Project Impact Table for Topic 2
University Park

Project Impact Metrics	During Project Period			Post Project Period		
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number of Buildings Retrofitted	18	74	138	69	35	17
Total square footage of buildings retrofitted	40,889	163,556	306,667	153,333	76,667	38,333
Average utilities savings (e.g. cost and fuel savings) achieved per unit retrofitted (per year)	$160.55	$234.28	$353.22	$353.22	$353.22	$353.22
Electricity savings per unit (kWh per year)	644.83	940.93	1,418.63	1,418.63	1,418.63	1,418.63
Natural gas savings per unit (therms per year)	19.78	28.87	43.52	43.52	43.52	43.52
Fuel oil savings per unit (gallons per year)	3.22	4.70	7.08	7.08	7.08	7.08
Jobs created or retained	12	14	17	6	3	2
Average emissions reductions (MMT CO2) per unit	0.00000141	0.00000206	0.00000310	0.00016055	0.00023428	0.00035322
EEBCG Funds Expended	$646,003	$424,680	$354,317	0	0	0
Leveraged Funds and In-Kind Resources Expended	$315,200	$673,600	$1,003,200	$501,600	$250,800	$125,400
Lifetime energy expenditure savings achieved each year	$44,457	$259,484	$733,540	$366,770	$183,385	$91,693
Lifetime leveraged energy expenditure savings from technology use in 5 other towns		$259,484	$2,934,161	$7,335,403	$18,338,507	$36,677,015

Assumptions:

All per unit savings measurements (emissions, energy saved, etc) refer to the yearly, not lifetime savings from the retrofit.

Energy Consumption and Expenditures (See Calculations Below)
Assume that retrofitted homes proximate to average maryland residential energy consumption, EIA, 2007 (1)
Assume that residential energy consumption in Maryland will remain at 2007 levels in the absence of the program.
Assume that residential energy expenditures for the average home in Maryland are represenative of our retrofitted homes (2)
(Where consumption for a fuel was less than 5kbtu per year, the fuel was excluded.)
Residential energy use estimates were checked against the DOE Buildings Energy Data Book, 2006 (3)

Retrofit and direct install reductions: (see calculations below)
For the utility direct-install measures, we assume 5% energy reductions per home, based on PEPCO estimates.
For retrofits, we assume 20% reduction in energy use per home, based on National Action Plan for Enery Efficiency (4) data, and others.

Penetration Estimates: (see calculations below)
Assume a 50% penetration rate for the utility direct install program, of which 50% develop into full audit and retrofits

Attribution & Additionality (see calculations below)
We assume that 75% of energy savings may be attributable to the additional funds provided by the DOE; 25% to the utility.
We a assume that none of the customers that installed upgrades with the program would have done so otherwise.

CO2 Estimates (see calculations below)
Carbon coeffiicents for each fuel type were calculated using estimates from EPA (5)(6).
For electricity, emissions were calculated from primary energy use rates from the DOE Building Energy Data Book (3)

Job Creation
Rebuilding America (7) sites 12.5 direct and indirect full-time-equivalent jobs per $1 million invested in building efficiency retrofits.

Cumulative Savings and Post-Project Savings
Assume a 15 year blended lifespan for energy savings to account for natural replacement and upgrades.
based on UP's intentional outreach to small towns, we estimate that 500 will download materials and 1% will implement in year 2 and 3
We anticipate program sustainability based on revolving loan fund and program sustainability elements

Sources:

(1) EIA - State Energy Data System. Table S4. Residential Sector Energy Consumption Estimates, 2007
(2) EIA - State Energy Data Sytem. Table S2b. Residential Sector Energy Expenditure Estimates by Source, 2007
(3) EIA - Buildings Energy Data Book, 2006
(4) National Action Plan for Energy Efficiency
(5) EPA Voluntary Greenhouse Gas Reporting Program -Fuel and Energy Source Codes and Emission Coefficients
(6) EPA Voluntary Greenhouse Gas Reporting Program -Fuel and Energy Source Codes and Emission Coefficients
(7) Rebuilding America - A National Policy Framework for Investment in Energy Effiicency Retrofits

Baseline						Assumptions:	Source
Maryland Residential	Natural Gas per home	41,450				1. Average Maryland residential energy consumption (EIA, 2009) is representative of University Park	Source on another spreadsheet
Energy Consumption	Electricity per home	46,099				2. Additional savings could be expected from fuels whose average consumption > 5kbtu per year. TI	Source on another spreadsheet
(kbtu per year)	Heating Oil per home	9,344					
CO2 Coefficients	Natural Gas	0.000053				Emissions factors derived from US EPA Voluntary Reporting of Greenhouse Gases	Source on another spreadsheet
(metric tons Co2 per	Electricity	0.000578					
kbtu)	Heating Oil	0.000073					
UNIVERSITY PARK							
PEPCO Direct InStall							
Penetration	Total Number of Homes	461		homes		Assumes 50% penetration of 923 homes	
Impact Per home	Energy Reduction Per Home	5%		percent reduction		For direct install, we assume at 5% reduction in home energy consumption	
Attribution	Customer Additionality	100%					
	Utility/Affiliate Additionality	75%					
		Per Home	Total	*Per home (diff units)*			
Total Savings	Natural Gas	1,554.39	716,575	15.54	therms		Source on another spreadsheet
(kbtu per year)	Electricity	1,728.70	796,931	506.65	kWh		
	Heating Oil	350.41	161,540	2.53	gallons		
CO2 savings	Natural Gas	0.08	38.06				
(metric tons CO2 per	Electricity	1.00	460.50				
year)	Heating Oil	0.03	11.83				
	Total	1.11	510.38	tons			
Home Performance with Energy Star							
Penetration	Total Number of Homes	231				Assumes 25% penetration of 923 homes	
Impact Per home	Energy Reduction Per Home	20%				For retrofits, we assume a 20% reduction in home energy consumption, based on estimates from th	Source
Attribution	Customer Additionality	100%					
	Utility/Affiliate Additionality	75%					
		Per Home	Total	*Per home (diff units)*			
Total Savings	Natural Gas	6,217.57	2,866,300	62.18	therms		
(kbtu per year)	Electricity	6,914.80	3,187,723	2,026.61	kWh		
	Heating Oil	1,401.65	646,160	10.11	gallons		
CO2 savings	Natural Gas	0.33	152.22				
(metric tons CO2 per	Electricity	4.00	1,842.00				
year)	Heating Oil	0.10	47.30				
	Total	4.43	2,041.53	tons			

UP	923	Penetration Rate			Number of Homes			Squarefootage of Retrofit			Percent of retrofits coefficient		
	Total Hom	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Direct Install	923	0.2	0.2	0.1	185	185	92	408,889	408,889	204,445	91%	71%	40%
EnergyStar	923	0.02	0.08	0.15	18	74	138	40,889	163,556	306,667	9%	29%	60%
Total		0.22	0.28	0.25	203	258	231	449,778	572,445	511,111	100%	100%	100%

	Emissions Reductions per home			Savings Per home			Natural Gas Savings (therms)			Electricity Savings (kwh)		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Direct Install	1.01	0.79	0.44	$115	$90	$50	*2,869*	*2,869*	*1,435*	*93,528*	*93,528*	*46,764*
EnergyStar	0.40	1.27	2.66	$46	$144	$303	*1,148*	*4,591*	*8,608*	*37,411*	*149,645*	*280,584*
Total (per building)	1.41	2.06	3.10	$ 161	$ 234	$ 353	*19.8*	*28.9*	*43.5*	*645*	*941*	*1,419*

	Natural Gas Savings (therms)		
	Year 1	Year 2	Year 3
Direct Install	*467*	*467*	*233*
EnergyStar	*187*	*747*	*1,400*
Total (per building)	*3.22*	*4.70*	*7.08*

SOURCES AND ASSUMPTIONS:

Penetration Rate and Number of Homes:

Based on a 50% penetration for the PEPCO direct install, 50% of which would opt for the more in-depth retrofit.

The rate of penetration reflects a steady ramp up in the whole program, with the deep retrofit portion applying to a great proportion of homes over time.

Squarefootage of Retrofit

Assumes median home size for the United States, according to the US Census.

2215 Source Source 2008 Median Household Size from US Census

Avg. Co2 reductions per home

Weighs the savings achieved through each type of retrofit using the percentage of retrofits each year.

Assumes average energy consumption her household for Maryland, according to the EIA.

Savings Per Home

Assumes average Maryland home energy expenditures, according to the EIA.

$ 2,522.97 per year Source

Job creation:

Rebuilding America sites 12.5 direct and indirect full-time-equivalent jobs per $1 million invested in building efficiency retrofits. Source