

# COMNET: An Introduction



Presentation to USGBC

Cliff Majersik, Ron Nelson, IMT

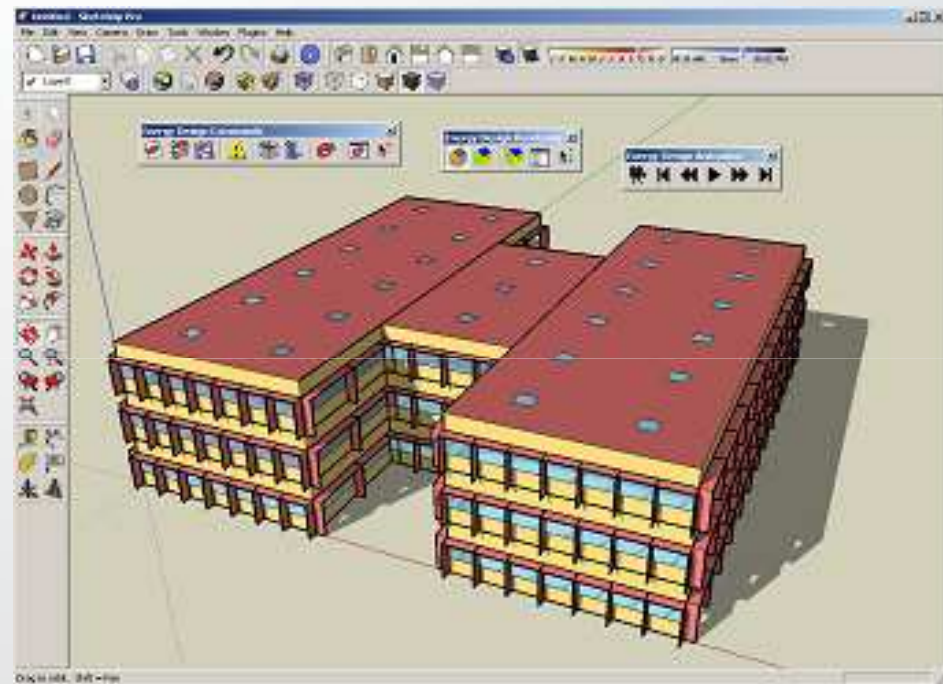
Dimitri Contoyannis, Kim Goodrich, AEC

April 8, 2011

[www.comnet.org](http://www.comnet.org)

# What is COMNET?

- **COMNET** is a methodology to facilitate the assessment of energy efficiency of commercial and multifamily buildings
  - Modeling guidelines and procedures consistent with ASHRAE 90.1
  - Default building usage parameters
  - Open standards for modeling software
- **COMNET** is not
  - A new rating system
  - Modeling software



# What problems does COMNET address?

- **Technical Challenges**

- Too many modeling flavors
- Results vary too much from modeler to modeler, from simulation to operation
  - Occupancy, plug loads, commercial refrigeration and vertical transportation
  - Gap between “predicted” and actual energy use of a building
- Manual generation of reference building subject to errors

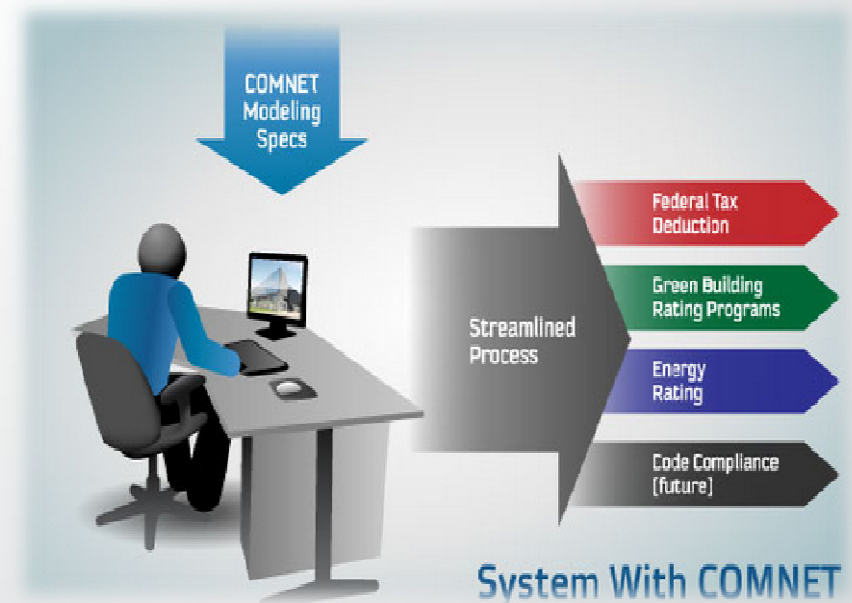
- **Market-Based Challenges**

- Many models prepared by modelers lacking needed expertise
- No ongoing quality assurance program; limited consequences for modeler misconduct

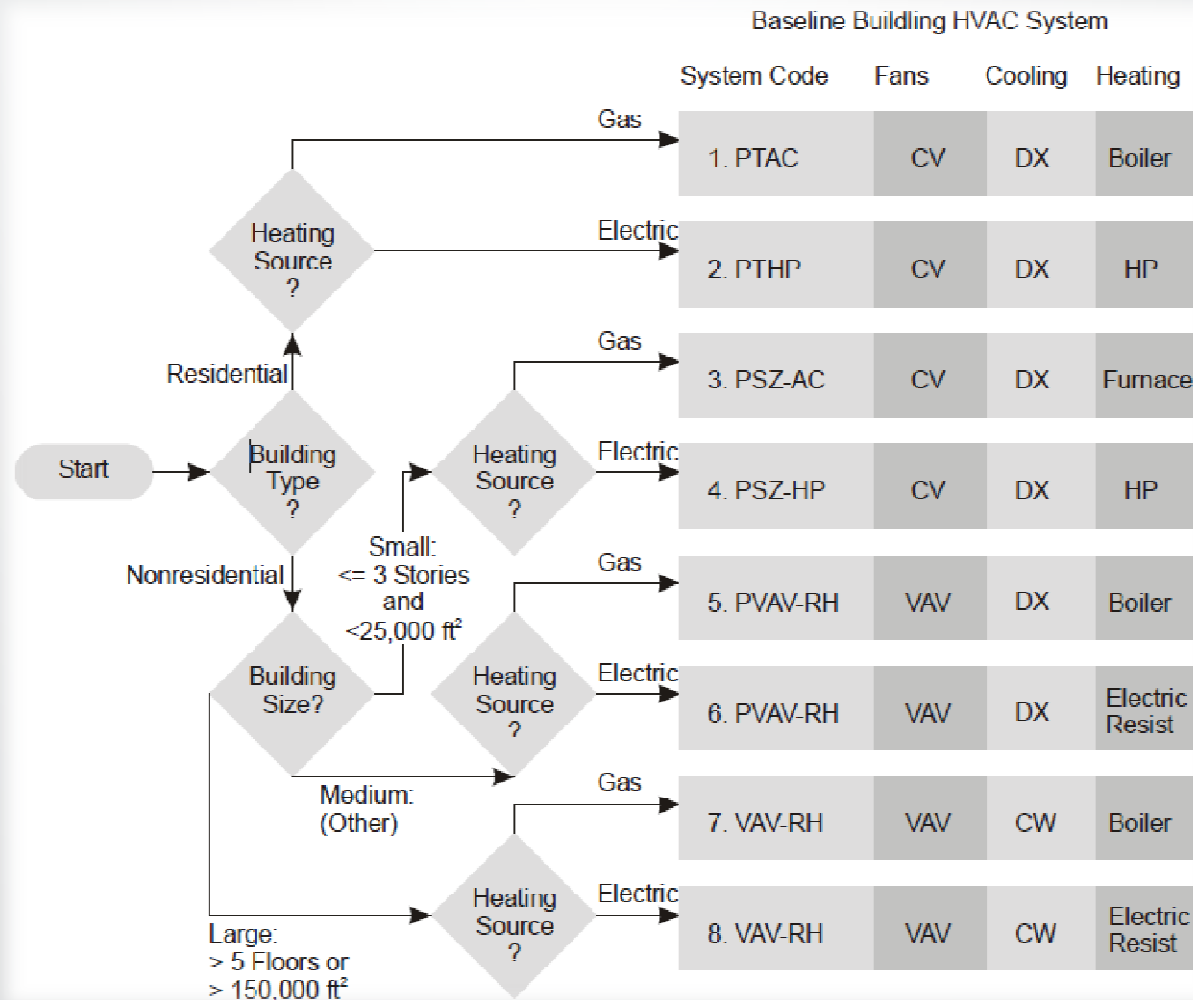


## COMNET offers solutions

- **COMNET standardizes process of energy simulations by:**
  - Accurate specification and automatic generation of the baseline building
  - Standardized schedules and other operation assumptions
  - Providing credit for reductions in non-regulated energy use, e.g. Energy Star equipment
- **COMNET is developing a quality assurance program:**
  - To accredit software
  - For building energy modelers
  - For screening building energy models before submission to rating authorities



# COMNET facilitates automatic generation of baseline building



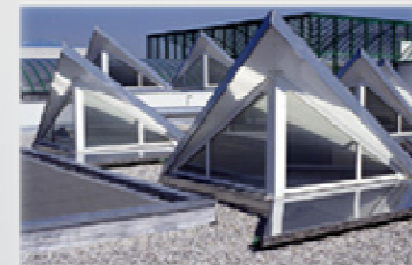
# COMNET Technical Manual

- **The COMNET Modeling Guidelines and Procedures (MGP)**

- Consistent with ASHRAE 90.1 Appendix G
- A consensus standard (seeking ANSI status)
- Procedures for energy modeling of commercial buildings and comparing against baseline standards
  - Federal tax deductions (ASHRAE 90.1-2001),
  - Green building ratings (ASHRAE Standard 90.1-2007), and
- Defines default modeling assumptions
  - Plug loads, commercial refrigeration, vertical transportation, occupancy, ...

- **Additional Future Baselines**

- ASHRAE 90.1-2010 under development
- Code compliance
  - California Title 24 under development
  - IgCC under consideration
- Building energy ratings—zero Energy Performance Index (zEPI) under consideration



**COMNET**  
Commercial Building Energy Modeling Guidelines and Procedures  
RESNET Publication 2010-001  
August 18, 2010



# COMNET MGP consensus process

- Written by COMNET technical team with participation including members of national labs, ASHRAE committees and the LEED EA TAG
- Two rounds of public comment
- Responses to each comment from the COMNET Technical Committee
- Approved by COMNET Standing Committee (CSC) and RESNET Board of Directors

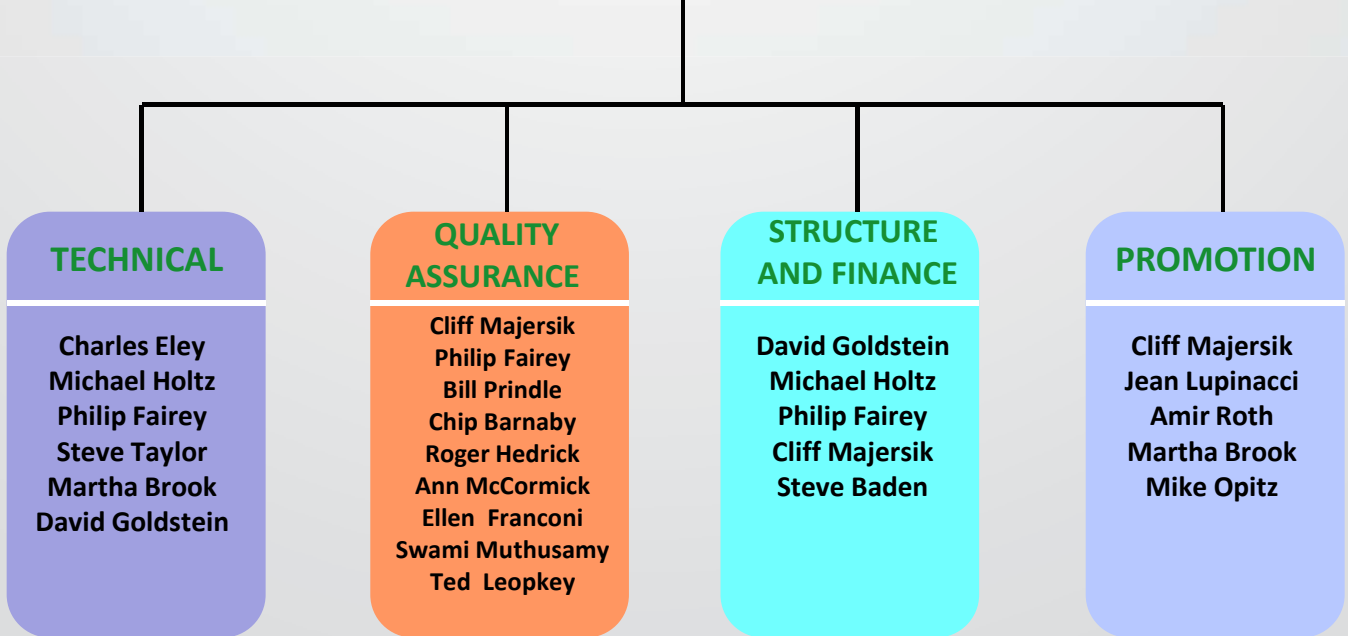


# Organization of COMNET

- Work performed within committees

**CSC**

Charles Eley, Chair (AEC)	Michael Holtz (LightLouver)	Philip Fairey (FSEC)
Bill Prindle (ICF)	David Goldstein (NRDC)	Cliff Majersik (IMT)
Jean Lupinacci (EPA)*	Steve Taylor (Taylor/ASHRAE)	Colin McCormick (DOE)*
Martha Brook (CEC)	Mike Opitz (Cadmus)	



\*Advisory members



# Benefits of COMNET

- **Benefits to USGBC/LEED and Other Rating Authorities**

- Standardized method to get an accurate, reliable asset rating
- More confidence in model results
- Less time required to review submittals (lower cost)
- Data flows seamlessly into rating authorities' databases
- Reduces errors in the model
- Process is adaptable to new and changing baselines

- **Benefits to Building Owners and LEED Projects**

- Reduces the time and cost of energy modeling
- Fewer opportunities for errors or differing rules interpretations means fewer rejections of models
- LEED points more predictable and less uncertain
- Quicker LEED certification
- Standardization allows for apples-to-apples comparison between buildings



## Benefits of COMNET (cont)

- **Benefits to Energy Modelers**

- Less effort, a more error free process
- Automatic generation of baseline buildings
- Credit for reductions in non-regulated energy use – e.g. plug loads and commercial refrigeration
- Same COMNET-accredited software can be used for multiple purposes
  - Green building ratings
  - Energy labels
  - Tax deduction
  - Utility/DSM programs
  - Code compliance (future)

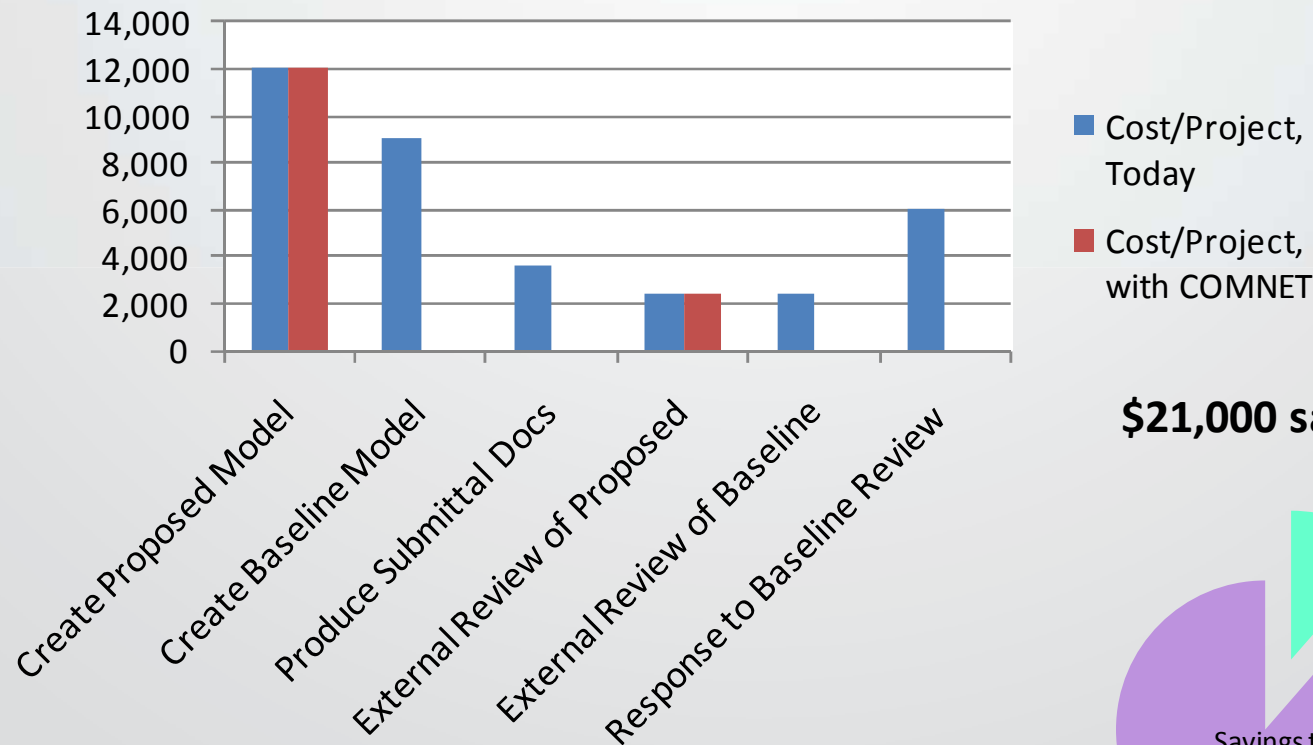
- **Benefits to Software Developers**

- Single specification serves multiple purposes-Tax credits, Green building ratings, Energy labels and Code compliance (future)
- Credibility from third-party
- Reduced development costs

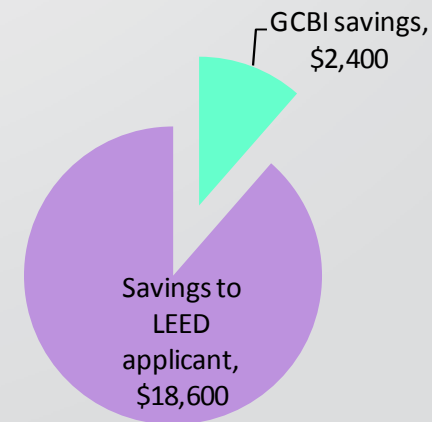


# Typical example: Potential Savings for LEED-NC, CS, Schools, Retail

**COMNET Saves \$21,000 (60%) per project on modeling costs**



**\$21,000 savings**



- **Business-As-Usual Assumptions**
  - **Building of typical complexity**
    - 204 hours for modeler
    - 32 hours for reviewer

## Typical example: Potential Savings for LEED-NC, CS, Schools, Retail

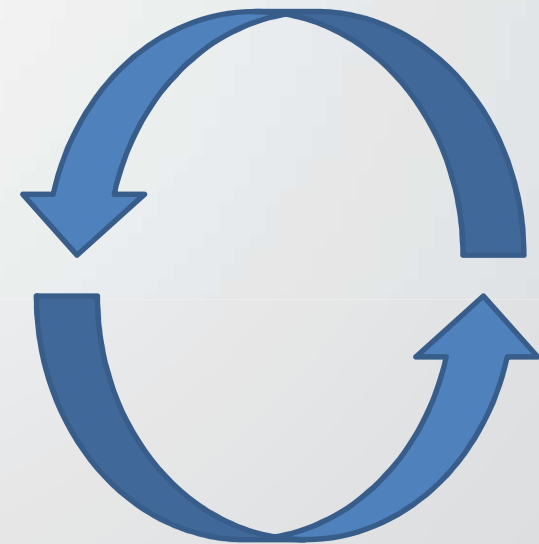
Task	Hours/Project	Cost/Project, Today	Cost/Project, with COMNET	COMNET SAVINGS
Create Proposed Model	80	\$12,000	\$12,000	\$0
Create Baseline Model	60	\$9,000	\$0	\$9,000
Produce Submittal Docs	24	\$3,600	\$0	\$3,600
External Review of Proposed	16	\$2,400	\$2,400	\$0
External Review of Baseline	16	\$2,400	\$0	\$2,400
Response to Baseline Review	40	\$6,000	\$0	\$6,000
<b>TOTAL Cost/Project</b>	<b>236</b>	<b>\$35,400</b>	<b>\$14,400</b>	<b>\$21,000</b>
Multiplied by 1000 Projects/Year	<b>236,000</b>	<b>\$35,400,000</b>	<b>\$14,400,000</b>	<b>\$21,000,000</b>

## Title 24 ACM – Current Status

- **The ACM (Alternative Calculation Method) defines modeling rules for the baseline building – analogous to ASHRAE 90.1 BPRM (Building Performance Rating Method)**
- **A custom energy budget is developed based on the proposed building’s envelope, HVAC and lighting features and physical geometry**
- **Requirements for baseline building match prescriptive code, and must be shown to be cost effective under the Warren-Alquist Act**
- **Incentive programs such as Savings by Design base percent savings against minimum Title 24 compliance**
- **However, the performance approach under T24 has its limitations:**
  - Only regulated energy use is considered
  - Compliance calculation places many restrictions on design inputs
  - The reference approach for certifying software is based on outdated software (DOE2.1e)

## Title 24 – Movement to COMNET Structure

- **California will be using COMNET to upgrade Title 24 ACM for 2013 Code cycle to:**
  - Allow designers to take credit for innovative design measures that are currently outside the scope e.g., passive design strategies, desiccant systems, heat recovery, WSE, heat pump coil defrost
  - Adopt COMNET building descriptors as the basis for rule-set to automatically generate the baseline building
  - Update the reference method for software testing based on criteria in COMNET
- **Other realignment with 90.1 PRM to:**
  - Move definition of baseline HVAC system based on number of stories and floor area to be consistent with PRM
  - Use ASHRAE PRM equipment sizing procedure based on unmet load hours



# Possible next steps for LEED/USGBC

- **Incentivize use of the COMNET MGP in LEED projects**
  - Comment submitted to LEED EA TAG for next version of LEED: Require use of MGP for building energy modeling
    - Alternatively, additional points under LEED EA Credit 1 could be offered to reward use of MGP
  - Innovation points for use of MGP
  - Fast track review of projects modeled using COMNET
- **Encourage energy modeling software developers to make their software COMNET compliant**
- **Provide new representation on 3 COMNET committees:  
Promotion, Technical and Standing (CSC)**



# Project Team

- **Project Management**
  - New Buildings Institute
- **Institutional Lead**
  - Institute for Market Transformation
  - RESNET
- **Technical Lead**
  - **Architectural Energy Corporation**
  - Energy Soft
  - Florida Solar Energy Center
  - Energy and Environmental Economics
  - McHugh Energy Consultants
  - National Resource Defense Council





## Conclusion

- COMNET Guidelines and Procedures are complete and ready to reference
- COMNET offers simpler, faster, cheaper building energy modeling with less variability
- COMNET can facilitate LEED submissions and reviews, increase compliance with procedures, and decrease rework, while saving money for USGBC/GBCI and registered projects

