



Land Use Analysis of NC Solar Installations

Summary

The NC Sustainable Energy Association (NCSEA) and the NC Department of Agriculture & Consumer Services (NCDA&CS) collaborated to determine the land use effects of utility-scale solar installations on North Carolina’s agricultural lands. Use of aerial photography and GIS software allowed for a determination that as of December 2016, solar installations occupy approximately 9,000 acres of former agricultural lands, or 0.2% of North Carolina’s 4.75 million acres of total cropland.

Additionally, it was found that utility scale solar installations in North Carolina occupy an average of 33.9 acres of land, with an average of 5.78 acres of land needed for each MW (AC) of electrical generation capacity. Solar PV installations currently add 2.3GW of solar generating capacity to North Carolina’s electricity grid, making NC second in the nation for installed solar PV capacity. These installations provide enough to power 256,000 homes, equaling 6.2% of all households in the state.^{1,2}

Methodology

NCSEA and NCDA&CS collaborated to analyze currently installed, ground mounted solar photovoltaic (PV) systems in the state using GIS software and aerial photography. NCSEA provided data on the location of solar PV installations in the state as of December 2016, and NCDA&CS was able to locate 318 of the 341 currently installed, ground mounted PV sites with capacities over 1 MW (AC) in the state utilizing the most recent aerial photography available. NCDA&CS found a total footprint of the 318 sites equaling 10,779 acres using conservative boundaries that approximately followed the fence line of the installation. Of this total, 8,462 acres, or 78.5%, had farmland as the previous land use. Previous land use was determined by visual inspection of aerial photography of the site immediately prior to the installation of the solar PV facility. The farmland designation includes use as cropland, hay land, or pasture. Based on average values obtained from the 318 mapped sites, solar installations in the state currently occupy approximately 11,559 total acres. Of that total, 9,074 acres were identified as having previous use as farmland. This accounts for approximately 0.2% of the state’s 4,745,014 acres of total cropland based on the 2012 USDA Census of Agriculture.³ This initial analysis provides a baseline for reproduction as changes in both the solar and agriculture industries will necessitate updated data going forward.

SOLAR ON AGRICULTURAL LANDS

2,300 MW
of Solar PV Capacity
11,600 acres
of land occupied
34 acres
per installation
5.78 acres
per MW of capacity
256,000 homes
powered by solar

¹ U.S. Energy Information Administration. (2016). 2015 Average Monthly Bill-Residential. Available at: http://www.eia.gov/electricity/sales_revenue_price/pdf/table5_a.pdf

² North Carolina Housing Coalition. Housing Facts and Statistics in NC. Available at: http://www.nchousing.org/research-data/facts_stats

³ United States Department of Agriculture Census of Agriculture. (2012). State Summary Highlights: 2012. Available at: https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_US_State_Level/st99_2_001_001.pdf