Landfills = Renewable Energy Opportunities

- 490+ MA landfills active since 1971
  - 460+ are now inactive or closed
  - >100 have “post closure” uses
Good Sites for PV Development

- Large open parcels
- Flat
- Close to connections to the electrical grid
- See Massachusetts Landfill Profiles: [http://www.mass.gov/dep/energy/landfill.htm](http://www.mass.gov/dep/energy/landfill.htm)

Steps to Develop a Successful Project

1. Assess Feasibility
2. Procure developer services
3. Design project/secure permits
4. Build project
Permits Needed for a PV facility

- MassDEP: Post closure use permit
- ISO New England: Power generation approval
- Electricity Utility: Interconnection agreement
- Municipality: Building permit, possibly wetlands approval

MassDEP Post Closure Use Permit

- To start: review existing permits, inspect the landfill, set up “pre-application” meeting with MassDEP

- Submit “Post Closure Use” Application to MassDEP (prepared by Resident MA Professional Engineer, with Owner’s approval)

- Agency review:
  - 2-6 months if landfill has been assessed and closed
  - Longer review if landfill has not been assessed and properly closed
Solid Waste Considerations

- MassDEP approval criteria:
  - Maintain integrity of cap, final cover system
  - No adverse impacts to public health, safety, welfare, or the environment

- Major issues:
  - Foundations
  - Storm water controls
  - Landfill gas
  - Long-term maintenance

Foundations

- Landfill cap/cover system: keep water out and landfill gas in
- Geotechnically stable, must accommodate loading, settlement
- Plans for storm water management, long-term maintenance must reflect design, development density
Storm Water Control

- Consider:
  - Foundation design, development density
  - Location, orientation of power lines
- Will the development:
  - Concentrate runoff?
  - Increase erosion potential?
  - Create water bars?
- Design for 24-hour, 25-year storm
- Evaluate potential for flooding in 24-hour, 100-year storm

Landfill Gas

- Consider:
  - Existing gas control system
  - Gas characteristics, migration pathways
- Protect:
  - Public Health (toxic compounds in ambient air)
  - Safety (explosion, fire, asphyxiation)
  - Welfare (nuisance odors)
- Plan includes:
  - Engineering and management controls
  - Monitoring
Long Term Maintenance

- Keep water out and landfill gas in
  - Designed well: minimal maintenance over the long term
  - Designed poorly: will need to address instability and erosion, cap repairs, expensive vegetation control

Supporting Materials

- Existing Site Conditions
  - Site plans (probably on file at MassDEP)
  - Report (narrative)
  - Findings (identify any baseline issues)

- Proposed Post Closure Use Design Plans
  - Site plans & detailed designs (P.E. stamped & sealed)
  - Narrative Report:
    - Technical analysis
    - Effects of changes
  - Financial assurance for final closure (privately-owned facilities only)
A Successful Project:

- Coordinates designs by multiple consultants
- Integrates well with the landfill cap and final cover system
- Won’t increase potential for erosion
- Doesn’t create new exposures to landfill gas or leachate
- Provides for adequate maintenance

Recent Issues that MassDEP has addressed:

- Project developer/operator’s liability for problems at the landfill
  - Developer/operator is responsible for problems caused by the construction/operation/maintenance of the PV project
  - Landfill owner keeps full responsibility for all problems at the underlying closed landfill
- Financial assurance required for privately-owned landfills & for municipally-owned facilities if the municipality is not a co-applicant
- Original developer/operator transfers interest in project to a new entity for long-term facility operation
  - Submits a Certification of Transfer of a Permit – new operator commits to meeting permit conditions
What has happened so far?

PV isn’t the only renewable energy option for closed Massachusetts landfills

- Two wind turbines are operating on closed MA landfills:
  - Hull (1.8 MW, 2006)
  - Kingston (1.8 MW, 2012)
Why is this happening in Massachusetts?

- 3 conferences introduced PV developers to landfill owners, solid waste consultants
- Renewable Portfolio Standard for investor-owned utilities
- Net metering established
- Benefits for landfill owners vs. fallow land

MassDEP Resources for Project Planning

- Fact Sheet: Developing Renewable Energy Facilities on Closed Landfills
- Post Closure Use Permit Instructions & Application Form
  - Control of Odorous Gas at MA Landfills
Questions?

Call or email:

- Sarah Weinstein, Deputy Assistant Commissioner, MassDEP Bureau of Air & Waste
  - Email: sarah.weinstein@state.ma.us
  - Telephone: 617/574-6862

- Dan Connick, Environmental Engineer, Solid Waste Section, MassDEP Southeast Regional Office
  - Email: daniel.connick@state.ma.us
  - Telephone: 508/946-2884