From: Springer, Darren [Darren.Springer@state.vt.us]
Sent: Saturday, March 07, 2015 3:16 PM
To: Miller, Elizabeth
CC: Hopkins, Asa
Subject: Re: H-40 RESET and DPS Spreadsheet of Heat Pumps

We have been getting some of these and Rebecca Ellis forwarded me a bunch yesterday. I provided her with some responses and pointed out the inaccuracies....
Thanks
Darren

Sent from my iPhone

On Mar 7, 2015, at 2:48 PM, Miller, Elizabeth <Elizabeth.Miller@state.vt.us> wrote:

> Assume u r on this list but here u go just in case not
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** Willem Post <wilpost37@gmail.com>
> > **Date:** March 7, 2015 at 1:50:06 PM GMT-5
> > **To:** <tklein@leg.state.vt.us>, <rellis@leg.state.vt.us>, <mhebert@leg.state.vt.us>, <rchesnut-tangerman@leg.state.vt.us>, <rforguites@leg.state.vt.us>, <mgamache@leg.state.vt.us>, <msullivan@leg.state.vt.us>, Warren Van Wyck <wvanwyck@leg.state.vt.us>, <myantachka@leg.state.vt.us>, <kram@leg.state.vt.us>, Oliver Olsen <oliver@oliverolsen.com>, <cbruno@leg.state.vt.us>
> > **Subject: H-40 RESET and DPS Spreadsheet of Heat Pumps**
> >
> > All,
> >
> > I obtained a copy of a DPS RESET spreadsheet (attached), and found several incorrect assumptions that made the numbers look better than would be true in the real world.
> >
> > The DPS spreadsheet likely is meant to "convince" busy, relatively inexperienced, legislators, and the gullible public that RESET is great, and to vote for H-40 ASAP, preferably without asking a lot of questions, which might slow the DPS' urgent efforts to "fight global warming".

Utilities would like H-40, as the use of heat pumps and electric vehicles would significantly increase energy sales, and they likely may go into the heat pump, etc., leasing/renting business, with monthly charges on ratepayer electric bills.

I prepared a spreadsheet with proper assumption, as explained below (attached), which 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.

The DPS spreadsheet shows all three as decreasing, as one would expect to get RESET passed by the legislature.

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

DPS assumed 2.4 as an average COP, which may be too high, likely to make numbers look good. 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 in my spreadsheet. 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.

DPS uses one ductless heat pump to heat the entire house, which has a lower in capital cost, likely to make numbers look good. Two ductless heat pumps, at increased capital cost, would likely be needed.

The remaining DPS assumptions appear correct, although the FO system efficiency at 85% is high. The annual AVERAGE efficiency is less, more like 75 - 80%. I used the DPS assumption in my spreadsheet.

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 a distance from northern Maine to southern Florida in one hundredth of a second!!! The electrons migrate very, very slowly; essentially, they vibrate in place at 60 cycles per second. How anyone at DPS, et al., can claim tiny Vermont has its very own special energy mix is beyond rational. ISO-NE correctly displays on its website ONE energy mix for the ENTIRE New England grid. Was there political influence on the analyses/calculations of engineers?

NOTE: There is an energy mix on PAPER, but that mix has to do with the energy supply contracts signed by utilities. It has NOTHING to do with the physical realities on the grid. You may check all this with utility systems engineers (obviously not DPS engineers) and ISO-NE engineers, if you still are doubtful.

Willem