HighSolar

April 5, 2018

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In [385]: from IPython.display import display, HTML
          from IPython.core.interactiveshell import InteractiveShell
          InteractiveShell.ast_node_interactivity = "all"
```

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In [386]: import pandas as pd
          # Load inputs
          #dfIn = pd.read_pickle("bau.pickle")
          #wx = pd.read_pickle("wx.pickle")
          #dfIn.merge(wx,how='outer',left_index=True,right_index=True)
          df = pd.read_pickle("../irradiance/big_irradiance.pickle")['2014']

          # Apply the heating model
          import numpy as np
          df['hload'] = np.maximum(0,1.27 - df.OAT * 0.091)
```

0.1 HE Solar

These are black collector tubes inside larger clear tubes which are evacuated. The vacuum tubes insulate the collector, so you get to keep more of the heat. They're marketed as being great for Canada, but I don't see many of them in Coastal BC.

Unfortunately, the only local source of irradiance data is the CWEEDS database, which ends in 2014 -- before my consumption data begins. My best path forward is to apply my heating load model to the irradiance years to see how effective solar would've been in the past.

Here are some figures for collector efficiency as a function of DT (collector - OAT), collected from https://www.builditsolar.com/References/Calculators/Collector/ColEfic.htm - Unglazed: 83% - 1.07 %/degC - Plate: 74% - 0.32 %/degC - VacTube: 53% - 0.12 %/degC

0.2 Example setup

Latitude51 sells a 30-pipe unit (1.8m x 58mm x 30 = 3.13 m^2) for $1767 shipped, = $564/m^2. We'll base this calculation on the 30-pipe unit.

0.3 Issues:

- No snow cover data. OK to neglect in Nanaimo, very rare to have useful irradiance while there's snowcover.
- Based on normal irradiance; This is OK for traverse with round tubes, but need to de-rate for azimuth.