**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) | WMAPE | RMSE | % TREND |
| Var 1 | No | 12.23 | 8.25 | 10.93 | 20.3 | 83.42 |
| Var 1 | 7 | 17.99 | 9.32 | 16.08 | 41.04 | 81.45 |
| Var 1 | 14 | 60.36 | 18.8 | 53.93 | 221.43 | 81.62 |
| Var 1 | 30 | 11.43 | 7.73 | 10.21 | 18.03 | 83.79 |
| Var 1 | 60 | 10.88 | 7.46 | 9.72 | 16.88 | 84.22 |
| Var 1 | 90 | 10.57 | 7.41 | 9.45 | 16.58 | 84.2 |
| Var 1 | 150 | 10.83 | 7.43 | 9.68 | 17.0 | 84.11 |
| Var 1 | 220 | 10.77 | 7.63 | 9.62 | 16.97 | 84.06 |
| Var 1 | 365 | 11.49 | 7.84 | 10.26 | 18.68 | 83.75 |
| Var 2 | No | 11.54 | 7.16 | 10.31 | 19.83 | 83.81 |
| Var 2 | 7 | 21.21 | 11 | 18.95 | 44.5 | 80.39 |
| Var 2 | 14 | 38.45 | 15.49 | 34.35 | 86 | 81.86 |
| Var 2 | 30 | 12.7 | 8.36 | 11.35 | 20.2 | 84.05 |
| Var 2 | 60 | 10.89 | 7.24 | 9.73 | 17.02 | 84.45 |
| Var 2 | 90 | 10.41 | 7.1 | 9.30 | 16.4 | 84.29 |
| Var 2 | 150 | 10.27 | 6.76 | 9.17 | 16.46 | 84.29 |
| Var 2 | **220** | **10.21** | **6.78** | **9.12** | **16.59** | **83.99** |
| Var 2 | 365 | 10.76 | 6.68 | 9.61 | 18.13 | 83.56 |
| Var 3 | No | 12.02 | 8.06 | 10.74 | 19.99 | 82.76 |
| Var 3 | 7 | 19.99 | 9.78 | 17.86 | 48.6 | 81.45 |
| Var 3 | 14 | 173.29 | 24.26 | 154.82 | 1707.78 | 80.88 |
| Var 3 | 30 | 12.01 | 8.14 | 10.73 | 18.86 | 83.61 |
| Var 3 | 60 | 10.69 | 7.24 | 9.55 | 16.81 | 84.13 |
| Var 3 | 90 | 10.59 | 7.36 | 9.46 | 16.58 | 84.22 |
| Var 3 | 150 | 10.52 | 6.95 | 9.40 | 16.76 | 84.25 |
| Var 3 | 220 | 10.50 | 7.00 | 9.38 | 16.84 | 84.39 |
| Var 3 | 365 | 11.25 | 7.39 | 10.05 | 18.52 | 84.16 |

**REGRESIÓN RIDGE y Lasso**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | WMAPE | RMSE | % TREND |
| Ridge | No | 11.55 | 7.16 | 10.32 | 19.84 | 83.0 |
| Ridge | 7 | 13.86 | 8.52 | 12.38 | 22.82 | 80.28 |
| Ridge | 14 | 24.41 | 12.0 | 21.81 | 43.64 | 81.40 |
| Ridge | 30 | 12.34 | 8.13 | 11.03 | 19.71 | 82.83 |
| Ridge | 60 | 10.80 | 7.16 | 9.65 | 16.96 | 83.20 |
| Ridge | 90 | 10.37 | 7.04 | 9.27 | 16.38 | 83.30 |
| Ridge | 150 | 10.26 | 6.76 | 9.17 | 16.46 | 83.45 |
| Ridge | **220** | **10.21** | **6.76** | **9.12** | **16.59** | **83.16** |
| Ridge | 365 | 10.77 | 6.71 | 9.62 | 18.14 | 82.92 |
| Lasso | No | 11.9 | 7.63 | 10.63 | 20.05 | 83.85 |
| Lasso | 7 | 12.84 | 7.48 | 11.47 | 22.68 | 82.48 |
| Lasso | 14 | 11.84 | 7.18 | 10.58 | 20.09 | 83.23 |
| Lasso | 30 | 11.00 | 7.17 | 9.83 | 18.06 | 84.94 |
| Lasso | 60 | 10.61 | 7.15 | 9.48 | 16.80 | 84.87 |
| Lasso | **90** | **10.12** | **6.86** | **9.04** | **16.25** | **84.62** |
| Lasso | 150 | 10.36 | 7.03 | 9.25 | 16.58 | 84.04 |
| Lasso | **220** | 10.46 | 6.98 | 9.34 | 16.92 | 84.28 |
| Lasso | 365 | 11.18 | 7.18 | 9.99 | 18.46 | 83.85 |

**SARIMA (2,1,1)(1,0,1,24)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | WMAPE | RMSE | % TREND |
| Endog | No | 15.61 | 10.28 | 13.94 | 24.10 | 83.27 |
| Endog | 7 | 15.29 | 9.22 | 13.66 | 24.19 | 81.64 |
| Endog | 14 | 14.74 | 8.97 | 13.17 | 23.49 | 82.73 |
| Endog | 30 | 14.16 | 8.72 | 12.65 | 22.78 | 82.91 |
| Endog | 60 | 14.15 | 8.66 | 12.64 | 22.72 | 83.1 |
| Endog | 90 | 14.3 | 8.79 | 12.78 | 23.11 | 82.76 |
| Endog | 150 | 14.58 | 8.73 | 13.03 | 23.82 | 82.68 |
| Endog | 220 | 14.42 | 8.64 | 12.88 | 23.46 | 82.7 |
| Endog | 365 | 15.59 | 10.21 | 13.93 | 24.1 | 83.29 |
| (2,1,1)(2,0,1,24) | 60 | 14.19 | 8.74 | 12.68 | 22.83 | 83.01 |

**REGRESIÓN LINEAL + SARIMA DE LOS RESIDUOS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | WMAPE | RMSE | % TREND |
| Var 2 | No |  |  |  |  |  |
| Var 2 | 7 | 10.43 | 6.81 | 9.31 | 17.05 | 83.43 |
| Var 2 | 14 | 10.33 | 6.72 | 9.23 | 16.99 | 83.62 |
| Var 2 | 30 | 10.38 | 6.7 | 9.27 | 16.95 | 83.75 |
| Var 2 | 60 | 10.29 | 6.66 | 9.2 | 16.69 | 83.8 |
| Var 2 | 90 | 10.27 | 6.67 | 9.17 | 16.86 | 83.82 |
| Var 2 | 150 | 10.24 | 6.62 | 9.15 | 16.85 | 83.83 |
| Var 2 | 220 | 10.26 | 6.60 | 9.17 | 16.89 | 83.89 |
| Var 2 | 365 | 10.26 | 6.63 | 9.17 | 16.91 | 83.95 |

**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 | Target Mean | Rolling window | MAE | MAE (median) | WMAPE | RMSE | % TREND |
| Conf\_1 | No | No |  |  |  |  |  |
| Conf\_1 | No | 7 | 10.45 | 6.16 | 9.33 | 17.88 | 82.09 |
| Conf\_1 | No | 14 | 10.22 | 5.94 | 9.13 | 17.67 | 83.08 |
| Conf\_1 | No | 30 | 10.36 | 6.18 | 9.26 | 16.95 | 83.00 |
| Conf\_1 | No | 60 | 10.60 | 6.31 | 9.47 | 17.49 | 83.29 |
| Conf\_1 | No | 90 | 10.54 | 6.39 | 9.42 | 17.09 | 83.19 |
| Conf\_1 | No | 150 | 10.48 | 6.38 | 9.36 | 17.1 | 83.15 |
| Conf\_1 | No | 220 | 10.58 | 6.41 | 9.45 | 17.3 | 83.17 |
| Conf\_1 | No | 365 | 10.75 | 6.50 | 9.61 | 17.56 | 82.87 |
| Conf\_1 | Si | 30 | 10.36 | 6.25 | 9.26 | 16.97 | 83.64 |
| Conf\_1 (X\_train.shape = [1] - 6 | Si | 30 | 10.19 | 6.08 | 9.11 | 16.77 | 84.01 |
| Conf\_1 (X\_train.shape = [1] - 10 | Si | 30 | 10.34 | 6.20 | 9.23 | 17.1 | 84.47 |
| Conf\_1 (X\_train.shape = [1] – 6  Var2 | Si | 30 | 10.02 | 6.19 | 8.95 | 16.34 | 83.59 |
| Conf\_1 (X\_train.shape = [1] – 6  Var3 (sin prevision demanda y fotov) | Si | 30 | 10.20 | 6.29 | 9.11 | 16.76 | 83.87 |

**XGBOOST**

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| VARIABLES | Rolling window | MAE | MAE (median) | WMAPE | RMSE | % TREND |
|  | None |  |  |  |  |  |
| Defecto | 7 | 10.64 | 6.27 | 9.51 | 17.78 | 78.89 |
| Defecto | 14 | 10.03 | 6.11 | 8.96 | 16.45 | 79.77 |
| 0.03 eta | 14 | 10.01 | 5.99 | 8.95 | 16.58 | 81.33 |
| 0.03 eta | 30 | 10.00 | 6.22 | 8.93 | 16.1 | 82.25 |
| 0.03 eta | 60 | 10.09 | 6.31 | 9.02 | 16.14 | 82.61 |
| 0.03 eta | 90 | 9.99 | 6.27 | 8.92 | 15.73 | 82.67 |
| 0.03 eta | 120 | 9.93 | 6.25 | 8.87 | 15.5 | 83.13 |
| 0.03 eta | 150 | 9.83 | 6.18 | 8.78 | 15.26 | 82.83 |
| 0.03 eta (target mean) | 150 | 9.85 | 6.26 | 8.80 | 15.33 | 83.26 |
| 0.03 eta | 220 | 9.96 | 6.22 | 8.9 | 15.82 | 82.94 |
| 0.03 eta | 365 | 9.90 | 6.12 | 8.85 | 15.69 | 83.39 |
| 0.03 eta y var 2 | 150 | 9.89 | 6.21 | 8.83 | 15.53 | 83.08 |
| 0.015 eta |  |  |  |  |  |  |

**LSTM**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| LSTM, DROPOUT | | Training | Retrain / steps\_epochs | Lookback | MAE | MAE (median) | WMAPE | RMSE | % TREND |
| (64,32,16; 0.2) | (100, 100) | (1, 24) | 30 | 14.02 | 8.05 | 12.53 | 23.45 | 81.63 |
| (64,32,16; 0.1) | (100, 100) | (3, 24) | 30 | 13.63 | 7.52 | 12.16 | 23.27 | 81.67 |
| (124, 64,32; 0.1) | (150, 100) | (5,24) | 30 | 13.67 | 7.45 | 12.19 | 23.29 | 81.75 |
|  |  |  |  |  |  |  |  |  |
| (128, 64, 32, 16; 0.15) | (50, 50) | (2, 24) | 28 | 14.78 | 7.95 | 13.18 | 25.32 | 81.32 |
| (128, 64, 32, 16; 0.15) | (75, 75) | (2, 24) | 28 | 15.07 | 8.39 | 13.44 | 25.47 | 80.14 |
| (128, 64, 32, 16; 0.15)  (empezando en marzo 2020 a entrenar) | (50, 50) | (2, 24) | 28 | 14.74 | 8.00 | 13.15 | 25.04 | 80.98 |
| (128, 64, 32, 16; 0.15) | (50, 50) | (2, 24) | 14 | 16.00 | 8.60 | 14.27 | 27.22 | 77.54 |
| (128, 64, 32, 16; 0.15) | (50, 50) | (2,24) | 49 | 14.66 | 8.38 | 13.08 | 24.74 | 81.71 |
| (128, 64, 32, 16; 0.15) | (50, 50) | (4,24) | 49 | 14.43 | 7.78 | 12.87 | 25.34 | 81.04 |