Community Solar Technical Assistance
available from the
NC Clean Energy Technology Center

Thursday, August 10, 2017
Presentation Outline:

- Objectives & Benefits
- Customer Outreach and Education
- Technical & Economic Modeling
- Next Steps
Community Solar Project Objectives

- REPS Compliance
- Meet Customer Demand for Solar with Community Solar Program
- Balance Sustainability with Good Economics for FPWC and its customers
Value of Community Solar

Community Solar Project

Value of Solar+Storage

Initial Investment & Operations Expense

Subscription Payments

Fayetteville PWC

Customer Subscribers

Bill Credit

Meet Customer Expectations and Value PWC as Sustainability Leader
## Fayetteville Public Works Commission Community Solar Project Team

<table>
<thead>
<tr>
<th>Role</th>
<th>NCCETC</th>
<th>Fayetteville PWC</th>
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<tbody>
<tr>
<td>Project Manager</td>
<td>Kimberly Conley</td>
<td>Mark Brown</td>
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<td></td>
<td>Senior Project Manager</td>
<td>Senior Customer Programs Officer</td>
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<td>Policy</td>
<td>Autumn Proudlove</td>
<td>Keith Lynch</td>
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<td></td>
<td>Senior Policy Analyst</td>
<td>Power Supply and Regulatory Manager</td>
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<td>Outreach</td>
<td>Kimberly Conley</td>
<td>Carolyn Justice-Hinson</td>
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<td></td>
<td>Senior Project Manager</td>
<td>Communications/Community Relations Officer</td>
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<td>Technical Project Manager</td>
<td>Isaac Panzarella, PE</td>
<td>Reggie Wallace</td>
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<td></td>
<td>Assistant Director, Technical Services</td>
<td>Director, Generation, Power Supply and Compliance</td>
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<td></td>
<td>Tommy Cleveland, PE</td>
<td>Frank Barrow</td>
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<td></td>
<td>Renewable Energy Project Coordinator</td>
<td>Director, Business Planning, Development and Logistics</td>
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<td></td>
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<td>Rick Anderson</td>
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<td>Electric Systems Engineering Manager</td>
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Communication Strategy

• **Unify image and message** – Clearly define program and internally align around it.

• **Target Audience** – Understand preferences. Some research indicates that a positive financial message appeals broadly to a larger group, with environmental benefits playing a supporting role.

• **Working with Others** – Enlisting external stakeholders can be a productive way to spread the message — religious groups, environmental orgs., (Sustainable Sandhills) and community organizers / events, co-branding is economical and effective.

• **Additional channels** – Sharing the message at national and local conferences. SES program will play a large role in promoting PWC’s progressive Community Solar program.

Survey Questions & Results

● 70% were unfamiliar with Community Solar
● After brief explanation, 90% interested in participating in Community Solar
● Most appealing aspects of Community Solar?
  ○ Saves me money on my utility bill - 81%
  ○ Reduces my utility’s cost - 74%
  ○ Utilizes clean energy - 73%
● About 1,500 responses indicated they would pay between $4-$12 / mo.
● More than 800 responses requested to be sent additional information

KEY: Education
Solar + Storage Technical Analysis

• Cost/Benefit optimization of various…
  – Sizing; PV & energy storage
  – Configurations; fixed tilt, tracking, etc
  – Development models; FPWC owned, PPA, etc

• Multi-year hourly model of PV and Battery
  – Battery capacity relative to PV capacity
  – Hours of battery storage
  – PV design
  – Battery control

• Hourly Data from 2006 to 2014
  – Duke-NC Hourly Demand
  – NC-Average Hourly Ambient Temperature
  – Fayetteville area hourly solar radiation
Proposed Project System: Photovoltaic and Battery Energy Storage

1 MW (~3,700 panels)

500 kW lithium Ion battery with 2 hours of storage
Value Produced

- Value of RECs
- Value of PV C-Peak Reduction
- Value of PV Energy
- Value of Battery C-Peak Reduction
Value Produced

- Solar, 58.70%
- Battery, 39.80%
- RECs, 1.40%
## Comparison of Project/Program Design Options

<table>
<thead>
<tr>
<th></th>
<th>Base Case (20-yr, flat $5 monthly subscription)</th>
<th>Share with all customers (no subscription)</th>
<th>PV-Only Community Solar</th>
<th>PV + Storage PPA Subscription</th>
<th>Partnership-Flip Subscription</th>
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<tbody>
<tr>
<td><strong>FPWC Benefits</strong></td>
<td>Simple, FPWC ownership/control, value after 25 years</td>
<td>No community solar marketing or billing cost, high value to FPWC</td>
<td>Simple to market, no concern of battery performance risk to CS participants. FPWC get returns on battery system</td>
<td>Very low cost and performance risk, no upfront payment, high IRR</td>
<td>Potential for best of both worlds: tax benefits monetized &amp; long-term ownership for FPWC</td>
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<td><strong>Customer Benefits</strong></td>
<td>Good value, decide to participate</td>
<td>No admin cost to absorb</td>
<td>No financial premium, poor investment</td>
<td>Potential for positive returns from first year</td>
<td>Potential for good returns</td>
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<td><strong>Concerns</strong></td>
<td>Cost to administer shares and bill credits</td>
<td>No option for more significant customer participation</td>
<td>Could be hard to sell all shares</td>
<td>No ownership/value at end of PPA</td>
<td>Complicated to setup, maybe complicated to integrate CS program</td>
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Program Design

Community Solar Subscription Model - Pays FPWC over 25 years

- Subscribers pay flat monthly subscription fee (approximately $4-5) for the value produced by a portion (1-share) of the system
- Subscribers receive the net benefits of solar and battery as a monthly bill credit (value generated minus operating costs)
- FPWC breaks even on the project (no subsidies)
  - 3,692 panels x $4-5/month x 12 months/year = $180,000 – 220,000 /year
  - Over 25 years = $ 4,500,000 to $5,500,000 over 25 years
  - NPV @ 4% discount rate of 25 years of payments
Subscriber Cash Flow – 25 year CS program

![Graph showing cash flow for 25 years of a 25-year Community Solar Program. The graph illustrates the monthly cost and bill credit over the project years, with a notable increase in costs towards the end of the 25 years.]
Benefits of Community Solar+Storage

- Supports REPs compliance with renewable energy generation owned by community
- Feasible means of investing in renewable energy through individual customer choice, but with community-wide benefit
- Reduces monthly coincident peak demand with dispatchable battery storage
- Enables ALL Customers to affordably “own” solar without investing $$$ in their own rooftop solar installations
Next Steps:

- Release RFQ
- Select Qualified Design-Build Partner
- EPC + Commissioning
- Customer Outreach
Site Location
Advancing Clean Energy for a Sustainable Economy

nccleantech.ncsu.edu