# Supplemental Materials

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E. Day-Type Clustering Relative RMSE Results at Different Spatial Resolutions

### A. Relative RMSE Results - Load

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Segment Number** | **Sequ-ential** | **Cate-gorical** | **Hourly Clustering** | | | | **Day-Type Clustering** | | | |
| **3-Way** | **Load** | **Solar** | **Wind** | **3-Way** | **Load** | **Solar** | **Wind** |
| 2 | 0.983 |  |  |  |  |  |  |  |  |  |
| 3 | 0.911 |  |  |  |  |  |  |  |  |  |
| 4 | 0.894 |  |  |  |  |  |  |  |  |  |
| 5 | 0.866 |  |  |  |  |  |  |  |  |  |
| 6 | 0.840 |  | 0.838 | 0.227 | 0.894 | 0.950 |  |  |  |  |
| 8 | 0.823 |  |  |  |  |  |  |  |  |  |
| 10 | 0.810 |  |  |  |  |  |  |  |  |  |
| 12 | 0.804 |  | 0.687 | 0.117 | 0.884 | 0.946 |  |  |  |  |
| 15 | 0.796 |  |  |  |  |  |  |  |  |  |
| 18 |  | 0.662 |  |  |  |  |  |  |  |  |
| 20 | 0.793 |  |  |  |  |  |  |  |  |  |
| 24 | 0.784 |  | 0.543 | 0.059 | 0.878 | 0.945 | 0.812 | 0.812 | 0.812 | 0.812 |
| 30 | 0.784 | 0.574 |  |  |  |  |  |  |  |  |
| 36 |  | 0.628 |  |  |  |  |  |  |  |  |
| 40 | 0.773 |  |  |  |  |  |  |  |  |  |
| 48 |  |  | 0.421 | 0.029 | 0.874 | 0.943 | 0.744 | 0.510 | 0.780 | 0.791 |
| 54 |  | 0.611 |  |  |  |  |  |  |  |  |
| 60 | 0.764 | 0.531 |  |  |  |  |  |  |  |  |
| 67 |  |  |  |  |  |  |  |  |  |  |
| 72 |  | 0.567 | 0.361 | 0.019 | 0.871 | 0.942 | 0.703 | 0.412 | 0.772 | 0.780 |
| 73 | 0.755 |  |  |  |  |  |  |  |  |  |
| 90 |  | 0.510 |  |  |  |  |  |  |  |  |
| 96 |  |  | 0.321 | 0.014 | 0.869 | 0.940 | 0.666 | 0.354 | 0.763 | 0.773 |
| 120 | 0.730 | 0.530 | 0.292 | 0.011 | 0.868 | 0.939 | 0.649 | 0.314 | 0.752 | 0.768 |
| 144 |  | 0.523 | 0.272 | 0.009 | 0.866 | 0.937 | 0.631 | 0.286 | 0.746 | 0.763 |
| 146 | 0.719 |  |  |  |  |  |  |  |  |  |
| 168 |  |  | 0.254 | 0.008 | 0.865 | 0.936 | 0.613 | 0.266 | 0.739 | 0.760 |
| 192 |  |  | 0.239 | 0.007 | 0.864 | 0.935 | 0.602 | 0.249 | 0.732 | 0.757 |
| 216 |  | 0.501 | 0.227 | 0.006 | 0.862 | 0.933 | 0.591 | 0.237 | 0.730 | 0.755 |
| 219 | 0.700 |  |  |  |  |  |  |  |  |  |
| 240 |  | 0.481 | 0.216 | 0.005 | 0.861 | 0.932 | 0.583 | 0.226 | 0.725 | 0.751 |
| 288 |  | 0.457 |  |  |  |  |  |  |  |  |
| 292 | 0.690 |  |  |  |  |  |  |  |  |  |
| 360 |  | 0.458 | 0.179 | 0.003 | 0.853 | 0.925 | 0.542 | 0.192 | 0.706 | 0.740 |
| 365 | 0.694 |  |  |  |  |  |  |  |  |  |
| 438 | 0.681 |  |  |  |  |  |  |  |  |  |
| 480 |  |  | 0.155 | 0.002 | 0.846 | 0.919 | 0.512 | 0.172 | 0.694 | 0.731 |
| 576 |  | 0.398 |  |  |  |  |  |  |  |  |
| 584 | 0.618 |  |  |  |  |  |  |  |  |  |
| 600 |  |  | 0.137 | 0.002 | 0.839 | 0.912 | 0.492 | 0.158 | 0.683 | 0.721 |
| 720 |  |  | 0.124 | 0.002 | 0.832 | 0.905 | 0.472 | 0.147 | 0.673 | 0.714 |
| 730 | 0.620 |  |  |  |  |  |  |  |  |  |
| 840 |  |  | 0.114 | 0.001 | 0.825 | 0.898 | 0.455 | 0.138 | 0.663 | 0.706 |
| 864 |  | 0.367 |  |  |  |  |  |  |  |  |
| 876 | 0.496 |  |  |  |  |  |  |  |  |  |
| 960 |  |  | 0.105 | 0.001 | 0.817 | 0.891 | 0.441 | 0.131 | 0.651 | 0.700 |
| 1080 |  |  | 0.098 | 0.001 | 0.810 | 0.882 | 0.428 | 0.124 | 0.642 | 0.693 |
| 1095 | 0.458 |  |  |  |  |  |  |  |  |  |
| 1200 |  |  | 0.091 | 0.001 | 0.802 | 0.874 | 0.416 | 0.119 | 0.634 | 0.687 |
| 1248 |  | 0.370 |  |  |  |  |  |  |  |  |
| 1460 | 0.355 |  |  |  |  |  |  |  |  |  |
| 1752 | 0.290 |  |  |  |  |  |  |  |  |  |
| 2190 | 0.236 |  |  |  |  |  |  |  |  |  |
| 2920 | 0.177 |  |  |  |  |  |  |  |  |  |
| 4380 | 0.113 |  |  |  |  |  |  |  |  |  |

### B. Relative RMSE Results - Solar

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Segment Number** | **Sequ-ential** | **Cate-gorical** | **Hourly Clustering** | | | | **Day-Type Clustering** | | | |
| **3-Way** | **Load** | **Solar** | **Wind** | **3-Way** | **Load** | **Solar** | **Wind** |
| 2 | 0.999 |  |  |  |  |  |  |  |  |  |
| 3 | 0.979 |  |  |  |  |  |  |  |  |  |
| 4 | 0.971 |  |  |  |  |  |  |  |  |  |
| 5 | 0.970 |  |  |  |  |  |  |  |  |  |
| 6 | 0.969 |  | 0.392 | 0.912 | 0.216 | 0.929 |  |  |  |  |
| 8 | 0.966 |  |  |  |  |  |  |  |  |  |
| 10 | 0.966 |  |  |  |  |  |  |  |  |  |
| 12 | 0.965 |  | 0.317 | 0.904 | 0.188 | 0.925 |  |  |  |  |
| 15 | 0.965 |  |  |  |  |  |  |  |  |  |
| 18 |  | 0.598 |  |  |  |  |  |  |  |  |
| 20 | 0.964 |  |  |  |  |  |  |  |  |  |
| 24 | 0.963 |  | 0.270 | 0.901 | 0.181 | 0.924 | 0.612 | 0.612 | 0.612 | 0.612 |
| 30 | 0.962 | 0.584 |  |  |  |  |  |  |  |  |
| 36 |  | 0.597 |  |  |  |  |  |  |  |  |
| 40 | 0.960 |  |  |  |  |  |  |  |  |  |
| 48 |  |  | 0.236 | 0.899 | 0.178 | 0.922 | 0.551 | 0.594 | 0.457 | 0.601 |
| 54 |  | 0.596 |  |  |  |  |  |  |  |  |
| 60 | 0.958 | 0.581 |  |  |  |  |  |  |  |  |
| 67 |  |  |  |  |  |  |  |  |  |  |
| 72 |  | 0.548 | 0.220 | 0.898 | 0.177 | 0.920 | 0.526 | 0.575 | 0.405 | 0.597 |
| 73 | 0.956 |  |  |  |  |  |  |  |  |  |
| 90 |  | 0.579 |  |  |  |  |  |  |  |  |
| 96 |  |  | 0.212 | 0.896 | 0.177 | 0.919 | 0.501 | 0.563 | 0.384 | 0.594 |
| 120 | 0.950 | 0.500 | 0.205 | 0.895 | 0.176 | 0.918 | 0.486 | 0.550 | 0.369 | 0.591 |
| 144 |  | 0.544 | 0.201 | 0.894 | 0.176 | 0.916 | 0.470 | 0.545 | 0.357 | 0.589 |
| 146 | 0.947 |  |  |  |  |  |  |  |  |  |
| 168 |  |  | 0.197 | 0.893 | 0.175 | 0.915 | 0.462 | 0.541 | 0.348 | 0.587 |
| 192 |  |  | 0.194 | 0.891 | 0.175 | 0.914 | 0.453 | 0.537 | 0.340 | 0.585 |
| 216 |  | 0.541 | 0.192 | 0.890 | 0.174 | 0.912 | 0.445 | 0.533 | 0.334 | 0.583 |
| 219 | 0.930 |  |  |  |  |  |  |  |  |  |
| 240 |  | 0.496 | 0.189 | 0.889 | 0.174 | 0.911 | 0.439 | 0.531 | 0.329 | 0.582 |
| 288 |  | 0.485 |  |  |  |  |  |  |  |  |
| 292 | 0.924 |  |  |  |  |  |  |  |  |  |
| 360 |  | 0.492 | 0.182 | 0.883 | 0.171 | 0.905 | 0.415 | 0.522 | 0.309 | 0.575 |
| 365 | 0.930 |  |  |  |  |  |  |  |  |  |
| 438 | 0.915 |  |  |  |  |  |  |  |  |  |
| 480 |  |  | 0.176 | 0.877 | 0.169 | 0.898 | 0.399 | 0.514 | 0.294 | 0.569 |
| 576 |  | 0.476 |  |  |  |  |  |  |  |  |
| 584 | 0.841 |  |  |  |  |  |  |  |  |  |
| 600 |  |  | 0.172 | 0.871 | 0.166 | 0.892 | 0.386 | 0.509 | 0.283 | 0.562 |
| 720 |  |  | 0.168 | 0.865 | 0.163 | 0.885 | 0.376 | 0.503 | 0.273 | 0.556 |
| 730 | 0.915 |  |  |  |  |  |  |  |  |  |
| 840 |  |  | 0.164 | 0.859 | 0.160 | 0.879 | 0.367 | 0.498 | 0.265 | 0.550 |
| 864 |  | 0.468 |  |  |  |  |  |  |  |  |
| 876 | 0.695 |  |  |  |  |  |  |  |  |  |
| 960 |  |  | 0.161 | 0.852 | 0.158 | 0.872 | 0.359 | 0.492 | 0.257 | 0.545 |
| 1080 |  |  | 0.158 | 0.847 | 0.155 | 0.865 | 0.352 | 0.488 | 0.250 | 0.539 |
| 1095 | 0.515 |  |  |  |  |  |  |  |  |  |
| 1200 |  |  | 0.156 | 0.841 | 0.152 | 0.858 | 0.345 | 0.483 | 0.244 | 0.535 |
| 1248 |  | 0.444 |  |  |  |  |  |  |  |  |
| 1460 | 0.478 |  |  |  |  |  |  |  |  |  |
| 1752 | 0.464 |  |  |  |  |  |  |  |  |  |
| 2190 | 0.402 |  |  |  |  |  |  |  |  |  |
| 2920 | 0.331 |  |  |  |  |  |  |  |  |  |
| 4380 | 0.239 |  |  |  |  |  |  |  |  |  |

### C. Relative RMSE Results - Wind

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Segment Number** | **Sequ-ential** | **Cate-gorical** | **Hourly Clustering** | | | | **Day-Type Clustering** | | | |
| **3-Way** | **Load** | **Solar** | **Wind** | **3-Way** | **Load** | **Solar** | **Wind** |
| 2 | 0.996 |  |  |  |  |  |  |  |  |  |
| 3 | 0.973 |  |  |  |  |  |  |  |  |  |
| 4 | 0.969 |  |  |  |  |  |  |  |  |  |
| 5 | 0.964 |  |  |  |  |  |  |  |  |  |
| 6 | 0.964 |  | 0.561 | 0.966 | 0.942 | 0.443 |  |  |  |  |
| 8 | 0.959 |  |  |  |  |  |  |  |  |  |
| 10 | 0.955 |  |  |  |  |  |  |  |  |  |
| 12 | 0.959 |  | 0.504 | 0.963 | 0.940 | 0.418 |  |  |  |  |
| 15 | 0.950 |  |  |  |  |  |  |  |  |  |
| 18 |  | 0.899 |  |  |  |  |  |  |  |  |
| 20 | 0.947 |  |  |  |  |  |  |  |  |  |
| 24 | 0.942 |  | 0.462 | 0.961 | 0.938 | 0.411 | 0.934 | 0.934 | 0.934 | 0.934 |
| 30 | 0.936 | 0.890 |  |  |  |  |  |  |  |  |
| 36 |  | 0.895 |  |  |  |  |  |  |  |  |
| 40 | 0.927 |  |  |  |  |  |  |  |  |  |
| 48 |  |  | 0.437 | 0.960 | 0.936 | 0.409 | 0.809 | 0.920 | 0.918 | 0.784 |
| 54 |  | 0.891 |  |  |  |  |  |  |  |  |
| 60 | 0.909 | 0.883 |  |  |  |  |  |  |  |  |
| 67 |  |  |  |  |  |  |  |  |  |  |
| 72 |  | 0.886 | 0.426 | 0.958 | 0.934 | 0.408 | 0.761 | 0.908 | 0.913 | 0.727 |
| 73 | 0.896 |  |  |  |  |  |  |  |  |  |
| 90 |  | 0.876 |  |  |  |  |  |  |  |  |
| 96 |  |  | 0.420 | 0.957 | 0.933 | 0.407 | 0.733 | 0.900 | 0.910 | 0.692 |
| 120 | 0.858 | 0.880 | 0.416 | 0.956 | 0.932 | 0.406 | 0.712 | 0.893 | 0.907 | 0.669 |
| 144 |  | 0.877 | 0.413 | 0.954 | 0.930 | 0.406 | 0.699 | 0.889 | 0.905 | 0.650 |
| 146 | 0.838 |  |  |  |  |  |  |  |  |  |
| 168 |  |  | 0.410 | 0.953 | 0.929 | 0.405 | 0.685 | 0.887 | 0.903 | 0.637 |
| 192 |  |  | 0.408 | 0.952 | 0.928 | 0.405 | 0.674 | 0.884 | 0.899 | 0.625 |
| 216 |  | 0.868 | 0.406 | 0.951 | 0.926 | 0.404 | 0.665 | 0.882 | 0.898 | 0.615 |
| 219 | 0.789 |  |  |  |  |  |  |  |  |  |
| 240 |  | 0.872 | 0.404 | 0.949 | 0.925 | 0.404 | 0.656 | 0.880 | 0.896 | 0.606 |
| 288 |  | 0.871 |  |  |  |  |  |  |  |  |
| 292 | 0.748 |  |  |  |  |  |  |  |  |  |
| 360 |  | 0.865 | 0.398 | 0.943 | 0.918 | 0.401 | 0.625 | 0.872 | 0.887 | 0.575 |
| 365 | 0.717 |  |  |  |  |  |  |  |  |  |
| 438 | 0.693 |  |  |  |  |  |  |  |  |  |
| 480 |  |  | 0.392 | 0.936 | 0.911 | 0.398 | 0.603 | 0.864 | 0.880 | 0.553 |
| 576 |  | 0.855 |  |  |  |  |  |  |  |  |
| 584 | 0.629 |  |  |  |  |  |  |  |  |  |
| 600 |  |  | 0.388 | 0.930 | 0.905 | 0.396 | 0.586 | 0.857 | 0.873 | 0.537 |
| 720 |  |  | 0.385 | 0.923 | 0.898 | 0.393 | 0.572 | 0.850 | 0.866 | 0.524 |
| 730 | 0.599 |  |  |  |  |  |  |  |  |  |
| 840 |  |  | 0.381 | 0.917 | 0.891 | 0.390 | 0.558 | 0.843 | 0.859 | 0.512 |
| 864 |  | 0.840 |  |  |  |  |  |  |  |  |
| 876 | 0.525 |  |  |  |  |  |  |  |  |  |
| 960 |  |  | 0.378 | 0.910 | 0.884 | 0.388 | 0.547 | 0.837 | 0.852 | 0.501 |
| 1080 |  |  | 0.374 | 0.904 | 0.877 | 0.385 | 0.536 | 0.830 | 0.845 | 0.491 |
| 1095 | 0.457 |  |  |  |  |  |  |  |  |  |
| 1200 |  |  | 0.371 | 0.897 | 0.870 | 0.382 | 0.526 | 0.823 | 0.838 | 0.482 |
| 1248 |  | 0.797 |  |  |  |  |  |  |  |  |
| 1460 | 0.405 |  |  |  |  |  |  |  |  |  |
| 1752 | 0.358 |  |  |  |  |  |  |  |  |  |
| 2190 | 0.306 |  |  |  |  |  |  |  |  |  |
| 2920 | 0.254 |  |  |  |  |  |  |  |  |  |
| 4380 | 0.177 |  |  |  |  |  |  |  |  |  |

### D. Hourly Clustering Relative RMSE Results at Different Spatial Resolutions

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Segment Number** | **3-Way Hourly Clustering** | | | **Load Hourly Clustering** | | | **Solar Hourly Clustering** | | | **Wind Hourly Clustering** | | |
|  | **model region** | **NERC** | **inter-conn** | **model region** | **NERC** | **inter-conn** | **model region** | **NERC** | **inter-conn** | **model region** | **NERC** | **inter-conn** |
| Load Dataset Relative RMSE | 24 | 0.543 | 0.453 | 0.483 | 0.059 | 0.344 | 0.488 | 0.878 | 0.867 | 0.843 | 0.945 | 0.898 | 0.811 |
| 48 | 0.421 | 0.400 | 0.465 | 0.029 | 0.340 | 0.485 | 0.874 | 0.863 | 0.841 | 0.943 | 0.896 | 0.809 |
| 72 | 0.361 | 0.376 | 0.453 | 0.019 | 0.339 | 0.484 | 0.871 | 0.861 | 0.834 | 0.942 | 0.895 | 0.808 |
| 96 | 0.321 | 0.363 | 0.446 | 0.014 | 0.338 | 0.483 | 0.869 | 0.859 | 0.832 | 0.940 | 0.894 | 0.806 |
| 120 | 0.292 | 0.354 | 0.442 | 0.011 | 0.337 | 0.482 | 0.868 | 0.857 | 0.830 | 0.939 | 0.892 | 0.805 |
| 144 | 0.272 | 0.347 | 0.438 | 0.009 | 0.337 | 0.481 | 0.866 | 0.856 | 0.829 | 0.937 | 0.891 | 0.804 |
| 168 | 0.254 | 0.341 | 0.435 | 0.008 | 0.336 | 0.481 | 0.865 | 0.854 | 0.828 | 0.936 | 0.890 | 0.803 |
| 192 | 0.239 | 0.336 | 0.432 | 0.007 | 0.336 | 0.480 | 0.864 | 0.853 | 0.826 | 0.935 | 0.889 | 0.801 |
| 216 | 0.227 | 0.332 | 0.430 | 0.006 | 0.335 | 0.479 | 0.862 | 0.851 | 0.825 | 0.933 | 0.887 | 0.800 |
| 240 | 0.216 | 0.329 | 0.428 | 0.005 | 0.335 | 0.479 | 0.861 | 0.850 | 0.822 | 0.932 | 0.886 | 0.798 |
| 360 | 0.179 | 0.318 | 0.421 | 0.003 | 0.332 | 0.475 | 0.853 | 0.842 | 0.815 | 0.925 | 0.880 | 0.792 |
| 480 | 0.155 | 0.311 | 0.415 | 0.002 | 0.329 | 0.472 | 0.846 | 0.835 | 0.808 | 0.919 | 0.873 | 0.786 |
| 600 | 0.137 | 0.305 | 0.410 | 0.002 | 0.327 | 0.468 | 0.839 | 0.828 | 0.800 | 0.912 | 0.867 | 0.780 |
| 720 | 0.124 | 0.301 | 0.406 | 0.002 | 0.324 | 0.464 | 0.832 | 0.821 | 0.792 | 0.905 | 0.860 | 0.775 |
| 840 | 0.114 | 0.296 | 0.402 | 0.001 | 0.321 | 0.460 | 0.825 | 0.814 | 0.786 | 0.898 | 0.853 | 0.769 |
| 960 | 0.105 | 0.293 | 0.398 | 0.001 | 0.319 | 0.456 | 0.817 | 0.807 | 0.779 | 0.891 | 0.847 | 0.762 |
| 1080 | 0.098 | 0.290 | 0.395 | 0.001 | 0.316 | 0.453 | 0.810 | 0.799 | 0.772 | 0.882 | 0.840 | 0.756 |
| 1200 | 0.091 | 0.286 | 0.391 | 0.001 | 0.313 | 0.449 | 0.802 | 0.792 | 0.765 | 0.874 | 0.834 | 0.750 |
| Solar Dataset Relative RMSE | 24 | 0.270 | 0.464 | 0.563 | 0.901 | 0.890 | 0.854 | 0.181 | 0.409 | 0.488 | 0.924 | 0.870 | 0.769 |
| 48 | 0.236 | 0.441 | 0.527 | 0.899 | 0.888 | 0.853 | 0.178 | 0.407 | 0.487 | 0.922 | 0.868 | 0.767 |
| 72 | 0.220 | 0.429 | 0.519 | 0.898 | 0.886 | 0.852 | 0.177 | 0.406 | 0.485 | 0.920 | 0.867 | 0.766 |
| 96 | 0.212 | 0.422 | 0.508 | 0.896 | 0.885 | 0.850 | 0.177 | 0.405 | 0.484 | 0.919 | 0.866 | 0.765 |
| 120 | 0.205 | 0.417 | 0.502 | 0.895 | 0.884 | 0.849 | 0.176 | 0.403 | 0.483 | 0.918 | 0.865 | 0.764 |
| 144 | 0.201 | 0.413 | 0.497 | 0.894 | 0.883 | 0.848 | 0.176 | 0.402 | 0.482 | 0.916 | 0.864 | 0.763 |
| 168 | 0.197 | 0.410 | 0.493 | 0.893 | 0.882 | 0.846 | 0.175 | 0.401 | 0.480 | 0.915 | 0.862 | 0.762 |
| 192 | 0.194 | 0.407 | 0.490 | 0.891 | 0.880 | 0.845 | 0.175 | 0.400 | 0.479 | 0.914 | 0.861 | 0.761 |
| 216 | 0.192 | 0.405 | 0.487 | 0.890 | 0.879 | 0.844 | 0.174 | 0.399 | 0.478 | 0.912 | 0.860 | 0.759 |
| 240 | 0.189 | 0.402 | 0.484 | 0.889 | 0.878 | 0.843 | 0.174 | 0.398 | 0.477 | 0.911 | 0.859 | 0.759 |
| 360 | 0.182 | 0.392 | 0.473 | 0.883 | 0.872 | 0.838 | 0.171 | 0.393 | 0.470 | 0.905 | 0.853 | 0.754 |
| 480 | 0.176 | 0.385 | 0.465 | 0.877 | 0.866 | 0.832 | 0.169 | 0.387 | 0.464 | 0.898 | 0.848 | 0.749 |
| 600 | 0.172 | 0.378 | 0.457 | 0.871 | 0.860 | 0.825 | 0.166 | 0.382 | 0.458 | 0.892 | 0.842 | 0.743 |
| 720 | 0.168 | 0.372 | 0.450 | 0.865 | 0.854 | 0.820 | 0.163 | 0.376 | 0.451 | 0.885 | 0.836 | 0.738 |
| 840 | 0.164 | 0.367 | 0.444 | 0.859 | 0.847 | 0.813 | 0.160 | 0.370 | 0.444 | 0.879 | 0.830 | 0.733 |
| 960 | 0.161 | 0.361 | 0.437 | 0.852 | 0.841 | 0.808 | 0.158 | 0.364 | 0.437 | 0.872 | 0.823 | 0.727 |
| 1080 | 0.158 | 0.356 | 0.431 | 0.847 | 0.835 | 0.802 | 0.155 | 0.358 | 0.430 | 0.865 | 0.817 | 0.722 |
| 1200 | 0.156 | 0.351 | 0.426 | 0.841 | 0.829 | 0.797 | 0.152 | 0.351 | 0.423 | 0.858 | 0.811 | 0.715 |
| Wind Dataset Relative RMSE | 24 | 0.462 | 0.783 | 0.915 | 0.961 | 0.956 | 0.945 | 0.938 | 0.934 | 0.929 | 0.411 | 0.749 | 0.871 |
| 48 | 0.437 | 0.763 | 0.902 | 0.960 | 0.955 | 0.943 | 0.936 | 0.932 | 0.928 | 0.409 | 0.748 | 0.870 |
| 72 | 0.426 | 0.753 | 0.885 | 0.958 | 0.953 | 0.942 | 0.934 | 0.931 | 0.925 | 0.408 | 0.747 | 0.868 |
| 96 | 0.420 | 0.746 | 0.879 | 0.957 | 0.952 | 0.941 | 0.933 | 0.930 | 0.924 | 0.407 | 0.746 | 0.867 |
| 120 | 0.416 | 0.741 | 0.874 | 0.956 | 0.951 | 0.940 | 0.932 | 0.928 | 0.922 | 0.406 | 0.745 | 0.866 |
| 144 | 0.413 | 0.738 | 0.870 | 0.954 | 0.949 | 0.938 | 0.930 | 0.927 | 0.921 | 0.406 | 0.744 | 0.865 |
| 168 | 0.410 | 0.735 | 0.865 | 0.953 | 0.948 | 0.937 | 0.929 | 0.925 | 0.920 | 0.405 | 0.743 | 0.864 |
| 192 | 0.408 | 0.732 | 0.862 | 0.952 | 0.947 | 0.936 | 0.928 | 0.924 | 0.918 | 0.405 | 0.742 | 0.863 |
| 216 | 0.406 | 0.730 | 0.859 | 0.951 | 0.946 | 0.934 | 0.926 | 0.923 | 0.917 | 0.404 | 0.741 | 0.862 |
| 240 | 0.404 | 0.727 | 0.856 | 0.949 | 0.944 | 0.933 | 0.925 | 0.922 | 0.916 | 0.404 | 0.740 | 0.861 |
| 360 | 0.398 | 0.718 | 0.844 | 0.943 | 0.938 | 0.927 | 0.918 | 0.915 | 0.909 | 0.401 | 0.736 | 0.855 |
| 480 | 0.392 | 0.710 | 0.835 | 0.936 | 0.931 | 0.921 | 0.911 | 0.908 | 0.903 | 0.398 | 0.731 | 0.849 |
| 600 | 0.388 | 0.703 | 0.827 | 0.930 | 0.925 | 0.914 | 0.905 | 0.902 | 0.896 | 0.396 | 0.726 | 0.844 |
| 720 | 0.385 | 0.697 | 0.819 | 0.923 | 0.918 | 0.908 | 0.898 | 0.895 | 0.889 | 0.393 | 0.721 | 0.838 |
| 840 | 0.381 | 0.691 | 0.812 | 0.917 | 0.912 | 0.901 | 0.891 | 0.888 | 0.883 | 0.390 | 0.716 | 0.832 |
| 960 | 0.378 | 0.685 | 0.805 | 0.910 | 0.905 | 0.895 | 0.884 | 0.881 | 0.876 | 0.388 | 0.712 | 0.826 |
| 1080 | 0.374 | 0.680 | 0.797 | 0.904 | 0.898 | 0.888 | 0.877 | 0.874 | 0.869 | 0.385 | 0.707 | 0.820 |
| 1200 | 0.371 | 0.674 | 0.790 | 0.897 | 0.891 | 0.882 | 0.870 | 0.867 | 0.862 | 0.382 | 0.702 | 0.814 |

### E. Day-Type Clustering Relative RMSE Results at Different Spatial Resolutions

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Segment Number** | **3-Way Day-Type Cluster** | | | **Load Day-Type Cluster** | | | **Solar Day-Type Cluster** | | | **Wind Day-Type Cluster** | | |
|  | **model region** | **NERC** | **inter-conn** | **model region** | **NERC** | **inter-conn** | **model region** | **NERC** | **inter-conn** | **model region** | **NERC** | **inter-conn** |
| Load Dataset Relative RMSE | 24 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 | 0.812 |
| 48 | 0.744 | 0.615 | 0.601 | 0.510 | 0.558 | 0.597 | 0.780 | 0.755 | 0.740 | 0.791 | 0.764 | 0.695 |
| 72 | 0.703 | 0.546 | 0.528 | 0.412 | 0.479 | 0.536 | 0.772 | 0.739 | 0.710 | 0.780 | 0.750 | 0.683 |
| 96 | 0.666 | 0.494 | 0.476 | 0.354 | 0.424 | 0.511 | 0.763 | 0.729 | 0.702 | 0.773 | 0.737 | 0.638 |
| 120 | 0.649 | 0.480 | 0.453 | 0.314 | 0.392 | 0.457 | 0.752 | 0.718 | 0.694 | 0.768 | 0.735 | 0.632 |
| 144 | 0.631 | 0.458 | 0.433 | 0.286 | 0.366 | 0.428 | 0.746 | 0.707 | 0.692 | 0.763 | 0.724 | 0.625 |
| 168 | 0.613 | 0.441 | 0.411 | 0.266 | 0.350 | 0.399 | 0.739 | 0.698 | 0.686 | 0.760 | 0.722 | 0.622 |
| 192 | 0.602 | 0.426 | 0.396 | 0.249 | 0.338 | 0.384 | 0.732 | 0.694 | 0.684 | 0.757 | 0.719 | 0.613 |
| 216 | 0.591 | 0.415 | 0.385 | 0.237 | 0.326 | 0.375 | 0.730 | 0.691 | 0.669 | 0.755 | 0.716 | 0.611 |
| 240 | 0.583 | 0.407 | 0.379 | 0.226 | 0.315 | 0.371 | 0.725 | 0.686 | 0.660 | 0.751 | 0.713 | 0.609 |
| 360 | 0.542 | 0.382 | 0.357 | 0.192 | 0.284 | 0.346 | 0.706 | 0.671 | 0.634 | 0.740 | 0.698 | 0.594 |
| 480 | 0.512 | 0.362 | 0.342 | 0.172 | 0.264 | 0.331 | 0.694 | 0.658 | 0.622 | 0.731 | 0.686 | 0.577 |
| 600 | 0.492 | 0.346 | 0.330 | 0.158 | 0.252 | 0.321 | 0.683 | 0.647 | 0.616 | 0.721 | 0.674 | 0.567 |
| 720 | 0.472 | 0.336 | 0.321 | 0.147 | 0.242 | 0.314 | 0.673 | 0.639 | 0.607 | 0.714 | 0.667 | 0.558 |
| 840 | 0.455 | 0.327 | 0.314 | 0.138 | 0.234 | 0.306 | 0.663 | 0.631 | 0.601 | 0.706 | 0.660 | 0.554 |
| 960 | 0.441 | 0.317 | 0.308 | 0.131 | 0.227 | 0.301 | 0.651 | 0.625 | 0.596 | 0.700 | 0.654 | 0.549 |
| 1080 | 0.428 | 0.309 | 0.302 | 0.124 | 0.222 | 0.295 | 0.642 | 0.616 | 0.589 | 0.693 | 0.646 | 0.544 |
| 1200 | 0.416 | 0.302 | 0.296 | 0.119 | 0.217 | 0.290 | 0.634 | 0.609 | 0.582 | 0.687 | 0.639 | 0.538 |
| Solar Dataset Relative RMSE | 24 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 |
| 48 | 0.551 | 0.557 | 0.595 | 0.594 | 0.592 | 0.595 | 0.457 | 0.502 | 0.516 | 0.601 | 0.586 | 0.565 |
| 72 | 0.526 | 0.530 | 0.567 | 0.575 | 0.572 | 0.580 | 0.405 | 0.472 | 0.500 | 0.597 | 0.581 | 0.555 |
| 96 | 0.501 | 0.521 | 0.542 | 0.563 | 0.563 | 0.579 | 0.384 | 0.460 | 0.490 | 0.594 | 0.578 | 0.552 |
| 120 | 0.486 | 0.507 | 0.540 | 0.550 | 0.553 | 0.552 | 0.369 | 0.453 | 0.487 | 0.591 | 0.577 | 0.545 |
| 144 | 0.470 | 0.502 | 0.539 | 0.545 | 0.541 | 0.544 | 0.357 | 0.447 | 0.484 | 0.589 | 0.574 | 0.542 |
| 168 | 0.462 | 0.499 | 0.526 | 0.541 | 0.537 | 0.530 | 0.348 | 0.443 | 0.482 | 0.587 | 0.571 | 0.539 |
| 192 | 0.453 | 0.496 | 0.524 | 0.537 | 0.535 | 0.529 | 0.340 | 0.439 | 0.481 | 0.585 | 0.569 | 0.537 |
| 216 | 0.445 | 0.493 | 0.523 | 0.533 | 0.532 | 0.528 | 0.334 | 0.436 | 0.479 | 0.583 | 0.567 | 0.536 |
| 240 | 0.439 | 0.489 | 0.518 | 0.531 | 0.529 | 0.528 | 0.329 | 0.433 | 0.477 | 0.582 | 0.566 | 0.534 |
| 360 | 0.415 | 0.474 | 0.509 | 0.522 | 0.520 | 0.518 | 0.309 | 0.424 | 0.471 | 0.575 | 0.558 | 0.525 |
| 480 | 0.399 | 0.464 | 0.499 | 0.514 | 0.512 | 0.511 | 0.294 | 0.416 | 0.466 | 0.569 | 0.550 | 0.518 |
| 600 | 0.386 | 0.455 | 0.493 | 0.509 | 0.506 | 0.507 | 0.283 | 0.409 | 0.461 | 0.562 | 0.544 | 0.512 |
| 720 | 0.376 | 0.448 | 0.483 | 0.503 | 0.501 | 0.501 | 0.273 | 0.403 | 0.457 | 0.556 | 0.539 | 0.507 |
| 840 | 0.367 | 0.442 | 0.480 | 0.498 | 0.496 | 0.497 | 0.265 | 0.398 | 0.452 | 0.550 | 0.534 | 0.501 |
| 960 | 0.359 | 0.436 | 0.476 | 0.492 | 0.491 | 0.493 | 0.257 | 0.394 | 0.448 | 0.545 | 0.529 | 0.495 |
| 1080 | 0.352 | 0.430 | 0.472 | 0.488 | 0.486 | 0.489 | 0.250 | 0.389 | 0.444 | 0.539 | 0.524 | 0.490 |
| 1200 | 0.345 | 0.425 | 0.468 | 0.483 | 0.481 | 0.485 | 0.244 | 0.384 | 0.440 | 0.535 | 0.518 | 0.484 |
| Wind Dataset Relative RMSE | 24 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 | 0.934 |
| 48 | 0.809 | 0.889 | 0.916 | 0.920 | 0.919 | 0.917 | 0.918 | 0.912 | 0.903 | 0.784 | 0.859 | 0.888 |
| 72 | 0.761 | 0.873 | 0.902 | 0.908 | 0.905 | 0.906 | 0.913 | 0.907 | 0.898 | 0.727 | 0.834 | 0.880 |
| 96 | 0.733 | 0.865 | 0.887 | 0.900 | 0.896 | 0.905 | 0.910 | 0.904 | 0.895 | 0.692 | 0.822 | 0.874 |
| 120 | 0.712 | 0.852 | 0.886 | 0.893 | 0.893 | 0.889 | 0.907 | 0.901 | 0.892 | 0.669 | 0.812 | 0.869 |
| 144 | 0.699 | 0.842 | 0.884 | 0.889 | 0.888 | 0.885 | 0.905 | 0.897 | 0.890 | 0.650 | 0.805 | 0.866 |
| 168 | 0.685 | 0.838 | 0.877 | 0.887 | 0.885 | 0.879 | 0.903 | 0.895 | 0.889 | 0.637 | 0.800 | 0.863 |
| 192 | 0.674 | 0.834 | 0.876 | 0.884 | 0.883 | 0.877 | 0.899 | 0.893 | 0.887 | 0.625 | 0.795 | 0.861 |
| 216 | 0.665 | 0.828 | 0.875 | 0.882 | 0.881 | 0.876 | 0.898 | 0.892 | 0.885 | 0.615 | 0.791 | 0.859 |
| 240 | 0.656 | 0.824 | 0.872 | 0.880 | 0.879 | 0.874 | 0.896 | 0.890 | 0.882 | 0.606 | 0.787 | 0.857 |
| 360 | 0.625 | 0.804 | 0.865 | 0.872 | 0.872 | 0.867 | 0.887 | 0.882 | 0.874 | 0.575 | 0.772 | 0.847 |
| 480 | 0.603 | 0.790 | 0.857 | 0.864 | 0.864 | 0.859 | 0.880 | 0.875 | 0.867 | 0.553 | 0.760 | 0.839 |
| 600 | 0.586 | 0.779 | 0.849 | 0.857 | 0.857 | 0.852 | 0.873 | 0.868 | 0.860 | 0.537 | 0.749 | 0.832 |
| 720 | 0.572 | 0.769 | 0.842 | 0.850 | 0.850 | 0.845 | 0.866 | 0.860 | 0.852 | 0.524 | 0.741 | 0.825 |
| 840 | 0.558 | 0.758 | 0.834 | 0.843 | 0.843 | 0.838 | 0.859 | 0.853 | 0.846 | 0.512 | 0.732 | 0.819 |
| 960 | 0.547 | 0.749 | 0.827 | 0.837 | 0.836 | 0.831 | 0.852 | 0.847 | 0.838 | 0.501 | 0.724 | 0.812 |
| 1080 | 0.536 | 0.740 | 0.819 | 0.830 | 0.830 | 0.825 | 0.845 | 0.840 | 0.830 | 0.491 | 0.717 | 0.805 |
| 1200 | 0.526 | 0.731 | 0.812 | 0.823 | 0.823 | 0.818 | 0.838 | 0.834 | 0.823 | 0.482 | 0.709 | 0.798 |