Mechanical & Plumbing Board and Building & Fire Code Board of Appeals

2021 Energy Code Review

Kurt Stogdill

Manager, Green Building and Sustainability

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Agenda

- Notable developments
- Significant 2021 IECC Changes
- Stakeholder Input
- Code Impacts
- Affordability
- Next Steps

2021 IECC- Notable Developments

IECC-

- Estimate 8-10% increase in energy efficiency over existing code
- Electric Vehicle (EV) Ready and Electrification were struck during appeals

Local-

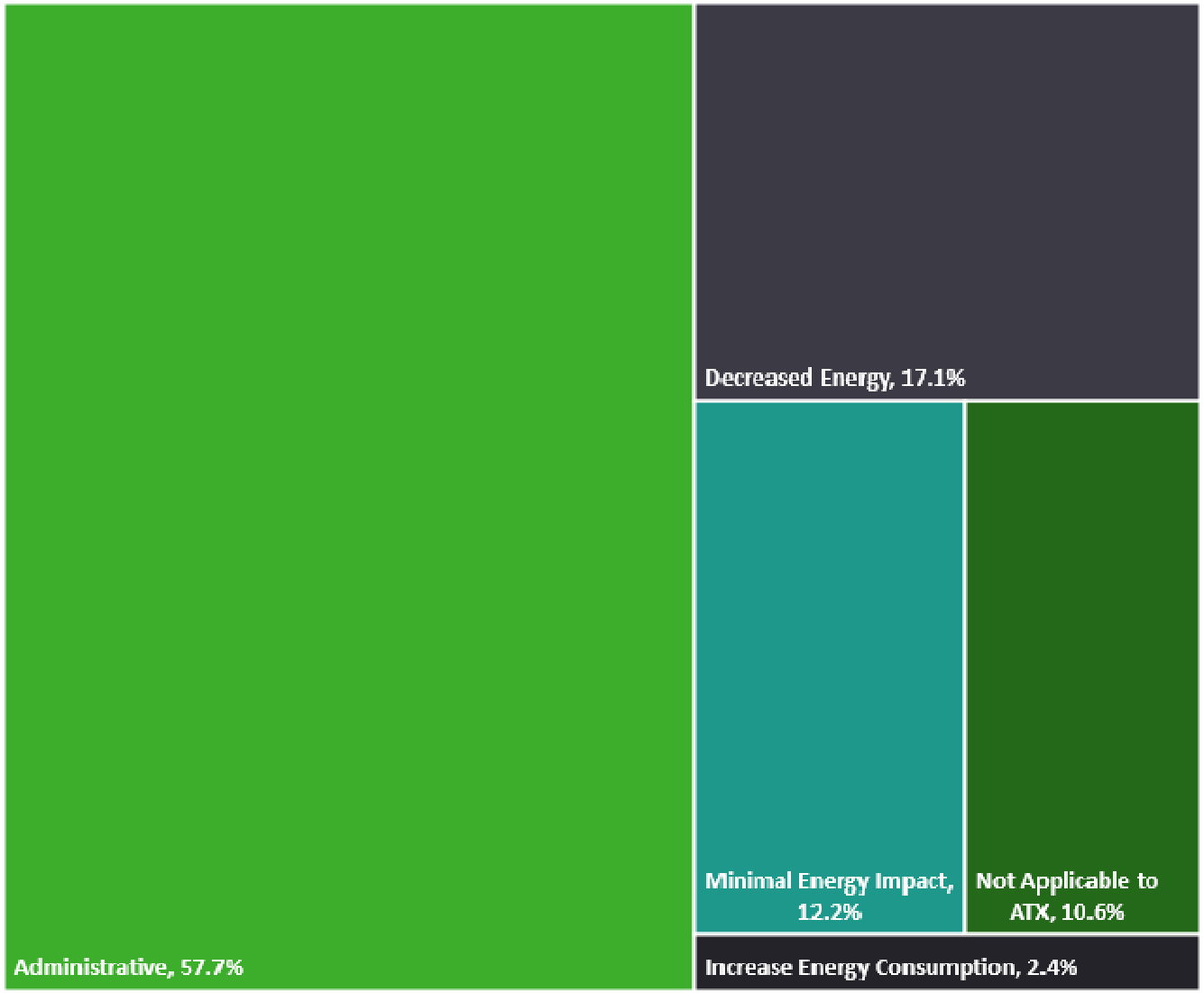
- No new local amendments, will carry over relevant 2015 amendments
  - Will carry forward Solar Ready
  - Removed requirement for natural gas water heating for residential construction
- Look to progress EV Ready and Electrification through means other than IECC

Significant 2021 Residential IECC Changes

2021 IECC Changes

- **57.7%** Administrative
- **17.1%** Decreased Energy
- **12.2%** Minimal Energy Impact
- **10.6%** Not Applicable to ATX
- **2.4%** Increase Energy Consumption

Published 2021 IECC can be accessed for free at: codes.iccsafe.org/content/IECC2021P1/iecc-residential-provisions



Insulation

- Increased ceiling R-value from R-38 to R-49
- Moved footnote regarding attic roofline insulation options to prescriptive table
  - local amendment
- Provided new option for wall outsulation
  - Continuous insulation for uninterrupted thermal barrier

Lighting Changes

- Interior lighting – all permanently installed lighting fixtures to have high efficacy lighting sources
- Exterior lighting for low-rise multifamily to comply with commercial energy code
- Lighting controls to be installed – interior and exterior

Mechanical Systems Changes

- Blower Door
  - Alternative compliance calculation for small dwellings, multifamily and single family
- Duct leakage
  - New standards and better guidance for testing and inspecting ducts
- Mechanical Ventilation
  - Mechanical ventilation testing
  - Changes to efficacies (airflow/wattage of equipment) for exhaust fans
  - Mech system piping insulation = MANDATORY

Other Paths of Compliance

Performance Path

- Updates to baseline
  - Added Dehumidstats
  - Update to water heating
    - Credit for good design
  - Update to mechanical ventilation

ERI Path

- Updated backstop (limits trade-offs to envelope requirements) to ERI (Energy Rating Index) path
- Renewables – added 5% cap for compliance
- Lowered ERI targets for compliance- lower is “better”
  - ATX to stay at 59

Additional Efficiency Option Packages

Prescriptive

OPTION 1: Enhanced envelope performance option

- **5% better envelope performance**

OPTION 2: Efficient HVAC equipment performance option

- **Furnace >= 95 AFUE and AC >= 16 SEER**
- **Air Source Heat Pump >= 10 HSPF/16 SEER**
- **Ground Source Heat Pump >= 3.5 COP**

OPTION 3: Reduced energy use in service water heating option

- **Fossil fuel water heater >= 0.82 EF**
- **Electric water heater >= 2.0 EF**
- **Solar water heater >= 0.4 Solar Fraction**

OPTION 4: More efficient duct thermal distribution system option

- **100% of ducts and air handler inside building thermal envelope**
- **100% of ductless or hydronic system inside building thermal envelope**
- **100% of duct thermal distribution system located in conditioned space**

OPTION 5: Improved air sealing and efficient ventilation system option

- **Air Leakage <= 3.0 ACH50**
- **HRV (75% Sensible Recovery Efficiency) or ERV (50% Latent Recovery/Moisture Transfer)**

Performance

- Pick one option from prescriptive list
- OR achieve 5% better than code

ERI

- Achieve 5% better on Energy Rating Index

Local Amendments

- Retained existing amendments where more stringent with published code; deleted amendments where now incorporated in published code
- Deleted requirement for gas water heating with adjacent gas service
- Added new code retaining timer language of
  - Added exception for open-source demand response technology
  - Retained exception for heat pump water heaters

Significant 2021 Commercial IECC Changes

Generally

Thermal envelope certificate required

Posted in mechanical room listing wall insulation levels, window performance, and results of testing

Additional efficiency requirements section SUBSTANTIALLY revised

Occupancy specific tables, points-based system based on measure pursued and climate zone

Alternative compliance approved by code official

Specifically allows code official to recognize separate programs as equivalent to energy code compliance

Home Energy Rating System (HERS) rating allowed, dwelling units in medium to high-density multifamily

Building Envelope

Air barrier testing for Residential & Institutional occupancy

Interlocks on mechanical systems, openings >40 sq. ft.

Slab edges part of definition “wall above grade”

Envelope table updates, fenestration changes (windows)

Mechanical

Fault detection and diagnostics (FDD), >100,000 sq. ft.

"FDD = A software platform that utilizes building analytic algorithms to convert data provided by sensors and devices to automatically identify faults in building systems and provide a prioritized list of actionable resolutions to those faults based on cost or energy avoidance, comfort, and maintenance impact"

Mechanical efficiency tables from ASHRAE 90.1

Variable Refrigerant Flow (VRF), computer rooms, Dedicated Outside Air Systems (DOAS)

Energy recovery systems (heat recapture for air)

Guestroom setback (hotel rooms when unoccupied)

Lighting & Power

Parking garage lighting control, new section

Electrical transformer efficiency

Automatic receptacle control – mandates % of controllable receptacles

Energy monitoring, >25,000 sq. ft.

Water

Hot water pipe length or volume restriction

Local Amendments

Dropped

- Registered design professional (related to commissioning)
- Roofing (now part of published code)
- Interlocks (now part of published code)
- Water heater timers (adding Demand Response alternative)
- Commissioning (now part of published code)

Recommended to keep

- Encapsulation (to allow insulation to more closely match its labeled value)
- Ventilation filtration, *MERV 6 (sealing of plenums and filtration)
- Window performance (carve out for Design and Compatibility standards)
- Demand response (to require open-source demand response capability)

* MERV= Minimum Efficiency Reporting Value is a measurement scale designed to report the effectiveness of air filters

Outreach

Residential Stakeholder Engagement

Stakeholder engagement process

- Over 30 external stakeholders representing a variety of interest groups including American Institute of Architects, Home Builder's Association
- Presented to American Institute of Architects
- Over 25 internal stakeholders

Three notices provided, announcing opportunities to engage with all the residential technical codes

PublicInput: vehicle for further engagement

- Documentation provided: Summary of local amendment changes, proposed ordinance, summary of stakeholder comments and responses
- 211 views to date, 9 non-repetitive suggestions addressing solar ready, EV ready, electric ready, current gas water heating requirements, ERI, air infiltration, attic insulation, and windows
- 61 comments received regarding EV ready and Electric ready
- Stakeholder comments led to a proposed code change for attic insulation at the attic roofline

Boards and Commissions

Affordable builders	4.5%
Architects	9.1%
Custom builders - Sustainable	13.6%
Developers - Affordable	4.5%
Energy Code testers/HERS raters	4.5%
Engineering firms	4.5%
Interest groups	36.4%
Manufacturers	4.5%
Mechanical contractors	4.5%
Multifamily builders	4.5%
Production builders	9.1%

Commercial Stakeholder Engagement

Commercial stakeholder engagement process initiated 1/14/2021

- Over 100 external stakeholders, compiled over 15 years representing a broad swath of the community both locally and nationally
- Presented to American Institute of Architects
- Over 50 internal stakeholders, including SPOCs.

Academia	6	6%
Architect	19	18%
Code Consulting	9	8%
Commissioning	5	5%
Contracting	11	10%
Development	11	10%
Engineering	19	18%
Interest Group	7	7%
Mechanical Engineer	8	7%
Trade Representative	12	11%
	107	

Six notices provided, announcing opportunities to engage with all the technical codes

PublicInput: vehicle for further engagement:

- Documentation provided: Summary of published code changes, summary of local amendment changes, proposed ordinance
- 183 views, 8 non-repetitive suggestions addressing commissioning, solar/EV ready, support of current activity, consideration of site/source, etc.

Boards and Commissions

Projected Code Impacts

Projected Energy Savings Over 2016 COA Energy Code

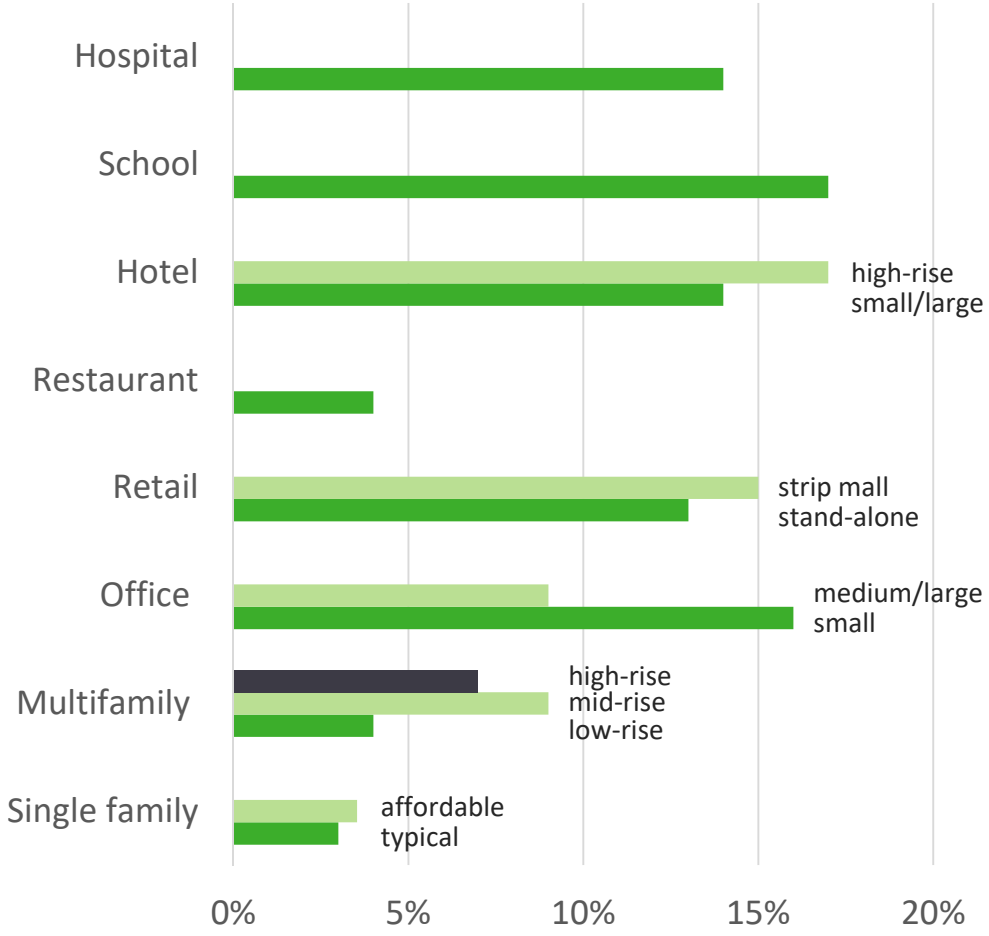
Projected Savings by Sector

Commercial 31,404 MWh | **10%**

Residential 5,249 MWh | **<4%**

Based on FY2020 building permits

Savings Percentage by Building Type



Projected Affordability Impacts

Affordability Impact of Adoption of 2021 IECC

Insulation- biggest single energy savings measure

- $430 increase in construction price of home
- Savings of $27/year
- Peak demand decreased by approx. .5 kW

With additional energy package (reference slide 9)

- Choose 1 of 5 options or modeling
- Option 3- efficient water heating
  - Approx. $1,430 increase in construction cost
  - Savings- up to$102/year
  - 12.8% energy savings over standard approach
  - Peak demand will decrease by 2.2 kW

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Next Steps

Next Steps

- Slated for June 3rd Council date
- Training for DSD and design & construction communities
- Effective date September 1st, 2021
- Continued work on any outstanding issues
  - Customer Choice
  - Transportation
  - We will report back to RMC in June with proposed path forward and timeline

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Thank You

Questions?

Kurt Stogdill

Kurt.Stogdill@austinenergy.com

512-413-1255

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