FIU Energy Performance
FY08-15

2015 SUS Energy Report

FIU | FLORIDA INTERNATIONAL UNIVERSITY

2015 SUS Energy Performance Report Background

- May 2010 — HB 5201 Section 30
  - "Each Florida college and state university shall strive to reduce its campus wide energy consumption by 10%... The reduction may be obtained by either reducing the cost of the energy consumed or by reducing total energy usage, or a combination of both."
  - **FY07-08 as base year**
- Dec. 2010 — SUS BOG prepared common reporting template & consolidated report/response
- Jan. 2011 — University system responded to Governor & Legislature
- Jan. 2016 — BOG published the FY14-15 update

2015 SUS Energy Conservation Report Analysis & Highlights

- Key Metrics (Legislative Compliance)
  - Energy Performance Indicator (EPI): kBTU/sf/yr (EPA Energy Star Program)
  - Cost Unit Index (CUI): $/sf/yr

	kBTU/sf (14-15 vs Base Yr)	$/sf (14-15 vs Base Year)	Total Reduction
FAU	13%	37%	49%
FSU	11%	38%	49%
FGCU	12%	30%	42%
FAMU	1%	26%	27%
USF	6.76%	19%	26%
FIU	1.1%	22.4%	23.4%
UWF	14%	7%	21%
NCF	7%	12%	20%
UF	8%	9%	17%
UCF	-11%	26%	15%
UNF	4%	-46%	-42%

SUS Energy Performance Report

Energy Performance Indicator (EPI) (kBTU/sf/yr) [(a)]

FY08 thru FY15

You can't compete if you don't keep score!

FIU Tops SUS in Energy Efficiency past 8 Years

Current year Rank	Inst.	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12	FY12-13	FY13-14	FY14-15	8 Yr. Avg.
1	FIU	62.5434	61.7255	61.6081	57.8005	58.6867	60.4090	66.5540	61.8848	61.4015
2	FGCU	71.0253	75.4651	73.7984	67.1765	59.3399	62.3815	64.8916	62.16687	67.0306
3	UCF	68.8894	66.8623	66.2602	66.5383	65.4222	62.2860	80.8785	76.2994	69.2134
4	UNF	70.8205	77.5205	73.9260	75.1166	72.8725	72.7322	67.5857	69.2134	72.4734
5	NCF	94.2446	72.4715	80.2173	77.7310	78.7387	79.4595	76.8838	87.1793	81.6906
6	FAU	103.2071	99.8266	95.7704	92.2594	96.3401	86.6301	92.3700	90.0220	94.5535
7	UWF	107.0459	98.9120	103.6523	101.5168	92.7575	98.0128	97.7632	92.1839	98.9805
8	FAMU	111.9451	119.7811	108.8060	104.1176	107.4416	127.3753	112.5234	111.2209	105.6469
9	FSU	120.6798	117.6840	119.5335	117.1786	114.3395	110.7335	109.0500	107.8034	114.6248
10	USF	138.5052	130.4274	124.2659	125.6657	129.5618	131.4070	143.3575	129.1486	131.5424
11	UF	137.1336	132.1314	135.1238	133.0343	127.5511	127.3938	128.4243	126.6593	130.9314
	SUS Avg	**108.7584**	**106.2725**	**105.5055**	**103.0540**	**100.7266**	**100.6069**	**103.7483**	**99.7841**	**103.5570**

(a) The Environmental Protection Agency (EPA) established kBTU/sf/yr as the key performance indicator for energy efficiency as part of its Energy Star rating program.
Source: State University System of Florida Board of Governors 2015 Energy Report received January 13, 2016.

What KBTU/SF Means in Dollars - Savings/Cost Avoidance

FIU beats #2 FGCU by $8MM*

FIU beats SUS average by $52MM**

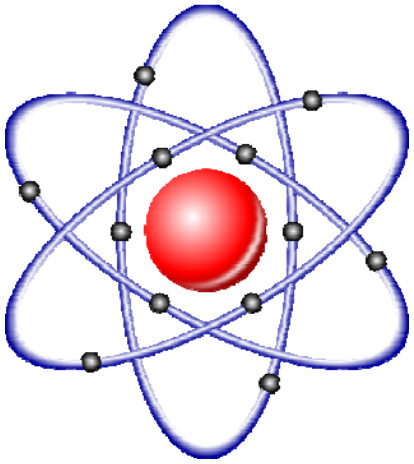
8 yr Ave. Rank	Inst.	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12	FY12-13	FY13-14	FY14-15	8 year Cost Avoidance
1	**FIU**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
2	FGCU	$1,569,475	$2,700,044	$2,057,787	$1,701,065	$116,627	$338,750	($284,319)	$53,825	$8,253,253*
3	UCF	$1,174,258	$1,009,468	$785,302	$1,585,279	$1,202,590	$322,351	$2,449,882	$2,752,473	$11,281,604
4	UNF	$1,531,582	$3,103,960	$2,079,326	$3,141,607	$2,532,787	$2,116,326	$176,454	$1,399,398	$16,081,439
5	NCF	$5,865,949	$2,111,758	$3,141,322	$3,615,929	$3,580,142	$3,271,644	$2,895,268	$4,829,994	$29,312,006
6	FAU	$7,524,365	$7,487,472	$5,766,764	$6,251,769	$6,722,760	$4,503,086	$4,415,646	$5,372,818	$48,044,680
7	UWF	$8,234,695	$7,307,723	$7,097,254	$7,931,317	$6,083,110	$6,457,892	$5,337,627	$5,785,623	$54,235,242
8	FAMU	$9,141,235	$11,408,846	$7,967,234	$8,403,173	$8,704,850	$11,500,470	$7,862,019	$9,420,759	$74,408,587
9	FSU	$10,757,498	$10,996,715	$9,778,082	$10,772,785	$9,936,419	$8,642,488	$7,267,339	$8,768,186	$76,919,511
10	UF	$13,802,091	$13,835,869	$12,409,797	$13,649,430	$12,295,265	$11,503,641	$10,581,497	$12,368,709	$100,446,300
11	USF	$14,055,908	$13,500,995	$10,576,927	$12,312,576	$12,654,261	$12,192,845	$13,135,495	$12,844,052	$101,273,059
	SUS Roll-up	$73,657,055	$73,462,851	$61,659,795	$69,364,930	$63,828,811	$60,849,493	$53,836,908	$63,595,837	$520,255,681
	Average (excl. FIU)	$7,365,706	$7,346,285	$6,165,979	$6,936,493	$6,382,881	$6,084,949	$5,383,691	$6,359,584	$52,025,568**

R1: Doctoral Universities – Highest Research Activity

Energy Performance Indicator(EPI)
(kBTU/sf/yr)

Ranking	Institution	FY 14-15	8 Yr. Avg
1	**FIU**	**61.8848**	**61.4015**
2	UCF	76.2994	69.2134
3	FSU	107.8034	114.6248
4	UF	126.6593	130.9314
5	USF	129.1486	131.5424

FIU beats R1-Doctoral SUS Average by $72MM



Savings/Cost Avoidance

Ranking	Institution	FY 14-15	8 Yr. Avg
1	FIU	$0	$0
2	UCF	$2,752,473	$11,281,604
3	FSU	$8,768,186	$76,919,511
4	UF	$12,368,709	$100,446,300
5	USF	$12,844,052	$101,273,059

Campus CUI ($/SQFT/yr)
Cost Unit Index

8 yr Ave. Rank	Inst.	FY07-08	FY08-09	FY09-10	FY10-11	FY11-12	FY12-13	FY13-14	FY14-15	8 Year Average
1	FIU	$ 1.65	$ 1.71	$ 1.45	$ 1.32	$ 1.30	$ 1.26	$ 1.39	$ 1.28	$ 1.42
2	UCF	$ 1.56	$ 1.68	$ 1.63	$ 1.56	$ 1.52	$ 1.35	$ 1.21	$ 1.16	$ 1.46
3	FGCU	$ 2.01	$ 2.46	$ 2.00	$ 1.54	$ 1.28	$ 1.27	$ 1.33	$ 1.41	$ 1.66
4	UNF	$ 1.38	$ 1.83	$ 1.71	$ 1.80	$ 1.76	$ 1.69	$ 1.68	$ 1.52	$ 1.67
5	UWF	$ 1.81	$ 1.89	$ 1.96	$ 1.96	$ 1.86	$ 1.67	$ 1.69	$ 1.68	$ 1.81
6	NCF	$ 2.08	$ 1.90	$ 1.78	$ 1.72	$ 1.77	$ 1.72	$ 1.73	$ 1.83	$ 1.82
7	FAU	$ 2.63	$ 2.30	$ 1.89	$ 1.74	$ 1.76	$ 1.53	$ 1.66	$ 1.67	$ 1.90
8	FAMU	$ 2.35	$ 2.66	$ 2.21	$ 2.02	$ 1.84	$ 1.78	$ 1.60	$ 1.75	$ 2.03
9	UF	$ 2.36	$ 2.50	$ 2.47	$ 2.34	$ 2.27	$ 2.11	$ 2.09	$ 2.14	$ 2.29
10	FSU	$ 2.99	$ 3.01	$ 2.51	$ 2.38	$ 2.10	$ 1.87	$ 1.70	$ 1.85	$ 2.30
11	USF	$ 2.80	$ 2.75	$ 2.48	$ 2.33	$ 2.33	$ 2.33	$ 2.34	$ 2.24	$ 2.45
SUS Avg (excl. FIU)		$2.27	$2.37	$2.15	$2.02	$1.93	$1.77	$1.74	$1.75	$2.04

Cost Unit Index
Using FIU cost as base

For every dollar that FIU spends on energy, other universities spend:

Ranking	Institution	Cost	Compared to FIU
1	**FIU**	**$1.00**	
2	UCF	$1.03	+3%
3	FGCU	$1.17	+17%
4	UNF	$1.18	+18%
5	NCF	$1.28	+28%
6	UWF	$1.28	+28%

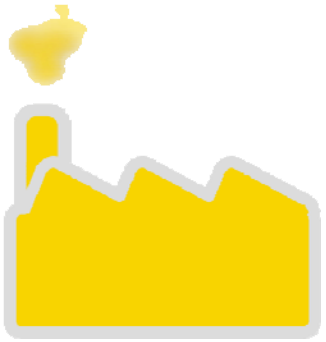
Ranking	Institution	Cost	Compared to FIU
7	FAU	$1.34	+34%
8	FAMU	$1.42	+42%
9	UF	$1.61	+61%
10	FSU	$1.62	+62%
11	USF	$1.72	+72%
	SUS Average	**$1.43**	**+43%**

Note: Calculations are based on eight year averages.

FIU Carbon Footprint Reduction (8 year)

2007	2008-2015 Avg.	Annual Savings	Total Savings
128,177,651 kwh	125,503,100 kwh	2,674,551 kwh	18,721,855 kwh

Over the eight year period FIU has saved the equivalent of:



12,910 Tons of CO_2

331,017 Trees

1,452,647 Gallons of Gasoline

Source: Greenhouse Gas Equivalencies Calculator, Environmental Protection Agency, www.epa.gov/cleanenergy/energy-resources/calculator.html

FIU “Worlds Ahead” performance

1) Chilled water plants provide cooling to most buildings on campus
   - High efficiency chillers (result in lowered KW/Ton consumption)

2) Meters & Measurements
   - Electrical and chilled water sub-meters on buildings approximately 80% of buildings provide real-time monitoring to achieve efficiency and reduce waste
   - Monthly reporting focus on kBTU/sf performance

3) On-line Energy Management System (EMS)
   - Central EMS balances temperatures in 95% of buildings, and also monitors general lighting areas such as hallways in main buildings

4) Building design focused on efficiency. All new buildings are LEED certified with a goal of Silver rating.

FIU “Worlds Ahead” performance

5) Culture of energy conservation

- Chilled water temperature synchronized with environmental conditions
- Motion-sensor switches throughout majority of the campus
- Replacement of T12 with T8 fluorescent lighting fixtures and implementation of LED for new lighting
- Temperature set point raised from 72 to 73°F during daylight hours, and 75 to 78°F during night hours
- In 2009 the replacement of liquid propane gas to natural gas resulted in a savings of more than $367k per year. In July 2015 we switched our natural gas provider. We anticipate this change will result in an additional 15-20% annual savings.
- Installation of low-flow water fixtures such as sinks, showers, toilets and urinals (these use about 30% less water than conventional counterparts)
- Landscape irrigation with captured rainwater at MMC, and with graywater at BBC

6) Craftsman’s approach & lunch-bucket work ethic

Staying #1 – Continuous Excellence

1) Finish chilled water and real-time electrical metering on all buildings

2) Expand chilled water loop as campuses grow and continue automation of the central chiller plants; re-commission utility plants

3) Increase operational efficiency of chiller plants & chilled water loop by utilizing computer-controlled chiller sequence operation.

4) Re-commissioning of entire buildings to obtain optimal operating conditions

5) Transition to LED Lighting where appropriate & feasible (Streets, Walkways, Garages, etc.)

6) Work side-by-side with the Sustainability office to maximize “green” goals and increase our current Silver rating in the Sustainability Tracking, Assessment, & Rating System (STARS) program by implementing energy initiatives that directly impact sustainability performance

7) Research ... Benchmark ... Listen ... Learn ... Advance