



ASGA-CERTIFIED™ SOLAR GRAZING TRAINING STANDARDS

ASGA Solar Grazing Training Certification teaches key topics and best practices that are fundamental to using sheep to manage vegetation on solar energy sites. An ASGA-Certified training course covers at minimum the following subjects. Where noted, delivery method and location are mandated.

A. PROGRAM NAME

1. Title includes the term Solar Grazing

B. VEGETATION MANAGEMENT OBJECTIVES AND STRATEGIES

1. Identifying performance objectives

- maintain vegetation below leading edge
- fire control
- support pollinator habitat
 - is site enrolled in a pollinator program such as Pollinator Scorecards, Monarch CCA habitat, etc.
 - if yes, what rules will influence grazing strategies

2. Defining performance standards and compliance

- height defined by inches? percent of ground? Average height?
- height defined as 'below leading edge' on X percent of ground?
- managing expectations regarding appearance (mowed finish vs. grazed finish)

3. Hybrid Models Combining Mechanical Control with Grazing

- rationale for utilizing sheep as main tool but also mowing
- comprehensive contracts vs graze only (who controls mowing?)
- shifting balance of mowing as sheep numbers stabilize
- assigning responsibility for maintaining parking areas and exterior perimeter
- Define boundaries of land leased/owned by solar developer, and exactly where grazier's responsibilities begin and end



- role of chemical or hand-cutting to control invasive, inedible or toxic plants

- identification of specific invasive, inedible, or toxic plants encountered in your region
- compliance with federal regulations and/or need for licensed pesticide applicator
- Mowing math: realistic time and labor data

4. Developing grazing model to accomplish objectives

- rationale for moving flock, rather than set-stocking
- rotation within site with single flock
- rotation within site with more than one flock
- 'pulse' grazing: drop in flock, remove after grazing event, repeat as needed
- calculating number of sheep needed based on stocking rate
- software solutions for viewing sites, planning grazing

5. Comparing vegetation management goals with optimal production goals

- seasonal, regional forage availability and growth patterns
- lambling on site pros and cons
- growing/finishing lambs on site pros and cons
- wethers as grazing flock pros and cons

C. SEEDING AND FORAGE

1. Soil testing

- for pH and nutrient status to optimize planting success
- for presence and level of contaminants or toxicity

2. Effect of previous ground cover

- crops common to specific region
- chemical history
- fallow land with established weeds
- degree of disturbance post-construction

3. Planting and establishing forage on site

- seed mix considerations for specific region
 - best timing for seeding (post or pre-construction)
 - establishment strategy and timing before onset of grazing
 - accommodating pollinator habitats

4. Poisonous or noxious plants dangerous to sheep

- appearance and growth habit of regionally important toxic plants
- control strategies
- level of concern for sheep

D. SHEEP MANAGEMENT AND WELFARE

Note: this section must include a presentation by a vet, either online or in-person. There must also be a session held in-person on a solar array with sheep, where handling and movement are undertaken.

1. Health and disease

- regionally relevant issues
- health concerns specific to classes of livestock on site
- euthanasia on-site
- prompt identification and removal of deadstock
- generally recognized animal welfare standards
- biosecurity when increasing flock size through outside purchases
- biosecurity if sharing site with other flocks

2. Moving sheep through the site

- from one grazing cell to the next (Dogs? Feed? Conditioned response?)
- corralling entire flock for trucking, sorting, or management tasks

3. Predator Control

- predators found in your region
- exterior fence and gate specifications for maximum protection
- use of guard dogs

4. Handling systems

- identifying purpose (load? treat? sort?)
- commercial options available
- portable vs. fixed, pros and cons
- components built for specific tasks
- calculating size of gathering and forcing pens

5. Transportation

- choosing a hauler
- complying with interstate regulations
- biosecurity
- space requirements
- sheep welfare and stress management during transport
- investing in trailer vs. hire as needed



6. Winter management options based on region

- return flock to home farm for hay feeding
- move flock to different region with year-round grass
- remain grazing on solar year-round if forage permits

7. Emergency flock removal plan

- pre-arranged location big enough for entire flock on short notice
 - drought
 - extreme weather
 - serious electrical production or maintenance problem at solar array

8. Considerations for wooled sheep on site-specific

- evaluating potential for entanglement with commonly used tracking systems
- adjusting shearing time to minimize fleece length
- shearing on the solar site

◦

9. Frequency of flock welfare checks

- ASGA recommends daily welfare checks for solar grazing flocks

10. Lambing On-Site

- Pros and cons
- Real-life case studies
- Decision-making framework

E. SHEEP NUTRITION

1. Dietary requirements according to production class: dry ewe, lactating, growing lamb, wether

- protein
- energy
- minerals
- vitamins

2. Meeting dietary requirements on solar site

- mineral supplementation
- assessing quality and quantity of available forage
- condition scoring sheep
- seasonal challenges and adaptations in your region
- unique supplements for extreme conditions (drought, excessive rain, etc.)

3. Water

- water requirements per head per day

- factors influencing water intake
- on-site water assessment (metered, well, ponds, creeks?)

F. WORKING WITH SITE INFRASTRUCTURE TO ACCOMMODATE SHEEP

1. Exterior fence and gate specifications and considerations

- predator exclusion
- trailer access

2. Gates

- inspection for critical gaps
- modification for predator management
 - -width sufficient to accommodate sheep and vehicle movement

3. Interior fencing to facilitate flock movement and manage grazing

- temporary fence products and materials
- safe use of portable electric fence
- fire code and insurance requirements for use of interior electric fence
- energizer choices
- approved equipment
 - -grounding...can solar infrastructure be used for grounding?
- pros and cons of temporary vs permanent interior fencing

4. Protecting sensitive structures from sheep contact

- permanent solutions
- portable solutions

5. Wire management

- best practices for sheep safety, avoiding drooping or looping cables
- inspecting the messenger wire (CAB) system
- importance of never touching any wire
- reporting protocol in place for observed wiring problems (dangling, fallen, brackets broken, etc)
- current trends in tracking and racking technology

6. Provision of water

- water requirements per head per day
- basics operations of well, pressure pumps, distribution lines, valves
- budgeting material cost for distributing well water
- hauling water:
 - commonly used equipment
 - budgeting actual time and cost for inclusion in proposal
- pros and cons of well vs hauling, from shepherd and solar developer point-of-view

- seeking technical assistance from NRCS, NCAT, or similar
- accessing financial support for water supply and distribution

7. Livestock trailer access

- anticipating rig size and turning radius
- sufficient turn-around area
- gate width and location
- minimizing collision risk
- annual maintenance

8. Improving Existing Problematic Site Design

- common shortcomings of sites not originally designed for grazing
- examples of physical retrofitting
- improving forage
- decision-making guidance

G. BIDS AND CONTRACTS

1. The bidding process

- Evaluating a solar site prior to submitting a bid
- Preparing a bid

2. Contracts: basic clauses

- identification of the 2 parties involved
- scope, term of work
- payment terms
- indemnification
- insurance requirements
- role of subcontractors
- sheep management, health, welfare
- early termination, and post-termination land access
- start date and contingencies for delay

3. Understanding Master Service agreements

4. Importance of long-term contracts

5. Examining sample contracts

6. How contract negotiation works

7. Renewal terms



H. BUDGETS AND START-UP COSTS

1. Principles of budgeting a Solar Grazing Enterprise

- sample budgets from ASGA website

2. Determining your grazing fee

- with or without mowing
- budgeting for spot control of invasives

3. Capital investment and sourcing

- calculating start-up costs
- strategies for obtaining loans
- breed vs purchase for flock expansion: pros and cons

4. Strategies for managing start-up costs

- collaborating with other producers, leasing sheep
- structuring fee schedule to accelerate start-up costs
- buy/sell grazing flock seasonally

5. Sample profitability scenarios

- community scale/direct generation
- utility-scale solar

I. INSURANCE

1. Needed by grazing partners

- commercial auto
- what is typically required
 - -required for all trucks/vehicles/trailers on site?
 - general liability insurance
 - match solar operator or O&M firm limits
 - need for explaining to insurance company: new concept, lack of historical data
 - determine your cost
 - naming your site as a “named additional site”
 - determine your cost
 - determine how often this status must be renewed

2. -Workman's Compensation

- may be required, depending on site location

3. Understanding that mandates are imposed on solar sites by their own insurance providers

- fire breaks/fire break strategy
- maximum height of vegetation tolerated across site



-liability coverage limits

J. SIGNAGE AND PUBLIC INTERACTION

1. Signage at All Access Gate

- problem prevention: Keep Gates Closed, Sheep on Site
- in case of emergency: name/number of sheep producer
- hazard awareness: electrified fencing, guard dogs, breeding rams
- educational: why sheep here?

2. Signs elsewhere

- warning signs on internal electric fence
- how to turn on/off internal electric if necessary (for technicians)

3. First impressions, public perception

- water
- food
- weather (sheep in snow? Grass too drought-brown?)
- overall healthy, happy appearance
- deadstock and plan for prompt removal

4. Technician comfort

- teaching on-site personnel how to behave around the flock and guard dogs if applicable
- updating new hires
- opening access to grazing cells when not used

5. Communications and Media Protocol

- Develop protocol with communications team for:
 - responding to media requests, identify spokesperson(s)
 - image rights and distribution
 - regulations on drone use
 - responding to requests for on-site tours

K. SOLAR SITE PRODUCTION BASICS

1. orientation to solar terminology

2. -solar array components and function

3. how solar electricity production and distribution works

L. POSTIVE PARTNERSHIP WITH YOUR SOLAR COMPANY



1. Common corporate structures and areas of responsibility

- solar developer
- owner/operator
- asset (site) manager
- operations and maintenance provider (O&M)

2. Essential relationships for your grazing operation

- who is the grazer contracted to work for?
- who is the grazers' day-to-day contact regarding site maintenance?
 - what corporate or staff changes could impact the grazing arrangement?

3. Ongoing Communication

- pre-planned chain of communication for specific situations
(grazing plans, problems spotted on site, novel situations)
- regular communications regardless of issues or problems

M. SAFETY ON SOLAR SITE

A minimum of one in-person session must be conducted at a solar array, presented by an experienced field technician

1. Common hazards/general safety/what can be safely touched

2. Installing posts after construction: avoiding contact with electricity

3. Personal Protective Equipment

4. Site-specific plans

- problem recognition
- chain of communication
- emergency shut-offs

5. Specifying who may enter site

- children?
- grazing partner staff?

6. Contingencies for extreme weather, natural disasters

- hurricane
- tornado
- lightning procedure, tracking apps

7. Implementing annual safety-reorientation



