



# Itron Forecast As A Service



# ACCURATE FORECASTS FOR SYSTEM AND MARKET OPERATIONS

- Accurate and timely short-term forecasts from five minutes ahead to several months ahead.
  - Forecasts tailored to your business needs
  - Ensemble Forecasts
  - Grid-Connected Renewable Generation Forecasts
  - On-Premise Solar Photovoltaic (PV) Generation Forecasts
  - Demand Response Forecasts



# THE ITRON ADVANTAGE



## PROVEN FORECAST FACTORY

- » Relied on by ISOs operating in North America, Australia and Europe
- » Advanced modeling processes
  - Advanced machine learning algorithms
  - Ensemble forecasts
  - Multiple weather providers
  - Top-down & Bottom-up forecast framework
  - Patented five-minute load forecast engine
  - Proprietary renewable generation and demand response forecast algorithms



## BACKED BY INDUSTRY EXPERTISE

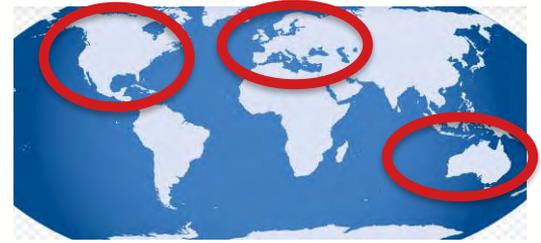
- » Itron team known for innovative forecast solutions since the 1970s
- » Deep energy modeling knowledge
- » Industry leader in delivery of advanced forecasting solutions
- » Itron's experienced forecasting team manages all forecast models
  - Monitor performance of weather, load and generation forecasts
  - Forecast tailored for each load
  - Ensure forecasts are aligned with current load conditions



## GLOBAL CLOUD PLATFORM

- Forecast as a Service is delivered on Microsoft Azure, which provides the scalability, security, power and agility required for safe and reliable operation.
- » Worldwide network of Microsoft-managed datacenters
    - All data stays within regulated data neighborhoods
    - Durable, highly available and massively scalable cloud services
    - Industry-leading data security compliance certifications

# SHORT TERM FORECASTING CLIENTS



# Azure regions

Azure has more global regions than any other cloud provider—offering the scale needed to bring applications closer to users around the world, preserving data residency, and offering comprehensive compliance and resiliency options for customers.

**50** regions  
worldwide

**140** available in  
140 countries



Engage your customers



Transform your products



Digital transformation

Empower your employees



Optimize your operations



# Azure—cloud for all



Productive



Hybrid



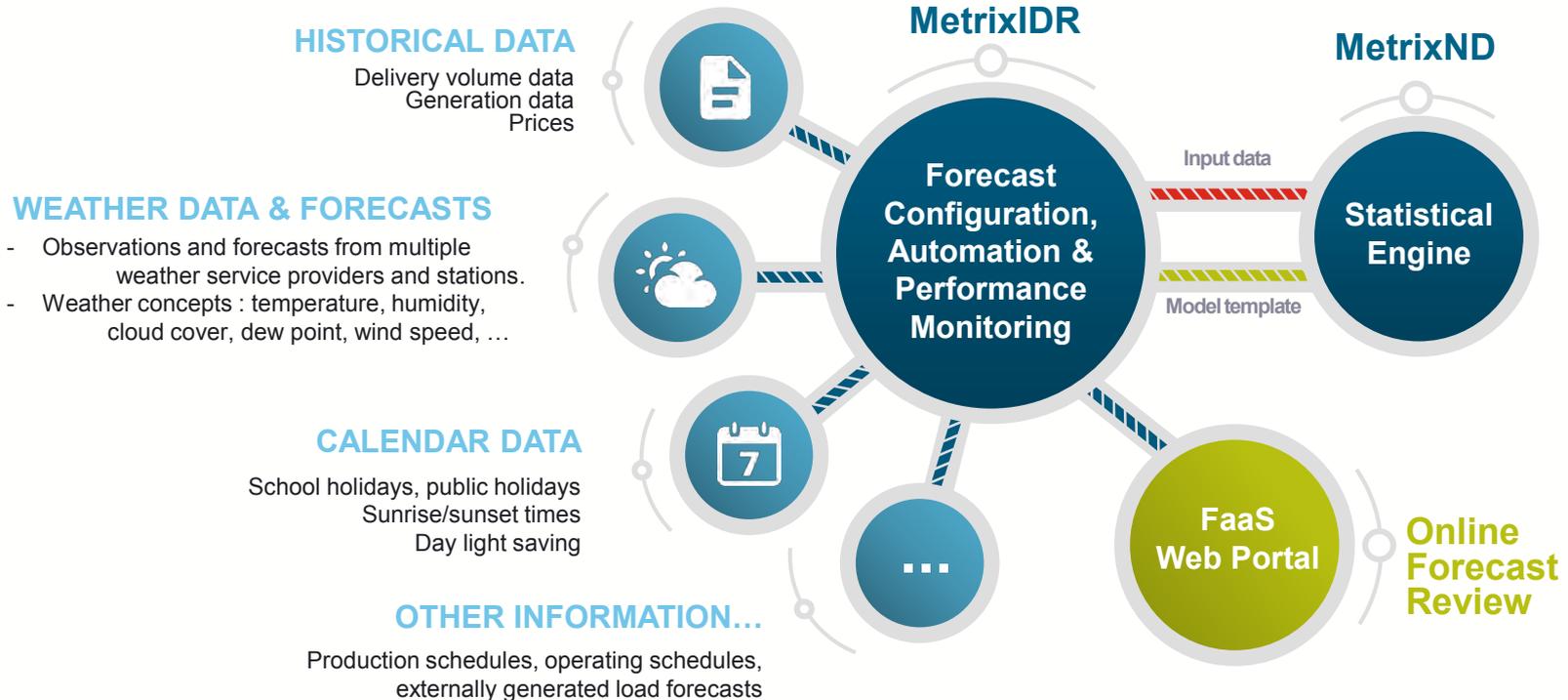
Intelligent



Trusted

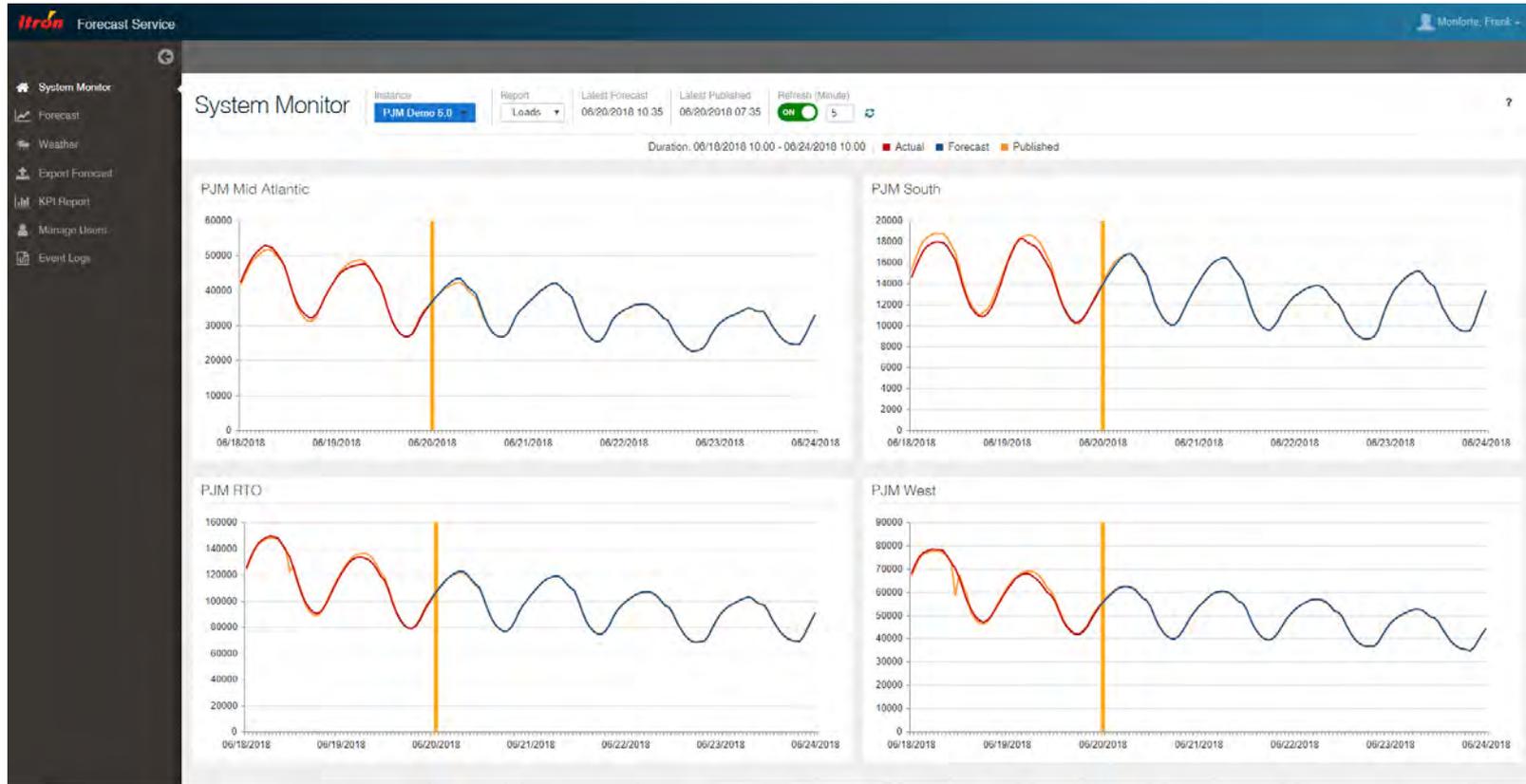
# ITRON FAAS BACKOFFICE SOLUTION

Input data and system components

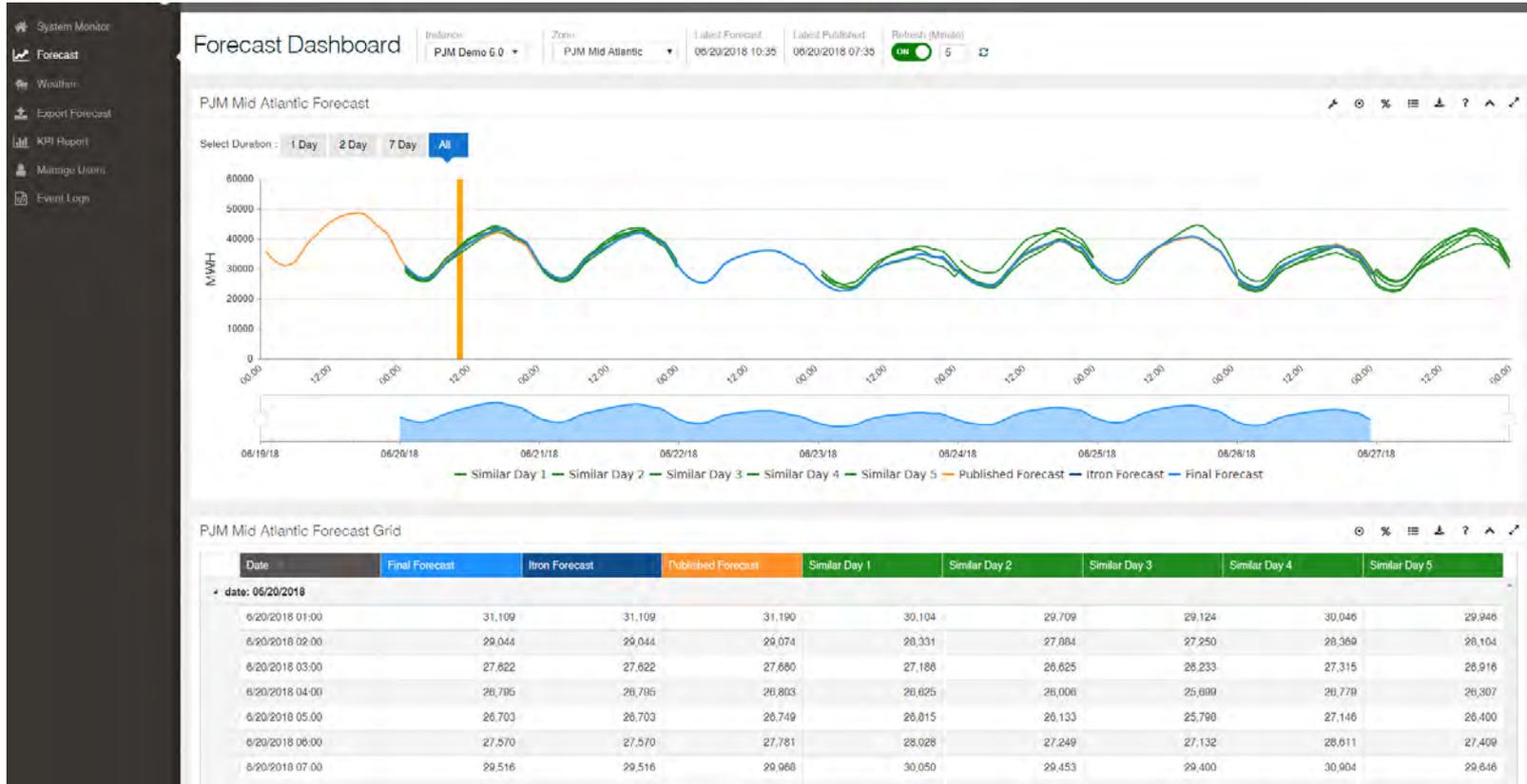




# ITRON'S FORECAST SERVICE WEB PORTAL



# ITRON'S FORECAST SERVICE WEB PORTAL



# ITRON'S FORECAST SERVICE WEB PORTAL

- System Monitor
- Forecast
- Weather
- Export Forecast
- KPI Report
- Manage Users
- Event Logs

Forecast Dashboard
Instance: PJM Demo 6.0
Zone: PJM Mid Atlantic
Label Forecast: 06/20/2018 10:35
Label Published: 06/20/2018 07:35
Refresh (Minute): ON 5

### PJM Mid Atlantic Forecast

Select Duration: 1 Day 2 Day 7 Day All

Modify Forecast Targets

Date: 06/20/2018

Peak Load: 43,493

Min. Load: 26,703

Energy: 856,647

Apply
Cancel

### PJM Mid Atlantic Forecast Grid

Date	Final Forecast	Iron Forecast	Similar Day 3	Similar Day 4	Similar Day 5
date: 06/20/2018					
6/20/2018 01:00	31,109				
6/20/2018 02:00	29,044				
6/20/2018 03:00	27,622	27,622	27,660	27,186	26,625
6/20/2018 04:00	26,705	26,705	26,803	26,625	26,008
6/20/2018 05:00	26,703	26,703	26,749	26,615	26,133
6/20/2018 06:00	27,570	27,570	27,781	28,028	27,249
6/20/2018 07:00	29,516	29,516	29,968	30,050	29,453
			29,124	30,046	29,946
			27,250	28,369	28,104
			26,233	27,315	26,916
			25,699	26,779	26,307
			25,796	27,146	26,400
			27,132	28,611	27,409
			29,400	30,904	29,646

# ITRON'S FORECAST SERVICE WEB PORTAL

- System Monitor
- Forecast
- Weather
- Export Forecast
- KPI Report
- Manage Users
- Event Logs

## Forecast Dashboard

PJM Mid Atlantic Forecast

Select Duration: 1 Day 2 Day 7 Day All

Create Weighted Forecast

Date: 06/20/2018

Final Forecast:

Itron Forecast:

Published Forecast:

Similar Day1:

Similar Day2:

Similar Day3:

Similar Day4:

Similar Day5:

Apply
Cancel

PJM Mid Atlantic Forecast Grid

Date	Final Forecast	Itron Forecast
date: 06/20/2018		
6/20/2018 01:00	31,109	
6/20/2018 02:00	29,044	
6/20/2018 03:00	27,622	
6/20/2018 04:00	26,705	
6/20/2018 05:00	26,703	
6/20/2018 06:00	27,570	
6/20/2018 07:00	29,516	

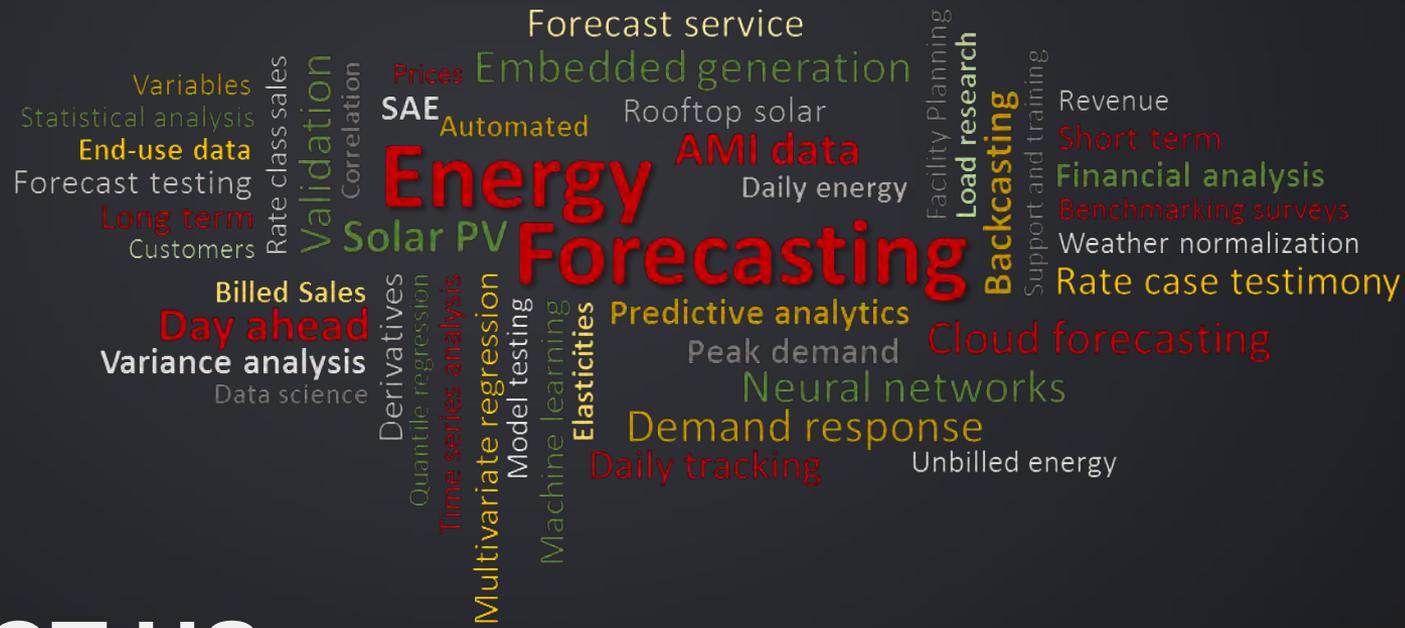
	Similar Day 3	Similar Day 4	Similar Day 5
29,709	29,124	30,046	29,946
27,884	27,250	28,369	28,104
26,625	26,233	27,315	26,916
26,008	25,699	26,779	26,307
26,133	25,790	27,146	26,400
27,249	27,132	28,611	27,409
29,453	29,400	30,904	29,646

# ITRON'S FORECAST SERVICE WEB PORTAL

Time ↑	Mean Absolute Error	Mean Error	Maximum Over Forecast Error	Maximum Under Forecast Error	Mean Over Forecast Error	Mean Under Forecast Error	Number of Over Forecast Errors Exceeding Tolerance	Number of Under Forecast Errors Exceeding Tolerance	Mean Absolute Percentage Error	Mean Percentage Error	Maximum Over Forecast Error	Maximum Under Forecast Percentage Error	Percentage of Over Forecasts	Percentage of Under Forecasts	Percent of Over Forecast Errors Exceeding Tolerance	F U R E E T
01:00	329.72	-26.29	-882.83	1,139.87	-323.48	337.37	0	0	1.0 %	-0.1 %	-3.7 %	3.5 %	55.0 %	45.0 %	0.0 %	
02:00	402.21	-33.99	-12,554.51	1,431.44	-472.55	341.92	1	0	1.6 %	-0.4 %	-86.5 %	4.5 %	46.2 %	53.8 %	0.6 %	
03:00	336.51	150.11	-1,174.65	1,542.88	-286.38	360.70	0	0	1.1 %	0.4 %	-4.2 %	4.9 %	32.5 %	67.5 %	0.0 %	
04:00	326.85	149.82	-799.15	1,623.22	-271.98	353.33	0	0	1.1 %	0.5 %	-3.7 %	5.3 %	32.5 %	67.5 %	0.0 %	
05:00	330.17	139.80	-828.52	1,507.32	-287.25	351.44	0	0	1.1 %	0.4 %	-3.9 %	5.0 %	33.1 %	66.9 %	0.0 %	
06:00	341.83	134.23	-835.00	1,832.02	-261.83	394.38	0	0	1.1 %	0.4 %	-3.4 %	5.9 %	39.6 %	60.4 %	0.0 %	
07:00	367.80	147.76	-1,079.01	1,997.84	-304.81	403.38	0	0	1.2 %	0.4 %	-3.7 %	6.2 %	36.1 %	63.9 %	0.0 %	
08:00	390.63	153.56	-1,338.67	1,963.29	-317.98	433.82	0	0	1.2 %	0.4 %	-4.5 %	5.9 %	37.3 %	62.7 %	0.0 %	
09:00	459.47	83.35	-5,662.20	2,152.60	-435.38	477.80	2	0	1.5 %	0.2 %	-22.3 %	6.2 %	43.2 %	56.8 %	1.2 %	
10:00	623.07	-41.53	-30,396.99	2,205.70	-935.98	450.83	2	0	3.8 %	-2.1 %	-408.4 %	6.2 %	35.5 %	64.5 %	1.2 %	
11:00	482.41	113.29	-5,759.68	2,266.39	-525.52	459.07	2	0	1.5 %	0.2 %	-21.2 %	6.3 %	35.1 %	64.9 %	1.2 %	
12:00	489.78	155.56	-6,015.74	2,331.53	-501.33	484.00	2	0	1.5 %	0.3 %	-21.9 %	6.1 %	33.3 %	66.7 %	1.2 %	
13:00	495.94	148.58	-5,836.88	2,424.34	-503.08	492.18	2	0	1.5 %	0.3 %	-21.7 %	6.5 %	34.5 %	65.5 %	1.2 %	
14:00	498.45	160.93	-5,836.04	2,577.15	-488.82	503.52	2	0	1.5 %	0.3 %	-21.1 %	6.9 %	34.5 %	65.5 %	1.2 %	
15:00	508.80	157.23	-5,833.28	2,585.55	-500.54	513.26	2	0	1.5 %	0.3 %	-21.7 %	6.9 %	35.1 %	64.9 %	1.2 %	
16:00	526.83	178.49	-5,829.60	3,002.11	-464.19	564.09	2	0	1.5 %	0.4 %	-21.9 %	8.5 %	37.5 %	62.5 %	1.2 %	
17:00	534.71	187.14	-5,852.30	2,242.26	-540.67	531.89	2	0	1.6 %	0.4 %	-21.7 %	6.0 %	32.1 %	67.9 %	1.2 %	
18:00	595.99	83.02	-9,053.31	1,946.08	-755.94	513.85	4	0	1.8 %	0.0 %	-35.9 %	5.6 %	33.9 %	66.1 %	2.4 %	
19:00	605.87	49.73	-9,112.58	1,890.64	-753.20	519.37	4	0	1.8 %	-0.1 %	-36.0 %	5.1 %	36.9 %	63.1 %	2.4 %	
20:00	673.09	-22.10	-9,131.50	1,737.74	-884.79	536.11	5	0	2.0 %	-0.3 %	-34.1 %	4.5 %	39.3 %	60.7 %	3.0 %	
21:00	642.28	-37.05	-8,918.48	1,782.61	-851.70	503.36	5	0	1.9 %	-0.4 %	-33.6 %	4.5 %	39.9 %	60.1 %	3.0 %	
22:00	627.96	-5.53	-8,594.27	1,981.13	-901.91	479.67	5	0	1.9 %	-0.3 %	-33.6 %	5.0 %	35.1 %	64.9 %	3.0 %	
23:00	651.90	88.86	-8,318.83	2,402.41	-892.37	541.07	5	0	2.0 %	-0.0 %	-33.9 %	6.1 %	31.5 %	68.5 %	3.0 %	
24:00	709.04	122.06	-8,186.77	2,629.89	-896.48	617.81	5	0	2.3 %	0.0 %	-35.0 %	6.9 %	32.7 %	67.3 %	3.0 %	
Maximum	709.04	187.14	-799.15	3,002.11	-261.83	617.81	5	0	3.8 %	0.5 %	-3.4 %	8.5 %	55.0 %	68.5 %	3.0 %	
Minimum	326.85	-41.53	-30,396.99	1,139.87	-935.98	337.37	0	0	1.0 %	-2.1 %	-408.4 %	3.5 %	31.5 %	45.0 %	0.0 %	
Average	497.95	93.21	-6,576.28	2,049.00	-556.59	465.18	2	0	1.6 %	0.1 %	-39.1 %	5.8 %	36.8 %	63.2 %	1.3 %	



**Questions**



# CONTACT US

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