Urban Renewable Power

Cleveland Urban Renewable Power

September 2016

Site Selection Process

Potential Locations

- Cuyahoga Land Bank, County, and others identified several potential vacant and blighted parcels with quick acquisition potential and minimum size requirements

Site	Location	Available Land (acres)	Potential Installed Capacity (kW DC)
A	W 11th Street / Spring Road Landfill	12.6 acres	~1,000
B	E 93rd and St Catherine	14.5 acres	3,540
C	Harvard Road Landfill	~48 acres	4,000+
D	City of Brooklyn Landfill	~78 acres	6,000+
Totals		153.1 acres	14,540 kW+ DC

- Sites considered but not currently under consideration:

Location	Available Land (acres)	Potential Installed Capacity (kW DC)
Kinsman and E 79th St	5.7 acres	1,580
Luke Easter Park / Kinsman & E116th St	4.5 acres	1,019

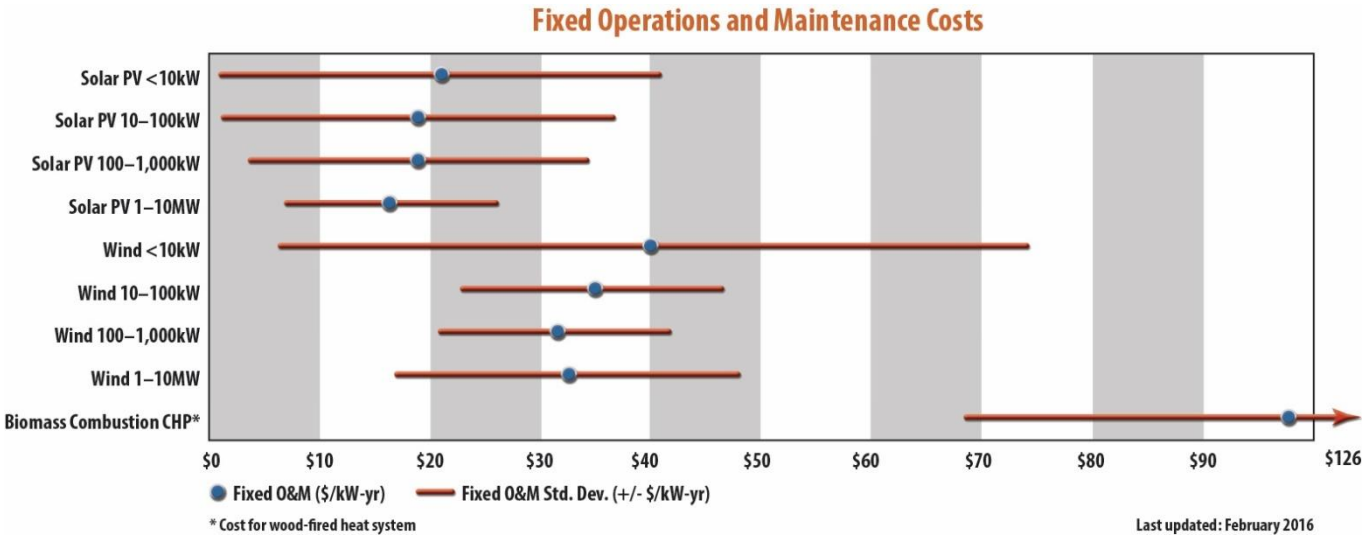
These two sites removed due to small size and not as easy to obtain site control

Project EPC Process

- Schedule:
  - Release of RFP: July 8, 2016
  - Deadline for Questions regarding RFP: July 22, 2016 5:00 PM EDT
  - Answer to Questions provided: July 27, 2016
  - Proposals Due: August 5, 2016 5:00 PM EDT
  - Establish Short List: September, 2016
  - Selection of Vendor: 3rd Quarter 2016
  - Execute Contracts: 3rd Quarter 2016
  - Commercial Operation Date: late 2016 into 2017 (depending upon sites and phasing)
- RFP was sent to 17 identified EPC firms
- Formal bids received from 7 EPCs
- Project scoring considered the following key areas:
  - Pricing
  - Experience and history
  - Local content and labor
  - Overall proposal strength
- Of the 7 formal bids, 3 identified for the “short list” for additional evaluation in conjunction with Eutectics and the project investor group

Project Operations Considerations

DOE Operations Costs Data



- Department of Energy's National Renewable Energy Lab (NREL) data indicates solar projects in the 1-10 MW size have total operations costs averaging $0.18/W per year
  - URP project estimates for O&M + insurance are in this range

Source: http://www.nrel.gov/analysis/tech_cost_om_dg.html

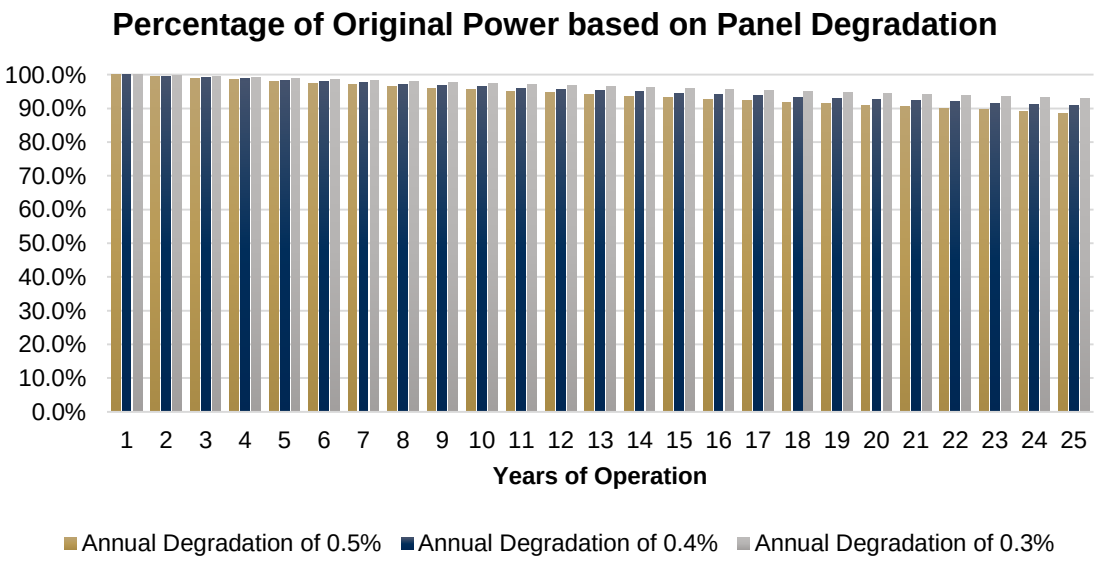
Project Lifetime Considerations

- Solar system component warranties are generally as follows:
  - Solar Panels: 20- or 25-year warranty with efficiency guarantees
  - Inverters: 10+ year warranty. For this project, we would have an extended (20-year) warranty built into the overall project installation costs
  - Racking, electrical, etc. all have anticipated useful life of 25+ years.

Useful Life

Useful Life

System Useful Life	Years
Photovoltaics	25 to 40 yr
Wind	20 yr
Biomass Combined Heat and Power	20 to 30 yr
Biomass Heat	20 to 30 yr
Solar Water Heat	10 to 25 yr
Solar Vent Preheat	30 to 40 yr
Ground Source Heat Pump	20 yr for interior components 100 yr for ground loop



- Panels are rated for 0.4% annual loss of efficiency
- Most panels perform better than that.
- At 0.4% efficiency loss, after 20 years the panels are producing ***over 92%*** of the original energy rating

Source:
http://www.nrel.gov/analysis/tech_cost_om_dg.html

Project Repowering

- System has useful life of 25+ years
- What happens at 25+ years?
  - Solar panels experience some degradation in power output
  - Inverter reliability may be nearing end of life
  - Racking, etc. has extensive useful life left.
- Options:
  - Continue operating as is
  - Replace panels with newer / more efficiency panels
    - Power density is generally increasing on a square footage basis.
    - If panels are replaced, inverters may need to be upsized as well

Project Team Contacts

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