



DATE: September 2, 2015

**CASE STUDY #1:** ARC RESOURCES LTD  
308 – 4 Avenue SW  
Calgary, AB  
Floors 4-12 (212,000 sf)

**Contacts:** William Mah: Supervisor, Office Services: ARC Resources Ltd.  
Ted Brouwers: Master Electrician, E2E Lighting Solutions Ltd.

Installation Date: July 2012 to November 2014

Products used:

Enduralite T8 LED 18W internally driven retrofit frosted tubes, 4000K color, 48" Length  
Enduralite T5 LED externally driven retrofit frosted tubes. 3000K color. 24" (9w), 36"(12w) and 48"(16w) lengths.  
Enduralite supplied MR16 bulbs. 6w, 3000K color & PL 4pin Horizontal LED bulb. 11w, 4000K color

## **BACKGROUND**

The project consisted of an initial test fit of 10 office areas. A cross section of staff and disciplines were engaged for the two (2) month study. The goal was to measure lumen output (before/after), solicit end user comments, track energy consumption/maintenance issues and complete a theoretical projected ROI analysis. The building has a LEED Gold certification and the tenant space achieved a LEED Silver certification. All floors in this building are separately metered for all utilities.

The initial findings strongly supported a consideration for an entire switchover to LED lighting. The lumen output measured (on average) a 10% increase in overall brightness in each test office and although end users were initially wary of the lighting and commented that it was "too bright", after a 1-3 days adjustment period, users found the LED lights very comfortable and their eyes did not feel as tired at the end of the day.

The economic study showed an ROI of approximately 42 months and cash avoidance in excess of \$700K for the duration of their lease through reduced labor, utility and material maintenance costs.

The project was split into two phases.

Phase 1: Retrofit all the closed offices and meeting rooms totaling close to 3000 LED Tubes. Utilize existing fixtures and have all fixtures CSA recertified

Phase 2: All MR16 and PL type pot-lights.

## **FINDINGS**

The LED tubes experienced a fail rate of 0.001% in 24-36 months of usage. Two (2) bulbs failed on initial installation and one (1) bulb failed 12 months in. To date, there has been no degradation to the quality or lumen output of the light itself.

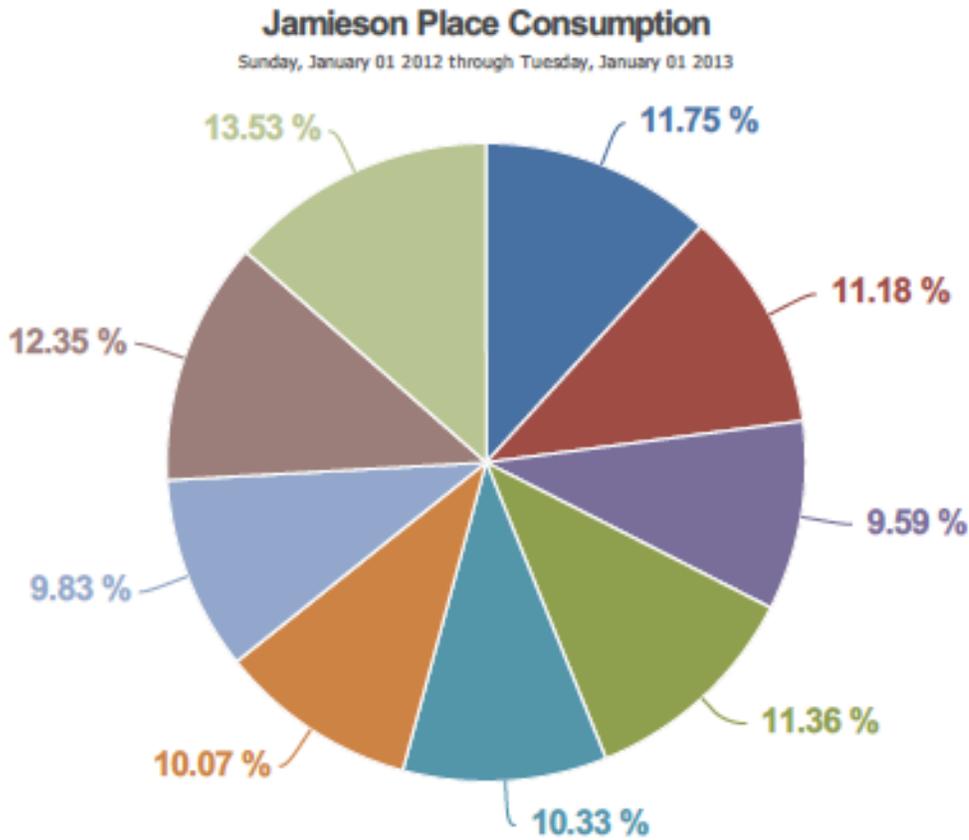
The LED MR16 and PL bulbs have a 0% fail rate in 18 months of usage.

The initial 42 month ROI has been decreased down to almost 30 months. Our initial calculations were very conservative and held utility rates constant for the duration of the client's lease. The Calgary marketplace saw numerous fluctuations in utility costs which resulted in larger utility refund cheques being issued back to the client. The overall project was deemed a success on all fronts and resulted in all their field office locations being converted to LED lighting.



**SUMMARY**

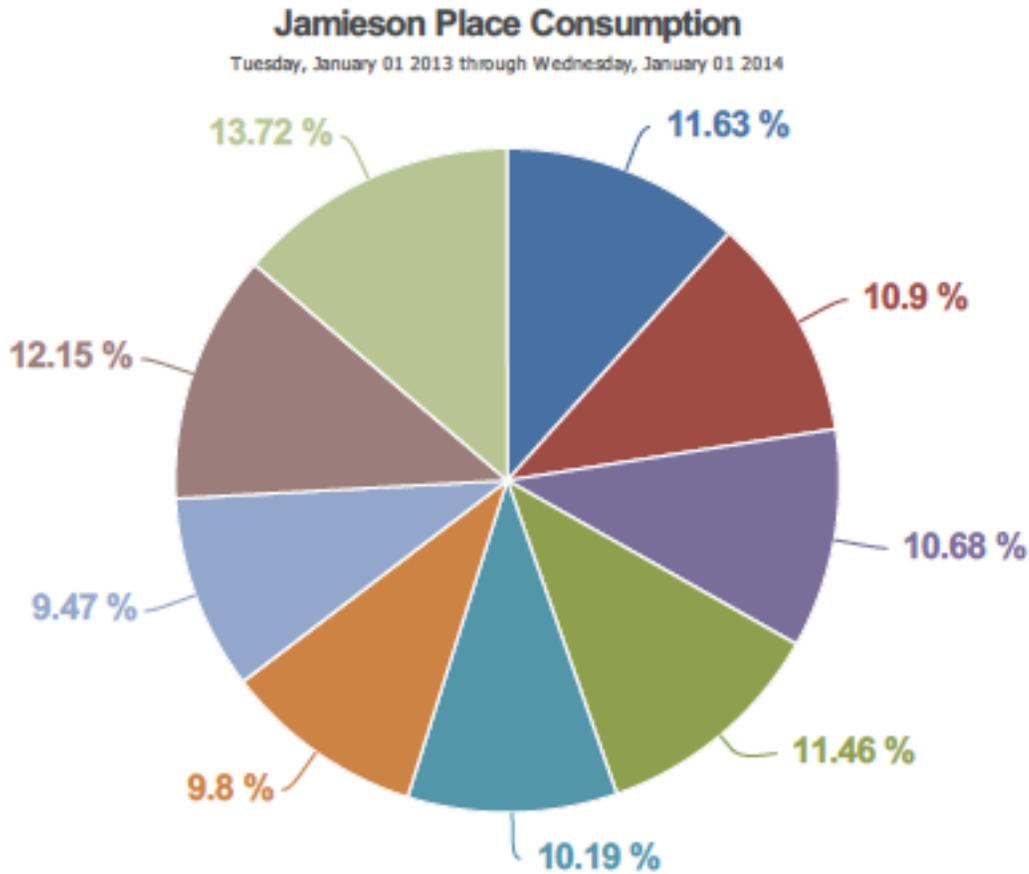
Chart A shows the approximated baseline consumption for all the floors from January 1, 2012 to Jan 1, 2013. Please keep in mind, this projected started mid year 2012 so a true baseline was not possible.



Building	Meter	Total Consumption
Jamieson Place	E008M09 - 12 Lighting & Power - 200A	172,451 kWh
Jamieson Place	E008M08 - 11 Lighting & Power - 200A	164,107 kWh
Jamieson Place	E008M07 - 10 Lighting & Power - 200A	140,764 kWh
Jamieson Place	E008M06 - 09 Lighting & Power - 200A	166,777 kWh
Jamieson Place	E008M05 - 08 Lighting & Power - 200A	151,534 kWh
Jamieson Place	E008M04 - 07 Lighting & Power - 200A	147,786 kWh
Jamieson Place	E008M03 - 06 Lighting & Power - 200A	144,301 kWh
Jamieson Place	E008M02 - 05 Lighting & Power - 200A	181,299 kWh
Jamieson Place	E008M01 - 04 Lighting & Power - 200A	198,574 kWh



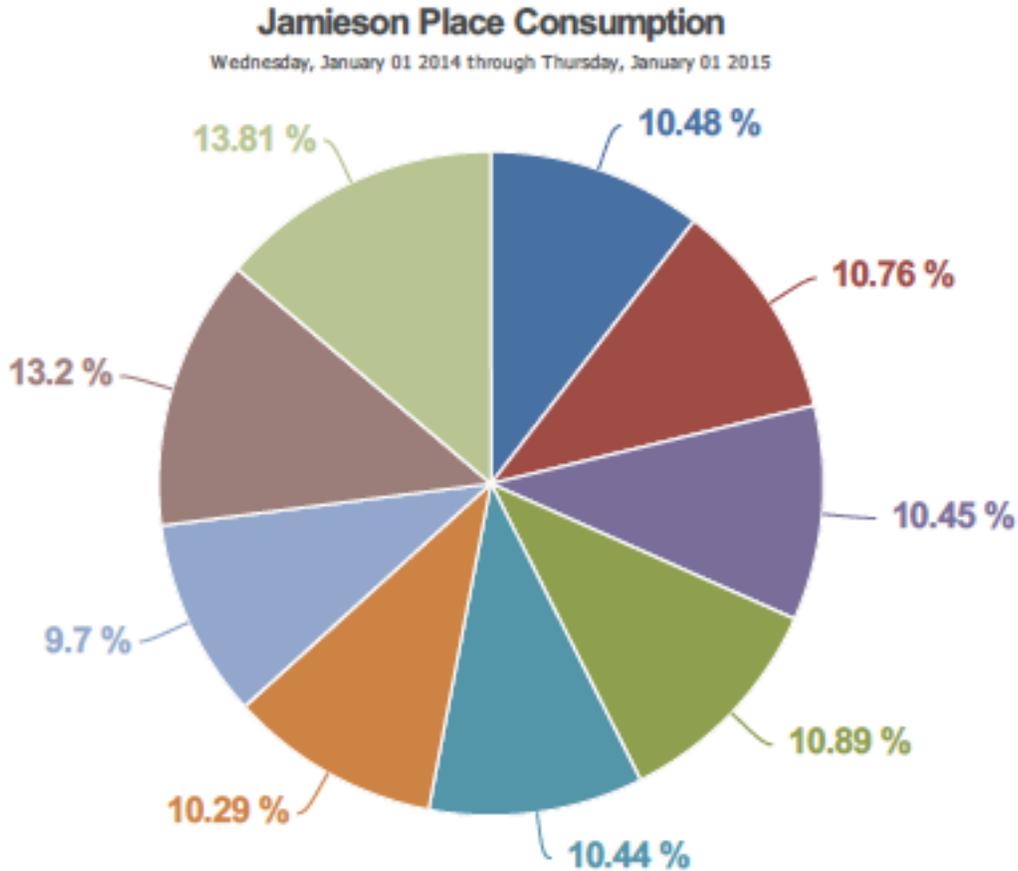
Chart B shows the same timeframe for 2013-2014. There were some anomalies captured on an annual basis, but most floors saw a decrease in annual energy consumption by 5%.



Building	Meter	Total Consumption
Jamieson Place	E008M09 - 12 Lighting & Power - 200A	166,663 kWh
Jamieson Place	E008M08 - 11 Lighting & Power - 200A	156,271 kWh
Jamieson Place	E008M07 - 10 Lighting & Power - 200A	153,078 kWh
Jamieson Place	E008M06 - 09 Lighting & Power - 200A	164,216 kWh
Jamieson Place	E008M05 - 08 Lighting & Power - 200A	146,122 kWh
Jamieson Place	E008M04 - 07 Lighting & Power - 200A	140,445 kWh
Jamieson Place	E008M03 - 06 Lighting & Power - 200A	135,802 kWh
Jamieson Place	E008M02 - 05 Lighting & Power - 200A	174,231 kWh
Jamieson Place	E008M01 - 04 Lighting & Power - 200A	196,663 kWh



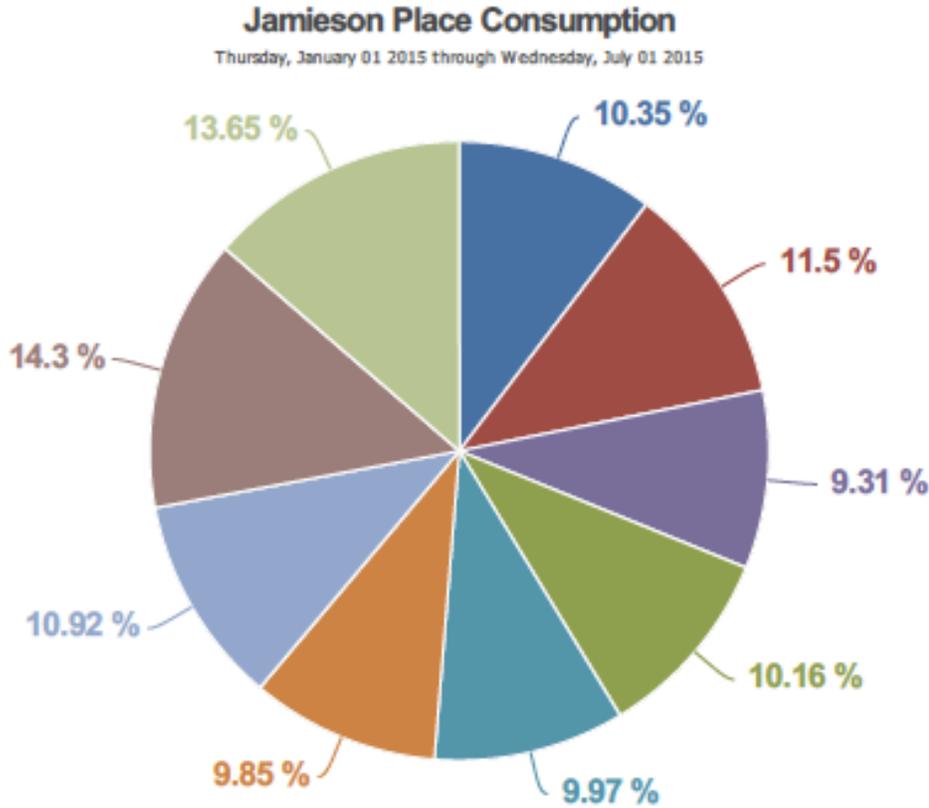
Chart C shows the same timeframe for 2014-2015. Again, the data is fairly consistent in showing an overall decrease in electricity consumption on a per floor basis.



Building	Meter	Total Consumption
Jamieson Place	E006M09 - 12 Lighting & Power - 200A	139,814 kWh
Jamieson Place	E006M08 - 11 Lighting & Power - 200A	143,602 kWh
Jamieson Place	E006M07 - 10 Lighting & Power - 200A	139,504 kWh
Jamieson Place	E006M06 - 09 Lighting & Power - 200A	145,309 kWh
Jamieson Place	E006M05 - 08 Lighting & Power - 200A	139,291 kWh
Jamieson Place	E006M04 - 07 Lighting & Power - 200A	137,293 kWh
Jamieson Place	E006M03 - 06 Lighting & Power - 200A	129,402 kWh
Jamieson Place	E006M02 - 05 Lighting & Power - 200A	176,118 kWh
Jamieson Place	E006M01 - 04 Lighting & Power - 200A	184,347 kWh



Chart D shows a six (6) month cumulative total for Jan-June 2015. This is the beginning of a true 12 month cycle including both phase 1 and 2 of the entire LED conversion project. Looking at the data and applying a forward 6+6 analysis, most floors are showing a 30-40% decrease in electricity consumption from the baseline year of 2012.



Building	Meter	Total Consumption
Jamieson Place	E008M09 - 12 Lighting & Power - 200A	51,975 kWh
Jamieson Place	E008M08 - 11 Lighting & Power - 200A	57,766 kWh
Jamieson Place	E008M07 - 10 Lighting & Power - 200A	46,736 kWh
Jamieson Place	E008M06 - 09 Lighting & Power - 200A	51,030 kWh
Jamieson Place	E008M05 - 08 Lighting & Power - 200A	50,053 kWh
Jamieson Place	E008M04 - 07 Lighting & Power - 200A	49,473 kWh
Jamieson Place	E008M03 - 06 Lighting & Power - 200A	54,833 kWh
Jamieson Place	E008M02 - 05 Lighting & Power - 200A	71,802 kWh
Jamieson Place	E008M01 - 04 Lighting & Power - 200A	68,535 kWh

\*NOTE: From January 2012 to current, the company has grown its employee base by approximately 30%. The increase in staff count contributes to an overall increase in electricity consumption, however the data shows an overall decrease. Had we been able to isolate and remove the increased headcount, the resulting consumption data would have been much higher than the projected 30-40%.