

Work Paper WPRSGNGDHW106
Gas Storage Water Heater 0.67 EF

Resource Solutions Group

Gas Storage Water Heater
0.67 EF

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At-A-Glance Measure List

Measure Code	Measure Description	Building Type	Building Vintage	Peak Electric Demand Reduction (kW/ Unit)	Electric Savings (kWh/ Unit)	Gas Savings (Therms/ Unit)	Base Case Cost (\$/Unit)	Measure Cost (\$/Unit)	Incremental Measure Cost (\$/Unit)	Effective Useful Life (years)
HW03	Gas Storage Water Heater 0.67 EF	ASM	ALL	0	0	185	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	ESE	ALL	0	0	124	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	EUN	ALL	0	0	178	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	GRO	ALL	0	0	191	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	HSP	ALL	0	0	297	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	HTL	ALL	0	0	228	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	MLI	ALL	0	0	140	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	OFL	ALL	0	0	164	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	OFS	ALL	0	0	56	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	RFF	ALL	0	0	109	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	RSD	ALL	0	0	166	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	RTL	ALL	0	0	105	\$549	\$917	\$369	15

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HW03	Gas Storage Water Heater 0.67 EF	SCN	ALL	0	0	150	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	MFM	ALL	0	0	148	\$549	\$917	\$369	15
HW03	Gas Storage Water Heater 0.67 EF	OTR	ALL	0	0	159	\$549	\$917	\$369	15

Table of Contents

At-A-Glance Measure List	ii
Table of Contents	iv
Gas Storage Water Heater 0.67 EF	5
1.1 Measure Description & Background	5
1.2 Base Cases for Savings Estimates.....	5
1.3 Measure Effective Useful Lives.....	5
1.4 Net-to-Gross Ratio	5
1.5 Energy Savings	5
1.6 Base Case Costs	7
1.7 Measure Costs	7
1.8 Incremental Measure Costs	8
References.....	10

Gas Storage Water Heater 0.67 EF

1.1 Measure Description & Background

Measure Description

This work paper describes the methodology and assumptions used to develop gas savings associated with replacing existing gas-fired storage water heaters with 67% EF gas-fired water heaters in a non-residential application. Primary applications would include (but not limited to) hotels/motels, small commercial spaces, offices and restaurants.

Technical Description

This measure is for upgrading from the 0.575 EF minimum code to a higher efficiency 0.67 EF gas storage-type water heaters. Gas storage water heaters are used to supply hot water for a variety of commercial building types.

1.2 Base Cases for Savings Estimates

Savings are calculated using the federal code standard minimum 0.575 EF.

1.3 Measure Effective Useful Lives

The measure effective useful life is 15 years as stated in DEER 08 EUL Update.⁽¹⁾

1.4 Net-to-Gross Ratio

The Net-to-Gross ratio for the Gas Storage Water Heater 0.67 EF is 0.80.

Table 1.0: Net-to-Gross Ratio

Measure	NTG
Gas Storage Water Heat 0.67 EF	0.80

1.5 Energy Savings

Gas savings depend on building type and are based on measure case energy factor of 0.67 and a heating capacity of 75 MBtuh. These values are averages of qualifying units. Savings values are derived from 2008 DEER Miser, which provides MBtuh gas savings per MBtuh capacity. Savings presented here are per water heater.

Table 1.1 DEER Gas Storage Water Heater Results

Building Type	Capacity	Energy Savings
Assembly	75	185
Education – Primary/Secondary	75	124
Education – Post Secondary	75	178
Grocery	75	191
Health/Medical - Hospital	75	297
Lodging - Hotel	75	228
Manufacturing - Light Industrial	75	140
Office – > 60,000 sq-ft	75	164
Office – < 60,000 sq-ft	75	56
Restaurant - FastFood	75	109
Restaurant – Sit Down	75	166
Retail	75	105
Storage	75	150
Multi-Family	75	119
Other	75	148

The building type definitions used in the At-A-Glance Table can be found in Appendix A.

For customer types where data was not available, the weighting was used to develop an average value to represent the “other” case strategy or used where building type results were considered to be outliers. The weighting used in the analysis is based on expected customer building type program penetration rates.

Table 1.2 – Table of Customer Types Weights

Building type	% Therm Usage
ASM	2%
ESE	6%
EUN	6%
GRO	2%
HSP	9%
HTL	2%
MLI	38%
OFS	2%
OFL	2%
RFF	2%
RSD	10%
RTL	6%
SCN	10%
MFM	3%
Totals	100%

1.6 Base Case Costs

DEER provides base case cost of this measure per water heater. This cost is converted to per MBtuh. Table 1.3 gives the based base cost for gas storage water heaters.⁽¹⁾

Table 1.3: Gas Storage Water Heater 0.67 EF Base Case Cost per MBtuh

Measure	Total Base Cost
Gas Storage Water Heater 0.67 EF (75,000 MBtuh)	\$549

1.7 Measure Costs

DEER provides cost of this measure per water heater. The cost is converted to per MBtuh. The costs are summarized in the following table.⁽¹⁾

Table 1.4: Gas Storage Water Heater 0.67 EF Measure Cost per MBtuh

Measure	Total Base Cost
Gas Storage Water Heater 0.67 EF (75,000 MBtuh)	\$917

1.8 Incremental Measure Costs

DEER states the incremental cost per water heater.⁽¹⁾ The cost has been converted to per MBtuh. DEER does not provide installation cost since the labor cost is considered as the same for both the measure and base cases. The incremental costs are summarized in the following table.

Table 1.6: Gas Storage Water Heater 0.67 EF Incremental Measure Cost

Measure	Total Incremental Cost
Gas Storage Water Heater 0.67 EF (75,000 MBtuh)	\$369

Appendix A: Building and Vintage code definitions

BLDG_TYPE_CODE	DESCRIPTION
ASM	Assembly
ESE	Education-Primary/Secondary
EUN	Education-University
GRO	Grocery
HSP	Health/Medical - Hospital
HTL	Lodging - Hotel
MLI	Manufacturing - Light Industry
OFL	Office - Large
OFS	Office - Small
OTR	No Building Type Available
RFF	Restaurant - Fast Food
RSD	Restaurant-Sit Down
RTL	Retail
SCN	Storage - Conditioned

References

1. **Database for Energy Efficient Resources.** *EUL/IMC Update pp 8 of 12.* 2008.
2. —. *Measure, Baseline and Incremental Cost (D03-092, D03-097).* 2005.