Q. In the Stone and Webster report “Review of Rate Design for Newfoundland Power”, it is stated on page 5:

“Hydro currently uses a weather adjustment model that separates weather-based peak changes from changes that may be attributable to actual growth in load requirements from customers.”

Please provide the equations associated with this model along with the data used to develop the model.

A. Hydro’s weather adjustment procedure is an element of its long-term NP Native Demand forecasting equation. The attached sheets provide the data and model currently used in forecasting.

## 2003 PLF NP Native Peak Demand Regression Data

| | NPWPEAK | NPAEDCUST | NPRDCUST | WINDCHILL | AAEHTMPAT | NPTOTGS | TECHCGE81 |
|---|---|---|---|---|---|---|---|
| 1968 | 172.9 | 2168 | 80648 | -33.2 | 8.12 | 285.4 | 0 |
| 1969 | 188.8 | 2712 | 82726 | -33.2 | 6.10 | 355.5 | 0 |
| 1970 | 223.7 | 3887 | 83926 | -33.2 | 5.93 | 420.4 | 0 |
| 1971 | 267.5 | 5069 | 86098 | -33.2 | 5.83 | 465.4 | 0 |
| 1972 | 316.1 | 8064 | 90598 | -33.2 | 5.75 | 510.4 | 0 |
| 1973 | 336.3 | 11161 | 91650 | -33.2 | 5.44 | 586.8 | 0 |
| 1974 | 408.4 | 16711 | 91530 | -33.2 | 4.96 | 652.7 | 0 |
| 1975 | 488.2 | 23842 | 90271 | -33.2 | 4.57 | 732.8 | 0 |
| 1976 | 585.4 | 29643 | 88650 | -36.3 | 4.54 | 806.3 | 0 |
| 1977 | 584.2 | 34015 | 88855 | -27.8 | 5.15 | 909.1 | 0 |
| 1978 | 639.9 | 36832 | 88889 | -28.2 | 5.53 | 1036.8 | 0 |
| 1979 | 664.1 | 39673 | 89107 | -30.9 | 6.19 | 1117.6 | 0 |
| 1980 | 662.7 | 42698 | 89322 | -29.6 | 6.44 | 1184.2 | 0 |
| 1981 | 716.2 | 46139 | 88993 | -15.0 | 6.41 | 1237.2 | 1 |
| 1982 | 731.8 | 49074 | 88202 | -32.4 | 6.14 | 1247.1 | 2 |
| 1983 | 742.6 | 52484 | 88184 | -28.6 | 7.07 | 1257.9 | 3 |
| 1984 | 833.8 | 56119 | 87588 | -40.0 | 7.20 | 1258.3 | 4 |
| 1985 | 825.6 | 59833 | 86822 | -25.0 | 7.50 | 1334.4 | 5 |
| 1986 | 847.8 | 63465 | 86306 | -37.8 | 8.54 | 1398.7 | 6 |
| 1987 | 886.0 | 67026 | 86049 | -10.0 | 8.06 | 1436.1 | 7 |
| 1988 | 957.3 | 71016 | 85891 | -36.5 | 7.80 | 1487.5 | 8 |
| 1989 | 1068.7 | 74668 | 85869 | -38.8 | 7.65 | 1599.7 | 9 |
| 1990 | 1041.4 | 77880 | 86139 | -44.5 | 7.15 | 1679.5 | 10 |
| 1991 | 1087.7 | 80608 | 86609 | -34.4 | 7.07 | 1751.0 | 11 |
| 1992 | 1014.9 | 83023 | 87395 | -39.0 | 7.49 | 1720.0 | 12 |
| 1993 | 1085.9 | 85260 | 88261 | -33.9 | 7.52 | 1728.0 | 13 |
| 1994 | 1019.3 | 87495 | 89385 | -39.8 | 7.43 | 1740.0 | 14 |
| 1995 | 1104.2 | 89731 | 88000 | -30.6 | 7.38 | 1746.0 | 15 |
| 1996 | 1060.4 | 91967 | 87408 | -32.6 | 7.26 | 1743.0 | 16 |
| 1997 | 1049.0 | 94785 | 86383 | -27.5 | 7.17 | 1732.0 | 17 |
| 1998 | 1022.8 | 96106 | 86218 | -34.4 | 7.60 | 1739.5 | 18 |
| 1999 | 995.7 | 96747 | 87174 | -25.2 | 7.71 | 1724.8 | 19 |
| 2000 | 1025.5 | 98405 | 86882 | -23.0 | 7.66 | 1740.2 | 20 |
| 2001 | 1175.9 | 100483 | 86345 | -28.0 | 7.49 | 1773.9 | 21 |

## 2003 PLF Regression Analysis for NP Native Peak Demand

NPWPEAK = .007691*NPAEDCUST + .001428*NPRDCUST + .135542*WINDCHILLWP$^2$
- 16.92053*AAEHTMPAT(-1) + 0.228*NPTOTGS(-1) - 7.72797*TECHCGE81

| | |
|---|---|
| NPWPEAK | Newfoundland Power winter peak demand (MW) |
| NPAEDCUST | Newfoundland Power all-electric domestic customers |
| NPRDCUST | Newfoundland Power regular domestic customers |
| WINDCHILL | Weighted Island windchill in $^o$C equivalent (avg. 20 Hr. temperature and 8 Hr. windspeed) |
| AAEHTMPAT | Lagged marginal electricity price |
| NPTOTGS | Lagged Newfoundland Power general service class sales (GWh) |
| TECHCGE81 | Trend variable for change in energy efficiency\intensity\diversity. |

Dependent Variable: NPWPEAK
Method: Least Squares
Sample(adjusted): 1968 2001
Included observations: 34 after adjusting endpoints

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| NPRDCUST | 0.001428 | 0.00046 | 3.09 | 0.005 |
| NPAEDCUST | 0.007691 | 0.00190 | 4.06 | 0.000 |
| WINDCHILLWP$^2$ | 0.135542 | 0.01814 | 7.47 | 0.000 |
| AAEHTMPAT(-1) | -16.92053 | 5.09587 | -3.32 | 0.003 |
| NPTOTGS(-1) | 0.228185 | 0.09566 | 2.39 | 0.024 |
| TECHCGE81 | -7.727971 | 2.68291 | -2.88 | 0.008 |

| | |
|---|---|
| Mean dependent var | 759.7 |
| S.D. dependent var | 307.8 |
| R-squared | 99.5% |
| Adjusted R-squared | 99.4% |
| S.E. of regression | 24.7 |
| Sum squared resid | 17130.7 |
| F-statistic | 1016.1 |
| Prob(F-statistic) | 0 |
| Durbin-Watson stat | 1.85 |