



Public Facilities Committee Report

City of Newton In City Council

Wednesday, March 7, 2018

Present: Councilors Crossley (Chair), Norton, Leary, Kelley, Danberg, Laredo, Lappin

Also Present: Councilor Downs

City staff Present: City Solicitor Ouida Young, Associate City Engineer John Daghlian, Senior Financial Analyst/Acting DPW Director of Finance Jack Cowell, Director of Sustainability Ann Berwick, Energy Project Manager Bill Ferguson, Chief Operating Officer Jonathan Yeo

#167-18 Granting of easements in the Austin Street Municipal Parking Lot

HER HONOR THE MAYOR requesting the authority to grant specific easements in the Austin Street Municipal Parking lot to permit the undergrounding of required electric service and telecommunications equipment, as noted on a plan entitled "Proposed Underground of Overhead Power & Telecommunications, Austin Street, Newton, Massachusetts", dated April 24, 2016, revised December 11, 2017, prepared by JHD. (Ward 2)

Action: **Public Facilities Approved 6-0 (Leary not Voting)**

Note: City Solicitor Ouida Young presented the request to grant an easement to RCN, Comcast and Verizon in order to underground existing overhead utilities and streetlights as conditioned in the Austin Street Special Permit Board Order. Atty. Young stated that Eversource will not provide electricity to the site until the easement has been granted and as such, the granting of the easement is time sensitive. She also stated that four existing overhead poles on the southern portion of Bram Way must remain, as they provide service to several Walnut Street businesses. A Committee member questioned whether the property owners have been contacted to discuss whether they wish to coordinate undergrounding of that equipment. Atty. Young stated that the Planning Department must carefully coordinate the undergrounding process, that it can be cost prohibitive and could interrupt operations. However, she agreed to follow up to determine that all owners have been contacted.

Associate City Engineer John Daghlian noted that the proposed transformer location will be moved further away from the residences in the direction of the church. This change has been discussed with and is supported by the neighborhood Liaison Committee. A Committee member asked whether the transformer will make noise. Mr. Daghlian confirmed that it is possible that the transformer may generate a low hum, but only from within a distance of about five feet, noted that the new transformers have been designed to be less audible. Committee members questioned how much the undergrounding is costing the City. Mr. Daghlian stated that the cost of undergrounding is \$800/linear foot and noted that the City has appropriated \$385,000 for the undergrounding of Eversource's equipment. He stated

that Comcast will be passing the expense onto ratepayers and Verizon is charging the project \$24,000 for the undergrounding of Fiber Optic cable. Mr. Daghlian noted that utility poles are increasing in size (height and width) as well as being buried deeper in order to withstand wind and increasing amounts of equipment. Councilor Kelley moved approval of the item which carried unanimously.

Public Facilities and Finance Committees

#172-18 Appropriate \$500,000 for snow and ice removal expenses

HER HONOR THE MAYOR requesting authorization to appropriate the sum of five hundred thousand dollars (\$500,000) from Free Cash to supplement the Department of Public Works' snow and ice operations budget.

Personnel Costs – Overtime (0140110-513001).....	\$150,000
Rental Vehicles (0140110-5273-5273)	\$350,000

Action: **Public Facilities Approved as Amended 5-0 @ \$1,939,987 (Leary, Lappin not Voting)**

Note: Senior Financial Analyst/Acting Finance Director Jack Cowell presented the request for \$1,939,987 for snow/ice removal and tree cleanup. The request includes the request for \$500,000 as docketed on March 5, 2018 as well as the amended request for an additional \$939,987. Mr. Cowell noted that there have been two significant snow events since the item was docketed. He stated that the Department of Public Works has spent \$6.4 million dollars this year. It was noted that over 1000 street trees have suffered damage and approximately 91 trees came down. Mr. Cowell confirmed that the cost of repairs and clean up from the tree damage totals \$835,000 to the City alone. The Chair asked whether FEMA may be offering assistance due to the severity of the storm and extent of the damage. Mr. Cowell noted that FEMA has not yet been contacted, to his knowledge.

A Committee member asked how the snow expenses compare to the winter of 2015. Mr. Cowell stated that in 2015, there were over 100" of snow and the City expended over \$7 million dollars in snow removal. This year the City has expended \$6.4 million dollars for 77.5" of snow and ice removal. Mr. Cowell noted that the magnitude of the storms this year has been greater, but confirmed that the City has spent approximately \$83,000/inch, which is less than the historical average of \$100,000/inch. A Committee member noted that as the City discusses the cost of undergrounding utilities, the cost of repairing above ground poles and wires should be considered. Councilor Danberg moved approval of the amended item which carried unanimously.

Note: Public Buildings Energy Project Manager Bill Ferguson presented an update of the supply and use of Energy relative to City Facilities and Operations to the Public Facilities Committee. Mr. Ferguson's presentation (attached) focused on Energy Supply Contracts, Solar Energy, Energy Use & Efficiency and Next Steps (energy efficiency and solar projects).

Energy Contracts

Mr. Ferguson reviewed details of the following new power purchasing contracts that began 12/01/2018:

Natural gas: We are paying less per therm, saving of \$225,400/yr.

Electricity We are paying less per kilowatt hour (kWh), saving \$228,000/yr.)

RECs (Renewable Energy Credits) \$30,000 cost to the City for 1050 RECs. The RECs are purchased from a wind turbine in Plymouth.

Demand Response Program: There is a contract with EnerNoc that pays the City to reduce energy consumption when called upon. If the City is called to reduce demand and is able to do so, and when the City is not asked to reduce energy consumption for any payment period, EnerNoc automatically grants payment to the City. This accounts for approximately \$ per year.

Solar Projects

Mr. Ferguson provided an overview of the Solar projects from Phase I (Countryside, Memorial Spaulding, Brown Middle, Newton North) all of which were rooftop installations, as well as Phase II (Newton South, Angier, Oak Hill, Bowen, Lower Falls Community Center, Fire Department 10, Eliot Street DPW Yard, Rumford) which are composed of rooftop installations, solar canopies in parking lots (NSHS and DPW at Elliot Street) and the very large ground mounted installation at the Rumford landfill. Mr. Ferguson provided an analysis of cost savings from each year and noted that the solar at Rumford generated more in five months than all of the other Phase I and Phase II projects. The expected net revenue from the Solar projects for 2018 is \$522,854.77. Expected total kWh for 2018 is 4.38 million, which is approximately equal to 21% of the City's electricity use (although the City sells the renewable energy credits, so cannot also take credit for the reduced emissions).

Mr. Ferguson noted that the City's intervention in the rate case with Eversource is worth approximately \$430,000 in avoided additional costs. Mr. Ferguson emphasized that the City must remain vigilant in opposing expected further attempts to diminish these programs. The Committee and members of the Energy Commission and public expressed gratitude to Mr. Ferguson, Associate City Solicitor Alan Mandl and Sustainability Director Ann Berwick for their hard work in advocating for Newton and other municipalities on the rate case.

Energy Use and Efficiency

Mr. Ferguson provided a comparison of Energy Efficiency Projects Funding Sources and Expenditures. Since FY2013, City funding and Green Communities grant money (totaling \$6,693,296.00) has been spent: LED Street light replacement lamps (\$1.5 million dollars),

Weatherization and Air Sealing City buildings (\$65,962), HVAC equipment replacement (\$1.8 million dollars), and LED Building Lighting replacements (\$3.2 million dollars). Mr. Ferguson noted that between 2010-2012 the Lower Falls Community Center was also retrofitted, yielding energy savings of 70%.

Mr. Ferguson showed the report generated from the Green Communities Mass Energy Insight Database. On an annual basis, City and utilities fuel usage data is submitted to the database, and DOER generates a performance report comparing various energy uses to the selected baseline year (2008). The report converts all energy usage to MBtus (millions of British thermal units), separating buildings, vehicles, street and traffic lights, open space (lighting) and water/sewer facilities (pumps). Mr. Ferguson noted that in 2017, as compared to the baseline; building energy use has decreased by 15%, street and traffic lights have decreased 67% (due to LED conversion), open space and vehicles have increased (8.5%) and water/sewer has decreased (1%). Committee members questioned why vehicles have increased. Mr. Ferguson noted that while the City is purchasing more efficient vehicles, we may be using vehicles more; resulting in the increase in fuel use. He noted that energy efficiency for vehicles is measured in mpg. He suggested that some municipal vehicles should not continue to be exempted and said further that the City is working to replace conventional vehicles with electric vehicles wherever possible. He noted that the Police Department has been receptive to using a hybrid vehicle.

Mr. Ferguson explained that the “weather-normalized” figure shown on the report is a statistic that has been used in prior years to more accurately compare energy use according to abnormal weather conditions. That is, the more severe the winter, the more heating energy is consumed, regardless of efficiencies employed. However, he noted that this figure is no longer being generated by the DOER, as there are many factors that affect its accuracy, and they are working to perfect their formula. Therefore, the 20% reduction goal under the Green Communities Program, is measured based on Total Energy Consumption. As of 2017, Newton has achieved a 15% reduction by the total energy standard since 2008, but only a 9% reduction using the weather normalized calculation. He stated that very few communities have met the 20% standard, but noted that the City will continue to work towards it.

Mr. Ferguson compared the kWh vs Cooling Degree Days chart which demonstrates the gradually declining trend for electricity use (down 20% from FY08. He noted that three municipal buildings (Newton North, Newton South, FA Day Middle School compose 41% of all use electricity use). The Cooling Degree Days show a hot summer. Mr. Ferguson highlighted the comparison between kWh used for fluorescent lights and kWh used for LED lights, showing a significant reduction. He stated that it is his belief that the most efficient ways to decrease energy consumption is to continue to replace fluorescents with LED lights as well as to recalibrate energy management systems within existing schools. Comparisons of use of kWh,

therms and MBtus are shown for Angier, Carr and Zervas. Mr. Ferguson noted that oil consumption for heating use has seen a major decline (from 744,000 gallons in 2008 to 67,000 in 2017), but has been replaced by natural gas. It was noted that 3 buildings make up 31% of total gas use (Newton North, Newton South, Brown Middle School) and 3 buildings make up 41% of electric use (Newton North, Newton South, FA Day Middle School) in the City.

Next Steps

SOLAR PHASE III Mr. Ferguson provided the attached list of 40 preliminary sites under review by the Administration and the Energy Commission for locating solar panels/canopies. He is requesting input from Council members relative to concerns and/or suggestions for specific locations. He emphasized that the list is very preliminary and noted that only the developer will be able to determine if a site is suitable once completing analyses including shading, engineering, roof mapping, etc. Committee members noted that it would be beneficial to know whether trees will need to be taken down in order to accommodate new installations. Mr. Ferguson noted that he cannot provide information relative to tree removal or revenue without a schematic design by the developer. It was noted that after review by the developer, the Administration will make a recommendation requiring each location to be authorized by the Council. Chief Operating Officer Jonathan Yeo stated that the Administration is very enthusiastic about solar installations. A Committee member noted that by locating solar facilities in parking lots and on roofs, more trees and forests can be preserved.

Energy Commission Chair Eric Olson commended the work of Mr. Ferguson, Ms. Berwick and Atty. Mandl in advocating for the City and other municipalities on the Eversource rate case. He noted that fighting for the City saved a lot of money and made solar more attractive for Newton and other MA communities. Mr. Olson stated that reasons to encourage solar installations include; normalizing solar for children, encouraging industry growth and reduced pricing, cost savings and running the City on renewable energy sources. He emphasized the importance of utilizing the green energy that the solar is generating. Mr. Olson emphasized that the cost savings generated from using RECs should be used to purchase more RECs to continue to increase energy efficiency. Mr. Ferguson noted that under the SMART program, S RECs will no longer exist and utility companies will own the RECs no matter what, disallowing the City to use the RECs generated from their own solar facilities. The Chair noted that with the revenue generated from RECs, the funds can also be used to invest in municipal assets to reduce energy demand.

Energy Commission Vice Chair Halina Brown questioned whether the energy consumption units have been converted into greenhouse gas emissions to determine whether progress is being made. Mr. Ferguson noted that while he has not yet converted the data into greenhouse gas emissions, there is a balance between increasing the programming and standards in the

City's buildings and schools (i.e. including air conditioning in schools) while increasing the efficiency/reducing the energy load. It was noted another factor increasing energy consumption is the increase in number of students, larger buildings as well as using schools for additional programming during the summer. Former Public Buildings Commissioner Stephanie Gilman stated that converting to greenhouse gas emissions can be more complicated but noted that converting buildings from oil to gas is a huge reduction. Committee members were thankful for the update and look forward to continued updates.

#45-18 Request for updates on Newton Power Program

PUBLIC FACILITIES COMMITTEE requesting updates from the Director of Sustainability and the Administration on the development of a program, known as Newton Power Choice, to aggregate the electricity supply and provide clean energy power options to Newton electric customers.

Action: Public Facilities Held 7-0

Note: Director of Sustainability Ann Berwick provided an update to the Public Facilities Program on the Newton Power Choice Program outreach efforts. Since the update, originally scheduled for discussion on March 7, 2018, was cancelled due to inclement weather, many students planning to attend were unable to reschedule. Ms. Berwick stated that she is working with students from FA Day Middle School (Generation Citizen), as well as students from both high schools. The high school students are doing senior projects for their Sustainability Class on the Newton Power Choice Program. Ms. Berwick noted that the students will be distributing information throughout the community, so must develop full comprehension of the program. Ms. Berwick voiced gratitude for participation from the School Department and enthusiasm on behalf of the students.

Newton North High School student Daniel Pitts attended and stated that there is strong interest among students in being able to purchase more renewable energy and streamlining the process. He expressed his enthusiasm for assisting in encouraging residents to purchase more green energy. He hopes that the City can set a positive example for sustainability in the future.

Ms. Berwick noted that electricity is the only energy form that can be made to be cleaner. She stated that gas and oil cannot be made cleaner, so it is imperative that we switch to electricity that is generated from renewable sources. She noted that the Newton Power Choice Program focus is on helping to drive the market for renewable energy. Ms. Berwick noted that the community outreach occurring in Newton has been more aggressive than any other MA municipality. Because the program is "opt-out", it is important for members of the public to be educated about how to "opt-out" if they need to. Ms. Berwick continued that it is equally important to encourage residents to "opt-up" to a higher level of renewable energy.

Ms. Berwick noted that she will have a part-time unpaid intern who will assist her by attending City events and farmer's markets to distribute information. She stated that there is a Green Newton survey that suggests between 86%-87% of respondents would be willing to spend more on renewable

energy (averaging around \$8/month for an average bill). She stated that setting the default level will be a KEY decision. A Committee member noted that Nudge Behavioral research indicates that most people generally stay at their default levels when put into “opt-out” or “opt-down” situations. It was suggested for this reason, the default level should be set high. It was noted that while there are two Councilors and two Energy Commission members are on the Working Group, the administration was empowered by the Council, as required by statute, to make the final decisions on how to structure the program. Ms. Berwick noted that cost savings cannot be guaranteed by aggregating the electricity load. Because the City will not know the market prices prior going out to bid, the rates are subject to change. Ms. Berwick stated however that currently, 30% renewable can range from an additional \$2 to \$5 a month. She noted that the difference will not generate significant expense or savings. Mr. Eric Olson stated that by setting a high level of default, the City can create significant reductions in emissions. He emphasized that residents are concerned about climate change and noted that the default level can be reevaluated at the end of the contract, if unsatisfactory.

It was noted that extensive information pertaining to the Newton Power Choice Program, as well as a current list of Citywide presentations, can be found at www.newtonpowerchoice.com. Ms. Berwick encouraged any suggestions for community groups or locations where she can visit for education about the program. With a motion from Council Lappin to hold the item, Committee members voted unanimously in favor.

#151-18 President’s Appointment of James Purdy to the Energy Commission

PRESIDENT LAREDO re-appointing James Purdy, 943 Chestnut Street, Newton Upper Falls to the Energy Commission for a term of office to expire December 31, 2019. (60 days: 04/06/18)

Action: Public Facilities Approved 7-0

Note: Committee members expressed gratitude for Mr. Purdy’s service on the Energy Commission. Councilor Norton moved approval of the appointment which carried unanimously.

#152-18 President’s Appointment of Michael Gevelber to the Energy Commission

PRESIDENT LAREDO re-appointing Michael Gevelber, 166 Melrose Street, Auburndale to the Energy Commission for a term of office to expire December 31, 2019. (60 days: 04/06/18)

Action: Public Facilities Approved 7-0

Note: Committee members expressed gratitude for Mr. Gevelber’s service on the Energy Commission. Councilor Danberg moved approval of the item which carried unanimously.

The Committee adjourned at 10:15 pm.

Respectfully Submitted,

Deborah Crossley

Public Facilities Meeting March 7, 2018

Energy Update

Context

- This presentation is about City Operations only.
- 4 Parts
 - I. Energy Supply Contracts
 - II. Solar Energy
 - III. Energy Use and Efficiency
 - IV. Next Steps

I. Energy Contracts

- Natural Gas Contract
- Electricity Contract
- RECs Contract
- Demand Response Contract

Natural Gas Supply Contract

(Contract period Nov 1, 2017 through Oct. 31, 2019)

ANNUAL Savings Compared to Previous Supply Contract

Therms FY 17	Price/Therm Previous Contract	Previous Contract Annual Cost	Price/Therm New Contract	New Contract Annual Cost
1,400,000	\$ 0.84	\$ 1,174,600	\$ 0.68	\$ 949,200
	Annual Savings	\$ 225,400		

Electricity Supply Contract (12-1-17 through 11-30-20)

1. ANNUAL Savings Compared to Preivous Supply Contract

kWh FY 17	Price Previous Contract	Previous Contract Annual Cost	Price New Contract	New Contract Annual Cost
8,800,000	\$ 0.103	\$ 906,400.00	\$ 0.087	\$ 761,200.00
12,000,000	\$ 0.103	\$ 1,236,000.00	\$ 0.096	\$ 1,153,200.00
		\$ 2,142,400.00		\$ 1,914,400.00
Annual Savings		\$ 228,000.00		

Renewable Energy Credits

- REC Contract: Calendar years 2018-2020. \$30,000 annually.
- Note: this is the equivalent of adding \$.00144/kWh to our electricity price.
- This contract is for 1050 additional RECs above state requirements. Which brings us to 5% above state requirements.
- This year we purchased directly through a REC broker who will be setting up a GIS (Generation Information System) account with ISO-NE.

DEMAND RESPONSE PROGRAM-EnerNoc rev 12-4-17

	<u>KW</u> <u>Enrollment-</u> <u>summer</u>	<u>KW</u> <u>Enrollment-</u> <u>winter</u>	<u>EnerNoc</u> <u>Pmt per</u> <u>season</u>	<u>Summer pmts</u>	<u>Winter pmts</u>	<u>Annual</u> <u>Payments</u>
12/1/17-5/31/18	1,500	850	\$ 5.83		\$ 19,822	\$ 19,822
6/1/18-5/31/19	1,500	850	\$ 5.83	\$ 69,960	\$ 19,822	\$ 89,782
6/1/19-5/31/20	1,500	850	\$ 5.83	\$ 69,960	\$ 19,822	\$ 89,782
6/1/20-5/31/21	1,500	850	\$ 5.83	\$ 69,960	\$ 19,822	\$ 89,782
6/1/21-5/31/22	1,500	850	\$ 5.83	\$ 69,960	\$ 19,822	\$ 89,782
6/1/22-5/31/23	1,500	850	\$ 5.83	\$ 69,960	\$ 19,822	\$ 89,782
Total Estimated Payments						\$ 468,732

Summary of Annual Savings from Energy Contracts

	Annual Savings v Prior contract	
Natural Gas Contract	\$ 225,400	
Electricity Contract	\$ 228,000	
Demand Response	\$ 89,782	
RECs	\$ (30,000)	
TOTAL SAVINGS	\$ 513,182	

II. Solar Projects

- Phase 1: 3 schools came on line Jan 2014
NHS came on line July 2014
- Phase 2: 8 locations (5 roof tops, 2 parking canopies and Rumford)
7 Came on line January 2017
Rumford came on line July 2017

Exhibit WF-3 Newton Solar Projects on-line as of July 2017.

Phase 1- PPA signed October 15, 2012

location	KW AC	KW DC	in service date	kWh/YR*	PPA price**	Term-yrs	Eversource Rate
1 Countryside Elementary School	50	62	12/31/2013	79,230	\$ 0.106	20A-9	
2 Memorial Spaulding Elem. School	100	110	12/31/2013	128,978	\$ 0.106	20A-9	
3 Brown Middle School	200	252	12/31/2013	309,041	\$ 0.106	20A-9	
4 Newton North High School	260	262	4/14/2014	283,718	\$ 0.106	20A-9	
total	610	686		800,968			

PPA price has a 2.5% escalator starting 4th year

Phase 2- 2 PPAs. Locations 1-7 signed May 25, 2016. Landfill signed June 30, 2016.

location	KW AC	KW DC	in service date	kWh/YR*	PPA price**	Term-yrs	Eversource Rate
1 South HS canopies and roof	240	302	1/25/2017	369,684	\$ 0.152	20 B-5	
2 Angier	36	46	1/25/2017	57,136	\$ 0.152	20 B-5	
3 Oak Hill	104	135	1/25/2017	171,203	\$ 0.152	20 B-5	
4 Bowen	58	79	1/25/2017	95,598	\$ 0.152	20 B-5	
5 LFCC	15	12	1/25/2017	15,096	\$ 0.152	20 B-5	
6 FD 10	11.5	11.2	1/25/2017	13,665	\$ 0.152	20 B-5	
7 Elliot St DPW Yd. canopies	483	599	1/25/2017	741,157	\$ 0.152	20 B-5	
8 Rumford Landfill	1671	2136	7/12/2017	2,843,949	\$ 0.098	20 B-5	
total	2618.5	3,320		4,307,488			

PPA price has a 2.0% escalator starting 2nd year

Source: PPA documents

* kWh/YR is design data included in the PPA documents

** This is first year PPA price paid by the City to the solar developer.

Solar Net Revenues (Savings)

Net Revenues

Calendar Year	Phase 1	Phase 2	Rumford	Annual Total Net Revenues
2014	\$ 49,942.81	\$ -	\$ -	\$ 49,942.81
2015	\$ 80,365.43	\$ -	\$ -	\$ 80,365.43
2016	\$ 75,895.14	\$ -	\$ -	\$ 75,895.14
2017	\$ 55,964.70	\$ 96,591.18	\$ 168,593.62	\$ 321,149.50
		Total NR 2014-2017		\$ 527,352.88
2018	\$ 73,854.77	\$ 99,000.00	\$ 350,000.00	\$ 522,854.77

Solar kWh Production

Calendar Year	Phase 1 kWh	Phase 2 kWh	Rumford kWh	Total kWh
2014	616,347	-	-	616,347
2015	741,541	-	-	741,541
2016	785,689	-	-	785,689
2017	612,422	1,064,000	1,027,600	2,704,022
		Total kWh production 2014-2017		4,847,599
2018	785,689	1,100,000	2,500,000	4,387,707

Solar Summary

- Our Solar Projects will generate \$522,000 in net savings for the City of Newton in Calendar Yr 2018.
- They will generate 4.38 million kWh in 2018 equal to 21% of the City’s electricity use.
- Our intervention in the Eversource rate case saves us about \$430,000 per year. We need to be ready to jump back in to protect our assets.

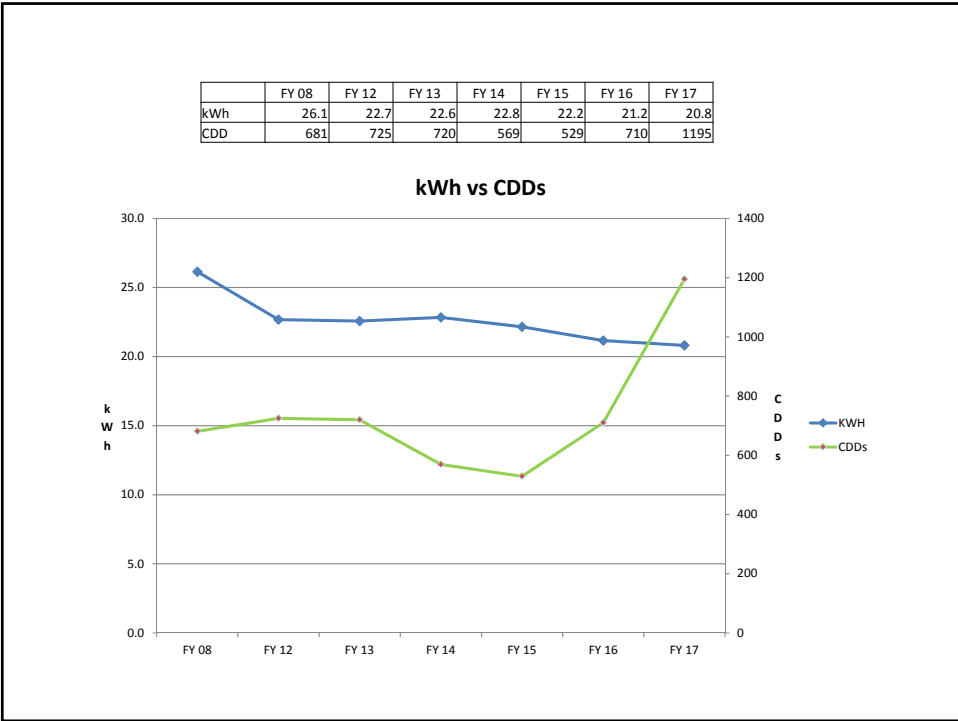
III. Energy Use and Efficiency

Energy Efficiency Funding Sources Since FY 2013		
City Funds (FY 2013)-Streetlighting	\$	1,300,736.00
City Bond Funds (6/2014) Phase 1	\$	2,600,000.00
Green Communities Grants since 2013	\$	934,035.00
Energy Stabilization Fund	\$	1,425,780.00
Embedded Utility Incentives/Rebates since	\$	432,745.00
TOTAL	\$	6,693,296.00
Energy Efficiency Expenditures Since FY 2013		
LED Streetlighting	\$	1,550,735.00
Weatherization and Air Sealing	\$	65,962.00
HVAC	\$	1,812,465.00
LED Building lighting	\$	3,264,134.00
TOTAL	\$	6,693,296.00

GREEN COMMUNITIES GRANTS		
2010-2012	\$ 179,500.00	LFCC: windows, shell insulation, air sealing
2013-2014	\$ 250,000.00	Street lighting: Conversion to LED
2015	\$ 236,878.00	LED conversions: Countryside, Oak Hill, Police Garage, Police HQ
2016	\$ 249,772.00	LED conversions: Burr, Horace Mann, Memorial Spaulding
2017	\$ 197,157.00	LED conversions: Franklin, Underwood, Williams, Memorial Spaulding
	\$1,113,307.00	

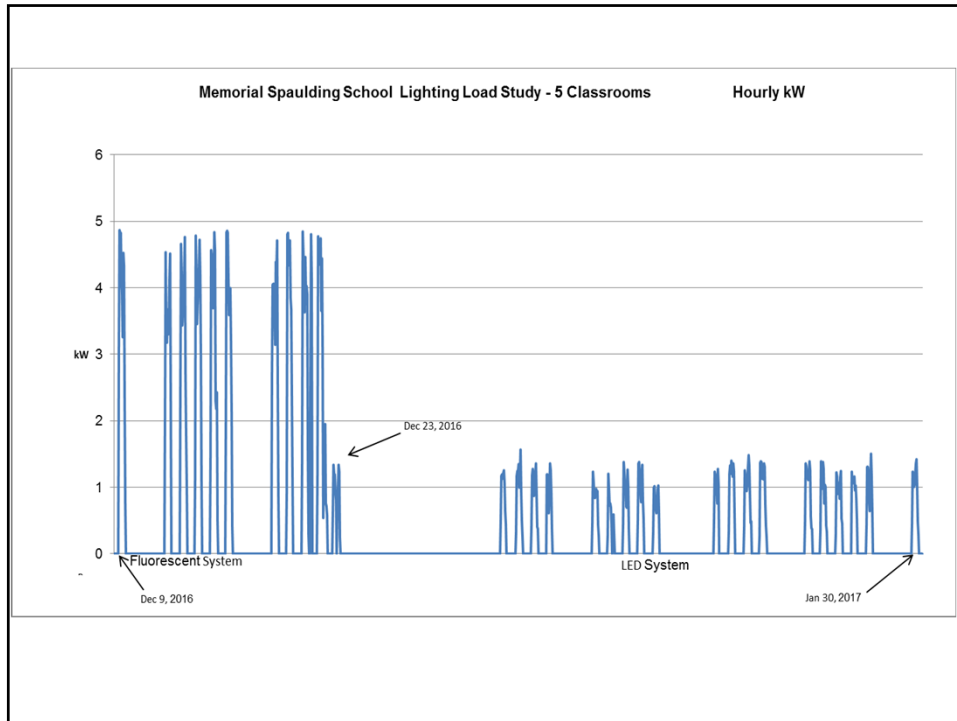
Criterion 3 Step 2: Complete Table 2 - Progress

Table 2: Timeline of Annual Municipal Energy Use											
	Baseline MMBtu	Year 1 MMBtu	Year 2 MMBtu	Year 3 MMBtu	Year 4 MMBtu	Year 5 MMBtu	Year 6 MMBtu	Year 7 MMBtu	Year 8 MMBtu	Year 9 MMBtu	For Most Recent Year: Change vs. Baseline (%)
Note Fiscal or Calendar Year	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	
Null	0	8,090			861		298	1,127		1,530	#DIV/0!
Buildings	245,902	232,631	217,809	231,912	188,583	207,258	223,836	237,397	198,031	207,090	15.8%
Open Space	528	499	496	451	462	482	511	530	582	535	-1.3%
Street & Traffic Lights	15,192	2,281	10,629	11,174	11,163	10,535	11,747	7,808	4,899	4,961	67.3%
Vehicles	34,753	36,483	34,077	35,527	30,728	33,714	34,015	35,186	44,492	37,363	-7.5%
Water/Sewer	3,469	3,731	3,639	3,306	3,523	3,104	2,861	2,951	2,560	2,949	15.0%
Building Stock Change Adjustment									-1200.00	-1748.40	#DIV/0!
Regional School Prorated											#DIV/0!
TOTAL ENERGY CONSUMPTION (NO Weather Normalization)	299,844	283,715	266,650	282,370	235,320	255,093	273,268	284,999	249,364	252,680	16.8%
TOTAL ENERGY CONSUMPTION (Weather-Normalized)	293,861	276,435	275,481	272,993	256,182	255,450	251,118	258,990	270,749		8%



Electricity Use Facts

- Electricity use has declined 20% compared to FY 2008 and 7.9% compared to FY 2013
- 43 of 90 accounts show a decrease in use when comparing FY 2013 to FY 2017
- 22 of 90 accounts show an increase
- Three buildings (4 accounts) make up 41 % of all use.



Angier School

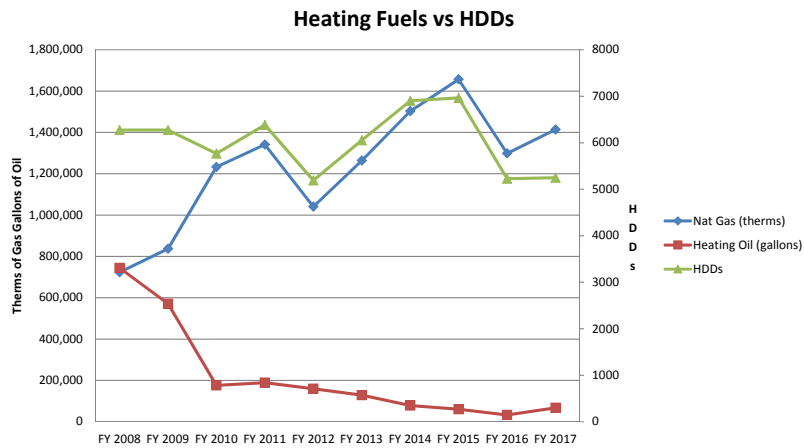
ANGIER SCHOOL				
	Old School Actual FY 2014	New School Actual Calendar 2017	Increase or decrease	
				%
kWh	151,736	469,752	318,016	210%
therms	40,647	19,618	(21,029)	-52%
MMBTUs	4,582	3,565	(1,018)	-22%
KBTU/SF	89	48	(42)	-47%

Carr and Zervas Schools

CARR SCHOOL				
	Pre-renovation Actual FY 2012	New School Actual FY 2017	Increase or decrease	%
kWh	120,800	240,240	119,440	99%
therms	37,499	14,877	(22,622)	-60%
MMBTUs	4,162	2,307	(1,855)	-45%
KBTU/SF	78	29	(49)	-63%

ZERVAS SCHOOL				
	Old School Actual FY 2015	Energy Model	Increase or decrease	%
kWh	198,096	567,516	369,420	186%
therms	37,158	16,600	(20,558)	-55%
MMBTUs	4,392	3,596	(795)	-18%
KBTU/SF	86	47	(38)	-45%

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
N Gas (Therms)	723,203	836,899	1,232,457	1,341,240	1,040,524	1,263,525	1,503,120	1,656,779	1,298,745	1,413,782
Htg Oil (gals)	744,052	571,139	176,201	189,119	159,659	128,924	78,218	60,337	32,546	67,230
HDDs	6274	6274	5768	6383	5190	6055	6904	6965	5227	5249



Heating Fuels Facts

- Heating Oil use has declined from 744,000 gallons in FY 2008 to 67,000 in FY 2017
- Heating oil has been replaced by natural gas
- Heating fuel use tracks HDDs very closely
- 20 of 47 buildings decreased gas use when comparing FY 2013 to FY 2017
- 27 of 47 buildings increased gas use
- 3 buildings make up 31% of total gas use

Summary: Energy Use and Efficiency

1. New school designs are going to drive up our electricity use even though they are more efficient. LED retrofits can help offset that.
2. About 56% of schools SF have been converted to LED and 23% of non-schools.
3. 41% of electricity use is by 3 buildings.
4. 31% of gas use is by 3 buildings.
5. Electricity use is declining. Gas use went up.

IV. Next Steps

- Move ahead with Phase 3 Solar RFQ
- Move ahead with LED lighting retrofits and retro-commissioning while developing an action plan/capital plan for City owned buildings.

Solar Phase 3-estimated time line

- March 2018- provide list of potential sites to PF
- May 2018- issue RFQ
- Fall 2018-select a developer
- Fall 2018- begin detailed site evaluation and schematic design
- Jan 2019- begin final site selection and development of leases
- Winter/Spring 2019-hold public meetings
- Spring 2019- obtain approval of PF for leases

Solar Phase 3 Potential sites: (rev 9/9/15) rev 11/2/2015, rev 11/12/15, 11/16/15, 12/17/15, 2/29/2016, 5/1/2017, 5/3/17, 5/15/2017, 11/3/2017, 12/8/2017, 2/6/2018, 2/28/2018

Group 1	panel	location	Roof Condition	Comment	Building		Use	Hours of Operation
					Square	Feet		
1	Ed Center roof, 100 Walnut St.	roof	good		70,000	Offices	7 am to 5 pm M-F	
2	Fire Station #3, 31 Willow Street, roof	roof	new			Public safety	24/7	
3	Zervas Elementary School, 30 Beethoven Ave	roof	new		80,000	Elementary School	7 am to 5 pm M-F	
4	Angier Elementary School Gym roof, 1697 Beacon St	roof	new		75,000	Elementary School	7 am to 5 pm M-F	
5	FA Day Middle School roof, 21 Milnot Place/Roof	roof	good		159,600	Middle School	7 am to 5 pm M-F	
6	Bigelow Middle School roof, 42 Vernon Street	roof	Main roof fair. Gym roof poor.	delete gym	92,500	Middle School	7 am to 5 pm M-F	
7	DPW garage, 110 Crafts St	roof	poor	delete	23,474	vehicle repair and maintenance	6 am to 4 pm M-F	
8	Burr Elementary School roof, 171 Pine Street	roof	20 years old	delete	53,000	Elementary School	7 am to 5 pm M-F	
9	Horace Mann Elementary School roof, 687 Watertown Street	roof	20 years old	delete	40,000	Elementary School	7 am to 5 pm M-F	
10	Mason Rice Elementary School roof, 149 Pleasant Street	roof	15 to 20 years old	delete	44,000	Elementary School	7 am to 5 pm M-F	
11	Williams Elementary School, 141 Grove Street	roof	good	delete	41,237	Elementary School	7 am to 5 pm M-F	
12	Lincoln-Elliott elementary School roof, 191 Pearl Street	roof	fair	delete per DZ	51,074	Elementary School	7 am to 5 pm M-F	
13	Aquinas School roof, 182 Jackson Road	roof	fair to good. Convert to be razed.	delete per DZ	93,710	Elementary School	7 am to 5 pm M-F	
14	Cabot roof, 229 Cabot School	roof	new			Elementary School	7 am to 5 pm M-F	
15	Warren House, 1600 Washington St, West Newton 02465, Newton Community Development Foundations	roof	Many roof obstructions. Roof condition undetermined	need to evaluate roof				
16	Weeks House 7 Hereward Road, Newton Community Development Foundations	roof	New roof being installed in Spring 2018. Many roof obstructions.					
	Crescent Street Housing	roof	new construction					
17	Fire Station #10, Headquarters, 1164 Centre Street	roof	new construction			Fire Station	24/7	
18	Hawthorne Fieldhouse, 17 Hawthorne St	roof	needs to be investigated	DC suggestion	5,600 SF			
19	Emmerson Community Center, 5 High St	roof	needs to be investigated. May be shading issues.	DC suggestion	13,418			

Group 2	panel location	Site conditions	Comment	Approximate SF	Use	Hours of Operation	
20	Manet Road Reservoir, 2 Manet Road	ground	Site has 4 underground water chambers. Structural evaluation must determine if site can take additional load. 4 hatches and several vents on site surface.	Engineering evaluation of the ability of the site to take added load of solar panels must be done by developer.	2.5 acres	Underground public water supply.	This is a secure site with a locked fence surrounding it.
21	Ward Street Reservoir, Ward Street	ground	panels will be very visible to abutters	delete		Above ground water supply.	This is a secure site with a locked fence surrounding it.
22	Islington Rd. Property ID 41023 0002	ground	About 2 acres of vacant lot on a 10 acre parcel.	Conservation area with hiking trails.	2.0 acres	hiking/walking trails.	

Group 3	panel location	Site conditions	Comment	# Spaces	Use	Hours of Operation		
23	Craft St parking lots, 90 and 110 Crafts St	parking lot	In front of 90 Crafts St. has potential but has shading of some areas from building.			66	Parking for DPW employees.	6 am to 4 pm M-F
24	Police/West Newton parking lots, Cherry Street	parking lot	Possible expansion of Police facilities in this area.	delete per ML and DZ.			Parking for Police Dept employees	24/7
25	Pearl Street parking lot	parking lot	10 trees, surrounded by structures. Shading issues.	delete		72	Public parking.	24/7
26	Hartford St parking lot	parking lot	Shading	delete		61	Public parking.	24/7
27	Melrose Ave parking lot	parking lot	Shading from buildings. Several trees. Small site viable.	Probably not viable.		36	Public parking.	24/7

Group	panel location	Site conditions	Comment	# Spaces	Use	Hours of Operation
28	Warren House parking lot, 1600 Washington St.	Many trees and much shading. Also, lease to non profit may cause complications.	delete			
29	Bobby Braceland Park parking lot, Upper Falls, Corner of Pennsylvania Ave. and Chestnut St.	Shading. Trees on east. Bldgs on west.	delete	60	Public parking.	24/7
30	Auburndale Cove, West Pine St.	minimal shading		150		
31	Main Library, 330 Homer Street	some tree removal will be required.				
Group 4						
32	Brown Middle School lot, corner of Meadowbrook Road and Wheeler Road	Site conditions Some shading from trees on south and west.		120	School employee parking.	7 am to 5 pm M-F
33	Brown Middle School courtyard canopy	Between building wings. Shading is a problem.	delete		School employee parking.	7 am to 5 pm M-F
34	Memorial Spaulding Elementary School parking lot, 250 Brookline Ave				School employee parking.	7 am to 5 pm M-F
35	Countryside Elementary School parking lot, 191 Dedham Street	No shading. small site but may be incorporated into a bigger project that includes the Brown Wheeler Rd project.		47	School employee parking.	7 am to 5 pm M-F
36	Oak Hill MS parking lot, 130 Wheeler Road, behind Oak Hill Middle School			40	School employee parking.	7 am to 5 pm M-F
37	Ed Center parking lot, 100 Walnut St.	Several large trees on north side. Shading from buildings on south. 2 middle rows are shade free.		120	School employee parking.	7 am to 5 pm M-F
38	Bigelow Middle School parking lot, Park Street (behind Bigelow School)		small	48	School employee parking.	7 am to 5 pm M-F

Group 4	panel location	Site conditions	Comment	# spaces	Use	Hours of Operation
	39 North High School lots, 360 Lowell Ave. parking lot on Walnut	8 trees, shading from bldg		130	School employee and student parking.	7 am to 10 pm M-F
	parking lot on Elm	several trees		22	School employee and student parking.	7 am to 10 pm M-F
	parking lot on Lowell	6 to 10 trees		120	School employee and student parking.	7 am to 10 pm M-F
Group 4	panel location	Site conditions	Comment	# spaces	Use	
40	Aquinas School parking lot, 182 Jackson Road parking lot	Shading on east from buildings. Trees on west. Limits to clear sun exposure. Possible expansion of building.	This is being deleted from the list due to building expansion considerations.	160	School employee parking.	7 am to 5 pm M-F