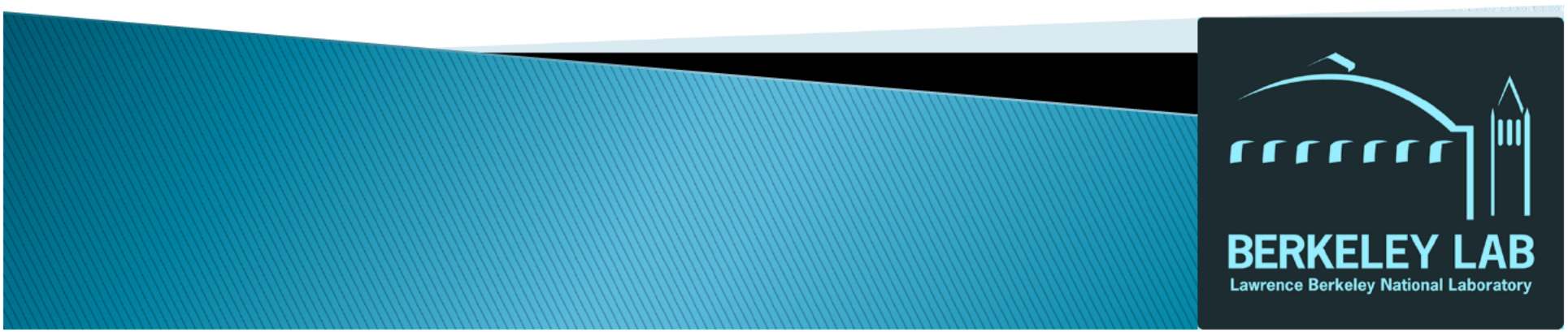
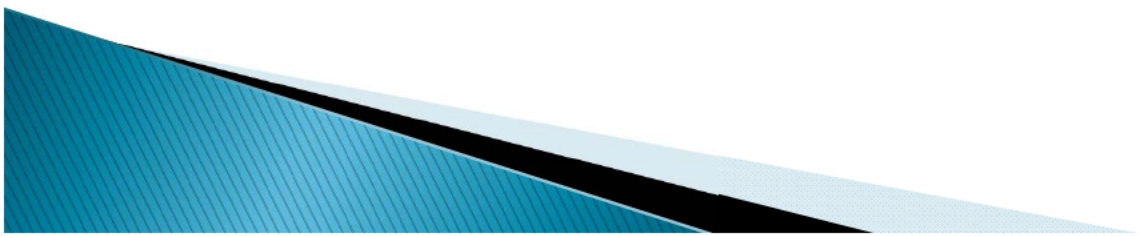
Recommendations for Meeting ASHRAE Standard 62.2

LBL, Max Sherman



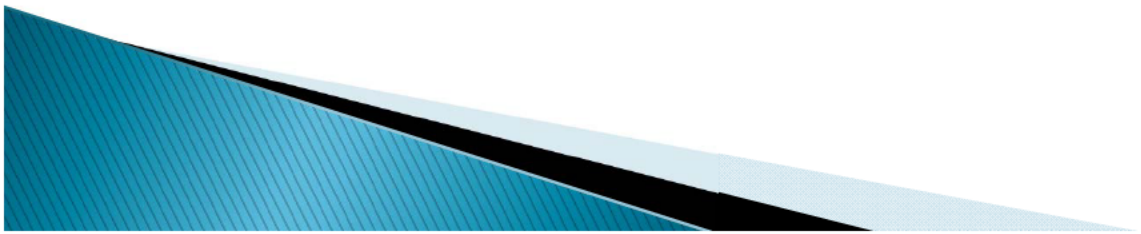
Context

- Providing IEQ is what buildings are all about
  - Indoor Air Quality/Health a key part
- High Performance Buildings Need Ventilation
  - 62.2 is only American National standard
- Ventilation will take up larger energy fraction
  - Failures are bigger problems in tight houses



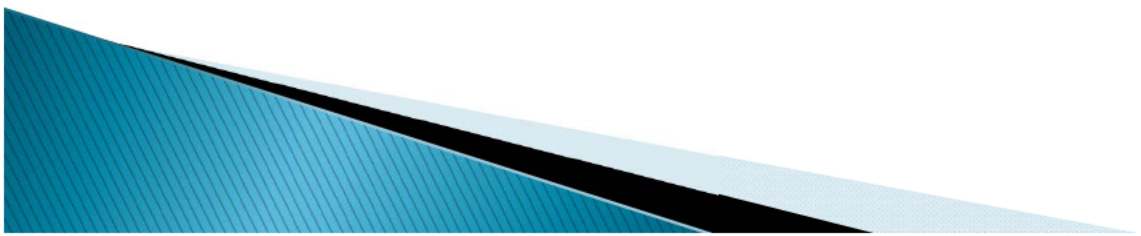
Technical Approach

- Energy Simulations
- IAQ Simulations
- Real-world O&M
- Measurements



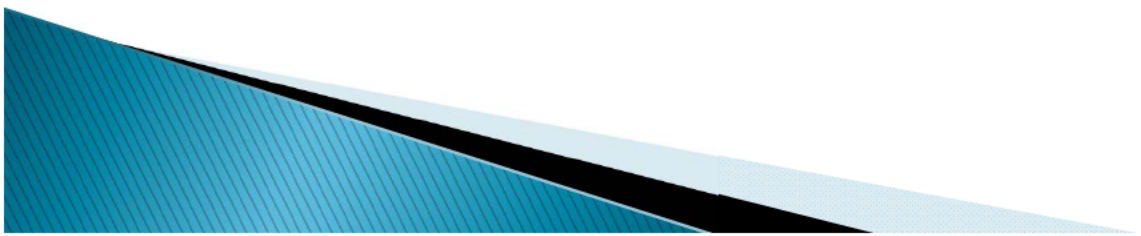
Core Guidance

- Follow 62.2: *Resistance is Futile*
  - Don't leave it to the occupants
  - (Double duty) exhaust fan should be default
- Have a good range hood
  - Cooking pollutants may be biggest source
- Design air handler for good filters
  - MERV 11 or higher will protect against PM2.5



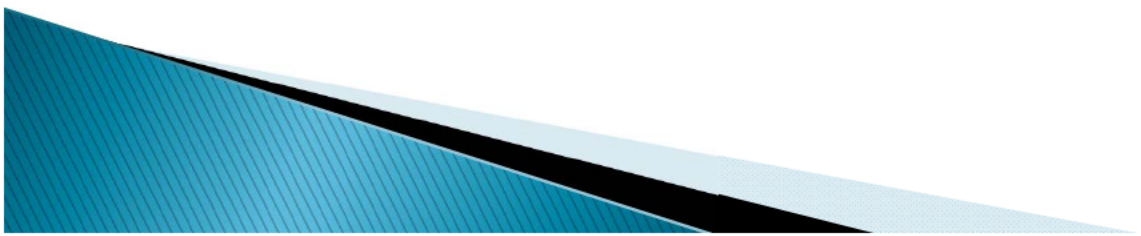
Value

- Energy Savings
  - High efficiency fans; no need to run air handler
- Robust
  - No inlets to clog; no complicated controls
- Low first cost
  - low replacement cost; long life
- IAQ Benefit
  - exhausts contaminates directly



Market Readiness

- 62.2 is being implemented now
- (Double duty) exhaust is out there now
- Range hoods are not rated
  - Need to use engineering judgment for now
- Particle filters are rated and available
  - Need to design as part of system

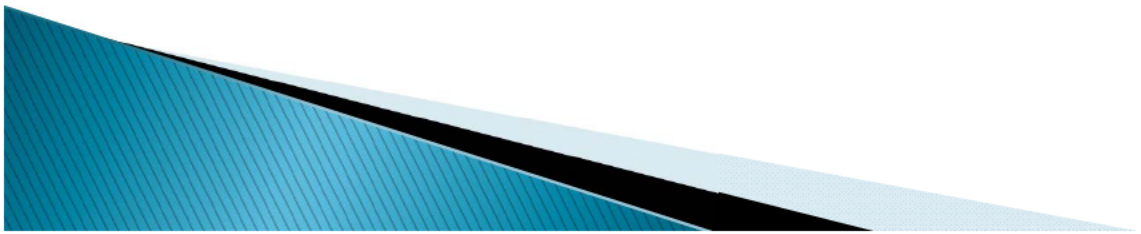


Pros and Cons vs. HRV/ERV/Supply

- PRO
  - Cheaper, easier, robust, extra exhaust
  - Does not require distribution in most houses
  - Less sensitive to leakage than balanced systems
- CON
  - Depressurizes in super-tight houses (inlets?)
  - Does not control where air comes from
- BOTH
  - Climate insensitive

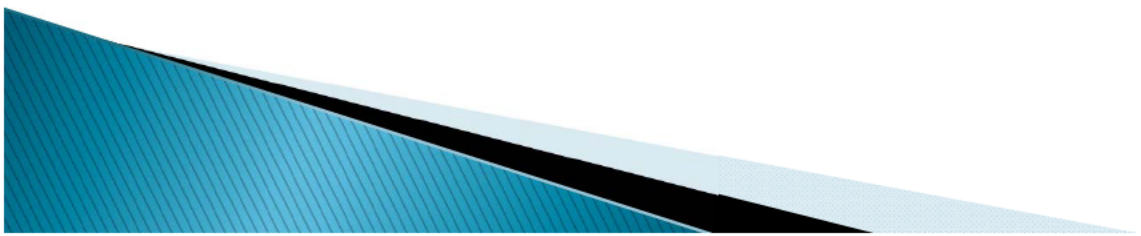
HRV/ERV ISSUES

- Recovers heat/humidity, for extreme climates
  - Leakage, imbalance, defrost lower performance
- Higher first and operating costs
- Tricky installation, O&M
  - Performance variation in the field
- ERV's only save latent energy if independent humidity control
  - Can make indoor humidity higher OR lower



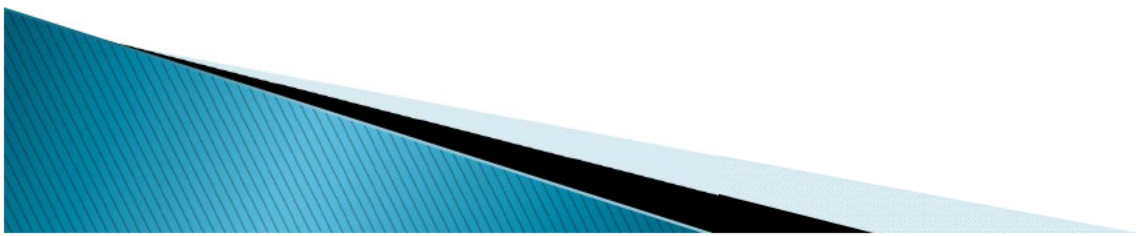
Supply System Issues

- Unbalanced ventilation (like exhaust)
- Allows control/conditioning of incoming air
- Requires energy to temper air
  - Blending with indoor air is common (e.g. CFIS)
  - Can still cause discomfort
- No advantage in hot humid climates
  - Unless combined with DHW, etc.



Exhaust except in Extreme Climates

- HRV in cold climates *might* be cost effective
- ERV in hot, humid or very cold climates
  - Independent humidity control may be needed
  - Don't connect to wet-room exhausts
- Need high efficiency fans if interlocked
  - Need to avoid short-circuiting otherwise



Technologies Not Quite Ready

- Automated Range Hoods
  - They exist, but no credit and too costly
- Chemical Air Cleaning: not yet for homes
  - Formaldehyde is biggest target
- Smart Ventilation Controllers
  - LBL developed RIVEC; could be soon
- IAQ Controllers
  - TVOC does not count: *"Run away; Run away"*
- Ultralow pressure drop, particle filters
  - Nanomaterial R&D underway