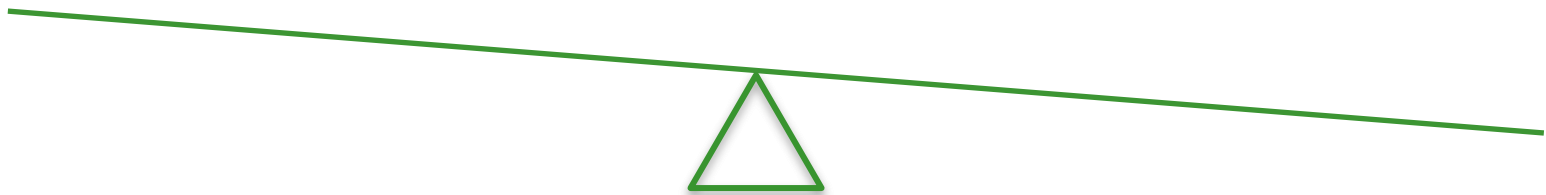


codevolution



DESIGN
procurement
Rating systems
IPD
QBS
codes
BIM
compensation
contract documents
taxes



Professional Practice

**FIRE SAFETY
STRUCTURAL INTEGRITY
MEANS OF EGRESS
LIGHT
VENTILATION
HEAT
WATER & WASTEWATER
ELECTRICAL & GAS
ENERGY EFFICIENCY**



2001
LEED



**Commercial Developer
Buy-In & Competitive Nature**

**Market
Transformation**

9/11

Enron

Katrina

CA AB32

**Political
Leadership**



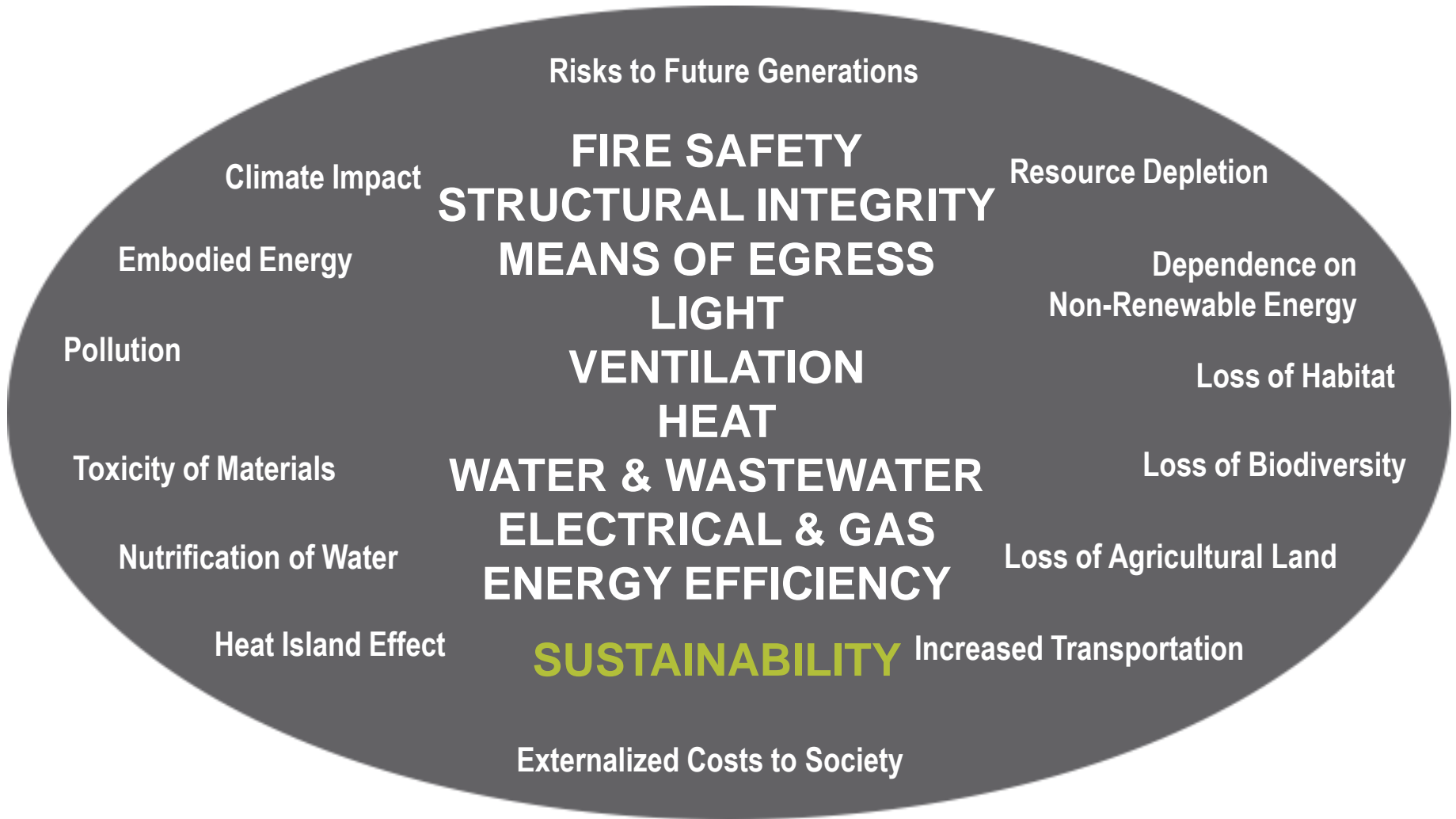
2012

'Ready for Adoption'



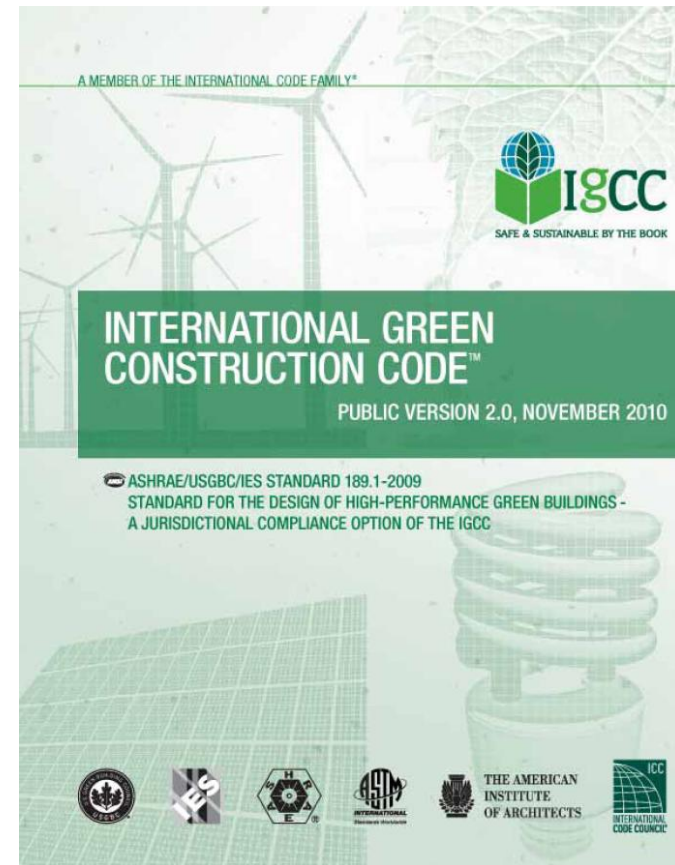
Jan 1, 2011
1st State Wide
Green Building
Code





IgCC Chapter Topics

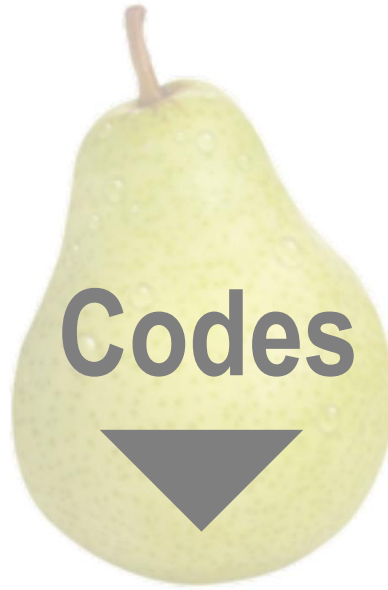
- Ch.1,2: Administration and Definitions
- Ch. 3: Jurisdictional Requirements – Standard 189.1 option here
- Ch. 3: Project Electives
- Ch. 4: Site Development & Land Use
- Ch. 5: Material Resource Conservation
- Ch. 6: Energy Efficiency & Atmospheric Quality
- Ch. 7: Water Resource Conservation & Efficiency
- Ch. 8: Indoor Environmental Quality
- Ch. 9: Commissioning, O&M
- Ch.10: Existing Buildings
- Ch.11: Existing Sites
- Ch.12: Referenced Standards



Comparing Green Building Rating Systems, Building Codes & Building Standards



- Inspirational & elective criteria
- Define achievement through ratings
- Uses 3rd party reviews or self certified
- 'Do Better than Code'



- It's the BUILDING CODE.
- The 'LAW' for licensed architect & engineers
- Little flexibility
- Permits required
- Intentionally hard to change
- Interpreted by Local Code Officials



- Sets or defines stakeholder based practices & metrics
- Referenced in other codes and ratings systems
- No Enforcement
- No Inspection

Green Building Ratings, Codes & Standards



LEED
2009 BD&C



Sustainable Sites



Water Efficiency



Energy & Atmosphere



Indoor Environmental Quality



Materials & Resources



Innovation in Design



Regional Priority

*CAL*Green

5. Commercial | 4. Residential



5.1 Planning and Design



5.3 Water Efficiency & Conservation



5.2 Energy Efficiency



5.5 Environmental Quality



5.4 Material Conservation & Resource Efficiency



Additional CALGreen Voluntary measures are required for Tier 1 & 2



ASHRAE
189.1



Site Sustainability



Water Use Efficiency



Energy Efficiency



Indoor Environmental Quality



Building Impact on Atmosphere, Materials & Resources



Construction and Operations Plans



Site Development and Land Use



Water Resource Efficiency



Energy Efficiency & Atmospheric Quality



Indoor Environmental Quality & Comfort



Material Resource Conservation



Commissioning, O&M

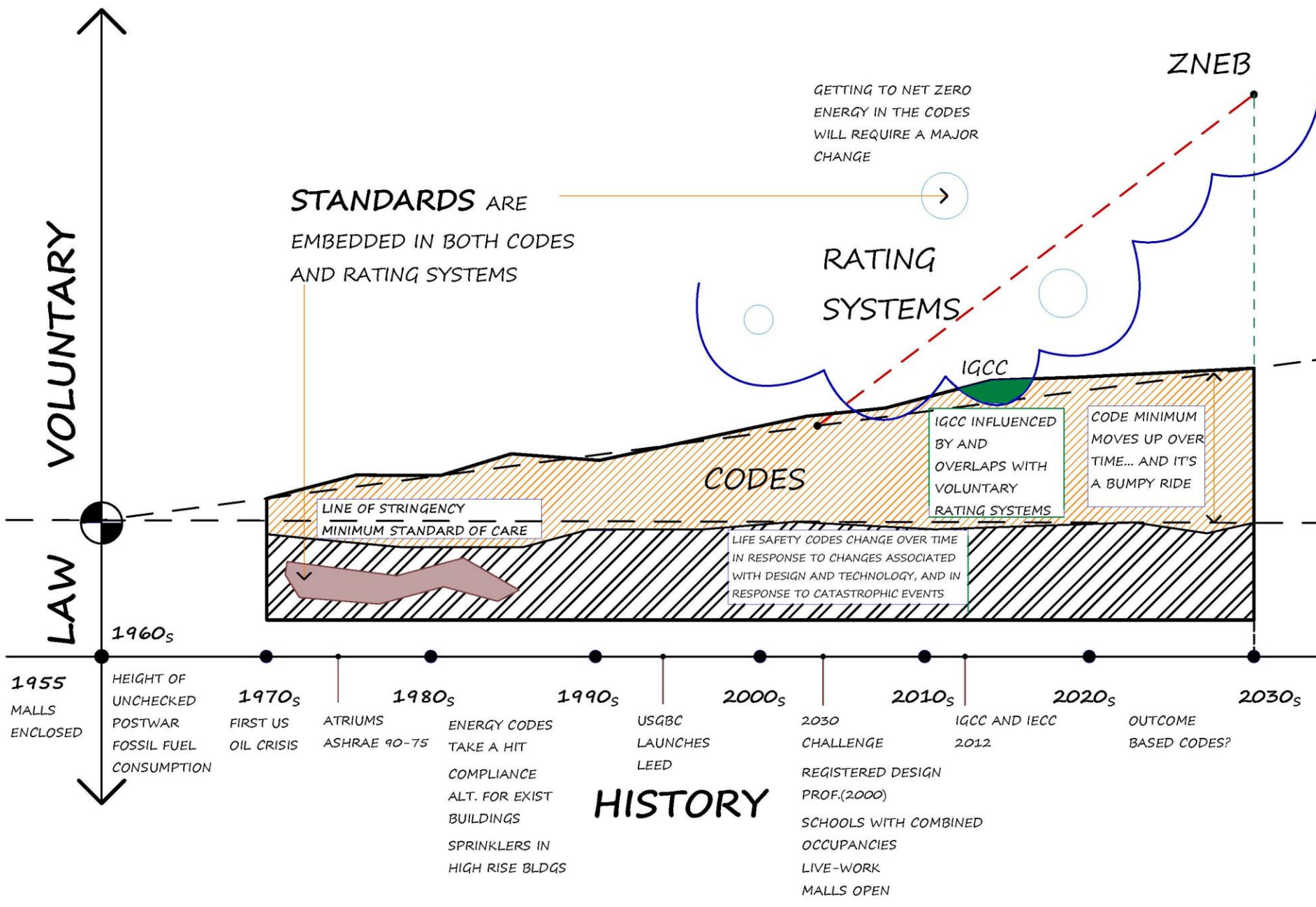


Jurisdictional & Elective Requirements



Existing Buildings & Sites





VOLUNTARY

LAW

STANDARDS ARE EMBEDDED IN BOTH CODES AND RATING SYSTEMS

GETTING TO NET ZERO ENERGY IN THE CODES WILL REQUIRE A MAJOR CHANGE

RATING SYSTEMS

ZNEB

CODES

IGCC

IGCC INFLUENCED BY AND OVERLAPS WITH VOLUNTARY RATING SYSTEMS

CODE MINIMUM MOVES UP OVER TIME... AND IT'S A BUMPY RIDE

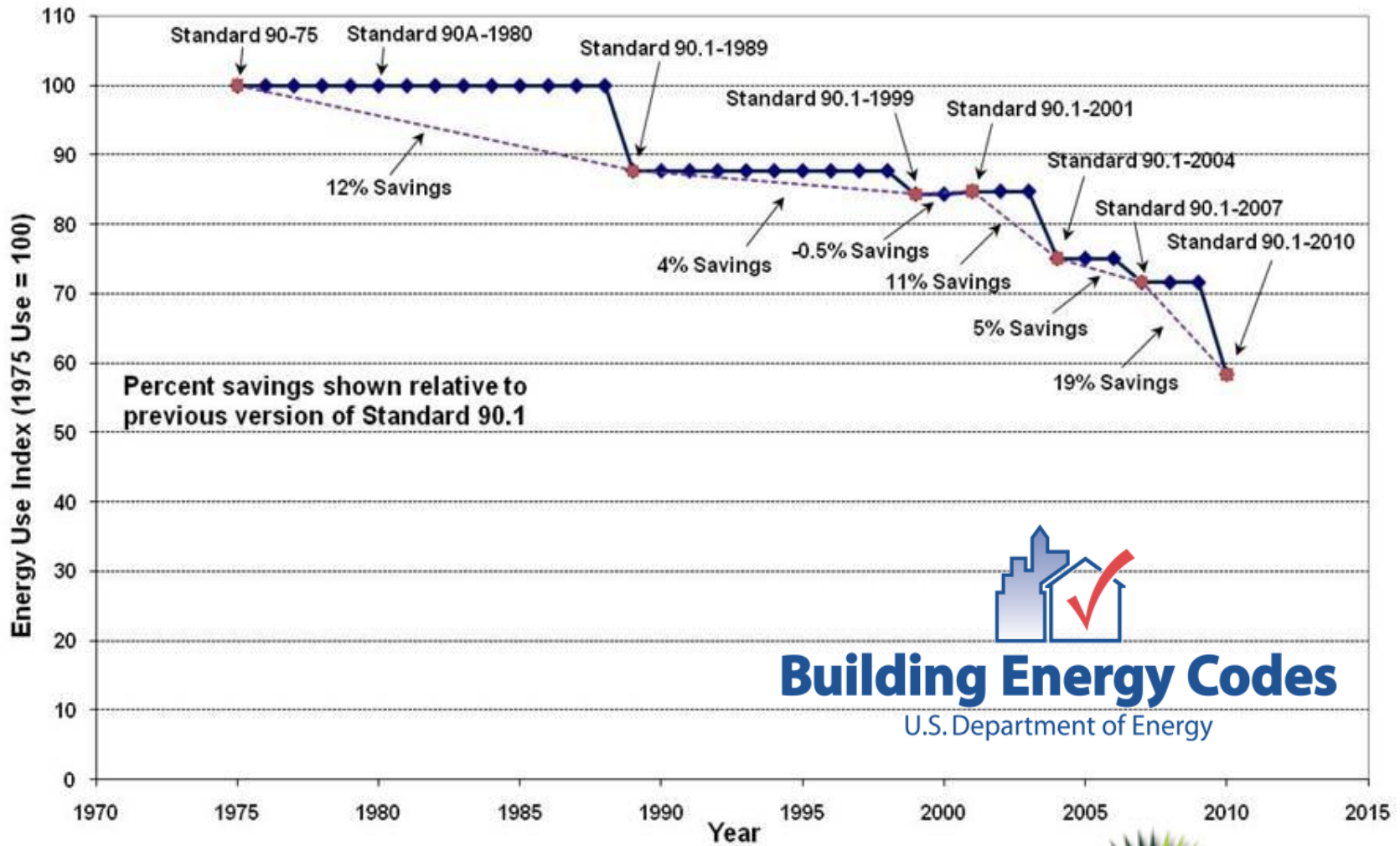
LINE OF STRINGENCY
MINIMUM STANDARD OF CARE

LIFE SAFETY CODES CHANGE OVER TIME IN RESPONSE TO CHANGES ASSOCIATED WITH DESIGN AND TECHNOLOGY, AND IN RESPONSE TO CATASTROPHIC EVENTS

HISTORY

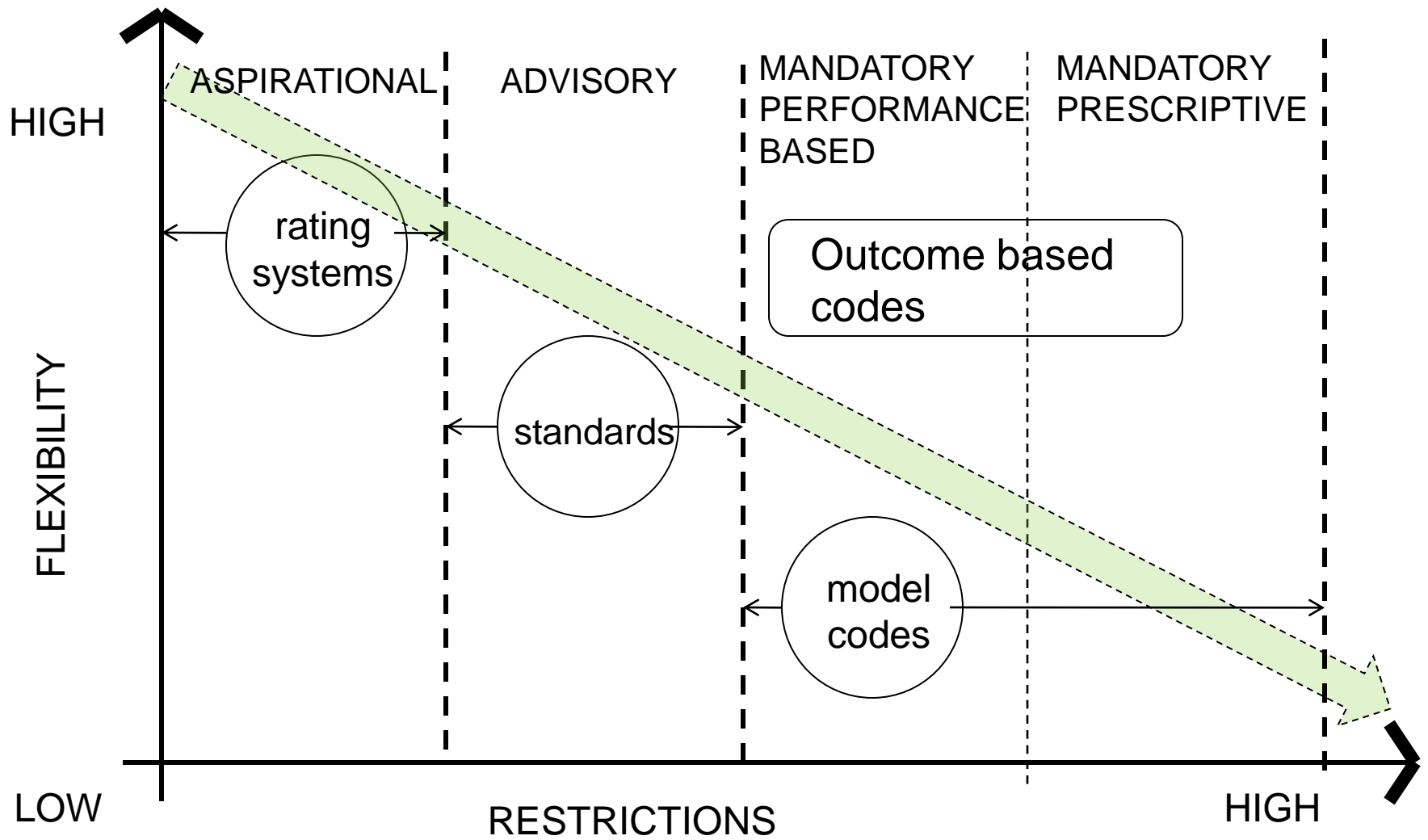
- 1955 MALLS ENCLOSED
- 1960s HEIGHT OF UNCHECKED POSTWAR FOSSIL FUEL CONSUMPTION
- 1970s FIRST US OIL CRISIS
- 1980s ATRIUMS, ASHRAE 90-75, ENERGY CODES TAKE A HIT, COMPLIANCE ALT. FOR EXIST BUILDINGS, SPRINKLERS IN HIGH RISE BLDGS
- 1990s USGBC LAUNCHES LEED
- 2000s 2030 CHALLENGE, REGISTERED DESIGN PROF.(2000), SCHOOLS WITH COMBINED OCCUPANCIES, LIVE-WORK MALLS OPEN
- 2010s IGCC AND IECC 2012
- 2020s OUTCOME BASED CODES?
- 2030s

New Commercial Construction Code Stringency 1975-2010 (Relative to Standard 90-75=100)



Building Energy Codes
U.S. Department of Energy

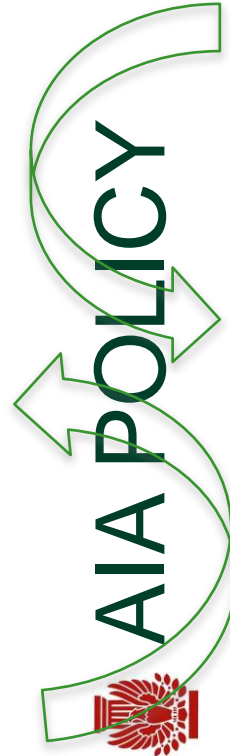
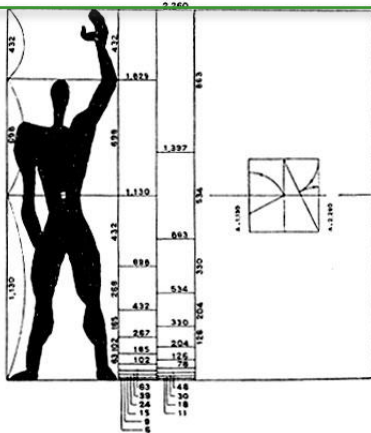




AIA IGCC ADVOCACY

What happens to architects

- Changes to standard of care
- Liability and Risk
- More or Less responsibility?
- Changes in design process
- Contract Docs
- HSW
- Other unknown professional issues



What happens to buildings

- All buildings rise up to meet the code through prescriptive- and outcome-based approaches
- What about existing buildings?
- Changes in the cost of construction
- Means and methods changes
- Evolution of building materials







Model Code Hearings

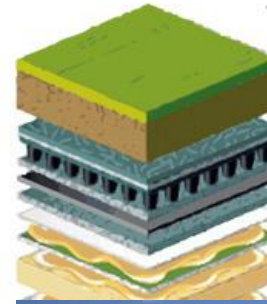
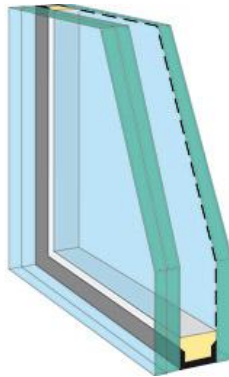


Glazing performance – building orientation – cooling efficiency – infiltration – operating hours – climate – weather – occupant density – heating efficiency – duct design – fan size – window area – HVAC control sophistication – building mass – interior shading – occupant habits – data centers – kitchen equipment – lighting power density – filter condition – wall color – lighting controls - furniture configuration – exterior vegetation - operable window use – insolation- glazing orientation – wall insulation – ventilation rate - exposed interior surface characteristics - domestic hot water use – number of computers – copiers and printers – elevators – exterior lighting - occupant gender ratio – elevation – photovoltaics - development density – register location – cooling distribution system – roof insulation – building manager training – cool roof – building surface to volume ratio – building use type – janitorial services – metering strategies – commissioning – structural system – acoustic treatment – slab edge detailing – night setback temperature – ground water temperature – humidity – occupant dress code – lamp replacement strategy – roof slope – daylight controls – sensor calibration – corporate culture – lease terms – utility meter characteristics – parking garage ventilation – HVAC system capacity – number of separate tenants – retail space – age of equipment – ceiling height – heating fuel – transformer capacity – window mullion pattern – terms of maintenance contract – wall thickness – building height – lighting fixture layout – overhangs – thermostat location – exit lighting – private offices – refrigerators – solar hot water – utility meter – load diversity



Glazing performance – building orientation – cooling efficiency – infiltration – operating hours – climate – weather – occupant density – heating efficiency – duct design – fan size – window area – HVAC control sophistication – building mass – interior shading – occupant habits – data centers – kitchen equipment – lighting power density – filter condition – wall color – lighting controls – furniture configuration – exterior vegetation – operable window use – insolation – glazing orientation – wall insulation – ventilation rate – exposed interior surface characteristics – domestic hot water use – number of computers – copiers and printers – elevators – exterior lighting – occupant gender ratio – elevation – photovoltaics – development density – register location – cooling distribution system – roof insulation – building manager training – cool roof – building surface to volume ratio – building use type – janitorial services – metering strategies – commissioning – structural system – acoustic treatment – slab edge detailing – night setback temperature – ground water temperature – humidity – occupant dress code – lamp replacement strategy – roof slope – daylight controls – sensor calibration – corporate culture – lease terms – utility meter characteristics – parking garage ventilation – HVAC system capacity – number of separate tenants – retail space – age of equipment – ceiling height – heating fuel – transformer capacity – window mullion pattern – terms of maintenance contract – wall thickness – building height – lighting fixture layout – overhangs – thermostat location – exit lighting – private offices – refrigerators – solar hot water – utility meter – load diversity

It's not about "gizmos!"

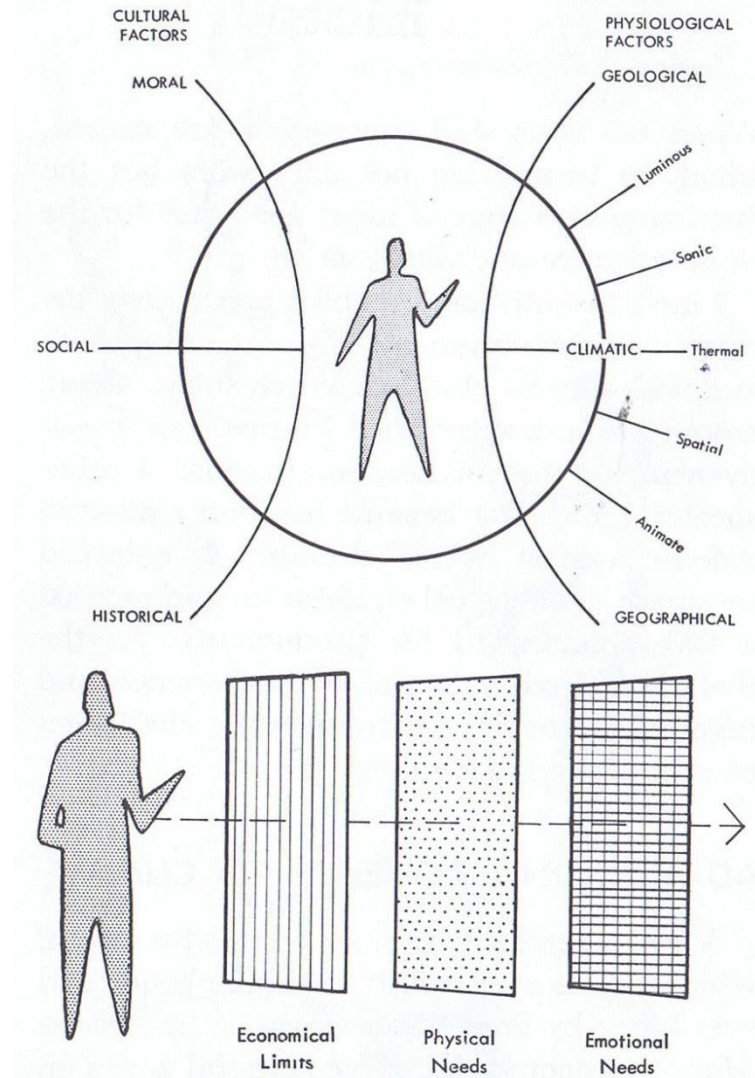
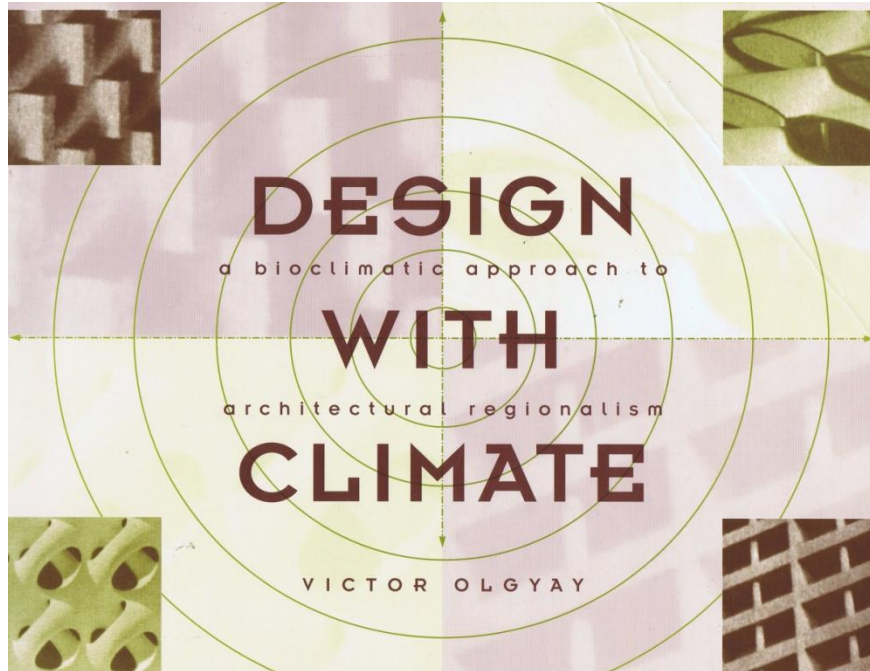


Vegetative Roof Assembly

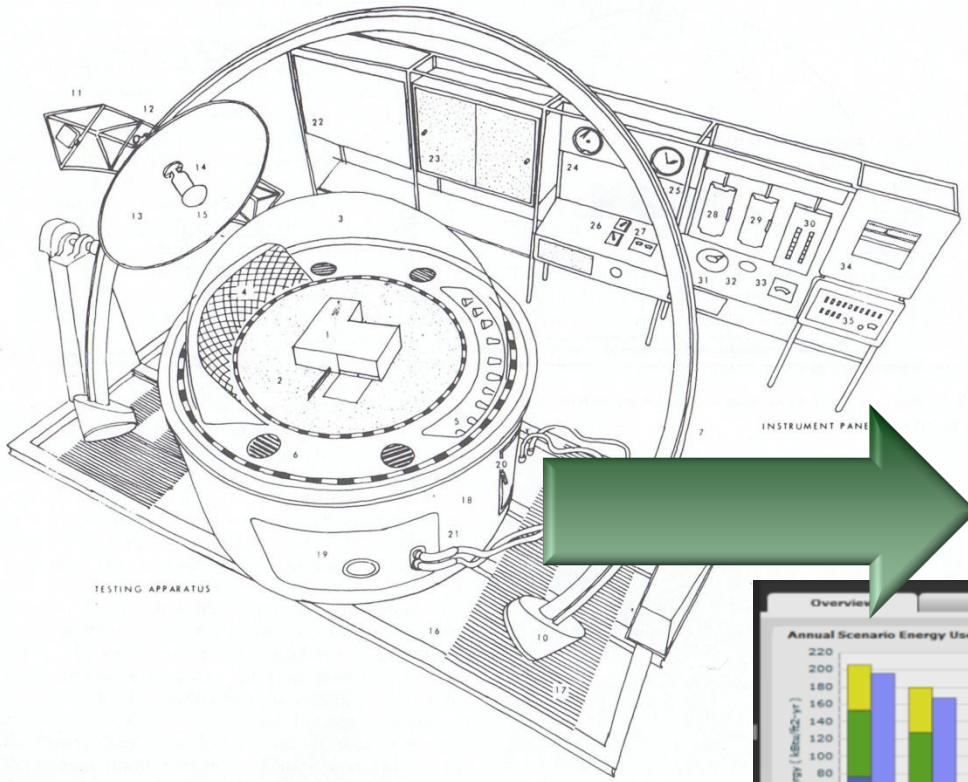
1. Plants
2. Growing Medium
3. Filter Fabric
4. Drainage Board
5. Membrane
6. Cover Board



It's about design!



8-9. Factors influencing architectural expression.



TESTING APPARATUS

R	#	cls:
7	4	(mu)
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7	4	(mu)
7	4	Dou

Annual Scenario Energy Use (per Total Floor Area)

Energy (kBtu/ft²-yr)

Peak (W/ft²)

Heating
Cooling
Fans
Lighting
Peak Ener

Gain (kBtu/ft²)

Time of Day (hour)

COMFEN (Whole Building Commercial)

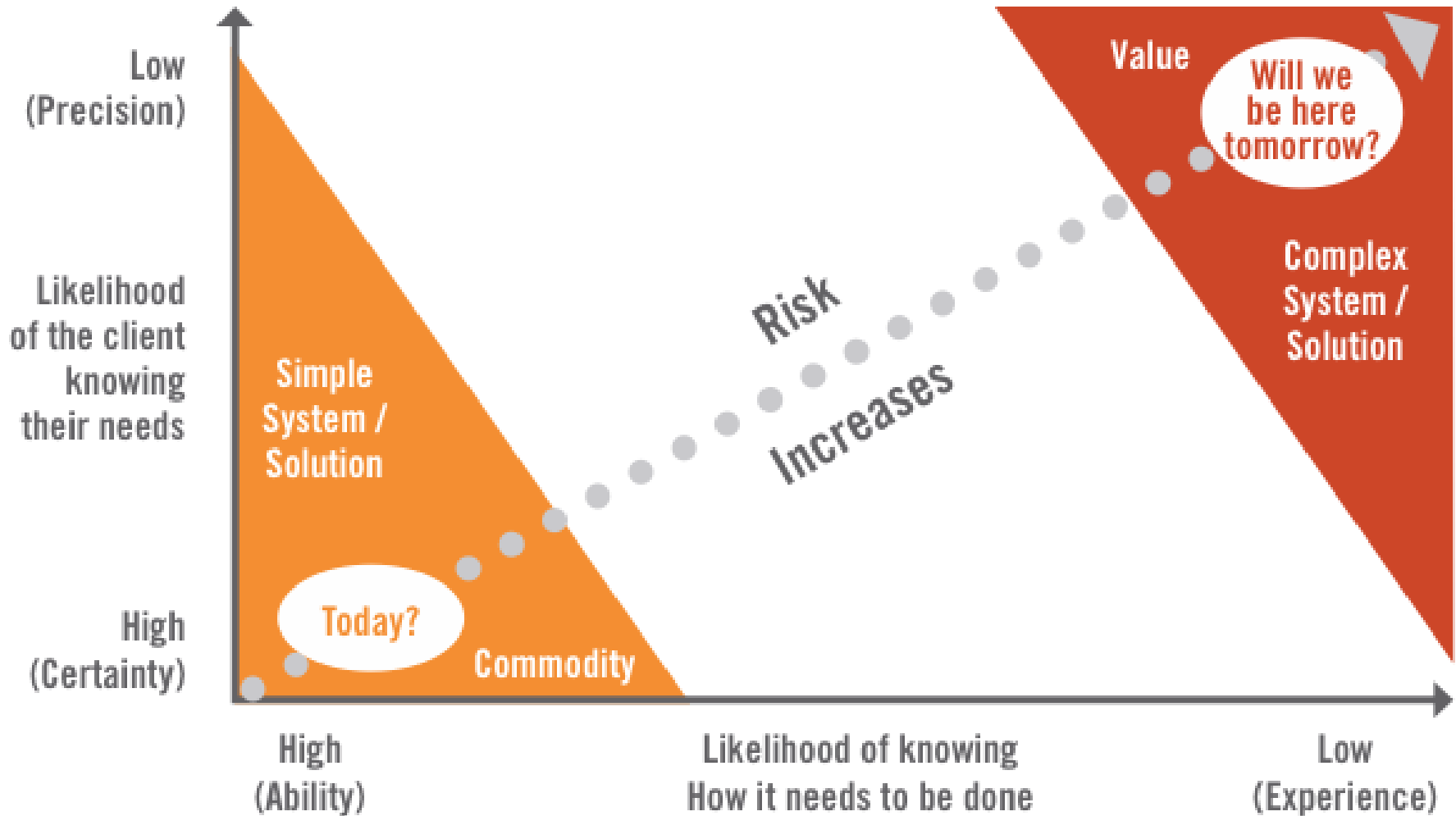
Energy Plus

Radiance (Daylighting)

182 B-6. Explanatory drawing of the Thermoheliodon.

Technology is helpful-
But it's not perfect.

Getting From Today's Standard Practice to High Performance Design



Sustainability and Risk

- The Risks of Unsustainable Buildings
- The cost impacts of green (buildings, codes)
- Green Litigation and Green Risk
- The Sureties
- Voluntary Certifications, Codes and Standards
- Issues for Architects, Contractors and Owners
- Moving forward – Next Steps for the Industry

Green Litigation

- Three types of green building risk
 - Materials and methods
 - Regulatory Non-compliance
 - Certifications
- Litigation is emerging
- Technology is evolving

Sureties and Insurers

- Industry Collaboration
- Emerging Technologies
- (Really) Understanding Surety Bonds
- The Standard of care
- Downstream issues
- Setting and clearly communicating expectations, roles and responsibilities

Voluntary Certifications, Codes and Standards

- Cost?
- Timeline
- Adoptions
- Industry Collaboration in Code Development
- Education of Building Officials, owners and design professionals

The issues – Common Ground

- Standard of care
- Compensation
- Owner Education
- Federal mandates, and incentives
- Industry Collaboration
- Building Performance

gaps

- In education
- Between generations of codes
- In energy modeling tools
- In understanding
- In acceptance

www.aia.org/codesadvocacy

www.aia.org/igcc

Twitter @AIACodes

KnowledgeNet Codes and Standards Group

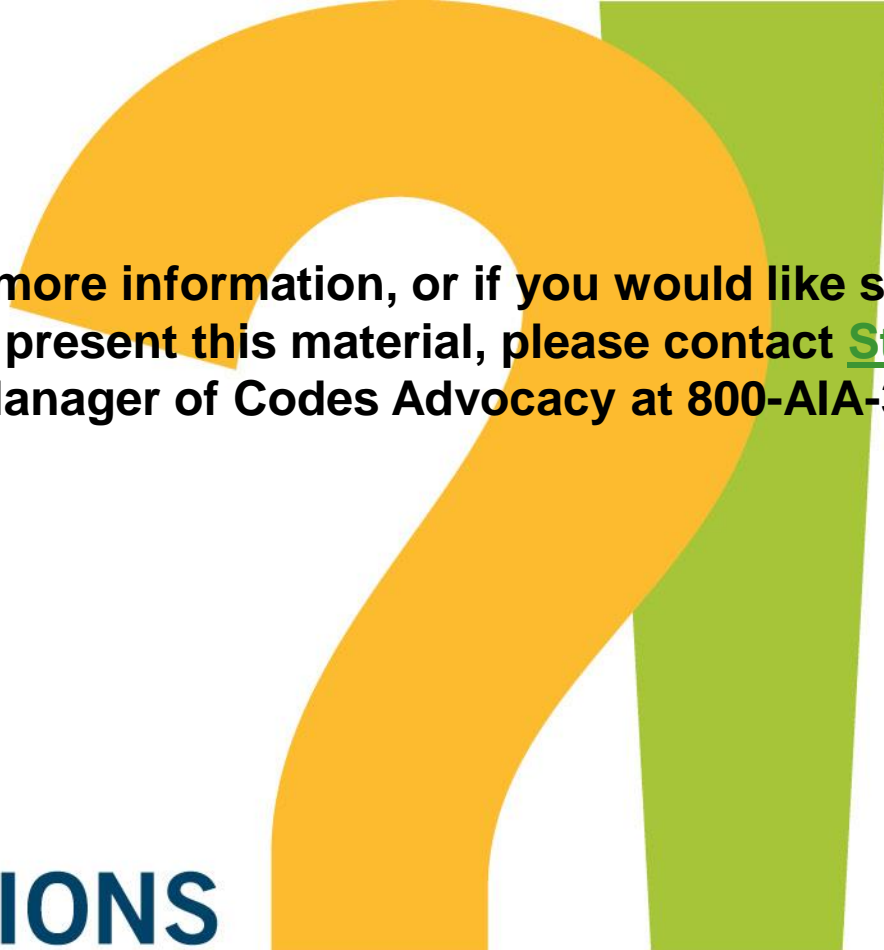
Linked In AIA Codes and Standards



AIA Codes and Standards Committee 2012 Proposed Projects

- AIA Guide to Codes and Standards (ongoing)
- The online technical Library for Codes and Standards
- AIA Guide to Commissioning
- The Risk Analysis Based Integrated Design Tool
- Model Code Development

IgCC Task Force



For more information, or if you would like someone from AIA to present this material, please contact [Stephanie Spear](#), Manager of Codes Advocacy at 800-AIA-3837 ext. 7449.

QUESTIONS

ANSWERS