Gas Water Heating

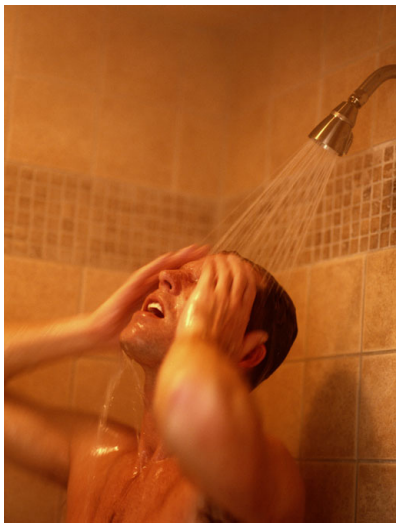
Overview:

Hot water is a part of everyday life and a necessity. Most people don't give water heating a second thought, they expect to turn on a spigot or shower and have hot water available for use.

Water heaters are available in various models and sizes to fit almost any application for residential, commercial and even industrial customers.

Equipment Options:

- Standard Tank Water Heater
- High Efficiency Tank Water Heater
- Indirect Water Heaters (uses a boiler)
- Continuous Water Heater
- Combo heating (Boiler Summer-Winter hook up, or indirect water heating from boiler)



Safe:

- Gas water heaters are tested to high standards and meet the following standards and codes:
  - ANSI (American National Standards Institute)
  - NAECA (National Appliance Energy Conservation Act)
  - ASHREA Standard 90
  - BOCA codes
- Can be installed almost anywhere in home or business

Reliable:

- Many models work without power and can still provide hot water in a black out.
- Versatility and sizing offer hot water when and where you need it.

Benefits:

- <u>Gas Tank versus Electric Tank</u>
  - Faster recovery: Heat water up to three times as fast as electricity
  - More hot water from a tank gas water heater than an electric unit
  - Save money
- <u>High efficiency tank versus standard tank</u>
  - More efficient – save money
  - Can direct vent unit
- <u>Continuous Water Heater versus Tank Water Heater</u>
  - More efficient – save money
    - Tank water heaters keep water hot around the clock where continuous water heaters only produce hot water when it is called for.

- Never run out of hot water, continuous supply
- No down time waiting for water heater to recover and be ready for use.

Table 1.1 – Summary of Results			
Water Heating System	Test No. 1 Monthly Operational Cost ($)	Test No. 2 Hot Water Delivery (gallons)	Test No. 3 Recovery Time (min:sec)
Electric, 40-gallon tank	$21.06	62.3	61:04
Natural gas-fired, 40-gallon tank	$17.73	95.5	21:35
Natural gas-fired, Instantaneous	$11.25	N/A	N/A

Results from Exelon Services Study 12/17/02 for Okaloosa gas as part of the Water Heating Test Consortium

Economics:

Water Heater Payback Chart (Gas versus Electric)

Gas ($/MCF)	Electric ($/KWH) $ 0.05	$ 0.06	$ 0.07	$ 0.08	$ 0.09	$ 0.10	$ 0.11	$ 0.12	$ 0.13	$ 0.14	$ 0.15	$ 0.16
$ 3.00	3.3	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.0	1.0	0.9	0.8
$ 4.00	3.7	2.9	2.3	2.0	1.7	1.5	1.3	1.2	1.1	1.0	0.9	0.9
$ 5.00	4.3	3.2	2.5	2.1	1.8	1.6	1.4	1.2	1.1	1.0	1.0	0.9
$ 6.00	5.0	3.6	2.8	2.3	1.9	1.6	1.5	1.3	1.2	1.1	1.0	0.9
$ 7.00	6.1	4.1	3.1	2.4	2.0	1.7	1.5	1.4	1.2	1.1	1.0	0.9
$ 8.00	7.7	4.7	3.4	2.7	2.2	1.9	1.6	1.4	1.3	1.2	1.1	1.0
$ 9.00	10.5	5.7	3.9	2.9	2.4	2.0	1.7	1.5	1.3	1.2	1.1	1.0
$ 10.00	16.6	7.1	4.5	3.3	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.0

< than 3 year Payback | < 2 year payback | <= 1 year payback

Size (gal)	40	Gallons consumed per year	30000		Efficiency	Usage		Gas	1,030,000	BTU/MCF
Installed cost	$ 600	Desired ave. temperature rise (Deg. F)	60	Gas	70%	21	MCF	Electric	3412	BTU/KWH
		BTU's of energy to make hot water	15,004,080	Electric	90%	4,886	KWH	Water	8.3356	lbs/Gal.

Environmental:

In a 9/04 study of the state of Texas, GARD Analytics demonstrated that electric water heaters cause more environmentally damaging emissions than gas water heaters when the source and efficiency of generating the electricity are compared to the emissions from gas water heaters.

More Info: (Sample list of manufacturers)

Tank Water Heaters	A. O. Smith	www.hotwater.com
	American Water Heater	www.americanwaterheater.com
	Bradford White	www.bradfordwhite.com
	GSW	www.gsw-wh.com
	Rheem	www.rheem.com
Continuous Water Heaters	Noritz America	www.noritzamerica.com
	Rinnai	www.rinnaina.com
	Takagi	www.takagi-usa.com
	Rheem	www.rheem.com

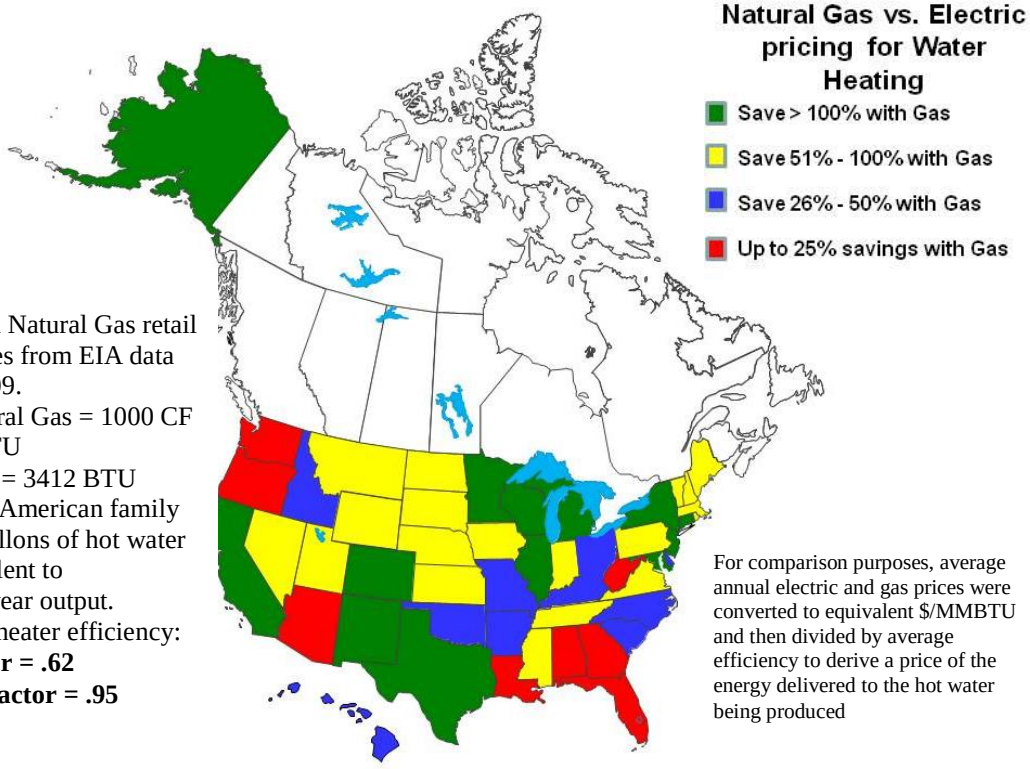
Homeowner Energy Pricing for Hot Water

- Homeowners enjoy long term benefits of lower energy pricing
- Natural Gas water heaters have higher First Hour Ratings and quicker recovery than comparable sized electric water heaters.
- It typically takes a 50-60 gallon electric water heater to match the capabilities of a 40 gallon natural gas water heater.

Cost of Natural Gas versus Electricity for Hot Water

While electric water heaters have a higher EF factor than gas water heaters the cost of energy to a homeowner reflects the amount of energy used at the source of generating that energy and as such the price of electric is higher than natural gas to produce residential hot water with a conventional tank style water heater everywhere in the U.S.

Average U.S. Price per year for Residential Water Heating	
Price of Natural Gas for Hot Water	Price of Electric for Hot Water
$ 305	$ 581



Assumptions:

- US Electric and Natural Gas retail residential prices from EIA data for the year 2009.
- 1 MCF of Natural Gas = 1000 CF = 1.032,000 BTU
- 1KWH electric = 3412 BTU
- Average North American family of 4 uses 70 Gallons of hot water per day, equivalent to 16.3MMBTU/year output.
- Average water heater efficiency:
- **Gas E.F. factor = .62**
- **Electric E.F. factor = .95**

For comparison purposes, average annual electric and gas prices were converted to equivalent $/MMBTU and then divided by average efficiency to derive a price of the energy delivered to the hot water being produced

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Water Heaters

Next to the heating and air conditioning system, a water heater is the second largest consumer of energy in a home and accounts for 25% of a home's total energy usage. Whether you are replacing an existing water heater or buying a new home with a choice of equipment, it's important to know the facts about water heaters.

Natural gas water heaters are the most popular water heaters on the market today - more than 50% of water heaters across the nation are fueled by natural gas. Gas water heaters are typically more expensive to purchase but are much less expensive to operate. According to the Department of Energy, the least expensive water heaters to buy are the most expensive to operate.

Economics

Today's natural gas water heaters are the most efficient and economical on the market. A natural gas water heater can operate for about half the cost of an electric water heater. Plus, natural gas heats water twice as fast as electric. No more worries about taking a cold shower or waiting to shower until laundry and the dishes are done. Natural gas keeps up with your busy lifestyle!

Efficiency

The energy efficiency of a water heater is reported as an energy factor, or EF. An energy factor is dependent upon how quickly the energy source (gas, electric, etc.) heats the water, how much energy is lost when the water heater is idle (only storing hot water) and energy lost as the unit cycles on and off. More efficient water heaters will have higher EF's. Due to differences in fuel types (gas or electric) never compare the EF of one type of water heater with the EF of another type of water heater. Only compare water heaters of the same fuel type. For instance, an electric water heater with an EF of 0.9 may cost more to operate than a gas water heater with an EF of 0.7.

Cost Comparisons

When shopping for a new water heater, make sure you look at both the purchase price of the unit as well as the annual operating costs. To compare units, use the federally mandated yellow EnergyGuide label found on most appliances. For water heaters, the EnergyGuide label will show annual operating costs using national average energy prices, how a particular model compares with other similar models and the first hour rating (FHR). The FHR is a measure of how much hot water the water heater will deliver during a busy hour. But beware, a larger tank does not necessarily mean a higher FHR. Gas water heaters have higher FHR's than electric water heaters of the same storage capacity.

Lifetime Value

Is it worth paying a higher purchase price for a water heater in order to gain additional efficiency? You can calculate the "payback" period for buying a higher efficiency model. (This is the number of years until you "pay yourself back" for the initial higher cost.)

- Using the EnergyGuide label, compare the annual operating costs of all models you are considering.
- Look at the price premium (additional cost of higher efficiency unit).
- Divide the price premium by the annual operating cost savings. A result that is less than one is a fraction of a year (.5 equates to 6 months).

Use this chart to compare water heaters:

	System One	System Two	System Three
Type of Fuel			
Installation Price			
Purchase Price			
Price Premium			
Annual Operating Cost (from Energy Guide label)			
Payback			
First Hour Rating			
Efficiency*			

*Remember, efficiencies of electric water heaters cannot be equally compared to efficiencies of natural gas water heaters.