FIRSTFUEL
BUILDING ENERGY ANALYTICS

Michigan EO Collaborative

Using Meter Data Analytics to Promote Efficiency

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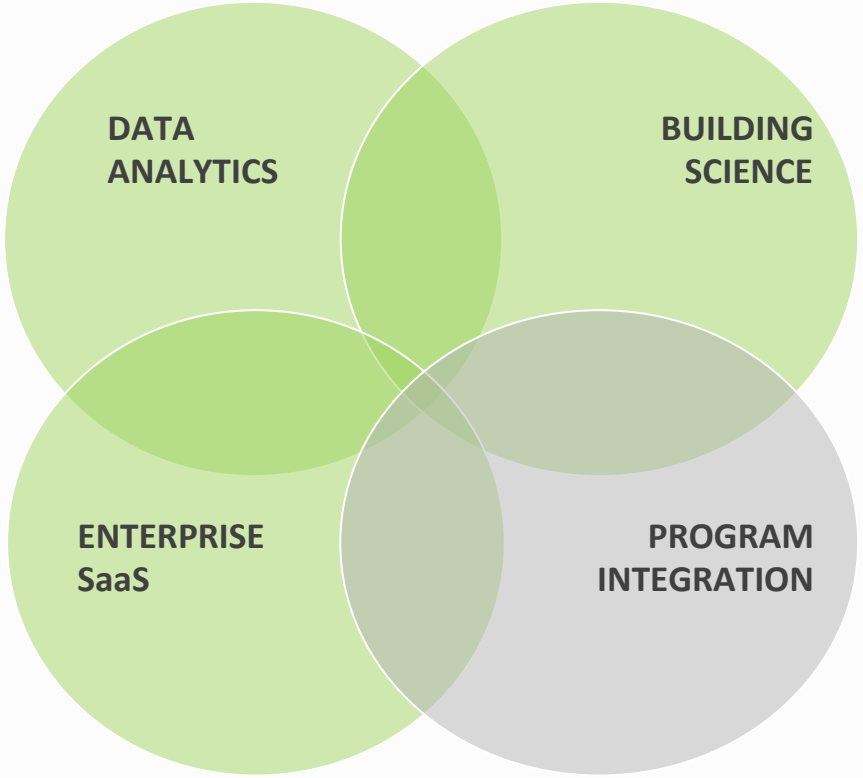
AGENDA

- FirstFuel Overview
- EE Challenges & Opportunities
- Innovative Program Design
- Future Implications

FIRSTFUEL IS AN ENERGY INFORMATION SERVICES COMPANY

Harnessing the power of **customer meter data** to **accelerate and scale** commercial energy efficiency via **'zero-touch' analytics**



- Backed by World-Class Investors (Battery Ventures, E.ON, etc)
- Deployed at nearly 20 large North American utilities and government agencies
- Deep, foundational expertise in analytics, building science, and SaaS disciplines

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LEVERAGING ANALYTICS TO ACCELERATE ENERGY SAVINGS DELIVERY

1

LIMITED INPUTS

From utility

Building address

1 yr electric meter data

From FIrstFuel

Local weather data

GIS Mapping/ Semantic Search

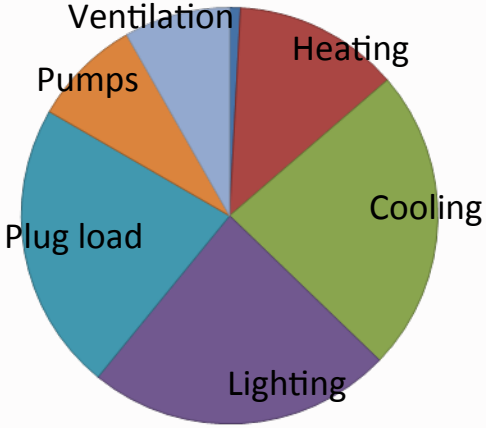
2

FIRSTFUEL ANALYTICS

Remote Building Analytics (RBA) platform

3

INSIGHT & EFFICIENCY



Example: End Use Breakdown

EVERY BUILDING'S DATA TELLS ITS OWN STORY

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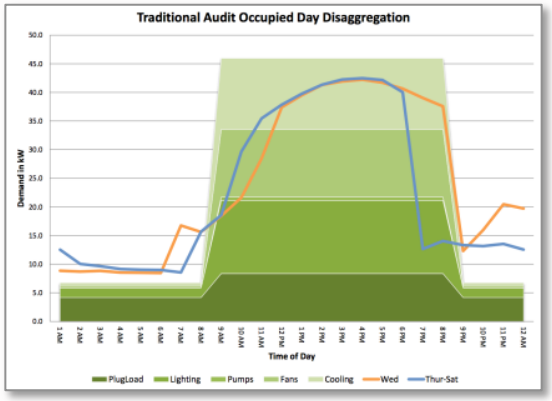
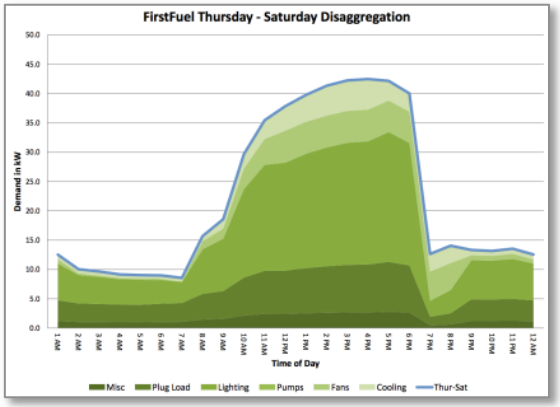
PG&E – SCALED FIELD PLACEMENT

ETCC 6-Month Successful Validation

*"FirstFuel has demonstrated itself as a **viable solution** to help automate the screening and auditing process."*



Traditional Audit



FirstFuel Audit

FIRSTFUEL vs ONSITE AUDITS		
END USE DISAGGREGATION	• **48 of 49** end-uses within margin of error	***"[FirstFuel's] method of hourly accounting improves the quality of the estimates."***
RECOMMENDATIONS & SAVINGS ESTIMATES	• **Within 7%** of onsite savings estimates • Found additional RCx measures	***"…able to identify and quantify operational ECMs that on-site audits typically miss"***
SPEED & SCALE	• **3x+ faster** than onsite audits • Study did not include elapsed time, scheduling or travel time	***"…audits require the time intensive and intrusive step of contacting building staff…[FirstFuel's] audit is completed without contacting the building staff."***

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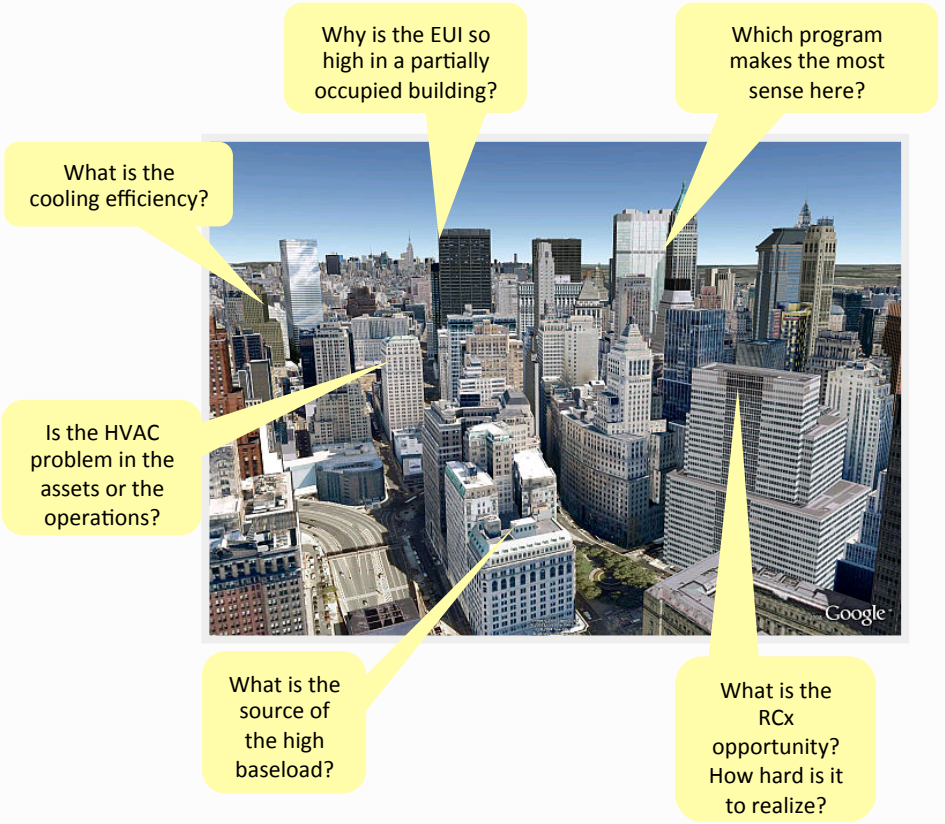
THE CASE FOR UTILITIES

THE CHALLENGES FOR UTILITY EFFICIENCY ARE RELATED TO SCALE…

- Increasingly aggressive EE goals
- Target and engage large, medium, and small businesses
- Identify new sources of EE savings
- Deploy a broad array of newly available technologies
- Track and attribute savings over time

…AND REQUIRE CONSISTENT, ACTIONABLE ENERGY INFORMATION



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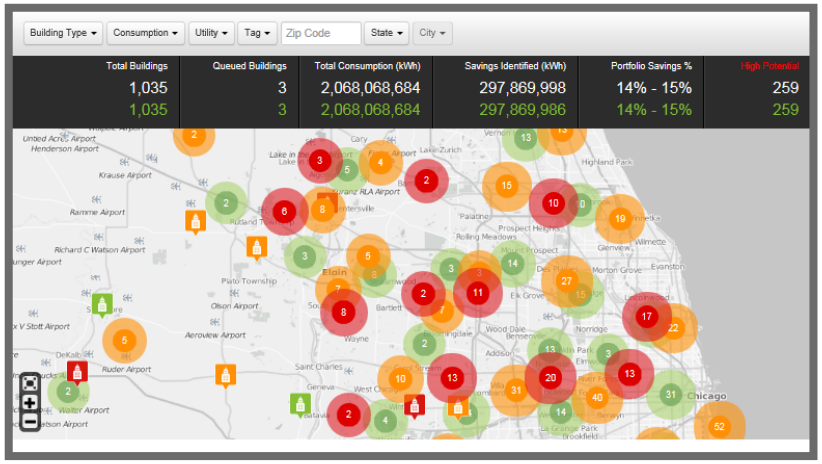
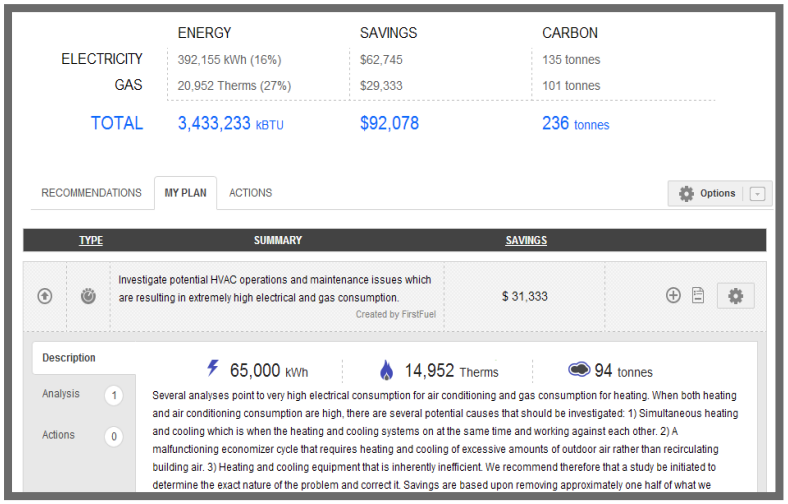
HOW ANALYTICS CAN TRANSFORM LIFECYCLE OF EFFICIENCY



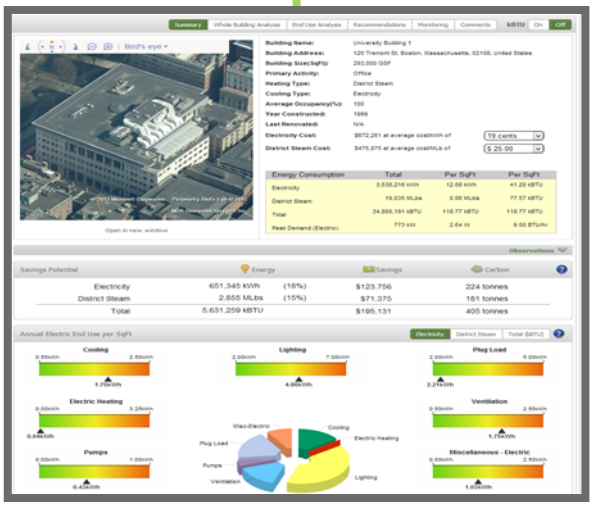


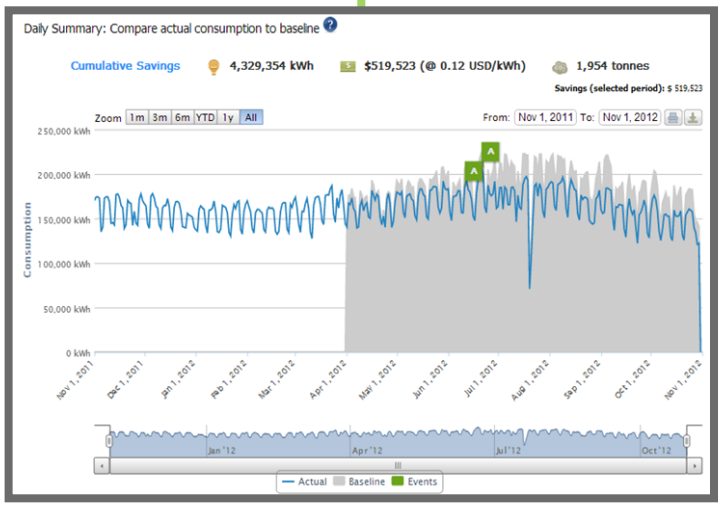
SCREEN PORTFOLIO

CONDUCT REMOTE AUDITS

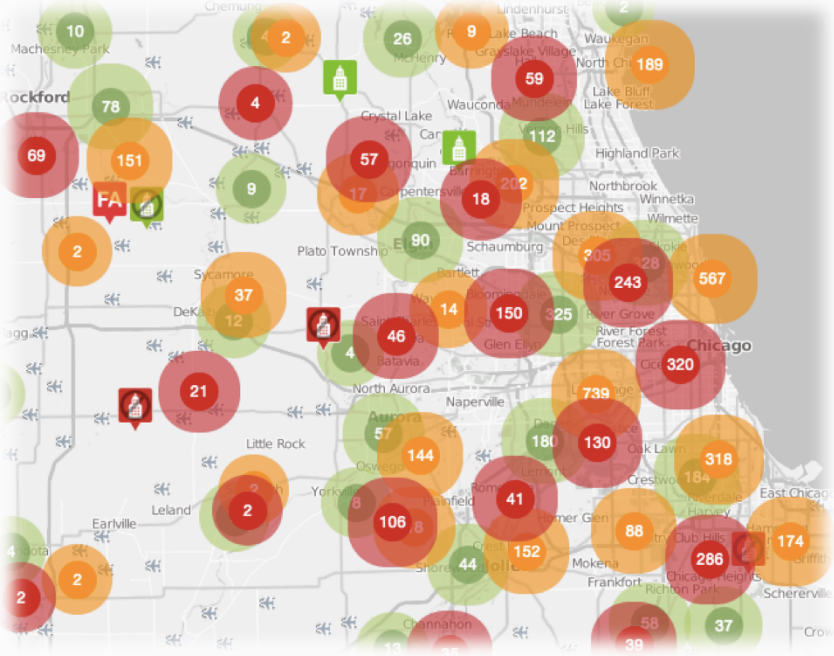
ENGAGE AND IMPLEMENT

MONITOR SAVINGS





THE MICHIGAN OPPORTUNITY



MI Reference 2012 Actual Energy Savings: 1,096,689 MWh

Analytics-Enabled Opportunity

- 2,000 Commercial Buildings X 10% Operational Savings =
- 250,000 MWh Identified (23% of Goal)

WHAT CAN FIRSTFUEL'S RICH DATABASE TELL US ABOUT THE MOST EFFICIENT PATH TO SAVINGS?

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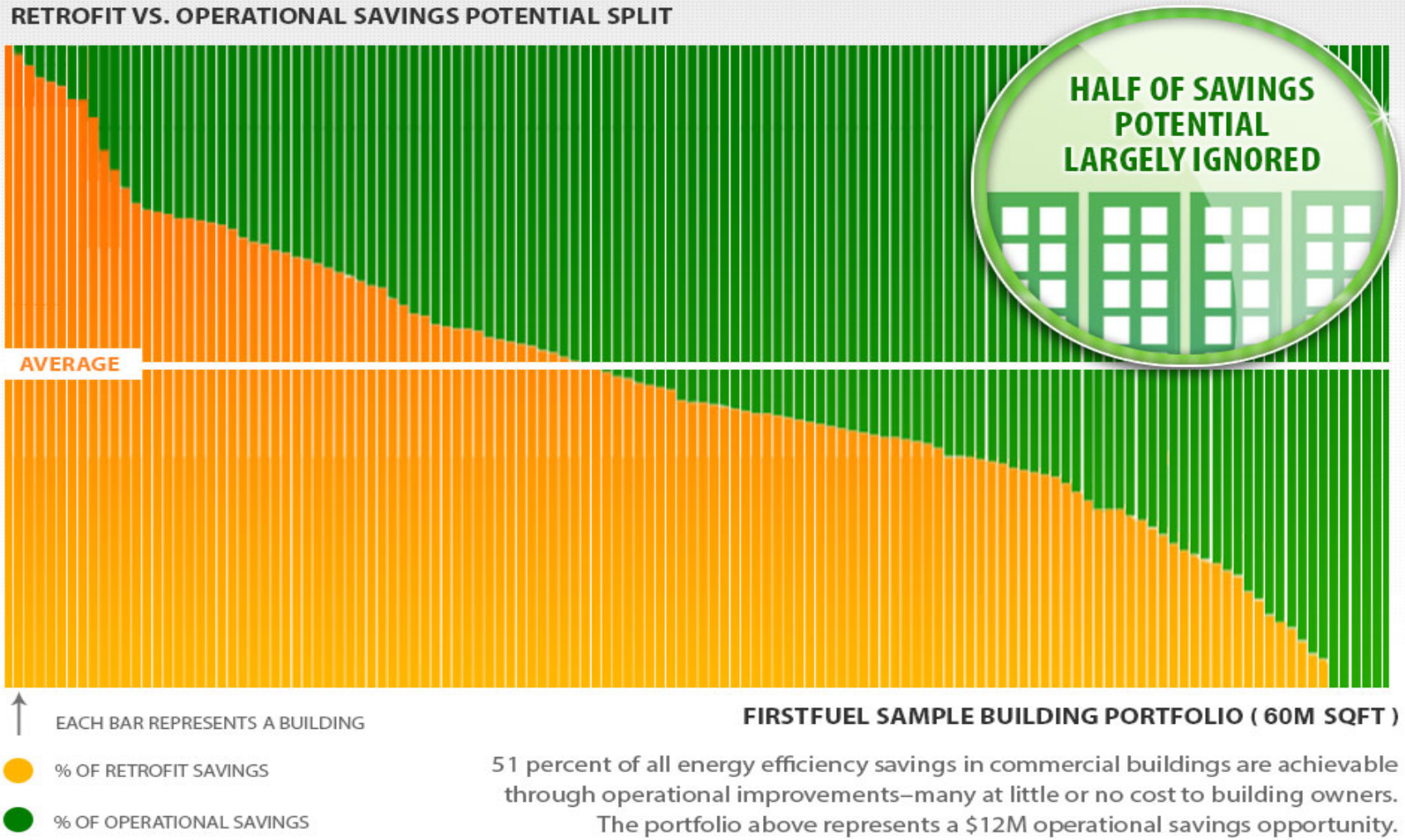
LOW / NO-COST OPERATIONAL CHANGES COULD DOUBLE ENERGY EFFICIENCY IN COMMERCIAL BUILDINGS



51 percent of all energy efficiency savings in commercial buildings are achievable through operational improvements–many at little or no cost to building owners. The portfolio above represents a $12M operational savings opportunity.

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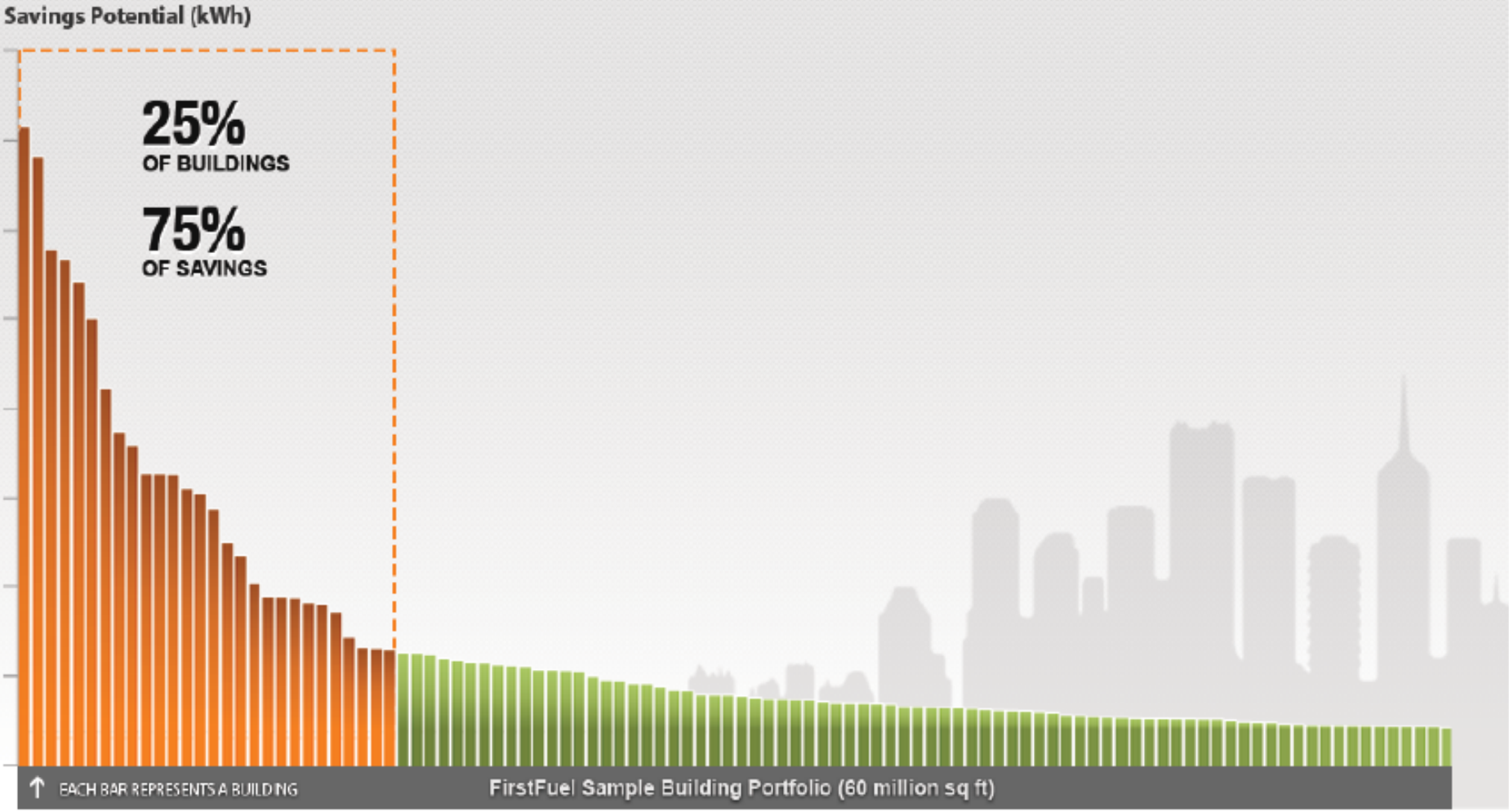
75% OF ENERGY EFFICIENCY OPPORTUNITY FOUND IN 25% OF BUILDINGS



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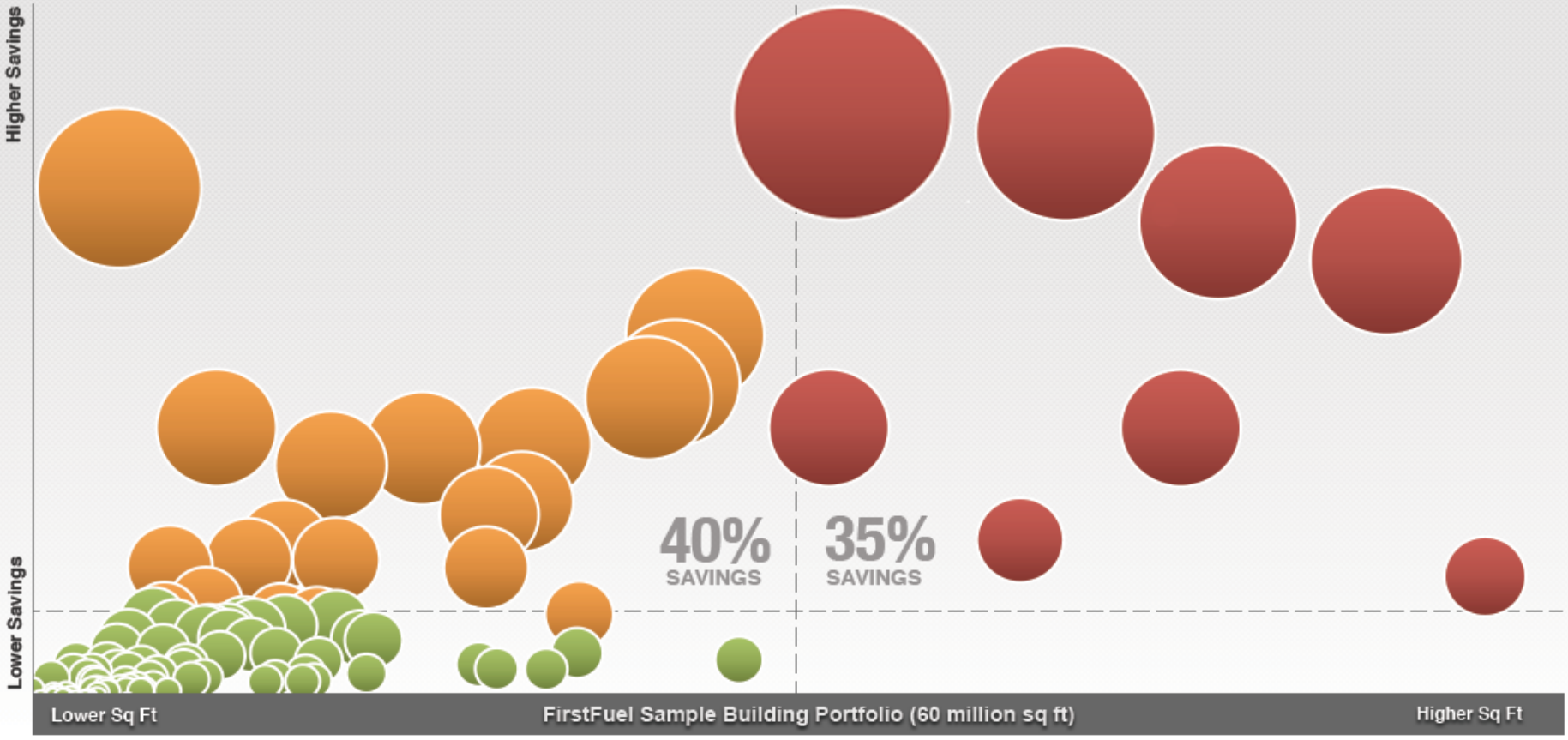
DEEP ENERGY SAVINGS HIDDEN IN MID-SIZED COMMERCIAL BUILDINGS



Each bubble represents a building. The size of the bubble is proportional to the size of the savings potential.

Many mid-sized buildings have limited savings potential.

The top mid-sized buildings represent 40% of total savings potential.

Most large buildings have large savings opportunities... but there are not as many.

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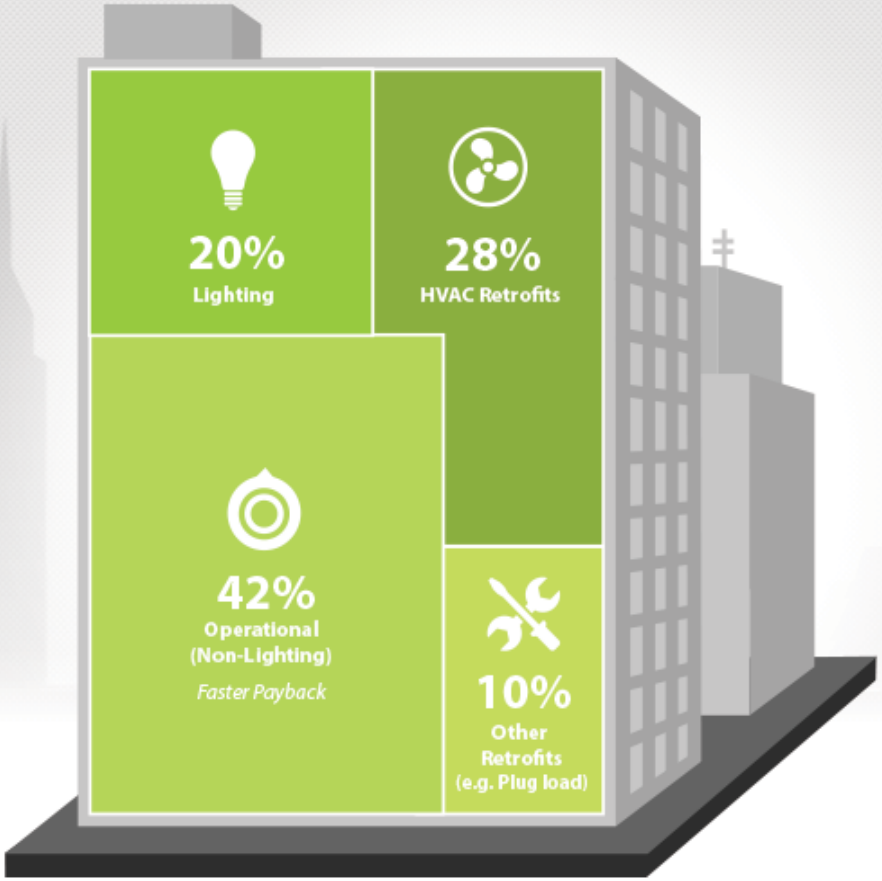
AFTER LIGHTING, WHATS NEXT FOR COMMERCIAL EFFICIENCY?



Lighting Represents Only 20% of the Total Savings Opportunity

- Operational savings (non-lighting) is the largest, most economical path to next generation savings
- Other retrofit programs have significant potential (38%) and analytics can drive smarter, cost-effective outcomes

Sample based on 60M sq.ft. of remote audits conducted by FirstFuel's Remote Building Analytics (RBA) Platform.

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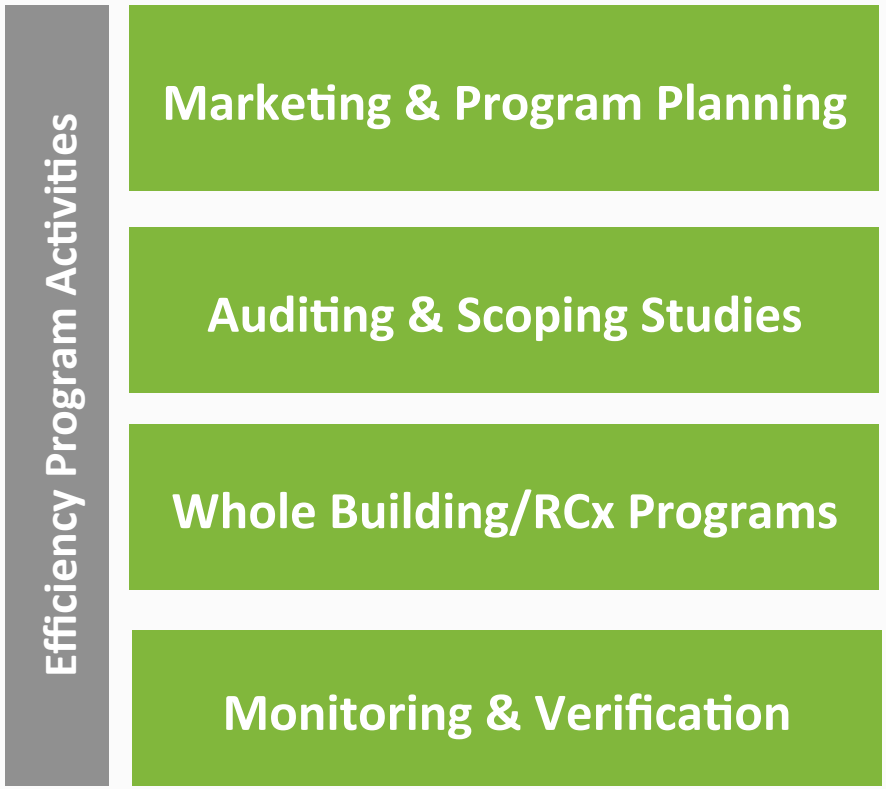
DRIVING VALUE ACROSS EFFICIENCY PROGRAM BUDGETS



Example Opportunities

- **QUALIFY** more leads faster, better, & cheaper
- **TARGET** customers effectively by segment

- **AUDIT**-level insight at fraction of time & cost

- **TURNKEY** operational savings
- **ACCELERATED** RCx programs

- **VERIFY** and increase measure persistence

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UTILITY EFFICIENCY PROGRAM IMPACT

ACCELERATED RETROCOMMISIONING EXAMPLE

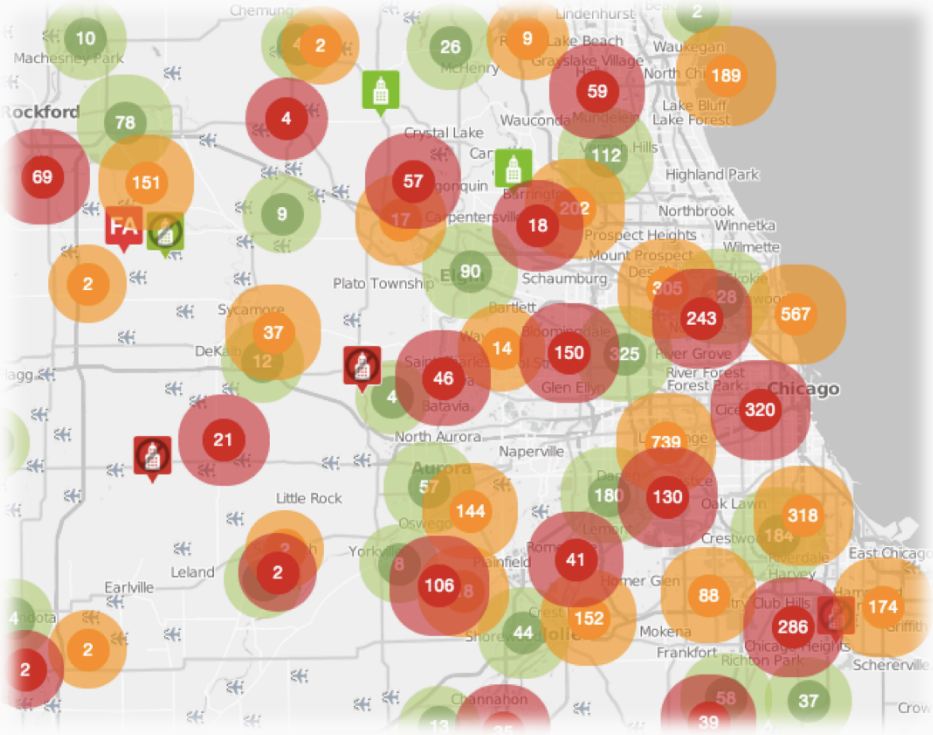
29,000 METER POPULATION

6,521 SCREENED BUILDINGS

400,000 MWH OPERATIONAL SAVINGS POTENTIAL

200 AUDITED BUILDINGS (TO DATE)

650 UNIQUE OPERATIONAL ECM'S



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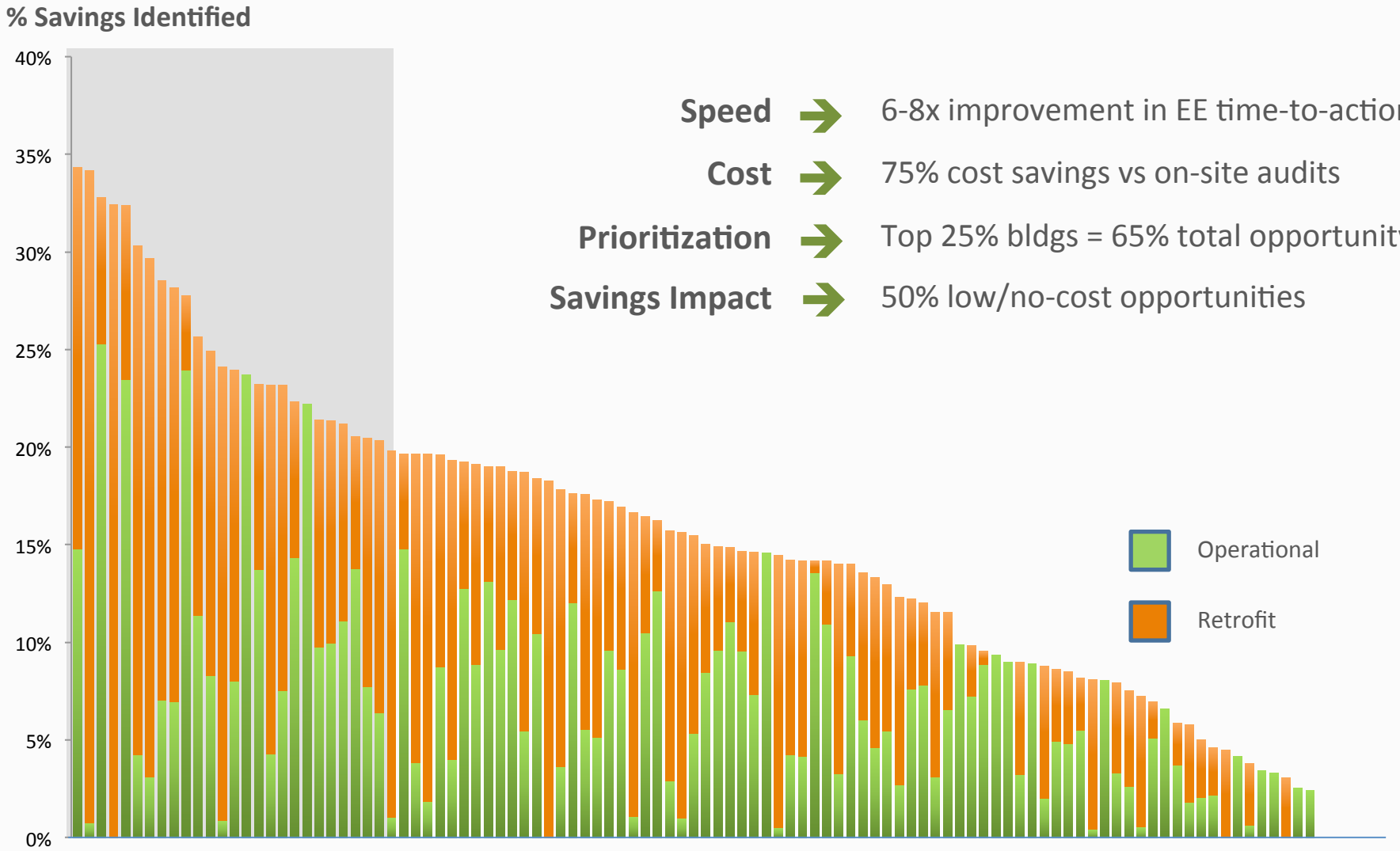
UTILITY EFFICIENCY PROGRAM IMPACT

RECENT DEPLOYMENT EXAMPLE



Speed → 6-8x improvement in EE time-to-action

Cost → 75% cost savings vs on-site audits

Prioritization → Top 25% bldgs = 65% total opportunity

Savings Impact → 50% low/no-cost opportunities

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BENEFITS OF ANALYTICS FOR EE PROGRAMS

Michigan Public Service Commission

- Timely and relevant policy and program decisions
- Increased focus on ALL customers regardless of size
- Focus on comprehensive whole-building programs
- Rigorous baseline of current conditions

Michigan Utilities

- Reduced time for program assessments and feedback
- Decreased cost to influence hard-to-reach customers
- Reduced “single measure” programs
- Credit and attribution for full range of efficiency savings that utilities enable

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THE FUTURE OF EFFICIENCY DELIVERY

EE PAST	EE PRESENT + FUTURE
RANDOM. REACTIVE.	STRUCTURED. STRATEGIC.
RETROFITS.	OPERATIONAL + RETROFITS = 2X.
ONE BUILDING. ONE MEASURE.	ALL BUILDINGS. DEEP SAVINGS.
kWh SAVINGS.	INTEGRATGED kWh + kW + Therm Savings
LOW SCALE. HIGH COST.	HIGH SCALE. LOW COST.

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