

# Implementation Rates of Energy Conservation Measures for Health Care Buildings

 **THE WEIDT GROUP**

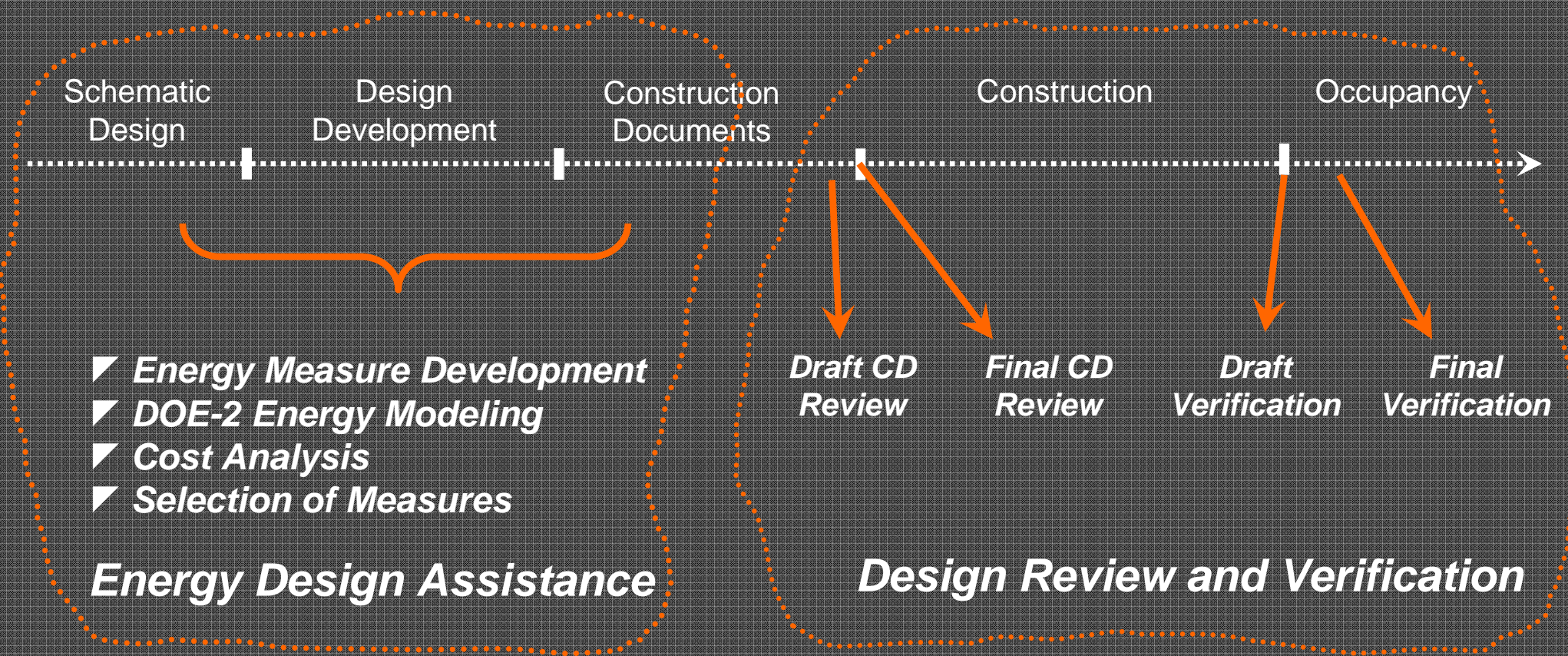
COLLABORATION  
ANALYSIS  
RESEARCH

**30**  
YEARS



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# Energy Consulting Process



# Data Resources at The Weidt Group

- ▶ 554 Completed EDA Projects
  - ▶ 100,000,000 Square Feet
- ▶ 428 Field Verified Projects
  - ▶ One third of these done by The Weidt Group

# Design Review Process

## Construction Documents

Windows	<ul style="list-style-type: none"><li>▶ Look for specification of glass type</li><li>▶ Verify key parameters (U, SHGC, VT)</li></ul>
Wall and roof insulation	<ul style="list-style-type: none"><li>▶ Calculate overall U-value and compare with expected values</li></ul>
Daylighting control and other lighting control	<ul style="list-style-type: none"><li>▶ Locate sensors and wiring on plans</li><li>▶ Review control sequences</li></ul>
Lighting design	<ul style="list-style-type: none"><li>▶ Count fixtures</li><li>▶ Check lamp and ballast types</li><li>▶ Check for fixture Watts</li><li>▶ Calculate W/sq ft</li></ul>
Mechanical equipment	<ul style="list-style-type: none"><li>▶ Check for equipment types and efficiencies</li></ul>
Mechanical controls	<ul style="list-style-type: none"><li>▶ Check plans and schedules for key components</li><li>▶ Review control sequences</li></ul>

# Verification Process

## Submittals and Site Visits

Windows	<ul style="list-style-type: none"> <li>➤ Look for specification of glass type in Submittals</li> <li>➤ Verify key parameters (U, SHGC, VT)</li> </ul>
Wall and roof insulation	<ul style="list-style-type: none"> <li>➤ Check construction in Submittals</li> <li>➤ Recalculate overall U-value, if needed</li> </ul>
Daylighting control and other lighting control	<ul style="list-style-type: none"> <li>➤ Locate sensors in site visit</li> <li>➤ Do functional test</li> <li>➤ Do logging of lighting power to show trends</li> </ul>
Lighting design	<ul style="list-style-type: none"> <li>➤ Count fixtures on-site; check lamps and ballasts</li> <li>➤ Determine Watts of representative fixtures</li> <li>➤ Calculate W/sq ft</li> </ul>
Mechanical equipment	<ul style="list-style-type: none"> <li>➤ Locate equipment in submittals and on-site</li> <li>➤ Record nameplate efficiencies</li> </ul>
Mechanical controls	<ul style="list-style-type: none"> <li>➤ Check Submittals for key components</li> <li>➤ Review control sequences in Submittals</li> <li>➤ Conduct functional test where possible</li> <li>➤ Do logging where possible to verify operation</li> </ul>

# Implementation Rate Defined

$$\text{Implementation} = \frac{\text{Energy Savings at Stage}}{\text{Energy Savings at Selection}}$$

## Four Stages:

- ▶ Draft CD Review (DCD)
- ▶ Final CD Review (CD)
- ▶ Draft Verification (DV)
- ▶ Final Verification (V)

# Implementation Rates

## Reasons to Study

- ▶ How much falls out between modeling effort and release of CDs?
- ▶ How much can be restored by each stage of the Design Review and Verification process?

# Implementation Rates

## Reasons to Study

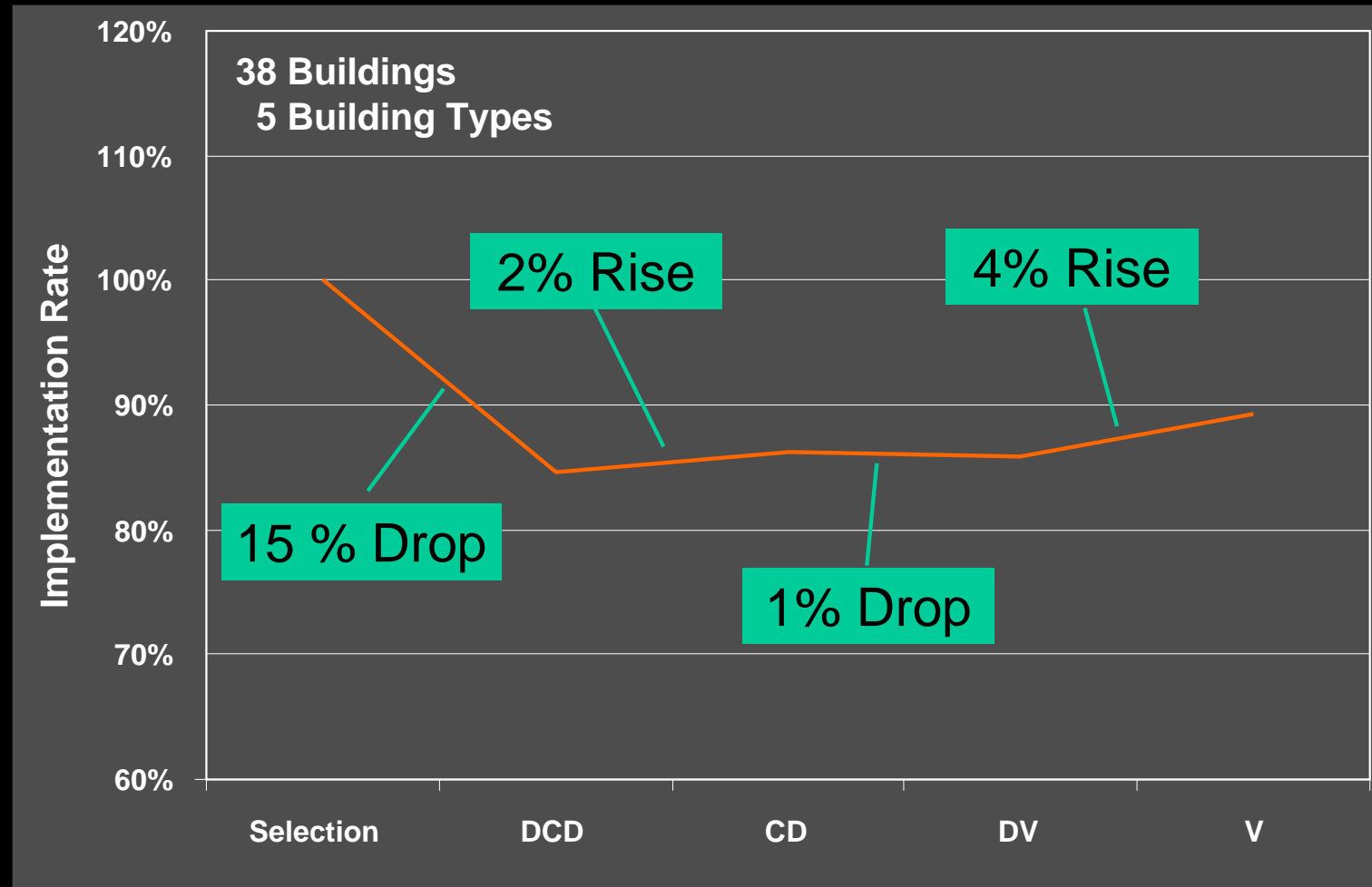
- ▶ What is the relative importance of CD review and post construction verification?
- ▶ How does this vary by measure type?

# Previous Implementation Rate Study by The Weidt Group

Number of buildings	105
Project scope	New construction; total building or addition
Floor area per building	20,000 to 900,000 sq ft
Location	Iowa
Building types	Office K-12 School College/ University Lab Health Care Mixed Use

*Source: Measuring the Success Rate of ECMs in New Construction; Greden, et al; ACEEE 2006 Summer Study*

# Implementation Rates By Stage From Previous Study

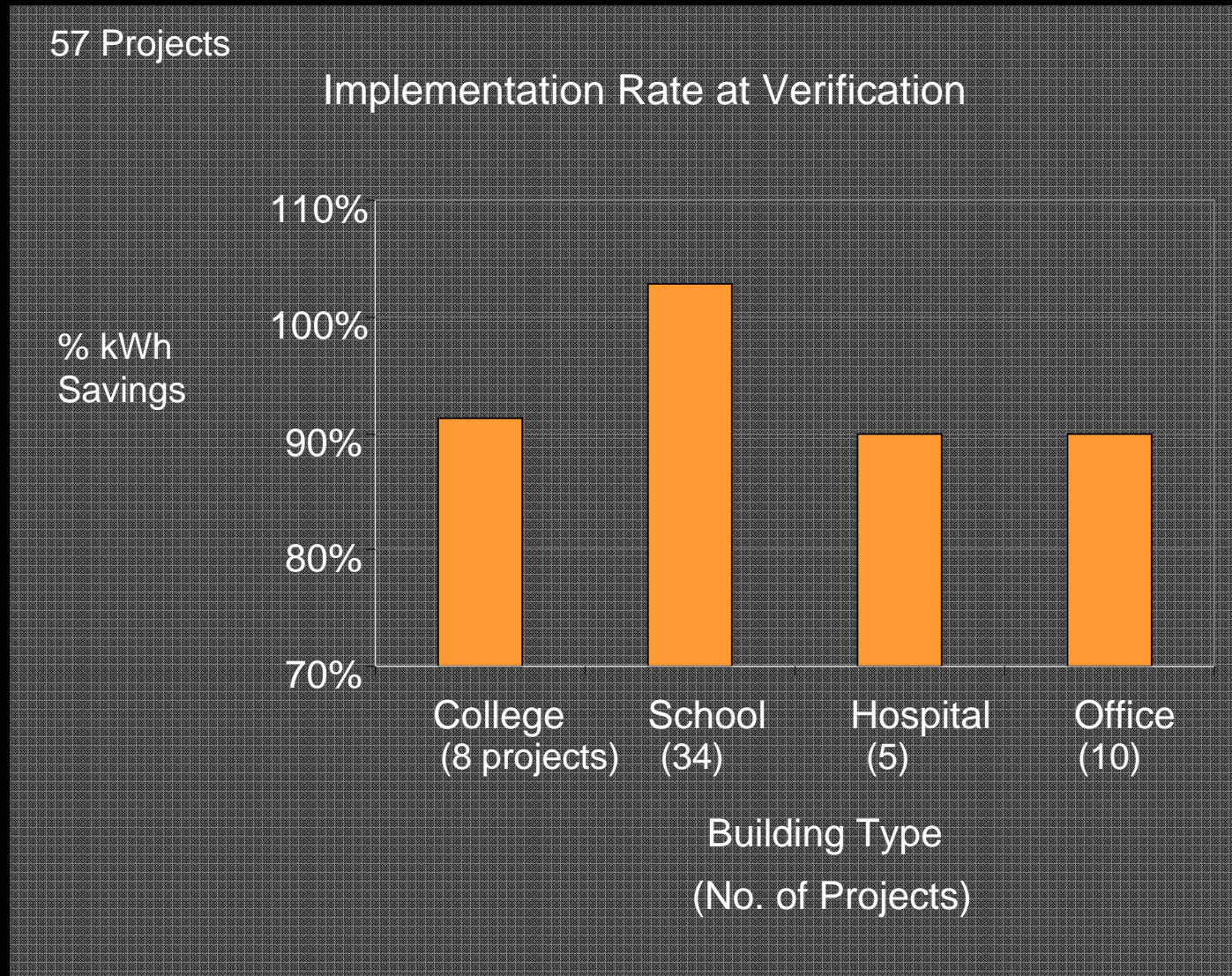


# Final Implementation Rates

## By Building Type from Previous Study

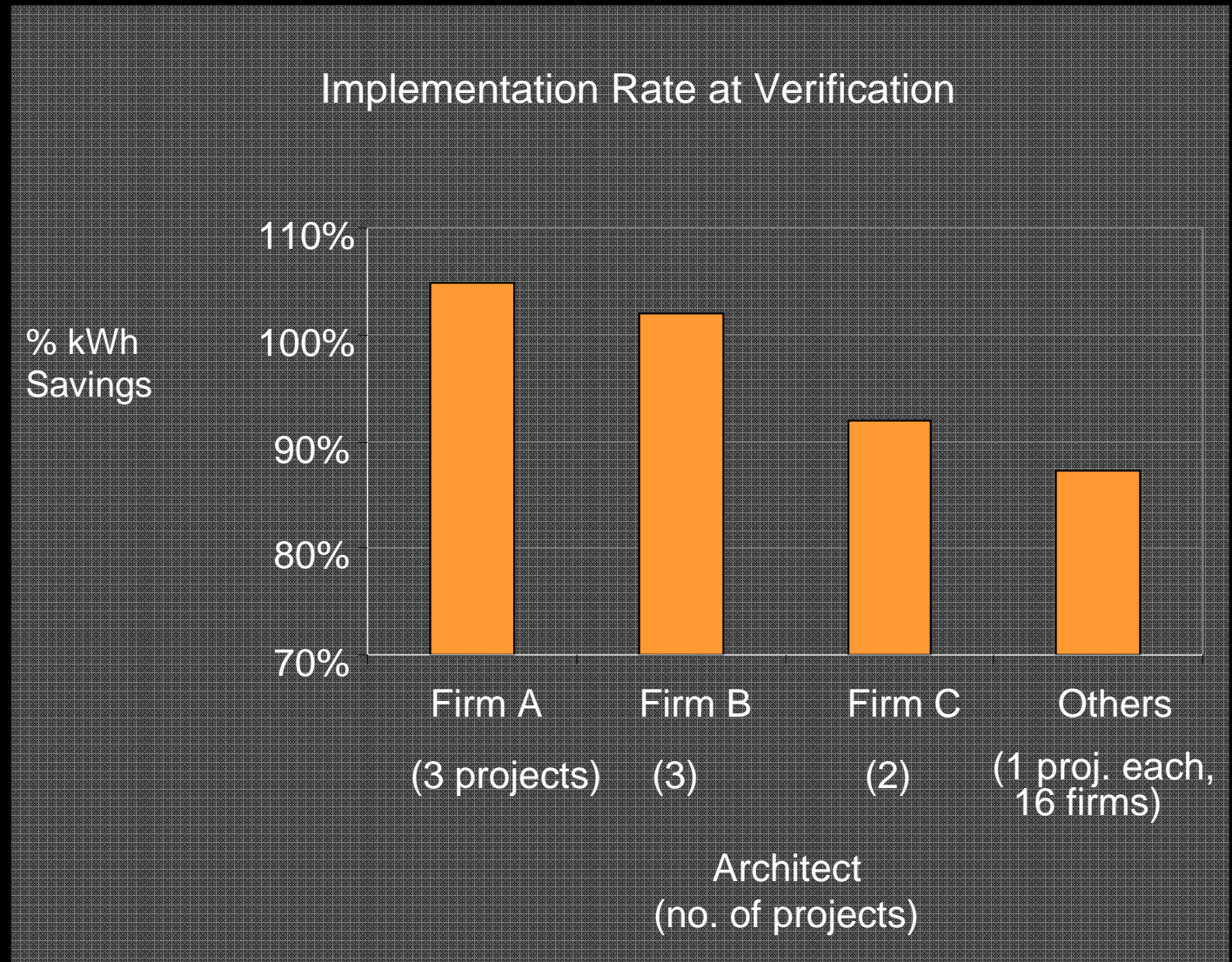
Schools must follow state mandate for energy measures

Schools have high repeat participation by owners and design team



# Final Implementation Rate

## By Participation Rate from Previous Study



# Health Care Buildings

## Current Study

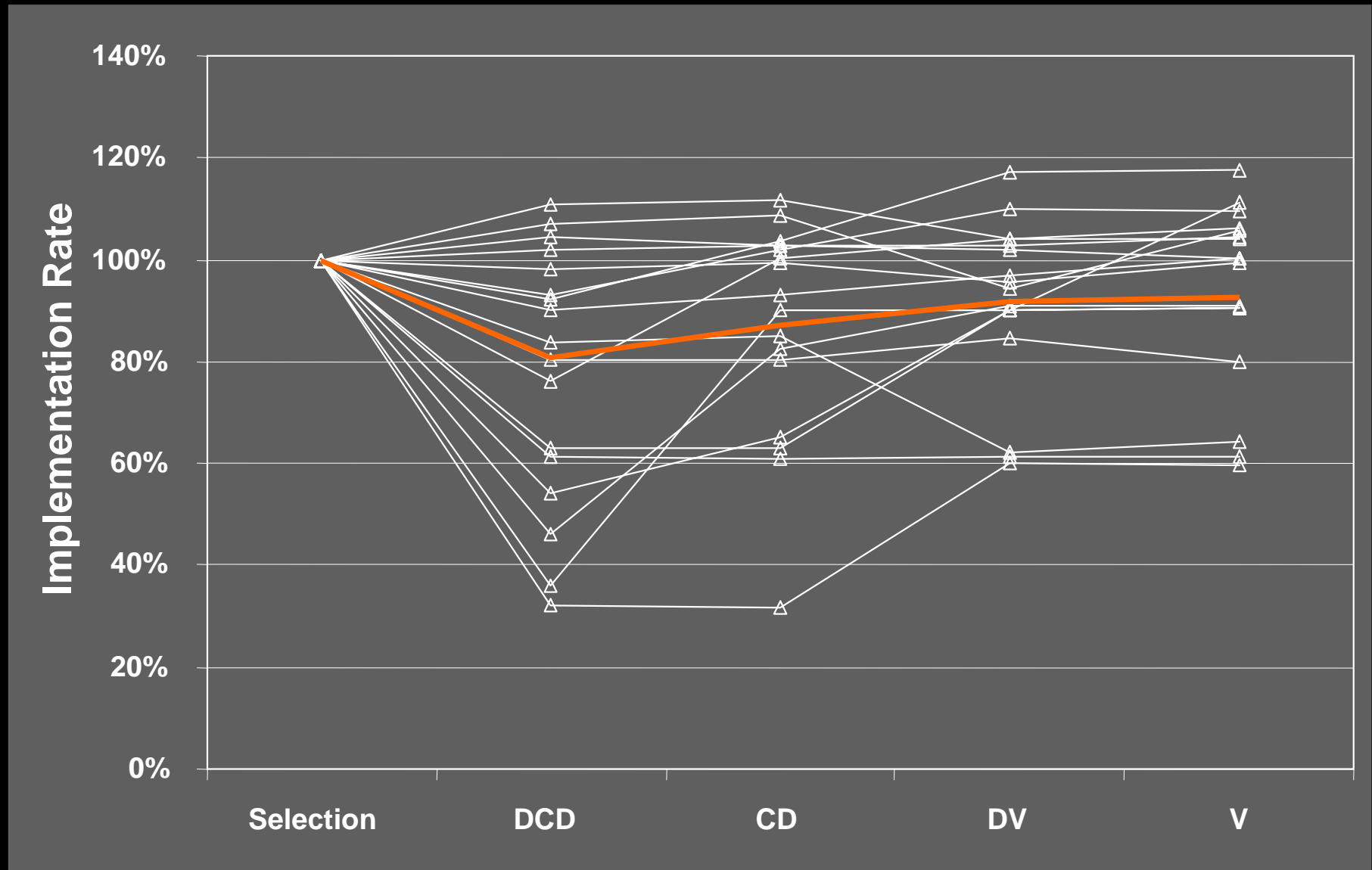
Number of buildings	16
Project scope	New construction; total building or addition
Floor area per building	50,000 to 500,000 sq ft
Location	Iowa, Minnesota, Colorado
Building Type	Health Care

# Modeled Energy Savings for Selected Measures

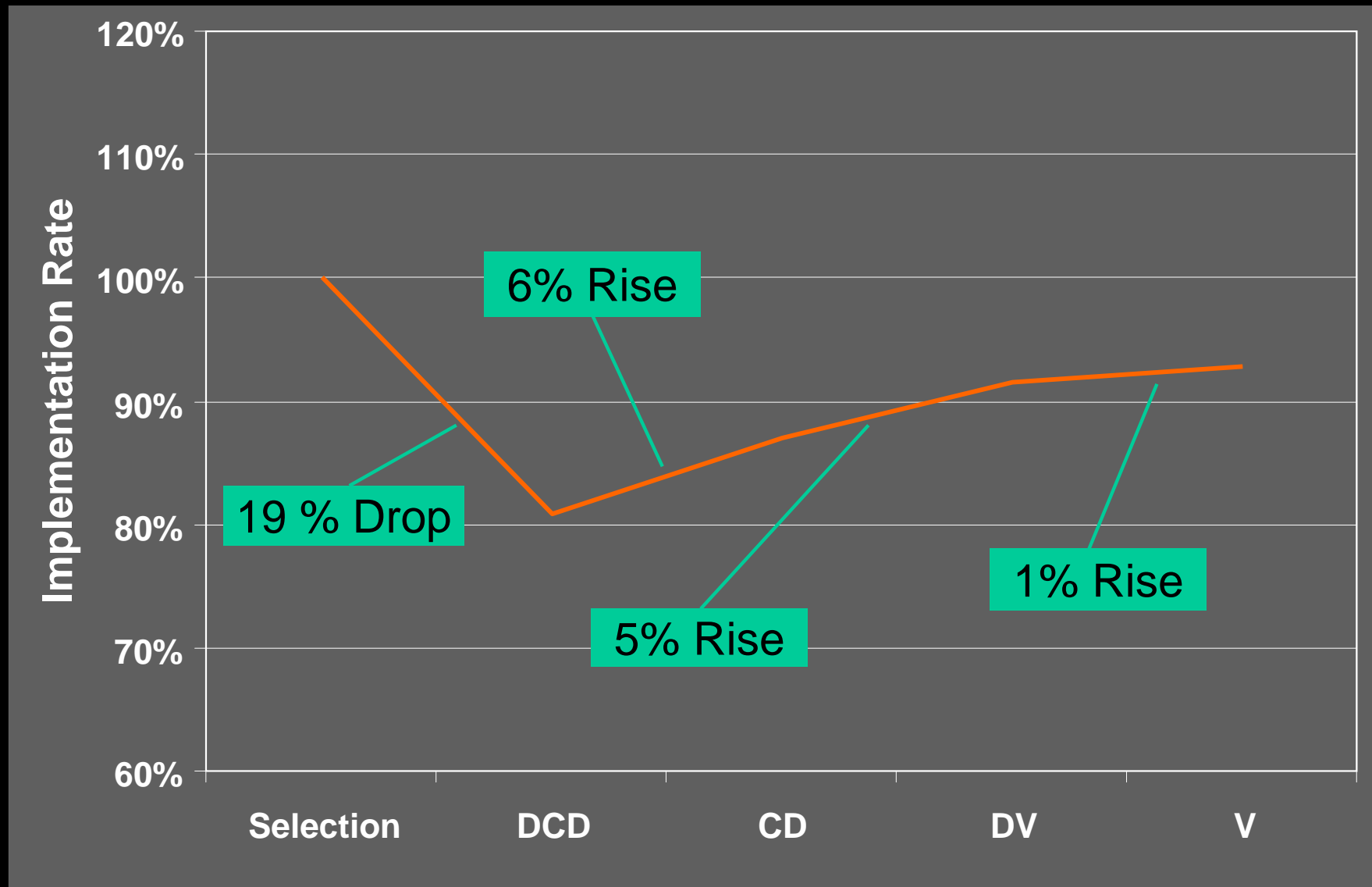
## Average of 16 Health Care Buildings

	Savings
Annual Dollars	23%
Electric Energy kWh	30%
Peak Electric kW	28%
Gas Energy	6%

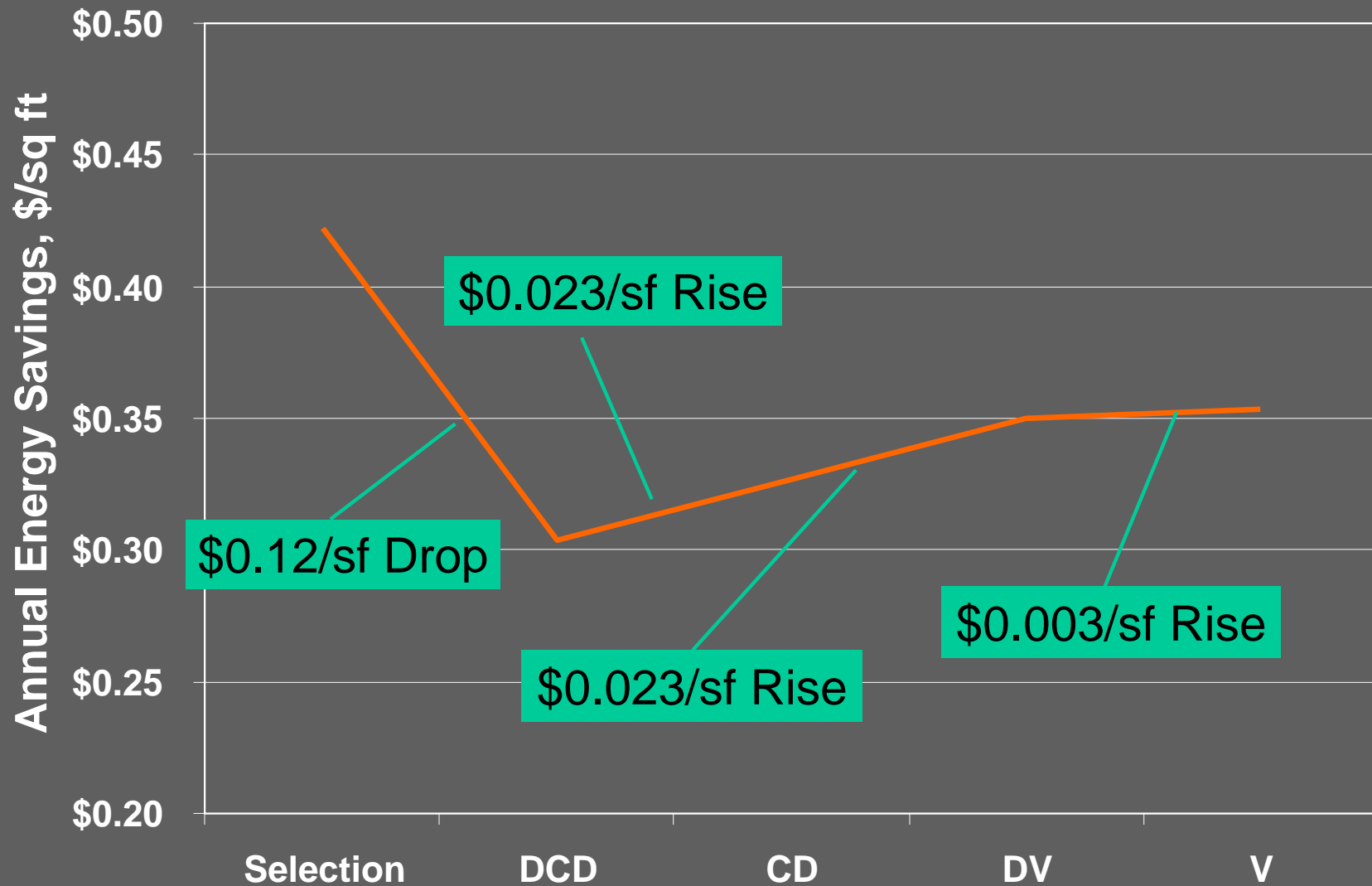
# Implementation Rate By Stage for 16 Health Care Buildings



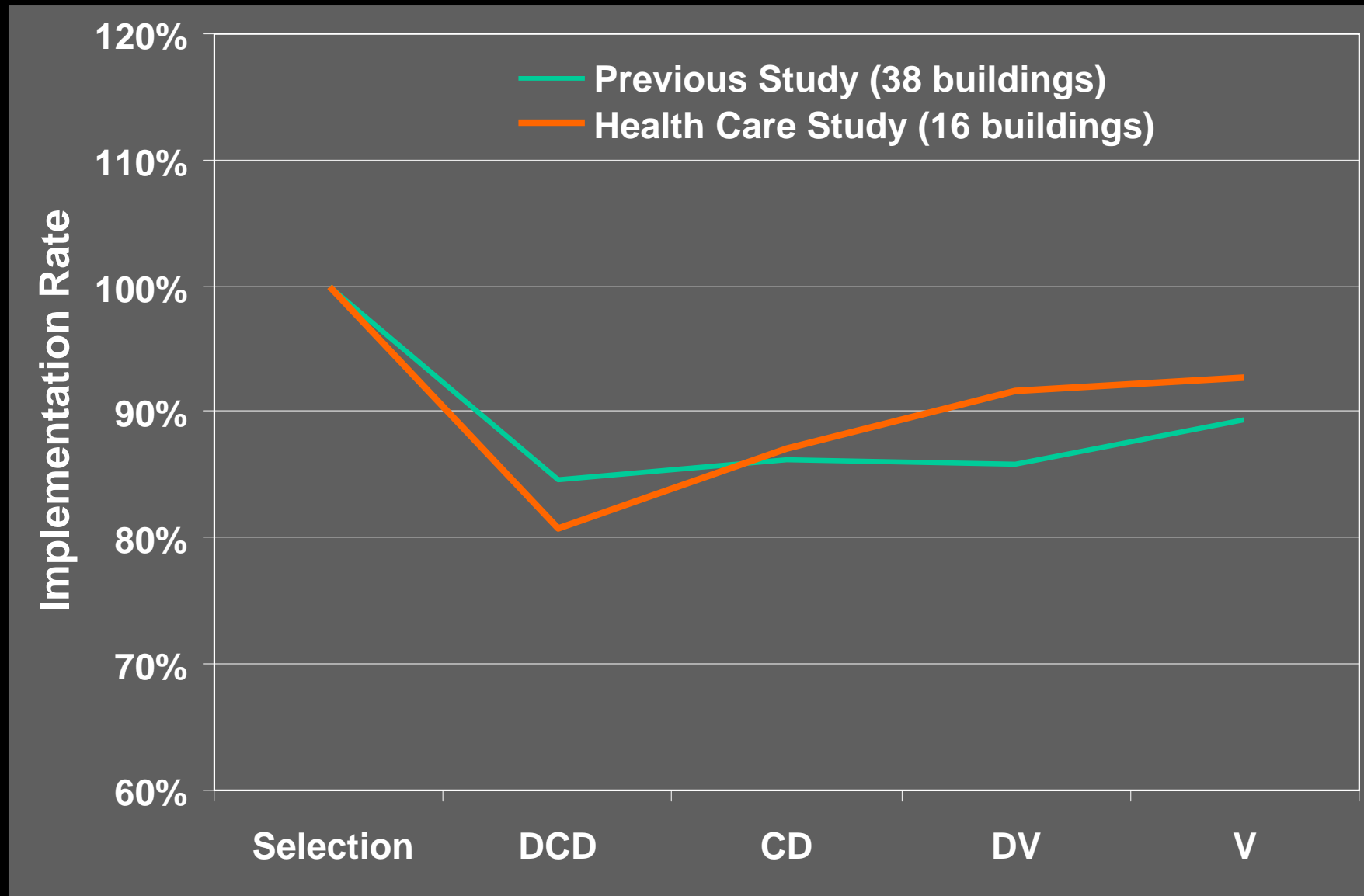
# Average Implementation Rate By Stage for Health Care Buildings



# Average Implementation Rate By Stage for Health Care Buildings

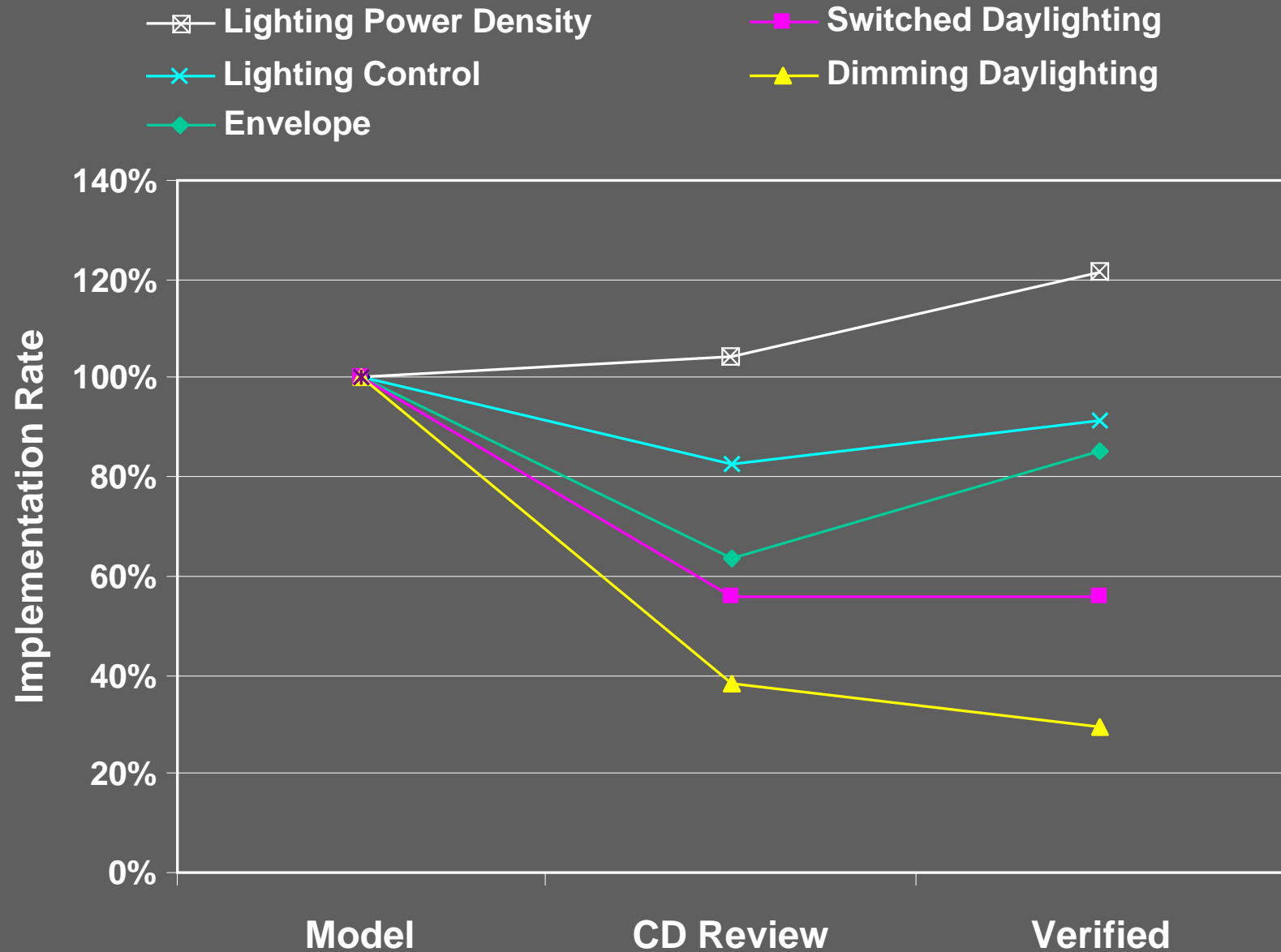


# Comparison with Previous Study

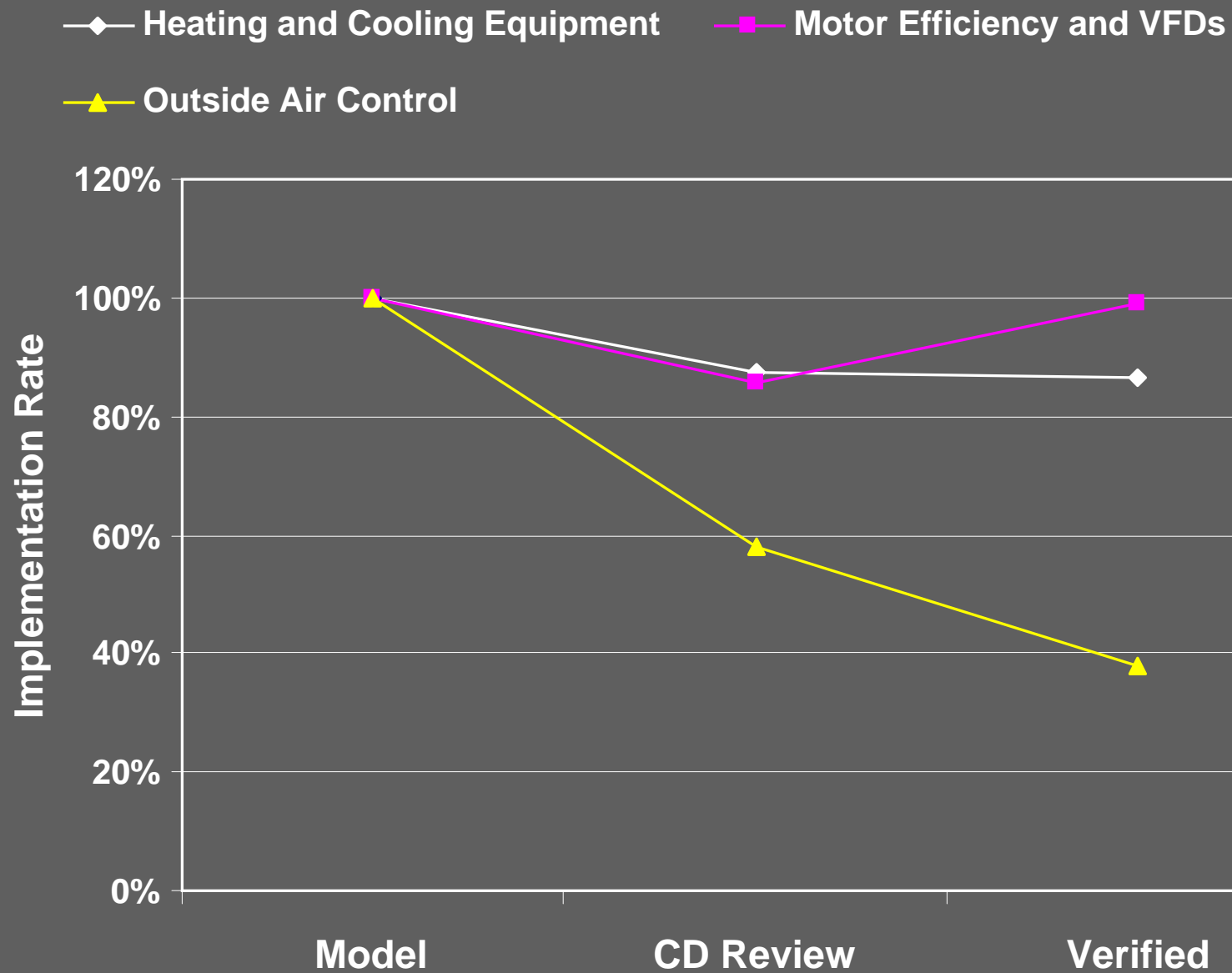


# Implementation Rates

## By Strategy Type for Envelope and Lighting



# Implementation Rates By Strategy Type Mechanical



# Conclusions

- ▶ Trends for Health Care buildings are similar to other building types
- ▶ Highest loss of savings occurs between Selection of Measures and release of CDs
- ▶ CD review stages show highest savings potential
- ▶ Verification savings show significant savings for some projects

# Conclusions

- ▶ Controls oriented measures are much more likely to have lost savings than equipment measures
  - ▶ Avg 70% loss for dimming daylighting
  - ▶ Avg 62% loss for outside air control

# Thank you



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