Event next week:

Chehalem Parks & Recreation Aquatic Center Building Tour

- **When:**
  - Wednesday, May 23, 2018 from 2-6 pm in Newberg
  - Training & tour of Aquatic Center 2-4 pm (CEUs available for members!)
  - Optional happy hour at Chehalem Winery 4-6 pm (food and first drink included in registration)

- **Presenters:**
  - Jacob James, Nexant
  - Gary Gripp, Anderson Poolworks
  - Rob Hall, Energy Trust of Oregon

- **Register at** [www.aeecrc.org/events](http://www.aeecrc.org/events)

This event is generously co-sponsored by Energy Trust of Oregon and Anderson Poolworks.
Upcoming events:

Mark your calendars:

- September 19, 2018 - Energy Engineering Forum at EcoTrust
  - Emily Pearce - Waypoint Group - How to Engage the Commercial Real Estate Community for Energy Efficiency Programs
- October 25, 2018 - Building Tour (Located TBD)
- November 21, 2018 - Energy Engineering Forum at EcoTrust
- December 4, 2018 - AEE Columbia River Chapter Holiday Party

www.aeeCRC.org
Check frequently for event registration and updates, membership information, and chapter news.
Agenda

- Legal Status
- Local Support
- Energy Use Overview
- Grow Room Energy Balance
- Energy Analysis Techniques
- Energy Efficiency Measures
- Barriers to Energy Efficiency
- Conclusions
Legal Status

- Measure 91
- Home Grow / Personal Possession
  - Four plants per property
- Regulated Growers and Retailers
  - Indoor
    - Micro Tier I: up to 625 SF
    - Micro Tier II: 626 SF to 1,250 SF
    - Tier I: 1,251 SF to 5,000 SF
    - Tier II: 5,001 SF to 10,000 SF
  - Outdoor
    - Micro Tier I: up to 2,500 SF
    - Micro Tier II: 2,501 SF to 5,000 SF
    - Tier I: 5,001 SF to 20,000 SF
    - Tier II: 20,001 SF to 40,000 SF
Permitting

- Buildings Codes Division
  - All spaces that are conditioned (cannabis) are regulated unless specifically exempted
  - Cannabis production facilities must comply with all provisions of OEESC 2014, including the economizer requirement.

- City of Portland Guide
  - Production rooms must have continuous or automated intermittent ventilation
  - 3 compliance paths
Energy Trust provides technical services and cash incentives to customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas, and Avista.
Energy Use Overview

- Highest relative energy costs
- EUI > 1,000 kBtu/SF
  - CBEC5 Median Office Building = 67 kBtu/SF
- 50% of Colorado’s load growth in 2015
- 50% increase in per-capita residential energy use in Humboldt County when California legalized medical
- Energy can represent 50% of the overall production costs
- 1 joint = 18 pints of beer
Botaneering
Energy Analysis Techniques

- Hourly energy model
- Energy balance
- Lights-on, lights-of, and transition loads
- Evapotranspiration

\[ ET_{sz} = \frac{0.408 \Delta (R_n - G) + \gamma \frac{C_n}{T + 273} u_2 (e_s^o - e_a)}{\Delta + \gamma (1 + C_d u_2)} \]

Equation 4.

- System response
- Dehumidifier & HVAC interaction

\[ P_D = \frac{S - SHR_T (S + L)}{3,412 (SHR_T - 1) - 970 \eta_D} \]
Energy Efficiency Measures - Lighting

Energy Efficiency Trends in the Cannabis Industry
Energy Efficiency Measures – High Efficiency Dehumidifiers
Energy Efficiency Measures – Hot Gas Reheat

Dehumidification Schematic

Major Differences Between GrowAire™ Systems And Air Conditioners

- Tandem Compressors
- Modulating Reheat Valves and Hot Gas Reheat Coil
- Low Ambient Control (Receiver Pressure and Hold Back Valves)
- Receiver for Refrigerant
- Accumulator (> 15 Ton)
- EXV for Superior Evaporator Control
- Evaporator Optimized for Humidity Removal

Figure 3: GrowAire™ Dehumidification Schematic
Energy Efficiency Measures – DX Assisted Desiccant
Figure 44–3 An open-loop, water-source heat pump with boiler and cooling tower to maintain the loop temperature
Energy Efficiency Measures – VRF
## Marijuana License Applications

### As of 8:00 AM May 11, 2018

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<th>Category</th>
<th>License Active</th>
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<th>Assigned</th>
<th>Ready For Assignment</th>
<th>Without Approved LUCS</th>
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Barriers to Efficiency – Wholesale Cost

Recreational Marijuana Prices

Price per Gram

Source: CO Dept of Revenue, Portland Business Journal, WA Econ and Rev Forecast Council, OLCC, Oregon Office of Economic Analysis
Barriers to Efficiency – Tradition
Willamette Week (04/18/18) - Oregon Grew More Cannabis Than Customers Can Smoke...

Rolling Stone (04/17/18) – ‘LEED for Weed’ – Can Pot Growers Save Money by Going Green?

*All entities listed above were sourced from the OLCC list of approved marijuana licenses, which is a public document. We do not claim to have worked with, nor endorse any of the entities.