MINNESOTA POLLUTION CONTROL AGENCY

# MACPZA: Solar Panel Recycling

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# Challenges for counties and other local units of government

- PV installations are uncharted territory that is growing quickly for municipal and local governments and property owners;
- Not all counties require decommissioning plans or financial assurance, and there is no standard plan and financial assurance requirements/mechanisms for solar installations < 50 MW that are locally permitted;
- Counties and local governments do not know what type or level of financial assurance is appropriate;
- Loss of local zoning and permitting authority if permitting is taken over by state for <50 MW installations;
- Shift siting and decommissioning risk to the state by reducing threshold for local permitting to <50 MW;

# Challenges for counties and other local units of government

- Zoning officers are seeing a wide variety of preliminary decommissioning plans with various claims related to decommissioning costs, salvage value of equipment, claims that “our panels are landfill friendly”, etc.
- Local government concerns about abandoned installations and who is liable for site if panels fail, developer disappears, property owner defaults on taxes, etc;
- Concerns about disposal, recycling, and regulatory status of panels at end of life;
- Counties could consider moratoriums on solar installations until these issues can be sorted out.

# County Application Status

| | | | Initial Applications | | Application in Review | | Study | | Design & Construction Phase | | Completed Projects | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **County** | **Active Applications** | **MW** | **Number of Applications** | **MW** | **Number of Applications** | **MW** | **Number of Applications** | **MW** | **Number of Applications** | **MW** | **Number of Applications** | **MW** |
| Anoka | 4 | 4 | | | | | 2 | 2 | 2 | 2 | | |
| Benton | 31 | 31 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 6 | 22 | 22 |
| Blue Earth | 26 | 24 | | | 2 | 2 | 2 | 2 | | | 22 | 20 |
| Carver | 54 | 41 | | | 3 | 3 | | | 2 | 2 | 49 | 36 |
| Chippewa | 22 | 22 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 12 | 12 |
| Chisago | 93 | 92 | 1 | 1 | 7 | 7 | 18 | 18 | 7 | 7 | 60 | 59 |
| Clay | 11 | 11 | 1 | 1 | 4 | 4 | 1 | 1 | 5 | 5 | | |
| Dakota | 60 | 59 | | | | | | | 3 | 3 | 57 | 56 |
| Dodge | 35 | 32 | 1 | | 1 | 1 | 5 | 5 | 11 | 10 | 17 | 16 |
| Douglas | 9 | 9 | | | | | 1 | 1 | 1 | 1 | 7 | 7 |
| Faribault | 2 | 2 | | | | | | | | | 2 | 2 |
| Freeborn | 3 | 2 | | | | | | | 2 | 2 | 1 | |
| Goodhue | 51 | 49 | | | 2 | 2 | 5 | 5 | 6 | 6 | 38 | 37 |
| Hennepin | 21 | 16 | 2 | 1 | | | | | 1 | 1 | 18 | 13 |
| Kandiyohi | 12 | 12 | 5 | 5 | | | | | 3 | 3 | 4 | 4 |
| Le Sueur | 29 | 27 | 1 | | | | 2 | 2 | 5 | 5 | 21 | 20 |
| Lincoln | 2 | | | | | | | | | | 2 | |
| Lyon | 11 | 11 | 1 | 1 | 1 | 1 | 4 | 4 | 1 | 1 | 4 | 4 |
| McLeod | 32 | 31 | 3 | 3 | 2 | 2 | 4 | 4 | 8 | 7 | 15 | 15 |
| Meeker | 12 | 12 | 5 | 5 | 2 | 2 | 1 | 1 | | | 4 | 4 |
| Murray | 4 | 3 | | | 2 | 1 | | | | | 2 | 2 |
| Nicollet | 17 | 17 | 2 | 2 | 1 | 1 | 3 | 3 | 4 | 4 | 7 | 7 |
| Olmsted | 11 | 11 | | | | | | | 5 | 5 | 6 | 6 |
| Pipestone | 13 | 13 | | | | | | | 1 | 1 | 12 | 12 |
| Pope | 38 | 38 | 1 | 1 | 2 | 2 | 9 | 9 | 5 | 5 | 21 | 21 |
| Ramsey | 4 | | 2 | | | | | | | | 2 | |
| Redwood | 9 | 9 | | | 1 | 1 | | | 5 | 5 | 3 | 3 |
| Renville | 15 | 15 | 1 | 1 | 1 | 1 | 1 | 1 | 5 | 5 | 7 | 7 |
| Rice | 58 | 57 | 2 | 2 | 2 | 2 | 6 | 6 | 20 | 19 | 28 | 28 |
| Scott | 25 | 23 | | | | | | | 3 | 3 | 22 | 20 |
| Sherburne | 64 | 62 | 2 | 1 | 4 | 4 | | | 4 | 4 | 54 | 53 |
| Sibley | 13 | 11 | 2 | 1 | 4 | 4 | 1 | 1 | 1 | 1 | 5 | 4 |
| Stearns | 93 | 89 | 8 | 7 | 5 | 5 | 4 | 3 | 6 | 6 | 70 | 68 |
| Steele | 8 | 7 | | | | | | | 2 | 2 | 6 | 5 |
| Wabasha | 20 | 18 | 4 | 2 | 3 | 3 | 2 | 2 | | | 11 | 11 |
| Waseca | 26 | 26 | | | 3 | 3 | 4 | 4 | 6 | 6 | 13 | 13 |
| Washington | 61 | 42 | | | | | | | 2 | 2 | 59 | 40 |
| Watonwan | 1 | | | | | | | | | | 1 | |
| Winona | 23 | 22 | 3 | 2 | 4 | 4 | 2 | 2 | 3 | 3 | 11 | 10 |
| Wright | 43 | 43 | | | 2 | 2 | | | 6 | 6 | 35 | 35 |
| Yellow Medicine | 10 | 10 | 4 | 4 | 1 | 1 | | | | | 5 | 5 |
| **Total** | 1076 | 1006 | 53 | 43 | 63 | 62 | 81 | 79 | 144 | 142 | 735 | 680 |

**4/3/2020**

# Solar Farm Comparison

#REFI

| County Name | Permitted Solar Farms | Denied Solar Farm | Type of Financial Guarantee | Amount of Financial Guarantee | How Determine Financial Guarantee | Plans to Limit Solar Farms | Notification of Sales of Permitted Projects | Why are Solar Applications Higher in Certain Counties |
|---|---|---|---|---|---|---|---|---|
| **Stearns** | 32 | 1 | Cash or LOC | $25,000/MW | Per MW | unknown | Yes | Location of County to metro and Xcel Service Area |
| **Sherburne** | 19 | 0 | Cash | $25,000 | Based on MW | No | Yes | Location of County to metro and Xcel Service Area |
| **Kandiyohi** | 5 | 0 | Cash Escrow between lessor and lessee | Amount proposed by applicant. $25,000 | NA | Possible density restriction | No | NA |
| **Rice** | 25 | 0 | Bond, Cash, Letter of Credit | $50,000 | NA | No | No | NA |
| **Chippewa** | 7 | 1 | None. Landowner responsibility. | NA | NA | No | No | Access to transmission lines and xcel |
| **Cass** | 0 | 0 | Bond, Cash | NA | NA | No | NA | Location and proximity to transmission grid |
| **Becker** | 0 | 0 | NA | NA | NA | NA | NA | NA |
| **Mille Lacs** | 0 | 0 | NA | NA | NA | No | No | Infrastructure is conducive to interconnection |
| **McLeod** | 15 | 2 | Bond, Letter of Credit | $100,000/MW | Local contractor bid | No | Yes | Transmission Infrastructure |
| **Faribault** | 0 | 0 | Bond | 125% of estimate | Project engineer | No | No | Transmission Infrastructure |
| **Big Stone** | 0 | 0 | Bond | NA | NA | No | No | Location of County to metro and Xcel Service Area |
| **Carlton** | 0 | 0 | Bond, Cash, Letter of Credit | % over engineer estimate | Engineer Estimate | No | No | Location |
| **Pipestone** | 3 | 0 | None | NA | NA | No | No | NA |
| **Wright** | 10 | 1 | Cash, Letter of Credit | Varies, typically $100,000 | Engineer Estimate, do not allow salvage cost, multiply by 150% | No | No | Xcel territory and infrastructure. |
| **Murray** | 3 | 0 | Letter of Credit | $25,000/MW | Consistent with surrounding counites | No | No | NA |
| **Yellow Medicine** | 1 | 0 | Bond | $5,000/MW | Consistent with other counites | No | No | NA |
| **Wabasha** | 10 | 0 | Letter of Credit, Bond | $25,000/MW | Consistent with other counites | No | Yes | Counites adjacent to urban areas will see more due to subscription requirements |
| **Fillmore** | 2 | 0 | Bond | $25,000/MW | Ordinance Requirement | No | Yes | NA |
| **Kanabec** | 0 | 0 | NA | NA | NA | NA | NA | NA |
| **Dodge** | 13 | 0 | Cash or Bond | $25,000. Increasing to $200,000 | Estimated cost from recyclers and business | Yes | No | Substation Infrastructure |
| **Steele** | 6 | 0 | None | NA | NA | No | Yes | Location of County to metro and Xcel Service Area |
| **Brown** | 0 | 0 | Bond | NA | NA | No | No | NA |
| **Benton** | 11 | 0 | Bond, Letter of Credit | $25,000/MW | Consistent with other counites | No | Yes | Xcel territory and infrastructure. |
| **Hubbard** | 0 | 0 | None | NA | NA | No | NO | Xcel territory and infrastructure. |
| **Pope** | 17 | 0 | Cash or Bond | $25,000/MW | Consistent with other counites. Amending Ord to subtract salvage value. Cost will increase. | No | Yes | NA |
| **Lac qui Parle** | 0 | 0 | None | NA | NA | NA | NA | NA |
| **Waseca** | 18 | 0 | Cash or Bond | $35,000/MW | Developers estimate | No | No | Programs offered utility companies, distance to substation and capacity |
| **Marshall** | 0 | 0 | NA | NA | NA | No | No | Geography and proximity to transmission lines |
| **Grant** | 0 | 0 | Bond, Letter of Credit, Cash | 1.5X estimate | Engineer estimate | No | Yes | Mandates |
| **Cook** | 0 | 0 | No requirement | No adopted provision | No provisions adopted | NA | NA | NA |

# Recap: Why is end of life management important?

IRENA-IEA Photovoltaic Power Systems Task 12 PV Sustainability

"In addition to its positive impacts on energy security and climate change, PV technology is also among the most environmentally friendly technologies of all energy and electricity generation technologies, particularly when evaluated from a life-cycle viewpoint, including end-of-life management. This means that proper end-of-life management is an indispensable issue for "clean" energy technologies."

"Managing end-of-life PV modules to recover valuable materials that can displace virgin ones is an important step toward meeting the challenge of sustainability."

Report IEA-PVPS T12-10:2018, page 5

# Consensus policy ideas raised by stakeholders in webinar conversations and written comments

1. require recycling and reuse with landfill ban;
2. manufacturers tied in for design;
3. costs internalized to the project or developer (permittee);
4. no costs that create disadvantages for anyone;
5. consistent and predictable approach for everyone;
6. applies to all installations, residential to utility scale

- Survey results show strong preference for permittee-funded options, in part because this is the funding/responsibility model in the solar sector

- All of the models, except rate payer funded, represent a type of permittee funded model.

**DRAFT FOR DISCUSSION**

| | **1. Commerce/PUC decommissioning model extended to solar facilities under 50 MW, individual permittee responsibility** | **2. Manufacturer Product Stewardship program** | **3. State electrical customer/ Rate payer funded statewide program** | **4. Permittee funded statewide model** |
|---|---|---|---|---|
| **Funding source(s)** | Permittee financial instrument for decommissioning | -Cost internalized by manufacturer<br>-or Eco Fee on product when permittee purchases | -Fee on utility bill of electrical customers/ratepayers<br>-Could be based on kwh consumption, monthly flat fee, percent of bill<br>-Not necessarily linked to individual ratepayer's use of solar-generated power, more likely statewide average | -Permittee pays, could be per panel/inverter fee, based on kwh generation.<br>-MN Sales tax could be reinstated and dedicated to end of life management |
| **Funding applied at panel purchase** | No<br>Permittee funds decomm through their choice of financial instrument, years 10-25 of permit | Yes<br>Funded at time of panel purchase by permittee<br>Mfr may partially internalize | No<br>See above | Options:<br>At panel purchase<br>Based on generation<br>Sales Tax on system |
| **Who funds** | Permittee | -Permittee<br>-Manufacturer and original purchaser of panels [may be partially internalized] | Ratepayer | Permittee |
| **When is it funded** | Years 10-25 of permit | Time of panel purchase<br>No fee at end of life | Through use of electricity or monthly bill<br>No fee at end of life | At panel purchase or through generation of electricity<br>No fee at end of life |
| **Who receives the money** | N/A | Product Stewardship Organization | Paid to utility and then remitted to central organization | Varies – could be paid to manufacturer, utility, DOR, etc., then remitted to central organization |
| **Who operates the program** | No program, individual permittee decisions | PSO-Product Stewardship Organization (one or more) | TBD, one organization statewide funded by rate payers | TBD, one organization statewide funded by permittees |
| **Decommissioning plan required in initial permit application** | Yes | Option | Option | Option |

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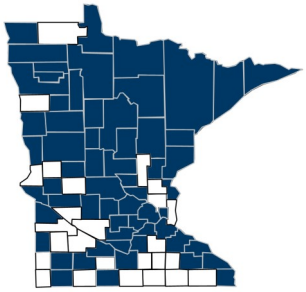
|---|---|---|---|---|
| **State oversight** | Through decommissioning plan review/approval by PUC and Commerce | Review and approval of PSO plan under enabling legislation; optional decomm plan | Presumably through enabling legislation; optional decomm plan | Presumably through enabling legislation; optional decomm plan |
| **Current and future recycling requirements** | Not currently required. Can require recycling of panels, inverters, other components in future | Anticipated to require recycling of panels, inverters, other components | Anticipated to require recycling of panels, inverters, other components | Anticipated to require recycling of panels, inverters, other components |
| **Locally permitted commercial installations** | State decomm program could be extended to all commercial installations or parallel requirements could be overseen by local permitting authorities | Covered by this program since it includes all panels sold into the state, anticipated to cover those already installed. | Anticipated to cover all commercial installations, including panels already installed. | Anticipated to cover all commercial installations, including panels already installed. |
| **Residential installations** | Need to establish framework for residential panels in this model | Anticipated to cover all panels sold into state and those already installed. | Anticipated to cover residential panels | Anticipated to cover residential panels, funding and other details TBD |

# AIS Prevention Aid Metrics 2020

A majority of the counties that receive Aquatic Invasive Species (AIS) Prevention Aid (see map) voluntarily completed and submitted metrics templates—a tool created to help all counties track their accomplishments. These impressive numbers highlight activities funded by AIS Prevention Aid in 2020. Note that in-person activities were limited in 2020 due COVID-19.



## $8,028,551.87 of AIS Prevention Aid was used by 61 counties in 2020 to fund these activities:

### People Involved

1,259 people doing AIS work, including 865 jobs and 6,908 hours served by 394 volunteers.

251 lake associations, 42 conservation groups, 99 businesses, 49 schools/youth organizations and 117 local governments are involved.

38 Counties have AIS Task Forces and Committees.

### Funds Leveraged

32 County grant programs awarded $1,687,092.19 to 196 organizations. $1,153,913.06 in additional funds were leveraged from 147 organizations to directly support aid-funded work.

### Communications

14,571 residents and visitors reached about AIS during events. 4,046 children were taught about AIS.

26 counties posted AIS information on social media. The 629 posts were seen by 250,008 followers.

### Control

23 counties spent $516,694.72 and leveraged $276,863.32 for invasive aquatic plant management on 176 lakes in partnership with 71 lake organizations.

### Monitoring

41 counties surveyed 605 lakes and rivers for AIS. They conducted 562 early detection surveys, 385 aquatic plant surveys, deployed 402 zebra mussel settling plates and conducted 185 veliger tows.

### Enforcement

95 local officers were trained on AIS laws. 105 local law enforcement officers actively enforced AIS laws in 22 counties and contacted 5,483 boaters.

### Watercraft Inspection

621 Level 1 and 96 Level 2 inspectors worked 209,005 hours and performed 470,011 inspections.

They covered 751 accesses on 612 water bodies in 38 counties.

They operated 37 decontamination units.

### Response

$1,201,669.59 is saved in a contingency fund (over multiple years, for a variety of activities) by 36 counties.

18 counties have new infestation response plans.

23 responses were coordinated.

# What counties are doing.

## Multi-county Coordination Effort

- Many AIS plans include goals for cooperation
  - *Collaborate in multi-jurisdictional efforts that encourage consistency, decrease individual county costs, and provide benefits to Douglas Co residents and resources.*
  - *Increase multi-jurisdictional consistency of AIS prevention efforts while maintaining local flexibility.*
  - *Establish regional workgroups to collaboratively address AIS spread within that region.*