Are your home energy bills breaking your bank account ??

What to do ???

Peter Talmage P.E

Everyone uses electricity at home.

Electricity is the universal energy form that can do everything and can replace other energy sources

Reddy Kilowatt ®

Our local electricity provider is

Eversource

Our cars run on gasoline.

The unit of gasoline we buy is the gallon.

The unit of electricity we buy is the kilo Watt hour or kWh.

What is a kilo Watt hour ? (kWh)

(Wattage x time in hours) ÷ 1000 = kWh

A 1000 watt toaster running for 1 hr will use 1 kWh ofelectricity.

A 10 watt LED light bulb running for 10 hours uses only 1/10 of a kWh.

Each month we receive a bill from Eversource

It's based on the electricity we've consumed

Account Number
123456789

Billing Date
Aug 5, 2015

Next Read Date
Sep 2, 2015

Service Provided to
Customer Name
Customer Address
NEEDHAM MA

Account Summary

Previous Bill	93.69
Payment - Thank You	-93.69
Total Cost Electricity	94.40
Amount Due	**$94.40**

Electricity Used

Rate A1-Residential
Meter

Jul 31, 2015 Actual Read		68748
Jul 02, 2015 Actual Read	-	68269
29 Day Billed Use		479

1746073	KWH
07/31	479
07/02	382
06/03	388
05/05	445
04/03	470
03/04	456
02/04	505
01/05	497
12/04	533

Cost of Electricity

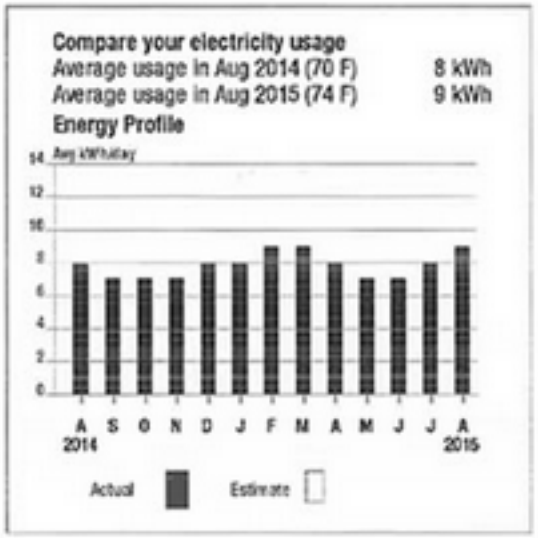
Delivery Services			
Customer Charge			6.43
Distribution	.06197 X	479 KWH	29.68
Transition	-.00095 X	479 KWH	-0.46
Transmission	.01915 X	479 KWH	9.17
Renewable Energy	.00050 X	479 KWH	0.24
Energy Conservation	.00250 X	479 KWH	1.20
Delivery Services Total			46.26

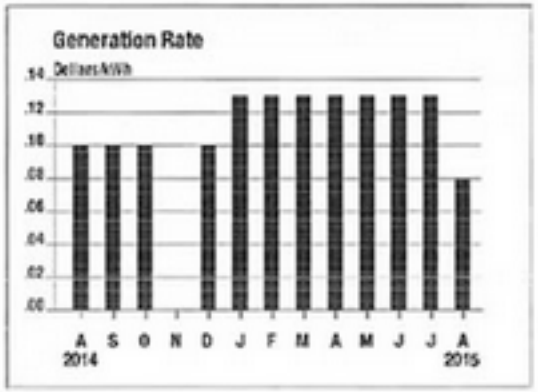
Supplier Services			
Generation Charge			
Basic Svc Fixed	.10050 X	479 KWH	48.14

Total Cost of Electricity **94.40**

EVERSOURCE

Account Number: **0710 000 0000**



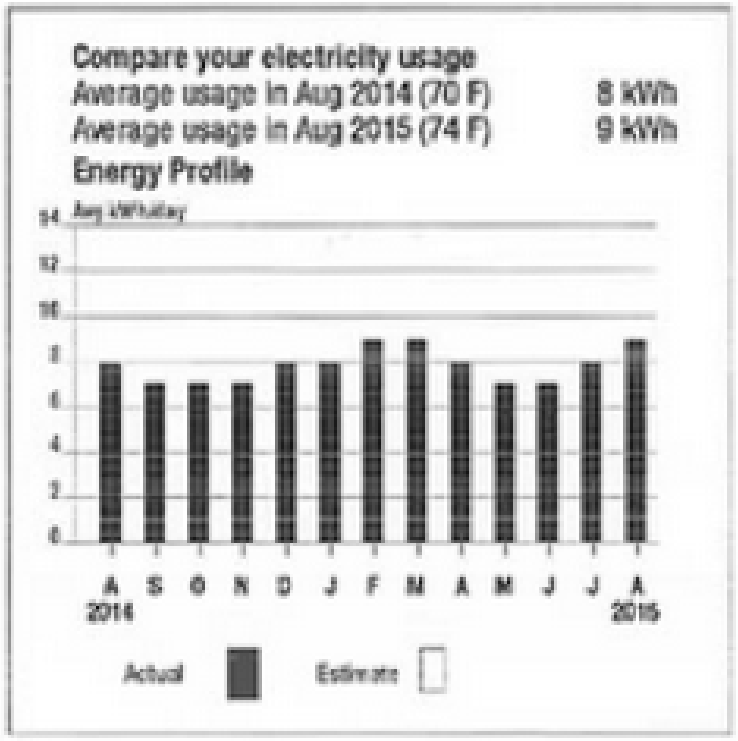


Delivery Services Detail	Distribution Rate: 001	
Transmission Chrg	313.00 kWh X .026550	$8.31
Distr Cust Srvc Chrg		$19.25
Distr Chrg per kWh	313.00 kWh X .033260	$10.41
CTA Chrg per kWh	313.00 kWh X .000410	-$0.13
FMCC Delivery Chrg	313.00 kWh X .001690	$0.53
Comb Public Benefit Chrg*	313.00 kWh X .010390	$3.25
Subtotal		**$41.62**

Supplier Services		
Generation Detail	**Standard Service**	
Generation Srvc Chrg**	313.000 kWh X $0.082280	$25.75
Subtotal		**$25.75**

Total Cost of Electricity	**$67.37**

Bills sometime show a summary of your monthly consumption:



Month	kWh used
January	248
February	254
March	279
April	280
May	279
June	210
July	217
August	279
September	217
October	217
November	210
December	248
Year total	2690
Month Average	**224**

With this info you can figure your average monthly consumption

You can reduce your gasoline purchases by walking, riding a bike or getting a more efficient car

You can reduce your electricity purchases from Evesource and your carbon footprint by generating your own electricity with a Photovoltaic array

In MASS we have net metering:

If you generate electricity it will off set any electricity you consume from Eversource at the same rate you buy it.

Any excess electricity you generate is credited to your account at the same rate.

0001920

CHRISTINE TALMAGE / PETER G TALMAGE

EVERSOURCE

Due Date	Total Amount Due
Jul 25, 2016	- $731.92

Statement date: Jun 30, 2016
Customer name key: TALM

Account number: 54598796001

Contact Information
Emergency: 1-877-659-6326 (anytime)
Web Site: www.eversource.com
Email: CustomerServiceWMass@eversource.com

Residential customers:
Customer Service: 1-877-659-6326
413-781-4300 Springfield area
M-F 8 a.m.-6 p.m.

Simplify your life
Use eBill and ePay at www.eversource.com
Or Pay by Phone 1-888-783-6618

Your electric supplier is
Eversource
P.O. Box 270
Hartford, CT 06141-0270

Electric Account Summary -- Ebill

Amount due on May 27	- $654.97
Balance Forward	- $654.97
New Charges/Credits	
Delivery Services	- $76.95
Electricity Supply Services	$0.00
Total new charges	- $76.95
Credit Balance	**- $731.92**

See Account Messages for important information.

Detail for Service at:

5 HARTMAN RD , AMHERST MA 01002-1413
Service reference: **453431005** Billing cycle: 20

Your meter reading for meter # 894199772

For billing period: May 27 - Jun 29 (33 days) Next read date on or about: Jul 29, 2016

Actual reading on Jun 29, 2016 purchases	9291
Actual reading on May 27, 2016 purchases	- 8809
Billed usage	= 482

Your meter reading for meter # 894199772

For billing period: May 27 - Jun 29 (33 days) Next read date on or about: Jul 29, 2016

Actual reading on Jun 29, 2016 sales	9320
Actual reading on May 27, 2016 sales	- 8384
Billed usage	= 936

This credit will off set the electricity that heats our house in winter

How large an array is needed to fully off set your consumption ?

In New England (at a good solar site) a 1000 watt array will generate an average of 100 kWh per month.

If your average monthly consumption is 350kWh then the array size would be: 3.5 x 1000 = 3,500 watts.

How much would a 3,500 watt array cost ??

Today systems cost about $4 per watt so: $14,000.

OUCH !! $14,000 is a lot of cash. How can you lower the cost ?

1. Make use of the 30% Fed and 15% MASS tax credits

2. Make use of the MASS CEC low interest loan program

3. Reduce the size of the array by reducing your consumption

It's a lot less expensive to save a kWh than it is to produce a kWr with solar

Now let's face up to some facts:

The Earth is warming primarily due to increasing levels of CO2 in the atmosphere

We are on track to have average temperatures 10 F +

Can everyone think " End of life on Earth ?

We must stop burning fuels NOW !!

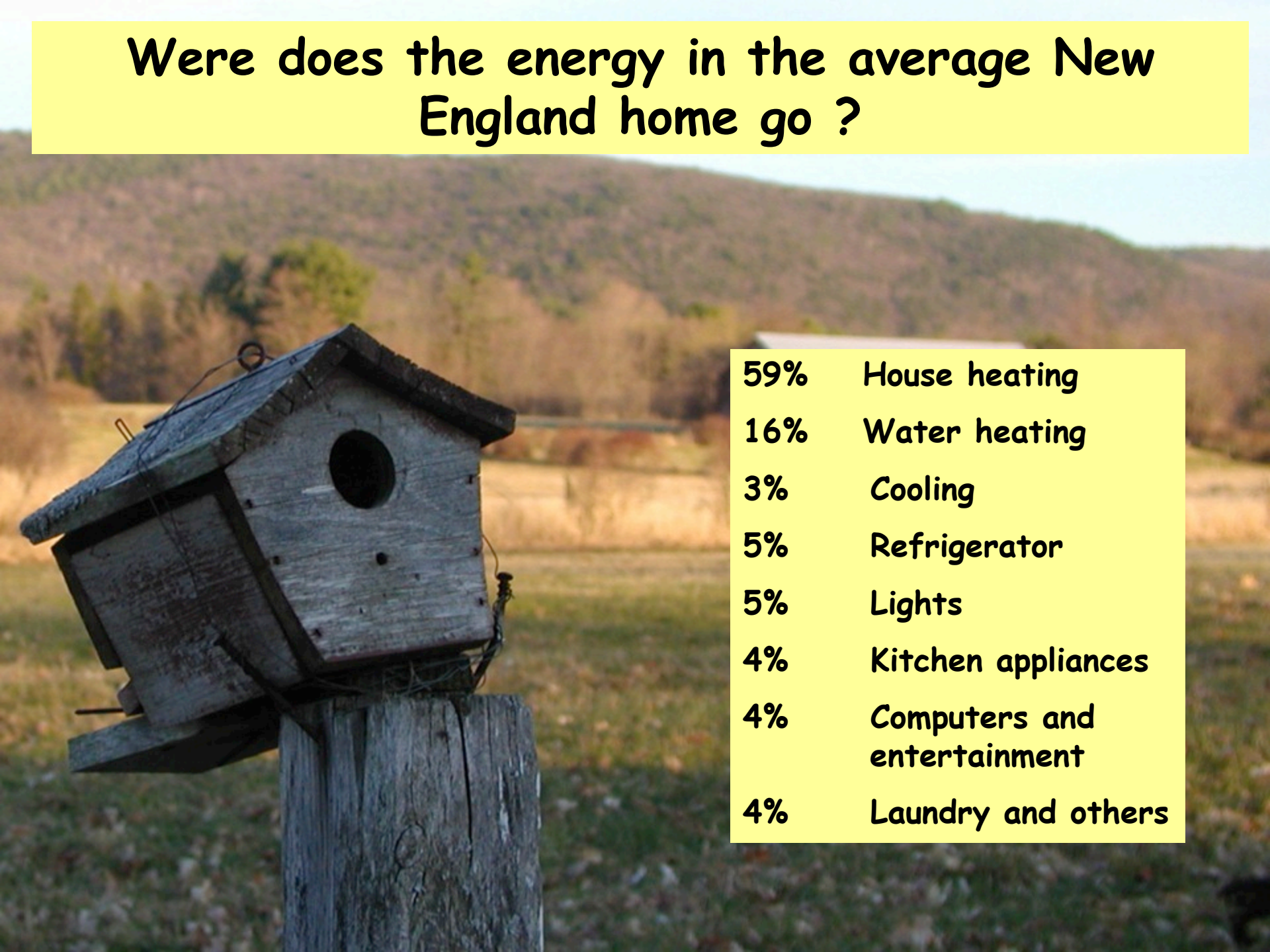
We must start reducing our energy consumption dramatically

All energy must start coming from solar sources

A super efficient homes powered by the sun must be part of the future

Electric vehicles can provide clean transportation and can power buildings when the sun is not shining

Were does the energy in the average New England home go ?



59%	House heating
16%	Water heating
3%	Cooling
5%	Refrigerator
5%	Lights
4%	Kitchen appliances
4%	Computers and entertainment
4%	Laundry and others

Saving Energy

how's your home energy I.Q.?

Why reduce you electrical usage ??

The lower your use, the smaller and less costly solar array you need

If your usage is low enough you can be an independent house when the electrical grid fails during higher temperatures in the coming decades

Had an energy audit of your house yet ??

This is step number one in reducing your energy consumption

http://goo.gl/R8cfP8

http://tinyurl.com/ltdszgv

Mass Save

How much of the heat loss in a typical house is due to air leakage?

Around 30%

The air leakage in a house can be measured by doing a blower door test during an energy audit.

Air sealing the attic floor and basement is most important.

Other benefits of air sealing:

1. Can reduce bugs in the house (How do all those Lady Bugs get in ??)

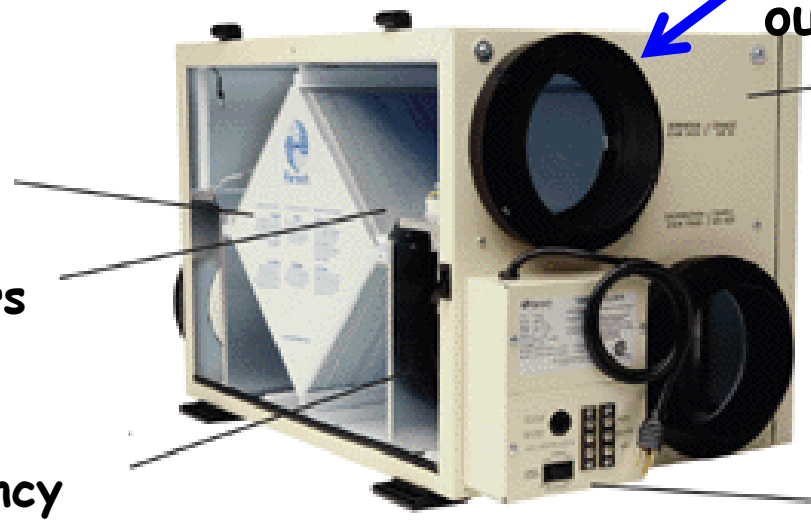
2. Reduced air pollution coming in

3. Reduces rain leakage into the house

4. Increases fire safety

Houses that get really tight need ventilation:

Heat Recovery Ventilator



How much can you reduce your heating load by

Setting back the thermostat 10 degrees each night

10%

An automatic set back thermostat will do this for you

You'll get one for free with your energy audit !!

A super insulated house uses how much less energy to heat than a conventional house ?

On average 50%

All Existing homes can be upgraded to super insulation levels.

A second wall can be built inside the existing wall for more insulation.

Insulation can be added to the outside of a home.

Cellulose insulation can easily be put in walls an can be added to attics.

Insulating the top 2 feet of a basement wall can reduce the heating load of a typical New England home by how much?

By up to20%

A thermal cameras can "see" heat. The hottest part of this house is the basement wall

How much heating goes out the windows ?

up to 25% in New England on average

Don't get fooled into thinking all new windows will save you lots of energy.

Even great new windows still loose energy.

How much heating does a typical house receive from the sun through its east, south and west facing windows ?

30%

Remember to remove your screens to get the full effect.

ATwo layer plastic winserts placed in a typical window will reduce the energy loss by how much?

Up to 50%

The inside layer is much warmer than the glass making everyone feel warmer without turning up the thermostat

How much more heat can an air source mini split heat pump produce than a baseboard electric heater with the same amount electricity ?

Heat Pump

Electric Baseboard

Up to 300% more (C.O.P. of 3)

If you have a photovoltaic system your heating is totally green

Replacing an old refrigerator or freezer with a new energy star model will save how much electricity per year ?

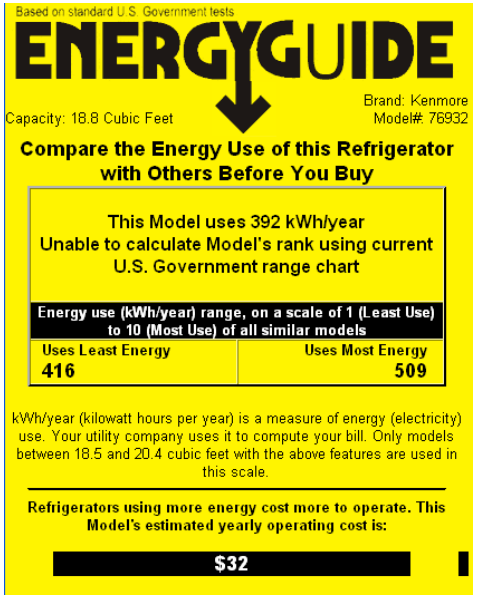
hundreds of kWh of electricity each year

They are quieter and are more durable as well

Utilities may offer rebates on
energy star refrigerators.

When buying appliances always look for this label.

Energy Star appliances use less energy, run quieter and last longer.


Based on standard U.S. Government tests

ENERGYGUIDE

Brand: Kenmore
Capacity: 18.8 Cubic Feet
Model# 76932

Compare the Energy Use of this Refrigerator with Others Before You Buy

This Model uses 392 kWh/year
Unable to calculate Model's rank using current U.S. Government range chart

Energy use (kWh/year) range, on a scale of 1 (Least Use) to 10 (Most Use) of all similar models

Uses Least Energy	Uses Most Energy
416	509

kWh/year (kilowatt hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models between 18.5 and 20.4 cubic feet with the above features are used in this scale.

Refrigerators using more energy cost more to operate. This Model's estimated yearly operating cost is:

$32

These labels allow you to compare appliances

Drying a load of clothes on a line saves you how much?

About 5 kWh with a value of$.80

Your clothes will smell so much better too !

An average family can get how much of its hot water needs from the sun ?

up to 100% but 50% easily

Solar water heating can also be more easily achieved using an electric water heater and a photovoltaic array.

If power fails however this system won't heat your water.

For more efficiency the electric water heater can be a heat pump model.

That TV cable box you've turn off with the remote control is still consuming how much power ?

29 watts

This is called a phantom load. It does nothing

Turn these loads fully off by unplugging them or with a power strip. (You'll get one with your energy audit)

Replacing a 60 watt incandescent bulb with a 10 watt LED run 4hours per day will save how much eletricity in a year ?

73 kWh

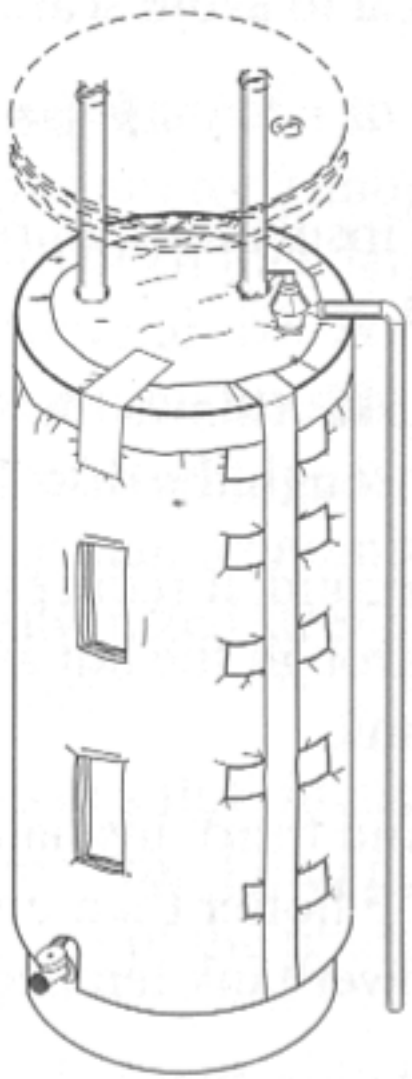
Power used by incandescent:

60 w x 4 hr/day x 365 day/yr ÷ 1000 w/kWh= 88 kWh/yr

Power used by LED:

10 w x 4 hr/day x 365 day/yr ÷ 1000 w/kWh= 15 kWh/yr

Energy saved: 88-15 = 73 kWr



A $15 insulation wrap added to an electric water heater can save a typical family how much electricity ?

225 kWh of electricity

Phantom Loads are those loads that occur even when a device is turned "off"

How much of the electricity consumed by American consumers is phantom?

14%

A simple meter can be used to measure the phantom load of a device.

The same device can be used to measure the energy use over time of an appliance