Cannabis Producer Energy Estimates

Presentation to Joint Task Force on Cannabis Environmental Best Practices

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Outline

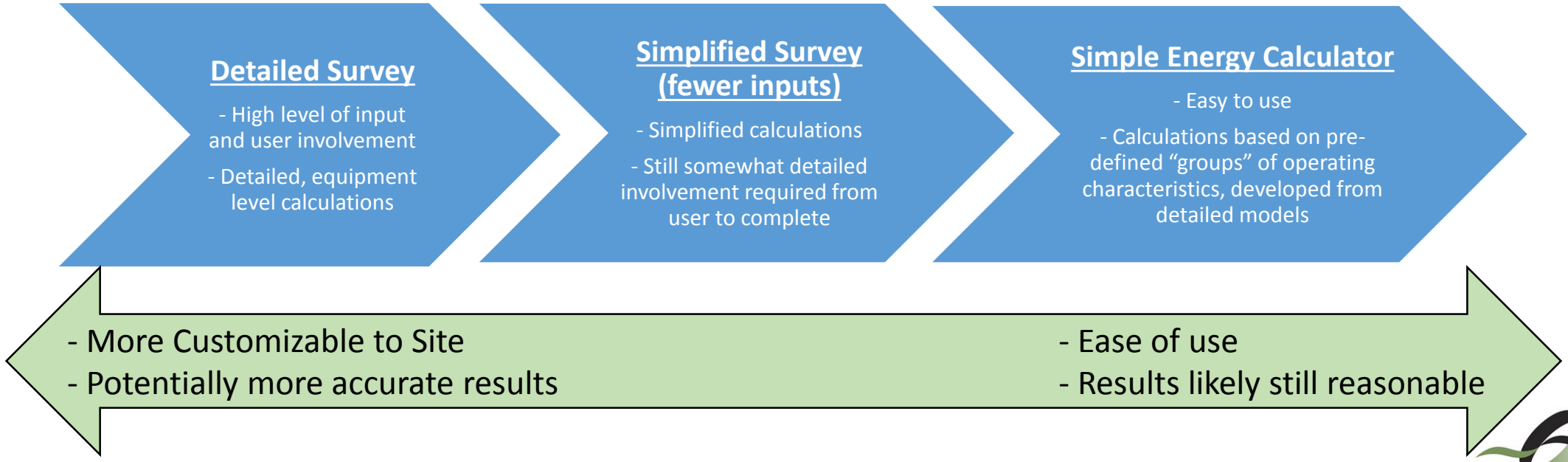
1. Background
2. Development of Indoor Cannabis Cultivator Energy Estimator
3. Analysis of Applicant Energy Estimates
4. Next Steps

Background

- Industry with largely unknown energy usage, and lack of comprehensive data across sector. Mostly anecdotal, with potentially wide variation
- Potential for energy-intensive operations, but also incentivized to reduce energy and operating costs to improve margins
- Energy intensity can vary widely between various grow operations and types
- Desire to better quantify and understand the energy usage of cannabis industry

Indoor Cannabis Cultivator Energy Estimator

- In response to a requirement for estimation of applicant energy usage, ODOE worked in collaboration with OLCC and industry workgroup to develop a tool to estimate the energy consumption of an indoor grow based on canopy size and general operating characteristics
- As with any calculator, there is a trade-off in simplicity/ease-of-use and ability to customize for specific characteristics
- The Calculator evolved:



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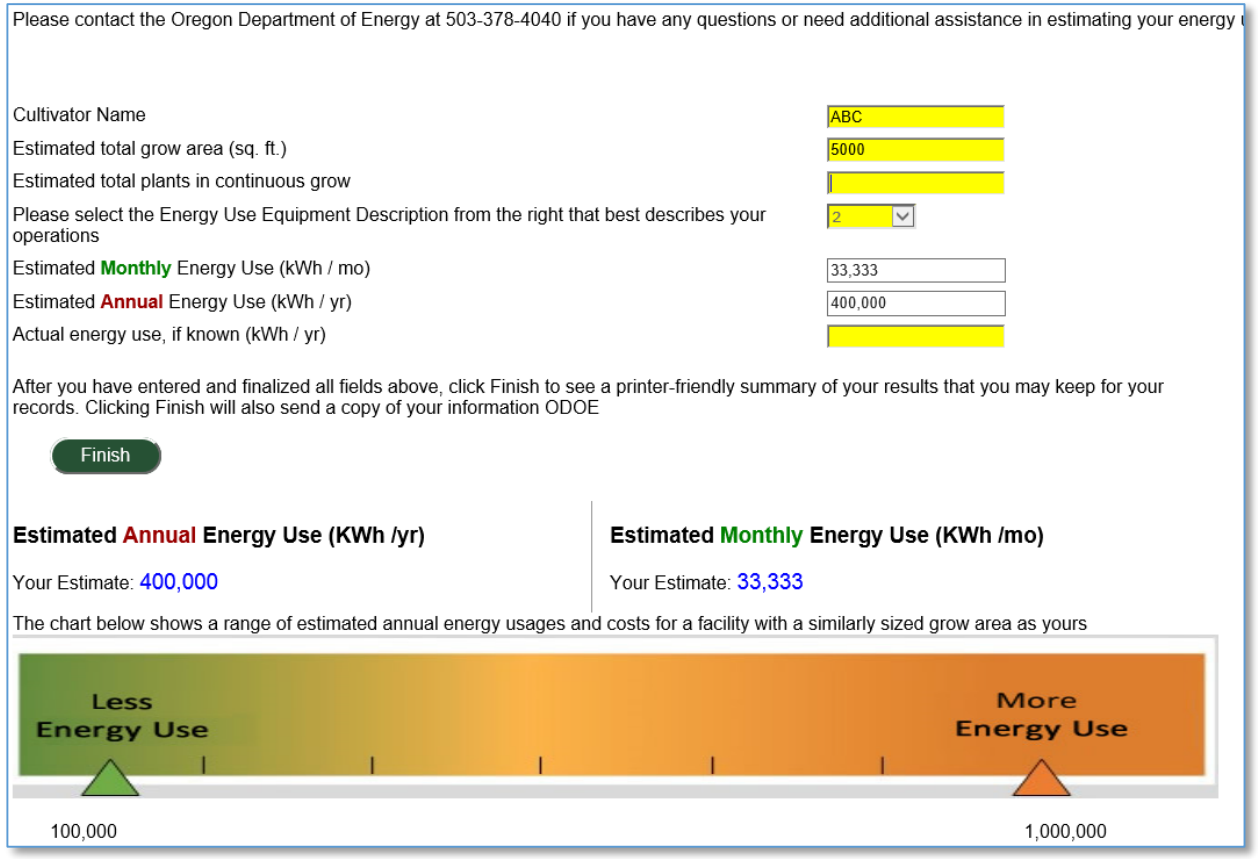
Indoor Cannabis Cultivator Energy Estimator

- Models showed a general range of 20 – 200 kWh/ft2, based on operational characteristics and equipment
- Based on canopy size, lighting density, and operating characteristics, indoor grow operations could be placed within one of four “buckets” across the spectrum of low to high energy usage
- Simplified user input – only need to input grow area square footage and select which of 4 “Equipment Descriptions” best match your operating characteristics (Low, Medium-Low, Medium-High, High)
- General estimate, but provided potential growers with a tool to estimate magnitude of electricity usage
- Could be supplemented or replaced with actual energy consumption, if numbers exist (preferred). Also, ODOE was available to assist if growers wanted a more detailed estimate of use



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Applicant Energy Use Estimate Analysis

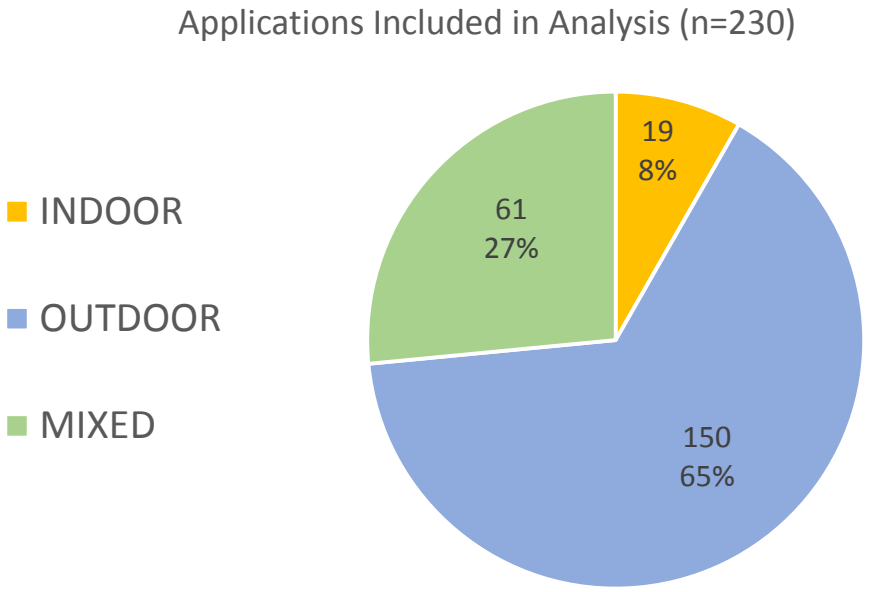
- ODOE has been working in collaboration with OLCC to manually harvest energy use data from Applicant forms
- Sample size of data analyzed (applicant counts as of 6/15/16, more data will be incorporated as it is available)
  - Grower applicant count: 736
  - Growers “assigned” by OLCC, processed, and given an Applicant ID: 387
  - Growers with both complete energy usage and canopy size: 230 *

* Some outliers removed due to energy estimates greatly outside of expected range.

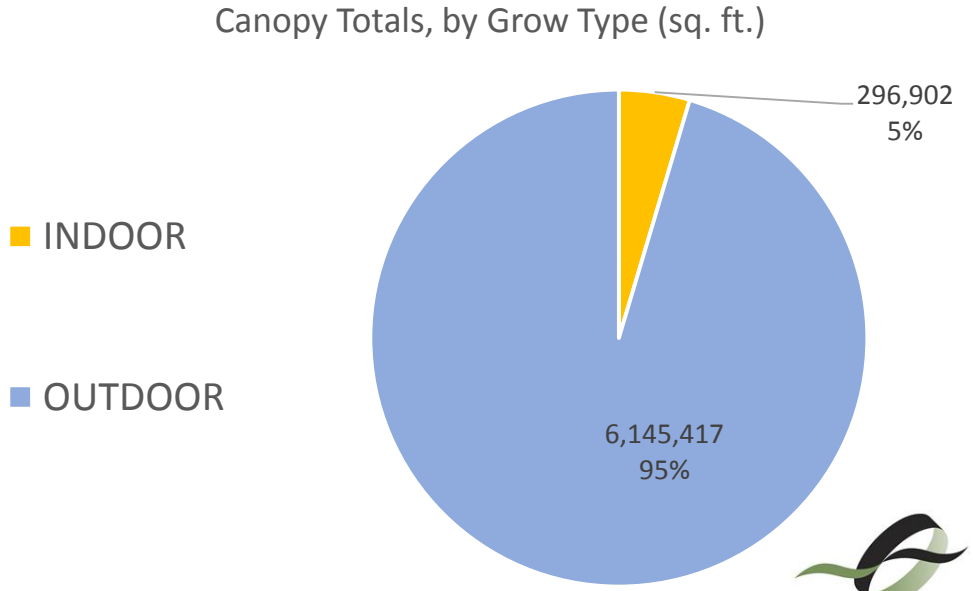
Applicant Energy Use Estimate Analysis

Production Type – Indoor vs. Outdoor

Majority of applications are classified as “Outdoor” grow



Similarly, the great majority of canopy square footage is related to outdoor grow



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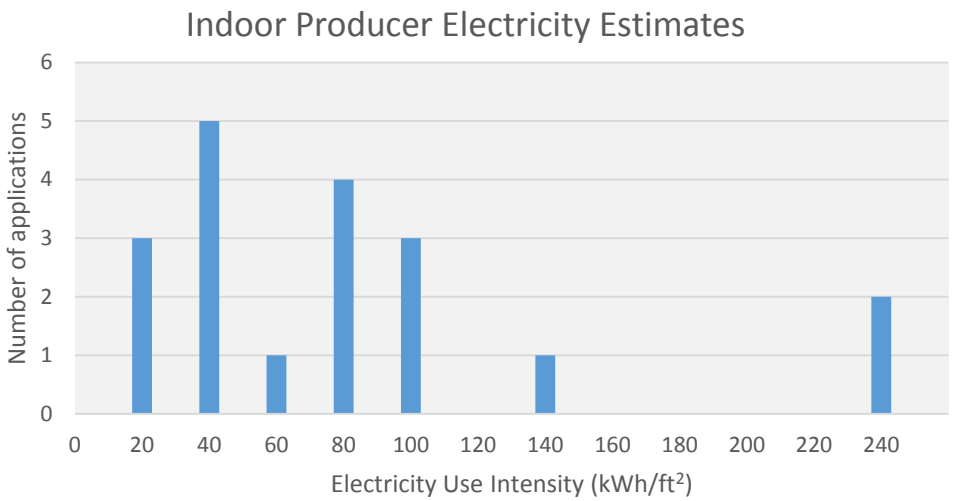
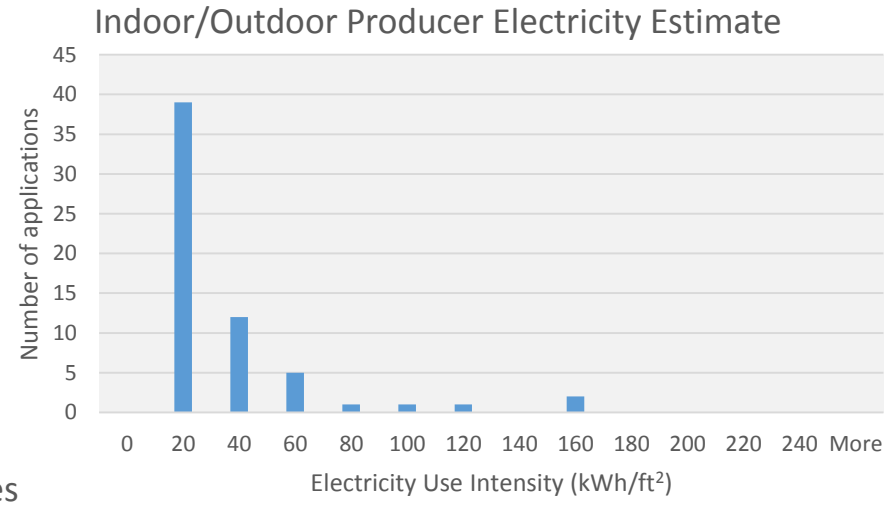
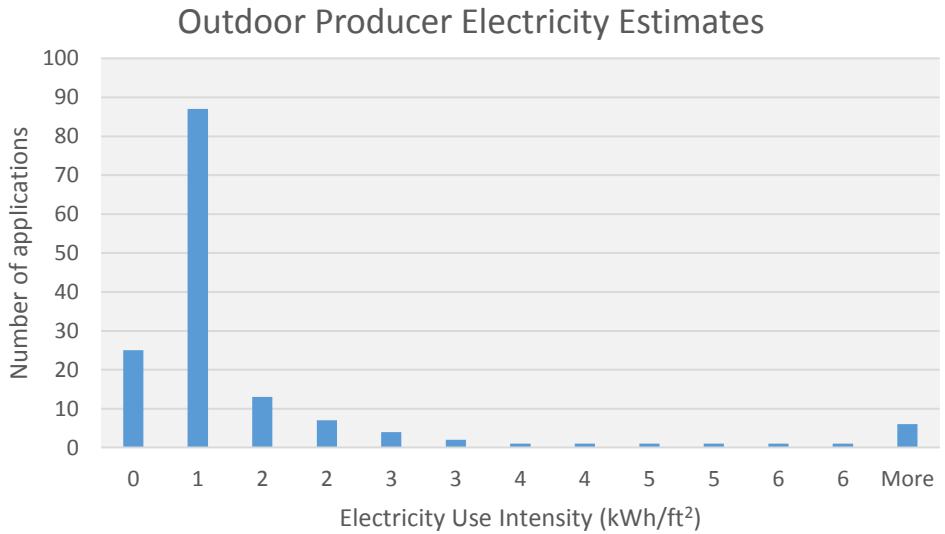
Applicant Energy Use Estimate Analysis

Energy Use Intensity (EUI), kWh/ft2/yr across Production Types







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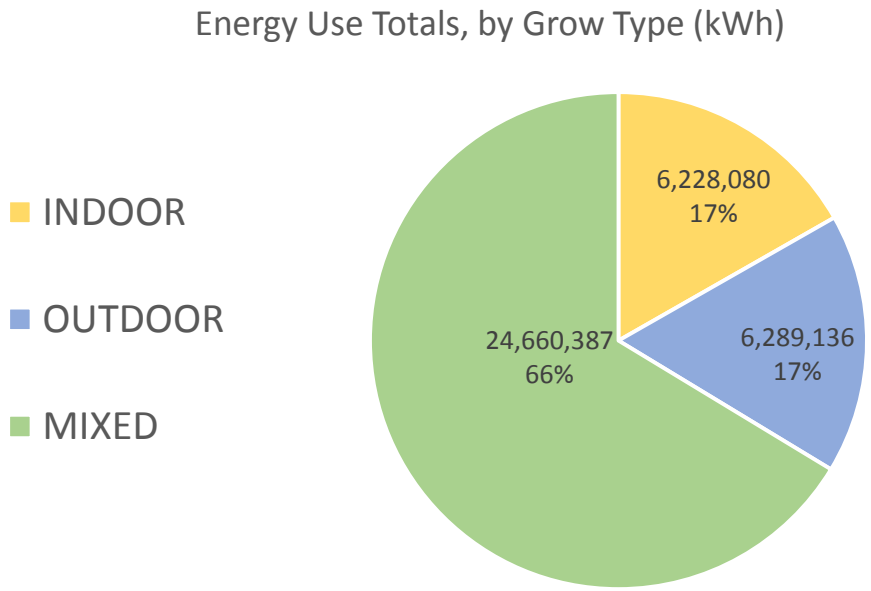
Applicant Energy Use Estimate Analysis

kWh Totals



	INDOOR	OUTDOOR	MIXED	TOTAL
Count	19	150	61	**230**
Electricity (kWh)	6,228,080	6,289,136	24,660,387	**37,177,603**
Indoor Canopy	108,195	0	188,707	**296,902**
Outdoor Canopy	0	4,987,763	1,157,654	**6,145,417**
Total Canopy (ft2)	108,195	4,987,763	1,346,361	**6,442,319**
kWh/ft2	58	1.26	18	**6**
aMW	0.71	0.72	2.82	**4.2**

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Applicant Energy Use Estimate Analysis

- How much is 37,000,000 kWh?
  - About 0.08% of Oregon annual electricity usage
  - Approximately equivalent to a large hospital

- Potential to scale up analysis to full amount of expected grower applicants (700+ currently)

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Next Steps

- ODOE will continue to work with OLCC to harvest data from remainder of applications and analyze the data for energy usage characteristics and trends
- Future reporting after Year 1 and beyond of **actual** electricity consumption will be critical for analysis and benchmarking
- Actual data will provide a great opportunity to compare estimates vs. reality and refine models
- ODOE, OLCC, ETO, and other industry personnel are currently working with Northwest Power and Conservation Council to develop and distribute a detailed survey to better understand specific operating characteristics of growers in Oregon

Thank You

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