

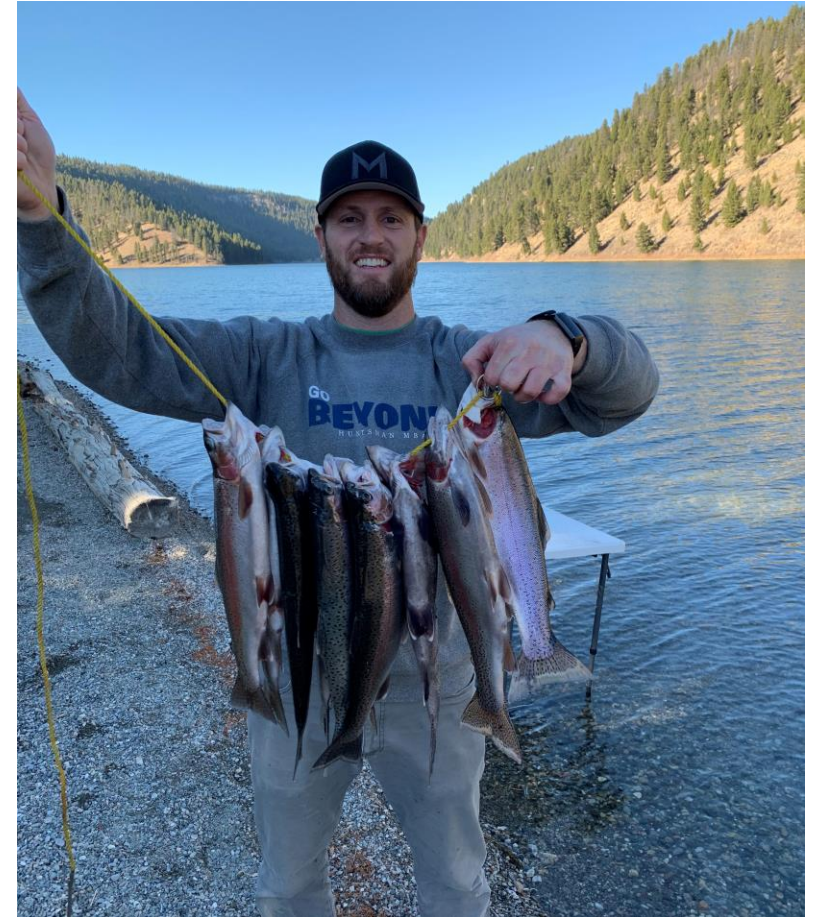
Dummies Guide to Non-Lighting

*A guide to non-lighting incentive offers
by Chase Harris & Tom Wood*



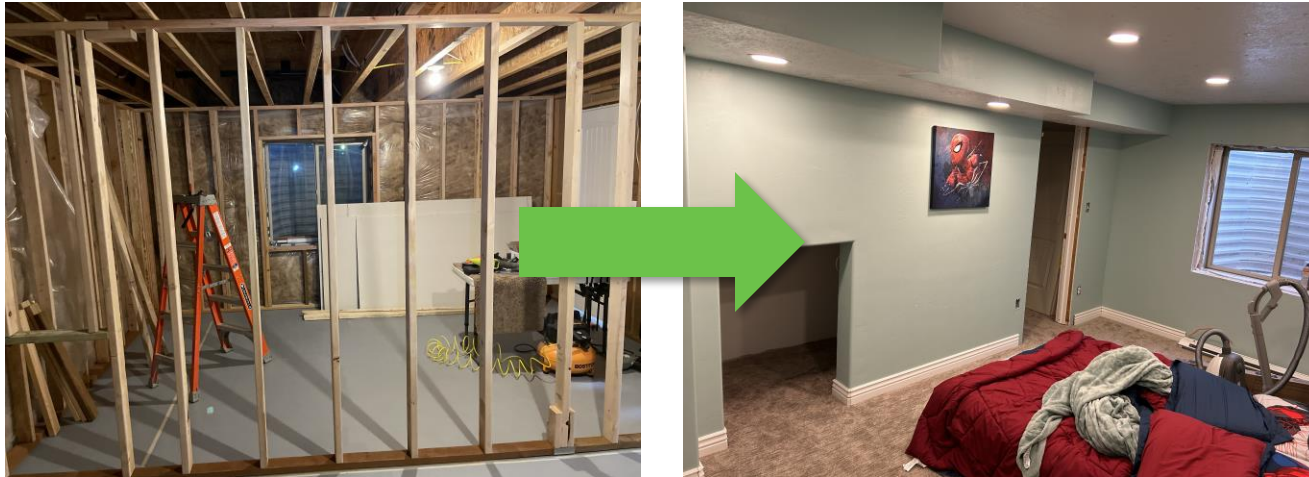
Quick Introduction

- Name: Chase Harris
- Wife: Alexandra
(married 12 years)
- Children: Scarlett (7),
Rowan (5), Charles (3),
Finn (1).
- Santa Claus:
Previous Co-worker



Professional Background

- Project Manager
(The new Logan)
- New to the team, only 4 months
- Have been involved as a vendor for over 12 years



- Experience with **SEVERAL** Utilities:
 - Rocky Mountain Power,
 - Idaho Power,
 - Bonneville Power Administration,
 - Logan City,
 - Southern California Edison,
 - Pacific Gas & Electric,
 - Con Edison,
 - AEP Ohio,
 - and more!



Course Objectives

1. Be familiar with:
 - A holistic approach to customer experience.
 - Finding the **NEW** low hanging fruit.
 - Be able to walk in and identify opportunities.
2. Why have goals?
 - Lighting impacted by efficiency mandates –
EISA removed screw-in lamps from offering.
 - Help lighting market longevity by integration into other initiatives.

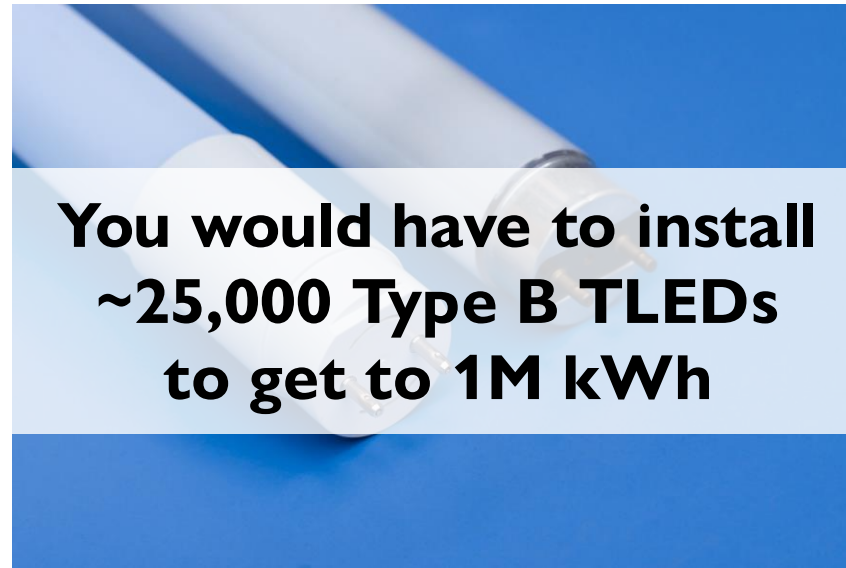


But dad, why non-lighting???

- Some of these systems result in over 1M kWh for one project.
- 1M kWh is a HUGE lighting project.



=



Variable Usage (Dimming) Throttles, an introduction.

Think of a
dimmer switch.



Output not at 100% all the time.

Dimming is Critical to Networked Lighting Controls Savings

- High End Trim
- Low End Trim
- Daylighting
- Ramp up/down times
- Demand Response
- Personal Tuning

Note: Networked controls without dimming capabilities are severely limited.

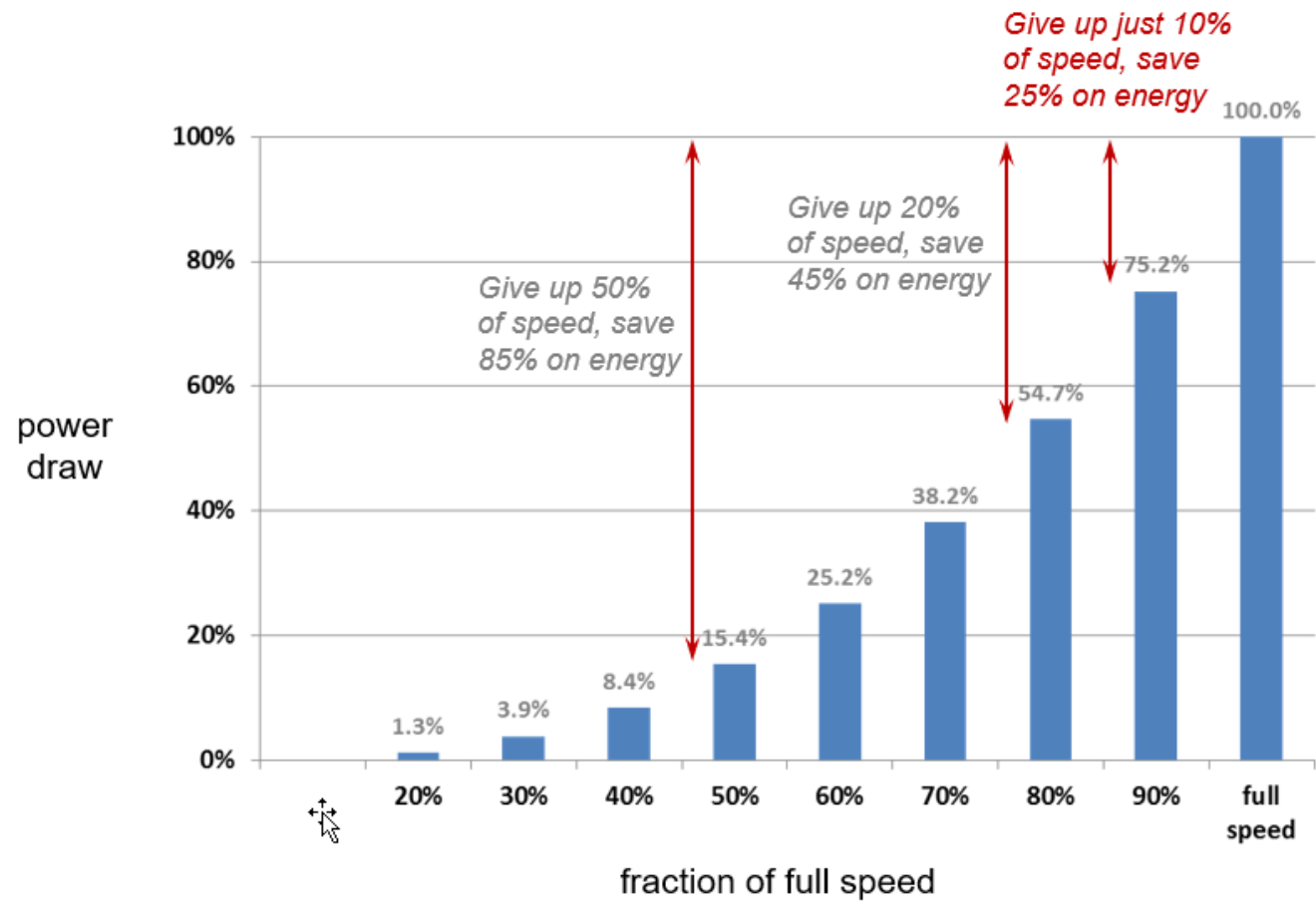


Candidates to Identify:

- *Motors and Drives*
 - Variable-Frequency Drive (VFD)
 - *Aka. Variable Speed Drive (VSD)*
 - Electronically Commutated Motors (ECM)



VFD Savings – For centrifugal loads such as pumps and fans



Benefits of Adding a VFD

- **74% of U.S. electricity is used by commercial buildings**

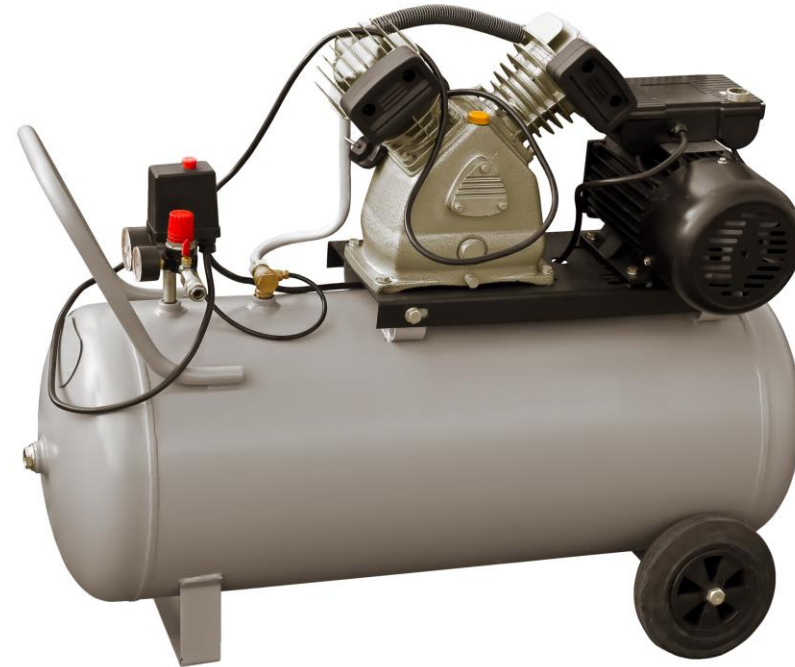
(source: US DOE, 2008 Building Energy Data Book)

- Estimated 50% of electricity used to move air and water
- **How does a VFD save electricity?**
 - Varies motor speed
 - Motor maintenance savings – soft start

% Speed	Frequency (Hertz)	% Savings
100%	60	0%
90%	54	27%
80%	48	49%
70%	42	66%
60%	36	78%
50%	30	88%
40%	24	94%
30%	18	97%
20%	12	99%
10%	6	100%
0%	0	100%

What is a Good Candidate?

- Fixed-Speed (Frequent starting and stopping of motor uses a lot of energy)
 - Pumps
 - Fans
 - Blowers
 - Compressors
- Note: Variable Need
(Think Dimmer Switch)



Candidates to Identify:

VFD Air Compressor

- New Compressors are costly
- Limited room (new require higher peak current)
- New may not integrate well into existing master controls
- Frequent starting and stopping of motor uses lots of energy
- Think *Dimmer Switch*

Various Sizes & Shapes



Image Courtesy of Pumps & Systems Magazine

Candidates to Identify:

VFD Pumps

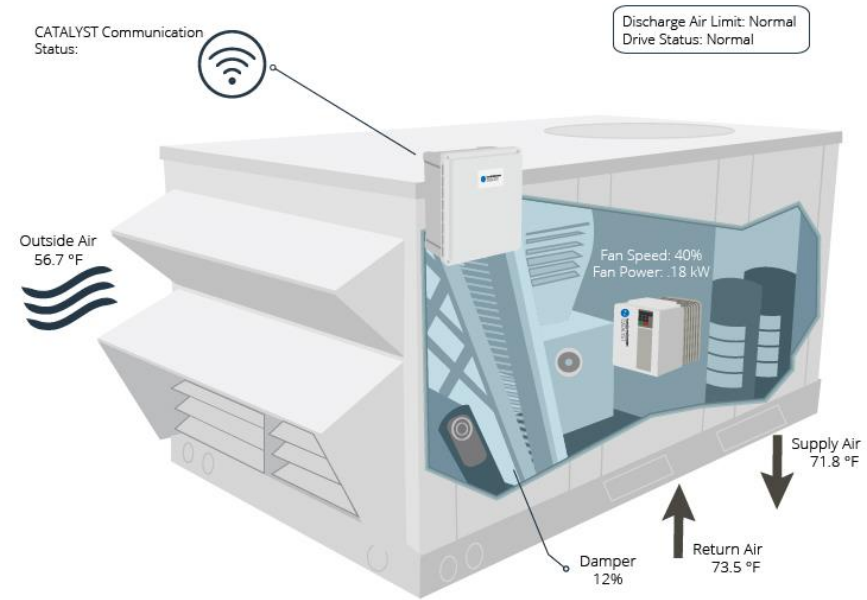
- Maintain pressure
- Less water waste
- Life is much easier on the user
- Think *Dimmer Switch*



Candidates to Identify:

VFDs on HVAC

- Part of the ARC measure
- Varies based on the need
 - Occupancy
 - Temperature
- Dynamic System being able to adjust continually
- Think Dimmer Switch



Images Courtesy of Transformative Wave



INTERNET OF THINGS



IoT

ARC

- VFDs – As covered
- Occupancy
- Economizers *(top image)*
- CO2 Sensing and other controls *(bottom image)*

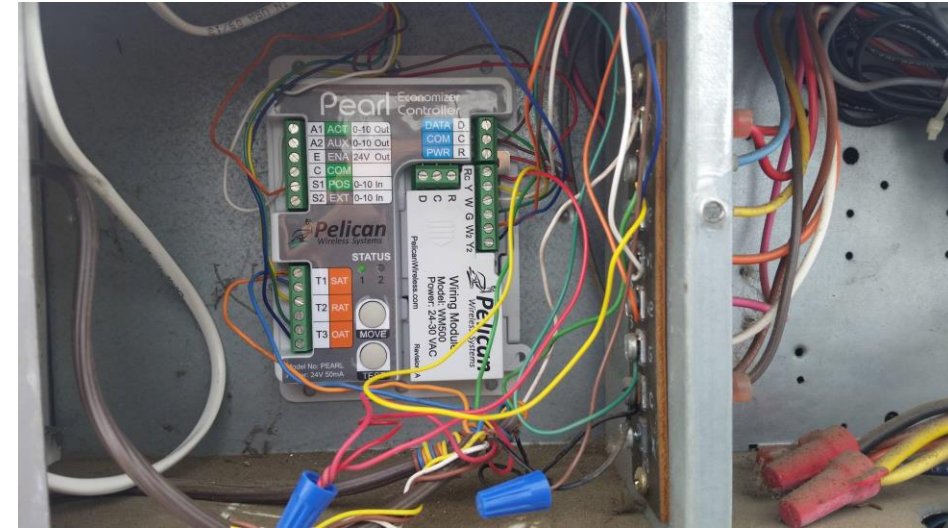


Image Courtesy of Pelican Wireless



IoT

Smart Power Strips

- Possible Occupancy

IoT

Smart Thermostat

- Possible Occupancy
- Must be replacing non-programmable
- Part of HVAC
Checkup (closed network)



Heat Pumps

It is **more efficient to move heat** around than it is to create it. How much more efficient? **Up to 400% in some cases.**

Heat Pumps

Variable Refrigeration Flow (VRF)

A space that needs to heat and cool at the same time consistently.

- *Meat Packing*
 - *Cooled spaces year round*
 - *Office space heated or cooled*
- *Production*
 - *Machinery heat needs cooling year round*
 - *Office space heated or cooled*

- *Food Production*
 - *Cooling year round*
 - *Office space heated or cooled*

Heat Pumps

What is a typical heat pump?

- Dual fuel
- PTAC vs PTHP
 - PTACs are typically resistance heating 30A circuits for the heating load.



Heat Pumps

Heat Pump Water Heater

- Existing resistance heating, **no fuel switching!**



Image Courtesy of Hot Water Solutions

Widgets

Food Services

- *Anti-Sweat Heater Controls*
- *High Efficiency Appliances*
- *Smart Hoods w/ Sensing*



Widgets

Occupancy based:

- *PTAC Controls*
- *Vending Miser*



Widgets

Green Motor Rewind (What is this???)

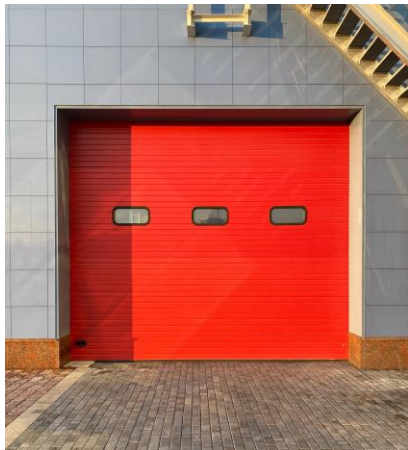
A Green Motor Rewind is **the rewinding of an induction motor that is intended to preserve its original efficiency**. Green practices include tight control of the burn-off process, stator core loss testing and repair, and performance criteria for the windings.

Widgets

Others:

- *Fast Acting Doors*
- *Fans*
- *Adaptive Refrigeration Control*

- Turn off fans or reduce fan speed to 50% when refrigerant not flowing
- Eliminate icing issues
- Fewer, shorter defrost cycles
- Reduced temperature fluctuation



*Special Note

Some of these may fall under Custom Measures. Which will require an Incentive Offer Letter (IOL) in advance.

System Optimization

HVAC Check-up; Small to medium customers

Yes, yes, yes – an HVAC check-up is worth the money. Just like your vehicle, your HVAC system is a complex piece of machinery that gets a lot of “mileage.” It’s full of critical and moving components, that experience wear and tear over time. Also just like your car, your HVAC system doesn’t operate at its best when it’s neglected and worn down.

HVAC Check-Up Checklist

- Thermostat testing and settings review
- Electrical connection tightening
- Lubrication for all moving parts
- Controls check
- Coil cleaning
- Check and straighten fins
- Clean condensate drain
- Change air filter
- Measuring refrigerant levels and charge
- Check and adjust blower motor and belts

System Optimization

Retro-commissioning; Large customers

- Building maintenance systems
- Central Plant
- Larger facility

Retro-commissioning is **the process of fine-tuning building systems to ensure a building is running at its optimal performance.** It addresses problems that have developed throughout a building's life as a result of issues such as aging equipment or changes in how spaces are used by occupants.



Recommissioning

- *Benefit of RxCx*
 - Energy Savings
 - Lower Operating cost
 - Optimized System Operation
 - Better equipment performance
 - Value Adder
 - Extend Equipment Life
 - Improved Indoor Air Quality
 - Improved Occupant Comfort

Q&A