A RESOLUTION ACCEPTING THE STAFF REPORT AND AUTHORIZING STAFF TO PURSUE A COMMUNITY FINANCED PHOTOVOLTAIC ARRAY AT THE TOWN COMMONS Draft Resolution No. 70/2011-12

WHEREAS, the Town of Carrboro wants to demonstrate that conservation practices can be applied to the daily operations of municipal government and to infrastructure projects; and

WHEREAS, the Town of Carrboro seeks to find methods of service delivery and operations that conserve energy and resources, thus saving taxpayer dollars and protecting and preserving the environment; and

WHEREAS, sound conservation practices can reduce government costs over the long-term; and

WHEREAS, the Town of Carrboro chooses to lead by example to show the practicality and effectiveness of conservation practices; and

WHEREAS, the Town of Carrboro seeks to encourage its citizens and its businesses to be stewards of the environment; and

WHEREAS, the Town of Carrboro seeks to pursue emerging and innovative approaches to community-based renewable energy.

WHEREAS, the Appalachian Institute for Renewable Energy (AIRE) is pioneering approaches for community investment in renewable energy;

NOW THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that

1) the Aldermen accept the staff report and approve the pursuit of a feasibility study (to be completed by AIRE, in collaboration with staff) of the installation of a photovoltaic array (up to 10 kW) on the south facing market stall at the Town Commons.



TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL PLANNING DEPARTMENT

DELIVERED VIA: HAND MAIL FAX EMAIL

То:	Board of Aldermen Matt Efird, Interim Town Manager
Cc:	Michael Brough, Town Attorney Patricia McGuire, Planning Director
	George Seiz, Public Works Director
	Chris Sherman, Assistant to the Public Works Director
	Arche McAdoo, Finance Director
	Annette Stone, Economic and Community Development Director
	Anita Jones-McNair, Recreation and Parks Director
	Wendell Rodgers, Facilities Administrator
From:	Randy Dodd, Environmental Planner
	Chris Lazinski, DELTA Fellow
Date:	January 10, 2011
Subject:	Solar Installation Opportunity at Town Commons

Background and Summary

Information has been pulled together to investigate the opportunity for a solar photovoltaic installation at the Town Commons. This information includes a framework for proceeding using a third party financing approach, site analysis, conceptual design, and utility interconnection considerations. The intent has been to perform a comprehensive "prefeasibility study". The information is based on research and communications with a variety of local parties, as well as experts and others pursuing similar projects. Options for how to proceed are suggested at the end of the memo; attachments with additional details are also provided.

Information

With an understanding of the Town's interest in "leading by example" as well as taking a positive step in addressing policy interests associated with sustainability, climate protection, community outreach and education, and fostering community pride, Town staff and DELTA

Fellows have investigated the opportunity for a solar photovoltaic installation at the Town Commons. This site was chosen because of its high visibility, along with the availability of an existing south facing roof with unimpeded solar access. Important parameters included how to finance the project given the limited capital currently available, as well as legal and operational considerations.

General Framework

The best framework that has been identified to date for the Town to pursue a renewable energy installation, given that a public source of capital has not been identified, is through a third party model.¹ In this model, system ownership would be transferred to the Town in the future via donation, bargain, or market sale. This model requires an agreement between a host (in this case, the Town), a solar services installer, and third party investor(s) in which the host agrees to provide the site for the solar PV panels and the investors who agree to own and operate the system. This agreement is beneficial to the investor(s) as they are able to benefit from tax credits, the income generated from the electricity that is sold either back to the utility or to the host customer, and renewable energy credits (RECs). The host (Town) benefits from educational and outreach opportunities and clean energy demonstration through the installation of a solar PV system, and receipt of a solar system with at least 15 years of warrantied service remaining via donation or bargain sale at least 5 years in the future after the investors have taken advantage of tax credits.

Through discussions and investigations pursued to date, some fundamental parameters for the Town considering this opportunity include:

- 1) Town up-front costs are nonexistent or minimal, e.g., associated with fees for a feasibility study and/or meter installation;
- 2) Town has neutral to positive long term cash flow relative to current operations;
- 3) Limited staff impact;
- 4) Clear and acceptable agreement about ownership and operation/maintenance of the system for its useful life, which could be as long as 30—50 years.

To date, the best opportunity that has been identified is to pursue a roof mounted solar array installation at the Town Commons on the market stall with a south/southwest facing roof, with a meter installation at the same location as an existing nearby meter. This installation is recommended because:

- 1) It is highly visible and a prime location to publicize the technology and the Town's interest in the technology
- 2) It is a straightforward, cost effective installation, with minimal "overhead" costs or lost use of space thanks to the existence, pitch, and orientation of the roof

It may be desirable to limit the size to 5kW to provide the option to participate in the NC Green Power program which entails \$0.10 per kWh of revenue (the cap for NC Green Power). (Note

¹ The authority for the Town to do so is presented under FAQs at the end of the memo.

that the owner could choose to pursue an alternative purchaser of RECs.) At a minimum, it is recommended that the size of a system not exceed 10kW because doing so means that the array could be contained on one stall and interconnection with the grid is less expensive and more straightforward to arrange with Duke Energy than a larger system.

For this concept to move forward, several steps would need to be pursued. These are outlined below.

- A solar services provider and investors would need to be identified/chosen, and one or more contracts/agreements drafted detailing both the installation and the post installation scope of services and responsibilities of all parties to the contract(s)/agreement(s). This could be pursued either through an RFP process, or through collaboration with an organization to thoroughly investigate the opportunity through a detailed feasibility study. A provider of support to the Town could be asked to pursue or coordinate some or all of these functions:
 - Perform all aspects of design, and installation
 - Coordinate all aspects of the financing (presumably with investors identified by provider, both up front and for the period of performance)
 - Monitor and maintain the system
 - Receive and distribute payments from sale of electricity and RECS
 - Serve as a legal entity to distribute tax benefits/process all incentives, depreciation, ownership, and any other necessary arrangements between the solar services provider and investors
 - Enter into a lease or similar agreement with the Town that makes the space for the system available, indemnifies and holds harmless, and contractually binds parties to above conditions, as well as possibility or terms for future transfer of ownership. If the Town desires revenue either from the sale of electricity or RECS, this would need to be spelled out as well. This would also affect the metering agreements that would be put in place with Duke Energy.

Other details would also need to be worked out to complete the installation and agreement(s).

1) Prior to finalizing the installation, an agreement is needed with Duke Energy to complete the grid connection, and for Duke to buy the electricity generated. Typically in these types of arrangements, the system owner enters into agreement with the utility and receives this revenue from the sale of electricity, but this is not mandated. Installing the appropriate meters for the terms of the agreement is also necessary. Given the likely structure of the agreement, a second meter would need to be installed for the solar PV system that measures output of the system only. Note that for systems less than 10kW, approving and installing the meter with Duke is a straightforward process with relatively limited paperwork that involves a small fee and 2-4 weeks lead time.

- 2) There are various operation and maintenance activities such as cleaning the panels and servicing the inverter and grid connection that would need to be agreed to up front. Presumably, this would be the owner's responsibility, and spelled out in the agreement with the Town.
- 3) Additionally, clarity is needed on whether the investors/owners would sell or donate the system to the Town, and other future transaction details.

Conceptual Design

Additional information is presented below to further evaluate the feasibility of a solar installation. This information includes:

- 1. A conceptual drawing of a proposed solar PV array that addresses:
 - Sizing options for the system given the available space on the roof.
 - The physical location and arrangement of the system and its components on the roof, and recommended combination of panels given the roof design.

2. An evaluation of the current structural capacity of the roof to support such a system, along with recommendations, if any, for roof improvements needed prior to installation.

3. Information from recommended panel manufacturers, and photographs of similar installations.

Local firms/parties with potential interest in providing these services were contacted (see list in Table 1), with a description of services being sought. Photos, site and building plans were provided, along with an offer for a tour of the site if interested.

Contact	Notes
Marc Desormeau	
(Sundogs Solutions)	Responded with \$1200 estimate for RFP support
Southern Energy Management	No response
Stew Miller (Yes! Solar Solutions)	Provided sketch of 5k system. No investors currently
Bruce Freeman (Skyward Solar)	No response
Alternative Energy NC	No response
Steve Nicolas (NC Solar Now)	No response
Honey Electric Solar	No response
	Provided sketch of 5k system. Architect only—not
Giles Blunden, architect	interested in installation or financing
Jason Guthrie (Strata Solar)	Not interested
Ed Witkin	Interested in project as learning opportunity for
(Carrboro Solar Works/Durham Tech)	Orange County campus/Durham Tech students
Logan Stephens (O2 Energies)	Not interested
Charles Murphy (local structural	Provided advice on structural sufficiency of market

Table 1: Summary of Contacts

engineer)	stalls for bearing weight from roof mounted system	
Glenn Barnes, UNC Environmental	Provided advice about structuring of power purchase	
Finance Center	agreement	
Rio Tazewell (Appalachian Institute	Interested in supporting necessary legal and financing	
for Renewable Energy)	services for tax equity financing of a community	
	supported system	
Transition Carrboro-Chapel Hill	This group is interested in the project and available to	
Energy Group	help recruit potential investors	
Sarah Blacklin (Market Manager)	The Farmers' Market approves of the Town pursuing	
	this opportunity	

The outreach efforts led to the following information.

- 1) Sketches were provided (complimentary) from Yes! and Giles Blunden. Both parties recommended an identical placement for a 5 kW system (Figure 1).
- 2) Most metal roofing products today come with warranties from 25 to 50 years (which is consistent with warranties for solar arrays). The existing roof is close to 13 years old. Giles Blunden inspected the roof and noticed some early signs of weathering, and as a result, recommended treatment of the tin (painting or other weatherproofing) prior to installation as a pre-installation maintenance activity to minimize the risk that the array would have to be removed for future roof maintenance. Public Works staff have agreed to have the metal roof assessed to determine the need and cost to have the surface coated prior to panel installation.
- 3) A structural investigation (through discussions with a structural engineer, Charles Murphy) indicates that a more detailed structural analysis could be warranted prior to finalizing the design. This analysis could entail a fee, and could recommend some structural improvements prior to solar system installation. According to Mr. Blunden, these costs would be eligible for renewable energy tax incentives if pursued in the same tax year as the system installation. A structural inspection would also be required as part of a building permit. It is assumed at this stage that any further analysis of the existing structure and any structural improvements would be provided by the solar services installer and investors.
- 4) Installation photos and manufacturer information on sales/specifications were requested. Photos of similar installations with the panels recommended by two installers are included in figures below, along with a summary of important specs. (Figures 2-4 and Table 2). The installation will involve the attachment of the panels by drilling thru the metal roof and bolting the array to the framing.
- 5) Additional information on PV panels recommended by Yes! and Strata is available at <u>http://www.schottsolar.com/us/products/photovoltaics/schott-perform-poly/</u>, <u>http://us.sunpowercorp.com/homes/products-services/solar-panels/signature-black/</u> and <u>http://www.stratasolar.com/our-work-residential</u> In addition, it is worth pointing out that the solar electric market has just seen the introduction of microinverter technology which means that DC to AC conversion with related microcircuitry can now be integrated with panels so that a stand-alone inverter is not required. More information from the main manufacturer of this technology is available at <u>http://enphase.com/wp-uploads/enphase.com/2011/08/Enphase-Brochure-System-Overview.pdf</u>.

- 6) The only organization identified to date that has expressed an interest in supporting the Town and potential investors in the complex legal and financial aspects of pursuing an agreement with third party investors is the nonprofit organization, the Appalachian Institute for Renewable Energy (AIRE). AIRE is developing a specialized business model focusing on community supported renewable energy through tax equity financing. A letter outlining AIRE's interest is attached to this memo. AIRE has recently worked on a similar project in Asheville that included a "Solarbration" after installation as an outreach event that publicized the multifaceted benefits of community based renewable energy. (More information about AIRE is available at http://aire-nc.org/.)
- 7) Ed Witkin, a former sole proprietor of Carrboro Solar Works and a renewable energy instructor at the Orange County campus of Durham Tech is interested in working with the Town to involve students in the pre-installation and/or installation phase of the project. An email indicating this interest is attached to this memo.
- 8) A insignificant deviation to the CUP for the Town Commons would only be needed if requested by the Town Manager or Board, and is seen by Zoning staff as a formality. Building and electrical inspections would be needed (the Town typically does not charge itself building inspection fees). Zoning staff voiced an opinion that the Appearance Commission review the project only if requested by the Town Manager or Board.

For planning purposes at this stage of the process, a roof sketch is provided for a system sized at 5 kW. This size has been chosen because it is the maximum size allowed for participation in NC Green Power's program that buys Renewable Energy Credits (RECs). However, there are other providers of RECs that could be identified by an organization supporting the project, so it is not recommended that this project be absolutely constrained by this size. It <u>is</u> recommended that the project be limited to no more than 10 kW because of more complicated utility interconnection requirements for larger systems, as well as available area on the roof(s). There could be future advantages to the Town in sizing a system between 5 kW and 10 kW if sufficient investment capital can be found in that a larger system would have more equity and provide more revenue at the time of transfer of the system to the Town. The installation cost for a 5kW system is estimated at \$25-30k.

	Strata Solar	Yes! Solar Solutions
Manufacturer / Model	Schüco MPE-220-PS09	Schott Poly 230
Power Rating	220W	230W
Peak Efficiency	13.4%	13.75%
Length x Width x Height	5.4 ft. x 3.3 ft. x 1.8 in.	5.5 ft. x 3.3 ft. x 2.0 in.
Panel Weight	44.1 lbs.	50.7 lbs.
Panel Weight per Square Foot	2.47 lbs/ft ²	2.79 lbs/ft^2
90% / 80% Power Output	12 years / 25 years	10 years / 25 years
Warranty Period		

Table 2: Design specifications for recommended solar panels



Figure 1: Yes! Solar Solutions proposal for 5kW system (stall with south facing roof)

Options for Next Steps

Two options have been identified for moving forward: pursuing a bid/RFP process or pursuing a feasibility study through Appalachian Institute for Renewable Energy (AIRE). The considerations and pros and cons of each are discussed below.

Considerations for moving forward with a bid/RFP process are provided below in Table 3.

RFP Notification:	Typical notification process; include firms/parties identified by		
	staff and DELTA Fellows		
Terms of agreement:	Town hosts and offeror installs, finances, owns, operates, and		
	maintains system through solar power purchase type agreement		
	Offeror can benefit from all available incentives and system		
	revenue during ownership		
	5 year minimum 10 year maximum private ownership followed		
	by donation or bargain sale to Town		
	Terms agreed to via lease or similar legal agreement. This could		
	involve some compensation for roof space.		
	(note that Glenn Barnes at UNC's Environmental Finance Center		
	recommended that the Town be careful about language in the RFP and lease		
	that recognizes tax equity financing complexities. It is recommended that the		
	Town have him review any future RFP and legal documents.)		
Services sought:	100% Financing		
	Installation, including utility interconnection		
	Support with outreach and education		
Responses sought:	1) Duration of ownership (5-10 years)		

Table 3:	Recommend	dations for	RFP Option
I upic 5.	Recomment	autions for	MI Option

	2) Donation or price of bargain sale	
	3) Financing plan	
	4) System design (rated kW, manufacturer of components,	
	mounting approach)	
	5) Installation plan (equipment used, timing, structural analysis)	
	6) Planned outreach/education steps	
	7) Acceptable terms of agreement	
RFP Review:	Propose committee (set up with representatives from Planning,	
	Public Works, Recreation and Parks, and Management Services)	
	that reviews responses and recommends awardee.	

The second option is to enter into agreement with AIRE to perform a feasibility study. AIRE's interest and general approach for the feasibility study are included in the attached letter (Attachment 1). Under this option, installation services would only be sought after the legal and financial structure has been developed and investors and capital identified.

The advantage of the RFP option is that it is a typical and understood process. Disadvantages include staff and DELTA Fellow time to prepare a bid package (potentially with support from Sundogs Solutions, at a cost of \$1200) and review bids, considerable uncertainty as to if a bid will be received that allows the project to move forward, and time associated with reviewing bids and project management. This uncertainty is linked to whether a (relatively) small project like this is sufficiently enticing to have a firm invest the time and money for the limited return on investment opportunity. Most similar projects are for much larger arrays.

One advantage of working with AIRE to complete a feasibility study is that there would be less staff and DELTA Fellow time involved than with a bid process; AIRE would be managing the project initiation steps involved in installer selection, as well as working with financers and setting up the legal and financial structure. Some staff involvement with helping identify potential investors would be required, although AIRE would work with the investors once identified. Another advantage is that the project would be a true demonstration of community based/financed renewable energy that could be a pilot for future similar projects. The distinction between the private firm project model and the AIRE project model is that AIRE is committed to the extensive up front work with community groups to educate and organize "empathetic investors" that are seeking security and responsibility in their investments, but not large returns. Private firms are likely going to be seeking investors that are interested solely/primarily in financial return. A disadvantage of working with AIRE would be that there would be a \$2k feasibility study cost up front. This cost could conceivably be transferred to investors, although an upfront guarantee of such may not be possible. The distinction also can be made in the simple difference between the for-profit and non-profit orientation of the two approaches. Regardless of whether a bid process or feasibility study approach is chosen, it is recommended that the inclusion of Durham Tech faculty and students in the project be encouraged to provide an educational and community outreach component.

Recommendation

Town staff recommend that the Town contract with AIRE to perform a feasibility study.

Attachment 1: Letter from Appalachian Institute from Renewable Energy (November 2, 2011)

OAIRE

164 South Depot St., Boone, North Carolina 28607

Mr. Matt Efird Interim Town Manager Town of Carrboro 301 West Main Street Carrboro, NC 27510

Dear Mr. Efird,

The Appalachian Institute for Renewable Energy (AIRE) is interested in investigating the possibility of working with the Town of Carrboro to develop a solar photovoltaic (PV) project using a method of structured tax-equity finance. AIRE is a nonprofit organization based in Boone, NC that helps community-based organizations such as local governments, churches, neighborhoods, schools, and nonprofits to benefit from a range of tax credits and financial incentives available for renewable energy. Using AIRE's innovative financial model, community-based organizations can potentially receive renewable energy systems as a charitable donation, providing at little to no cost to them a valuable educational asset and revenue generating opportunity.

AIRE's model involves organizing local investors and businesses that are willing to provide the upfront investment capital needed to purchase a renewable energy system, creating legal structures that allow for optimized utilization of the available incentives, and facilitating the transfer of ownership after the life cycle of the incentives have expired and investors have reached their targeted return. Project development begins first by conducting a Feasibility Study to determine the scope and depth of the prospective investor pool and their ability to fully utilize the available incentives, in addition to the physical viability of the site for solar. This involves surveying the prospective investors, arranging solar site assessments, and generating pro forma spreadsheets indicating potential Return on Investment (ROI) for participating investors. After the Feasibility Study is completed AIRE facilitates the creation of a suite of legal documents and structures including a Limited Liability Company (LLC), Operating Agreement, and Lease Agreement.

AIRE seeks to partner with the Town of Carrboro to organize a solar PV project at the Town Commons. In order to determine feasibility AIRE would work closely with Town staff to identify potential investors, provide them with relevant information, and gather necessary data to produce a Feasibility Study report. The Feasibility Study report would serve as a prospectus for individuals to share with their personal tax advisors and determine whether they are ready to commit to participating in a project. AIRE charges a fee of \$2000 for producing the Feasibility Study, which may be recouped by selling it to the project investors if the project moves forward. Project investors can add the cost of the Feasibility Study to the total capital cost of the system, meaning that it is included in the basis for the tax credits and financial incentives.

If you have any questions or concerns please do not hesitate to contact us.

Sincerely,

Rio Tazewell Outreach and Education Director Phone: 828-406-8995 | Email: rio@aire-nc.org

Attachment 2: Message from Ed Witkin, Orange County Campus of Durham Tech

Hello Randy,

I enjoyed discussing the solar project at the Carrboro Town Commons. This sounds like a great opportunity for community involvement.

I am now working full time as the Sustainability Coordinator/ Instructor at Durham Technical Community College at the Hillsborough campus. We have an excellent training facility on campus, and offer courses in solar electricity, solar hot water, renewable energy, Home Energy Use Analysis, etc. A major focus of our programs is to engage our students in real-world projects. For instance, this fall our solar electric class designed and built a solar electric generator on a trailer that was used to power the amplifiers at one of the stages at the Festi fall event in Chapel Hill.

The solar project at the Carrboro Town Commons presents an excellent opportunity for our students, community leaders, local businesses and citizens to work together and create an educational and practical renewable energy system. After working in the solar/energy industry for more than 25 years, it is quite evident to me that we all need to gain a much better understanding of the energy we generate and consume. A solar electric system can be an excellent educational tool in addition to supplying clean energy to the electricity grid.

Our students would be eager to be involved in any part of the design, engineering, and construction of the solar electric system. While there will certainly be logistical hurdles involved with a collaborative project, I think the long-term benefits will be appreciated by generations to come.

If you think would like to pursue this with us, we can arrange to have our students meet you at the site and get an idea of how to proceed.

I will look forward to working with you.

All the best. Ed Witkin

Ed Witkin Sustainability Coordinator/ Instructor Durham Tech Community College Orange County Campus witkine@durhamtech.edu (919) 536 7238 ext. 4218

"FAQS"

This section attempts to respond to anticipated questions.

Question: What authority does the Town have to allow a third party entity to install, own and operate a solar electric system on Town land?

Response: G.S. 159-5.1 provides: "Municipalities ... may jointly or severally own, operate and maintain projects with any person, firm, association or corporation, public or private, engaged in the generation, transmission or distribution of electric power and energy for resale within this State or any state contiguous to this State." Since this statute was enacted in 1977, it was not specific to solar power purchase arrangements, but the Town Attorney has offered an opinion that it is broad enough to authorize these arrangements. Examples of precedents include the Town of Shelby and City of Raleigh, and out of state, in Prescott Valley, AZ in which similar projects have been pursued. In addition, Planning staff and DELTA Fellows have asked this question of various parties in recent weeks and have not identified any restrictions to entering into such an agreement. Finally, Planning staff and DELTA Fellows have participated in webinars and pursued research that highlights these types of agreements as a viable, desirable, and increasingly popular path for public/private partnerships that encourage renewable energy installations. The conclusion is that no legal barriers have been identified, and precedents exist to allow the Town to serve as a host for an installation. It is important that the specific legal agreements that are entered into provide clarity about the respective parties' liability, responsibilities, and abilities to benefit from the installation and generation of electricity.

Question: Have staff and DELTA Fellows contacted alternative providers, or considered alternative approaches for proceeding with this installation?

Response: Staff and Fellows have met with a variety of parties as discussed in the memo. A list of local installers has also been compiled in the event that a competitive process is chosen.

Question: What up front/installation costs would/could the Town incur (if any)? For example, would the Town be responsible for the Duke fee associated with the interconnection?

Response: AIRE would likely request a fee of \$2000 for a feasibility study if the Town were to enter into an agreement with AIRE. The Feasibility Study report would serve as a prospectus for potential investors to share with their personal tax advisors and determine whether they are ready to commit to participating in a project. AIRE charges a fee of \$2000 for producing the Feasibility Study, which may be recouped by selling it to the project investors if the project moves forward. Project investors can add the cost of the Feasibility Study to the total capital cost of the system, meaning that it is included in the basis for the tax credits and financial incentives. It is assumed that the interconnection fee from Duke would be financed by the investors.

Question: Would the Town incur any operation and maintenance costs while serving as a host but not as system owner?

Response: Presumably these costs would be covered by the owner, as spelled out in their agreement with the Town.

Question: What are the options for transferring ownership of the system to the Town in terms of timing, as well as potential costs to the Town and the financing of those costs?

Response: The initial owner would sell or donate the system 5-10 years into the future. The Town Attorney has offered an opinion that 10 years would be the longest that the Town could enter into such an agreement. The exact terms of the transfer of ownership should be stipulated in the agreement.

Question: Do contractual templates exist that might be helpful to the Town?

Response: DELTA Fellows have pulled together templates of contractual documents that address the agreement between the investor and Town, the RFP proposal, and the Duke Energy interconnection documents. Example bid and power purchase agreement documents from Prescott Valley, AZ and Shelby, NC have been obtained.

Question: Will/could the installation affect the operation of the Farmer's Market (or other Town Commons users/events)?

Response: No known impacts to any Town Commons uses/users have been identified. With the inclusion of educational signage, a beneficial use of the facility is envisioned. The Market Manager has been contacted and has indicated that there are no foreseeable contractual obstacles regarding this project. The Town can use the property at their discretion as long as there is no interference with the Farmers' Market operations.