

PRESENTATION AT THE NFLD POWER RATE APPLICATION PART 1

Does anyone at this proceeding have a feeling for what a gigawatt hour of saving means to the the average residential consumer? Or what will be the impact of a cumulative gross saving, or aggregate saving, of 49 gigawatts hours by the year 2014? Does the size of this saving meet the expectation of the consumer, the consumer Advocate, or this Board?

Nfld Power seeks to raise the domestic rate 7.9 percent, on top of the 6.6 percent granted just 7 months ago. It seeks to raise profits by 19 percent. And the consumer gets what?: the latest version of the ENERGY CONSERVATION PLAN . What is the dollar value in benefits of this plan for the average household? We can calculate the dollar cost of the increases for an average electric heated house, using 22,000 kwh/year. The recent rate increase added \$169 a year and this one another \$194 dollars. \$363 dollar increase in one year to a \$2500 power bill. What offset dollar value will the conservation plan bring? Does our Consumer Advocate or this Board know? I suspect Nfld Power knows, but there is no evidence or charts that show it.

Is the Consumer Advocate satisfied with this plan? I emailed Mr Johnson with a number of concerns: is this plan sufficiently funded? Are they targeting the right technologies to maximize benefits for the consumers? Are the savings getting the proper verification process? Are the resources and the results favourable compared to other utilities with serious conservation plans? Did you question any concerns with the utilities before the hearings started? Are there issues of a technical nature that you sought expert advice from any consultant on energy conservation efficiency? If so, what issues, what consultant, what advice and recommendations were provided? Do you and the utilities acknowledge that the greatest potential benefit to both the domestic and commercial customers is in cost effective technology for space heating and hot water, as they comprise 80 percent of their loads? Are you satisfied that the present plan contains nothing to address space heating and hot water? Do you agree that the utilities are having trouble identifying technologies for this? Do you wish to see cost effective space heating technology in operation in Nfld at several sites currently being monitored and producing excellent cost effective results? Do you intend to question any utility officials on the Conservation Plan during these proceedings? If so, what concerns or clarifications are you seeking?

Mr. Johnson replied " We intend to ask questions pertaining to this area."

I questioned further " Can you advise the number of phone calls, emails or letters approximately that you have received from residential or commercial customers opposing the rate increase? Does Nfld Power use the cost of Holyrood oil at 18.9 cents per kilowatthour or a lower number to evaluate customer efficiency options? I asked further 'Is there a date when the Conservation plan will be discussed at the hearing?

Mr Johnson replied "I would expect that Nfld Power VP of operation will testify say Thursday or Friday. Hope this helps.

Mr Johnson avoided answering my questions and concerns but I had hoped he would address these with Nfld Power. Here too I was disappointed.

By the courtesy of the PUB I later read the testimony on this subject, which I summarize as follows:

Mr Kelley to Mr Smith: Are there examples of how Nfld Power responds to evolving customer expectations?
Smith: they want to conserve energy and lower their electricity bills. We've responded to this with energy conservation programs... the primary change is to improve program accessibility... to reach a broader scope of customers, not just those with electric heat. The biggest expansion is in the small technologies program for residential customers... to help customers lower their electricity bills. By the end of 2014, annual gross energy savings are forecast to be 49.5 gigawatt hours. and 9.4 million annual avoided cost of fuel at Holyrood. The Plan costs will increase from 3 million to 4.8 million. To put this in perspective, the break even point on the costs will be two and a half years. To summarize, we feel that we've been successful in responding to customer's primary concerns of reliability and price. We believe this is reflected in our annual satisfaction index, on Table 2-1, page 2-3 of the company's evidence. which shows customer satisfaction has been relatively stable from 2007 to 2011.

Later, Mr Johnson, our Consumer Advocate, asks Mr Smith: the Five-year Energy Conservation Plan.. for 2012-2016... the insulation program has resulted in the highest amount of energy savings of all the programs... to upgrade insulation in basements, attics, ... And that customer .. awareness... of it being the biggest contributor to the total energy reductions.... with total savings over that period of nearly 33,000 megawatt hours.....From 2009 to 2012, at a cost of 4.2 million.... and 42 percent of the cost of the program is giving 57 percent on the savings. Now with new house standards by St John's.... basement insulation, exterior windows, and that sort of thing is within their jurisdiction... and the National Building Code implemented these new standards for homes built in Canada.....so Nfld Power and Nfld Hydro no longer has to incent for new homes covered by codes.... I see the forecast conservation operating cost for 2012-2014 going down from 659, 589, to 514, and I would like for you to comment... if it seems to produce these savings in energy which would most directly impact people's bills , and we know that you don't have to spend so much as you used to in terms of the new construction... But you still have the existing housing stock out there , and I'm curious, as to why we would bring down the spending on insulation and perhaps not enhance it, to target the existing housing stock....

Mr Smith: its.. a reflection of ... we're bringing down the numbers..

Johnson: but in terms of payback.... about 4 to five year payback....it seemed to me to be pretty good bang for the buck... relative to some other initiatives.

Smith: Bang for the buck ... i mean ... all of the programs we do, windows, thermostats, and the new programs ... they'll all have a bang for the buck, so to speak, or a payback type of thing. Insulation is certainly one of them that customers have expressed interest in in the past. But you know, the other programs , thermostats and windows , have also shown...

Johnson: has it been assessed as to whether it does in fact provide a greater bang for the buck than some of the other measures that are put forward as part of the residential program?

Smith; each of these has their own test mechanism.... to ensure that there is a payback and the insulation has a good payback, yes.

Johnson; Now that we don't have new housing stock ... reaching out to existing housing stock... is there any of that done?

Smith: yes , we reach out in different ways. TV advertising, website, it gets equal billing with windows and thermostats

Johnson: ads are good .. is there any more direct reach out ... to individual householders... and saying "look, have you considered this?"

Johnson; maybe , a way to try to answer , I guess, ... we're trying to appeal to a broader group of our customers, not just the electric heat customers. And it's in the genesis, I guess, of our new small technology program, going forward, that this program will have to go through a different type of promotion and advertising and things that we're going to make a broader group of our customers interested ... to reach out beyond those that just happen to have electric heat. You might say that it's a bit of a fairness issue that all customers should have a chance to participate and, you know, that's the genesis of that program we're doing. ... it about making a program that qualifies for all customers and, you know... that's the new direction we're going in and that will have to be promoted differently and dealt with differently, yes.

Johnson: Are there targets for 2012-2013 .. we want to have X amount of our customers in the existing housing stock, for instance , take advantage of the insulation rebate, is it done like that?

Smith: We have targets .. for the overall impact of the program... but at the individual level ... I just don't know remember them.

Johnson; Could you find out.. if there are individual targets for uptake for the residential offerings? You see what I'm saying?

Smith : Yes . yes.... not just gigawatt hours , you mean the number of participants more so?

Johnson: Yes. Yes. particularly the insulation and windows..... that's what I was driving at there... whether there are any such targets

Smith: Again, I don't know of any such targets by program, for gigawatt hours, or for participants, but I think we would track it by these categories... I just don't know it

Johnson: If you could undertake to provide what the targets are.... and in terms of the impact.. that customers want to conserve energy and lower their bills.. And from your experience...you spoke about the small technologies being successful on the aggregate basis and that's a good thing. In terms of the ability of the customer to influence his or her own bill the most, would it be fair to say that that would be the insulation one?

Smith : I guess, .. insulation .. unlike a CFL light bulb, where the savings would be smaller... you would think insulation would get more benefit.... I think it's logical with insulation, yes.

There ended the evidence for the customer Conservation Plan. How enlightening was this? It was hard for Mr Smith to admit that insulation was superior to CFL lights, with answers " I guess",..."You would think' ... and finally "it is logical"... but even then, no admission of how ineffective CFL lights really are for saving electricity in our location and climate. And too, regular customers know how effective insulation is, as does Mr Johnson. So why was it so hard for Mr. Smith to admit this? He an electrical engineer, who one might expect should

readily know and readily admit this. Or is it that this power distribution company lacks expertise on energy efficiency options for customers?

In summary, Mr. Smith reluctantly concedes that insulation is better than CFC lights to save customers money, and also concedes that new housing codes free up program costs for insulation, that could be redirected to older houses. Yet Mr. Smith says this will not happen. He says we should move from helping owners of electric heated houses to others.... all in the name of fairness to all customers... And that new savings will be made through small technology items.... through the principle of aggregate savings.... Yes , AGGREGATE SAVINGS, as in the old plan. ... Aggregate Savings, which Johnson says is "a good thing".

And there ended the full discussion on conservation. Not even a commitment to target insulation for older stock houses.

NOT A WORD spoken about the new specific" small technologies" being considered.

NOT A WORD about concept plans for efficient heating.

NOT A WORD about air infiltration issues (given we live in one of the windiest areas in the world).

NOT A WORD about the "interactive effects" noted in of MAEBEC study, used as a guide by Nfld Power for efficiency savings, and which puts to question much ,if any beneficial affect of CFC lights.

NOT A WORD about comparing our achievements with other jurisdictions,

And NOT A WORD ABOUT other concerns I had raised.

In my opinion, this was a spectacle, a mere joke, a love fest: between the company and the consumer advocate. It was an abandonment of responsibility by the consumer advocate on behalf of the ratepayers. While being subjected to high rate increases, the single most beneficial aspect of the meagre conservation plan, the insulation measure, was being scaled back 22 percent from 2012 and 50 percent from 2011. And the overall result being to leave the customers, and the Board, unenlightened to as what could be possible in savings and cost reductions from many efficient large technology programs . The new direction, in fact ,is the same as the old direction, only worse. The old plan is a genesis for the new:1. more near useless small technology incentives, and 2. ignore proven large technology incentives.3. ignore verification. 4.Spend lots on advertizing and planning. It is a strategy of small savings for the customer to keeping energy sales robust. A strategy to benefit shareholders of Nfld Power's parent company, Fortis, and almost nothing for the consumer. And a strategy to justify very expensive new generation, and distribution assets.

PRESENTATION- NFLD POWER RATE APPLICATION PART 2

AGGREGATE SAVINGS : A GOOD THING?

Those were the words of our Consumer Advocate, Mr Tom Johnson, to Nfld Power Vice president , Mr Smith, but not as a question , but a affirmation, in regard to how the small technology measures would be evaluated. So what is aggregate savings, and is it a good thing?

For a saving measure, like for example insulation, it is durable and long lasting. Once installed, it can save energy each year going forward. Assume a system uses 100 units of energy per year, and an efficiency measure saves just one unit (one percent) of the energy when installed. It saves one percent in year one , one percent in year two, one percent in year 3 and so on. Adding these each year gives an aggregate amount. So the aggregate amount keeps increasing even if no further saving measure is implemented. If further measures are taken, then these again are added as making a contribution each year.

It is clear that using this method gives rise to a large number in terms of "aggregate" savings. For the example shown, with a single efficiency measure of one unit, after 100 years we get a "aggregate saving" of 100 units. So, in 100 years, our aggregate saving of 100 units now equals our consumption of 100 units. If you plot it on a chart, it appears that the savings equals the consumption. The saving appear tremendous. Lets look at the chart on appendix A.

Of course, we know that, in reality, we have saved only one percent throughout, and one percent is very little. Such is the illusion of aggregate savings.

If, instead, we plotted aggregate savings against aggregate consumption, then the real saving would be apparent. In year two we get 2 units of aggregate saving and 200 units of aggregate consumption. So one percent saving hold up, and likewise for each year.

So if we say aggregate savings is good, so it may be. But it is also bad, in terms of representing the real progress of savings. To see meaningful progress in energy savings we need to see the incremental savings, the new added savings in subsequent years. So incremental savings, not aggregate saving should be the yardstick to measure progress and achievements. To do otherwise is to confuse and mislead the extent of the achievement. I submit that aggregate savings as a measure of success of energy savings it therefore a bad thing. And if one wants to compare apples with apples, one could compare aggregate savings with aggregate cost increases for power. There we would see a \$360 increase in one year give an aggregate increase of \$3600 over 10 years.

To see the incremental saving from our 2009-2012 we have to calculate the incremental saving. We get this.

Aggregate savings GWH, from 2009 to 2014:	2.6	7.7	19.8	28.1	36.7	49.5	gross
aggregate	144.4						
Incremental savings GWH, from 2009 to 2014:	2.6	5.1	12.1	8.3	8.7	12.1	gross

incremental 48.9

You can see the 49.5 Gigawatt hours, referred to by Mr Smith, as the aggregate amount achieved by 2014, is in reality 12.1 new incremental savings for the year 2014, which is the same amount saved in the year 2011. And the gross aggregate for the 6 years is 144.4, whereas the gross incremental savings is only 48.9, about one third the value.

A key question is, what is the dollar value of an incremental saving to a residential customer? We know that a kilowatt-hour(kwh) is 1000 watts operating for one hour. It is currently billed at a rate of 11.17 cents. A gigawatt-hour(GWH) is 1 billion watts operating for one hour. It is 1,000,000,000 watt-hours, or 1million kilowatt-hours. At a price of 0.1117 (11.17 cents), the value of 1 gigawatt-hour is \$111,700. For 2013, for a new incremental system saving of 8.7 GWH, this will be \$971,790 of new savings across the whole island. With about 270,000 customers, including commercial, this is an average of \$3.60 per customer. As most savings are residential. An electric heated house use more electricity than others. It gives about \$5.00 in new savings for them, and a lesser amount for non electric heat customers. So new savings for 2013 can be expected to be \$5 FOR AN AVERAGE ELECTRIC HEATED HOUSE.

Perhaps now we see why Nfld Power prefers to use system "aggregate gigawatt-hours". It just sounds so huge. And Mr Johnson concurs with Nfld. Power, says aggregate savings "is a good thing".

Nfld Power says their plan is a "reasonable one", and a reasonable response to the customers desire to lower energy bills.

An average electric heated house using about 22,000 kwh per year, and will see an increase of \$302 from last July to this July. This increase has a built in conservation offset of \$5 . This shows that within one year the costs jumps 60 times the rate of new conservation savings.

Does anyone besides Nfld Power, Nfld Hydro and our Consumer Advocate feel this is reasonable and a good plan?

Is this leadership in creating a CULTURE OF CONSERVATION?

I would submit that this plan is shameful, and shows a disregard for the consumer, both residential and commercial: who are the ratepayers.

I would submit that an engineer, with knowledge of energy efficiency and efficiency technology, should not sign off on such a proposal.

I would submit that an advocate of the consumer should never have accepted this plan, and should have questioned and sought or accepted advise as to what is going on.

I would ask , is not the consumer advocate aware of what other jurisdictions are achieving for their consumers?

Let us look at this plan some more:

ENERGY SAVINGS COMPARED TO ENERGY SALES

A good and easy way to see and appreciate the magnitude of the new yearly incremental savings, using gigawatt-hours as the yard stick, is to view the savings as a percentage of the system power sales. These are residential sales of power in Nfld. and the savings are most all residential.

2012 SALES 3472 GWH, INCREMENTAL NEW SAVINGS 8.3 GWH	2/10 OF 1
PERCENT	
2013 SALES 3520 GWH, INCREMENTAL NEW SAVINGS 8.7 GWH,	2/10 OF 1
PERCENT	
2014 SALES 3545 GWH INCREMENTAL NEW SAVINGS 12.1 GWH,	3/10 OF 1
PERCENT	

It should be noted

1. that the savings are so small that it produces no net reduction in overall sales. Instead the sales climb 1 percent or more per year.
2. by 2014 savings include commercial and industrial, so for residential alone the percentage remains at 2/10 of 1 percent, in part from a REDUCTION in house insulation measures.

ENERGY PLAN SPENDING COMPARED TO ENERGY SALE REVENUE

A good and easy understood way to appreciate the progress of the conservation effort is to look at what percent of the revenue is actually fed back to the customer in terms of conservation spending. We get this:

2013	Sales \$602 million	Conservation spending \$3.4 million	6/10 of 1 percent
2014	Sales \$619 million	Conservation spending \$4.2 million	7/10 of 1 percent

COMPARISON WITH OTHER UTILITIES WITH PROGRESSIVE CONSERVATION PLANS

In terms of spending as a percentage of sales revenue, many utilities, such as Vermont, Mass, British Columbia spend in excess of 3 percent of revenues, with some exceeding 4 percent. So many other utilities are spending 5 to 6 times more.

In terms of system energy savings , many utilities are saving 2 percent and some are exceeding this, as compared to our 2/10 of 1 percent. This is a 10 fold or better saving performance than what we are achieving. And our performance is far worse on energy savings than on spending. This suggests much inefficiencies in program planning, selection, promoting, delivery and verification.

IS OUR PROGRAM REASONABLE TO MEET CUSTOMER EXPECTATION?

This can be answered in one word. NO. It is nothing but a dismal failure. Who would want to defend it?

And if a \$5 per year conservation saving is not sufficient insult to the ratepayers, consider this:

What would be the effect if, in the 4 months of winter, a homeowner put 6 mil plastic over just one 4 ft by 4 ft bedroom double pane R2 window, and so make it R4?

In 4 months this saves about \$18.00 on electricity, almost 4 times the Conservation Plan! Plastic for a window as small as 3ft x2 ft would match the Conservation Plan. And the Nfld Power Plan consumes over a million dollars per year in engineering, planning, administration, and advertising!

PRESENTATION- NFLD POWER RATE APPLICATION PART 3

BENIFIT OF THE CONSERVATION AND EFFICIENCY PLAN TO RATEPAYERS

The Nfld electricity source is about 85 percent low cost hydro generation. About 12 percent is oil fired thermal generation. In 2008, when the first multi-year Conservation Plan was planned, the cost of the thermal generation was 9.8 cents per kwh, which reflected oil prices. Program measures that saved sufficient energy to offset the oil cost, could meet the test as an economic measure. Since then, oil costs have risen to the present level of about 18.9 cents. Technology measures that were marginally beneficial then, in many cases, are very beneficial now, as some technologies have had substancial reductions in cost. Our oil consumption now costs in excess of 100 million dollars per year. Yet conservation program spending to offset fuel cost is only at the 4-5 million dollar level.

What is the appropriate level to spend on conservation and efficiency? Expert advise to our last plan had findings on this from the MAEBEC Study. Here is what that study said, on page 136.

A review of U.S. and Canadian jurisdictions concluded that the annual CDM expenditures to about 1.5 percent of annual electricity revenues might be appropriate for a utility in the early stages... in that it takes time to properly introduce programs into the market place.... and that once program delivery experience is gained, a ramping up to a level of about 3 percent of annual electricity sales is appropriate.... and that higher percentages may be warranted if rapid growth in electricity demand is expected, or if there is an increasing gap between demand and supply. And climate change mitigation measures would presumably also fall into a similar category of potential measures.... and that even those states with 3 percent of annual revenues as thier CDM target has found that there are more cost effective CDM opportunities than could be met by the 3 percent funding... and, B.C Hydro, over the past few years, have been at about 3.3 percent of electricity revenues. However, the results of B C Hydro recently completed study (Conservation Potential Review-2007) identified over 20,000GWH of remaining cost-effective CDM opportunities by 2026. The magnnitude of remaining cost-effective CDM opportunities combined with the aggressive targets set out in British Columbia's provincial Energy Plan suggest that B C Hydro future CDM expenditures are likely to increase significantly if the new targets are to be met.....and that, as to the approach to spending levels for conservation and efficiency, ... the key issue is resolving the trade off between wanting to procure all cost -effective measures and concerns about the resulting short term effect on rates.... and that based on findings from an Integrated Resource Plan,...A BENEFIT-COST ASSESSMENT TEND TO ACCEPT WHATEVER RATE EFFECTS ARE NECESSARY TO SECURE THE OVERALL RESOURCE PLAN, INCLUSIVE OF THE COST- EFFECTIVE ENERGY EFFICIENCY MEASURES.

Let me re-state this last sentence:

REGARDLESS OF THE SHORT TERM EFFECT ON RATES, AS LONG AS THE MEASURE IS COST EFFECTIVE, IT IS NECESSARY AND APPROPRIATE TO GO AFTER THESE OPPORTUNITIES

The large scale study in the USA, The McKinley Report, in 2008 can explain this further. They found that energy efficiency measures are 1/3 cheaper than ANY source of new generation. And that it can delay and offset new generation sources, as well as reduce expenses for electrical distribution assets. And a KEY FINDING was that a 8 percent increase in rates, to fund a 50 percent rebate to customers for efficiency improvements, would actually save customers 24 percent on their energy bills, because of reduced energy consumption.

Since that finding , many more jurisdiction have signed on to aggressive efficiency plans.

Applying the McKinley findings to Nfld would result in an average electric heated home having yearly cost reductions of over \$600 per year, instead of \$5 dollars, from this proposed Plan(My analysis shows that saving on yearly power bills in Nfld can be 30 percent, and therefore higher than in the USA)

It is clear that our power companies have failed to take advantage of efficiency opportunities. Funding conservation and efficiency at 5 million per year while consuming over 100 million worth of oil at Holyrood attests to this failure. We have missed several years of opportunities for aggressive measures. The analysis,(attached Appendix) shows that we have cost effective efficiency opportunities to offset 4 times the current production at Holyrood. It can be achieved at modest costs and at long term reduction in costs for ratepayers. It requires targeting the larger scale technologies for space heating, hot water, air infiltration and more efforts in insulation and more efficient windows. Small technology items, envisioned by the Present Plan, will be like CFC lights, almost no impact to reduce energy cost to ratepayers.

[REDACTED]

[REDACTED]

COST-EFFECTIVE LARGE SCALE EFFICIENCY MEASURES

It is logical that to make meaningful gains in energy savings one must assess the opportunities for those products that consume energy on a large scale. Meaningful saving cannot be achieved from thermostats. Nor from small technology items or efficient appliances like refrigerators or CFC lights which shift most of the savings to increase the heating load. The Maebec Report called it an "interactive effect", saying it reduces the saving by 60 percent, and for our climate, in my opinion, it probably reduces it 90 percent.

Our large scale energy uses are these:

For an electric heated house, space heating consumes 69 percent of our energy and hot water 11 percent. And older housing stock has air leakage of 5 air changes per hour compared to new codes having 1.5. Air leakage is a huge cost-effective efficiency opportunity, and is being ignored. It is more significant for Nfld, as we have one of the highest average wind areas in the world.

Consider a 1200 sq ft house with air leakage of 5 airchanges per hour. In winter with 15 F outdoor temperature and in high winds, it takes 14 kw of heat to warm that cold air. A reduction to 3 air changes saves 5.6 kw. New generation capacity will cost about \$15,000.00 per kw. That house leakage will involve a capital investment of \$84,000.00 for new generation. The Maebec Report in 2008 showed that air sealing would cost about \$1,000.00 per house. For peak demand reduction, 100,000 houses with air sealing gives 560 Megawatt reduction. THIS IS BY FAR THE BIGGEST AND ONE OF THE LOWEST COST MEASURES THAT WE ARE IGNORING. AND THE SAVING ON SYSTEM ASSETS ARE IN ADDITION TO CUSTOMER ENERGY SAVINGS AND IMPROVED COMFORT.

WHAT ARE THE OPPORTUNITIES FOR SPACE HEATING SAVINGS?

NFLD HYDRO says they "may" do a study on ductless heat pump units. For now it is in the "concept stage". it is NOT a part of the Present plan filed in these hearings.

Their previous plan excluded such a measure. They could find no cost effective air source units. Their research was rather narrow. These units were designed and developed in Japan in the 1970s. Today almost all residential units in Asia and Europe use them. They are now being used more in the USA(300,000 installed by 2010) and Canada.

WHAT THE RESEARCH AND EVIDENCE SHOWS:

1. Mini-split heat pump units reduces heating for our climate on average 65 percent. They operate down to -15C with some models down to -30C., and can provide the full heating requirement without baseboard supplemental heat.
2. They are very suitable for new or older houses. They require no duct work. One or two indoor wall mounted heating heads per floor gives excellent performance and almost complete replacement for the baseboard heaters.
3. they are a third or less the cost of ground source heatpumps, and very cost effective, especially against Holyrood costs of 18.9 cents per kwh
4. their contribution to system peak demand reduction is huge, and a blessing to assist the power companies with meeting the winter peak load.
5. they have been used in Canada for over 10 years , and in Nfld for over 8 years.
6. there are at least over 500 residential installations. And a number of Nfld Power employees have installed them, even if their research deartment can't find them.
7. the general view is that they save significant energy.
8. a key feature is the invertor technology that allows variable speed which greatly improves energy savings.

HAVE THERE BEEN STUDIES DONE TO PROVE THE EFFECTIVENESS OF THESE?

My research shows the following:

In the Northwest USA, the Bonneville Power Administration launched a small pilot program in 2007 for single family homes, with 14 units installed in the living areas.

Findings:

- 1 The average decrease for 10 sites was 3978 kwh/year. In the third year, for 7 sites the average saving was 5109 kwh/year. Savings generally were over 44 percent.
- 2 performance at part load was "remarkable". Spring and fall conditions allow part load operation
- 3 the system performed better than the manufacturer's ratings
- 4 following the early success, by Sept 2011 , over 11,000 unit were installed

In Connecticut and Mass a pilot was conducted in 2007, at 144 sites. Winters there dip below zero degree F . On average, during the heating season they saved 2,500 kwh/year. They were not aimed to cover all the zones, as some installed only a single head in the main living space. Average savings were 30 percent, but some exceeded 50 percent. Over 85 percent of participants were satisfied. The interest was so high that they had to use a lottery method to select the participants. Based on the result they developed an aggressive ductless heatpump (DHP) policy to target regular electric resistance heat.

FINDINGS:

- 1 that DHPs were a viable, cost -effective solution.
- 2 the results may be conservative, as newer units have even better performance
- 3 peak saving for the heating was 0.307 kw,(not that great as their climate is such that peak load is in the summer).
- 4 overall satisfaction was very high, with 38 out of 40 giving a 4 or 5 on a 1-5 scale
- 5 most perferred them over baseboard heaters
- 6 Comfort and temperature was superior to the baseboard heaters.
- 7 Some seniors needed assistance to use the "GADGET", the controller.
- 8 the realistic savings on heat energy is expected to be 40 percent.
- 9 paybacks can be 2-3 years (due to higher electricity costs than Nfld)
- 10 incentive programs and tax credits makes them attractive options
- 11 benefit to cost ratio ranges from 2.9 to 7.6 (which represents the simple return on investment from the participants perspective
- 12 They can be a cost effective measure and targeting high users maximize savings and cost-effectiveness.
- 13 In 2010 incentives of \$1000 dollars were given for a single head unit, up from \$500 dollars in 2009, and

over 200 contractors involved.

14 for efficient houses, the ductless can serve for whole house heating

NFLD PILOT STUDY

This author commenced a pilot study in 2010 . To date 4 sites and house styles are being monitored

Findings:

A Location, Bishop's Cove A 1000 sq ft, slab on grade house, 25 years old. Upgrades were made to the shell plus a single head unit to serve the whole area. The HP installed cost was about \$3600 plus \$700 for attic installation

1 yearly heat reduction is about 70 percent, as good as a ground source system. This in part due to the enhanced installation method, with the remote unit installed in the attic instead of outdoors. Improved efficiency comes from solar gain .

2 The HP load at cold conditions of -15C is 1.6 kw, when at a COP of 2. This would give a contribution to system peak load reduction of 1.6 KW

B Location, Upper Island Cove , a 5 year old house , 2 story . 2 single heads installed on the main level, with heat rising upstairs. The installed cost about \$4500. Baseboard connected load of 11.5 kw

1 TOTAL HOUSE ENERGY USE REDUCTION (per Nfld Power bills, copy attached as Appendix) shows : 27 percent in Oct; 37 percent in Nov; 37.5 percent in Dec; 40 percent in Jan. These suggest heating reduction exceeding 60 percent for winter months. The Jan saving alone is about \$165.00 in value yearly savings may go to \$800.00 or more

2 The HP load measures at a cold condition of -13C was 2.3 kw, when at a COP about 2. This would give a contribution to system peak load reduction of 2.3 kw.

C Location, Mount Pearl, a 5 year old R-2000 3 level house, with 2 heads in the basement and 2 on the main level, allowing heat to rise upstairs. Installed cost about \$7500. Original baseboard load is 20 kw.

1 heat reduction for this winter is about 30 percent.

2 The HP load at cold conditions of -16C was 3.1 kw. Other baseboard totaled 1.5 kw. For a COP of 2 this gives a contribution to system peak load reduction of 3.1kw.

D Location , Petty Hr. A small 50 year old house about 600 sq ft. 1 head installed, Installed cost about \$2700

1 heat savings, about 30 percent

2 The Hp load at cold conditions was 0.9 kw. At a COP of 2 it gives 0.9 kw reduction to the system peak load

In terms of offset against new generation capital costs of \$15,000.00 per kw, we see

HOUSE	HP COST	PEAK DEMAND SAVING(KW)	OFFSET VALUE
A	\$4500	1.6	\$24,000
B	\$4500	2.3	\$34,000
C	\$7500	3.1	\$46,000
D	\$2700	0.9	\$13,500

NOTE The offst value is high compared to the Electric Benefit Avoide Cost for Connecticut where gas turbine generation is about \$2000 per kw. And where savings and benefit rarios are per enclosed Appendix

B.C. Hydro's ENERGY CONSERVATION PLAN OFFERS NUMEROUS INCENTIVES FOR RESIDENTIAL AND COMMERCIAL CUSTOMERS (see appendix attached). Fortis BC, a sister company of Nfld POWER is a partner.

In particular incentives include

1 air sealing	\$500
2 Energy star HRV plus air seal to 3 ach	\$1000
3 attic insulation	\$ 750
4 wall insulation	\$1500
5 basement insulation	\$1000
6 Crawl space insulation	\$1000
7 Ductless heatpump, 2 heads	\$1000
8 electric HP water heater	\$ 500
9 drain water heat recovery	\$150

These are most all large energy savers. CFC lights and small technology items are not even considered.

And in NOVA SCOTIA, the "Heating Revolution" is promoted, using the ductless heatpumps. There they turned over Conservation and Efficiency to a non profit EFFICIENCY CORPORATION , AND NOW FUNDING IT AT \$47 MILLION PER YEAR

These large scale measures have large peak demand reduction impacts

PEAK DAMAND REDUCTIONS

Our Conservation Plan does little to address the peak demand problem. We have a winter peak that is about 3 times higher than the summer peak. The primary cause is inefficient heating and infiltration in our house. The consumer doesn't understand that problem, but feels it after a winter outage. And the consumer pays dearly for it in oversized electrical assets and fuel consumption at Holyrood. And our power companies solution is to keep adding new, very expensive, generation capacity, instead of assisting the customer to reduce winter demand. The ratepayer pays the shot for poor efficiency and conservation plans. In our recent Energy Plan we undertook to reduce consumption by 20 percent by 2010. But we do little to achieve this.

One can see the significant contribution that air sealing and efficient heating and insulation can make to demand reduction. An aggressive and sustained plan can cut hundreds of megawatts from our winter peak load, And the benefit to consumers over the decades would be in the billions of dollars.

In Ontario they pay for residential retrofits \$800 per kw load reduction. In Quebec, \$7000 for residential ground source heat pumps.

CONCLUSION: The Conservation Plan as proposed is inappropriate in funding , and in measures selected, and has no meaningful beneficial impact for the ratepayer. It does little to reduce system peak loads, the high cost of which is put on the ratepayer. The utilities, both Nfld Power and Nfld Hydro should be replaced by others with this mandate. In addition, rates than give discounts for more power use should be changed as it discourages conservation. And 400 amp residential services also discourages efficient heating systems, adding to utility asset costs.

[REDACTED]

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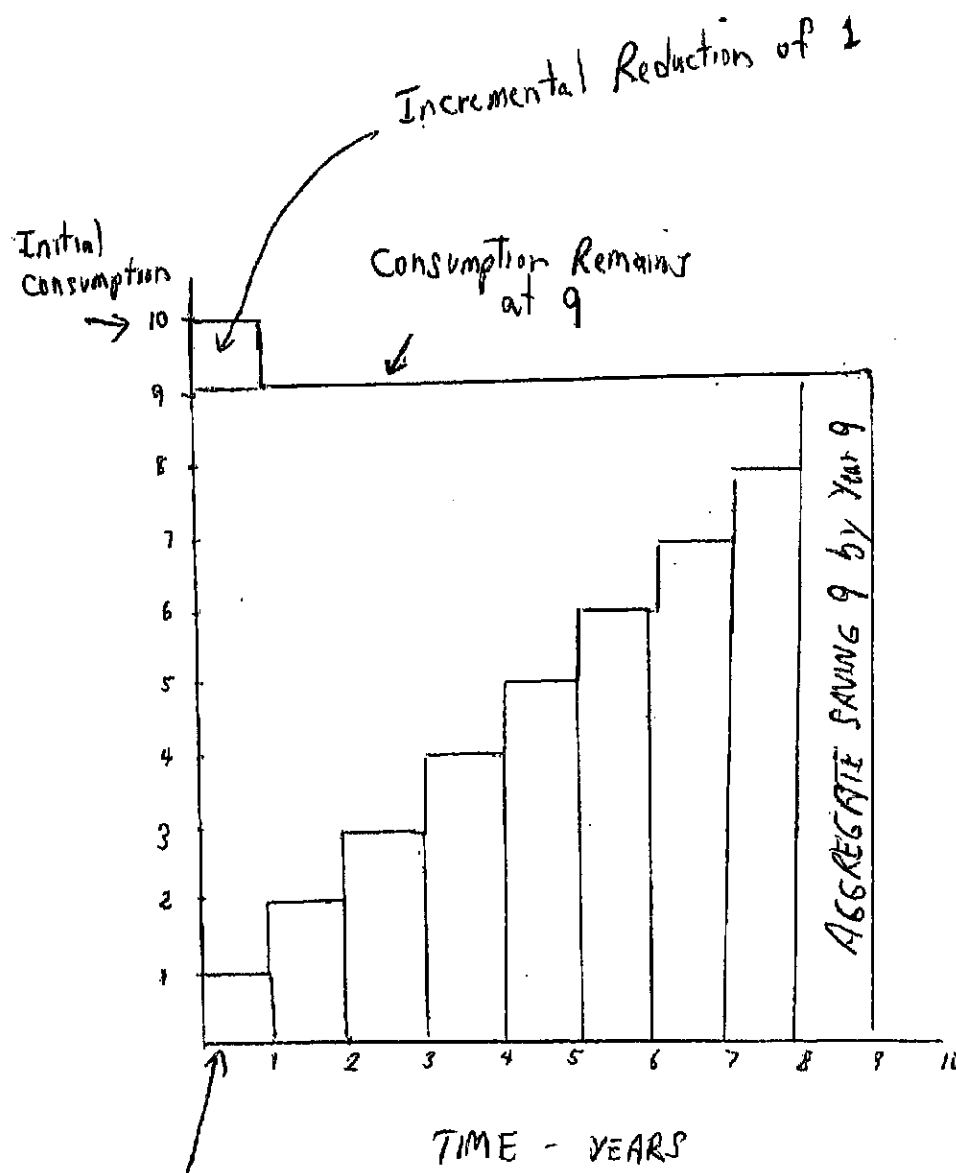
[REDACTED]

[REDACTED]

Appendix K shows approved ductless heatpumps. In nfld, Daikan, Fujitsu, Sanyo and Panasonic are available and being used.

Presentation by: Winston Adams, B. Eng. (electrical) Graduate of MUN and Nova Scotia Tech College in 1971 . Design engineer with Nfld Hydro from 1971-1975 in high votage substation design, relaying and protection, commmissioning. And 35 years with HVAC manufacturers, primarily heating systems for hospitals, schools and commercial buildings. Interests in efficiency applications for residential, including pilot program monitoring ductless heatpumps under Nfld climate conditions. Early education at Upper Island Cove, now resides at Logy Bay.

Appendix A



EFFICIENCY

MEASURE, UNIT, Year 1

SAMPLE
AGGREGATE SAVING

NEWFOUNDLAND POWER
A FORTIS COMPANY

PO Box 8910, St. John's, NL, A1B 3P6
Power Outages & Emergencies: 1-800-474-5711
Customer Relations: 737-2802 or 1-800-663-2802 Fax: 737-2903
Email: customerrelations@newfoundlandpower.com
Call us online at newfoundlandpower.com

Service Address:

Rate: Domestic Service

Your meter was read on: October 18

Next meter reading on or about: November 16

Account Number

Billing Date

October 18, 2012

Previous Balance 111.56
Payments to September 29 - Thank you 111.56CR
Previous balance owing \$0.00

This Month's Electric Charges

Basic Customer Charge 15.88
Energy Charge: 821 kWh @ 11.171 cents/kWh 91.71
Discount 1.5% 1.61CR
Subtotal Electric Charges 105.78
Harmonized Sales Tax: 13% (R103864831) 13.75
Residential Energy Rebate: 8% 8.46CR
Total charges \$111.07

Receive your bill electronically every month with eBills. Join eBills today at www.newfoundlandpower.com

Meter Reading Information

Meter number:

Date	Reading
Oct 18	26759
Sep 18	25909
30 Days	821 kWh

Area Light Charges

1 - 100 W B55 Reg arm @ \$10.48 / area light 16.48
Harmonized Sales Tax: 13% (R103864831) 2.14
Total area light charges \$18.62

Your Past Energy Usage

Total Amount Due on or before November 1, 2012

\$129.69

To avoid interest, please pay by November 16, 2012. Interest is charged on overdue balances of \$50.00 or more. The annual rate of interest is the sum of Scotiabank's prime rate in effect at the end of the previous month plus five percent.

Electrical Usage	This Month	Same Month Last Year
Total kWh	821	1179
Billing Days	30	32
Average kWh/Day	27	37

Newfoundland Power thanks everyone impacted by Tropical Storm Leslie for your patience. Our employees worked around the clock to restore power as safely and quickly as possible.

Oct DOWN 25%

Please keep this portion for your records.

Please return this portion with your payment.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Newfoundland Power Inc.
PO Box 8910, St. John's, NL, A1B 3P6
newfoundlandpower.com

Account Number

Amount Due

\$129.69

Discount Date

November 1, 2012

Amount Due After Discount Date

\$131.30

The Power of Life Project Donation

Enter Amount Paid

129.69

POWER
A FORTIS COMPANY

Box 8910, St. John's, NL, A1B 3P6
Power Outages & Emergencies: 1-800-474-5711
Customer Relations: 737-2802 or 1-800-863-2802 Fax: 737-2903
Email at customerrelations@newfoundlandpower.com
Visit us online at newfoundlandpower.com

Service Address: [REDACTED]

Rate: Domestic Service

Your meter was read on: November 16

Next meter reading on or about: December 14

Account Number

Billing Date

November 16, 2012

Previous Balance

129.69

Payments to October 20: Thank you

129.89CR

Previous balance owing

\$0.00

Receive your bill electronically every month with eBills. Join eBills today at www.newfoundlandpower.com.

This Month's Electric Charges

Basic Customer Charge

15.68

Energy Charge: 1032 kWh @ 11.171 cents/kWh

115.28

Discount: 1.5%

1.96CR

Subtotal Electric Charges

129.00

Harmonized Sales Tax: 13% (R103864831)

16.77

Residential Energy Rebate: 8%

10.32CR

Total charges

\$135.45

Meter Reading Information

Meter number: [REDACTED]

Date

Reading

Nov 16

27791

Oct 16

26759

29 Days

1032 kWh

Total Amount Due on or before November 30, 2012

\$135.45

To avoid interest, please pay by December 14, 2012. Interest is charged on overdue balances of \$50.00 or more. The annual rate of interest is the sum of Scotiabank's prime rate in effect at the end of the previous month plus five percent.

Your Past Energy Usage

Electrical Usage	This Month	Same Month Last Year
Total kWh	1032	1694
Billing Days	29	30
Average kWh/Day	36	56

35.6

56.5

↓
37%

NOV DOWN
37%

Please keep this portion for your records.

Please return this portion with your payment.

NEWFOUNDLAND
POWER
A FORTIS COMPANY

Newfoundland Power Inc.
PO Box 8910, St. John's, NL A1B 3P6
newfoundlandpower.com

Account Number

Amount Due

\$135.45

Discount Date

November 30, 2012

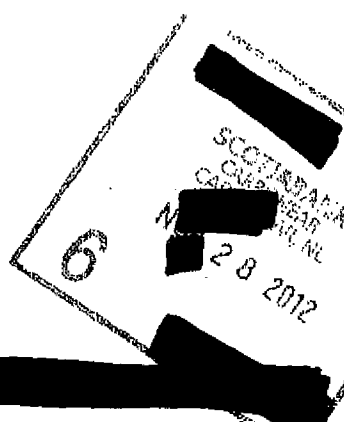
Amount Due After Discount Date

\$137.41

The Power of Life Project Donation

Enter Amount Paid

135.45



POWER

A FORTIS COMPANY

Box 8910, St. John's, NL, A1B 3P6
 Power Outages & Emergencies: 1-800-474-5711
 Customer Relations: 737-2802 or 1-800-863-2802 Fax: 737-2903
 Email at customerrelations@newfoundlandpower.com
 Visit us online at newfoundlandpower.com

Service Address: [REDACTED]
 Rate: Domestic Service
 Your meter was read on: December 17
 Next meter reading on or about: January 16

Account Number

Billing Date

December 17, 2012

Previous Balance

Payments to November 26 - Thank you

Previous balance owing

135.45

135.45CR

\$0.00

Receive your bill electronically every month with eBills. Join eBills today at www.newfoundlandpower.com.

This Month's Electric Charges

Basic Customer Charge

15.68

Energy Charge: 1762 kWh @ 11.171 cents/kWh

196.83

Discount: 1.5%

3.19CR

Subtotal Electric Charges

209.32

Harmonized Sales Tax: 13% (103864831 RT0001)

27.21

Residential Energy Rebate: 8%

16.75CR

Total charges

\$219.78

Meter Reading Information

Meter number: [REDACTED]

Date

Reading

Dec 17

29553

Nov 16

27791

31 Days

1762 kWh

Total Amount Due on or before January 4, 2013

\$219.78

To avoid interest, please pay by January 17, 2013. Interest is charged on overdue balances of \$50.00 or more. The annual rate of interest is the sum of Scotiabank's prime rate in effect at the end of the previous month plus five percent.

Your Past Energy Usage

Electrical Usage	This Month	Same Month Last Year
Total kWh	1762	2548
Billing Days	31	28
Average kWh/Day	57	91

50.2

31

DOWN
 Dec 37 1/2 %

Please keep this portion for your records.

Please return this portion with your payment.

NEWFOUNDLAND
POWER
 A FORTIS COMPANY

Newfoundland Power Inc.
 PO Box 8910, St. John's, NL A1B 3P6
newfoundlandpower.com

Account Number

Amount Due

\$219.78

Discount Date

January 4, 2013

Amount Due After Discount Date

\$222.97

The Power of Life Project Donation

JAN 04 2013

Enter Amount Paid

POWER
A FORTIS COMPANY

PO Box 8910, St. John's, NL, A1B 3P6
Power Outages & Emergencies: 1-800-474-5711
Customer Relations: 737-2802 or 1-800-663-2802 Fax: 737-2903
Email at customerrelations@newfoundlandpower.com
Visit us online at newfoundlandpower.com

Service Address [REDACTED]
Rate: Domestic Service
Your meter was read on: January 18
Next meter reading on or about: February 15

Appendix B

Account Num

Billing D.

January 18, 2013

Previous Balance
Payments to January 4 - Thank you
Previous balance owing

219.78
219.78CR
\$0.00

Receive your bill electronically every month with ebills. Join ebills today at www.newfoundlandpower.com.

This Month's Electric Charges

Basic Customer Charge
Energy Charge: 2089 kWh @ 11.171 cents/kWh
Discount: 1.6%
Subtotal electric charges
Harmonized Sales Tax: 13% (10986 4831 RT0001)
Residential Energy Rebate: 8%
Total charges

15.68
233.36
3.74CR
245.30
31.89
19.62CR

\$257.57

Meter Reading Information

Meter number: [REDACTED]

Date Reading
Jan 18 81642
Dec 17 29583
32 Days 2089 kWh

Your Past Energy Usage

Total Amount Due on or before February 1, 2013

\$257.57

To avoid interest, please pay by February 19, 2013. Interest is charged on overdue balances of \$50.00 or more. The annual rate of interest is the sum of Scotiabank's prime rate in effect at the end of the previous month plus five percent.

Electrical Usage	This Month	Same Month Last Year
Total kWh	2089	3706
Billing Days	32	34
Average kWh/Day	65	109

65.3 109.0

↓ 40%

Jan DOWN 40%

Please keep this portion for your records.

Please return this portion with your payment.

NEWFOUNDLAND
POWER
A FORTIS COMPANY

Newfoundland Power Inc.
PO Box 8910, St. John's, NL A1B 3P6
newfoundlandpower.com

Account Number

Amount Due

Discount Date

Amount Due After Discount Date

The Power of Life Project Donation

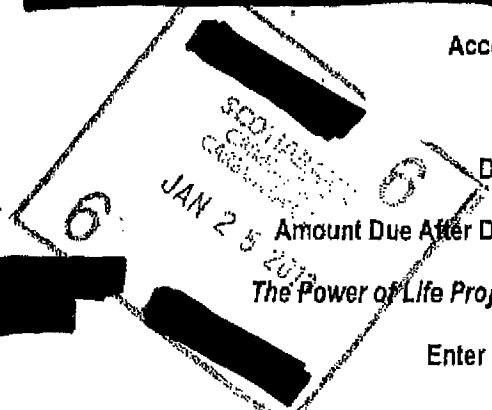
Enter Amount Paid

\$257.57

February 1, 2013

\$261.31

257.57



Appendix C

Table 5: Savings and Benefit-Cost Ratios

		Low	Average	High
Pre DHP Heating Consumption	A	3,000	10,000	20,000
DHP Annual Heating Savings (kWh)	B	1,200	4,000	8,000
Pre DHP Cooling Consumption	C	60	120	300
DHP Cooling Savings (kWh)	D	40	80	200
Total Dollar Annual Savings (note 1)	$E = 0.18 \times (B + D)$	\$223	\$734	\$1,476
Heat Pump Size (Btu/hr) (note 2)		12,000	24,000	36,000
Gross Installed Cost (note 3)	F	\$3,000	\$4,500	\$6,000
CEEF Incentive	G	\$1,000	\$1,000	\$1,000
Federal Tax Credit (30% capped at \$1,500)	$H = 0.30 \times (F - G)$	\$600	\$1,050	\$1,500
Final Customer Cost (note 4)	$I = F - G - H$	\$1,400	\$2,450	\$3,500
Simple Payback (Years)		6.3	3.3	2.4
Electric Benefit (note 5)	J	\$1,848	\$6,040	\$12,170
Utility Benefit-Cost Ratio	$J \div G$	1.85	6.04	12.17
Total Resource Benefit-Cost Ratio	$J \div F$	0.62	1.34	2.03
Customer Benefit-Cost Ratio (note 6)	$18 \times E / I$	2.9	5.4	7.6

Notes:

- 1) Based on assumed average Connecticut rate of 18 cents per kWh.
- 2) Estimated heat pump based on size of heating load.
- 3) Costs based on review of CL&P rebate data. Assumes single zone system for Low and Average case, and a two system for the high case.
- 4) Final cost reflects 30% U.S. federal tax credit and current CEEF incentive of \$1,000.
- 5) Calculated using current CL&P avoided costs as filed in the CL&P and UI 2010 Conservation & Load Management Plan.
- 6) Calculated based on an 18 year estimated measure life. This number represents total lifetime savings divided by customer cost. Savings is not discounted.

Next Steps

Prior to the pilot, the CEEF offered a \$500 rebate for residential participants who installed ENERGY STAR central air conditioners or heat pumps (including DHPs). Both CL&P and UI agreed that a higher incentive would help jump start Connecticut's residential DHP market. Therefore, in August 2009, a request was filed with the Connecticut Department of Utility Control (DPUC) to increase the incentive available to participants through the CEEF programs to \$1,000 for participants with electric resistance heat and for DHPs that have a Heating Season Performance Factor (HSPF) of 10 or greater.

The request generated a series of data requests from the DPUC regarding DHPs¹⁷ requesting clarification on the DHP pilot's evaluation results, potential for DHP savings in Connecticut, and information surrounding the proposed \$1,000 incentive for high-efficiency

¹⁷ Connecticut Department of Public Utility Control, Docket No. 08-10-03 RE01.

B.C Hydro

APPENDIX D

ELIGIBLE IMPROVEMENTS – Not all requirements are detailed in this document. Refer to "Important Notes" on the back of this brochure and consult the "LiveSmart BC Notes for Contractors".

Interior /
NorthernSouth
Coastal**LIVE SMART CHAMPION**

Undertake a Champion Level upgrade in at least five upgrade categories. Champion Level upgrades are identified by a ★. Upgrade categories are divided by green or blue bands. Please see the "LiveSmart Notes for Contractors" for more details.

\$500

\$400

Achieve CHBA Built Green Renovation Standard Platinum. Visit www.builtgreencanada.ca for information.

\$500

\$400

AIR SEALING AND MECHANICAL VENTILATION

Perform Air Sealing of the Home to Achieve

Base Target + 25%

\$500

\$400

Base Target + 15%

\$300

\$250

Base Target + 5%

\$125

\$100

Install or replace mechanical ventilation

Install an HVI certified ENERGY STAR Heat Recovery Ventilator and a house air tightness of 3ach@50Pa in Interior/Northern or 4.5 ach@50Pa in South Coastal ★

\$1000

\$800

Note: In order to qualify bathroom fans must be ducted to the exterior of the house.

Install an ENERGY STAR Bathroom Fan where there was not previously a bathroom fan

\$100

\$100

Replace an existing bathroom fan with an ENERGY STAR bathroom fan

\$50

\$50

ATTIC INSULATION – 100% coverage required upon completion. Incentive pro-rated based on coverage before upgrade

Increase Attic Insulation

Existing insulation R12 or less. Upgrades to achieve a minimum of R50 ★

\$750

\$600

Existing insulation R13-R25. Upgrades to achieve a minimum of R50

\$375

\$300

Existing insulation R26-R35. Upgrades to achieve a minimum of R50

\$125

\$100

Increase Cathedral or Flat Roof Insulation

No existing insulation. Upgrade to achieve a minimum of R14 ★

\$750

\$600

Existing insulation R1 – R12. Upgrade to achieve a minimum of R28 ★

\$750

\$600

Existing insulation R13 – R35. Upgrade to achieve a minimum of R50

\$250

\$200

EXTERIOR WALL INSULATION

Exterior Wall Insulation

Add at least R9 for 100% of building to achieve a minimum of R12 ★

\$1500

\$1200

Add at least R9 for 80% of building to achieve a minimum of R12 ★

\$1200

\$1000

Add at least R9 for 60% of building to achieve a minimum of R12

\$900

\$700

Add at least R3.8 for 100% of building to achieve a minimum of R12 ★

\$1000

\$750

Add at least R3.8 for 80% of building to achieve a minimum of R12

\$800

\$600

Add at least R3.8 for 60% of building to achieve a minimum of R12

\$600

\$450

BASEMENT INSULATION AND OTHER INSULATION

Basement Insulation

Add at least R23 for 100% of surface area ★

\$1250

\$1000

Add at least R23 for 80% of surface area ★

\$1000

\$800

Add at least R23 for 60% of surface area

\$750

\$600

Add at least R10 for 100% of surface area ★

\$625

\$500

Add at least R10 for 80% of surface area

\$500

\$400

Add at least R10 for 60% of surface area

\$375

\$300

Other Insulation – 100% coverage required upon completion. Incentive pro-rated based on coverage before upgrade

Basement Header

Add at least R20

\$125

\$100

Crawl Space Wall (can qualify for only this rebate or Floor Above Crawl Space Rebate)

Add at least R23 ★

\$1000

\$800

Add at least R10

\$500

\$400

Floor Above Crawl Space

Add at least R24 ★

\$550

\$450

Exposed Floor

Add at least R20 (150 sq ft minimum)

\$225

\$175

WINDOWS, DOORS AND SKYLIGHTS – Heated space only

ENERGY STAR Windows, Doors and Skylights Replacement

Rated one ENERGY STAR zone better ★ (must upgrade a minimum of 75% of windows to achieve Champion Level)

\$70

\$60

Rated for your ENERGY STAR zone

\$35

\$30

LiveSmart qualified storm windows. Only available for formally recognized heritage homes. For qualification requirements and a list of eligible, formally-recognized heritage homes, speak to your energy advisor.

\$25

\$20

BC HYDRO

APPENDIX D

ELIGIBLE IMPROVEMENTS – Not all requirements are detailed in this document. Refer to "Important Notes" on the back of this brochure and consult the "LiveSmart BC Notes for Contractors".

Interior /
NorthernSouth
Coastal

PRIMARY SPACE HEATING – Maximum of one incentive for Primary Space Heating

Please note: Heating systems may be advertised with an AFUE "up to" a certain percentage. Please ensure that the installed efficiency of your heating system meets the requirements below.

Contractor with TECA or HRAI accreditation or ASCT Mechanical Technologist credential	Furnace, Heat Pump, Boiler or Heat Recovery Ventilator system design and installation signed off by a TECA Quality First, HRAI Skilltech or ASCT Mechanical Technologist accredited professional. See "Important Notes" on the back for details.	\$100	\$100
Gas Furnace or Boiler Replacement	ENERGY STAR gas furnace 95% AFUE or better with DC variable speed motor ★	\$600	\$500
	ENERGY STAR condensing gas boiler 90% AFUE or better ★	\$600	\$500
	Zero-clearance gas furnace that has a 90% AFUE or higher. Only available for mobile homes.	\$300	\$250
Air Source Heat Pump Note: All components of each ENERGY STAR qualified Air Source Heat Pump system must have a qualifying AHRI number. This includes new or existing furnaces, indoor and outdoor air handlers, and heat pumps. If you are planning on installing an Air Source Heat Pump insist that your contractor consult the "LiveSmart BC Notes for Contractors" before purchasing or installing any equipment.	ENERGY STAR central system verified with an AHRI number, with either a new DC variable speed air handler or a new ENERGY STAR furnace with DC variable speed motor ★	\$1500	\$1500
	Ductless mini-split: one head in main occupied area plus one additional head on a different floor, ENERGY STAR or LiveSmart qualified inverter-based system ★		
	ENERGY STAR central system added to an existing furnace or added to an existing indoor air handling unit ★	\$1000	\$1000
	Ductless mini-split: single head in main occupied area, ENERGY STAR or LiveSmart qualified inverter-based system ★		
	ENERGY STAR single package system ★		
Ground or Water Source Heat Pump Note: Canadian Geo Exchange Coalition certificate must be available at the time of the follow-up assessment	CAN/CSA C448 compliant, new ground source heat pump installation that is certified by the Canadian GeoExchange Coalition ★	\$2500	\$2500
	CAN/CSA C448 compliant, ground source heat pump replacement that is certified by the Canadian GeoExchange Coalition ★	\$1000	\$1000
	CAN/CSA C448 compliant, new shared ground source heat pump serving two or more homes that is certified by the Canadian Geo Exchange Coalition	One incentive per shared loop \$1500	\$1500
		One for each distribution system in the shared loop ★ \$1000	\$1000

OTHER SPACE HEATING

Wood Stove or Gas Fireplace Replacement to Pellet Stove	Replace existing supplementary heating system with a pellet burning appliance that meets or exceeds the Washington State particulate emission standards for solid fuel burning domestic appliance. For a list of qualifying appliances, speak to your advisor.	\$500	\$500
Electronic Thermostats	Replace a minimum of five thermostats for electric baseboards with electronic thermostats	\$50	\$50

WATER HEATING – Maximum of one incentive for Gas or Electric Water Heater

Gas Water Heater Replacement	ENERGY STAR condensing type with an Energy Factor of 0.90 ★	\$300	\$300
	ENERGY STAR with an Energy Factor of 0.82	\$200	\$200
	Condensing gas storage type that has a Thermal Efficiency of 94%	\$300	\$300
	Condensing gas storage-type with Thermal Efficiency of 90%	\$200	\$200
Electric Heat Pump Water Heater Installation	Electric heat pump water heater with an Energy Factor of 2.0 or greater. Must be installed in an unconditioned space or have the supply and exhaust air ducted to the outdoors	ENERGY STAR Integrated system ★ \$500	\$500
		Add-on system \$250	\$250
Solar Water Heater Installation	CSAF 378 compliant. Installed by company with one installer trained to CSAF383.08. See Important Notes for Contractors for lists of eligible systems and contractors ★	\$500	\$500
Drain Water Heat Recovery Installation	With efficiency greater than 42%	\$150	\$150

DISTRIBUTED POWER GENERATION – A maximum of \$1300 for any combination of new equipment

Through net metering, generate power via	Photovoltaic	Wind	Micro-hydro	Fuel Cell		
	per 1 kw	per 0.6 kw	per 0.4 kw	per 0.25 kw	\$260	\$260

interaction. A ratio of 0.6 has been incorporated into the model to account for this uncertainty.

5.5.3 Sensitivity Analysis – Alternative Avoided Costs

A sensitivity analysis was conducted using preliminary avoided cost values that assume development of the Lower Churchill/DC link. The sensitivity analysis reviewed the scope of measures that would pass or fail the economic screen under the changed avoided costs. Based on the preliminary avoided cost values assessed, the analysis concluded that any impacts would be modest.

5.6 CDM MEASURE SUPPLY CURVES

A supply curve was constructed for each of the two service regions based on the economic potential savings associated with the above measures. The following approach was followed:

- Measures are introduced in sequence to see incremental impact and cost
- Sequence is determined by principle of 1) reduce load 2) meeting residual load with most efficient technology
- Is organized by CCE levels.

Exhibits 5.5 and 5.6 show the supply curves for, respectively, the Island and Isolated and the Labrador Interconnected service regions. Exhibits 5.7 and 5.8 show the measures included in each of the supply curves.

Exhibits 5.5 and 5.6 both show measures with CCEs above the thresholds for the two regions. This is because the economic screening process did not consider either interaction between measures or interaction between end uses. All measures were included in the analysis if their CCE values were below the threshold, excluding interactive effects. In the economic potential analysis itself, however, these interactive effects are included in full. Measures that apply to the same end use are applied in sequence, as described above, substantially reducing the savings available to those applied later. Furthermore, measures that reduce the internal heat loads produced by lighting, electronics and appliances tend to increase the need for space heating. This space heating penalty is applied against the savings from those measures. For consistency with previous exhibits, the supply curve shows all the measures that were included in the economic potential analysis, including those that now exceed the economic threshold.

Exhibit 5.7: Summary of Residential Sector Energy-efficiency Measures, Island and Isolated Service Region 2026¹¹⁷

Measure	Average CCE (\$/kWh)	Annual Savings (GWh/year)
Energy Star Computer	\$0.00	55
DHW Pipe Wrap	\$0.00	7
Low-Flow Showerheads and Faucets	\$0.01	6
Standard T8 Lighting - Common Areas	\$0.01	0.1
25% Lower Energy Apartment Building	\$0.01	-1
Programmable Thermostats	\$0.01	40
CFLs - Standard	\$0.01	97
Standby Losses	\$0.03	92
Crawl-space Insulation	\$0.03	10
40% Lower Energy Apartment Building	\$0.03	4
Timer	\$0.03	1
Energy Star Windows , Advanced Glazing	\$0.04	29
Super High Performance Windows	\$0.04	28
New House Designed to an EGNH 80 Rating	\$0.05	32
Building recommissioning	\$0.05	6
Motion Sensor	\$0.05	1
Air Source Heat Pump	\$0.06	11
Ground Source Heat Pump	\$0.07	0.4
Attic Insulation, Roof Insulation	\$0.07	21
Wall Insulation	\$0.07	1
High Efficiency HRV	\$0.08	16
Foundation Insulation	\$0.08	225
Energy Star Fridge	\$0.08	8
Redesign with high performance T8s	\$0.09	1
Energy Star TV	\$0.09	13
Air Leakage Sealing	\$0.10	19
Energy Star Top Loading Clothes Washer	\$0.10	102
LED Holiday Lights	\$0.10	9
CFLs Specialised	\$0.11	10
Energy Efficient Freezer	\$0.14	4

¹¹⁷ The above exhibit includes measures with a CCE that exceeds the study's avoided cost threshold. The increased CCE is due to the impact of interactive effects. The measures are shown to maintain consistency with previous exhibits. The inclusion of interaction between measures has a particularly large effect on space heating savings. More efficient lighting and appliances contribute less waste heat to the home and therefore the space heating requirement is greater. In the 25% Lower Energy Apartment Building, for example, the savings in space heating energy are actually overwhelmed by the increased load because the lights and appliances are more efficient. This is less of an issue in Labrador, where fewer appliance measures pass the economic screen.

Exhibit 6.12: Summary of Annual Electricity Savings for the Island and Isolated Service Region by End Use and Dwelling Type, Upper Achievable Potential (GWh/yr.)

Dwelling Type	Milestone Year	Residential															
		Total	Space Heating	Ventilation	DHW	Cooking	Refrigerator	Freezer	Dishwasher	Clothes Washer	Clothes Dryer	Lighting	Computer and peripherals	Television	Television Peripherals	Other Electronics	Small Appliances & Other
Detached	2011	47.1	1.9	0.0	9.0		0.0	0.0		0.0	0.0	34.4	1.0	0.0	0.7	0.0	
	2016	121.6	15.0	0.1	14.9		0.6	0.3		0.3	2.4	70.2	8.0	1.3	8.2	0.2	
	2021	233.0	45.9	0.1	24.7		2.2	1.2		0.9	7.8	107.0	16.0	4.8	21.8	0.5	
	2026	362.0	116.0	0.2	38.6		4.4	2.6		2.1	17.5	144.6	26.3	9.7	0.0	0.0	
Attached	2011	5.6	0.0	0.0	1.1		0.0	0.0		0.0	0.0	4.2	0.1	0.0	0.1	0.0	
	2016	15.5	1.6	0.0	1.8		0.1	0.0		0.0	0.2	8.6	1.2	0.2	1.7	0.0	
	2021	29.6	4.6	0.0	3.0		0.4	0.0		0.1	0.8	13.3	2.4	0.6	4.3	0.1	
	2026	41.6	10.4	0.0	4.8		0.8	0.0		0.2	1.8	18.2	4.0	1.3	0.0	0.0	
Apartment	2011	3.5	0.3	0.1	0.7		0.0	0.0		0.0	0.0	2.2	0.1	0.0	0.1	0.0	
	2016	9.5	0.6	0.2	1.6		0.1	0.0		0.0	0.1	4.6	0.8	0.1	1.3	0.0	
	2021	18.0	1.2	0.4	3.2		0.3	0.0		0.0	0.3	7.1	1.6	0.4	3.4	0.0	
	2026	25.1	4.5	0.7	5.2		0.7	0.0		0.1	0.8	9.6	2.7	0.9	0.0	0.0	
Isolated	2011	1.0	0.0	0.0	0.2		0.0	0.0		0.0	0.0	0.8	0.0	0.0	0.0	0.0	
	2016	2.2	0.0	0.0	0.3		0.0	0.0		0.0	0.0	1.5	0.1	0.0	0.1	0.0	
	2021	3.7	0.1	0.0	0.5		0.0	0.0		0.0	0.2	2.3	0.2	0.1	0.3	0.0	
	2026	5.0	0.2	0.0	0.8		0.1	0.1		0.0	0.3	3.1	0.3	0.1	0.0	0.0	
Other	2011	0.4	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	0.6	0.0	0.0	0.0	0.0	
	2016	1.0	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	1.1	0.0	0.0	0.0	0.0	
	2021	1.6	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	1.7	0.0	0.0	0.0	0.0	
	2026	2.1	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	2.2	0.0	0.0	0.0	0.0	
Vacant and Partial	2011	0.6	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	0.8	0.0	0.0	0.0	0.0	
	2016	1.4	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	1.5	0.0	0.0	0.0	0.0	
	2021	2.1	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	2.2	0.0	0.0	0.0	0.0	
	2026	2.8	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	2.9	0.0	0.0	0.0	0.0	
TOTAL	2011	58.2	2.0	0.1	10.9		0.0	0.0		0.0	0.0	42.8	1.2	0.1	1.0	0.0	
	2016	151.1	17.0	0.3	18.6		0.8	0.4		0.3	2.8	87.6	10.0	1.6	11.3	0.3	
	2021	287.9	51.6	0.6	31.4		2.9	1.3		1.1	9.1	133.5	20.1	5.9	29.7	0.7	
	2026	438.7	130.9	0.9	49.5		5.9	2.7		2.5	20.5	180.7	33.2	12.1	0.0	0.0	

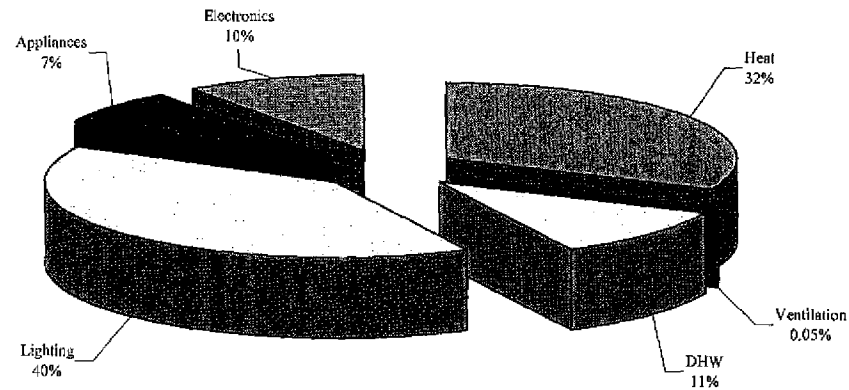
Notes: 1) Results are measured at the customer's point-of-use and do not include line losses. 2) Any differences in totals are due to rounding. 3) A value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value. 4) Negative values in the space heating end use are a result of the reduction in internal heat gains due to lighting and appliance measures being greater than any savings from space heating measures. 5) Savings for television peripherals and other electronics are from standby loss reduction measures. Workshop participants believed that by 2026 advances in the appliances themselves would eliminate the savings available from add-on devices such as timed power bars. Savings in the last milestone period therefore drop to zero.

Exhibit 6.13: Summary of Annual Electricity Savings for the Island and Isolated Service Region by End Use and Dwelling Type, Lower Achievable Potential (GWh/yr.)

Dwelling Type	Milestone Year	Residential															
		Total	Space Heating	Ventilation	DHW	Cooking	Refrigerator	Freezer	Dishwasher	Clothes Washer	Clothes Dryer	Lighting	Computer and peripherals	Television	Television Peripherals	Other Electronics	Small Appliances & Other
Detached	2011	12.2	0.5	0.0	2.2		0.0	0.0		0.0	0.0	8.4	0.3	0.0	0.7	0.0	
	2016	54.8	3.3	0.0	6.0		0.1	0.1		0.1	0.5	33.1	2.5	0.7	8.2	0.2	
	2021	128.2	11.1	0.1	11.0		0.4	0.2		0.2	1.4	74.5	5.3	1.8	21.8	0.5	
	2026	190.8	30.8	0.1	15.3		0.8	0.5		0.4	3.3	132.9	5.0	1.8	0.0	0.0	
Attached	2011	1.5	0.0	0.0	0.3		0.0	0.0		0.0	0.0	1.0	0.0	0.0	0.1	0.0	
	2016	7.2	0.1	0.0	0.7		0.0	0.0		0.0	0.0	4.0	0.4	0.1	1.7	0.0	
	2021	16.6	0.4	0.0	1.3		0.1	0.0		0.0	0.1	9.2	0.8	0.2	4.3	0.1	
	2026	22.3	2.1	0.0	1.9		0.2	0.0		0.0	0.3	16.7	0.8	0.2	0.0	0.0	
Apartment	2011	1.3	0.2	0.0	0.3		0.0	0.0		0.0	0.0	0.6	0.0	0.0	0.1	0.0	
	2016	5.2	0.4	0.1	0.8		0.0	0.0		0.0	0.0	2.3	0.2	0.1	1.3	0.0	
	2021	11.6	0.7	0.2	1.5		0.1	0.0		0.0	0.1	5.0	0.5	0.2	3.4	0.0	
	2026	14.6	2.1	0.3	2.6		0.1	0.0		0.0	0.1	8.7	0.5	0.2	0.0	0.0	
Isolated	2011	0.2	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	
	2016	1.0	0.0	0.0	0.1		0.0	0.0		0.0	0.0	0.7	0.0	0.0	0.1	0.0	
	2021	2.3	0.0	0.0	0.2		0.0	0.0		0.0	0.0	1.6	0.1	0.0	0.3	0.0	
	2026	3.4	0.0	0.0	0.3		0.0	0.0		0.0	0.1	2.9	0.0	0.0	0.0	0.0	
Other	2011	0.1	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.0	
	2016	0.4	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	0.5	0.0	0.0	0.0	0.0	
	2021	1.1	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	1.2	0.0	0.0	0.0	0.0	
	2026	1.9	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	2.0	0.0	0.0	0.0	0.0	
Vacant and Partial	2011	0.1	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	
	2016	0.6	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	0.7	0.0	0.0	0.0	0.0	
	2021	1.4	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	1.5	0.0	0.0	0.0	0.0	
	2026	2.6	-0.1	0.0	0.0		0.0	0.0		0.0	0.0	2.7	0.0	0.0	0.0	0.0	
TOTAL	2011	15.5	0.7	0.0	2.8		0.0	0.0		0.0	0.0	10.6	0.3	0.1	1.0	0.0	
	2016	69.2	3.7	0.1	7.6		0.2	0.1		0.1	0.6	41.4	3.1	0.8	11.3	0.3	
	2021	161.3	12.0	0.3	14.1		0.5	0.2		0.2	1.7	93.0	6.6	2.3	29.7	0.7	
	2026	235.7	34.8	0.4	20.1		1.1	0.5		0.5	3.8	166.0	6.3	2.2	0.0	0.0	

Notes: 1) Results are measured at the customer's point-of-use and do not include line losses. 2) Any differences in totals are due to rounding. 3) A value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value. 4) Negative values in the space heating end use are a result of the reduction in internal heat gains due to lighting and appliance measures being greater than any savings from space heating measures. 5) Savings for television peripherals and other electronics are from standby loss reduction measures. Workshop participants believed that by 2026 advances in the appliances themselves would eliminate the savings available from add-on devices such as timed power bars. Savings in the last milestone period therefore drop to zero.

**Exhibit 6.16: Savings by Major End Use,
Upper Achievable – Island and Isolated Service Region 2026 (%)**



Totals for Exhibits 6.16 and 6.17 may not add to 100% due to rounding.

**Exhibit 6.17: Savings by Major End Use,
Lower Achievable – Island and Isolated Service Region 2026 (%)**

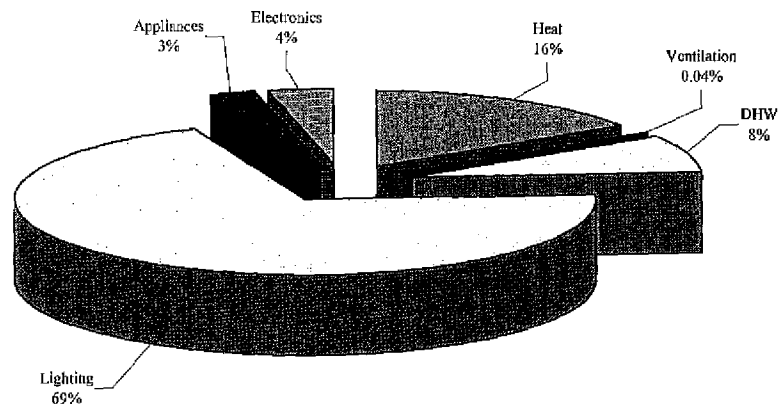


Exhibit 6.22: Peak load Reductions (MW) Relative to Reference Case by Milestone Year, Service Region and Achievable Scenario

Service Region	Milestone Year	Peak Demand Reduction MW	
		Upper Achievable	Lower Achievable
Island and Isolated	2011	10.8	2.9
	2016	29.1	13.3
	2021	57.8	32.4
	2026	91.1	48.9
Labrador Interconnected	2011	0.6	0.2
	2016	1.8	0.8
	2021	3.8	1.9
	2026	6.5	3.3
TOTAL	2011	11.4	3.1
	2016	30.9	14.1
	2021	61.6	34.3
	2026	97.6	52.2

Bonneville Power Administration Ductless Heat Pump Program

Qualified Products List: Ductless & Mini-Split Heat Pumps

Updated 1/1/2013

AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
4703234	COMFORT AIRE	AVMH09SC1	BVMH09SC1	13.05	18.30	9900	8.60	
3057537	COMFORT AIRE	AVMH12SB	BVMH12SB	10.70	18.60	15500	9.50	Discontinued - Eligible until further notice
4703235	COMFORT AIRE	AVMH12SC1	BVMH12SC1	12.15	19.30	13300	8.90	
5080493	COMFORT AIRE	AVMH18DC1	BVMH09FC1(2)	10.00	16.00	19000	8.00	
4702124	COMFORT AIRE	AVMH18DC1	BVMH09FC1(2)	10.15	16.00	18100	8.00	Discontinued - Eligible until further notice
3057538	COMFORT AIRE	AVMH18SB	BVMH18SB	10.75	16.20	20600	8.20	Discontinued - Eligible until further notice
4703236	COMFORT AIRE	AVMH18SC1	BVMH18SC1	12.00	17.50	17400	9.55	
3057539	COMFORT AIRE	AVMH24SB	BVMH24SB	9.60	16.20	27600	8.20	Discontinued - Eligible until further notice
4703237	COMFORT AIRE	AVMH24SC1	BVMH24SC1	10.20	17.10	23600	8.40	
4702123	COMFORT AIRE	AVMH27TC1	BVMH09FC1(3)	9.80	16.00	24600	8.00	Discontinued - Eligible until further notice
4702125	COMFORT AIRE	AVMH27TC1	BVMH09FC1(3)	9.80	16.00	24600	8.00	Discontinued - Eligible until further notice
5080494	COMFORT AIRE	AVMH27TC1	BVMH09FC1, BVMH12FC1	9.50	16.00	25400	8.00	
3057543	COMFORT AIRE	AVMH30SB	BVMH30SB	9.00	13.50	23600	7.80	Discontinued - Eligible until further notice
4919381	COMFORT AIRE	AVMH30SC1	BVMH30SC1	10.00	16.00	30000	9.60	
4702126	COMFORT AIRE	AVMH36QC1	BVMH09FC1(4)	10.60	15.00	36200	8.00	Discontinued - Eligible until further notice
5080495	COMFORT AIRE	AVMH36QC1	BVMH09FC1, BVMH12FC1	9.00	14.50	38000	8.00	
4906213	COMFORT AIRE	AVMH36QC1	BVMH12FC1(3)	10.60	15.00	36200	8.00	Discontinued - Eligible until further notice
5009994	COMFORT AIRE	AVMH36QC1	BVMH12FC1+ BVMH09FC1(2)	8.30	12.90	36000	7.80	
5009996	COMFORT AIRE	AVMH36QC1	BVMH18FC1(2)	8.50	13.40	36200	8.00	Discontinued - Eligible until further notice
4919382	COMFORT AIRE	AVMH36SC1	BVMH36SC1	9.50	14.50	36000	9.00	
None	DAIKIN	2MXS18DVJU	CTXS09DVJU					Discontinued - Eligible until further notice
3059249	DAIKIN	2MXS18GVJU	CTXS07HVJU, CTXS07JVJU, CTXS07LVJU, CTXS09GVJU, CTXS09HVJU, CTXS09LVJU, CTXS12GVJU, CTXS12HVJU, CTXS12LVJU, CTXS18HVJU, FTXS09DVJU, FTXS15DVJU, FTXS15HVJU, FTXS15LVJU, FTXS18DVJU, FTXS18HVJU, FTXS18LVJU	12.60	19.50	22000	9.20	

Bonneville Power Administration Ductless Heat Pump Program

Qualified Products List: Ductless & Mini-Split Heat Pumps

Updated 1/1/2013

AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
3697115	DAIKIN	3MXS24JVJU	CTXS07HVJU, CTXS07JVJU, CTXS07LVJU, CTXS09GVJU, CTXS09HVJU, CTXS09LVJU, CTXS12GVJU, CTXS12HVJU, CTXS12LVJU, CTXS18HVJU, FTXS09DVJU, FTXS15DVJU, FTXS15HVJU, FTXS15LVJU, FTXS18DVJU, FTXS18HVJU, FTXS18LVJU	12.50	16.60	30000	9.00	
3059253	DAIKIN	4MXS32GVJU	CTXS07HVJU, CTXS07JVJU, CTXS07LVJU, CTXS09GVJU, CTXS09HVJU, CTXS09LVJU, CTXS12GVJU, CTXS12HVJU, CTXS12LVJU, CTXS18HVJU, FTXS09DVJU, FTXS15DVJU, FTXS15HVJU, FTXS18DVJU, FTXS18HVJU, FTXS18LVJU	10.30	17.20	32000	9.30	
3208530	DAIKIN	4MXS32GVJU	CTXS09HVJU(3), FTXS18HVJU	10.00	17.60	33600	9.30	
None	DAIKIN	RX09FVJU	FTXS09DVJU					Discontinued - Eligible until further notice
None	DAIKIN	RX12FVJU	FTXS12DVJU					Discontinued - Eligible until further notice
3208518	DAIKIN	RX15FVJU	FTXS15HVJU, FTXS15DVJU	11.00	13.00	18000	7.70	Discontinued - Eligible until further notice
3208519	DAIKIN	RX18FVJU	FTXS18DVJU, FTXS18HVJU	10.30	13.00	21600	7.70	Discontinued - Eligible until further notice

Bonneville Power Administration Ductless Heat Pump Program

Qualified Products List: Ductless & Mini-Split Heat Pumps

Updated 1/1/2013

AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
3208520	DAIKIN	RX24FVJU	FTXS24HVJU, FTXS24DVJU	8.50	13.00	24000	7.70	Discontinued - Eligible until further notice
3208521	DAIKIN	RXG09HVJU	FTXG09HVJU	15.80	26.10	12000	11.00	
3208522	DAIKIN	RXG12HVJU	FTXG12HVJU	14.00	24.20	16000	10.55	
3208523	DAIKIN	RXG15HVJU	FTXG15HVJU	12.90	21.00	18000	10.00	
3696642	DAIKIN	RXN09JEVJU	FTXN09JEVJU	10.70	13.00	10000	8.00	
4615169	DAIKIN	RXN09KEVJU	FTXN09KEVJU	12.00	18.00	10000	8.50	
3696643	DAIKIN	RXN12JEVJU	FTXN12JEVJU	10.60	13.00	12000	8.00	
4615187	DAIKIN	RXN12KEVJU	FTXN12KEVJU	9.90	14.00	13500	8.50	
4626615	DAIKIN	RXN15KEVJU	FTXN15KEVJU	12.00	14.50	18000	8.50	
4615196	DAIKIN	RXN18KEVJU	FTXN18KEVJU	12.00	14.50	21600	8.50	
4615197	DAIKIN	RXN24KEVJU	FTXN24KEVJU	8.60	14.00	24000	8.50	
3208515	DAIKIN	RXS09DAVJU	FDXS09DVJU	10.90	13.00	10000	7.70	
3208512	DAIKIN	RXS09DAVJU	FTXS09HVJU	11.00	16.00	10000	8.80	
None	DAIKIN	RXS09DVJU	FTXS09DVJU					Discontinued - Eligible until further notice
3696299	DAIKIN	RXS09JEVJU	FTXS09JEVJU	12.50	18.00	10000	10.00	
5265753	DAIKIN	RXS09LVJU	FTXS09LVJU	15.30	24.50	12000	12.50	
3208514	DAIKIN	RXS12DAVJU	FDXS12DVJU	8.85	13.00	11500	7.70	
3208510	DAIKIN	RXS12DAVJU	FTXS12HVJU	9.30	16.00	11500	8.80	
None	DAIKIN	RXS12DVJU	FTXS12DVJU, FTXS12HVJU					Discontinued - Eligible until further notice
3696303	DAIKIN	RXS12JEVJU	FTXS12JEVJU	12.50	18.00	12000	10.00	
5265755	DAIKIN	RXS12LVJU	FTXS12LVJU	12.80	23.00	14400	12.50	
3208511	DAIKIN	RXS15DVJU	FTXS15HVJU, FTXS15DVJU	12.20	17.00	18000	10.10	
5265756	DAIKIN	RXS15LVJU	FTXS15LVJU	12.80	23.00	15000	11.60	
3208509	DAIKIN	RXS18DVJU	FTXS18HVJU, FTXS18DVJU	11.30	16.30	21600	9.10	
5265757	DAIKIN	RXS18LVJU	FTXS18LVJU	12.70	20.30	18000	11.00	
3208513	DAIKIN	RXS24DVJU	FTXS24DVJU, FTXS24HVJU	9.30	15.00	24000	9.20	
5265758	DAIKIN	RXS24LVJU	FTXS24LVJU	12.50	20.00	21400	10.60	
3208524	DAIKIN	RXS30HVJU	FTXS30HVJU	10.70	17.00	34800	8.30	
5265772	DAIKIN	RXS30LVJU	FTXS30LVJU	10.70	19.30	34800	8.30	
3208525	DAIKIN	RXS36HVJU	FTXS36HVJU	8.35	16.20	38000	8.30	
5265774	DAIKIN	RXS36LVJU	FTXS36LVJU	8.35	17.90	38000	8.30	
4627362	DAIKIN	RZQ18PVJU9	FAQ18PVJU	12.70	18.60	20000	8.70	
5039481	DAIKIN	RZQ18PVJU9	FCQ18PAVJU	13.00	18.60	20000	10.30	
4627364	DAIKIN	RZQ18PVJU9	FCQ18PVJU	12.20	13.00	20000	7.70	Discontinued - Eligible until further notice
4627365	DAIKIN	RZQ18PVJU9	FHQ18PVJU	14.00	18.00	20000	11.10	
4627363	DAIKIN	RZQ24PVJU9	FAQ24PVJU	10.20	17.60	27000	9.10	
5039482	DAIKIN	RZQ24PVJU9	FCQ24PAVJU	12.00	18.50	27000	10.20	

Bonneville Power Administration Ductless Heat Pump Program

Qualified Products List: Ductless & Mini-Split Heat Pumps

Updated 1/1/2013

AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
4615282	DAIKIN	RZQ24PVJU9	FCQ24PVJU	11.10	13.00	27000	7.70	Discontinued - Eligible until further notice
4627366	DAIKIN	RZQ24PVJU9	FHQ24PVJU	12.60	18.00	27000	10.00	
5039483	DAIKIN	RZQ30PVJU	FCQ30PAVJU	9.30	15.50	34000	10.20	
3475992	DAIKIN	RZQ30PVJU	FCQ30PVJU	9.60	13.00	34000	7.70	Discontinued - Eligible until further notice
3475995	DAIKIN	RZQ30PVJU	FHQ30PVJU	10.50	17.20	34000	8.40	
4651142	DAIKIN	RZQ36PVJU9	FCQ36MVJU	9.60	13.00	39500	7.70	Discontinued - Eligible until further notice
5039484	DAIKIN	RZQ36PVJU9	FCQ36PAVJU	11.40	17.90	40000	9.00	
4626610	DAIKIN	RZQ36PVJU9	FHQ36MVJU	10.20	14.00	37400	8.10	
4626607	DAIKIN	RZQ42PVJU9	FCQ42MVJU	8.10	13.00	41500	7.70	Discontinued - Eligible until further notice
5039485	DAIKIN	RZQ42PVJU9	FCQ42PAVJU	10.30	17.00	47000	8.60	
4626609	DAIKIN	RZQ42PVJU9	FHQ42MVJU	9.50	13.80	39500	8.10	
4362403	FRIEDRICH	MR09Y3H	MW09Y3H	12.50	21.00	10000	10.50	
4362404	FRIEDRICH	MR12Y3H	MW12Y3H	12.50	21.00	14000	10.50	
3799477	FRIEDRICH	MR18Y3H	MW18Y3H	13.00	19.20	21600	10.00	
3653906	FRIEDRICH	MR24DY3F	MW09Y3FM, MW12Y3FM	10.40	16.50	28000	9.00	
1169239	FRIEDRICH	MR24UY3F	MC24Y3F	10.55	15.00	24200	8.50	
1169247	FRIEDRICH	MR24UY3F	MS24Y3F	9.85	15.00	24000	8.50	
3799478	FRIEDRICH	MR24Y3H	MW24Y3H	12.50	18.00	27600	10.00	
3653905	FRIEDRICH	MR36TQY3F	MW09Y3FM, MW12Y3FM, MW18Y3FM	8.80	15.00	36400	9.00	
1169249	FRIEDRICH	MR36Y3F	MS36Y3F	8.05	14.00	36400	8.50	
4185166	FUJITSU	AOU12RLFW	ASU12RLF	12.50	22.00	16000	11.00	
3302799	FUJITSU	AOU12RLS	ASU12RLS	14.45	25.00	16000	12.00	
5063326	FUJITSU	AOU12RLS2	ASU12RLS2	13.80	25.00	16000	12.00	
4185167	FUJITSU	AOU15RLS	ASU15RLS	12.50	21.00	18000	11.00	
5069748	FUJITSU	AOU15RLS2	ASU15RLS2	12.00	21.50	18000	12.00	
883706	FUJITSU	AOU18RLX	ABU18RULX	10.90	16.00	21400	8.50	
883703	FUJITSU	AOU18RLX	AUU18RCLX	11.05	16.00	21000	8.50	
4359504	FUJITSU	AOU18RLXFW	ASU18RLF	13.30	19.20	21600	10.00	
4651512	FUJITSU	AOU18RLXFZ	ASU09RLF, ASU12RLF	12.50	18.00	22000	9.00	
4397408	FUJITSU	AOU18RLXFZ	ASU07RLF, ASU09RLF, ASU12RLF	12.50	18.00	22000	9.30	
4651511	FUJITSU	AOU18RLXFZ	ASU07RLF, ASU12RLF	12.50	18.00	22000	9.00	
3799054	FUJITSU	AOU18RLXS	ASU18RLXS	13.00	19.20	21600	10.00	
883715	FUJITSU	AOU24RLX	ABU24RULX	9.85	15.00	24000	8.50	
883705	FUJITSU	AOU24RLX	AUU24RCLX	10.55	15.00	24200	8.50	
4359511	FUJITSU	AOU24RLXFW	ASU24RLF	12.50	18.00	27600	10.00	

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
4397405	FUJITSU	AOU24RLXFZ	ASU12RLF, ASU18RLF, ASU7RLF, ASU9RLF, AUU12RLF, AUU18RLF, AUU9RLF	12.50	18.00	24000	9.50	
3799055	FUJITSU	AOU24RLXS	ASU24RLXS	12.50	18.00	27600	10.00	
3018316	FUJITSU	AOU24RML1	ASU9RMLQ, ASU12RMLQ	10.40	16.50	28000	9.00	Discontinued - Eligible until further notice
3018313	FUJITSU	AOU24RML1	AUU9RML, AUU12RML	10.40	16.50	24000	9.00	Discontinued - Eligible until further notice
3799056	FUJITSU	AOU30RLX	ASU30RLX	10.00	17.50	32000	9.50	
883717	FUJITSU	AOU36RLX	ABU36RSLX	8.05	14.00	36400	8.50	
883709	FUJITSU	AOU36RLX	AUU36RCLX	8.05	14.00	36000	8.50	
4397402	FUJITSU	AOU36RLXFZ	ASU09RLF, ASU12RLF, ASU18RLF, ASU7RLF, AUU12RLF, AUU18RLF, AUU9RLF	8.80	16.00	36400	9.40	
3018317	FUJITSU	AOU36RML1	ASU9RMLQ, ASU12RMLQ, ASU18RMLQ	8.80	15.00	36400	9.00	Discontinued - Eligible until further notice
3018315	FUJITSU	AOU36RML1	AUU12RML, AUU18RML, AUU9RML	8.80	15.00	36000	9.00	Discontinued - Eligible until further notice
883704	FUJITSU	AOU42RLX	AUU42RCLX	9.15	15.00	45000	8.50	
4007304	FUJITSU	AOU48RLXFZ	ASU07RLF, ASU09RLF, ASU12RLF, ASU18RLF, ASU24RLF	9.25	17.00	54000	9.80	
4185165	FUJITSU	AOU9RLFW	ASU9RLF	13.80	23.00	12000	11.00	
3302798	FUJITSU	AOU9RLS	ASU9RLS	17.30	26.00	12000	12.00	
5063325	FUJITSU	AOU9RLS2	ASU9RLS2	16.10	27.20	12000	12.50	
4865914	GOODMAN	MSH092E19MC	MSH092E19AX	14.00	19.00	10000	9.60	
4865915	GOODMAN	MSH122E19MC	MSH122E19AX	12.50	19.00	13000	9.60	
4865916	GOODMAN	MSH123E19MC	MSH123E19AX	12.50	18.80	13000	9.30	
4865917	GOODMAN	MSH183E19MC	MSH183E19AX	12.50	19.20	19200	9.60	
4865918	GOODMAN	MSH243E19MC	MSH243E19AX	12.50	18.00	25400	9.60	

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
4733651	LENNOX MS7 SERIES	MS7HO09L1*	MS7HI09L1*	14.20	22.00	9500	9.80	
4733653	LENNOX MS7 SERIES	MS7HO09P1*	MS7HI09P1*	14.20	22.00	9500	9.80	
4733652	LENNOX MS7 SERIES	MS7HO12L1*	MS7HI12L1*	12.50	20.00	12100	9.60	
4733654	LENNOX MS7 SERIES	MS7HO12P1*	MS7HI12P1*	12.50	20.00	12100	9.60	
4733655	LENNOX MS7 SERIES	MS7HO18P1*	MS7HI18P1*	12.00	18.00	25000	10.20	
4733656	LENNOX MS7 SERIES	MS7HO24P1*	MS7HI24P1*	12.00	18.00	26000	10.20	
4733657	LENNOX MS7 SERIES	MS7HO30P1*	MS7HI30P1*	10.05	16.00	28400	8.20	
5454432	LENNOX MS8Z SERIES	MS8ZO18P2	MS8HI09P1, MS8HI12P1	10.20	16.00	19000	8.20	
5454433	LENNOX MS8Z SERIES	MS8ZO24P3	MS8HI09P1, MS8HI12P1, MS8HI18P1	8.20	16.00	29000	8.20	
5454434	LENNOX MS8Z SERIES	MS8ZO30P4	MS8HI09P1, MS8HI12P1, MS8HI18P1	7.30	16.00	30400	8.20	
4412707	LG	LAU090HSV(2)	LAN090HSV(2)	13.30	20.00	10800	11.00	Discontinued - Eligible until further notice
None	LG	LAU095HV	LAN095HV					Discontinued - Eligible until further notice
3716588	LG	LAU096HV	LAN096HV	12.60	19.00	11700	9.20	Discontinued - Eligible until further notice
4412714	LG	LAU120HSV(2)	LAN120HSV(2)	12.50	20.00	13300	11.00	Discontinued - Eligible until further notice
3000785	LG	LAU125HV	LAN125HV	10.70	18.60	15200	9.50	Discontinued - Eligible until further notice
3716589	LG	LAU126HV	LAN126HV	10.20	18.00	15100	8.90	Discontinued - Eligible until further notice
4412715	LG	LAU180HSV(2)	LAN180HSV(2)	12.60	20.50	22000	9.70	Discontinued - Eligible until further notice
3001458	LG	LAU185HV	LAN185HV	10.80	16.20	20200	8.20	Discontinued - Eligible until further notice
3716590	LG	LAU186HV	LAN186HV	9.70	15.00	20400	7.70	Discontinued - Eligible until further notice
4412716	LG	LAU240HSV(2)	LAN240HSV(2)	10.80	20.00	27600	10.00	Discontinued - Eligible until further notice
3001459	LG	LAU245HV	LAN245HV	9.80	16.20	27200	8.20	Discontinued - Eligible until further notice
3716591	LG	LAU246HV	LAN246HV	9.30	15.60	27000	8.00	Discontinued - Eligible until further notice
None	LG	LMU185HV	LMAN095HV(T), LMAN125HV(T), LMCN125HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T)	12.50	15.00	17600	8.70	Discontinued - Eligible until further notice

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
3677991	LG	LMU186HV	LMAN095HV(T), LMAN125HV(T), LMCN125HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T)	12.50	16.00	17000	8.50	Discontinued - Eligible until further notice
4385633	LG	LMU187HV	LMAN095HV(T), LMAN125HV(T), LMCN125HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T)	14.00	21.00	17000	9.20	
None	LG	LMU245HV	LMAN095HV(T), LMAN125HV(T), LMAN185HV(T), LMCN125HV, LMCN185HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T), LMN185HV(T), LMN186HV(T)	12.50	19.10	24000	10.30	Discontinued - Eligible until further notice
3707112	LG	LMU246HV	LMAN095HV(T), LMAN125HV(T), LMAN185HV(T), LMCN125HV, LMCN185HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T), LMN185HV(T), LMN186HV(T)	12.50	16.00	27000	10.30	Discontinued - Eligible until further notice

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
4397401	LG	LMU247HV	LMAN095HV(T), LMAN125HV(T), LMAN185HV(T), LMCN125HV, LMCN185HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T), LMN185HV(T), LMN186HV(T)	13.40	21.70	26400	9.40	
None	LG	LMU365HV	LMAN095HV(T), LMAN125HV(T), LMAN185HV(T), LMCN125HV, LMCN185HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T), LMN185HV(T), LMN186HV(T)	9.60	18.50	37000	9.10	Discontinued - Eligible until further notice
3707113	LG	LMU366HV	LMAN095HV(T), LMAN125HV(T), LMAN185HV(T), LMCN125HV, LMCN185HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T), LMN185HV(T), LMN186HV(T)	8.60	18.00	35400	9.10	Discontinued - Eligible until further notice

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
4018195	LG	LMU369HV	LMAN095HV(T), LMAN125HV(T), LMAN185HV(T), LMCN125HV, LMCN185HV, LMN095HV(T), LMN096HV(T), LMN125HV(T), LMN126HV(T), LMN185HV(T), LMN186HV(T)	12.50	17.50	41000	10.50	
5265353	LG	LSU090HYV	LSN090HYV	16.40	28.00	11000	12.00	
3716608	LG	LSU091HSV	LSN091HSV	13.30	20.00	10800	11.00	
5356474	LG	LSU091HSV2	LSN091HSV2	13.30	20.00	10900	11.00	
5261828	LG	LSU120HYV	LSN120HYV	14.10	26.00	13600	11.50	
3716609	LG	LSU121HSV	LSN121HSV	12.50	20.00	13300	11.30	
5356475	LG	LSU121HSV2	LSN121HSV2	12.50	20.00	13300	11.00	
3819287	LG	LSU161HSV	LSN161HSV	12.50	19.00	20200	9.70	
3716610	LG	LSU181HSV	LSN181HSV	12.60	18.20	22000	9.70	
5356476	LG	LSU181HSV2	LSN181HSV2	12.60	20.50	22000	9.70	
3952309	LG	LSU240HSV	LSN240HSV	12.50	18.90	27600	10.20	
5360103	LG	LSU240HSV2	LSN240HSV2	10.80	20.00	27600	10.00	
3856057	LG	LSU246HV	LSN246HV	9.20	14.70	26000	7.70	
1400993	LG	LSU305HV	LSN305HV	9.00	13.50	29000	7.80	Discontinued - Eligible until further notice
4397438	LG	LSU307HV	LSN307HV	10.00	18.00	32000	9.50	
4042222	LG	LSU360HV	LSN360HV	8.20	16.10	35200	9.90	
3456263	LG	LUU245HV	LFN245HV	9.60	13.00	26000	7.70	Discontinued - Eligible until further notice
3716985	LG	LUU246HV	LCN246HV	9.20	14.00	25000	7.70	
3716986	LG	LUU246HV	LFN246HV	9.20	13.00	25000	7.70	Discontinued - Eligible until further notice
3456264	LG	LUU425HV	LCN425HV	9.90	14.00	44000	7.70	Discontinued - Eligible until further notice
3456265	LG	LUU425HV	LFN425HV	9.00	13.00	44000	7.70	Discontinued - Eligible until further notice
3853391	LG	LUU426HV	LCN426HV	8.80	14.00	41000	7.70	Discontinued - Eligible until further notice
3853390	LG	LUU426HV	LFN426HV	8.80	13.00	41000	7.70	Discontinued - Eligible until further notice
3160637	DAIKIN	MUZA09NA	MSZA09NA	13.00	17.00	10000	8.20	Discontinued - Eligible until further notice
3160638	DAIKIN	MUZA12NA	MSZA12NA	10.30	17.00	13600	8.20	Discontinued - Eligible until further notice
3168239	DAIKIN	MUZA15NA	MSZA15NA	8.90	16.00	18000	8.20	Discontinued - Eligible until further notice
3160640	DAIKIN	MUZA17NA	MSZA17NA	7.80	16.00	20000	8.20	Discontinued - Eligible until further notice
3160641	DAIKIN	MUZA24NA	MSZA24NA	7.60	16.00	23200	8.20	Discontinued - Eligible until further notice
3059257	DAIKIN	MUZD30NA	MSZD30NA	8.00	14.50	32600	8.20	
3059258	DAIKIN	MUZD36NA	MSZD36NA	7.60	14.50	35200	8.20	
3059255	DAIKIN	MUZFD09NA	MSZFD09NA	13.80	23.00	10900	10.00	Discontinued - Eligible until further notice

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
3604581	mitsubishi	MUZFD09NA	MSZFE09NA	13.80	23.00	10900	10.00	Discontinued - Eligible until further notice
3059256	mitsubishi	MUZFD12NA	MSZFD12NA	12.50	22.00	13600	10.55	Discontinued - Eligible until further notice
3604081	mitsubishi	MUZFD12NA	MSZFE12NA	12.50	22.00	13600	10.55	Discontinued - Eligible until further notice
3577497	mitsubishi	MUZFE09NA	MSZFE09NA	15.50	26.00	10900	10.00	
4908219	mitsubishi	MUZFE09NA1	MSZFE09NA	15.50	26.00	10900	10.00	
3577498	mitsubishi	MUZFE12NA	MSZFE12NA	12.90	23.00	13600	10.50	
4934170	mitsubishi	MUZFE12NA1	MSZFE12NA	12.90	23.00	13600	10.50	
4217888	mitsubishi	MUZFE18NA	MSZFE18NA	14.20	20.20	21600	10.30	
3818123	mitsubishi	MUZGA24NA	MSZGA24NA	8.80	17.50	23200	9.50	Discontinued - Eligible until further notice
3577499	mitsubishi	MUZGE09NA	MSZGE09NA	13.60	21.00	10900	10.00	
3576362	mitsubishi	MUZGE12NA	MSZGE12NA	12.50	20.25	14400	10.00	
3576035	mitsubishi	MUZGE15NA	MSZGE15NA	13.00	21.00	18000	10.00	Discontinued - Eligible until further notice
4934349	mitsubishi	MUZGE15NA1	MSZGE15NA	13.00	21.00	18000	10.00	
3575946	mitsubishi	MUZGE18NA	MSZGE18NA	10.50	19.20	21600	10.00	Discontinued - Eligible until further notice
4939870	mitsubishi	MUZGE18NA1	MSZGE18NA	10.50	19.20	21600	10.00	
4217872	mitsubishi	MUZGE24NA	MSZGE24NA	12.50	19.00	27600	10.00	
None	mitsubishi	MXZ2A20NA	MSZA09NA, MSZA12NA, MSZA15NA, MSZA17NA, MSZFD09NA, MSZFD12NA, MSZFE09NA, MSZFE12NA		16.00	20000	8.50	Discontinued - Eligible until further notice
3577580	mitsubishi	MXZ2B20NA	MFZKA09NA, MFZKA12NA, MSZFD09NA, MSZFD12NA, MSZFE09NA, MSZFE12NA, MSZGE06NA, MSZGE09NA, MSZGE12NA, MSZGE15NA, SLZKA09NA, SLZKA12NA, SLZKA15NA	12.00	18.00	22000	8.90	
3589025	mitsubishi	MXZ2B20NA	MSZGE09NA(2)	12.50	18.00	22000	8.90	

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
None	mitsubishi	MXZ3A30NA	MSZA09NA, MSZA12NA, MSZA15NA, MSZA17NA, MSZA24NA, MSZFD09NA, MSZFD12NA		16.00	30000	10.00	Discontinued - Eligible until further notice
3885922	mitsubishi	MXZ3B24NA	MFZKA09NA, MFZKA12NA, MFZKA18NA, MSZFE09NA, MSZFE12NA, MSZFE18NA, MSZGE06NA, MSZGE09NA, MSZGE12NA, MSZGE15NA, MSZGE18NA, SLZKA09NA, SLZKA12NA, SLZKA15NA	12.00	17.50	25000	9.30	
3949963	mitsubishi	MXZ3B24NA	MSZGE06NA(2)+ MSZGE09NA	12.50	17.50	25000	9.30	
3896180	mitsubishi	MXZ3B24NA	MSZGE06NA(2)+ MSZGE12NA	12.50	17.50	25000	9.30	

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
3837727	MITSUBISHI	MXZ3B30NA	MFZKA09NA, MFZKA12NA, MFZKA18NA, MSZFE09NA, MSZFE12NA, MSZFE18NA, MSZGA24NA, MSZGE06NA, MSZGE09NA, MSZGE12NA, MSZGE15NA, MSZGE18NA, MSZGE24NA, SLZKA09NA, SLZKA12NA, SLZKA15NA	9.10	17.50	28600	10.50	
None	MITSUBISHI	MXZ4A36NA	MSZA09NA, MSZA12NA, MSZA15NA, MSZA17NA, MSZA24NA, MSZFD09NA, MSZFD12NA		16.00	36000	8.50	Discontinued - Eligible until further notice
3885942	MITSUBISHI	MXZ4B36NA	MFZKA09NA, MFZKA12NA, MFZKA18NA, MSZFE09NA, MSZFE12NA, MSZFE18NA, MSZGA24NA, MSZGE06NA, MSZGE09NA, MSZGE12NA, MSZGE15NA, MSZGE18NA, MSZGE24NA, SLZKA09NA, SLZKA12NA, SLZKA15NA	9.40	18.00	36000	9.30	

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
3895358	mitsubishi	MXZ8B48NA	MFZKA09NA, MFZKA12NA, MFZKA18NA, MSZFE09NA, MSZFE12NA, MSZFE18NA, MSZGA24NA, MSZGE06NA, MSZGE09NA, MSZGE12NA, MSZGE15NA, MSZGE18NA, MSZGE24NA, SLZKA09NA, SLZKA12NA, SLZKA15NA	8.30	15.00	54000	8.70	
3017686	mitsubishi	PUMYP36NHMU	PKFYP06NBMUE, PKFYP08NBMUE, PLFYP12NCMUE, PKFYP18NHMUE	11.20	14.30	40000	8.20	
3017689	mitsubishi	PUMYP48NHMU	PKFYP12NHMUE, PKFYP15NHMUE, PKFYP18NHMUE	9.00	15.50	52000	8.70	
3345310	mitsubishi	PUZA18NHA3(BS)	PKAA18HA(L)	8.00	15.30	19000	9.50	Discontinued - Eligible until further notice
3345311	mitsubishi	PUZA18NHA3(BS)	PLAA18BA	9.30	14.20	19000	9.80	Discontinued - Eligible until further notice
4385495	mitsubishi	PUZA18NHA4(BS)	PKAA18HA(L)	8.00	15.30	19000	9.50	
4385496	mitsubishi	PUZA18NHA4(BS)	PLAA18BA	9.30	14.20	19000	9.80	
3160821	mitsubishi	PUZA24NHA2(BS)	PLAA24BA	9.60	13.60	26000	8.50	Discontinued - Eligible until further notice
3345313	mitsubishi	PUZA24NHA3	PCAA24KA, PKAA24KAL	10.30	16.80	26000	10.90	Discontinued - Eligible until further notice
3345312	mitsubishi	PUZA24NHA3(BS)	PKAA24KA(L)	10.60	17.00	26000	10.80	Discontinued - Eligible until further notice
3345314	mitsubishi	PUZA24NHA3(BS)	PLAA24BA	9.60	13.60	26000	8.50	Discontinued - Eligible until further notice
4385500	mitsubishi	PUZA24NHA4	PCAA24KA	10.30	16.80	26000	10.90	
4385499	mitsubishi	PUZA24NHA4(BS)	PKAA24KA(L)	10.60	17.00	26000	10.80	
4385498	mitsubishi	PUZA24NHA4(BS)	PLAA24BA	9.60	13.60	26000	8.50	
3160826	mitsubishi	PUZA30NHA2(BS)	PCAA30GA	7.30	13.00	32000	8.50	Discontinued - Eligible until further notice
3160824	mitsubishi	PUZA30NHA2(BS)	PLAA30BA	7.30	13.60	32000	8.70	Discontinued - Eligible until further notice
3345316	mitsubishi	PUZA30NHA3(BS)	PCAA30KA	8.00	14.50	32000	9.20	Discontinued - Eligible until further notice

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AHRI #	Manufacturer	Outdoor Model Number	Indoor Coil Model Number	EER	SEER	Rated Heating Capacity	HSPF	NOTES
3345315	MITSUBISHI	PUZA30NHA3(BS)	PKAA30KA(L)	7.30	15.50	32000	8.90	Discontinued - Eligible until further notice
3345317	MITSUBISHI	PUZA30NHA3(BS)	PLAA30BA	7.30	13.60	32000	8.70	Discontinued - Eligible until further notice
4385505	MITSUBISHI	PUZA30NHA4(BS)	PCAA30KA	8.00	14.50	32000	9.20	
4385506	MITSUBISHI	PUZA30NHA4(BS)	PKAA30KA(L)	7.30	15.50	32000	8.90	
4385507	MITSUBISHI	PUZA30NHA4(BS)	PLAA30BA	7.30	13.60	32000	8.70	
894760	MITSUBISHI	PUZA36NHA(BS)	PCAA36GA, PKAA36GA(L)	7.80	13.10	37000	8.30	Discontinued - Eligible until further notice
3160829	MITSUBISHI	PUZA36NHA2(BS)	PCAA36GA	7.60	13.10	37000	8.30	Discontinued - Eligible until further notice
3160827	MITSUBISHI	PUZA36NHA2(BS)	PLAA36BA	7.80	14.20	37000	9.30	Discontinued - Eligible until further notice
3345319	MITSUBISHI	PUZA36NHA3(BS)	PCAA36KA	7.60	14.40	37000	10.20	Discontinued - Eligible until further notice
3345318	MITSUBISHI	PUZA36NHA3(BS)	PKAA36KA(L)	6.80	14.00	37000	9.30	Discontinued - Eligible until further notice
3345320	MITSUBISHI	PUZA36NHA3(BS)	PLAA36BA	7.80	14.20	37000	9.30	Discontinued - Eligible until further notice
4385509	MITSUBISHI	PUZA36NHA4(BS)	PCAA36KA	7.60	14.40	37000	10.20	
4385510	MITSUBISHI	PUZA36NHA4(BS)	PKAA36KA(L)	6.80	14.00	37000	9.30	
4385508	MITSUBISHI	PUZA36NHA4(BS)	PLAA36BA	7.80	14.20	37000	9.30	
3160831	MITSUBISHI	PUZA42NHA2(BS)	PCAA42GA	8.30	13.80	45000	8.50	Discontinued - Eligible until further notice
3160830	MITSUBISHI	PUZA42NHA2(BS)	PLAA42BA	9.10	14.40	45000	9.30	Discontinued - Eligible until further notice
3345321	MITSUBISHI	PUZA42NHA3(BS)	PCAA42KA	10.20	15.80	45000	10.20	Discontinued - Eligible until further notice
3345322	MITSUBISHI	PUZA42NHA3(BS)	PLAA42BA	9.10	14.40	45000	9.30	Discontinued - Eligible until further notice
4385511	MITSUBISHI	PUZA42NHA4(BS)	PCAA42KA	10.20	15.80	45000	10.20	
4385512	MITSUBISHI	PUZA42NHA4(BS)	PLAA42BA	9.10	14.40	45000	9.30	
3202594	MITSUBISHI	PUZHA30NHA	PLAA30BA	12.00	15.60	32000	7.70	Discontinued - Eligible until further notice
3345325	MITSUBISHI	PUZHA30NHA2	PCAA30KA	12.10	16.10	32000	9.30	Discontinued - Eligible until further notice
3345324	MITSUBISHI	PUZHA30NHA2	PKAA30KA(L)	12.00	16.50	32000	9.50	Discontinued - Eligible until further notice
3345323	MITSUBISHI	PUZHA30NHA2	PLAA30BA	12.20	15.60	32000	9.40	Discontinued - Eligible until further notice
4385514	MITSUBISHI	PUZHA30NHA4	PCAA30KA	12.10	16.10	32000	9.30	
4385513	MITSUBISHI	PUZHA30NHA4	PKAA30KA(L)	12.00	16.50	32000	9.50	
4385515	MITSUBISHI	PUZHA30NHA4	PLAA30BA	12.20	15.60	32000	9.40	
3059260	MITSUBISHI	PUZHA36NHA	PLAA36BA	11.50	16.00	38000	7.70	Discontinued - Eligible until further notice
3345328	MITSUBISHI	PUZHA36NHA2	PCAA36KA	12.10	16.60	38000	10.30	Discontinued - Eligible until further notice
3345327	MITSUBISHI	PUZHA36NHA2	PKAA36KA(L)	12.00	16.20	38000	10.00	Discontinued - Eligible until further notice
3345326	MITSUBISHI	PUZHA36NHA2	PLAA36BA	12.60	17.00	38000	10.00	Discontinued - Eligible until further notice
4385518	MITSUBISHI	PUZHA36NHA4	PCAA36KA	12.10	16.60	38000	10.30	
4385517	MITSUBISHI	PUZHA36NHA4	PKAA36KA(L)	12.00	16.20	38000	10.00	
4385516	MITSUBISHI	PUZHA36NHA4	PLAA36BA	12.60	17.00	38000	10.00	
4415024	MITSUBISHI	SUZKA09NA	SLZKA09NA	12.00	15.00	10900	9.60	
4415252	MITSUBISHI	SUZKA12NA	SLZKA12NA	12.00	15.40	13600	9.60	
4415364	MITSUBISHI	SUZKA15NA	SLZKA15NA	10.20	16.00	18000	9.60	
5052779	PANASONIC	CU2E18NBU	CSE9NKUAW, CSE12NKUAW	11.50	18.00	20200	8.80	

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5052301	PANASONIC	CU3KE19NBU	CSMKE7NKU, CSMKE9NKU, CSMKE12NKU, CSMKE18NKU, CSMKE24NKU, CSMKE9NB4U, CSMKE12NB4U, CSKE18NB4UW	12.00	18.00	23200	8.80	
5052302	PANASONIC	CU4KE24NBU	CSMKE7NKU, CSMKE9NKU, CSMKE12NKU, CSMKE18NKU, CSMKE24NKU, CSMKE9NB4U, CSMKE12NB4U, CSKE18NB4UW	11.50	18.00	27200	8.50	
5052303	PANASONIC	CU4KE31NBU	CSMKE7NKU, CSMKE9NKU, CSMKE12NKU, CSMKE18NKU, CSMKE24NKU, CSMKE9NB4U, CSMKE12NB4U, CSKE18NB4UW	11.20	17.20	30600	9.30	
5052774	PANASONIC	CUE12NKUA	CSE12NKUAW	12.00	20.00	13800	10.00	
5292704	PANASONIC	CUE18NKUA	CSE18NKUA	13.15	18.00	20400	8.50	
5292705	PANASONIC	CUE24NKUA	CSE24NKUA	10.20	17.50	28800	8.50	
5052773	PANASONIC	CUE9NKUA	CSE9NKUAW	13.05	21.00	11200	10.50	
5052304	PANASONIC	CUKE12NKU	CSKE12NB4U	9.40	16.00	13600	8.50	
5052306	PANASONIC	CUKE18NKU	CSKE18NB4UW	9.40	16.00	20400	8.50	
5052305	PANASONIC	CUKE18NKU	CSKE18NKU	11.70	20.00	20400	10.00	
5052307	PANASONIC	CUKE24NKU	CSKE24NKU	9.80	17.00	29000	8.50	
5052317	PANASONIC	CUKE30NKU	CSKE30NKU	9.30	16.00	33000	9.00	
5052318	PANASONIC	CUKE36NKU	CSKE36NKU	8.50	16.00	36000	9.00	
5052308	PANASONIC	U26PE1U6	S26PK1U6	8.90	14.90	28600	9.30	
5052309	PANASONIC	U26PE1U6	S26PT1U6	8.50	14.50	30200	9.40	
5052311	PANASONIC	U26PE1U6	S26PU1U6	8.50	14.10	29200	9.60	
5052290	PANASONIC	U36LE1U6	S07MK1U9, S09MK1U9, S12MK1U6, S18MK1U6, S24MK1U6	11.50	17.00	43000	9.80	

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5052312	PANASONIC	U36PE1U6	S36PT1U6	8.10	15.10	36800	8.80	
5052314	PANASONIC	U36PE1U6	S36PU1U6	8.10	14.60	36800	8.40	
5052315	PANASONIC	U42PE1U6	S42PT1U6	9.40	15.60	44500	9.50	
5052316	PANASONIC	U42PE1U6	S42PU1U6	8.70	14.60	47500	9.70	
5052300	PANASONIC	U52LE1U6	S07MK1U9, S09MK1U9, S12MK1U6, S18MK1U6, S24MK1U6	10.20	17.40	58500	9.60	
4109319	PRIDIOM	AOS091HX	AWS091HX	13.50	19.00	11000	9.00	Discontinued - Eligible until further notice
4109320	PRIDIOM	AOS121HX	AWS121HX	13.50	20.00	15500	9.50	Discontinued - Eligible until further notice
4109321	PRIDIOM	AOS181HX	AWS181HX	13.00	18.00	19000	9.00	Discontinued - Eligible until further notice
4109322	PRIDIOM	AOS241HX	AWS241HX	10.50	16.00	28000	10.00	Discontinued - Eligible until further notice
5052762	PRIDIOM	POM091HX	PWM091HX	14.00	19.00	10000	9.60	
5052763	PRIDIOM	POM121HX	PWM121HX	12.50	18.80	12500	9.60	
5052764	PRIDIOM	POM181HX	PWM181HX	12.50	19.20	19000	9.60	
4883811	PRIDIOM	POM273HX	PWM093HX(3)	9.80	16.00	24600	8.00	
5295913	PRIDIOM	POM273HX	PWM093HX, PWM123HX, PWM183HX	9.80	16.00	25400	8.00	
4883812	PRIDIOM	POM365HX	PWM093HX(4)	10.60	15.00	36200	8.00	
5295914	PRIDIOM	POM365HX	PWM093HX, PWM123HX, PWM183HX	10.60	15.00	38000	8.00	
5371975	PRIDIOM	POS091HX	PWS091HX	14.00	19.00	10000	9.60	
5296704	PRIDIOM	POS121HX	PWS121HX	12.50	18.80	12500	9.60	
5094539	PRIDIOM	POS181HX	PWS181HX	12.50	19.20	19000	9.60	
5371976	PRIDIOM	POS241HX	PWS241HX	9.60	16.00	24600	7.80	
5052765	PRIDIOM	POW241HX	PWM241HX	9.60	16.00	24600	7.80	
4733658	QUIETSIDe	QSVMO24A	QSVMI09A(2)	8.30	16.00	19000	8.20	
4733659	QUIETSIDe	QSVMO24A	QSVMI09A+ QSVMI12A	8.30	16.00	22000	8.20	
4732677	QUIETSIDe	QSVSO09A	QSVSI09A	14.20	22.00	9500	9.80	
4732678	QUIETSIDe	QSVSO12A	QSVSI12A	12.50	20.00	12100	9.60	
4732679	QUIETSIDe	QSVSO18A	QSVSI18A	12.00	18.00	25000	10.20	
4732680	QUIETSIDe	QSVSO24A	QSVSI24A	12.00	18.00	26000	10.20	
1362352	SAMSUNG	AQV09JAX	AQV09JA	13.85	20.00	12000	9.99	Discontinued - Eligible until further notice
3405716	SAMSUNG	AQV09NSDX	AQV09NSD	13.10	19.00	12000	9.50	
1362399	SAMSUNG	AQV12JAX	AQV12JA	11.40	19.00	13600	9.00	Discontinued - Eligible until further notice
3405718	SAMSUNG	AQV12NSDX	AQV12NSD	10.65	18.00	13600	8.50	
1362408	SAMSUNG	AQV12VBAX	AQV12VBAN	11.40	19.00	13600	9.00	Discontinued - Eligible until further notice
None	SAMSUNG	AQV12VBEK	AQV12VBE					Discontinued - Eligible until further notice

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3405712	SAMSUNG	AQV12VBEX	AQV12VBE	11.20	19.00	13600	9.00	Discontinued - Eligible until further notice
1362405	SAMSUNG	AQV18JAXKCV	AQV18JA	10.60	17.00	20400	8.00	Discontinued - Eligible until further notice
3405902	SAMSUNG	AQV18NSDX	AQV18NSD	10.45	16.00	20400	8.00	
3405901	SAMSUNG	AQV18VBEX	AQV18VBE	10.60	16.00	20400	8.00	Discontinued - Eligible until further notice
1362407	SAMSUNG	AQV24JAXKCV	AQV24JA	9.20	15.50	27000	7.80	Discontinued - Eligible until further notice
3405720	SAMSUNG	AQV24NSDX	AQV24NSD	8.50	15.00	27000	7.80	
3405714	SAMSUNG	AQV24VBE	AQV24VBE	8.60	15.50	27000	7.80	Discontinued - Eligible until further notice
3023182	SAMSUNG	AQV36JAX	AQV36JA	11.00	18.00	34000	9.00	
3069050	SAMSUNG	MH050FXCA2A	MH026FNCA, MH035FNCA, MH052FNCA	10.05	15.50	19400	8.00	
3069052	SAMSUNG	MH080FXCA4A	MH026FNCA, MH035FNCA, MH052FNCA	9.90	15.50	31600	8.00	
1362349	SAMSUNG	UH035CAV	EH035CAV	10.40	17.80	13600	9.20	
1362350	SAMSUNG	UH052CAV	EH052CAV	10.90	13.60	18000	8.50	
1362351	SAMSUNG	UH070CAV	EH070CAV	10.20	15.10	24000	8.50	
3298253	SAMSUNG	UH105CAV	CH105CAV	10.60	15.50	38000	9.50	
None	SAMSUNG	UQB09JJWC	AQB09JJWC					Discontinued - Eligible until further notice
None	SAMSUNG	UQB12JJWC	AQB12JJWC					Discontinued - Eligible until further notice
None	SAMSUNG	UQB18J6WC	AQB18J6WC					Discontinued - Eligible until further notice
None	SAMSUNG	UQB24J2WC	AQB24J2WC					Discontinued - Eligible until further notice
1130538	SANYO	CH0971	KHS0971	12.50	16.00	12200	8.50	Discontinued - Eligible until further notice
1140989	SANYO	CH1271	KHS1271	10.90	17.00	13300	9.30	Discontinued - Eligible until further notice
3269082	SANYO	CH1271	XHS1271	9.40	16.00	13000	8.50	Discontinued - Eligible until further notice
1130539	SANYO	CH1872	KHS1872	11.70	20.00	20400	10.00	Discontinued - Eligible until further notice
3269083	SANYO	CH1872	XHS1872	9.40	16.00	20400	8.50	Discontinued - Eligible until further notice
1130540	SANYO	CH2472	KHS2472	9.80	17.00	29000	8.50	Discontinued - Eligible until further notice
3091863	SANYO	CH2672R	KHS2672R	8.80	15.90	27600	9.50	Discontinued - Eligible until further notice
3091862	SANYO	CH2672R	KHS2672R	8.90	14.90	28600	9.30	Discontinued - Eligible until further notice
3091866	SANYO	CH2672R	THHW2672R	8.50	14.50	30200	9.40	Discontinued - Eligible until further notice
3091865	SANYO	CH2672R	THW2672R	8.50	14.50	30200	9.40	Discontinued - Eligible until further notice
3091867	SANYO	CH2672R	UHW2672R	9.10	14.00	28600	9.00	Discontinued - Eligible until further notice
3091864	SANYO	CH2672R	XHW2672R	8.50	14.10	29200	9.60	Discontinued - Eligible until further notice
3091868	SANYO	CH3072R	KHS3072R	8.10	15.00	34000	9.00	Discontinued - Eligible until further notice
3952901	SANYO	CH3082	KHS3082	9.30	16.00	33000	9.00	Discontinued - Eligible until further notice
3091869	SANYO	CH3672R	KHS3672R	8.30	15.90	35600	8.80	Discontinued - Eligible until further notice
3091872	SANYO	CH3672R	THHW3672R	8.10	15.10	36800	8.80	Discontinued - Eligible until further notice
3091871	SANYO	CH3672R	THW3672R	8.10	15.10	36800	8.80	Discontinued - Eligible until further notice
3091873	SANYO	CH3672R	UHW3672R	7.80	13.90	35600	8.50	Discontinued - Eligible until further notice
3091870	SANYO	CH3672R	XHW3672R	8.10	14.60	36800	8.40	Discontinued - Eligible until further notice

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3952902	SANYO	CH3682	KHS3682	8.50	16.00	36000	9.00	Discontinued - Eligible until further notice
3091875	SANYO	CH4272R	THW4272R	9.40	15.60	44500	9.50	Discontinued - Eligible until further notice
3091874	SANYO	CH4272R	XHW4272R	8.70	14.60	47500	9.70	Discontinued - Eligible until further notice
3933237	SANYO	CMH1972A	KMHS0772, KMHS0972, KMHS1272, KMHS1872, KMHS2472	12.70	16.40	26200	8.80	Discontinued - Eligible until further notice
3933472	SANYO	CMH2472A	KMHS0772, KMHS0972, KMHS1272, KMHS1872, KMHS2472	11.40	16.50	29400	8.40	Discontinued - Eligible until further notice
3933960	SANYO	CMH3172A	KMHS0772, KMHS0972, KMHS1272, KMHS1872, KMHS2472	10.90	17.20	32000	9.30	Discontinued - Eligible until further notice
3639381	TOSHIBA CARRIER RAS	RAS09LAVUL	RAS09LKVUL	13.00	20.00	10800	10.00	
3639388	TOSHIBA CARRIER RAS	RAS12LAVUL	RAS12LKVUL	12.60	23.00	14200	9.70	
3639394	TOSHIBA CARRIER RAS	RAS15LAVUL	RAS15LKVUL	13.00	20.00	18000	9.00	
3639395	TOSHIBA CARRIER RAS	RAS17LAVUL	RAS17LKVUL	12.60	19.00	20200	9.00	
3639396	TOSHIBA CARRIER RAS	RAS22LAVUL	RAS22LKVUL	8.30	15.50	23200	9.00	
3638305	TOSHIBA CARRIER S.D. INVERTER	RAVSP180AT2UL	RAVSP180CTUL	8.60	17.00	19000	10.80	
3638303	TOSHIBA CARRIER S.D. INVERTER	RAVSP180AT2UL	RAVSP180KRTUL	10.00	19.50	19000	11.50	
3638304	TOSHIBA CARRIER S.D. INVERTER	RAVSP180AT2UL	RAVSP180UTUL	10.70	20.50	18800	11.50	
3638308	TOSHIBA CARRIER S.D. INVERTER	RAVSP240AT2UL	RAVSP240CTUL	9.00	19.50	28800	10.30	
3638306	TOSHIBA CARRIER S.D. INVERTER	RAVSP240AT2UL	RAVSP240KRTUL	9.10	16.70	26400	9.80	
3638307	TOSHIBA CARRIER S.D. INVERTER	RAVSP240AT2UL	RAVSP240UTUL	11.00	20.70	26000	9.50	
3638310	TOSHIBA CARRIER S.D. INVERTER	RAVSP300AT2UL	RAVSP300CTUL	13.00	20.60	29800	8.50	

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3638309	TOSHIBA CARRIER S.D. INVERTER	RAVSP300AT2UL	RAVSP300UTUL	14.00	21.00	33400	11.00	
3638312	TOSHIBA CARRIER S.D. INVERTER	RAVSP360AT2UL	RAVSP360CTUL	12.00	20.40	38000	11.00	
3638311	TOSHIBA CARRIER S.D. INVERTER	RAVSP360AT2UL	RAVSP360UTUL	13.00	21.00	36000	11.90	
3638314	TOSHIBA CARRIER S.D. INVERTER	RAVSP420AT2UL	RAVSP420CTUL	9.70	18.80	44500	11.00	
3638313	TOSHIBA CARRIER S.D. INVERTER	RAVSP420AT2UL	RAVSP420UTUL	11.50	19.00	46000	10.30	
3808326	TOSHIBA CARRIER XPOWER	38GXM2243	40GXM0123(2)	9.60	14.50	27000	8.30	
4514735	TOSHIBA CARRIER XPOWER	38GXM4303	40GXM0093(3)	8.70	15.00	25400	8.00	
3808374	TOSHIBA CARRIER XPOWER	38GXM4303	40GXM0093(4)	8.00	14.50	28000	8.40	
3810035	TOSHIBA CARRIER XPOWER	38GXQ0183	40GXQ0183	8.60	15.00	18000	8.20	
3810096	TOSHIBA CARRIER XPOWER	38GXQ0243	40GXQ0243	9.40	16.00	24000	8.10	
3806470	XPOWER CARRIER	38GXM2183	40GXM0093(2)	8.90	14.00	18000	7.90	