

Customer-Side Management In the Budding Cannabis Sector

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2018 Midwest Energy Solutions

Presentation Outline

The Customer

Operational Priorities

Business Priorities

Energy Priorities

Utility Programs

A New Kind of Customer



The Hippie Farmer

- Portland, OR
- Fully indoor operation
 - ~ 30,000 sq-ft canopy
 - All artificial lighting
- Succeeded in medical market, moved over into recreational
- Motivated to ***legitimize the industry***



The Compassionate Investor

- Denver, CO
- Fully indoor operations (x3)
 - ~ 10,000 sq-ft canopy
 - All artificial lighting
- Succeeded in medical market, moved over into recreational
- Very motivated to ***repay investors fast***



The Big-Pharma Businessman

- Boston, MA
- Fully indoor operation
 - ~ 100,000 sq-ft canopy
 - All artificial lighting
- Brand new entry, going directly to hyper-controlled facility
- Motivated to ***closely control output***



The Cottage-Industry Grower

- Tucson, AZ
- Fully indoor operation
 - ~ 8,000 sq-ft canopy
 - All artificial lighting
- Grew illegally for years, then moved to medical market
- Motivated to ***do good & do well***



The Farming Pharmacist

- San Francisco, CA
- Indoor & outdoor operations
 - ~ 10,000 sq-ft canopy
 - Artificial & natural lighting
- Grew illegally for years, then moved to recreational market
- Motivated to ***make good medicine***

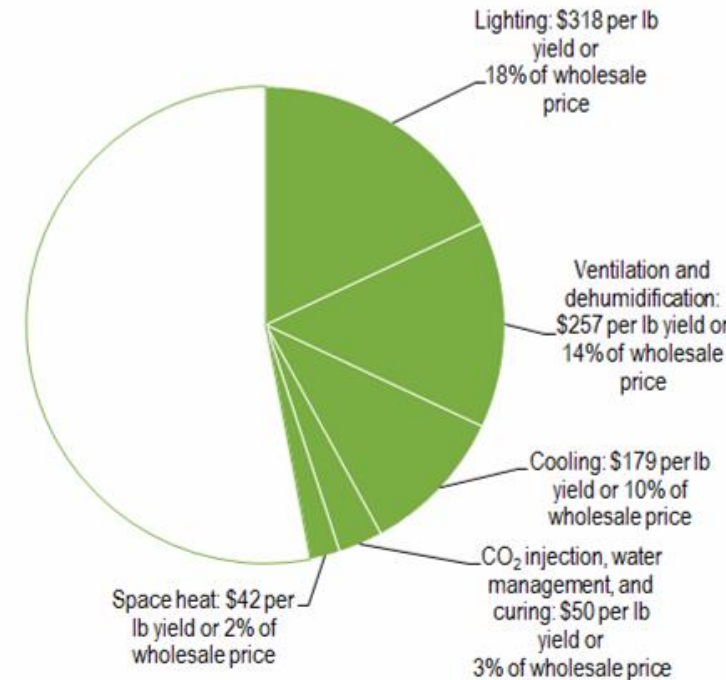


Similar Priorities, Very Different Facilities

- Facilities are very diverse, even internally; no facility will be filled entirely with mature plants
- Vertical integration of producers
→ more energy
 - Processing, extraction, and packaging use energy
- Different end-use products, different operations
 - Strain differences
 - Quality requirements
 - Output metrics
- Moving into greenhouse or outside isn't a "no brainer;" consider other factors (policies, pest control, cycles per year)
- Switching to LEDs requires change in operations
 - Watering
 - Scheduling
 - Grow time
- Security concerns
- Compliance

The Business Prospects Have Changed Quickly

- Mills & Zeramby estimated energy costs to be almost 50% of the total cost of production
- Growers consistently told us that energy was **20 – 30%** of their cost to produce
- Costs have come down a lot



Notes: CO₂ = carbon dioxide; kWh = kilowatt-hour; lb = pound.

© E Source; data from Evan Mills, "The Carbon Footprint of Indoor Cannabis Production," *Energy Policy*, v. 46 (2012)

Efficiency Is Important, But Not Critical (Yet)

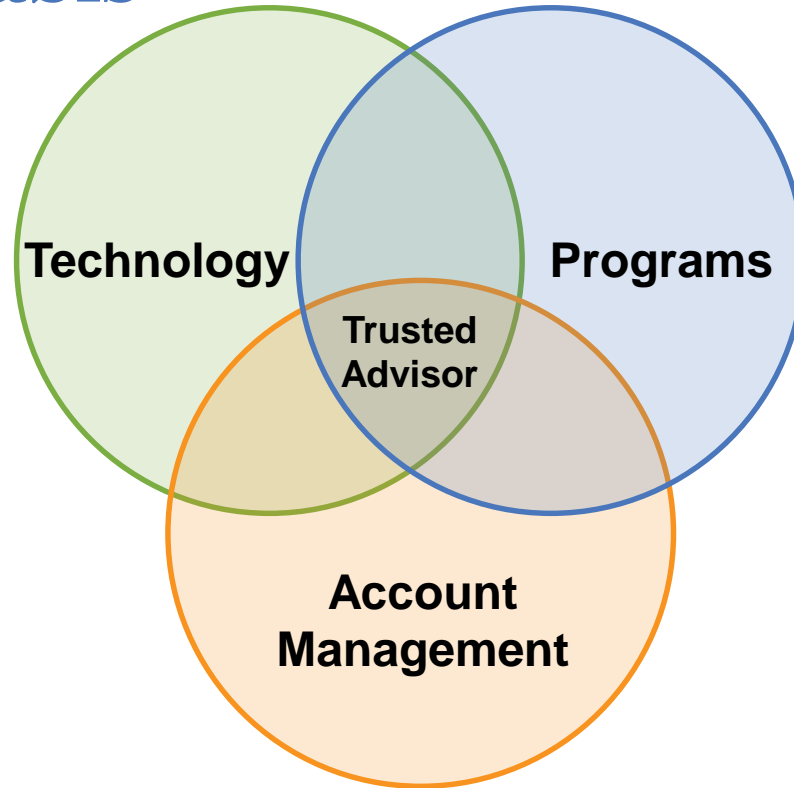
“Our cooling system is far from optimized, and we are very aware of that, but we are stuck with it for now.”

“We’re very interested in installing LEDs in the whole facility. We have some, and see them as the future in lighting. We just don’t think they’re fully ready yet.”

“Energy waste is the cost of doing business. Bottom line.”

The Role Utilities Can Play in Cannabis

- Lighting
- Dehumidification
- Heating
- Cooling



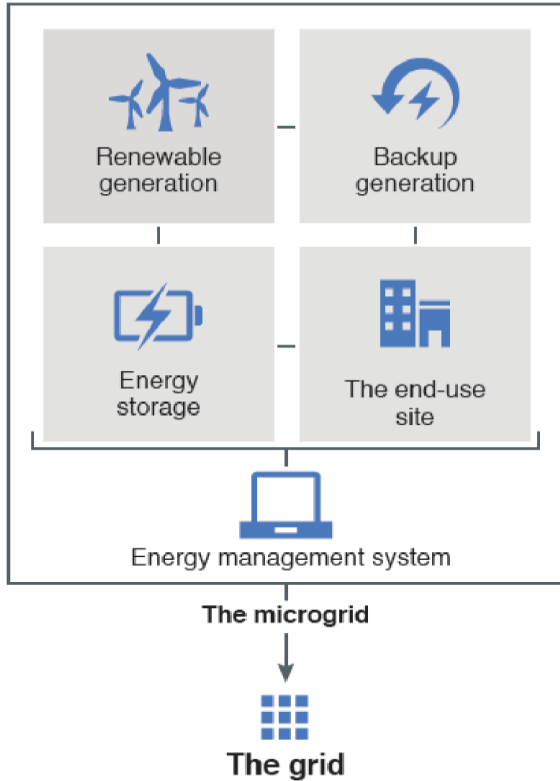
- EE upgrades
- Demonstration projects
- Existing rebates
- Cannabis-specific programs

What Utilities In Legal States Are Doing So Far

Program administrator	State	Example incentive amounts	Source
Avista Utilities	Washington	\$163,000 for 560 LED fixtures	Utilities Struggle to Control Appetites in Energy-Hungry Marijuana Industry
Energy Trust of Oregon	Oregon	Projects range from \$15,000 to \$80,000	Pot Is Power Hungry: Why the Marijuana Industry's Energy Footprint Is Growing
Puget Sound Energy	Washington	\$90,000 for 100 LED fixtures	Where Marijuana Plants Flourish Under Energy-Saving LED Lights
Seattle City Light	Washington	\$100,000+ for 100 LED fixtures	Pot Is Power Hungry: Why the Marijuana Industry's Energy Footprint Is Growing
Xcel Energy	Colorado	Less than \$270,000 total paid in 2015	Colorado Struggles with Marijuana's Huge Carbon Footprint

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Looking Forward



THE CANNABIS POWERSCORE™

Now in beta release and ready for your feedback



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Courtesy: Resource Innovation Institute

Thank You!



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