

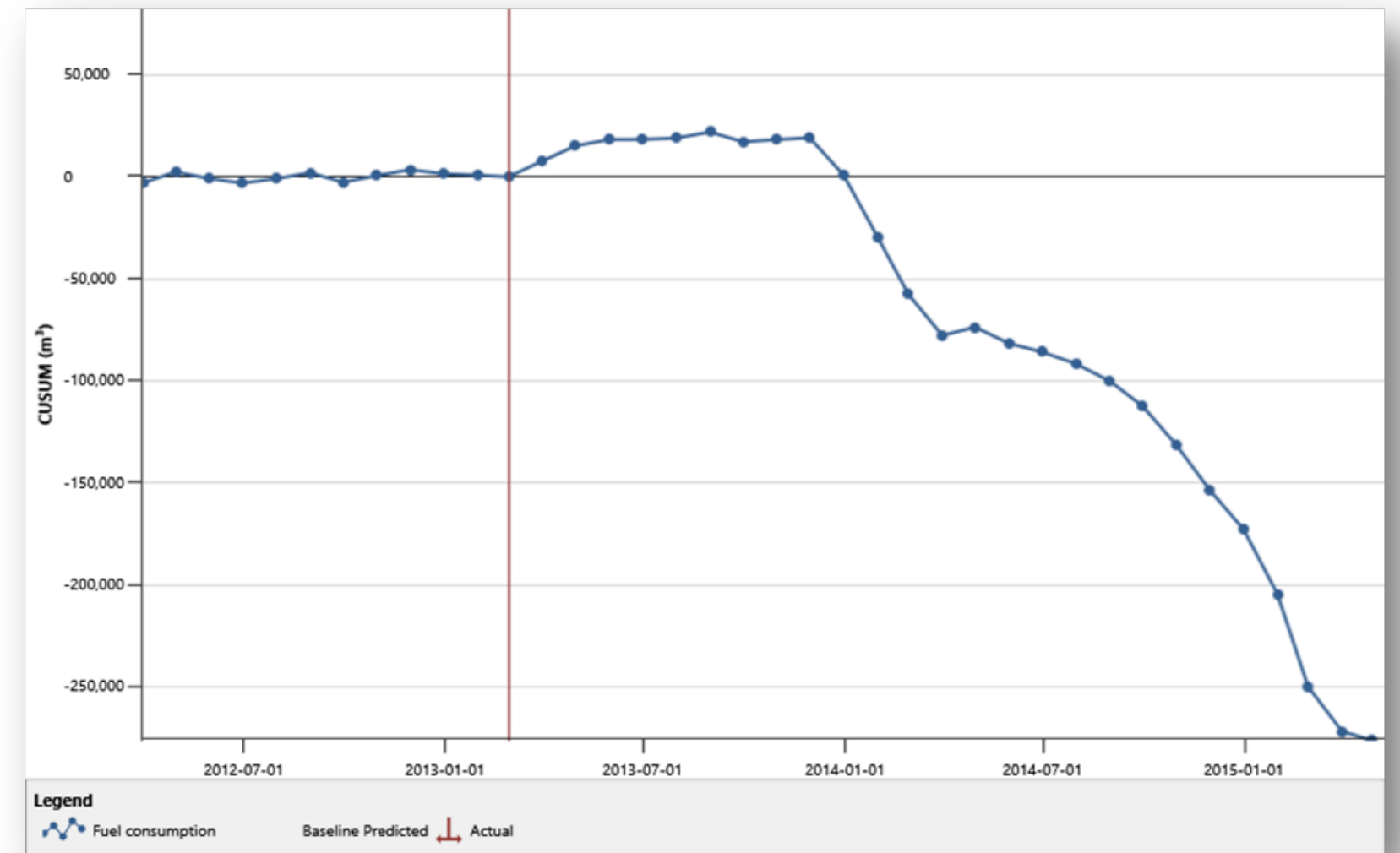


What is a CUSUM?

A Key Performance Analysis feature of RETScreen[®] Expert

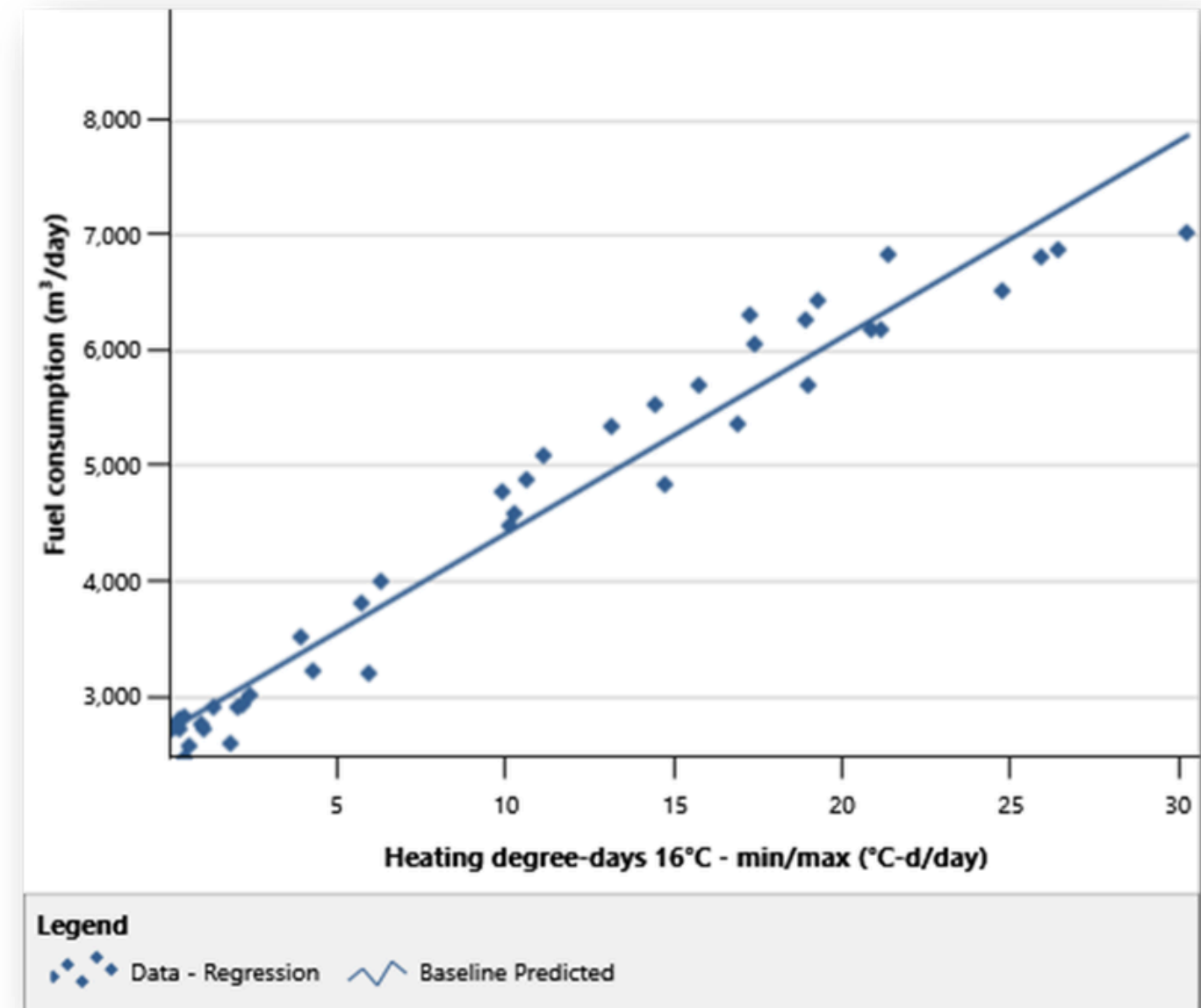
Cumulative Sum of Differences (CUSUM)

- To allow a more insightful analysis, more advanced techniques should be considered.
- One common and powerful approach is called CUSUM – CumulativeSum of differences from predicted values
 - CUSUM charts are effective in detecting small or gradual shifts in data.
 - Allows for timely intervention and corrective actions.
 - By continuously monitoring the CUSUM chart, organizations can identify and address deviations in performance before they lead to significant waste or expense.



The Baseline for a CUSUM: Regression

- Must account for the drivers of consumption
- A model of the consumption is used to obtain a predicted value that accounts for the drivers
 - This model can be analytical but is usual statistical, based on how the drivers relate to the consumption
 - A **regression analysis** between the drivers and consumption is established
 - Often a linear relation for energy performance purposes – as the physical processes are linear
 - If the regression shows a good relationship, it becomes the model of our building for reference purposes to calculate the deviations in CUSUM.



Interpreting a CUSUM Graph

- The Reference period should appear as a relatively flat line with the CUSUM always at 0 at the end of the reference period.
- Change of slope are key indicators in a CUSUM graph
 - Upward slope = Worsening performance vs Reference period
 - Flat = Identical to the Reference
 - Downward = Better!
- Change in slope shows that something has changed
 - Could be the system is off
 - (ex. Summer for boilers)
- Need to explain the changes in slopes!

