

AI Analysis Report

Site: Test Site

Generated on: August 08, 2025 at 01:24 PM

This report contains a comprehensive AI-powered analysis of energy data, including statistical analysis, performance metrics, and actionable recommendations for maintenance and optimization.

Executive Summary

AI Analysis Summary for Renewable Energy Site

SITE CONFIGURATION: - Site Type: energy - Site Specifications: Wind Farm Alpha

CSV DATA ANALYSIS: - Data points analyzed: 33908 - Features identified: 5 - Target variable: ActivePower_kW - Date range: 2018-01-01 to 2018-12-31

PERFORMANCE METRICS: - Mean output: 1393.69 - Standard deviation: 1096.42 - Model R² score: 0.9635

ANOMALIES ANALYSIS: - Total anomalies detected: 222 - Upper threshold: 3586.53 - Lower threshold: -799.16 - Mean value: 1393.69

The anomalies table provides a detailed list of all detected anomalies, showing timestamps, values, threshold types, and deviation percentages. This information helps identify patterns in anomalous behavior and can guide maintenance decisions.

RECENT INSPECTIONS: 1. Date: 2024-01-15 | Status: normal | Notes: No notes provided
2. Date: 2024-01-15 | Status: normal | Notes: No notes provided

INSPECTION ANALYSIS: - Total Inspections: 2 - Critical Issues: 0 - Concerns: 0 - Normal Status: 2

RECOMMENDATIONS: 1. Continue regular maintenance schedule for energy systems 2. Monitor performance based on the analyzed data patterns 3. Address any critical inspection findings immediately 4. Consider model-based predictions for proactive maintenance 5. Implement site-specific optimization strategies 6. Review the anomalies table for any patterns in system behavior 7. Use anomaly detection insights for predictive maintenance planning

KEY INSIGHTS: - System performance analysis completed successfully - Model provides good predictive capability (R²: 0.9635) - Inspection status provides operational guidance - Risk assessment based on both data analysis and inspection findings - Anomalies analysis provides additional insights for system monitoring

CHARTS GENERATED: - Main data visualization charts (regression_results.png, rolling_averages.png) - Anomaly detection chart (anomaly_detection.png) - Residuals distribution chart (residuals_histogram.png)

Note: This analysis combines automated CSV data analysis with inspection findings. The anomalies table provides detailed information about system anomalies for better decision-making.

Analysis Statistics

Metric	Value
Data Points	33908
Features	5
Target Variable	ActivePower_kW
Date Range	{'start': '2018-01-01', 'end': '2018-12-31'}
Uploaded Filename	uploaded_data.csv

Data Visualizations

Chart: Anomaly Detection

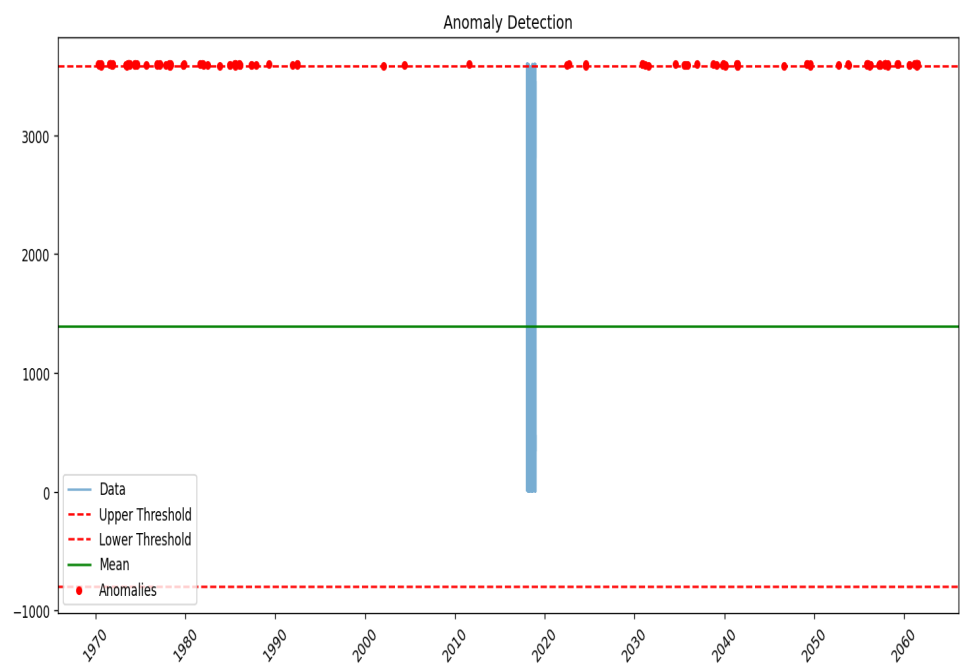


Chart: Regression Results

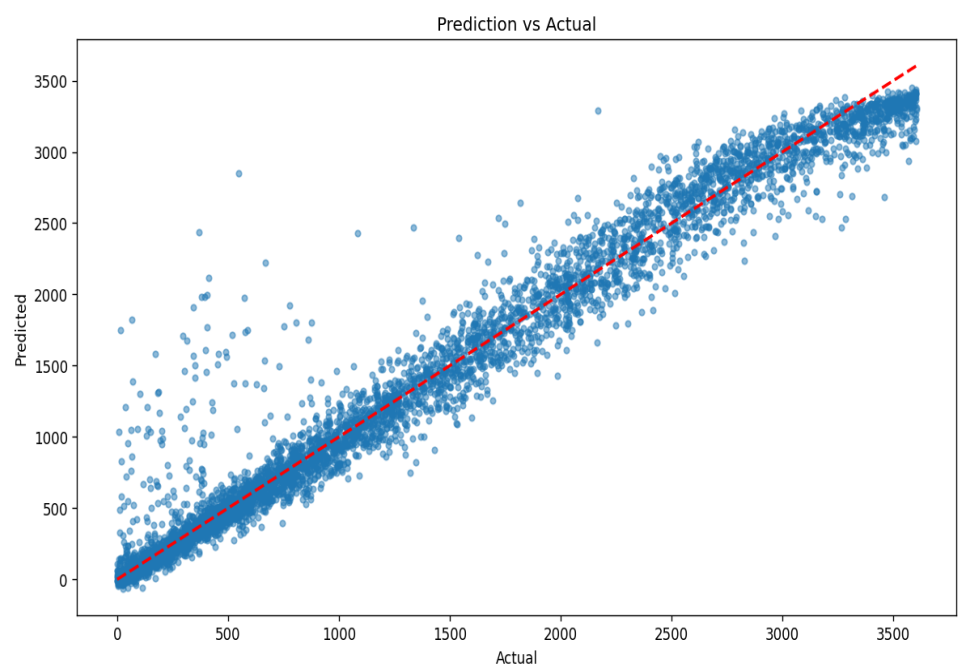


Chart: Residuals Histogram

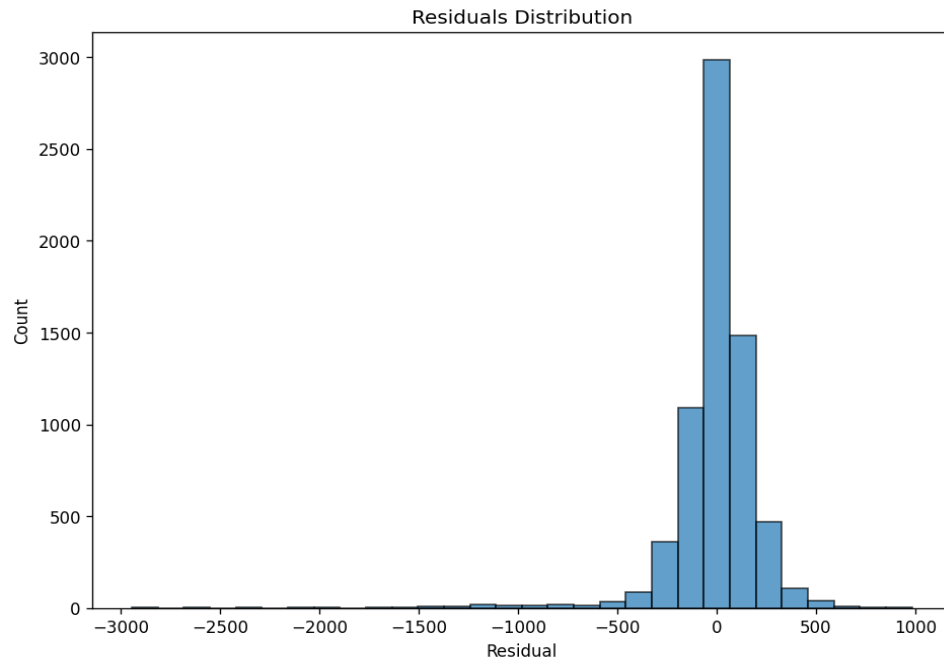
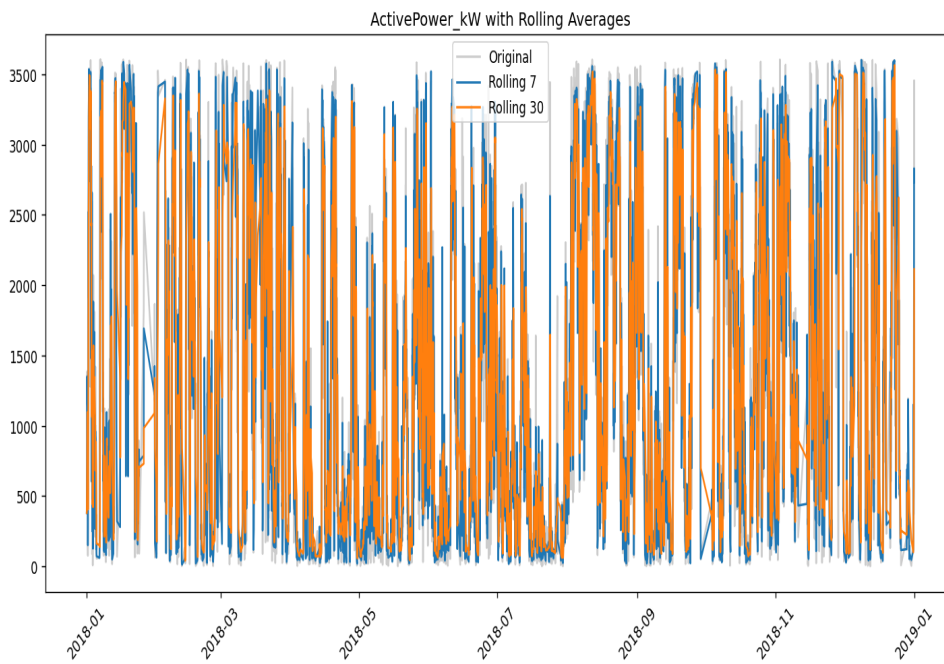


Chart: Rolling Averages



Anomalies Analysis

Total anomalies detected: 222 Upper threshold: 3586.53 Lower threshold: -799.16 Mean value: 1393.69 Standard deviation: 1096.42

Timestamp/Index	Value	Threshold Type	Threshold	Deviation	Deviation %
2018-01-01 21:00:00	3604.21	Above Upper	3586.53	2210.52	158.6%
2018-01-01 23:10:00	3597.60	Above Upper	3586.53	2203.92	158.1%
2018-01-02 01:20:00	3589.44	Above Upper	3586.53	2195.75	157.5%
2018-01-02 07:40:00	3589.59	Above Upper	3586.53	2195.90	157.6%
2018-01-02 14:40:00	3589.43	Above Upper	3586.53	2195.74	157.5%
2018-01-02 16:50:00	3599.01	Above Upper	3586.53	2205.32	158.2%
2018-01-02 20:40:00	3587.51	Above Upper	3586.53	2193.82	157.4%
2018-01-02 20:50:00	3603.11	Above Upper	3586.53	2209.42	158.5%
2018-01-02 21:00:00	3591.09	Above Upper	3586.53	2197.40	157.7%
2018-01-06 21:40:00	3602.82	Above Upper	3586.53	2209.14	158.5%
2018-01-06 21:50:00	3603.50	Above Upper	3586.53	2209.81	158.6%
2018-01-06 22:00:00	3601.66	Above Upper	3586.53	2207.97	158.4%
2018-01-07 03:20:00	3603.32	Above Upper	3586.53	2209.64	158.5%
2018-01-07 03:30:00	3603.59	Above Upper	3586.53	2209.90	158.6%
2018-01-07 03:40:00	3602.95	Above Upper	3586.53	2209.26	158.5%
2018-01-07 03:50:00	3602.80	Above Upper	3586.53	2209.11	158.5%
2018-01-07 04:00:00	3597.19	Above Upper	3586.53	2203.50	158.1%
2018-01-07 08:00:00	3600.10	Above Upper	3586.53	2206.41	158.3%
2018-01-07 16:50:00	3596.42	Above Upper	3586.53	2202.73	158.1%
2018-01-07 19:50:00	3590.52	Above Upper	3586.53	2196.84	157.6%
2018-01-07 22:10:00	3603.21	Above Upper	3586.53	2209.52	158.5%
2018-01-07 22:20:00	3602.81	Above Upper	3586.53	2209.12	158.5%
2018-01-13 13:20:00	3591.97	Above Upper	3586.53	2198.28	157.7%
2018-01-13 17:30:00	3590.63	Above Upper	3586.53	2196.95	157.6%
2018-01-13 19:10:00	3587.75	Above Upper	3586.53	2194.07	157.4%
2018-01-15 23:30:00	3601.07	Above Upper	3586.53	2207.38	158.4%
2018-01-15 23:40:00	3601.42	Above Upper	3586.53	2207.73	158.4%
2018-01-15 23:50:00	3602.64	Above Upper	3586.53	2208.95	158.5%
2018-01-16 00:40:00	3603.39	Above Upper	3586.53	2209.71	158.6%
2018-01-16 00:50:00	3603.47	Above Upper	3586.53	2209.78	158.6%
2018-01-16 01:00:00	3603.32	Above Upper	3586.53	2209.63	158.5%

2018-01-16 11:10:00	3589.82	Above Upper	3586.53	2196.13	157.6%
2018-01-16 12:30:00	3592.78	Above Upper	3586.53	2199.10	157.8%
2018-01-16 18:30:00	3601.85	Above Upper	3586.53	2208.16	158.4%
2018-01-16 18:40:00	3592.95	Above Upper	3586.53	2199.27	157.8%
2018-01-17 02:20:00	3603.60	Above Upper	3586.53	2209.91	158.6%
2018-01-17 02:40:00	3600.16	Above Upper	3586.53	2206.47	158.3%
2018-01-17 02:50:00	3600.47	Above Upper	3586.53	2206.78	158.3%
2018-01-17 03:00:00	3598.52	Above Upper	3586.53	2204.83	158.2%
2018-01-17 03:20:00	3598.70	Above Upper	3586.53	2205.01	158.2%
2018-01-17 04:10:00	3589.30	Above Upper	3586.53	2195.61	157.5%
2018-01-17 05:10:00	3591.92	Above Upper	3586.53	2198.24	157.7%
2018-01-19 18:10:00	3603.32	Above Upper	3586.53	2209.63	158.5%
2018-01-19 18:20:00	3602.99	Above Upper	3586.53	2209.30	158.5%
2018-01-19 18:30:00	3596.97	Above Upper	3586.53	2203.28	158.1%
2018-01-19 18:50:00	3595.41	Above Upper	3586.53	2201.72	158.0%
2018-01-19 19:00:00	3603.58	Above Upper	3586.53	2209.89	158.6%
2018-01-19 19:30:00	3601.97	Above Upper	3586.53	2208.28	158.4%
2018-01-19 19:50:00	3597.47	Above Upper	3586.53	2203.78	158.1%
2018-01-21 13:20:00	3602.29	Above Upper	3586.53	2208.60	158.5%
2018-01-21 17:00:00	3593.98	Above Upper	3586.53	2200.29	157.9%
2018-02-01 11:00:00	3592.82	Above Upper	3586.53	2199.13	157.8%
2018-02-07 23:00:00	3602.17	Above Upper	3586.53	2208.48	158.5%
2018-02-07 23:30:00	3596.82	Above Upper	3586.53	2203.14	158.1%
2018-02-08 23:20:00	3594.63	Above Upper	3586.53	2200.94	157.9%
2018-02-09 00:20:00	3597.50	Above Upper	3586.53	2203.81	158.1%
2018-02-09 00:30:00	3598.18	Above Upper	3586.53	2204.49	158.2%
2018-02-11 02:10:00	3594.72	Above Upper	3586.53	2201.03	157.9%
2018-02-13 20:00:00	3602.50	Above Upper	3586.53	2208.82	158.5%
2018-02-13 23:30:00	3600.80	Above Upper	3586.53	2207.11	158.4%
2018-02-13 23:50:00	3600.96	Above Upper	3586.53	2207.27	158.4%
2018-02-14 06:00:00	3593.84	Above Upper	3586.53	2200.15	157.9%
2018-02-14 12:10:00	3588.04	Above Upper	3586.53	2194.35	157.4%
2018-02-14 19:10:00	3599.78	Above Upper	3586.53	2206.09	158.3%
2018-02-14 20:10:00	3587.66	Above Upper	3586.53	2193.97	157.4%
2018-02-14 21:10:00	3598.25	Above Upper	3586.53	2204.56	158.2%
2018-02-14 22:40:00	3593.73	Above Upper	3586.53	2200.04	157.9%
2018-02-19 10:10:00	3595.26	Above Upper	3586.53	2201.57	158.0%
2018-02-19 10:30:00	3593.76	Above Upper	3586.53	2200.07	157.9%

2018-02-19 15:30:00	3597.89	Above Upper	3586.53	2204.20	158.2%
2018-02-27 21:20:00	3603.88	Above Upper	3586.53	2210.20	158.6%
2018-02-27 21:30:00	3603.57	Above Upper	3586.53	2209.88	158.6%
2018-03-01 20:30:00	3600.91	Above Upper	3586.53	2207.22	158.4%
2018-03-01 21:00:00	3602.93	Above Upper	3586.53	2209.24	158.5%
2018-03-01 21:10:00	3603.43	Above Upper	3586.53	2209.74	158.6%
2018-03-01 21:20:00	3602.93	Above Upper	3586.53	2209.24	158.5%
2018-03-03 16:00:00	3593.89	Above Upper	3586.53	2200.20	157.9%
2018-03-06 15:40:00	3589.85	Above Upper	3586.53	2196.16	157.6%
2018-03-13 11:00:00	3588.16	Above Upper	3586.53	2194.47	157.5%
2018-03-18 18:40:00	3590.61	Above Upper	3586.53	2196.92	157.6%
2018-03-18 18:50:00	3591.94	Above Upper	3586.53	2198.25	157.7%
2018-03-20 23:00:00	3600.41	Above Upper	3586.53	2206.72	158.3%
2018-03-21 03:50:00	3604.11	Above Upper	3586.53	2210.42	158.6%
2018-03-21 04:10:00	3599.32	Above Upper	3586.53	2205.63	158.3%
2018-03-21 04:20:00	3598.59	Above Upper	3586.53	2204.90	158.2%
2018-03-21 04:30:00	3599.38	Above Upper	3586.53	2205.69	158.3%
2018-03-21 04:40:00	3592.61	Above Upper	3586.53	2198.92	157.8%
2018-03-21 04:50:00	3588.32	Above Upper	3586.53	2194.63	157.5%
2018-03-22 10:50:00	3595.92	Above Upper	3586.53	2202.23	158.0%
2018-03-22 11:50:00	3603.19	Above Upper	3586.53	2209.50	158.5%
2018-03-22 12:00:00	3602.45	Above Upper	3586.53	2208.76	158.5%
2018-03-22 16:30:00	3592.95	Above Upper	3586.53	2199.26	157.8%
2018-03-22 16:40:00	3595.38	Above Upper	3586.53	2201.69	158.0%
2018-03-27 06:30:00	3595.26	Above Upper	3586.53	2201.57	158.0%
2018-03-27 06:50:00	3592.73	Above Upper	3586.53	2199.04	157.8%
2018-03-29 03:30:00	3596.34	Above Upper	3586.53	2202.65	158.0%
2018-04-06 16:10:00	3600.59	Above Upper	3586.53	2206.90	158.3%
2018-04-19 06:10:00	3593.27	Above Upper	3586.53	2199.58	157.8%
2018-04-20 19:00:00	3602.91	Above Upper	3586.53	2209.23	158.5%
2018-04-20 19:10:00	3589.88	Above Upper	3586.53	2196.19	157.6%
2018-04-20 19:30:00	3599.03	Above Upper	3586.53	2205.35	158.2%
2018-05-26 12:50:00	3586.76	Above Upper	3586.53	2193.07	157.4%
2018-06-01 17:30:00	3591.22	Above Upper	3586.53	2197.53	157.7%
2018-06-28 14:30:00	3601.88	Above Upper	3586.53	2208.20	158.4%
2018-08-05 01:10:00	3589.52	Above Upper	3586.53	2195.83	157.6%
2018-08-05 21:00:00	3604.43	Above Upper	3586.53	2210.74	158.6%
2018-08-11 20:20:00	3588.55	Above Upper	3586.53	2194.86	157.5%

2018-08-11 23:30:00	3603.24	Above Upper	3586.53	2209.55	158.5%
2018-08-30 22:20:00	3603.46	Above Upper	3586.53	2209.77	158.6%
2018-08-30 22:30:00	3604.56	Above Upper	3586.53	2210.88	158.6%
2018-08-30 22:40:00	3604.76	Above Upper	3586.53	2211.07	158.6%
2018-08-31 17:10:00	3590.92	Above Upper	3586.53	2197.23	157.7%
2018-09-02 04:50:00	3587.27	Above Upper	3586.53	2193.58	157.4%
2018-09-13 04:20:00	3602.15	Above Upper	3586.53	2208.46	158.5%
2018-09-16 21:20:00	3589.69	Above Upper	3586.53	2196.00	157.6%
2018-09-17 06:00:00	3593.22	Above Upper	3586.53	2199.53	157.8%
2018-09-17 06:10:00	3589.37	Above Upper	3586.53	2195.68	157.5%
2018-09-18 01:40:00	3590.70	Above Upper	3586.53	2197.02	157.6%
2018-09-20 17:50:00	3600.38	Above Upper	3586.53	2206.70	158.3%
2018-09-26 08:50:00	3601.18	Above Upper	3586.53	2207.49	158.4%
2018-09-28 08:20:00	3589.37	Above Upper	3586.53	2195.68	157.5%
2018-10-05 00:10:00	3590.67	Above Upper	3586.53	2196.98	157.6%
2018-10-05 00:20:00	3597.67	Above Upper	3586.53	2203.98	158.1%
2018-10-05 00:30:00	3600.66	Above Upper	3586.53	2206.97	158.4%
2018-10-05 01:50:00	3590.67	Above Upper	3586.53	2196.99	157.6%
2018-10-05 02:10:00	3596.39	Above Upper	3586.53	2202.70	158.0%
2018-10-05 03:50:00	3589.81	Above Upper	3586.53	2196.13	157.6%
2018-10-05 19:40:00	3588.17	Above Upper	3586.53	2194.48	157.5%
2018-10-05 20:50:00	3591.63	Above Upper	3586.53	2197.94	157.7%
2018-10-09 20:20:00	3597.08	Above Upper	3586.53	2203.39	158.1%
2018-10-09 20:30:00	3600.26	Above Upper	3586.53	2206.57	158.3%
2018-10-09 21:20:00	3596.55	Above Upper	3586.53	2202.86	158.1%
2018-10-09 21:30:00	3592.90	Above Upper	3586.53	2199.21	157.8%
2018-10-09 21:40:00	3588.00	Above Upper	3586.53	2194.31	157.4%
2018-10-09 21:50:00	3587.81	Above Upper	3586.53	2194.12	157.4%
2018-10-09 23:20:00	3599.01	Above Upper	3586.53	2205.32	158.2%
2018-10-09 23:30:00	3601.84	Above Upper	3586.53	2208.16	158.4%
2018-10-25 06:20:00	3588.48	Above Upper	3586.53	2194.80	157.5%
2018-11-02 17:20:00	3603.41	Above Upper	3586.53	2209.72	158.6%
2018-11-02 17:50:00	3603.59	Above Upper	3586.53	2209.90	158.6%
2018-11-02 18:00:00	3603.60	Above Upper	3586.53	2209.91	158.6%
2018-11-03 17:40:00	3597.88	Above Upper	3586.53	2204.19	158.2%
2018-11-03 20:10:00	3586.67	Above Upper	3586.53	2192.98	157.4%
2018-11-16 02:50:00	3594.06	Above Upper	3586.53	2200.37	157.9%
2018-11-18 20:10:00	3599.65	Above Upper	3586.53	2205.96	158.3%

2018-11-18 20:20:00	3590.97	Above Upper	3586.53	2197.28	157.7%
2018-11-25 18:50:00	3597.90	Above Upper	3586.53	2204.21	158.2%
2018-11-25 19:20:00	3602.43	Above Upper	3586.53	2208.74	158.5%
2018-11-25 19:30:00	3594.04	Above Upper	3586.53	2200.36	157.9%
2018-11-25 19:40:00	3602.06	Above Upper	3586.53	2208.37	158.5%
2018-11-25 19:50:00	3602.31	Above Upper	3586.53	2208.63	158.5%
2018-11-25 20:00:00	3602.97	Above Upper	3586.53	2209.28	158.5%
2018-11-25 20:10:00	3591.88	Above Upper	3586.53	2198.19	157.7%
2018-11-25 20:50:00	3600.74	Above Upper	3586.53	2207.05	158.4%
2018-11-25 21:50:00	3602.30	Above Upper	3586.53	2208.61	158.5%
2018-11-28 09:30:00	3595.75	Above Upper	3586.53	2202.06	158.0%
2018-11-28 19:10:00	3587.20	Above Upper	3586.53	2193.51	157.4%
2018-11-28 21:50:00	3589.03	Above Upper	3586.53	2195.34	157.5%
2018-11-29 01:50:00	3590.16	Above Upper	3586.53	2196.47	157.6%
2018-11-29 02:10:00	3593.74	Above Upper	3586.53	2200.05	157.9%
2018-12-05 13:30:00	3594.58	Above Upper	3586.53	2200.89	157.9%
2018-12-05 16:40:00	3590.41	Above Upper	3586.53	2196.72	157.6%
2018-12-05 16:50:00	3593.62	Above Upper	3586.53	2199.93	157.8%
2018-12-05 17:50:00	3599.98	Above Upper	3586.53	2206.29	158.3%
2018-12-05 20:10:00	3593.70	Above Upper	3586.53	2200.01	157.9%
2018-12-05 22:00:00	3594.54	Above Upper	3586.53	2200.85	157.9%
2018-12-08 14:20:00	3593.72	Above Upper	3586.53	2200.03	157.9%
2018-12-08 14:40:00	3602.30	Above Upper	3586.53	2208.61	158.5%
2018-12-08 14:50:00	3598.04	Above Upper	3586.53	2204.35	158.2%
2018-12-08 15:00:00	3602.78	Above Upper	3586.53	2209.09	158.5%
2018-12-08 15:10:00	3601.39	Above Upper	3586.53	2207.70	158.4%
2018-12-08 15:20:00	3600.97	Above Upper	3586.53	2207.28	158.4%
2018-12-08 15:30:00	3601.17	Above Upper	3586.53	2207.48	158.4%
2018-12-08 15:40:00	3601.52	Above Upper	3586.53	2207.83	158.4%
2018-12-08 16:10:00	3600.64	Above Upper	3586.53	2206.95	158.4%
2018-12-09 00:20:00	3596.56	Above Upper	3586.53	2202.87	158.1%
2018-12-09 04:40:00	3600.90	Above Upper	3586.53	2207.21	158.4%
2018-12-09 04:50:00	3601.02	Above Upper	3586.53	2207.34	158.4%
2018-12-09 11:00:00	3595.83	Above Upper	3586.53	2202.14	158.0%
2018-12-09 11:10:00	3591.56	Above Upper	3586.53	2197.87	157.7%
2018-12-10 07:00:00	3588.73	Above Upper	3586.53	2195.04	157.5%
2018-12-10 08:40:00	3599.98	Above Upper	3586.53	2206.29	158.3%
2018-12-13 13:30:00	3601.07	Above Upper	3586.53	2207.38	158.4%

2018-12-13 13:40:00	3600.71	Above Upper	3586.53	2207.02	158.4%
2018-12-13 14:00:00	3599.75	Above Upper	3586.53	2206.06	158.3%
2018-12-18 19:50:00	3594.08	Above Upper	3586.53	2200.39	157.9%
2018-12-19 00:00:00	3595.04	Above Upper	3586.53	2201.35	158.0%
2018-12-22 05:20:00	3598.53	Above Upper	3586.53	2204.84	158.2%
2018-12-22 05:40:00	3601.08	Above Upper	3586.53	2207.39	158.4%
2018-12-22 07:30:00	3597.42	Above Upper	3586.53	2203.73	158.1%
2018-12-22 08:00:00	3602.02	Above Upper	3586.53	2208.33	158.5%
2018-12-22 08:10:00	3601.84	Above Upper	3586.53	2208.15	158.4%
2018-12-22 14:40:00	3598.19	Above Upper	3586.53	2204.50	158.2%
2018-12-22 15:40:00	3599.74	Above Upper	3586.53	2206.05	158.3%
2018-12-22 16:00:00	3599.59	Above Upper	3586.53	2205.91	158.3%
2018-12-22 16:20:00	3595.41	Above Upper	3586.53	2201.72	158.0%
2018-12-22 16:50:00	3590.80	Above Upper	3586.53	2197.11	157.6%
2018-12-22 17:00:00	3601.08	Above Upper	3586.53	2207.39	158.4%
2018-12-22 17:10:00	3601.69	Above Upper	3586.53	2208.00	158.4%
2018-12-22 17:20:00	3601.55	Above Upper	3586.53	2207.86	158.4%
2018-12-22 17:30:00	3601.48	Above Upper	3586.53	2207.80	158.4%
2018-12-22 17:40:00	3592.26	Above Upper	3586.53	2198.57	157.8%
2018-12-22 17:50:00	3599.14	Above Upper	3586.53	2205.45	158.2%
2018-12-22 23:20:00	3594.77	Above Upper	3586.53	2201.09	157.9%
2018-12-23 00:00:00	3587.48	Above Upper	3586.53	2193.79	157.4%
2018-12-23 00:10:00	3597.11	Above Upper	3586.53	2203.43	158.1%
2018-12-23 00:20:00	3591.41	Above Upper	3586.53	2197.72	157.7%
2018-12-23 00:30:00	3600.73	Above Upper	3586.53	2207.05	158.4%
2018-12-23 00:40:00	3597.56	Above Upper	3586.53	2203.87	158.1%
2018-12-23 00:50:00	3600.88	Above Upper	3586.53	2207.20	158.4%
2018-12-23 01:10:00	3600.77	Above Upper	3586.53	2207.09	158.4%
2018-12-23 02:40:00	3600.16	Above Upper	3586.53	2206.47	158.3%
2018-12-23 02:50:00	3599.73	Above Upper	3586.53	2206.04	158.3%
2018-12-23 03:00:00	3591.19	Above Upper	3586.53	2197.50	157.7%
2018-12-23 03:30:00	3599.72	Above Upper	3586.53	2206.03	158.3%
2018-12-23 03:40:00	3600.08	Above Upper	3586.53	2206.40	158.3%
2018-12-23 04:10:00	3590.12	Above Upper	3586.53	2196.43	157.6%
2018-12-23 06:50:00	3596.79	Above Upper	3586.53	2203.10	158.1%
2018-12-23 07:00:00	3601.27	Above Upper	3586.53	2207.58	158.4%
2018-12-23 07:10:00	3601.53	Above Upper	3586.53	2207.85	158.4%
2018-12-23 07:20:00	3597.36	Above Upper	3586.53	2203.68	158.1%

2018-12-23 08:10:00	3591.73	Above Upper	3586.53	2198.04	157.7%
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All 222 anomalies are included in this report.

Detailed Analysis

The AI analysis provides comprehensive insights into the energy system performance, including data-driven recommendations for maintenance and optimization. The analysis combines statistical modeling with operational insights to deliver actionable recommendations for energy system management.

- Performance analysis based on comprehensive data review
- Statistical modeling for predictive insights
- Risk assessment and mitigation strategies
- Maintenance optimization recommendations
- Operational efficiency improvements