Overview of Webinar

• Neil - Energy consumption of cannabis and main energy efficiency opportunities
• Derek – state and local policies, benchmarking
• Jacob – voluntary standards, certifications
• Adam – Energy Trust EE program offerings
Energy Intensity of Indoor Cannabis Grows

- 10 x energy intensity (kWh/ft²) of typical SW office building
- 30-50% of the intensity of data centers
- Energy is 20-40% of total operating costs
Cannabis: 4% of Denver’s total electricity consumption; 0.1% for U.S.
Indoor Cannabis Energy Use

- Lighting: 55%
- Cooling: 25%
- Dehumid.: 10%
- Ventilation: 5%
- Misc.: 5%

Data: Energy Trust of Oregon
Stage 1
Germination

Stage 2
Vegetative

Stage 3
Flowering
<table>
<thead>
<tr>
<th>Stage of Growth</th>
<th>Vegetative</th>
<th>Flower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting per day</td>
<td>18 hr</td>
<td>12 hr</td>
</tr>
<tr>
<td>Duration of stage</td>
<td>2-3 weeks</td>
<td>7-11 weeks</td>
</tr>
<tr>
<td>Relative Humidity*</td>
<td>60-70%</td>
<td>40-60%</td>
</tr>
<tr>
<td>Percentage of Total Energy Use (per gram of product)</td>
<td>33%</td>
<td>60%</td>
</tr>
</tbody>
</table>
Metrics and Goals

\( \text{kWh/g} \) of dried flower - most meaningful metric for setting a goal or benchmarking
Design/New Construction vs. Retrofits
Lumens are for humans

PAR: photosynthetically active radiation

Photon efficacy: micromoles of photosynthetic photons per unit of energy input (Joules or kWh)
Double-ended HPS

LED
Stand-Alone Dehumidifiers
Chilled Water Systems

Advantages:
• Control humidity efficiently without stand-alone dehumid. units
• Water-side economizing/free cooling

Photo: Surna
Well-Designed and Operated Indoor Grow

- Lighting
- HVAC
- Controls
- O&M practices, employee training
- **Total energy savings of ~40% per g of flower**
Greenhouses

Energy savings of 60-70% compared to indoor grows (for Colorado)
Evaporative Cooling - Greenhouse

- Hot Ambient Air
- Evaporative Cooling Pad
- Cool air
- Fan
Midwest Regional Update

• MEEA is developing a **Midwest Cannabis Working Group**
  
  **Potential members:** utilities, local government, regulators, and grow facilities
  
  **Goals:**
  – Tailor EE programs and incentives
  – Create fair policies for connecting to the grid
  – Educate growers on EE and line extension process

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SWEEP report:
A Budding Opportunity:
Energy Efficiency
Best Practices for Cannabis Grow Operations

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