



THE NEXT WAVE IN CLEAN ENERGY: HYDROGEN AND NUCLEAR SYNERGY

OUR INVESTMENT THESIS

As the world transitions towards a cleaner energy future, hydrogen is poised to play a vital role. The hydrogen market is expected to increase dramatically in the coming years, driven by the shift towards a "hydrogen economy." We believe that the growing demand for hydrogen, driven by its potential to replace oil as a transport fuel and in other applications, can be met through a combination of renewable sources, carbon capture technologies, and nuclear power. With the U.S. government's investments and initiatives in place, we think that the country is well-positioned to capitalize on the potential of clean hydrogen and create a more resilient energy future. Notably, **nuclear power can play a significant role in supporting this transition by providing clean electricity and heat for hydrogen production.** The International Energy Agency (IEA) forecasts that by 2040, electricity will become the core of the energy system, requiring a significant increase in the flexibility of electricity systems, including the use of hydrogen-based fuels. We believe that the complementary role of nuclear power in mass-producing green hydrogen via centralized production facilities will become increasingly important in the near term, particularly as nations ramp up nuclear programs and incorporate nuclear energy into sustainable finance taxonomies.

OUR PICK THIS MONTH

Constellation Energy Corporation (NASDAQ: CEG)



Constellation Energy is the largest carbon-free energy producer in the U.S., driving clean energy adoption. **Its stock has gained more than 160% in the past year.** In 2025, the company benefits from revised federal rules enabling nuclear plants to qualify for hydrogen production tax credits under Section 45V, boosting its clean hydrogen initiatives. It has also secured a record-setting **\$840 million contract with the U.S. General Services Administration (GSA)** to supply clean energy and improve efficiency at government facilities. Additionally, **Constellation's \$26.6 billion acquisition of Calpine Corporation** will create the largest clean energy provider in the U.S., with nearly 60 GW of low- and zero-emission capacity. The deal positions Constellation for significant growth, driven by rising power demand, particularly from artificial intelligence (AI) data centers.

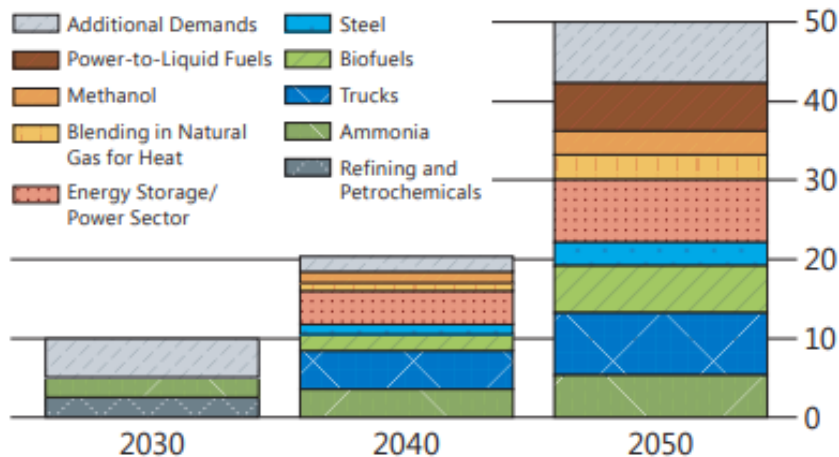
A PROMISING STEP TOWARDS AMERICA'S ENERGY RESILIENCE

The growing need for cleaner energy sources has become increasingly evident over the past few years, with the U.S. government taking significant steps to balance economic and infrastructure concerns. The 2021 Bipartisan Infrastructure Law (BIL) and 2022 Inflation Reduction Act (IRA) paved the way for massive investments in American infrastructure and jobs, aiming to solidify the country's energy dominance. Hydrogen, a principal low-carbon source of energy, has emerged as a vital component in this endeavor. **The U.S. Department of Energy's (DOE) "Hydrogen Hubs" program aims to optimize America's natural energy sources and fuel economic growth,** and we believe this initiative has the potential to create a significant impact on the country's energy landscape.

Hydrogen holds significant promise as a clean fuel, with the ability to be produced from natural gas, nuclear power, and renewable sources like wind and solar. When produced with minimal emissions, it plays a key role in enhancing energy resilience and reducing carbon dioxide emissions. The two primary low-carbon methods of hydrogen production—renewable sources and natural gas with carbon capture—are vital for addressing climate concerns. Estimates indicate suggest that the widespread adoption of hydrogen fuel cells could create ~675,000 new jobs in the U.S. by 2035, with

the country already accounting for nearly half of new hydrogen fuel cell patents. Further, hydrogen can help strengthen electric grid resiliency, producing electricity and reducing the strain on the grid.

Chart 1: Potential Demand for Clean Hydrogen Across Multiple Applications (Million Metric Tons H2 per Year)



Source: Intro-act, U.S. National Clean Hydrogen Strategy and Roadmap at a Glance, July 2024

\$3/KG HYDROGEN TAX CREDIT BOOSTS NUCLEAR ENERGY STOCKS

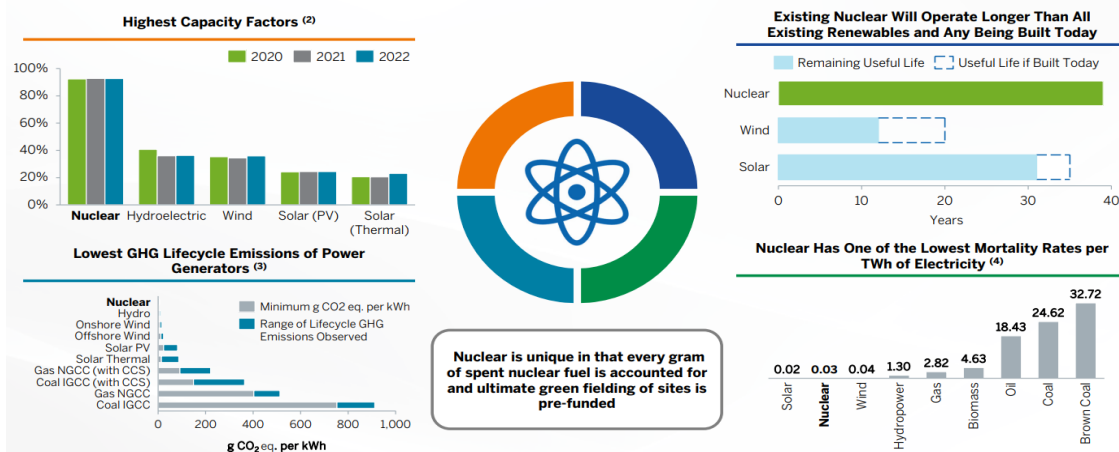
The U.S. Treasury's final rules on the 45V hydrogen tax credit, released on January 03, 2025 sent nuclear energy stocks soaring, with some companies experiencing notable gains. The new regulations allow nuclear power and natural gas producers to qualify for the full credit of \$3 per kilogram, potentially unlocking billions of dollars in funding for the respective industries. We believe this development is a significant positive for the nuclear energy sector, as it provides clarity and investment certainty for producers seeking to qualify for the clean hydrogen production tax credit. The credit, which ranges from \$0.60 to \$3 per kilogram based on carbon emissions levels, is expected to help grow the industry and move projects forward. Companies such as **Constellation Energy** and **Vistra (NYSE: VST)** have already seen notable increases in their stock prices, with gains of ~39% and ~21%, respectively on a YTD basis. We think the inclusion of nuclear power in the hydrogen tax credit's final rules is a major catalyst for the industry, and companies focused on small modular reactors are also likely to benefit from this development. With the final rules offering clarity and flexibility, we anticipate increased investment in the clean hydrogen sector, and believe that companies positioned to leverage the hydrogen tax credit will be well-rewarded as the industry grows and evolve.

We believe that these rules will drive deployment of clean hydrogen, particularly in heavy industry, and create new economic opportunities. The rules also incorporate crucial safeguards for electrolytic hydrogen production, such as the requirement for Energy Attribute Certificates to meet certain criteria for temporal matching, deliverability, and incrementality. We believe that these safeguards will help ensure that electricity consumption for hydrogen production meets the statutory lifecycle GHG emissions standards. This incentive, combined with the Hydrogen Hubs program, can create tens of thousands of well-paying jobs in construction, engineering, and manufacturing, while driving reductions in emissions. Additionally, the role of nuclear power in hydrogen production is also gaining traction, with the potential to produce zero-carbon hydrogen using cold electrolysis, low-temperature steam electrolysis, and high-temperature steam electrolysis.

NUCLEAR POWER'S EMERGING ROLE IN HYDROGEN PRODUCTION: A 25% to 50% EFFICIENCY POTENTIAL

The production of hydrogen, a critical feedstock for the chemicals industry, is currently dominated by fossil fuels, resulting in significant CO₂ emissions. However, nuclear power is fast emerging as an attractive way to produce clean and green hydrogen, with efficiencies ranging from 25% to 50% or more, depending on the technology employed. For instance, high-temperature steam electrolysis can achieve an efficiency of 45%, while direct thermochemical production can reach 50% or more. The use of nuclear heat to assist steam reforming of natural gas can reduce natural gas consumption by about 30% and eliminate flue gas CO₂ emissions. We believe that this technology has significant potential for large-scale hydrogen production, particularly in regions with existing nuclear infrastructure. Several projects are already underway to demonstrate the feasibility of nuclear-powered hydrogen production, including the use of electrolysis, low-temperature steam electrolysis, and high-temperature steam electrolysis. For example, the U.S DOE has selected two projects to advance flexible operation of light water reactors with integrated hydrogen production systems, while the Idaho National Laboratory is working on a \$12.5 million project to demonstrate high-temperature steam electrolysis using heat and electricity from a nuclear reactor.

Chart 2: Nuclear is an Unparalleled Source of Electricity



Source: Intro-act, Constellation Energy Investor Presentation, Sept 2024

- (1) <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/as-power-plant-fleet-age-holds-at-28-us-nuclear-fleet-hits-middle-age-milestone-72411273>
- (2) https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=table_6_07_b
- (3) https://unece.org/sites/default/files/2022-04/LCA_3_FINAL%20March%202022.pdf
- (4) <https://ourworldindata.org/grapher/death-rates-from-energy-production-per-twh> ; mortality rates are measured based on deaths from accidents and air pollution per terawatt-hour (TWh) of electricity

The cost of producing renewable hydrogen is still a significant barrier to adoption, with costs typically 1.5 to 6 times more expensive than hydrogen from unabated fossil fuels. Despite incentives like the Inflation Reduction Act, workforce shortages, infrastructure gaps, and insufficient tax incentives limit development and adoption. We think that addressing these barriers with a clear, committed vision for a sustainable, scalable hydrogen future is crucial. Currently, the adoption of hydrogen in new applications, such as heavy industry, long-distance transport, and energy storage, accounts for less than 1% of global demand. The lack of incentives for demand creates a "chicken and egg" scenario, where potential off-takers are hesitant to commit to hydrogen without a clear market demand, and producers are reluctant to scale up without guaranteed offtake agreements. We believe that increasing demand-side incentives will help boost adoption, and the current uneven assistance, with supply-side support being 50% larger than demand-side support, needs to be addressed. Estimates suggest that low-emissions hydrogen could reach 49 Mtpa by 2030, but excluding early-stage development projects, this figure drops to just 26 Mtpa by 2030. **We opine that the industry needs to focus**

on moving existing projects further along, rather than starting from the scratch, to address the slow-moving project pipeline.

COMPANY SPOTLIGHT: CONSTELLATION ENERGY CORPORATION (NASDAQ: CEG)

Constellation (Founded: 2021, HQ: Baltimore, MD) is the largest producer of carbon-free energy in the U.S., providing a significant portion of the country's clean energy supply. The company has recently welcomed the U.S. Treasury Department's reversal of its prior decision to prohibit existing nuclear plants powering clean hydrogen production from qualifying for federal tax credits under Section 45V of the Inflation Reduction Act. This change in policy is expected to have a positive impact on Constellation's operations, as it will allow the company to earn credits for hydrogen production from its existing nuclear fleet. Constellation's president and CEO, Joe Dominguez, has stated that the company's customers need access to reliable nuclear energy to transition to clean hydrogen and other sustainable technologies, and that the final rule is an important step in the right direction. The company is currently reviewing the impact of the final rules on its proposed clean hydrogen project at the LaSalle Clean Energy Center and its role in the MachH2 Hub.

Constellation has also recently been awarded a record-setting contract by the U.S. General Services Administration (GSA) to supply power to over 13 government agencies and perform energy savings and conservation measures at five GSA-owned facilities in the National Capital Region. The 10-year, \$840 million contract is the largest in GSA history, and will provide over 1 million megawatt hours of clean energy annually, with a portion of the power coming from investments Constellation will make to increase plant output. The company will also provide energy efficiency solutions, including LED lighting, weatherization, and upgrades to HVAC and building control equipment, to help reduce energy costs and emissions. This contract demonstrates the growing recognition of the importance of nuclear energy in the transition to a carbon-free energy future, and Constellation's role as a leading provider of clean and reliable energy.

The company recently announced its acquisition of Calpine Corporation [Private] in a cash and stock transaction valued at an equity purchase price of approximately \$16.4 billion, in a \$26.6 billion net purchase price. This acquisition creates the nation's largest clean energy provider - expanding CEG's presence in key markets like TX and CA - with a diverse portfolio of zero- and low-emission generation assets, including nuclear, natural gas, geothermal, hydro, wind, solar, cogeneration, and battery storage. The combined company will have nearly 60 GW of capacity from zero- and low-emission sources, spanning the continental U.S. The transaction is expected to deliver benefits to Constellation's owners, with expected immediate adjusted operating EPS accretion of more than 20% in 2026 and at least \$2 per share of EPS accretion in future years. The acquisition will also add more than \$2 billion of free cash flow annually, creating strategic capital and scale to reinvest in the business. Additionally, Constellation's base earnings outlook is expected to continue growing at a double-digit rate through the decade. The company's financial position will be impacted by the acquisition, with the assumption of approximately \$12.7 billion of Calpine's net debt.

The deal is slated to close within 12 months and is expected to enhance CEG's capacity to meet growing power demand, particularly from AI data centers. The demand for power from AI data centers is projected to triple by 2030, driving growth in the energy sector. CEG's shares have reflected this trend, more than doubling in value over the past 12 months. **CEG has gained 38.58% in the past month whereas in past one year the price has risen more than 165%.** As the energy landscape continues to evolve, we believe CEG's expanded portfolio and increased capacity are likely to be key factors in its future performance.

Chart 3: CEG vs S&P 500 (1-Year Performance)



Source: Intro-act, Trading View, Data as on January 20, 2025

CLEANTECH NEWS

INDUSTRY TRENDS

AI Opportunities Action Plan: Government launches AI Energy Council. The government has launched an AI Energy Council as part of its AI Opportunities Action Plan, aiming to accelerate the rollout of artificial intelligence technologies. The plan seeks to harness AI's potential in various sectors, including energy, and drive innovation through public-private partnerships. It also aims to address concerns around job displacement and ensure workers are equipped with new skills. The council will focus on developing AI solutions for energy efficiency and sustainability. [Read more.](#) (BusinessGreen)

Government eyes reforms to unlock smart energy data innovations. The government is seeking views on a proposed system allowing consumers to share energy usage data with authorized third parties, aiming to drive innovation in smart energy technologies. This move aims to unlock new ideas and solutions for managing energy consumption, potentially leading to cost savings and reduced carbon emissions. The initiative seeks to balance consumer protection with the benefits of data sharing, ensuring that individuals' personal information is safeguarded while still enabling the development of innovative energy management systems. [Read more.](#) (BusinessGreen)

Heathrow Airport to make £86 million in SAF funding available to airlines in 2025. Heathrow Airport is providing £86 million in Sustainable Aviation Fuel (SAF) funding to airlines in 2025, aiming to speed up their transition to cleaner energy. This increased funding under Heathrow's SAF incentive scheme will support the adoption of SAFs by airlines operating at the airport. The move aligns with efforts to reduce carbon emissions and promote sustainable aviation practices. [Read more.](#) (BusinessGreen)

Trump could freeze offshore wind for six months for review, says congressman. Jeff Van Drew, a congressman, has stated that President Trump could potentially freeze offshore wind development for six months to review the issue.

This move would allow the administration to assess the impact of offshore wind farms on national security and other concerns. The decision would be made through executive action, bypassing Congressional approval. [Read more.](#) (Recharge)

US Wind signs key state deals amid local legal battle. US Wind, a Maryland-based company developing a 1GW wind farm, has secured key state agreements despite facing opposition from local authorities over landfall and substation approvals. The deals were reached with the state's Department of the Environment and Public Service Commission, clearing the way for the project to move forward. However, county-level opposition remains, with officials expressing concerns about the project's impact on the environment and local communities. [Read more.](#) (Recharge)

Trump and clean energy: Five crucial policy areas to watch. The US green energy sector is bracing for changes under President Trump, with five policy areas being closely watched. These include tax credits and incentives for clean energy projects, which could impact investment in solar and wind power. Additionally, the administration's stance on carbon pricing, grid modernization, and renewable portfolio standards will be crucial. Furthermore, the fate of the Clean Power Plan, a key climate change regulation, hangs in the balance under Trump's leadership. [Read more.](#) (Recharge)

GE Vernova CEO says offshore wind 'tough stretch' can end when prices reset. GE Vernova CEO Scott Strazik believes the current "tough stretch" for offshore wind can be resolved once price resets occur, allowing the industry to become a thriving sector. He emphasizes that participants cannot sustain themselves if they're not making a profit. The CEO sees potential in the market and is optimistic about its future, citing the need for prices to adjust to ensure long-term viability and profitability for all stakeholders involved. [Read more.](#) (Recharge)

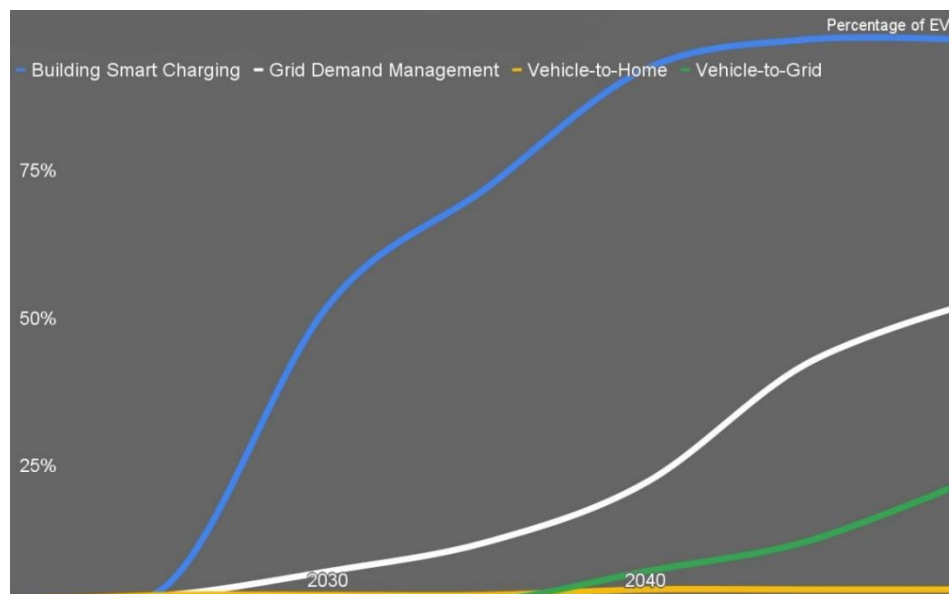
Renewable energy shares fall as Trump 'no more wind' threat draws rebuke. Renewable energy shares fell on Wednesday as President-elect Donald Trump's comment that he would "no more" support wind power drew widespread rebuke. Orsted, Vestas, and Nordex were among the companies hit by the decline, with investors concerned about the impact of Trump's rhetoric on the US renewable energy market. The statement was seen as a threat to the industry, which has been growing in recent years due to government incentives and declining costs. [Read more.](#) (Recharge)

EV demand management aggregation is commercializing. The electric vehicle (EV) demand management aggregation space is commercializing, with companies like BluWave-ai aggregating EVs to turn off charging during high grid demand. However, the author remains skeptical about vehicle-to-grid and vehicle-to-home models due to timing issues, psychological factors, and limited economic merit. The industry faces challenges in getting people to sign up for these services, as they fear loss more than valuing gain, and grids prefer aggregated electricity from many vehicles rather than individual ones. [Read more.](#) (CleanTechnica)

Three new ways to install solar panels on railway infrastructure. Last year, three new ways to install solar panels on railway infrastructure emerged. A Swiss firm developed a rapid-fire system for installing solar panels between railroad ties, maximizing space and efficiency. In Lithuania, SoliTek collaborated with Stalcorp to install bifacial solar panels in sound barriers along railway lines, producing 13.2 megawatt-hours of electricity per year. Meanwhile, Sekisui Chemical's thin film perovskite solar cells are being tested on Japanese railway sound barriers, and US startup SunTrain developed a battery-in-a-boxcar solution to collect and transport solar energy, leveraging spare railway capacity for grid-scale demonstrations in Colorado. [Read more.](#) (CleanTechnica)

USA can recycle 90% of wind turbine mass. A new report from the US Department of Energy outlines recommendations to increase recycling and reuse of decommissioned wind energy equipment and materials, creating a more circular economy. The research reveals that existing US infrastructure can process 90% of decommissioned wind turbine mass, but new strategies are needed for the remaining 10%. The study will guide \$20 million in investments from the Bipartisan Infrastructure Law to advance technologies addressing this gap, aiming to make the US wind energy industry fully sustainable. [Read more.](#) (CleanTechnica)

Chart 4: Growth of EV Battery Exploitation Strategies



Source: Intro-act, CleanTechnica, Strategies by Michael Barnard, Chief Strategist, TFIE Strategy Inc

'Mobilising capital': GFANZ shifts focus, as exodus of US banks from net zero groups gathers pace. The Glasgow Financial Alliance for Net Zero (GFANZ) is shifting its focus to work with institutions that aim to mobilize capital towards net zero goals. This change comes as several US banks have exited net zero groups, including the Net Zero Banking Alliance and GFANZ. The exodus reflects growing concerns among some financial firms about the pace of climate action and their role in achieving it. [Read more.](#) (*BusinessGreen*)

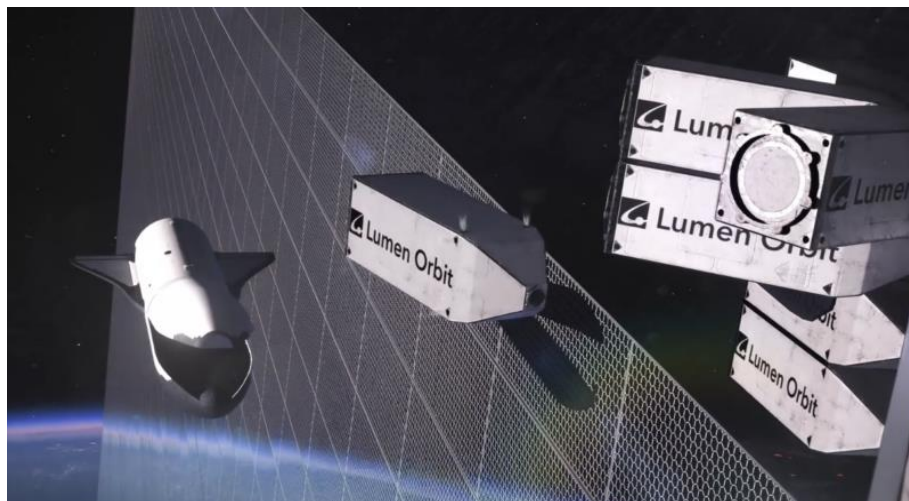
Trump's green energy winner? Why geothermal could be ready to 'drill baby, drill'. As President Trump returns to office, wind and solar energy face uncertainty, but geothermal power is gaining attention as a potential winner. Analysts suggest that geothermal energy, which harnesses heat from the Earth's core, could be poised for growth due to its reliability and scalability. With existing infrastructure in place, geothermal can provide baseload power, making it an attractive option for utilities and industries looking for stable energy sources. This shift could make "drill baby, drill" a phrase associated with geothermal rather than oil drilling. [Read more.](#) (*Recharge*)

9 organizations for groundbreaking program to foster collaboration between communities & stakeholders in the energy transition. The U.S. Department of Energy (DOE) announced the selection of nine organizations to participate in the Regional Energy Democracy Initiative (REDI) Consortium in Texas and Louisiana. REDI aims to foster collaboration between communities and stakeholders, providing technical assistance and capacity building for community benefits associated with DOE-funded projects. The initiative will empower communities at the forefront of the nation's energy transition, ensuring that benefits result in secure, resilient, and affordable energy for the region. [Read more.](#) (*CleanTechnica*)

US solar manufacturing is soaring. US solar manufacturing has experienced significant growth, with the country ranking 3rd globally in solar panel production. The Inflation Reduction Act of 2022 boosted the industry, but growth began before its enactment. Major investments have been made to build factories and expand existing facilities, particularly in the South. US solar module factories can now produce enough to meet nearly all domestic demand. Plans are underway to build more factories, which will create even more American jobs. The Solar Energy Industries Association warns that maintaining policies supporting this growth is crucial for continued success. [Read more.](#) (*CleanTechnica*)

Space solar race heats up, now with flying data centers. A US startup, Lumen Orbit, is pioneering space-to-space solar technology to power data centers in orbit, leveraging low-cost solar energy and modular design for expansion. This approach avoids terrestrial power system pressure, permitting requirements, and environmental reviews, allowing for rapid deployment and scalability. The business model focuses on AI training demands, offering significant cost savings compared to traditional data center operations on Earth. [Read more.](#) (CleanTechnica)

Chart 5: Illustration of Flying Data Centers in Space



Source: Intro-act, CleanTechnica

Geothermal research funding opportunity in USA. The U.S. Department of Energy's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs have announced funding opportunities for FY25 Phase I Release 2 projects focused on geothermal heating, cooling, and enhanced geothermal systems. Two research topics are included: one on geothermal heating and cooling and a second on enhanced geothermal systems. Letters of Intent are due January 14, 2025, with full applications due February 26, 2025. [Read more.](#) (CleanTechnica)

Redefining energy 2025 predictions: Transportation, Energy, Electricity, & Investments. Laurent Segalen and Gerard Reid hosted their annual predictions episode with Michael Barnard, reviewing last year's predictions and making new ones. The first prediction was that Stellantis would outsource EV production in China, which Barnard correctly predicted by noting the company's joint venture with Leap Motor and CATL. Other predictions included a possible derailment of the energy transition due to politics, which Barnard gave a score of 2 out of 5 for being correct but off on timing. [Read more.](#) (CleanTechnica)

Basin & range geography could be ideal for cutting edge data centers. Data centers are facing increasing power demands due to artificial intelligence and other technologies. However, energy efficiency has historically outpaced demand, and AI may also boost grid-wide efficiency. To mitigate potential power shortages, ideal locations for cutting-edge data centers should be identified, featuring abundant renewable energy resources, low local energy demand, and cooler temperatures for heat dissipation. [Read more.](#) (CleanTechnica)

Buckinghamshire Council gives nod to 49.9MW solar project. Buckinghamshire Council has approved a 49.9MW solar project, allowing a club to install new solar panels at no upfront cost. The installation has already reduced the club's energy bills by approximately 40 per cent. This move is expected to benefit the club financially and contribute to a more sustainable environment. [Read more.](#) (BusinessGreen)

Solar dominates US grid-scale power additions through October as skeptic Trump muddies outlook. Solar energy dominated US grid-scale power additions through October, with 7.6 gigawatts of new solar capacity installed,

surpassing wind power for the first time. This growth comes despite President-elect Trump's skepticism towards renewable energy and his proposed tariffs on imported solar panels. His threat to axe tax credits could undermine progress in the sector, which is hitting its stride. The US Energy Information Administration reported that solar accounted for 44% of new grid-scale capacity added through October. [Read more.](#) *(Recharge)*

Biden's green law could be double-edged sword for offshore wind: ACP. The American Clean Power (ACP) association suggests that President Biden's green law could have a double-edged effect on offshore wind. While the law aims to boost renewable energy, it may inadvertently hinder the sector by imposing strict regulations and costs. This contradicts President-elect Trump's promise to terminate both the law and offshore wind. The study results imply that leaving the law intact might also reduce the sector's growth, making it a complex issue for policymakers to navigate. [Read more.](#) *(Recharge)*

Republican and Democrat governors urge Trump to keep clean energy in mix. Republican and Democratic governors from western US states are urging President-elect Trump to include clean energy in the country's energy mix. They want a "balanced portfolio of resources" in the new administration's energy policy, ensuring that renewable sources like solar and wind power are part of the plan. The governors aim to promote economic growth and job creation through diverse energy options, rather than relying solely on fossil fuels. [Read more.](#) *(Recharge)*

US Wind slams 'anti-business' move to reject offshore wind substation. US Wind strongly criticized Sussex County's decision to reject its proposed offshore wind substation, calling it an "anti-business" move. The project vows to fight the decision, which it claims sets a "dangerous precedent" for local opposition to halt development. This rejection could have significant implications for the county's economy and the growth of the renewable energy sector in the area. [Read more.](#) *(Recharge)*

US DOE extends vehicle-to-everything (v2x) work with 9 new partners. The US Department of Energy (DOE) has extended its Memorandum of Understanding (MOU) on vehicle-to-everything (V2X) technology through April 2027. The MOU aims to support a resilient and cyber-secure grid, with nine new signatories joining the existing list of 25 entities. These new partners include dcbel, Bidirectional Energy, NYC School Bus Umbrella Services, Kaluza, and others. They aim to leverage electric vehicle batteries for various services, including grid support, home energy independence, and economic benefits, while promoting a cleaner and more sustainable future. [Read more.](#) *(CleanTechnica)*

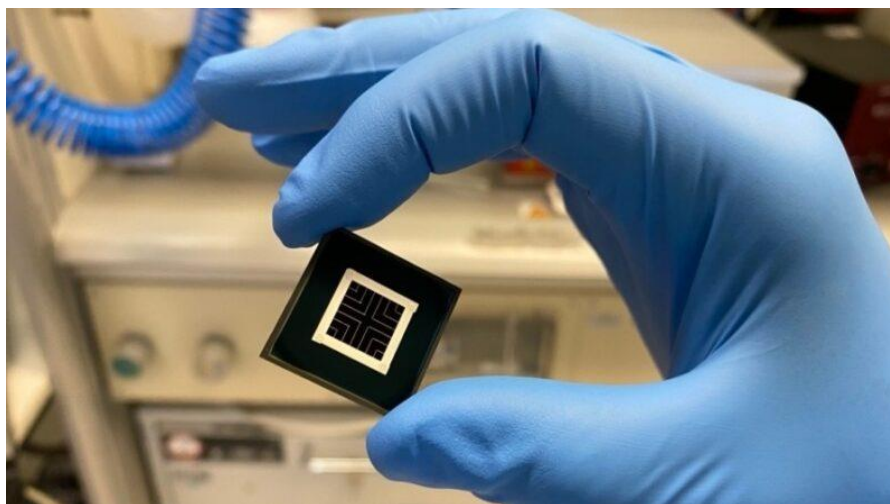
CIP takes control at 5GW onshore wind mega-plan to power green hydrogen. CIP takes control of the 5GW onshore wind mega-plan to power green hydrogen production. The project aims to generate enough renewable energy to produce green hydrogen, which will be sold to Braya Renewable Fuels' biorefinery in Come by Chance, Newfoundland. This biorefinery has expressed interest in buying green hydrogen from the nearby Toqlukuti'k project, indicating a potential market for the clean energy source. The 5GW onshore wind farm is expected to play a significant role in powering green hydrogen production and supporting the transition to renewable energy. [Read more.](#) *(Recharge)*

Study: ESG reporting software spend tipped to quadruple to \$5.6bn by 2029. Businesses are expected to spend \$5.6 billion on Environmental, Social, and Governance (ESG) reporting software by 2029, a fourfold increase from current levels. This surge is driven by companies' need for technology to manage complex corporate reporting requirements. The growth is attributed to the increasing urgency of ESG issues, such as climate change and social responsibility, which are becoming essential components of business operations and investor expectations. [Read more.](#) *(BusinessGreen)*

Green Volt awards key contracts for trailblazing project seen as floating wind bellwether. Green Volt has awarded key contracts for a 560MW trailblazing project, considered a bellwether for large-scale floating wind. The project's success is crucial in proving the viability of this technology. Even competitors are supporting Green Volt's endeavor, recognizing its significance in advancing the industry. The project's outcome will have far-reaching implications for the renewable energy sector, particularly in terms of cost reduction and scalability. [Read more.](#) *(Recharge)*

Solving the silicon-perovskite tandem solar cell puzzle. Researchers at Fraunhofer have analyzed the most competitive pathways for commercial-scale development of a silicon-perovskite tandem solar cell, concluding that breaking the Shockley-Queisser barrier is not necessarily the most commercially viable option. A new perovskite-silicon tandem solar cell with a 31.6% solar conversion efficiency presents the most viable and sustainable pathway to mass adoption. The team also developed a lifecycle analysis, finding that advanced recycling processes support lifecycle energy efficiency. [Read more.](#) (*CleanTechnica*)

Chart 6: Silicon-Perovskite Tandem Solar Cell Puzzle



Source: *Intro-act*, *CleanTechnica*, *Fraunhofer*

New York City could face power crunch after offshore wind slowdown. New York City faces a potential power crunch due to a slowdown in offshore wind development, which could hinder the city's ability to meet its clean energy goals. The city relies heavily on renewable energy sources, and a delay in new offshore wind projects would exacerbate existing supply-demand imbalances. This situation necessitates the exploration of alternative clean energy sources to ensure a stable power supply for New York City residents. [Read more.](#) (*Recharge*)

Local Energy, Global Lessons: How Ranch Sereno models the future of community-centered energy. The Ranch Sereno community solar project in California's Contra Costa County demonstrates how to address community opposition by designing projects that serve multiple local needs. The project reduces reliance on fragile transmission lines, generates power near where it's used, and offers a more resilient energy solution for local families and businesses. Thoughtful decisions, such as site selection and minimizing grading requirements, reduced permitting concerns and supported the local economy through job creation. [Read more.](#) (*CleanTechnica*)

Solar power booming all around, Chinese EVs expanding, us EV charging infrastructure boom. Solar power and electric vehicle markets are booming globally, with significant growth reported in various regions. In India, solar installations have grown 106% this year, while China has commissioned a 1-gigawatt offshore solar farm and a 3-gigawatt solar farm on a former coal site. The US has seen an 86% increase in clean power capacity installations, with residential energy storage reaching a new record in the third quarter. Electric vehicle sales are also growing worldwide, including in Mexico and the Philippines, where Chinese EVs are gaining popularity. [Read more.](#) (*CleanTechnica*)

REGULATORY UPDATES

Regulatory chaos could disrupt US solar manufacturing and implementation. The Inflation Reduction Act has created over 330,000 jobs in clean energy projects, including solar installations, and \$265 billion in new investments.

However, a study predicts that dismantling the IRA will eliminate more than 9 million good jobs. The next administration plans to dismantle the IRA, which includes production tax credits for manufacturing renewable products. This uncertainty has led companies like Heliene to delay investments, potentially halting solar module manufacturing and implementation. Regulatory chaos may disrupt US solar manufacturing and implementation, affecting jobs and the transition to a renewable economy. [Read more.](#) (*CleanTechnica*)

'From this moment on, aviation will be a greener': SAF Mandate comes into force. The UK's Sustainable Aviation Fuel (SAF) Mandate has come into effect, mandating airlines to work towards a goal where 10% of all jet fuel comes from sustainable low-carbon sources. This move aims to reduce the aviation industry's carbon footprint and make air travel more environmentally friendly. The mandate requires airlines to use SAF in their operations, marking a significant shift towards greener aviation practices. [Read more.](#) (*BusinessGreen*)

CAPITAL MARKETS

Google, Microsoft, others invest \$300 million in crushed rocks as CO2 removal solution. Google, Microsoft, and other companies have invested \$300m in crushed rocks as a solution for CO2 removal. This investment marks growing excitement around this technology, which was previously considered a newcomer to carbon capture methods. The crushed rocks, known as "mineral carbonation," can absorb CO2 from the atmosphere, potentially helping to mitigate climate change. This end-of-year deal is one of several recent investments in innovative carbon removal technologies. [Read more.](#) (*BusinessGreen*)

U.S. Department of Energy invests \$45 million to support regional consortia focused on securing domestic critical minerals and materials. The U.S. Department of Energy's Office of Fossil Energy and Carbon Management announced \$45 million in funding for six projects to create regional consortia to accelerate the development of critical mineral and materials supply chains. The investments will focus on secondary and unconventional feedstocks, such as coal and oil by-products, to rebuild domestic supply chains for critical minerals and materials. This will support American manufacturing and production of clean energy technologies and national defense, while creating high-wage jobs and delivering environmental benefits. [Read more.](#) (*CleanTechnica*)

USDA Funds renewable energy project in rural Texas. The San Miguel Electric Cooperative in rural Texas has been awarded over \$1.4 billion from the US Department of Agriculture's Rural Utilities Service program to transition from a coal-fired thermal generating station to a 400 MW solar installation and 200 MW battery storage facility. The project, funded through the Empowering Rural America (New ERA) program, aims to reduce greenhouse gas emissions and provide affordable power to 340,000 rural Texas customers. The conversion is expected to be operational by 2027 and will not affect SMEC's ongoing mine reclamation program. [Read more.](#) (*CleanTechnica*)

Power giant taps billionaire-backed CO2 battery in 'history-making' deal. Italian power company Enel has signed a "history-making" deal with Energy Dome to deploy its CO2 battery technology, backed by Bill Gates' energy innovation fund. The 20MW/200MWh facility will be able to supply energy for ten straight hours, reducing greenhouse gas emissions and providing stability to the grid. This innovative solution uses CO2 as a thermal energy storage medium, offering a more efficient and sustainable alternative to traditional batteries. [Read more.](#) (*Recharge*)

Chart 7: A Rendering of the 20MW/200MWh facility, Which Will be Able to Supply Energy for Ten Straight Hours



Source: Intro-act, Recharge, Energy Dome

COMPANY NEWS

Amazon revs-up 'largest ever' UK order for 148 electric trucks. Amazon has placed its largest-ever order for electric trucks in the UK, with 148 fully-electric heavy goods vehicles set to join its fleet over the next 18 months. This significant investment aims to reduce emissions and improve air quality in urban areas. The new trucks will be used for delivery purposes, contributing to Amazon's goal of achieving net-zero carbon emissions by 2040. [Read more.](#) (*BusinessGreen*)

ERM agrees to acquire Newfields' environmental division. ERM has agreed to acquire Newfields' environmental division, expanding its global reach and capabilities in environmental consulting. The acquisition will enhance ERM's services for clients across various sectors, including energy, infrastructure, and natural resources. Financial terms of the deal were not disclosed. This move is expected to strengthen ERM's position as a leading environmental consultancy firm globally. [Read more.](#) (*BusinessGreen*)

Dark Green Group eyes plan for fleet of 12 urban green gas AD plants. Dark Green Group plans to build a fleet of 12 urban green gas AD plants in the UK. These plants will convert food waste into biomethane, sufficient to heat around 50,000 homes annually. The project aims to reduce greenhouse gas emissions and create jobs. The AD plants will be located in urban areas, utilizing existing infrastructure to minimize environmental impact. This initiative aligns with the UK's goal of reducing reliance on fossil fuels and increasing renewable energy production. [Read more.](#) (*BusinessGreen*)

Low Carbon inks PPA with Canadian carbon removals developer Deep Sky. Low Carbon inked a 10-year PPA with Canadian carbon removals developer Deep Sky, utilizing renewable electricity from one of its solar farms to power Deep Sky's first major DAC facility. The deal will enable Deep Sky to remove up to 50,000 tons of CO₂ annually, equivalent to taking around 11,000 cars off the road. This partnership marks a significant step towards reducing greenhouse gas emissions and promoting sustainable development in Canada. [Read more.](#) (*BusinessGreen*)

Uniper acquires rights to develop 470MW Humber side carbon capture power plant. Uniper acquired the rights to develop and operate a 470MW carbon capture power plant in Humber side. The project aims to provide low-carbon power, with the exact location not specified. Once operational, it will have sufficient capacity to meet electricity demands.

Uniper's acquisition allows for further development of the site, which is expected to contribute significantly to the UK's renewable energy goals and reduce carbon emissions. [Read more.](#) (*BusinessGreen*)

LS Power swoops for Algonquin's 11GW renewables business amid Trump Canada flap. LS Power acquired Algonquin's 11GW renewables business, including 3GW of operating assets and 8GW pipeline, spanning the US-Canada border. This deal comes amidst controversy surrounding President-elect Trump's comments on annexing Canada. The acquisition marks a significant expansion for LS Power in the renewable energy sector, with a substantial portfolio of operating and development-stage projects. [Read more.](#) (*Recharge*)

Pine Gate plans 2026 construction start for largest proposed US solar + storage project. Pine Gate plans to start constructing its massive 1.2GW solar array in Oregon by 2026, which would be the largest proposed US solar and storage project. The facility will have up to 7.2GWh of onsite storage capability for six hours, providing a reliable power source during periods of low sunlight. This project aims to address energy needs while minimizing environmental impact through renewable energy sources. [Read more.](#) (*Recharge*)

Chart 8: A Pine Gate Renewables Solar Project



Source: *Intro-act*, *Recharge News*, *Pine Gate Renewables*

Shell strikes deal with corporate renewable energy specialist. Shell Energy Europe has partnered with corporate renewable energy specialist Evolve Energy, aiming to increase access to renewable power purchase agreements (PPAs) for UK commercial and industrial customers. The deal allows Shell to offer a wider range of PPAs, including those from onshore wind farms and solar parks. This partnership is expected to support the growth of renewable energy in the UK market, providing businesses with more options for sustainable power procurement. [Read more.](#) (*Recharge*)

Vestas' flurry of year-end orders dominated by US ahead of second Trump term. Vestas, a Danish OEM, announced over 1.6GW in year-end wind turbine orders, with the majority coming from the US ahead of President Trump's second term. Orders were also received from Japan and Guatemala, but the US dominated the flurry of activity. The significant orders from the US indicate a strong demand for renewable energy in the country, particularly under the current administration's policies supporting clean energy. [Read more.](#) (*Recharge*)

Meta seals solar PPA with Longroad Energy as firms' US renewables partnership hits 1.3GW. Meta has sealed a solar power purchase agreement (PPA) with Longroad Energy, adding 300MW of clean energy to its US data center

operations. This deal brings the total renewable energy partnership between Meta and Longroad to 1.3GW. The 1000 Mile array in Texas will provide power for Meta's growing data centers, further reducing the company's carbon footprint. [Read more.](#) *(Recharge)*

Thrive Renewables acquires rights for 57MW Scottish Borders onshore wind farm. Thrive Renewables acquired the rights to build a 57MW onshore wind farm in Scotland's Borders region. The project is located near Tweedsmuir and was purchased for an undisclosed sum. Thrive Renewables views this development as a significant opportunity, highlighting its commitment to clean energy investment. [Read more.](#) *(BusinessGreen)*

BP and new offshore wind partner JERA among winners in Japan's latest tender. BP and its new offshore wind partner JERA were among the winners in Japan's latest tender, securing development rights for a combined 2.2GW of capacity. The pair featured in two different consortium groups, both using Siemens Gamesa turbines. Japan awarded development rights for an additional 1.1GW of capacity, bringing the total to 3.3GW. This is part of the country's efforts to increase its renewable energy production and reduce reliance on fossil fuels. [Read more.](#) *(Recharge)*

Vestas confirms Asia-Pacific debut for 15MW wind turbine. Vestas has confirmed its Asia-Pacific debut with a 15MW wind turbine, marking the first firm order in the region for its flagship offshore machine. The order was placed by an undisclosed Japanese customer, who will use the turbine to generate power from the sea. This marks a significant milestone for Vestas in the Asia-Pacific market, where demand for renewable energy is growing rapidly. [Read more.](#) *(Recharge)*

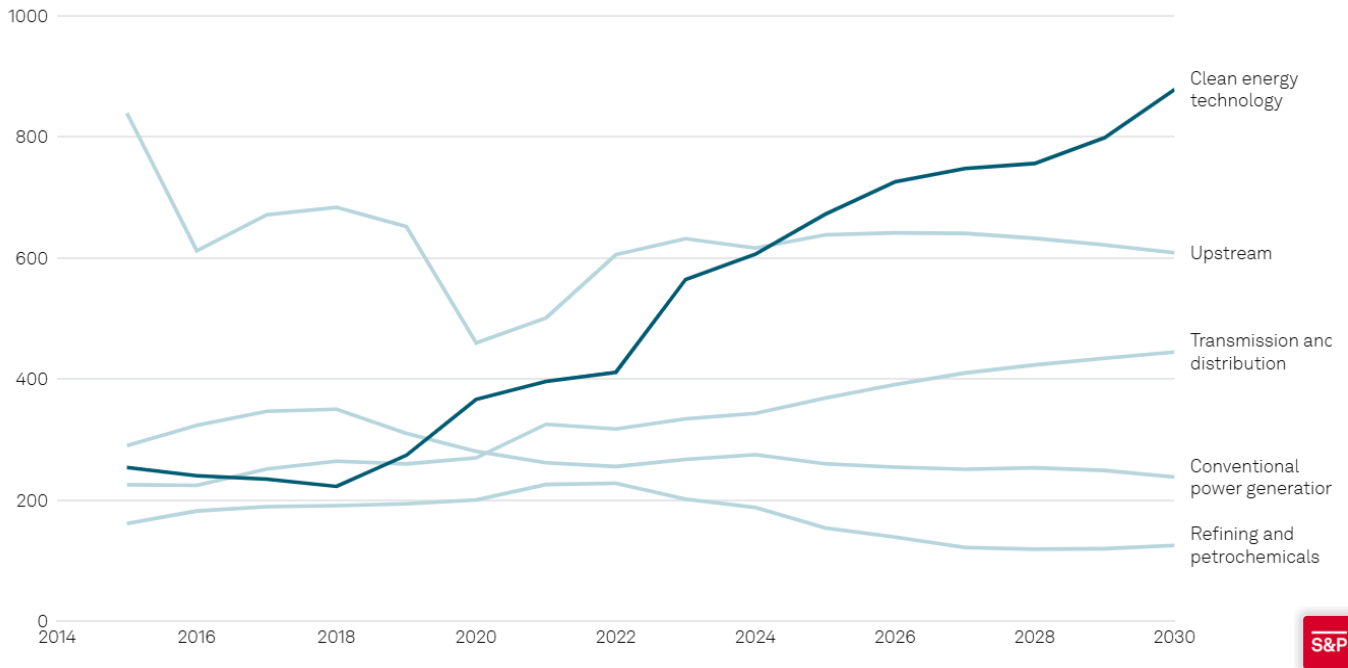
Penison funds swoop for stake in US renewables giant Pattern Energy. Penison funds are investing in a US renewable energy company, Pattern Energy, by acquiring a significant stake. The investment is aimed at supporting the growth of clean energy and reducing carbon emissions. Pension funds from Europe and North America have partnered to make this move, which is expected to boost Pattern Energy's operations and expand its presence in the global market. [Read more.](#) *(Recharge)*

JA Solar's Bycium+ Cell sets new record for open-circuit voltage — 748.6mV. JA Solar has achieved a record-breaking open-circuit voltage for a solar cell using tunnel oxide passivated contact (TOPCon) technology, with its Bycium+ cell reaching 748.6 mV. The finding was independently confirmed by Germany's Institute for Solar Energy Research in Hamelin. The cell also achieved a power conversion efficiency of 26.07%, short-circuit current of 13.71 mA, and fill factor of 83.82%. This milestone highlights TOPCon technology's potential and sets a new standard for crystalline silicon PV cells, driving progress towards high-performance, cost-effective PV solutions that accelerate the global transition to clean energy. [Read more.](#) *(CleanTechnica)*

Giant solar + storage project turned on in California. Arevon Energy has commissioned the Eland 1 Solar-plus-Storage Project in California's Mojave, Kern County. The project provides 384 MW of solar power capacity and 150 MW/600 MWh of energy storage capacity. It is the first phase of a larger project with total capital costs over \$2 billion. When complete, it will be one of the nation's largest solar-plus-storage installations. The project has created economic benefits for the local community, including jobs and revenue for schools and first responders. [Read more.](#) *(CleanTechnica)*

CLEANTECH CHART OF THE MONTH

Chart 9: In 2025, Clean Energy Technology Supply Spending Is Set to Surpass Investments in Upstream Oil and Gas for the First Time (\$ billion, real 2023)



Source: Intro-act, S&P Global

Note: Clean energy supply spending - includes renewable power generation, green hydrogen production and carbon capture and storage (CCS)

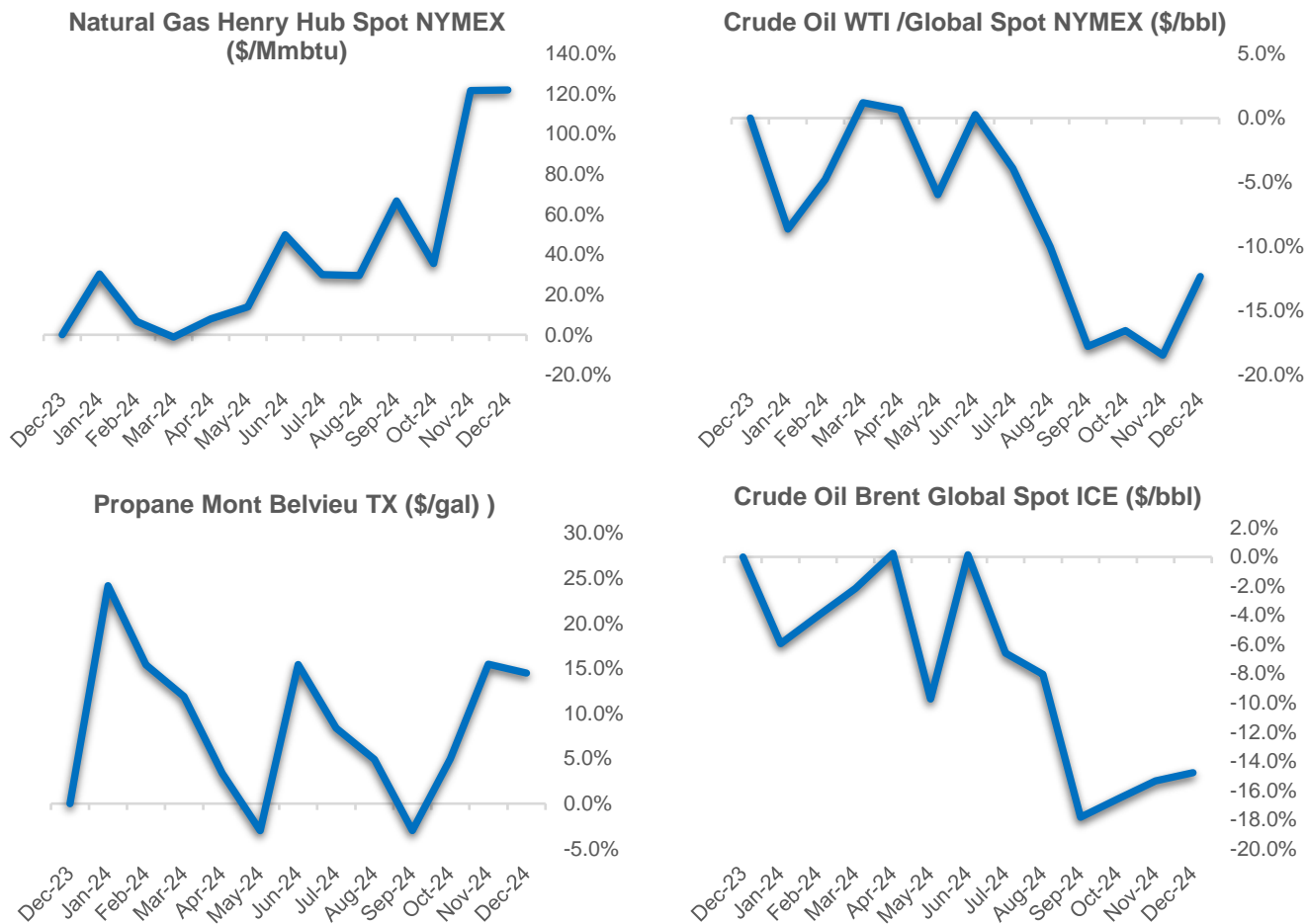
Source: S&P Global Commodity Insights

CLEANTECH COMMODITIES

CleanTech Commodities	Price as of 31 Dec 2024	1M	3M	6M	1Y	YTD
Natural Gas and Crude Oil						
Natural Gas Henry Hub Spot NYMEX (\$/Mmbtu)	3.40	▲ 0.29%	▲ 28.30%	▲ 40.50%	▲ 102.38%	▲ 40.50%
Crude Oil WTI /Global Spot NYMEX (\$/bbl)	72.44	▲ 6.12%	▲ 5.37%	▼ -12.54%	▼ -13.24%	▼ -12.54%
Crude Oil Brent Global Spot ICE (\$/bbl)	74.58	▲ 0.57%	▲ 3.08%	▼ -14.53%	▼ -15.47%	▼ -14.53%
Propane Mont Belvieu TX (\$/gal)	0.82	▼ -0.97%	▲ 18.12%	▼ -2.40%	▲ 8.23%	▼ -2.40%
Refined Products						
Gasoline Conv Regular NY Harbor (\$/gal)	2.07	▲ 1.72%	▲ 0.98%	▼ -18.08%	▼ -24.26%	▼ -18.08%
Diesel No. 2 Low Sulfur NY Harbor (\$/gal)	2.31	▲ 6.88%	▲ 10.03%	▼ -7.66%	▼ -7.88%	▼ -7.66%
Heating Oil No. 2 NY Harbor (\$/gal)	2.24	▲ 6.47%	▲ 37.28%	▼ -5.96%	▼ -7.17%	▼ -5.96%
Jet Fuel Kerosene-Type U.S. Gulf Coast (\$/gal)	2.23	▲ 9.22%	▲ 13.21%	▼ -9.69%	▼ -9.80%	▼ -9.69%
Gasoil Near Term (IFEU \$/mt)	695.25	▲ 2.70%	▲ 4.67%	▼ -11.49%	▼ -10.17%	▼ -11.49%
Ethanol Iowa (CRB \$/gallon)	1.47	▼ -5.77%	▼ -6.07%	▼ -25.38%	▼ -4.55%	▼ -25.38%
WTI USG 3:2:1 Crack Spread	15.30	▲ 9.57%	▼ -5.99%	▼ -12.27%	▼ -29.84%	▼ -12.27%
Metals						
Copper Cash Official LME (\$/mt)	8706.00	▼ -1.95%	▼ -10.86%	▼ -8.13%	▼ -12.71%	▼ -8.13%
Lithium Carbonate 99.2% USGS (\$/t)	10325.00	▼ -3.50%	▼ -2.36%	▼ -18.70%	▼ -31.62%	▼ -18.70%
Nickel Cash Official LME (\$/mt)	15100.00	▼ -4.10%	▼ -11.20%	▼ -10.97%	▼ -20.42%	▼ -10.97%
Cobalt Cash Official LME (\$/mt)	24300.00	▲ 0.00%	▲ 0.60%	▼ -9.26%	▼ -12.34%	▼ -9.26%
Platinum Indust (Engelhard) (\$/ozt)	915.00	▼ -2.14%	▼ -7.58%	▼ -9.85%	▼ -3.07%	▼ -9.85%
Uranium Near Term (NYM \$/lbs)	72.90	▼ -5.26%	▼ -10.83%	▼ -14.89%	▼ -18.95%	▼ -14.89%

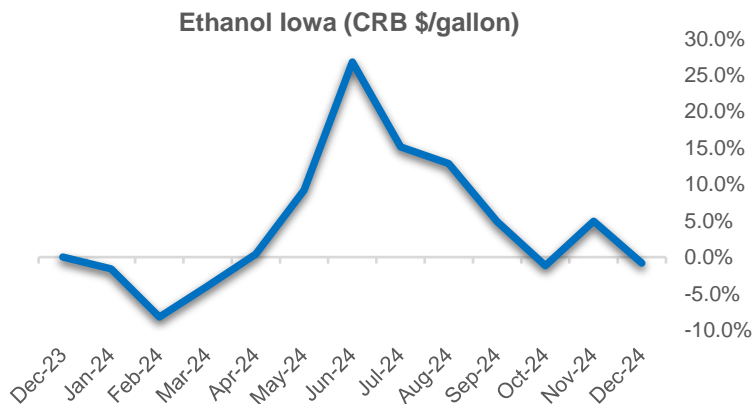
Source: Intro-act, FactSet, Investing.com. Data as of 12/31/24.

Chart 10: Indexed Change in Natural Gas and Crude Oil Prices in Last 12 Months



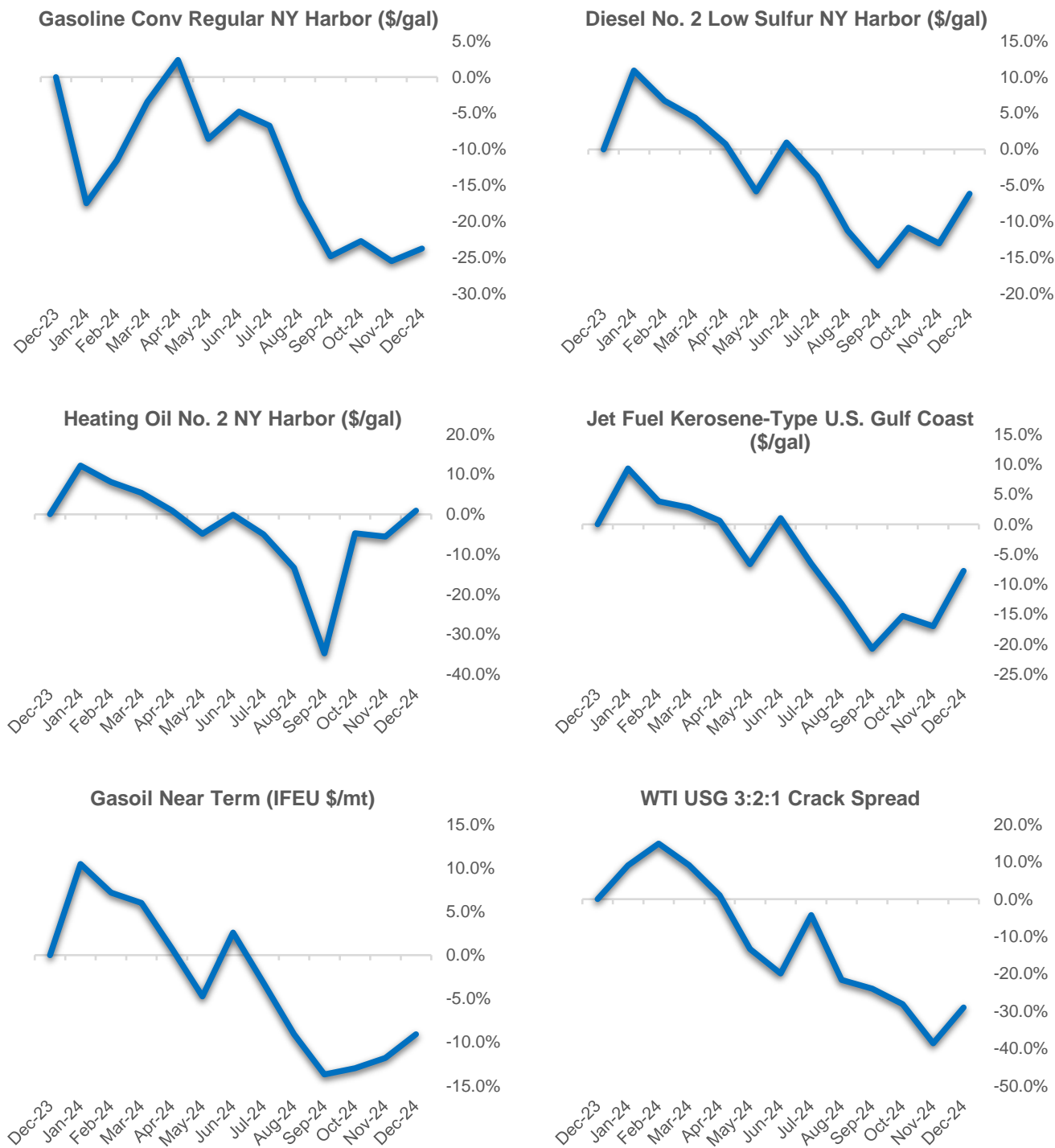
Source: Intro-act, FactSet, Investing.com. Data as of 12/31/24.

Chart 11: Indexed Change in Ethanol Prices in Last 12 Months



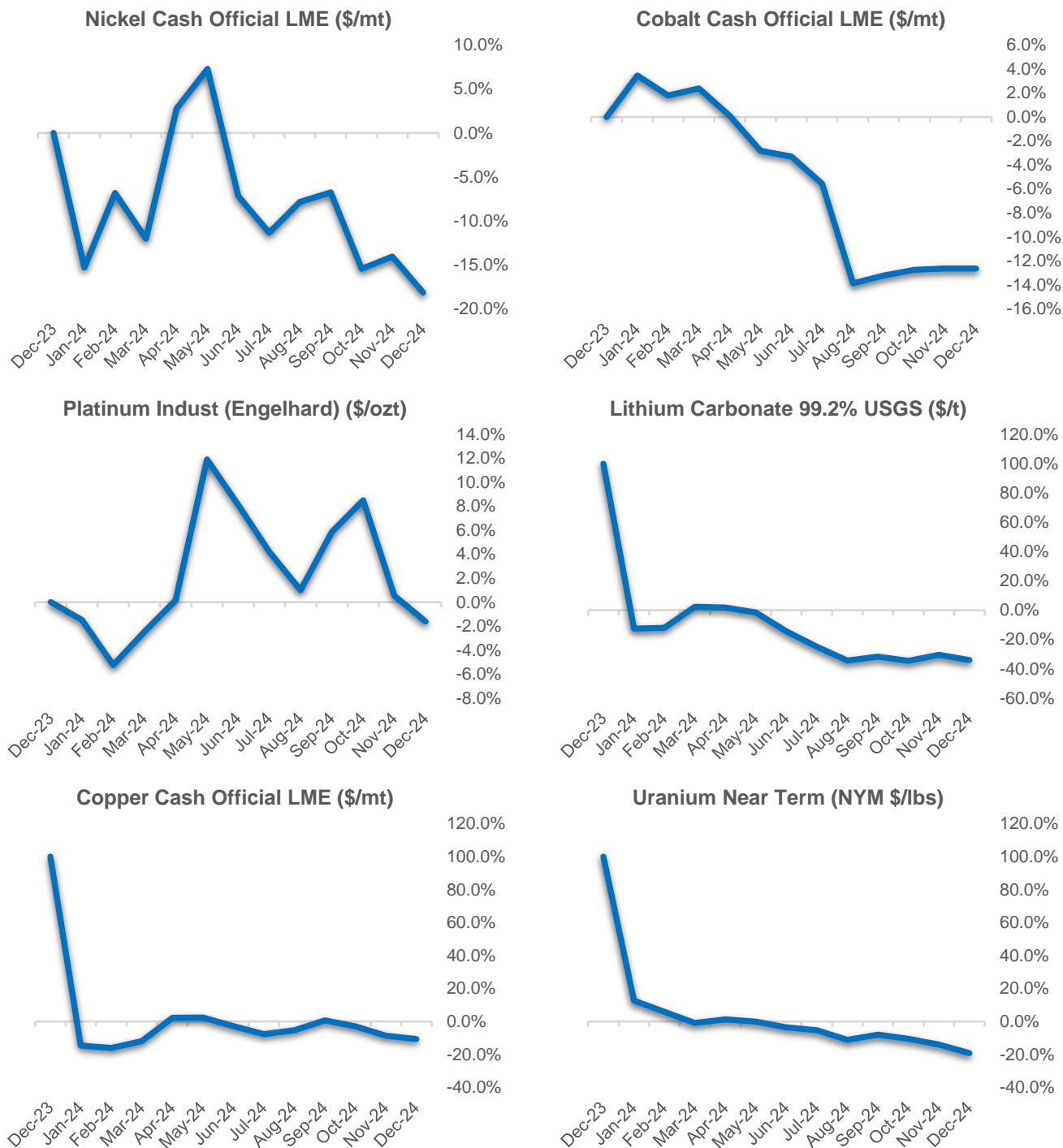
Source: Intro-act, FactSet, Investing.com. Data as of 12/31/24.

Chart 12: Indexed Change in Refined Products in Prices Last 12 Months



Source: Intro-act, FactSet. Data as of 12/31/24.

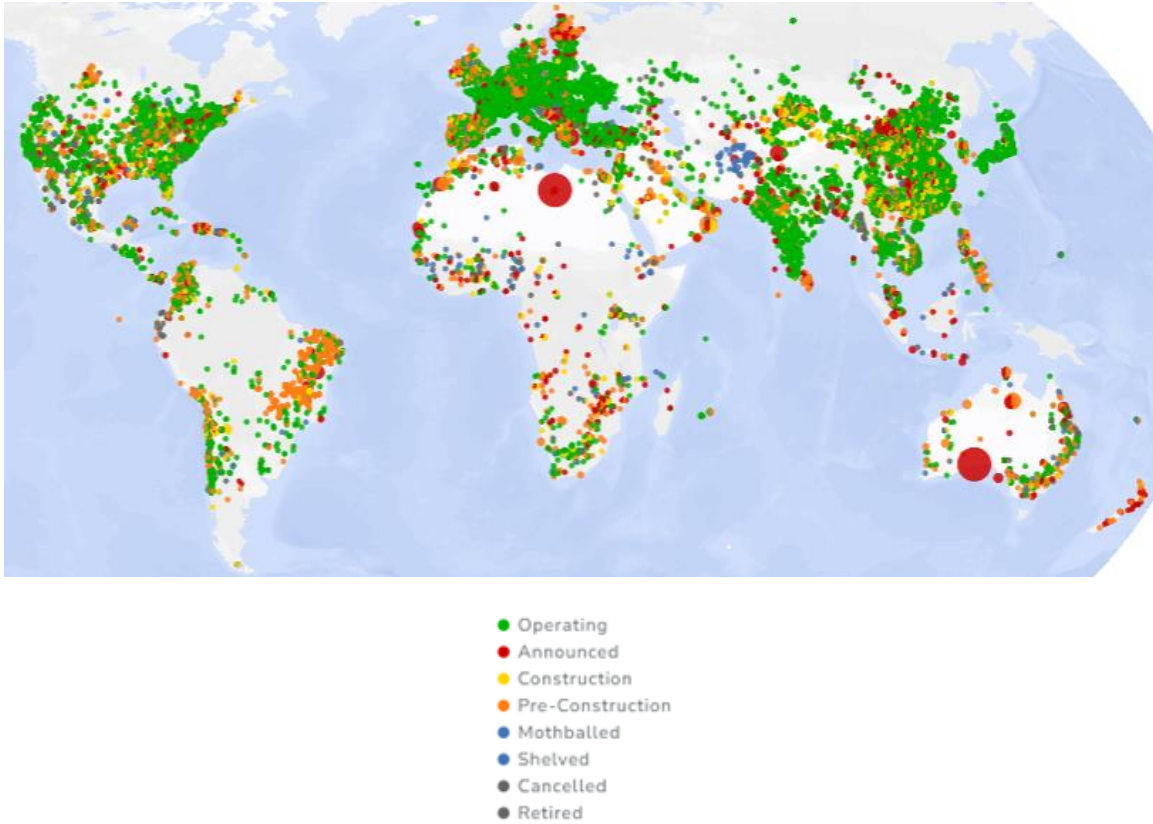
Chart 13: Indexed Change in Cleantech Metal Prices Last 12 Months



Source: Intro-act, FactSet. Data as of 12/31/24.

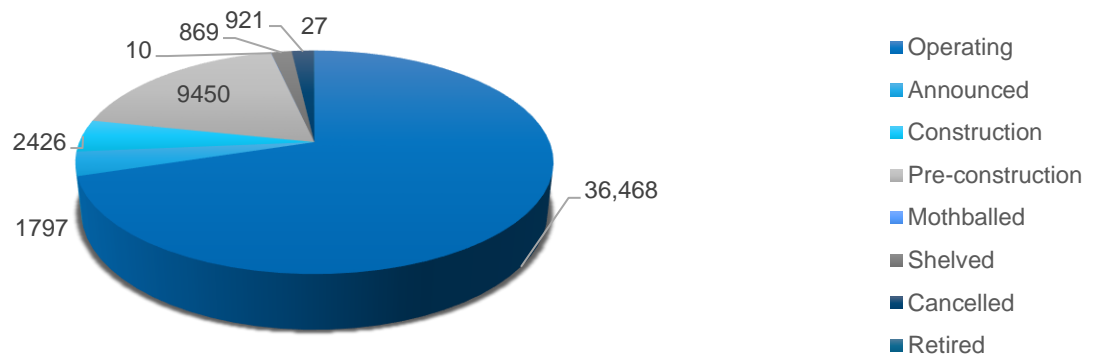
CLEANTECH INSTALLATIONS

Chart 14: Global Solar Power Tracker (As of June 2024*)



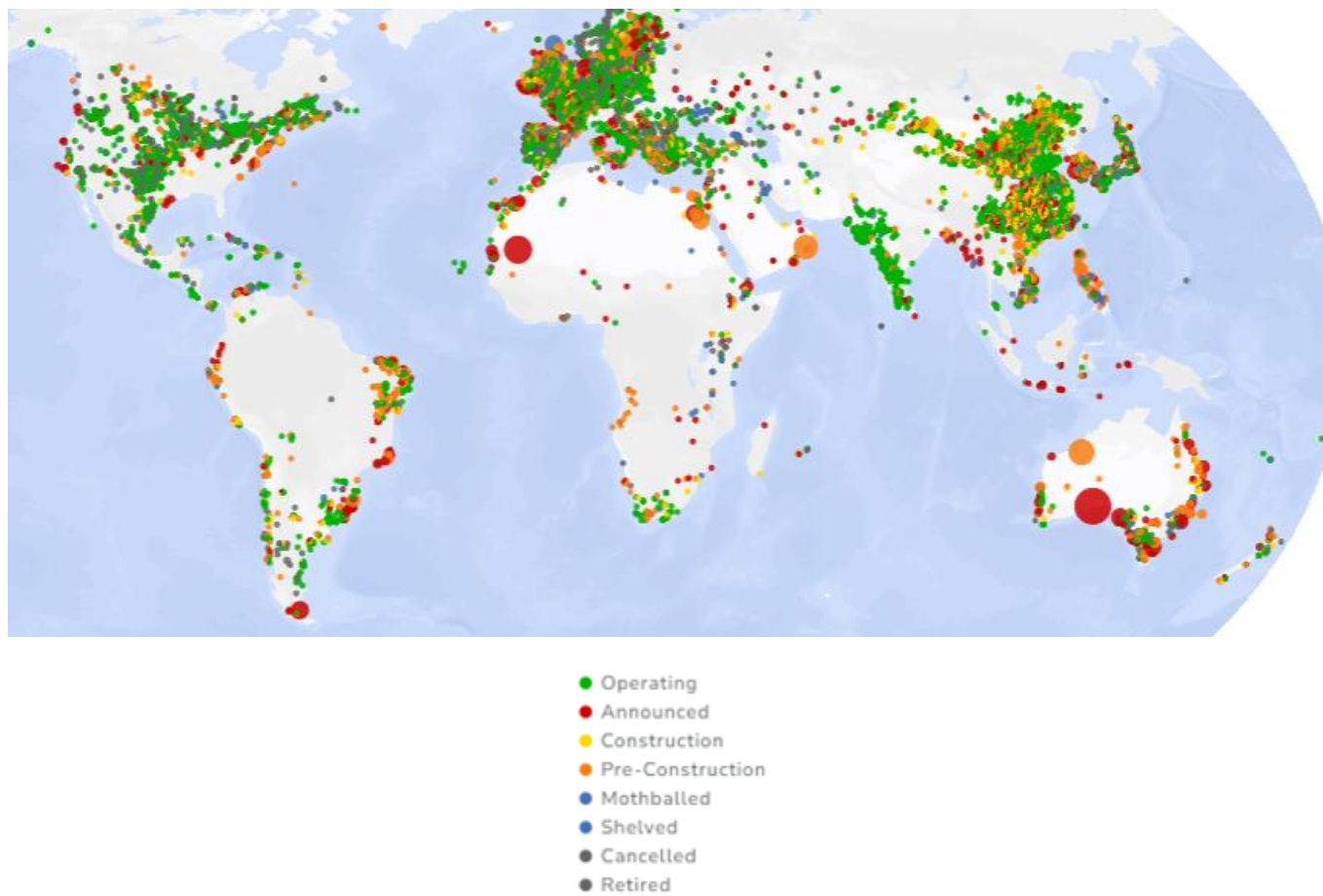
Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 15: Worldwide Solar Farm Phases. Total Farms: 51,048 as of June 2024*



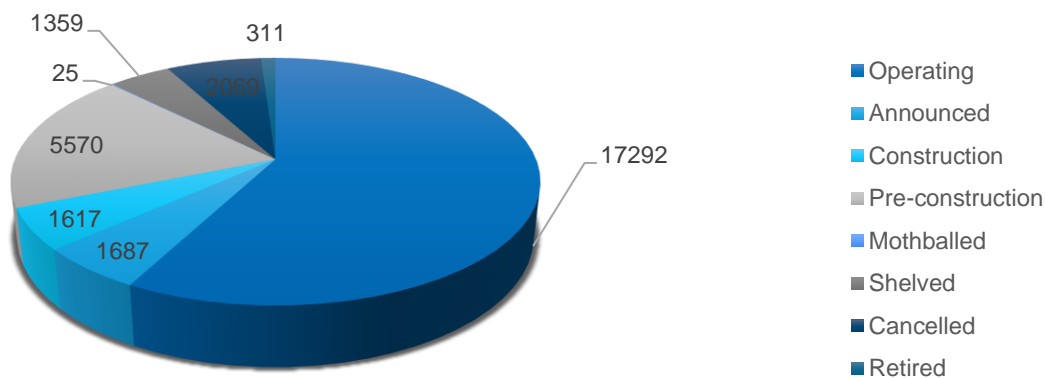
Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 16: Global Wind Power Tracker (June 2024*)



Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 17: Worldwide Wind Farm Phases. Total Farms: 29,930 as of June 2024*



Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

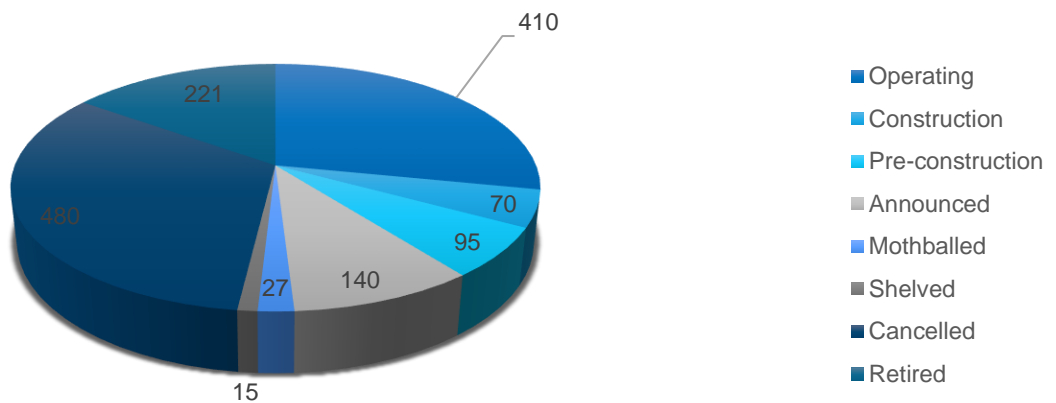
Chart 18: Global Nuclear Power Tracker (June 2024*)



- Operating
- Construction
- Pre-construction
- Announced
- Shelved
- Mothballed
- Retired
- Cancelled

Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 19: Worldwide Nuclear Power Plants. Total Farms: 1,458 as of June 2024*



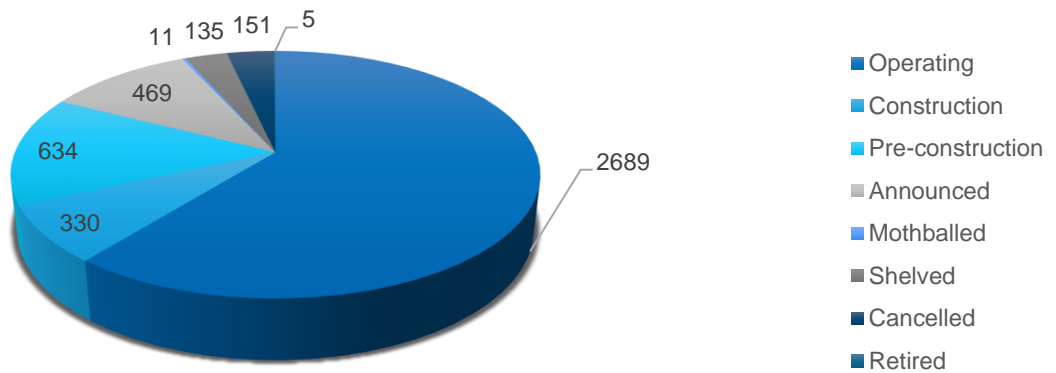
Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 20: Global Hydropower Tracker (June 2024*)



Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 21: Worldwide Hydropower Plants. Total Farms: 4,424 as of June 2024*



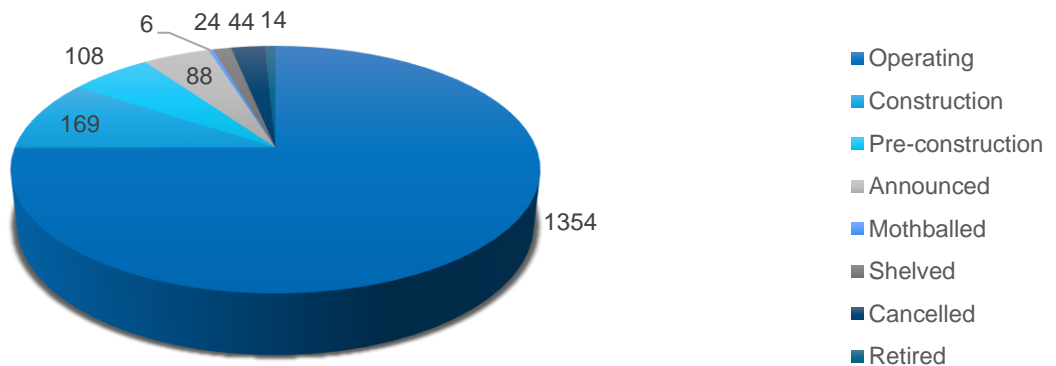
Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 22: Global Bioenergy Power Tracker (June 2024*)



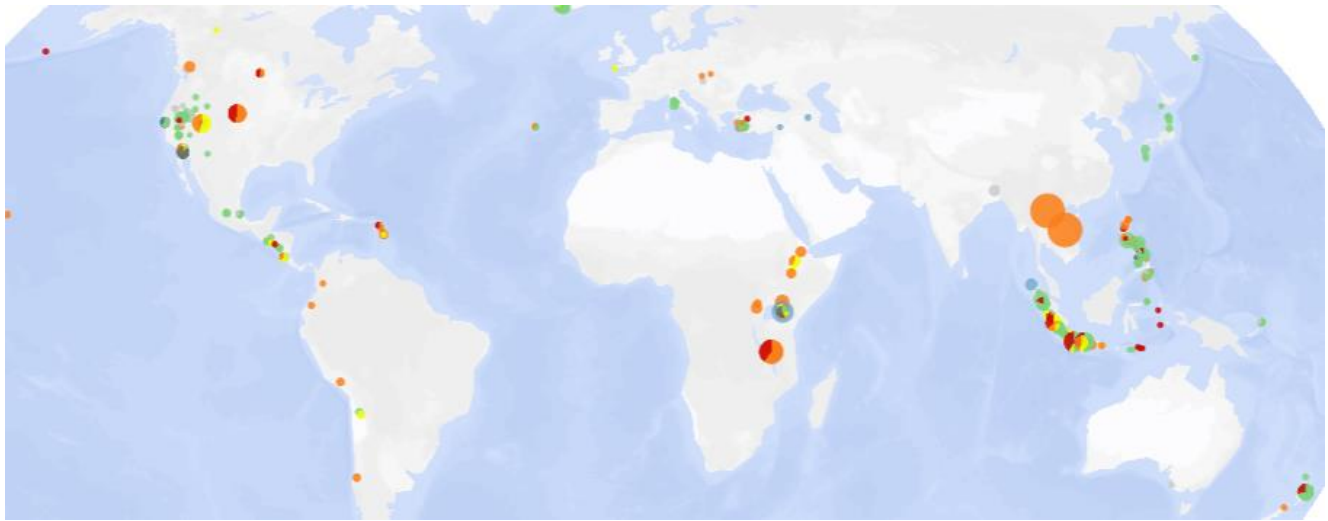
Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 23: Worldwide Bioenergy Power Plants. Total Farms: 1,807 as of June 2024*



Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

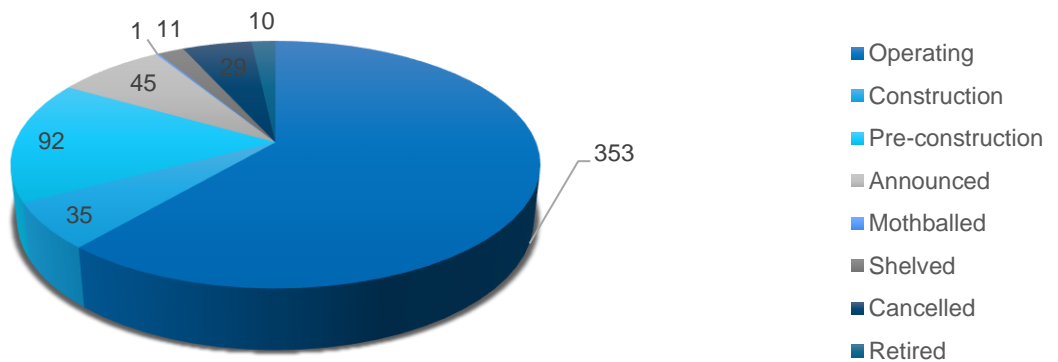
Chart 24: Global Geothermal Power Tracker (June 2024*)



- Operating
- Construction
- Pre-construction
- Announced
- Shelved
- Mothballed
- Retired
- Cancelled

Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

Chart 25: Worldwide Geothermal Power Plants. Total Farms: 576 as of June 2024*



Source: Intro-act, Global Energy Monitor
 *The data is available only up to June 2024

CLEANTECH CAPITAL MARKET ACTION

M&A Activity

Target	Target Country	Acquirer	Transaction Value (MM)	Announcement Date
Oxand SASU	France	Meridiam Infrastructure Partners SAS	-	15-Jan-2025
Calpine Corp.	United States	Constellation Energy Corp.	29,392.00	10-Jan-2025
Enel Green Power India Pvt Ltd.	India	WAAREE Energies Ltd.	7,919.99	10-Jan-2025
Citicore Renewable Energy Corp.	Philippines	PT Pertamina Power Indonesia	114.66	09-Jan-2025
CWind Ltd.	United Kingdom	AES Group	-	08-Jan-2025
Ethical Power Ltd.	United Kingdom	Ethical Power Ltd. /Skinner/	-	31-Dec-2024
Bay Wind Projects Pvt Ltd.	India	Ramkrishna Iron Works Pvt Ltd.	0.00	30-Dec-2024
O2 Power Pvt Ltd.	India	JSW Neo Energy Ltd.	1,500.00	27-Dec-2024
Guangdong Chant Group, Inc.	China (People's Republic)	Beijing Zhongke Hongyuan Information Technology Co., Ltd.	25.07	24-Dec-2024
Amplus Phoenix Energy Pvt Ltd.	India	UFlex Ltd.	0.64	20-Dec-2024
Deutsche Windtechnik AG	Germany	Deutsche Windtechnik AG /Meier/	-	20-Dec-2024
Midwest Renewable Energy LLC	United States	Verity Tracking	-	19-Dec-2024
Slovenské elektrárne AS	Slovakia	Energetický a priemyslový holding as	78.54	19-Dec-2024

Source: Intro-act, FactSet

PE/ VC Funding Activity

Company Name	Funding Round	Amount (\$ mln)	Active Investors	Investment Date
Origis Energy USA, Inc.	Private Sh	1,000.00	Antin Infrastructure Partners SAS; Brookfield Corp. 3x5 Partners LLC; Baruch Future Ventures LLC; BHP Ventures Partners; Breakthrough Energy Investment LLC; Capricorn Investment Group LLC (Private Equity); Congruent Management LLC; CPP Investment Board Infrastructure; DCVC Management Co. LLC; Devon Energy Corp.; Echelon Capital/Venture capital/; Elemental Exceleator, Inc.; Galvanize Climate Solutions LLC; HarbourVest Partners LLC; Helmerich & Payne, Inc.; Impact Science Ventures; John Douglas Arnold; Liberty Energy, Inc.; Liberty Mutual Holding Co., Inc.; Macquarie Group Ltd.; Marunouchi Innovation Partners Co. Ltd.; Mercuria Investment Co., Ltd. /Private Equity/; Mitsubishi Heavy Industries, Ltd.; Neglected Climate Opportunities LLC; Prelude Ventures LLC; Sabanci Climate Ventures	15-Jan-2025
Fervo Energy Co.	Series E	135.00	Amara Raja; Gotion High-tech Co., Ltd; Government of Czech Republic; IPM Growth; Lilium NV; Rio Tinto; Wildcat Discovery Technologies, Inc.	19-Dec-2024
InoBat JSA	Series C	103.99	Anhui Zhong'an Capital Management Co. Ltd.; Bank of Communications Co., Ltd.; Beijing Guangyue Private Equity Fund Management Co., Ltd.; CCB Trust Co., Ltd.; China Electric Industrial Finance Equity Fund Mngt Co. Ltd.; Feixi Industrial Investment Holding Co. Ltd.; Government of China; Hefei Innovation Sci-Tec Venture Capital Co. Ltd.; Huagai Capital Co. Ltd.; Lenovo Capital & Incubator Group; Qiming Venture Partners Ltd.; SB China Capital; Shandong Weiqiao Pioneering Group Co., Ltd.; Shanghai Muhua Jinyu Equity Investment LP; Zhejiang Puhua Tianqin Equity Investment Management Co. Ltd.	20-Dec-2024
Beijing Jingshenxiang Technology Co., Ltd.	Series B2	102.76	AFW Partners, Inc.; Amazon (Venture Capital); AP Ventures LLP; BHP Ventures Partners; Collaborative Fund; DCVC Management Co. LLC; Government of Singapore; Hanwha Investment & Securities Co. Ltd. /Venture Capital/; Kibo Invest Pte Ltd.; Korea Zinc Co., Ltd.; Marunouchi Innovation Partners Co. Ltd.; MiLA Capital Advisors LLC; Mitsubishi Corp.; Mitsubishi Heavy Industries, Ltd.; Mitsui O.S.K. Lines, Ltd.; MOL Switch LLC; New Lab LLC; Quantum Ventures Korea Co. Ltd.; Samsung Heavy Industries Co., Ltd.; Saudi Aramco Energy Ventures LLC; Seoul Investment Partners Co., Ltd.; SK Innovation Co., Ltd.; SV Investment Co Ltd(Venture Capital); Synergy Marine Pte Ltd.; Temasek Capital	26-Dec-2024
AMOGY, Inc.	Series C	56.00		15-Jan-2025

			Pte Ltd.; Vertical Partners SAS; Yanmar Ventures Co. Ltd.; Zeon Ventures, Inc.	
Regional Fish Institute, Ltd.	Series C	19.11	Beyond Next Ventures, Inc.; CBC Co., Ltd.; Chushin Venture Capital Co., Ltd.; CITIC Capital Holdings Ltd.; Daiwa House Ventures Co. Ltd.; Ebara Corp.; FOOD & LIFE COMPANIES LTD.; Future Venture Capital Co. Ltd. (Private Equity); Iwatani Corp.; Iyogin Capital Co. Ltd.; Kiyoken Co. Ltd.; Kyoshin Social Capital KK; Kyoto Angel Fund KK; Marui Group Co., Ltd.; Mitsubishi UFJ Capital Co., Ltd.; Mitsui O.S.K. Lines, Ltd.; Mizkan Holdings Co., Ltd.; Nippon Telegraph & Telephone Corp.; Okumura Corp.; SB Players Corp.; Seven & i Holdings Co., Ltd.; SMBC Venture Capital KK; Technology Seed Incubation Co., Ltd.; The Kansai Electric Power Co., Inc.; UBE Corp.; Ushio, Inc.; Yoshicon Co., Ltd.	26-Dec-2024
Moment Energy, Inc.	Series A	15.00	Asahi Kasei Corporate Venture Capital; Duro Ventures LLC; Fika Management LLC; Garage Capital; In-Q-Tel; MCJ Collective LP; One Small Planet Family; Overture Climate LLC; Overture Venture; The Climate Pledge; Version One Ventures LLC; Voyager Partners Management LLC; Wovenearth Ventures LLC	16-Jan-2025
Metafuels AG	Series A	9.00	Celsius Industries LLP; Contrarian Ventures UAB; Energy Impact Partners LP; Fortescue Capital; Rockcreek Ventures, Inc.; Verve Capital Partners AG	16-Jan-2025
Advanced Ionics, Inc.	Series B	6.70	Argosy Foundation; BP Technology Ventures Ltd.; Clean Energy Venture Group LLC; Clean Energy Venture Management LLC; Jera Ventures; Lummus Technology LLC; Mitsubishi Heavy Industries, Ltd.; SWAN Impact Network, Inc. /Venture Capital/ Avesta Capital LLC; Buoyant Ventures Management LLC; Constellation Technology Ventures; Keiki Capital LLC; Laconia Advisory Services LLC; Masa Partners LLC; MassMutual Ventures LLC; Meridian Venture Partners LLC; Rosecliff Venture Management LLC; Stage Venture Partners LLC; TechStars Central, LLC; Thin Line Capital LLC	08-Jan-2025
Sunairio, Inc.	Seed Round2	6.40	A1 Health Ventures; Arsenal Capital Management LP; Cambridge Ventures, Inc.; Claritas Health Ventures; Elevate Ventures, Inc.; HC Capital LLC	20-Dec-2024
hc1 Insights, Inc.	Series D	6.30	Buildit Accelerator OÜ; Impact Ventures Kockázati Tokealap-kezelő Zrt.; Impact Ventures Management Pty Ltd.; Kendris Capital Ltd.; New Energy Technology/Au/; Radix Venture Partners; Sunly Startup OÜ; The Untitled Ventures LLP	13-Jan-2025
Schaeffler Baltic SIA	Seed Round4	2.57		14-Jan-2025
Conductor Solar, Inc.	Series C	0.56	Alchemy Group LLC; Lorentzen Investments LLC; LOUD Capital LLC	20-Dec-2024
Bioness, Inc.	Private Sh	Undisclosed	Accelmed Partners II Management, LLC	02-Jan-2025

Ezzing Building Synergies SL	Series D	Undisclosed	Centro para el Desarrollo Tecnológico Ind /Private Equity/; KIC InnoEnergy SE; Repsol Energy Ventures SA; Telefonica Open Innovation SLU	01-Jan-2025
Gluware, Inc.	Private Sh	Undisclosed	Cuadrilla Capital LLC	08-Jan-2025
Hydrogen Onsite SL	Series B	Undisclosed	Breakthrough Energy Investment LLC; ENGIE New Ventures SA; Equinor Energy Ventures; Fundación Tecnalia Corporación Tecnológica; Gestión de Capital Riesgo del País Vasco SGEIC SA; Seed Capital de Bizkaia SGEIC SA; Technische Universiteit Eindhoven Holding BV	31-Dec-2024
MG LLC	Private Sh	Undisclosed	GTCR LLC; Recognize partners LP	02-Jan-2025
OMB SALERI SpA	Private Sh	Undisclosed	Dea Capital Alternative Funds SGR SpA; Findos Investor GmbH	19-Dec-2024
OMH Healthedge Holdings, Inc.	Private Sh	Undisclosed	Goldman Sachs Asset Management LP (Private Equity); Ontario Teachers' Private Capital	20-Dec-2024
Oxand SASU	Private Sh	Undisclosed	Meridiam Infrastructure Partners SAS	15-Jan-2025
Retail Metal Stores, Inc.	Private Sh	Undisclosed	PNC Riverarch Capital	19-Dec-2024
Rotating Machinery Services, Inc.	Private Sh	Undisclosed	Arcline Investment Management LP	09-Jan-2025
Snowden Capital Advisors LLC	Private Sh	Undisclosed	Estancia Capital Management; Snowden Capital Advisors LLC /Employees/	10-Jan-2025
Vpplab Corp.	Series A	Undisclosed	Jeju Center For Creative Economy & Innovation Co., Ltd.; MY Social Company Co. Ltd.; Smilegate Investment Co. Ltd.	26-Dec-2024
Ziton A/S	Private Sh	Undisclosed	Macquarie Infrastructure & Real Assets (Europe) Ltd.	09-Jan-2025

Source: Intro-act, FactSet

CLEANTECH INSTITUTIONAL INVESTOR LEAGUE

Chart 26: Cleantech Institutional Owners League (Current)

Rank	Investor Name	Invested in Cleantech (\$)	Q/Q Change (\$)	Change in Positions (#)	Cleantech as % of AUM
1	The Vanguard Group, Inc.	100,069,689,857	(6,691,944,670)	-4	11.06%
2	BlackRock Fund Advisors	56,739,320,076	(3,446,532,384)	-9	6.27%
3	SSgA Funds Management, Inc.	37,440,148,783	(1,517,130,572)	-17	4.14%
4	Geode Capital Management LLC	22,049,714,206	(1,148,432,806)	-6	2.44%
5	Fidelity Management & Research Co. LLC	18,778,765,580	(3,996,294,753)	0	2.08%
6	Capital Research & Management Co. (Global Investors)	14,643,228,181	(3,142,232,152)	1	1.62%
7	BlackRock Advisors (UK) Ltd.	12,232,600,282	(1,079,428,746)	-1	1.35%
8	JPMorgan Investment Management, Inc.	9,586,253,622	(1,203,105,665)	-3	1.06%
9	T. Rowe Price Associates, Inc. (IM)	9,405,238,243	(1,531,190,569)	-2	1.04%
10	Charles Schwab Investment Management, Inc.	9,088,398,825	(297,559,682)	-4	1.00%
11	Capital Research & Management Co. (International Investors)	8,893,798,240	(1,065,777,163)	0	0.98%
12	BlackRock Investment Management (UK) Ltd.	8,519,393,511	(1,689,742,418)	-24	0.94%
13	Dimensional Fund Advisors LP	8,365,043,058	(462,629,504)	-2	0.92%
14	Northern Trust Investments, Inc. (Investment Management)	8,363,136,677	(428,176,188)	-5	0.92%
15	Capital Research & Management Co. (World Investors)	8,156,207,170	(946,516,397)	0	0.90%
16	Wellington Management Co. LLP	7,809,646,761	579,463,805	1	0.86%
17	State Farm Investment Management Corp.	7,438,270,970	207,456,743	0	0.82%
18	Invesco Capital Management LLC	6,565,524,551	(16,510,591)	-7	0.73%
19	Morgan Stanley Smith Barney LLC (Investment Management)	5,878,436,773	5,156,371	-1	0.65%
20	Legal & General Investment Management Ltd.	5,738,977,368	(514,671,765)	-1	0.63%
21	Massachusetts Financial Services Co.	5,464,298,149	(666,405,007)	-3	0.60%
22	Columbia Management Investment Advisers LLC	5,307,436,774	(143,837,167)	-3	0.59%
23	Nomura Asset Management Co., Ltd.	5,062,538,108	(506,370,272)	-5	0.56%
24	RBC Global Asset Management, Inc.	5,031,767,389	(754,324,047)	-16	0.56%
25	Vanguard Global Advisers LLC	4,690,434,884	(294,068,436)	-2	0.52%
	Others	513,439,598,979	(75,070,121,999)	(1,151)	56.75%
				(1,264)	

Source: Intro-act, 13F Filings

Chart 27: Top 25 Cleantech Buyers (Q/Q)

Sr No.	Investor Name	Invested in Cleantech (\$)	Q/Q Change (\$)	Change in Positions (#)	Cleantech as % of AUM
1	KB Asset Management Co. Ltd.	136,802,621	136,802,621	100	3%
2	Capital Performance Advisors LLP	897,101	854,504	64	0%
3	Sterling Capital Management LLC	137,592,068	52,219,033	54	2%
4	Hemington Wealth Management LLC	1,361,615	575,214	43	0%
5	Claris Advisors LLC	71,585	71,585	35	0%
6	BMO Nesbitt Burns Securities Ltd.	15,842,097	15,842,097	33	2%
7	Catalyst Funds Management Pty Ltd.	4,538,493	4,538,493	32	1%
8	RBC Dominion Securities, Inc.	3,116,120	(1,281,104)	32	0%
9	Ashton Thomas Securities LLC	4,201,332	1,702,530	28	1%
10	Intech Investment Management LLC	163,107,037	12,534,432	27	2%
11	Jaffe Tilchin Investment Partners LLC	6,278,472	104,416	25	0%
12	UBS Switzerland AG (Investment Management)	385,546,118	49,925,207	25	1%
13	Eastern Bank (Investment Management)	82,432,819	46,596,183	24	1%
14	Brooklyn Investment Group LLC	3,981,445	1,379,431	23	1%
15	GeoWealth Management LLC	6,313,989	147,005	23	0%
16	Truvestments Capital LLC	9,139,212	862,442	21	2%
17	Corecap Advisors LLC	6,483,489	2,965,534	20	0%
18	FCG Fonder AB	11,795,073	11,497,965	20	1%
19	Planned Solutions Financial & Insurance Services, Inc.	692,463	692,463	20	0%
20	Themes Management Co. LLC	373,321	298,212	19	1%
21	FSA Wealth Management LLC	1,429,003	1,429,003	18	1%
22	Prospera Private Wealth LLC	6,874,459	4,155,471	18	1%
23	Edward D. Jones & Co. LP (Investment Management)	66,303,229	28,031,114	17	0%
24	Oarsman Capital, Inc.	2,817,041	863,739	17	1%
25	Banque Degroof Petercam SA (Private Banking)	8,883,182	8,883,182	16	0%

Source: Intro-act, 13F Filings

Chart 28: Top 25 Cleantech Sellers (Q/Q)

Sr No	Investor Name	Invested in Cleantech (\$)	Q/Q Change (\$)	Change in Positions (#)	Cleantech as % of AUM
1	Norges Bank Investment Management	1,008,785,488	(23,107,119,728)	-144	0%
2	China Asset Management Co., Ltd.	1,574,701,650	(1,893,352,987)	-83	2%
3	China Universal Asset Management Co., Ltd.	779,372	(1,203,364,296)	-74	0%
4	Bosera Asset Management Co., Ltd.	4,795,493	(528,870,391)	-73	0%
5	Nuveen Asset Management LLC	49,703,966	(740,435,131)	-71	0%
6	Harvest Fund Management Co., Ltd.	5,258,375	(1,569,873,508)	-68	0%
7	Pictet Asset Management SA	4,642,823,947	(938,016,012)	-63	3%
8	Credit Suisse Asset Management (Schweiz) AG	320,594,850	(137,144,595)	-56	1%
9	E Fund Management Co., Ltd.	456,748,770	(1,465,206,868)	-56	1%
10	KBC Asset Management NV	359,495,431	(433,770,717)	-56	1%
11	State Board of Administration of Florida Retirement System	676,034,534	(374,050,217)	-53	1%
12	KBC Fund Management Ltd.	1,270,644	(140,896,650)	-48	0%
13	CI Investments, Inc.	282,443,166	(398,523,011)	-46	1%
14	Irish Life Investment Managers Ltd.	192,290,789	(54,653,208)	-45	2%
15	Mediolanum International Funds Ltd.	60,356,792	(310,900,417)	-44	0%
16	Connor, Clark & Lunn Investment Management Ltd.	1,005,408,458	(138,009,798)	-42	5%
17	LGT Capital Partners AG (Investment Management)	20,764,188	(40,796,943)	-38	0%
18	Redwood Wealth Management Group LLC	1,940,086	(1,422,192)	-37	2%
19	Pictet Asset Management (Europe) SA (Italy)	16,518,659	(43,355,837)	-35	1%
20	BlackRock Japan Co. Ltd.	1,172,287,378	(29,455,423)	-34	1%
21	Shanghai Guotai Junan Securities Assets Management Co., Ltd.	9,856,756	(10,982,701)	-34	1%
22	Innealta Capital LLC	230,975	(833,263)	-31	0%
23	Susquehanna Investment Group LLC	63,959,508	(110,037,722)	-30	1%
24	The Family Firm, Inc.	134,455	(860,362)	-29	0%
25	1832 Asset Management LP	3,195,879,953	(336,305,020)	-28	4%

Source: Intro-act, 13F Filings

ETF SPOTLIGHT

Global X Cleantech ETF (CTEC)

Closing Price (\$)	CUSIP	Expense Ratio	Inception
6.96	37954Y228	0.5	27/10/2020

AUM (\$ million)	Shares Outstanding (#)	Fund Flows (1M, \$)	Fund Flows (YTD, \$)
30.59	4 MM	\$-561 K	\$-549 K

Fund Description

The CTEC Fund is an environmentally focused investment opportunity, designed to mirror a global index of companies driving technological advancements that mitigate environmental harm. This fund commits at least 80% of its assets to securities within the underlying index, in addition to American Depositary Receipts (ADRs) and Global Depositary Receipts (GDRs) linked to those securities. The underlying index comprises businesses primarily dedicated to Cleantech, including renewable energy, energy efficiency, smart grid solutions, lithium-ion batteries, fuel cells, and pollution prevention. These companies are carefully selected based on their generation of at least 50% of revenues from Cleantech-related activities and must meet specific market capitalization and liquidity criteria. The fund aims to harness the growth potential of Cleantech, and any modifications to the 80% investment policy necessitate a 60-day prior notice to shareholders. With eligibility spanning countries such as the United States, Japan, China, the United Kingdom, and others, this fund offers diversification for eco-conscious investors seeking Cleantech exposure.

ETF Returns Annualized (As of 12/31/2024)

1 Year	3 Year	5 Year	Since Inception
-35.85%	-26.51%	-14.89%	-16.64%

ETF Returns Cumulative (As of 12/31/2024)

1 Month	3 Month	YTD	Since Inception
-6.35%	-17.19%	-35.85%	-53.27%

Top 10 Holdings (updated as of 01/16/25)

Ticker	Name	% of Net Assets	Market Value (\$)
BE	BLOOM ENERGY CORP- A	9.72	3,007,174.84
NXT	NEXTRACKER INC-CL A	8.21	2,539,737.54
968 HK	XINYI SOLAR HOLDINGS LTD	5.56	1,721,583.61
FSLR	FIRST SOLAR INC	5.25	1,624,855.68
NDX1 GR	NORDEX SE	5.1	1,577,095.44
257 HK	EB ENVIRONMENT	4.91	1,518,156.65
PLUG	PLUG POWER INC	4.36	1,349,170.52
QS	QUANTUMSCAPE CORP	4.3	1,329,596.50
6121 TT	SIMPLO TECHNOLOGY CO LTD	4	1,237,311.63
JMAT LN	JOHNSON MATTHEY PLC	3.9	1,206,966.10

Source: Intro-act

For more information on CTEC visit: <https://www.globalxetfs.com/funds/ctec/>

iShares Global Clean Energy ETF (ICLN)

Closing Price (\$)	CUSIP	Expense Ratio	Inception
11.37	464288224	0.41	24/06/2008

AUM (\$ Billion)	Shares Outstanding (#)	Fund Flows (1M, \$)	Fund Flows (YTD, \$)
1.42	124 MM	\$-35 MM	\$-6 MM

Fund Description

The ICLN Fund offers investors exposure to a carefully curated selection of global companies at the forefront of the clean energy sector. This fund seeks to replicate the performance of the S&P Global Clean Energy Index™, comprising approximately 100 clean energy-related companies. To be eligible for inclusion in this index, companies must meet specific criteria, including a minimum total market capitalization of \$300 million, float-adjusted market capitalization of \$100 million, and a median daily value traded of \$3 million over six months, all on developed market exchanges. The index construction process involves rigorous screening, utilizing classifications such as the Global Industry Classification Standard (GICS) and FactSets Revere Business Industry Classification System (RBICS), along with environmental, social, and governance (ESG) considerations. Clean energy exposure scores are assigned based on a company's primary business, with additional evaluation of carbon-to-revenue footprint to ensure alignment with sustainable and environmentally responsible practices. The result is a diversified fund that offers investors an opportunity to participate in the global clean energy revolution while adhering to stringent ESG criteria.

ETF Returns Annualized (As of 12/31/2024)

1 Year	3 Year	5 Year	Since Inception
-25.78%	-17.57%	0.59%	-6.83%

ETF Returns Cumulative (As of 12/31/2024)

YTD	1 Month	3 Months	Since Inception
-25.78%	-7.03%	-21.59%	-68.95%

Top 10 Holdings (updated as of 01/15/25)

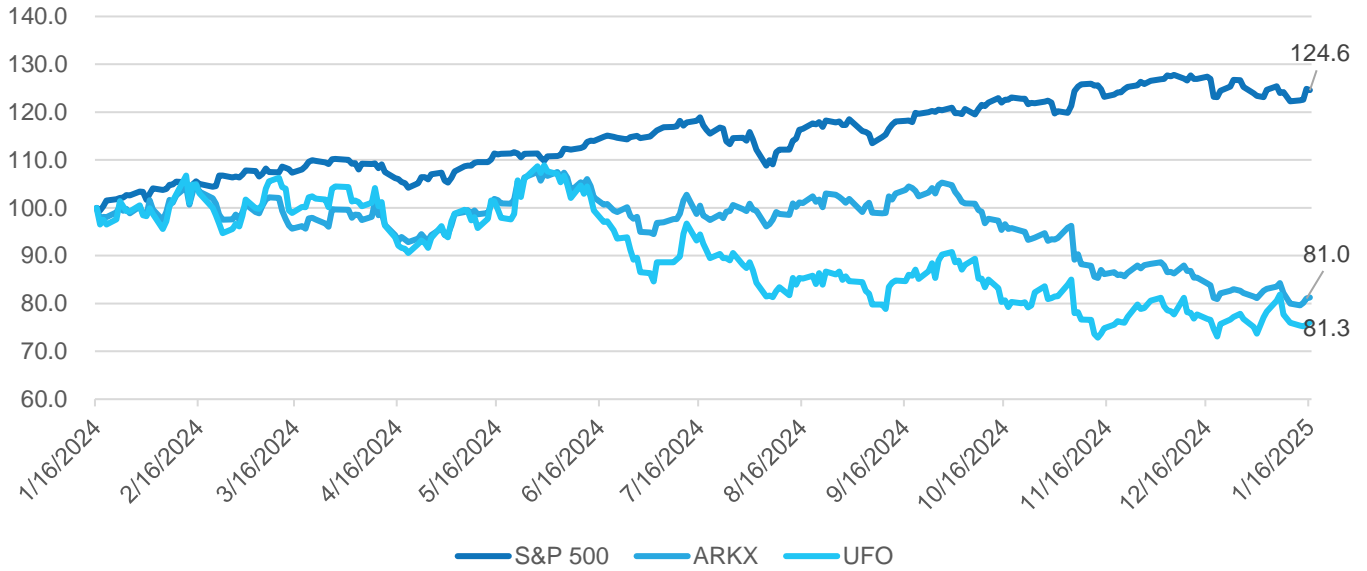
Ticker	Name	% of Net Assets	Market Value (\$)
FSLR	FIRST SOLAR INC	8.13	114,806,494.60
IBE	IBERDROLA SA	6.58	92,931,123.48
SSE	SSE PLC	5.97	84,256,395.86
ENPH	ENPHASE ENERGY INC	5.11	72,204,121.41
VWS	VESTAS WIND SYSTEMS	4.62	65,198,311.18
600900	CHINA YANGTZE POWER LTD A	4.41	62,275,335.39
9502	CHUBU ELECTRIC POWER INC	3.92	55,301,069.64
EDP	EDP ENERGIAS DE PORTUGAL SA	3.76	53,105,313.91
NXT	NEXTRACKER INC CLASS A	3.52	49,675,718.77
SUZLON	SUZLON ENERGY LTD	3.07	43,399,036.32

Source: Intro-act, FactSet

For more information on ICLN visit: <https://www.ishares.com/us/products/239738/ishares-global-clean-energy-etf>

ETF Performance vs. S&P 500

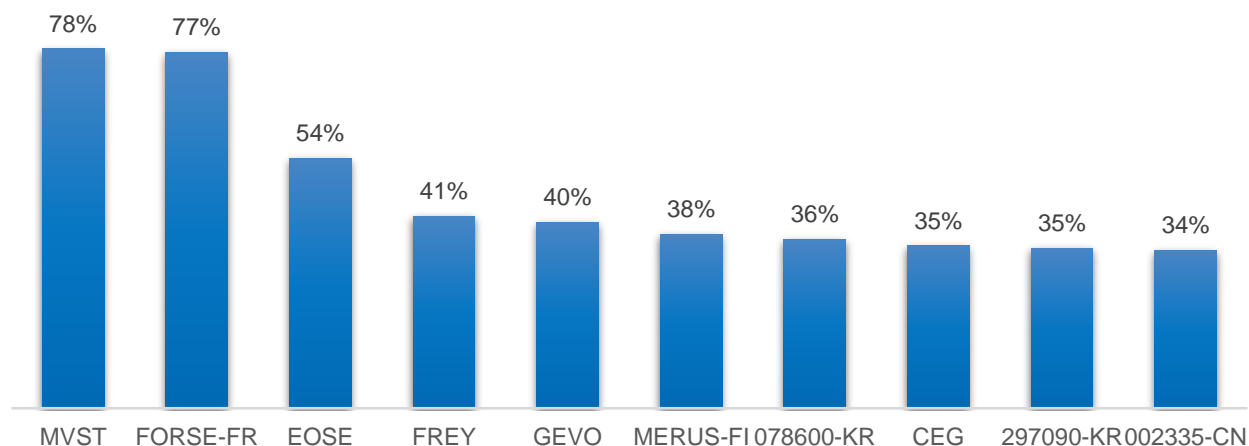
Chart 29: 12-month Indexed Returns of ICLN and CTEC vs. S&P 500



Source: Intro-act, FactSet, Data as of 01/15/2025.

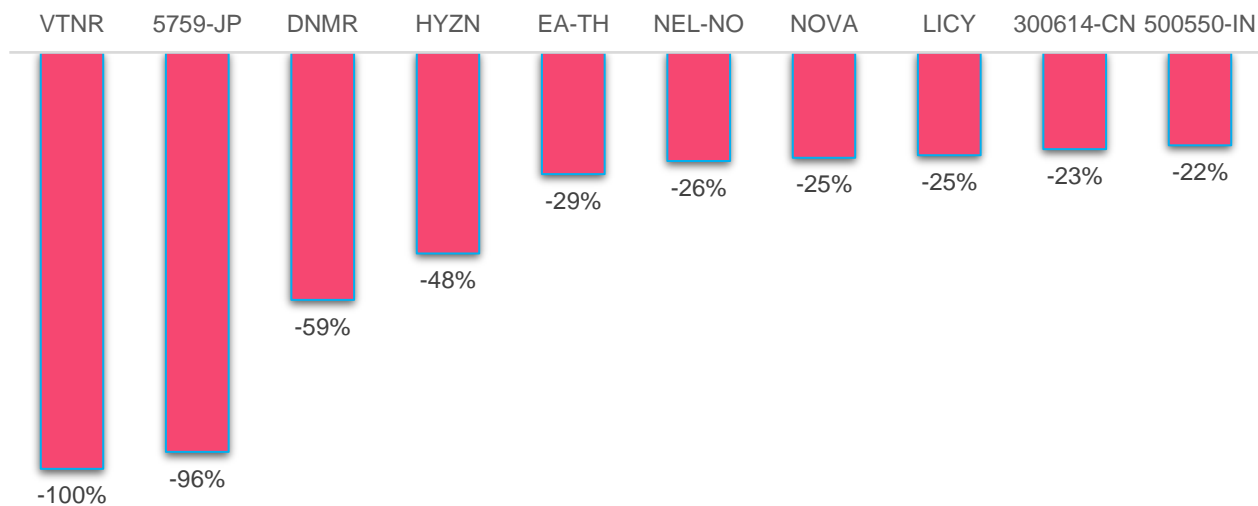
GAINERS AND LOSERS – CLEANTECH STOCKS

Chart 30: Top 10 M/M Cleantech Gainers



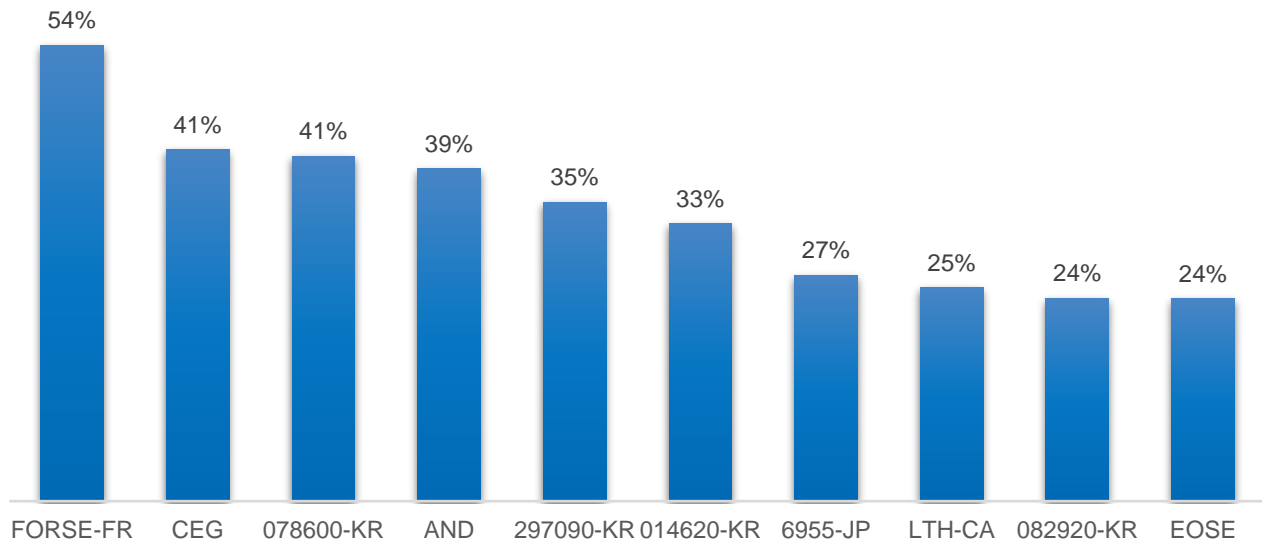
Source: Intro-act, FactSet, Data as on January 17, 2025.

Chart 31: Top 10 M/M Cleantech Losers



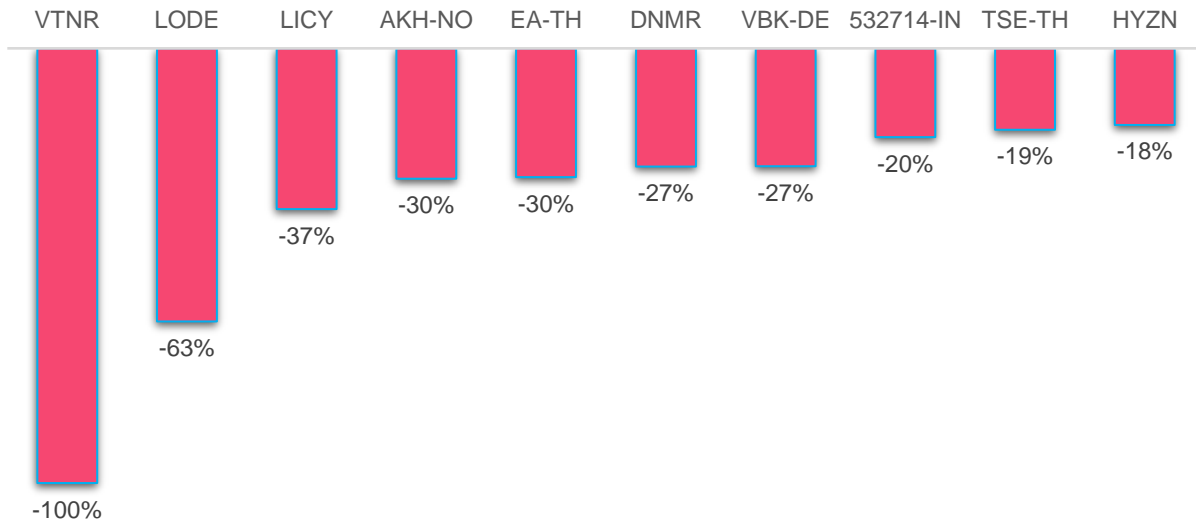
Source: Intro-act, FactSet, Data as on January 17, 2025.

Chart 32: Top 10 YTD Cleantech Gainers



Source: Intro-act, FactSet. Data as on January 17, 2025.

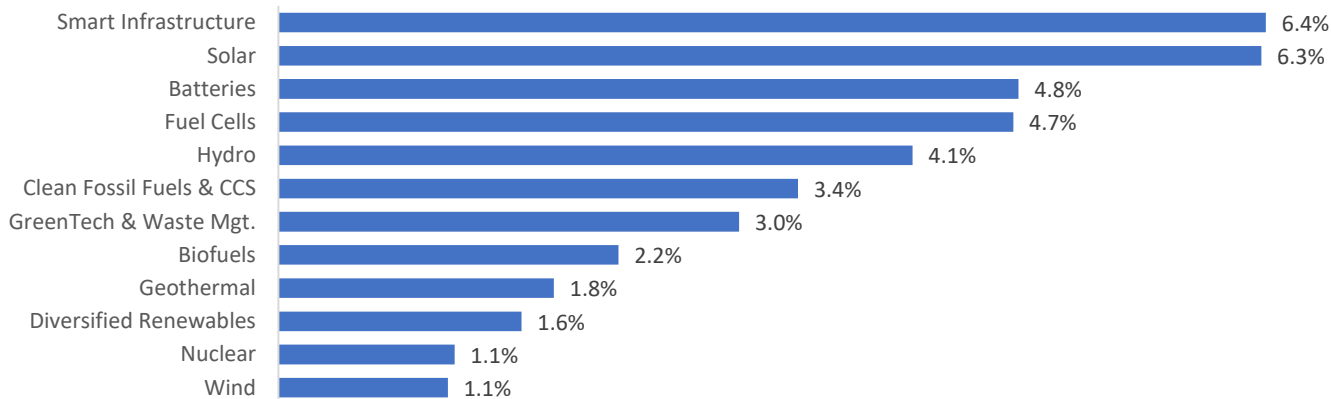
Chart 33: Top 10 YTD Cleantech Losers



Source: Intro-act, FactSet. Data as on January 17, 2025.

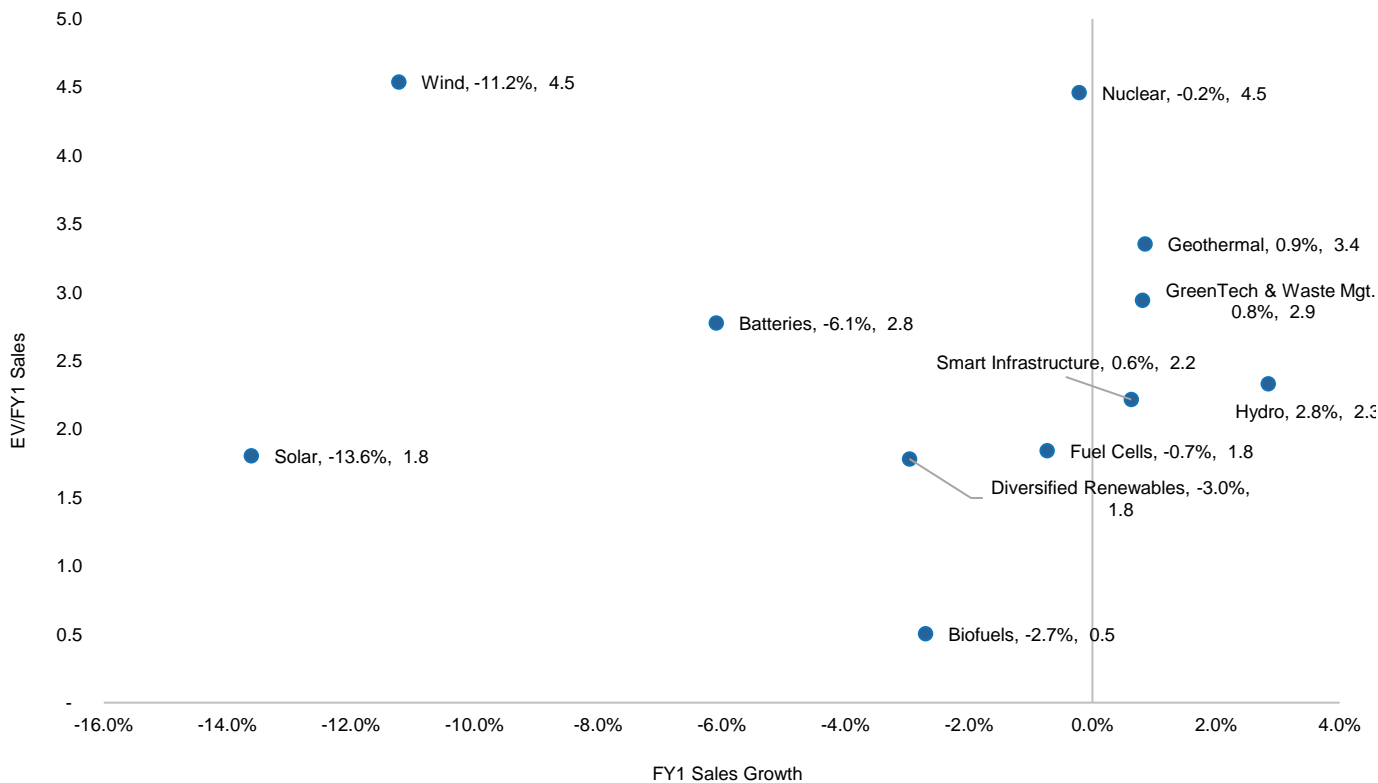
SEGMENT RETURN AND VALUATION

Chart 34: YTD Stock Price Returns by Segment



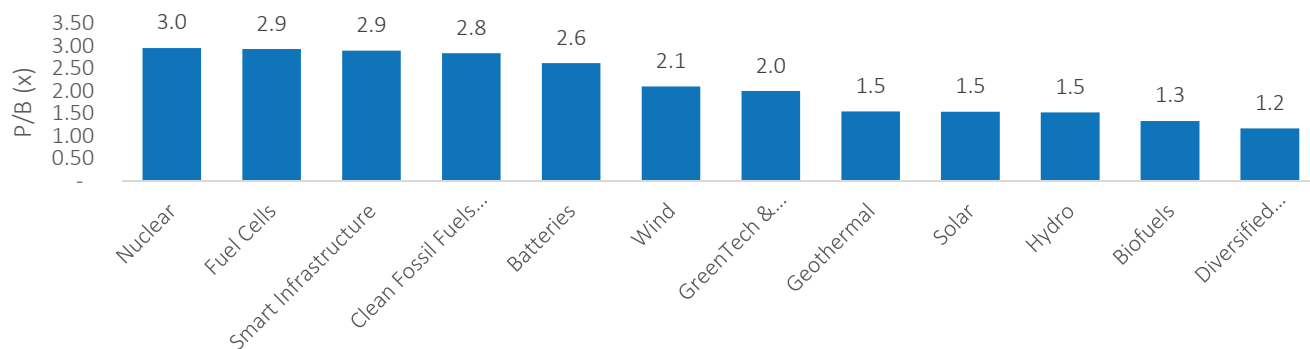
Source: Intro-act, FactSet. YTD Data as on January 17, 2025.

Chart 35: Cleantech Industry Growth and Valuation by Segment



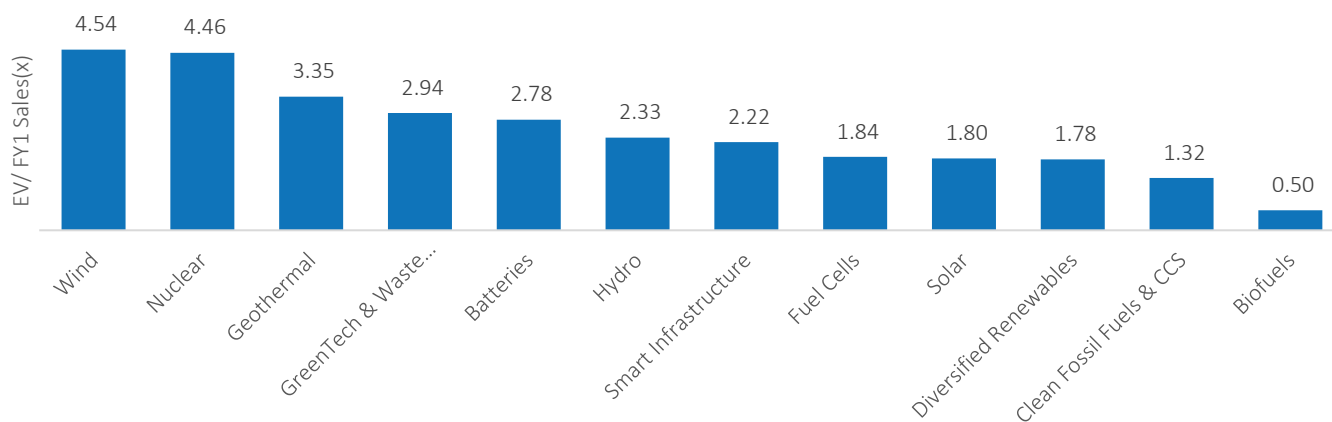
Source: Intro-act, FactSet, Data as on January 17, 2025. FY1 data is the first unreported financial year.

Chart 36: Price-to-Book Multiple by Segment



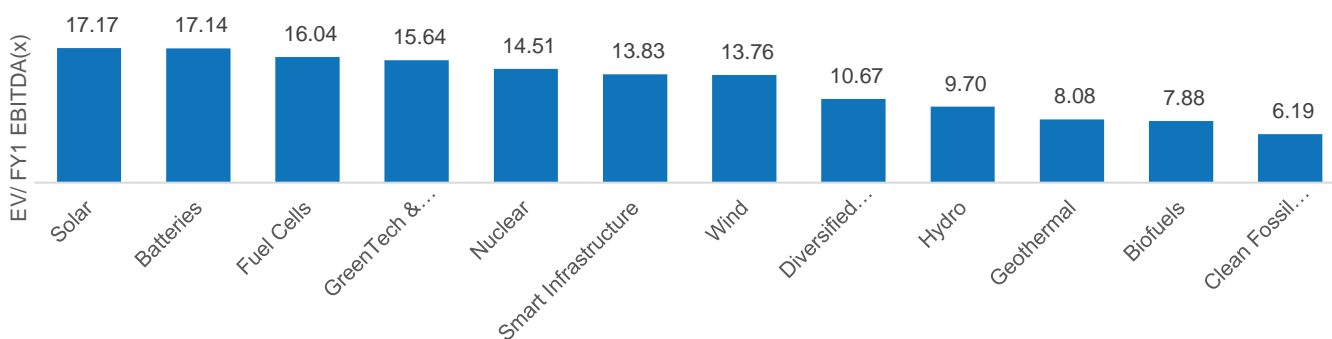
Source: Intro-act, FactSet. Data as on January 17, 2025

Chart 37: EV to FY1 Sales Multiple by Segment



Source: Intro-act, FactSet. Data as January 17, 2025. FY1 data is the first unreported financial year.

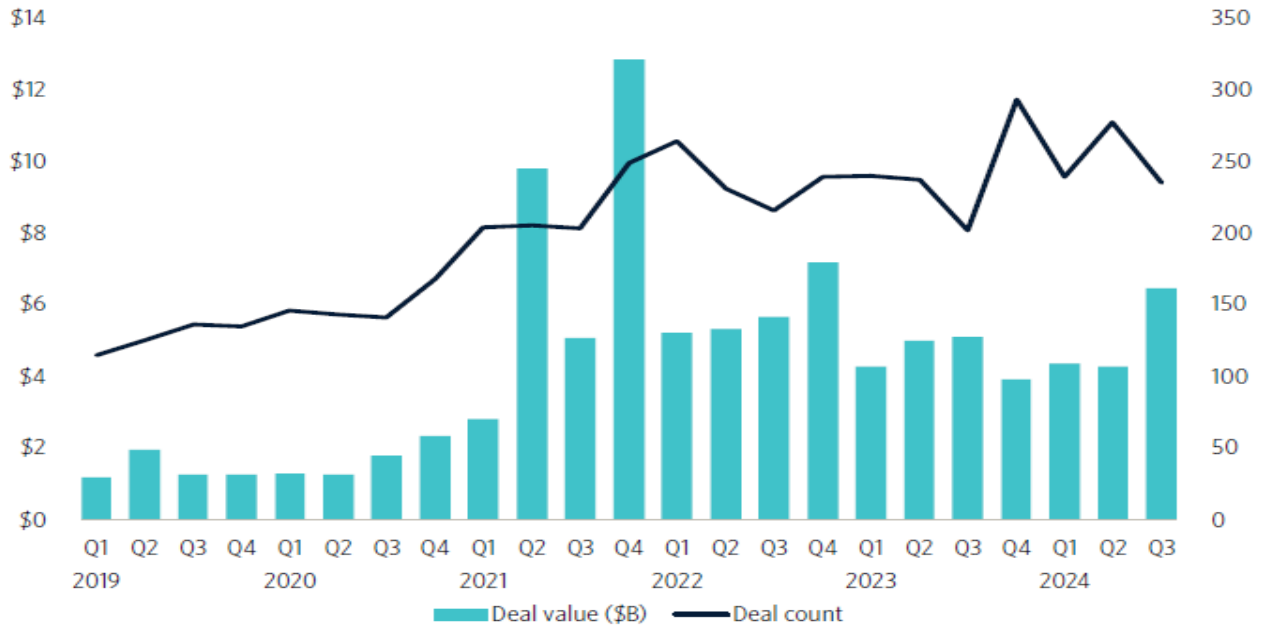
Chart 38: EV to FY1 EBITDA Multiple by Segment



Source: Intro-act, FactSet. Data as on January 17, 2025. FY1 data is the first unreported financial year.

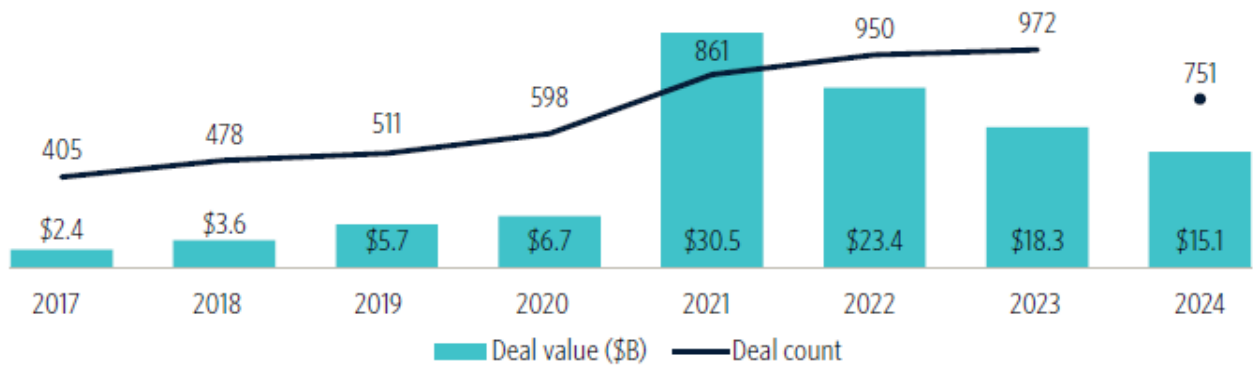
CLEANTECH CAPITAL MARKET TRENDS

Chart 39: Clean Energy VC Deal Activity by Quarter



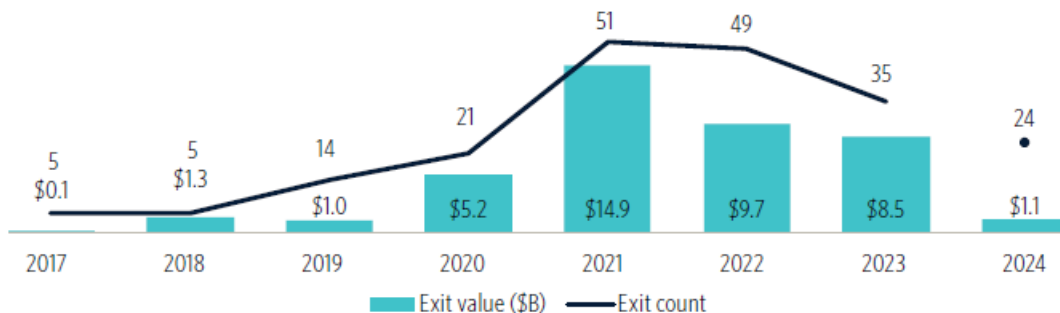
Source: Intro-act, Pitchbook, *Data as of September 30, 2024.

Chart 40: Clean Energy VC Deal Activity



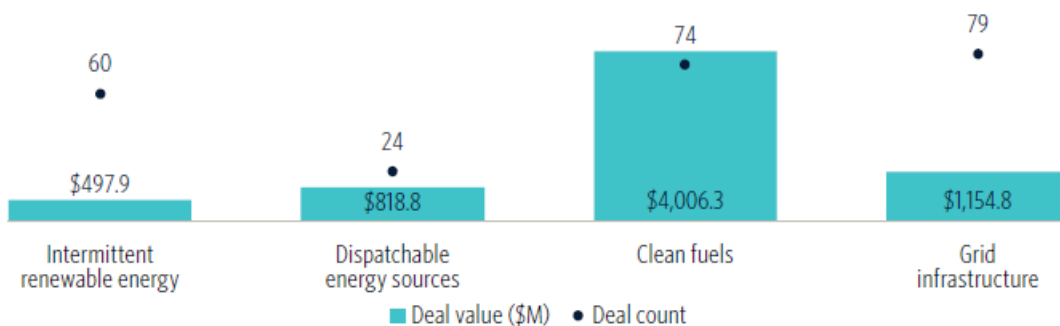
Source: Intro-act, Pitchbook, * Data as of September 30, 2024.

Chart 41: Clean Energy VC Exit Activity



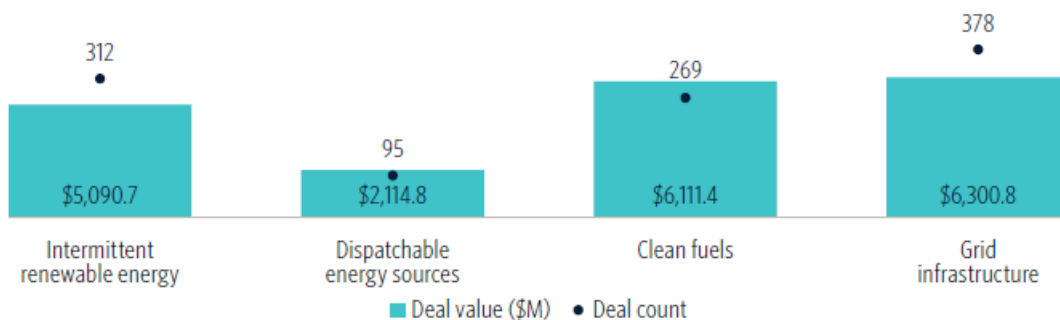
Source: Intro-act, Pitchbook, * Data as of September 30, 2024.

Chart 42: Q324 Clean Energy VC Deal Activity by Segment



Source: Intro-act, Pitchbook, * Data as of September 30, 2024

Chart 43: Trailing 12-Month Clean Energy VC Deal Activity by Segment*



Source: Intro-act, Pitchbook, * Data as of September 30, 2024

Chart 44: Top-10 Clean Energy VC Deals in 2Q24

Company	Close date	Category	Deal value (\$M)
newcleo	30-Sep-25	Nuclear fusion	151.0
Sublime Systems	11-Sep-25	Hydrogen	75.0
Peak Energy	17-Jul-25	Battery storage	55.0
Sage Geosystems	6-Sep-25	Geothermal	44.8
Aether Fuels	18-Sep-25	Waste to energy/fuel	36.9
Solarcycle	1-Aug-25	Solar photovoltaic	31.6
RedoxBlox	3-Jul-25	Nonbattery storage	29.0
Aalo Atomics	19-Jul-25	Nuclear fusion	27.0
Sunswap	26-Aug-25	Solar photovoltaic	22.3
BSLBATT	9-Jul-25	Battery storage	21.0

Source: Intro-act, Pitchbook, * Data as of September 30, 2024.

Chart 45: Top VC-backed Clean Energy Companies by Total VC Raised to Date*

Company	VC (\$M) raised to date	Category
Northvolt	6867.5	Battery storage
CGN Wind Energy	4771	Wind
Start Campus	4157.1	Analytics & grid management
SVOLT	3231.3	Battery storage
Mobii Green Energy	2025	Hydrogen
Commonwealth Fusion Systems	1999	Nuclear fusion
TAE	1314.7	Nuclear fusion
Sila	1308.5	Battery storage
China Hydrogen Energy Technology	1000	Hydrogen
Form Energy	928	Battery storage

Source: Intro-act, Pitchbook * Data as of September 30, 2024.

CLEANTECH SPAC ACTION

Chart 46: Cleantech SPACs (Searching)

S. No	SPAC Name	Ticker	Trust Value (\$ Mn)	IPO Date	Estimated Completion Date
1	Global Lights Acquisition Corp	GLAC	69	11/14/2023	5/14/2025
2	Legato Merger Corp. III	LEGT	201	2/6/2024	5/6/2026
3	Nabors Energy Transition Corp. II	NETD	300	7/13/23	7/13/25
4	Spring Valley Acquisition Corp. II	SVII	230	10/12/2022	10/17/2025
5	EQV Ventures Acquisition Corp	EQV	350	8/6/2024	8/6/2026
6	CO2 Energy Transition Corp.	NOEM	69	11/20/2024	11/20/2026

Source: Intro-act, Boardroom Alpha

Chart 47: Cleantech SPACs (Business Combination Agreement Announced)

S.No	SPAC Name	Ticker	Target Company	EV (\$ Mn)	Close Date
2	Aquaron Acquisition Corp.	AQU	Bestpath	1200	1Q25
6	Focus Impact BH3 Acquisition Company	BHAC	XCF Global Capital	1,840	1Q25
8	Portage Fintech Acquisition Corp.	PFTA	Rbio Energy	350	2Q25
13	Inflection Point Acquisition Corp. II	IPXX	USA Rare Earth, LLC	870	3Q25

Source: Intro-act, Boardroom Alpha

Chart 48: Cleantech SPACs

S. No	SPAC Name	Ticker (Old)	DE-SPAC	Ticker	Closing Date
1	Decarbonization Plus Acquisition Corp IV	DCRD	Hammerhead Resources	HHRS	23-Feb-23
2	Roth CH Acquisition IV Co.	ROCG	Tigo Energy Inc	TYGO	23-May-23
3	Rice Acquisition Corp. II	RONI	NET Power	NPWR	8-Jun-23
4	ROC Energy Acquisition Corp.	ROC	Drilling Tools International	DTI	20-Jun-23
5	Freedom Acquisition I Corp	FACT	Complete Solar, Inc.	CSLR	17Jul-23
6	TLG Acquisition One Corp.	TLGA	Electriq Power	ELIQ	31-Jul-23
7	Genesis Unicorn Capital Corp.	GENQ	Environmental Solutions Group Holdings Limited	ESGL	2-Aug-23
8	Perception Capital Corp. II	PCCT	Spectaire Inc.	SPEC	19-Oct-23

9	HNR Acquisition Corp	HNRA	Pogo Resources, LLC	HNRA	15-Nov-23
10	Nabors Energy Transition Corp.	NETC0	Vast	VSTE	18-Dec-23
11	Dune Acquisition Corporation	DUNE	Global Hydrogen Energy	HGAS	21-Dec-23
12	Clean Earth Acquisitions Corp.	CLIN	Alternus Energy Group Plc	ALCE	22-Dec-23
13	Nubia Brand International Corp.	NUBI	Honeycomb Battery Co.	STI	2-Feb-24
14	ESGEN Acquisition Corp	ESAC	Sunergy	ZEO	13-Mar-24
15	Power Digital Infrastructure Acquisition II Corp.	XPDB	Montana Technologies	AIRJ	14-Mar-24
16	Keyarch Acquisition Corp	KYCH	ZOOZ Power Ltd.	ZOOZ	4-Apr-24
17	AltC Acquisition Corp.	ALCC	Oklo	850	7-May-24
18	Global Partner Acquisition Corp II	GPAC	Stardust Power, Inc.	SDST	9-July-24
19	Blue World Acquisition Corp.	BWAQ	Vietnam Sunergy Cell Company	TOYO	1-July-24
20	ESGEN Acquisition Corp	ESAC	Sunergy	ZEO	14-Mar-24
22	Project Energy Reimagined Acquisition Corp.	PEGR	Heramba Electric	PITA	26-July-24
23	TMT Acquisition Corp.	TMTC	eLong Power Holding Limited	ELPW	29-Oct-24
24	Roth CH Acquisition V Co.	ROCL	New Era Helium Corporation	NEHC	6-Dec-24

Source: Intro-act, Boardroom Alpha

CLEANTECH EVENTS CALENDAR

S. No.	Event	Place	Dates
1	International Conference on Renewable Energy and Global Energy Crisis (ICREGC)	Dubai, UAE	January 22, 2025
2	Cleantech Forum North America 2025	San Diego USA	January 27, 2025
3	Green Cement & Concrete Innovation Europe 2025	United Kingdom	February 20, 2025
4	Connecting Hydrogen MENA 2025	Dubai	February 24, 2025
5	2nd Global Steel Sustainability	Frankfurt, Germany	February 26, 2025

Source: Intro-act, Multiple web sources

CLEANTECH COMP TABLE

Peer Set	12/17/2024	Share Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	Price Performance			Sales			EBITDA			Book Value		
					% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book	
Biofuels	Ticker		128,634	218,052			2%	464,012	447,467	0.5 x	41,242	28,161	7.7 x		1.2 x	
1	VALERO ENERGY CORP	VLO-US	124.9	39,538	47,907	48%	-6%	2%	144,766	129,344	0.4 x	14,580	6,333	7.6 x	79.77	1.6 x
2	ARCHER DANIELS MIDLAND CO	ADM-US	51.5	24,640	31,857	35%	-6%	2%	93,935	86,293	0.4 x	6,185	4,407	7.2 x	45.97	1.1 x
3	WILMAR INTERL LTD	F34-SG	2.3	14,418	37,574	19%	-3%	2%	67,155	68,583	0.5 x	3,565	3,591	10.5 x	3.15	0.7 x
4	BUNGE GLOBAL SA	BG-US	81.3	11,347	16,381	41%	-7%	5%	59,540	52,962	0.3 x	3,531	2,489	6.6 x	72.59	1.1 x
5	DARLING INGREDIENTS INC	DAR-US	35.3	5,618	10,010	37%	-8%	5%	6,788	5,753	1.7 x	1,612	1,104	9.1 x	28.62	1.2 x
6	ENERGY ABSOLUTE PC	EA-TH	0.1	858	2,578	594%	-48%	-1%	837	504	5.1 x	353	296	8.7 x	0.21	0.5 x
7	COSAN SA	CSAN3-BR	1.4	2,680	17,205	169%	-11%	9%	7,930	27,564	0.6 x	4,493	3,208	5.4 x	1.73	0.8 x
8	SD GUTHRIE BERHAD	5285-MY	1.1	7,602	9,433	7%	-20%	-1%	3,825	4,205	2.2 x	707	832	11.3 x	0.55	2.0 x
9	VALMET OYJ	VALMT-FI	23.9	4,413	5,594	41%	-7%	-1%	5,951	5,540	1.0 x	771	733	7.6 x	13.89	1.7 x
10	VERBIO SE	VBK-DE	11.2	716	851	126%	-24%	-9%	1,847	1,700	0.5 x	136	107	7.9 x	14.36	0.8 x
11	SAO MARTINHO SA	SMTO3-BR	4.1	1,360	2,764	56%	-9%	9%	1,306	1,239	2.2 x	586	611	4.5 x	3.20	1.3 x
12	GREEN PLAINS INC	GPRE-US	10.9	703	1,094	132%	-19%	15%	3,296	2,511	0.4 x	44	55	20.0 x	14.32	0.8 x
13	FIRST RESOURCES	EB5-SG	1.1	1,690	1,900	12%	-8%	0%	981	994	1.9 x	274	380	5.0 x	0.81	1.3 x
14	COFCO BIOTECH	000930-CN	0.8	1,494	1,900	16%	-22%	6%	2,812	-	-	6	-	-	0.77	1.0 x
15	ANDERSONS INC	ANDE-US	42.9	1,463	1,788	43%	-9%	6%	14,750	10,857	0.2 x	405	337	5.3 x	39.00	1.1 x
16	MONTAUK RENEWABLES	MNTK-US	4.0	566	570	103%	-14%	-1%	175	205	2.8 x	48	64	9.0 x	1.93	2.0 x
17	ADECOAGRO S A	AGRO-US	10.1	1,053	2,059	19%	-14%	7%	1,442	1,500	1.4 x	470	470	4.4 x	13.85	0.7 x
18	RAIZEN SA	RAIZ4-BR	0.4	513	12,947	117%	-14%	10%	42,446	41,098	0.3 x	3,028	2,543	5.1 x	0.34	1.1 x
19	GREENVOLT ENERGI	GVOLT-PT	8.6	1,201	2,841	9%	-3%	1%	370	468	6.1 x	115	184	15.4 x	3.52	2.5 x
20	CROPENERGIES AG	CE2-DE	13.6	1,191	1,129	11%	-14%	-3%	-	-	-	-	-	-	9.17	1.5 x
21	LONGYAN ZHUOYUE	688196-CN	5.0	603	621	37%	-49%	9%	388	534	1.2 x	18	34	18.5 x	3.12	1.6 x
22	SHANDONG MINHE ANI	002234-CN	1.3	467	585	23%	-24%	10%	288	308	1.9 x	(31)	(12)	-	0.81	1.6 x
23	REX AMERICAN RES	REX-US	41.2	723	467	48%	-5%	-1%	833	636	0.7 x	-	92	5.1 x	32.13	1.3 x
24	ENVIVA INC	EVA-US	0.0	0	1,591	1229900%	-99%	-55%	-	-	-	-	-	-	(1.51)	0.0 x
25	AUDAX RENOVABLES	ADX-ES	1.6	746	1,157	32%	-19%	3%	2,487	2,037	0.6 x	106	122	9.5 x	0.49	3.4 x
26	JALLES MACHADO SA	JALL3-BR	0.8	236	836	106%	-7%	5%	352	408	2.1 x	234	268	3.1 x	1.12	0.7 x
27	HENAN BCCY ENVIRON	300614-CN	1.6	259	352	54%	-33%	24%	-	-	-	-	-	-	1.28	1.3 x
28	DALMIA BHARAT	500097-IN	4.9	398	397	41%	-24%	16%	347	417	1.0 x	49	58	6.8 x	4.38	1.1 x
29	CAMLIN FINE	532834-IN	1.4	243	321	17%	-34%	-14%	194	217	1.5 x	14	20	16.3 x	0.47	3.0 x
30	GEVO INC	GEVO-US	1.6	376	222	116%	-69%	-25%	17	15	14.7 x	(44)	(58)	-	2.11	0.7 x
31	TUNAS BARU LAMPUNG	TBLA-ID	0.0	230	1,053	18%	-6%	2%	-	968	1.1 x	-	135	7.8 x	0.09	0.4 x
32	ALTO INGREDIENTS	ALTO-US	1.5	113	178	63%	-20%	-6%	1,223	952	0.2 x	21	0	1,153.7 x	3.44	0.4 x
33	DHAMPUR SUGAR MILL	500119-IN	2.1	135	179	56%	-32%	10%	261	236	0.8 x	32	24	7.3 x	1.94	1.1 x
34	AEMETIS INC	AMTX-US	3.0	148	593	136%	-29%	11%	187	299	2.0 x	(22)	(11)	-	(5.41)	-0.6 x
35	DHAMPUR BIO	543593-IN	1.4	96	160	35%	-22%	9%	-	-	-	-	-	-	1.71	0.8 x
36	CODEXIS INC	CDXS-US	5.6	458	409	8%	-55%	18%	70	65	6.3 x	(48)	(39)	-	0.90	6.2 x
37	LGI LIMITED	LGI-AU	2.0	175	190	6%	-36%	7%	23	23	8.4 x	10	11	17.7 x	0.37	5.4 x
38	AGRIA GROUP	AGH-BG	10.7	73	285	24%	-6%	2%	-	-	-	-	-	-	24.54	0.4 x

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39	COMSTOCK INC	LODE-US	0.4	80	72	175%	-66%	-57%	1	2	34.1 x	-	-	-	0.33	1.1 x
40	FERMENTALG	FALG-FR				-	-	-	-	-	-	-	-	-		-
41	GREENLANE	GRN-CA	0.1	11	(0)	64%	-38%	12%	43	-	-	(8)	-	-	0.10	0.7 x

Peer Set	12/17/2024	Share Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	Price Performance			Sales			EBITDA		Book Value			
					% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book	
Clean Fossil Fuels & CCS	Ticker		140,116	178,404			3%	144,414	139,079	1.3 x	33,673	30,007	5.9 x		2.6 x	
42	AIR PRODS & CHEMS	APD-US	304.7	67,762	81,418	11%	-30%	5%	12,101	12,307	6.6 x	5,037	5,281	15.4 x	76.61	4.0 x
43	ENI SPA	ENI-IT	13.4	44,084	67,106	27%	-4%	2%	100,947	94,064	0.7 x	22,530	19,364	3.5 x	16.61	0.8 x
44	SHANXI LU'AN ENVIR	601699-CN	2.1	6,242	3,855	90%	-13%	6%	5,958	4,869	0.8 x	1,999	1,079	3.6 x	2.15	1.0 x
45	HENAN SHENHUO COAL	000933-CN	2.4	5,336	7,405	48%	-23%	3%	5,212	5,358	1.4 x	1,488	1,109	6.7 x	1.32	1.8 x
46	CNOOC ENERGY	600968-CN	0.6	5,680	5,077	27%	-35%	-4%	6,811	7,423	0.7 x	820	898	5.7 x	0.35	1.6 x
47	CALIFORNIA RES	CRC-US	53.3	4,867	5,746	13%	-19%	3%	2,801	2,921	2.0 x	866	992	5.8 x	39.13	1.4 x
48	KEDA INDUSTRIAL GR	600499-CN	1.1	2,096	2,890	59%	-17%	4%	1,343	1,550	1.9 x	350	323	9.0 x	0.83	1.3 x
49	AKER SOLUTIONS ASA	AKSO-NO	2.7	1,331	273	90%	-4%	2%	3,397	4,534	0.1 x	122	399	0.7 x	3.69	0.7 x
50	GUIZHOU PANJIANG R	600395-CN	0.7	1,509	4,064	35%	-7%	1%	1,298	1,181	3.4 x	232	293	13.9 x	0.71	1.0 x
51	TECNICAS REUNIDAS	TRE-ES	10.9	877	532	34%	-30%	-4%	4,475	4,609	0.1 x	194	217	2.5 x	7.33	1.5 x
52	AKER CARBON CA	ACC-NO	0.5	312	(120)	112%	-4%	-7%	149	-	-	(19)	-	-	0.80	0.6 x
53	TIDEWATER	LCFS-CA	0.6	21	158	1048%	-23%	4%	72	264	0.6 x	34	53	3.0 x	3.00	0.2 x

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					% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book	
Diversified Renewables	Ticker		392,472	743,780			2%	437,983	416,077	1.8 x	70,614	69,737	10.7 x		1.2 x	
54	ENBRIDGE INC	ENB-CA	41.4	90,140	166,459	9%	-21%	-2%	32,551	32,024	5.2 x	12,223	12,707	13.1 x	18.83	2.2 x
55	HITACHI	6501-JP	26.0	120,455	125,653	9%	-43%	5%	62,089	60,623	2.1 x	7,735	8,776	14.3 x	7.61	3.4 x
56	ENGIE	ENGI-FR	15.6	38,032	82,662	15%	-11%	-1%	89,257	80,699	1.0 x	16,216	15,641	5.3 x	12.18	1.3 x
57	NIDEC CORPORATION	6594-JP	18.3	21,868	24,434	40%	-7%	5%	15,148	16,571	1.5 x	1,904	2,433	10.0 x	8.85	2.1 x
58	RWE AG	RWE-DE	29.7	22,125	34,650	39%	-4%	-1%	31,103	26,689	1.3 x	9,122	5,655	6.1 x	46.14	0.6 x
59	CHUBU ELEC POWER	9502-JP	10.2	7,748	27,913	39%	-4%	-3%	23,042	22,905	1.2 x	3,402	2,657	10.5 x	23.05	0.4 x
60	ZHEJIANG ZHENENG	600023-CN	0.8	10,787	17,054	34%	-17%	4%	13,244	13,232	1.3 x	2,302	2,584	6.6 x	0.74	1.1 x
61	BROOKFIELD RENEWABLE	BEP-US	23.5	6,703	59,628	26%	-15%	3%	5,038	3,359	17.8 x	2,130	2,358	25.3 x	13.00	1.8 x
62	TOKYO ELEC POWER	9501-JP	3.0	4,819	46,349	141%	-11%	0%	43,883	43,897	1.1 x	-	4,343	10.7 x	12.87	0.2 x
63	FUJI ELECTRIC CO.	6504-JP	56.7	8,466	8,562	23%	-25%	9%	7,014	7,200	1.2 x	993	1,116	7.7 x	27.67	2.0 x
64	MERCURY NZ LTD	MCY-NZ	3.4	4,792	5,981	30%	-7%	4%	2,106	1,992	3.0 x	539	474	12.6 x	1.95	1.8 x
65	BHARAT HEAVY ELECT	500103-IN	2.9	9,939	10,419	41%	-22%	7%	2,871	3,627	2.9 x	50	198	52.7 x	0.81	3.5 x
66	SOJITZ CORPORATION	2768-JP	19.8	4,453	10,888	44%	-4%	-1%	15,316	16,030	0.7 x	835	1,064	10.2 x	28.10	0.7 x
67	ULTRAPAR	UGPA3-BR	2.7	3,033	5,098	133%	-8%	9%	25,374	21,910	0.2 x	1,215	926	5.5 x	2.18	1.2 x
68	HUBEI ENERGY GR	000883-CN	0.7	4,534	11,325	25%	-21%	3%	2,576	2,773	4.1 x	797	1,011	11.2 x	0.73	1.0 x
69	IHI CORPORATION	7013-JP	54.0	8,358	11,797	15%	-66%	-7%	8,501	10,339	1.1 x	(12)	1,420	8.3 x	17.08	3.2 x
70	CIA ENER MG-CEMIG	CMIG4-BR	1.9	3,546	6,782	19%	-9%	4%	7,011	6,108	1.1 x	1,578	1,521	4.5 x	1.59	1.2 x
71	ELEC POWER DEV	9513-JP	16.6	3,033	14,519	8%	-10%	1%	8,070	8,004	1.8 x	1,438	1,343	10.8 x	45.72	0.4 x
72	ENCAVIS AG	ECV-DE	18.2	2,946	5,375	7%	-36%	1%	505	476	11.3 x	353	315	17.1 x	5.99	3.0 x
73	CENTRAIS ELET BRAS	ELET6-BR	6.5	1,806	22,514	55%	-7%	6%	7,405	6,533	3.4 x	3,499	3,550	6.3 x	8.21	0.8 x
74	TERNA ENERGY SA	TENERGY-GR	20.8	2,457	3,345	5%	-23%	1%	351	-	-	189	-	-	3.96	5.2 x
75	TAURON POLSKA	TPE-PL	0.9	1,661	5,886	10%	-28%	4%	11,740	8,561	0.7 x	1,452	1,375	4.3 x	2.43	0.4 x
76	ROMANDE ENERGIE	REHN-CH	49.6	1,414	1,522	32%	-7%	16%	998	941	1.6 x	220	125	12.2 x	91.95	0.5 x
77	RENEW ENERGY	RNW-US	7.0	1,793	10,399	6%	-27%	3%	1,158	1,144	9.1 x	831	890	11.7 x	3.60	2.0 x
78	GEK TERNA S.A	GEKTERNA-GR	19.3	1,996	3,265	5%	-24%	5%	3,749	3,171	1.0 x	628	505	6.5 x	11.65	1.7 x
79	FIRST GEN	FGEN-PH	0.3	998	2,523	31%	-2%	0%	2,542	-	-	820	-	-	0.91	0.3 x
80	KEPCO PLANT	051600-KR	31.3	1,410	1,179	12%	-24%	5%	1,149	1,083	1.1 x	186	187	6.3 x	19.54	1.6 x
81	BCPG PCL	BCPG-TH	0.2	476	1,184	50%	-11%	-2%	140	114	10.4 x	106	106	11.2 x	0.28	0.6 x
82	SHANGHAI ELECTRIC	2727-HK	0.4	1,076	11,992	53%	-52%	1%	15,883	15,215	0.8 x	735	675	17.8 x	0.49	0.8 x
83	ABO WIND AG	AB9-DE	41.4	381	687	60%	-17%	10%	326	335	2.1 x	64	59	11.7 x	22.35	1.9 x
84	PETROVIETNAM	NT2-VN	0.8	223	176	41%	-8%	-6%	259	218	0.8 x	47	28	6.3 x	0.56	1.4 x
85	AKER HORIZONS	AKH-NO	0.2	128	1,660	146%	-25%	-11%	-	-	-	-	-	-	0.48	0.4 x
86	ENER INNOV	EIDF-ES	4.1	242	298	235%	-24%	28%	206	138	2.2 x	(11)	17	17.2 x	0.47	8.6 x
87	RENEWABLE JAPAN	9522-JP	8.1	243	1,100	23%	-59%	2%	223	131	8.4 x	-	81	13.6 x	2.45	3.3 x
88	ALTIUS RENEWABLE	ARR-CA	8.4	259	197	5%	-35%	0%	8	-	-	4	-	-	6.25	1.3 x
89	CLEARWISE AG	ABO-DE	1.7	131	303	37%	-4%	1%	48	37	8.1 x	35	23	13.1 x	2.21	0.8 x

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	Ticker					% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book
	Batteries			349,732	404,622			5%	151,457	141,168	2.9 x	18,993	22,555	17.9 x		2.6 x
90	CATL	300750-CN	37.6	165,515	155,911	14%	-48%	3%	55,710	50,944	3.1 x	9,841	11,966	13.0 x	7.37	5.1 x
91	LG ENERGY SOLUTION	373220-KR	265.8	62,199	77,267	24%	-15%	12%	25,254	17,763	4.3 x	3,202	2,368	32.6 x	58.69	4.5 x
92	ORSTED A/S	ORSTED-DK	47.7	20,068	33,314	42%	-17%	6%	11,876	11,930	2.8 x	2,700	4,177	8.0 x	21.80	2.2 x
93	LUCID GROUP INC	LCID-US	2.8	8,312	6,444	61%	-30%	-9%	595	781	8.2 x	(2,609)	(2,383)	-	1.15	2.4 x
94	SOLAREEDGE TECH.	SEDG-US	14.4	833	901	512%	-29%	6%	2,977	927	1.0 x	346	(1,114)	-	16.72	0.9 x
95	GENERAC	GNRC	165.1	9,824	11,138	19%	-34%	6%	4,023	4,303	2.6 x	638	777	14.3 x	40.50	4.1 x
96	LITTELFUSE INC	LFUS-US	243.7	6,048	6,348	13%	-9%	3%	2,363	2,186	2.9 x	529	417	15.2 x	103.69	2.4 x
97	WUXI LEAD INTELLIG	300450-CN	2.9	4,610	5,119	32%	-38%	8%	2,292	1,848	2.8 x	341	221	23.2 x	1.05	2.8 x
98	CHINA SHIPBUILDI.G	600482-CN	3.4	7,595	5,757	17%	-37%	1%	6,224	7,037	0.8 x	286	1,287	4.5 x	2.37	1.4 x
99	CNGR ADVANCED	300919-CN	5.2	4,852	8,744	32%	-28%	6%	4,730	5,420	1.6 x	538	525	16.6 x	2.96	1.7 x
100	ENERSYS	ENS-US	91.5	3,645	4,472	23%	-6%	-1%	3,582	3,688	1.2 x	516	562	8.0 x	46.17	2.0 x
101	SHENZHEN KEDALI	002850-CN	14.0	3,794	4,019	21%	-44%	4%	1,452	1,682	2.4 x	305	328	12.2 x	5.66	2.5 x
102	GOTION HIGH-TECH	002074-CN	3.0	5,131	10,484	21%	-25%	34%	4,363	5,062	2.1 x	401	544	19.3 x	1.95	1.5 x
103	VOLTRONIC POWER	6409-TW	56.7	4,976	4,779	32%	-26%	0%	600	708	6.7 x	146	166	28.9 x	3.07	18.5 x
104	WUXI AUTOWELL	688516-CN	6.0	1,882	2,064	94%	-22%	1%	873	1,326	1.6 x	222	305	6.8 x	1.95	3.1 x
105	FARASIS ENERGY	688567-CN	1.5	1,877	1,999	41%	-24%	-3%	2,270	1,793	1.1 x	(91)	65	30.6 x	1.13	1.4 x
106	FLUENCE ENERGY INC	FLNC	17.0	2,209	1,885	53%	-25%	7%	2,699	3,932	0.5 x	78	178	10.6 x	3.65	4.7 x
107	ZHUHAI COSMX	688772-CN	2.3	2,628	3,231	25%	-34%	6%	1,582	1,623	2.0 x	293	215	15.0 x	0.85	2.7 x
108	BEIJING EASPRING	300073-CN	5.8	2,802	2,164	38%	-35%	4%	2,093	1,073	2.0 x	322	125	17.3 x	3.56	1.6 x
109	HUNAN CHANGYUAN	688779-CN	0.8	1,510	1,724	27%	-26%	7%	1,481	-	-	15	-	-	0.52	1.5 x
110	ZHEJIANG HANGKE	688006-CN	2.7	1,623	1,332	26%	-28%	10%	553	507	2.6 x	129	95	13.9 x	1.20	2.2 x
111	GUANGZHOU GREAT	300438-CN	4.1	2,076	2,595	35%	-44%	8%	957	1,044	2.5 x	87	143	18.1 x	1.48	2.8 x
112	SHENZHEN SENIOR	300568-CN	1.4	1,698	2,497	39%	-32%	6%	416	513	4.9 x	167	180	13.9 x	1.01	1.4 x
113	KEHUA DATA CO	002335-CN	3.2	1,481	1,910	43%	-27%	-19%	1,123	1,097	1.7 x	186	135	14.1 x	1.36	2.4 x
114	ZHEJIANG NARADA	300068-CN	2.5	2,037	3,362	45%	-59%	12%	2,024	-	-	109	-	-	0.86	2.8 x
115	ANKER INNOVATIONS	300866-CN	12.2	3,614	6,172	22%	-45%	-9%	2,416	3,259	1.9 x	286	318	19.4 x	2.13	5.7 x
116	SUNNOVA ENERGY	NOVA-US	4.2	525	9,464	210%	-29%	22%	721	848	11.2 x	275	648	14.6 x	14.24	0.3 x
117	W-SCOPE CHUNGJU	393890-KR	8.3	280	666	349%	-12%	10%	228	248	2.7 x	72	22	29.9 x	20.15	0.4 x
118	V-GUARD INDUSTRIES	532953-IN	5.1	2,231	2,241	34%	-33%	4%	575	645	3.5 x	51	63	35.6 x	0.52	9.9 x
119	SINENG ELECTRIC CO	300827-CN	6.5	2,325	2,509	16%	-60%	8%	681	896	2.8 x	65	92	27.2 x	0.78	8.3 x
120	GUIZHOU ZHENHUA E-	688707-CN	1.7	855	967	56%	-34%	12%	950	271	3.6 x	57	(28)	-	1.24	1.4 x
121	PEOPLE AND TECH.	137400-KR	28.3	672	758	129%	-12%	12%	404	692	1.1 x	62	110	6.9 x	15.59	1.8 x
122	NIKOLA CORP	NKLA-US	1.2	102	218	2751%	-12%	2%	36	111	2.0 x	(540)	(446)	-	6.86	0.2 x
123	VARTA AG	VAR1-DE	1.8	75	702	1022%	-52%	10%	887	856	0.8 x	23	63	11.2 x	4.26	0.4 x
124	FREYR BATTERY	FREY-US	1.8	247	83	91%	-48%	-32%	0	0	-	(75)	(95)	-	3.83	0.5 x

125	SHENZHEN CLICK	002782-CN	1.7	821	783	26%	-33%	-3%	-	-	-	-	-	-	0.53	3.1 x
126	ENCHEM CO LTD	348370-KR	91.4	1,929	1,961	219%	-18%	3%	-	-	-	-	-	-	18.99	4.8 x
127	LI-CYCLE	LICY-US	1.5	35	429	924%	-39%	-36%	18	29	14.8 x	(149)	(88)	-	12.73	0.1 x
128	HNAC TECHNOLOGY	300490-CN	1.2	484	632	33%	-30%	14%	-	-	-	-	-	-	0.92	1.3 x
129	GOGORO INC	GGR-US	0.6	153	456	312%	-28%	10%	350	306	1.5 x	29	40	11.5 x	0.91	0.6 x
130	MICROVAST	MVST-US	1.2	374	533	147%	-87%	-44%	307	358	1.5 x	(20)	(21)	-	1.58	0.7 x
131	ZHEJIANG POWER	688184-CN	2.0	120	387	37%	-23%	11%	-	-	-	-	-	-	2.17	0.9 x
132	CALB GROUP CO LTD.	3931-HK	1.6	989	9,664	31%	-13%	-2%	3,736	4,418	2.2 x	379	752	12.9 x	2.72	0.6 x
133	FUJIAN NEBULA	300648-CN	3.4	509	623	32%	-47%	9%	-	-	-	-	-	-	0.76	4.5 x
134	ENERGY VAULT	NRGV-US	1.8	278	201	47%	-57%	-20%	342	55	3.6 x	(62)	(58)	-	1.18	1.5 x
135	W-SCOPE CO	6619-JP	1.7	96	966	228%	-11%	-2%	322	199	4.9 x	77	29	33.9 x	6.15	0.3 x
136	EOS ENERGY	EOSE-US	3.9	852	1,171	65%	-84%	-20%	16	15	80.0 x	(133)	(147)	-	(2.64)	-1.5 x
137	ALLIS ELECTRIC	1514-TW	3.0	814	835	83%	-23%	0%	301	280	3.0 x	33	31	26.8 x	0.63	4.8 x
138	VITZROCELL CO LTD	082920-KR	13.9	317	222	31%	-15%	-2%	131	142	1.6 x	36	45	4.9 x	7.98	1.7 x
139	VULCAN ENERGY	VUL-AU	3.7	689	626	50%	-65%	-4%	7	8	74.4 x	(38)	(38)	-	1.52	2.4 x
140	NHOA	NHOA-FR	1.3	360	327	8%	-57%	1%	295	-	-	(18)	-	-	0.90	1.4 x
141	LEOCH INTL	842-HK	0.2	270	793	20%	-27%	-2%	1,864	-	-	-	-	-	0.45	0.4 x
142	FORSEE POWER	FORSE-FR	0.4	27	70	696%	-5%	-13%	183	157	0.4 x	(7)	1	71.6 x	0.82	0.5 x
143	LARGO INC	LGO-CA	1.8	113	183	59%	-22%	2%	199	139	1.3 x	5	(6)	-	2.83	0.6 x
144	FDK CORPORATION	6955-JP	3.5	119	201	51%	-8%	2%	403	-	-	-	-	-	2.88	1.2 x
145	MPLUS CORP	259630-KR	5.6	69	82	91%	-13%	9%	-	71	1.2 x	-	9	8.8 x	4.44	1.3 x
146	NIPPON DENKAI LTD	5759-JP	0.3	3	89	3687%	-96%	2255%	107	-	-	-	-	-	1.60	0.2 x
147	FLUX PWR HLDGS	FLUX-US	1.7	28	43	251%	-7%	6%	-	-	-	-	-	-	0.33	5.1 x
148	PIONEER PWR	PPSI-US	4.3	47	48	63%	-22%	4%	41	44	1.1 x	1	(7)	-	1.34	3.2 x
149	IDEAL PWR INC	IPWR-US	6.9	56	38	102%	-19%	-8%	0	-	-	-	-	-	2.48	2.8 x
150	GELION UK LTD	GELN-GB	0.2	30	25	87%	-24%	4%	3	3	7.3 x	(7)	(6)	-	0.11	2.0 x
151	KYOTO GROUP	KYOTO-NO														

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Fuel Cells	Ticker		61,293	69,735			5%	37,320	37,095	1.9 x	1,543	4,287	16.3 x		3.2 x	
152	CUMMINS INC	CMI	361.2	49,554	56,413	7%	-37%	4%	34,065	33,751	1.7 x	3,017	5,246	10.8 x	75.24	4.8 x
153	PLUG POWER INC	PLUG-US	2.5	2,242	2,784	109%	-35%	15%	891	707	3.9 x	(1,073)	(738)	-	3.44	0.7 x
154	BLOOM ENERGY	BE-US	24.8	5,662	6,861	16%	-66%	12%	1,333	1,413	4.9 x	73	120	57.4 x	1.89	13.1 x
155	NEL ASA	NEL-NO	0.3	446	286	209%	-31%	12%	165	134	2.1 x	(48)	(20)	-	0.26	1.0 x
156	BALLARD PWR SYS	BLDP-CA	1.6	481	(129)	127%	-23%	-3%	102	72	-1.8 x	(153)	(160)	-	2.26	0.7 x
157	DOOSAN FUEL CELL	336260-KR	11.9	777	1,247	69%	-15%	9%	195	282	4.4 x	15	32	39.5 x	4.21	2.8 x
158	SHINRY TECH.	300745-CN	2.3	393	353	36%	-26%	9%	-	253	1.4 x	-	2	184.9 x	1.95	1.2 x
159	CERES POWER	CWR-GB	2.2	417	251	90%	-27%	0%	28	69	3.6 x	(63)	(26)	-	1.10	2.0 x
160	FUELCELL ENERGY	FCEL-US	10.5	215	141	333%	-48%	16%	112	177	0.8 x	(101)	(56)	-	32.26	0.3 x
161	NANOFILM TECH.	MZH-SG	0.6	369	371	34%	-21%	0%	132	148	2.5 x	27	36	10.3 x	0.42	1.3 x
162	SFC ENERGY AG	F3C-DE	17.3	301	248	57%	-4%	-3%	128	149	1.7 x	16	21	11.6 x	8.24	2.1 x
163	POWERCELL SWEDEN	PCCELL-SE	3.0	176	155	61%	-32%	-5%	30	30	5.2 x	(5)	(4)	-	0.40	7.7 x
164	HYZON MOTORS INC	HYZN	1.7	13	(20)	2579%	-49%	56%	0	11	-1.8 x	(131)	(141)	-	2.35	0.7 x
165	BUMHAN FUEL CELL	382900-KR	9.1	80	137	138%	-14%	7%	23	25	5.6 x	(2)	13	10.4 x	8.31	1.1 x
166	BEIJING SINOHYTEC	2402-HK	2.5	89	565	83%	-24%	-6%	111	124	4.6 x	(19)	(32)	-	1.72	1.5 x
167	TECO 2030 ASA	TECO-NO	0.0	11	20	797%	-76%	3%	7	-	-	(9)	-	-	0.02	2.3 x
168	S-FUELCELL	288620-KR	6.3	44	27	145%	-16%	4%	-	-	-	-	-	-	6.73	0.9 x
169	ADVENT TECH.	ADN-US	5.7	15	15	68%	-70%	14%	5	-	-	-	-	-	(6.86)	-0.8 x
170	CELL IMPACT AB	CI-SE	0.0	9	10	235%	-26%	1%	5	4	2.3 x	(9)	(4)	-	0.04	0.3 x

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Geothermal	Ticker		7,390	13,612			2%	4,260	4,297	3.2 x	1,699	1,772	7.7 x		1.4 x	
171	ORMAT TECH.	ORA-US	71.5	4,322	6,703	18%	-17%	6%	829	885	7.6 x	482	546	12.3 x	39.50	1.8 x
172	PERTAMINA GEOTHERM	PGEO-ID	0.1	2,325	2,412	69%	-4%	-3%	414	399	6.0 x	336	326	7.4 x	0.04	1.2 x
173	FIRST PHILIPPINE	FPH-PH	1.0	460	4,095	20%	0%	-3%	2,939	2,937	1.4 x	823	845	4.8 x	5.96	0.2 x
174	POLARIS RENEWABLE	PIF-CA	9.1	191	316	16%	-10%	-2%	79	76	4.2 x	58	55	5.7 x	11.85	0.8 x
175	ENVIRONMENT FRIEND	3777-JP	0.2	59	54	61%	-31%	-1%	113	-	-	-	-	-	0.07	2.8 x
176	BLUESTONE RES	BSR-CA	0.2	32	31	193%	-25%	-4%	-	-	-	-	-	-	0.14	1.5 x

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GreenTech & Waste Mgt.	Ticker		119,877	163,452			3%	57,636	56,732	2.9 x	8,992	10,583	15.4 x		1.9 x	
177	WASTE CONNECTIONS	WCN	176.3	45,486	53,860	11%	-18%	3%	8,022	8,906	6.0 x	2,523	2,909	18.5 x	32.02	5.5 x
178	XYLEM INC	XYL	120.8	29,340	30,468	21%	-9%	4%	7,364	8,486	3.6 x	1,392	1,736	17.6 x	43.59	2.8 x
179	GFL ENVIRONMENTAL	GFL	44.6	17,003	25,036	10%	-31%	0%	5,562	5,539	4.5 x	1,483	1,575	15.9 x	12.75	3.5 x
180	CASELLA WASTE	CWST	106.5	6,638	7,387	8%	-22%	1%	1,265	1,549	4.8 x	295	365	20.2 x	24.19	4.4 x
181	STERICYCLE INC	SRCL				-	-	-	2,659	-	-	417	-	-	27.53	-
182	ACEA SPA	ACE-IT	19.6	4,170	10,519	2%	-26%	1%	5,071	4,684	2.2 x	1,517	1,520	6.9 x	12.00	1.6 x
183	KEPPEL INFRA.	A7RU-SG	0.3	2,028	4,987	15%	-3%	1%	1,554	1,552	3.2 x	304	308	16.2 x	0.11	3.1 x
184	SIMS LTD	SMSMY	7.9	1,526	1,971	23%	-19%	7%	5,776	4,596	0.4 x	211	266	7.4 x	8.87	0.9 x
185	CHINA TIANYING INC	000035-CN	0.7	1,744	3,108	16%	-39%	11%	735	797	3.9 x	220	235	13.2 x	0.63	1.1 x
186	ENERGY RECOVERY	ERII	16.1	932	825	26%	-24%	9%	128	145	5.7 x	29	33	24.9 x	4.04	4.0 x
187	SHANGHAI ENV.	601200-CN	1.1	1,541	3,084	15%	-21%	2%	883	-	-	242	-	-	1.13	1.0 x
188	PURECYCLE TECH.	PCT	11.7	2,027	2,309	33%	-76%	14%	0	5	453.7 x	(92)	(96)	-	1.39	8.4 x
189	MONTROSE ENV	MEG-US	17.5	601	987	185%	-13%	-6%	624	695	1.4 x	79	95	10.3 x	13.10	1.3 x
190	GS ENGINEERING	006360-KR	12.8	1,096	3,791	28%	-21%	10%	10,068	8,785	0.4 x	(144)	344	11.0 x	35.58	0.4 x
191	ENVIRI CORP	NVRI	7.4	594	2,084	73%	-11%	-4%	2,069	2,363	0.9 x	293	321	6.5 x	6.04	1.2 x
192	NGL ENERGY	NGL-US	4.8	635	4,730	29%	-20%	-4%	6,957	6,152	0.8 x	610	653	7.2 x	(1.00)	-4.8 x
193	CECO ENVIRONMENTAL	CECE	31.2	1,091	1,216	13%	-41%	3%	545	562	2.2 x	58	64	19.1 x	6.90	4.5 x
194	WELLE ENV.	300190-CN	0.5	421	779	16%	-37%	17%	305	-	-	35	-	-	0.64	0.8 x
195	TSUKISHIMA HOLDING	6332-JP	9.1	415	445	13%	-14%	1%	797	845	0.5 x	-	-	-	12.99	0.7 x
196	VERTEX ENERGY INC	VTNR	0.0	4	452	4422%	-100%	25%	3,177	-	-	17	-	-	1.34	0.0 x
197	VA TECH WABAG	533269-IN	22.2	1,380	1,355	3%	-68%	16%	343	383	3.5 x	45	53	25.8 x	3.69	6.0 x
198	GREENTECH ENV.	688466-CN	2.0	247	273	24%	-35%	9%	79	-	-	18	-	-	1.28	1.6 x
199	EKOPAK NV	EKOP-BE	15.0	223	281	38%	-6%	3%	39	66	4.3 x	4	4	72.9 x	3.62	4.1 x
200	CSD WATER SERVICE	603903-CN	1.0	196	474	46%	-24%	10%	-	-	-	-	-	-	0.87	1.1 x
201	DANIMER SCIENTIFIC	DNMR	3.8	11	402	1857%	-66%	70%	47	46	8.7 x	(39)	(35)	-	70.08	0.1 x
202	DYNAGREEN ENV.	1330-HK	0.4	177	2,211	10%	-36%	-5%	547	467	4.7 x	205	231	9.6 x	0.83	0.5 x
203	GREEN IMPACT	GIP-CA	2.3	45	79	49%	-24%	-1%	118	99	0.8 x	(0)	(2)	-	2.88	0.8 x
204	ASCENT INDUSTRIES	ACNT-US	11.5	116	141	8%	-29%	2%	193	-	-	-	-	-	9.38	1.2 x
205	TACMINA CORP	6322-JP	11.2	87	56	36%	-4%	11%	71	-	-	-	-	-	9.15	1.2 x
206	NAGAOKA INTL	6239-JP	6.7	48	36	87%	-3%	-11%	64	-	-	-	-	-	6.10	1.1 x
207	EVERGEN INFRA.	EVGN-CA	1.0	14	36	98%	-11%	0%	6	10	3.5 x	0	3	13.7 x	2.66	0.4 x
208	PUEQU CO LTD	9264-JP	9.0	42	68	79%	-24%	1%	56	-	-	-	-	-	5.47	1.6 x

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Hydro	Ticker		236,633	439,603			4%	179,954	177,499	2.5 x	41,323	43,512	10.1 x		1.5 x	
209	VINCI	DG-FR	104.5	61,636	91,816	26%	-4%	6%	74,052	73,536	1.2 x	12,839	12,980	7.1 x	51.78	2.0 x
210	CEZ	CEZ-CZ	39.8	21,432	30,610	6%	-15%	1%	14,670	14,153	2.2 x	5,377	5,214	5.9 x	18.16	2.2 x
211	ENDESA SA	ELE-ES	21.6	22,876	35,286	5%	-20%	0%	27,584	25,822	1.4 x	4,092	5,369	6.6 x	7.91	2.7 x
212	HUANENG LANCANG	600025-CN	1.3	24,019	42,699	33%	-15%	2%	3,238	3,440	12.4 x	2,300	2,527	16.9 x	0.44	3.0 x
213	S.P.E.E.H. HIDRO	H2O-RO	26.1	11,732	10,966	15%	-6%	2%	2,646	2,187	5.0 x	1,754	1,395	7.9 x	10.30	2.5 x
214	TATA POWER CO	500400-IN	5.0	15,829	22,379	19%	-21%	8%	7,364	8,012	2.8 x	1,296	1,489	15.0 x	1.23	4.0 x
215	MERIDIAN ENERGY	MEL-NZ	3.3	8,617	9,294	27%	-6%	0%	3,035	2,639	3.5 x	566	495	18.8 x	1.78	1.9 x
216	ORKLA ASA	ORK-NO	8.8	8,812	10,927	10%	-26%	2%	6,407	6,152	1.8 x	893	913	12.0 x	4.08	2.2 x
217	BROOKFIELD RENEWABLE	BEP.UT-CA	23.5	6,711	59,726	25%	-15%	3%	5,038	3,359	17.8 x	2,130	2,358	25.3 x	12.23	1.9 x
218	NHPC LTD	533098-IN	1.0	10,048	14,444	42%	-18%	6%	1,141	1,255	11.5 x	585	708	20.4 x	0.45	2.2 x
219	BROOKFIELD RENEW.	BEPC-US	29.3	5,258	41,296	20%	-27%	31%	4,551	6,051	6.8 x	3,053	3,091	13.4 x	17.61	1.7 x
220	IDACORP INC	IDA-US	112.1	5,973	8,676	7%	-23%	3%	1,766	1,840	4.7 x	529	571	15.2 x	61.38	1.8 x
221	PORTLAND GEN	POR-US	44.5	4,692	9,396	12%	-12%	2%	2,923	3,183	3.0 x	880	1,040	9.0 x	34.42	1.3 x
222	CHINA SOUTHERN	600995-CN	1.4	4,559	7,242	19%	-24%	3%	779	872	8.3 x	498	552	13.1 x	0.93	1.5 x
223	SJVN LTD	533206-IN	1.4	5,464	7,836	48%	-25%	14%	314	370	21.2 x	229	294	26.7 x	0.43	3.2 x
224	COLBUN S.A.	COLBUN-CL	0.1	2,185	3,459	16%	-5%	1%	2,013	1,599	2.2 x	745	629	5.5 x	0.16	0.8 x
225	BORALEX INC	BLX-CA	20.7	2,122	4,974	31%	-13%	3%	733	598	8.3 x	499	479	10.4 x	10.85	1.9 x
226	WEBUILD SPA	WBD-IT	3.0	3,015	2,708	4%	-33%	3%	10,882	11,846	0.2 x	892	965	2.8 x	1.61	1.8 x
227	INNERGEX	INE-CA	5.8	1,188	6,142	37%	-11%	4%	772	731	8.4 x	545	505	12.2 x	3.09	1.9 x
228	AKSA ENERJI	AKSEN.E-TR	1.0	1,262	2,060	49%	-9%	-7%	1,092	776	2.7 x	247	210	9.8 x	0.89	1.2 x
229	ENEL GENERACION	ENGEPEC1-PE				-	-	-	-	-	-	-	-	-	-	-
230	TANGSHAN JIDONG	000401-CN	0.8	1,190	4,439	15%	-29%	6%	3,907	3,629	1.2 x	351	549	8.1 x	1.46	0.5 x
231	BESTWAY MARINE	300008-CN	0.7	1,222	1,282	27%	-41%	10%	498	-	-	35	-	-	0.16	4.4 x
232	SCATEC ASA	SCATC-NO	6.9	1,098	3,597	26%	-13%	-1%	445	574	6.3 x	343	441	8.2 x	5.66	1.2 x
233	MANAWA ENERGY	MNW-NZ	3.2	1,010	1,331	7%	-28%	3%	289	267	5.0 x	88	63	21.1 x	2.03	1.6 x
234	CK POWER PUBLIC	CKP-TH	0.1	764	1,824	29%	-12%	0%	285	306	6.0 x	111	108	16.9 x	0.10	0.9 x
235	MEIDENSHA CORP	6508-JP	26.5	1,205	1,363	10%	-36%	-5%	1,846	1,942	0.7 x	152	190	7.2 x	17.29	1.5 x
236	NAFCO CO LTD	2790-JP	13.4	400	284	50%	-8%	12%	1,226	-	-	-	-	-	37.76	0.4 x
237	TORISHIMA PUMP	6363-JP	15.2	440	418	47%	-9%	8%	522	564	0.7 x	55	61	6.9 x	12.68	1.2 x
238	NORTHWEST PIPE	NWPX-US	52.2	517	670	11%	-47%	8%	444	493	1.4 x	51	70	9.6 x	36.53	1.4 x
239	TOKYO ENERGY	1945-JP	6.8	236	235	44%	-4%	0%	569	-	-	-	-	-	12.82	0.5 x
240	LITHIUM IONIC	LTH-CA	0.5	84	85	68%	-45%	-1%	-	0	-	-	(21)	-	(0.00)	-767.5 x
241	GIA LAI ELECTRIC.	GEG-VN	0.4	157	598	47%	-6%	-7%	-	93	6.4 x	-	66	9.1 x	0.41	1.1 x
242	INDIAN HUME PIPE	504741-IN	4.9	260	327	48%	-44%	17%	166	167	2.0 x	21	20	16.2 x	1.92	2.6 x
243	DAIDO METAL	7245-JP	3.1	146	443	58%	-3%	-7%	823	852	0.5 x	100	103	4.3 x	9.79	0.3 x
244	DAT PHUONG	DPG-VN	2.0	128	210	22%	-23%	12%	-	155	1.4 x	-	26	7.9 x	1.16	1.7 x
245	REACH SUBSEA	REACH-NO	0.6	181	310	54%	-37%	-8%	184	239	1.3 x	88	104	3.0 x	0.33	1.9 x
246	INIZIATIVE	IB-IT	14.9	78	196	12%	-6%	-1%	27	31	6.3 x	19	22	9.0 x	14.49	1.0 x
247	IMAGINEER CO	4644-JP	6.6	70	43	14%	-7%	14%	38	-	-	-	-	-	7.74	0.9 x
248	SYNERTEC CORP	SOP-AU	0.0	19	13	171%	-17%	6%	13	14	0.9 x	(4)	(1)	-	0.02	2.1 x

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					% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book	
Nuclear	Ticker		235,839	418,480			1%	93,524	92,253	4.5 x	26,985	28,248	14.8 x		3.1 x	
249	CONSTELLATION	CEG-US	234.2	73,262	80,163	37%	-53%	5%	24,918	22,513	3.6 x	4,025	4,790	16.7 x	40.19	5.8 x
250	PUBLIC SVC	PEG-US	85.5	42,573	64,414	11%	-33%	1%	11,237	10,237	6.3 x	4,928	4,190	15.4 x	32.32	2.6 x
251	ENTERGY CORP NEW	ETR-US	74.8	32,093	60,012	10%	-36%	-1%	12,643	12,691	4.7 x	4,590	4,907	12.2 x	35.06	2.1 x
252	CHINA NATL NUCLE.P	601985-CN	1.4	26,053	88,843	25%	-24%	-11%	10,333	10,530	8.4 x	6,122	6,350	14.0 x	0.69	2.0 x
253	CAMECO CORP	CCJ-US	53.4	23,248	24,044	17%	-34%	4%	1,922	2,115	11.4 x	617	994	24.2 x	10.56	5.1 x
254	BWX TECHNOLOGIES	BWXT-US	118.1	10,797	11,989	15%	-34%	6%	2,496	2,682	4.5 x	472	502	23.9 x	11.58	10.2 x
255	CHINA NUCLEAR ENGI	601611-CN	1.2	3,469	16,204	20%	-27%	-7%	15,105	15,868	1.0 x	1,104	1,262	12.8 x	0.93	1.2 x
256	CGN POWER CO LTD	1816-HK	0.4	4,108	52,338	27%	-29%	0%	11,422	11,817	4.4 x	4,911	5,096	10.3 x	0.33	1.1 x
257	NEXGEN ENERGY LTD	NXE-US	7.3	4,108	4,029	23%	-32%	10%	2	3	1,410.9 x	(52)	(28)	-	1.59	4.6 x
258	URANIUM ENERGY	UEC-US	7.5	3,190	3,004	18%	-46%	13%	0	135	22.2 x	(41)	6	471.0 x	1.97	3.8 x
259	LANZHOU LS HEAVY	603169-CN	0.8	1,008	1,574	13%	-30%	3%	713	813	1.9 x	63	72	22.0 x	0.34	2.3 x
260	DENISON MINES	DNN-US	2.0	1,812	1,726	22%	-31%	13%	1	3	572.6 x	68	(53)	-	0.49	4.2 x
261	ENERGY FUELS INC	UUUU-US	5.6	1,091	770	48%	-24%	8%	38	64	12.1 x	(27)	(16)	-	2.26	2.5 x
262	SINOSEAL HOLDING	300470-CN	5.1	1,070	946	24%	-22%	2%	189	210	4.5 x	60	67	14.1 x	1.72	3.0 x
263	BEIJER ALMA AB	BEIA.B-SE	15.3	822	1,183	43%	-10%	3%	658	634	1.9 x	120	119	10.0 x	6.46	2.4 x
264	JIANGSU SHENTONG	002438-CN	1.7	859	986	21%	-35%	1%	294	322	3.1 x	68	74	13.2 x	0.92	1.8 x
265	CENTRUS ENERGY	LEU-US	71.9	1,127	1,125	65%	-53%	8%	320	397	2.8 x	62	41	27.2 x	4.66	15.4 x
266	EAGLE INDUSTRY	6486-JP	13.0	649	719	14%	-14%	8%	1,068	-	-	-	-	-	15.87	0.8 x
267	TAIHEI DENGYO	1968-JP	32.6	685	424	22%	-17%	5%	830	833	0.5 x	-	-	-	32.78	1.0 x
268	NUSCALE PWR	SMR-US	21.7	2,195	1,894	49%	-91%	2%	23	17	114.2 x	(147)	(139)	-	1.64	13.3 x
269	FISSION URANIUM	FCUUF	0.5	435	336	99%	-1%	0%	0	0	-	(9)	-	-	0.47	1.1 x
270	UR-ENERGY INC	URG	1.2	422	305	73%	-17%	1%	18	32	9.6 x	(16)	(48)	-	0.42	2.8 x
271	SUNG KWANG BEND	014620-KR	16.3	456	348	37%	-56%	11%	187	161	2.2 x	39	41	8.5 x	13.12	1.2 x
272	WOOJIN INC	105840-KR	4.6	93	107	80%	-14%	8%	96	95	1.1 x	14	14	7.5 x	6.04	0.8 x
273	STUDSVIK	SVIK-SE	10.7	88	99	27%	-4%	1%	79	79	1.3 x	6	6	17.3 x	4.28	2.5 x
274	CHINA NUCLEAR	611-HK	0.0	91	901	47%	-28%	9%	-	-	-	-	-	-	0.12	0.4 x
275	TVE CO LTD	6466-JP	14.7	36	(4)	27%	-8%	3%	72	-	-	-	-	-	29.97	0.5 x

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Smart Infrastructure	Ticker		418951.41	492697.81			6%	219,304	216,631	2.3x	36,324	34,812	14.2x		2.9x	
276	SIEMENS AG	SIE-DE	202.5	162,037	206,595	2%	-18%	5%	80,304	81,481	2.5 x	14,181	14,715	14.0 x	67.63	3.0 x
277	ABB LTD	ABB	58.0	107,895	110,663	2%	-30%	8%	32,235	32,686	3.4 x	5,825	6,261	17.7 x	7.64	7.6 x
278	STMICROELECTRONICS	STMPA-FR	25.7	23,231	20,259	90%	-9%	3%	17,286	13,212	1.5 x	6,154	3,376	6.0 x	18.08	1.4 x
279	SIEMENS INDIA LTD	500550-IN	91.7	32,662	31,555	6%	-48%	20%	2,637	2,975	10.6 x	367	426	74.1 x	5.04	18.2 x
280	EVE ENERGY	300014-CN	6.5	11,958	15,924	28%	-34%	1%	6,736	6,813	2.3 x	853	949	16.8 x	2.45	2.6 x
281	WESCO INTL INC	WCC-US	186.1	9,121	14,055	16%	-29%	3%	22,385	21,735	0.6 x	1,705	1,514	9.3 x	102.90	1.8 x
282	SENSATA TECH.	ST-US	29.5	4,409	7,115	46%	-10%	8%	4,054	3,910	1.8 x	907	877	8.1 x	19.71	1.5 x
283	ACUITY BRANDS INC	AYI	312.9	9,693	9,426	8%	-30%	7%	3,841	4,391	2.1 x	675	800	11.8 x	79.46	3.9 x
284	AGL ENERGY	AGL-AU	6.8	4,608	5,690	23%	-26%	-2%	8,993	8,265	0.7 x	1,467	1,287	4.4 x	5.00	1.4 x
285	ADVANCED ENERGY	AEIS	120.7	4,545	4,550	7%	-26%	4%	1,660	1,461	3.1 x	258	184	24.8 x	30.91	3.9 x
286	SHARP CORP	6753-JP	6.5	4,211	6,610	17%	-23%	4%	14,949	14,776	0.4 x	354	411	16.1 x	1.28	5.0 x
287	HYUNDAI AUTOEVER	307950-KR	90.7	2,487	2,046	52%	-6%	6%	2,294	2,447	0.8 x	234	245	8.3 x	41.25	2.2 x
288	ITRON INC	ITRI-US	111.6	5,031	5,331	12%	-40%	3%	2,174	2,432	2.2 x	226	314	17.0 x	29.95	3.7 x
289	VERRA MOBILITY	VRRM	24.0	3,949	4,806	30%	-15%	-1%	817	878	5.5 x	372	402	12.0 x	2.95	8.1 x
290	BEIJING E-HUALU	300212-CN	3.4	2,449	3,095	45%	-43%	6%	106	115	27.0 x	(157)	59	52.4 x	0.57	6.0 x
291	IREN SPA	IRE-IT	2.0	2,590	8,788	15%	-9%	1%	6,988	6,567	1.3 x	1,293	1,287	6.8 x	2.28	0.9 x
292	HANNON ARMSTRONG	HASI	27.9	3,306	7,434	31%	-22%	4%	320	363	20.5 x	247	238	31.2 x	19.11	1.5 x
293	FIBOCOM WIRELESS	300638-CN	2.5	1,905	1,881	25%	-43%	-10%	1,065	1,125	1.7 x	137	123	15.3 x	0.63	3.9 x
294	KEC INTERNATIONAL	532714-IN	13.7	3,651	4,104	13%	-48%	-2%	2,384	2,630	1.6 x	146	194	21.1 x	2.22	6.2 x
295	TKH GROUP NV	TWEKA-NL	31.7	1,340	1,930	53%	0%	-3%	2,006	1,774	1.1 x	304	264	7.3 x	22.81	1.4 x
296	HEXING ELECTRICAL	603556-CN	5.1	2,472	2,081	52%	-27%	0%	580	711	2.9 x	147	185	11.2 x	1.94	2.6 x
297	NV5 GLOBAL INC	NVEE-US	19.5	1,269	1,468	45%	-8%	4%	862	941	1.6 x	137	149	9.9 x	12.63	1.5 x
298	TAIWAN SECOCOM CO	9917-TW	4.2	1,887	1,952	11%	-13%	13%	-	-	-	-	-	-	0.85	4.9 x
299	TOPCON CORPORATION	7732-JP	18.2	1,974	2,369	3%	-54%	4%	1,388	1,421	1.7 x	143	158	15.0 x	6.18	2.9 x
300	ALFEN NV	ALFEN-NL	12.4	270	355	464%	-9%	0%	541	499	0.7 x	60	28	12.8 x	8.01	1.6 x
301	COSCO SHIPPING	002401-CN	2.2	811	616	25%	-21%	1%	245	-	-	-	-	-	0.62	3.5 x
302	KAZAKHSTAN ELEC.	KEGC-KZ	2.8	783	977	22%	-1%	-2%	560	-	-	245	-	-	4.92	0.6 x
303	PENTAMASTER CORP	7160-MY	0.9	668	610	22%	-21%	5%	145	149	4.1 x	29	32	19.2 x	0.24	3.9 x
304	SHANGHAI FUDAN	1385-HK	1.9	543	1,751	72%	-42%	-2%	491	493	3.6 x	143	123	14.3 x	0.99	1.9 x
305	JIAYUAN SCIENCE	301117-CN	4.5	420	364	37%	-37%	8%	31	34	10.7 x	(1)	3	105.7 x	1.92	2.4 x
306	HANGZHOU EZVIZ	688475-CN	4.2	1,721	2,832	36%	-20%	3%	669	749	3.8 x	98	84	33.7 x	0.93	4.5 x
307	SHENZHEN LONGTECH	300916-CN	4.0	582	462	29%	-59%	-2%	-	-	-	-	-	-	1.22	3.3 x
308	SHIJIAZHANG KELIN	603050-CN	2.8	772	948	48%	-49%	0%	-	-	-	-	-	-	0.82	3.5 x
309	FARO TECHNOLOGIES	FARO	27.6	522	523	18%	-51%	9%	359	340	1.5 x	12	36	14.7 x	13.51	2.0 x
310	AMERICAN SUPERCOND.	AMSC	25.9	1,023	963	47%	-64%	5%	146	211	4.6 x	(4)	6	154.4 x	4.70	5.5 x
311	JIANGSU TONGXIN.	301339-CN	2.8	331	774	35%	-44%	5%	103	123	6.3 x	38	40	19.4 x	0.90	3.1 x
312	BILLION ELECTRONIC	3027-TW	0.9	103	104	75%	-8%	0%	-	-	-	-	-	-	0.56	1.6 x
313	ENERGY S.P.A	ENY-IT	0.9	48	60	184%	-18%	-12%	69	39	1.5 x	11	(7)	-	1.10	0.8 x
314	DRAGONFLY ENERGY	DFLI-US	2.9	20	63	352%	-14%	5%	64	52	1.2 x	(17)	(20)	-	(0.04)	-68.3 x
315	INVINITY ENERGY SY	IES-GB	0.2	88	(20)	106%	-44%	0%	28	6	-3.3 x	(27)	(26)	-	0.44	0.5 x
316	POWERFLEET INC	PWFL	6.9	917	816	6%	-59%	4%	134	352	2.3 x	7	71	11.5 x	4.18	1.7 x
317	CEPTON INC	CPTN-US	3.2	51	112	19%	-25%	-2%	13	-	-	(41)	-	-	(3.24)	-1.0 x
318	INSEEGO CORP	INSG	11.0	165	243	88%	-85%	7%	196	199	1.2 x	17	21	11.3 x	(6.78)	-1.6 x
319	ARQ INC	ADES	7.0	295	276	18%	-63%	-7%	99	111	2.5 x	(3)	7	40.5 x	5.19	1.4 x

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320	ORION ENERGY SYS	OESX	0.8	27	36	86%	-17%	3%	91	99	0.4 x	(7)	0	-	0.48	1.7 x
321	MERUS POWER OYJ	MERUS-FI	3.3	26	22	90%	-5%	-13%	-	31	0.7 x	-	-	-	1.06	3.1 x
322	FERROAMP AB	FERRO-SE	0.4	22	15	264%	-15%	0%	34	24	0.6 x	(8)	(3)	-	0.30	1.2 x
323	TANTALUS SYSTEMS	GRID-CA	1.3	66	71	12%	-58%	3%	42	44	1.6 x	(0)	0	640.1 x	0.12	11.3 x

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Solar	Ticker		84,161	124,266			6%	78,029	65,640	1.9 x	9,367	6,556	19.0 x		1.4 x	
324	FIRST SOLAR INC	FSLR-US	188.3	20,156	19,572	63%	-28%	7%	3,319	4,188	4.7 x	1,167	1,924	10.2 x	70.93	2.7 x
325	ENPHASE ENERGY	ENPH-US	73.4	9,917	9,481	93%	-21%	7%	2,291	1,331	7.1 x	752	382	24.8 x	6.89	10.6 x
326	JA SOLAR TECH.	002459-CN	2.0	6,774	10,117	50%	-39%	10%	11,262	10,388	1.0 x	1,691	691	14.6 x	1.32	1.5 x
327	XINJIANG DAQO	688303-CN	3.5	7,465	6,682	55%	-33%	6%	2,259	1,062	6.3 x	1,051	40	167.9 x	2.69	1.3 x
328	TRINA SOLAR	688599-CN	3.1	6,702	12,143	36%	-32%	18%	15,649	11,928	1.0 x	1,352	667	18.2 x	1.85	1.7 x
329	SUZHOU MAXWELL	300751-CN	15.1	2,922	4,046	35%	-36%	5%	1,116	1,515	2.7 x	136	170	23.8 x	3.66	4.1 x
330	ARRAY TECH.	ARRY-US	5.5	831	1,568	197%	-6%	-9%	1,577	911	1.7 x	288	175	9.0 x	0.42	12.9 x
331	HENGDIAN GROUP	002056-CN	1.8	2,929	2,763	26%	-18%	4%	2,742	3,123	0.9 x	418	-	-	0.78	2.3 x
332	SUNRUN INC	RUN-US	10.1	2,257	15,583	121%	-10%	9%	2,260	2,049	7.6 x	(1,427)	58	266.9 x	23.55	0.4 x
333	SHOALS TECH.	SHLS-US	4.9	820	951	256%	-17%	-11%	489	393	2.4 x	173	98	9.7 x	3.27	1.5 x
334	RISEN ENERGY	300118-CN	1.9	2,136	4,446	33%	-35%	16%	-	-	-	-	-	-	1.62	1.2 x
335	DAQO NEW ENERGY	DQ-US	18.0	1,185	1,700	72%	-24%	-7%	2,309	1,020	1.7 x	942	(181)	-	71.62	0.3 x
336	CECEP SOLAR ENERGY	000591-CN	0.7	2,435	5,366	19%	-18%	4%	1,318	-	-	-	-	-	0.83	0.8 x
337	NEXTRACKER INC	NXT-US	35.7	5,131	4,731	74%	-13%	-2%	2,500	2,850	1.7 x	521	645	7.3 x	8.81	4.1 x
338	WUHAN DR LASER	300776-CN	9.1	2,480	2,559	37%	-44%	5%	223	289	8.9 x	72	89	28.8 x	1.60	5.7 x
339	CANADIAN SOLAR	CSIQ	11.7	772	5,272	118%	-9%	5%	7,614	6,230	0.8 x	719	577	9.1 x	43.43	0.3 x
340	JINKOSOLAR HLDG	JKS-US	26.6	1,412	6,556	41%	-37%	10%	16,716	13,134	0.5 x	1,626	991	6.6 x	55.60	0.5 x
341	JOLYWOOD	300393-CN	0.9	1,019	2,107	63%	-25%	9%	-	878	2.4 x	-	(65)	-	0.50	1.9 x
342	JIANGSU SHUANGXING	002585-CN	0.8	930	1,278	31%	-29%	11%	698	812	1.6 x	53	81	15.7 x	1.09	0.7 x
343	BRAVIDA HOLDING AB	BRAV-SE	7.3	1,491	1,883	28%	-18%	1%	2,814	2,658	0.7 x	222	196	9.6 x	3.61	2.0 x
344	SUNPOWER CORP	SPWR-US				-	-	-	-	-	-	-	-	-	-	-
345	DAEJOO ELECTRONIC	078600-KR	52.4	811	944	127%	-8%	7%	138	153	6.2 x	11	29	32.9 x	7.68	6.8 x
346	WONIK IPS CO LTD	240810-KR	15.6	764	663	113%	-6%	3%	514	514	1.3 x	20	42	15.8 x	11.99	1.3 x
347	UNITED RENEWABLE	3576-TW	0.3	505	757	52%	-13%	1%	-	176	4.3 x	-	-	-	0.22	1.4 x
348	MAXEON SOLAR	MAXN-US	6.2	94	362	9689%	-19%	-18%	1,125	646	0.6 x	4	(127)	-	(13.87)	-0.4 x
349	HUBEI HUITIAN NEW	300041-CN	1.3	730	959	16%	-28%	7%	539	-	-	63	-	-	0.74	1.8 x
350	ABALANCE CORP	3856-JP	4.5	82	298	372%	-14%	-3%	1,402	-	-	-	-	-	7.96	0.6 x
351	JIANGSU YUXING	300305-CN	0.9	322	410	55%	-27%	18%	233	-	-	23	-	-	0.92	0.9 x
352	TES CO LTD	095610-KR	10.6	209	101	124%	-14%	13%	110	147	0.7 x	0	18	5.6 x	12.07	0.9 x
353	THAI SOLAR ENERGY	TSE-TH	0.0	57	169	148%	-21%	2%	-	-	-	-	-	-	0.05	0.5 x
354	OTOVO ASA	OTOVO-NO	0.1	25	36	243%	-17%	15%	102	58	0.6 x	(31)	(26)	-	0.17	0.5 x
355	CHUGAI RO CO LTD	1964-JP	22.7	177	180	5%	-33%	8%	186	-	-	-	-	-	22.66	1.0 x
356	SUZHOU DELPHI	688170-CN	3.3	264	294	42%	-20%	8%	80	102	2.9 x	6	(2)	-	1.66	2.0 x
357	NPC INC.	6255-JP	5.7	125	86	64%	-27%	3%	72	77	1.1 x	18	17	5.0 x	2.87	2.0 x
358	INTEVAC INC	IVAC-US	3.4	92	36	33%	-28%	0%	53	63	0.6 x	-	-	-	4.17	0.8 x
359	GANTAN BEAUTY	5935-JP	13.5	52	57	30%	-31%	5%	92	-	-	-	-	-	9.50	1.4 x
360	SOLARMAX TECH.	SMXT	1.2	56	82	1191%	-51%	-24%	-	-	-	-	-	-	(0.24)	-5.1 x

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361 SUPER TOOL 5990-JP 12.4 29 30 19% -3% 2% 37 - - - - - 29.14 0.4 x

Peer Set	12/17/2024	Share Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	Price Performance			Sales			EBITDA			Book Value		
					% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/ EBITDA	Book/ Share	P/ Book	
Wind	Ticker		542,188	839,263			1%	204,708	176,908	4.7 x	53,149	59,123	14.2 x		2.0 x	
362	NEXTERA ENERGY	NEE-US	72.3	148,616	238,369	19%	-25%	1%	28,114	27,018	8.8 x	14,758	16,529	14.4 x	24.34	3.0 x
363	GE AEROSPACE	GE-US	165.8	179,444	184,773	17%	-24%	-1%	64,565	34,769	5.3 x	7,814	8,220	22.5 x	17.44	9.5 x
364	IBERDROLA SA	IBDRY-US	55.4	88,201	160,811	12%	-18%	4%	53,333	51,334	3.1 x	15,639	16,956	9.5 x	32.61	1.7 x
365	DOMINION ENERGY	D-US	53.6	45,016	87,487	16%	-19%	-1%	14,393	15,219	5.7 x	6,420	7,183	12.2 x	31.17	1.7 x
366	EVERSOURCE ENERGY	ES-US	58.5	21,438	49,890	18%	-11%	2%	11,911	12,369	4.0 x	3,603	4,282	11.7 x	41.34	1.4 x
367	AVANGRID INC	AGR-US	35.6	13,786	29,490	6%	-17%	-1%	8,309	-	-	2,222	-	-	51.06	0.7 x
368	NORTHLAND POWER	NPI-CA	12.8	3,329	8,840	47%	-4%	3%	1,654	1,650	5.4 x	918	889	9.9 x	10.65	1.2 x
369	MING YANG SMART	601615-CN	1.8	4,160	6,327	13%	-40%	14%	3,844	4,366	1.4 x	138	322	19.7 x	1.76	1.0 x
370	NEOEN SA	NEOEN-FR	41.5	6,344	10,579	6%	-43%	1%	568	627	16.9 x	514	515	20.6 x	18.57	2.2 x
371	SUZLON ENERGY	532667-IN	0.8	11,161	11,130	25%	-48%	13%	785	1,295	8.6 x	125	201	55.5 x	0.04	21.3 x
372	TITAN WIND ENERGY	002531-CN	1.2	2,121	3,732	37%	-24%	9%	1,066	804	4.6 x	268	278	13.4 x	0.69	1.7 x
373	CECEP WIND-POWER	601016-CN	0.5	2,915	5,934	14%	-22%	4%	708	743	8.0 x	610	590	10.1 x	0.37	1.2 x
374	NORDEX SE	NDX1-DE	11.6	2,746	2,311	51%	-19%	-1%	7,023	7,547	0.3 x	2	296	7.8 x	4.28	2.7 x
375	CLEARWAY ENERGY	CWEN-US	26.1	2,162	13,604	18%	-21%	0%	1,314	1,420	9.6 x	1,058	1,172	11.6 x	18.17	1.4 x
376	CS WIND CORP	112610-KR	28.8	1,215	2,010	91%	-10%	3%	1,128	2,143	0.9 x	133	268	7.5 x	17.71	1.6 x
377	QINGDAO TIANNENG	300569-CN	0.7	730	1,309	25%	-26%	5%	-	-	-	-	-	-	0.76	0.9 x
378	INOX WIND LTD	539083-IN	2.3	2,958	3,351	38%	-46%	7%	209	530	6.3 x	32	89	37.5 x	0.24	9.5 x
379	WINDEY ENERGY	300772-CN	1.9	1,356	2,162	17%	-51%	7%	2,586	2,905	0.7 x	27	28	77.3 x	1.07	1.8 x
380	ALIMAK GROUP	ALIG-SE	10.4	1,119	1,393	15%	-22%	-1%	681	632	2.2 x	128	126	11.0 x	6.15	1.7 x
381	VRL LOGISTICS	539118-IN	6.5	564	684	41%	-17%	9%	347	372	1.8 x	47	56	12.1 x	1.33	4.9 x
382	JIANGSU HAILI WIND	301155-CN	8.4	743	1,995	27%	-44%	15%	233	245	8.1 x	17	18	113.2 x	3.44	2.4 x
383	FICONT INDUSTRY	605305-CN	3.7	782	551	27%	-22%	-5%	153	197	2.8 x	33	54	10.1 x	1.55	2.4 x
384	EUROGROUP	EGLA-IT	3.0	285	842	71%	-12%	10%	902	926	0.9 x	173	123	6.9 x	2.69	1.1 x
385	GURIT HOLDING AG	GURN-CH	14.5	68	144	524%	-18%	-14%	520	477	0.3 x	39	30	4.9 x	19.29	0.7 x
386	GOLDWIND SCI&TECH	2208-HK	0.9	689	10,667	13%	-62%	6%	6,952	7,751	1.4 x	714	913	11.7 x	1.19	0.7 x
387	CS BEARING CO LTD	297090-KR	3.0	81	86	148%	-16%	1%	59	68	1.3 x	2	4	20.9 x	2.20	1.4 x
388	TPI COMPOSITES INC	TPIC-US	1.2	57	662	379%	-8%	-37%	1,451	1,353	0.5 x	(86)	(32)	-	(6.77)	-0.2 x
389	BROADWIND INC	BWEN-US	1.8	39	78	161%	-15%	-5%	203	142	0.6 x	21	12	6.3 x	2.66	0.7 x
390	WINDAR PHOTONICS	WPHO-GB	0.6	62	51	23%	-41%	-15%	5	7	7.5 x	0	1	65.9 x	0.06	10.1 x

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