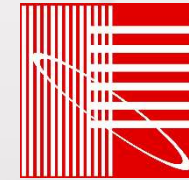


**BS**  
2019  
2-4 SEPT  
ROME



**16th IBPSA**  
INTERNATIONAL  
**CONFERENCE**  
AND EXHIBITION



INTERNATIONAL  
BUILDING  
PERFORMANCE  
SIMULATION  
ASSOCIATION

## **Panel Discussion:** **ASHRAE Standard 209-2018 Simulation Aided Design**

### **Part 1: Introduction to ASHRAE Standard 209-2018**

Speaker:

Erik Kolderup  
Kolderup Consulting

Authors:

# Agenda

---

Erik Kolderup      Introduction to ASHRAE Standard 209-2018

---

Minu Agarwal      Process, a key ingredient to high performance design

---

Annie Marston      How 209 relates to current practice in a non-US country

---

Dru Crawley      Discussion

---



Introduction to ASHRAE Standard 209-2018  
Erik Kolderup, Kolderup Consulting

# Introduction to Standard 209

1. Why and how it came to be
2. What it is
3. Challenges



ANSI/ASHRAE Standard 209-2018

## Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE on March 30, 2018, and by the American National Standards Institute on April 2, 2018.

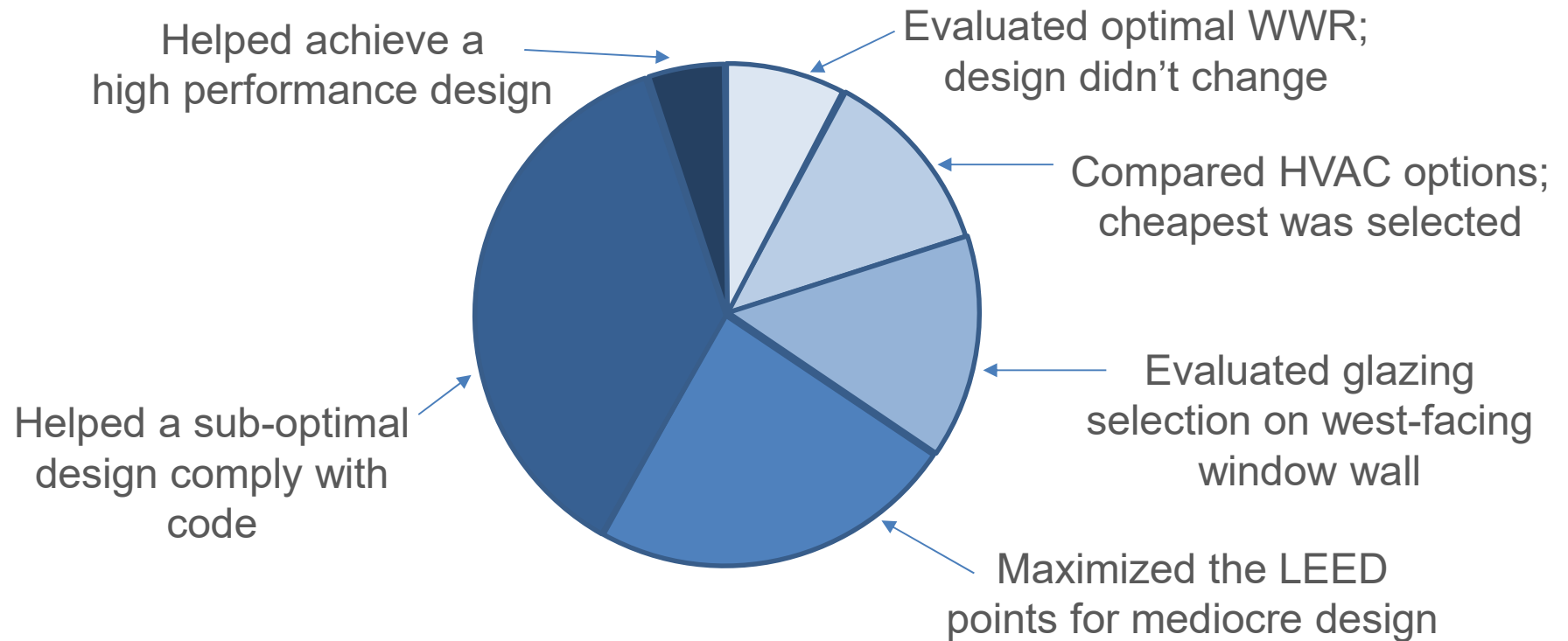
ASHRAE® Standards are scheduled to be updated on a five-year cycle; the date following the Standard number is the year of ASHRAE approval. The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 678-559-2129. Telephone: 404-636-9400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

© 2018 ASHRAE ISSN 1041-2336

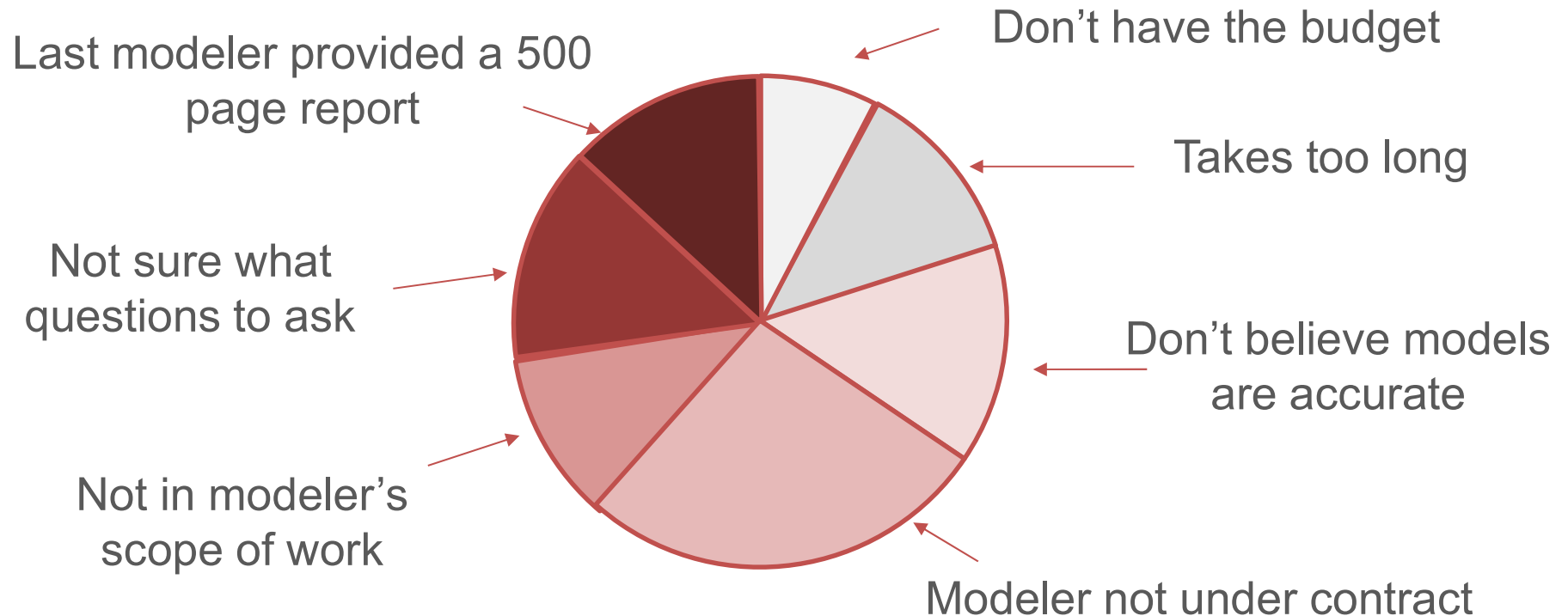


Introduction to ASHRAE Standard 209-2018  
Erik Kolderup, Kolderup Consulting

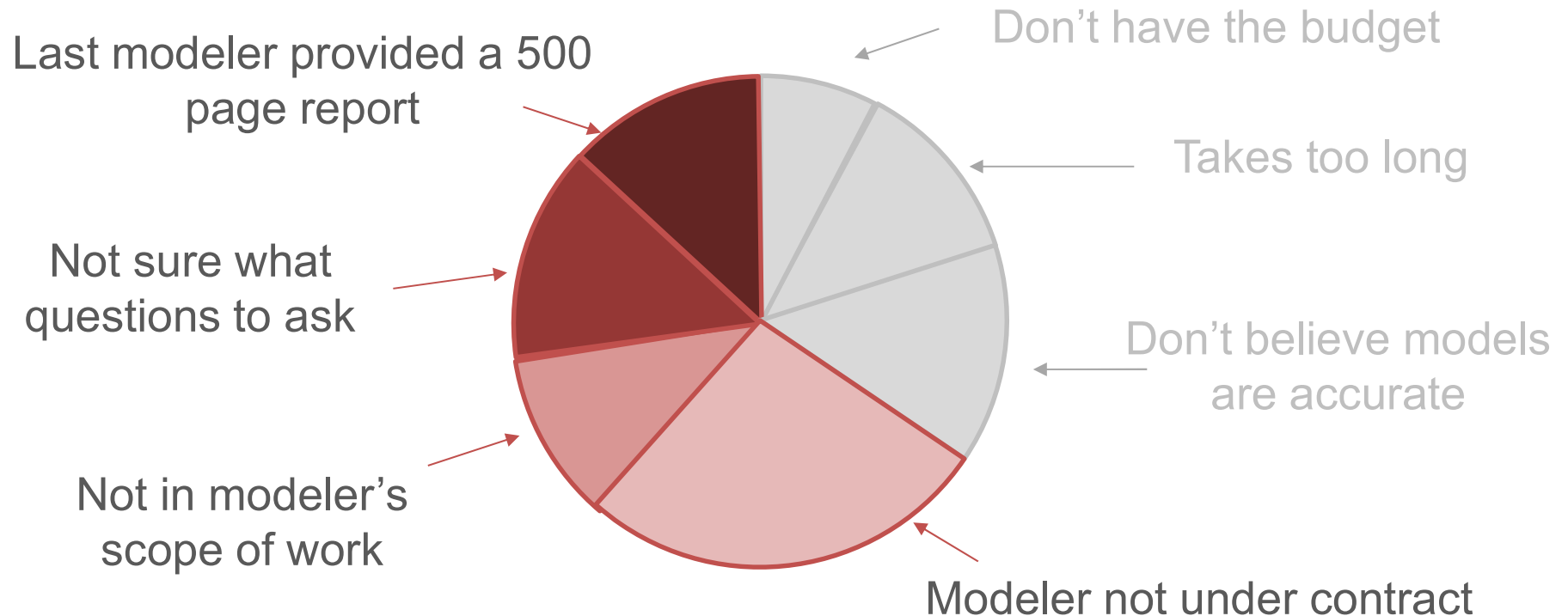
## Energy modeler's lament



## Why is it so?



## Why is it so?



## How 209 came to be

2011 Spring	Email list discussion
2011 Oct.	ASHRAE approved title, purpose and scope
...	
2016 Mar.	1 <sup>st</sup> Public Review
2017 May	2 <sup>nd</sup> Public Review
2017 Nov.	3 <sup>rd</sup> Public Review
2018 Apr.	Publication

# What it is

- Process standard
- Minimum requirements
  1. Four specific activities
  2. Two modeling cycles
    1. Load-reduction
    2. Additional design-phase cycle
- Optional modeling cycles
  - Construction phase
  - Occupancy phase



ANSI/ASHRAE Standard 209-2018

## Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE on March 30, 2018, and by the American National Standards Institute on April 2, 2018.

ASHRAE® Standards are scheduled to be updated on a five-year cycle; the date following the Standard number is the year of ASHRAE approval. The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

© 2018 ASHRAE

ISSN 1041-2336



Introduction to ASHRAE Standard 209-2018  
Erik Kolderup, Kolderup Consulting



# What it is

1. Purpose
2. Scope
3. Definitions
4. Utilization
5. General Requirements
6. Design Modeling Cycles
7. Construction and Operations Modeling
8. Post-Occupancy Energy Performance Comparison



ANSI/ASHRAE Standard 209-2018

## **Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings**

Approved by ASHRAE on March 30, 2018, and by the American National Standards Institute on April 2, 2018.

ASHRAE® Standards are scheduled to be updated on a five-year cycle; the date following the Standard number is the year of ASHRAE approval. The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

© 2018 ASHRAE

ISSN 1041-2336



Introduction to ASHRAE Standard 209-2018  
Erik Kolderup, Kolderup Consulting

# What it is

## 5. General Requirements

5.1 Software Requirements

5.2 Modeler Credentials

5.3 Climate and Site Analysis

5.4 Benchmarking

5.5 Energy Charrette

5.6 Establish Energy Performance Goals

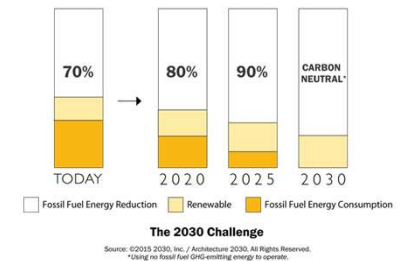
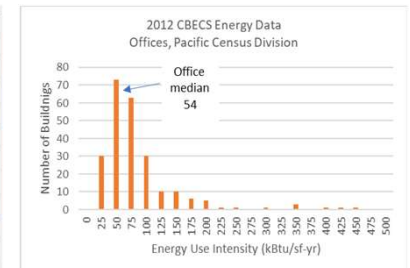
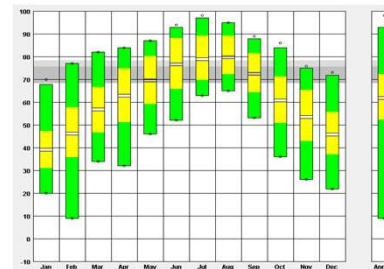
### 5.7 General Modeling Cycle Requirements

5.7.1 Energy Baselines and Goals

5.7.2 Input Data

5.7.3 Reporting


5.7.4 Quality Assurance



## What it is

### 6. Design Modeling Cycles

#### Timing

6.1	#1	Simple Box Model	Conceptual Design
6.2	#2	Conceptual Design	
6.3	#3	<b>Load Reduction</b> 	Schematic Design
6.4	#4	HVAC System Selection	
6.5	#5	Design Refinement	Design Development
6.6	#6	Design Integration & Optimization	
6.7	#7	Energy Simulation-Aided Value Engineering	Construction Documents

# What it is

## 6.1 Modeling Cycle # 1—Simple Box Modeling

**6.1.1 Purpose.** Identify the distribution of energy by end use. Evaluate *energy end uses* and demand characteristics that affect building conceptual design.

**6.1.2 Applicability.** This *modeling cycle* applies before the building's geometry and site orientation have been set in the design process. This must be completed before or during the *energy charrette* described in Section 5.5.

**6.1.3 Analysis.** Create *energy models* to calculate annual building energy by end use and peak heating and cooling loads with identical *HVAC systems*. Perform a sensitivity analysis by varying the following building characteristics:

- a. Building geometry
- b. Window-to-wall ratio, by orientation, and shading options (if applicable)
- c. Orientation
- d. Thermal performance of the envelope and structure

## What it is

### 7. Construction and Operations Modeling

7.1 #8 As-Designed Performance

7.2 #9 Change Orders

7.3 #10 As-Built Energy Performance

### 8. Post-Occupancy Energy Performance Comparison

8.1 #11 Post-Occupancy Energy Performance Comparison

# Compliance

## Required

5.3 Climate and Site Analysis

5.4 Benchmarking

5.5 Energy Charrette

5.6 Energy Performance Goals in OPR

5.7 General Modeling Cycle  
Requirements

+

6.3 Modeling Cycle #3  
Load Reduction Modeling

5.7 General Modeling Cycle  
Requirements

+

One additional design-phase  
modeling cycle (earlier or later)

## How to use it

- Policy
- Request for proposal
- Scope of work
- Guide for design process
  - Analyses
  - Interactions



ANSI/ASHRAE Standard 209-2018

### **Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings**

Approved by ASHRAE on March 30, 2018, and by the American National Standards Institute on April 2, 2018.

ASHRAE® Standards are scheduled to be updated on a five-year cycle; the date following the Standard number is the year of ASHRAE approval. The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

© 2018 ASHRAE

ISSN 1041-2336



Introduction to ASHRAE Standard 209-2018  
Erik Kolderup, Kolderup Consulting

## Designers & Owners

## Analysts

Climate & site analysis

Benchmarking

Charrette (meeting)

Goals in OPR

Discuss purpose, inputs, baselines and goals

Input QA review  
Output QA review

Analysis  
Input reporting  
Output reporting

Discuss purpose, inputs, baselines and goals

Input QA review  
Output QA review

Analysis  
Input reporting  
Output reporting



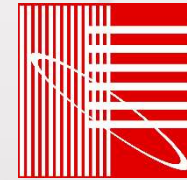
## Parting thoughts

- Simulation is more important than ever
- We can get more benefit from simulation
- We are still learning how to integrate simulation
- Standard 209 is a step towards a common understanding

**BS**  
2019  
2-4 SEPT  
ROME



**16th IBPSA**  
INTERNATIONAL  
**CONFERENCE**  
AND EXHIBITION



INTERNATIONAL  
BUILDING  
PERFORMANCE  
SIMULATION  
ASSOCIATION

## **Panel Discussion:**

ASHRAE Standard 209-2018 Simulation Aided Design

Part 1: Introduction to ASHRAE Standard 209-2018

Questions and Comments

Speaker:

Erik Kolderup  
Kolderup Consulting

Contacts:

[erik@kolderupconsulting.com](mailto:erik@kolderupconsulting.com)