STRATEGIC ENERGY ACTION PLAN UPDATE

REVISION #1, DECEMBER 2015
SUPERSEDES ORIGINAL JUNE 2012 VERSION

EXECUTIVE SUMMARY

PURPOSE

On June 14, 2012 the Town of Cary Council approved the Town's first Strategic Energy Action Plan establishing an energy reduction goal with associated strategies to actively improve energy practices in order to lower costs and reduce emissions that contribute to environmental pollution. The plan serves as a guide to sound energy decision-making, improving the efficient use of energy while maintaining high levels of service in all areas. This document, dated December 10, 2015, is an update to this original Strategic Energy Action Plan.

GOAL

Since the Town's energy use is driven by the services it provides, and since the Town continues to grow, there is a certain fixed level of energy use that Town operations will use. When originally recommending the 2020 goal, staff examined the major categories of energy use and determined reduction percentages that are achievable and realistic using technology and operational change to yield the following overall goal. The term "business as usual" means that this is the level of energy use that we can anticipate if the Town did not drive energy reduction further. Using 2014 data, staff examined progress toward this goal from the 2010 baseline, and updated the activities under each of the four key focus areas to assure continuous progress.

Overall Goal from 2010 Baseline:

13% reduction in energy use from the projected "Business as Usual" energy use estimate by 2020

Anticipated Savings and Emissions from Achieving this Goal:
$1,500,000 savings/yearly
and yearly reduction of 7,000 metric tonnes of carbon dioxide

Subgoals that will help us achieve this overall goal:

- Fleet—Increase average miles per gallon (MPG) for town fleet by 20%; Reduce miles driven by 5%

- Buildings & Streetlights—30% reduction
- Water & Wastewater—3% reduction

KEY ELEMENTS OF THE PLAN

Four Strategic Focus Areas (A through D) for Energy Management for the Town of Cary:

A. Energy Data Management
B. Energy Supply Management
C. Energy Demand Management
    1. Energy Use in Buildings and Streetlights
    2. Energy Use in Water and Wastewater Treatment and Transport
    3. Energy Use from Vehicles and Motorized Equipment
D. Organizational Integration and Education

Key performance indicators for the Town, summarized in Table 1, below, and in more detail in Attachment 1:

- Total energy use (MMBTU, million British thermal units), total cost ($), total emissions (MTCDE, metric tonnes carbon dioxide equivalent)
- Energy use per citizen (MMBTU/citizen), Energy cost per citizen ($/citizen), Emissions per citizen (MTCDE/citizen)
- For buildings, energy use per gross square foot (btu/gsf)
- For water and wastewater, energy use per volume treated (btu/MG) and energy use per citizen (btu/citizen)
- Average miles per gallon (MPG) and yearly number of miles traveled. Suggest next revision include average MPG per vehicle class as well.

SEAP Performance Indicators	Unit	2010 Baseline	2014	% Change from 2010 to 2014
Gross Performance				
Total Energy Use	MMBTU	376,306	380,005	1.0%
Fleet	MMBTU	90,737	88,135	-2.9%
Buildings	MMBTU	58,552	67,612	15.5%
Streetlights	MMBTU	26,180	9,853	-62.4%
Buildings + Streetlights	MMBTU	84,732	77,465	-8.6%
Water & Wastewater	MMBTU	200,837	214,404	6.8%
Total Energy Cost	$	8,307,212	9,339,660	12.4%
Total GHG Emissions	MTCDE	43,932	42,518	-3.2%
Per Capita Performance				
Population	persons	134,700	147,561	9.5%
Energy Use / Capita	MMBTU/person	2.794	2.575	-7.8%
Energy Cost / Capita	$/person	61.672	63.294	2.6%
GHG Emissions / Capita	MTCDE/person	0.326	0.288	-11.7%
Service Performance				
Facility Energy Use / Square Ft	MMBTU/sf	0.753	0.647	-14.0%
Wastewater: Energy per Gallon Treated	MMBTU/million gallons	29.5	28.7	-2.7%
Water Supply: Energy per Gallon Supplied	MMBTU/million gallons	13.5	12.2	-10.0%
Fleet: Average MPG	MPG	10.6	11.8	11.6%
Fleet: Annual VMT (vehicle miles traveled)	VMT	4,684,605	3,890,453	-17.0%

Table 1, Key Performance Indicators for 2010 and 2014

CURRENT CONDITIONS AND PLAN

- **Energy Consumption (2014) –** we utilize 67,595,917 kWh of electricity at a cost of $ 6.9 million, 613,520 therms of natural gas at a cost of $ 459,933, 5,923 gallons of propane at a cost of $16,510 and 693,421 gallons of fleet fuel at a cost of $1.9 million. This is a total energy cost of $9.3 million.

    - Fleet, reduced 2,601 MMBTU (-2.9%) between 2010 and 2014.
    - Buildings & Streetlights, decreased 6,777 MMBTU (-8%) between 2010 and 2014.
    - Water & Wastewater, increased 13,567 MMBTU (6.8%) between 2010 and 2014.
    - Cumulative increase between 2010 and 2014 is 4,189 MMBTU (1.1%)

- **Implementation -** we will seek to institutionalize energy efficiency as a key organizational value by:
    - Making all Town departments responsible for meeting the goals and requirements of this Plan. The Sustainability Manager will coordinate and work with Town departments to regularly report to management on the effectiveness of the Plan, including energy and cost saving impacts of the Plan.
    - Ensuring that personnel who work with energy equipment or are involved in energy-related decisions receive training for implementing this Plan.
    - Providing training and technical resources to assist the Facilities staff in evaluating various energy-saving technologies.
    - Serving as a positive example to the community by demonstrating the benefits of energy efficiency and, where possible, renewable energy resources.

- **Reporting and Plan Review -** we expect to update Council on the key performance indicators yearly and to review the plan extensively every third year.

Focus A: Energy Data Management					
Strategy 1.	Collect, update, and quality control utility data to support management of energy as an important cost center				
Activities	**Last Milestone**	**Frequency**	**Department(s)**	**Next Due**	**Notes**
Ground truth and geo-locate all electric meters	2011	Every 5 to 7 years	PW	2016 to 2018	
Web-based system viewable by staff with electricity and natural gas data for every meter, building, and department.	Established 2012	One Time	T&F	On-going	
Update Web-based system for electricity and natural gas accounts monthly.	2014	Monthly	T&F and Finance	Monthly	
Submeter Fire Station #8	2013	One Time	T&F, PW, FD	Completed	
Assure that Fire Station #8 fully utilizes the energy management system	2015	One Time	T&F, PW	FY16, working to refine the system so it is easier to use	
Town Hall Building Automation System (BAS) installed and integrated into a web-based system that allows access to all Town buildings with BAS's and a dashboard that can accommodate future buildings.	2016	One Time	T&F, PW, TS, PRCR	FY2016, Near Completion	

Focus B: Supply Side Management (Utility Side)					
Strategy 1.	Actively manage the cost of utilities and fleet fuel				
Strategy 2.	Utilize incentive programs				
Activities	**Last Milestone**	**Frequency**	**Department(s)**	**Next Due**	**Notes**
On-going familiarity with Duke Energy Progress Rates to identify savings opportunities	Began in 2010	As needed—rates could change 1X/year	T&F, PW, FN	As needed—triggered by revised rates at Utilities Commission	Staff opted out of a fee for our 8 largest meters in 2011, which is expected to save $1.6M over a 10-year period.
Train staff on energy management principles	2011	As needed	T&F, PW	As needed	We have 3 Certified Professional Energy Managers on staff.
Progress Energy Rate Review	Reviews conducted March 2012, Sept 2013, Aug 2014, October 2015	At least every other year for all accounts. For new large accounts, after 6 months.	T&F, PW, UT	October 2016	Duke Energy does a review yearly. The Town does a more in-depth review when needed.
Daily gasoline and biodiesel fleet fuel costs obtained through Go Energy.	Daily	Daily	FN	On-going	Last 4 fiscal years have yielded a savings over state contract for both fuels.
Negotiation of propane costs	As needed	As needed	FN	On-going	
Apply for Progress Energy Incentives where applicable	On-going	As needed	T&F, PW, UT	On-going	
Review of past utility billing to assure that there were no errors in past billing	Planned for FY2016 or FY2017	Every four years	T&F	FY2020	Typically these projects can be bid for no cost—in return for a % of the rebates provided

Utilize peak shaving at the Western Wake Water Reclamation Facility	Began FY2015	On-going	UT	On-going	Estimated $18,500/month savings.
Timing operations during off peak hours at utility plants when possible	On-going	On-going	UT	On-going	

Focus C: Energy Demand Management

1. Energy Use in Buildings and Streetlights

Strategy 1.	Conduct energy audits to identify opportunities for conservation
Strategy 2.	Identify and implement no-cost energy efficiency projects
Strategy 3.	Identify and implement energy efficiency projects with paybacks of 5 years or fewer
Strategy 4.	Include energy efficiency projects in regular budget development process and continue to pursue grant funds to offset costs

Activities	Last Milestone	Frequency	Department(s)	Next Due	Notes
HVAC and/or lighting retrofits done at James Jackson Operations Center, Bond Park Community Center, Bond Park Senior Center, Herb Young Community Center, Parking Deck, and Town Hall	Completed September 2012	One Time	PW, T&F	One Time	100% grant funded
Audits and retrofits of six existing fire stations and fire administration	Audits and energy retrofits completed 2015	One Time	PW, T&F	One Time	100% grant funded

Retrocommissioning of Town Hall to determine energy saving opportunities in the buildings with the highest KBtu/sqft	Final report delivered April 2012;	One Time	PW, T&F	One Time	100% grant funded
Implementation of retro commissioning recommendations	Recommendations on maintenance and equipment. Maintenance changes completed. Made 30% of equipment changes completed.	One Time	PW	One Time	Recommendations pursued when equipment needs replacement.
LED streetlight pilot	Installation completed Dec 2010	Pilot	T&F	One Time	100% grant funded
LED streetlight change out of over 8,800 streetlights	Complete 2015	One Time	T&F	One Time	Duke Energy Progress implemented this project and coordinated with Town.
Project to change exterior and interior lighting at Town facilities to efficient lighting	Underway FY2016	One Time	T&F, PW	Planned phase II for FY2017	
Develop a new building SOP or policy to assure energy and water efficiency in new construction	Underway FY 2016	One Time	T&F, PW	Review and revise every 3 years, due FY2019	
Develop a building operational SOP or policy for existing buildings (to include temperature set	Planned for FY2017	One Time	All departments	Review and revise every 3 years, due FY2020	

points, appliance efficiency guidelines, etc.)					
Town Hall unoccupied settings for weekends/evenings using the building automation system (BAS). Set staff management expectations for unoccupied and occupied settings for 10 other buildings with BAS systems.	Complete FY2016. Adding two more buildings to the BAS in FY16.	On-going	T&F, PW, PRCR	On-going	For the 10 non-Town Hall buildings, a report is run every other month to update building managers on the effectiveness of their occupied/unoccupied management.
Develop a 10-Year Asset Management Plan for HVAC equipment	Completed 2013 with on-going updates	On-going	T&F, PW, WR	On-going	
Track opportunities for implementation of alternative energy like solar when cost effective	1.8MW third-party owned solar system; a small solar PV installation; 2 solar thermal hot water heaters	On-going	T&F, PW	On-going	
Research data analytics services that help to identify energy efficiency opportunities	Planned for FY17 to FY19	Forthcoming	T&F, PW	Forthcoming	
Research performance contracts as a method to pay for energy efficiency upgrades with no up-front cost to the Town.	Planned for FY17 to FY20.	Forthcoming	T&F, FN, PW	Forthcoming	

Focus C: Energy Demand Management

2. Energy Use in Water and Wastewater Treatment and Transport

Strategy 1.	Conduct third party evaluation of water and wastewater operations for energy efficiency opportunities
Strategy 2.	Use life cycle cost analysis to evaluate energy efficient equipment when new equipment is needed
Strategy 3.	Analyze processes for opportunities to meet operational needs and save energy

Activities	Last Milestone	Frequency	Department(s)	Next Due	Notes
Third party evaluation of water and wastewater plants for energy efficiency opportunities	Funded in FY16	Every third year	UT	FY19	
Minimize onsite aerated sludge holding	On-going	On-going	UT	On-going	
Variable frequency drives on pumping systems	In place; As needed upon replacement or original purchase	On-going	UT	On-going	
Energy efficient finished water pump motors	In place	On-going	UT	On-going	
Energy efficient aeration systems at Western Wake Water Reclamation Facility	In place	On-going	UT	On-going	
Replacing aging aeration systems	As needed	On-going	UT	As needed	
Ongoing effort to replace exterior lighting with more efficient lighting.	On-going	On-going	UT, PW	On-going	NWRF has been particularly successful in replacing lighting for energy efficiency and operational improvements. Project at SWRF is being implemented FY16.

Focus C: Energy Demand Management

3. Energy Used in Vehicles and Motorized Equipment

Strategy 1.	Diversify fuel types to buffet the Town against price fluctuations

Strategy 2.	Pilot new fleet technologies to increase fuel efficiency and determine if operationally appropriate and cost effective
Strategy 3.	Seek to reduce the number of miles traveled in a way that meets operational need and reduces cost
Strategy 4.	Vehicle Right-Sizing—we will seek to purchase vehicles that are the right size for the job and no larger
Strategy 5.	Fleet Utilization—we will seek to fully utilize all vehicle assets and we will sell or shift under-utilized assets when practical

Activities	Last Milestone	Frequency	Department(s)	Next Due	Notes
Pilot alternatively fueled vehicles including hybrid and all-electric options	On-going	As practical with Town and grant funds	All, as needed	On-going	1 all-electric Nissan Leaf, 1 hydraulic hybrid trash truck, 3 hybrid Toyota Prius's, 5 hybrid Toyota Camrys, 2 hybrid Ford Escapes, 1 Ford Fusion hybrid, 1 electric Gator, 1 hybrid Silverado, 2 hybrid Honda Insights
Pilot anti-idling technologies (3 police vehicles and 2 utility vehicles) in 2012 and 22 in 2013	Installed FY 2012 and FY2015	On-going	PW	Completed grant funded effort	Thus far the Town has not seen results that warrant replication with this technology
Pilot telematics in 57 PW fleet vehicles	On-going	On-going	T&F, PW, Town Manager's Office	Considering including this technology in FY17 budget	Resulted in 20% increase in mpg
Robust biodiesel (B20) program	On-going	On-going	PW	On-going	C-Tran switched to gasoline from biodiesel in 2011 for a considerable cost saving and for operational and logistical improvements
Monthly Sustainable Fleet Team meetings to review alternative fuels, new technologies, and management efficiencies	On-going	On-going	PW, T&F, FN, PD, Town Manager's Office	On-going	

Yearly Fleet Utilization Review	During FY16 budget development	Yearly	PW, Sustainable Fleet Team	During FY17 budget development	
Teleconferencing for Fire Department	Completed FY 2013	One Time	FD	One Time	
No Idling SOP for Fire Department	Completed FY 2013	One Time	FD	One Time	
Fleet pool car system	Piloting FY16	One Time	PW, Town Manager's Office	Full implementation in FY16 or FY17	
During each year's budget preparation staff will critically consider selecting replacement vehicles that are appropriate for the operational need, with an eye toward opportunities to down-size	On-going	On-going	All Departments	On-going	
Fleet Efficiency SOP for Town—procurement expectations, utilization, efficient driving behavior, right-sizing	Completed FY 2014	One Time	PW, Sustainable Fleet Team	Review for updating FY16 or FY17	

Focus D: Organizational Integration and Education	
Strategy 1.	Educate and inform staff on the Strategic Energy Action Plan and how they can work to assist the Town in surpassing these goals
Strategy 2.	Formally recognize staffers who recommend or innovate regarding energy and sustainability
Strategy 3.	Friendly competitions to drive down waste of energy
Strategy 4.	Include this plan on the external website

Activities	Last Milestone	Frequency	Due On	Department(s)	Next Due	Notes

Sustainability Manager speaks briefly to all New Employee Training Classes about the Town's approach to energy conservation	Occurred from September 2011 to December 2013	NA	NA	T&F	Completed	Staff exploring how to assure that new employees are informed on the SEAP in a standard way. Currently the Fleet Efficiency SP is included in all new employee paperwork.
Formal recognition of staffers who recommend energy and sustainability initiatives	On-going	As Nominations Occur	On-going	HR	On-going	
Intranet site to educate and inform staff on what the Town is doing on energy	Planned	Planned	Planned FY17 or FY18	T&F	Planned	
Fire Department energy competition between fire houses	2012 (top station reduced an average of 15%). Another competition just ended in fall of 2015.	As appropriate	NA	T&F and FD	As appropriate	Results on 2015 competition are pending. Staff is exploring other opportunities for competitions.