

The Present and Future State of North Carolina's Solar Energy Industry: The Effects of Letting the State's Tax Credit Expire

By Evan Hiatt

I. Solar Industry Overview

The solar industry is made up of three different categories: residential, commercial, and utility.¹ Residential units are usually ones that are placed on rooftops and can provide the majority, if not all of the power needs of a single home.² In North Carolina, these systems can be hooked to the power grid and monitored through a process called net metering where homeowners can buy power not supplied by the panels or sell off any excess power generated.³ Commercial systems are used by businesses and usually create more power, as they are typically installed on flat roofs and can be oriented directly towards the sunlight.⁴ Furthermore, businesses usually have more roof space, meaning they can erect larger panels that capture more light.⁵ Utility solar systems typically sit on at least a few acres and instead of supplying power directly to owners, the energy is sold to wholesale utility buyers.⁶

While a single cell within solar panels only produces a few watts of power, a standard 5 kilowatt (kW) solar system⁷ used for residential purposes consists of around 20

¹ James Hamilton, *Careers in Solar Power*, U.S. DEP'T OF LABOR, http://www.bls.gov/green/solar_power/ (last visited Dec. 30, 2016).

² Luke Tarbi, *How Many Solar Panels Do I Need For My Home?*, ENERGY SAGE (June 20, 2016) <http://news.energysage.com/how-many-solar-panels-do-i-need/>.

³ See LUKAS BRUN ET. AL., DUKE CTR. ON GLOBALIZATION, GOVERNANCE, AND COMPETITIVENESS, *THE SOLAR ECONOMY: WIDESPREAD BENEFITS FOR NORTH CAROLINA*, 37 (2015), http://www.cggc.duke.edu/pdfs/02152015Duke_CGGC_NCSolarEnergyReport.pdf.

⁴ *Residential and Commercial Solar Panels: What's the Difference?*, ALDER ENERGY SYSTEMS, <http://www.alder-energy.com/residential-commercial-solar-panels-whats-the-difference/> (last visited Dec. 30, 2016).

⁵ *Id.*

⁶ See *Utility Scale Solar Power*, SOLAR ENERGY INDUS. ASS'N, <http://www.seia.org/policy/power-plant-development/utility-scale-solar-power> (last visited Dec. 30, 2016).

⁷ Sara Matasci, *What Does a 5kW Solar System Cost in the U.S.?*, ENERGY SAGE (June 3, 2016), <http://news.energysage.com/5kw-solar-systems-compare-prices-installers/>.

panels and produces on average 7,161 kilowatthours (kWh) annually.⁸ The average American home uses 10,812 kWh, so this system would provide the majority of required energy.⁹

However, solar systems are quite expensive. The 5 kW system referenced above usually costs around \$20,000.¹⁰ To develop solar farms at an industrial and commercial level, the average price is around \$1 million dollars per acre.¹¹ Developing a utility-scale, 5 megawatt (MW) solar farm typically costs around \$5 million.¹²

II. The Solar Industry Within North Carolina

As of early 2016, North Carolina had approximately 1.8 gigawatts (GW) of solar energy installed across the state.¹³ 22 MWs (1.2%) of this is residential, while commercial solar equals around 94 MWs (5%) of the overall makeup.¹⁴ The remaining 93.8% is produced by utility facilities owned by independent power producers, the majority of which are contracted to Duke Energy.¹⁵

Rural counties in North Carolina tend to draw a disproportionate amount of the solar business, as Catawba, Robeson, and Wayne counties house 24.7% of utility-scale solar

⁸ See Tarbi, *supra* note 2.

⁹ *How Much Electricity Does An American Home Use?*, U.S. ENERGY INFORMATION ADMINISTRATION, <https://www.eia.gov/tools/faqs/faq.cfm?id=97&t=3> (last updated Oct. 18, 2016).

¹⁰ Mathias Aarre Maehlum, *How Much Do Solar Panels Cost*, ENERGY INFORMATIVE, <http://energyinformative.org/solar-panels-cost/> (last updated March 23, 2015).

¹¹ See *Solar Farm Cost Per Acre*, INNOVATIVE SOLAR SYSTEMS, <http://innovativesolarfarms.com/solar-farm-cost-per-acre/> (last visited Dec. 30, 2016).

¹² Kirin D. Walsh, *An Industry on the Precipice of Change: Maintaining Solar Energy's Copetitive Advantage in North Carolina After the Expiration of the Investment Tax Credits*, 93 N.C. L. Rev. 1935, 1937 (Sept. 2015).

¹³ John Downey, *N.C. Solar Construction Likely Peaked in 2015, Report Says*, CHARLOTTE BUSINESS JOURNAL (Sept. 14 2016), <http://www.bizjournals.com/charlotte/news/2016/09/14/report-says-n-c-solar-construction-likely-peaked.html>.

¹⁴ *Id.*

¹⁵ *Id.* John Murawski, *Peak Solar? NC's Frenetic Pace of Solar Development Faces Hurdles*, NEWS & OBSERVER (June 18, 2016), <http://www.newsobserver.com/news/business/article84421832.html>.

production.¹⁶ This is quite impressive when considering that these counties only make up 4.8% of the state's total population.¹⁷ The solar industry has provided a huge economic boon to these areas by providing \$505,893,117 for rural economies that are typically plagued by job scarcity.¹⁸

In 2015, the largest generators of electricity were nuclear energy (32.6%), coal (31.4%), and natural gas (28.3%).¹⁹ Renewable energies comprised about 7% of the state's power production in 2015,²⁰ with solar energy contributing around 1%.²¹ However, this may change in the foreseeable future due to the state's previous investment in the solar industry.

During 2014, North Carolina gave out \$126,661,982 in tax credits for businesses and residents using solar energy, which has generated \$717,612,130 in spending.²² For every dollar the state paid out in credits, it has received \$1.93 in return for its investment.²³ As a result, ratepayers saw reduced costs on their electricity bills.²⁴ It is estimated that the tax dollars spent so far on clean energies in North Carolina, 82% of which have been on solar

¹⁶ See BRUN, *supra* note 3, at 13.

¹⁷ See NORTH CAROLINA OFFICE OF STATE BUDGET & MGMT., COUNTY ESTIMATES (2016), <https://www.osbm.nc.gov/demog/county-estimates>.

¹⁸ See BRUN, *supra* note 3, at 13.

¹⁹ U.S.E.I.A., NORTH CAROLINA: STATE PROFILE AND ENERGY ESTIMATES, <http://www.eia.gov/state/?sid=NC> (last updated Aug. 18, 2016).

²⁰ *Id.*

²¹ U.S.E.I.A., NORTH CAROLINA: PROFILE ANALYSIS, <http://www.eia.gov/state/analysis.cfm?sid=NC&CFID=14834343&CFTOKEN=572542e0ca1ddc85-39E6309C-5056-A34B-> (last updated Aug. 18, 2016).

²² N.C. DEP'T OF REVENUE, CREDIT FOR INVESTING IN RENEWABLE ENERGY PROPERTY, YEAR 2014 (Apr. 29, 2015), http://www.dornrc.com/publications/incentives/2015/2_3b_renengyprop14.pdf.

²³ RTI INT'L, THE ECONOMIC IMPACT OF CLEAN ENERGY DEVELOPMENT IN NORTH CAROLINA: SUMMARY FINDINGS (2014), http://www.energync.org/resource/resmgr/Resources_Page/NCSEA_econimpact2014summary.pdf.

²⁴ N.C. SUSTAINABLE ENERGY ASS'N, REPORT SHOWS RURAL AREAS BENEFITING SIGNIFICANTLY FROM NORTH CAROLINA CLEAN ENERGY DEVELOPMENT (Feb. 23, 2015), http://c.ymcdn.com/sites/energync.site-ym.com/resource/resmgr/Press_Releases/2015_RTI_Study_Release_FINAL.pdf.

power, will save the state \$651 million in electricity costs by 2029.²⁵ There are over 450 North Carolina companies engaged in the solar industry.²⁶ These corporations provide approximately 4,307 jobs and at least \$2 billion dollars worth of direct spending within the state.²⁷

A variety of factors made the state of North Carolina a proverbial breeding ground for new solar installation within the past few years. From 1977 to 2014, the price of silicon PV cells has fallen from \$76.67 per watt to an all-time low of \$0.36, which greatly reduced installation costs.²⁸ The price for solar is continually dropping, seeing a deduction of 7.5% in the 2nd fiscal quarter of 2016 alone.²⁹ North Carolina also “has more solar power capacity than the rest of the Southeastern states combined, and ranks second in the nation behind California for pulling power from the sun.”³⁰ With the state and federal tax credit available to taxpayers in 2015, the price to install a standard solar system was cut in half.³¹

Due to all of these factors and the role they played in alleviating the financial burden associated with the solar industry, “North Carolina solar companies invested almost \$1.7 billion in building more than 900 megawatts worth of solar projects in 2015.”³²

III. Federal Efforts to Assist the Solar Industry

The federal Investment Tax Credit (ITC), established by the Energy Tax Act of 1978, was a measure taken by Congress to facilitate the birth of renewable energy sectors.³³ It

²⁵ RTI INT’L, THE ECONOMIC AND RATE IMPACT ANALYSIS OF CLEAN ENERGY DEVELOPMENT IN NORTH CAROLINA (2015).

²⁶ See BRUN, *supra* note 3, at 2.

²⁷ *Id.*

²⁸ See BRUN, *supra* note 3, at 6.

²⁹ Luis Martinez, *N.C. Now Second in Solar; Smart Policies Can Keep It That Way*, NAT. RES. DEF. COUNCIL (Sept. 20, 2016), <https://www.nrdc.org/experts/luis-martinez/nc-now-second-solar-smart-policies-can-keep-it-way>.

³⁰ Dale Neal, *Tax Credit Sunset Could Dim Solar Business Prospects*, CITIZEN-TIMES (Jan. 14, 2016), <http://www.citizen-times.com/story/money/2016/01/14/tax-credit-sunset-could-dim-solar-business-prospects/78596786/>.

³¹ See Walsh, *supra* note 12, at 13.

³² See Downey, *supra* note 13.

provided 10% income tax deductions for those properties eligible for solar installation.³⁴ The Energy Policy Act of 2005 increased the ITC further to 30% for both residential and commercial units.³⁵ A few years later, the ITC was again amended to extend to public utilities owned by investors and extended the 30% rate to 2016 by the Emergency Economic Stabilization Act of 2008.³⁶ So far, the ITC has been utilized extensively. As of October 2016, 4% of homeowners in America had solar panels installed on their houses.³⁷ In 2015, the ITC was extended by the Ominibus Appropriations Act until 2023.³⁸ However, the credit will drop from 30% to 26% in 2020, drop again to 22% in 2021, only to be phased out entirely by 2023 while maintaining a set 10% credit to utility systems.³⁹

In the 1970's in the midst of the nation's energy crisis, Congress enacted the Public Utilities Regulatory Polices Act (PURPA).⁴⁰ This legislation required regulated utility companies to buy power from independent power producers if they can produce it at a cheaper rate than the utility can at its own lowest cost.⁴¹ However, this was interpreted by the Federal Energy Regulatory Committee (FERC) to mean that none of the potential costs of pollution by regulated utility companies would be factored in to their own costs of

³³ See BRUN, *supra* note 3, at 31.

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ Brian Kennedy, *Americans Strongly Favor Expanding Solar Power to Help Address Costs And Environmental Concerns*, PEW RESEARCH CENTER (Oct. 5, 2016) <http://www.pewresearch.org/fact-tank/2016/10/05/americans-strongly-favor-expanding-solar-power-to-help-address-costs-and-environmental-concerns/>.

³⁸ *Solar Investment Tax Credit (ITC)*, SOLAR ENERGY INDUS. ASS'N, <http://www.seia.org/policy/finance-tax/solar-investment-tax-credit> (last visited Dec. 30, 2016).

³⁹ *Id.*

⁴⁰ See BRUN, *supra* note 3, at 32.

⁴¹ *Public Utilities Regulatory Policy Act (PURPA)*, UNION OF CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/smart-energy-solutions/strengthen-policy/public-utility-regulatory.html#.VJ2-bsLpA (last visited Dec. 30, 2016).

production.⁴² This means that many of the non-cost benefits of renewable energies, such as self-sustainability and lack of pollution, are largely ignored.

IV. North Carolina's Efforts to Jumpstart the Solar Industry State-Wide

North Carolina has supplemented federal assistance for the solar industry by implementing policies that have supported the ignition of the solar industry in North Carolina.

While PURPA was executed at the federal level, it is administered by state utility regulatory agencies.⁴³ The North Carolina Utilities Commission (NCUC) ordered that utility companies must enter into Power Purchase Agreements (PPA's) for 15-year terms with solar power facilities that produce fewer than 5 MWs annually.⁴⁴ This has been extremely beneficial to the solar industry within North Carolina, as the majority of facilities fall below the 5 MW threshold.⁴⁵

In 2007, the North Carolina General Assembly took the initiative to create the Renewable Energy and Energy Efficiency Portfolio Standard (REPS).⁴⁶ This legislation demands that investor-owned utilities must obtain 12.5% of their power from renewable sources by 2021, with interim targets of 5% in 2015 and 10% in 2018.⁴⁷ Furthermore, REPS requires that municipally-owned utilities and cooperatives must reach a 10%

⁴² *Id.*

⁴³ CAROLYN ELEFANT, REVIVING PURPA'S PURPOSE, THE LAW OFFICES OF CAROLYN ELEFANT, 32 (2011) <http://www.recycled-energy.com/images/uploads/Reviving-PURPA.pdf>.

⁴⁴ Elias Hinckley, *North Carolina Utilities Commission Maintains Key Power Purchase Agreement Terms for Solar Investments*, ENERGY FIN. REPORT (Feb. 2, 2015), <http://blog.sandw.com/energyfinancereport/2015/02/north-carolina-utilities-commission-maintains-key-power-purchase-agreement-terms-for-solar-investments/>.

⁴⁵ See BRUN, *supra* note 3, at 16.

⁴⁶ N.C. Gen. Stat. § 62-133.8(b)(1) (2013).

⁴⁷ *Id.*

renewable energy target by the year 2018.⁴⁸ As a result, Duke Energy completed a 20 MW solar farm in North Carolina during 2013 that powers around 4,000 homes.⁴⁹

While North Carolina provides many incentives for utility-scale facilities in the solar industry, it also provides a financial inducement called net metering that is targeted towards those who own smaller solar panel systems. Net metering allows owners to receive full credit value for the excess energy that their systems produce.⁵⁰ Many times, these credits will be used to offset the client's electricity bill.⁵¹ The only applicable solar energy systems under the system are those that have a capacity of 1 MW, meaning that it will mainly apply to residential and commercial solar energy systems.⁵²

Perhaps the most significant legislation passed by the state was the state-level renewable energy tax credit in 1977.⁵³ This credit, amended several times over its history, offered a 35% credit that compensated North Carolina taxpayers for the costs of construction, lease, and purchase of renewable energies.⁵⁴ Coupled with the 30% solar Investment Tax Credit (ITC) from the federal level, North Carolinians could have solar energy installed at a price discounted up to 65%.⁵⁵ However, the state-level tax credit recently expired on December 31st, 2015, eliminating the state-wide subsidies available for

⁴⁸ See BRUN, *supra* note 3, at 33.

⁴⁹ *Dogwood Solar*, DUKE ENERGY, <https://www.duke-energy.com/commercial-renewables/dogwood-solar.asp> (last visited Dec. 30, 2016).

⁵⁰ See BRUN, *supra* note 3, at 33.

⁵¹ See *Frequently Asked Questions About Solar Photovoltaic and Solar Thermal (Hot Water) Systems*, GO SOLAR CALIFORNIA (2016), http://www.gosolarcalifornia.ca.gov/solar_basics/faqs.php.

⁵² See BRUN, *supra* note 3, at 33.

⁵³ *Id.* at 1.

⁵⁴ See *Renewable Energy Tax Credit*, N.C. CLEAN ENERGY TECH. CTR., <http://programs.dsireusa.org/system/program/detail/541> (last updated February 15, 2016).

⁵⁵ See *Solar Investment Tax Credit*, *supra* note 38.

potential solar energy customers.⁵⁶ This could cause a significant impact on a blossoming industry within North Carolina.

V. The Potential Impact of the Expired Tax Credit.

In 2015, North Carolina installed the 2nd most MWs worth of solar capacity in the country (maximum possible generation output).⁵⁷ Then, as the tax credit was set to expire, companies rushed to finish projects, and within a year, the amount of solar capacity more than doubled within the state.⁵⁸ This explosion of business made North Carolina the 3rd largest state in regards to solar capacity, falling behind only Arizona and California.⁵⁹ The state also experienced a 130.9% estimated net growth from utility scale facilities and distributed solar PV Generation in between July 2015 and July 2016.⁶⁰ In the 2nd Quarter of 2016 alone, North Carolina added 144 MWs, an amount that can power more than 15,000 homes.⁶¹

However, projections have stated that North Carolina will construct around 630 MWs of solar by the end of 2016, which is about 70% of what was built in 2015.⁶² It is also speculated that investment in the industry will decrease to \$1 billion, which is nearly half the amount expended in 2015.⁶³ Consequently, projections forecast the state adding more than 2.9 GWs to its grid over the next 5 years – twice as much as the total added between 2011 and 2015.⁶⁴

⁵⁶ See *Renewable Energy Tax Credit*, *supra* note 54.

⁵⁷ See PROFILE ANALYSIS, *supra* note 21.

⁵⁸ U.S.E.I.A., TABLE 1.17.B. NET GENERATION FROM SOLAR PHOTOVOLTAIC (Sep. 26, 2016), http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_17_b.

⁵⁹ *Id.*

⁶⁰ *Id.*

⁶¹ See Martinez, *supra* note 29.

⁶² See Downey, *supra* note 13.

⁶³ See Martinez, *supra* note 29.

⁶⁴ *Id.*

However, these projections don't consider whether projects in the planning and development stages will be continued in light of the expired credit. As of now, there are 377 facilities totaling 3,034 MW still in the preparation phases that are still subject to change.⁶⁵ With the tax credit seeing its end in North Carolina, solar companies have been expanding their business into South Carolina, where a 25% tax credit is still offered.⁶⁶

Since the majority of North Carolina's solar systems are of the utility variety, the tax credit is an extremely crucial blow. The credit reduced costs of production by up to \$2.5 million, meaning that developers have lost their primary funding source used to persuade potential investors.⁶⁷

North Carolina's largest solar developers, who focus mainly on utility-scale projects, have faced additional hardships other than the expiration of the state's tax credit. While tax credits help to pay for the installation of solar farms, the upgrades to said farms are absorbed completely by the developer, and these improvements have seen an uptick in price from \$75,000 in 2013 to estimates in excess of \$300,000 in 2016.⁶⁸ Additionally, the Power Purchase Agreements (PPA's), where utility corporations are required to buy from independent power producers who can generate energy at a cheaper rate than the corporation, are rendering payments that are exponentially lower as time proceeds.⁶⁹⁷⁰ When the prices of PV panels plummeted, it also made it possible for utility companies to install their own solar farms, causing the subsidies from PPA's to drop from around 15

⁶⁵ See BRUN, *supra* note 3, at 12-13.

⁶⁶ See Neal, *supra* note 30.

⁶⁷ See Murawski, *supra* note 15.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ See BRUN, *supra* note 3, at 33.

cents per kWh to less than 1/10 of a cent per kWh.⁷¹ In between the cut of the state tax credit, the amplified costs of installations, and staggeringly low generated revenue from PPA's, the future of utility solar (93.8% of total within North Carolina) is uncertain.

Strata Solar is the largest solar company in North Carolina, accounting for over a 4th of the total solar installed.⁷² Due to the current constraints on the solar industry, Strata has begun to contemplate moving much of their business elsewhere.⁷³ Specifically, Strata is exploring options of creating enormous 300 MW farms in the Southwest, as compared to their typical 5 and 20 MW farms in North Carolina.⁷⁴

The utility scale solar projects, such as those created by Strata Solar, have been the fastest growing and most popular form of renewable energy within North Carolina.⁷⁵ In between 2007 and 2015, solar PV accounted for 22% of the renewable energy generated.⁷⁶ Nearly 94 percent of that amount is attributable to utility solar farms.⁷⁷

The growth and performance of the solar industry within North Carolina, specifically that of utility-scale farms, is a positive step towards the utopian goal of total reliance on clean energy. With the looming factor of global warming and the subsequent emphasis by all forms of government towards cleaner forms of energy, the significance of solar energy for our country's future cannot be understated. However, allowing the North Carolina's tax credit to expire, among other current financial restraints on the solar industry, will discourage potential developers to move to the state and encourage presiding companies to relocate their business. By reinstating a tax credit of some sort, North

⁷¹ See Murawski, *supra* note 15.

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ RTI INT'L, *supra* note 23.

⁷⁶ *Id.*

⁷⁷ See Murawski, *supra* note 15.

Carolina would save money on energy, create new jobs, stimulate rural economies, and invest in an environmentally clean future.