Law, Policy, and the Future of Solar Financing

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Law, Policy, and the Future of Solar Financing explores the legal and policy implications of increasing the finance of solar energy.

This paper is based on discussion at a one day event, co-convened by the UNC School of Law Center for Climate, Energy, Environment, and Economics ("CE^3"); the UNC School of Law Center for Banking and Finance; and the UNC School of Government Environmental Finance Center. This workshop was designed to bring stakeholders together from the environmental, energy, and finance space, to examine the current state of solar financing and discuss legal opportunities, barriers, and proposals for increasing financing opportunities to benefit financial institutions, solar providers, and policies related to more carbon neutral electricity provision. Participants included academic experts, experts on government solar incentives, representatives from public Green Banks and renewable energy companies, representatives of law firms, financial institutions of various sizes, the NC Utilities Commission and electric utilities. A full list of participants may be found in Appendix B. The Program Agenda is in Appendix A and Appendix C provides a detailed review of the presentations.

I. Introduction

All forms of renewable energy are at an inflection point. Falling costs, changing technology, and new environmental and climate regulations have all moved to exponentially increase the growth of renewable energy across the country, particularly in wind and solar power. While wind currently has significantly more market share than solar, predictions are that solar photovoltaic energy will be the fastest growing source of energy moving forward. Solar photovoltaic energy also highlights the differing regulatory regimes and economic drivers which influence the use of solar at utility scale and solar energy at small (or "distributed generation") scale.

Much of the growth of wind and solar energy has been assisted by government policies providing specific financial incentives for deploying these resources, but in the case of solar in North Carolina and other states, some of these incentives have lapsed. In North Carolina, the state tax credit, one of the most generous in the country for solar energy, expired at the end of 2015, and the federal solar tax tax incentives are scheduled to phase down within several years.

Additionally, the declining demand and price for fossil fuel energy have impacted investment in all energy, including renewables. These factors highlight the need for re-examining the financing strategies and profit opportunities for solar energy under this "new normal. Law and policy play outsize roles in

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what forms solar energy financing will take. This requires an examination of: 1) the future demand for solar energy; 2) the current state of and viability of financing options for solar energy projects (both small scale distributed and utility scale); and 3) financing challenges and solutions to increasing the availability of private sector financing of solar deployment through legal and/or policy changes.

II. Session Recap

This workshop continued to build on previous CE^3 workshops, bringing together diverse stakeholders to discuss issues surrounding financing of solar energy and, over the course of the day, find areas of agreement (and disagreement), come to conclusions and shape recommendations. In particular, attendees were asked to engage with questions around: 1) the future demand for solar energy; 2) the current state of and viability of financing options for solar energy projects (both small scale distributed and utility scale); and 3) financing challenges and solutions to increasing the availability of private sector financing of solar deployment through legal and/or policy changes.

In order to assist participants in examining these areas, the workshop included detailed presentations about the future energy mix, the role of solar and law, including current legal influences such as the role of PURPA and net metering; the North Carolina example and other state experiences, including third party sales and the tax treatment of solar assets; the market for bank financing; current financial products and programs, including a discussion of tax equity investors, utility-scale financing, and yield cos; and the drivers and barriers of emerging markets and financial products, focusing on the perceived legal barriers for increasing availability of solar financing, and possible solutions, including residential roof-top market expansion, tax credit bonds, green bank and green bonds, third party sales, and institutional and non-profit properties. Detailed descriptions of the presentations are contained in Appendix C.

The participants were told at the beginning of the meeting that the Chatham House Rule was in effect; anyone at the meeting is free to use the information from the discussion, but is not allowed to reveal who made any specific comment. This was implanted to foster an open discussion during the workshop.

III. Issues

The most important issues identified in the Workshop were:

- **Uncertainty and complexity surrounding terms of prices paid for solar power from various size installations is a major barrier to more solar financing and deployment of solar energy. The State of North Carolina's standardization of pricing terms and interconnection criteria from power sources of a particular size has incented more solar development in North Carolina than in states without these policies. Additional contract standardization nationally may also aid in adoption.**

  Much of the price paid for solar energy is determined by the interaction of the federal Public Utility Regulator Policy Act ("PURPA") and state regulations interpreting various provisions of PURPA, including the appropriate determination of the "avoided cost" price, which is paid to qualifying small generators for the power they supply onto the grid. In North Carolina, this is a static measure, determined in a docket by the North Carolina Utilities Commission (NCUC), and

does not vary by location on the grid, the time of day the generation is put onto the grid, or how the generation may (or may not) coincide with higher demand. The avoided cost rate, determined every two years, is fixed until the next completed avoided cost docket.

Along with the standardized rate, a standard contract with Duke Energy is also available to generators up to 5 MW that among other things guarantees the standard rate for a specified period. Therefore, for systems up to that limit, there is no need for an individual developer to negotiate all the terms that would be in a standard contract with the incumbent utility, including the terms of interconnection. This has led to a significant number of just under 5 MW utility-scale projects being developed in the state.

Additionally, the financial uncertainties are different for utility-scale installations compared to residential installations. With utility-scale installations, uncertainty could come from a potential change in the avoided cost rate with future contracts, while for residential installations uncertainty derives from a lack of historical performance data of the panels ("performance risk") and associated components and concern over net metering policies.

Failure of state laws to authorize third party purchases and installation of residential and community solar has also hampered growth in many states such as North Carolina. In order to get around these restrictions, rate of return may need to be structured in a more complex manner, reducing the value of investment.

- **Complexity of deals and standardization is related to the fundamental issue regarding solar energy financing and deployment, which is the total rate of return on investment. In addition to the reduction in transaction costs with standardization, other factors can affect this calculation, including other government incentives, cost of alternative sources of power, savings from increasing scale, and utility commission interpretation of the public interest.**

  Though reduction of transaction costs through standardization of PURPA qualifying entities can reduce costs of solar deployment, as demonstrated in North Carolina, other factors also come into play, such as tax incentives, cost of other sources, environmental and renewable energy policy, regulatory determination of the public interest and new economies of scale that are just being recognized. Because the rate of return on solar investment is dynamic, this can come into tension with static policy such as the specific size limit set by North Carolina for PURPA determined compensation. As economies of scale grow, providing better return on investment for larger and larger solar installations, this can decrease the value of standardization as the rate of return realization from larger scale may outweigh the additional transaction costs needed to reach a compensation agreement. This also suggests that a more flexible or dynamic standardization policy might allow the realization of both kinds of positives to a rate of return.

- **Varying and changing state policies in different areas such as environmental protection, low-cost energy provision, and business development, may not be coordinated, creating uncertainty in rate of return calculations. This uncertainty inhibits investment in solar energy deployment. Therefore, more consistency and predictability within state systems governing the rate to be paid for solar energy would increase opportunities for financing and**

deployment. Identifying disparate values and factors that should be considered when making determinations, and carefully comparing and weighing these is an important step moving forward.

Many states and utility commissions are looking at how to appropriately value solar and what factors to include in that calculation. Most of the more complex – and comprehensive – valuations and methodologies are taking place in states with wholesale electricity markets, as valuing distributed generation resources appropriately sends a strong price signal as to what value these resources can provide to the grid. These states have also tended to look at the externality costs that distributed generation can save, i.e., using the social cost of carbon as part of the valuation. States with vertically integrated utilities, like North Carolina, do not have the market to provide the reference point for when distributed generation can be an asset that makes economic sense, and likewise, have tended to define the benefits of solar power more narrowly.

- **While on average, utility or larger scale solar usually produces electricity at a cheaper cost, providing a higher rate of return, smaller scale solar and distributed generation may be preferential policy in some arenas depending on which values and factors noted above are considered.** The disagreement between policies to incent either utility-scale or distributed generation or both is one that needs to be subject to much more discussion. Besides the main economic efficiency argument, utility-scale solar installations also tend to have higher capacity factors and may allow for more efficient, and therefore cheaper, energy production. While utility-scale solar may also enable a higher penetration of solar power more quickly – since it can be built faster – and, therefore, provide a larger carbon benefit more quickly, it does have some downsides. Utility-scale solar may have higher or lower infrastructure costs, can be subject to the same line losses as traditional electricity due to the fact that the electricity is generated away from the load centers using that electricity, and can require large tracts of land.

  Distributed solar generation is typically placed on structures already in existence, rather than on land which could be used for other purposes. Line losses are minimized, because the power can first be used at that location, with excess power not needed at the time of generation fed onto the grid. Infrastructure upgrades, especially in the short term, may be minimized; and, with enough distributed generation, larger transmission infrastructure may no longer be needed. Distributed generation also deploys private capital – in North Carolina especially, given the lack of third party sales, the capital used for residential solar is most commonly that of the homeowner – rather than the utility rate basing the solar assets and, therefore, charging a profit on that capital. However, only exceptionally efficient homes with some form of storage will generally be able to use solar panels to provide for their complete electricity demand or go completely “off grid.”

  While both utility-scale and distributed solar provide benefits – some similar, some different – policy choices regarding the valuation of solar will continue to drive adoption of each to varying degrees, and both are likely necessary to transition to a low-carbon future.

- **The rate of return for solar energy will also vary based on the state regulatory system used for electricity production and transmission. As distributed generation is increasingly added to the grid in vertically regulated states, this lessens funding going to grid maintenance. This suggests that the primary regulated utility will have to be part of how solar deployment is structured and paid for, and that state public utilities may also need to look at altering pricing structures, such as separating transmission costs from generation costs.**

  Inherent in this statement is the acceptance and need for the regulated monopolistic utility and the grid to continue in its current form for the foreseeable future. Depending on technological innovations, grid infrastructure spending may be able to decrease in coming decades. It also assumes that regulated electric utilities will continue to increase in size; future planning, however, may need to recognize a shrinking of the regulated utility, and planning for this eventual change in scope will be required to ensure an orderly transition that electricity customers support.

IV. Recommendations

From these discussions, the following recommendations are made:

- Recommendation 1: State PUC's should consider standardization of pricing for solar, but should revisit this frequently to account for new technological and competitive changes. Additionally, standardized contract terms and development of a template that could be used nationally may aid in decreasing the transaction costs associated with solar installations.

- Recommendation 2: Policy makers need to undertake an examination of all of the diverse values and issues related to solar deployment, and decide the amount of solar penetration that is desired. From this decision, a rate of return can be established to bring about this penetration, and policies can be established and altered to provide that rate of return to investors. *This issue along with related topics will continue to be explored by CE3 in the next two years*.

- Recommendation 3: Specific attention should be paid to relative values between smaller and larger scale solar and if those values are not recognized by the market, whether and what subsidies should be in place.

- Recommendation 4: States should not put up legal barriers to innovative ways to deploy solar, particularly prevention of third party sales and tax increment financing.

- Recommendation 5: The addition of more distributed generation in vertically integrated markets suggest new pricing mechanisms such as separating out generation and transmission costs and creating appropriate regulations to reflect this.

- Recommendation 6: The difficulty of transferring property interests in solar projects (such as ownership of tax benefits or revenue streams) hampers financing. Making these interests more

easily transferable with standardization, including at the federal level, would continue to aid in the development of the solar market.

- Recommendation 7: Allowing third party sales would increase adoption of solar generation, especially in the residential and commercial markets.

V. Next Steps

- CE3 will be undertaking a series of events exploring the legal process of transparently incorporating values and detriments associated with solar energy (and other distributed energy). The first event, "the Value of Solar Power and law" will occur on November 11, 2016.
- CE3 and the Center for Banking and Finance will continue to explore the creation and value of standardized financial products for increasing the penetration of solar energy and other DE.

APPENDIX A: AGENDA

Continental Breakfast – 8:30-9:00 A.M.

9:00 A.M. – 9:15 A.M.

I. Welcome
Lissa Broome, UNC School of Law Center for Banking and Finance
Victor B. Flatt, UNC School of Law Center for Climate, Energy, Environment and Economics
Jeff Hughes, UNC School of Government Environmental Finance Center

9:15 A.M. – 10:00 A.M.

II. Introduction to the future energy mix, the role of solar and law, including current legal influences such as the role of PURPA and net metering
Jonas Monast, Nicholas Institute
Heather Payne, CE^3

10:00 A.M. – 10:45 A.M.

III. The North Carolina example and other state experiences, including third party sales and tax treatment of assets
Rebecca Rogers, Live Oak Bank
Heather Payne, CE^3

10:45 A.M. – 11:00 A.M. BREAK

11:00 A.M. – 11:20 A.M.

IV. The market for bank financing: the demand for and financing opportunity for increased solar energy, including enhanced growth of renewables driven by policy and demand predictions
Victor B. Flatt, CE^3
Bo Somers, Duke Energy

11:20 A.M. – NOON

V. Current financial products and programs (and future outlook), including a discussion of tax equity investors, utility-scale financing, and yield cos, among other topics
Rory Huntly, Jacobs Capital
David Scoglio, Stata Solar
John Hackney, Wells Fargo

NOON – 12:45 P.M. LUNCH PROVIDED

12:45 P.M. – 1:30 P.M.

VI. Drivers and barriers of emerging markets and financial products, focusing on the perceived legal barriers for increasing availability of solar financing, and possible solutions. Discussion will include residential roof-top market expansion, tax credit bonds, green bank and green bonds, third party sales, and institutional and non-profit properties.
Jeff Hughes, EFC
Steve Levitas, FLS Energy and Kilpatrick Townsend
Rob Youngs, Coalition for Green Capital Representative
Rebecca Rogers, Live Oak Bank

1:30 P.M. – 2:20 P.M.

VII. OPEN DISCUSSION. Workshop will conclude with a facilitated open discussion session where participants are provided opportunity to frame future opportunities and to articulate the policy needs necessary to achieve their vision.

This discussion will address connecting developers to capital; barriers to bank involvement; what new types of financing are needed, a comparison of public or public/private options, standardization of financial products and issues of regulatory uncertainty and financing timeline

Opening remarks:
David Scoglio, Strata Solar
John Hackney, Wells Fargo
Lauren Joy Bowen, Southern Environmental Law Center

Moderators:
Jeff Hughes, EFC
Michael Youth, North Carolina Sustainable Energy Association

2:20 P.M – 2:45 P.M.

VIII. Summary and recommendations
Moderators:
Jeff Hughes, EFC
Victor Flatt, CE^3
Lissa Broome, Center for Banking and Finance

APPENDIX B – PARTICIPANTS

Lauren Joy Bowen
Southern Environmental Law Center

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UNC School of Law

Tait Chandler
UNC Energy Services

Greg Characklis
UNC Environmental Sciences & Engineering

Kate Daniel
NC Clean Energy Technology Center

Tim Dodge
Public Staff, NC Utility Commission

Theodore Feitshans
NC State Agricultural & Resource Economics

Steve Ferrey
Suffolk Law School

Victor Flatt
UNC School of Law

John Hackney
Energy & Power Investment Banking Group, Wells Fargo Securities

Christie Hartinger
Wyrick Robbins

Jeff Hughes
UNC Environmental Finance Center

Rory Huntly
Jacobs Capital

Ben Inskeep
EQ Research

Pam Jagger
UNC School of Public Policy

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Duke Energy

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UNC Institute for the Environment

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Michael Youth
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Student Scribes:
Erin Carter, *Law 2016*
Cordon Smart, *Law 2017*

APPENDIX C: DETAILED REVIEW OF PRESENTATIONS

Session 1: Introduction to the future energy mix, the role of solar and law, including current legal influences such as the role of PURPA and net metering

After a welcome, the workshop commenced with a presentation by Jonas Monast to put solar energy in the broader context of the electricity sector. Main considerations as part of this context include other shifts which are occurring, including natural gas prices, regulations, fuel price projections, existing infrastructure, available transmission capacity, and pipelines. Electricity demand, which had been growing annually, is now flat and is projected to remain flat going forward; the future of nuclear energy and energy storage are uncertain. With innovations in technology, options for electricity generation may look very different than today. This uncertainty also incents utilities to delay investments in any particular area, including renewables. However, we are experiencing a populist movement in the electricity market with the introduction and deployment of residential solar.

The second half of the first session consisted of an overview, presented by Heather Payne, of the state of the law around solar across the country. In 2015, regulators in 46 states made policy changes regarding solar energy in a variety of ways, many of which could impact the economics of solar. The discussion included a brief overview of the Public Utility Regulatory Policies Act (PURPA), the current state of net metering around the country, policy options that could co-exist with net metering such as demand and standby charges, potential PURPA changes, and what policy options could replace net metering in the future.

Session 2: The North Carolina example and other state experiences, including third party sales and tax treatment of assets

This session started with a general overview of the financing mechanisms for utility-scale solar from the perspective of working in North Carolina. Existing incentives and the stable environment that had existed within the state that have spurred the deployment of utility-scale solar installations were discussed. These highlighted successes of the industry in the state and the resulting knowledge base have facilitated developers competing in other markets. North Carolina benefits include working with a single utility (Duke Energy), property tax abatement, a renewable portfolio standard, standard contracts, and an interconnection agreement and process. In addition to individually bringing down the costs of utility-scale solar deployment, all these lead to consistency, with developers and financiers having an understanding of how a project will proceed. A final note was that the cost of capital is now more determinative of pricing due to the drop in solar panel price, so rising interest rates could have an impact on deployment.

The second part of the session focused on third party sales and how that is impacting solar markets in other states. Presented by Heather Payne, the discussion focused around which states allow third party sales, how they can help with residential solar affordability, and other mechanisms to increase access to solar without third party sales being allowed in the state. These methods could include community

solar, on-bill financing, utility-owned customer-sited solar, and increased access to net metering and making interconnection easier.

Session 3: The market for bank financing: the demand for and financing opportunity for increased solar energy, including enhanced growth of renewables driven by policy and demand predictions

This session featured Victor Flatt providing a brief overview of some of the driving factors for the future energy mix. He noted several potential factors moving forward, including the (possible) implementation of the Clean Power Plan, electrification of the motor vehicle fleet, and growing demand for solar electricity.

As the utility perspective is important to understand as part of these conversations, this second part of this session included an outlook for the solar industry from the perspective of Duke Energy, a vertically integrated utility operating in the state. As with all utility presentations, the need for safe, affordable and reliable power was mentioned as paramount. Duke continues to estimate that load will grow at 1.5% annually for the next 15 years in areas served in North Carolina. Noting the dramatic success regarding the installation of utility-scale solar in the state – NC represents 60% of all PURPA projects in the country – there was discussion of some of the pricing and interconnection issues associated with the deployment of solar on the grid, as 80-90% of solar projects in Duke's interconnection pipeline are 5MW or less and therefore qualify for the standard contract. There was also a discussion about the time delay for grid interconnection and its effect on solar. Multiple smaller units (designed to fit under the 5MW NC cap) mean that the queue becomes larger and time to integration longer.

Next the Integrated Resource Planning process was discussed and this included a discussion of the ways in which Duke Energy plans to deploy solar energy in the future. The ongoing debate surrounding the cost of solar energy moving forward was also mentioned, and that solar energy could not be used without backup power because of its intermittent nature. NC also uses a static avoided cost calculation, calculated by the NCUC every other year, instead of locational marginal pricing or some of the other pricing systems used in other states. It is possible that Duke Energy and other traditionally regulated utilities would be open to changing to a more dynamic pricing scheme.

Session 4: Current financial products and programs (and future outlook), including a discussion of tax equity investors, utility-scale financing, and yield cos, among other topics

Drawing from experience working in the industry, representatives from financial companies made presentations on financing models for solar, enabling workshop participants to understand financing mechanisms for solar financing. While discussing different financing mechanisms such as yield cos, panelists touched on the marketability of different models and their utility. Among other things, this conversation highlighted the complexity and inefficiencies within the solar financing market, raising questions about the need for a different market approach.

An overview of Strata Solar was presented. It has 115 PURPA qualifying facilities, with $2 billion in investment since 2009, mostly in North Carolina. Financial models for projects are developed, based on

understanding the potential renewable energy portfolio (REPs) value, projected revenues and amortization, interconnection costs, and administrative costs. The credits for the REP are not inconsequential; they began around $2.50 and peaked a few years ago between $4 and $5 in North Carolina. However, the variation in the rules between states make it hard for developers to sell credits based on North Carolina solar generation into other state REPs markets. Also, banks will not underwrite the value of REP credits into the financing agreement as cash flow, so there is a potential to lose $0.02-0.03/watt. Leases are fairly standard. However, investors are not going to take much of the risk; the developer needs to take the risks with working capital. The expiration of the state tax credits has significantly impacted how deals had been structured, and has made the financing less efficient.

The next presentation was on different financing mechanisms. One of these called a yield cos – a publicly traded company that pays out cash flow to investors and serves as a consolidator for the solar industry – have attractive evaluations and low enough cost of capital to buy already-developed projects and let the project developers free up that cash and move onto the next project. However, yield-cos are dependent on efficient capital markets, and there have now been dislocations in the capital markets with yield cos, causing that market to stumble. Therefore, new financing mechanisms have to be developed. The renewal of the federal tax credit did increase certainty in the market. There was also a discussion about the difference in degrees of risk between utility-scale and residential solar investment; there tends to be higher regulatory and policy risk on the residential side. According to some persons, utility-scale, and to a slightly lesser degree commercial and industrial installations, can better withstand regulatory uncertainty. As solar can shift away from depending on tax credits, he noted that it should become easier to finance more efficiently. Mr. Hackney opined that any sort of loan product can help the residential market develop, but this entails lots of risk because of policy changes and unknowns around how residential solar performs long term.

This session finished with a general perspective on project financing, noting that one objective in project development is to figure out how to monetize the benefits these projects are creating, and the complex structures that have to exist to bring in outside investors with tax liability. This is inherently inefficient. Leasing can provide another opportunity, as can a partnership flip, where the principal does not sell the assets but hands over a bulk of the equity so the entity monetizing the tax credits owns the assets until the credits are used and then the ownership changes again. But all of these are to solve a specific problem with how to best monetize the benefits. With respect to yield- cos, there was discussion that there isn't a flaw in the structure per se; but that selling them as growth platforms is the wrong narrative. The growth platform narrative pushed hedge fund participation as opposed to long-term investors. With regard to the challenges faced in financing residential solar, it was noted that PACE loans could be a good mechanisms, but these face challenges due to loan and lien priorities.

Session 5: Drivers and barriers of emerging markets and financial products, focusing on the perceived legal barriers for increasing availability of solar financing, and possible solutions. Discussion will include residential roof-top market expansion, tax credit bonds, green bank and green bonds, third party sales, and institutional and non-profit properties.

This panel focused on addressing the existing financial structures and other emerging options for solar financing. The panelists touched on some of the key barriers to the availability of solar financing, including the treatment and availability of tax credits as well as the lack of adequate data to make informed financing decisions.

The example of an inverted lease transaction was presented. It was noted that this type of agreement is very time consuming and administratively complex, requiring 200 to 300 legal documents. An inverted lease transaction is a transaction where the lessee utilizes the Investment Tax Credit and makes rental payments to the lessor, who takes the tax depreciation. This arrangement is an exception to the general rule that only a tax owner may claim benefits.[2] This type of deal is not done at scale on a project-by-project basis because of the complexity. The complexity also makes them hard to replicate, and few players in the financial markets are willing to enter into these types of transactions. The real issue is the supply of tax equity investors in the market; historically, it has only been the largest banks and financial institutions. The hope is that other corporate players will enter the market with the increasing knowledge base of these types of deals. Even easier would be to allow entities to purchase the tax credits and make those credits a transferable property interest. There was also a suggestion for increased flexibility within the energy market, where monopolies now restrict consumer choice for energy. Two potential financing projects suggested were green source energy programs and alternative financing mechanisms for consumer-sited generation. Standard fifteen year contracts for systems up to 5 MW has been incredibly important in simplifying the North Carolina market.

Next, the function and typical setup of green banks was discussed, including the goal to take limited public capital, use that money to bring in more private capital, and de-risk projects through green bank financing mechanisms, including simple credit enhancements like a loan offer reserve, co-investments with local investors, or warehousing, where smaller projects are pooled together to reach significant enough scale to interest private capital.

Again, the PACE model was discussed as a good financing option as it can reduce lender risk. In this model for small to medium investments, the loan is paid back through an assessment on the property, which can be collected with property taxes. If done correctly, the debt service month to month for the

[2] Detailed definition: An inverted lease is a two-tiered tax equity financing structure utilizing dual project SPVs to divide tax and cash benefits between the sponsor equity investor and tax equity investor parties. Benefits are shared via the passing of tax credits through a project master lease between the entity responsible for constructing and owning the asset ("Owner") and the entity that has the rights to the material project contracts ("Lessee") such as the interconnection agreement and the PPA. Tax benefits including accelerated depreciation are shared between parties via a minority equity interest that the Lessee holds in the Owner, which allows the Owner to pass net operating gains/losses through to the Lessee entity via IRS Sec. 704(b) partnership reallocation. Typical ownership structure involves the sponsor equity investor holding the majority ownership position in the Owner entity with the minority position held by the Lessee entity. The majority ownership of the Lessee is held by the tax equity investor with a minority positon held by the sponsor equity investor which also typically acts as managing member over both Owner and Lessee entities. A basic primer with more information is available from SEIA. John Marciano, Inverted Lease: Basics, SEIA Finance and Tax Seminar (2013), http://www.chadbourne.com/files/upload/Marciano-Inverted_Lease_Basics_Solar_EnergySeminar_Feb13.pdf.

investment plus the energy is less than what the property owner was paying for just energy before. Using property tax allows for financial institutions to also see FICA scores and other credit history, which makes the process of attracting investment more simple as there is a way to assess the borrower's ability to pay the loan back. But PACE loans are also senior to any mortgage, which can make it hard to get the mortgage holder to agree to, as they must sign a consent letter.

Some of the discussion on the general outlook for the market emphasized the need to operate at large scale, arguing that bigger will be more efficient, which will bring the costs down for everyone. This opinion is also based on the scale of necessary reductions in greenhouse gases. While not everyone was in agreement, it was argued that larger scale will bring in industry partners, drive development of a knowledge base, increase efficiency, rationalize and normalize transactions and deployment, all of which will continue to drive innovation.

It was also suggested that better data on how panels perform, installer reliability, and general system reliability are needed to assure financiers that the risk is manageable.

With respect to residential projects, it was noted that they could benefit from securitization, but that the benefits of that are dependent on the interest rate environment, as the transaction costs of securitization are high. Regarding securitization and utility-scale systems, there needs to be a larger asset base before a secondary market can develop.

The conversation also talked about NC GreenPower, and how it is now focused on promoting development of solar in schools by providing matching funds. This, however, is more about exposing children to renewable energy than making money on solar financing. Additionally, while enabling legislation for PACE exists in NC, there is a need for greater municipal and local involvement to increase utilization, which may require standardized procedures to incent participation in the program.

Session 6: Open discussion

In the open discussion, it was noted that the states leading in solar have more of a mix between residential, commercial and utility-scale than NC, which has a disproportionately large amount of utility scale compared to residential and commercial/industrial. It was argued that In North Carolina, if third party sales were legalized and the state tax credit were reinstated, it would be a complete game changer for residential solar. It was also noted that small scale installations need both the state and federal tax credits, and with both net metering and third party sales, residential solar can compete against the low consumer electricity prices. However, in order to get a realistic price signal, the appropriate avoided cost assessment needs to be established.

In addition to the points noted above, the open discussion part of the workshop included discussion of:

- Resilience. Distributed generation is needed for resilience in times of disaster, where the ability to island microgrids will become increasingly important with more extreme weather.

- Utility Participation. The question of how to make distributed solar more attractive to utilities is one that many states are grappling with. However, no program will truly work for customers if the utility always has to approve everything (and everything must be in the shareholders' best interests).
- Value of Solar. Many studies have shown that net metered solar, even at retail electricity prices, undervalues the generation being put onto the grid by residential and distributed solar. This can be especially true when environmental benefits are factored in. A measure like Locational Marginal Pricing would be very different from how the value is calculated today; however, LMP would be difficult in North Carolina at this time because the vertically-integrated utility usually doesn't split costs out that finely.
- Intermittent Penetration. No one is sure where the point is on Duke's system that a barrier would be crossed on integrating intermittent sources to the point that there would be a tradeoff between value and benefits, but everyone agreed that NC is not there yet.
- Transmission and Distribution Spending. While there is no agreement that increases in solar actually increase transmission and distribution spending requirements (and, in fact, some studies have shown the opposite), utilities often make this argument. The question is how to determine whether this is really occurring based on solar or other distributed generation, and, if it is, how to address the T&D costs associated with load variability due to distributed generation.
- Community Solar. This market is evolving but has a promising outlook.
- Low Income Solar Adoption. As in many states, there is an open discussion around what incentives need to exist to encourage adoption of distributed generation technologies by low income households. One option is that credits for the state REPS could be worth a higher value if the power is generated by a system on a residential structure which meets a low income threshold.
- Tax Exempt Entities. One of the main value drivers with the current solar financing mechanism is the tax credit. However, this does not provide value to tax exempt entities, like nonprofits, schools, etc. A further discussion around how financing mechanisms can provide similar value to these entities is also needed.