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://oee.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

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

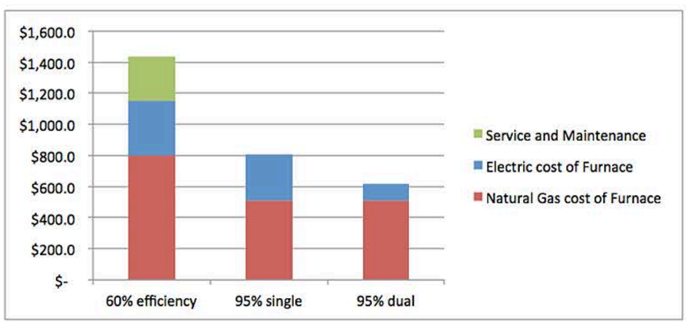
Therefore

using Enbridge Hydro One networks - Durham - R1 billing

	60%	95% single	95% double	
Electric Cost	$ 179.06	$ 152.37	$ 45.87	JE renewal rate at 7.5 cents/kwh
Delivery	$ 129.73	$ 114.08	$ 51.67	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Regulatory	$ 18.06	$ 15.40	$ 4.81	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Debt Retirement	$ 16.72	$ 14.22	$ 4.28	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Total Electricity Charges	$ 343.57	$ 296.07	$ 106.63	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
HST	$ 44.66	$ 38.49	$ 13.86	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Subtotal	$ 388.24	$ 334.56	$ 120.50	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Clean energy Benefit (-10%)	$ (38.82)	$ (33.46)	$ (12.05)	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Total Amount	$ 349.42	$ 301.11	$ 108.45	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility

	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

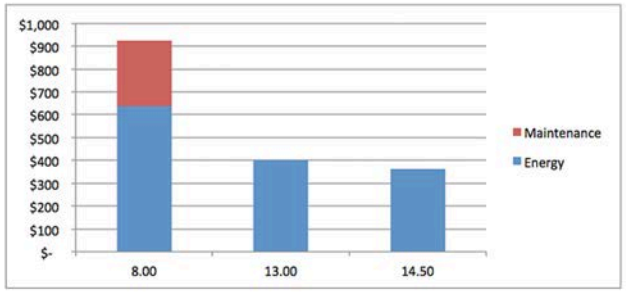
based on sizing criteria set out by American Standard. Also based on the number of 2.0 ton furnace NHS installs
http://en.wikipedia.org/wiki/Seasonal_energy_efficiency_ratio
http://en.wikipedia.org/wiki/Seasonal_energy_efficiency_ratio

therefore:

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

	SEER 8.0	13.0	14.5	
Electricity	$ 337	$ 207	$ 186	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Delivery	$ 222	$ 146	$ 134	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Regulatory	$ 37	$ 21	$ 19	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Debt Retirement Charge	$ 31	$ 19	$ 17	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Total Electricity Charges	$ 628	$ 394	$ 356	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
HST	$ 82	$ 51	$ 46	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Subtotal	$ 709	$ 445	$ 402	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Clean Energy Benefit (-10%)	$ (71)	$ (45)	$ (40)	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Total Amount	$ 638	$ 401	$ 362	http://www.oeb.gov.on.ca/OEB/Consumers/Electricity/Your+Electricity+Utility
Service and Maintenance	$ 285	$ -	$ -	$20.99 x 13% x 12 months (as per NHS protection plan)
Total Yearly Cost to operate	$ 923	$ 401	$ 362	
Total monthly cost to operate	$ 76.90	$ 33.39	$ 30.15	



	8.00	13.00	14.50
Energy	$ 638	$ 401	$ 362
Maintenance	$ 285		
	$ 923	$ 522	$ 561

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