Program Description

Public service program

- Cash Incentives
- Energy Design Assistance
- Project Roundtable
- Educational Opportunities
- Program Coordination

Facilitate energy efficient design and construction in new multi-family housing through cash incentives and design assistance.
Eligible Customers

Multi-family buildings in PG&E service territory:

- 3 or more attached units
- New construction
- Exceed 2008 Title 24 Standards by at least 15%
- Submit complete application package prior to construction start
- Complete construction and verification by December 31, 2015

* Please contact HMG if you are unsure of the eligibility of your project.
Program Process

- Participant provides HMG with:
  - Completed application
  - Title 24 documentation
  - Architectural plan-set (+MEP)
  - Service territory verification
  - W9 Form
- HMG conducts a plan review to verify energy measures, estimated savings, % better than Title 24
- Project enrolled, receives ‘Letter of Enrollment’
- Third party HERS verification conducted during construction to ensure energy measures installed*
- HMG verifies any changes to project since enrollment and ensures as-built still exceeds Title 24 by at least 15%
- Project completed and incentives paid

*Note: the program verification protocols are in addition to any HERS measures on your Title 24
Incentive Information

Developer Incentives:
- $100 per unit plus incremental incentives based on energy savings
- HERS verification incentive: $60 per unit (max of $12,000 per project)

Energy Consultant Incentives:
- $50 per unit (max of $10,000 per project)
Program Contact Information

- Toll Free: 866-352-7457
- Email: cmfnh@h-m-g.com
- Website: www.h-m-g.com/multifamily

Program Manager: Amy Barr, barr@h-m-g.com
Plan Review Manager: Linda S. Murphy, murphy@h-m-g.com
Associate Manager: Sophia Hartkopf, hartkopf@h-m-g.com
Associate Plan Review Manager: Keith Sage, sage@h-m-g.com
Associate Manager: Katie Eberle, eberle@h-m-g.com
Program Associate: Ashley Heath, heath@h-m-g.com
Program Assistant: Lauren Moreno, moreno@h-m-g.com
Introduction to Indoor Air Quality in Multi-Family Buildings

Marian Goebes, PhD
Heschong Mahone Group
Bob Herman
Herman Coliver Locus Architecture
Outline

- Why do we care about IAQ
  - Key IAQ Concepts for Multi-Family Buildings
    - Pollutants Of Concern
    - Creating Good IAQ
    - Unique challenges in multi-family buildings
  - Source Control
  - Code Requirements
  - Ventilation Strategies: Typical, and Better Practices
  - Compartmentalization
  - Precautionary Tale of Why IAQ is Important & Resources
- Case study of a MF building that successfully integrated good indoor air quality practices
IAQ – Why is it important?

- Health effects include:
  - Asthma and allergies
  - Long term effects (radon and formaldehyde)
  - CO poisoning – 500 unintended deaths / year, 15,000 emergency room visits (CDC, 2007)
- Code – requires ventilation and exhaust
- Marketing – healthy indoor environment attractive to tenants and condo buyers
Pollutants of Concern

- Gases include (but not limited to!)
  - Carbon monoxide
  - VOCs (e.g., formaldehyde) – often higher indoors
  - Radon
  - Moisture (mold, structural damage)

- Particulate matter includes (but not limited to)
  - Soil particles (tracked in on shoes)
  - Combustion particles (cooking, gas fired appliances, smoking): smaller = worse!
  - Biological particles (e.g., mold spores)
Creating Good IAQ – The Basics

1. Source control – reduce emissions
   - Low emitting materials
   - Walk off mats and smoking bans

2. Pollutant removal
   - Ventilation – bringing in fresh air
   - Spot exhaust – bathroom, kitchen, laundry room
   - Other methods – air filters in HVAC equipment (high Minimum Efficiency Rating Value “MERV” ratings)
   - Tenant and staff education – green products: cleaning, dry cleaning; using fans, replacing filters
Challenges: pollutant transfer between units, potential for insufficient fresh air to units, because:

- Stack effect → top floors get bottom floors’ stale air
- Exterior envelope: floor area lower in multi-family buildings

Solutions:

- Provide reliable fresh air source
- Compartmentalization - Seal exterior and between units

The Stack Effect, from LBNL’s “Energy Efficient Ventilation in Apartment Buildings”.
Creating Good IAQ: Source Control

- Source control – reduce emissions
  - Low emitting materials (some required in CALGreen)
    - Low VOC paints, adhesives and sealants
    - Hard flooring – preferably FloorScore certified, or Green Label Plus carpet
    - Avoid composite materials (e.g., particle board) or use materials with low VOC / formaldehyde content
  - Insulation – CA Collaborative for High Performance Schools (CHPS) certified
  - Walk off mats (6’ long, cleanable)
  - Ban smoking in building
Creating Good IAQ: Ventilation and Exhaust: Code Requirements

- Ventilation and exhaust: Low-rise Residential code (CALgreen) includes:
  - Ventilation requirements:
    - ASHRAE 62.2 rates: $0.01*sf + 7.5* (BR+1) = 52.5 cfm$ for 1500 sf, 2 BR unit
    - Operable windows no longer accepted!
  - Exhaust requirements
    - Bathrooms and kitchens: exhausted to outside
    - ASHRAE 62.2 rates: kitchen: 100 cfm, bathroom: 50 cfm (or 20 cfm continuous).
    - Bath fans ENERGY STAR labeled, humidistat-controlled
Code Requirements

- High-rise requirements: CA Building Code cites ASHRAE 62.1
  - Ventilation:
    - Mechanical ventilation: 0.06*sf + 5* (BR+1) = 105 cfm for 1500 sf, 2 BR unit
    - Operable windows allowed
  - Exhaust:
    - Kitchen: 100 cfm, bathroom: 50 cfm (25 continuous)

- Beginning 1/1/13, CO alarms required in all New construction MF units (with combustion equipment)
Typical MF ventilation strategies:
- Supply only – pressurized corridors with undercut doors
- Exhaust only without dedicated make-up air source
- Operable windows

Better ventilation strategies:
- Supply only – supplied directly to units
- Exhaust only, with make-up air source (e.g., z-ducts)
- Balanced (e.g., Energy Recovery Ventilator – ERV) - $$
"Build tight, ventilate right" still applies

- But include sealing each unit - seal all penetrations, chases, elevator shafts; weather-strip doors to hallways
- If possible, check sealing through blower door test: $\leq 0.30 \text{ cfm}_{50}/\text{sf enclosure area}$

Unit enclosure area = $2 \times 8 \times 30 + 2 \times 8 \times 20 + 2 \times 20 \times 30 = 2000 \text{ sf}$
Ventilation is an energy penalty, but well worth it!
- VOC concentrations can build up, mold growth
- Precautionary tale:
  - LEED-NC certified building – initially: 0.1 air changes per hour (recommended minimum = 0.35), Radon 4-17 pCi from concrete in walls!
- Solution: increase ventilation

Source: Brodhead, AART Int’l Symposium, September 14-17, 2008.
References

- Programs:
  - GreenPoint Rated Multi-Family: http://www.builditgreen.org/greenpoint-rated-new-home/
  - LEED for Homes Midrise: avail on www.usgbc.org/homes
  - ENERGY STAR Multifamily: www.energystar.gov

- Low emitting products:
  - CA Collaborative for High Performance Schools (CHPS): http://www.chps.net/dev/Drupal/node/27
  - SCS FloorScore Program: www.scscertified.com/iaq
Successful Multi-Family IAQ Case Study
A FORCED AIR SYSTEM DISTRIBUTES FRESH AIR THROUGHOUT THE GROUND FLOOR USING AIR HANDLING UNITS INSTALLED ABOVE THE COMMUNITY ROOM CEILING. THE AHU'S ALSO DISTRIBUTE HEAT IN CONJUNCTION WITH A ROOF MOUNTED BOILER.

AIR CONDITIONING UNITS LOCATED IN THE GARAGE PROVIDE COOLING FOR THE SERVICE OFFICES.

FIRST FLOOR PLAN

1 ENTRY LOBBY
2 ADMINISTRATIVE OFFICES
3 MAILROOM
4 COMMUNITY ROOM
5 COURTYARD
6 COMMUNITY KITCHEN
7 ELEVATOR LOBBY
8 CONFERENCE ROOM
9 STORAGE/MAINTENANCE
10 RETAIL
11 TRASH ROOM
12 GARAGE
fresh air circulation

exhaust through relief air louvers

corridors

fresh air intake through z-ducts

studio units
Questions?

Marian Goebes
916-962-7001
goebes@h-m-g.com

Bob Herman
Herman Coliver Locus
rherman@hclarchitecture.com