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Clean Energy Development and Services (CEDS)

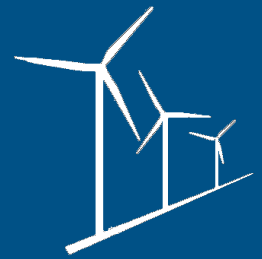
Project Updates from GIS Department

After meeting with DMME members on the 9th of March, the GIS department received from DMME an updated Dominion COV list named PotentialSites_20160218_v4. This list had a list of Virginia Corrections facilities highlighted and GIS analysis began on these properties.

The goal was to plot the correction facilities and extract the county tax parcels that were owned by the Department of Corrections (DOC). We wanted to visualize the size of the parcels, the terrain elevation and slope, the land cover and structures, and any nearby State facilities so we could determine if solar PV could be placed on the property.

Process summary for GIS

1. In Esri ArcMap, geocode the addresses from the potential sites list to assign latitude longitude coordinates and plot them on a map of Virginia.
2. Perform geoprocessing tools to select and extract the county tax parcels surrounding the corrections facilities.
 - Several facilities were close to other facilities and in many cases the parcel contained both facilities.
 - Some facilities had several parcels owned by DOC and those parcels were merged to form a single boundary to perform analysis.
 - Parcel data in regards to ownership was verified as well as possible. Many counties did not list ownership within the parcel attributes making parcel identification difficult. *If a parcel did not contain a corrections facility or was not attributed to the DOC in the county database it was not included in these calculations.*
 - United States Prison data was discovered on the U.S. Department of Homeland Securities HIFLD website. This dataset was a polygon GIS layer containing the locations of prison sites in the United States. Each prison facility had been carefully digitized (drawn in GIS) and attributes such as facility name, address, county, phone#, status, population, and web links were included. This data did not include parcel or land area data but was extremely useful in identifying the number of different facilities in Virginia as well as being more current than the DGS property list.
 - Once this dataset was incorporated and county parcels extracted, analysis of the properties could begin.
3. Correction facility parcel analysis began by assigning the annual kWh values from the Dominion COV list.
 - Since the Dominion COV list does not have kWh values for each listed



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facility building, it was decided to assign the annual kWh value of all the properties within each parcel to the parcel itself. So if a parcel of 100 acres contained three facilities, the demand for that parcel was the total of all the service address meters of the three facilities (or as well as could be determined).

- Several prison facilities were outside of the Dominion or ApCo territory and those parcels were not included at this time.
4. Selected Parcels for Analysis
 - We have 16 parcels containing 34 corrections facilities in Dominion territory and 9 parcels with 9 facilities in ApCo territory.
 5. Property Analysis began by overlaying the NREL solar insolation data and extracting the annual value for solar insolation at each parcel. That value was added to the parcel attributes.
 6. A GIS layer was created to determine the elevation and slopes on each parcel. Percent slope was used in the calculations.
 - Slope was classified to identify those areas where slopes were between 0-5%, 5%- 8%, and 10% to 20% and higher. The goal was to locate open areas in the parcels where the terrain was between 0 and 8% slope for the purpose of installing ground mount solar arrays.
 - Open areas are defined as areas of dirt or grass that appear to be un-used and do not contain structures. If an area appeared to be agricultural it was included. Steep slopes, rocky terrain and areas of obvious use were not included. This definition is highly subjective and open area acreages may be edited after site inspections or management decisions.
 - Open areas were digitized around obstructions, steep slopes, structures, and other hazards. Wetland areas were skirted. Each open area acreage was calculated, and the open area acreage for the entire parcel was noted in the parcel attributes.
 1. Southern orientation also comes into play when digitizing open areas. Some slopes may be more than the 8% slope. If those slopes face south they could be utilized for the ground mount PV. At this time I have not digitized south facing slopes greater than 8% but several of the parcels have areas that can be assessed.
 7. Calculation of demand, solar array size and available space.
 - An Excel spreadsheet has been produced and calculations have begun.
 - Parcel sizes range between 45 and 2700 acres.
 - Open areas range from 0 to 557 acres.
 - Annual electric demand ranges between 19,000 kWh to 17,821,791 kWh.
 - Calculations of PV size were made based on the formula shown at the DMME meeting on the 9th of March.
 - Calculations are in progress and the properties that appear promising will be selected for presentation to DMME. Parcel information reports will be created to display images, map results, calculations, and other relevant data.

8. Next steps.

- Create property data sheets as described above.
- Perform additional calculations to include options for different types of ground-mount systems.
- Consider digitizing certain sized south-facing slopes on properties with little or no flat open areas.