Strata Solar
End of Term. Upon the expiration or earlier termination of the Term, Tenant shall remove Tenant's Property, vacate the Premises and restore the Premises to substantially the condition in which it existed as of the Rent Commencement Date, subject to any alterations that are unrelated to Tenant's use or occupancy of the Premises and any clearing and grubbing of the Premises; provided, that upon at least ninety (90) days' advance written request by Landlord to Tenant, Tenant shall not remove those electrical lines and connections identified by Landlord. The removal of Tenant's Property and restoration of the Premises shall be completed in a manner that does not unreasonably and adversely affect the suitability of the Premises for farming purposes. If Tenant fails to vacate the Premises in accordance with this Section 12, Landlord shall be entitled to holdover rent in the amount equal to one hundred twenty-five percent (125%) of Rent for the final year of the Term, prorated on a daily basis, for each day that Tenant fails to so vacate the Premises.

FLS Energy
Removal of System. Except as otherwise provided in Section 9.02 (Landlord Default), upon the expiration or earlier termination of this Agreement, Tenant at Tenant's expense, shall promptly remove all of its tangible property comprising the System from the Property on mutually convenient dates, whereupon Tenant shall vacate the Property. The Property shall be returned to its condition immediately prior to the installation of the System, reasonable wear and tear excepted.

SunEnergy1
Surrender of Site. Upon expiration of the Term, any termination of this Ground Lease, and any termination of this Ground Lease with respect to any portion of the Site and/or Easement Areas (collectively referred to in this Article 6 as "Termination"), Owner shall have the right to require Tenant to remove so much of said Facility and any other improvements located upon the Site or Easement Areas that are subject to such Termination as Owner may elect. Owner shall provide Tenant written notice of said election ("Owner's Election") within sixty (60) days of such Termination. Notwithstanding anything herein to the contrary, however, in the event Tenant elects to terminate all or any portion(s) of the Site or the Easement Areas under the terms of Article 2 or Article 7, Tenant shall be entitled to retain title to and shall remove all of its Facility and other improvements and personal property located within such areas as to which the Ground Lease and/or any Easement is terminated, and Owner shall not be entitled to elect to take title to same. Within ninety (90) days of Owner's Election, Tenant shall commence to decommission, dismantle, and remove the Facility and any other improvements and all other property of Tenant located upon the Site or Easement Areas ("Tenant Removal Obligations") that Owner is not entitled to take title to and return such applicable portions of the Site and Easement Areas to their condition as of the Effective Date to the extent reasonably practical. In this regard, Tenant shall repair any damage to, and remove any debris placed upon, Owner's property arising out of or related to such removal or Tenant's use of the Site and Easement Areas and shall complete such Tenant Removal Obligations within one hundred eighty (180) days of commencement of the work, or such other period of time as may be agreed to by Owner. Owner hereby grants to Tenant and Tenant's Parties a license to enter upon the Site and the Easement Areas to perform the activities required to be performed by Tenant pursuant to this Article 6, which license shall be effective commencing upon the date of Termination and shall terminate upon the date on which such Tenant Removal Obligations are complete. Failure by Tenant to perform the above Tenant Removal Obligations within said period shall entitle Owner to perform said Tenant Removal Obligations including sale or disposal of the Facility, fixtures, personal property and any other improvements remaining on the Site or Easement Areas and recover all of its costs and expenses in doing so from Tenant. Owner will provide written notice to Tenant of Owner's election to commence Tenant Removal Obligations under this Article 6 at least Twenty (20) days prior to commencing any Tenant Removal Obligations and if following receipt of such notice from Owner Tenant thereafter commences Tenant Removal Obligations, then Tenant shall be provided with a reasonable time to complete Tenant Removal Obligations. During the period of surrender, all provisions of this Ground Lease, except for Article 4 regarding Rents, shall remain in full force and effect until that time that Tenant's Removal Obligations are complete and the Site has been fully surrendered in accordance with this Article 6.

Solar Company 1
Effect of Termination. Upon termination of this Agreement and/or the relevant Lease(s), Lessee shall, as soon as practicable thereafter, remove all Solar Facilities from the surface of the relevant portion(s) or all, as the case may be, of the Property down to a depth of four (4) feet. All portions of the Property disturbed by Lessee in connection with such removal activities shall be restored to a condition reasonably similar to its original condition. Reclamation shall include, as reasonably required, leveling, terracing, mulching and other reasonably necessary steps to prevent soil erosion. Reclamation also shall include environmental remediation in the event Lessee contaminates the Property in violation of Section 8.7. If Lessee fails to remove such Solar Facilities and restore such portion(s) of the Property disturbed by Lessee to a condition reasonably similar to its original condition within twelve (12) months of termination, or such longer period as Owner may provide by extension, Owner may remove such Solar Facilities and restore such portion(s) of the Property disturbed by Lessee, in which case Lessee shall reimburse Owner for reasonable and documented out-of-pocket costs of removal and restoration incurred by Owner. Lessee shall be obligated to continue to pay Rent in accordance with Section 4 (prorated for any partial year) until it has completed the removal of such Solar Facilities and restored such portion(s) of the Property in accordance with this Section 13.2.

Solar Company 2
Prior to the expiration or earlier termination of this Lease Tenant shall restore the Land (and any other land of Landlord impacted by Tenant's use of the Premises) to substantially its condition as of the Effective Date using prudent engineering practices and removing Tenant's Property (including, without limitation, all fencing, roads, solar panels and mounting, and other improvements or alterations) and any electrical or communication or other utility poles, lines and connections (unless such lines and connections are used in connection with other property owned by Landlord and Landlord gives written notice to Tenant at least ninety (90) days prior to the expiration or earlier termination of the Lease identifying the specific lines and connections to remain on the Premises). The removal and restoration shall be completed in a manner that does not materially and adversely affect the use of the Premises for farming purposes.

Solar Company 3
End of Term. Upon the expiration or earlier termination of the Term, Tenant shall remove Tenant's Property and vacate the Premises. The removal of Tenant's Property shall be completed in a manner that does not unreasonably and adversely affect the suitability of the Premises for farming purposes, and Tenant shall leave the Premises free of any conditions created by Tenant which present a current unreasonable risk of harm to Landlord or members of the public. For the avoidance of doubt, Tenant shall have no obligation to restore any improvements demolished and removed from the Premises as permitted under Section 12 and shall not be required to replant any trees or farm crops removed in connection with the construction of the System. If Tenant fails to vacate the Premises in accordance with this Section 13, Landlord shall be entitled to holdover rent in the amount equal to one hundred twenty-five percent (125%) of Rent for the final year of the Term, prorated on a daily basis, for each day that Tenant fails to so vacate the Premises. Any such holdover shall be construed as a tenancy from month-to-month.

Solar Company 4
Alterations, Improvements & Surrender. Tenant, at any time, may (i) construct, repair, maintain, erect, install, or demolish any buildings, structures, or other improvements in, on, or under the Premises; (ii) make any other alterations or improvements to the Premises and Facility; (iii) clear any trees or shrubbery; (iv) and store soil or materials on the Premises, without the prior consent of Landlord. Such improvements to the Premises or Facility include, but are not limited to, utility meter(s), inverter pad(s), inverters, photovoltaic panels, utility lines and installations, cables, wires, fiber, conduit, footings, foundations, towers, poles, cross arms, guy lines and anchors, and any related or associated improvements. Any topsoil stored on the Premises shall be managed in an appropriate manner to limit runoff. Tenant, at its sole expense, shall replace any soil it removed from the Premises within a period of time not to exceed sixty (60) days from the termination of the Lease. Any and all property that constitutes the Facility or a part thereof is the exclusive property of the Tenant. Tenant, at its sole expense, shall remove all improvements upon the termination of the Lease, excepting normal wear and tear and any below grade improvements.

Conservatively calculated, these companies represent over 60% of the NC solar market.

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N.C. Clean Energy Technology Center (formerly the NC Solar Center) Overview

- Created in 1988 as a resource for renewable energy programs and information, training, technical assistance and applied research
- Operated by the College of Engineering at N.C. State University
- Primary funding sources:
  - NCGA appropriations passed through the DEQ State Energy Program
  - federal and state grants
  - fee-for-service work

Major Program Areas:

- Renewable Energy
- Clean Power & Efficiency
- Clean Transportation
- Economic Development
- Energy Policy
- Workforce Development
- Education & Outreach

NC CLEAN ENERGY TECHNOLOGY CENTER

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3 Questions

Are solar panels in NC toxic?

What about the end of the life of a solar facility?

What about regulations?

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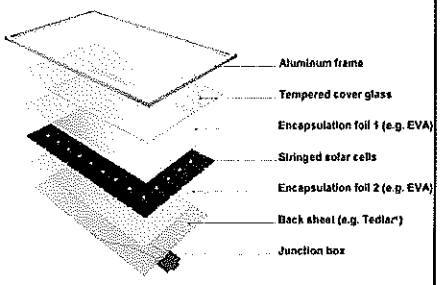
Toxic Solar Panels/Modules?

Silicon based

- 80+% glass and aluminum
- Up to 10% silicon
- Remainder is primarily polymers and copper
- Lead in the solder in some modules is the only potentially hazardous material
  - Passes EPA's Toxic Leaching Characteristic Procedure (TCLP) test – so non-hazardous and can put disposed of in landfills



Questions & Answers Ground-Mounted Solar Photovoltaic Systems
www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf

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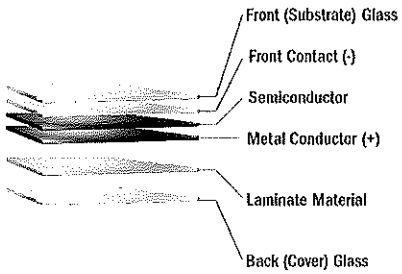
Toxic Solar Panels/Modules?

Cadmium Telluride (CdTe)

- "Thin Film", 1/26th thickness of a human hair
- CdTe is solid and stable, insoluble in water
- Cd is waste byproduct of zinc refining
- Tested for safety during breakage
- Tested for safety during fire
- Modules pass the EPA TCLP test

CdTe PV: Facts and Handy Comparisons Vasilis Fthenakis, Brookhaven National Laboratory
www.bnl.gov/pv/files/pdf/art_165.pdf



First Solar's Series 4 CdTe Thin Film Module

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End of Life of a Solar Facility

- When is the end of life?
  - At 25 year module power warranty?
  - Valuable grid connection
- Who is responsible?
  - The PV system owner
  - Leases require PV owner to remove
- What is the process to decommission?
- Salvage value vs cost to decommission
- What happens to the modules?
- "…disposal of utility-scale CdTe PV modules in *unlined* landfills [common in developing countries] is unlikely to result in adverse health or environmental impacts."*

NC CLEAN ENERGY TECHNOLOGY CENTER

*Evaluation of Potential Health and Environmental Impacts from End-of-Life Disposal of Photovoltaics" www.novapublishers.com/catalog/product_info.php?products_id=50605

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Typical Solar Facility Lease Decommissioning Language

"Tenant" is the solar facility owner. "Landlord" is the land owner.

Termination of Lease. Prior to the expiration or earlier termination of this Lease **Tenant shall restore the Land** (and any other land of Landlord impacted by Tenant's use of the Premises) to substantially its condition as of the Effective Date using prudent engineering practices and **removing Tenant's Property** (including, without limitation, all fencing, roads, solar panels and mounting, and other improvements or alterations) and any electrical or communication or other utility poles, lines and connections (unless such lines and connections are used in connection with other property owned by Landlord and Landlord gives written notice to Tenant at least ninety (90) days prior to the expiration or earlier termination of the Lease identifying the specific lines and connections to remain on the Premises). The removal and restoration shall be completed in a manner that does not materially and adversely affect the use of the Premises for farming purposes.

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PV Module Recycling

- 90% - 95% of a PV module can be recycled into similar value and quality products
- Disposal volumes in US are not yet high enough to make deep recycling economically viable
- Lower-value recycling is very common in NC and US, resulting in small payment for modules
- PV Cycle is a voluntary industry-led initiative to collect and recycle end-of-life PV modules. Started in 2006, active across EU
- First Solar takes back and recycles 100% of their modules

http://greenelectronicscouncil.org/wp-content/uploads/2015/10/Overview_SVTC_Scorecard_and_Industry_Trends_Oct2015.pdf

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Solar Regulation in North Carolina

- NC Utilities Commission Certificate of Public Convenience & Necessity (CPCN)
- DEQ: approved Erosion and Sediment Control Plan (E/S) and a Stormwater permit
- Wetland delineation by Army Corp of Engineers
- Local jurisdiction requires a development permit
  - Often a Conditional Use Permit, requires notification and a public hearing
  - NC Template Solar Ordinance (2013)
  - 2014 survey of NC county solar regulation/ordinance

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Contents of Template Ordinance

go.ncsu.edu/template-solar-ordinance

NORTH CAROLINA Solar Center

NC SUSTAINABLE ENERGY ASSOCIATION

December 18, 2013

Dear members and communities across North Carolina,

North Carolina is quickly moving up the ranks of states leading in solar energy. By the end of the year we are expected to have more solar photovoltaic (PV) capacity installed in NC than in 45 or 46 other states. The majority of this rapid growth is occurring in utility-scale ground mounted PV systems covering 5 to over 100 acres per system; however, installations on residential and commercial rooftops are also increasing. The recent sprouting of these solar farms means that many communities across our state are being asked to address solar-related land use permitting issues for the first time.

To address this challenge, the North Carolina Sustainable Energy Association and the North Carolina Solar Center initiated a project to engage stakeholders in the creation of a template solar development ordinance intended for local governments to adapt to their particular needs. Today the final product is available.

A broad range of stakeholders were involved in an open consensus drafting process--including local planners, state and federal agencies, power companies, agriculture, and environmental groups. The template is based on existing NC solar ordinances and leading national model solar ordinances and is intended as a balanced approach to solar development with sufficient flexibility for communities to tailor it to their local needs. In addition to the ordinance itself, there are numerous appendices with valuable information and resources on solar energy for local governments in North Carolina.

We encourage you to review these materials and hope that they will serve as a useful starting point for those communities that wish to create or update a local solar development ordinance.

Sincerely,

Johanna H. Reese
Director of Government Relations
North Carolina Association of County Commissioners

Kimberly S. Hibbard
General Counsel
North Carolina League of Municipalities

Ben Hitchings, AICP, CZO
President
North Carolina Chapter of the American Planning Association

Stakeholders Available for Contact

The following selected members of the template ordinance working group have agreed to make themselves available for questions regarding the ordinance or issues related to solar development.

NC Clean Energy Technology Center (NCCETC) (formerly the NC Solar Center) Tommy Cleveland (919) 515-9432 Tommy_Cleveland@ncsu.edu	**NC Sustainable Energy Association (NCSEA)** Maggie Clark (336) 402-6246 Maggie@energync.org
Duke Energy Bruce Barkley (919) 546-2814 Bruce.Barkley@duke-energy.com	**Duke University Nicholas Institute** Larry Shirley (919) 613-8745 Larry.Shirley@duke.edu
Federal Aviation Administration (FAA) Dana Perkins at Atlanta ADO in Working Group Aaron Braswell at Memphis ADO is current contact (901) 322-8192 Aaron.Braswell@faa.gov	**Mathis Consulting** Ben Edwards (828) 351-9631 ben@mathiscounsulting.com
NC Association of County Commissioners Casandra Skinner 919-715-7665 Casandra.Skinner@ncacc.org	**NC Conservation Network** Nadia Luhr (919) 857-4699 ext.107 nadia@ncconservationnetwork.org
NC Department of Agriculture – Ag. Development & Farmland Preservation Dewitt Hardee (919) 707-3069 Dewitt.Hardee@ncagr.gov	**NC Department of Agriculture – Agribusiness Development** Ron Fish (919) 707-3119 Ron.Fish@ncagr.gov
NC Depart. of Commerce – Div. of Community Assistance - Community Planning, Central Region Oliver Bass (919) 571-4900 obass@nccommerce.com	**NC DENR – Division of Energy, Mineral, & Land Resources - State Energy Program** Bob Leker (919) 733-1907 bleker@nccommerce.com
NC DENR – Division of Water Quality (DWQ) Bill Diuguid (919) 807-6369 Bill.Diuguid@ncdenr.gov	**NC DENR – Military Affairs and Strategic Planning** Chris Russo (919) 707-3128 Chris.Russo@ncdenr.gov
NC Department of Revenue (Tax) Michael Brown (919) 814-1142 Michael.Brown@dornc.com	**NC Farm Bureau** Paul Sherman (919) 719-7292 Paul.Sherman@ncfb.org
NC League of Municipalities Kim Hibbard (919) 715-3936 khibbard@nclm.org	**NC State University Forestry Department** Mark Megalos (919) 513-1202 mamegalo@ncsu.edu

NC Wildlife Resources Commission Kacy Cook (910) 638-4887 Kacy.Cook@ncwildlife.org	**Planner – Catawba County** Susan Ballbach (828) 465-8381 sballbach@catawbacountync.gov
Planner – Cleveland County Chris Martin 704-484-4975 Chris.Martin@clevelandcounty.com	**Planner – Granville County** Dervin Spell (919) 603-1333 Dervin.Spell@granvillecounty.org
Planner – Guilford County Les Eger (336) 641-3635 leger@co.guilford.nc.us	**Planner – Warren County** Ken Krulik (252) 257-7027 ext.30 kkrulik@co.warren.nc.us
Solar Industry - Carolina Solar Energy Richard Harkrader (919) 682-6822 rharkrader@carolinasolarenergy.com	**Solar Industry - Parker Poe Adams & Bernstein, LLP** Katherine Ross (919) 835-4671 katherineross@parkerpoe.com
Solar Industry - PCG Solar/Green Guys Mike Whitson (704) 497-0367 mike@pcgsolar.com	**Solar Industry - O_2Energies, Inc.** Logan Stephens (336) 708-5161 logan@o2energies.com
Solar Industry - Spilman Thomas & Battle, PLLC Nathan Atkinson (363) 725-4496 natkinson@spilmanlaw.com	**Solar Industry - Southern Energy Management** Bob Kingery (919) 836-0330 ext 101 bkingery@southern-energy.com
Solar Industry - Strata Solar Lance Williams (919) 960-6015 ext 306 lwilliams@stratasolar.com	**Solar Industry - QF Solutions** Donna Robichaud (513) 659-1178 drobichaud@qf-solutions-llc.com
UNC School of Government Adam Lovelady (919) 962-6712 adamlovelady@sog.unc.edu	**NCSEA/Duke University Graduate Student** Michael Fucci (302) 584-4152 fucci@energync.org

Local government planning support resources:

- **NC Department of Commerce – Division of Community Assistance – Office of Community Planning:** To request services please contact the office nearest you. Contact information is available at www.nccommerce.com/cd/community-planning/regional-office-services
- **Solar Outreach Partnership (SolarOPs) – a US Department of Energy funded project:** Designed to help accelerate solar energy adoption on the local level by providing best practices, resources, and technical assistance to local governments. www.solaroutreach.org

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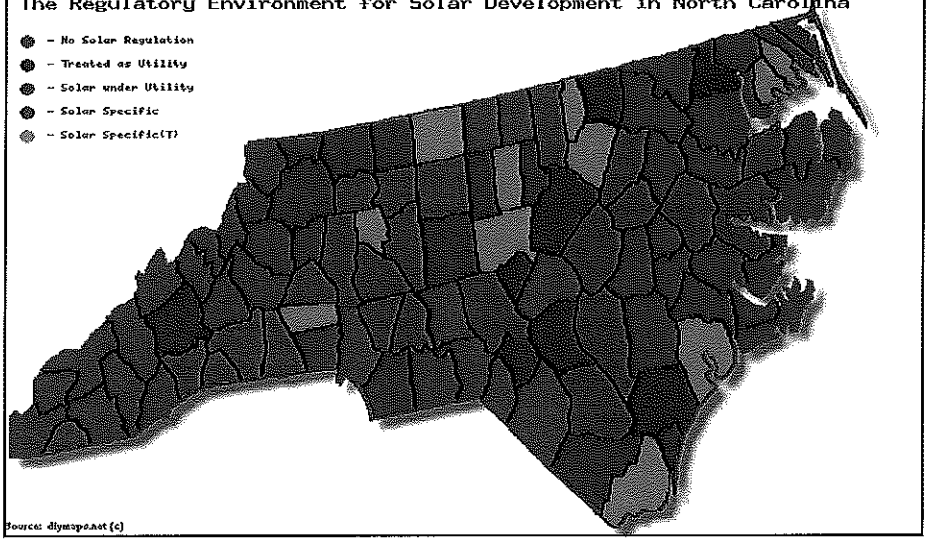
UNC Public Policy course – Fall 2014 Analysis

The Regulatory Environment for Solar Development in North Carolina



Source: dlynapo.net (c)

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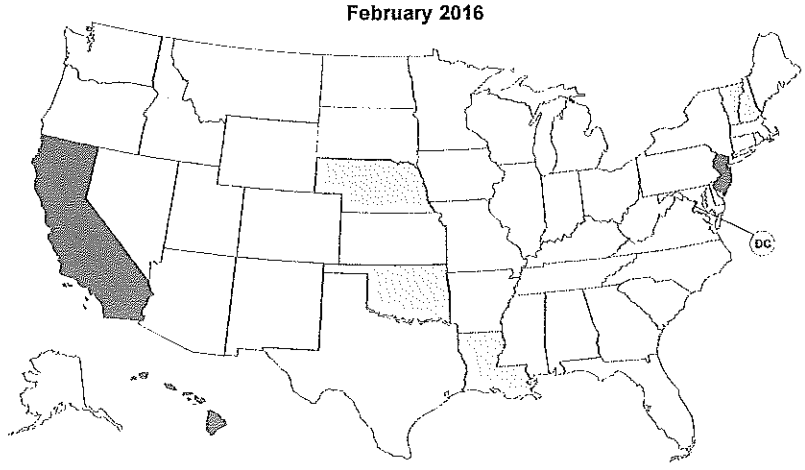
State Solar Decommissioning Policies

February 2016



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- Statewide solar decommissioning rules apply under certain circumstances
- Statewide requirement to submit a decommissioning plan under certain circumstances
- No statewide solar decommissioning rules

Summary of State Solar Decommissioning Policies -- 2016-02-03

Statewide/federal decommissioning rules and financial security requirement under certain circumstances.	CA, HI, BLM (federal)
Statewide decommissioning rules apply under certain circumstances. No requirement to provide financial security.	NJ
Statewide optional certification process. Includes site restoration and financial security requirements.	WA
Statewide requirement to submit a decommissioning plan under certain circumstances.	LA, NE, NH, OK, VT
No statewide policy; local government ordinances that address solar siting must address decommissioning.	VA
No statewide policy; local government authority.	AL, AK, AZ, AR, CO, CT, DC, DE, FL, GA, ID, IL, IN, IA, KS, KY, MA, MD, ME, MI, MN, MS, MO, MT, NC, NM, NV, NY, ND, OH, OR, PA, RI, SC, SD, TN, TX, UT, WV, WI, WY

Table of State Solar Decommissioning Policies -- 2016-02-03

State(s)	Applicability	Details	Source
Federal - Bureau of Land Management	BLM-managed lands	The Bureau of Land Management (BLM) has a policy for approving utility-scale solar developments on BLM managed lands. BLM requires solar right-of-way holders to post a bond that covers environmental liabilities during operation, decommissioning and disposal, and site restoration.	43 U.S.C. 1764(i) 43 CFR 2805.12(g)
Hawaii	Class A, B, and C Agricultural Land	Solar energy facilities on Class B or C agricultural land that have received a special use permit must be decommissioned at the owner's expense within twelve months of the conclusion of operation or useful life. The land must be restored to substantially the same physical condition as existed prior to the development of the solar energy facility. Proof of financial security to decommission the facility must be provided to the county planning commission. [The same requirements apply to solar facilities on Class A agricultural land that have met the additional requirements to be sited on this land.]	HRS § 205-4.5
California	Statewide; Solar-use easement applicants	Department of Toxic Substances Control has the authority to designate end-of-life PV modules that are hazardous waste as universal waste and subject them to the state's universal waste management procedures. Examples of universal wastes in California include batteries, cell phones, and other electronics. To obtain a perpetual solar-use easement, the local government may require financial security for site restoration. To obtain a term or self-renewing solar-use easement, a performance bond or other restoration security must be posted. A solar-use easement is a right or interest acquired by a local government in a parcel of land that will restrict the land's use to solar PV facilities.	Cal Health & Saf Code § 25259 Cal Gov Code § 51191.3
New Jersey	Commercial Farm Lands; Pinelands Management Area	Decommissioning of solar energy facilities on commercial farm lands must be done in accordance with a conservation plan designed to address the impacts of the decommissioning process. Decommissioning of solar energy facilities is subject to local ordinances. Solar energy facilities in any Pinelands Management Area shall be decommissioned within twelve months of cessation of utilization. Decommissioning includes removal of all energy facilities, structures, and equipment; restoration of the parcel unless it is to be put into active agricultural use or is approved for development; and any other measures necessary to address ecological and visual impacts.	N.J.A.C. § 2:76-2A.12 N.J.A.C. § 7:50-5.36

Washington	Statewide	Solar energy projects may opt in to receive certification from the Energy Facility Site Evaluation Council. This certification is in lieu of any other state or local permits. This certification includes requirements for site restoration and financial assurance of such restoration.	WAC 463-72
Vermont	Statewide; systems >1MW	As a requirement for a state-issued Certificate of Public Good, applications for solar systems greater than 1 MW must include a decommissioning plan.	CVR 30-000-056
New Hampshire	Statewide; systems >30MW	Solar energy systems greater than 30 MW require a certificate from the Public Utilities Commission. A description of the decommissioning plan and financial assurances for decommissioning is required to apply for this certificate.	RSA 162-H
Nebraska	Statewide for solar easements	A description of the decommissioning plan is required to obtain a solar easement.[1]	R.R.S. Neb. § 66-911.01
Oklahoma	Statewide for solar easements	A description of the decommissioning plan is required to obtain a solar easement.[1]	60 Okl. St. § 820.1
Louisiana	State-owned lands	Must submit a decommissioning plan if the facility is on state-owned land.	LAC 43:V.921
Virginia	Local Governments Statewide	No statewide decommissioning rules, but local ordinances addressing the siting of solar facilities must also address decommissioning.	Va. Code Ann. § 67-103
Massachusetts, North Carolina	No statewide policy	No statewide decommissioning rules, but guidance is provided to local governments in the form of a model ordinance.	N/A
AL, AK, AZ, AR, CO, CT, DC, DE, FL, GA, ID, IL, IN, IA, KS, KY, MA, MD, ME, MI, MN, MS, MO, MT, NM, NV, NY, ND, OH, OR, PA, RI, SC, SD, TN, TX, UT, WV, WI, WY	No statewide policy	These states have no statewide policy regarding solar decommissioning. Local governments may adopt ordinances including decommissioning rules.	N/A

[1] A solar easement allows the owner of a solar energy system to secure rights to continued access to sunlight from a neighboring party whose property could be developed in such a way (e.g., building, foliage) as to restrict the system's access to sunlight. This is not the same instrument as California's "solar-use easement."

First Solar's Sustainability Advantage

First Solar®

ENVIRONMENTAL

- Providing the leading eco-efficient PV technology
- Operating world-class manufacturing facilities
- Applying responsible PV construction practices
- Offering globally available recycling services

ECONOMIC

- Enabling affordable access to clean electricity globally
- Producing more energy with a lower levelized cost of electricity
- Eliminating fuel price volatility and hedging costs
- Delivering most bankable PV solutions in the industry

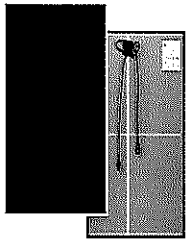
SOCIAL

- Creating jobs in local communities
- Ensuring a safe and engaging workplace
- Promoting development and education programs
- Partnering with responsible suppliers for a sustainable supply chain

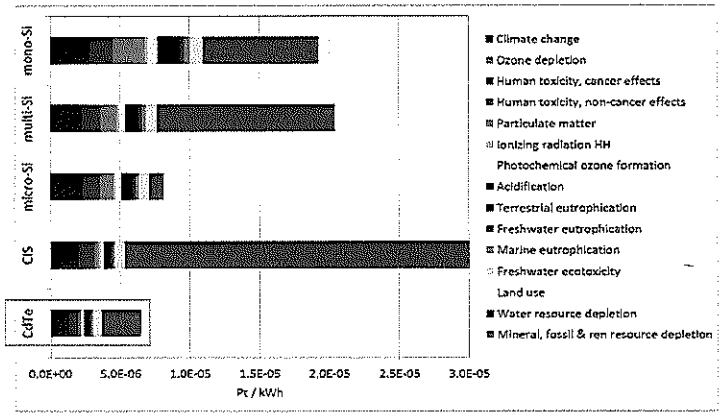
Leading Eco-Efficient PV Technology

First Solar's thin film cadmium telluride (CdTe) photovoltaic (PV) solutions are the industry's leading eco-efficient technology due to their superior energy yield, competitive cost and smallest life cycle impacts.[1]

- Highest efficiency potential of any PV material known today
- Proven annual energy yield advantage over c-Si in harsh operating environments
- Fixed pricing and low operating costs eliminate fuel price volatility
- Cost competitive with conventional energy sources today
- Generates clean electricity for 25+ years with no carbon emissions or air pollutants
- Smallest carbon footprint, lowest water use, and fastest energy payback time[2]
- Global and cost-effective PV recycling services



Creating more value with less environmental impact per kWh generated



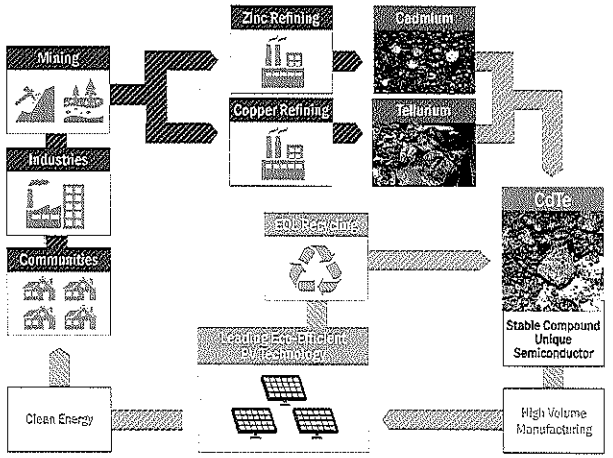
Life cycle environmental impact (normalized and equally weighted) of 1 kWh of DC electricity production from a PV module on a slanted roof in Europe[3]

A multi-stakeholder study evaluated the environmental footprint of five different PV technologies in accordance with the European Commission's Product Environmental Footprint Category Rules and concluded that CdTe PV has the smallest environmental impact in most of the fifteen impact categories.[4]

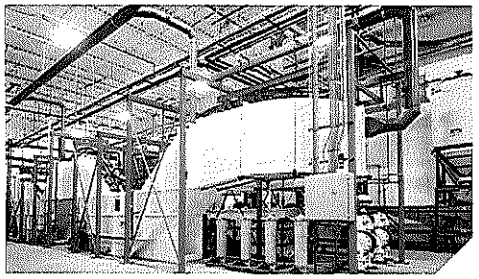
[1] M. Seitz, M. Kroban, T. Pitschke, S. Kriebe, 2013. Eco-Efficiency Analysis of Photovoltaic Modules, Bifa Environmental Institute, Germany.
[2] Energy payback time is the amount of time a system must operate to recover the energy required to produce and recycle it.
[3] P. Stolz and A. Wade. Product Environmental Footprint Pilot on Photovoltaic Electricity Production. Joint Meeting of the Environmental Footprint Steering Committee and the Environmental Footprint Technical Advisory Board, September 2015.
[4] Wyss et.al., PEF screening report of electricity from photovoltaic panels in the context of the EU Product Environmental Footprint Category Rules (PEFCR) Pilots, v.1.4, August 2015, Switzerland

Committed to Responsible Life Cycle Management

First Solar is committed to responsible product life cycle management. We take into account the environmental impact of our products and utility-scale solar projects throughout their life cycles; from sustainable raw material sourcing and responsible manufacturing and construction, to providing a cost-effective recycling service for PV power plant and module owners.



First Solar recycling services are globally available, flexible and cost-effective.



First Solar PV Module Recycling Technology (Version 3)

First Solar's thin film PV technology transforms mining waste byproducts into a stable CdTe compound and leading eco-efficient PV solutions that produce clean and affordable energy for 25+ years. We are further reducing our life cycle impacts through our long-standing leadership in PV recycling. Our state-of-the-art recycling facilities are operational at all our manufacturing plants and achieve high recovery rates. Over 90% of the semiconductor material can be reused in new modules and 90% of the glass can be reused in new glass products.

Operational Excellence and Sustainable Business Practices

First Solar is committed to responsible manufacturing and PV power plant construction. All First Solar manufacturing sites are certified to globally recognized standards: ISO 14001 for Environmental Management, ISO 9001 for Quality and OHSAS 18001 for Occupational Health and Safety. We are minimizing our operational impact and driving continuous improvement through increased module and manufacturing throughput efficiency, conservation projects and on-site PV installations. First Solar has received global recognition for its state-of-the art environmental controls and performance, world-class health and safety practices, industry-leading quality and reliability and manufacturing excellence.

Awards and Recognition

2015 - **MENA Award 2015** - PV Technology Innovation

2015 - **Prime Minister's Hibiscus Award** - "Exceptional Achievement in Environmental Performance," "Kedah State Award" and "Special Project Gold Medal" - First Solar Malaysia

2015 - **Global Leadership Awards** - Excellence in Renewable Energy Manufacturing Sector - First Solar Malaysia

2014 - **Solar Industry Awards 2014** - *Solar Award for Excellence: Company, Thin Film Innovation, System Integration (Skytron energy GmbH)*

2014 - **CNBC RQ 50** - *#18 Ranked Most Innovative Companies/R&D*

2014 - **Kedah's Department of Occupational Safety & Health (DOSH) Excellence Award (Electrical and Electronic Industry Category)** - First Solar Kulim Manufacturing Facility, Malaysia

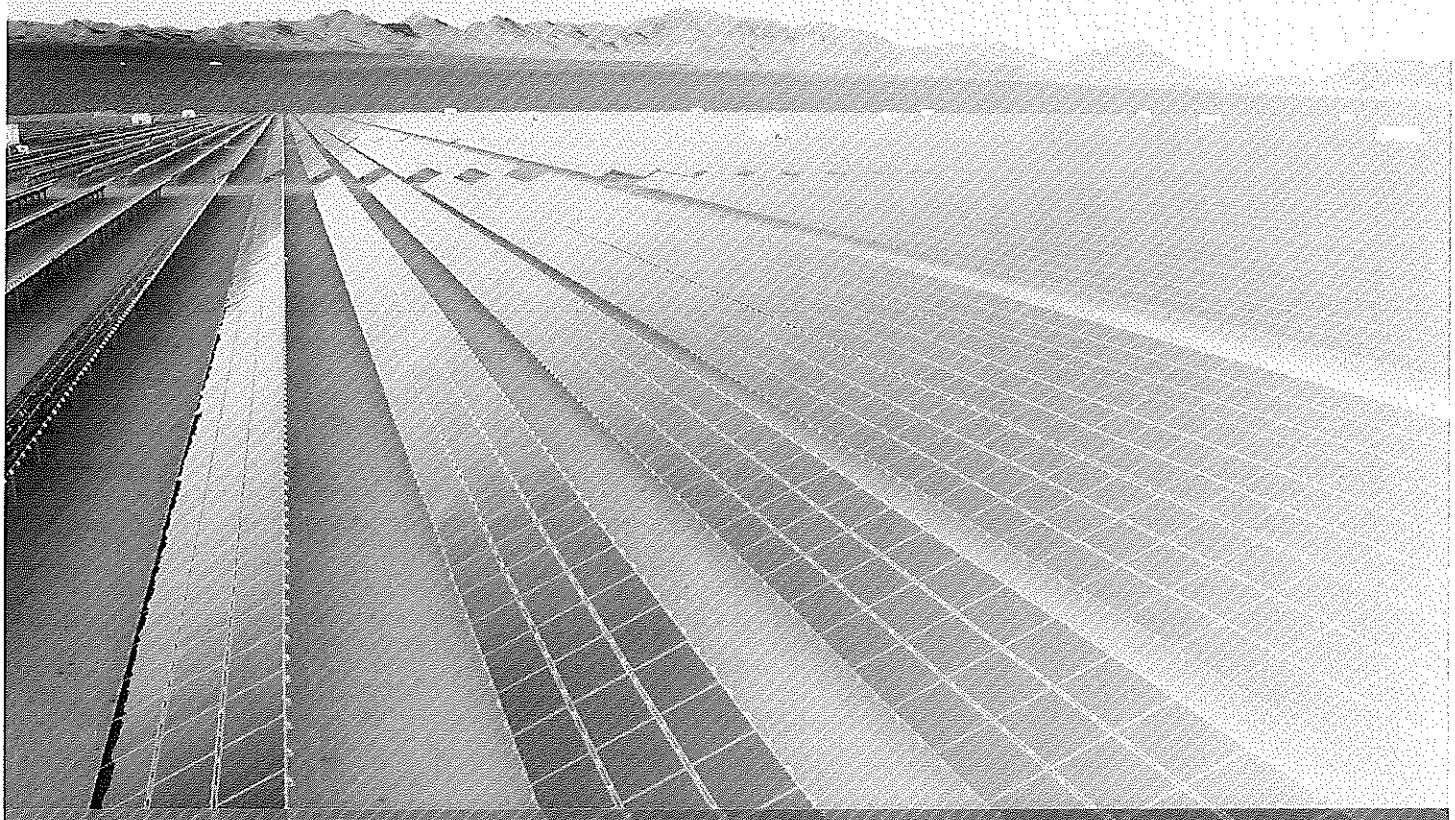
About First Solar

First Solar is a leading global provider of comprehensive photovoltaic (PV) solar energy solutions that are taking energy forward. With more than 10 gigawatts (GW) installed worldwide, we develop, finance, engineer, construct and operate some of the world's largest and most successful PV power plants in existence today.

First Solar®

www.firstsolar.com

First Solar®



THE RECYCLING ADVANTAGE

COST EFFECTIVE. SUSTAINABLE.

OVERVIEW

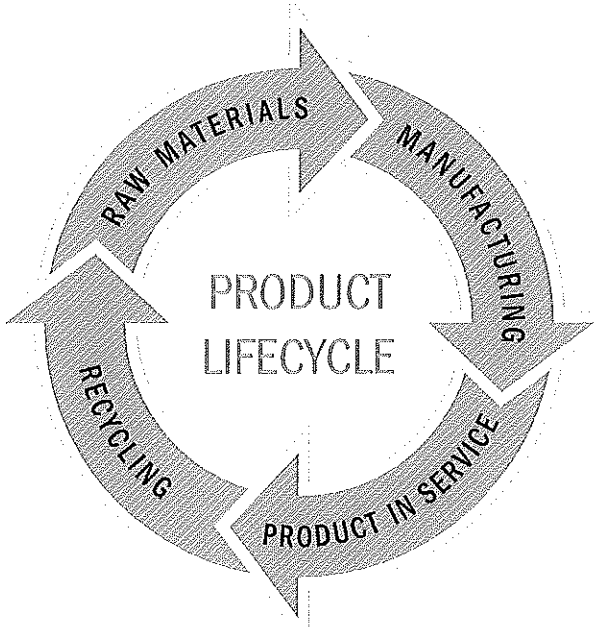
First Solar leads the industry with a proven recycling solution that fulfills solar's promise as a clean and sustainable renewable energy. We believe that powering the future requires a commitment to responsible product life cycle and end-of-life management.

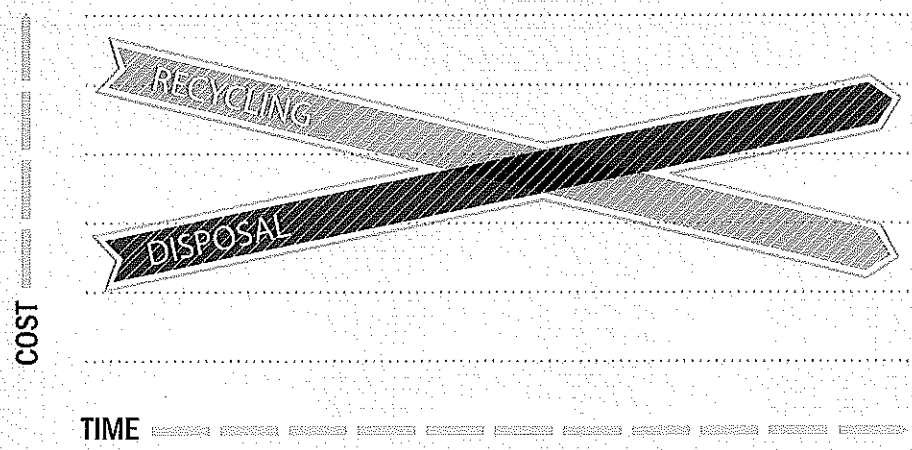
WHY RECYCLE WITH FIRST SOLAR?

Recycling offers economic and environmental benefits over disposal and is the most environmentally sustainable and responsible solution for managing photovoltaic (PV) modules at end-of-life (EOL). Recycling can also help ensure compliance with various e-waste regulations and permitting requirements around the world.

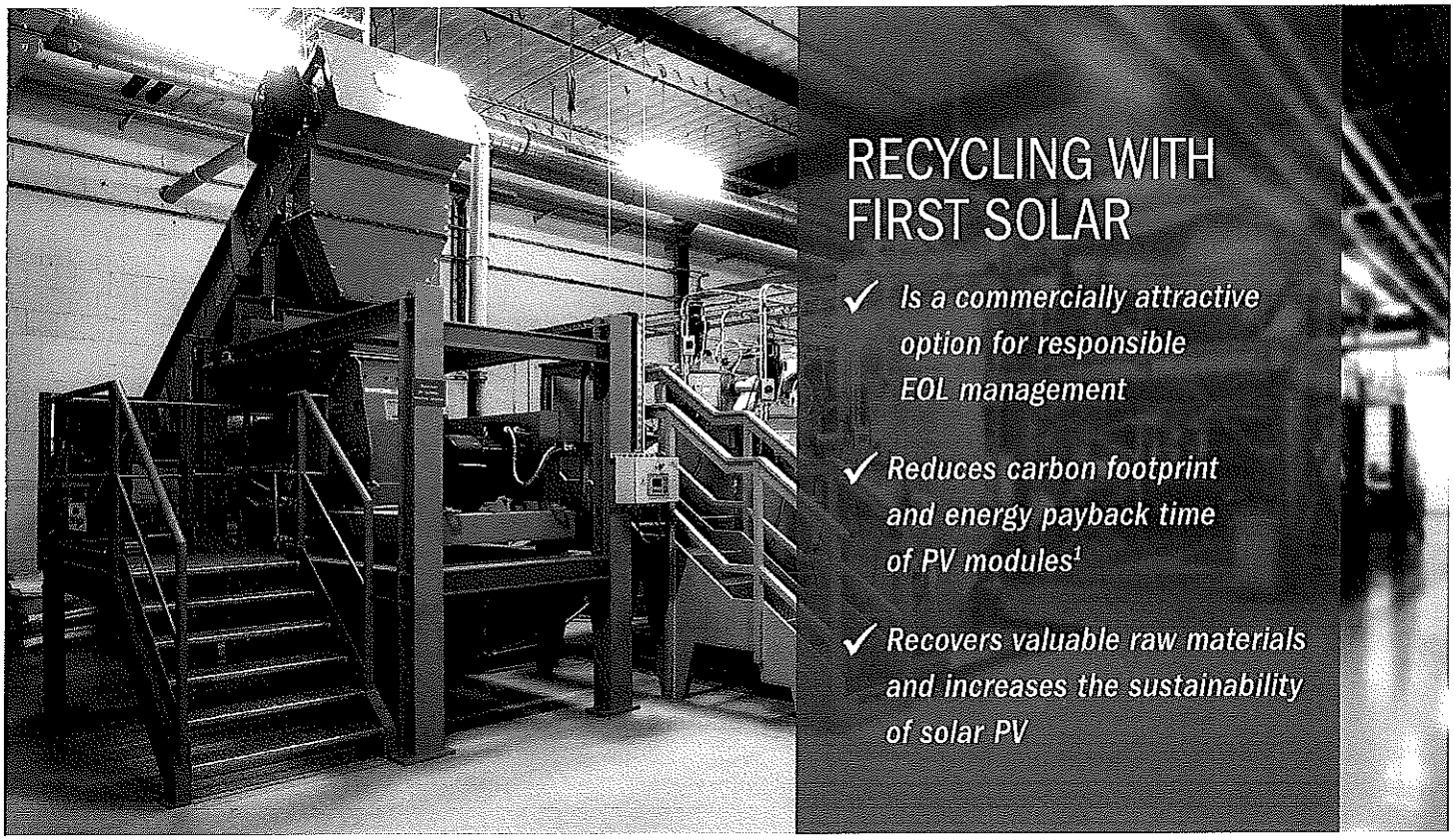
First Solar realizes that our customers' decisions to recycle must make economic sense. We continuously invest in recycling innovation to drive down costs and help our customers maximize their return on investment.

As the availability of sites and land for disposal become scarcer, and regulatory disposal requirements become more burdensome for all PV technologies, disposal costs will likely increase above costs for recycling.





RECYCLING VS. DISPOSAL COSTS



RECYCLING WITH FIRST SOLAR

- ✓ *Is a commercially attractive option for responsible EOL management*
- ✓ *Reduces carbon footprint and energy payback time of PV modules[1]*
- ✓ *Recovers valuable raw materials and increases the sustainability of solar PV*

FLEXIBLE SOLUTIONS TO MEET YOUR NEEDS

First Solar provides customers a flexible, commercially attractive and environmentally responsible recycling service for managing First Solar modules at EOL.

Our recycling service can be easily included in all First Solar sales and service agreements including operations and maintenance (O&M), engineering, procurement, and construction (EPC), PV power plant and module sales agreements.

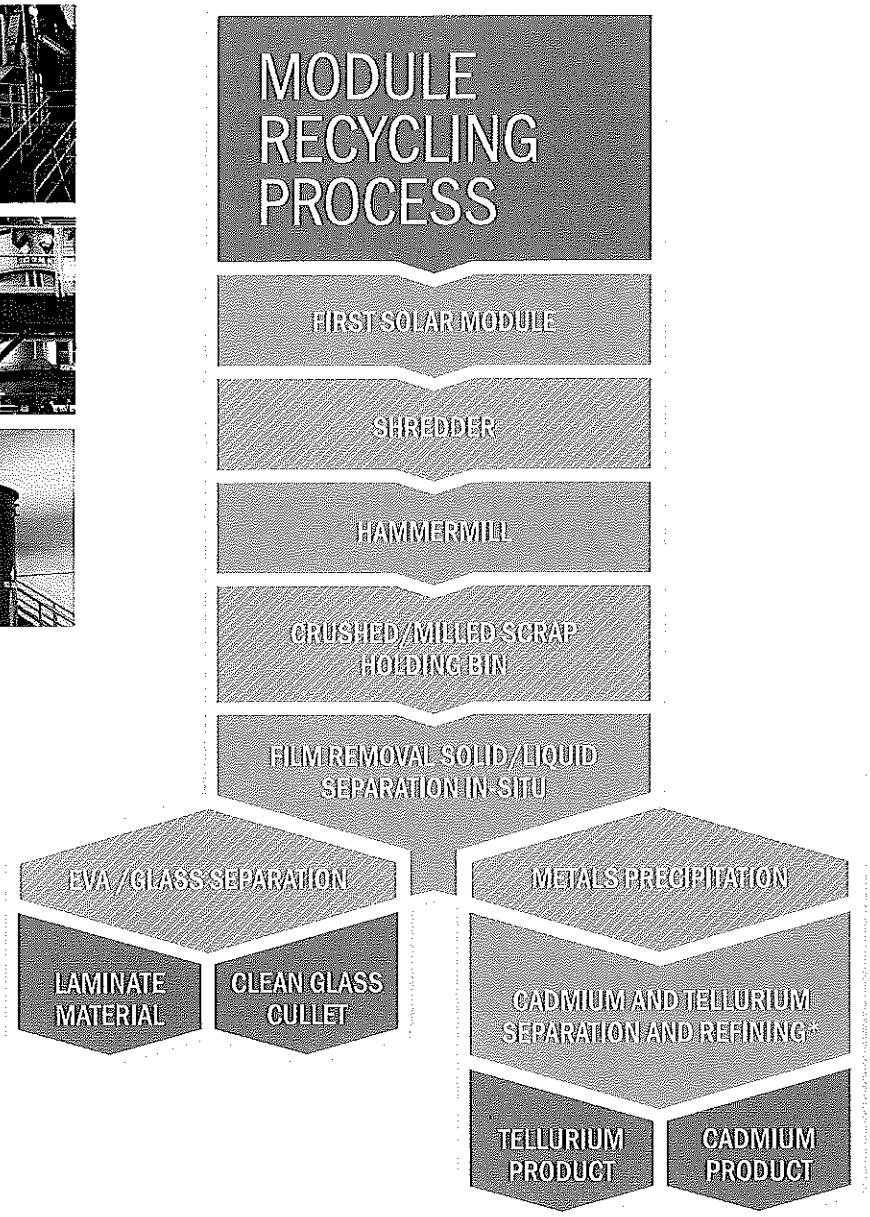
- ✓ Convenient and globally available—one source for all your solar PV needs
- ✓ Competitive and cost-effective
- ✓ Flexibility offered through contracts with renewable pricing
- ✓ No up-front fees. Pay-as-you-go model enables you to recycle on a per-module basis
- ✓ Scalable from construction through decommissioning
- ✓ Responsible recycling you can trust—First Solar operates to sound and responsible global standards

GLOBAL, PROVEN, INDUSTRY-LEADING EXPERTISE

First Solar's long-standing leadership in PV life-cycle management and recycling gives system owners confidence in knowing that their modules will be managed to sound and responsible global standards. First Solar pioneered the first global and comprehensive module recycling program in the PV industry in 2005. Our state-of-the-art recycling facilities are operational at all our manufacturing plants and have a scalable capacity to accommodate high volume recycling as more modules reach the end of their 25+ year life. Our experience in recycling has allowed us to continuously improve processes, technology, and reduce operational costs.

Our proven, state-of-the-art module recycling process achieves high recovery rates; more than 90% of the semiconductor material and 90% of the glass can be reused in new modules and products.

MODULE RECYCLING PROCESS



90%+
RECYCLING OF SEMICONDUCTOR MATERIAL

~90%
RECYCLING OF GLASS

*Cadmium and tellurium separation and refining are conducted by a third-party.

First Solar®

KNOW YOUR OPTIONS / SUSTAINABILITY MADE SIMPLE

Learn more about how First Solar can help you meet your module EOL management needs at a cost advantage. Our affordable recycling services are globally available today for a cleaner, more sustainable tomorrow.

recycling@firstsolar.com Website: **www.firstsolar.com/recycling**

[1]Held, Michael, and Robert Ilg. "Update of Environmental Indicators and Energy Payback Time of CdTe PV Systems in Europe." Progress in Photovoltaics: Research and Applications 19, no. 5 (August 2011): 614–626. doi:10.1002/pip.1068.