Clearing the Smoke: The Energy Implications of Legalized Cannabis Cultivation

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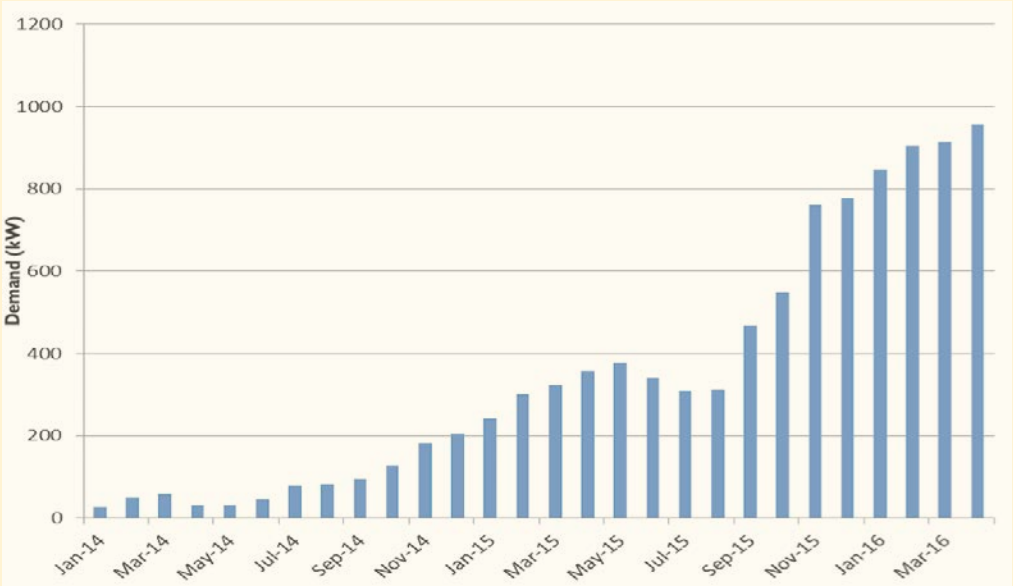
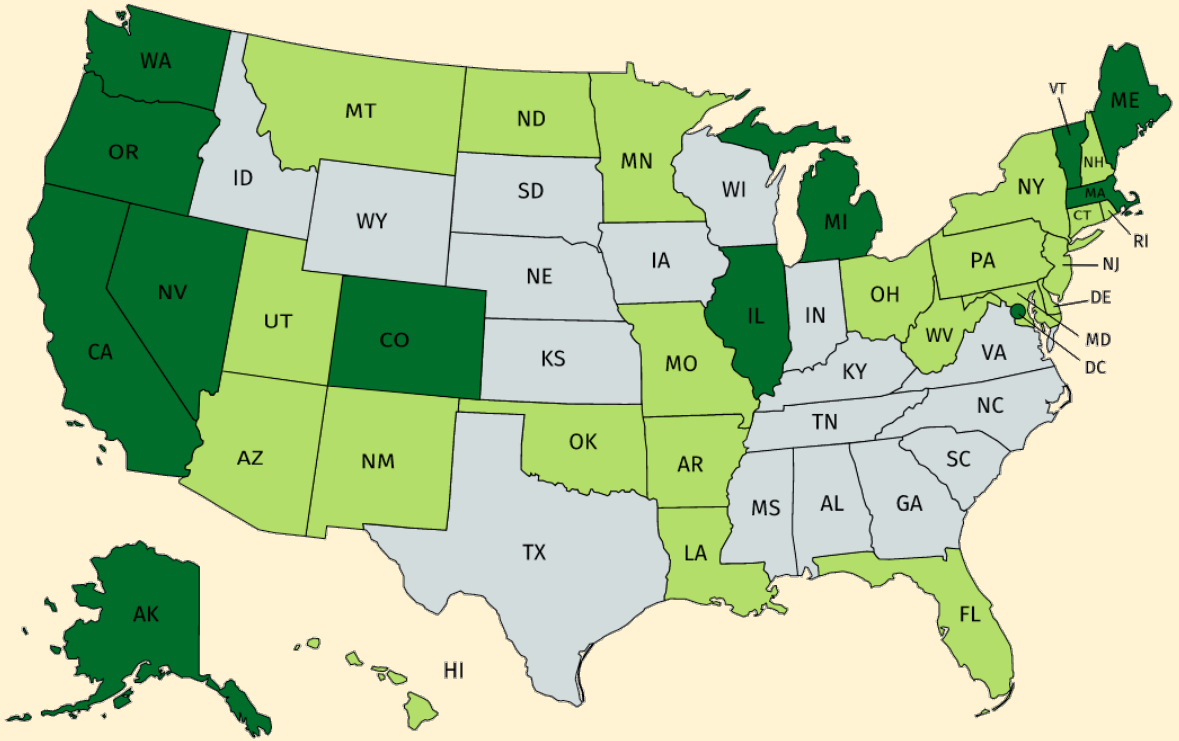
Cannabis at IEPEC?

"After legalization, we were expecting to see a 10% increase over time from cannabis. Instead, we saw a 62% growth in energy demand in the first three months."



Current Landscape



Energy Implications

Indoor cultivators consume significant amounts of energy through lighting and HVAC

- Traditional HID lighting: 1000W
- Run times 18-24 hours a day
- 1-3% of total electric usage

Emergence of LEDs

+ Consume 40-60% less energy
+ Require little or no cooling and venting
+ Can be configured closer to plants

- Higher initial price point
- Require alternative growing techniques
- Stigma of lower quality product

Research Topics

- Grow configurations
- Lighting market characterization
- Grower preferences and purchasing habits
- Energy implications and utility strategies

Key Findings

Growers

- Preferences and decision making
- Non-energy benefits
- LED receptiveness

Equipment

- Lighting market characterization
- Lighting purchasing channels
- Ancillary products

Key Findings

Growers

Grower Preferences

Indoor

- **58%** Weather
- **42%** Security /privacy

Outdoor

- **72%** Operating costs
- **42%** Space constraints

Greenhouse

- **56%** Weather
- **44%** Operating costs

Color spectrum (4.3) and **Energy efficiency (4.0)** most important factors for selecting lighting types

LED Receptiveness

Then…

- Strong grower biases against LEDs
- Lack of experience with LEDs
- Less than 10% adoption rate

Now…

- Increased awareness of LEDs
- Market actor-reported increase in receptiveness
- High adoption rate; 50% of survey respondents

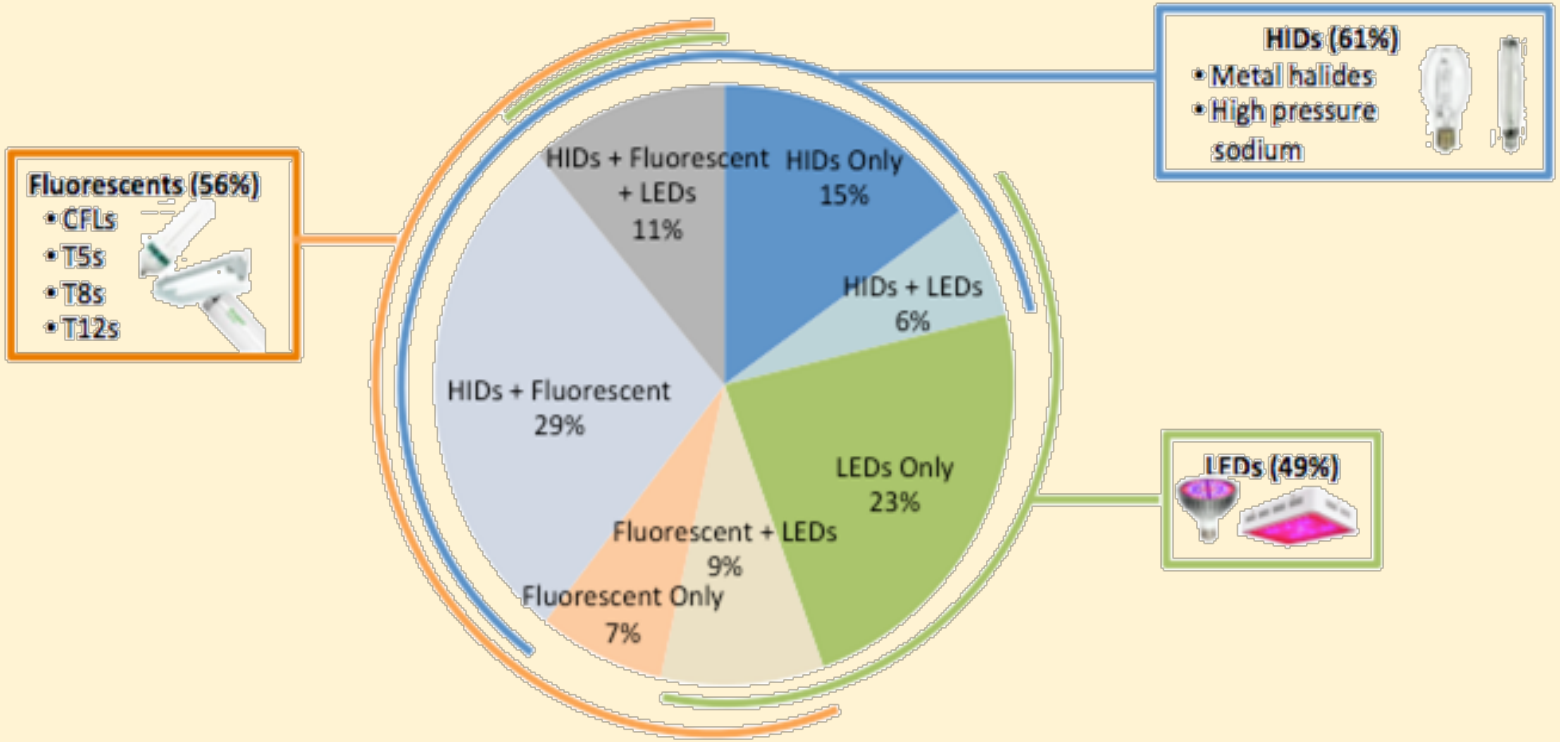
Non-Energy Benefits

- Maintenance costs
- Product quality/THC concentrations
- Vertical expansion
- Reduced temperature

Key Findings

Equipment

Lighting Market Characterization



Purchasing Channels

For OR retailers, **74%** of 2017 lighting sales were from HIDs compared to **17%** from LEDs.

LED purchasers typically…

- Special order through retailer
- Order online – **58% of surveyed growers**
- Order directly through distributor/manufacturer

Future Market Trends

- Expectations for cannabis markets to grow; consolidate long term
- Emergence of PAR and PPFD
- Adoption of Ceramic Metal Halide (CMH)
- Lower costs for LEDs

Recommendations for Program Design

Growers using LEDs may be only using these for some of their plants or for only a portion of the growing cycle

Majority of LEDs purchased online versus a traditional retailer

Distinguish between recreational and medical use residential growers; include incentives for medical growers

Provide case studies and resources for growers to learn about energy efficiency

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