

# Swarthmore College Energy Use Status Report For 2016

- Progress on energy savings and cost avoidance
- Growth of Campus-Energy Intensity
- Actual Use Figures for the Fiscal Year 2014-2015
- Carbon Contribution
- Charts
- Accomplishments
- Challenges



## Gross Square Feet Added to the Campus

**Year Blds.  
Added**

<b>2000</b>	<b>Total Sq. Ft.*</b>	<b>1,283,558</b>	
2001	Mullan Tennis & Fitness Center	28,275	1,311,833
2003	Chiller Plant	4,415	1,316,248
2003	Kyle House	5,010	1,321,258
2004	Science Center	134,281	1,455,539
2004	Alice Paul	34,471	1,490,010
2004	Septa Station	2,324	1,492,334
2007	Lang Center	9,642	1,501,976
2007	David Kemp	26,333	1,528,309
2010	Wister Education Center	5,400	1,533,709
2013	101 S. Chester Road	32,703	1,566,412
2014	Matchbox	21,000	1,587,412
2015	DanaWell Infill	23,770	1,611,182
	<b>Increased square footage</b>	<b>327,624</b>	

\* Excludes faculty staff housing



<b>Budget Year</b>	<b>Btu's Per Square Foot</b>	<b>Btu Cost in Dollars per square foot</b>	<b>Square footage</b>
1999-2000	114,510	1.01	1,283,558
2000-2001	121,855	1.45	1,311,833
2001-2002	108,255	1.39	1,311,833
2002-2003	123,792	1.63	1,321,258
2003-2004	110,673	1.51	1,321,258
2004-2005	114,738	1.74	1,492,334
2005-2006	109,738	1.89	1,492,334
2006-2007	109,270	1.73	1,492,334
2007-2008	103,740	1.89	1,528,309
2008-2009	95,930	1.63	1,528,309
2009-2010	104,406	1.46	1,533,709
2010-2011	95,970	1.38	1,533,709
2011-2012	88,503	1.21	1,533,709
2012-2013	91,681	1.34	1,566,412
2013-2014	99,844	1.41	1,587,412
2014-2015	96,456	1.38	1,611,182
2015-2016	93,813	1.02	1,611,182

From a historical perspective we have done a very good job of containing the energy units required to heat, cool and light our Campus. Even with the growth we've experienced over the past fifteen years, we have driven the average Btu per square foot rate below 100,000 Btu.

As we add buildings it is critical that the energy profiles are designed well below that 100KBtu average to stay in sync with the College's carbon neutrality goals. NPPR is being designed with a 50KBtu target. The benefit of reducing energy intensity is illustrated on the next page. We have limited control over energy market prices so our costs need to be controlled by limiting use.

# Reduction in the Energy Intensity of the Campus Nets Substantial Savings both Immediate and Ongoing

Year Ending	Gross Square Feet	Dollar Cost for Energy per GSF	BTU Rate of Energy Use per GSF (Energy Intensity)	Potential Cost at 2010 Rate of Energy use	Actual Cost	Savings by Reducing Energy Intensity from 2010 rate
2010	1,533,709	\$1.46	104,406	\$2,773,629	\$2,277,631	\$-
2011	1,533,709	\$1.38	95,970	\$2,515,589	\$2,180,720	\$334,868
2012	1,533,709	\$1.21	88,503	\$2,177,862	\$1,914,510	\$263,352
2013	1,566,412	\$1.34	91,681	\$1,697,144	\$1,617,140	\$80,004
2014	1,587,412	\$1.41	99,844	\$1,943,180	\$1,853,515	\$89,665
2015	1,611,182	\$1.38	96,456	\$2,110,212	\$1,853,515	\$256,697
2016	1,611,182	\$1.02	93,813	\$1,822,043	\$1,637,177	\$184,866
						\$1,209,453

Peak Energy Intensity in 2005 was 114,738 Btu/Sq. Ft. Over \$3 million dollars in avoided cost have been saved by reducing Energy Intensity

# Actual use for 2016/Facilities Management Only

			Equivalent Heat Value
•Heat Plant Fuel Oil #2	10,259	Gallons	1,539 mmBtu
•Heat Plant Nat. Gas	80,457	dkth	80,457 mmBtu
•Diesel	4049	Gallons	567 mmBtu
•Gasoline	19401	Gallons	2425 mmBtu
•Plant Electricity	14,172,782	kWh	48,360 mmBtu
•Auxiliary Electricity <sup>1</sup>	684,543	kWh	2,366 mmBtu
•Auxiliary Nat. Gas <sup>1</sup>	18,563	mcf	18,563 mmBtu
•Auxiliary #2 Fuel <sup>1</sup>	0	Gallons	0 mmBtu
•Purchased REC's <sup>2</sup>	16,880,000	kWh	

1 Metered Use in buildings (used for College business) off the main campus systems. Includes the addition of 101 South Chester Road.

2 Renewable Wind Energy Credits to offset carbon contribution of electricity use

Excludes faculty/staff housing



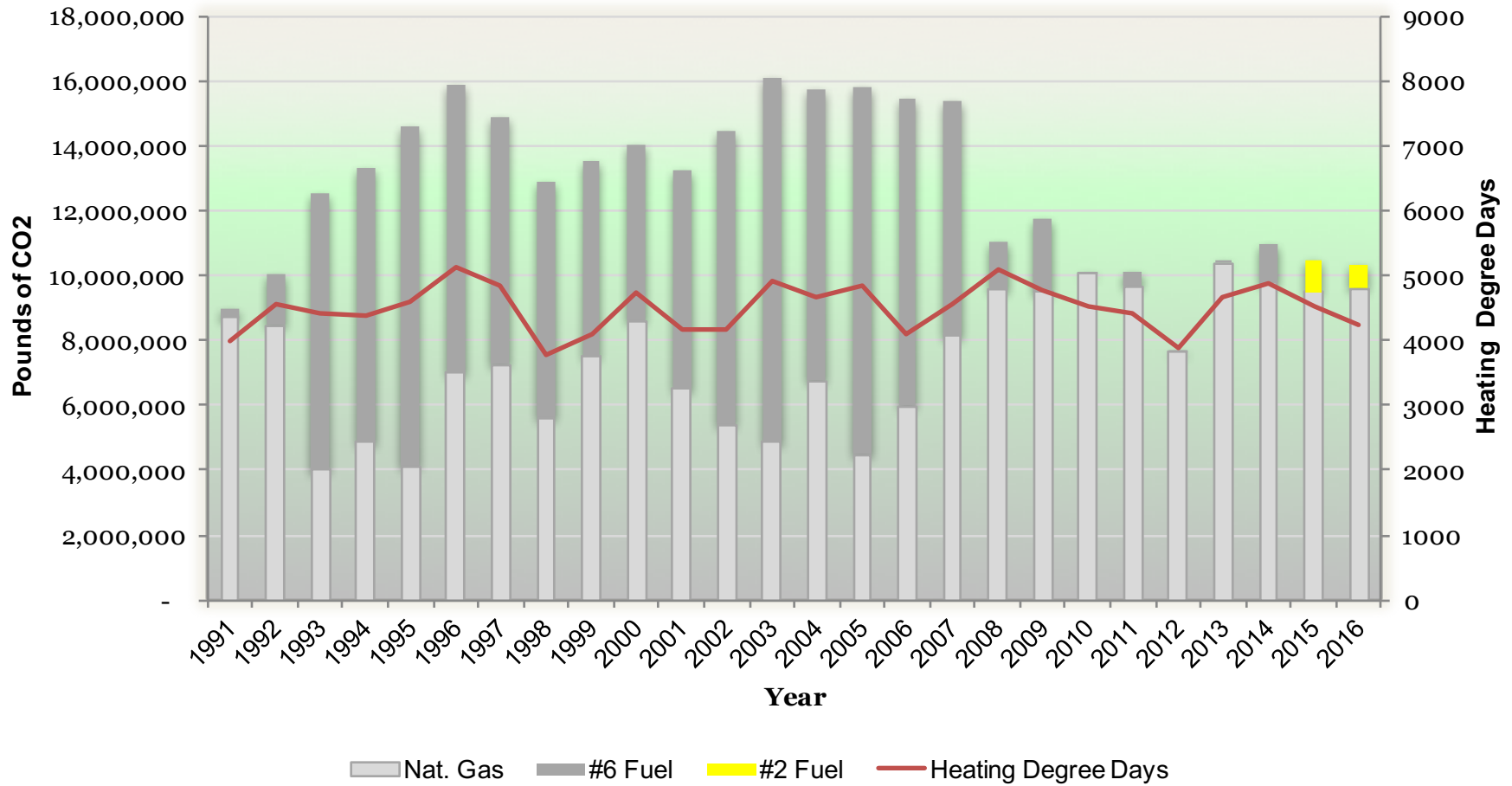
## Carbon Emissions By Source - Facilities Management

- Scope 1-Direct Emissions-Fuels 4,575 MT eCO<sub>2</sub>
- Scope 2-Indirect Emissions-Electricity 6,851 MT eCO<sub>2</sub>
- Offsets-Wind Power -8,228 MT eCO<sub>2</sub>
- Net Emissions 3,198 MT eCO<sub>2</sub>

Calculations from Clean Air Cool Planet factors

\*Estimated from 2014

## Annual CO2 Emissions from Heat Plant Fuels





## Scope 1&2 Gross Combined Emissions From Heat Plant

