Developing Utility Scale PV Solar Installations on Closed Landfills

Facilitation Slides for "Rethinking Renewable Energy on Brownfields Sites" Session

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SUNLIGHT + LANDFILLS = POWER

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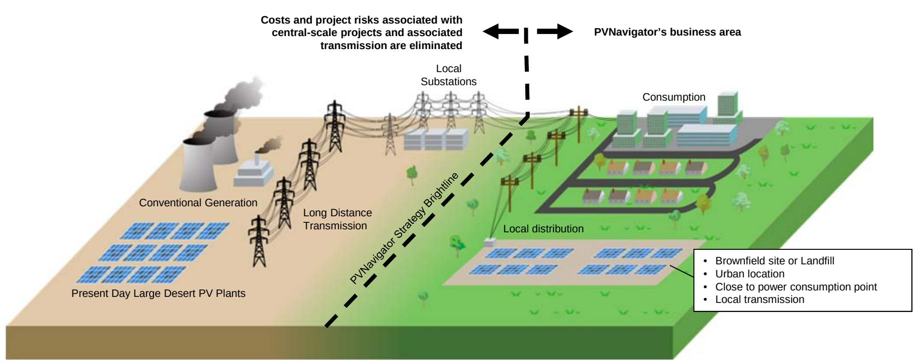
1 – 10 MW, Small-Scale, Distributed, PV Solar Facilities Can Rapidly Deliver Power to Meet Utilities' RPS Standards or Generate Renewable Energy Credits (SRECs).

PV Navigator, L.L.C.'s business model is centered around the following drivers:

- ***Speed to marketplace*** ahead of larger central-scale projects
- Availability of ***urban landfill or Brownfield sites*** which can host the panels
- ***Availability of funding*** for small plants
- Location of sites by ***existing distribution or local load***
- ***Project cost avoidance*** via use of Brownfield sites and the need for new transmission lines
- ***Minimizing permitting requirements*** via development on State or Federal superfund sites
- ***RPS regulatory drivers*** for green power purchase
  - e.g., in CA, 20% renewable power by 2010, and 33% by 2020



According to U.S. EPA, There is No Shortage of Brownfield and Landfill Site Acreage Which Could be Suitable for Renewable Energy.

- Over 400,000 identified Brownfield sites in the United States
- 16 million acres are available for development of renewable energy
- That's enough land to generate approximately 3,175,000 MW
- (For reference, the Hoover Dam generates about 2,000 MW)

A Landfill Site is a Good PV Development Candidate if Certain Screening Criteria are Met.

Appropriate Geographic Location

Land Control (Title or Long-Term Lease)

Environmentally Impacted Land (Restricted Future Use)

Nearby Interconnection Point

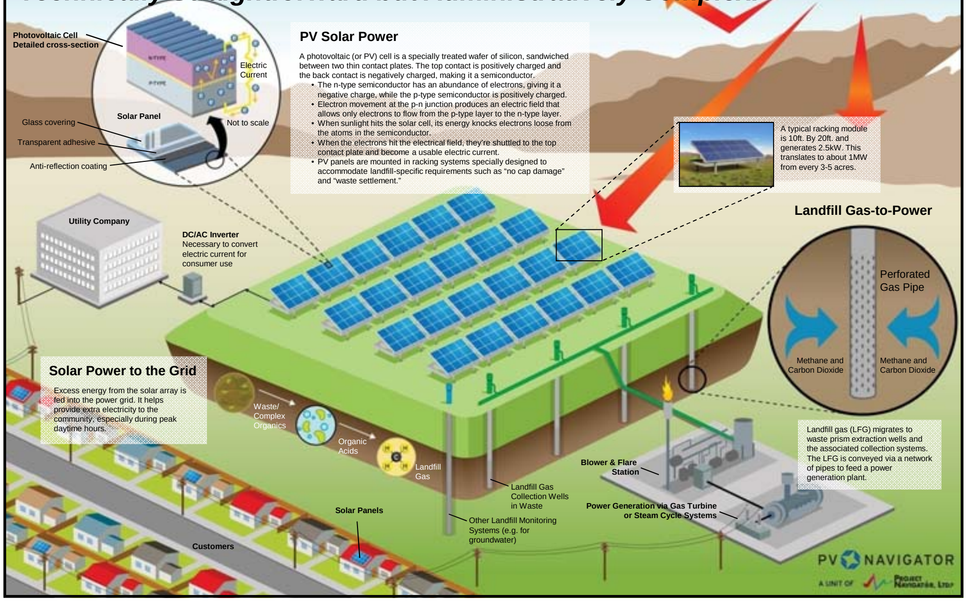
Project Financing
- External
- Internal

Adjacent Load (PPA Approach)

Green Corporate Goals

State-Mandated Renewable Portfolio Standards

Landfill Sites are Excellent Platforms for PV Solar Facilities. Flat Acreage, Close to Load and Interconnect, Putting Otherwise Unusable Acreage Back to Use. *Projects are Technically Straightforward but Administratively Complex.*



Case Study: PV Navigator, LLC Entered into an Agreement in 2011 to Develop a 6 MW PV Solar Installation on the Southern Ocean Landfill (SOLF), New Jersey with Power Sales to Atlantic City Electric.

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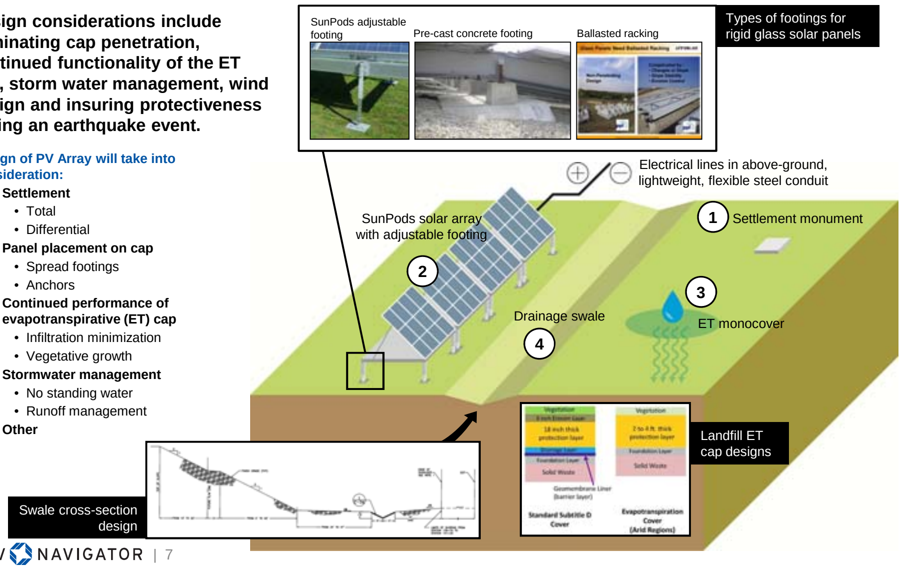
Key Design Criteria are Minimal Settlement & The Continued Need for Cap Functionality.

Design considerations include eliminating cap penetration, continued functionality of the ET cap, storm water management, wind design and insuring protectiveness during an earthquake event.

Design of PV Array will take into consideration:

1. **Settlement**
   - Total
   - Differential
2. **Panel placement on cap**
   - Spread footings
   - Anchors
3. **Continued performance of evapotranspirative (ET) cap**
   - Infiltration minimization
   - Vegetative growth
4. **Stormwater management**
   - No standing water
   - Runoff management
5. **Other**



PNL Has a Grant from the California Energy Commission to Pilot Test a PV System on a Closed Superfund Landfill Site in Los Angeles.