ENVIRONMENTAL STEWARDSHIP ASSESSMENT

Report

1st Parish

Unitarian Universalist Church

Chelmsford, Massachusetts

February, 2007

Massachusetts
Interfaith Power & Light

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February, 2007

1st Parish Unitarian Universalist
2 Westford Street
Chelmsford, MA

Dear 1st Parish Congregants:

We are pleased to transmit this **Energy Assessment and Environmental Stewardship Report**. We encourage you to make it available within your congregation, and to promote similar efforts by others in the community of faith. Remember, **If We Don't, Who Will?**

By implementing the recommendations here, you will be well on your way to better stewardship of the earth and savings on your operating costs through reducing your energy consumption.

The next step in your journey is the most exciting one. With this report you have a full array of steps to follow. Equally important you have our prayers in support, and, as needed, our presence as well.

Please review the report carefully. This report contain a range of recommendations for your congregation to reduce its energy consumption, lower your operating costs and reduce the pollution from your buildings. Some of the recommendations are simple and inexpensive; others require a bigger initial expenditure.

It might seem daunting to think about moving forward with these recommendations. However, neither your congregation nor the earth is in better shape until actual changes are made to your facilities and to your usage patterns, and your congregants take similar actions.

Again, thank you for your stewardship and your membership in MIP&L. Together, we will save energy, save money, save the planet, protect the peace, protect human health, and create jobs!

After you have had some time to review the report, we can talk by phone or sit down with you to discuss the findings. Feel free to call me at 617-734-8944 or e-mail me at nuttpowell@MIPandL.org when you are ready to set up an appointment.

In faith,

Tom

Thomas E. Nutt-Powell
President

Enc.

This report presents the findings and recommendations of the assessment of energy use and environmental stewardship of 1st Parish Unitarian Universalist, Chelmsford. As stewards of the earth it is important that communities of faith understand the contribution of their facilities to environmental conditions. It is also important that they act responsibly to improve their situation, and to prompt similar understanding and action on the part of their congregants.

The information in this report is organized in the following sections...

- **Summary** — Identifies the facility attributes and issues for environmental stewardship
- **Environmental Stewardship Profile** — Shows current use and cost of utilities, with the environmental impacts and potential for change
- **Facility Systems and Conditions** — Covering heating, domestic hot water, cooling, electrical, plumbing, and building envelope systems, with photos illustrating key conditions.
- **Related Environmental Stewardship Action** — Including clean electricity, and actions by congregants.
- **Appendices** — Detailed utilities use data, facility use patterns and materials for use in taking next steps, and a description of available services via Massachusetts Interfaith Power & Light.

SUMMARY

First Parish Unitarian Universalist is located at 2 Westford Street, Chelmsford, Massachusetts. The facility consists of the following structures:

- *Meeting House* — Constructed in 1842, the meeting house building has wood walls, clear glass windows, a pitched roof, and wooden doors.
- *Addition* — Constructed in 1956, the addition contains classrooms, offices and a chapel. It also has wood clapboard walls, clear glazed windows (some new), a pitched roof, and entry doors on both north and south facades.

The facility is heated by a *gas-fired atmospheric hydronic boiler*, located in a mechanical room at the intersection of the two buildings. The radiation dates to the year of construction of the addition. There are four zones, with thermostats located in the Sanctuary, parlor, chapel and vestry. *Domestic hot water* is generated by three sources: (1) a gas-fired on-demand wall-mounted boiler in the mechanical room; (2) electric on-demand under the sink in the parlor kitchen and (3) an electric 40-gallon tank in the crawl space. There is no *central cooling*. Electric *service* is through the basement of the church building. It evidences upgrades over time. There is separate service for the tower clock. *Wiring* dates from various stages of work of each building. *Interior lighting* is shows upgrades over time by space. It is primarily florescent. There is *entry lighting* at doors. The main *equipment* with electricity demands includes office machines (computers and copy machines) and kitchen equipment, including refrigerators and dishwasher, some commericl grade.. The primary *water* use is from the sinks in the rest rooms and in the kitchen. The primary *sewer* use is toilets.

As currently configured and operated the facility paid an estimated $11,348 for gas and electricity in 2006. There was no historic information provided. However, even if use is constant costs have increased annually, sometimes dramatically. As compared to the average facility of its type, 1st Parish used less energy per square foot and but pays more.

The key environmental stewardship issues for the facility are...

- ✓ **Building** — Improve thermal performance of the envelope

- ✓ **Heating** — Install an energy-efficient heat generation source with contemporary controls for multiple zones. Split the new section into four heating zones by side and floor. Install a single highly efficient DHW system as part of the new heat generation solution.

- ✓ **Cooling** — Replace existing inefficient air conditioners with the best available Energy Star rated air conditioners.

- ✓ **Electrical** — Continue to upgrade and use energy-efficient fixtures and lamping. A move to clean electricity (possibly by installation of photovoltaics on the south-facing roofs, certainly by purchase of 100% green electricity) is essential.

- ✓ **Maintenance** — Ensure good and timely maintenance of systems using MIP&L's maintenance contract template, including a complete inventory of equipment whether covered or not.

- ✓ **Congregants and Community —** Initiate a continuing program of environmental stewardship by congregants in their homes, and, by extension, in their places of work and communities. Encourage others in the broader community of faith to do likewise.

MIP&L is a *Mutual Ministry.*

If We Don't, Who Will?

First Parish Unitarian Universalist, Chelmsford

Environmental Stewardship Profile

	Last Year			
ELECTRICITY				
	2006	2007	2008	**Total**
kWh Used	16,040	0	0	**16,040**
Cost	$3,208	$0	$0	**$3,208**
Cost per kWh	$0.20	#DIV/0!	#DIV/0!	**$0.20**
% change in Use		0.0%	#DIV/0!	
kBtu/year	54,536	0	0	**54,536**

No costs provided. Estimated.

OIL	No OIL			

	Last Year			
GAS				
	2006	2007	2008	**Total**
therms Used	5,239	0	0	**5,239**
Cost	$8,140	$0	$0	**$8,140**
Cost per therm	$1.55	#DIV/0!	#DIV/0!	**$1.55**
% change in Use		0.0%	#DIV/0!	
kBtu/year	523,900	0	0	**523,900**

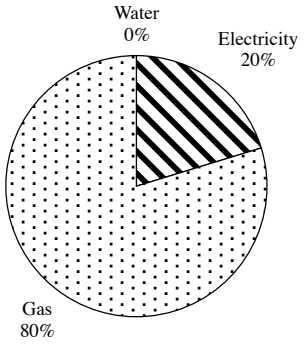
	Last Year	*0*	*0*	
WATER				
	2006	2007	2008	**Total**
Units Used	0	0	0	**0**
Cost	$0.00	$0.00	$0.00	**$0.00**
Cost per Units	#DIV/0!	#DIV/0!	#DIV/0!	**#DIV/0!**
% change in Use		#DIV/0!	#DIV/0!	

No W&S information

	Last Year			
	2006	**2007**	**2008**	**Total**
Total Cost	**$ 11,348**	**$ -**	**$ -**	**$ 11,348**
% change	**-**			

Note: Some data may be estimated.

Utility Use by Type



Energy Benchmark — How Your Facility Compares

	You	Average	% of Average
kBtu Use/SF	47	61	76%
Cost/SF	$0.91	$0.68	$1.34

Estimate of Your Pollution Production

	CO_2	SO_2	NO_x
Electricity	23,739	149	42
Gas and/or Oil	88,015	1	69
Total	111,754	150	111

Potential for Pollution Reduction

	CO_2	SO_2	NO_x
Green electricity	***99%***	***100%***	***73%***
Gas	***<<As much as***	***19%***	***savings>>***
Possible Reduction	(39,827)	(149)	(43)
% reduction	-36%	-100%	-39%

CO2	Carbon Dioxide, a greenhouse gas
SOx	Sulfur Oxides, which cause acid rain
NOx	Nitrogen Oxide, which causes health problems

1st Parish Unitarian Universalist, Chelmsford

Summary of Facility Systems and Conditions

Building	Component	Type	Quantity	Year Installed	Efficiency	Action
Meeting House	*Walls*	Wood & Brick	5,460± sf	1842	Poor	Insulate as possible
Total SF	*Windows*	Clear, Large	25	1842+	Poor	Interior storm windows
5400	*Roof*	Pitched	3,100± sf	1842+	Fair	Add attic insulation
	Doors	Wood	3	1842+	Fair	Weatherstrip.
Addition	*Walls*	Wood	3,460± sf	1956	Fair	Insulate as possible
Total SF	*Windows*	Wood frame. Hunge	28	Various	Good>Fair	Interior storm windows
7014	*Roof*	Pitched	4,640± sf	1956+	Fair	Add attic insulation
	Doors	Wood	3	Various	Good>Fair	Weatherstrip.

Heating	Component	Type	Quantity	Year Installed	Efficiency	Action
	Generation	Gas fired atmospheric	495 mbh	1970±	Poor	Upgrade to 92+% efficiency condensing mode
	Controls	Standard	with boiler	?	Poor	Upgrade to digital
	Distribution	Hydronic	4 zones	Recent	Good	Use 7 day/4 setting
	DHW	Gas & Electric	3 separate.	Various	Fair>Poor	Upgrade to one gas-fired 92+% efficiency condensing mode on-demand DHW

Cooling	Component	Type	Quantity	Year Installed	Efficiency	Action
	Generation	NONE				
	Controls					
	Distribution					

Electrical	Component	Type	Quantity	Year Installed	Condition Efficiency	Action
	Service	2 meters	Separate for clock	Recent	Good	Monitor
	Wiring	Copper	—	Various	Good	Monitor
	Lighting, Interior	Most florescent	Each space	Various	Good	Upgrade as possible
	Lighting, Exterior	Various	Entries	Various	Fair	Upgrade to CFL+
	Equipment	Office & Kitchen	Some commercial	Various	Good>Poor	Always use EnergyStar Check EPA website for best rating

Plumbing	Component	Type	Location	Year Installed	Efficiency	Action
	Water	Sinks	Restrooms & Kitchen	Various	Low	Use on/off aerators
	Sewer	Toilets	Restrooms	Various	Low	Use 1.6 gallon

Note: **Action** is related to affirmative environmental stewardship.

FACILITY SYSTEMS AND CONDITIONS

This section presents information on each of the major systems at the facility, the conditions, recommended actions and fundamental reasons for taking these actions. In many instances a recommendation is made to use EnergyStar equipment. Note that EnergyStar labeling simply means that the equipment meets a *minimum* threshold of efficiency. Selection of equipment should involve comparison shopping, including accessing information available at EPA's EnergyStar web site, http://www.energystar.gov/. Also, a variety of helpful technical information relevant to recommendations is provided at Appendix G. Seek gas and electric company rebates.

Heating

Existing Conditions

Heat is generated for the entire facility by a *gas-fired atmospheric hydronic boiler*. The boiler, manufactured by Weil McLain, was installed in the 1970s. It is rated at 495,000 btu. It has an estimated efficiency of 75%. The heating system has in-space programmable thermostat *controls*. The controls serve four zones. They are located in the Sanctuary, parlor, chapel and vestry. Heating *distribution* is by pumps via hydronic radiation.

Recommendations

It is recommended that high efficiency (92+%) gas-fired condensing mode boiler be installed. This should be done in conjunction with upgrade of the DHW system. Obtain gas company financial rebates.

Domestic Hot Water

Existing Conditions

Domestic hot water is generated by three sources: (1) a gas-fired on-demand wall-mounted boiler in the mechanical room; (2) electric on-demand under the sink in the parlor kitchen and (3) an electric 40-gallon tank in the crawl space. The equipment is of various ages. While on-demand is more efficient that stored DHW, having three generation sources is inefficient.

Recommendations

It is recommended that a single on-demand gas-fired DHW source be installed, sensibly in conjunction with the new heating system.

Cooling

Existing Conditions

There is no central cooling.

Recommendations

If cooling is installed, use the highest SEER rating available. The EPA website provides equipment information. This is also the case for home installations, and is especially important for through-window equipment.

Electrical

Existing Conditions

Electric *service* is provided to the facility via a main service duct that enters the building in the basement. There is separate service for the tower clock, maintained and paid for by the Town.

The *lighting* varies by room. The majority of the lighting is energy efficient. There is a variety of *equipment* in the facility that uses electricity, including office equipment, refrigerators, and other kitchen equipment, including a commercial-grade dishwasher. This equipment varies in age and condition. The majority of the equipment is not energy efficient.

Recommendations

Continue to use (or upgrade to) energy-efficient fixtures and lamping. Upgrade equipment to energy efficient standards on replacement, making use of electric company financial incentives.

Plumbing

Existing Conditions

The primary *water* using equipment in the facility includes sinks in the restrooms and the kitchen. The toilets in the restrooms are the primary generator of *sewer* use.

Recommendations

Continue water conservation measures, including faucet aerators and 1.6 gallon toilets.

Building Envelope

Existing Conditions

The building *walls* are primarily wood, with brick at the lower level of the Meeting House.. They are not well insulated. There is a steeple. The *windows* are primarily clear, single glazed, with some rooms in the addition having newer thermopane windows. They windows have exterior storm windows, which serve primary for weather protection, as they have drip holes for

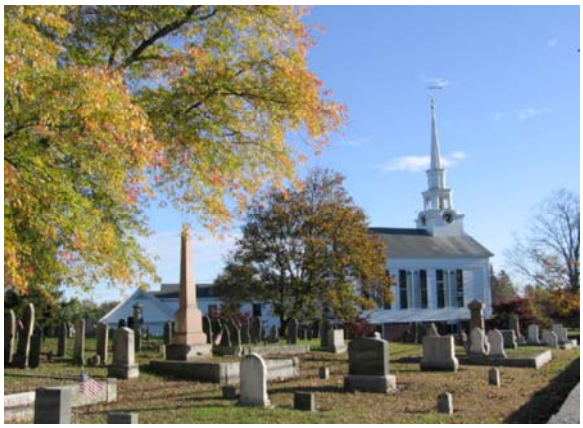
water run-off, which also permits air into the space in winter. The *roofs* are pitched. There is some attic insulation. There are primarily wood *doors*, generally old

Recommendations

It is recommended that additional insulation be added to accessible attic spaces, to walls and especially in the ceiling of the crawl space. It is further recommended that interior "storm" windows be installed for improved thermal performance. These can remain in place for non-operable windows, and be removed in summer for those windows used for natural ventilation. Finally it is recommended that the south-facing roofs have photovoltaic (PV) equipment (potentially shingles, if historic controls apply) installed as a means of direct, non-polluting electricity generation.

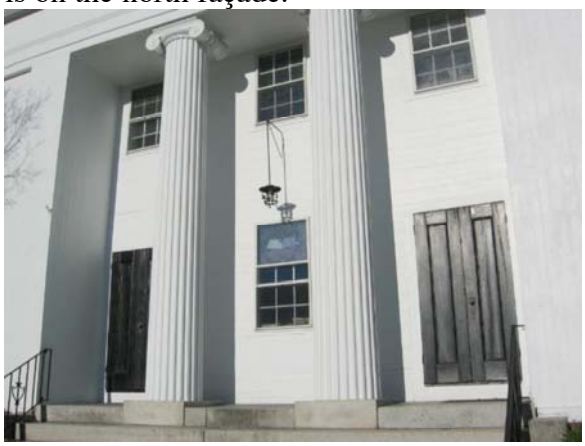
Maintenance

Ensure good and timely maintenance of systems using MIP&L's maintenance contract template, including a complete inventory of equipment whether covered or not. The template is found at Appendix F, and is available at the MIP&L web site, **www.MIPandL.org**.



#1 — View of building and cemetery, from west. The congregation dates to 1655.

#2 — The primary entries for the new section (including one directly to the chapel) is on the north façade.



#3 — Entry to Meeting House. Windows are wood frame with clear single pane glazing. Some rooms in the new section have new windows. Use of interior "storm" windows is an energy conservation measure that also enhances occupant comfort.

#4 — An accessible entry is at the lower level of the Meeting House.

#5 — View of newer (foreground) and older (rear) sections of building. The boiler room is in the brick section with the chimney.

#6 — The steeple and clock are recognized as parts of Chelmsford's history.

#7 — View to front of Sanctuary. Non-operable windows should have interior "storms" for thermal upgrade year round.

#8 — View to rear of Sanctuary.

#9 — Entry foyer at front of Meeting House. Weatherstrip doors for improved thermal performance.

#10 — Stairs between floors act as chimneys. As possible, ensure that heating zones are closed off each from the others.

#11 — Blown and batt insulation in Sanctuary attic, with wiring for lighting. More insulation is possible. Installation by congregants keeps costs at materials only.

#12 — Main entry door and entry hall to new section, with fire alarm panel at right. The main office is at this entry. Building has hydronic heating.

#13 — Hall at day care center, view toward older section and large vestry room.

#14 — Vestry is used for day care during the week also.

#15 — The kitchen is in the older section, off the vestry space.

#15 — Chapel. There are 4 heating zones in the building, this being one. There is a balcony here also.

#16 — "Attic" space over chapel insulted.

#17 — The parlor is on the 1st floor of the new section. It has a small kitchen.

#18 — Classroom on the 2nd floor is typical of the spaces on this level. There are also 2 offices on this floor.

#19 — View out from Howard room, showing stairs. Creating upper and a lower floor, north and south heating zones will improve thermal energy efficiency and occupant comfort.

#20 — New window with thermopane glazing. Upgrade windows as funds available, progressing from most to least used rooms. Installation of interior storm windows at all locations is a low cost and high yield action.

#21 — Window in Chapel. Exterior storm windows are for weather, not thermal performance, given drip holes at base to permit water to escape, and also air to get in!

#22 — Insulating ceiling of crawl space recommended. Access available for re-piping to create 4 zones in new section.

#23 — There is one gas-fired atmospheric boiler. Upgrade to high efficiency (92%) condensing mode, with two boilers to ensure heat even if one "fails". Install good digital controls. Continue use of on-demand DHW generation, now wall mounted at right. Consolidate building DHW generation to only **one** high-efficiency source, sensibly in this location.

#24 — On-demand DHW generation (electric) in kitchen of parlor.

#25— Additional 40 gallon electric DHW tank is in the crawl space.

RELATED ENVIRONMENTAL STEWARDSHIP ACTION

This section discusses related environmental stewardship actions for the congregation

Clean Electricity

Every time we use electricity we are polluting the earth. The electricity that we use comes from power plants. The vast majority of these power plants burn non-renewable fossil fuels such as coal, oil, and gas. These power plants cause a great deal of pollution and impact the health and safety of those who live near them. Unfortunately, these same power plants are disproportionately located in poor communities and communities of color. This is a phenomenon known as "environmental injustice" and "environmental racism." In fact, three different studies of national scope (including the United Church of Christ's Commission on Racial Justice) found that race is the single most influential factor in community exposure to pollution.

Encouraging the growth of renewable, clean electric sources – and stopping our dependence on dirty, fossil fuel-burning power plants – is one important step toward environmental justice and stewardship of the earth.

1st Parish can further its commitment to stewardship of the earth and environmental justice by converting from the dirty power that is delivered by your electric company to a clean renewable energy product. The switch will replace the polluting power sources that your congregation currently uses with clean, renewable energy sources.

What polluting power is the 1st Parish using? Currently the majority of New England's electricity comes from non-renewable polluting resources like coal, oil, natural gas and nuclear power. More than 85% of our electricity is generated from these sources: 27 % from oil, 18% coal, 20% natural gas, and 20% nuclear power. Coal, oil and natural gas all release large amounts of air pollution—particularly carbon dioxide (the main contributor to global warming), sulfur dioxide (which causes acid rain), and nitrogen oxide (which causes smog).

According to the American Heart Association, roughly 10,000 people die prematurely each year from heart- and lung-related illness associated with emissions from fossil fuel power plants, not to mention the thousands of children who suffer daily with pollution-related asthma. Nuclear power raises long-term concerns about the disposal and storage of radioactive nuclear waste. So every time we turn on the lights or watch TV we are causing environmental damage by increasing the demand to produce more power from dirty conventional power plants.

What are clean, renewable energy sources? Renewable energy comes from sources such as the sun, wind, water and biomass/landfill gas (our garbage). These energy sources are referred to as renewable because they are not finite resources, like oil, coal, and other fossil fuels. The planet will not run out of sun energy! Even more important is the fact that renewable resources create little or no pollution.

1st Parish can offset its electrical usage by purchasing Renewable Energy Certificates, or "greentags". You will be "voting with your dollar" to offset your congregation's electrical usage with clean, renewable electricity suppliers. How do you make this "vote"? Use the form attached as Exhibit C. At the congregation's current rate of electrical usage (approximately 16,000 kWh each year), purchasing greentags to offset 100% of your electrical usage would cost approximately between $195 and $385. We would recommend that you opt for a product that is offered by a Massachusetts-based not-for-profit company. These products are New England Wind and ClimateSAVE. Further details about these products can be found in Appendix D and at www.newenglandwind.com and www.climatesave.com.

With the new **Clean Energy Choice program,** you now have a chance to triple the impact when you choose clean electric suppliers. As always, "voting with your dollar" for clean energy will increase the demand for new electricity generating facilities that are renewable in source (*e.g.*, wind, solar, *etc.*). As always, it also sends an important message to policymakers that you want clean, renewable energy sources rather than polluting fossil fuel burning power plants. Now, with Clean Energy Choice, the **Massachusetts Technology Collaborative will match each dollar you spend** to support new renewables with up to **$1 for your Chelmsford** to spend on

renewable energy projects or educational materials, and with up to **$1 for renewable energy and energy efficiency projects that benefit low-income residents**. Truly, this is a win-win-win! It is, quite simply, the right thing to do. (See Appendix D for more information about Clean Energy Choice.) Note that New England Wind is eligible for the Clean Energy Choice matching grant funds; ClimateSAVE is not.

Truly, this is an incredible opportunity for faith in action. Congregants who live in NSTAR or municipal electric territory can also purchase New England Wind or ClimateSAVE. Congregants who live in National Grid territory can enroll in the GreenUp program for their homes, also described in Appendix D.

Details and forms for clean energy product options are available in Appendix C for the Congregation and in Appendix D for congregants, friends and neighbors, and others in your community.

Your congregation now has the option to make a powerful pro-creation statement by spending between $195 and $385 annually to use 100% green electricity at the facility. If doing 100% is not possible, begin with using 50% green electricity for the facility (this would cost between $100 and $200), then move up to 100% next year!.

If we don't, who will?

Appendix A

Utilities Use Information 2006

SUMMARY OF UTILITY USE

First Parish Unitarian Universalist, Chelmsford

YEAR	TOTAL	ELECTRICITY $s	ELECTRICITY KWH	GAS $s	GAS THERMS	Degree Days	WATER & SEWER $s	WATER & SEWER VOLUME
2006	**$8,140**	$0	16040	$8,140	5239	3,420	$0	0
2007	**$0**	$0	0	$0	0	3,478	$0	0
% prior year	**0.0%**	#DIV/0!	0.0%	0.0%	0.0%	101.7%	#DIV/0!	#DIV/0!
2008	**$0**	$0	0	$0	0	2,703	$0	0
% prior year	**#DIV/0!**	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	77.7%	#DIV/0!	#DIV/0!
2009	**$0**	$0	0	$ -	0	0	$ -	0
% prior year	**#DIV/0!**	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0%	#DIV/0!	#DIV/0!

No electric costs.

No W&S information.

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ELECTRICITY USE

First Parish Unitarian Universalist, Chelmsford

Provider National Grid
Meter #
Account #
Rate **Serves>**

Year	Bill Month	$s	% increase $s	KWH	$/KWH	% increase KWH
2006	January			1,440	$0.00	
	Februrary			1,440	$0.00	
	March			880	$0.00	
	April			2,160	$0.00	
	May			1,600	$0.00	
	June			720	$0.00	
	July			1,200	$0.00	
	August			1,440	$0.00	
est	September			*1,400*	$0.00	
	October			1,360	$0.00	
	November			1,040	$0.00	
	December			1,360	$0.00	
		$0.00		16,040	$0.00	
2007	January		#DIV/0!		#DIV/0!	0.00%
	Februrary		#DIV/0!		#DIV/0!	0.00%
	March		#DIV/0!		#DIV/0!	0.00%
	April		#DIV/0!		#DIV/0!	0.00%
	May		#DIV/0!		#DIV/0!	0.00%
	June		#DIV/0!		#DIV/0!	0.00%
	July		#DIV/0!		#DIV/0!	0.00%
	August		#DIV/0!		#DIV/0!	0.00%
	September		#DIV/0!		#DIV/0!	0.00%
	October		#DIV/0!		#DIV/0!	0.00%
	November		#DIV/0!		#DIV/0!	0.00%
	December		#DIV/0!		#DIV/0!	0.00%
		$0.00	#DIV/0!	0	#DIV/0!	0.00%
2008	January		#DIV/0!		#DIV/0!	#DIV/0!
	Februrary		#DIV/0!		#DIV/0!	#DIV/0!
	March		#DIV/0!		#DIV/0!	#DIV/0!
	April		#DIV/0!		#DIV/0!	#DIV/0!
	May		#DIV/0!		#DIV/0!	#DIV/0!
	June		#DIV/0!		#DIV/0!	#DIV/0!
	July		#DIV/0!		#DIV/0!	#DIV/0!
	August		#DIV/0!		#DIV/0!	#DIV/0!
	September		#DIV/0!		#DIV/0!	#DIV/0!
	October		#DIV/0!		#DIV/0!	#DIV/0!
	November		#DIV/0!		#DIV/0!	#DIV/0!
	December		#DIV/0!		#DIV/0!	#DIV/0!
		$0.00	#DIV/0!	0	#DIV/0!	#DIV/0!
2009	January		#DIV/0!		#DIV/0!	#DIV/0!
	Februrary		#DIV/0!		#DIV/0!	#DIV/0!
	March		#DIV/0!		#DIV/0!	#DIV/0!
	April		#DIV/0!		#DIV/0!	#DIV/0!
	May		#DIV/0!		#DIV/0!	#DIV/0!
	June		#DIV/0!		#DIV/0!	#DIV/0!
	July		#DIV/0!		#DIV/0!	#DIV/0!
	August		#DIV/0!		#DIV/0!	#DIV/0!
	September		#DIV/0!		#DIV/0!	#DIV/0!
	October		#DIV/0!		#DIV/0!	#DIV/0!
	November		#DIV/0!		#DIV/0!	#DIV/0!
	December		#DIV/0!		#DIV/0!	#DIV/0!
		$0.00	#DIV/0!	0	#DIV/0!	#DIV/0!

GAS USE

First Parish Unitarian Universalist, Chelmsford

Provider Keyspan **Serves>**

Meter #

Account #

Year	Bill Date	$s		Therms	$/thrm	% increase	Degree Days
2006	January	$1,474.87		855	$1.72		1,059
	Februrary	$1,789.69		1,151	$1.55		634
	March	$985.50		643	$1.53		476
	April	$596.16		410	$1.45		196
	May	$226.61		206	$1.10		26
	June	$52.33		45	$1.16		3
	July	$14.90		11	$1.35		0
	August	$38.99		33	$1.18		0
	September	$141.92		138	$1.03		0
	October	$494.85		428	$1.16		92
	November	$935.69		530	$1.77		318
	December	$1,388.51		789	$1.76		616
		$8,140.02		5,239	$1.55		3,420
2007	January		0.00%		#DIV/0!	0.00%	868
	Februrary		0.00%		#DIV/0!	0.00%	661
	March		0.00%		#DIV/0!	0.00%	604
	April		0.00%		#DIV/0!	0.00%	173
	May		0.00%		#DIV/0!	0.00%	110
	June		0.00%		#DIV/0!	0.00%	5
	July		0.00%		#DIV/0!	0.00%	0
	August		0.00%		#DIV/0!	0.00%	0
	September		0.00%		#DIV/0!	0.00%	0
	October		0.00%		#DIV/0!	0.00%	96
	November		0.00%		#DIV/0!	0.00%	269
	December		0.00%		#DIV/0!	0.00%	692
		$0.00	0.00%	0	#DIV/0!	0.00%	3,478
							101.70%
2008	January		#DIV/0!		#DIV/0!	#DIV/0!	568
	Februrary		#DIV/0!		#DIV/0!	#DIV/0!	667
	March		#DIV/0!		#DIV/0!	#DIV/0!	502
	April		#DIV/0!		#DIV/0!	#DIV/0!	178
	May		#DIV/0!		#DIV/0!	#DIV/0!	66
	June		#DIV/0!		#DIV/0!	#DIV/0!	0
	July		#DIV/0!		#DIV/0!	#DIV/0!	0
	August		#DIV/0!		#DIV/0!	#DIV/0!	0
	September		#DIV/0!		#DIV/0!	#DIV/0!	2
	October		#DIV/0!		#DIV/0!	#DIV/0!	88
	November		#DIV/0!		#DIV/0!	#DIV/0!	199
	December		#DIV/0!		#DIV/0!	#DIV/0!	433
		$0.00	#DIV/0!	0	#DIV/0!	#DIV/0!	2,703
							77.72%
2009	January		#DIV/0!		#DIV/0!	#DIV/0!	0
	Februrary		#DIV/0!		#DIV/0!	#DIV/0!	0
	March		#DIV/0!		#DIV/0!	#DIV/0!	0
	April		#DIV/0!		#DIV/0!	#DIV/0!	0
	May		#DIV/0!		#DIV/0!	#DIV/0!	0
	June		#DIV/0!		#DIV/0!	#DIV/0!	0
	July		#DIV/0!		#DIV/0!	#DIV/0!	0
	August		#DIV/0!		#DIV/0!	#DIV/0!	0
	September		#DIV/0!		#DIV/0!	#DIV/0!	0
	October		#DIV/0!		#DIV/0!	#DIV/0!	0
	November		#DIV/0!		#DIV/0!	#DIV/0!	0
	December		#DIV/0!		#DIV/0!	#DIV/0!	0
		$0.00	#DIV/0!	0	#DIV/0!	#DIV/0!	0
							0.00%

Appendix B

Space Use for Typical Week

To be provided by congregation

Appendix C

Green Electricity Purchase Information for Congregation

First Parish Unitarian Universalist, Chelmsford

GreenUp Options

Approximate kwh usage on R-1 account: 16,040 kwh

Options	Per kWh	Annual	Match?	Content	Certification	Source
NewWind Energy 100%	$ 0.024	$ 384.96	CEC*	100% renewable, 50% new	Green-e	new wind
NewWind Energy 50%	$ 0.012	$ 192.48	CEC*	50% renewable, 25% new	Green-e	new wind
New England GreenStart 100%	$ 0.024	$ 384.96	CEC*	100% renewable, 25% new	Green-e	new biomass, wind, solar
New England GreenStart 50%	$ 0.013	$ 200.50	CEC*	50% renewable, 15% new	non-certified	new biomass, wind, solar

Per kWh rate is premium added to usual National Grid Bill

* This option is eligible for the Clean Energy Choice matching grant program of MTC.

Sterling Planet products are not eligible.

Appendix D

Information for Congregants

Green Electricity Purchase Information

Contribute to a cleaner energy future

Clean Energy Choice

You have a powerful new choice! You can support the development of renewable energy while:

- Helping strengthen the Massachusetts economy
- Reducing our reliance on polluting fossil fuels
- Earning grants for your city or town and also for low-income citizens

Clean Energy Choice was created by the Massachusetts Technology Collaborative's Renewable Energy Trust. The Trust generates economic and environmental benefits for the Commonwealth's residents by helping pioneer clean energy technologies and helping create sustainable markets for power generated from renewable sources.

www.cleanenergychoice.org

75 North Drive
Westborough, MA 01581
Phone: (508) 870-0312
Fax: (508) 898-9226

MASSACHUSETTS TECHNOLOGY COLLABORATIVE
RENEWABLE ENERGY TRUST

Voluntary Contributions Help to Speed the Transition to a Clean Energy Future.

By developing energy from wind, solar, and other renewable resources, Massachusetts can reduce reliance on fossil fuels that contribute to air pollution and global warming.

One way to jumpstart the transition to a clean energy future is to voluntarily contribute to new renewable energy sources. Any Massachusetts resident can participate and choose to pay anywhere between $5 to $15 a month, but only you can decide if this is something that is right for you to do. The Massachusetts Technology Collaborative (MTC) offers a comprehensive website to help you make this decision, www.cleanenergychoice.org.

Increased Demand for Renewable Energy Helps Force the Expansion of Clean Energy Supplies.

What Will My Monthly Payments Accomplish?

By voting with your dollars for clean energy you will:

- Help increase the demand to build new electricity generating facilities that use renewable energy
- Send an important signal to policymakers that you want clean, renewable sources of power.

Sign Up

The following renewable energy suppliers have joined with MTC to provide you with Clean Energy Choices. Please feel free to contact them via www.cleanenergychoice.org or directly:

Mass Energy Consumers Alliance
(Tax-deductible Clean Energy Choice offerings are available from this supplier.)
1-800-287-3950
www.MassEnergy.com

CET & Conservation Services Group, Inc.
1-800-689-7957
www.GreenerWattsNewEngland.com

Community Energy
1-866-WIND-123
www.NewWindEnergy.com

Clean Energy Choice

Each $1 of Support for New Renewables Is Matched with as much as $2 in MTC Grants.

If you choose to participate in Clean Energy Choice, MTC will match every dollar you spend to support renewables with:

- Up to one dollar for your city or town to spend on renewable energy projects or educational materials.*
- In addition, up to one dollar for renewable energy and energy efficiency projects that benefit low-income residents.

* Communities that own their municipal light plants are not eligible for this MTC matching grant.

Some Choices Can Be Partly or Entirely Deducted from Your Federal Tax Return.

Clean Energy Choice participants are helping everyone in Massachusetts join in the transition to clean energy. Because premiums paid for renewable energy support a good cause, in some cases they can be treated like a charitable contribution and be partially or entirely deducted from your federal income taxes (look for those offerings that say "tax deductible").

Find Out If Clean Energy Choice Is Right For You

The Massachusetts Technology Collaborative's Renewable Energy Trust invites you to find out more or to sign up at www.cleanenergychoice.org.

Here, you will find:

- answers to your questions
- help deciding if Clean Energy Choice is right for you
- information regarding renewable energy suppliers and offerings.

Appendix E

MIP&L Services

Massachusetts Interfaith Power & Light
MIP&L

Member Services

Membership in MIP&L supports the mission of environmental stewardship by helping promote renewable energy, energy conservation, and the wise use of resources. Membership is open to any congregation, organization and/or related facility of the *community of faith*. Annual member fees are modest, based on the operating budget of the member.

MIP&L is a ***mutual ministry***, with members working in their organizations, homes, workplace and community to bring about sensible and timely environmental actions.

Basic Services

1. An energy audit of each congregant's home.[1]
2. General help and advice with energy and environmental questions, both personally and electronically (including an interactive Website).
3. Special Programs, including workshops and membership meetings.
4. MIP&L Newsletter, including a calendar of upcoming MIP&L programs; member "success" stories; faith-based ecology pieces; and environmental news highlights.

Additional Services (a range of optional services, paid for separately)

1. An Environmental Stewardship Assessment of core facilities. The member provides information on facility and utility use. A skilled professional (a.) examines the building, lighting, heating, cooling and controls systems; (b.) reports on the patterns of use and their impact; and (c.) identifies approaches to improved stewardship, including possible equipment installation (current or future). (Congregation)
2. Oil-buying aggregation group, to reduce the cost of purchasing heating oil. (Congregation and Congregants)
3. Cost reduction assistance in gas purchasing. (Congregation)
4. Purchase of clean renewable energy. (Congregation and Congregants)
5. Capital Needs Assessments and 20-year Capital Plans (Congregation)
6. Access to utility rebate programs.
7. Technical assistance — the opportunity to have an expert "set of eyes" review new construction projects, building additions, and retrofits to existing systems. MIP&L can act in a variety of roles, such as independent advisor, project manager, assistance in procurement of professional services and/or in obtaining turnkey implementation of environmental stewardship actions.

[1] For most locations, this is at no cost, subject to the rules and regulations of the local energy utility. The home assessment is available at a modest fee in locations not paid for by the utility.

Appendix F

Maintenance Contract Template

INSTRUCTIONS

A contract is an earnest form of communication.

It helps each party understand and act on the mutual responsibilities and expectations.

1 Enter the information for the two Parties, the "client" and the "provider".
The entry at (" ") is for an abreviation, such as "MIP&L".

2 Complete Exhibits A-1 and A-2. Together they are an INVENTORY of the important heating, ventilating, and air conditioning ("HVAC"), and mechancial and electrical ("M&E) equipment at the facility.
The decision to put a piece of equipment in A-1 or A-2 is based on cost and complication of care.

REMEMBER: Everything has a "useful life", and will need care sooner or later. Good preparation is the key.

3 The decision to put a piece of equipment in A-1 or A-2 is based on cost and complication of care.
This needs to be a carefully considered decision, with client and provider considering costs and benefits.

4 Based on the conclusion about the nature of service to be provided for the specified components
Complete Exhibit B. Costs can be lumped for a combination of components.
Typical service actions include system start-up, mid-point review and shut-down.
Some equipment may require more frequent servicing to function effectively and efficiently.
Be certain to enter the hourly rate for additional services, both routine and emergency.

5 Additional exhibits may be added to provide further clarity and specification of work scope, timing, responsibilities of the parties and so.

Questions? Call Massachusetts Interfaith Power & Light **1-800-406-5374**
www.MIPandL.org
Note that rows 1>25 do not print!

CONTRACT
MEP Systems Maintenance

1 — PARTIES

Client _____ (" ")
Contact Person _____ Title _____
Address _____
City/State/Zip _____
Phone _____ Fax _____
Email _____

Provider _____ (" ")
Contact Person _____ Title _____
Address _____
City/State/Zip _____
Phone _____ Fax _____
Email _____

2 — SERVICES TO BE PROVIDED

The ***provider*** is responsible for maintenance and service for the equipment identified in **Exhibit A-1.** **Exhibit A-2** identifies equipment for which maintenance and service will not be provided. The services shall include *routine, periodic* and *milestone* maintenance and servicing to insure the safe, continuous and efficient operation of the equipment. In general the meaning of *routine* , *periodic* and *milestone* maintenance and servicing shall be as specified and/or recommended by the manufacturer of the equipment or system. Failing such guidelines, recommendations and standards of applicable industry organizations shall apply.

3 — TERMS FOR SERVICES TO BE PROVIDED

Exhibit B sets for the specific services to be provided for the equipment included in this contract. The services will be provided during normal working hours. Exhibit B also sets forth the cost for services Payment for services shall be within thirty (30) days of receipt of invoice.

Taxes: Client is exempt from sales tax on products permanently incorporated into its facilities. Provider will be provided a documentation of sales-tax exemption from the client, and will place the number on invoices for services rendered. At the completion of the annual cycle of maintenance, Provider shall file with Client a statement that all purchases made under the exemption were entitled to be exempt. Provider shall pay legally assessed penalties for any improper use of the Client's tax exemption number.

Insurances: Provider shall purchase and maintain insurance providing the coverages and limits designated in this Section. Insurance shall be provided by insurers licensed to transact business in the Commonwealth. Provider shall not start to perform and furnish services, in whole or in part, or continue to perform and furnish any part of the services, unless Provider has in full force and effect all the required policies of insurance. Provider must provide the following coverage:

(a) General liability insurance with a combined single limit of not less than $1,000,000 for injury to or death of any one person, for injury to or death of any number of persons in one occurrence, and for damage to property, insuring against any and all liability of the Client and the Provider including, without limitation, coverage for contractual liability and broad form property damage;

(b) Workers Compensation and Employers Liability Insurance providing statutory benefits to all employees;

(c) Owned, Non-Owned and Hired Automobile Liability with a limit of not less than $1,000,000 combined single limit;

(d) Excess Liability Insurance shall provide the following protections: employer's liability, general liability and automobile liability. Excess Liability Insurance shall be at least as broad as the underlying policies of liability insurance.

Client shall be named as an additional insured under Sections (a), (c), and (d). Client shall be provided a Certificate of Insurance, which shall also provide a 30-day notice of cancellation.

Hold Harmless: Provider shall indemnify, defend and hold harmless Client from any and all liability of whatever kind and character for loss, actual or claimed, to persons or property arising by virtue of the activities of Provider, its agents, servants, employees or clients. Provider shall properly notify Client of any claim involving the services or the Client.

Duration: The contract shall commence on _____ and shall remain in force for twelve (12) months, subject to extensions and renewals. The contract shall automatically terminate if no extension is formally agreed to within thirty (30) days of the end date of the current contract. Termination other than at end of contract requires a thirty (30) day notice, to be provided in writing addressed to the signators of the contract. The notice of termination is to be delivered by United States Postal Service using certified mail, return receipt requested.

SIGNATORS

	For Client		*For Provider*
Signature	_____	Signature	_____
Title	_____	Title	_____
Date	_____	Date	_____

EXHIBIT A-1

Equipment Covered

#	Location	Component	Manufacturer	Size	Model	Serial #	Date

EXHIBIT A-2

Equipment Not Covered

#	Location	Component	Manufacturer	Size	Model	Serial #	Date

EXHIBIT B

Services to be Provided, with Costs

When?	Component	Service		Cost

NOTES

1 Cost for all services described above includes labor and materials.

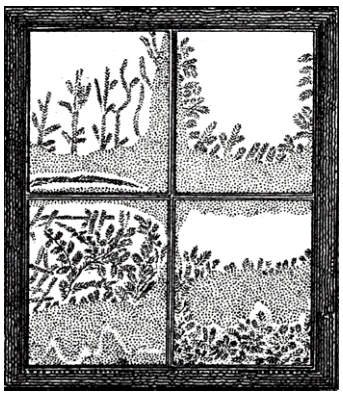
2 Hourly rate for additional services is $0.00 Regular $0.00 Emergency
Materials for additional services will be charged at cost plus 0.00%

3 Client to be provided with report of work for each service call, whether in contract or additional

4 Report for Fall and Spring scheduled service is to include recommendations on future work, timing and cost

Appendix G

Useful Technical Information



Everyday Environmental Stewardship

Saving Energy in Existing Buildings

Louis Tsien

Key issue:
Winter Draftiness

Stewardship Opportunity: Interior Storm Windows

As people of faith, we believe that we should be stewards of God's creation. As heads of household and governance board members, we wince at energy bills that seem only to increase from year to year. Energy conservation is a great abstract idea, for both theological and practical reasons -- but improving the energy efficiency of our buildings (both homes and religious facilities) takes both money and effort, of which we never have enough. And when most of the typical solutions are installed, it still seems drafty in the winter. What to do?

Stewardship Opportunity — Interior Storm Windows
Exterior storm windows leak air because of moveable sashes, and weep holes that drain rain water in the summer let cold air in during the winter. Inexpensive flexible plastic film applied on the inside works, but is not very aesthetic and can harm paint. The best solution is to purchase pre-assembled or build sturdy lightweight interior storm windows.

How I Figured It Out
I've struggled with this dilemma for several decades, both at home in Watertown, MA, and on behalf of my church, St. John the Evangelist in downtown Boston. Our family moved to Watertown in the early 1980s, soon after the OPEC oil embargo and gas lines of the late 70s. Our house is somewhat elderly, wood framed, 3 stories plus basement, gravity hot water radiators fired (then) by a coal-converted-to-oil boiler.

Over the next 20 years, we had insulation blown into the exterior walls and attic, replaced the primary windows with double-paned glazing, and replaced the boiler with a modern gas-fired unit and added a circulation pump; all of these are big ticket, but standard energy-conscious upgrades for an old building. Yet, certain rooms in the house still felt cold -- which infuriated me: where could the heat be going? My wife says I looked ridiculous, crawling around on hands and knees while holding a lit candle, looking for cold air currents.

No more candle flame watching.
I use a **remote infrared thermometer with digital readout** (Raytek or Extech, available online, or from You Do It Electronics, Needham). The thermometer even has a red laser pointer, to indicate the location at which temperature is being read. The reading changes almost instantly, rather than taking minutes like conventional thermometers. Scan slowly around the edges of a window, and by watching the numbers climb or drop you can see

which parts of the window are leaking heat. Scan up and down the inside of an exterior wall, and the point to which the blown-in insulation has settled is obvious -- there's a 5ºF-temperature difference across a very short distance.

The Flaw of Exterior Storm Windows
We do have exterior storm windows. However, closing the exterior storm windows, to my surprise, did not greatly improve the interior temperature readings! On the other hand, application of flexible plastic film (boxed kits from 3M, FrostKing, Niagara Conservation) on the INSIDE helped a lot, as long as the plastic film was airtight all the way around, especially along the bottom of the window.

How could this be? An exterior storm window with moveable upper and lower sashes leaks air, both at the middle and also around the edges. It also has to have "weep holes" to drain away condensation which otherwise would rot the window sill; but the weep holes also leak air, reducing the insulating effectiveness of the storm window.

Plastic Film works but is a pain
I liked the effectiveness of the plastic film kits, and they are quite inexpensive; but they are a recurring pain to install, and my wife didn't like either their appearance or the paint damage done by the double-sided adhesive tape used to mount the film to the window casing.

When St. John's boiler failed in 2003, in addition to heating system replacement (described in MIP&L newsletter of October 2003), MIP&L recommended an interior storm window system designed by **Windowsavers** (http://wwww.windowsavers.com). The Windowsavers system uses rigid acrylic (Plexiglas™ or similar) plastic sheets, purchased separately, together with magnetic strips which adhere the acrylic to the window casing while also providing an airtight seal.

The concept intrigued me enough to do two things: to research other rigid-pane interior storm window systems on the Internet, and to buy material to try out.

Modern Plastics (http://www.modernplastics.com) offers a variety of plastic extrusions (Defender™) which clip onto the edge of an acrylic sheet for the purposes of mounting and sealing to a window casing, either by snapping mating pieces together or with magnetic strips.

Both the Windowsavers and Modern Plastics products seemed somewhat pricey to me: $2 per linear foot for the edges, plus the cost of the acrylic sheet, and the hassle of getting it cut.

Attachment Option #1 — Magnetic Strips and Plastic Extrusion

My first window was a hybrid: Windowsavers magnetic strip for the sides and top, and a Modern Plastics extrusion for the bottom, which fits flat on top of a window sill (See diagram 1.) Works well, looks good, but somewhat expensive and time-consuming to build.

In hunting for acrylic sheet suppliers, I happened upon **J Freeman** in Dorchester (56 Tenean Street, http://www.jfreeman.com). Hard to get to, inconvenient hours, non-existent customer service; but they will custom cut .093" clear acrylic sheet for $1.49/sq ft net, vs. about $2/sq ft for a stock sized piece at Home Depot, which then has to be cut to size.

Attachment Option #2 — Screws and Weatherstripping

For the next set of windows, I decided to use mechanical means -- screws -- to fasten the acrylic, and ordinary weatherstripping for air tightness. This too worked well, was easier to assemble – fewer long, thin, adhesive-backed strips which need careful handling and alignment -- and less expensive: 50¢/ft for the edges. Different mounting arrangements are needed, depending on the window configuration. Standard twist drills can cause cracking when making holes in acrylic; a special drill bit for plastic (90º-tip angle instead of the standard 118º) helps avoid this.

Attachment Option #3 — Wood Frame with screws and weatherstripping

A sturdier version of option #2 is to mount the acrylic on a wood frame, with weatherstripping serving as a seal/gasket between the acrylic and the window frame. This option adds the cost of the wood, and the time to paint to match. However, it is sturdy, easily installed and will last many years. It also presents the opportunity to meet aesthetic requirements, blending the frame into the finish standard of the window and surrounding space.

What about really big windows?
One other set of windows is worth mentioning. These are extremely large (8 ft wide x 25 ft high) Gothic arched windows in the church façade. Temperature readings taken last winter showed almost 100% infiltration, i.e. the inside readings at the window edges were basically equal to the outside temperature. It would be impossible to obtain single sheets of acrylic of that size, impractical to butt join multiple pieces. Instead, I'm planning to use wide rolls of flexible plastic film, with magnetic strips on the inside of the window casing to hold the plastic film in place. The material hasn't arrived yet; I'll let you know, once it's installed, how well it works.

Helpful Hints
If you want to undertake something like this for your home or church, here are some practical hints:

- ✓ **Decide how the sheet will be mounted**: against which surfaces, with how much clearance or overlap required in each direction for the mounting and sealing mechanism (magnetic, adhesive, nails, screws, weatherstripping, etc.). A drawing helps you visualize whether the sheet dimension needs to be larger (overlap) or smaller (clearance) than the relevant window dimension. The drawing doesn't need to be to scale.

- ✓ **Measure carefully and often**. Especially in old buildings, don't assume that rectangular-looking openings are in fact exactly rectangular. Measure both top and bottom, both left and right. Measure both diagonals to make sure they are the same.

Do-It-Yourself vs. Professionally Built/Installed
The variations described above are all "Do-It-Yourself" – scope, measure, purchase materials, assemble, and install. A growing industry of manufacturers and installers are also available – for a price – to do this work for you. (Try a Google search on "interior storm windows"). However, the price is high. For a 3'x5' window, a professionally built and installed window may run between $100-200. The alternatives described above, for the same size window, cost $30-50 for materials. Non-profit organizations can save a lot of money with skilled volunteer labor.

Monitor Hydronic Boilers

Natural Gas, Oil or Propane (LP)

Other Products from HouseNeeds.com

Return to Monitor Boiler Main Page

- Water Heaters
- Radiant Heat
- Gas Space Heaters
- Electric Heaters
- Boilers
- Heating Supplies
- Plumbing Supplies
- Radiators
- Ventilation
- Bath & Kitchen
- Solar
- Misc

The MZ Boiler

Most Efficient Proven Gas Boiler in America.

Brilliantly designed for ultra high efficiency and built with the highest quality components, these fully condensing, wall-hung units provide you with the greatest level of comfort for your money. Built to last forever with minimal service, they offer a multitude of installation options and can perform many tasks -space heating, domestic hot water, pool and spa heating, snow melt - you name it. Using high-grade stainless steel for the heat exchanger and cast aluminum for the water jacket, a lifetime of reliable operation is virtually assured!

These Energy Star® MZs are designed for condensing, a process that recovers the heat trapped in the water vapor produced by gas combustion. Condensing enables the boiler to extract all of the heat possible, saving you money year after year. Instead of a flue gas temperature in the 350º to 400º range as the conventional non-condensing boiler produces, the MZ's can be in the range of 50º for snowmelt applications to 170º for baseboard copper-finned operation. The difference in temperature reflects the heat going in the home, not up the chimney. Condensing is great for the environment because along with the condensed vapor, many pollutants are harmlessly drained away.

The clean-burning MZs exceed the strictest air quality standard in the US - the California South Coast Air Quality Standards - by 60%!

The MZ Boiler Model MZ25S

This model combines heat and domestic hot water and it's perfect for one-bathroom homes or condos where space is a premium.

- Techinical Information of the MZ 25S Boiler
- Pricing Information

The MZ Boiler Model MZ25C

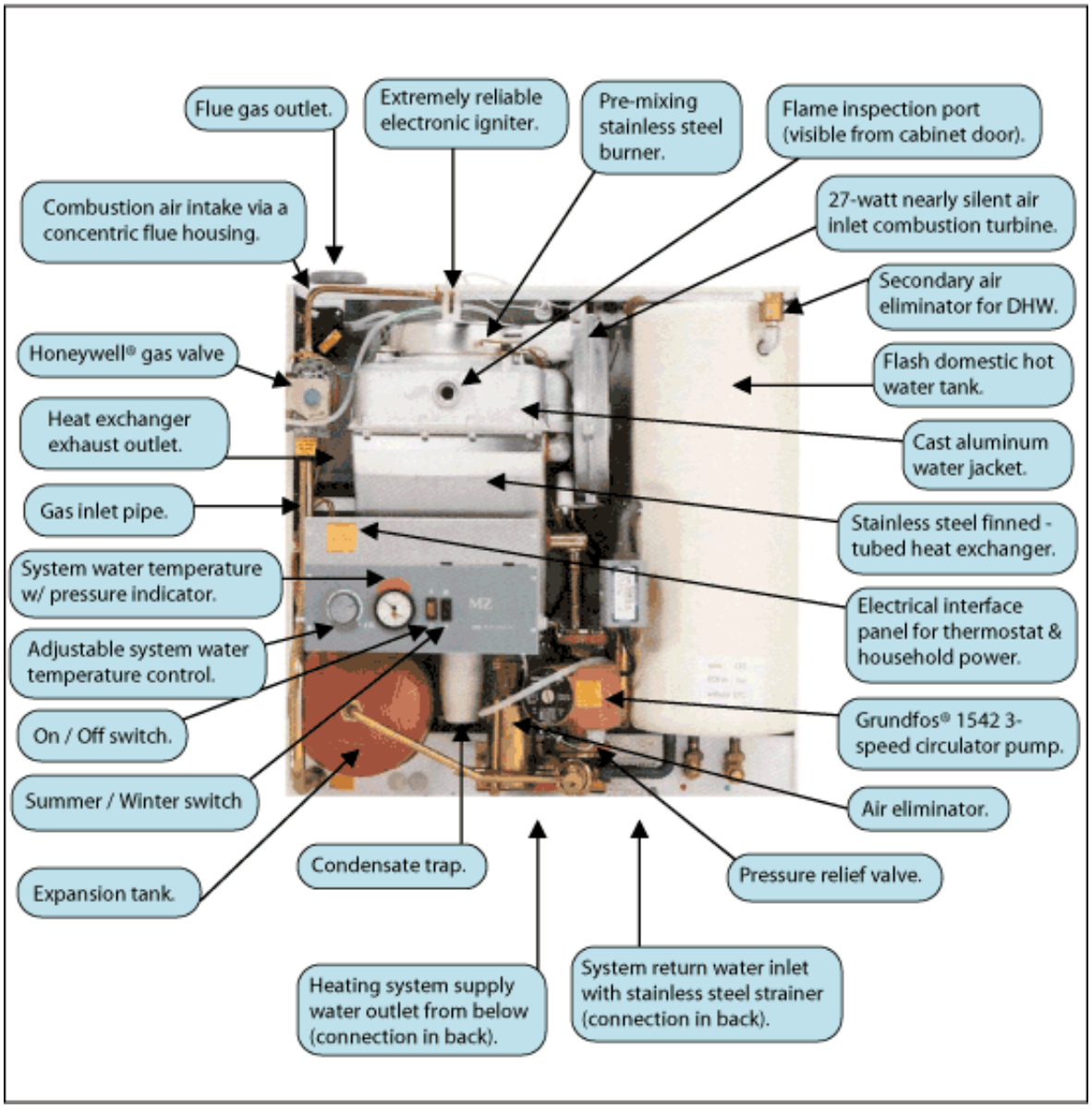
This unit easily heats most homes and can produce an endless supply of hot water when combined with one of our BS indirect tanks.

- Techinical Information of the MZ 25C Boiler
- Pricing Information

The MZ Boiler Model MZ40C

This model has the highest output of the Monitor line and is perfect for larger homes and commercial applications.

Monitor MZ 25S



Hit the X button at the top of this page to close this window

MUNCHKIN

STAINLESS STEEL HIGH EFFICIENCY BOILER

Opening the Door to the 21st Century in High Performance Heating Equipment

This is one of the most compact and efficient heaters available on the market today. Each Munchkin heater will modulate its firing rate to match the actual energy requirements. This feature provides additional savings versus traditional single firing heaters. With stainless steel construction, you can be assured that you are buying the highest quality appliance.

Proven European technology, manufactured in the United States.

Quiet operation is just another benefit that comes with the Munchkin heater.

Durability

96% Efficiency

Quiet Operation

Reliability

MH27745 US LISTED

CONTROLS C US

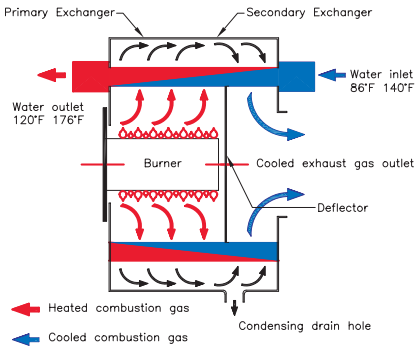
member gama

The Munchkin Gas Boiler:

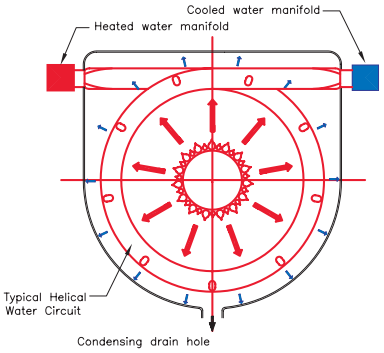
The Most Compact and Efficient Boiler Available on the Market

How it Operates

When the room thermostat calls for heat, the Munchkin control board will start the pump and start to monitor the return water temperature of the system before the heater will begin to heat the water. Once the controller has sensed a drop in the return water temperature below the temperature set point minus the differential set point, the boiler will start to heat the water. This eliminates the boiler starting every time the thermostat calls for heat. This feature keeps the system from short cycling.



Once the system has sensed the temperature difference, the Munchkin will activate the blower motor for 5 seconds to prepurge the system before starting the Munchkin. The Munchkin controller will now start to modulate the pre-mix burner based on analyzing the return water temperature, supply water temperature, and the set point temperature. By compiling this information, the controller utilizes an algorithm to fully adjust the firing rate while maintaining the desired output temperature. The pre-mix burner fans have a low-voltage direct current drive motor with a pulse relay counting. This system allows precise control over the fan speed and combustion air volumes. Coupled with the gas valve and the Venturi system set to provide a one-to-one ratio of precisely measured volumes of fuel to air, accurate and instant burner output is achieved. This keeps the Munchkin running at the **highest efficiency 92% AFUE.**

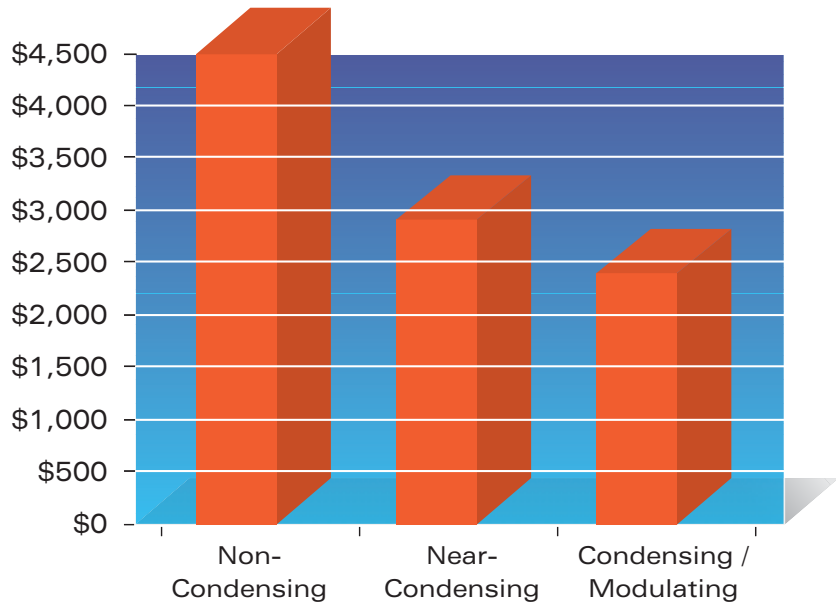


When the thermostat is satisfied, the Munchkin will then go through a 4 second post-purge cycle before shutting off. Munchkins are equipped with a control display with indicators that show the normal operation of the boiler. This display will also serve as a diagnostic tool for servicing.

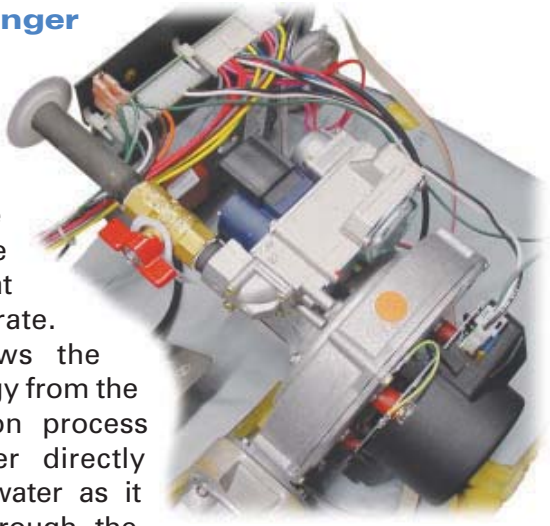
92% AFUE condensing technology

The cost of fuel in some areas of the country has increased almost 40% in just one year! Munchkin High Efficiency Modulating 92% AFUE gas boilers provides a maximum payback on fuel savings. As the chart illustrates below savings can result in payback periods of **less than 3 years.** Depending on the age of your present equipment, the Munchkin could save you as much as **50%** on your fuel bills.

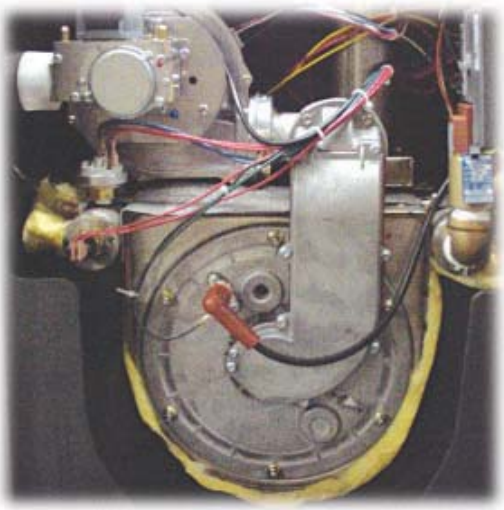
3-Year Energy Costs



Durable All Stainless Steel Heat Exchanger



The Munchkin design starts with the individual stainless steel helical water circuits, which provide maximum corrosion resistance caused by the condensing of the flue gas inside the secondary portion of the heat exchanger. The flue and individual stainless steel water circuits are baffled to direct the flow which maximize the heat transfer rate. This allows the heat energy from the combustion process to transfer directly into the water as it passes through the individual stainless steel helical circuits. The Munchkin heat exchanger absorbs so much energy that the exhaust gas can be vented with **standard schedule 40 PVC pipe**. The sealed combustion process and minimal water volume content eliminates external heat loss, this means very little stand by heat loss, resulting in additional energy savings versus a traditional system.



Features and Benefits

- **Fully Modulating for Ultra High Efficiency (92% AFUE)**
  Lowest possible operating cost. Rapid return on investment.
- **Consists of Stainless Steel Construction (316L)**
  Highest quality material available for maximum reliability.
- **Compact, Lightweight Design**
  Installs virtually anywhere, where similar appliances cannot! Zero clearance to combustibles and a small footprint. Its lightweight design makes it easy to be installed by one person! The Munchkin can even be shipped via Parcel Service!
- **Add-on Vision Systems**
  Vision authorized dealers can increase the installation capability of the Munchkin Boiler by adding on one or more of the three Vision systems. Vision Systems offers the customer a variety of "add-on" controls like Outdoor Reset, Multiple Boiler Control, Zone Temperature Control, Alarms and many other features.
- **Direct Vent with Standard Schedule 40 PVC Plastic Pipe**
  Less expensive to install. No chimney required! Installation flexibility.
- **Quiet Operation**
  Refrigerator quiet!
- **State-of-the-Art Control**
  Self-diagnostic microprocessor control system to simplify service.
- **Reliable field-proven spark ignition**
  Constant dependable operation
- **Each Unit is Inspected for 100% Quality Satisfaction**
  Superior quality
- **Sealed combustion**
  Safest-operating appliance available
- **Environmentally friendly**
  Low emissions environment
- **Modular Component Construction**
  Easily maintained.
- **12 Year Limited Warranty**
  Assurance of quality.
- **Operates at Low Supply Temperature**
  No bypass valve controls needed to protect boiler.
- **New: 1 1/4" NPT Return and Supply Connections**

Standard Equipment

- Plastic Heater Jacket
- Modulating Heater Controller
- Burner Fan
- Honeywell Gas Valve Venturi System
- 24 Volt Transformer
- Supply / Return Temperature Thermister
- Water Pressure Switch (Set at 8 PSI)
- Wiring Harness
- 5/8 Condensation Connection
- Spark Electrode
- Vent Termination Coupling and Tee (PVC)
- Rectification Probe
- High Grade Stainless Steel Burner
- Electrical Junction Box With Switch
- High Limit Temperature Control
- 30 PSI ASME Relief Valve
- Combination Pressure - Temperature Gauge
- New 1¼" Boiler Return & Supply Connections

Design Enhancements

↑ The patented **Munchkin Heat Exchanger** has been designed to provide maximum heat transfer, while also providing unsurpassed corrosion resistance with stainless steel construction.

European designed, → high grade **stainless steel burner** with reliable spark ignition coupled with the Honeywell gas valve and Venturi system. This pre-mix combustion system is the engine which provides reliable and efficient operation.

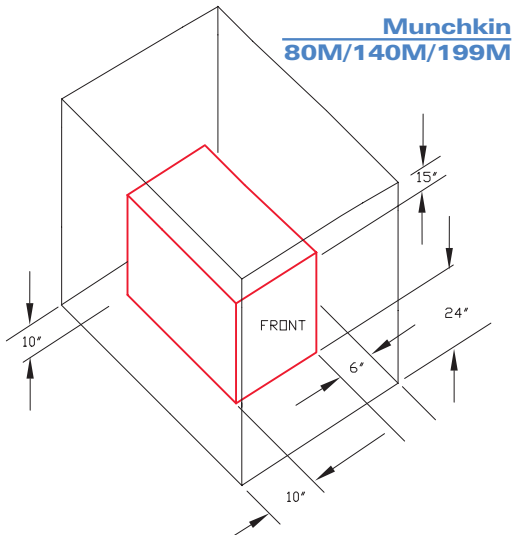
← The **Munchkin 925 Control Board** is engineered to modulate the firing rate to match the actual needs of the heat system, saving money by conserving energy.

Optional Equipment

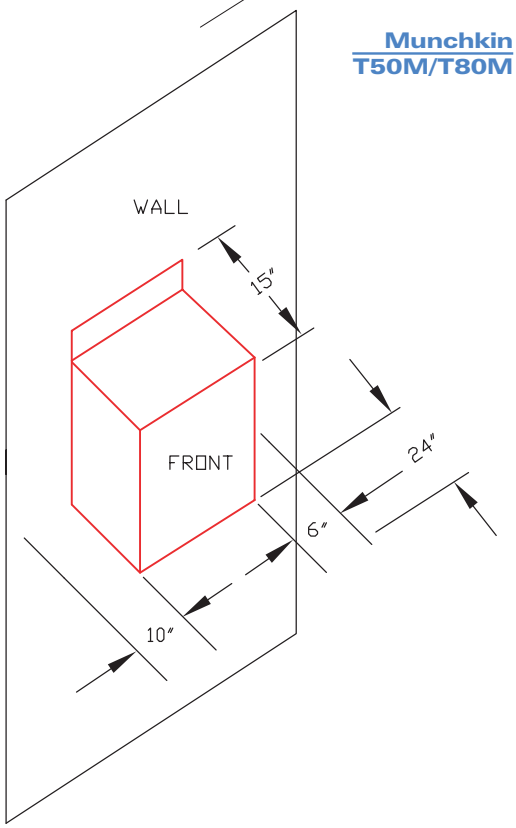
- SuperStor Ultra Indirect Fired Water Heater
- SuperStor Ultra Pool Heater
- Condensate Neutralizer Kit
- **Vent Kit Includes:**
  - V1000 Aluminum Outside Termination Kit
  - Concentric Vent Kit Termination 3"

Recommended Service Clearances

Munchkin 80M/140M/199M



Munchkin T50M/T80M



Performance Ratings

Model	Input Modulation	DOE Heating	AFUE	Shipping Weight	IBR
T50	18,000 to 50,000	16,000 to 46,000	92%	58 lbs.	40,000
T80	19,000 to 80,000	17,000 to 74,000	92%	58 lbs.	64,000
80M	27,000 to 80,000	25,000 to 74,000	92%	75 lbs.	64,000
140M	46,000 to 140,000	43,000 to 129,000	92%	101 lbs.	112,000
199M	66,000 to 199,000	61,000 to 183,000	92%	111 lbs.	159,000

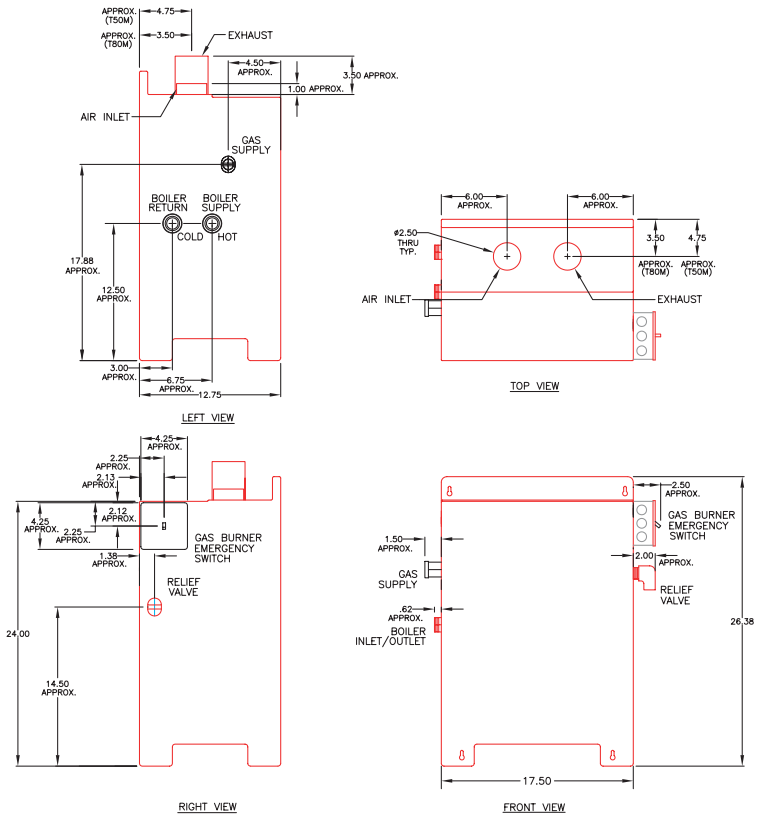
Connection Sizes

Model	Supply/Return Connection	Gas Connection Size	Vent Diameter
T50	1-1/4" NPT	3/4"	2"
T80	1-1/4" NPT	3/4"	2"
80M	1-1/4" NPT	3/4"	3"
140M	1-1/4" NPT	3/4"	3"
199M	1-1/4" NPT	3/4"	3"

The Munchkin Gas Boiler — Ideal for Home Use

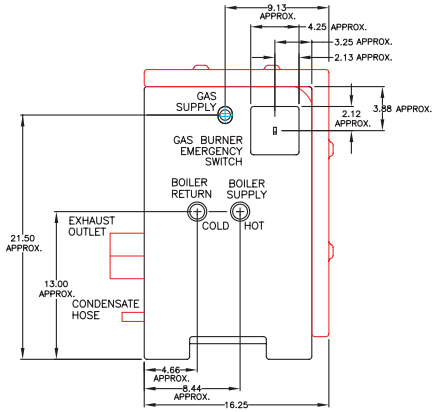
Dimensions

T50 / T80M

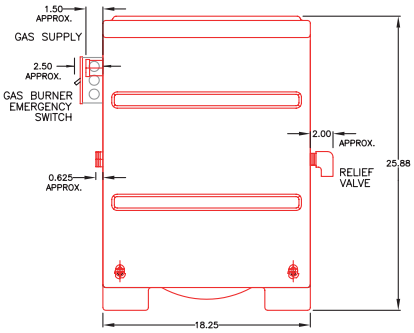


Dimensions

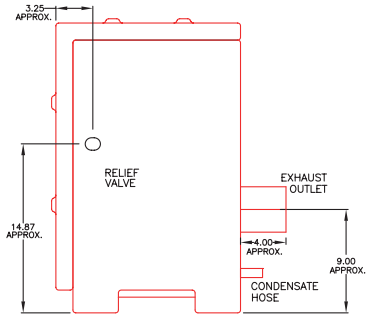
80M



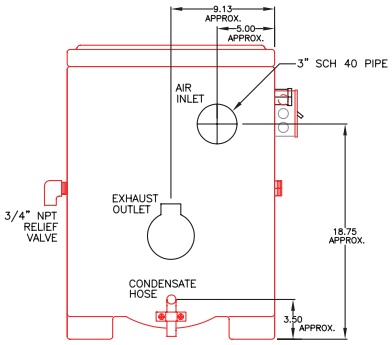
LEFT SIDE VIEW



FRONT VIEW

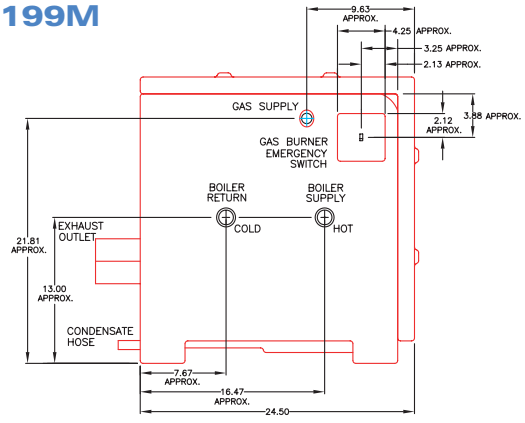


RIGHT SIDE VIEW

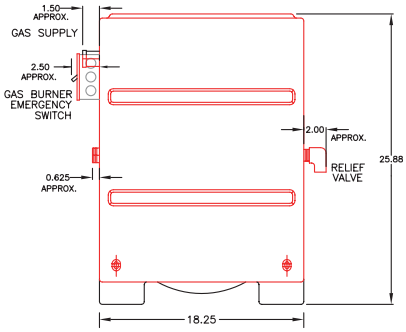


BACK VIEW

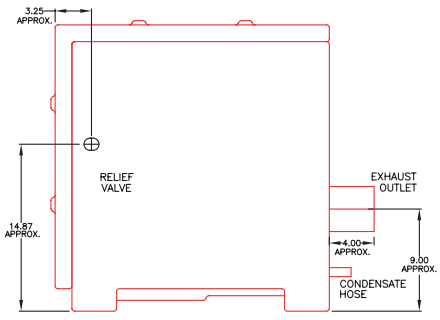
140M / 199M



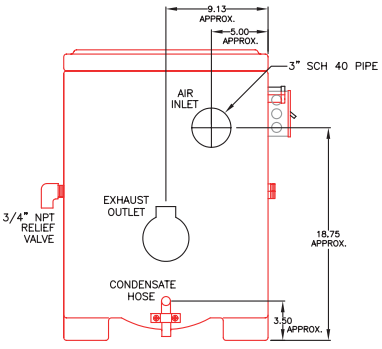
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



BACK VIEW

Monitor MZ 25 S Boiler Technical Information

This medicine-cabinet sized unit does it all with its built-in domestic "Flash" hot water tank so that no separate hot water tank is necessary. It gives instant hot water and there is no mixture of heating system water and domestic hot water. The 25S is perfect for installations where space is at a premium. It is recommended for one-bathroom homes and condos. Virtually silent, this zero-clearance to combustibles unit can be mounted in a closet or anywhere that's convenient for you.

Technical Specifications - MZ 25 S	
Functions	Comfort Heating & Domestic Hot Water
Efficiency	95%
Clearance From Combustibles Required	None
Electrical Use for Operation	108 Watts
Dimensions (approx.)	30" H x 30" W x 13" D (180 lbs.)
BTU/HR Input	94,500
Hot Water Production (Instantaneous)	2.9 Gallons per minute
Flue	Direct Vent
Circulator Pump (Grundfos® # 1542)	Built-in
HoneyWell® Positive Pressure Gas Valve	Built-in
Air Eliminator	Built-in
Low Water Cut-off	Built-in
Relief Valve	Built-in
Expansion Tank	Built-in

Click here to see an exploded inside view of the MZ 25S Boiler

Return to Monitor MZ Page

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P.O. BOX 525 WARREN, VT 05674
1-802-583-2726

Trinity, Canton

Comparison of Options — 20 Year Impacts

	BOILER OPTIONS			
	Best	**Good**	**Average**	**Current**
Efficiency	93%	84%	70%	62%
Therms/Year	5,729	6,343	7,611	8,568
Cost/Therm	$0.95	$0.95	$0.95	$0.95
New Boiler Cost	$30,000	$25,000	$18,000	$15,000
Annual Operating Cost	$5,443	$6,026	$7,231	$8,140
20 Year Operating Cost	$108,851	$120,514	$144,616	$162,792
TOTAL Cost for 20 Years	$138,851	$145,514	$162,616	$177,792
Utility Incentive	$5,500	$0	$0	$0
NET to User	$133,351	$145,514	$162,616	$177,792
$s saved *(current $s)*	$44,441	$32,278	$15,176	$0
Inflation rate at > 3.0%				
New Boiler Cost	$30,000	$25,000	$18,000	$15,000
20 Year Operating Cost	$146,243	$161,912	$194,295	$218,714
TOTAL Cost for 20 Years	$176,243	$186,912	$212,295	$233,714
Utility Incentive	$5,500	$0	$0	$0
NET to User	$170,743	$186,912	$212,295	$233,714
$s saved *(inflated $s)*	$62,971	$46,802	$21,419	$0
	20 Year Emissions			
CO_2 (greenhouse gas)	1,924,944	2,131,188	2,557,426	2,878,848
NOx (health issues)	1,512	1,675	2,009	2,262
% savings vs. current	33.1%	26.0%	11.2%	0.0%

Note: Efficiency is estimated seasonal

This report and analysis is based upon observations of the visible and apparent conditions of the property and the components evaluated on the date of assessment. Care has been taken in the performance of this assessment. This report is made only in the best exercise of our ability and judgment. However, Massachusetts Interfaith Power & Light (and or its representatives) makes no representations regarding latent or concealed defects that may exist, and no warranty or guarantee is expressed or implied. Conclusions in this report are based on estimates of the age and normal working life of various items of equipment and appliances. Predictions of life expectancy and the balance of useful life are necessarily based on industry and/or statistical comparisons and observed conditions. It is essential to understand that actual and future conditions can alter the useful life of any item. The previous use/misuse, irregularity of servicing, faulty manufacture, unfavorable conditions, acts of God and unforeseen circumstances make it impossible to state precisely when each item will require replacement and/or what the actual savings in use and cost will be. The Member herein should be aware that certain components with the above referenced property may function consistent with their purpose at the time of the assessment, but due to their nature are subject to deterioration without notice. Unless otherwise noted, all building components are assumed to have met the building code requirements in force at the time of construction. Conclusions reached in this report assume responsible ownership and competent management of the property. Information provided to us by others is believed to be reliable. However we assume no responsibility for the accuracy of such information.