



Energy Reduction Programs: Understanding, Implementing & Delivering

PL Energy Services



PL Energy Services Value to Condominium Directors

- ▶ Control Maintenance Fees
- ▶ Maximize Rebates
- ▶ Measurement & Verification





PL Energy Services



- ▶ Industry recognized name for providing engineering services, energy conservation plans & building efficiency upgrades.
- ▶ Performed over 400 commercial energy audits for industrial, commercial and multi-residential property management companies.
- ▶ 22 innovative, qualified employees.



Head Office:
Markham, Ontario

Control Maintenance Fees Energy Audits & Rebates

▶ Retrofit Program

- ▶ Receive up to 50% on Projects.
- ▶ Secure Money Proactively.
- ▶ **Standard Equipment Applies!**
- ▶ Includes Roof/Windows/Elevators

▶ Energy Audit Funding Program

- ▶ 50% Funded



saveONenergy™
RETROFIT PROGRAM

saveONenergy™
AUDIT FUNDING

saveONenergy™
EXISTING BUILDING COMMISSIONING



Retrofit Program: What Upgrades Can I Make?

- ▶ HVAC Systems
- ▶ Chiller Systems
- ▶ Boilers & Heat Recovery
- ▶ CO Sensors
- ▶ Makeup Air units
- ▶ General Exhaust Fans
- ▶ Booster Pumps
- ▶ Motors VFD's
- ▶ Heat Pumps
- ▶ Building Automation Systems
- ▶ Common Area Painting
- ▶ Building Envelope
- ▶ Fan Coil / PTAC
- ▶ Lighting and Controls



Energy Audit: Benchmark Utility Consumption

| Project | Annual Savings (Elec, Gas, Water) | Estimated Cost | Estimated Rebate | Cost w/Rebate | Estimated Payback (YRS) |
|-----------------------------------|--------------------------------------|-------------------|---------------------|--------------------------|---------------------------------------|
| 0-3 Year Payback | | | | | |
| LED Parking Upgrade | \$10,246 | \$10,794 | \$4,269 | \$6,524 | 0.64 |
| VFD Primary Loop Pump 1 | \$3,942 | \$6,600 | \$805 | \$5,795 | 1.47 |
| VFD Primary Loop Pump 2 | \$3,942 | \$6,600 | \$805 | \$5,795 | 1.47 |
| Building Automation System | \$4,659 | \$9,480 | \$776 | \$8,704 | 1.87 |
| Improved Air Distribution Control | \$7,358 | \$18,200 | \$4,295 | \$13,905 | 1.89 |
| LED Common Area Upgrade | \$18,537 | \$46,500 | \$8,937 | \$37,563 | 2.03 |
| 0-3 Year | Annual Savings | Cost | Rebates | Cost w/Rebate | Annual Condo Fee Reduction |
| Total | \$48,683 | \$98,174 | \$19,887 | \$78,286 | \$211.67 |



Energy Audit: Identify Inefficiencies

| Project | Annual Savings (Elec, Gas, Water) | Estimated Cost | Estimated Rebate | Cost w/Rebate | Estimated Payback (YRS) |
|-------------------------------|--------------------------------------|-------------------|---------------------|--------------------------|---------------------------------------|
| 3-5 Year Payback | | | | | |
| VFD - Cooling Tower | \$1,178 | \$5,300 | \$1,542 | \$3,758 | 3.19 |
| LED Exterior Upgrades | \$3,140 | \$13,256 | \$2,302 | \$10,954 | 3.49 |
| CO Sensor System Installation | \$3,182 | \$15,000 | \$2,614 | \$12,386 | 3.89 |
| 3-5 Year | Annual Savings | Cost | Rebates | Cost w/Rebate | Annual Condo Fee Reduction |
| Total | \$7,499 | \$33,556 | \$6,458 | \$27,098 | \$32.61 |




Energy Audit: Implement Solutions

| Project | Annual Savings (Elec, Gas, Water) | Estimated Cost | Estimated Rebate | Cost w/Rebate | Estimated Payback (YRS) |
|----------------------------|--------------------------------------|-------------------|---------------------|--------------------------|---------------------------------------|
| 5+ Year Payback | | | | | |
| Rooftop Unit Replacement | \$3,363 | \$38,000 | \$12,185 | \$25,815 | 7.68 |
| Elevator Motor Replacement | \$18,423 | \$164,837 | \$10,000 | \$154,837 | 8.40 |
| Condensing Boiler | \$3,564 | \$70,000 | \$5,000 | \$65,000 | 18.24 |
| Window Retrofit | \$4,050 | \$180,000 | \$2,700 | \$177,300 | 43.78 |
| Roof Replacement | \$4,125 | \$185,000 | \$2,750 | \$182,250 | 44.18 |
| 5+ Year | Annual Savings | Cost | Rebates | Cost w/Rebate | Annual Condo Fee Reduction |
| Total | \$3,564 | \$70,000 | \$5,000 | \$65,000 | \$15.49 |

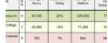
Case Study: HVAC RTU REPLACEMENTS




Project Cost:
\$157,900.00



Demand Savings:
50 kW



Energy Savings:
33,000 kWh

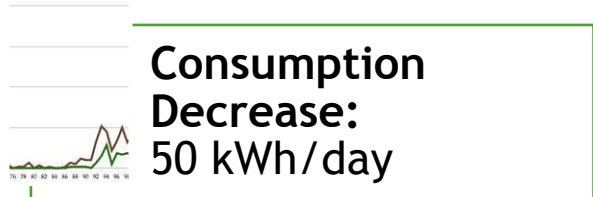



Grant Incentive:
\$40,000.00

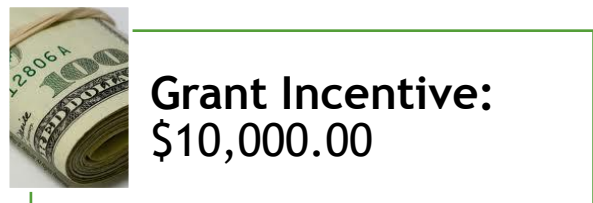


Case Study: ELEVATOR MOTOR RETROFIT

- ▶ Retrofit of three elevators that serve a 14-story residential building.
- ▶ The existing elevators ran on 25hp, 1150rpm AC hoist that were in continuous operations. Each elevator was replaced with more efficient 25hp AC low slip, controlled by VVVF non-regenerative motor drives.

**Energy Savings:
122,815 kWh**



Case Study: BUILDING AUTOMATION SYSTEM

- ▶ Installation of a Building Automation System with the existing blower fan system on a 20 story commercial building.
- ▶ Results : Accurate, real-time information, reduced contractor calls and 1.5 year payback.
- ▶ The incentive for this project paid 50% of the total cost of the project and the energy savings had a payback of less than 1 year.
- ▶ Installed by PL



**Project Cost:
\$17,500.00**

2008-2009 SIGNAL RETIRING PROJECT
PROJECT RESULTS SUMMARY
ENERGY'S BENEVOLENT FUND

| Year | Actual Energy Savings (kWh) | Percentage Savings | Actual Fuel Savings (\$) | Annual Fuel Savings (\$) |
|------|-----------------------------|--------------------|--------------------------|--------------------------|
| 2008 | 10,000 | 25% | 100,000 | 75 |
| 2009 | 20,000 | 50% | 200,000 | 150 |
| 2010 | 30,000 | 75% | 300,000 | 225 |
| 2011 | 40,000 | 100% | 400,000 | 300 |
| 2012 | 50,000 | 125% | 500,000 | 375 |
| 2013 | 60,000 | 150% | 600,000 | 450 |
| 2014 | 70,000 | 175% | 700,000 | 525 |
| 2015 | 80,000 | 200% | 800,000 | 600 |
| 2016 | 90,000 | 225% | 900,000 | 675 |
| 2017 | 100,000 | 250% | 1,000,000 | 750 |
| 2018 | 110,000 | 275% | 1,100,000 | 825 |
| 2019 | 120,000 | 300% | 1,200,000 | 900 |
| 2020 | 130,000 | 325% | 1,300,000 | 975 |
| 2021 | 140,000 | 350% | 1,400,000 | 1,050 |
| 2022 | 150,000 | 375% | 1,500,000 | 1,125 |
| 2023 | 160,000 | 400% | 1,600,000 | 1,200 |
| 2024 | 170,000 | 425% | 1,700,000 | 1,275 |
| 2025 | 180,000 | 450% | 1,800,000 | 1,350 |
| 2026 | 190,000 | 475% | 1,900,000 | 1,425 |
| 2027 | 200,000 | 500% | 2,000,000 | 1,500 |
| 2028 | 210,000 | 525% | 2,100,000 | 1,575 |
| 2029 | 220,000 | 550% | 2,200,000 | 1,650 |
| 2030 | 230,000 | 575% | 2,300,000 | 1,725 |
| 2031 | 240,000 | 600% | 2,400,000 | 1,800 |
| 2032 | 250,000 | 625% | 2,500,000 | 1,875 |
| 2033 | 260,000 | 650% | 2,600,000 | 1,950 |
| 2034 | 270,000 | 675% | 2,700,000 | 2,025 |
| 2035 | 280,000 | 700% | 2,800,000 | 2,100 |
| 2036 | 290,000 | 725% | 2,900,000 | 2,175 |
| 2037 | 300,000 | 750% | 3,000,000 | 2,250 |
| 2038 | 310,000 | 775% | 3,100,000 | 2,325 |
| 2039 | 320,000 | 800% | 3,200,000 | 2,400 |
| 2040 | 330,000 | 825% | 3,300,000 | 2,475 |
| 2041 | 340,000 | 850% | 3,400,000 | 2,550 |
| 2042 | 350,000 | 875% | 3,500,000 | 2,625 |
| 2043 | 360,000 | 900% | 3,600,000 | 2,700 |
| 2044 | 370,000 | 925% | 3,700,000 | 2,775 |
| 2045 | 380,000 | 950% | 3,800,000 | 2,850 |
| 2046 | 390,000 | 975% | 3,900,000 | 2,925 |
| 2047 | 400,000 | 1000% | 4,000,000 | 3,000 |
| 2048 | 410,000 | 1025% | 4,100,000 | 3,075 |
| 2049 | 420,000 | 1050% | 4,200,000 | 3,150 |
| 2050 | 430,000 | 1075% | 4,300,000 | 3,225 |
| 2051 | 440,000 | 1100% | 4,400,000 | 3,300 |
| 2052 | 450,000 | 1125% | 4,500,000 | 3,375 |
| 2053 | 460,000 | 1150% | 4,600,000 | 3,450 |
| 2054 | 470,000 | 1175% | 4,700,000 | 3,525 |
| 2055 | 480,000 | 1200% | 4,800,000 | 3,600 |
| 2056 | 490,000 | 1225% | 4,900,000 | 3,675 |
| 2057 | 500,000 | 1250% | 5,000,000 | 3,750 |
| 2058 | 510,000 | 1275% | 5,100,000 | 3,825 |
| 2059 | 520,000 | 1300% | 5,200,000 | 3,900 |
| 2060 | 530,000 | 1325% | 5,300,000 | 3,975 |
| 2061 | 540,000 | 1350% | 5,400,000 | 4,050 |
| 2062 | 550,000 | 1375% | 5,500,000 | 4,125 |
| 2063 | 560,000 | 1400% | 5,600,000 | 4,200 |
| 2064 | 570,000 | 1425% | 5,700,000 | 4,275 |
| 2065 | 580,000 | 1450% | 5,800,000 | 4,350 |
| 2066 | 590,000 | 1475% | 5,900,000 | 4,425 |
| 2067 | 600,000 | 1500% | 6,000,000 | 4,500 |
| 2068 | 610,000 | 1525% | 6,100,000 | 4,575 |
| 2069 | 620,000 | 1550% | 6,200,000 | 4,650 |
| 2070 | 630,000 | 1575% | 6,300,000 | 4,725 |
| 2071 | 640,000 | 1600% | 6,400,000 | 4,800 |
| 2072 | 650,000 | 1625% | 6,500,000 | 4,875 |
| 2073 | 660,000 | 1650% | 6,600,000 | 4,950 |
| 2074 | 670,000 | 1675% | 6,700,000 | 5,025 |
| 2075 | 680,000 | 1700% | 6,800,000 | 5,100 |
| 2076 | 690,000 | 1725% | 6,900,000 | 5,175 |
| 2077 | 700,000 | 1750% | 7,000,000 | 5,250 |
| 2078 | 710,000 | 1775% | 7,100,000 | 5,325 |
| 2079 | 720,000 | 1800% | 7,200,000 | 5,400 |
| 2080 | 730,000 | 1825% | 7,300,000 | 5,475 |
| 2081 | 740,000 | 1850% | 7,400,000 | 5,550 |
| 2082 | 750,000 | 1875% | 7,500,000 | 5,625 |
| 2083 | 760,000 | 1900% | 7,600,000 | 5,700 |
| 2084 | 770,000 | 1925% | 7,700,000 | 5,775 |
| 2085 | 780,000 | 1950% | 7,800,000 | 5,850 |
| 2086 | 790,000 | 1975% | 7,900,000 | 5,925 |
| 2087 | 800,000 | 2000% | 8,000,000 | 6,000 |
| 2088 | 810,000 | 2025% | 8,100,000 | 6,075 |
| 2089 | 820,000 | 2050% | 8,200,000 | 6,150 |
| 2090 | 830,000 | 2075% | 8,300,000 | 6,225 |
| 2091 | 840,000 | 2100% | 8,400,000 | 6,300 |
| 2092 | 850,000 | 2125% | 8,500,000 | 6,375 |
| 2093 | 860,000 | 2150% | 8,600,000 | 6,450 |
| 2094 | 870,000 | 2175% | 8,700,000 | 6,525 |
| 2095 | 880,000 | 2200% | 8,800,000 | 6,600 |
| 2096 | 890,000 | 2225% | 8,900,000 | 6,675 |
| 2097 | 900,000 | 2250% | 9,000,000 | 6,750 |
| 2098 | 910,000 | 2275% | 9,100,000 | 6,825 |
| 2099 | 920,000 | 2300% | 9,200,000 | 6,900 |
| 2100 | 930,000 | 2325% | 9,300,000 | 6,975 |

**Energy Savings:
367,226 kWh**



**Grant Incentive:
\$8,750.00**

Case Study: FAN COIL RETROFIT

- ▶ Retrofit of fan coil motors throughout a Condominium building.
- ▶ Results: Elimination of maintenance issues, annual energy savings \$56,936.00



**Consumption
Decrease:
113 kWh/day**

| Month | Actual kWh | Target kWh | Savings (\$) |
|---------------------|---------------|----------------|---------------|
| Jan 15 | 10,000 | 10,000 | 0 |
| Feb 15 | 8,000 | 10,000 | 1,600 |
| Mar 15 | 6,000 | 10,000 | 3,200 |
| Apr 15 | 4,000 | 10,000 | 4,800 |
| May 15 | 2,000 | 10,000 | 6,400 |
| Jun 15 | 1,000 | 10,000 | 8,000 |
| Jul 15 | 1,000 | 10,000 | 8,000 |
| Aug 15 | 1,000 | 10,000 | 8,000 |
| Sep 15 | 1,000 | 10,000 | 8,000 |
| Oct 15 | 1,000 | 10,000 | 8,000 |
| Nov 15 | 1,000 | 10,000 | 8,000 |
| Dec 15 | 1,000 | 10,000 | 8,000 |
| Annual Total | 30,000 | 120,000 | 90,000 |

**Energy Savings:
331,997 kWh**



**Grant Incentive:
\$90,960.00**



Case Study: NEW WINDOWS RETROFIT

- ▶ Old single glazed windows were replaced with more energy efficient double-glazed windows at this commercial facility.
- ▶ Done in conjunction with other rebates at the same building.



Project Costs:
48,000.00

| 2018-2019 SIGNAL RETROFIT PROJECT | | | | |
|-----------------------------------|----------------------|------------------------|-------------------------|-------------------------|
| PROJECT RESULTS SUMMARY | | | | |
| WEEKDAYS (MONDAY - FRIDAY) | | | | |
| Year | Energy Savings (kWh) | Percentage of Original | Annual Energy Cost (\$) | Annual Energy Cost (\$) |
| 2018 | 27,000 | 25% | 15,000 | 15,000 |
| 2019 | 27,000 | 25% | 15,000 | 15,000 |
| 2020 | 27,000 | 25% | 15,000 | 15,000 |
| 2021 | 27,000 | 25% | 15,000 | 15,000 |
| 2022 | 27,000 | 25% | 15,000 | 15,000 |
| 2023 | 27,000 | 25% | 15,000 | 15,000 |
| 2024 | 27,000 | 25% | 15,000 | 15,000 |
| 2025 | 27,000 | 25% | 15,000 | 15,000 |
| 2026 | 27,000 | 25% | 15,000 | 15,000 |
| 2027 | 27,000 | 25% | 15,000 | 15,000 |
| 2028 | 27,000 | 25% | 15,000 | 15,000 |
| 2029 | 27,000 | 25% | 15,000 | 15,000 |
| 2030 | 27,000 | 25% | 15,000 | 15,000 |

Energy Savings:
27,000 kWh




Grant Incentive:
\$2,700.00

Case Study: CHILLER REPLACEMENTS


- ▶ This project consisted of the replacement of a buildings 260 Ton chiller system to a high efficiency unit.
- ▶ The project ended up having 75kW of energy savings and yielded a grant incentive of \$44,000.00.





Project Cost:
\$180,000.00



Demand Savings:
75 kW



Energy Savings:
209,000 kWh



Grant Incentive:
\$44,000.00

Measurement & Verification

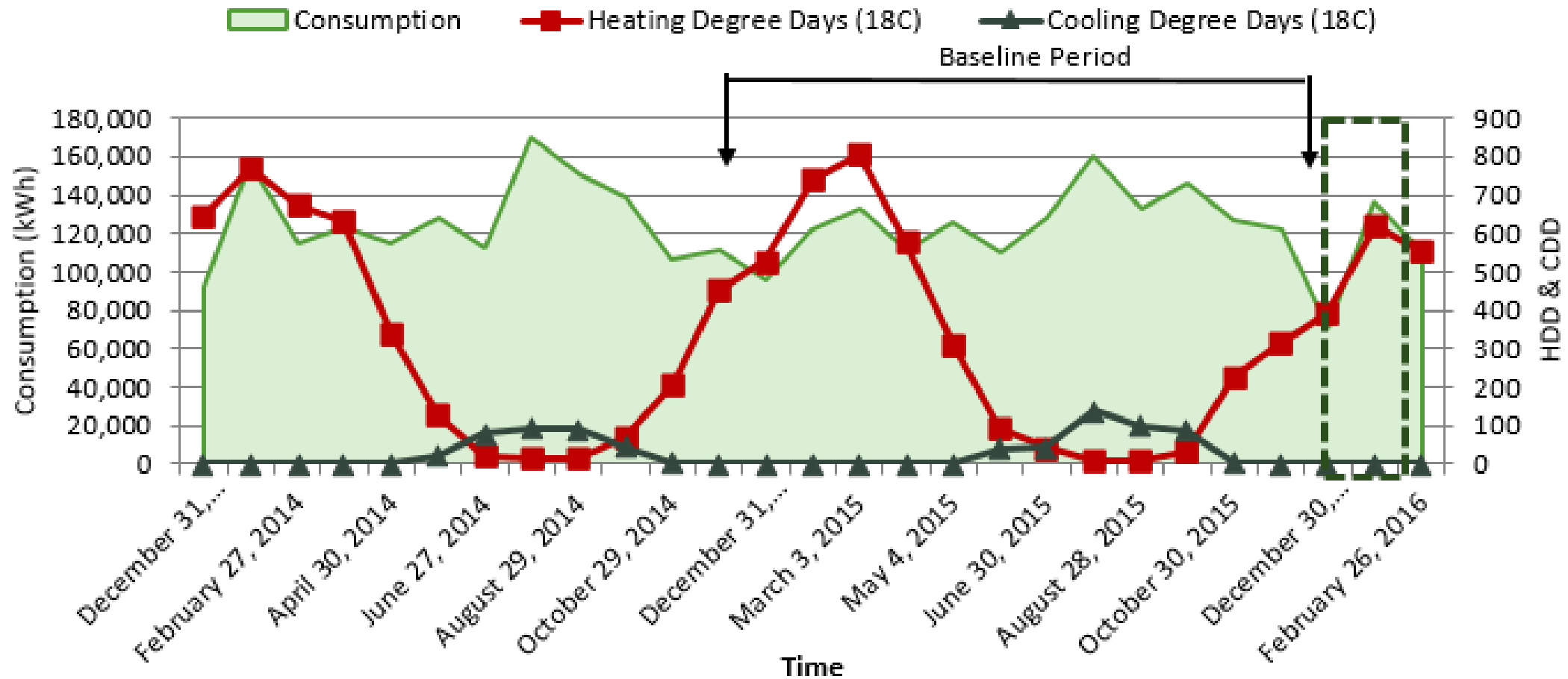


- ▶ Educate Boards & Owners
- ▶ Horror stories spread faster than success!
- ▶ “Pick and Peck” Systems
 - ▶ Multiple contractors have worked on site over the year



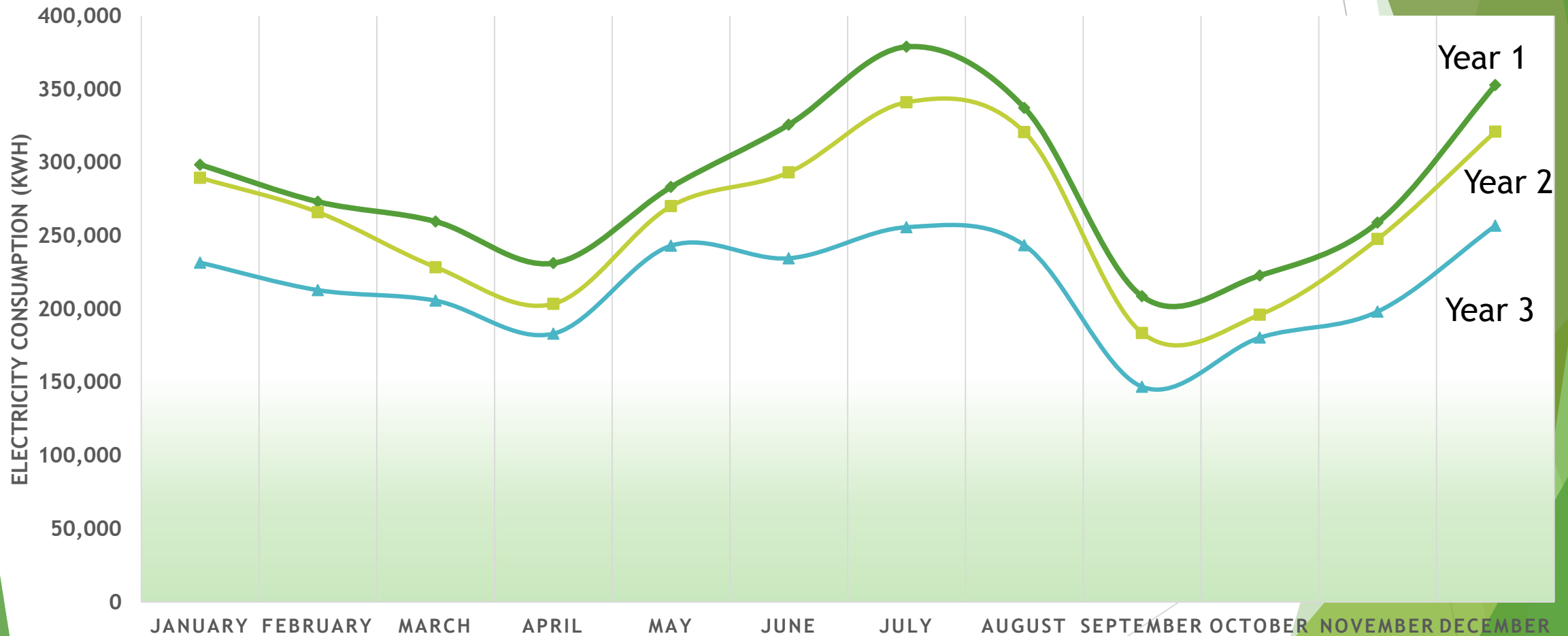
Measurement & Verification

Electricity Consumption Trend



Measurement & Verification

ELECTRICITY CONSUMPTION TRENDS



Retrofit Program: Rules & Guidelines

- ▶ Hydro Projects **MUST** be pre-approved before commencement
- ▶ Gas Project may be approved post-retrofit
- ▶ Must reduce energy demand reduction for a minimum of 48 months.
- ▶ Minimum of 1kW Reduction.



Moving Forward...



- ▶ Energy costs are rising - and will continue to do so!
 - ▶ Strategically invest into reducing consumption - the savings will follow.
- ▶ Measurement & Verification
 - ▶ Provide proof projects are saving energy
- ▶ Maximize Rebates
 - ▶ Boards are informed and educated with accurate, concise information

Questions?



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