**INFORME DE RESULTADOS**

El periodo de predicción va a ser de 2021-01-01 a 2021-12-31. Todas las métricas globales van a ser evaluadas en este proceso.

**VARIABLES**

Var 1 🡪 df1 con lag 24 y sin demanda, eólica\_fotov y festivos

Var 2 🡪 Todas + lag24, 48 y 1 semana

Var 3 🡪 Todas + lag24, 48 y 1 semana, menos Brent, Demanda, Eolica, Festivo Regional, Humedad\_Relativa, Radiacion y Precipitacion

Var 4 🡪 Todas + lag24, menos Brent, Demanda, Eolica, Festivo Regional, Humedad\_Relativa, Radiacion y Precipitacion

**BASELINE**

Lo primero es la realización de un modelo baseline a partir del cual mejorar los subsecuentes posibles modelos.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MODELO | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| BASELINE | **16.07** | **8.92** | **85.53** | **14.36** | **27.38** | **74.84** |

**REGRESIÓN LINEAL**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| Var 2 | No | 11.54 | 7.16 | 143.97 | 10.31 | 19.83 | 83.81 |
| Var 2 | 7 | 21.21 | 11 | 100.23 | 18.95 | 44.5 | 80.39 |
| Var 2 | 14 | 38.45 | 15.49 | 67.99 | 34.35 | 86 | 81.86 |
| Var 2 | 30 | 12.7 | 8.36 | 87.91 | 11.35 | 20.2 | 84.05 |
| Var 2 | 60 | 10.89 | 7.24 | 117.13 | 9.73 | 17.02 | 84.45 |
| Var 2 | 90 | 10.41 | 7.1 | 104.89 | 9.30 | 16.4 | 84.29 |
| Var 2 | 150 | 10.27 | 6.76 | 120.6 | 9.17 | 16.46 | 84.29 |
| Var 2 | **220** | **10.21** | **6.78** | **122.39** | **9.12** | **16.59** | **83.99** |
| Var 2 | 365 | 10.76 | 6.68 | 132.38 | 9.61 | 18.13 | 83.56 |
| Var 3 | No | 12.02 | 8.06 | 125.88 | 10.74 | 19.99 | 82.76 |
| Var 3 | 90 | 10.52 | 7.37 | 116.75 | 9.40 | 16.45 | 83.26 |
| Var 4 | 90 | 10.67 | 7.39 | 118.88 | 9.53 | 16.53 | 83.25 |
| Var 5 | 150 | 10.49 | 6.96 | 135.09 | 9.37 | 16.72 | 84.24 |

**REGRESIÓN LINEAL + SARIMA DE LOS RESIDUOS**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| Var 2 | No |  |  |  |  |  |  |
| Var 2 | 7 | 10.43 | 6.81 | 123.48 | 9.31 | 17.05 | 83.43 |
| Var 2 | 14 | 10.33 | 6.72 | 123.12 | 9.23 | 16.99 | 83.62 |
| Var 2 | 30 | 10.38 | 6.7 | 123.34 | 9.27 | 16.95 | 83.75 |
| Var 2 | 60 | 10.29 | 6.66 | 123.15 | 9.2 | 16.69 | 83.8 |
| Var 2 | 90 | 10.27 | 6.67 | 123.12 | 9.17 | 16.86 | 83.82 |
| Var 2 | 150 | 10.24 | 6.62 | 123.02 | 9.15 | 16.85 | 83.83 |
| Var 2 | **220** |  |  |  |  |  |  |
| Var 2 | 365 |  |  |  |  |  |  |

**REGRESIÓN RIDGE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| Todas | No | 11.7 | 7.28 | 154.06 | 10.45 | 20.11 | 83.81 |
| Todas | 7 | 14.1 | 8.51 | 109.62 | 12.6 | 23.61 | 80.27 |
| Todas | 14 | 24.78 | 12.05 | 84.41 | 22.14 | 44.32 | 81.37 |
| Todas | 21 | 15.74 | 10.04 | 72.91 | 14.06 | 25.73 | 82.46 |
| Todas | 30 | 12.31 | 8.11 | 94.67 | 11.00 | 19.64 | 82.83 |
| Todas | 45 | 11.07 | 7.17 | 97.09 | 9.89 | 17.59 | 83.07 |
|  | 60 | 10.79 | 7.14 | 117.45 | 9.64 | 16.95 | 83.23 |
| Todas | 90 | 10.37 | 7.04 | 105.73 | 9.26 | 16.37 | 83.31 |
| Todas | 120 | 10.29 | 6.86 | 117.43 | 9.19 | 16.44 | 83.39 |
| Todas | 150 | 10.26 | 6.76 | 122.00 | 9.16 | 16.45 | 83.47 |
| Todas | **220** | **10.21** | **6.76** | **123.09** | **9.12** | **16.59** | **83.13** |
| Todas | 365 | 10.77 | 6.72 | 132.62 | 9.62 | 18.14 | 82.95 |

**REGRESIÓN LASSO**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| Todas | No |  |  |  |  |  |  |
| Todas | 7 |  |  |  |  |  |  |
| Todas | 14 |  |  |  |  |  |  |
| Todas | 30 |  |  |  |  |  |  |
| Todas | 45 |  |  |  |  |  |  |
| Todas | 60 |  |  |  |  |  |  |
| Todas | 90 |  |  |  |  |  |  |
| Todas | 120 |  |  |  |  |  |  |
| Todas | 150 |  |  |  |  |  |  |
| Todas | **220** |  |  |  |  |  |  |
| Todas | 365 |  |  |  |  |  |  |

**RANDOM FOREST**

Conf\_1 = (n\_estimators = 150, criterion = "mae",max\_depth = None,max\_features = X\_train.shape[1] -1, n\_jobs = -1, random\_state = 123)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| Conf\_1 | No |  |  |  |  |  |  |
| Conf\_1 | 7 | 10.45 | 6.16 | 62.07 | 9.33 | 17.88 | 82.09 |
| Conf\_1 | 14 | 10.22 | 5.94 | 63.79 | 9.13 | 17.67 | 83.08 |
| Conf\_1 | 30 | 10.36 | 6.18 | 71.16 | 9.26 | 16.95 | 83.00 |
| Conf\_1 | 60 | 10.60 | 6.31 | 112.93 | 9.47 | 17.49 | 83.29 |
| Conf\_1 | 90 | 10.54 | 6.39 | 194.88 | 9.42 | 17.09 | 83.19 |
| Conf\_1 | 120 | 10.51 | 6.44 | 168.13 | 9.39 | 17.24 | 83.01 |
| Conf\_1 | 150 | 10.48 | 6.38 | 120.47 | 9.36 | 17.1 | 83.15 |
| Conf\_1 | 220 | 10.58 | 6.41 | 101.65 | 9.45 | 17.3 | 83.17 |
| Conf\_1 | 365 |  |  |  |  |  |  |

**XGBOOST**

(n\_estimators=1000,max\_depth=None,eta=0.1,subsample=0.7,colsample\_bytree=0.8)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
|  | None |  |  |  |  |  |  |
|  | 7 | 10.64 | 6.27 | 58.4 | 9.51 | 17.78 | 78.89 |
|  | 14 | 10.03 | 6.11 | 56.59 | 8.96 | 16.45 | 79.77 |
| 0.03 eta | 14 | 10.01 | 5.99 | 61.29 | 8.95 | 16.58 | 81.33 |
| 0.03 eta | 30 | 10.00 | 6.22 | 67.9 | 8.93 | 16.1 | 82.25 |
| 0.03 eta | 60 | 10.09 | 6.31 | 105.65 | 9.02 | 16.14 | 82.61 |
| 0.03 eta | 90 | 9.99 | 6.27 | 123.05 | 8.92 | 15.73 | 82.67 |
| 0.03 eta | 120 | 9.93 | 6.25 | 113.31 | 8.87 | 15.5 | 83.13 |
| 0.03 eta | 150 | 9.83 | 6.18 | 82.57 | 8.78 | 15.26 | 82.83 |
| 0.03 eta | 220 | 9.96 | 6.22 | 81.77 | 8.9 | 15.82 | 82.94 |
| 0.03 eta | 365 | 9.90 | 6.12 | 74.2 | 8.85 | 15.69 | 83.39 |

**SARIMA**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| Endog | 7 | 15.29 | 9.22 | 65.7 | 13.66 | 24.19 | 81.64 |
| Endog | 14 | 14.74 | 8.97 | 111.55 | 13.17 | 23.49 | 82.73 |
| Endog | 30 | 14.16 | 8.72 | 194.69 | 12.65 | 22.78 | 82.91 |
| Endog | 60 | 14.15 | 8.66 | 141.75 | 12.64 | 22.72 | 83.1 |
| Endog | 90 | 14.3 | 8.79 | 148.62 | 12.78 | 23.11 | 82.76 |
|  | 120 |  |  |  |  |  |  |
|  | 150 |  |  |  |  |  |  |
|  | 220 |  |  |  |  |  |  |
|  | 365 |  |  |  |  |  |  |

**LSTM**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| LSTM, DROPOUT | Training | Retrain / steps\_epochs | MAE | MAE (median) | MAPE | WMAPE | RMSE | % TREND |
| (64,32,16; 0.2) | (100, 100) | (1, 24) | 14.02 | 8.05 | 200.75 | 12.53 | 23.45 | 81.63 |
| (64,32,16; 0.1) | (100, 100) | (3, 24) | 13.63 | 7.52 | 94.65 | 12.16 | 23.27 | 81.67 |
| (124, 64,32; 0.1) | (150, 100) | (5,24) | 13.67 | 7.45 | 64.96 | 12.19 | 23.29 | 81.75 |

**CNN**

**HÍBRIDO**