



**Arlington Community Energy Plan  
Metrics Report  
2/17/2017**

## **Background**

In June 2013 the Arlington County Board adopted a Community Energy Plan (CEP) and made it part of the County's Comprehensive Plan. To help facilitate CEP implementation, the County created an Implementation Framework. In Goal Area 5 of that framework regarding County Government Activities, Strategy 5 calls for the creation of metrics to measure CEP progress. Since there are so many items in the Implementation Framework and energy covers myriad categories, it is important to explicitly define how we plan to measure progress toward reaching our CEP goals. This document provides the performance indicators and metrics that will effectively influence decision-making and help track CEP implementation progress.

As noted in Strategy 5, “the CEP consists of an overarching ‘headline goal’ – greenhouse gas (GHG) emissions per capita – that is viewed through lenses of economic competitiveness, energy security, and environmental protection. In addition, the Plan includes several more specific goals for different energy sectors that contribute to achievement of the headline goal. It is essential that the County establish metrics to track progress toward these goals. Staff are identifying key indicators and metrics for progress towards energy use reduction, resilience, and energy-related economic competitiveness.”

Indicators are defined as characteristics that support the measurement of an overall goal. Metrics are the units of measure for each indicator. The indicators and metrics described in this document either measure performance related to activities over which the community has control and influence, or provide a foundation for the measurement of performance and context for outcomes. The difficulty in obtaining data, e.g., the frequency in which data is provided, helped determine the frequency of reporting each indicator and metric.

**Performance Indicator #1:** Energy Productivity  
**Metric:** Greenhouse gas emissions per capita (mt CO<sub>2</sub>e/capita/year)  
**CEP Benefits:** Environmental Commitment  
**AIRE Workplan Projects:** Multiple / overall CEP implementation  
**Previous AIRE Projects:**

**Description**

The Community Energy Plan's (CEP) purpose is to establish and guide policy to 1) enhance Arlington County's economic competitiveness, 2) improve energy security and reliability for residents and businesses, and 3) strengthen the community's environmental commitment. The CEP uses greenhouse gas (GHG) emissions per capita as a proxy for overall energy productivity and as a primary metric for environmental commitment.

Data		
Year	GHG Emissions per Capita (mt CO <sub>2</sub> e/capita/year)	Notes
2007	12.9	Revised in 2012
2012	11.3	

**Performance Indicator #2:** Fuel Source Diversity  
**Metric:** Community-wide energy consumption by primary fuel type/total energy consumption  
**CEP Benefits:** Energy Security  
**AIRE Workplan Projects:** Renewable projects - co-ops, solar purchasing, APS coordination  
**Previous AIRE Projects:** IEMPs

**Description**

Communities with a diverse selection of energy sources are less likely to experience the catastrophic failures or severe economic impacts in a crisis experienced by those that lack energy alternatives. Thus, this metric is an indicator of resiliency. Greater diversity and a balanced fuel portfolio will buffer fuel price shocks and help reduce perceptions of uncertainty and risk. Other potential benefits of fuel diversity (as compared to the current fuel mix) include a cleaner environment as well as greater grid reliability and flexibility.

While influence over grid-supplied fuel diversity rests in the hands of utilities, and thus is out of Arlington County’s direct control, this indicator is more than just informational. As a priority indicator, fuel diversity keeps Arlington moving towards encouraging diverse fuel sources through an emphasis on alternative energy installations and onsite generation. Achieving greater fuel diversity through local measures may incur significant first costs, requiring life cycle and cost-benefit analyses to balance this first cost with the long-term benefits of greater energy security, self-sufficiency, and price stability.

Data								
Year	Electricity	Unleaded	Natural Gas & CNG	Diesel	Fuel Oil & Kerosene	Biodiesel	LPG	Solar
2012	36.25%	38.65%	19.87%	4.18%	0.58%	0.35%	0.12%	0.01%

**Performance Indicator #3:** Building Energy Efficiency / Energy Use Intensity  
**Metric:** Energy use intensity [kBtUs / gross square foot / year]  
**CEP Benefits:** Environmental Commitment  
 Green Building Density Incentive Program, Green Home Choice Program,  
**AIRE Workplan Projects:** Residential Energy Efficiency Program, LED Bulb Campaign, Commercial  
 Building Financing and Incentives  
**Previous AIRE Projects:**

**Description**

In Arlington County, the energy use of non-residential buildings alone accounts for 53% of total energy use. Energy efficiency—avoided energy consumption—means less energy demand, which reduces the strain on the existing energy delivery infrastructure and decreases upfront capital and long-term operating costs for end users. More importantly, reduction in demand means that energy needs can be more easily satisfied through renewable or distributed systems, which increases overall system resiliency. Building owners will note that the CoStar Group documents the association between building energy efficiency and higher lease rates. Federal-sector lease agreements now require a demonstrated level of high building energy efficiency, a significant consideration for the Arlington commercial real estate market. The environmental benefits of building energy efficiency include lower GHG emissions, which Arlington County’s greenhouse gas emissions survey will document.

Data				
Year	Residential (kBtu/sf)	Commercial (kBtu/sf)	County Buildings (kBtu/sf)	Public School Buildings (kBtu/sf)
2012	46	93	94	67

**Performance Indicator #4:** Energy Intensity of Production  
**Metric:** Total annual energy use (all sectors) / jobs  
**Metric:** Total annual energy use (all sectors) / capita  
**Metric:** Total annual source energy use (all sectors) / (capita and/or jobs)  
**CEP Benefits:** Economic competitiveness  
**AIRE Workplan Projects:** Education/Outreach projects  
**Previous AIRE Projects:**

**Description**

Traditionally countries report their economic output per unit of energy consumed. However, it is difficult to accurately assess economic output at the County level. Thus, as a proxy for energy intensity of production we plan to assess the total energy consumed divided by total number of Arlington County jobs. A separate but related metric would be total energy consumed divided by total number of Arlington County residents.

<b>Data</b>			
<b>Year</b>	<b>Annual Site Energy Usage (MMBtu/capita)</b>	<b>Annual Site Energy Usage (MMBTU/job)</b>	<b>Annual Source Energy Usage (MMBtu/capita)</b>
2012	121	113	217

**Performance Indicator #5:** Distributed Backup Electrical Generation Capacity  
**Metric:** Total number of off-grid hard-wired, stand-by generators  
**CEP Benefits:** Energy Security  
**AIRE Workplan Projects:** Keeping apprised of resiliency grant opportunities  
**Previous AIRE Projects:**

**Description**

The need to have backup power is an indicator of resiliency to the failure of the central electrical grid. This metric looks at the community’s ability or capacity to meet its electrical demand without grid support using hard-wired, stand-by generators.

Data	
Year	Number of Generators
2012	327

**Performance Indicator #6:** Demand Response Program Participation  
**Metric:** # of time-of-use program participants  
**CEP Benefits:** Energy security  
**AIRE Workplan Projects:** Education/Outreach projects, Residential Energy Efficiency Program  
**Previous AIRE Projects:**

**Description**

Demand response is a market-based, time-of-use economic tool available to utilities and their customers to reduce power demand when power is most expensive. Electric power is most expensive during periods of high peak demand. Customers can contract with utilities or third party vendors to reduce their electric demand using load management, standby generation, or other means. Participation in demand response program signals the ability of the Arlington energy infrastructure to be flexible in the face of energy challenges, and is an indicator of community energy use sophistication.

<b>Data</b>	
<b>Year</b>	<b>Time-of-use Participants in Dominion Territory</b>
2013	17,139



**Performance Indicator #7:** Transportation Fuel Diversity  
**Metric:** Number of county-registered alternative fuel vehicles / number all vehicles registered (includes public and private vehicles)  
**Metric:** Number of electric vehicle charging stations in Arlington  
**CEP Benefits:** Environmental Commitment  
**AIRE Workplan Projects:** Electric vehicle charging policy  
**Previous AIRE Projects:**

**Description**

Alternative fuel vehicles create less demand for conventional petroleum-based fuels, leading to increased transportation flexibility, another factor cited throughout the literature as a key indicator of energy security. Transportation fuel diversity shares many of the benefits of built environment fuel diversity. It hedges against price spikes and supply disruptions. Transportation fuel diversity also results even more directly in environmental benefit, since alternative fuel vehicles are often low-emitting vehicles. Greater transportation fuel diversity is thus especially significant in our metropolitan area as a whole, which has the worst traffic congestion in the nation, according to a 2011 study by Texas A&M University.

<b>Data</b>		
<b>Year</b>	<b># of County-registered Alternative Fuel Vehicles / # all Vehicles Registered</b>	<b>Number of Electric Vehicle Charging Stations in Arlington</b>
2013/2016	0.0000159	57

**Performance Indicator #8:** Vehicle Efficiency  
**Metric:** Avg. EPA-estimated MPG for all vehicles registered in the County  
**CEP Benefits:** Environmental Commitment  
**AIRE Workplan Projects:** Electric vehicle charging policy  
**Previous AIRE Projects:**

**Description**

Congress first established Corporate Average Fuel Economy (CAFE) standards in 1975, largely in response to the 1973 oil embargo. Those standards have become more stringent over time. The latest set of standards covering light vehicle model years 2017-2025 were finalized by the U.S. Environmental Protection Agency and U.S. Department of Transportation in August 2012. These new standards will reduce average global warming emissions of new passenger cars and light trucks in a way that is equivalent to 54.5 miles per gallon (mpg) if the standards were met exclusively with fuel efficiency improvements.

<b>Data</b>	
<b>Year</b>	<b>Average EPA-estimated MPG</b>
2013	23.4

**Performance Indicator #9:** Transportation Mode Split  
**Metric:** Average Household Trips/Day (Measure 7)  
**Metric:** Commute Mode Share (Measure 8)  
**Metric:** Usage of ART & Metrobus (Measure 9)  
**Metric:** Usage of Bicycle Infrastructure (Measure 10)  
**Metric:** Number of cars per household  
**CEP Benefits:** Environmental Commitment  
**AIRE Workplan Projects:** Education/Outreach projects  
**Previous AIRE Projects:**

**Description**

Commute mode share is a strong indicator of whether Arlington residents and workers are utilizing available alternative transportation options. Measuring this indicator over time can reveal whether Arlington is successfully managing travel demand and the transportation systems, a specific policy outlined in Arlington’s Master Transportation Plan. This measures ties into the MTP Goal 1: Provide High-Quality Transportation Services, Goal 2: Move More People Without More Traffic, and Goal 5: Manage Effectively and Efficiently.

Arlington County anticipates a 22 percent increase in population and a 38 percent increase in jobs between 2010 and 2040. A reduction in the drive alone commute mode share is important to managing the experience of traffic congestion in a constrained network, and to minimizing the wear and tear on roadways to help each infrastructure investment last longer.

Average Number of Trips per Household per Day					
Year	Drive alone	Rideshare	Transit	Walk/Bike	Other
2010	1.5	1.2	0.4	0.6	0.1

Commute Mode Share for Persons Living in Arlington					
Year	Drive alone	Carpool/vanpool	Transit	Walk/Bike	Telework/CWS
2013	0.53	0.06	0.26	0.07	0.08

**Performance Indicator #9: Transportation Mode Split (data continued)**

Usage of Art and Metrobus			Usage of Biking Infrastructure		
Year	Art Passengers	Metrobus Passengers	Year	Bike Trail Volume (trips)	Capital Bikeshare Membership
2013	2644933	18,495,908	2013	2,224,788	2,120

Vehicles per Household				
Year	0	1	2	3+
2012	11.5%	48.8%	30.4%	9.3%

**Performance Indicator #10:** Transportation: Infrastructure Energy Use  
**Metric:** % of county-owned streetlights converted to LEDs; MWh saved (Measure 30)  
**CEP Benefits:** Environmental Commitment  
**AIRE Workplan Projects:** Ongoing AIRE support to Arlington DOT Transportation Engineering and Operations staff  
**Previous AIRE Projects:**

**Description**

Arlington has retrofitted over 65 percent of its streetlights to LED, and maintains a centrally controlled GIS-based web inventory to monitor streetlight location, status and energy use. Arlington also operates a smart streetlight program, where streetlights dim as the activities on street go down. For example, on residential streets, lights turn on at a 75 percent illumination level at dusk and gradually decrease to 25 percent at 11:00 PM, then stay at that level for the rest of night.

<b>Data</b>		
<b>Year</b>	<b>MWh saved</b>	<b>% of County-owned Streetlights Converted to LEDs</b>
2012	1190	34%
2014	2614	67%

**Performance Indicator #11:** Energy Efficiency: Public Sector & Utility Programs  
**Metric:** Public-sector spending on energy efficiency programs [\$ per capita / year]  
**Metric:** Utility's budget for energy efficiency programs [\$ per capita / year]  
**CEP Benefits:** Economic competitiveness  
**AIRE Workplan Projects:** AIRE projects in the CIP; AIRE annual workplan  
**Previous AIRE Projects:**

**Description**

Allocating resources and incentives for energy efficiency is a key factor in market uptake, leading to reduced energy demand, increased energy availability, and enhanced energy security. Reports using REMI (Regional Economic Models, Inc.) modeling, such as the one cited earlier for the New England Region, also connect this metric to economic competitiveness.

Data				
Year	AIRE Budget [\$ per capita / year]	EE CIP Budget [\$ per capita / year]	EE Incentive Funds Disbursed to Public [\$ per capita / year]	Utilities' Budget for Energy Efficiency Programs [\$ per capita / year]
2012	\$7.56	\$1.22	\$0.00	\$4.77

**Performance Indicator #12:** Solar PV Investment  
**Metric:** Number of public solar energy systems installed  
**Metric:** Capacity of public solar systems  
**Metric:** Number of all community solar energy systems installed  
**Metric:** Capacity of all community solar systems  
**CEP Benefits:** Environmental Commitment  
**AIRE Workplan Projects:** Solar in the Community projects  
**Previous AIRE Projects:**

**Description**

The use of renewable energy, particularly solar photovoltaics (solar electric) can reduce operating costs for businesses and homes. Since solar photovoltaics (PV) generate electricity largely coincident with summer cooling demands, the use of solar PV helps reduce the summer peak demand for electricity.

<b>Data</b>				
<b>Year</b>	<b># of Public Systems (Schools + Govt)</b>	<b>County System Capacity (kW, Schools + Govt)</b>	<b># of Total Systems (Entire Community)</b>	<b>Total Solar PV Capacity (kW)</b>
2012	3	72	61	306