



RESOURCE
INNOVATION
INSTITUTE

Can we grow more food with less resources?

 Bluelab

May 26, 2021

Agenda

About Resource Innovation Institute (5 minutes)

USDA project: *Data-Driven Market Transformation for Efficient, Sustainable CEA* (5 minutes)

Validating performance with PowerScore (10 minutes)



ABOUT US

About RII

Objective, data-driven non-profit

Founded 2016 in Portland, Oregon

Expertise in climate policy, utility programs,
green building certification, sustainable
business, construction & indoor cultivation



ABOUT US

Vision & Values

Vision:

Resilient harvests for the next hundred years.

Values:

- Agility
- Transparency
- Community
- Transformation



What We Do / Our Mission

We lead the measurement, adoption & celebration of the world's most efficient agricultural ideas.



Measurement

Efficiency & Productivity

- Key Performance Indicators
- Energy, Emissions, Water, Waste
- Benchmarks & Baselines



Adoption

Best Practices & Standards

- Training
- Policies
- Utility Programs



Celebration

Leadership Recognition

- Verification
- Case Studies
- Certification

ABOUT US

Our Growing Team

**Derek Smith****EXECUTIVE DIRECTOR &
BOARD MEMBER**

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**Gretchen
Schimelpfenig****TECHNICAL DIRECTOR &
DIRECTOR OF OPERATIONS**

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**Dulce Dorado****FINANCE / HR MANAGER**

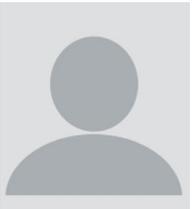
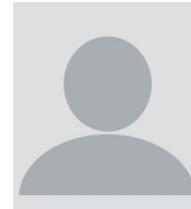
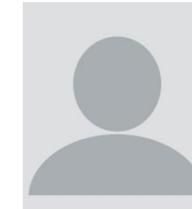
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**Brandy Welvaert****COMMUNICATIONS &
COMMUNITY MANAGER**

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**Morgan Lesko****SENIOR SOFTWARE
DEVELOPER****Producer Services
& Benchmarking****TARGET TO BE HIRED SUMMER****Government &
Utility Services****PLANNING FOR 2021-2022****Excellence
Network****Certification****TO BE HIRED 2022+**

ABOUT US

Our Network



nationalgrid



Efficiency
Vermont



f'fth
season
CONNECTION



ABOUT US

Technical Advisory Council

Multi-disciplinary body who aggregates knowledge to support producers and other stakeholders with objective and peer-reviewed data and curriculum on benchmarking resource efficiency

- Guides development of standards
- Shapes tools and resources to support best practices
- Advocates for informed policies, incentives and regulations

HVAC - Lighting - Utility - Water - Policy - Data - Controls

2021

Emissions - Facility Design & Construction



ABOUT US

Educating the Market



Best Practices
Guides



Primers*



Quarterly
Reports*



Media Partnerships



Controls & Automation Best Practices Coming in July!

*membership required to access

ABOUT US

Training the Market

Continuing Education Platform

- Live events and on-demand recorded content featuring subject matter expert speakers
- Virtual classrooms for diverse learners
- Distribution channels through partners



<p>Producers</p>	  
<p>Utilities & Programs</p>	   
<p>Design & Construction</p>	  

ABOUT US

Services for Producers

- **Facility performance** benchmarking aligned with industry-standard KPIs on energy, water & waste
- **Portfolio-level “digital” facility audits** to enable comparative rankings of cultivation assets on efficiency and productivity for MSOs and investors
- **ESG reporting** support
- **Thought leadership** opportunities to be featured in case studies and conference presentations
- **Guidance** on how to maximize incentives and support from utilities and governments



Energy Efficiency		
Facility	2,510 kBtu / sq ft	██████████
HVAC Efficiency	307 kBtu / sq ft	██████████
Water Efficiency		
Water Facility	114 gal / sq ft	██████████
Water Productivity	2.97 g / gal	██████████
Waste Efficiency		
Waste Facility	1.45 lbs / sq ft	██████████
Waste Production	235 g / lbs	██████████



ABOUT US

Recent Activities

- Held Indoor Agriculture Energy Solutions conference bringing together CEA producers, utilities, govts
- Supported Massachusetts cultivators with best practices guidance on complying with energy laws
- Advised utility how to incorporate non-energy benefits (e.g., quality) into their CEA program offerings
- Held largest event ever last month: 400+ registrants for Harvesting Savings workshop on dehumidification



ABOUT US

Strategic Advisory Council

The Strategic Advisory Council of Resource Innovation Institute guides RII's strategic plan to develop data-driven standards to advance agricultural resilience and recognition for leading producers.



Equilibrium Capital



wbcasd



WWF



Grodan®


 FORD
FOUNDATION

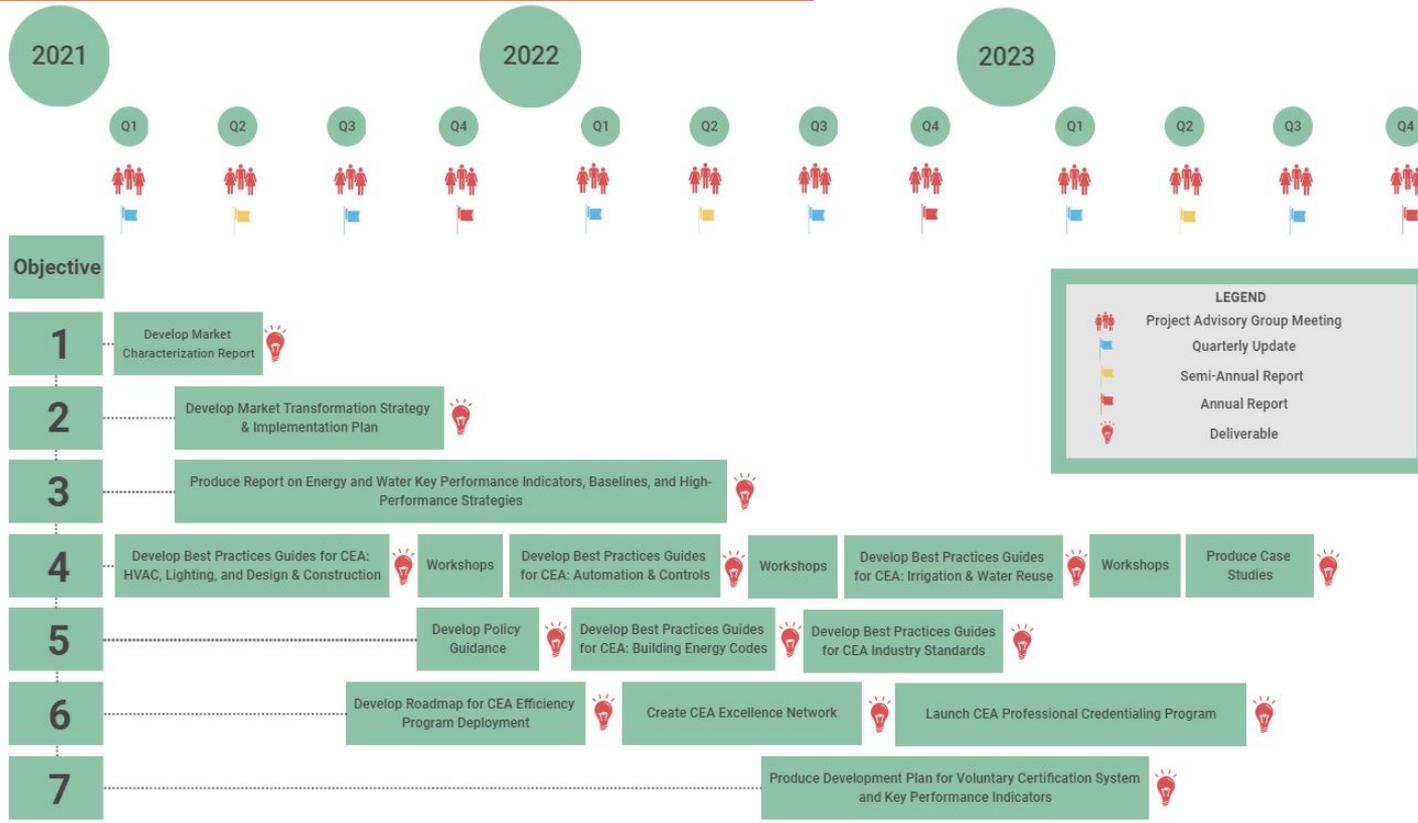



SECTION 02

USDA PARTNERSHIP: DATA-DRIVEN CEA

ABOUT US

USDA Market Transformation for Efficient, Sustainable CEA



CEA Leadership Committee / USDA Project Advisory Group

Kyle Booth	Energy Solutions
Chris Callahan	UVM Extension Services
Lisa Causarano	Schneider Electric
Jeff Clarke	EnviroAir Industries & ASHRAE Board
Darrin Drollinger	ASABE
Rob Eddy	CEA Consultancy
Molly Graham	Midwest Energy Efficiency Alliance
Josh Holleb	Ceres Greenhouses
Phil Johnson	Grodan
Blake Lange	Signify
Damien Markiewicz	Resource Innovations
Jeff Stone	Oregon Association of Nurseries
Grant Vandenbussche	Fifth Season
Jan Westra	Priva
Corinne Wilder	Fluence By OSRAM
Mike Zartarian	Zartarian Engineering



You are Invited to Become a USDA Pilot Partner

Pilot Partners are asked to:

- **Advise** on desired benchmarking user experience
- **Provide energy usage** and production data into PowerScore platform
- **Be publicly transparent** about some data, TBD by mutual agreement

Pilot Partners receive thought leadership & operational value:

- **Recognition** as an RII member
- **Case studies** on cultivation facilities - To be socialized in a variety of channels
- **PowerScore Performance Snapshot** - Overview of your operational performance relative to a range of KPIs addressing energy, emissions, water and waste
- **Producer Resource Efficiency Plan** - Recommendations on increasing efficiency and productivity



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SECTION 03

POWERSCORE BENCHMARKING

How We Turn the Sustainability Vision of CEA Into Reality

Three approaches, all part of the puzzle:

1. **Vision** - What is possible?
2. **Model** - What can we predict?
3. **Measure & Verify** - What actually happened?



Don't Overlook the G in ESG!

Governance relies on data:

1. **Standardized** - How is my operation performing year over year?
2. **Comparable** - How does it compare to others?
3. **Trusted** - Is it verifiable?



Equilibrium Capital

TRESS
CAPITAL

 **POSEIDON**
ASSET MANAGEMENT

The Path to Efficiency, Productivity & Profitability Starts with Benchmarking



The Environmental Protection Agency reports that commercial building owners who benchmark their buildings year over year achieve an average of **2-7% energy savings**.



How Competitive is Your Facility?

Not-for-profit benchmarking platform enables year-over-year performance rankings for *production environments and research chambers* based on industry standard KPIs for resource *efficiency and productivity*

- Energy kWh / sq ft or sq m
- Energy grams / kBtu
- Water gallons / sq ft or sq m
- Water grams / gallons or litre
- Emissions kg CO₂e / sq ft or sq m
- Waste lbs / sq ft or sq m



Energy Efficiency

Facility	3,130 kBtu / sq ft		40 th percentile
Electric Facility	976 kBtu / sq ft		37 th percentile
Non-Electric Facility	2,160 kBtu / sq ft		40 th percentile
Production	0.0333 g / kBtu		50 th percentile
Electric Production	0.107 g / kBtu		31 st percentile
Non-Electric Production	0.0483 g / kBtu		25 th percentile
Lighting Efficiency	6,040 kWh / day		12 th percentile
HVAC Efficiency	307 kBtu / sq ft		60 th percentile

Secure

To ensure the highest level of data protection, RII has engaged Management Science Associates (MSA), global leaders in data security and analytics, with expertise in HIPAA compliance and benchmarking for associations in the fields of pharmaceuticals, tobacco and industrial sectors.

Together, with producers, investors and supply chain partners, we are developing confidentiality protocols that clearly define access, use and ownership of data.



Vetted

RII's Technical Advisory Council of supply chain leaders built and has relied upon PowerScore for years to support their producer customers in assessing and validating of the efficiency performance of their indoor cultivation environments.



“PowerScore was designed with growers for growers. We leverage it to help our customers pinpoint their efficiency opportunities.”



Trusted

Supported by USDA to establish CEA KPIs, benchmarks and building rating system

Funded by Massachusetts Dept. of Energy Resources to support producers with energy and water reporting compliance

350+ producer users to date



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What Aggregate Benchmarking Data is Teaching Us

Cultivator preferences drive variable performance

Greenhouse CO2e performance vulnerable to location

Technologies are being validated

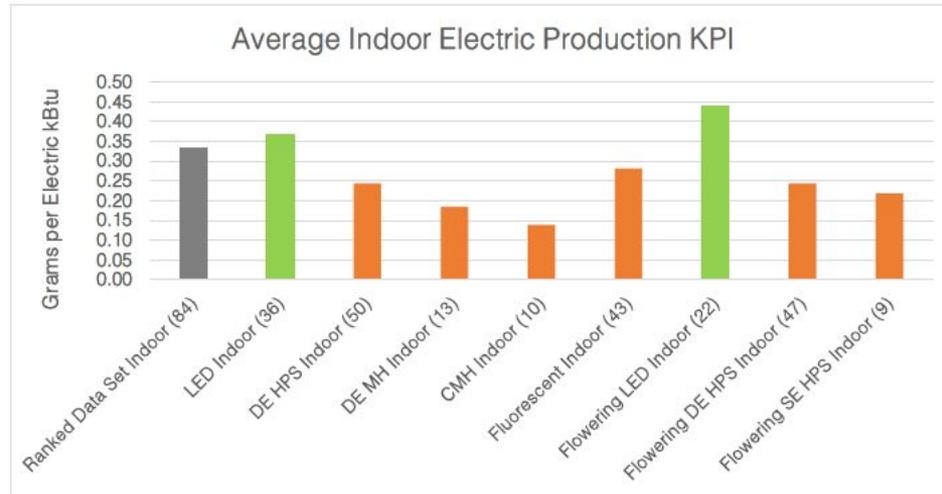


Figure 3. Average Electric Production Efficiency of Indoor Cannabis Operations in PowerScore's Ranked Data Set

We Have Data; We Just Need to be Smarter with It



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Thank You!

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