

MULTI-FAMILY PROGRAM IMPROVEMENT OPPORTUNITIES

Positioning the Retrofit Initiative for a Future With Negligible Claimable Lighting Savings

► July 19, 2017

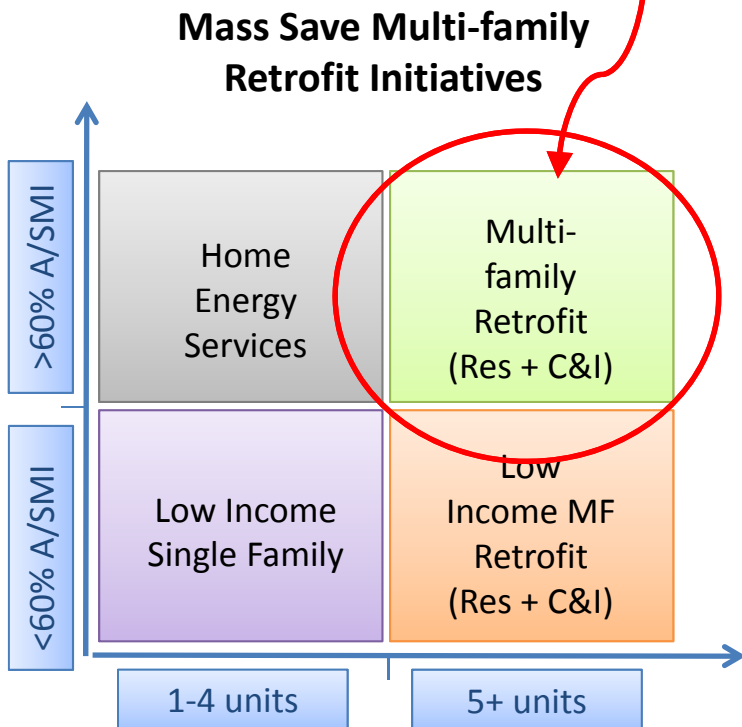
OVERVIEW OF TOPICS



- ▶ **Brief overview of market rate multi-family retrofit initiatives**
- ▶ **Rethinking the multifamily programs due lighting savings decline**
- ▶ **Potential areas for continued improvement based on recent EM&V findings**
- ▶ **Recommended strategies to surmount some persistent barriers and address challenges**

INITIATIVES OVERVIEW

Focus area for this presentation



Area Median Income (AMI) used for:

- Single Family:
- Multi-family:

www.ma-eeac.org

2013-2015	<ul style="list-style-type: none"> • Consultants and EM&V recommend integrating C&I and Res MF retrofit • Energy Action Plan report template introduced for market rate retrofit • Enhancements recommended from '16-'18 planning workshops
2016-2018	<ul style="list-style-type: none"> • Project Point of Contact (PPC) introduced for market rate MF retrofit • C&I MF retrofit project tracking, budgets, and BCRs introduced • New impact and process evaluation studies for market rate retrofit

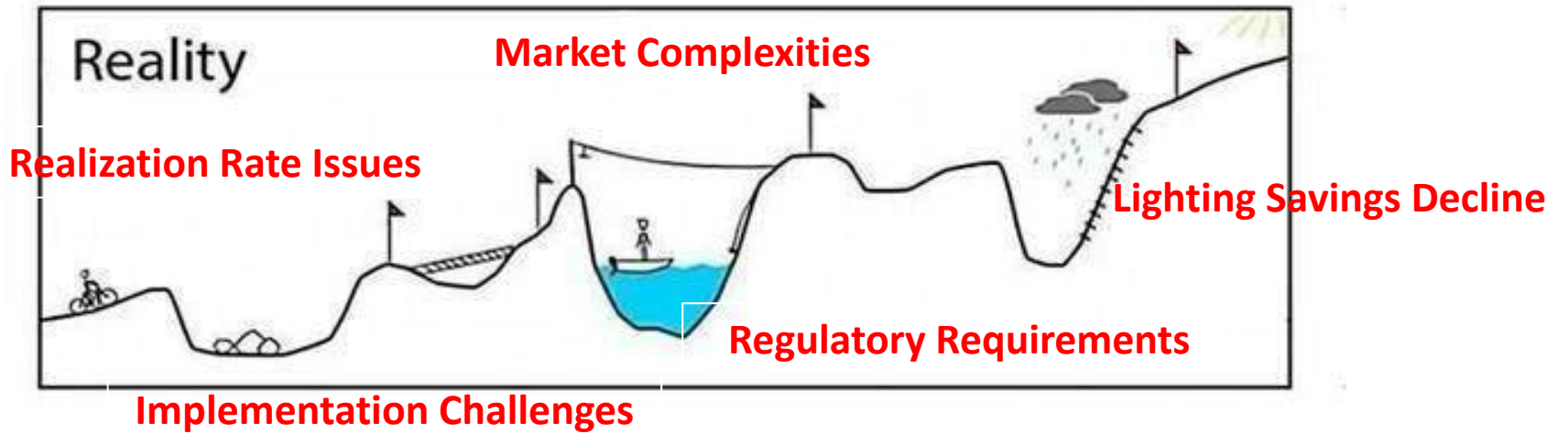
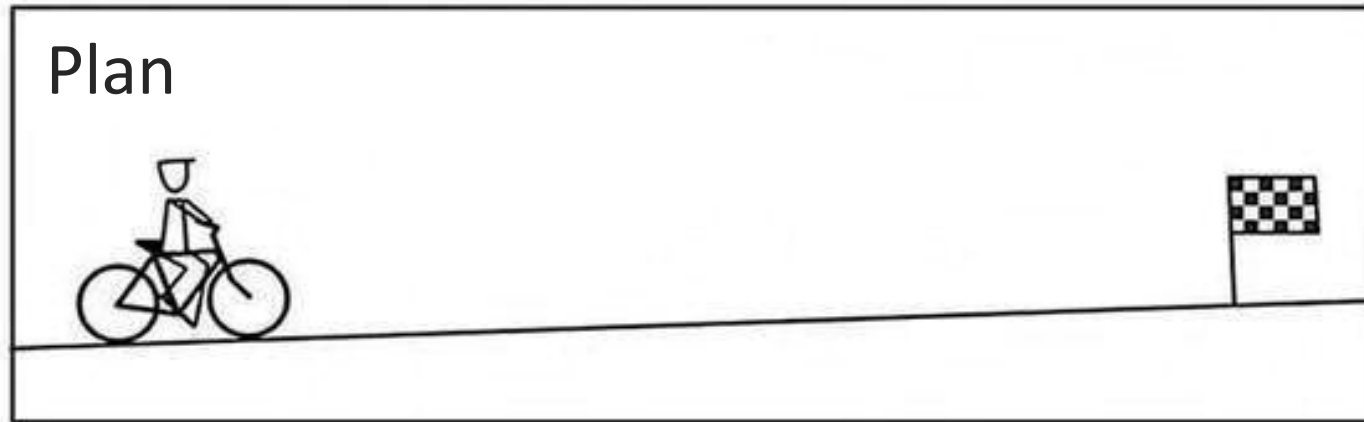
PROGRAM OFFERS AND SERVICES

The Project Point of Contact (PPC) provides a whole building, cross-sector energy assessment and project management assistance

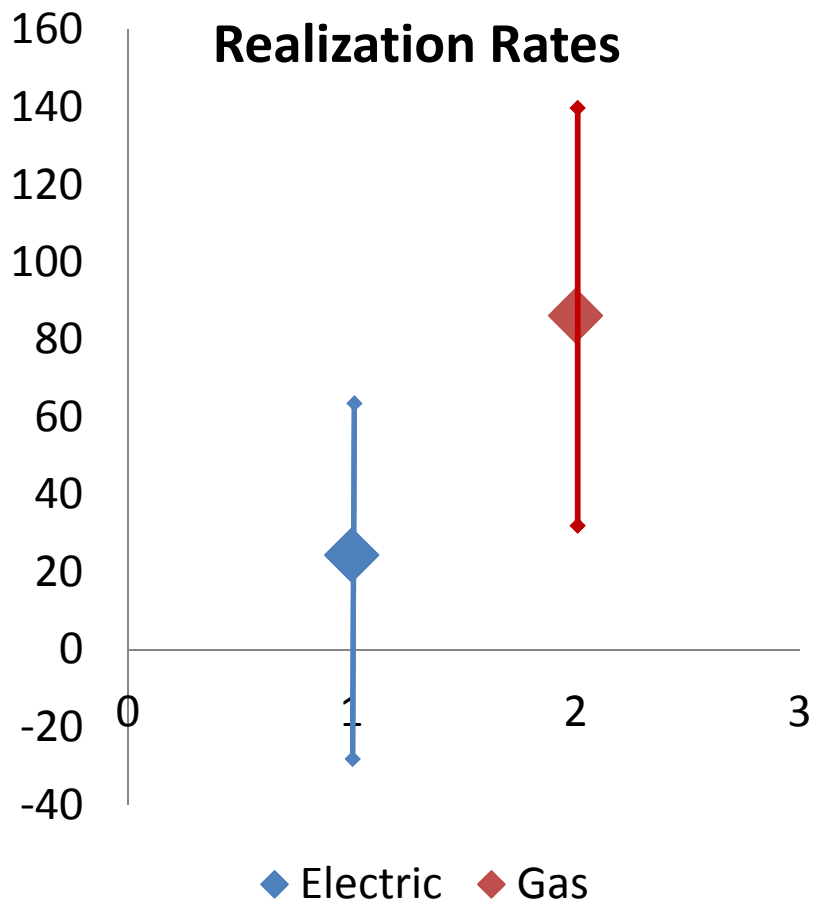
- Pre-screened prescriptive measures:
 - Lighting
 - Weatherization,
 - Low-flow showerheads
 - Thermostats
- Participation in other initiatives (equipment rebates)
- Custom measures
- Financing options
- Project and contractor coordination



BUT, EVEN BEST LAID PLANS FACE CHALLENGES...



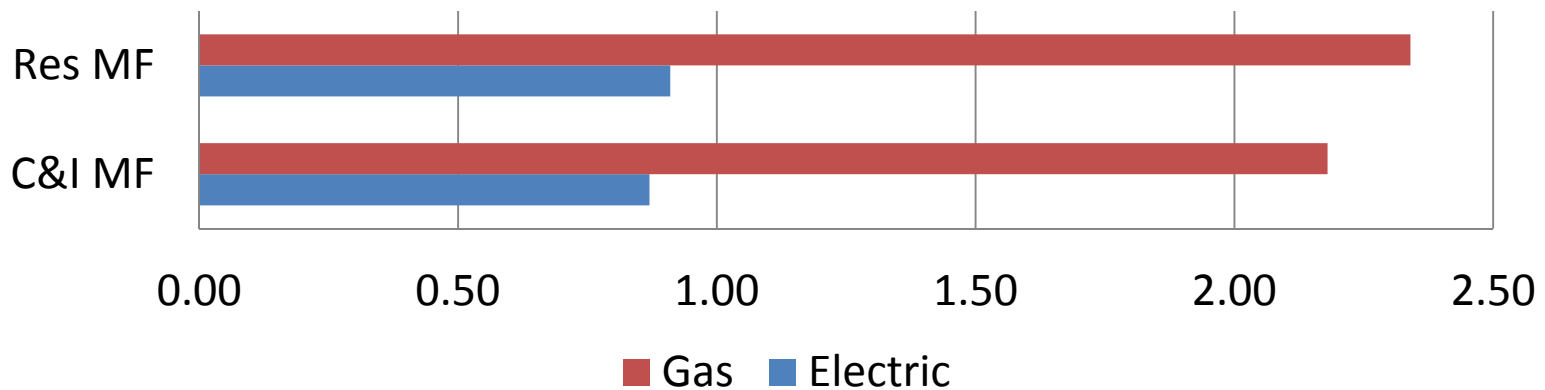
MARKET RATE MF RETROFIT IMPACT EVALUATION 2016



- ▶ Realized energy savings for retrofit measures:
 - *Electric RR = 24.4% +/-49.3*
 - *Gas RR = 86.2% +/-64.1*
- ▶ PAs are working to determine root causes and mitigate
- ▶ Follow on EM&V work informed Hours of Use and In-Service Rate adjustments for final 2016 results and forward planning
- ▶ Net To Gross study may influence further adjustments

BENEFIT COST RATIOS AFTER APPLYING EVALUATION ADJUSTMENT FACTORS

Market Rate MF Retrofit BCRs by Initiative
(2016 Evaluated, statewide)



- Adjustments to predicted and claimed savings directly impact benefit cost ratios (BCRs)
- Lower Hours of Use and In-Service Rates for lighting drive BCRs below 1.0 for electric alone
- BCRs will be driven lower as baselines increase and market transformation progresses

WITHOUT CLAIMABLE LIGHTING SAVINGS THE CURRENT MODEL IS NOT SUSTAINABLE

- ▶ The MF retrofit initiative is designed to offer whole building services, but relies heavily on lighting:
- ▶ In 2016, lighting in C&I and Res MF Retrofit (combined) represented:

	Annual Savings	Lifetime Savings
Electric	74%	64%
Electric + Gas	34%	21%

▶ EM&V findings:

“Building owner expectations are not aligned with program goals to diversify end use measure mix.”

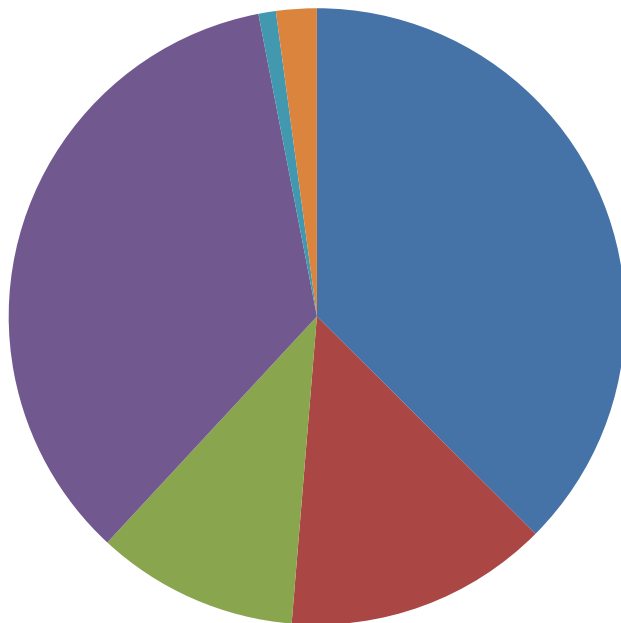
“Customers [evaluation researchers] spoke with were primarily interested in having Mass Save retrofit their lighting at no charge.”

“Auditors perceive pursuit of additional measure to be not worth their time with these customers”

“HVAC end uses are not prioritized”

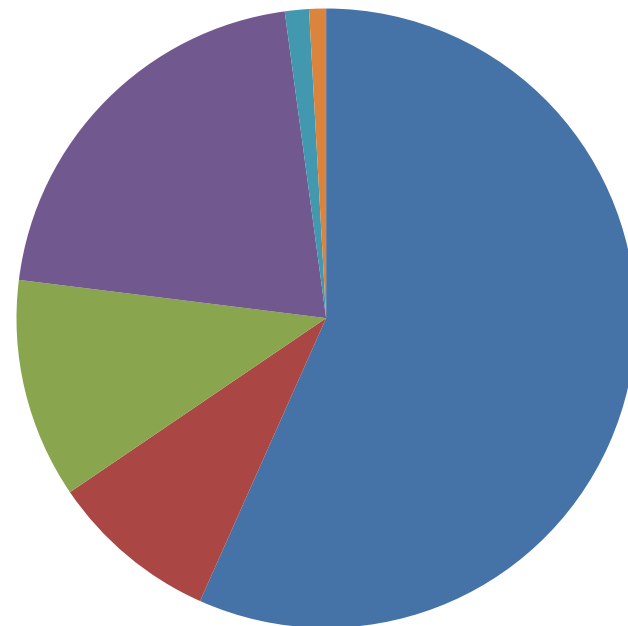
C&I AND RESIDENTIAL MULTI-FAMILY RETROFIT: DISTRIBUTION OF SAVINGS BY END USE (2016 STATEWIDE)

Gas + Electric Annual Savings by End Use (MMBtu)



■ Envelope
■ Lighting

Gas + Electric Lifetime Savings by End Use (MMBtu)



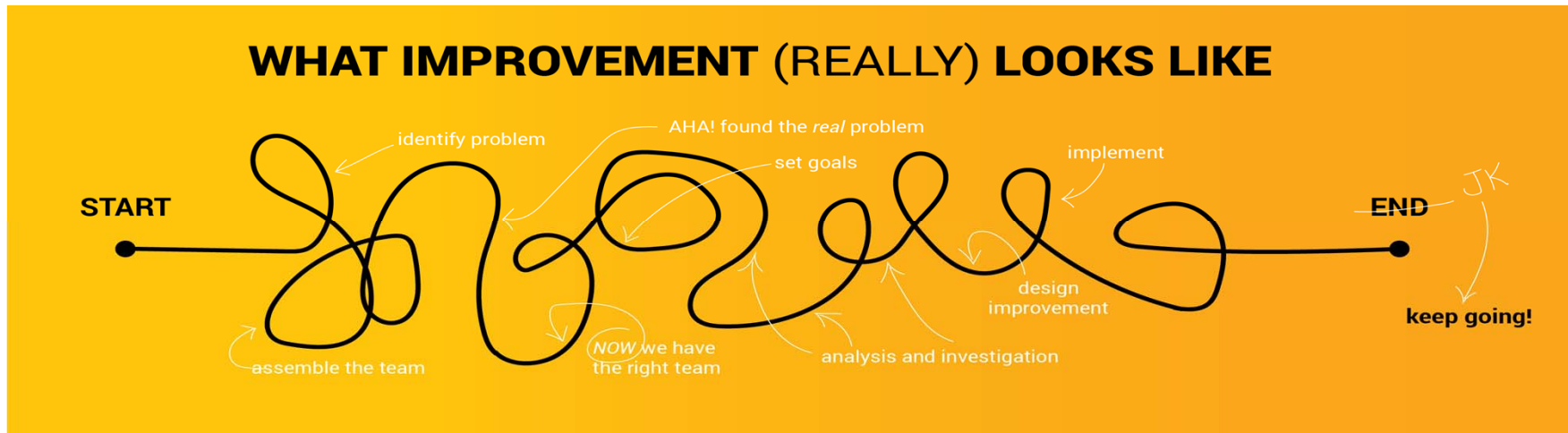
■ Hot Water ■ HVAC
■ Refrigeration ■ Products

ADDITIONAL EVALUATION FINDINGS AND RESULTS FROM 2016 DATA

- ▶ **Auditors are missing program eligible measure opportunities**
 - No evaluated projects had existing lighting controls in common areas
 - HVAC end uses not prioritized through standard project activities
 - Connections between the audit & incentives are not tracked
- ▶ **Additional measure opportunities:**
 - Duct sealing
 - *Added starting in 2017*
 - Programmable thermostats with heat pumps not in 2016 data
- ▶ **QA/QC Processes and Systems are not well-defined**
 - Inspection procedures, data tracking, and communication of results is inconsistent and not clearly understood
 - *The PAs' Multi-Family Working Group has been working to standardize processes, reporting, and communication*

POTENTIAL REMEDIES TO IMPROVE RESULTS

1. Improve program tracking by facility to support continuous improvements
2. Establish a framework that supports and encourages innovation and whole building solutions
3. Provide customizable levels of service appropriate to varying customer and building types
4. Enhanced focus on whole building measures



IMPROVEMENT OPPORTUNITY 1: IMPROVED FACILITY TRACKING

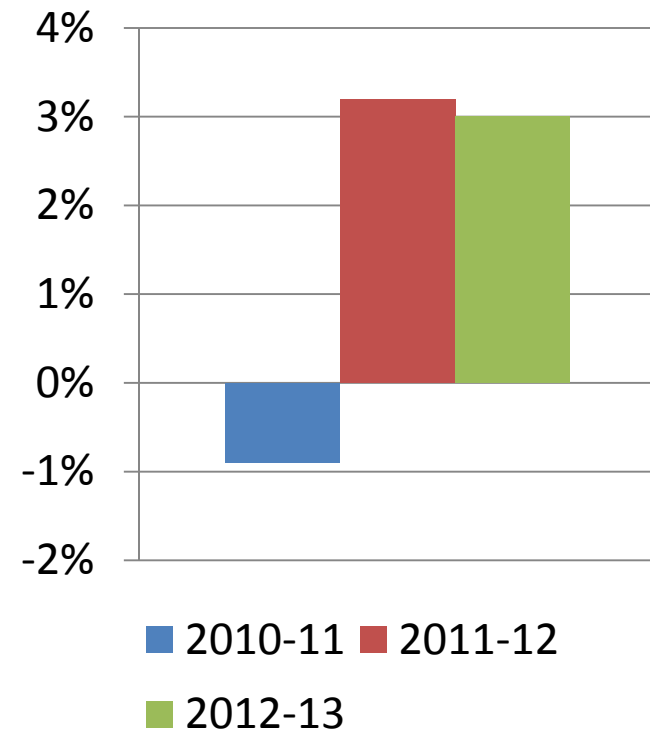
- ▶ **Apply unique site identifiers to standardize and uniformly track and count multi-family projects at the dwelling, building, and facility levels**
 - Participation rates, level of retrofit comprehensiveness and depth of savings achieved
 - Participation patterns by initiative and measure type
 - Effectiveness of cross-initiative hand-offs and address attrition points

IMPROVED FACILITY TRACKING AND BENCHMARKING

- ▶ **Aggregate consumption data at the building/facility level to:**
 - Pre-screen facilities to manage resources
 - Populate benchmarking tools
 - 3% savings in source energy observed in NYC multi-family buildings
 - Prioritize improvements based on consumption history
 - Enhance “sales” process by addressing the customer’s value proposition

Data source: NYC Benchmarking and Transparency Policy Impact Report; U.S. DOE 2015

Multi-family Source Energy Savings from Benchmarking (NYC)

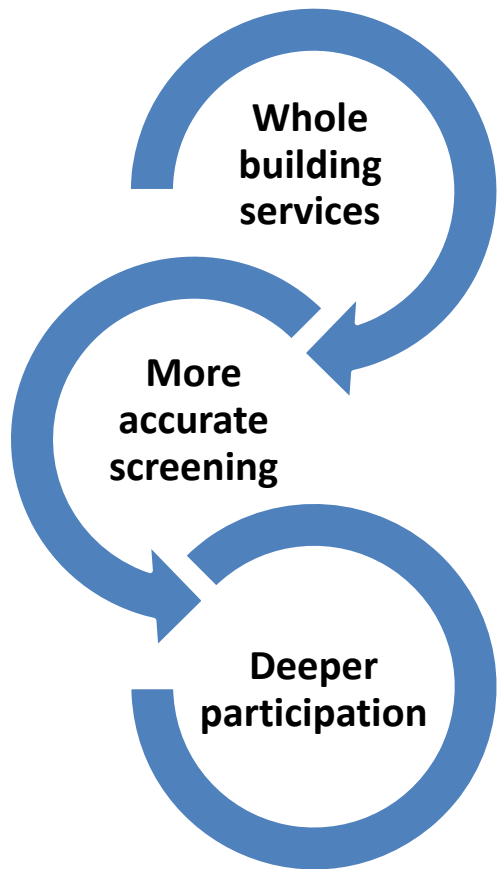


CONNECTING PARTICIPANT COUNTS TO DWELLINGS AND BUILDINGS

- ▶ **Better counting could lead to better customer service:**
 - Normalizing metrics to savings estimates per building, unit, or sqft could be key to overcoming “split incentive” issues
 - Helping property owners use building/portfolio data for benchmarking helps sell the project, generates goodwill and trust, and motivates owners/managers to track consumption
- ▶ **The multi-family program census evaluation is a start; application of results should be monitored and periodically assessed**

IMPROVEMENT OPPORTUNITY 2: FRAMEWORK SUPPORTING WHOLE BUILDING APPROACHES

- ▶ **Enable a BCR screening approach that includes cross-sector and multi-fuel impacts:**

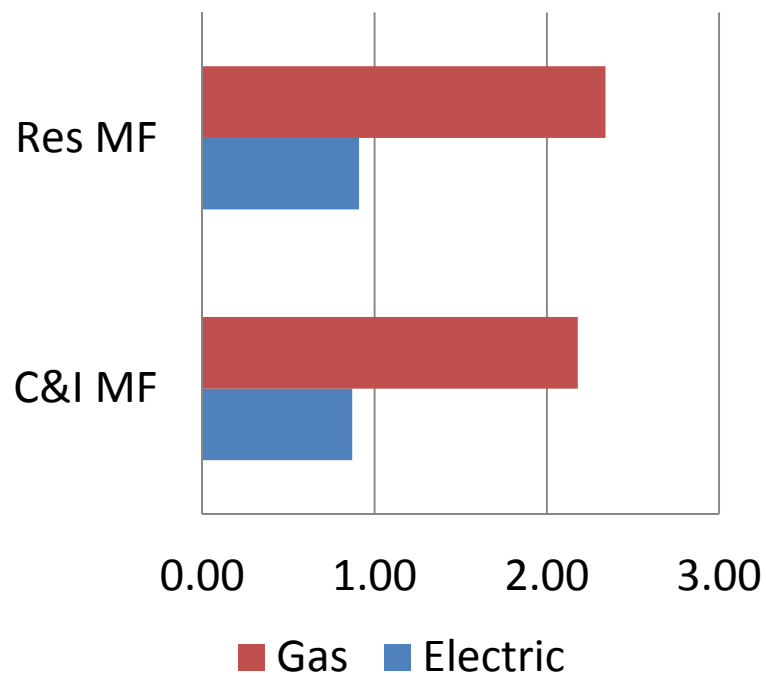


- Re-focus program efforts on providing whole building services rather than meeting individual sector/fuel goals
- Enable more accurate whole building measures screening impacting both residential and C&I metered accounts
- Facilitate a sales process oriented toward the property owner’s value proposition to encourage deeper participation

BLENDED BCR RATIONALE AND SCENARIOS

- ▶ Both C&I and Res MF electric retrofit have difficulty passing the TRC independently
- ▶ BUT, there is always overlap and interactivity
- ▶ **Additional Considerations:**
 - Individual PA results will vary
 - Further Realization Rate adjustments are possible pending outcome of NTG study
 - Likely require DPU approval

Market Rate MF Retrofit BCRs by Initiative
(2016 Evaluated, statewide)



BLENDING BCR SCENARIOS

- Using 2016 results, an all-in blended BCR for market rate multi-family retrofit would combine to 1.29

Summary Data from 2016 Statewide Data Tables			
Multifamily Retrofit-Evaluated			
Initiative	TRC Costs	Benefits	B/C
Residential Electric	\$ 20,527,322	\$ 18,683,890	0.91
C&I Electric	\$ 11,480,810	\$ 9,958,202	0.87
Residential Gas	\$ 8,486,425	\$ 19,866,333	2.34
C&I Gas	\$ 4,192,859	\$ 9,129,309	2.18
Res E+G	\$ 29,013,747	\$ 38,550,223	1.33
C&I E+G	\$ 15,673,669	\$ 19,087,511	1.22
Res Elec + C&I Elec	\$ 32,008,132	\$ 28,642,092	0.89
Res Gas + C&I Gas	\$ 12,679,284	\$ 28,995,642	2.29
All Combined	\$ 44,687,416	\$ 57,637,734	1.29

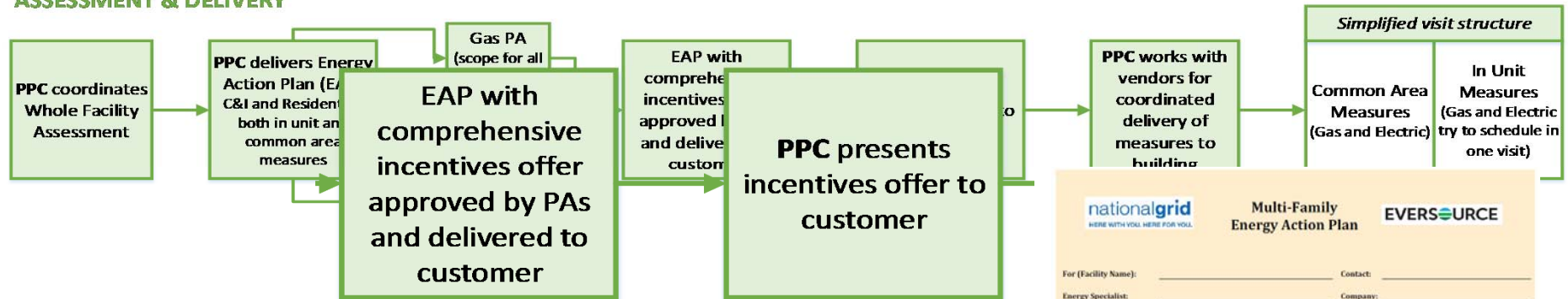
IMPROVEMENT OPPORTUNITY 3: CUSTOMIZABLE LEVELS OF SERVICE, AUDITS, AND SALES TOOLS

► Further develop audit options for differing customer segments



THE MASS SAVE ENERGY ACTION PLAN ADDRESSES ELIGIBLE MEASURES

ASSESSMENT & DELIVERY



- ▶ Oriented around available incentives
- ▶ Comprehensive list of incentivized measures available for the building
- ▶ Checklist format with supplemental proposal including costs to the owner

Multi-Family Energy Action Plan

For (Facility Name): _____ Contact: _____

Energy Specialist: _____ Company: _____

Energy Specialist phone: _____ Email: _____

Opportunities to reduce energy costs, improve occupant comfort, and enhance appearance and durability are varied in multi-family buildings. The differing sizes, construction types, styles, and ages of multi-family housing stock in Massachusetts all pose unique considerations. These are taken into account when developing a plan to upgrade energy efficiency in these facilities.

This Energy Action Plan provides an overview of all possible improvements that were evaluated for your facility during our recent site visit to your facility. The improvements that are applicable to your site are marked "Recommended for your facility". Improvements that were considered but do not apply to your facility are marked "Evaluated but not applicable".

Accompanying this Energy Action Plan is a Proposal that identifies the improvements that qualify for significant incentives and direct installation through the Multi-Family Retrofit Program. Energy improvements in this Plan which are incorporated into the Proposal are identified with a check mark in the box labeled "Included in the attached proposal".

For recommended measures that are NOT included in this proposal, Massachusetts utilities and energy efficiency service providers offer attractive incentives and services to help make upgrades feasible and affordable for you through other programs. Your Energy Specialist can help direct you to the appropriate resource, or you can visit the Mass Save® web site at www.masssave.com to learn more.

We hope that you will take the first step towards a more efficient facility by executing the proposed contract as soon as possible.

Questions concerning energy efficiency services for multi-family sites in Massachusetts?

The Multi-Family Market Integrator (MMI) is a joint effort of the MA electric and gas utilities and efficiency service provider to offer a single point of contact on all multi-family energy efficiency services available through the Mass Save sponsors. Contact the MMI at 1-800-594-7277 for information from any site in the state with five (5) or more dwelling units.

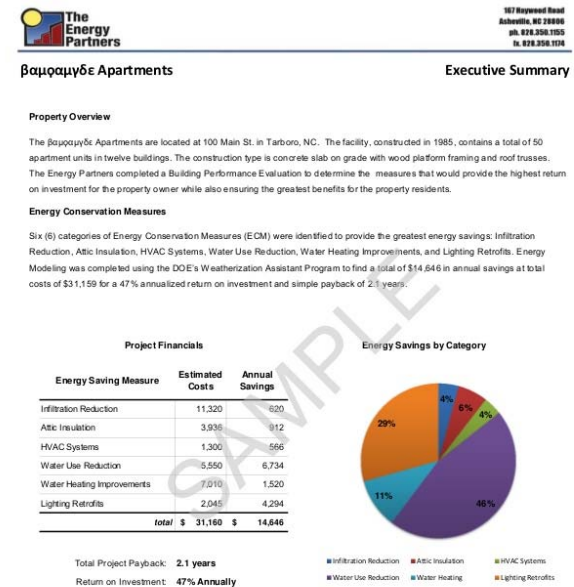
INVESTMENT GRADE AUDIT REPORTS

► **Investment grade audits include measures and incentives, AND:**

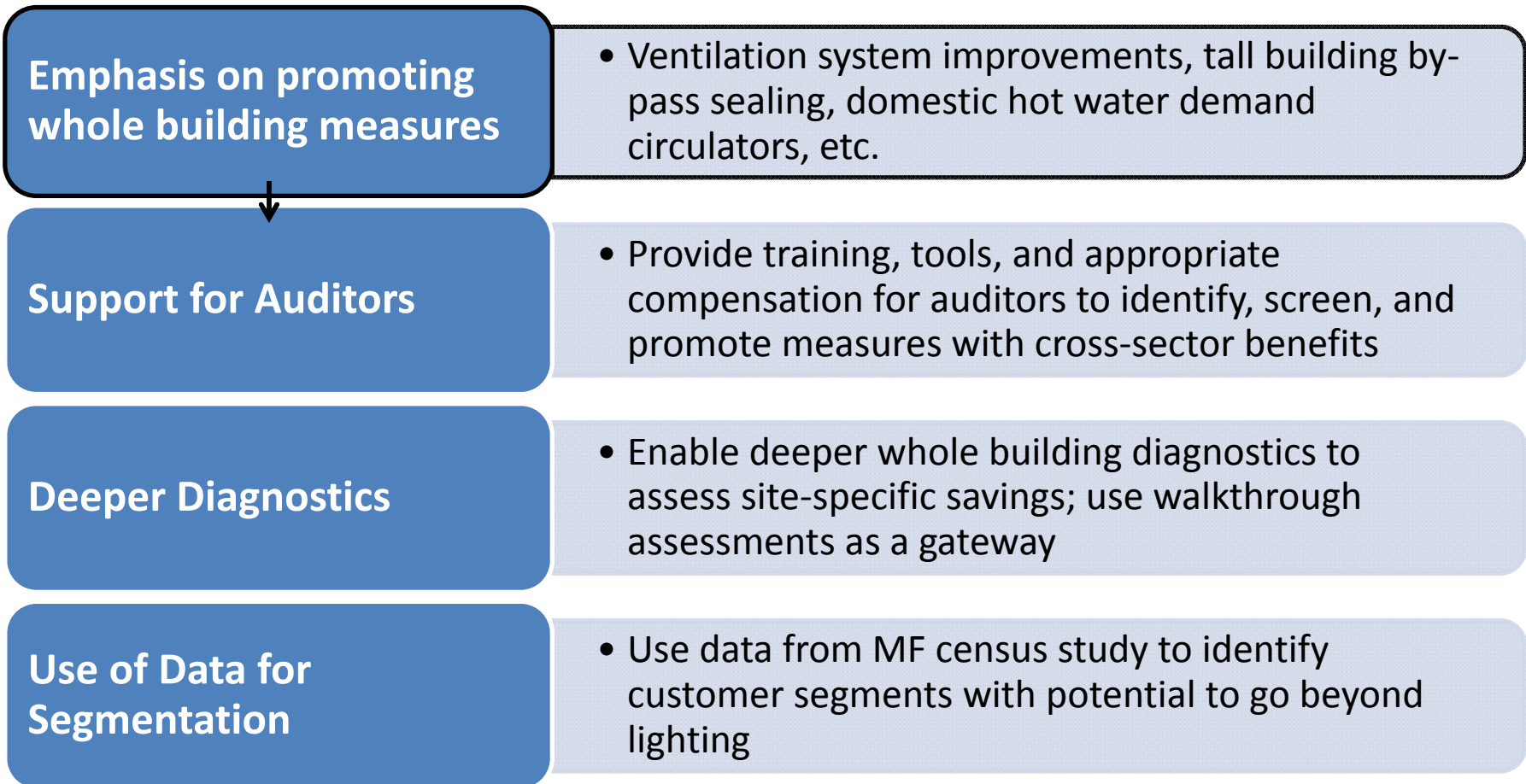
- Executive Summary with customer-oriented financial investment metric like SIR or ROI
- Condition assessment of the building’s energy features
- Recommended loading order and timing for improvement measures

► **And, may also include:**

- Low cost, no cost “DIY” energy saving opportunities
- O&M energy saving recommendations
- Recommendations for planned replacement of energy-related components/equipment
- Water savings and other custom analysis



IMPROVEMENT OPPORTUNITY 4: WHOLE BUILDING MEASURES



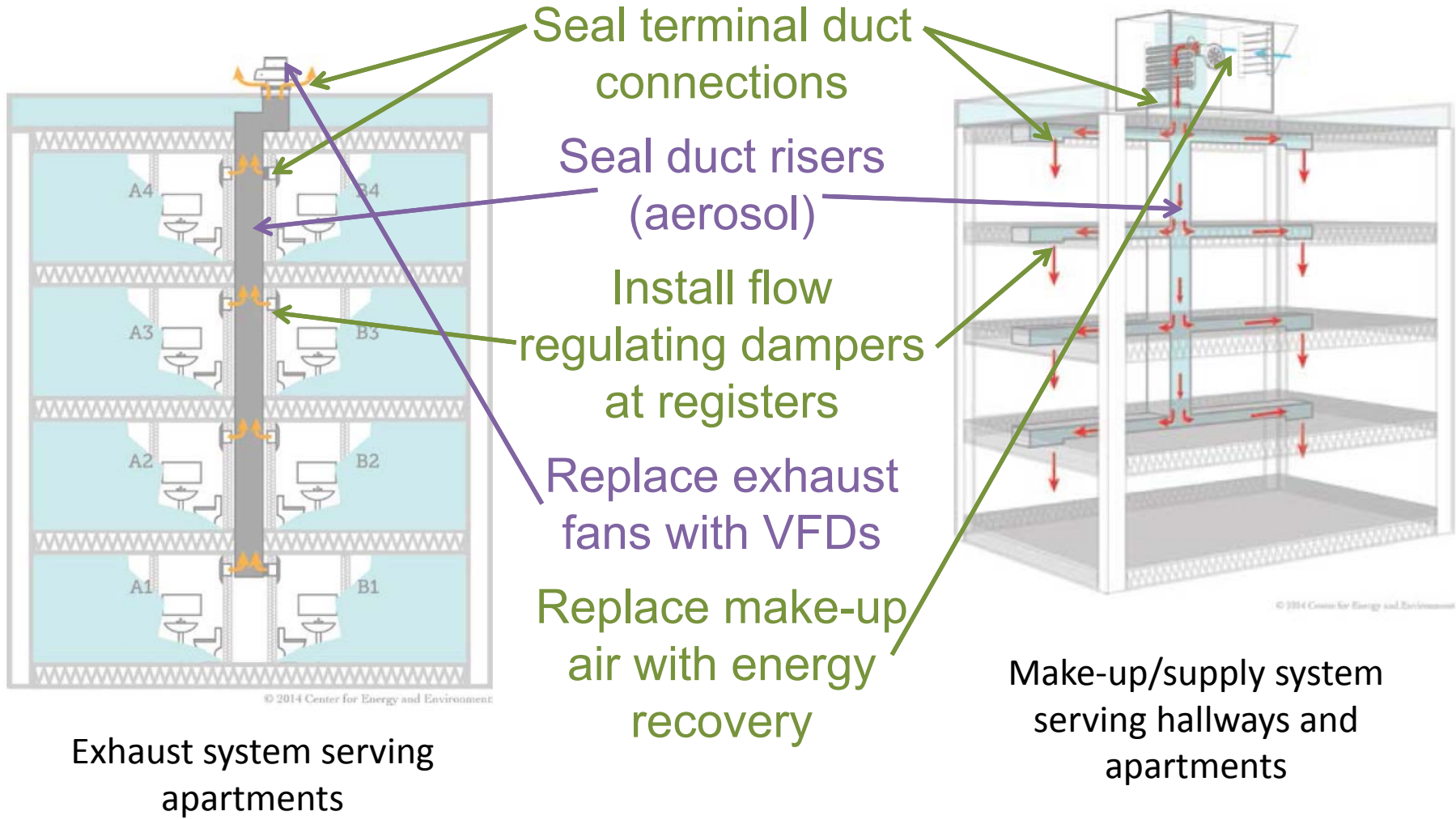
ENERGY EFFICIENCY MEASURE MINI CASE STUDY

Multi-family Ventilation Optimization

BENEFITS OF MULTIFAMILY VENTILATION SYSTEM OPTIMIZATION

- ▶ **Applicable to bigger buildings with central ventilation systems**
 - Most existing systems are either under-ventilating, over-ventilating, or significantly imbalanced
 - All of these represent potential energy losses, as well as contributing to IAQ, comfort, and durability issues
 - Air sealing without managing ventilation is never recommended because air sealing can exacerbate existing problems or introduce new ones
- ▶ **Benefits are multi-fuel and cross-sector**
 - Savings impact both base electric load and heating and cooling loads
 - Benefits accrue to both the building owner and the residents
 - Both staff and residents play a role in proper operation

ELEMENTS OF A VENTILATION SYSTEM IMPROVEMENT



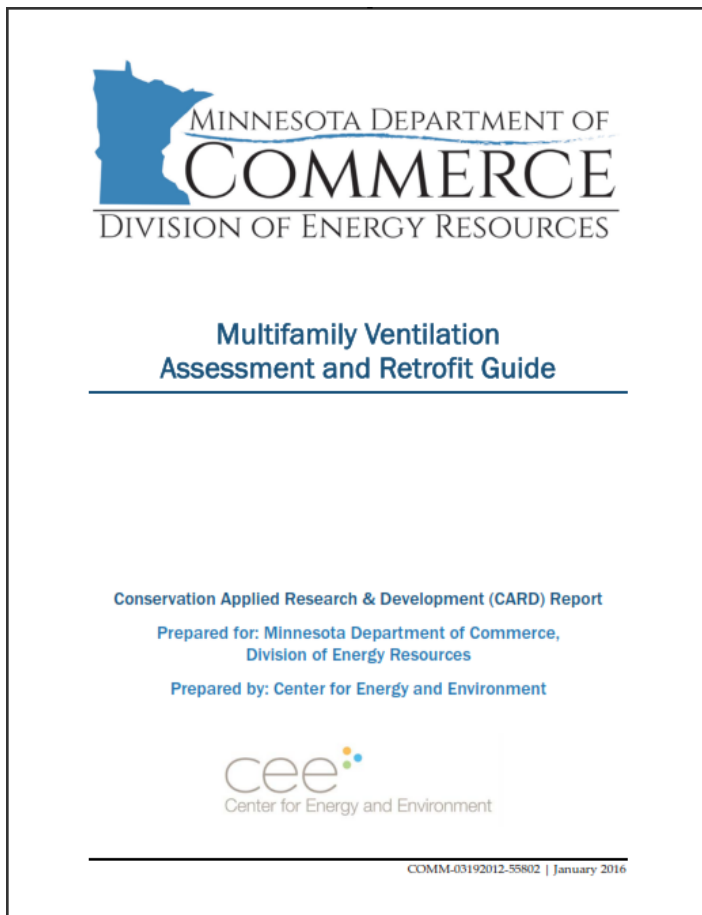
VENTILATION OPTIMIZATION EXAMPLE: CARLYLE TOWERS, CALDWELL, NJ (2008 RETROFIT)

Improvement	Impact	Annual Savings
Seal and balance exhaust ducts (25 shafts)	250 CFM leakage per shaft reduced to 15 CFM	\$7,000 (electric savings)
Replaced exhaust fans	300 Watt fans reduced to 125 Watt	
Improved Heating Performance*	57,000 therm heating load reduced to 41,000 therm	\$19,000 (gas savings)
<i>*savings from ventilation work alone</i>	Total Predicted Savings:	\$26,000
	Actual Measured Savings:	\$29,462
	Estimated Project Cost:	\$50-60,000

“Soon after the retrofit was completed, we heard from tenants who thanked the building manager for fixing the heat. While we didn’t touch the heating system per se, by sealing the shaft leaks and automating the damper adjustments, the furnace was noticeably more efficient and effective.”

David Legow, president Legow Management

MINNESOTA'S MF VENTILATION ASSESSMENT AND RETROFIT GUIDE



- ▶ Offers standardized, low-cost screening methods and higher precision diagnostics
- ▶ Guidance to calculate savings
- ▶ Customizable decision tree for identifying cost-effective opportunities at screening
- ▶ Paybacks can be as low as 2 months, but generally range from 3-6 years

SUMMARY AND CLOSING



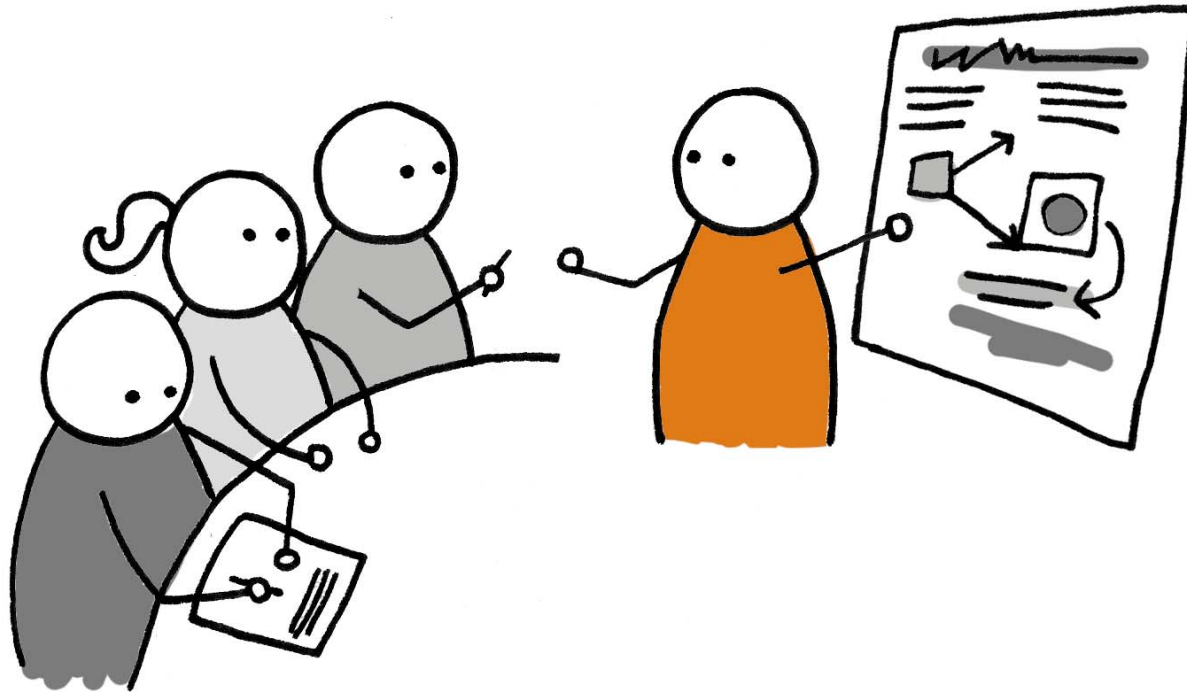
- ▶ **The loss of claimable lighting savings is an opportunity to re-think multi-family retrofit approach**
 - Lighting is already becoming less cost-effective and mid-course adjustments are temporary fixes
 - Need to begin thinking now about big picture, systemic changes to support the program in future market conditions
- ▶ **Implementation challenges are largely symptomatic of policy and program level structural hindrances**
 - Better alignment of initiatives, delivery channels, and cost-benefit testing with whole building approach
 - Whole building oriented incentive offers and delivery channels

SUMMARY AND CLOSING



- ▶ **Investments are needed to respond to changing marketplace and further evolve the program**
 - Improved data capture and project tracking, benchmarking, customer segmentation
 - A base of auditors that can identify and communicate a range of energy saving opportunities to customers
- ▶ **To get people to invest in their buildings, give them investment grade information**
 - Messaging supporting whole building investment
 - Flexible audit paths to respond to range of customer needs and reports that reflect the customer's value proposition

DISCUSSION

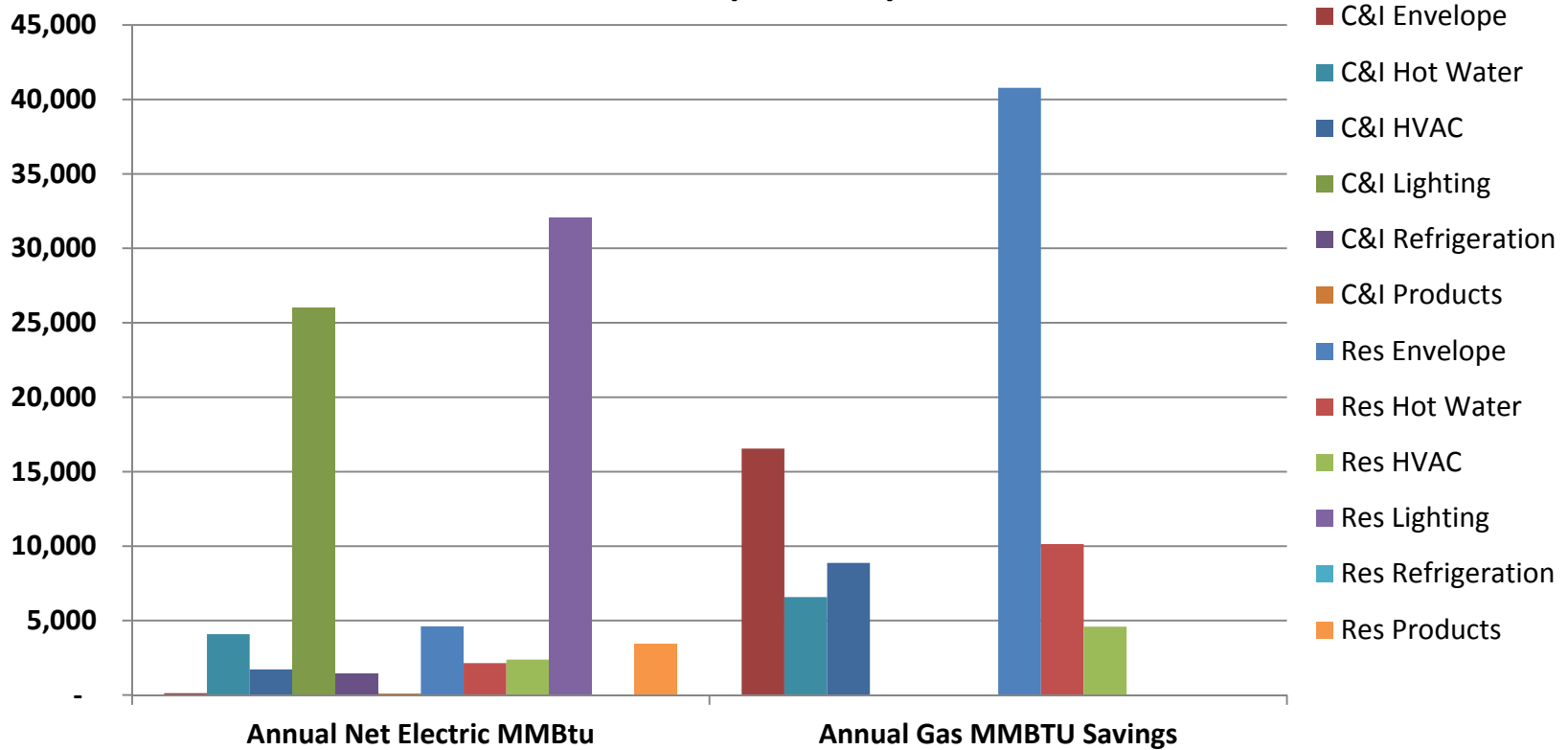


EXTRA SLIDES



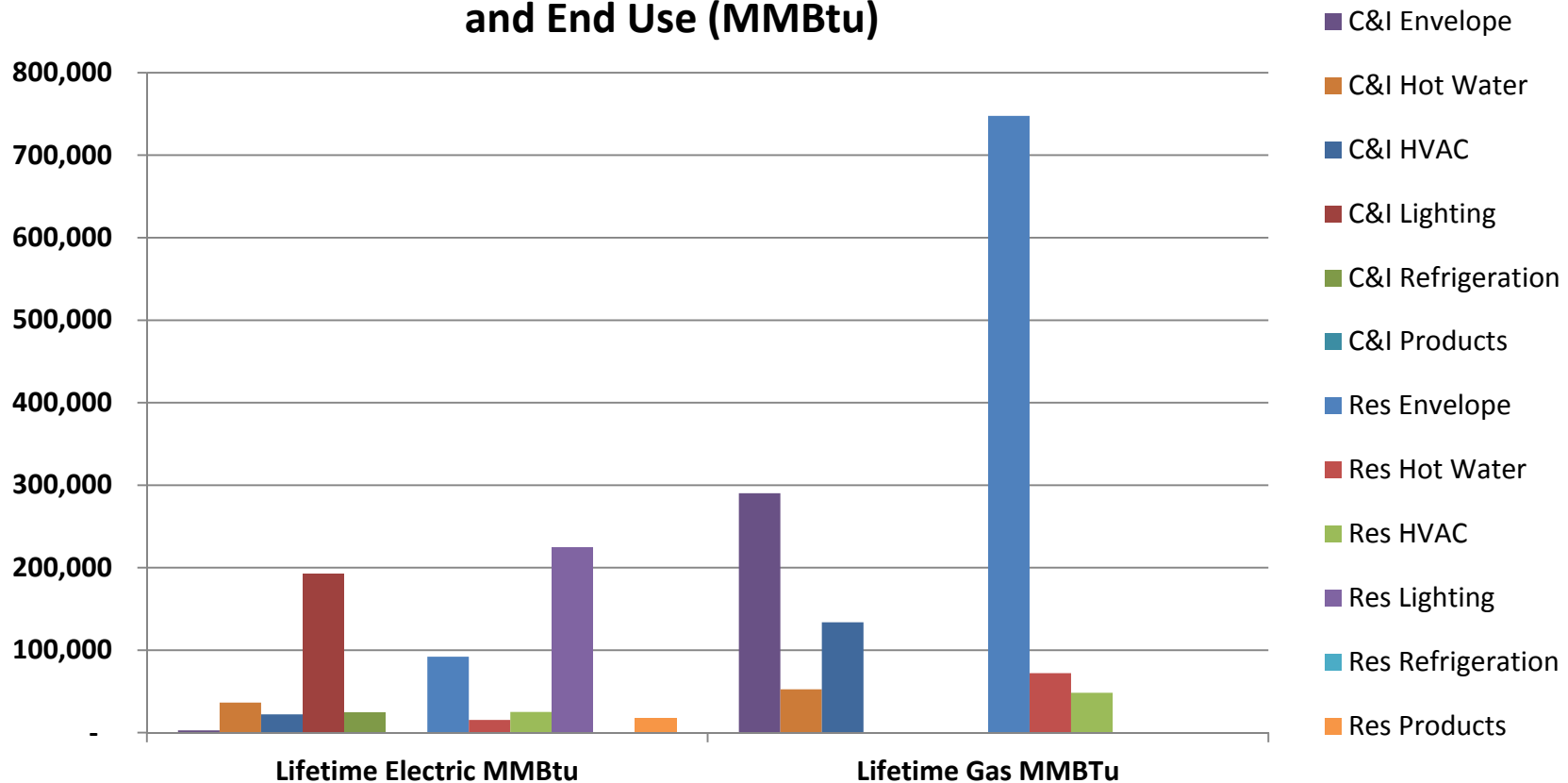
C&I AND RESIDENTIAL MULTI-FAMILY RETROFIT: DISTRIBUTION OF SAVINGS BY END USE (2016 STATEWIDE)

Annual Savings by Fuel, Sector, and End Use (MMBtu)



C&I AND RESIDENTIAL MULTI-FAMILY RETROFIT: DISTRIBUTION OF SAVINGS BY END USE (2016 STATEWIDE)

Lifetime Savings by Fuel, Sector, and End Use (MMBtu)



EXAMPLE OF MARKET ORIENTED AUDIT APPROACH

- ▶ **Use customer intake process to determine customer needs**
- ▶ **Use energy consumption data to benchmark building energy usage profile**
- ▶ **Provide tiered levels of assessment, depending on customer's desires and building's needs**

Tier 1 Walkthrough Audit

- Use when energy saving potential is minimal OR site is complex enough that the audit itself requires scoping

Tier 2 Physical Needs Assessment

- Use when primary needs align well with prescriptive eligible measures

Tier 3 Whole Building Analysis

- Use to when custom measures and whole building interventions are needed, to assess cross-cutting measure opportunities, and to develop economic case for customer investment