

ENERGY, POWER, & INFRASTRUCTURE SECTOR REPORT

FEBRUARY 2022

CAPSTONE PARTNERS

TABLE OF CONTENTS

CONTACT OUR ENERGY, POWER, & INFRASTRUCTURE EXPERTS

Ted Kinsman
Managing Director
303-572-6013
tkinsman@capstonepartners.com

CJ Hummel
Managing Director
303-748-3512
cjhummel@capstonepartners.com

Wolfgang Zahner
Vice President
303-951-7119
wzahner@capstonepartners.com

ENERGY, POWER, & INFRASTRUCTURE

February 2022

SECTOR HIGHLIGHTS

Batteries & Storage

The large-scale deployment of energy storage capacity and battery storage is key to the successful transition to renewable energy sources.

- Over the next decade, battery storage growth is expected to grow at a 30%+ compound annual growth rate (CAGR), driven by the increased deployment of intermittent generation and retirements of baseload generation.
- Of the total projected annual deployments, roughly 80% of storage installations will come from the front-of-the-meter (FTM), utility scale market.
- In Q3 the U.S. Storage Market deployed 1,140 megawatts (MW) of storage, 2.4x the amount that was deployed in Q2 2021, according to Wood Mackenzie.

Storage Costs

- From 2015 to 2019, the energy capacity-weighted average installed cost fell by 72% for an average five-year annual decrease of 27%.
- Going forward, holding duration constant at four hours, system costs will decline ~6% per year through 2030 from $333/kilowatt-hour (kWh) to $167/kWh, which, assuming a constant four-hour duration, is roughly $1.30/MW to $0.70/MW, according to Bloomberg New Energy Finance.

Technology Trends

- In the past ~20 years lithium-ion batteries have received the bulk of storage investment and research & development (R&D) and have emerged as the dominant utility-scale storage technology. Since 2003, 93% of large-scale battery storage installations have been lithium-ion.
- We estimate that more than $10 billion of growth capital has been raised for battery-related technologies since 2016. This capital has largely been deployed to address the challenges of lithium-ion batteries, including energy density, charge time, safety, and materials cost.

Commodity Prices	Units	Latest	3MoChange
Henry Hub Natural Gas	$/MMbtu	$4.72	19.4%
Commercial Electricity	$/kWh	$7.01	-14.0%
Commercial Natural Gas	$/Mcf	$6.74	-4.1%
Crude WTI Spot	$/bbl	$107.67	62.2%
Retail Gasoline	$/gal	$2.61	14.6%
Retail ULSD	$/gal	$2.76	18.7%

Power Gen Capacity Adds	Units	Latest	Change
Wind*	MW	1,141	0.9%
Solar*	MW	1,010	1.8%
Natural Gas*	MW	102	0.0%

2021 Spark Spreads	Units	Latest	Change
NEISO	$/MWh	$14.38	-1.6%
ERCOT	$/MWh	$19.51	-2.4%
PJM	$/MWh	$13.85	-2.7%
CAISO	$/MWh	$16.49	0.9%

Crack Spreads	Units	Latest	Change
EC 3-2-1 Crack	$/bbl	$18.27	130.7%
GC 3-2-1 Crack	$/bbl	$16.78	79.3%
WC 3-2-1 Crack	$/bbl	$16.84	59.5%

Upstream Data	Units	Latest	Change
U.S. Rig Count	Actual	650	1.0%
Crude Production	MMbbl/d	11,567	-1.7%
Nat Gas Production	BCF/d	3,683,216	3.7%

Source: Capital IQ, (*) data has a three-month lag

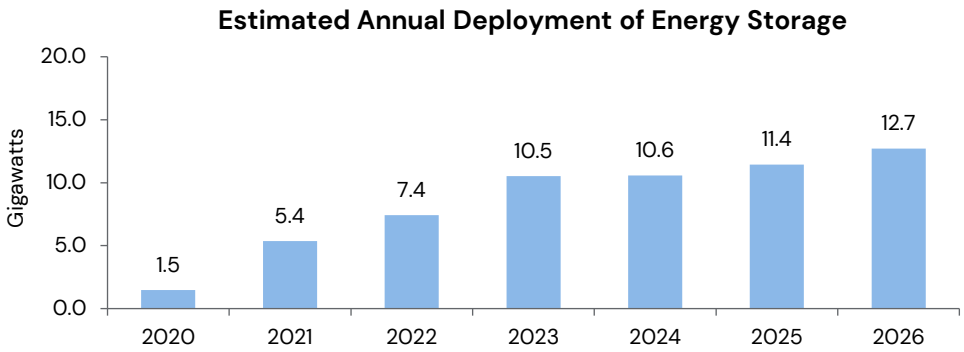
Market Observations

Battery Storage Growth and Drivers

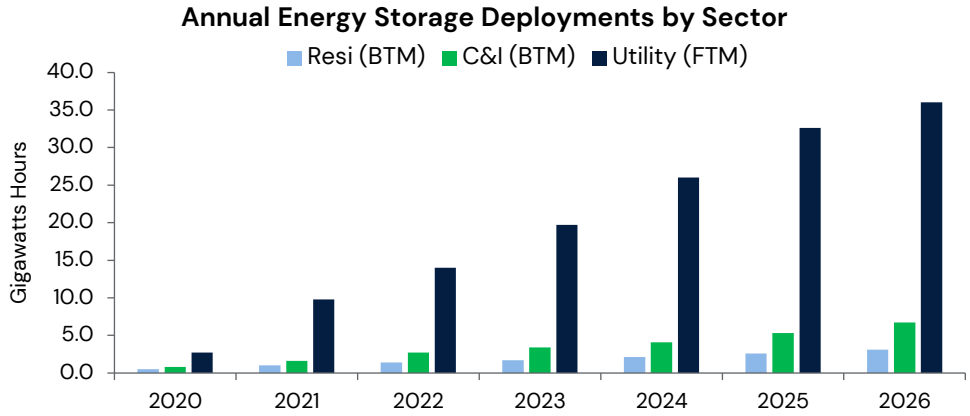
The key to a successful transition to renewable energy sources is the large-scale deployment of energy storage capacity, and battery storage, specifically in the near term. Over the next decade, battery storage growth is expected to grow at a 30%+ CAGR, driven by the increased deployment of intermittent generation and retirements of baseload generation, which together can increase grid variability. To maintain grid reliability, power supply and demand must be balanced at all times and at all locations to avoid grid frequency variations of more than 1%. Frequency changes greater than 1% are likely to destabilize the grid, potentially causing rolling blackouts or worse.

Various renewable and clean energy tax credit extensions still have a chance in the Build Back Better Act (BBB) or as part of other bills. A growing number of Democrats in Congress want to move ahead with the climate portion of President Biden's stalled spending bill, saying the urgency of a warming planet demands action. President Biden endorsed the strategy during a news conference on January 19th, saying that he was "confident we can get pieces, big chunks" of the bill passed. "I think it's clear that we would be able to get support for the $500 billion plus for energy and the environment."

Studies by the National Renewable Energy Lab (NREL), the U.S. Department of Energy (DOE), and U.S. Energy Information Administration (EIA) project U.S. storage capacity additions of roughly 200 GW by 2050, with potential of up to 900 GW in certain scenarios. In 2021, the EIA estimates that roughly 5.4 GW of storage capacity was installed which is over 3.5x the amount installed in 2020 (~1.5 GW). Looking forward, the estimated annual deployment of energy storage for both behind-the-meter (BTM) and front-of-the-meter (FTM) is >10 GW per year through 2026.

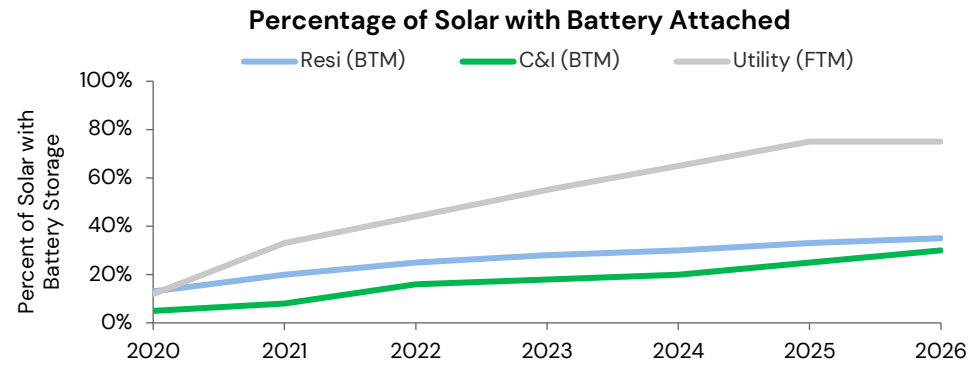


Of the total projected annual deployments, the majority of capacity will come from utility scale (FTM) market, with roughly 80% of all storage installations coming from this segment. In the BTM market, the C&I segment comprises roughly 13% of projected install capacity, with residential comprising the remainder.



In Q3 the U.S. storage market deployed 1,140 MW of storage, 2.4x the amount that was deployed in Q2 2021, according to Wood Mackenzie. Q3 2021 was the largest quarter on record in MW terms, beating out the previous record holding quarter (Q4 2020) by 612 MW. The residential market saw 97.9 MW installed, a slight rebound after the market dipped in Q2. Equipment constraints continue to limit installations, but vendors and installers have been expanding the range of battery options available for projects and are making progress on project backlogs.

The co-location of storage with solar is a substantial driver of demand for battery storage systems in both the behind-the-meter (BTM) and FTM markets. For residential solar owners, battery storage provides economic benefits in many cases, as well as emergency backup power supply. Wood Mackenzie estimated that roughly 35% of residential rooftop solar systems will include battery storage. For commercial and industrial (C&I) customers, battery storage brings additional uses and benefits, including peak demand charge shaving and monetization of grid services. Finally, the most significant market for battery storage, Mackenzie estimated that over 75% of utility scale solar will include battery storage systems by 2026.



Sources: Wood Mackenzie, U.S. Energy Storage Monitor Q4 2021, Credit Suisse

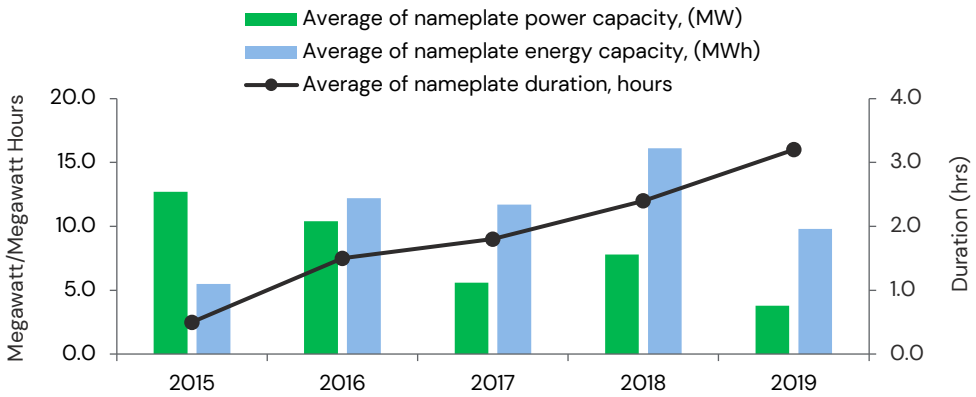
Market Observations (Continued)

Battery Storage Costs

Because batteries have a limited discharge time, costs can be quoted on a per kilowatt (power capacity) or per kilowatt-hour (energy capacity) basis. For example, two 1 megawatt battery systems that cost $1 million each would be quoted as costing $1,000/kW. However, if one system had 1 hour of storage capacity while the second system had four hours of capacity, the associated costs would be $1,000/kWh for the first system versus $250/kWh for the second. As such, battery duration is a key determinant of system characteristics such as cost. Even when using the same cells and inverters, a system intended to provide long duration discharge will optimize its design to minimize energy cost (in dollars per kWh), whereas a system intended to provide a short-duration injection of power into the grid will minimize power cost (dollars per kW). From 2015 to 2019, the average nameplate energy capacity of large-scale battery storage systems increased from 5.5MWh to almost 10MWh, according to the EIA. This increased occurred even as the average power capacity decreased from ~12.7MW to 3.8MW as the average duration of these systems increased from roughly half an hour to over three hours.

Average Capacity and Duration Trends

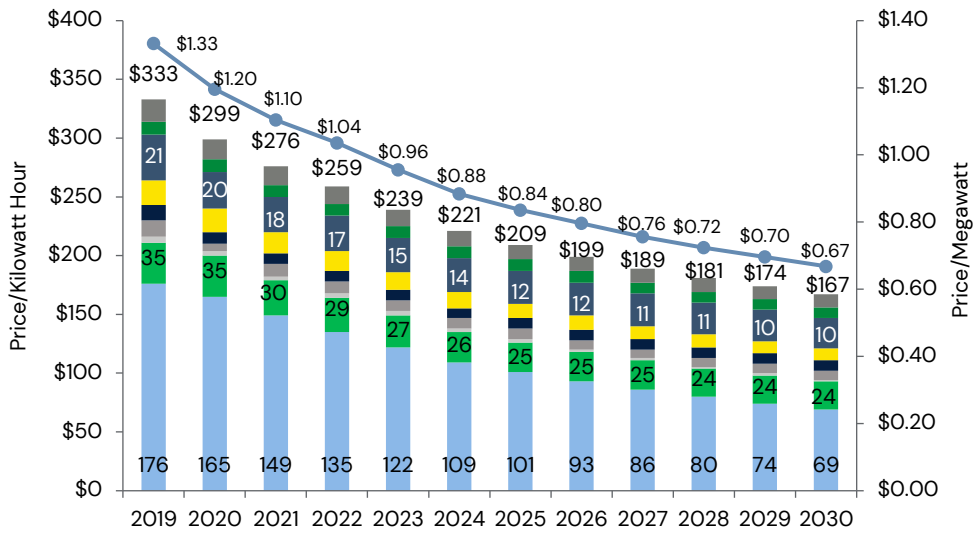
(Large Scale Battery Storage Systems, 2015-2019)



Because of this general increase in average duration, battery storage costs by energy capacity ($/kWh) have decreased over time, while staying stable in terms of power capacity costs ($/kW). The energy capacity-weighted average installed cost fell by 72% between 2015 and 2019 for an average five-year annual decrease of 27%. However, from 2015 to 2019, power capacity costs have remained relatively stable and within an average cost range of $1.00/MW and $1.65/MW. The trends of declining costs in terms of energy capacity and of relatively stable costs in terms of power capacity result from the increasing durations and larger energy capacities over time.

The following chart shows the fully burdened capital costs for a four-hour alternating

Large Scale 4-Hour Battery Storage System Install Cost



current (AC) energy storage system. Holding duration constant at four hours, system costs will decline ~6% per year through 2030 from $333/kWh to $167/kWh, which, assuming a constant four-hour duration, translates to roughly $1.30/MW to $0.70/MW, according to Bloomberg New Energy Finance. U.S. Energy Information Agency: Battery Storage in the United States: An Update on Market Trends (August 2021).

This forecasted reduction in the battery cost is expected to improve the economics of energy storage and support the development of larger energy storage systems (ESS). Moreover, the levelized cost of storage (LCOS) of battery storage has decreased from an estimated $324/MWh in 2018 to an estimated $192/MWh in 2020, according to the Lazard Levelized Cost of Storage Analysis. This reduction in cost makes battery storage economically competitive with the gas peakers which were estimated to have a levelized cost of energy (LCOE) range of $151/MWh to $198/MWh in 2020, according to the Lazard Levelized Cost of Energy Analysis.

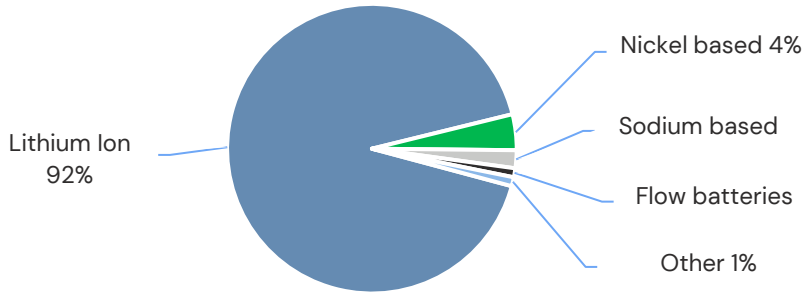
Energy Storage Technology

Until relatively recently, the only mainstream model of grid scale storage was pumped hydro, which entails using electricity when demand is low to pump water uphill into storage, then releasing the stored water through turbines when demand is high to generate more power. Pumped hydro still accounts for the vast majority of the world's installed power storage capacity, though growth in new installations is minimal compared to modern electrochemical, electromechanical, and thermal technology systems.

Sources: Wood Mackenzie, Credit Suisse, U.S. Energy Information Agency

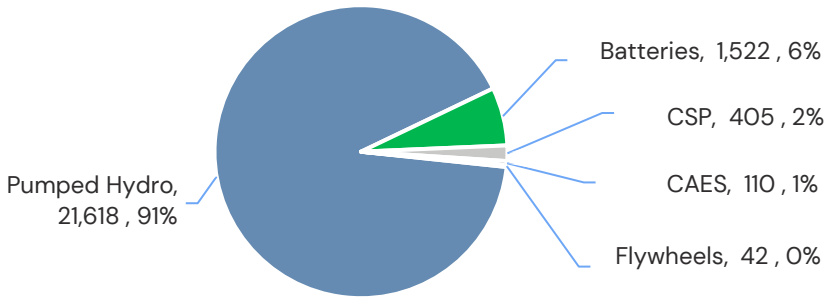
Market Observations (Continued)

2020 U.S. Storage Capacity by Technology
(Megawatts)



Over the past 20+ years, nearly all energy storage installations in the U.S. have been electrochemical, electromechanical, or thermal systems. Electrochemical systems refer mostly to batteries of various types. The earliest large-scale battery storage installations in the U.S. used nickel-based and sodium-based chemistries. However, in the last ~20 years, lithium-ion batteries have received the bulk of storage investment and R&D and have emerged as the dominant utility-scale storage technology. Since 2003, 93% of all large-scale battery storage installations have been lithium-ion.

Large-Scale battery Storage Capacity by Chemistry
(2003-2019)

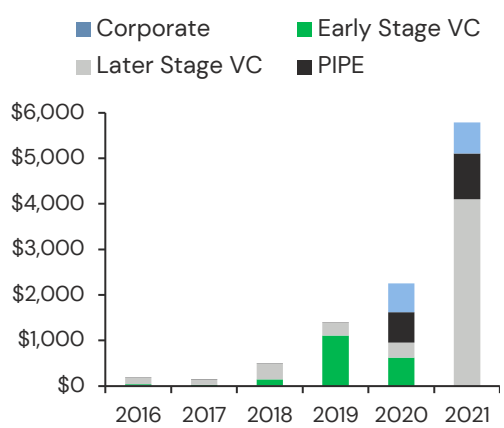


Li-ion batteries are cost competitive with some gas peaking plants. However, the challenge with Li-ion is that there is limited separation in its power and energy capital costs. For example, an EV effectively needs twice the amount of Li-ion cells to double its mileage range, resulting in very high marginal cost of energy ($/kWh). Other battery storage chemistries and technologies, including iron flow, aqueous zinc, vanadium redox, and liquid metal are in different phases of development but have yet to have significant deployment in large-scale grid applications in the United States. Beyond that, thermal energy storage systems include molten salt storage (in conjunction with concentrating solar power), hot water storage tanks, and ice storage air conditioning. Electromechanical systems include flywheels, compressed air technology, and gravity-based storage.

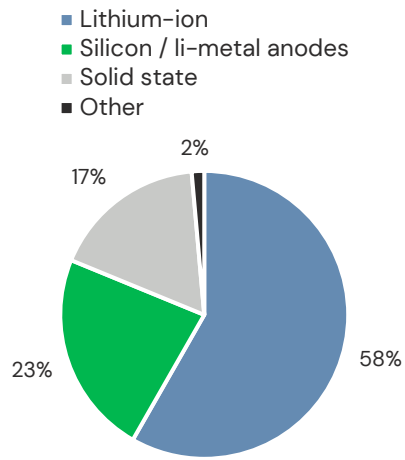
	Maximum System Size (MW)	Discharge Time	Operating Life	Energy Density (Wh / L)	Efficiency (%)
Pumped Hydro	3,000	4 to 8 hours	30 to 60 years	0.2 - 2	70 - 85
Compressed Air	1,000	2 to 30 hours	20 to 40 years	2 - 6	40 - 70
Molten Salt	150	Up to 24 hours	30 years	70 - 210	80 - 90
Lithium-Ion Battery	100	Up to 8 hours	1,000 to 10,000 cycles	200 - 400	85 - 95
Lead-Acid Battery	100	Up to 8 hours	6 to 40 years	50 - 80	80 - 90
Flow Battery	100	Up to 24 hours	12,000 to 14,000 cycles	20 - 70	60 - 85
Hydrogen	100	Up to 7 days	5 to 30 years	600	25 - 45
Flywheel	20	Up to 1 hour	20,000 to 100,000 cycles	20 - 80	70 - 95

We estimate that over $10 billion of growth capital has been raised for battery related technologies since 2016. The vast majority of this capital has been deployed towards technologies that address the primary challenges of li-ion batteries, including energy density, charge time, safety, and materials cost. These include companies developing and commercializing technologies relating to the use of solid electrolyte materials (solid state batteries), or to the development of alternative anode materials such as silicon or metallic lithium which potentially provide much higher energy density versus current anode materials.

Battery Technology Capital Dollars Raised



Battery Technology Capital Raised



Sources: U.S. EIA 860 Data, U.S. Energy Information Agency, World Energy Council, Raymond James, Pitchbook, Capstone Partners

Articles We Noticed

US Residential Solar: Why Is Customer Acquisition Still So Costly?

U.S. residential solar market has benefited from record-breaking industry growth. However, the industry's continued fragmented market leads to stiff competition, resulting in stubbornly high customer acquisition costs.

Wood Mackenzie

2 November 2021

2022 Utility M&A to Focus on Renewable Asset Recycling, Minority Stake Sales

Minority stake transactions and renewable power asset recycling will dominate deal-making in 2022. The multiples are enticing alternatives to tapping equity capital markets. Notably, Algonquin Power & Utilities announced a $2.85 billion purchase of American Electric Power.

S&P Global Market Intelligence

29 November 2021

The Green Hydrogen Revolution Is Sweeping Europe and Asia

Europe and Asia are aggressively pursuing the green hydrogen industry, encouraging a global transition to renewables. Recently, Shell launched one of the largest electrolyzers in China while Korean industrial giant Hyosung has planned an $835 million investment in green hydrogen.

Oilprice.com

2 February 2022

SPP, MISO Identify 7 Cross-Seam Transmission Projects That Could Unlock Up to 53 GW of New Generation

The SPP and MISO have identified seven transmission projects which could allow up to 53 GW of potential generating capacity to interconnect with the grid. This would relieve constraints on other potential renewable projects along the grid.

Utility Drive

2 February 2022

Brookfield Renewable Picks Up 20 GW of Solar, Storage Projects as Developers Seek Strategic Acquisitions

Brookfield Renewable acquired Urban Grid for $650 million which tripled Brookfield's existing pipeline. Moreover, this acquisition will bring in approximately 13 GW of utility-scale solar and 7 GW of energy storage.

Utility Drive

1 February 2022

Corporate Renewable Energy Deals Soared in 2021, Smashing Previous Record

Power producers sold 31.1 GW of green energy to companies outside the electric industry, generating a 24% increase from 2020. Power and technology company deals accounted for more than 10% of green energy.

S&P Global Market Intelligence

31 January 2022

Gas Generators Make Their Move as Texas Redesigns Power Market

Winter storms have caused energy blackouts across Texas. The U.S. Energy Information Administration reported an increase of 2.8 GW of natural gas capacity in Texas, increasing a competitive backup power strategy during emergencies.

S&P Global Market Intelligence

29 November 2021

DOE to Offer $3 Billion to Boost Battery Production, Recycling

The recent promotion of EVs and transition to renewable energy production has spurred funding from DOE. $2.8 billion will support new, retrofitted and expanded domestic production of advanced batteries.

Utility Drive

16 August 2021

Microgrid Project Using Vanadium Redox Flow Battery

San Diego Gas & Electric and Sumitomo Electric completed a zero-emissions microgrid using a vanadium redox flow battery. The utility is building four additional microgrids, integrating 145 MW of energy storage.

pv magazine USA

31 January 2022

Grid Storage Systems Unlikely to See Price Declines Until 2024

Grid storage systems are anticipated to post strong returns until 2024 when lithium-ion batteries scales to meet the increased demand from automakers. Moreover, cell capacity for grid-energy storage is forecasted to increase by 130 GWh in five years.

IHS Markit

4 February 2022

Rooftop Solar Price to Keep Rising This Year

GlobalData analyzed pandemic trends and reported rooftop solar modules are expected to moderately increase in 2022 with eventual falling prices in 2023. The high demand for solar modules have created supply chain issues across the globe.

pv magazine USA

16 February 2022

New PV Module Recycling Tech

Rosi Solar has innovated mild thermal and chemical treatment, allowing the extraction of high-value metals and materials. In particular, the company patented its reintegration process to recover ultra-pure silicon lost during the production of photovoltaic cells.

pv magazine USA

16 February 2022

Select Recent Transactions

Close Date	Target	Target Description	Buyer	Deal Synopsis
02/02/22	Borrego Solar Systems	Provides 45MW of solar and 88MWh of battery energy storage to low-income subscribers.	Distributed Solar Development	The 45MW of solar and 88MWh of battery energy storage is set to work under the Solar Massachusetts Renewable Target (SMART) Program, a long-term, sustainable solar incentive program to promote cost-effective solar development across the state.
02/01/22	SES (Energy Storage) (TSX:SES)	Develops high-performance Li-Metal rechargeable batteries for electric vehicles and other applications.	Ivanhoe Capital Acquisition	The transaction will create the first publicly-traded hybrid Li-Metal battery company that combines the high energy density of Li-Metal with cost effective manufacturability at scale.
02/01/22	Congruitive	Designs smart grid software to simplify the acquisition and integration of data over energy networks.	Tantalus (TSE:GRID)	Tantalus' acquisition of Congruitive further demonstrates their purpose-driven mission to help utilities become sustainable from an enhanced financial, operational and environmental perspective.
01/31/22	Cotopaxi	Provides energy management system solutions for industrial and commercial energy and process optimization.	Spirax Sacro/ Equipamentos Industriais	The acquisition accelerates Spirax Sacro/Equipamentos Industriais strategy of improving the efficiency and sustainability of its industrial steam use.
01/27/22	In-Charge Energy	Develops electric charging stations designed to accelerate the electrification of the transportation industry.	ABB Technology Ventures	ABB anticipates In-Charge Energy to help position ABB more strongly to benefit from significant investments in U.S. EV market with focus on sustainable fleet electrification.
01/26/22	Urban Grid Solar	Develops utility-scale solar power plants intended to support the transition towards clean energy.	Brookfield Renewable Partners (NYSE:BEP)	Brookfield Renewable Partners will engage with Urban Grid's team to maximize the value of the company's development pipeline by leveraging its operating and commercial expertise.
01/19/22	Storion Energy	Manufactures vanadium redox flow battery technology for residential installations.	Stryten Energy	Storion Energy is expanding Stryten's Essential Power division which provides advanced lead and lithium battery technologies and services.
01/18/22	American Petroleum Sales & Service	Distributes petroleum equipment intended to serve the oil and gas industry.	Rosewood Private Investments	The combination between American petroleum Sales & Service and Rosewood Private Investments enables an extended service offerings to both existing and new customer relationships.
01/18/22	Momentum Fuel Technologies	Manufactures CNG fuel systems intended to offer compressed natural gas fuel systems for Class 6-8 vehicles.	Cummins (NYSE:CMI)	The acquisition of Momentum Fuel Technologies enables Cummins to improve customer service for both CNG and RNG through an improved support network.
01/13/22	Seapeak	Provides marine transportation services for liquefied natural gas, liquefied petroleum gas and crude oil.	Stonepeak Infrastructure Partners	This transaction will provide over $200 million in financing for the expansion of Stonepeak's composting facilities in future years.
01/12/22	Atlas Organics	Develops commercial composting solutions to promote sustainable agriculture and landscaping.	Generate	Generate Capital expands its presence in organic waste management through investment in South-Carolina-based composting company amid increasing demand for sustainable waste solutions
01/11/22	STI Norland	Designs and manufactures solar trackers and fixed-tilt structures.	Array Technologies (NAS:ARRY)	The acquisition is an important first step in the expansion strategy, creating a global reach in trackers with leading positions in every major market for solar.

Sources: PitchBook, Array Technologies website, businesswire.com, ABB website, Tantalus website, Ivanhoe Capital website

Select Recent Transactions (Continued)

Close Date	Target	Target Description	Buyer	Deal Synopsis
01/11/22	Zetec	Manufactures nondestructive testing devices and solutions for critical inspection of several industries.	Eddyfi Technologies	The addition of Zetec to Eddyfi Technologies completes market coverage and enhances expertise in power generation, aerospace, defense, rail, and manufacturing.
01/04/22	Heila	Develops modular energy platforms to connect and optimize distributed energy resources.	Kohler	With this transaction, Kohler intends to expand its clean energy management offering and leverages the history of trusted expertise in power resiliency with newer clean energy technologies.
01/03/22	Vere Technology	Specializes in manufacturing pumps for oil and gas production applications.	Extract Production Services	Extract Production Services acquired Vere Technology through an LBO for an undisclosed amount.
01/02/22	ADS-TEC Energy (NAS:ADSE)	Produces, develops, and markets battery-buffered EV charging systems infrastructure, battery storage systems, and cloud-based services.	European Sustainable Growth Acquisition (NAS:EUSG)	ADS-TEC Energy will further enable the European Sustainable Growth Acquisition to build its energy division through EV charging systems infrastructure, battery storage systems, and cloud-based services, allowing the customer to control and manage their systems.
12/30/21	Heliogen (NYSE: HLGN)	Innovates solar energy systems to unlock the power of sunlight to replace fossil fuels.	Athena Technology Acquisition	This acquisition accelerates and advances Heliogen's mission to empower a sustainable civilization with low-cost solar energy that makes clean power more affordable than fossil fuels.
12/24/21	Babcock International Group (Overhead Line Power Business)	Provides engineering services serving the overhead line electric transmission and distribution industry.	M Group Services	Babcock International Group PLC's Overhead Line Power business will enhance the existing electricity, gas, and green energy capabilities, expanding the M Group Services' Energy division.
12/21/21	Opus One Solutions	Develops real-time energy management software designed to transform interactions with the energy internet.	General Electric (NYSE:GE)	GE's acquisition of Opus One Solutions further reinforces GE Digital's commitment to helping the customers transition to a sustainable grid.
12/17/21	AlsoEnergy	Develops monitoring, control, and management platform for energy assets.	Stem (Energy Storage) (NTS: STEM)	This acquisition of AlsoEnergy combines Stem's unique storage optimization capabilities with the company's asset performance monitoring and control software to deliver a on-stop-shop solution for renewable energy projects.
12/17/21	NxEdge	Provides vertically integrated solutions to the semiconductor market	EnPro Industries (NYSE:NPO)	NxEdge will enable EnPro Industries to transform its strategy to drive value through the addition of unique, high-margin, high-cash flow industrial technology businesses in secular growth markets.
12/14/21	Eathly Labs	Provides small-scale carbon capture systems intended to address the carbon dioxide emissions from industrial sources.	Chart Industries	Chart Industries intends to accelerate its innovation to capture as much as 20x the CO2 from large craft breweries, meet the CO2 conversion needs of wineries, distilleries, and cannabis, and accelerate offerings immediately in the Canadian market.
12/10/21	Altus Power America (NYS: AMPS)	Operates large-scale roof, ground, and carport-based photovoltaic and energy storage systems.	CBRE Acquisition Holdings	The combination of technological innovation and strategic partnership will position Altus Power for success in a growing market for locally sited, clean power generation, and battery storage for businesses and homes.
12/09/21	Sunpro Solar	Provides rooftop solar systems intended to serve residential and commercial properties.	ADT Security Services	The acquisition helps ADT Security Services expand consumer offerings, increase total addressable markets, and create an opportunity for cross-selling between security and solar customers.

Sources: PitchBook, PR Newswire, Chart Industries website, pirvateequitywire.com, Heliogen website, Zetec website

Select Recent Transactions (Continued)

Close Date	Target	Target Description	Buyer	Deal Synopsis
12/09/21	Frames Group	Designs and manufactures measurement systems for the energy, renewables, and oil and gas sector.	Power Plug (NAS: PLUG)	The acquisition of Frames Group will support Plug Power's goal to reach an installed electrolyzer capacity of three gigawatts (GW) by 2025.
12/07/21	Solid Power (NAS: SLDP)	Develops next-generation all-solid-state battery technology.	Decarbonization Plus Acquisition III	Decarbonization Plus Acquisition III intends to focus on Solid Power's next-generation all-solid-state battery cells for automotive applications.
12/01/21	ecobee	Develops smart home monitoring devices designed to deliver intelligent energy management.	Generac Power Systems (NYSE:GNRC)	The combination of ecobee's cutting-edge technologies with Generac's power generation, energy storage, and energy management devices will allow Generac to create a clean, efficient, and reliable home energy ecosystem.
12/01/21	Anord Mardix	Manufactures critical power distribution and protection equipment for the energy and power generation industry.	Flex (Electronics) (NAS:FLEX)	Anord Mardix's current platform strengthens Flex's Industrial business, adding to Flex's portfolio of power solutions and expanding its offerings in the rapidly growing data center market.
11/30/21	DEPCOM Power	Provides solar power plant EPC and storage services to deliver energy at a lower cost.	Koch Engineered Solutions	With this transaction, Koch Engineered Solutions can build a new industry platform in renewables and electrical infrastructure value chain, adding extensive knowledge and capability to their global client base.
10/26/21	H.A.R.T High Voltage Apparatus Repair and Testing Co.	Provides high-voltage maintenance and testing services for electric utilities, power plants, and large-scale power users	Electric Power Systems	Electric Power Systems intends to broaden its high-voltage service offerings, using H.A.R.T High Voltage Apparatus Repair and Testing Co.'s existing network.

Sources: PitchBook, DEPCOM Power website, ecobee website, Decarbonization Plus Acquisition III website

Macroeconomic Activity

Table 1: Industrial Production Index (INDPRO)

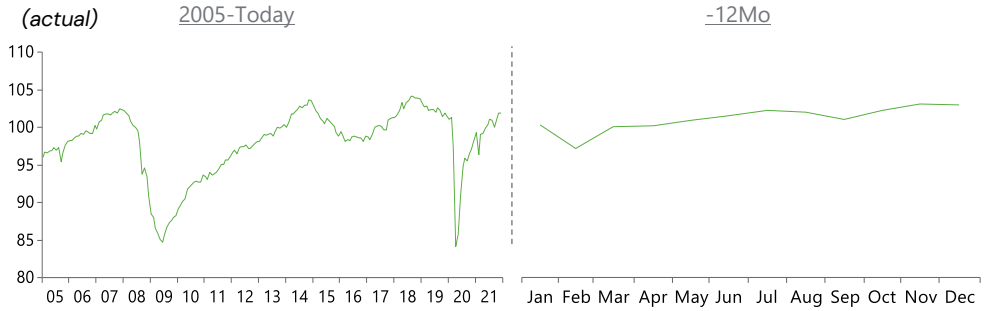


Table 2: Total Construction Spending: Nonresidential

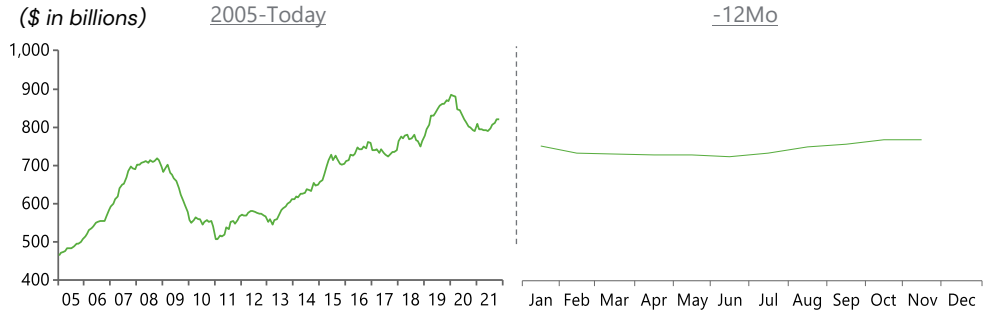


Table 3: Total Construction Spending: Power

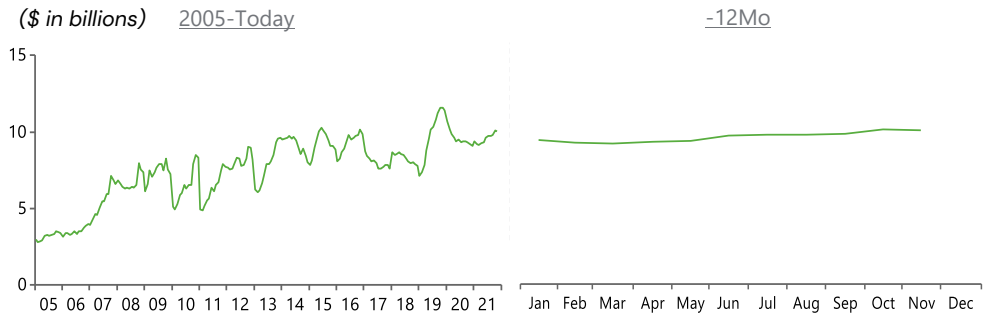


Table 4: Manufacturers' New Orders: Nondefense Capital Goods Excluding Aircraft

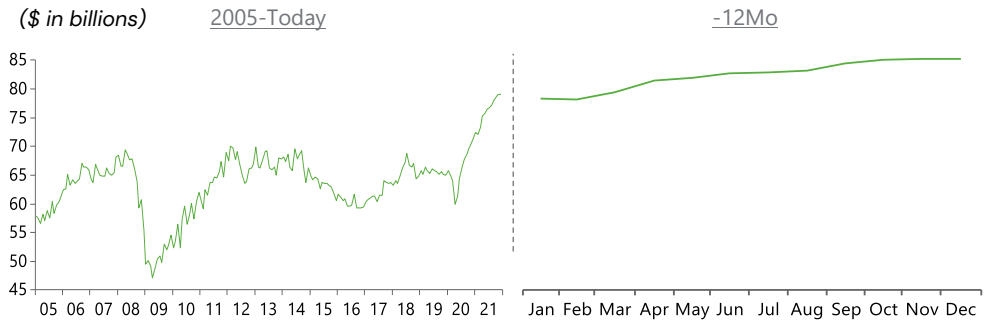


Table 5: Value of Manufacturers' New Orders for Durable Goods Industries: Machinery: Mining, Oil Field, and Gas Field Machinery

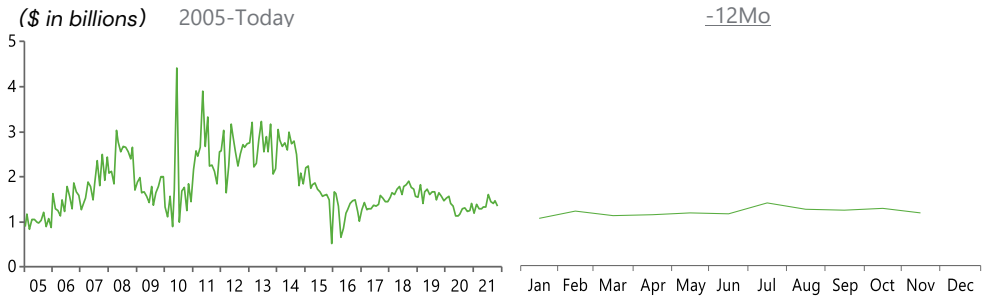
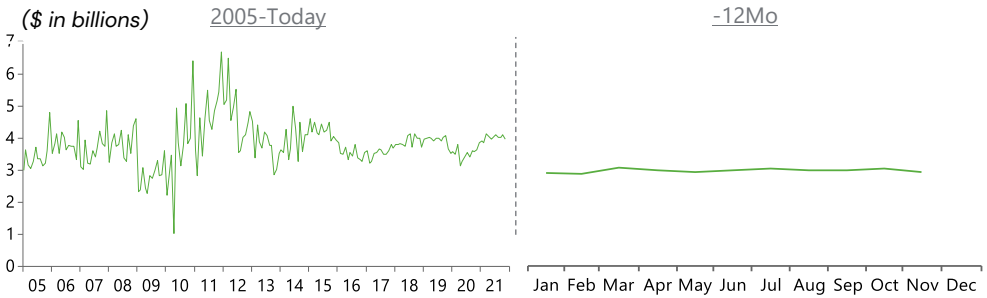
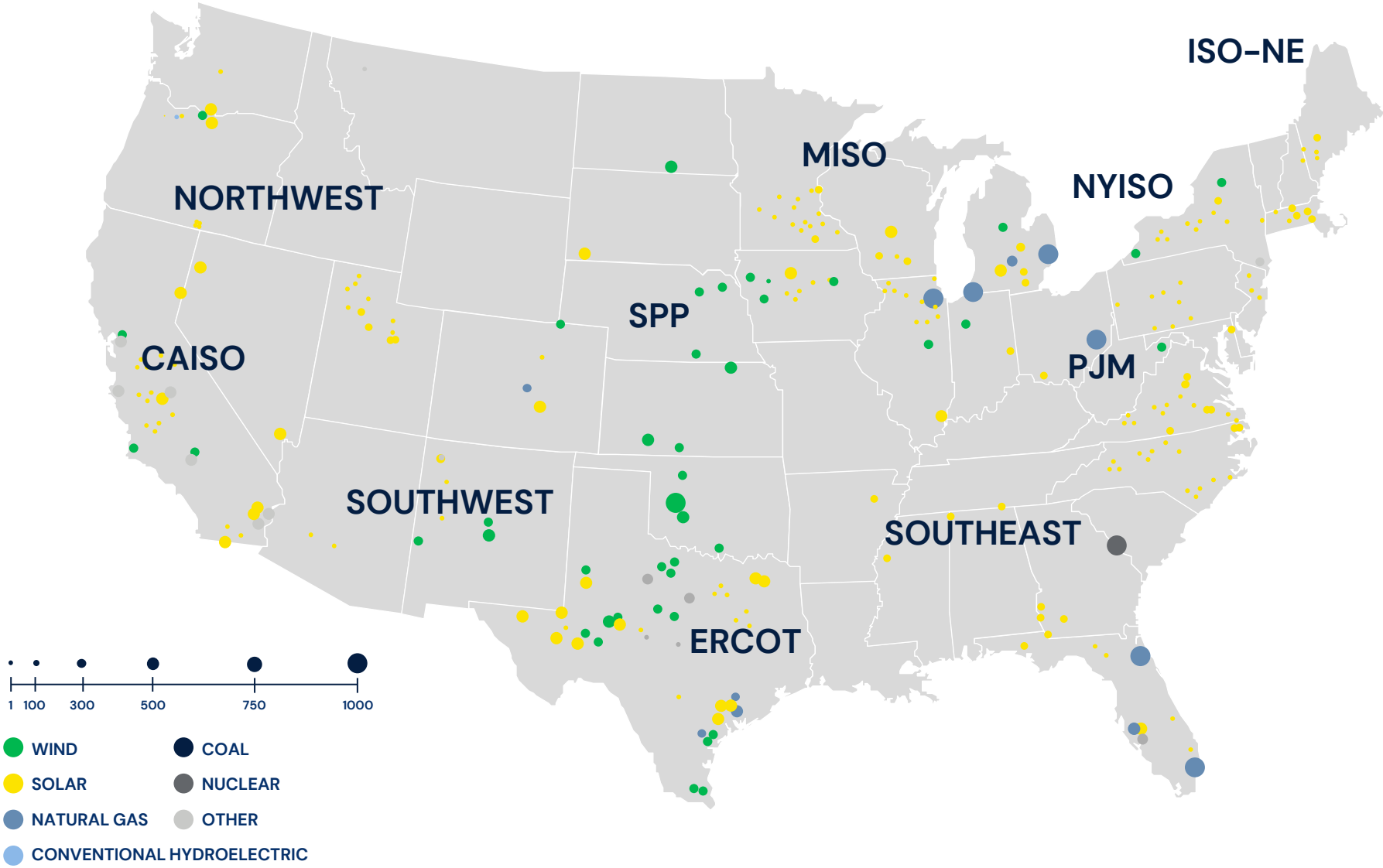


Table 6: Value of Manufacturers' New Orders for Durable Goods Industries: Machinery: Turbines, Generators, and Other Power Transmission Equipment



Power Generation Capacity

Utility Scale Generating Units Planned to Come Online from July 2021 to June 2022



Power Generation Capacity

Table 1: Historical Capacity Additions – Renewables

(MW)

	Trailing Months				Percent Change			
	1Mo	3Mo	12Mo	YTD	1Mo	3Mo	12Mo	YTD
Wind	1,141	1,628	17,868	11,016	0.9%	1.3%	16.0%	9.3%
Solar	1,010	667	12,861	9,464	1.8%	1.3%	28.8%	19.7%
Energy Storage	642	268	2,950	2,867	2.4%	1.1%	12.0%	11.7%
Other Renewable	(37)	90	(95)	(74)	0.0%	0.1%	-0.1%	-0.1%
Total	2,756	2,653	33,583	23,272	1.3%	0.9%	14.2%	10.1%

Table 2: Historical Capacity Additions - Fossil Fuels/Nukes

(MW)

	Trailing Months				Percent Change			
	1Mo	3Mo	12Mo	YTD	1Mo	3Mo	12Mo	YTD
Natural Gas	102	509	4,434	4,790	0.0%	0.1%	0.9%	1.0%
Coal	-	(1,760)	(5,803)	(4,173)	0.0%	-0.8%	-2.7%	-1.9%
Other Fossil Fuels	(2)	(7)	(1,406)	(516)	0.0%	0.0%	-4.6%	-1.7%
Nuclear	-	-	(1,036)	(1,036)	0.0%	0.0%	-1.1%	-1.1%
All Other	(19)	-	(19)	(19)	-1.3%	0.0%	-1.3%	-1.3%
Total	81	(1,258)	(3,831)	(954)	-0.2%	-0.1%	-1.7%	-1.0%

Table 3: Projected Capacity Additions – Renewables

(MW)

	Current	Projected Changes		Percent Change	
	Capacity	1Mo	12Mo	1Mo	12Mo
Wind	129,394	5,337	10,150	4.1%	7.8%
Solar	57,518	4,368	17,323	7.6%	30.1%
Energy Storage	27,438	1,119	4,578	4.1%	16.7%
Other Renewable	95,372	4	148	0.0%	0.2%
Total	309,723	10,828	32,199	4.0%	13.7%

Table 4: Projected Capacity Additions - Fossil Fuels/ Nukes

(MW)

	Current	Projected Changes		Percent Change	
	Capacity	1Mo	12Mo	1Mo	12Mo
Natural Gas	490,597	869	9,432	0.2%	1.9%
Coal	211,381	(804)	(10,537)	-0.4%	-5.0%
Other Fossil Fuels	29,330	-	(72)	0.0%	-0.2%
Nuclear	95,464	-	367	0.0%	0.4%
All Other	1,505	-	-	0.0%	0.0%
Total	828,278	65	(810)	0.0%	-0.6%

Table 5: Fossil Fuel Capacity Factors

(MW)

	Trailing Months				Percent Change			
	Mar-21	-1Mo	-6Mo	-12Mo	1Mo	3Mo	6Mo	12Mo
Coal	39.4%	60.7%	43.6%	30.9%	-9.2%	-21.3%	-4.2%	8.5%
CC	44.5%	50.9%	60.2%	52.2%	-9.5%	-6.4%	-15.7%	-7.7%
GT	7.6%	11.1%	11.5%	9.7%	-1.1%	-3.5%	-3.9%	-2.1%
ST	7.5%	12.6%	16.2%	11.1%	-1.5%	-5.1%	-8.7%	-3.6%
IC	11.1%	13.5%	15.4%	13.1%	0.7%	-2.4%	-4.3%	-2.0%

Table 6: Renewable Generation Capacity Factors

(MW)

	Trailing Months				Percent Change			
	Jan-20	-1Mo	-6Mo	-12Mo	1Mo	3Mo	6Mo	12Mo
Geothermal	72.4%	79.3%	73.6%	65.8%	-3.7%	-6.9%	-1.2%	6.6%
Hydroelectric	44.0%	37.9%	50.6%	42.7%	5.2%	6.1%	-6.6%	1.3%
Nuclear	100.2%	88.8%	96.1%	101.6%	2.9%	11.4%	4.1%	-1.4%
Photovoltaic	16.3%	18.6%	32.7%	16.5%	0.6%	-2.3%	-16.4%	-0.2%
Thermal	6.2%	13.0%	29.7%	8.1%	-0.8%	-6.8%	-23.5%	-1.9%
Wind	34.1%	42.0%	38.1%	36.9%	-3.0%	-7.9%	-4.0%	-2.8%

Source: U.S. Energy Information Administration

Spark Spreads & Forward Curves

Table 1: Power Price Forward Curves by Region

($/MWh)

Peak	2022	2023	2024	2025	2026	2027
New England	74.6	58.9	52.9	51.0	52.8	56.1
Greater New York	69.3	57.6	57.3	60.4	61.1	62.3
Penn/Jersey/Maryland	57.7	47.5	45.8	45.2	44.4	44.4
Midwest	55.4	45.3	43.6	42.7	41.8	41.7
Illinois	53.4	44.5	44.1	41.7	42.6	43.4
Southeast/Gulf Coast	49.6	42.2	41.8	42.0	41.2	41.4
Texas	59.3	47.7	40.2	37.9	35.4	34.5
Desert Southwest	99.2	77.0	59.2	61.3	54.6	54.5
So Cal	68.9	54.6	45.5	41.9	38.9	38.2
North CA	70.8	55.6	46.4	42.6	41.4	40.8
Pac Northwest	74.8	65.1	57.5	54.7	54.9	55.2
U.S. Average	**62.7**	**51.3**	**46.5**	**45.8**	**44.3**	**44.4**

Flat	2022	2023	2024	2025	2026	2027
New England	67.4	53.4	48.1	47.4	49.1	52.1
Greater New York	60.5	50.8	51.3	53.3	54.5	55.2
Penn/Jersey/Maryland	50.5	40.9	39.5	39.0	38.4	38.5
Midwest	48.7	39.0	37.2	36.7	36.1	36.3
Illinois	47.2	38.0	38.1	36.2	37.0	37.7
Southeast/Gulf Coast	45.6	37.6	37.5	37.6	37.6	37.7
Texas	47.8	39.1	34.3	32.5	30.9	30.0
Desert Southwest	81.7	66.4	55.7	57.3	51.7	52.2
So Cal	63.3	52.9	47.3	45.6	43.8	43.0
North CA	65.8	54.6	48.6	46.4	43.9	43.6
Pac Northwest	60.5	55.2	50.9	49.3	48.8	49.2
U.S. Average	**54.1**	**44.5**	**41.4**	**41.0**	**40.0**	**40.1**

Table 2: Spark Spread Forward Curves by Region

($/MWh)

Peak	2022	2023	2024	2025	2026	2027
New England	23.1	18.9	17.2	18.7	21.2	24.4
Greater New York	34.0	29.0	31.4	35.9	36.9	37.9
Penn/Jersey/Maryland	25.1	20.7	22.5	23.5	23.0	21.9
Midwest	26.6	21.7	21.9	21.5	20.6	19.7
Illinois	22.9	19.3	21.0	19.3	20.1	20.3
Southeast/Gulf Coast	19.1	17.1	19.3	20.3	19.7	19.2
Texas	28.5	22.9	18.0	16.6	14.4	12.9
Desert Southwest	71.2	55.8	40.4	42.5	35.8	35.0
So Cal	35.4	27.2	20.4	17.4	14.3	13.2
North CA	40.2	30.9	24.0	20.9	19.9	18.6
Pac Northwest	44.8	40.8	35.7	33.4	33.6	33.3
U.S. Average	**31.6**	**26.0**	**22.6**	**22.7**	**20.8**	**20.1**

Flat	2022	2023	2024	2025	2026	2027
New England	15.9	13.4	12.4	15.1	17.5	20.5
Greater New York	25.2	22.3	25.4	28.8	30.3	30.8
Penn/Jersey/Maryland	17.9	14.1	16.2	17.3	17.0	16.0
Midwest	19.8	15.3	15.5	15.6	14.9	14.3
Illinois	16.6	12.8	15.1	13.8	14.5	14.6
Southeast/Gulf Coast	15.1	12.5	14.9	15.9	16.1	15.5
Texas	17.0	14.3	12.1	11.2	9.9	8.3
Desert Southwest	53.6	45.3	36.9	38.5	32.9	32.6
So Cal	29.8	25.4	22.3	21.0	19.2	18.0
North CA	35.2	29.8	26.2	24.7	22.4	21.4
Pac Northwest	30.5	31.0	29.1	28.0	27.5	27.2
U.S. Average	**22.7**	**19.2**	**18.1**	**18.4**	**17.3**	**16.5**

Source: U.S. Energy Information Administration

Public Market by Sector

Summary Sector Trading Statistics

	Stock Performance			Margin Profile			Valuation Metrics			
	Change From						TEV /			
	-1Mo	-3Mo	-12Mo	Gross Profit	EBITDA	FCF	LTM Revenue	LTM EBITDA	FWD Revenue	FWD EBITDA
Energy Infrastructure										
Infrastructure Services	-2.1%	7.7%	77.7%	6.7%	6.7%	7.3%	0.8x	14.9x	0.8x	11.3x
Utility Services	-1.1%	18.3%	158.9%	12.1%	8.8%	11.6%	1.2x	12.4x	1.1x	11.3x
Industrial Services	-9.0%	-3.6%	79.6%	16.9%	9.0%	5.3%	0.0x	0.7x	0.0x	7.8x
Testing, Inspection, & Certification	3.3%	10.8%	48.5%	22.3%	22.8%	27.2%	0.2x	0.7x	0.2x	13.8x
Environmental Services	1.2%	15.8%	35.7%	26.0%	23.3%	32.0%	0.1x	0.6x	0.1x	12.8x
Flow Control	1.9%	6.2%	74.4%	36.0%	15.9%	18.5%	0.1x	0.7x	0.1x	12.9x
Diversified Process Equipment	3.5%	15.3%	70.1%	29.1%	17.5%	20.5%	0.2x	0.8x	0.0x	20.6x
Average	-0.3%	10.1%	77.8%	21.3%	14.9%	17.5%	0.4x	4.4x	0.3x	12.9x
Energy Technology										
Measurement, Control, & Automation	-0.5%	4.6%	56.8%	33.6%	18.3%	20.9%	3.0x	16.7x	3.6x	19.2x
Energy Management	4.0%	-0.6%	66.6%	31.2%	19.7%	43.0%	2.3x	19.8x	2.4x	20.8x
Fuel Cells	-7.2%	-38.4%	250.1%	12.4%	-43.3%	-2.1%	15.7x	-46.6x	22.2x	18.6x
Solar Equipment	0.6%	-16.3%	120.1%	21.8%	10.0%	16.2%	3.8x	72.5x	1.4x	29.5x
Energy Storage	-6.3%	-28.5%	N/A	3.9%	-53.8%	-39.1%	37.8x	27.2x	2.3x	19.4x
Solar Inverters	-3.1%	-14.3%	127.8%	31.1%	13.8%	18.5%	7.0x	42.5x	10.0x	51.8x
Battery OEM	1.7%	-21.3%	-6.1%	-927.8%	-3267.1%	-2807.5%	745.2x	-23.1x	685.4x	-51.5x
Average	-1.5%	-16.4%	102.5%	-113.4%	-471.8%	-392.9%	116.4x	15.6x	103.9x	15.4x
Power										
Solar Developers	-12.2%	-28.9%	160.4%	23.1%	6.4%	-86.7%	2.6x	45.3x	2.9x	32.3x
YieldCo's	-6.0%	-6.1%	41.8%	31.5%	61.5%	-20.2%	11.3x	18.7x	12.3x	19.3x
Independent Power Producers	-4.6%	-0.8%	33.8%	26.3%	39.3%	-21.4%	2.6x	14.0x	3.5x	9.3x
Power Utilities - Large Cap	-0.4%	11.9%	10.6%	26.8%	38.4%	-34.1%	4.9x	13.0x	5.3x	71.2x
Average	-5.8%	-6.0%	61.7%	26.9%	36.4%	-40.6%	5.4x	22.7x	6.0x	33.0x

LEADING MIDDLE MARKET ADVISOR FOR THE ENERGY TRANSITION

NOR-CAL CONTROLS ENERGY SOLUTIONS

EXCLUSIVE ADVISOR ON ITS EVALUATION OF STRATEGIC ALTERNATIVES

March 2022

Solar control systems design / integration

Project Columbia

SELL-SIDE ENGAGEMENT

Wind O&M services

COMMONWEALTH ELECTRICAL TECHNOLOGIES

HAS BEEN ACQUIRED BY

EAGLESTONE, LLC a portfolio company of Aterian

Commercial solar design / install

MARTIN ENERGY GROUP

HAS OBTAINED FINANCING FROM

ORION ENERGY PARTNERS

Distributed generation systems

Eagle AUTOMATION

HAS BEEN ACQUIRED BY

FEATHERINGILL CAPITAL

Energy automation & control services

Technical Diagnostic Services

HAS BEEN ACQUIRED BY

CALVERT STREET CAPITAL PARTNERS

Electrical systems testing & optimization

TAYLOR CONSULTING & CONTRACTING

HAS BEEN ACQUIRED BY

Albireo Energy Partnering for Success

Energy management & optimization

AltAir Fuels

HAS RECEIVED MEZZANINE CAPITAL FROM

NEW ENERGY CAPITAL

Jesta Capital

Renewable fuels production

Marubeni Sustainable Energy

HAS BEEN ACQUIRED BY

EWP

Renewable power generation

WINDWORKS POWER

HAS BEEN ACQUIRED BY

ALLETE clean energy

Wind power generation

Energy, Power & Infrastructure Coverage

Sector Coverage

Energy Infrastructure

- Infrastructure Services & Equipment
- Midstream Services & Equipment
- Refinery & Industrial Services
- Fuel Distribution & C-stores
- Environmental Services
- Engineering & Consulting

Power

- Conventional Power
- Renewable Power
- Distributed Generation
- Transmission & Distribution
- Services & Equipment

Energy Technology

- Automation
- Measurement & Control
- Energy efficiency
- Smart Grid
- Water & Wastewater
- Batteries & Storage
- Biofuels

Oil and Gas

- Oilfield Services
- Exploration & Production
- Manufacturing & Distribution
- Construction & Fabrication
- Water Management
- Sand and Proppants

Mining & Minerals

- Base Metals
- Precious & Specialty Metals
- Energy Minerals
- Industrial Minerals

Capabilities

Mergers & Acquisitions

- Sell-side Advisory
- Buy-side Advisory
- Recapitalizations
- Mergers & Joint Ventures

Capital Advisory

- Equity Advisory
- Debt Advisory
- Infrastructure Finance

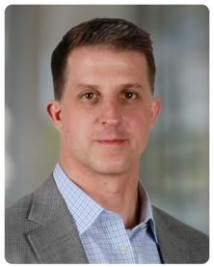
Financial Advisory

- Transaction Advisory
- Interim Management
- Performance Improvement
- Valuation Advisory
- Litigation Support

Special Situations & Restructuring

- Special Situations
- Turnaround
- Restructuring
- Bankruptcy
- Insolvency

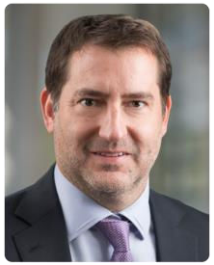
Report Contributors



Ted Kinsman
Managing Director
tkinsman@capstonepartners.com | 303-572-6013

Ted Kinsman is a Managing Director in Capstone Partners' Energy, Power, & Infrastructure Group. Ted brings over 20 years of experience in finance and investment banking within the energy sector, and throughout his career has closed transactions totaling over $2 billion as both advisor and principal investor.

Previously, Ted spent several years at The Broe Group as a member of its Strategic Capital Group and Broe's private investment division where he focused on the acquisition of energy and natural resources assets. He joined Headwaters MB, now Capstone Partners, in 2005 and helped establish Capstones' Energy, Power, & Infrastructure Group. In that capacity, Ted has obtained extensive deal experience across the energy sector, including transactions in the power, energy infrastructure, energy technology, and oil & gas sectors.
.



CJ Hummel
Managing Director
cjhummel@capstonepartners.com | 303-748-3512

CJ Hummel is a Managing Director in Capstone Partners' Energy & Power Group. He brings 15 years of experience in project finance, mezzanine finance and private equity investing in the development and acquisition of energy infrastructure assets.

CJ has particular expertise in tax equity and project financing for various sectors in the energy industry including infrastructure, power generation (both conventional and renewable), alternative fuels and downstream assets. His most recent transactions include the sale of Marubeni Sustainable Energy's 70 megawatts of biomass and co-generation assets to Korea East-West Power Company, the convertible tax equity raise for the conversion of Mt. Poso Cogeneration Company's 49.5 megawatt coal-fired power generation plant to burn 100% biomass, the equity and debt formation for the acquisition and refurbishment of Global Ampersand's two 12.5 megawatt biomass power generation facilities and the bond financing for the construction of a 4.7 megawatt run-of-river hydroelectric facility for Bowersock Mills & Power Company.

Prior to joining Headwaters MB (now Capstone Partners) in 2007, CJ was a founding member of Galena Capital playing a key role investing over $100 million in the acquisition and restructuring of four companies. Prior to Galena, he served a Senior Vice President for Alliant Energy Generation and Vice President for El Paso Corporation's EP Power Finance private equity arm.

Wolfgang Zahner
Vice President
wzahner@capstonepartners.com | 303-951-7119

Wolfgang brings a diverse background of leadership and industry experience in manufacturing, supply chain, finance, and military operations to his team. At Capstone Partners, his M&A experiences include a variety of industries to include Aerospace & Defense, Manufacturing, Industrial Operations, Consumer, and Insurance.

Prior to joining Capstone, Wolfgang was an associate at General Electric's Corporate Audit Staff with roles in the Oil & Gas, Transportation, and Power businesses. He also served as an Explosive Ordnance Disposal Officer in the US Air Force as a Captain, with two deployments to Afghanistan and Kuwait in support of Operation Enduring Freedom and Operation Iraqi Freedom.

Endnotes

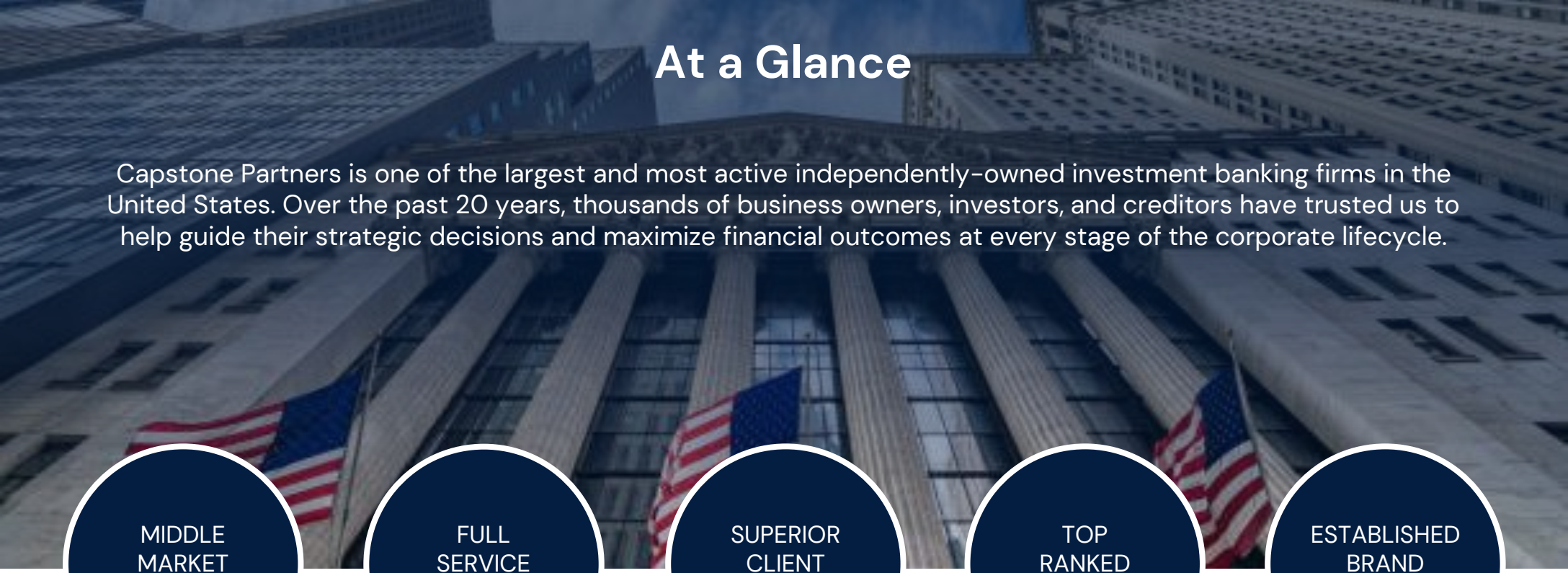
1. "Electric Power Monthly" U.S. Energy Information Administration https://www.eia.gov/electricity/monthly/ accessed February 15, 2022
2. "Electric Generating Summer Capacity Changes (MW)" Table 6.1, U.S. Energy Information Administration, https://www.eia.gov/electricity/monthly/ accessed February 15, 2022
3. "Federal Reserve Economic Data", FRED, St. Louis Fed https://fred.stlouisfed.org/ accessed February 02, 2022
4. "Inventory of Operating Generators" U.S. Energy Information Administration https://www.eia.gov/electricity/monthly/, accessed February 12, 2022
5. "Inventory of Planned Generators" U.S. Energy Information Administration https://www.eia.gov/electricity/monthly/, accessed February 11, 2022
6. "Spark Spreads and Forward Curves" Guggenheim Securities Price Deck, Shahriar Pourreza, CFA, accessed February 17, 2022
7. "U.S. Average System Prices by Market Segment, Q1 '20 and Q1 '21" Wood McKenzie, Utility Scale Report, accessed February 17, 2022
8. Bloomberg New Energy Finance, February 23, 2022
9. Citi Research, February 23, 2022FactSet, accessed February 23, 2022
10. Credit Suisse, February 23, 2022
11. National Renewable Energy Lab: Storage Futures Study, May 2021
12. Pitchbook, February 23, 2022
13. Raymond James, February 23, 2022
14. U.S. Department of Energy: Solar Futures Study, September 2021
15. U.S. EIA 860 Data, February 23, 2022
16. U.S. Energy Information Agency: Battery Storage in the United States: An Update on Market Trends (August 2021)
17. U.S. Energy Storage Monitor Q4 2021
18. Wood Mackenzie, February 23, 2022
19. World Energy Council, February 23, 2022

CAPSTONE PARTNERS

Common Goals. Uncommon Results.

At a Glance

Capstone Partners is one of the largest and most active independently-owned investment banking firms in the United States. Over the past 20 years, thousands of business owners, investors, and creditors have trusted us to help guide their strategic decisions and maximize financial outcomes at every stage of the corporate lifecycle.



MIDDLE MARKET FOCUS

We were founded to serve the needs of entrepreneurs, sponsors and family-owned businesses. 88% of our clients are private companies.

Dedication

FULL SERVICE CAPABILITIES

We can deliver a full suite of corporate finance solutions entirely in-house, supported by 4 complementary and fully integrated services teams.

Resources

SUPERIOR CLIENT RESULTS

We have earned a 96% performance rating from our clients, driven by an aggregate valuation premium of 32% on our clients' transactions.

Service

TOP RANKED PERFORMANCE

We consistently rank in the top 3 of firms in the U.S. for deals under $250M and the top 10 firms globally for deals under $500M.

Leadership

ESTABLISHED BRAND REPUTATION

The Capstone brand is well established across the strategic acquiror, private equity and Wall Street communities with over 600 deals completed.

Credibility

A DIFFERENT KIND OF FIRM. BUILT FOR THE MIDDLE MARKET.

Thought Leadership

Our specialized industry groups are supported by an award-winning research team that helps us deliver proprietary, sector-specific market intelligence to our clients. Having been featured in over 50 of the nation's top media outlets, we are a trusted source for middle market insights and emerging industry trends.

Acquirer Activity

Our sector-specific database provides proprietary insight into deal multiples and appetite.

PE & Investor Activity

Our relationships with PE firms give us an insiders view of sought-after sectors and criteria.

Financing Markets

Our debt team breaks down volume, pricing and leverage statistics of today's credit market.

Value Drivers

Our bankers offer unique perspectives on value drivers through firsthand client results.

Industry Trends

Our conversations with leading players in the market helps us identify emerging trends.

Competitive Dynamics

Our pulse on leading public companies reveals insights into key growth drivers and strategies.

Featured in:

CNBC · Forbes · REUTERS · CNN · Bloomberg · The Motley Fool · WSJ · MERGERS&ACQUISITIONS

Optimal Positioning » Market Intelligence « Qualified Interest