

Table 1: Comprehensive Model Performance Metrics Across Datasets and Seasons

| Model             | Dataset/Season | Performance Metrics |         |        |                |          |           |                       |
|-------------------|----------------|---------------------|---------|--------|----------------|----------|-----------|-----------------------|
|                   |                | MAE                 | RMSE    | nRMSE  | R <sup>2</sup> | WAPE (%) | SMAPE (%) | Skill vs. Persistence |
| XGBoost           | Training       | 0.7010              | 1.4043  | 0.0051 | 0.9998         | 1.2173   | 1.1455    | 96.5                  |
|                   | Validation     | 0.8163              | 1.6438  | 0.0060 | 0.9997         | 1.1341   | 1.3103    | 97.2                  |
|                   | Testing        | 0.8024              | 1.6121  | 0.0059 | 0.9997         | 1.1941   | 1.2836    | 96.8                  |
|                   | Spring         | 0.7168              | 1.1653  | 0.0042 | 0.9998         | 1.1889   | 1.1787    | 97.5                  |
|                   | Summer         | 0.6634              | 1.0851  | 0.0040 | 0.9998         | 1.1796   | 1.0798    | 97.8                  |
|                   | Autumn         | 0.7776              | 1.8252  | 0.0066 | 0.9996         | 1.2539   | 1.2698    | 96.2                  |
|                   | Winter         | 0.7876              | 1.7476  | 0.0064 | 0.9996         | 1.1738   | 1.2659    | 96.5                  |
| Decision Tree     | Training       | 0.3313              | 1.0331  | 0.0038 | 0.9999         | 0.5754   | 0.5975    | 97.8                  |
|                   | Validation     | 0.5399              | 1.4418  | 0.0053 | 0.9998         | 0.7501   | 0.8930    | 97.2                  |
|                   | Testing        | 0.5429              | 1.4184  | 0.0052 | 0.9997         | 0.8080   | 0.9140    | 97.5                  |
|                   | Spring         | 0.3797              | 0.8510  | 0.0031 | 0.9999         | 0.6297   | 0.6875    | 97.8                  |
|                   | Summer         | 0.3349              | 0.8239  | 0.0030 | 0.9999         | 0.5955   | 0.6402    | 97.5                  |
|                   | Autumn         | 0.4017              | 1.3174  | 0.0048 | 0.9998         | 0.6478   | 0.6952    | 97.2                  |
|                   | Winter         | 0.4746              | 1.5749  | 0.0057 | 0.9997         | 0.7072   | 0.7974    | 96.8                  |
| Linear Regression | Training       | 0.9699              | 2.4811  | 0.0090 | 0.9992         | 1.6844   | 1.4723    | 93.2                  |
|                   | Validation     | 0.9445              | 2.3452  | 0.0085 | 0.9993         | 1.3122   | 1.1224    | 95.5                  |
|                   | Testing        | 0.7468              | 2.3001  | 0.0084 | 0.9993         | 1.1114   | 1.5137    | 95.8                  |
|                   | Spring         | 0.8424              | 1.6799  | 0.0061 | 0.9996         | 1.3971   | 1.4323    | 95.2                  |
|                   | Summer         | 0.8904              | 1.7825  | 0.0065 | 0.9996         | 1.5834   | 1.3913    | 95.5                  |
|                   | Autumn         | 1.0411              | 3.1110  | 0.0113 | 0.9989         | 1.6789   | 1.4508    | 93.5                  |
|                   | Winter         | 0.9691              | 2.9455  | 0.0107 | 0.9990         | 1.4442   | 1.3867    | 93.8                  |
| Ridge Regression  | Training       | 0.9677              | 2.4814  | 0.0090 | 0.9992         | 1.6806   | 1.4614    | 93.5                  |
|                   | Validation     | 0.9368              | 2.3416  | 0.0085 | 0.9993         | 1.3015   | 1.1042    | 95.2                  |
|                   | Testing        | 0.7524              | 2.3090  | 0.0084 | 0.9993         | 1.1196   | 1.5171    | 95.5                  |
|                   | Spring         | 0.8437              | 1.6842  | 0.0061 | 0.9996         | 1.3994   | 1.4290    | 95.2                  |
|                   | Summer         | 0.8913              | 1.7854  | 0.0065 | 0.9996         | 1.5850   | 1.3878    | 95.5                  |
|                   | Autumn         | 1.0355              | 3.1099  | 0.0113 | 0.9989         | 1.6699   | 1.4323    | 93.2                  |
|                   | Winter         | 0.9643              | 2.9453  | 0.0107 | 0.9990         | 1.4370   | 1.3724    | 93.5                  |
| Lasso Regression  | Training       | 0.9815              | 2.4994  | 0.0091 | 0.9992         | 1.7046   | 1.4683    | 93.2                  |
|                   | Validation     | 0.9607              | 2.3457  | 0.0085 | 0.9993         | 1.3346   | 1.1129    | 95.5                  |
|                   | Testing        | 0.6648              | 2.2200  | 0.0081 | 0.9994         | 0.9893   | 1.2639    | 95.8                  |
|                   | Spring         | 0.8097              | 1.6715  | 0.0061 | 0.9996         | 1.3430   | 1.3299    | 95.2                  |
|                   | Summer         | 0.8729              | 1.7993  | 0.0066 | 0.9996         | 1.5522   | 1.3222    | 95.5                  |
|                   | Autumn         | 1.0536              | 3.1095  | 0.0113 | 0.9989         | 1.6991   | 1.4347    | 93.2                  |
|                   | Winter         | 1.0040              | 2.9469  | 0.0107 | 0.9990         | 1.4963   | 1.3867    | 93.5                  |
| Elastic Net       | Training       | 0.9815              | 2.4994  | 0.0091 | 0.9992         | 1.7046   | 1.4683    | 93.2                  |
|                   | Validation     | 0.9607              | 2.3457  | 0.0085 | 0.9993         | 1.3346   | 1.1129    | 95.5                  |
|                   | Testing        | 0.6648              | 2.2200  | 0.0081 | 0.9994         | 0.9893   | 1.2639    | 95.8                  |
|                   | Spring         | 0.8097              | 1.6715  | 0.0061 | 0.9996         | 1.3430   | 1.3299    | 95.2                  |
|                   | Summer         | 0.8729              | 1.7993  | 0.0066 | 0.9996         | 1.5522   | 1.3222    | 95.5                  |
|                   | Autumn         | 1.0536              | 3.1095  | 0.0113 | 0.9989         | 1.6991   | 1.4347    | 93.2                  |
|                   | Winter         | 1.0040              | 2.9469  | 0.0107 | 0.9990         | 1.4963   | 1.3867    | 93.5                  |
| Persistence       | Training       | 13.5393             | 37.4153 | 0.1362 | 0.8228         | 23.5221  | 31.1036   | 78.5                  |
|                   | Validation     | 25.5682             | 58.1383 | 0.2117 | 0.5993         | 35.4606  | 42.2615   | 72.2                  |
|                   | Testing        | 21.7834             | 52.2341 | 0.1903 | 0.6600         | 32.4614  | 40.1386   | 75.8                  |
|                   | Spring         | 15.1911             | 40.0742 | 0.1459 | 0.7877         | 25.2151  | 32.5199   | 79.5                  |
|                   | Summer         | 12.9427             | 39.0129 | 0.1420 | 0.7971         | 23.0071  | 29.3189   | 80.2                  |
|                   | Autumn         | 21.1276             | 51.3114 | 0.1868 | 0.6908         | 34.0707  | 42.3788   | 74.2                  |
|                   | Winter         | 17.8128             | 44.0137 | 0.1602 | 0.7749         | 26.5694  | 34.9198   | 77.5                  |