

# Winter Fuels Explanatory Notes

## Prices

The residential No. 2 heating oil and propane prices (excluding taxes) for a given State are based on the results of telephone surveys of a sample of marketers and refiners. Data are collected by State Energy Offices under the Energy Information Administration (EIA) State Heating Oil and Propane Program.

### Sampling Methodology and Estimation Procedures

To estimate aggregate propane and No. 2 heating oil price data for a State, the sample and volume weights were applied to the reported price, summed and divided by the sum of the weighted volume:

$$\sum_{j=1}^s \sum_{i=1}^{n_j} w_{ij} v_{ij} p_{ij} / \sum_{j=1}^s \sum_{i=1}^{n_j} w_{ij} v_{ij}.$$

where  $w$  = sample weight,  $v$  = volume weight,  $p$  = price,  $i$  = respondent,  $n_j$  = sample size of stratum  $j$ , and  $s$  = number of strata, to obtain a volume weighted price.

The volumes used for No. 2 heating oil and propane are the company's residential sales volume as reported on the EIA-863 "Petroleum Product Sales Identification Survey."

These fixed volume weights indicate the relative importance of the individual companies according to the size of their sales. Therefore, changes in the average price across time reflect only the change in the price being offered by the company, and not changes in the amounts sold. Price indexes constructed using fixed volumes, such as these annual sales, are known as Laspeyres Indexes. The alternative method of weighting, current weights, would require each company to report the number of gallons sold at the reported price each pricing period. This method is more burdensome on the companies and reflects prices over a period of time as compared to a point in time. Therefore, the calculation of average prices tends to lag behind the reference period. Indexes constructed from current period weights are known as Paasche Indexes.

Both methods of weighting are correct; they do, however, vary when current weights are changing. It has been argued that during periods of change, the Laspeyres method has a tendency to overestimate price changes, while the Paasche method tends to underestimate price changes.

In this survey, it is expected that the relative change in volumes weekly is small. Residential sales are not bulk in nature and do not tend to reflect discounts on price for large volume purchases. Absolute changes in volume within a year's time would more likely reflect demand and be consistent across companies within a geographical area.

### Residential No. 2 Heating Oil

The No.2 heating oil price data are reported by a statistical sample. The sample design used is similar to that used for the EIA Form EIA-782, "Resellers'/Retailers' Monthly Petroleum Product Sales Report." The sampling frame used was based on residential heating oil sales reported on the 2002 Form EIA-863, "Petroleum Product Sales Survey." Certainties were defined at the State level according to the market shares of sales in each State as reported in the frame survey. The remaining frame companies were stratified into three groups by their residential heating oil sales volumes in each State. Strata boundaries were determined using the Dalenius-Hodges procedure. The sample allocations were designed to yield average price coefficients of variation (CV) of 1%, but individual State sample sizes were capped at 35 if the target CV was not met at that point. In those States, the average CV is expected to be less than 3%. In addition, a minimum size of 15 was required for each State. The sample weights ( $w_{ij}$ ) used in estimating average prices were calculated as  $N/n$ , the inverse of the probability of selection. Volume weights ( $V_{ij}$ ) were assigned using the data reported in the frame survey.

### Residential Propane

The propane price data are reported by a statistical sample. The sample design is similar to that of the heating oil sample, defining certainty companies according to their State level market shares as reported in the 2002 EIA-863 survey, and stratifying the remaining frame companies into 2 size groups according to their volumes. However, the selection and reporting unit for propane is the outlet, so for certainties, an outlet of the company was selected for each 5% market share the company had in the State. The Dalenius-Hodges procedure was used to define the strata boundary for the remaining frame companies. The individual outlets were then selected using an outlet address listing EIA developed using information provided by the industry and State energy officials. The sample allocations for propane were designed to yield average price coefficients of variation (CV) of 1%, but State sample sizes were capped at 35 if the target CV was not met at that point. In those States, the average CV is expected to be less than 3%. In addition, a minimum size of 15 was required for each State. Sampling weights ( $w_{ij}$ ) for noncertainties were calculated as  $N/n$ , the inverse of the probability of selection for that State. Volumes for sampled outlets were assigned as the total company volume in the frame survey divided by the number of outlets on the outlet list for each company.

## Revision Error

Numbers may be revised in the publication based on data received late or receipt of revised data. Numbers are published as preliminary and final. The difference between preliminary and final data is called the revision error.

## Response Rate

Response rates are generally 95 to 100 percent.

## Note 3. Confidentiality of Information

The information contained on Form EIA-877 will be kept confidential and not disclosed to the public to the extent that it satisfies the criteria for exemption under the Freedom of

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