

# Energy Efficiency (EE) Solutions

Solar Power 101: June 8, 2009



**STANDARD**  
Renewable Energy

# Integrating EE into your home

1. Why EE first?
2. DIY EE solutions
3. Summary of rebates and incentives

# Why EE first?

## What is Energy Efficiency?

Delivering the same or more services for less energy

With respect to your home...

Making sure you have a tight building envelope so that the energy you demand is not wasted outside your thermal boundary and used in a sustainable manner

# Why EE first?

## The Negawatt (-w):

Watts saved by more efficient use

-Amory Lovins (RMI)

*8x cheaper to save electricity than produce it*

# DIY EE Solutions

## Biggest Culprits

- Heating, Ventilating and Cooling (HVAC)
- Refrigeration
- Hot Water
- Lighting

# DIY EE Solutions

## Solutions

1. HEATING, VENTILATING AND COOLING (HVAC)
  - Insulation, High-Efficiency Units, Ducts, Weatherization, Passive Design
2. REFRIGERATION
  - High-Efficiency Appliances
3. HOT WATER
  - Insulation, Settings
4. LIGHTING
  - Daylighting, CFLs

# DIY EE Solutions

## 1. HEATING, VENTILATING AND COOLING (HVAC)

- Accounts for 46% of your utility bill
- GHG emissions (12% of total SO<sub>x</sub>; 4% of total NO<sub>x</sub>)

### What To Do In Your Home....

#### WEATHERIZATION

1. Sealing the envelope

#### INSULATION

1. R-value
2. Types

#### PASSIVE DESIGN

#### EQUIPMENT

1. Choose the right equipment
2. Maintenance
3. Programmable Thermostat

#### DUCTS

1. Seal leaky ducts
2. Insulate ducts

# DIY EE Solutions

## 1. HEATING, VENTILATING AND COOLING (HVAC)

### WEATHERIZATION

1. Caulking, Weather-stripping, door sweeps
2. Foam sealing
3. Keep flue damper shut!

# DIY EE Solutions

## 1. HEATING, VENTILATING AND COOLING (HVAC)

### INSULATION

1. Minimum R-Value
2. Where to insulate
3. Types of Insulation
4. Keep flue damper shut!

# DIY EE Solutions

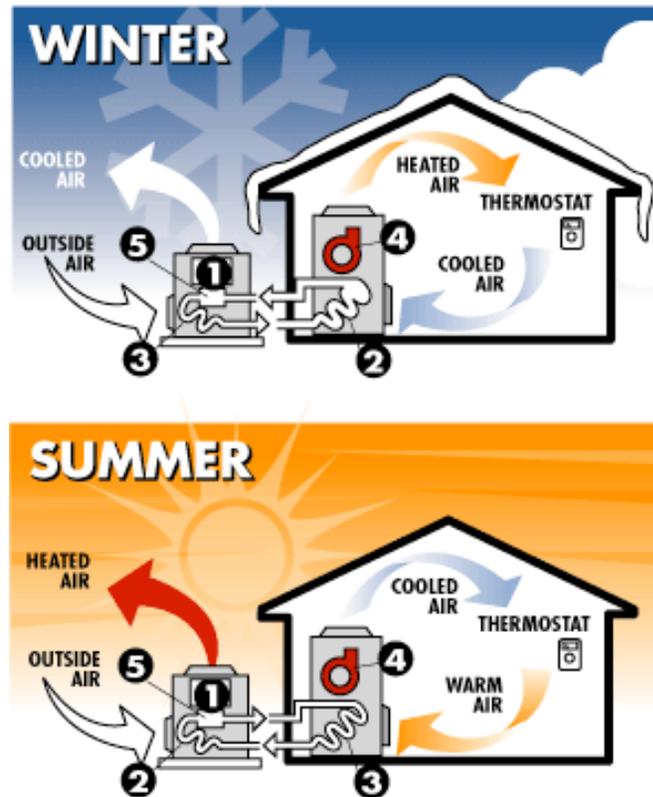
## 1. HEATING, VENTILATING AND COOLING (HVAC)

### EQUIPMENT

1. Energy Efficient Equipment
  - EER vs. SEER
  - AFUE and HSPF
  - Heat Pumps
2. Maintenance
  - Precision Tune-Ups (PTPs)
3. Programmable Thermostats
  - Where to locate
  - How to program

# DIY EE Solutions

## 1. HEATING, VENTILATING AND COOLING (HVAC)



# DIY EE Solutions

## 1. HEATING, VENTILATING AND COOLING (HVAC)

### DUCTS

1. Sealing Ducts
2. Insulating Ducts



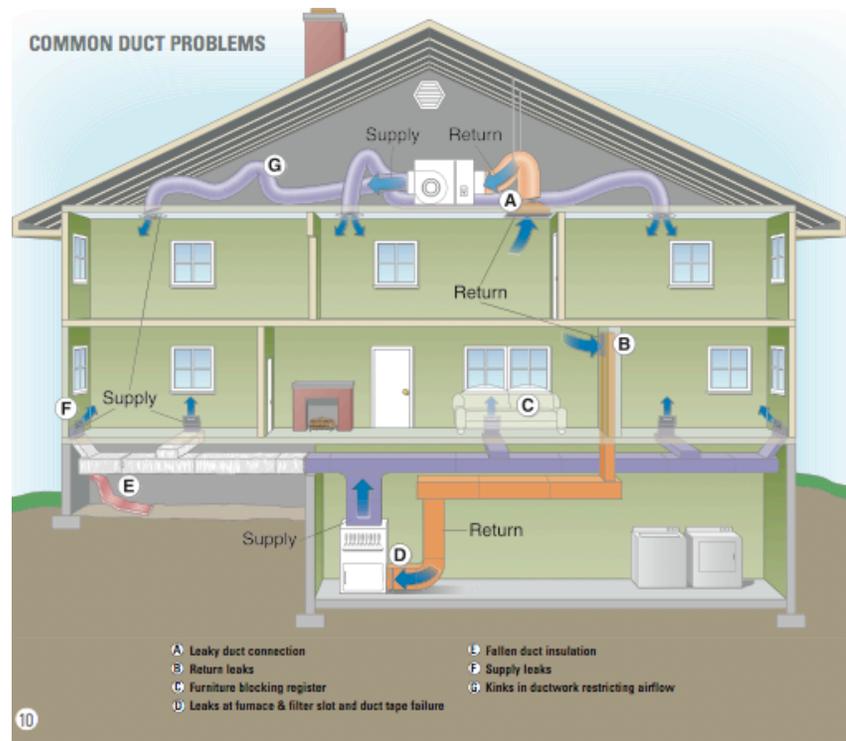
Cotton Insulated Duct Wrap



Insulated Flex Duct

# DIY EE Solutions

## 1. HEATING, VENTILATING AND COOLING (HVAC)



# DIY EE Solutions

## 1. HEATING, VENTILATING AND COOLING (HVAC)

### **PASSIVE DESIGN**

#### Passive Solar Heating

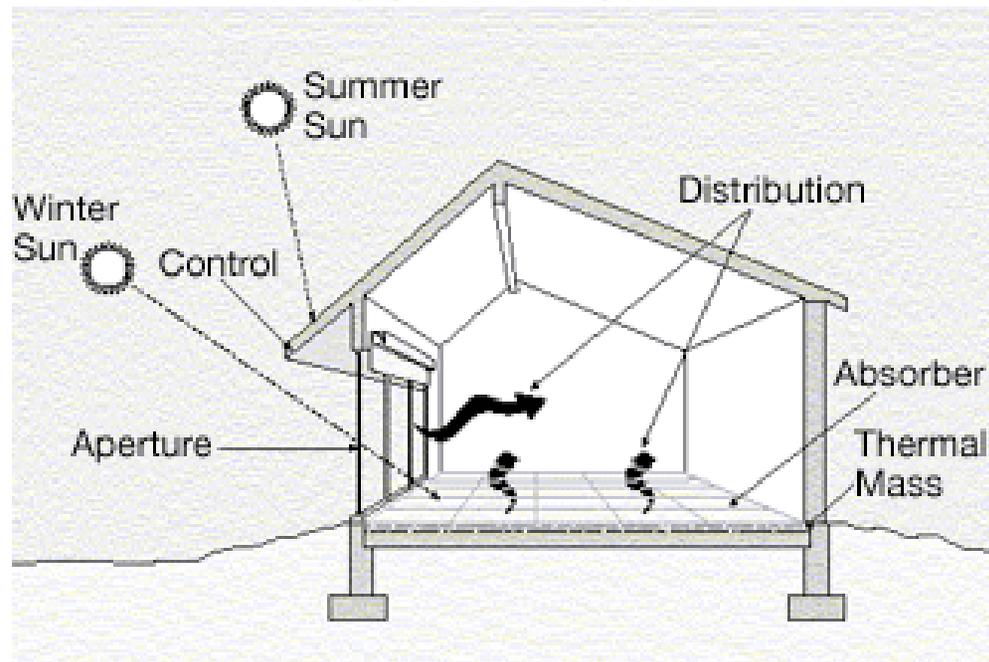
1. Larger, insulated windows on South
2. Concrete floors/thermal mass near windows

#### Passive Solar Cooling

1. Shade trees
2. Carefully placed overhangs
3. Curtains on large south windows; window film

# 1. HEATING, VENTILATING AND COOLING (HVAC)

## PASSIVE DESIGN



# DIY EE Solutions

## 2. REFRIGERATOR AND WASHER & DRIER

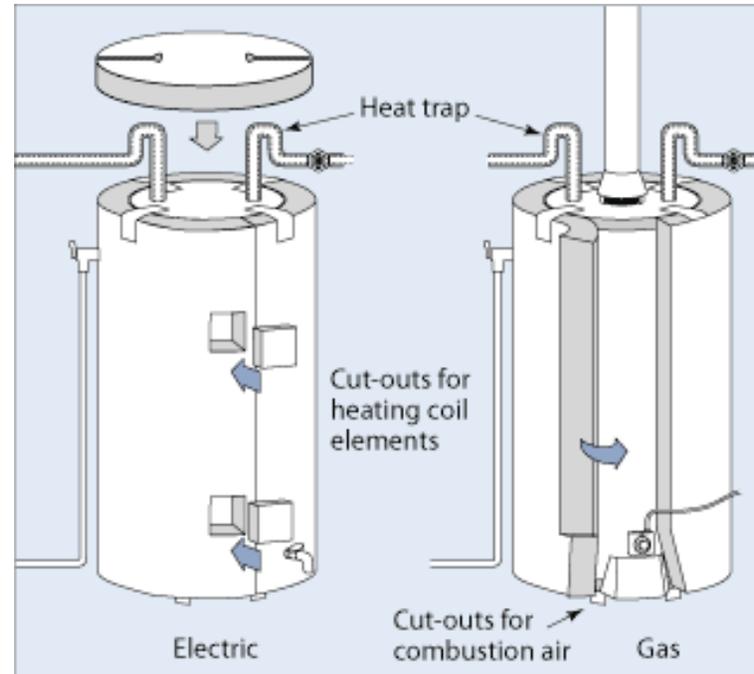
1. Set points
2. Suggestions



# DIY EE Solutions

## 3. DOMESTIC HOT WATER

1. Set points
2. Insulation
3. Use less water!



# DIY EE Solutions

## 4. LIGHTING

1. CFLs/LEDs
2. Timers and photo cells
3. Recycle your old bulbs!



# DIY EE Solutions

## 4. LIGHTING

Existing Incandescent		Replacement CFL
Wattage	Lumens (output)	Wattage
25	375	9
40	500	11
60	800	15
75	1200	18-20
100	1650	23-27

# Incentives

## FEDERAL INCENTIVES

- EE tax credit cannot be used on new construction
- Available for 2009 and 2010
- \$1500 maximum per homeowner combined

# Incentives

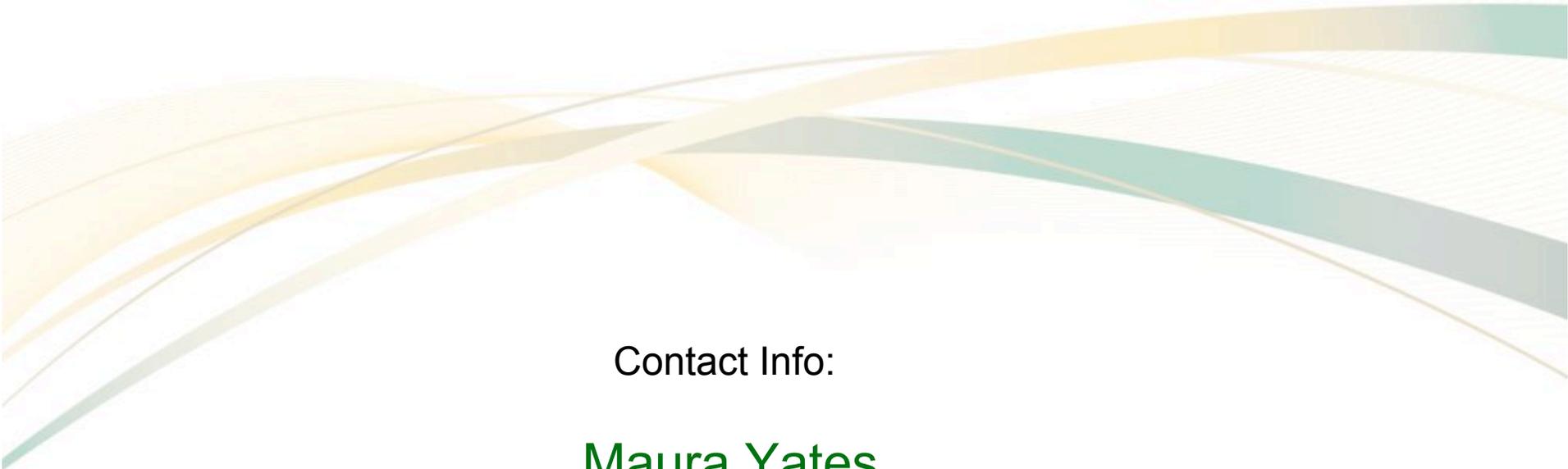
## FEDERAL INCENTIVES

<b>HVAC: 30% of system cost; capped at \$1,500</b>			
<b>Air Conditioning</b>			
<i>Split Systems</i>	EER >=13	SEER >= 16	
<i>Package Systems</i>	EER>=12	SEER >=14	
<b>Nat Gas/Propane Furnace</b>			
	AFUE >=95%		
<b>Heat Pumps</b>			
<i>Split Systems</i>	HSPF >= 8.5	EER >= 12.5	SEER >= 15
<i>Package Systems</i>	HSPF >= 8	EER >= 12	SEER >= 14
<b>INSULATION: 30% of total cost; capped at \$1,500</b>			
-Must meet 2009 IECC Code			
-Primary purpose must be to insulate (ie insulated siding does not count)			
-2 year warranty or last 5 years			
<b>WATER HEATING: 30% of total cost; capped at \$1,500</b>			
Natural Gas, Propane or Oil	Energy Factor >=.82 Thermal Efficiency >=90%		

# Incentives

## TEP INCENTIVES

<b>EFFICIENT HOME COOLING</b>	SEER 14 \$200 SEER 15+ \$250	
<b>SHADE TREE PROGRAM</b>	\$8.00/tree	
<b>SOLAR HOT WATER</b>	UFI	\$750 + \$0.25/kWh up to \$1,750
	PBI	10 Year: \$0.057/kWh 15 Year: \$0.052/kWh 20 Year: \$0.051/kWh



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