictate if the financial assurance is a capital or operating costs
- Some policy frameworks do not allow salvage value and others do
- Anecdotal evidence suggests requiring 100% financial assurance at the outset of the project can lead to project delays, and project cancellation
- Policies that do not allow for salvage value impact the financial assurance amount and may impact end-of-life equipment decisions

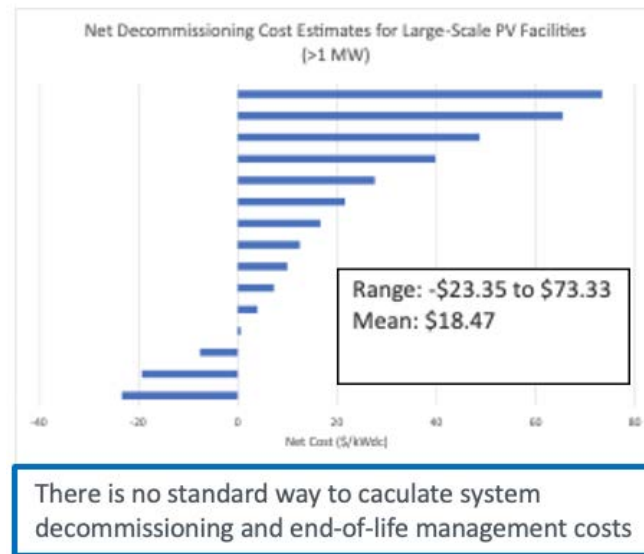
Example

BLM financial assurance requirements do not allow for salvage value and requires \$10,000/acre prior development

Gemini Solar Project 690 MW approximately 7,100 acres on BLM land required \$71 million dollars for financial assurance prior to project development.

Future Considerations

- 27 GW of commercial and utility-scale PV capacity installed as of 2020 is expected to be decommissioned by 2030
- Projected growth in solar expected to quadruple and most is expected to be utility/commercial land based solar
- Policy design is important
- Need for study and publicly available resources
- Could be an opportunity to enable other CE pathways for the solar industry



Utility-scale solar in the US is expected to quadruple to 240 GWdc by 2040 most of which is expected to be ground-mounted solar which will be subject to federal and state PV system decommissioning policies

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