

# RENEWABLE ENERGY REUSE ASSESSMENTS

NOVEMBER 2013

## EPA Region 5 Superfund Redevelopment Initiative



## RENEWABLE ENERGY ASSESSMENTS

For over 10 years, the U.S. Environmental Protection Agency (EPA) Superfund Redevelopment Initiative has been supporting communities nationwide to return Superfund sites to beneficial uses. As part of this program, EPA Region 5 has provided resources to evaluate potential for renewable energy generation at select Superfund sites.

In 2012-2013, EPA Region 5 sponsored five renewable energy assessments to support local governments and regulatory agencies in evaluating renewable energy opportunities. Each of the five assessments was tailored to the site's context and stakeholder reuse goals and integrated the renewable energy assessment services listed to the right.

This briefing document provides a brief summary of the following renewable energy reuse assessments.

### Resource Availability Screening

#### **Former GM Lansing Plants**

*Lansing, MI*

### On-Site Renewable Energy Use

#### **Ott/Story/Cordova Chemical Co. Site**

*Muskegon County, MI*

#### **Prairie View Landfill / Joliet Army Ammunitions Plant**

*Will County, IL*

### Utility-Scale Solar

#### **Butterworth Landfill**

*Grand Rapids, MI*

#### **Yeoman Creek Landfill**

*Waukegan, IL*



*Region 5 2013  
Renewable Energy Assessments*

## RENEWABLE ENERGY ASSESSMENT SERVICES

### Resource Screening

Through review of resource availability data provided by the U.S. Department of Energy and the National Renewable Energy Laboratory, resource screenings can be accomplished with a low level of effort and enable stakeholders to quickly identify the renewable energy sources best suited to a particular site. Typical resource screenings include evaluations of solar, wind and biomass resources.

### Site Suitability Analysis

Mapping and analysis of a site's physical features, existing or planned remedial components, ownership, infrastructure and surrounding land use considerations provides a next level of analysis. The site suitability analysis integrates site remedy compatibility and renewable energy technology considerations into reuse suitability maps to assist site owners, responsible parties and regulatory agencies reach agreement on portions of a site that may be suitable for on-site renewable energy generation. Additional suitability analysis outcomes include: site-specific remedy compatibility considerations, potential facility size options and high level capital and periodic cost estimates.

### Preliminary Financial Assessment

Preliminary comparative financial assessments provide financial payback approximations that can help site owners and municipalities understand the financial benefits and limitations for a range of renewable energy project ownership and development scenarios tailored to stakeholder goals and site suitability.

## CONTACT INFORMATION

For additional information regarding Region 5 Renewable Energy Assessments, contact:

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# Resource Availability Screening

## FORMER LANSING PLANTS - Lansing and Lansing Township, MI

During 2012-2013, EPA Region 5 sponsored a reuse framework for the former General Motors Plants 2, 3 and 6 located in Lansing Township and the City of Lansing, Michigan. Since the closure of the three plants in 2006, the City of Lansing (Plant 6) and Lansing Township (Plants 2 and 3) have conducted independent planning efforts for the former GM plants that outline goals for green industry and mixed-use development.

The EPA-funded reuse planning effort provided an opportunity to bring together municipalities, the RACER Trust and regulatory agencies, integrate planning goals into a unified redevelopment framework and conduct a renewable energy screening to help align cleanup and future use planning.

- The site suitability and future land use framework provide a mixed-use redevelopment concept to accommodate multiple stakeholder goals and development types.
- Site infrastructure and available land could support a biomass processing and packaging facility as part of a green technology park.
- Site offers potential to integrate small-scale solar or wind facilities for on-site use.

The GM Lansing plants reuse framework demonstrates how a resource availability screening can be integrated into a broader reuse planning effort to help align sustainable energy opportunities with site redevelopment.



### SIZE:

240 acres

### ASSESSMENT TYPE:

Resource availability screening

### RESOURCES EVALUATED:

Biomass, solar and wind.

### OUTCOMES:

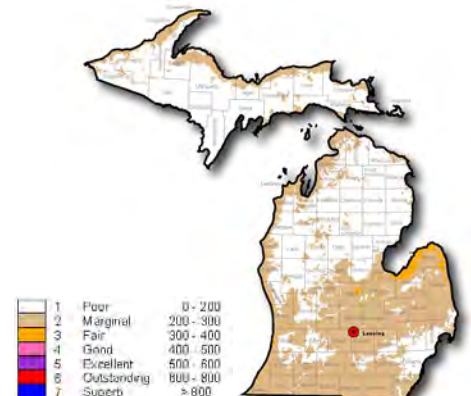
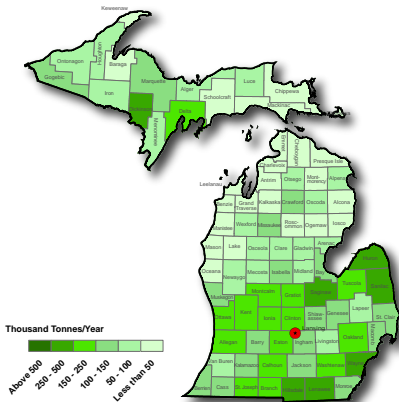
The future land use framework provides a mixed-use redevelopment concept that could potentially accommodate a biomass processing and packaging facility as part of a green technology park and opportunities to integrate small-scale solar or wind facilities for on-site use.

### Assessment Findings

**BIOMASS:** The greater Lansing area has average availability of biomass feedstocks compared to other areas of the state.

**SOLAR:** Michigan and the greater Lansing area have relatively good solar energy resources as measured by irradiance level (4kWh/m<sup>2</sup>/day). Irradiance levels of 6kWh/m<sup>2</sup>/day and higher are considered excellent.

**WIND:** The wind resource available within the greater Lansing area falls within the Class 1 to 2 category, which suggests a poor to fair wind resource relative to other areas of the state. Classes 3 to 7 are considered suitable for utility-scale wind power development.



# On-Site Renewable Energy Use

## OTT/STORY/CORDOVA CHEMICAL CO. SITE - Muskegon County, MI

At the Ott/Story/Cordova Chemical Co. Superfund Site (site) in Dalton Township, Michigan, EPA and Michigan Department of Environmental Quality have completed cleanup to address soil and sediment contamination, and ground water remediation is underway.

The renewable energy assessment evaluated remedy compatibility and the potential financial impact of on-site renewable energy use to offset electric and thermal energy demand for the site's Ground Water Treatment Plant. (GWTP).

### Assessment Findings

- Suitability analysis identified areas suitable for reuse based on remedy components, institutional controls and County reuse goals.
- 20 acres adjacent to the GWTP could potentially support on-site renewable energy facilities.
- On-site solar or wind could potentially off-set more than 30 percent of the GWTP electricity usage with wind or solar PV systems ranging from 1-1.9 MW.
- A geothermal heat pump installed at the GWTP utilizing treated ground water could help off-set thermal heating and cooling demand for the facility's buildings.



### SIZE:

220 acres

### ASSESSMENT TYPE:

Resource availability screening  
Site Suitability Analysis  
Financial Analysis

### RESOURCES EVALUATED:

Solar, wind and geothermal.

### OUTCOMES:

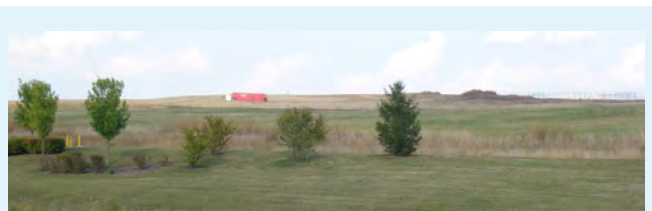
EPA and MDEQ will continue technical and financial feasibility evaluations and are considering government-owned and public-private partnership development scenarios to locate the appropriate renewable energy technologies at the site.

## PRAIRIE VIEW LANDFILL / JOLIET ARMY AMMUNITIONS PLANT - Will County, IL

The Prairie View Landfill is an active non-hazardous waste landfill located on a portion of the former Joliet Army Ammunitions Plant site owned by Will County, IL. Waste Management operates the landfill and a 4.8 MW gas-to-energy plant at the site. The Prairie View Landfill renewable energy assessment prioritized solar as the most viable renewable energy resource at the site and evaluated the landfill's compatibility and financial considerations for a set of pilot innovation projects to advance hybrid gas-to-energy and solar PV generation at the site.

### Assessment Findings

- Suitability analysis identified areas suitable for solar PV based on landfill phasing, remedy components and reuse goals.
- Areas outside of the future landfill footprint could potentially accommodate a 2 MW utility-scale solar PV system.
- Pilot demonstration project could utilize mobile solar PV arrays on the surface of closed landfill cells to test compatibility and feasibility of integrating active landfill operations, gas-to-energy and solar PV systems.
- Small-scale rooftop solar PV system could provide electricity to landfill office or maintenance buildings.



### SIZE:

222 acres

### ASSESSMENT TYPE:

Resource availability screening  
Site Suitability Analysis  
Financial Analysis

### RESOURCES EVALUATED:

Solar and wind.

### OUTCOMES:

Will County and Waste Management are working in coordination with the Joliet Arsenal Development Authority to prioritize short and long-term solar projects for the site.

## BUTTERWORTH LANDFILL - Grand Rapids, MI

The City of Grand Rapids has set a target to source 30 percent of municipal electricity demands from renewable energy sources (hydro, wind and solar) by 2013 and 100 percent by 2020. At the Butterworth Landfill site, 140 acres of City-owned land offers the potential for utility-scale solar generation to offset municipal electricity demands. The solar reuse assessment evaluated 1) site suitability for solar PV based on remedy components, grades, ownership and infrastructure; 2) identified the benefits and limitations of seven potential solar project ownership options; and 3) provided a comparative analysis of financial impacts for three solar project ownership scenarios prioritized by the City.

### Assessment Findings

- Suitability analysis evaluated potential for solar PV based on ownership, reuse goals, remedy components and site features.
- 38 acres suitable for solar PV with potential to support 5-10 MW solar PV system as part of a mixed-use renewable energy/recreational reuse approach.
- Potential direct-use solar PV system to supply electricity to a nearby City-owned waste water treatment plant.
- Opportunity to partner with local utility and third party developers to locate utility-scale solar PV at the site.

## YEOMAN CREEK LANDFILL - Waukegan, IL

At the Yeoman Creek Landfill Site, the site owner, City of Waukegan School District, and the site's responsible parties are evaluating the site's utility-scale solar photovoltaic (PV) generation potential.

The solar reuse assessment 1) evaluated site suitability for solar PV; 2) identified the benefits and limitations of seven potential solar project ownership scenarios; and 3) provided a comparative analysis of financial impacts for three different ownership scenarios prioritized by the City of Waukegan School District.

### Assessment Findings

- Suitability analysis identified remedy compatibility considerations to help prioritize site suitability and phasing options for advancing solar PV across different landfill units.
- 45 acres suitable for solar PV.
- Potential to support 6 MW solar PV system in two phases of renewable energy development.
- Financial assessment assisted local government in prioritizing a land lease arrangement as the most viable way to host a solar PV project at the site.



### SIZE:

190 acres

### ASSESSMENT TYPE:

Site Suitability Analysis  
Financial Analysis

### RESOURCES EVALUATED:

Solar

### OUTCOMES:

The City intends to build on this renewable energy assessment through briefings with key decision makers, soliciting proposals from solar developers and refining project design and feasibility analysis.



### SIZE:

72 acres

### ASSESSMENT TYPE:

Site Suitability Analysis  
Financial Analysis

### RESOURCES EVALUATED:

Solar

### OUTCOMES:

Building on the solar reuse assessment, the City of Waukegan School District plans to solicit proposals from solar renewable energy developers.