

## **Chapel Hill Energy Efficiency Block Grant Strategic Options**

The generation of energy efficiency and renewable strategic options benefitting the municipal operations budget and the general community occasioned this set of options. The first four—municipal lighting and municipal HVAC, energy manager and solar grove—are designed for the benefit of the Town in its own operations. The remainder would benefit town residents and businesses. The consulting team initially generated a list of more than a dozen options, a list reduced to ten once the Town’s staff and the Sustainability Committee commented. The table below estimates impacts only for the next two years--although some of the options--including the financing programs, should sustain participation levels and increase annual total savings for many years to come.

The Town has \$554,900 in formula grant funds from DOE under this opportunity, \$504,900 of which will be utilized for implementation of the plan. The Town hopes to file its plan by the end of January, 2010.

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Chapel Hill Options Summary Table

Sector	Customers	kwh	Therms	Carbon Reduce (MTC)	Utility Savings	Savings / Customer	EECBG \$	Leveraged	Total Investment	Jobs Retained / Created
Municipal										
Municipal (Lighting)	1	265,030		149	\$21,202	\$21,202	\$5,096	\$51,018	\$56,114	0.6
Municipal (HVAC)	1	486,558	17,587	367	\$68,773	\$68,773	\$68,773	\$275,094	\$343,867	3.7
Contract Energy Manager	1	291,000	3,240	170	\$30,000	\$30,000	\$25,000	\$30,000	\$55,000	0.6
Solar Grove		18,198	0	24	\$5,296	NA	\$211,176	\$100,000	\$167,000	1.8
Community										
On-Bill Financing	850	2,636,700	59,500	4,312	\$335,070	\$394	\$150,000	\$4,100,000	\$4,250,000	46.2
PACE	240	879,840	23,520	1,806	\$116,208	\$484	\$150,000	\$1,650,000	\$1,800,000	19.6
Neighborhood Canvass	580	1,799,160	40,600	2,942	\$228,636	\$394	\$150,000	\$1,307,700	\$2,900,000	31.5
Efficiency 2.0	2,765	1,628,378	1,532	925	\$131,695	\$48	\$40,000	\$20,000	\$60,000	0.7
On-Bill Utilities Feedback, Savings Tips	27,650	12,212,835	11,490	6,937	\$987,712	\$36	\$50,000	\$100,000	\$150,000	1.6
Refrigerator Replacement in Public Housing	175	70,000	0	84	\$7,000	\$40	\$10,000	\$75,000	\$85,000	0.9

**Project Title:** Municipal Operations

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**Project Activity:** Retrofit lighting and possibly HVAC systems in Town-owned facilities

**Sectors served:** Public

**Customers served over 2 years:** N/A

**Utilities Savings (per year):**

Lighting:

- 265,030 kWh
- \$21,202

Extensive Retrofits

- 486,558 kWh
- 17,587 therms
- 3,336 thousand gallons
- \$68,773

**Greenhouse gas emissions reduced:** 149 MTCDE from lighting alone; 367 MTCDE from more extensive retrofits

**Total EECBG Funds Invested:** \$5,096 for lighting alone; \$68,773 for more extensive retrofits

**Total Dollars Leveraged:**

Lighting Only: \$51,018 from performance contracting and utility incentives

Extensive Retrofits: \$275,094 from performance contracting and utility incentives

**Jobs Created:** 0.6 for lighting; 3.7 for more extensive retrofits

**Summary Description:**

Preliminary studies we completed indicate the presence of lighting projects with a less than five-year payback at most town facilities. This would be a fairly low cost investment – approximately \$51,000 for projects with a 2.75-year or less payback – that would be tempered by \$2-\$5/fixture rebates from Duke Energy under the \$mart Savers program.

Further efficiency upgrades to municipal facilities may be possible, including EMS systems, occupancy sensors, and HVAC upgrades. These improvements could be financed at closer to a 4:1 ratio by utilizing performance contracting or private financing sources. Utility rebates are also possible under the \$mart Saver program. The Town could also apply for a State Energy Office grant, which will focus on low hanging fruit,<sup>1</sup> or for financing from a state fund which offers 1% financing to projects with a 10-year or less payback.<sup>2</sup>

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<sup>1</sup> <http://www.energync.net/sdocs/State%20Energy%20Program%20FACT%20SHEET.pdf>

<sup>2</sup> <http://www.energync.net/funding/eilp.html>

**Project Title:** Contract Energy Manager for Municipal Operations

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**Project Activity:** A contracted, part-time position to identify and implement municipal utility savings.

**Sectors served:** Public

**Customers served over 2 years:** 1

**Utilities Savings (per year):** 291,000 kWh, 3,240 therms, \$30,000 (including water)

**Greenhouse gas emissions reduced:** 170 MTCDE

**Total EECBG Funds Invested:** \$25,000

**Total Dollars Leveraged:** \$30,000

**Jobs Created:** 0.35

**Summary Description:**

A part-time contracted energy manager would work with Town Facilities Manager, maintenance staff and Sustainability Officer to identify low cost, no-cost measures and behavioral practices to reduce overall electric, gas and water usage approximately 3% per year. Low cost measures, such as occupancy sensors for lighting, would be installed from current utilities and operations budget for measures with paybacks below 2.5 years. Behavioral measures would affect maintenance staff protocols and involve training for town employees. Contests, frequent building usage feedback, space utilization changes, and savings tips would be employed. This contract manager—who might be shared with Carrboro and other nearby communities—would also identify and implement newly available Duke Energy, US Department of Energy, and NC State Energy Office incentive programs over next two years. The key concept embedded in this idea is that annual utility savings would pay for the contract, and generate some savings net of the contract.

**Project Title:** Solar Grove

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**Project Activity:** Install an 18-kW PV charging system for electric vehicles, possibly on the Wallace Deck

**Sectors served:** Public

**Customers served over 2 years:** N/A

**Utilities Savings (per year):** 18,198 kWh and 1,600 gallons of gasoline (assuming 4 PEVs). Total cost savings of \$5,296.

**Greenhouse gas emissions reduced:** 24 MTCDE

**Total EECBG Funds Invested:** \$211,176

**Total Dollars Leveraged:** \$100,000

**Jobs Created:** 3.4

**Summary Description:**

The Solar Grove concept has been developed with Solar Tech South, a local PV installer and developer. The Grove consists of free-standing PV modules as well as a plug-in station for electric vehicles. We have identified the Wallace Parking Deck as the optimal site for such a charging station, as the system must be attached to a physical building to be eligible for EECBG funding.

Matching funds, up to 80% of the charging station and any PEVs purchased by the Town, are available from the Clean Fuel Advanced Technology Fund, administered through the NC Solar Center.<sup>3</sup> The Solar Grove project could encourage adoption of plug-in electric vehicles and also supports the Town's work with Project Get Ready, a regional collaboration to spur the development of electrified transportation.

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<sup>3</sup> <http://www.engr.ncsu.edu/ncsc/transportation/CFATproject.htm>

**Project Title:** On-Bill Financing

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**Project Activity:** Create an on-bill financing program, perhaps using OWASA water bills as the delivery mechanism, to allow customers to access up-front capital for energy efficiency (EE) and renewable (RE) technology projects to be paid back over time through utility bill savings.

**Sectors served:** Residential, multi-family, small C&I, large C&I

**Customers served over 2 years:** 850 (approx 3% of customers)

**Utilities Savings (per year):** 2,636,700 kWh, 59,500 therms, total savings of \$335,070

**Greenhouse gas emissions reduced:** 4,312 MTCDE

**Total EECBG Funds Invested:** \$150,000

**Total Dollars Leveraged:** \$4,100,000 (assuming success with pending DOE grant proposal)

**Jobs Created:** 46.2

**Summary Description:**

On-bill financing programs have been in place in 10 states for several years, primarily serving commercial customers.<sup>4</sup> An on-bill financing program for Chapel Hill would set up a pool of capital from private sources and EECBG funds that can be accessed by customers to implement attractive, quick-payback EE and RE projects. The customer pays back the loan over time as they realize utility savings – this payback is facilitated “on-bill” to minimize upfront investment and simplify the transaction. Financing charges would be subsidized using EECBG funds. The delivery mechanism could be the OWASA monthly water bill, with a small administrative charge accruing to OWASA as a revenue source. Loans could attach to the owner or to the property itself, making this attractive for owner occupants as well as tenants, who only pay as long as they are in residence and seeing savings from the improvement.

Our calculations assume \$5,000 average investment.

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<sup>4</sup> See “Paying for Energy Efficiency Upgrades Through Utility Bills” at <http://ase.org/content/article/detail/5476>

**Project Title:** Special Assessment Financing (PACE)

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**Project Activity:** Create a special assessment financing mechanism to allow customers to take loans from Town funds (EECBG or debt issued) for use in energy efficiency or renewable energy project; these funds are paid back through property taxes over time.

**Sectors served:** Residential, multi-family, small C&I, large C&I, University, public

**Customers served over 2 years:** 240

**Utilities Savings (per year):** 879,840 kWh, 23,520 therms, total savings of \$116,208

**Greenhouse gas emissions reduced:** 602 MTCDE

**Total EECBG Funds Invested:** \$150,000

**Total Dollars Leveraged:** \$1,650,000

**Jobs Created:** 19.6

**Summary Description:**

There is statutory support for special assessment financing for energy efficiency and renewable energy in North Carolina.<sup>5</sup> Several other cities are pursuing this as an option; Asheville is farthest along in the process. Special assessment financing is attractive because it attaches repayment to a property, not a person, and allows individuals to access low-interest capital from the Town.

Implementing a special assessment program in Chapel Hill would take at least 1 year, realistically closer to 1.5 years and costs would include 1) issuing debt or raising funds to capitalize the program, 2) retaining a collection agency, 3) staff and upfront time in designing program, 4) reserve fund for non-payment / change orders for contractors.

Studies conducted in California, where PACE originated, indicate that customers want the Town to provide a list of pre-approved contractors. Customers are open to PACE financing, if it makes financial sense, and Berkeley predicted a 6% penetration rate.<sup>6</sup> Set-up costs for a single community PACE program (\$10 M bond issuance) are almost \$1M, of which approximately 75% can be wrapped into the financing. Given that threshold, it may be prudent to explore a PACE program with neighboring communities.

Our calculations are limited by total amount of EECBG funds to be invested, assuming a \$7,500 average investment per customer.

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<sup>5</sup> See Kara Millonzi "An Overview of Special Assessment Bond Authority in North Carolina." Local Finance Bulletin 40, Nov 2009.

<sup>6</sup> See Devi Prasad's full presentation at <http://rael.berkeley.edu/sites/default/files/berkeleysolar/BerkeleyFIRST%20Market%20Research%20Survey.pdf>

**Project Title:** Neighborhood Canvass Pilot

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**Project Activity:** Target high-potential neighborhoods for low-cost, no-cost EE upgrades, with the support of a growing force of trained contractors in the region, thanks to Durham's large investment in this strategy.

**Sectors served:** Residential, multi-family

**Customers served over 2 years:** 583

**Utilities Savings (per year):** 1,799,160 kWh, 40,600 therms, total savings of \$228,636

**Greenhouse gas emissions reduced:** 2,942 MTCDE

**Total EECBG Funds Invested:** \$150,000

**Total Dollars Leveraged:** \$2,750,000

**Jobs Created:** 31.5

**Summary Description:**

The neighborhood canvas pilot would take advantage of Chapel Hill's social networks and strength of community to effectively retrofit a neighborhood with low-cost, no-cost EE upgrades. This strategy can also maximize economies of scale if specific, simple upgrades are targeted. Durham is pursuing a similar program, using Clean Energy Durham as the volunteer educator force and Advanced Energy as technical and training lead. Clean Energy Durham may be expanding its operations to other communities, and Chapel Hill can take advantage of the 15 contractors Durham will train in this area.

Leveraging will take place via utility incentives, customer cost share, and a network of private funding sources. Our calculations assume an average investment of \$5000 per home.



**Project Title:** Efficiency 2.0

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**Project Activity:** Utilize social networking to create competitions and realize voluntary energy conservation.

**Sectors served:** Residential, multi-family, University, public, small C&I

**Customers served over 2 years:** 2,765

**Utilities Savings (per year):** 1,628,378 kWh, 1,532 therms; \$131,695 total

**Greenhouse gas emissions reduced:** 925 MTCDE

**Total EECBG Funds Invested:** \$40,000

**Total Dollars Leveraged:** \$20,000

**Jobs Created:** 0.7

**Summary Description:**

The Efficiency 2.0 platform combines competition, real-time information, social networking, and energy efficiency education to realize voluntary conservation. Research shows that simply making individuals aware of energy use can lead to 4% reductions or more.<sup>7</sup> This strategy can be employed in residential, commercial, and University settings and could achieve up to 10% penetration given effective and sustained marketing.

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<sup>7</sup> Dietz et al "Household actions can provide a behavioral wedge to rapidly reduce U.S. carbon emissions." PNAS 2009 online at <http://www.pnas.org/content/early/2009/10/23/0908738106.abstract>

**Project Title:** On-Bill Utilities Feedback, Savings Tips

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**Project Activity:** Utilize utility bill feedback, report card, and tips to motivate customers, realize voluntary energy conservation.

**Sectors served:** Residential, multi-family

**Customers served over 2 years:** 27,650

**Utilities Savings (per year):** 12,212,835 kWh, 11,490 therms; \$987,712 total

**Greenhouse gas emissions reduced:** 6,937 MTCDE

**Total EECBG Funds Invested:** \$50,000

**Total Dollars Leveraged:** \$100,000

**Jobs Created:** 2

**Summary Description:**

With an impact not unlike Efficiency 2.0, the quarterly bill stuffers utilize bar graphs, and billing feedback to instill competition, real-time information, and energy efficiency education to realize voluntary conservation. The billing messages compare one's usage to neighbors with similar building profiles. It also provides practical tips to reduce usage through behavioral practices and low-cost investments. This program saved Sacramento Municipal Utilities Department 3% across the board among its residential customers in 2008. We assume the same reduction when applied to Chapel Hill. We propose to place on Duke electric bill or Piedmont gas bill, but address both utilities usage. If we cannot do both, it can still be cost-effective directed to one or the other, with preference for the electric bill. The utility would have to agree to this, and provide a cost-share.

**Project Title:** Refrigerator Replacement in Public Housing

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**Project Activity:** Utilize HUD incentives to pay for new, efficient refrigerators from electricity savings sustained over ten years.

**Sectors served:** multifamily public housing tenants

**Customers served over 2 years:** 175

**Utilities Savings (per year):** 70,000 kWh, \$7000

**Greenhouse gas emissions reduced:** 84 MTCDE

**Total EEBCG Funds Invested:** \$10,000

**Total Dollars Leveraged:** \$75,000

**Jobs Created:** 0.5

**Summary Description:**

The Refrigerator replacement opportunity would utilize an energy efficiency incentive created by Congress in 1987 and managed by the federal Department of Housing and Urban Development for public housing authorities. The Housing Department has 342 units of public housing, of which an estimated total of 175 have refrigerators more than 10 years old. The HUD incentive program enables the Housing Department to enter into a municipal lease, secure tax-exempt financing, purchase the refrigerators, and engage a contractor to install them. Financed over twelve years, the annual savings from the more efficient appliances pays the annual debt service costs. This financing may be supplemented by EEBCG funds, if necessary to assure that annual savings exceed debt services costs. Since residents pay directly their electricity bills and receive utility allowances to offset the cost, the HUD incentive works by reducing the utility allowance, but allows the Housing Department to keep the difference between the pre-retrofit cost and post-retrofit cost to pay off the debt. By reducing the allowance less than the anticipated annual savings, the tenant can also enjoy a modest cash improvement as well.

The Town may also consider paying for the refrigerators in their entirety from EEBCG funds.

It may also be important to note that the Town is also considering two new ideas—the provision of more efficient window air conditioners and solar hot water measures—for their application in the 330 public housing units. As discussed additionally in the attached information request for a domestic solar hot water incentive for Town residents generally, we discuss the feasibility of folding all of these measures into a single procurement for an energy performance contract. There is an existing HUD incentive program that facilitates such a program in which the Housing Department can hire a contractor to identify measures, project costs and savings, arrange for financing, oversee contractor installations, guarantee the savings, and monitor the savings over time. Further consideration of the refrigerator replacement opportunity in this context is worthwhile.