

**From:** Springer, Darren [Darren.Springer@state.vt.us]  
**Sent:** Friday, March 06, 2015 8:19 PM  
**To:** 'Rebecca Ellis'  
**Subject:** RE: DPS Spreadsheet of Heat Pumps Displacing Fuel Oil

And the last one, with responses below in italics. Let me know if you need anything else or have any questions!

Thanks,  
Darren

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**From:** Springer, Darren  
**Sent:** Friday, March 06, 2015 10:08 AM  
**To:** 'Rebecca Ellis'; Tony Klein  
**Subject:** Fwd: DPS Spreadsheet of Heat Pumps Displacing Fuel Oil

Sent from my iPhone

Begin forwarded message:

**From:** "Tauscher, David" <[David.Tauscher@state.vt.us](mailto:David.Tauscher@state.vt.us)>  
**Date:** March 6, 2015 at 10:01:51 AM EST  
**To:** "Hopkins, Asa" <[Asa.Hopkins@state.vt.us](mailto:Asa.Hopkins@state.vt.us)>, "Springer, Darren" <[Darren.Springer@state.vt.us](mailto:Darren.Springer@state.vt.us)>  
**Subject:** FW: DPS Spreadsheet of Heat Pumps Displacing Fuel Oil

Looks like the audience is a bit wider now.

**From:** Willem Post [<mailto:wilpost37@gmail.com>]  
**Sent:** Friday, March 06, 2015 10:00 AM  
**To:** Tim Ashe; Ayer, Claire; [bbalint@leg.state.vt.us](mailto:bbalint@leg.state.vt.us); [pbaruth@leg.state.vt.us](mailto:pbaruth@leg.state.vt.us); Joe Benning; Senator Christopher A Bray; John Campbell; [bcollamore@leg.state.vt.us](mailto:bcollamore@leg.state.vt.us); Ann Cummings; [ddegree@leg.state.vt.us](mailto:ddegree@leg.state.vt.us); William Doyle; Peg Flory; Jane Kitchel; Virginia Lyons; Mark MacDonald; Norman Mcallister; Richard McCormack; Alice Nitka; Anthony Pollina; John Rodgers; Sears, Sen. Richard; [msirotkin@leg.state.vt.us](mailto:msirotkin@leg.state.vt.us); Diane Snelling; Robert Starr; White, Jeanette; [dzuckerman@leg.state.vt.us](mailto:dzuckerman@leg.state.vt.us); Aaron Rosenbluth; [preservethewellfleetilove@gmail.com](mailto:preservethewellfleetilove@gmail.com); Mark Whitworth; Tauscher, David  
**Subject:** DPS Spreadsheet of Heat Pumps Displacing Fuel Oil

All,

I obtained a copy of the subject spreadsheet (attached), and found several incorrect assumptions that made the numbers look better than would be true in the real world.

*DS - He obtained a copy because we freely share our data with people who ask us....*

The DPS spreadsheet would be used to "convince" busy, relatively inexperienced, legislators that RESET is great, and to vote for it ASAP, preferably without

asking a lot of questions, which might slow the DPS efforts to fight global warming.

DPS assumed Vermont has a renewable energy percent of 65, which is half way between 55% in 2017 and 75% in 2032. It looks reasonable, but it is not, based on the physical reality that ALL OF NEW ENGLAND has the SAME energy mix, which at present is about 20% (hydro + RE), and which may become 25% by the middle of the 2017 - 2032 period.

***DS - Mr. Post does not understand RECs and how the region accounts for renewable energy. If H. 40 passes Vermont will have claim to renewable electric supply of 55% in 2017 rising to 75% by 2032. Using the 65% figure to estimate the fossil fuel displacement value of heat pumps is accurate.***

**NOTE:** Energy on the grid, no matter the source, moves as electro-magnetic waves at near the speed of light, 1,800 miles per 0.01 second, that is from northern Maine to southern Florida in one hundredth of a second!!! The electrons migrate very slowly; essentially, they vibrate in place at 60 cycles per second. How anyone can claim tiny Vermont has its very own special energy mix is beyond to me.

***DS - REC markets demonstrate how much renewable electricity each utility has in their mix, and all of these state requirements are reflected in the region's grid.***

**NOTE:** There is an energy mix on PAPER, but that mix has to do with the energy supply contracts signed by utilities. It is has NOTHING to do with the physical realities on the grid. You may check all this with ISO-NE, if you still are doubtful.

**NOTE:** On colder days, the 3.0 RATED coefficient of performance, COP, of a heat pump tends to become 1.5 or even less. At these low levels, it would not pay to run heat pumps, and it would be better to run the fuel oil boiler.

***DS - below negative 13 degrees cold-climate heat pumps are not currently rated to perform. Customers will use back-up fossil systems during these times. In addition because we care about not driving up peak demand, there may be times where heat pumps could run, but utility demand management programs might offer incentives or programs so they don't during peak times regardless of temperature.***

**NOTE:** DPS assumed 2.4 as an average COP, which I think may be too high. To get an accurate value, one would have to use Heating Degree HOURS, to determine heat pump output levels; using Heating Degree DAYS would not be sufficiently accurate. I used the DPS assumption.

All the other DPS assumptions are correct, although the FO system efficiency at 85% is somewhat high. I would have chosen 75 - 80%

My spreadsheet (attached) shows the following results:

- 1) CO2 reduction of 8905 lb/yr, equivalent to 8.9 RECs/yr, or 133.6 RECs for 15 years
- 2) Cost INCREASE of \$76.72/yr, if one heat pump, INCREASE of \$293.93/yr, if two heat pumps
- 3) Primary energy INCREASE of 3,162,620 Btu/yr

***DS - Asa might be able to decipher what he is trying to say here, but it sounds like he manipulated our spreadsheet with his assumptions to come up with data***

*showing heat pumps increase costs for customers. Real-world experience through GMP's heat pump lease program demonstrates the opposite. They will pay for heat pump lease or financing, and pay more for electricity, but save on fossil fuel use. I would note also that Energy Co Op of Vermont, a fuel dealer who leases heat pumps, shows similarly how customers can save with heat pumps (<http://www.co-opheatpumps.net/cost>).*

The DPS spreadsheet shows all three are decreasing.

Willem