



# COMMERCIAL AND INDUSTRIAL (C&I) MARKET CHARACTERIZATION RESULTS

Presented by TRC

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## BACKGROUND

### What is market characterization research?

Market characterization research studies the **penetration, saturation, and efficiency levels** of equipment among Consumers Energy’s commercial and industrial (C&I) customers. We conducted similar studies 2015 and 2011, and results are compared over time.

This research helped to inform the *potential study* that developed estimates of remaining energy efficiency potential for commercial customers in Consumers Energy’s service territory. These data are also used to inform program design target opportunities.

| Business Type   | Share Among All C&I Customers |
|---|-------------------------------|
|  Education   | 2.3%                          |
|  Grocery     | 1.5%                          |
|  Health      | 5.7%                          |
|  Industrial  | 5.2%                          |
|  Lodging     | 1.0%                          |
|  Office      | 31.2%                         |
|  Other/Misc. | 5.1%                          |
|  Restaurant | 3.5%                          |
|  Retail    | 8.0%                          |
|  Warehouse | 4.7%                          |
| <b>Total</b>  | <b>68.1%</b>                  |



## METHODOLOGY

OCT - DEC 2019:

**On-site visits** to inventory existing equipment, including heating, ventilation, and air conditioning (HVAC), lighting, envelope, water heating, refrigeration, cooking, process/steam

SAMPLE:

**225**  
C&I customers

OCT 2019 - FEB 2020:

**Follow-up online surveys with customers from on-sites** to assess attitudes and purchase decisions, including:

- Attitudes and barriers toward energy efficiency
- Past and planned actions to improve energy efficiency
- Customer awareness of energy efficiency programs

SAMPLE:

**145**  
C&I customers from  
on-sites



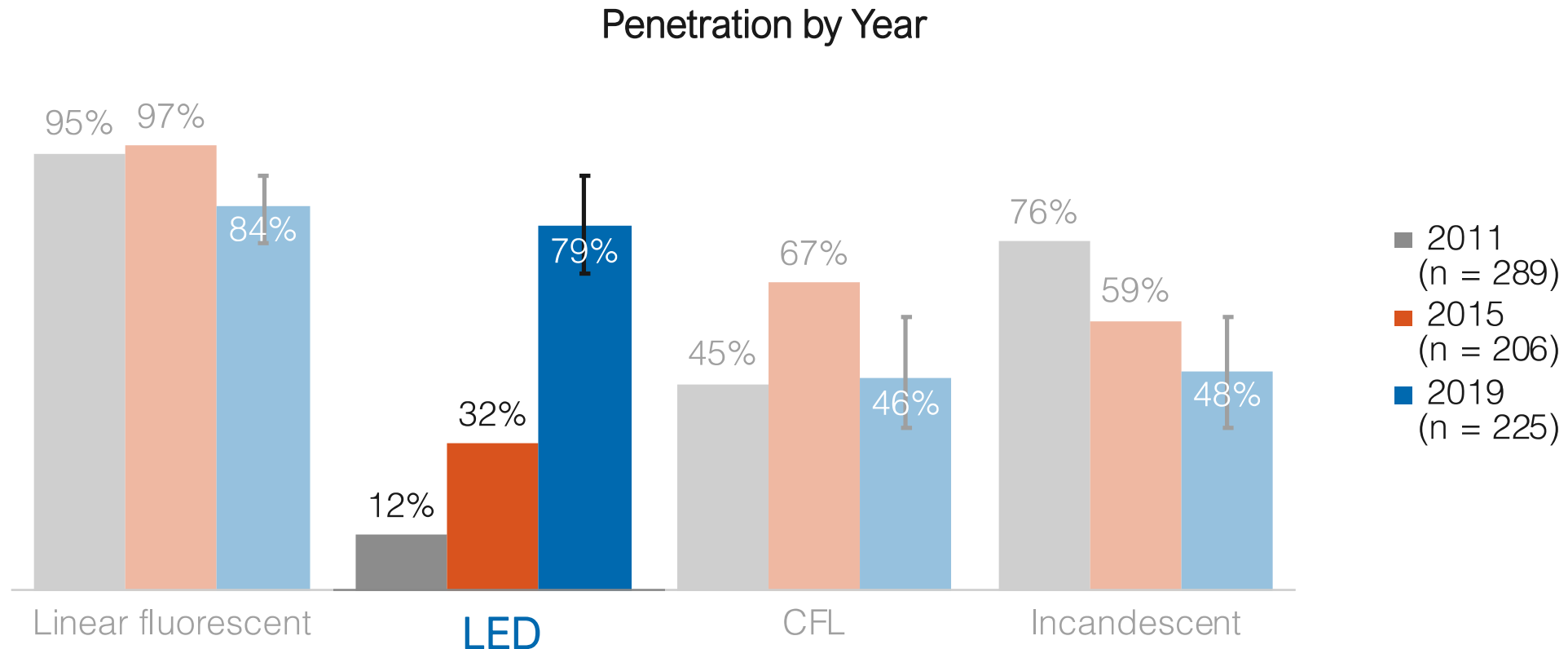
## AGENDA

- Key End Uses
  - Lighting
  - Water Heating & Refrigeration
  - Lighting & HVAC Controls
  - Drives
- Energy Efficiency Awareness
- Motivation and Barriers



# LIGHTING PENETRATION OVERVIEW

LED penetration has more than doubled since 2015, from 32% to 79%.



\*Black bars represent the 90% confidence intervals; see appendix slide for more information



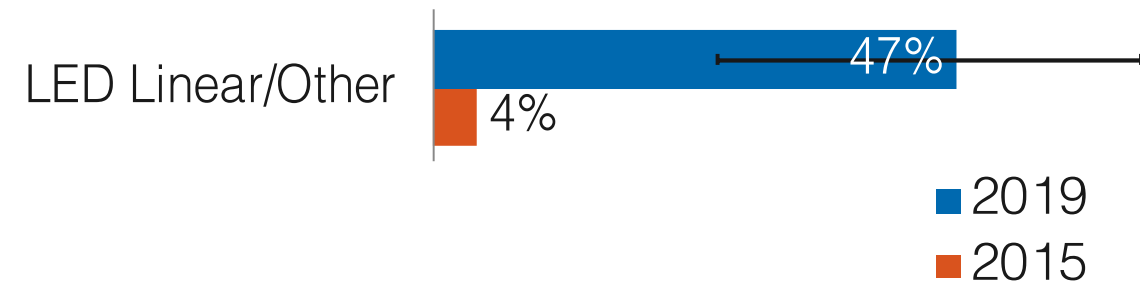
## ON-SITE KEY FINDINGS: LIGHTING

The saturation of both interior and exterior light emitting diodes (LEDs) has increased substantially since 2015.

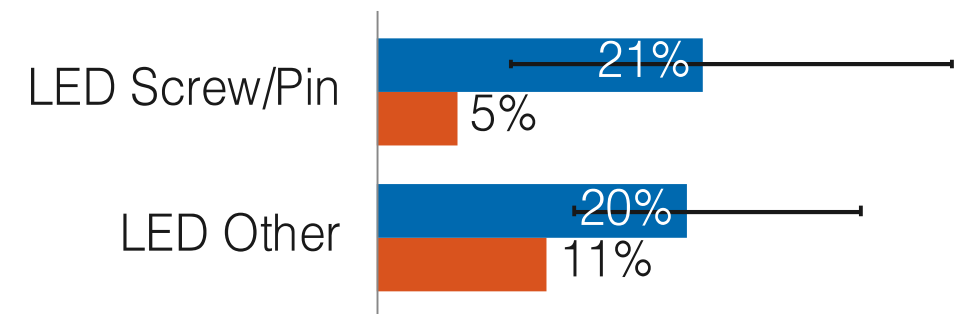
↓ The saturation of fluorescent T8s, T12s, high-intensity discharge (HID), incandescent, and interior compact fluorescents (CFLs) *decreased*

↑ The saturation of exterior CFLs *increased*

### Interior LED Saturation



### Exterior LED Saturation



Black line indicates 90% confidence interval



## ON-SITE KEY FINDINGS: WATER HEATING & REFRIGERATION

There is **relatively low saturation** of instantaneous water heaters and high efficiency refrigeration equipment.

- We did not see any instantaneous water heaters on-site.
- High efficiency refrigeration equipment such as heat recovery systems, high efficiency evaporator fans, and energy star refrigerators and freezers were not present at many sites.

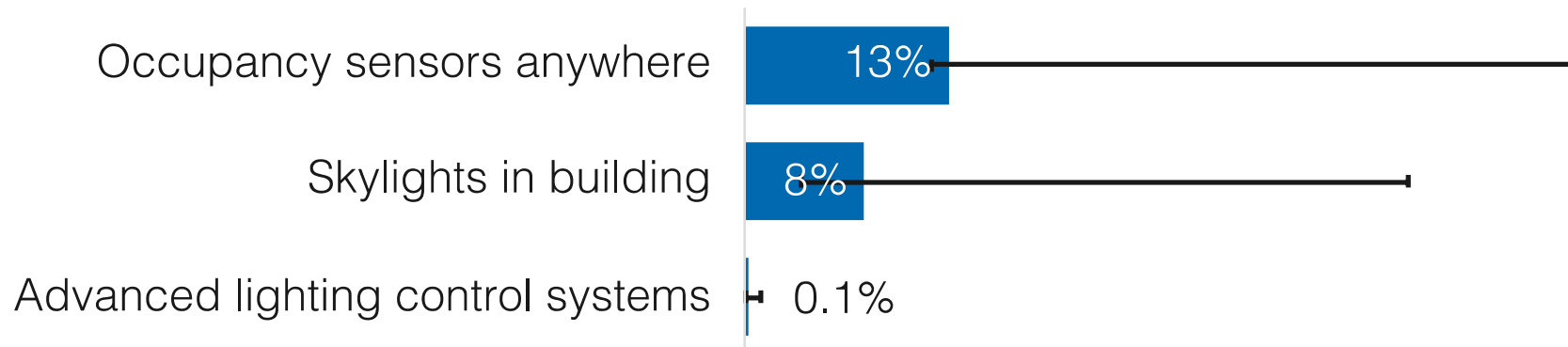


## ON-SITE KEY FINDINGS: CONTROLS

The **penetration of lighting controls remains low** and presents an energy efficiency opportunity for Consumers Energy's programs.

→ Of the sites visited, 13% of facilities had occupancy controls and only one had advanced lighting controls. None had controls near skylights

### Penetration of Lighting Controls



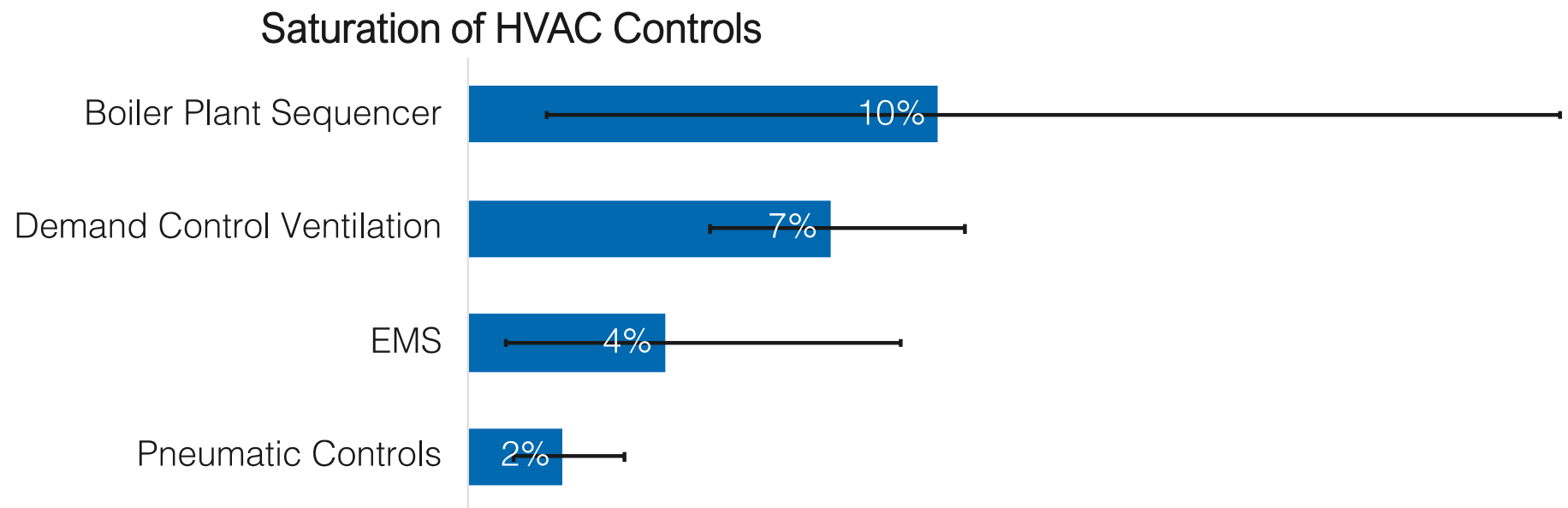




## ON-SITE KEY FINDINGS: CONTROLS

Across all equipment types, **controls represent an opportunity** for Consumers Energy programs.

- The saturation of **HVAC** and refrigeration controls were less than 30% in most cases, and substantially less in some cases

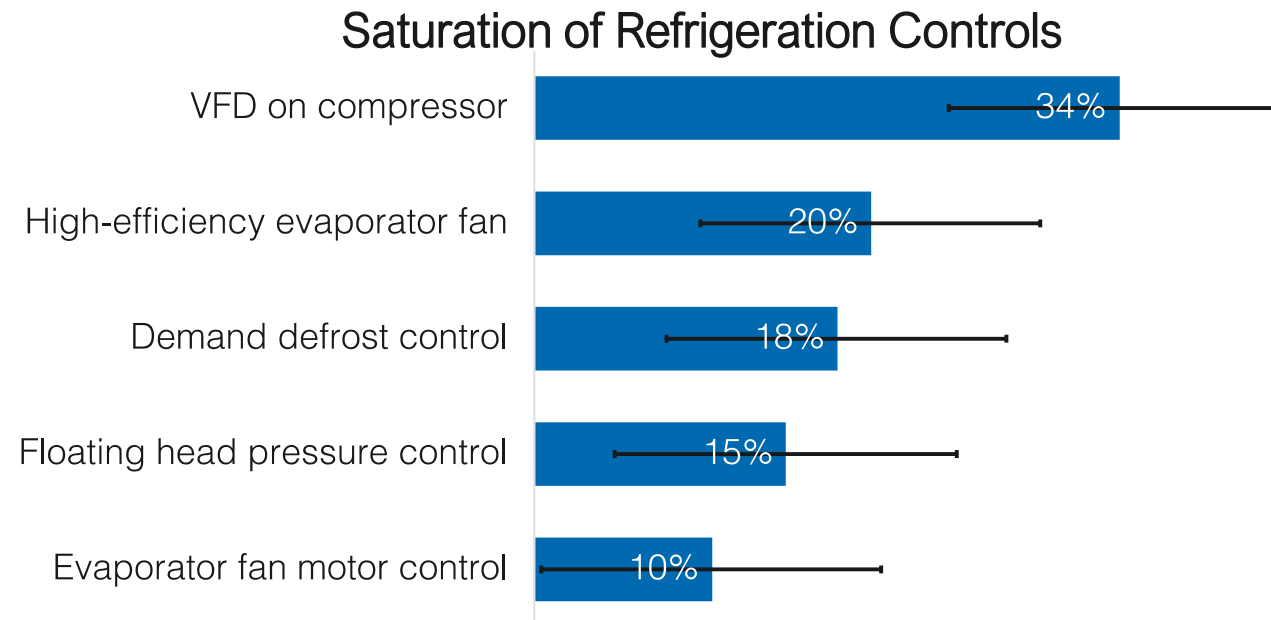




## ON-SITE KEY FINDINGS: CONTROLS

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## ON-SITE AND SURVEY KEY FINDINGS: VFDS

The saturation of variable frequency drives (VFDs) was **fairly low** across equipment and facility types.

- The saturation of VFDs was below 30% in most cases, and substantially less in some cases
- Only 14% of survey respondents would install a VFD without a rebate

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Questions?

