





## Energy Audit Software: NEAT, REM/Design, & TREAT

2008 Energy OutWest Conference  
Scottsdale, Arizona  
June 2-6, 2008




## Overview

- Compare NEAT, REM/Design, & TREAT
- Look at:
  - Features
  - A few assumptions and pitfalls
  - Input screens
  - Output reports




## Designed for Different Audiences

- NEAT was developed exclusively for Weatherization providers
- REM/Design & REM/Rate were designed for new building optimization, energy code compliance, HERS ratings, EEM
- TREAT was built for home performance contractors
- But, they all have added features, either at the request of users or to enter additional markets, which has made them somewhat more similar to each other




## NEAT Features

- Expanded client application information
- Contact information for agency personnel, clients, contractors, and vendors
- Recording of health & safety issues and H&S retrofit measures
- Recording of CAZ, zonal, pressure pan measurements
- Detailed work orders
- Status tracking of client, applications, audits, work orders, inspections, & contractor payments




## NEAT Features

- Tracking of payments & balances of multiples funding sources
- Inventory of materials & supplies automatically updated by completed work orders
- Report generation
- GIS feature allows mapping of individual dwellings
- Ability to attach digital photos to each client, audit, or work order




## REM/Design Features

- Energy-efficient mortgage report
- Energy appraisal addendum
- Energy Code compliance
- Improvements analysis (existing buildings)
- Design optimization (new buildings)
- Heating and cooling equipment sizing
- Utility DSM compliance analysis
- EPA Energy Star Home analysis




## TREAT Features

- Create a multi-zone energy model of single-family or multi-family buildings
- Calculate the monthly cost of each fuel used in the model for typical weather conditions
- Present a work scope for a selected package of improvements, including basic cost estimation
- Print reports for customers that encourage investing in improvements, including information on building performance



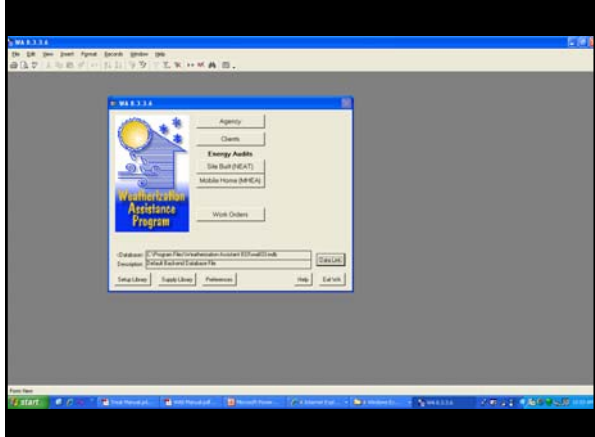

## TREAT Features

- Analyze utility bills for multiple fuels and meters in the building
- Estimate usage for the missing utility bills
- Track energy use after the improvement package is installed
- Weather-normalize actual utility bills and calculate the base load (non-heating usage) for each fuel




## TREAT Features

- Calibrate the model to match calculated monthly energy usage to actual billing data
- Create a database of clients (customers)
- Save filtered lists of customers in ASCII format, for use in mail-merges for follow up letters and marketing
- Perform Home Energy Rating


## NEAT Input

- Client information
  - Audits & work orders organized under Clients
  - So entering Client information is first step
- Audit status
  - Site visit scheduled for, completed on
  - Billing data collected on
  - Recommendations generated on
  - Audit complete and locked on
  - Walk away by Auditor on
  - Delayed on
  - Denied on
  - Other




## NEAT Input

- Shell tab
  - Walls
    - Frame walls having existing insulation & non-frame walls will not be analyzed by NEAT unless Added Insulation Type is specified as User Type 2
  - Foundation
    - Perimeter is length bordering outdoors, not portion adjacent to other foundations
    - % Perimeter Exposed is portion that will benefit from sill insulation
    - If foundation wall height <2 ft, NEAT won't consider floor or foundation wall insulation




## NEAT Input

- **Heating tab**
  - If primary system is replaced, user can specify if any secondary systems will be eliminated
  - New screens to enter results of safety and diagnostic tests:
    - Operational tests
    - Vent tests
    - Furnace & boiler components
    - Inspections
    - Thermostat



## NEAT Input

- **Heating operational tests**
  - Flue gas analysis
  - Carbon monoxide
  - Heat rise
- **Heating vent test**
  - Venting information
  - Normal operating conditions draft measurements



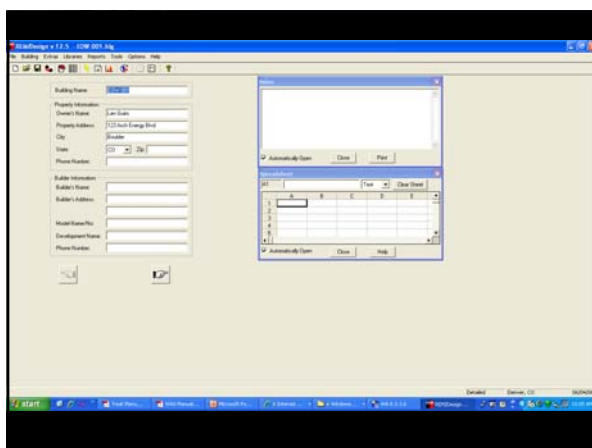

## NEAT Input

- **Ducts/Infiltration**
  - Blower door & duct leakage
  - Optional screens for:
    - Zonal pressure tests
    - Pressure balance
    - Pressure pans
- **Baseloads**
  - Operational & vent tests for water heaters



## NEAT Input


- **Health & Safety tab added**
  - Whole house
  - Equipment
  - Building shell
- **Photos**
- **Measures**
  - Work orders

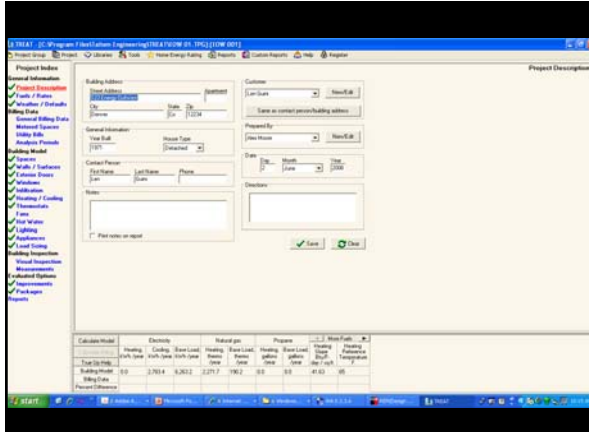
## REM/Design Input

- **Numeric inputs will accept a number or an equation. Handy spreadsheet also**
- **Save as default building feature establishes default values for future buildings**
- **Can import Elite RHVAC and WrightSoft Right Suite files (.xrr and .xrm files only)**
- **Batch files**

## REM/Design Input




- Utility bill reconciliation
- Library transfer
- Two-building reports
- Group/ungroup improvement measures
- Can analyze replacing existing heating system with a different type that uses a different fuel




Calculation	Electric	Heated gas	Heated oil	Heated propane	Heated wood	Heated coal	Heated biomass	Heated solar	Heated geothermal	Heated wind	Heated hydro	Heated other
Total Heating	2,781.4	3,302.2	2,271.7	196.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## TREAT Energy Model




- A building is viewed as an aggregation of spaces
  - Spaces may be conditioned (heated and/or cooled) or unconditioned
  - The maximum number of spaces in a building is 100.
- Each space must have at least one surface (wall, ceiling, or floor)
  - Only exterior surfaces and surfaces between heated and unheated spaces may be entered
  - The total number of surfaces in a project must not exceed 500
  - Up to 300 of them may be exterior surfaces
  - There may be up to 100 unique wall constructions

## TREAT Energy Model




- Each space may contain unlimited number of appliances and lighting and a ventilation fan
- Each exterior surface may contain multiple doors and windows
  - The total number of window records in the building must not exceed 500
- Each wall may have a single overhang, to model shading
  - The overhang runs the full length of the wall, is located at the top of the wall and is a horizontal surface parallel to the ground.
- The model building must have a heating system that may consist of up to two subsystems: main (primary) and backup (secondary)
  - Each subsystem has its own distribution system
  - Back up heating is activated when the main heating capacity is exceeded.

## TREAT Energy Model

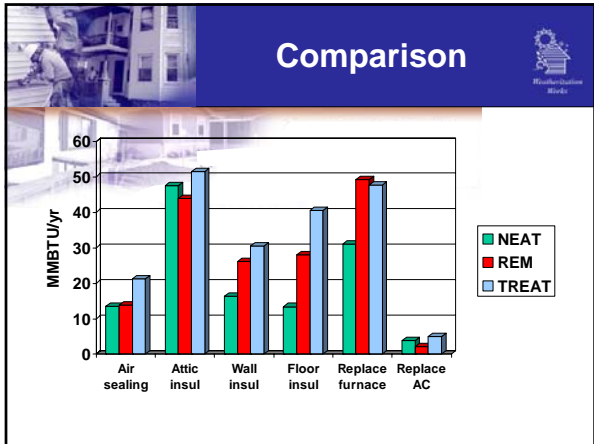


- The heating system can be connected to multiple thermostats (the building can have multiple heating zones)
- Each heating/cooling zone may include any number of spaces (rooms)
- The building may have a cooling system. The cooling system may share its distribution with a heating subsystem
- Heating and cooling systems share thermostats

## TREAT Energy Model



- The leakage area of a heated space is distributed among its surfaces in proportion to the surface area
- If, in addition, the user assigns leakage area to surfaces, then only the remaining (unassigned) leakage is distributed among surfaces in proportion to the surface area
- Each project may contain a model of a single Base Building and unlimited number of improvement packages for that Base Building



### Contact Information

**Alex Moore**  
**Simonson Management Services**  
 7747 Heatherton Lane  
 Potomac, Maryland 20854  
 Phone: (703) 938-0021  
 Email: [amoore@sms-results.com](mailto:amoore@sms-results.com)