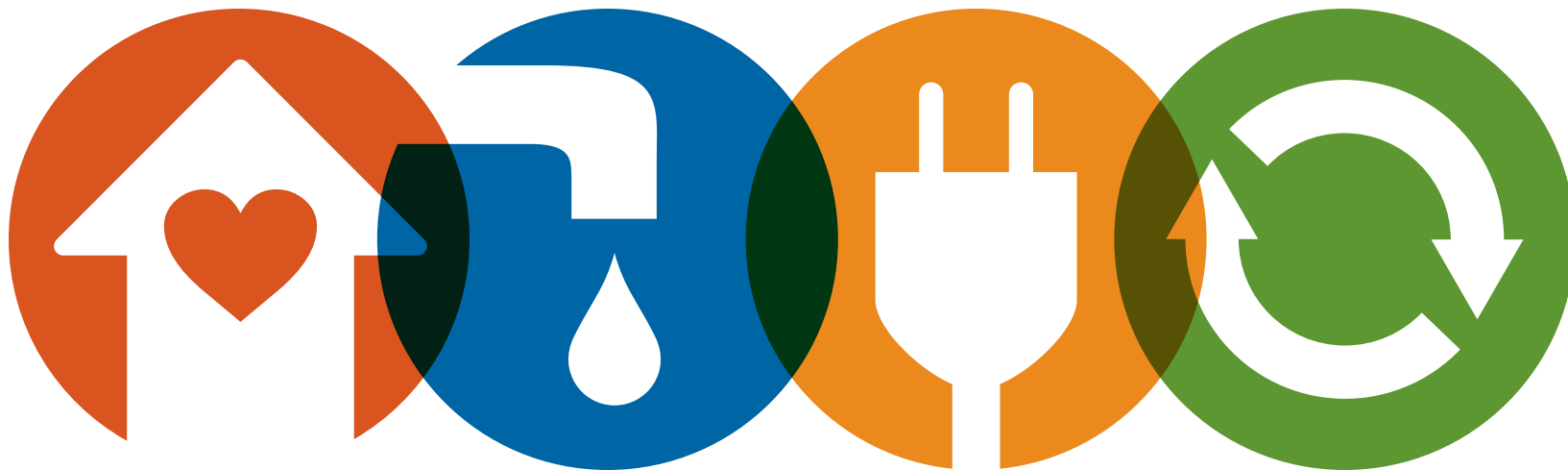








GREEN & HEALTHY LIVING:

Operations & Maintenance Training in a Box



**IMPROVEMENTS FOR YOUR BUILDING WORKSHOP
TRAINER NOTES**

TABLE OF CONTENTS

Overview	03
Getting Started	04
What You Should Provide	06
Training Summary Agenda	07
Introduction Workshop	09
 BENCHMARKING PROPERTIES FOR ENERGY USAGE	11
 ENERGY CONSERVATION	15
 HEALTHY LIVING	18
 WATER CONSERVATION	23
 WASTE & RECYCLING	27
 PUTTING THE PIECES TOGETHER	29
Attachment A: Handouts & Resources	34
Appendix of Student Exercises	35
Credits	50

OVERVIEW

The Enterprise Green and Healthy Living Operations and Maintenance “Training In A Box” (TIAB) is a one-day training course designed to introduce trainees to green and healthy practices that can be integrated into current planning, maintenance and resident services activities.

The training is designed to assist property owners, resident services staff, building maintenance staff, property managers and others involved in property management. The training materials include: presentations and engaging activities to aid you in leading easily executed mini-workshops that are largely ready to go “out of the box.” Slides and activities may be tailored to meet local needs.

These notes provide suggestions to assist you in preparing to teach the class and work with the materials. The notes include instructions for leading class exercises and completed sample exercises.

GETTING STARTED: TRAINER PREPARATION

You should allocate at least 4-6 hours to review the training materials before teaching the first time.

The training resources are posted in electronic folders on the Enterprise Green Communities website. One folder is dedicated to each of seven core topics and a general handouts and resources folder contains additional materials. Two related E-learning workshops, Benchmarking & Reducing Energy and Conserving Water, are also provided.

The Enterprise Green & Healthy Living training documents consist of the following:

- Introduction
- Benchmarking Properties for Energy
- Energy Conservation
- Water Conservation
- Healthy Living
- Waste & Recycling
- Putting the Pieces Together
- Handouts & Resources
- E-learning workshops

GETTING STARTED: COURSE MATERIALS

The training resources posted in each of the seven core training workshop folders include: PowerPoint slides, student exercise handouts and related video. These training tools are described in general to the right. The Trainer's Notes (this document) discusses how to use the tools appropriate to each workshop.

- **Presentation slides (MS PowerPoint)** – The bulk of the course content is contained in these slides. Separate slide presentations are provided for each workshop. You are encouraged to tailor the slides to incorporate local issues and conditions and to reduce the number of slides as appropriate. We have erred on the side of providing more slides to give you a range of material to present.
- **Exercises (Acrobat PDF)** – The course materials include exercises to engage participants in problem solving tasks. This group work is often a highlight of the class for many participants. They learn from each other and apply their experience and new knowledge to practical situations. The training materials provide student exercise handouts. These Trainer's Notes provide detailed instructions and completed sample answers/responses for each exercise. The PowerPoint slides provide prompts to signal you when to use the recommended exercises.
- **Videos** – Videos are provided for selected workshops. Some videos are appropriate for use in the classroom setting while others are available to help “train the trainer.”
- **Handouts & Resources (Acrobat PDF and MS Word)** – Three types of materials are included in this folder. Student handouts include the Course Agenda and materials that are recommended for distribution to all students. Sample reference materials include documents that you can use as sample documents to have available at the training for students to review. Reference materials include documents that may be useful to some students as they pursue green and healthy operations; you are encouraged to provide participants a link to these materials. A full list of these items is provided in Attachment A: Handouts & Resources.
- **E-learning workshops (Web Content)** – Two E-learning workshops are provided: 1) Benchmarking & Reducing Energy and 2) Conserving Water. These workshops can be used to supplement the in class training or as an alternative to the in class presentation. Each workshop generally takes 20-30 minutes to complete. The content is consistent with the in class materials, although less extensive. Participants may find it useful to offer these E-learning workshops to their colleagues after returning from the training to help explain opportunities to benchmark, reduce energy and conserve water. Trainers can access the E-learning workshops in the E-learning workshop folder associated with this course.



WHAT YOU, AS THE TRAINER, SHOULD PROVIDE

You should provide the below materials to support the training:





- Chalkboard, dry erase board or easel paper for illustrations and notes
- Small diameter straws for use in the Healthy Living workshop
- **Products For Demonstration** – Selected materials can be useful in demonstrations and as giveaways. Products can be purchased as a package directly from www.EFI.org (800-379-4121) for approximately \$60 including the Kill-a-Watt meter or \$40 without the Kill-a-Watt meter. You may also obtain the materials from Home Depot or other suppliers. Recommended products: compact fluorescent lightbulbs; smart surge protector; Kill-a-Watt meter (optional); WaterSense showerheads and faucet aerators, pest proofing corrosion resistant metal.

TRAINING SUMMARY AGENDA

Below is the annotated Trainer agenda. A student version is supplied separately in the Handouts/Resources folder in a Word format to allow you to modify it per local conditions. The agenda also indicates a suggested duration for the recommended exercises. The remainder of these Trainer Notes provides a detailed discussion of the demonstrations, exercises and video relevant to each workshop.

TIME	WORKSHOP	CONTENT	DURATION
9:00 am	INTRODUCTION	<ul style="list-style-type: none"> • Introductions & Slides • Discussion: Brainstorm Current Property Management Actions 	15 minutes 15 minutes
9:30 am	 BENCHMARKING PROPERTIES	<ul style="list-style-type: none"> • Slides • Discussion: Benchmarking Energy • Benchmarking Exercise 1: Benchmarking Energy • Optional: E-learning Workshop 	10 minutes 5 minutes 15 minutes
10:00 am	 ENERGY CONSERVATION	<ul style="list-style-type: none"> • Slides • Discussion: Identifying Energy Conservation Measures • Videos: Grandma's House & How to Read an Electricity Bill (optional) • Optional: E-learning Workshop 	90 minutes 15 minutes 15 minutes
12:00	LUNCH		

TRAINING SUMMARY AGENDA

TIME	WORKSHOP	CONTENT	DURATION
1:00 pm	 HEALTHY LIVING	<ul style="list-style-type: none"> • Slides • Demonstration: Breathing With Asthma • Healthy Living 1: Identify the Health Problems 	90 minutes 5 minutes 25 minutes
3:00 pm	 WATER CONSERVATION	<ul style="list-style-type: none"> • Slides • Water Conservation Exercise 1: Planning Water Upgrades • Video: Test for Toilet Leaks • Optional: E-learning Workshop 	20 minutes 20 minutes 5 minutes
3:45 pm	 WASTE & RECYCLING	<ul style="list-style-type: none"> • Slides • Video: What Can be Recycled (optional) 	25 minutes 5 minutes
4:15 pm	 PUTTING THE PIECES TOGETHER	<ul style="list-style-type: none"> • Slides • Putting the Piece Together Exercise 1: Greening Unit Turnover • Putting the Pieces Together Exercise 2: Greening Work Order Requests • Discussion: Brainstorm Green Changes to Current Practices 	10 minutes 10 minutes 10 minutes 15 minutes
5:00 pm	ADJOURN		

INTRODUCTION WORKSHOP

The introduction workshop is designed to engage participants in thinking about their operations and maintenance and how they could “green” practices.

You will need a chalkboard, dry erase board or easel paper to record notes visible to a class audience. This workshop involves one discussion and is scheduled for 30 minutes. You should start with introductions and ask participants if there are any issues or specific questions that they want addressed. After completing introductions, move into slides which prompt you to begin the discussion described on the following page.

DISCUSSION: BRAINSTORM CURRENT PROPERTY MANAGEMENT ACTIONS

GOAL	PREPARATION	ACTIVITY
<p>To identify current maintenance activities, vendors and contracts and possible actions to make these activities green and healthy.</p>	<ul style="list-style-type: none">• You will need a flip chart with a pen and colored stickers.	<ul style="list-style-type: none">• Before going into the slides, ask the students the question on the slide, “What are your most common maintenance tasks; staff and vendors?” Record all responses from students on the flip chart. Refer to the notes in the slides for prompts if the students don’t have enough responses.• Once the list is completed (you may add more as the course moves on), ask the students to place the dot stickers next to the maintenance activity that could be done in a greener way and what they would change to make it green. This helps the class begin to think both individually and collectively about green opportunities.

Benchmarking Properties





BENCHMARKING PROPERTIES FOR ENERGY USAGE WORKSHOP

This workshop will teach participants the importance of benchmarking.

You must review the speaker notes in the PowerPoint slides to know where to ask questions pertaining to the slides and review the exercise slides. It is critical to review this workshop before the course to add in local data and decide what's applicable to the audience. *Specifically in Slide 16, you should find local data on multi-family energy usage. The data in the slide is for heating climate in the Northeast.*

The workshop uses one discussion and one exercise. A complimentary E-learning workshop is available in the folder dedicated to E-learning content. You may use this resource to supplement or replace course content. Some students may also find it helpful to share the E-learning content with colleagues to introduce or reinforce content and strategies discussed in the training class.

This workshop is scheduled for 30 minutes.



DISCUSSION: BENCHMARKING ENERGY USE

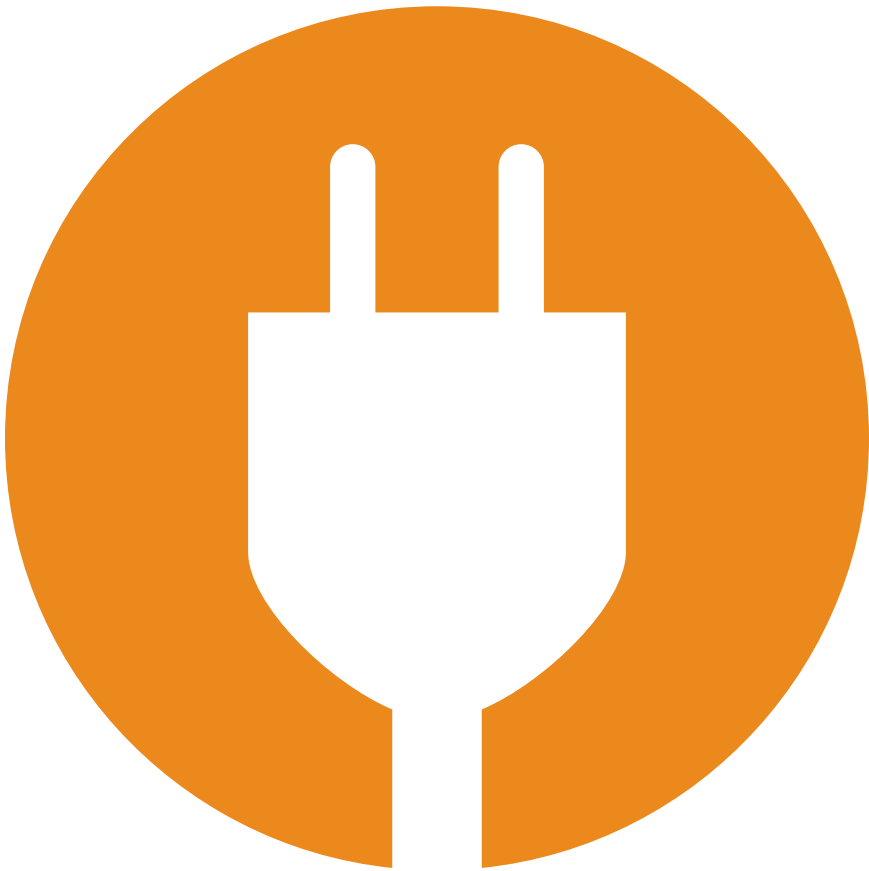
GOAL	PREPARATION	ACTIVITY
<p>To understand the power of benchmarking energy use, methods for benchmarking, metrics for benchmarking and what to do with the information.</p>	<ul style="list-style-type: none">• You should review the slides before leading the discussion to identify when to pose questions based on the concepts and data presented.	<ul style="list-style-type: none">• Throughout the slides there are a series of questions pertaining to the concepts and data presented.• Pose these questions to the class and explain why responses are right or wrong.

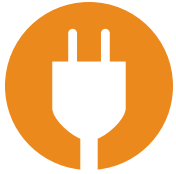


EXERCISE 1: BENCHMARKING ENERGY USE

GOAL	PREPARATION	ACTIVITY
<p>To understand what benchmarking tells us about energy use.</p>	<ul style="list-style-type: none"> • Read through the exercise slides to be aware of the data presented. • Break trainees up into groups of 4-7 students. • Have copies of the benchmarking slides for this exercise printed out. <hr/> <div> </div> <p>Note: Sample answers are shown in the appendix.</p>	<ul style="list-style-type: none"> • Review the PowerPoint benchmarking slides. • Discuss which buildings are using the most energy, what might be contributing to high-energy use and what the property owner might do to investigate and reduce energy use. • Ask groups to report out and facilitate the discussion.

Energy Conservation





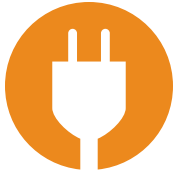
ENERGY CONSERVATION IN HEATING, COOLING & LIGHTING WORKSHOP

This workshop has over 60 slides, not including the energy audit case studies. It is critical to review this workshop before the course to add in local data and decide what's applicable to the audience in terms of energy conservation strategies.

This workshop includes one discussion and two videos. Possible sources of multifamily energy usage data could be your local weatherization agency. Course contents not applicable to the participants can be removed. Each energy conservation strategy sub-section begins with a title slide. Two energy audit case studies are provided, one for a heating climate and one for a cooling climate. You must choose which case study is applicable to local conditions. An optional video is provided. If you choose to show the video you will need to secure speakers for the audio. You are encouraged to provide demonstration items such as compact fluorescent bulbs, electric smart strips and a Kill-a-Watt meter.

A complimentary E-learning workshop is available at http://www.greencommunitiesonline.org/tools/toolkits/elearning_module_energy/ in the folder for E-learning content. You may use this resource to supplement or replace course content. Some students may also find it helpful to share the E-learning content with colleagues to introduce or reinforce strategies discussed in the training class.

This workshop is scheduled for two hours.



DISCUSSION: IDENTIFYING ENERGY CONSERVATION MEASURES

GOAL	PREPARATION	ACTIVITY
<p>To understand how to evaluate energy usage and to identify strategies to reduce energy in a cost effective manner.</p>	<ul style="list-style-type: none">• You should review the slides ahead of time and read the slide notes to become familiar with questions shown in the notes section of the slides.	<ul style="list-style-type: none">• You will prompt students with questions pertaining to photos or concepts on the slides. (See notes in the Energy Conservation slides.)• When a slide with a question arises, pose the question to the whole group and encourage everyone to answer.• Sometimes there will be more than one answer.• Explain to the students why responses are right or wrong.

Video Resources:

- **What about Grandma’s House** – Provides an overview of the “the building as a system” and explains through a case study the pitfalls of poorly designed energy upgrades and strategies to avoid these pitfalls. This optional 3-5 minute video can be used in conjunction with this workshop if time permits.
- **How to Read an Electricity Bill** – Provides instructions on how to read a utility bill. It can be used to “train the trainer” or in a classroom setting.

Healthy Living





HEALTHY LIVING

CREATING HEALTHIER HOUSING WORKSHOP

This workshop teaches participants the importance of healthy housing and strategies to create healthier living environments.

The slides require you to incorporate local asthma data and provide a link to download this information. The slides also include an optional bedbug section. You should determine if participants have experienced this problem and determine if you want to use the bed bug slides.

This workshop contains one demonstration (with accompanying video) and one exercise; it is scheduled for two hours.



DEMONSTRATION: ASTHMA BREATHING THROUGH A STRAW

GOAL	PREPARATION	ACTIVITY
<p>Have residents experience what it can feel like to have an asthma attack or breathing problem.</p>	<ul style="list-style-type: none">• Handout small straws. Review the video demonstrating this exercise. You should provide the straws. They are generally available at office supply stores, coffee shops, etc. <hr/> <p>Video Resources:</p> <ul style="list-style-type: none">• Breathing with Asthma – Shows a trainer conducting the “Breathing with Asthma” demonstration. This is a helpful video to watch before you conduct this demonstration for the first time.	<ul style="list-style-type: none">• Ask each resident to breathe through the straw for about 30 seconds. Be sure to let residents know that if they have breathing issues or feel faint at any time they should stop using the straw.• Debrief and ask them how it felt? Typical responses are “ I had trouble getting enough air in,” “ hard,” “like an elephant was sitting on my chest,” “hard to get enough air out,” etc.• Explain that when we breathe normally it is like breathing through a paper towel holder. When we are having an asthma attack due to an allergic reaction, we get swelling in the airway – our paper towel holder become a small straw – and the muscles around our airway may spasm or tighten further reducing the size of the airway. All of this is what makes it feel so bad.



EXERCISE 1: IDENTIFY THE HEALTH PROBLEMS

GOAL

To describe sources of common health problems and appropriate responses.

Allocate 25 minutes for this exercise.

PREPARATION

- Print out the problem picture slides on paper.
- Make enough copies so that you will have one set for every 6 students.
- They will work in groups to complete this exercise.

**HEALTHY LIVING EXERCISE 1:
IDENTIFY THE HEALTH PROBLEMS
ANSWER KEY**

GOAL To describe sources of common health problems and appropriate responses.

DIRECTIONS Complete the below table for each picture. The instructor will provide pictures.

Slide	What's the problem/situation? How does it look?	What identifies problem & when to intervene?	What addresses the problem & when?	How do you prevent it from happening again?
1	Two teenagers are talking. One is wearing a bandage on his arm. The other is holding a first aid kit. They are in a room with a first aid kit on the wall.	Bandage, first aid kit, teenagers	First aid kit, bandage	First aid kit, bandage
2	A person is sitting at a desk, looking at a computer screen. The screen shows a graph with a red line that is going up. The person is looking at the screen with a concerned expression.	Person looking at computer screen, graph on screen	Person looking at computer screen, graph on screen	Person looking at computer screen, graph on screen
3	A person is sitting at a desk, looking at a computer screen. The screen shows a graph with a red line that is going up. The person is looking at the screen with a concerned expression.	Person looking at computer screen, graph on screen	Person looking at computer screen, graph on screen	Person looking at computer screen, graph on screen

Note: Sample answers are shown in the appendix.



EXERCISE 1:

IDENTIFY THE HEALTH PROBLEMS

ACTIVITY

- Break up the class into groups of 5-7 individuals. Try and mix up students to allow them to meet people they may not know. Distribute the exercise forms, which allow participants to record their answers. (If you created a notebook, the exercises may be in one tab.)
- Provide each group a copy of the problem pictures. Ask them not to write on the pictures. This will allow you to reuse the pictures for future trainings.
- Provide the class about 15 minutes to review the slides and fill in the exercise form. Let them know that they are looking for moisture, ventilation and pest problems.
- Stop the group work and show the slides, debrief the answers and call on each group to provide their insights. The problems and likely repairs for each “problem” are presented in the PowerPoint notes. The answers for the problem slides are provided in the exercise answer key in the appendix.

Water Conservation





WATER CONSERVATION WORKSHOP

This section teaches participants the importance of conserving water and strategies to conserve water at their properties.

This workshop uses one exercise and one video. It is very important that you complete the exercise on your own before teaching the exercise to understand how much time is needed and how to guide participants. You will need one laptop for each group of 4-5 students working on the exercise.

A complimentary E-learning workshop is available at http://www.greencommunitiesonline.org/tools/toolkits/elearning_module_water_conservation/ and can be used to supplement the course materials, replace specific content, or as a resource students can use with colleagues after completing the course to introduce them to the concepts and strategies discussed during the training.

This workshop is scheduled for 45 minutes.



EXERCISE 1: PLANNING WATER UPGRADES

GOAL

To understand the water saving potential and pay-back of water conservation upgrades.

PREPARATION

- Review the Excel spreadsheet.
- Test out the questions to be sure you can calculate the answers.
- Explore the assumptions tab.
- Identify laptops to use with the class.
- It is best to have no more than 4 people per laptop.
- If there are insufficient laptops, you can facilitate this exercise using one central laptop and project the spreadsheet for a whole group discussion.
- Allocate at least 20 minutes for this exercise.



Note: An answer key is shown in the appendix.



EXERCISE 1:

PLANNING WATER UPGRADES

ACTIVITY

- Review the Excel spreadsheet with students. Directions are provided in a tab on the spreadsheet. (Each group will have access to an Excel spreadsheet). Review the existing water use. Total use is 92 gallons/person/day. Existing water uses: toilets: 5 gpf (leaking); showerheads: 4 gpm; kitchen sink: 2.5 gpm; bath sink: 2.5 gpm.

Video Resources:

- **Test for Toilet Leaks** – Shows how to test a toilet to determine if it is leaking. It can be used with participants.

Waste & Recycling





WASTE & RECYCLING WORKSHOP

This workshop discusses opportunities to reduce waste generated onsite and increase recycling.

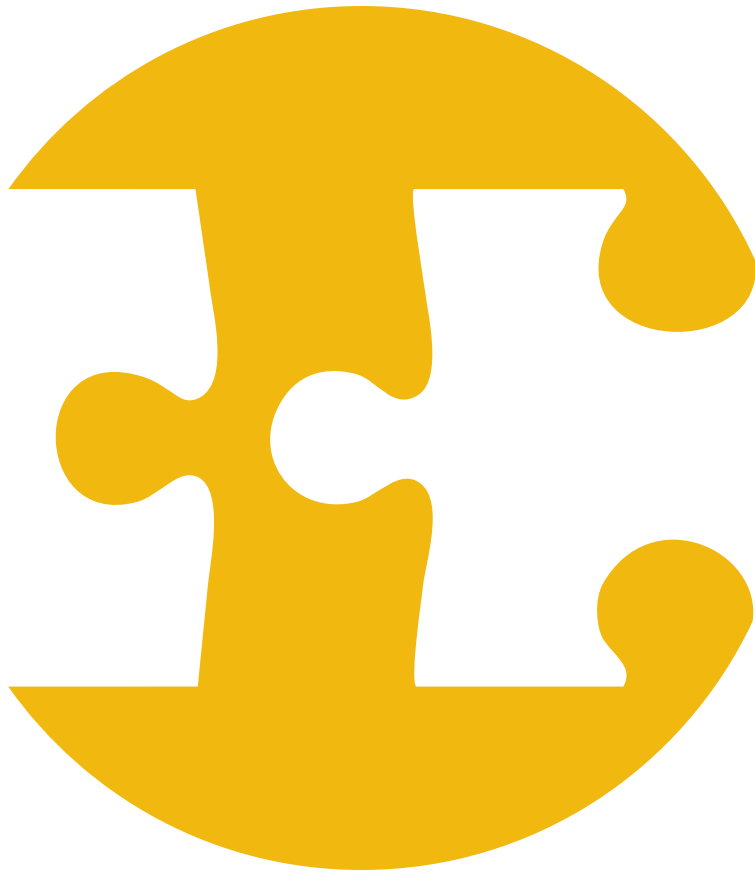
Because local recycling requirements vary significantly, you are encouraged to incorporate local standards and resources into the presentation. This workshop contains slides and an optional video demonstrating the ranges of household items that can be recycled.

This workshop is scheduled for 30 minutes.

Video Resources

- **What Can Be Recycled** – Shows products that can be recycled. This video could be used with participants or to help prepare the Trainer to conduct such a demonstration in class.

Putting the Pieces Together





PUTTING THE PIECES TOGETHER WORKSHOP


This workshop will give participants tools and strategies to implement a comprehensive Green & Healthy Living Operations & Maintenance Plan.

The slides for this workshop are intended to guide discussion and support the exercises. This workshop contains two exercises and one discussion.

This workshop is scheduled for 30 minutes.



EXERCISE 1: GREENING UNIT TURNOVER

GOAL	PREPARATION	ACTIVITY
<p>To use knowledge gained from all the workshops to make new decisions about current maintenance practices during apartment turnover. Decide which activities can be modified to enhance their green elements.</p>	<ul style="list-style-type: none">Review the Green Unit Turnover & Property Inspection Checklist provided in the appendix. <hr/>  <p>Note: Checklist can be found in the appendix.</p>	<ul style="list-style-type: none">Break the class into groups of 4-6 students.Ask students to review the exercise handout; it's a list of unit turnover procedures.Determine which activities can be modified, what they would change about it and how they would implement these changes.Student should also be encouraged to add actions to the checklist.Students should be thinking about how to integrate new activities to reduce energy and water usage, conserve resources, improve indoor health and comply with new green and healthy operations and maintenance policies.



EXERCISE 2: GREENING WORK ORDER REQUESTS

GOAL	PREPARATION	ACTIVITY
<p>To identify a green and healthy approach to work order requests.</p>	<ul style="list-style-type: none">Students will need the exercise handout. <div><p>PUTTING THE PIECES TOGETHER EXERCISE 2: GREENING WORK ORDER REQUESTS ANSWER KEY</p><p>GOAL: To identify a green and healthy approach to work order requests.</p><p>DIRECTIONS: Below are 3 scenarios for work order requests. Brainstorm the green and healthy work order responses. List solutions you would like and explain how you would do it.</p><p>Scenario 1: The office is having a lot of paper waste. The printer is old and slow. The office manager is thinking about getting a new printer. The office manager is thinking about getting a new printer. The office manager is thinking about getting a new printer.</p><p>Scenario 2: The office is having a lot of paper waste. The printer is old and slow. The office manager is thinking about getting a new printer. The office manager is thinking about getting a new printer. The office manager is thinking about getting a new printer.</p><p>Scenario 3: The office is having a lot of paper waste. The printer is old and slow. The office manager is thinking about getting a new printer. The office manager is thinking about getting a new printer. The office manager is thinking about getting a new printer.</p></div> <p>Note: Sample answers are shown in the appendix.</p>	<ul style="list-style-type: none">Break the class into groups of 4-6 students.Instruct students to review the exercise handout. Each group can discuss all three scenarios, or if time is an issue each group can take one scenario and rely on the class discussion to review all scenarios.Encourage students to read the whole scenario, brainstorm the specific work orders that would typically be undertaken, and consider what if any green and healthy products and/or practices should be integrated into typical responses.Discuss each scenario as a class and keep track on the flip chart for comparison to the answer. Students may also list new strategies not listed; this is encouraged.



DISCUSSION: GREEN CHANGES TO CURRENT PRACTICES

GOAL	PREPARATION	ACTIVITY
<p>Students are able to identify actions their organization can pursue or they can undertake to pursue green and healthy practices.</p>	<ul style="list-style-type: none">• You will need a flip chart to record answers and the original list from the opening discussion.• You will distribute the Enterprise Green Asset Management Toolkit at the end of this exercise.	<ul style="list-style-type: none">• Ask each student what the first thing they are going to change about their property management activities and record responses on the flip chart. Lead a discussion about the best way to implement these strategies:<ul style="list-style-type: none">– What will they start with? Benchmarking?– What are they goals of changing these practices?– Who on their staff will be responsible?– Who might be able to help them? What resources can help them?– What policies will they change? Cleaning? Laundry?– Will staff be trained and if so on what?– Will they track performance from retrofits and policy changes?• You are encouraged to ask more questions as appropriate.

ATTACHMENT A: HANDOUTS & RESOURCES

This folder is organized into 3 sub-folders. The documents provided in each sub-folder are listed to the right.

Training Handouts – Recommended handouts for all students

- Course Agenda
- Reasons to Explore Smoke Free Housing Factsheet
- Model IPM Contract Language
- Enterprise Green Asset Management Tool Kit

Sample Materials – Trainers are encouraged to provide display copies during class







- The National Center for Healthy Housing Ventilation Factsheets
- Sample Air Conditioner Policy
- Sample Energy Audit
- Saving Water in Your Multifamily Building

Reference Materials – Trainers are encouraged to make available electronically

- Energy Conservation
 - Multifamily Building Energy Calculator
 - How to Benchmark: BTU/ft²/HDD Step-by-Step Calculation
- Healthy Living
 - EPA Renovation & Repainting Small Entity Compliance Guide
 - IPM Checklist for HUD M2M Program
 - How to Control Pests Safely Factsheet
 - What's Working for Bed Bug Control
 - Green & Healthy Resources Guide

APPENDIX OF STUDENT EXERCISES

The following appendix provides the student exercise forms for each workshop with sample answers where applicable. Student exercises are available for download in the Operations & Maintenance Training in a Box section of the Enterprise Green Communities website. They are organized by corresponding workshop topic.

WORKSHOP	EXERCISE	APPENDIX CONTENT
 BENCHMARKING PROPERTIES	<ul style="list-style-type: none"> • Exercise 1: Benchmarking Energy Use 	<ul style="list-style-type: none"> • Exercise 1: Sample answers
 ENERGY CONSERVATION	<ul style="list-style-type: none"> • (There are no student exercises for the Energy Conservation workshop) 	<ul style="list-style-type: none"> • How to Benchmark, Step by Step reference document
 HEALTHY LIVING	<ul style="list-style-type: none"> • Exercise 1: Identify the Health Problems 	<ul style="list-style-type: none"> • Exercise 1: Sample answers
 WATER CONSERVATION	<ul style="list-style-type: none"> • Exercise 1: Planning Water Upgrades 	<ul style="list-style-type: none"> • Exercise 1: Answer key • Exercise 1: Excel file
 WASTE & RECYCLING	<ul style="list-style-type: none"> • (There are no student exercises for the Waste & Recycling workshop) 	
 PUTTING THE PIECES TOGETHER	<ul style="list-style-type: none"> • Exercise 1: Greening Unit Turnover • Exercise 2: Greening Work Order Requests 	<ul style="list-style-type: none"> • Exercise 1: Green Unit Turnover & Property Inspection Checklist • Exercise 2: Sample answers



BENCHMARKING

EXERCISE 1:

BENCHMARKING ENERGY USE

SAMPLE ANSWERS

GOAL

To understand what benchmarking tells us about energy use.

DIRECTIONS

Review the benchmarking slides. Discuss which buildings are using the most energy, what might be contributing to high energy use, what the property owner might do to investigate and reduce energy use.

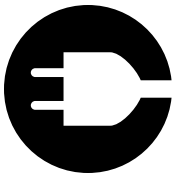
Group 1 Possible Responses

This graph shows a set of apartments; 3 units have much higher energy usage. For the apartments with higher use, an owner might want to know the number of bedrooms in apartment (larger apartments use more energy), how many people live there, and what kinds of heating/cooling systems are in that unit. We would want to investigate possible reasons for the high energy use through talking with tenants, a possible visit to that unit to see if there are extra people, extra electronics, added heating or cooling systems, extra appliances, etc. Owners and manager could work with residents to help them understand how their behavior translates into high-energy use. The data could potentially be misleading for a number of reasons: large family, people working all shifts, large apartment, and unknown outlets connected to their meter, oxygen machines, etc.

.....

Group 2 Possible Responses

This graph shows a portfolio of buildings in Boston, MA. We can see that 2 buildings have much higher energy usage per square foot than the rest. An owner should investigate the building's existing conditions, existing mechanical systems to determine they are working properly, and any recent changes to the building. An owner might consider an energy audit to better assess the energy use and an interview the building manager. Implement energy conservation measures identified during the audit and investigate possible funding sources for upgrades. The data could be misleading for a number of reasons: weather conditions, occupancy changes, building demographics, meters are incorrect, unusual building uses, etc.

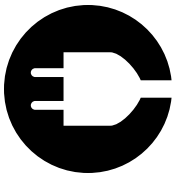


HOW TO BENCHMARK, STEP BY STEP ENERGY CONSERVATION REFERENCE

1. If my building is heated with electricity (one meter)

(We assume here that hot water is gas or oil, but separate fuel, non-electric)

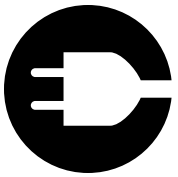
- Get two years of electricity usage.
- Look for the two lowest kwh consumption months in a one-year period (typically May or September).
- Add these two months together, divide by total number of days during that period (this is base use/day)
- Multiply by 365. This is your annual base usage in kwh (non heating or cooling electric).
- Add together total winter kwh usage (October through May). Get the number of days during this period.
- Multiply your daily base usage by your total number of winter billing days. This is your winter base usage.
- Subtract your total winter base usage from your total winter kwh usage. This is your heating usage in kwh.
- Divide this number by the total square footage of the building. Multiply by 3412.
- Divide by annual heating degree days = $Btu/ft^2/HDD$
- Repeat this for the following year. Now you have two different years' heating usage.
- Get gas or oil bills for two years for all non-heating uses (hot water [oil or gas], dryer and/or stove gas).
- Total each year separately.
- Divide each year by square feet in the building. Separately, divide each year by number of bedrooms.
- Now we know hot water, stove, and gas dryer usage of fuel both per bedroom and per square foot.



HOW TO BENCHMARK, STEP BY STEP ENERGY CONSERVATION REFERENCE

2. If my building is heated with gas, oil, or steam

- Get two years of oil, gas or steam usage.
- Look for average daily fuel usage in the summer (hot water only).
- Add summer periods together; divide by number of days during your specific summer period.
- Multiply by 365. This is your annual base usage.
- Get annual totals of gas, oil, or steam usage for each year separately.
- For each year, subtract your annual base usage from the total annual usage. This is your heating usage.
- Divide by building square feet. This is your heating consumption per square foot.
- Multiply by 100,000 (gas), or 138,000 (#2), or 145,000 (#4), 155,000 (#6) or 1,000,000 (steam). These are the Btu/sq.ft.
- Divide by annual heating degree days = $\text{Btu/ft}^2/\text{HDD}$
- Divide annual base usage by total usage. This is your percentage of fuel used to make hot water.
- Get your total annual kwh electricity usage. Divide by building square feet and by number of bedrooms.



HOW TO BENCHMARK, STEP BY STEP ENERGY CONSERVATION REFERENCE

3. If my building uses interruptable gas or other dual fuel system

- Get annual totals of gas or oil usage for each year separately.
- Using a worksheet, note all gas usage and oil deliveries for two years in chronological order.
- Whichever fuel is used less, convert btu fuel usage from that fuel to the fuel that is used more often.
(Example: if you used 1000 gallons of # 2 oil, that would be 138,000,000 btu or 1380 therms of gas)
- Put these deliveries in the best chronological order you can. Some deliveries will have to be combined.
- Look for average daily fuel usage in the summer (hot water only)
- Add summer periods together; divide by number of days during your specific summer period.
- Multiply by 365. This is your annual base usage.
- For each year, subtract your annual base usage from your total annual usage.
This is your heating usage.
- Divide by building square feet. This is your heating consumption per square foot.
- Multiply by 100,000 (gas), or 138,000 (#2), or 145,000 (#4), 155,000 (#6) or 1,000,000 (steam). These are the Btu/sq.ft.
- Divide by annual heating degree days = $\text{Btu}/\text{ft}^2/\text{HDD}$
- Divide annual base usage by total usage. This is your percentage of fuel used to make hot water.
- Get your total annual kwh electricity usage. Divide by building square feet and by number of bedrooms



HEALTHY LIVING EXERCISE 1: IDENTIFY THE HEALTH PROBLEMS

SAMPLE ANSWERS

GOAL

To describe sources of common health problems and appropriate responses.

DIRECTIONS

Complete the below table for each picture. The instructor will provide pictures.

Slide	What's the problem/concern? How should it be fixed?	Who identifies problem & when is it noticed?	Who addresses the problem & when?	How do you prepare to act?
1	The downspout is disconnected. The water makes the foundation wet. Look through the basement window and see the mold on the inner wall of the basement. The rainwater is becoming ground water. Reconnect the downspout and gutter, remove moldy drywall and flooring, perhaps insulation.	Maintenance worker, resident complaint.	Maintenance	No special training
2	Bathroom exhaust grilles. The top right shows a dirty grille, which may block exhaust in this system where fans are pulling air from roof top fans. The bottom 2 pictures show gaps between the ductwork and sheet rock, which makes the system less efficient, and can pull the warm moist bathroom air into wall cavities and also can reduce the amount of moist air exhausted outside. The bottom right picture shows a dirty duct. Clean ducts, air seal to close gaps.	Annual inspections, unit turn over, tenant complaints.	Maintenance, subcontractors, energy workers	Air sealing training
3	Mold growth was caused by warm air hitting a cold exterior wall. If it was a leak we would likely see moisture problems on the bottom drywall or other sides. Remove drywall, install insulation or close holes.	Annual inspections, unit turn over, tenant complaints.	Maintenance	If extensive mold, use appropriate worker protections and containment guidelines



HEALTHY LIVING EXERCISE 1: IDENTIFY THE HEALTH PROBLEMS

SAMPLE ANSWERS

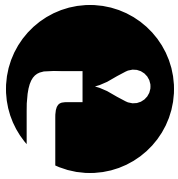
Slide	What's the problem/concern? How should it be fixed?	Who identifies problem & when is it noticed?	Who addresses the problem & when?	How do you prepare to act?
4	Mold has formed at the top of an exterior wall. There is an attic above the ceiling. The wind blew back the insulation from the edge of the attic. Without insulation, the wall became cold. Moisture inside the home condensed on the ceiling. Insulate, clean mold, reduce interior humidity sources.	Annual inspections, unit turn over, tenant complaints.	Maintenance, energy workers	If extensive mold, use appropriate worker protections and containment guidelines. Energy worker insulation/air sealing training.
5	Picture is from Texas. Air conditioning ducts in the attic had leakage and the connection to the sheetrock/ceiling register was not sufficient. The leakage resulted in condensation and moisture along the grille, which combined with dirt to grow mold. Repair ducts to seal them and seal connection to register. Clean grille and ceiling.	Annual inspections, unit turn over, tenant complaints.	Maintenance, energy workers or HVAC contractors	Duct sealing expertise
6	Bathroom fans venting to the attic can distribute warm moist air into attics. If the attic is colder this can produce condensation on the interior roof sheathing and other materials. Vent to exterior.	Often not identified. Possibly maintenance staff responding to roof issues if venting creates problems; annual inspections if attics are included. Heat loss through the roof can sometimes be identified in the winter via melting snow.	Maintenance or contractors	
7	Mice feces. Deteriorated older paint. IPM treatment for mice – seal holes and cracks for exclusion, use traps. Reduce moisture that may cause deteriorated paint. Use lead safe work practices to repair paint follow EPA Lead RRP.	Annual inspections, unit turn over, tenant complaints.	Maintenance or contractors, IPM contractor	Lead RRP training, IPM certification



HEALTHY LIVING EXERCISE 1: IDENTIFY THE HEALTH PROBLEMS

SAMPLE ANSWERS

Slide	What's the problem/concern? How should it be fixed?	Who identifies problem & when is it noticed?	Who addresses the problem & when?	How do you prepare to act?
8	Cockroach feces both under the shelf and also along the baseboard. Housekeeping and IPM treatment.	Annual inspections, unit turn over, tenant complaints.	IPM contractor	IPM certification
9	These pictures don't show problems but rather opportunities to use greener products: 1. Resilient floor and adhesives with fewer VOCs 2. Painting: Use low or no VOC paints. 3. Cabinets: Use products with low urea formaldehyde – meet the new California standards	Unit turnover, rehab	Contractors or maintenance staff	
10	Nicotine stains during a unit turnover (top left) and cigarette burn on carpet on picture on right. This can increase maintenance costs and also increase risks of fires. Adopt Smoke Free Housing Policies.	Annual inspections, unit turn over, tenant complaints from neighbors.	Contractors or maintenance staff	
11	Extra space left for local slide			



WATER CONSERVATION

EXERCISE 1:

PLANNING WATER UPGRADES

ANSWER KEY

GOAL

To understand the water saving potential and payback of water conservation upgrades.

DIRECTIONS

Review WC1: Planning Water Upgrades spreadsheet for directions.
Each group will have access to an Excel spreadsheet

Review the existing water use.

Total use is 92 gallons/person/day. Existing water uses: toilets: 5 gpf (leaking); showerheads: 4 gpm; kitchen sink: 2.5 gpm; bath sink: 2.5 gpm.

1: Using package #1, determine the daily water use and payback for a water conservation package that uses the following strategies: showerhead 2 gpm; kitchen faucet 1.5 gpm; bath faucet 1 gpm; toilet 3gpf (assumes leaks from flapper are repaired and toilet functions as designed).

Answer: water use = 53.5 gallons/person/day; payback = 0.6 years

2: Using package #2, determine the daily water use and payback for a water conservation package that uses the same strategies for showerheads and faucet aerators identified in #1 above, but that also replaces the leaking old toilet with a new EPA WaterSense toilet that uses 1.28 gpf. (Note: The payback allocates \$450 to replace the toilet (parts and labor). This may be a higher than local costs. Students may adjust the assumptions in the assumptions tab.)

Answer: water use = 48.34 gallons, payback = 2.4 years

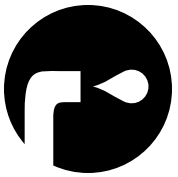
3: What is your preferred package if you must keep the payback under 1 year?

Answer: Package 1

If the payback can extend for 3 years?

Answer: Package 2

Discussion Suggestions: This is a good opportunity for participants to explore the spreadsheet. Facilitate a group discussion to ask: What surprised you about the water savings from various packages?, Which changes produce the greatest water savings?, etc.



WATER CONSERVATION EXERCISE 1: PLANNING WATER UPGRADES

WC1: PLANNING WATER UPGRADES EXCEL FILE

Building Info		Fixture Info	#	Flow Rate (gpm)	Proposed (gpm)
Total SF	100000	# of Bathroom Sinks	100	2	0.5
# of Units	100	# of Showerheads	100	3.75	1.75
1 BD	50	# of Kitchen Sinks	100	2.5	1.5
2 BD	50	# of Toilets	100	5	1.6
# of Baths	100	Existing Water Usage			
# of Kitchens	100	Daily Water Use (g)	22,000		
# of People	225	Annual Water Use (g)	8,030,000		
Existing Per Person Daily Water Usage (G/ per/ day)	92	Annual Water Use (HCF)	10,734		
		Rate \$/ HCF	\$ 5.00		
		Annual Water Bill	\$ 53,669		

****NOTE** On the assumptions tab you'll find assumptions for daily water usage and

Package 1*		* Assumes dishes are hand washed.			Package 1 Proposed Water Savings	
Fixture	# of Uses per Day/ Person	Duration (min.)	Flow Rate (gpm)	Total Water Use/ Day/ Person	Daily Water Savings (g/ day)	
Bathroom Sink	4	6		0	Annual Water Savings (g/ year)	-
Kitchen Sink*	4	15		0	Annual Water Savings (HCF)	0
Shower	1	8		0	Annual Water Savings (\$)	\$ -
Replace Flapper	3	1		0	Payback (yr)	#DIV/0!
			Proposed Per Person Daily Water Usage (G/ per/ day)	0		
Package 2*		* Assumes dishes are hand washed.			Package 2 Proposed Water Savings	
Fixture	# of Uses per Day/ Person	Duration (min.)	Flow Rate (gpm)	Total Water Use/ Day/ Person	Daily Water Savings (g/ day)	
Bathroom Sink	4	6		0	Annual Water Savings (g/ year)	-
Kitchen Sink*	4	15		0	Annual Water Savings (HCF)	0
Shower	1	8		0	Annual Water Savings (\$)	\$ -
New Toilet	3	1		0	Payback (yr)	#DIV/0!
			Proposed Per Person Daily Water Usage (G/ per/ day)	0		



PUTTING THE PIECES TOGETHER

EXERCISE 1:

GREEN UNIT TURNOVER & PROPERTY INSPECTION CHECKLIST

GOAL

To green unit turnover activities.

DIRECTIONS

Review and modify the sample unit turnover checklist to incorporate additional green actions.

SCHEDULING

SUBMITTED TO
MAINT. ON

UNIT
NUMBER

TERMINATION
DATE

MOVE-OUT
DATE

PAINTERS
ON

CARPET
CLEANERS ON

EXTERMINATION
ON

DATE
COMPLETED

MOVE-IN
DATE

EMPLOYEE
INITIALS

MECHANICAL

_____ Set heat to 55 degrees.

_____ Check replacement reserve schedule for MEP Systems.

_____ Check that air conditioner units are operative.

_____ Turn off all air conditioner units.

_____ Between Nov-April install AC sleeve cover or remove unit.

_____ Remove air conditioner filters, wash/replace and return.

_____ Clean air conditioner grill(s). Check/repair AC sleeve caulking.

_____ Check heaters for proper operation.

_____ Check thermostat function.

_____ HEPA vacuum and wipe baseboard radiators.



PUTTING THE PIECES TOGETHER

EXERCISE 1:

GREEN UNIT TURNOVER & PROPERTY INSPECTION CHECKLIST

APPLIANCES

- _____ Set oven to required temperature for cleaning.
- _____ Check to ensure refrigerator is Energy Star - if not, replace with Energy Star model.
- _____ Check to ensure dishwasher is Energy Star - if not, replace with Energy Star model.
- _____ Direct vent kitchen stove exhaust where possible.
- _____ Check operation of disposal by running with ice cubes and water.
- _____ Soak refrigerator and stove parts as needed. Remove refrigerator condensate pan, wash and return to unit.
- _____ Wash refrigerator inside and out. HEPA vacuum and use green cleaning product.
- _____ Wash refrigerator and stove parts; use green cleaning product.
- _____ Clean floor and walls behind stove and refrigerator. Report pest droppings, apply borate.*
- _____ Clean stove top and ovens using green cleaning product.
- _____ Reassemble stove and refrigerator.
- _____ Make sure stove and refrigerator are operating properly.
- _____ Set refrigerator to lowest temperature.
- _____ Check stove and pilot lights. Light as needed.
- _____ Clean hood fan and filter, use green cleaning product.
- _____ Clean dishwasher, use green cleaning product.

* *Note: Some state require a licensed pesticide applicator apply borates.*

ELECTRICAL

- _____ Clean light fixtures and shades.
- _____ Check to ensure all light fixtures are Energy Star - if not, replace with Energy Star fixtures.
- _____ Clean all switch and outlet plates.
- _____ Replace any burnt out bulbs. Use CFL or energy efficient.
- _____ Hard wire CO detectors or use 5 year battery detectors and test.
- _____ Hard wire smoke detectors and test.
- _____ Check door bell.
- _____ Check operation of CO alarms, if present.
- _____ Clean bath light and check bath fan operation/grills. Install Energy Star bath fan/light where possible, on timer.



PUTTING THE PIECES TOGETHER

EXERCISE 1:

GREEN UNIT TURNOVER & PROPERTY INSPECTION CHECKLIST

PLUMBING

- _____ Check operation of toilets, gpf <1.6.
 - _____ Check GPF of toilets, replace > 1.6 with Water Sense Toilet <1.3 gpf
 - _____ Test toilet flapper; eheck for leaks with dye test.
 - _____ Check showerhead; if not <1.75 gpm install new head.
 - _____ Check faucet aerators <1.5 kitchen <.5 bath & check shower diverter.
 - _____ Check kitchen sink, bath tub + shower faucets for proper operation. Replace parts as needed.
 - _____ Check under kitchen and bath sinks for leaks. Repair as needed.
 - _____ Fill holes to exterior walls under kitchen or bath.
 - _____ Caulk tub shower area and sink/backsplashes, if needed.
 - _____ Replace toilet seats, if needed.
 - _____ Check all G.F.I. Outlets.
 - _____ Clean sinks, toilets, baths, showers, tiles, use green cleaner.
-

WINDOWS/ PATIOS/ PORCHES

- _____ Wash all window, use green cleaner.
 - _____ Check shades/blinds for proper operation and appearance. Clean or replace.
 - _____ Caulk all windows, storms, rebalance, caulk and ensure operation.
 - _____ Check weatherstripping on apartment front and rear entry doors and correct if needed.
 - _____ Check for operating storm door to exterior, install door sweeps and weatherstrip as needed.
 - _____ Check all traverse rods for proper operation. Repair or replace, as needed.
 - _____ Clean patio door tracks, decks, if present, use green cleaner.
 - _____ Make sure porches/patios are clean.
-

CLOSETS/ CABINETS/ SHELIVING/ COUNTERS

- _____ Make sure closet doors (especially bi-folds) open and close properly.
- _____ Make sure cabinets and draws open and close properly.
- _____ Clean shelving and make sure it is secure.
- _____ Clean doors, door tracks and interiors of closets, cabinets and draws.
- _____ Clean medicine cabinet and other mirrors.
- _____ Clean all counters.
- _____ Wipe all door jambs, sills and woodwork.



PUTTING THE PIECES TOGETHER

EXERCISE 1:

GREEN UNIT TURNOVER & PROPERTY INSPECTION CHECKLIST

FLOORING

- _____ Damp mop and wax all wood floors - use green cleaners
 - _____ Remove spots and wipe clean all tile floors. Wax.
 - _____ HEPA vacuum carpeting and check for necessary repair.
 - _____ Shampoo carpets. Do not close up unit with wet carpet.
 - _____ Wipe clean all base cove molding.
-

MISCELLANEOUS

- _____ Inspect for pest droppings, report problems.
 - _____ Apply baits/gel or boric acid behind appliances etc. if there's a persistent cockroach issue
 - _____ If mice, seal holes and cracks and install door sweep.
 - _____ Change exterior door and mailbox locks. Update maintenance file keys.
 - _____ Perform final check for dust.
 - _____ Remove all working materials. Check for mislaid tools.
 - _____ Make sure no trash is left behind. Check for recycling bins.
 - _____ Lock apartment door and deliver keys to office.
-

APPROVALS

APPROVED BY SUPER

DATE

APPROVED BY MANAGER

DATE



PUTTING THE PIECES TOGETHER

EXERCISE 2:

GREENING WORK ORDER

REQUESTS

SAMPLE ANSWERS

GOAL

To identify a green and healthy approach to work order requests.

DIRECTIONS

Below are 3 scenarios for work order requests. Brainstorm the green and healthy work order response. List actions you would take and materials you would use.

Scenario 1:

Bathroom damage from leaking toilet above, ceiling has peeling paint and has partially come down. Lower unit bath fan is not working well, vanity and flooring damaged due to leak/flood. Old toilet exists in upper unit. Building was constructed in late 1940's. What do you do in the lower unit? What do you do in the upper unit?

Upper unit: Fix toilet; check flapper, replacing flooring if needed with greener option – ceramic tile, low VOC VCT, rubber. If toilet is damaged or if funds are available replace with low flow toilet. Replace aerators in bath sink and check showerhead, if >2 gpm replace with low flow showerhead. Check for pest problems in units, if pests evidence found seal holes and cracks, resident education, and traps for mice, appropriate pesticide for cockroaches – call in IPM contractor. Replace bulbs with CFLs and Energy Star fixtures.

Lower unit: Lead safe work practices replacing ceiling and repaint with low VOC paint. Replace flooring with green option (ceramic, low VOC VCT, rubber). Vanity replaced use low urea formaldehyde woods; bath fan check venting and install low some energy efficient fan; opportunity to replace bath light as well with CFL option. CFLs for other bulbs. Faucet aerators. Check flapper and if toilet is 3 gpf replace with Water Sense option. Water sense showerhead. Check for pest problems and seal any holes or cracks for pests. Call in IPM contractor if needed.

Scenario 2:

Resident complains that they smell neighbor's smoke and cooking odors. Resident reports increased pest problems that they think are coming from the neighbor's trash. Daughter has asthma; they are requesting a reasonable accommodation to replace the old worn out carpet that they think is making the asthma worse.

Check air sealing in ventilation grilles and exhaust duct work from units. Check neighbors unit – is kitchen exhaust working, do they use it. Clean duct work. Investigate pest problems with IPM contractor. Housekeeping help if needed. Remove old carpet and replace with smooth and cleanable flooring not added carpet (e.g. linoleum, marmoleum, wood.). Think about that smoke free campaign you've wanted to start.

Scenario 3:

Kitchen fire, appliances and flooring destroyed. Kitchen had gas range. Kitchen exhaust fan was present. Unit had chronic cockroach problem.

Install Energy Star refrigerator and lighting. Evaluate kitchen exhaust duct work to ensure it is working properly before installing gas range. Install low flow aerators for kitchen sink. Preventative pest treatment: seal holes and cracks, apply borates in walls and behind new appliances (may require licensed pesticide applicator in some states). Vanity replaced with low urea formaldehyde wood – this may not be readily available, considering having one in stock. Use Greenseal low VOC paints.

CREDITS

Prepared by

Tohn Environmental Strategies &
Steven Winter Associates, Inc.

Design by

Worldstudio

Enterprise Green Communities

American City Building
10227 Wincopin Circle
Columbia, MD 21044
800.624.4298

www.greencommunitiesonline.org
www.enterprisecommunity.org

June 2011

Enterprise would like to thank the following organizations for assistance in providing information, content and review for these training resources: The National Center for Healthy Housing, Southface and Mercy Housing.

Enterprise Green Communities

Enterprise Green Communities provides funds and expertise to enable developers to build and rehabilitate homes that are healthier, more energy efficient and better for the environment – without compromising affordability. Enterprise Green Communities also assists state and local governments to ensure their housing and economic development policies are smart and sustainable. Enterprise Green Communities homes are built according to the Enterprise Green Communities Criteria, the first national framework for healthy, efficient, environmentally smart affordable homes. The next generation of Enterprise Green Communities launched on Oct. 21, 2009, with a national call to action and a \$4 billion commitment to green affordable housing. Learn more at www.greencommunitiesonline.org.

Enterprise

Enterprise is a leading provider of the development capital and expertise it takes to create decent, affordable homes and rebuild communities. For more than 25 years, Enterprise has introduced neighborhood solutions through public-private partnerships with financial institutions, governments, community organizations and others that share our vision. Enterprise has raised and invested more than \$10.6 billion in equity, grants and loans to help build or preserve more than 270,000 affordable rental and for-sale homes to create vital communities. Enterprise is currently investing in communities at a rate of \$1 billion a year. Visit www.enterprisecommunity.org and www.enterprisecommunity.com to learn more about Enterprise's efforts to build communities and opportunity.