'Weather' or Not to Protect

By J.D. Buss

Too much rainfall or not enough can ruin crop yield. Excessive snowfall can break a municipality budget, while no snow generates a budget surplus. Freezing cold temperatures over an extended period will drive heating demand, while a warm winter could wipe out annual profit or even a business.

For anyone in the retail propane business, the winter of 2011-2012 will live in infamy. Extended periods of warm temperatures in several regions of the U.S. saw home heating demand drop radically, along with bottom-line income. Historically and statistically, that winter was an anomaly, something that supposedly would not happen again for some time. But then the first half of the 2012-2013 winter looked to be a repeat performance.

Thankfully, we all know the end of the story for last winter—cold temperatures struck at the tail end and hung around through part of April. Regardless of the ending, both of the last two winters have highlighted a very old but very large risk: volumetric fluctuations due to weather.

Retailers all over the U.S. track HDDs (heating degree days). In the finance world an HDD represents the difference between 65ºF and a day's average temperature. For example, if the daily average temperature ends up at 25ºF, the HDD count for that day comes out to be 40. Any daily average above 65 and the HDD count for the day is zero. To calculate total HDDs for a month or period, simply add up all the daily HDDs.

Many firms know, either implicitly or detailed very explicitly, what level of HDDs generate a certain amount of propane demand for a given month or period. Based on this data, the retailer can then estimate how weather changes impact its bottom line.

Knowing the data and facts, however, do nothing to mitigate the impact of weather changes on a business. Like any other risk, unless action is taken to mitigate it, the risk could still destroy a company. This ultimately brings up the question of how to hedge or protect against the weather.

Since the late 1990s, this industry has seen changes and growth. Enron began trading HDD and CDD (cooling degree day) swaps on its electronic platform, and now CME Group is clearing swaps on 26 major cities in the U.S. Reinsurers jumped into this market and are still some of the major players. Hedging instruments have gone from a plain HDD swap to transactions centered on straight temperature, rainfall, or snowfall. Most weather risk can, and will, be traded all over the globe on a daily basis.

Anytime the words weather, hedging, and derivative are combined in a sentence it seems to create the ultimate oxymoron. Weather changes are as old as the earth itself and have never been controlled by man. So why create a financial tool that appears to be Las Vegas-style gambling on a weather roulette wheel? Because the goal for many firms does not center on predicting what the weather will do, but rather protecting against the possible volatility (changes) that weather could inflict on their business.

Weather fluctuations drive changes in consumer usage of propane. Changes in the weather, specifically on a region-by-region basis can, but not normally, have a direct correlation to propane prices. Utilizing traditional hedging methods that focus on price movements will not fit the bill and could still leave a firm exposed to weather risk.

Enter weather derivatives, or weather protection tools, as I call them. These instruments can typically be written up for many major cities within states and be designed to match the dollar-for-dollar impact that weather changes have on a retailer's bottom line.

Take the state of Michigan, a heavy winter-propane usage area, as an example. During the November-to-February period, the center of the state could have an average of 4200 HDDs for the four-month period. For every HDD movement up or down, a hypothetical retailer may incur a $3000 impact on his bottom line based on total volume sold and average margins.

With this limited data, the Michigan retailer could enter into a swap with a high-credit-rated firm that would pay the retailer $3000 per HDD below the 4200 level for that four-month period. Of course, the flip side of this transaction would be that if the HDD count comes in above the 4200 level, then the retailer would have to make a payout of $3000 per HDD.

Lower HDD numbers equal lower sales volume and a payout to the retailer on the HDD swap, while a higher HDD count provides higher consumer sales volume and requires the retailer to pay out on the swap. Each scenario works to accomplish the same thing: protection of the budgeted bottom line value.

The last three paragraphs have only touched on an extremely basic example that could be further modified based on the needs and tolerance level of the retailer. A swap could have a maximum payout amount that would limit possible revenue on the transaction as well as any cash payout for a higher HDD count. If a retailer only wants to protect against lower HDD levels and not have to worry about possibly paying out cash at the end, for a set premium the retailer can purchase an insurance product that will pay out only if the HDD level falls. Variations on these tools could be endless.

The winter of 2011-2012 may bring back some nightmares, but it should also generate questions on how to mitigate risk in the future. Weather patterns and temperatures will continue to fluctuate, which will drive propane sales volumes higher or lower. Any volume fluctuations can impact the bottom line, which means knowing how to handle this risk is vital.

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