

Furnace

Gas Cost Portion of Furnace Use

Average Yearly Gas Usage per home	3064	Cubic Meters	www.oeb.gov.on.ca/OEB/ Documents/QRAM/enbridge_rates_20110401.pdf
Gas cost	\$ 0.239	c/m3	Current JE renewal rate as of April 12, 2011
Yearly gas cost	\$ 732.30		Average yearly gas usage per home x Gas cost
Transportation of gas	0.057273	c/m3	Current JE renewal rates as of April 12, 2011
Yearly Transportation of gas	\$ 175.48		Average yearly gas usage per home x Transportation of gas
Delivery	0.0893	c/m3	www.oeb.gov.on.ca/OEB/ Documents/QRAM/enbridge_rates_20110401.pdf
Yearly Delivery of gas	\$ 273.62		Average yearly gas usage per home x Delivery of gas
Total	\$ 1,181.40		
HST	\$ 153.58		13%
Total Cost	\$ 1,334.98		
% of Gas consumed by Furnace	60%		http://oe.nrcan.gc.ca/Publications/statistics/sheu-summary/residential.cfm?attr=12
Total yearly Gas cost to operate Furnace	\$ 800.99		
95% efficiency furnace is 95%/60% = 1.58 x	\$ 506.95		\$800.99 / 1.58 = \$506.95

Electric Cost Portion of Furnace Use

Furnace is heated using Gas but the Motor to blow the hot air into the house is powered by electricity. The difference between a single and dual furnace is the motor (ECM vs PSC)

ECM motor reduces the average furnace electrical consumption from 9.29 to 2.38 kwh/day

Single Stage Belt drive PSC motor	9.29 kwh/day	x	257 days	=	2,388
Single Stage direct drive PSC motor	7.91 kw/day	x	257 days	=	2,032
ECM motor	2.38 kwh/day	x	257 days	=	612

Therefore

using Enbridge Hydro One networks - Durham - R1 billing

	60%	95% single	95% double
Electric Cost	\$ 179.06	\$ 152.37	\$ 45.87
Delivery	\$ 129.73	\$ 114.08	\$ 51.67
Regulatory	\$ 18.06	\$ 15.40	\$ 4.81
Debt Retirement	\$ 16.72	\$ 14.22	\$ 4.28
Total Electricity Charges	\$ 343.57	\$ 296.07	\$ 106.63
HST	\$ 44.66	\$ 38.49	\$ 13.86
Subtotal	\$ 388.24	\$ 334.56	\$ 120.50
Clean energy Benefit (-10%)	\$ (38.82)	\$ (33.46)	\$ (12.05)
Total Amount	\$ 349.42	\$ 301.11	\$ 108.45

found in section 6.0 conclusions in this report

<http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc38443/nrcc38443.pdf>

This report relates to cold winter months (Jan/Feb/Mar) = 90 days

As per attached report showing 15% efficiency between direct driven vs belt

assuming furnace works half of that amount in Oct/Nov/Dec/Apr = 60 days

Assuming Air Conditioner (which uses the same motor) works 107 days

Therefore total days worked = 90+60+107 = 257

JE renewal rate at 7.5 cents/kwh

<http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility>

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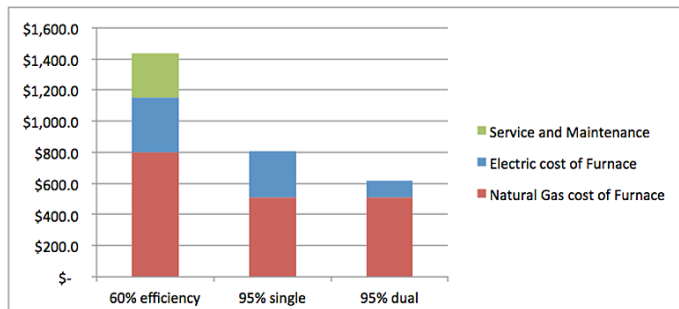
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	60% efficiency	95% single	95% dual
Natural Gas cost of Furnace	\$ 801.0	\$ 507.0	\$ 507.0
Electric cost of Furnace	\$ 349.4	\$ 301.1	\$ 108.4
Service and Maintenance	\$ 284.6	\$ -	\$ -
Total Yearly cost	\$ 1,435.0	\$ 808.1	\$ 615.4
Total monthly cost	\$ 119.59	\$ 67.34	\$ 51.28
		\$ 819.6	

Motor Efficiency between PSC (found in single stage furnaces) and DCM = 68.5%/28.5% = 2.4 times more efficient (reference attached marketing piece)

Also in this report summary 1.1 shows how DCM motor is 60% more efficient than PSC (<http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc38443/nrcc38443.pdf>)



820
561



Air Conditioner

Number of cooling days per summer		
June	30	days
July	31	days
August	31	days
September	15	days
Total	107	days
Assuming 14 hours per day equals	1498	Hrs/season

Typical single dwelling home of 1500 sqft uses 2.0 TON, 24,000 BTU AC

24,000 BTU x 1498 Hrs/Year = 35,952,000 BTU/Yr

8 SEER air conditioner = 35,952,000 BTU/year / 8 BTU/W x h = 4,494,000 Wh/year = 4,494 kwh/year

a 13 SEER 24,000 BTU equales 38.5% savings when compared to an 8 SEER AC

13 SEER air conditioner = 35,952,000 BTU/year/13 BTU/w x h = 2,765,538 wh/year = 2,765 kwh/year

a 14.5 SEER 24,000 BTU equales 44.8% savings when compared to an 8 SEER AC

14.5 SEER air conditioner = 35,952,000 BTU/year/14.5 BTU/w x h =2,479,448 wh/year = 2,479 kwh/year

therefore:

	SEER		
	8.0	13.0	14.5
Electricity	\$ 337	\$ 207	\$ 186
Delivery	\$ 222	\$ 146	\$ 134
Regulatory	\$ 37	\$ 21	\$ 19
Debt Retirement Charge	\$ 31	\$ 19	\$ 17
Total Electricity Charges	\$ 628	\$ 394	\$ 356
HST	\$ 82	\$ 51	\$ 46
Subtotal	\$ 709	\$ 445	\$ 402
Clean Energy Benefit (-10%)	\$ (71)	\$ (45)	\$ (40)
Total Amount	\$ 638	\$ 401	\$ 362
Service and Maintenance	\$ 285	\$ -	\$ -
Total Yearly Cost to operate	\$ 923	\$ 401	\$ 362
Total monthly cost to operate	\$ 76.90	\$ 33.39	\$ 30.15

based on sizing criteria set out by American Standard. Also based on the number of 2.0 ton furnace NHS installs

http://en.wikipedia.org/wiki/Seasonal_energy_efficiency_ratio

http://en.wikipedia.org/wiki/Seasonal_energy_efficiency_ratio

Plugging the kw into the oeb calculator (8 seer = 4,494 kwh, 13 seer = 2,765 kwh, 14.5 seer =2,479kwh)

Using the Hydro one Networks as electricity provider and Durham region R1 as the region

please note that the electricity \$ portion is not taken from OEB because JE renewable rate was used instead

JE renewable rate as of April 1, 2011 is 7.5 Cents/kwh

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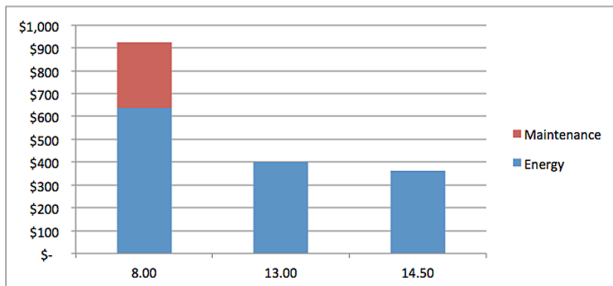
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\$20.99 x 13% x 12 months (as per NHS protection plan)



Energy
Maintenance

	8.00	13.00	14.50
Energy	\$ 638	\$ 401	\$ 362
Maintenance	\$ 285	\$ -	\$ -
	\$ 923	\$ 401	\$ 362