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Zacks Small-Cap Research

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Midwest Energy Emissions (OTCQB: MEEC)

Zacks SCR Initiates Coverage of Midwest Energy Emissions (aka ME_2C Environmental).

Based on comparative analysis that utilizes the valuation metric of price-to-sales (P/S), a second quartile industry P/S ratio of 4.71 on TTM sales indicates a share price target of $1.09

Current Price (02/06/23)	$0.48
Valuation	**$1.09**

OUTLOOK

ME_2C Environmental is positioned to accelerate top-line growth and achieve growing profitability by providing a patented mercury capture process, demand for which is being bolstered by management's **patent litigation strategy**. Proactively, management has built additional capacity that is capable of fulfilling the anticipated increase in sorbent demand. We expect revenues to increase by 50%+ in both 2022 and 2023. Current **litigation against refined coal defendants** could potentially result in a windfall settlement. In addition, ME_2C is in the process of developing a **REE** (Rare Earth Element) **extraction technology**.

SUMMARY DATA

52-Week High	**$0.69**
52-Week Low	**$0.16**
One-Year Return (%)	**-12.09**
Beta	**1.17**
Average Daily Volume (shrs.)	**101,324**
Shares Outstanding (million)	**93.09**
Market Capitalization ($ mil.)	**$44.68**
Short Interest Ratio (days)	**0.01**
Institutional Ownership (%)	**13**
Insider Ownership (%)	**32**
Annual Cash Dividend	**$0.00**
Dividend Yield (%)	**0.00**
5-Yr. Historical Growth Rates	
Sales (%)	**N/M**
Earnings Per Share (%)	**N/A**
Dividend (%)	**N/A**
P/E using TTM EPS	**N/M**
P/E using 2023 Estimate	**N/M**
P/E using 2024 Estimate	**N/M**

Risk Level	**Average**
Type of Stock	**Small-Growth**
Industry	**Pollution Control**

ZACKS ESTIMATES

Revenue
(in millions of $)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2021	3.0 A	2.3 A	5.0 A	2.7 A	13.0 A
2022	3.3 A	5.1 A	7.5 A	5.6 E	21.6 E
2023	5.6 E	7.1 E	8.8 E	7.5 E	29.0 E
2024					32.0 E

Earnings per Share
(EPS is operating earnings before non-recurring items)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2021	-$0.01 A	-$0.02 A	$0.00 A	-$0.02 A	-$0.05 A
2022	-$0.01 A	$0.00 A	$0.01 A	$0.00 E	-$0.01 E
2023	-$0.00 E	$0.01 E	$0.02 E	$0.00 E	$0.03 E
2024					$0.06 E

Quarterly EPS may not equal annual EPS total due to rounding.

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EXECUTIVE OVERVIEW

After several transitional years, Midwest Energy Emissions (aka ME_2C Environmental) has emerged as a **profitable**, small cap pollution control company with **growing revenues** driven by **increasing reoccurring product** (sorbent) **deliveries** from its patented mercury capture process. The primary catalyst was and continues to be the company's successful **enforcement efforts** against coal-fired EGUs (Electric Generating Units) that infringe on ME_2C's patented solutions and products. As a result, over the next couple of years, new license agreements and/or new supply contracts are expected to be announced. In addition, **patent infringement litigation against refined coal entities is pending** with a trial date currently set for November 2023. If successful, the potential compensation from a verdict or from a negotiated settlement would be transformational for the company.



Management is embarked on a **Three Pillar Strategy** composed of

1) **growing sorbent product sales and licensing fees** by extending the enforcement of the company's successful patent litigation effort against coal-fired EGUs,
2) further protecting the company's patented technology by **securing compensation from refined coal operators** that allegedly have utilized SEA® Technology to generate billions of dollars in tax credits afforded by American Jobs Act of 2004 and
3) pursuing new technologies through **product development**, particularly the **extraction of Rare Earth Elements**, along with coal ash cleanup and wastewater/ash pond remediation.

The size of the addressable markets is significant relative to the company's trailing 12-month (TTM) revenues. Having signed eight new license agreements since 2020, ME_2C has established a solid foundation in its core mercury emissions capture business. Currently, ME_2C commands roughly a 15% market share ($22 million of a $150 million market). Implemented in late-2018, the company's patent litigation strategy spurred the signing of licensing agreements with four domestic coal-fired power plants, along with two sorbent supply contracts. Managements of electric utilities with coal-fired EGUs have become keenly aware of not only the company's **strong intellectual property position** in mercury emissions capture technology, but also ME_2C's **unique knowledge and proficiency** in being able to optimize the mercury capture process.

Examining the news flow pertaining to both new and renewals of sorbent product contracts, there is evidence that the company's SEA Technology can deliver a reduced environmental footprint at a lower cost than alternative technologies by successfully **maximizing mercury capture** while **minimizing sorbent product consumption**. This empirical validation of SEA Technology's ability to achieve compliance with MATS requirements at the lowest cost (along with providing saleable coal ash) is best exemplified by agreement history of Vistra Corp. (described as "one of the largest utilities in the U.S.") which has successively initiated and later renewed sorbent supply contracts on three plants. Also, it appears that these contracts are testaments to ME_2C Environmental's **expertise in chemisorption** and the accompanying skill set that allows the mercury capture process to be finetuned to the peculiarities of each individual EGU.

Ultimately, we expect that the **organic growth of the company's sorbent product sales** should **result in a 40%-to-45% market share** in the U.S. Our expectation appears reasonable given the dynamics of the electric utility industry, the company's belief that certain aspects of SEA Technology are being used at over 40% of domestic coal-fired EGUs and the initial success in the company's litigation approach of enforcement. Since August 2020, **a rush of <u>new</u> agreements** has been announced, specifically **eight <u>new</u> non-exclusive license agreements** with coal-fired electric utilities and **two <u>new</u> supply significant contracts** for coal-fired EGUs.

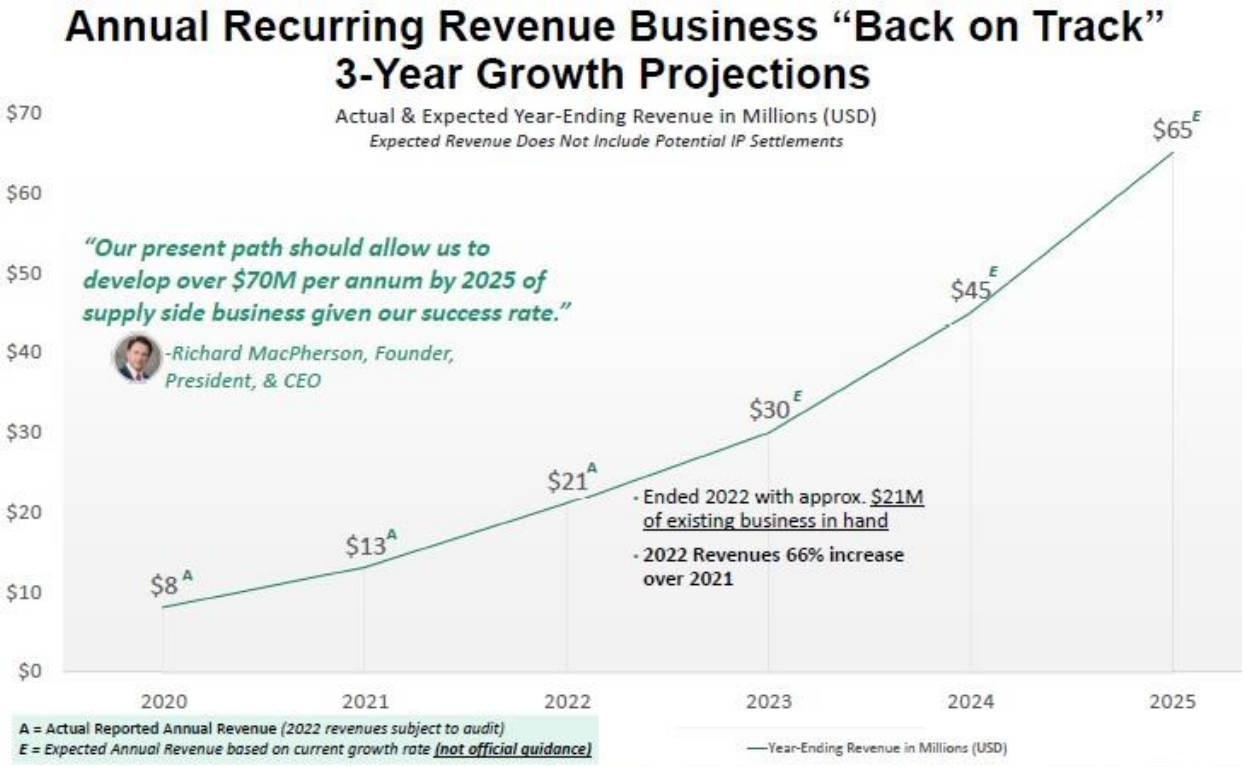
2021 Announcements

- January 11, 2021 **-** secured **<u>new</u>** non-exclusive **license agreement** with major U.S. utility
- January 19, 2021 **-** secured **<u>new</u>** non-exclusive **license agreement** with large, North American utility
- March 16, 2021 **-** signed **2-year supply contract** extension with coal-fired utility in the Midwest
- March 22, 2021 - received **2-year contract extension** with coal-fired utility in the Midwest (expected annual value of $2.5 million)
- July 15, 2021 - secured **<u>new</u> multi-year supply agreement** coal-fired power plant in the Midwest (owned by a southwestern utility that entered into a license agreement in 2020).
- September 21, 2021 **–** signed **<u>new</u> 5-year** non-exclusive **license agreement** with utility in Midwest
- November 30, 2021 – sign **<u>new</u> 5-year license agreement** (including ROFR) with another significant coal-powered utility operating in the Midwest

2022 Announcements

- January 12, 2022 **–** signed **2-year supply contract renewal** with one of the largest domestic utilities (and long-term customer) for 2 EGUs in the South (expected annual value of $2.5 million)
- January 18, 2022 - secured **<u>new</u> 1-year supply contract** for an EGU in the Southwest with major U.S. utility (entered into a license agreement in 2021)
- February 1, 2022 - secured **<u>new</u> 1-year supply contract** with licensee for coal-fired EGU in the Midwest (owned by a southwestern utility that entered into a license agreement in 2020 and which has direct supply contracts for three of its EGUs).
- February 10, 2022 - secured **<u>new</u> 1-year supply contract** with a licensee (owned by a southwestern utility which **now has direct supply contracts for four of its EGUs**)
- February 23, 2022 – **secured multi-year supply contract renewal** for a third plant of one of the largest domestic utilities (expected annual value of $1.5 million)
- March 28, 2022 - exercised right of first refusal (ROFR) for **<u>new</u> 3-year product supply contract** with a licensee, a significant coal-powered utility operating in the Midwest (expected annual value of $1.0 million)
- August 16, 2022 - signed **3-year** non-exclusive **license agreement** (including ROFR) with a utility in the Midwest
- December 1, 2022 – signed **5-year** non-exclusive **license agreement** with a utility in the Southwest

Management expects to continue to increase the number of licensees and sorbent product contracts over the next two-to-three years, according to the projections in the company's January 2023 presentation (see below), though management is careful to clarify that their projection process does not rise to the level of official guidance.



Midwest Energy Emissions Presentation January 2023

The company is seeking new utility customers through either license agreements for the use of its SEA Technology and/or direct contractual supply arrangements for the delivery of sorbent. With a "business first approach" directed at unlicensed EGUs, management is keen on capturing additional supply business and license agreements pertaining to its proprietary SEA Technology. Both types of agreements are lucrative with an 80% margin on license fees and margins in the 30%-to-40% range for sorbent supply contracts. ME_2C seeks to enter into positive discussions with the managements responsible for these coal-fired power plants. Management is reaching out to coal-fired plants that appear to be utilizing SEA Technology, which should produce new business agreements.

Texarkana Manufacturing & Distribution Facility



Midwest Energy Emissions Presentation November 2022

Management has prepared for the anticipated increase in sorbent sales by already investing in the needed **infrastructure** and constructing a **new manufacturing and distribution facility in Texarkana**. The modern facility was designed and completely paid for by ME_2C. The facility is currently in the process of being commissioned in order to be brought into operation during 2023. The nameplate capacity can support $100 million in annual product supply revenues.

Management Operational Guidance

On January 18, 2023, management upwardly revised prior guidance. **Revenues for 2022 are now anticipated to be $21.6 million**. In addition, **management expects that 2023 revenues will increase by up to 50%**. The company's existing contracts with coal-fired utilities represent reoccurring revenue streams that are expected to repeat during 2023, along with contracts that are expected to be initiated during the 2023 calendar year. Additional guidance is expected to be issued when year-end 2022 results are released in early April.

Previously, on the November 14th earnings conference call, management reconfirmed prior guidance that revenues are on track to be $20 million in 2022. In addition, management anticipated that the 2023 top-line would be in the at least $25 million to $26 million range. **We anticipate that additional license and/or supply agreements will be announced during the first quarter of 2023**.

Conclusion

ME_2C Environmental began to **generate double-digit increasing revenues** in 2021 and is expected to be **profitable** in 2023 through its patent enforcement of its mercury emissions **SEA technology**. Furthermore, ongoing **patent litigation against refined coal entities** could result in a significant financial windfall. Management is pursuing research in chemisorption technology (the company's core competency) for applications related to **Rare Earth Element** (REE) **extraction**, coal ash cleanup and wastewater remediation.

- ME_2C began to generate increasing revenues from its mercury emissions SEA technology as a result of management patent-litigation strategy.

- Management's **patent litigation strategy** is generating significant top-line growth from sorbent product contracts and licensing fees, both of which are enhancing the company's profitability.

- **Litigation against certain refined coal entities** is progressing and **could result in a significant settlement for damages, if proven successful**.

- Management has no plans to seek capital through the issuance of equity for the foreseeable future. Furthermore, management **negotiated the option** to **buy back a significant number of shares** (up to 7.5 million shares at $0.50 per share) from AC Midwest Energy LLC (an affiliate of Alterna Capital Partners).

- **Reduction of interest expense** through the
    - elimination of all convertible debt.
    - execution of debt repayment agreement with Alterna Capital that pushes all debt payments (on both secured & unsecured notes) out three years (through 2025)
    - reduction of interest rate on the secured note from 15% to 9%

PATENT LITIGATION STRATEGY

In November 2018, ME_2C Environmental announced a **patent strategy/licensing program** in an effort to capture revenues from the unauthorized use of the company's patented SEA Technology. Caldwell Cassady & Curry, P.C. (an Intellectual Property law firm based in Dallas, TX) was engaged, first to analyze and validate the company's patent portfolio and second to seek fair compensation from many coal-fired utilities, particularly those that had adopted the enhancement of sorbent with a halide-based substance. Initially, Caldwell Cassady & Curry attempted to resolve the cases of alleged patent infringement by offering the utilities the option of either entering a licensing agreement or a sorbent supply contract with ME_2C Environmental.

Though the effort gained some traction with a new multi-year supply contract being secured with a US-based utility, the patent strategy progressed on **July 17, 2019** to the **initiation of patent litigation** against **four major utility defendants** and **key refined coal entities** (for a total of 43 defendants) in the U.S. District Court for the District of Delaware, specifically for the infringement of U.S. Patents 10,343,114 and 8,168,147. On July 15, 2020, the complaint was amended to include infringement of patents 10,589,225, 10,596,517 and 10,668,430.

Between July 2020 and January 2021, **the four major utility defendants entered into non-exclusive license agreements** with ME_2C, which in turn promptly dismissed the patent infringement claims brought against each of them. Two of the four utility defendants (Vistra Corp. and another unnamed utility) signed license agreements and subsequently entered into product supply agreements.

Despite challenges from the **refined coal defendants**, court rulings have allowed ME_2C to proceed against a certain number of significant refined coal entities (now numbering 24). These IRC Section 45 tax credits were made available by the American Jobs Creation Act of 2004. The **fact discovery** portion of the litigation against the refined coal entities **concluded in September 2022**.

The defendants have moved to dismiss multiple times. Each motion has been denied. Most recently, on January 21, 2023, the Magistrate Judge ruled that ME_2C's allegation of the "active step element of induced infringement" was sufficiently pleaded, and therefore, Gallagher's motion to dismiss was denied. The **trial by jury date** is currently **scheduled for November 2023**.



ME_2C's **estimate of potential damage claims is substantial**, and management is confident that the company will prevail in claiming its rightful share of the value created through the use of the company's SEA Technology by refined coal operators that generated IRC Section 45 tax credits.

Furthermore, management has indicated that about 29 power plants with multiple refined coal-fired EGUs continue to use the company's patented technologies without a license. As the litigation moves forward and is ultimately settled, management anticipates that these coal-fired utilities will seek license agreements and/or sorbent supply contracts.

DEBT RESTRUCTURING

Over the last four years, ME_2C has restructured its debt obligations several times. Most recently, in October 2022, management successfully **extended the maturity** of the company's debt held by AC Midwest Energy LLC (an affiliate of Alterna Capital Partners) **to August 25, 2025**. Previously, during 2021, the company's **convertible notes were eliminated** through their conversion into shares of common stock.

The more **significant consequences** of these debt restructurings are:

- The company no longer has any convertible notes outstanding.
- Shares outstanding increased 14% in 2021 to 89,115,951 shares.
- Interest expense declined due to elimination of quarterly principal payments on the unsecured note

Most recently, in October 2022, the financing agreement with AC Midwest was amended such that:

- the maturity dates for both the unsecured & secured notes are now August 25, 2025
- the $13.15 million unsecured note bears a zero cash interest rate
- the interest rate on the $272,000 secured note was reduced from 15.0% to 9.0%
- the $13.15 million unsecured note bears a zero cash interest rate
- AC Midwest is entitled to a non-recourse profit participation preference, which is to be derived from net litigation proceeds, net revenue, adjusted free cash flow and net proceeds from any equity offerings; in addition, the profit share cap was increased to $17,654,931
- ME_2C has the option to repurchase up to roughly 7.5 million of the 11.7 million shares held by AC Midwest at $0.50 per share

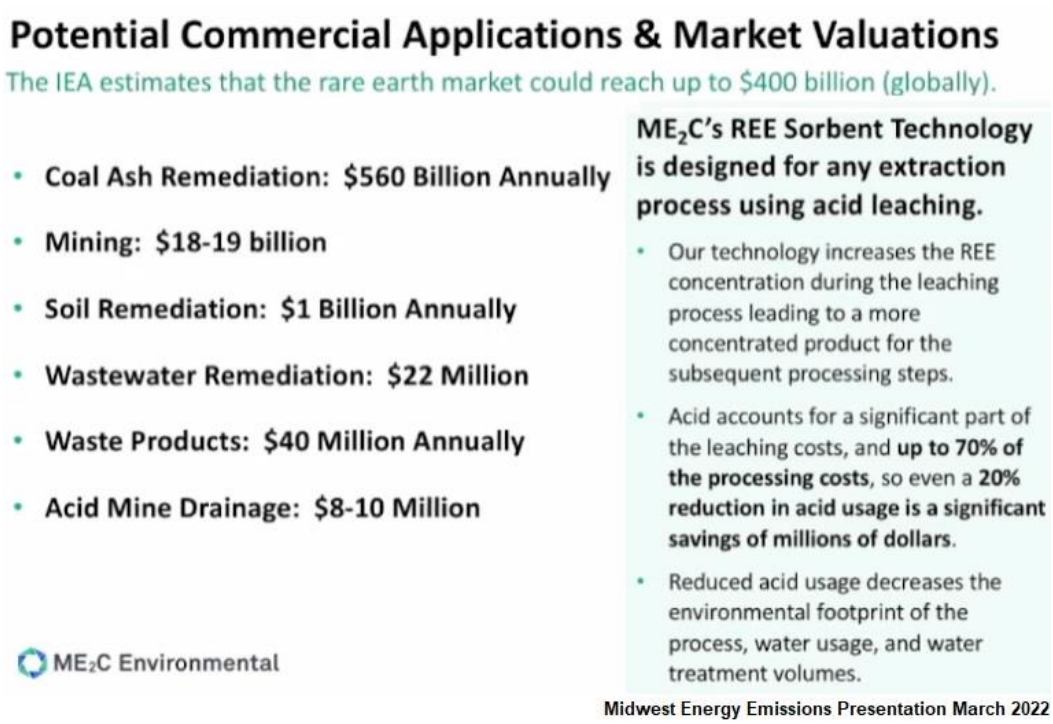
RARE EARTH ELEMENT (REE) CAPTURE TECHNOLOGY

The management of ME_2C Environmental envisions that Rare Earth Element (REE) technologies can extract REEs from the coal ash waste created a coal-fired power plants, which would have multiple benefits and applications:

1) The environment would greatly benefit as coal ash is a critical concern that leads to toxic contamination of soil and water
2) Cleanup and remediations costs, which are the responsibility at the utilities, could be offset through the value of the extracted REEs
3) More rare earth elements would be produced domestically, securing independence from offshore REE producers
4) ME_2C's proposed extraction method is designed to be an improvement over the current acid leaching methodology, which requires the use of caustic chemicals

Therefore, the company has dedicated an R&D effort to the **development of new rare earth and remediation technologies**, which if successful, would proceed to the commercialization phase. Management is committed to developing REE technologies to process and extract rare earth elements, initially from coal ash at coal-fired EGUs, along with **coal ash ponds** and water run-off associated with coal mines. The **potential markets are substantial**, and the company plans to enter the areas **on a licensing or royalty basis**, which requires less capital investment, **as well as in-house** to perform rare earth extraction processes.

Management strongly believes that continued R&D will prove successful in developing a commercially-viable sorbent technology that will contribute to rare earth element production. The extraction technology and the recovery process under development are based on extracting REEs **during the solvent state** rather than current liquid or heat-based approaches.



Midwest Energy Emissions Presentation March 2022

The **R&D goals** are to improve the process and reduce the cost of extracting rare earth elements at coal-fired utilities, provide environmental REE remediation, and simultaneously produce commercially saleable REEs. By achieving the goals, ME_2C would play a key role in both the clean-up of coal waste and the production of rare earth elements in North America.

Initial laboratory work was conducted between 2019 and 2021 in collaboration with Dr. Scott A. Drummond under a 3-year license and development agreement. The work focused on extracting REEs while maintaining their purity. In March 2021, ME_2C participated in creating Eleclear Technologies, LLC with Dr. Drummond on a 70/30 basis with initial total funding being $1.2 million.

In June 2021, ME_2C Environmental retained the College of Earth and Mineral Sciences at the Pennsylvania State University **to evaluate the capture capacity and regeneration potential** of the rare earth element technology. The initial round of evaluation testing was completed in September 2021. Preliminary results were encouraging. The testing of real-world materials was completed in March 2022. In October 2022, the license and development agreement with Dr. Drummond expired, and the company pivoted its testing approach to focus to the initial extraction of rare earth elements from their original source as opposed to Dr. Drummond's emphasis on the processing of REEs that were already extracted.

ME_2C Environmental continues to evaluate and test technologies for the processing and extraction of REEs in the solvent state. Further testing continues at the University of North Dakota to address the technological challenge of developing a core extraction process. Management expects additional research results to be delivered in mid-2023.

The anticipated pathway moving forward, after the initial R&D phase, is to conduct pilot-scale testing in the field with a joint partner (either a utility or possibly a mining company). Management is confident that a commercially viable REE extraction technology can be developed.

CORPORATE OVERVIEW

Headquartered Corsicana, TX, Midwest Energy Emissions (OTCQB: MEEC) aka ME_2C Environmental provides patented mercury capture solutions for coal-power plants whose mercury emissions exceed the U.S. Environmental Protection Agency's Mercury and Air Toxic Standards (MATS). **The company has successfully commercialized its Sorbent Enhancement Additive (SEA) Technology**, which can achieve mercury removal levels that are more efficiently with significantly less operational interruptions than other methods while preserving the quality (and hence the marketability) of fly-ash, a by-product from the coal burning process. The company holds **40 issued patents and patents-pending** related to mercury removal processes. The company's holistic **cost-competitive solution** for mercury emission control is a proven, effective technology that reduces mercury emissions over a wide range of plant configurations and coal types.

ME_2C Environmental deploys what appears to be the industry's best available capture technology for mercury emissions reduction at coal-fired power plants. Management believes that the SEA Technology process with an optimized blend of sorbents is the most efficient, cost-effective manner to capture mercury. **SEA Technology provides an approach that optimizes the mercury capture process** while requiring significantly less material. As a result, SEA Technology lessens the total amount of sorbent injected, thereby reducing the cost of mercury emissions reduction. **The technology is also tunable**, allowing ME_2C's consumable products to be formulated specifically for a coal-fired unit and its coal-fuel-type. Importantly, the process has less operational impact with minimal corrosion to the plant's equipment and preserving the marketability of fly ash, an important ancillary revenue stream for many power plants.

ME_2C has demonstrated a **technical competitive advantage** by bringing EGUs to MATS compliance in a cost-effective manner. As many coal-fired utilities are having difficulties, ranging from encountering prohibitive costs in achieving a 90% reduction in mercury emissions to having to de-rate (lower the capacity of) boilers to attain compliance, management is focused on further penetrating the fleets of existing customers as well as securing new clients (electric utilities with coal-fired EGUs) which are challenged and are seeking an economical solution to comply with MATS.

It is noteworthy to mention that the **process of commercializing** any pollution control technology or method within the utility industry is a lengthy and expensive process, which involves the migration of a technology from the laboratory to commercial-scale demonstrations and then to contract signings, installations, testing and finally commercial operations. Lead times for the selection of mercury emissions control solutions are long, with power producers requiring demonstrations in order to evaluate and assess the effectiveness and costs of competing pollution control systems. Since SEA Technology is both operationally effective and cost-effective, ME_2C successfully broached these major barriers to enter the pollution control segment serving the electric utility industry.

On February 16, 2021, the company was **rebranded as ME_2C Environmental** (for trade purposes) in order to better reflect the broadened focus on emissions control technologies across the energy sector. Formerly Midwest Energy Emissions, the company is expanding its suite of offerings into **REE** (Rare Earth Element) **extraction technologies**.

PATENT OVERVIEW

SEA Technology, the company's **core IP**, provides an operationally-effective and cost-efficient mercury emissions solution that is flexible to accommodate a broad range of configurations of coal-fired power plants fueled by varying coal types. **SEA Technology** utilizes the application of sorbent enhancement additives to promote the oxidation of elemental mercury in preparation for adsorption by uniquely formulated blends of sorbent products. Utilizing these Technologies, ME_2C is able to

offer highly efficient solutions to utilities so that their coal-fired units can achieve mercury emissions reduction while maintaining the marketability of the fly ash by-product.

ME_2C owns **SEA Technology** through the **acquisition of all patents rights and patents pending related to the Sorbent Enhancement Additive** (SEA) **Technology i**n April 2017. The purchase price was $2.5 million and 925,000 shares of MEEC common stock, of which 628,998 shares were issued directly to the original technology owners and 296,002 shares were issued to the inventors.

The portfolio of patents rights and patents pending is composed of **40 patents and patents-pending** related to mercury removal processes. The patents in the United States include
:

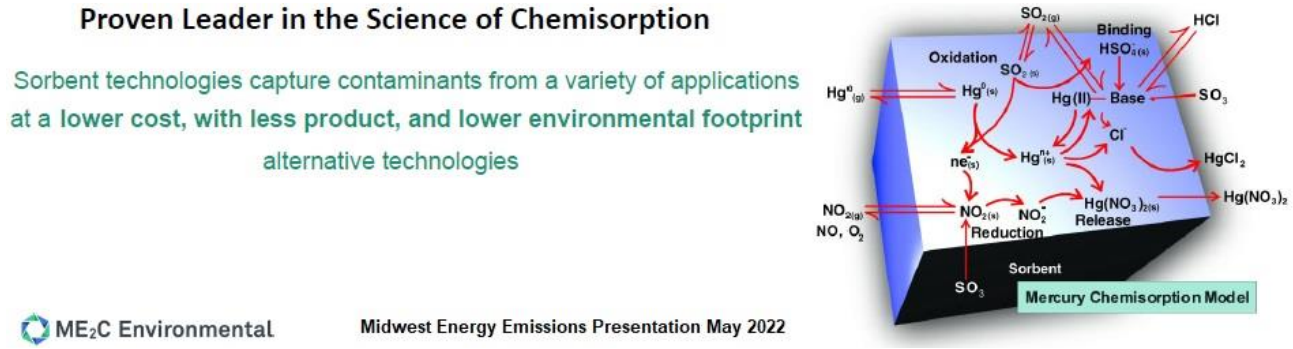
- Sorbents and Flue Gas Additives for the Oxidation and Removal of Mercury (7,435,286)
- High-Temperature Halogen Dissociation for Mercury Control in Coal-Fired Systems (7,615,101)
- Multifunctional Abatement of Air Pollutants in Flue Gas (7,628,969)
- Sorbents for the Oxidation and Removal of Mercury (8,168,147)
- Process for Regenerating a Spent Sorbent (8,173,566)
- Mercury Control Using Moderate-Temperature Dissociation of Halogen Compounds (8,312,822)
- Process for Regenerating a Spent Sorbent (Continuation) (8,440,585)
- Sorbents for the Oxidation and Removal of Mercury (Continuation) (8,652,235)

China has promulgated emission regulations, but has yet to implement mercury reductions. In October 10, 2013, 140 nations (including the US, Canada, China, Germany, Netherland and the U.K.) signed and adopted the **Minamata Convention** on mercury, an international treaty that recognized mercury is a chemical of global concern and addresses the reduction of emissions of mercury and mercury compounds. The Minamata Convention entered into force 90 days after the 50th instrument of ratification/acceptance/approval/accession was deposited (August 16, 2017). As of December 2022, there are 128 signatories to the treaty. The 5th meeting of the Conference of the Parties to the Minamata Convention on Mercury is scheduled for early November 2023 in Geneva, Switzerland. Long-term, there is **blue sky potential** for international demand for the company's mercury remediation solutions.

SEA TECHNOLOGY

Utilizing a patented Sorbent Enhancement Additive (SEA) Technology, ME_2C is able to offer a more efficient solution to utilities so that their coal-fired units can achieve mercury emissions reduction while maintaining the marketability of the fly ash by-product. The company's SEA Technology utilizes the application of sorbent enhancement additives to promote the oxidation of elemental mercury in preparation for adsorption by uniquely formulated blends of sorbent products.

Mercury is emitted from coal-fired boilers in three basic forms: elemental mercury (Hg^0), oxidized mercury (Hg^{2+}) and particulate-bound mercury (Hg_p). It is required that **the <u>total</u> of all three forms of mercury be measured and reduced.** The ratio of elemental to the oxidized forms of mercury emitted from combustion is highly dependent on the type of coal that is combusted. By and large, bituminous coal-fired boilers emit primarily oxidized mercury while the majority of mercury produced by low rank coal-fired (subbituminous and lignite) boilers is elemental mercury.[i] The strongest factor for this generalization is that the relatively high concentrations of halogens, such as chlorine and bromine, in bituminous coals results in the oxidization of elemental mercury to form oxidized mercury, primarily the mercuric halides ($HgCl_2$ and HBr_2). In contrast, both subbituminous and lignite coals not only have lower quantities of halogens, but also higher amounts of alkaline material (such as calcium and sodium) than bituminous coals. The halogens from the combustion of subbituminous coal and lignite have a tendency to react with the alkaline materials with the result that little halogen oxidizes the elemental mercury.[ii] Though in aggregate, roughly 60% of the mercury emitted by coal combustion is elemental mercury and 40% is oxidized mercury.[iii]

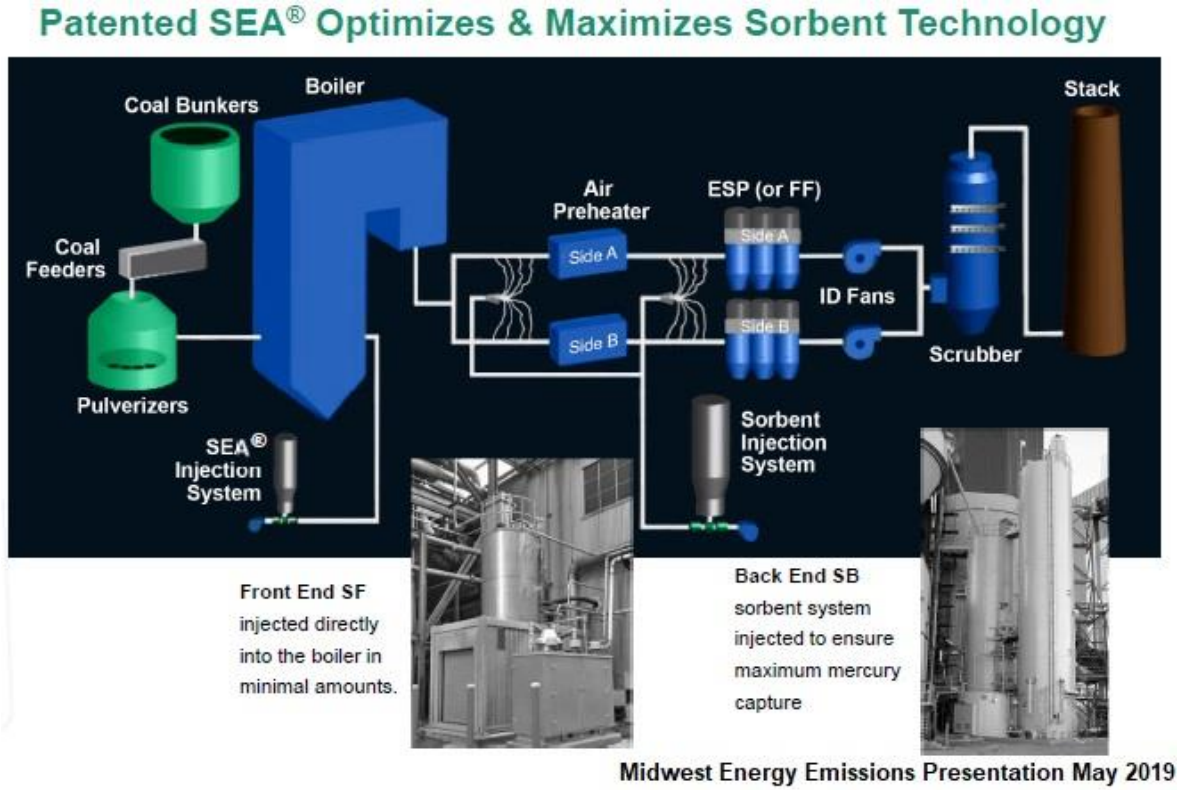


Elemental mercury is very difficult to capture and remove because, by definition, it is in its elemental form (a single atom with a neutral charge). Elemental mercury is the most difficult to remove from flue gas since it is practically insoluble in water, and hence, not typically removed by wet processes like flue gas desulfurization (FGD) systems aka scrubbers. However, **oxidized mercury** is reactive in that it more easily deposited and captured by sorbents. Through the chemical reaction by which oxidized mercury is formed, it becomes charged allowing its efficient capture by pollution control devices. It is highly soluble in water, and therefore, readily captured in wet scrubbers. **Particle-bound mercury** is condensed on the fine fly ash particles emitted by coal-fired boilers. With charged components, Hg_p sticks to surfaces and is readily removed by pollution control devices designed to remove particulates (bag houses/fabric filters, electrostatic precipitators and scrubbers) and also by activated carbon.

The use of a Brominated Activated Carbon (BAC) injection system is the most common method used today to oxidize elemental mercury, primarily since BAC is more effective than Standard Powdered Activated Carbon (PAC) for removing mercury from flue gas of boilers burning low chlorine content coal. However, the cost of operation can become uneconomical, since the injection of activated carbon sorbent is only cost-effective at capturing about 60% of the mercury emissions, at which point diminishing effectiveness is achieved by the injection of additional sorbent. For some 1,000 MW coal-fired units, the cost to achieve a 90% reduction in mercury emissions can exceed over $10 million per year.

ME_2C can provide a highly efficient mercury emissions capture process, along with custom-blended halogenated front-end sorbent enhancement additives and back-end sorbents, for an effective and cost-competitive solution for controlling emissions mercury in coal-fired units. The use of SEA Technology, namely the proprietary additives and sorbents, costs between $1.0 million and $2.5 million annually, depending on size of the EGU, the coal being combusted and the amount of time the plant is being operated. In addition, the fly ash by-product remains marketable, which may not be the case in a BAC system. Fly ash is fine, powdery matter collected by the fabric filters and electrostatic precipitators, which is mostly utilized by the cement/concrete industry, but also for structural fills (such as embankments), the stabilization of waste materials and road bases. The sale of fly ash represents an opportunity for utilities to both increase revenues and reduce costs. Fly ash, also known as coal ash, is found to be rich in rare earth elements (REEs).

ME_2C provides a **process** that can be fine-tuned to achieve optimum efficiency, by tweaking not only the **location and method of injection** of products, but especially the **blend and reactivity** of sorbents. The company's solution for 90%+ mercury emissions reduction is a **two-step process** that can be modified to the unique configuration of the customer's EGU and the coal type being combusted. The **first step** involves the introduction of **flue gas conditioning products** that promote the conversion of elemental mercury to oxidized mercury and particulate-bound mercury, which are more easily captured in downstream devices.



SF-10, ME_2C's proprietary and patented sorbent enhancement additive flue gas conditioner, is **injected into the coal-fired boiler** by ME_2C's injection system. The SF-10 immediately gasifies and migrates throughout furnace system promoting mercury oxidation. With a keen understanding of the complex interactions among elemental mercury, sorbent enhancement additives and flue gases, along with the role and impact that these various components of flue gas have on chemisorption, EERC designed SEA Technology to maximize the conversion of elemental mercury to oxidized mercury while minimizing the amount of injected sorbent enhancement additives. The location of front-end injection **optimizes the residence time** for these reactive conditioning products to oxidize the elemental mercury. Promoting mercury oxidation through catalytic processes and materials is a key feature of SEA Technology and only requires the use of a relatively small amount of sorbent enhancement additive. In addition, the amount of SF-10 being injected is adjusted to the unique requirements of each client's system to ensure benefit-to-cost performance.

The cost of installing the **front-end injection system** is roughly $500,000; however, ME_2C sells its front-end and back-end products for the duration of the contract. Typically, the lower operating costs can provide a 4- to 5-month payback on the front-end capital equipment when compared to current costs of operating a Brominated Activated Carbon system.

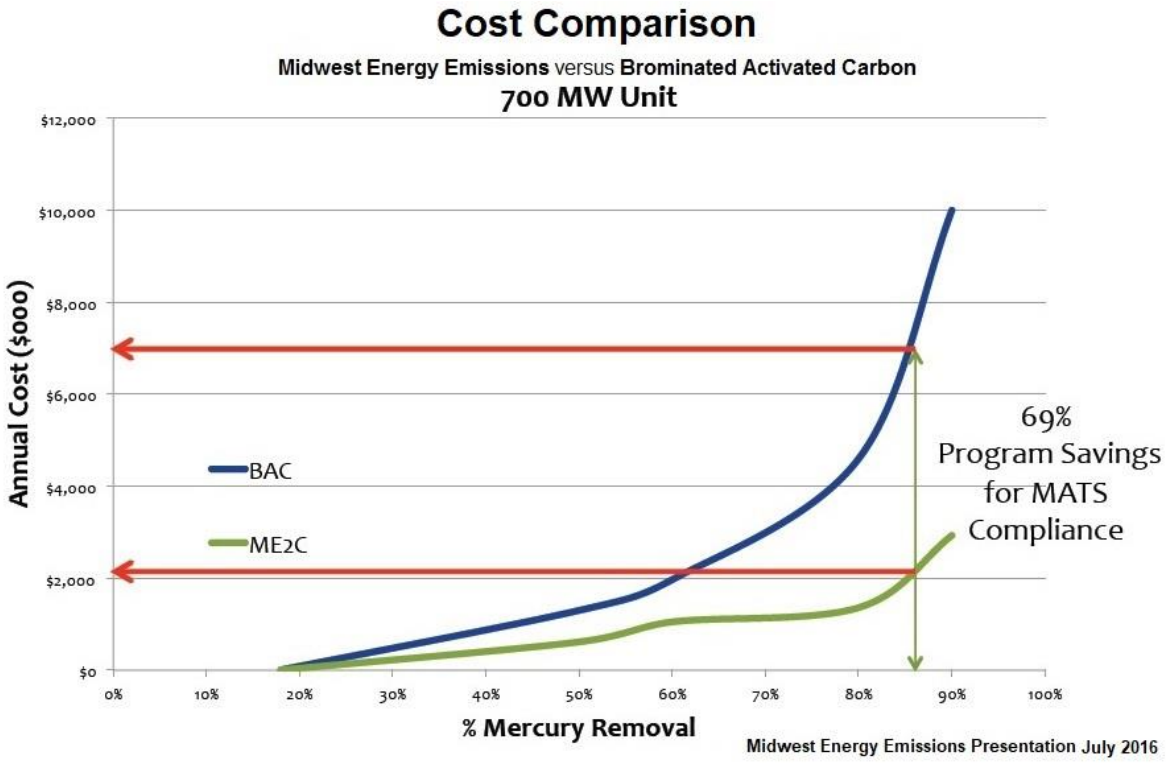
SEA Technology's **back-end injection system** is located up-stream (prior) to the particulate matter (PM) equipment, principally bag-house and electrostatic precipitator. ME_2C offers a variety of products for introduction into the mercury-contaminated flue gas stream, with the most-used product being SB-24. The fine sorbent particles of the sorbent are injected through a flue gas duct, where the now more reactive, oxidized mercury contacts the sorbent and attaches to its surface so it can be collected. The pregnant sorbent is removed from the flue gas stream, along with the fly ash, in the bag-house or electrostatic precipitator. The cost of the back-end system is in the $1.0-$1.5 million range, but an injection silo must be installed in all cases when mercury emissions reduction at lower levels cannot be achieved. This back-end injection system is common to almost any mercury collection technology in the industry, and not unique to SEA.

SB-24 is the mainstream sorbent product of ME_2C and designed to provide active capture sites for mercury absorption. The proprietary blend performs well across all known boiler configurations and most coal types without impacting fly ash quality. SB-24 is the company's most effective and least cost-per-pound sorbent.

The SEA Technology process has been proven to be effective over a broad range of coal types and configurations of coal-fired power plants. ME_2C provides an approach that optimizes the mercury capture process while minimizing the cost of injected sorbents. The optimal combination is determined through extended parametric testing of various combinations of front- and back-end products to determine the arrangement that exhibits optimum mercury removal rate at the minimal consumption of sorbent material. Depending on the existing air pollution control equipment and the type of coal being burned, the SEA Technology system can also be tailored on-the-fly through adjustable sorbent enhancement additive and sorbent feed rates. As a result, SEA Technology lessens the total amount of sorbent injected.

A **case study** was performed in which mercury removal and costs were monitored through parametric testing of the use of both SEA Technology proprietary sorbents and Brominated Activated Carbon at the same 700 MW EGU powered by subbituminous coal. The results (depicted in the graph below) clearly indicate that ME_2C 's SEA Technology is vastly superior to BAC in terms of cost and effectiveness.

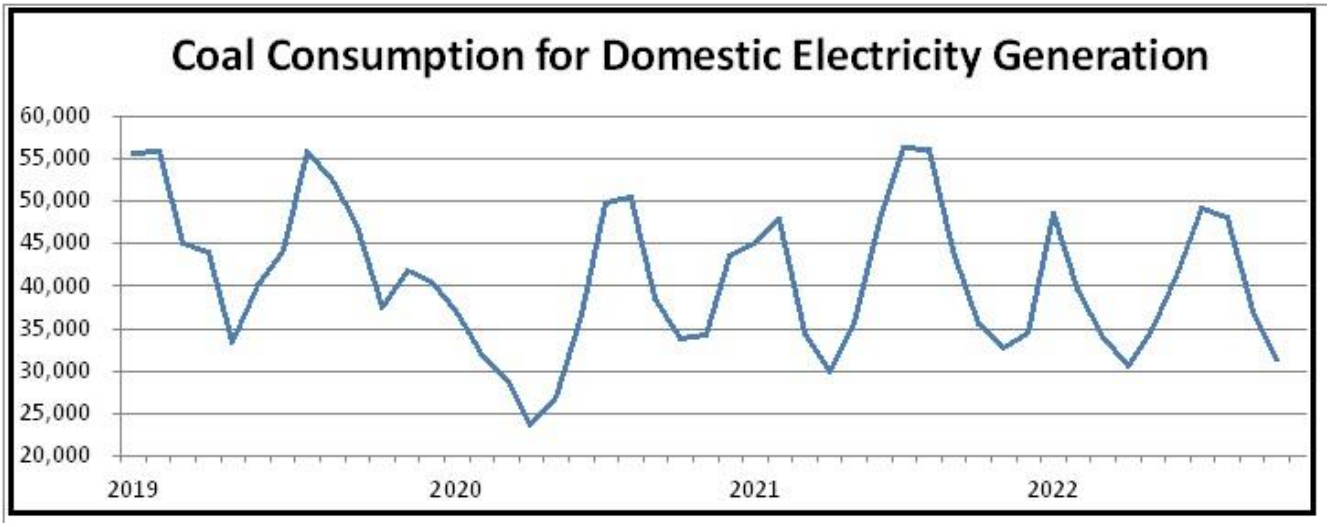
Attaining 80%+ mercury reduction levels at low rank coal- EGUs by injecting Powdered Activated Carbon or Brominated Activated Carbon has proven to be challenging and, in most cases, uneconomical. The higher volumes of injectant not only can increase annual injectant costs to the $5 million to $20 million range, but also potentially can creates severe operational issues, including corrosion of the plant's equipment and the degradation of the fly ash by-product, which renders it unsuitable for sale.



SEASONALITY

Despite ongoing retirements of coal-fired power plants since 2010, coal-fired EGUs continue to be utilized to generate electricity, particularly during periods of increased demand for electricity, namely from **December to February** and from **June to August**. These peak periods are driven by increased demand for heat in the winter and air conditioning during the summer, respectively. The **strong periods of seasonal utilization** are reflected in the ME_2C's reported financial results with top-line revenues being higher in the first and third quarters.

Seasonal Consumption of Coal for Domestic Electricity Generation



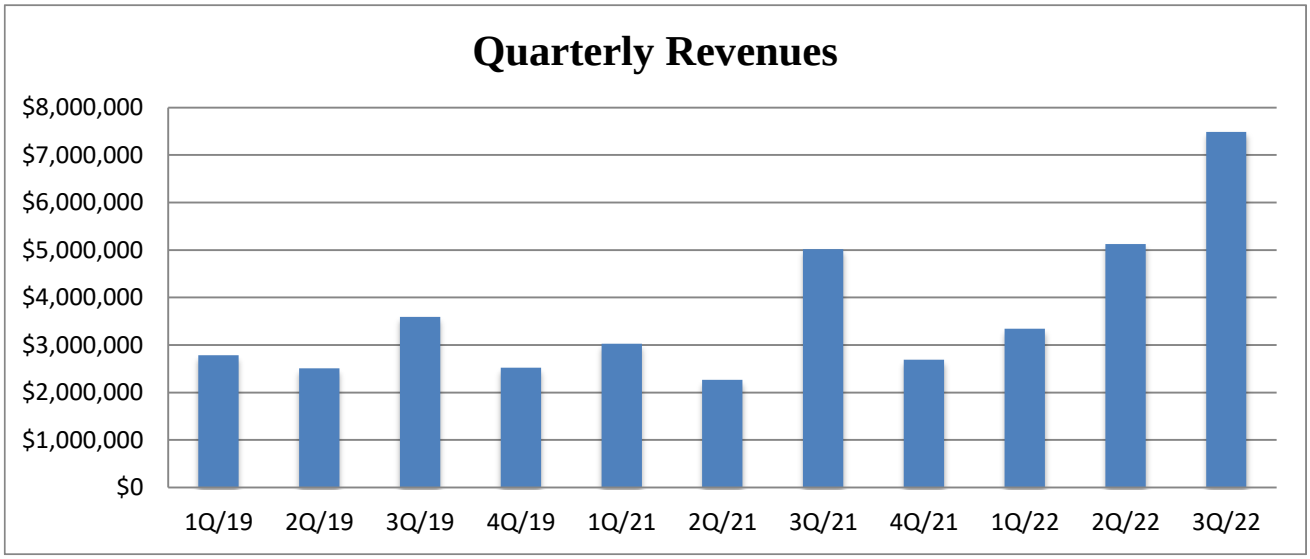
Despite competition from sources of renewable electricity generation (wind and solar), along with the displacement of coal-derived electricity by natural gas-fueled EGUs when gas prices are competitive, we expected market share gains by ME_2C will defray any negative macro-trend affecting the use of coal-fired EGUs.

RECENT NEWS

Financial Results for the Third Quarter of 2022

On November 14, 2022, ME_2C reported results for the third quarter ending September 30, 2022. **Total revenues increased 49.1%** to $7,485,972 from $5,019,717 reported in the comparable quarter last year as revenue from product (sorbent) deliveries increased 57.5% to approximately $7,383,000. Sorbent sales increased primarily from increased supply demands in the coal-fired utilities as well as from the addition of several new utilities to the company's customer base for sorbent sales over the last 12 months.

Total operating expenses increased 40.3% to $6.43 million versus $4.58 million, primarily attributable to the 57.5% increase in **Cost of sales** stemming from (and in line with) the 57.5% increase in sorbent product sales. **SG&A expenses** decreased 1.2%; hence, the **gross margin** (on sorbent sales) **remained steady at 30.9%**. **Interest expense declined 37.3%** to $317,510 versus $506,592 million in the comparable quarter last year, primarily attributable to the decrease in notes payable as certain notes were converted into stock.



The company reported **net income of $569,379** (or $0.01 per diluted share) versus a reported loss of $206,648 (or $0.0023 per diluted share) in the third quarter of 2021, primarily due to strong sales of sorbent and secondarily, to the reduction in interest expense. **Adjusted EBITDA** improved to $1,165,000 versus $697,000 in the third quarter of 2021.

As of September 30, 2022, the company had $1.26 million in cash on hand and **working capital of $2.19 million**. Shares outstanding marginally increased by 0.7% (YOY) to 89,871,132 shares.

VALUATION

Finding comparable companies to ME_2C Environmental is challenging. The company is unique in that it has a singular focus (the mercury emissions control market), holds the patents to SEA Technology processes and is increasing market penetration through the commercialization of SEA Technology. Many companies involved in the air pollution control industry range from companies that provide commodity chemicals and/or equipment to divisions of large, diversified companies where emission controls is just a small part of total operations. These types of companies are generally valued in the lower-to-middle portions of the valuation continuum rather than in the higher-end of the spectrum where highly-focused companies with patented treatment processes tend to trade.

We believe that the **valuation comparables** of ME_2C Environmental should Albemarle (ALB), Cabot Corp. (CBT), CECO Environmental (CECE), Ecolab (ECL) and IDEX (IEX). For example, CECO Environmental provides engineering, manufacturing and construction services. Also, these comparable pollution control and value-added specialty chemical companies have comparable business models to ME_2C and achieve higher-than-average gross margins, generally in the 25%-to-30% range.

The appropriate valuation methodology for ME_2C Environmental is based on price-to-sales (P/S) due the character of the company's enterprise, namely a small-capitalization company, currently in the process of turning profitable, but with an expected sales profile that should grow as more coal-fired utilities license the company's SEA Technology and contract for the company's patent-protected sorbent product. Comparable companies trade in a P/S valuation range between 1.0 and 6.0.

Industry Comparables	Pr Chg YTD	P/E CFY	Beta	Gross Margin	Price/ Book	Price/ Sales	EV/ EBITDA
MIDWEST ENERGY EMISSIONS	84.6	N/M	1.17	27.2	N/M	2.1	20.8
Industry Mean	13.1	19.1	1.24	29.3	4.9	3.4	17.9
Industry Median	5.2	12.9	1.35	21.7	4.9	3.6	18.7
S&P 500	14.3	17.2	10.80	N/A	15.0	4.3	16.9
ALBEMARLE CORP.	27.6	10.5	1.52	18.1	5.0	6.0	18.5
CABOT CORP.	11.8	11.8	1.37	20.2	4.9	1.0	10.6
CECO ENVIRONMENTAL	23.2	15.3	1.32	25.2	2.5	1.3	18.9
ECOLAB INC.	4.2	31.9	1.00	37.5	6.4	3.3	21.6
IDEX CORP.	-1.3	25.9	0.98	45.3	5.6	5.4	19.8
Industry Acquisitions		**Acquiror**					
CALGON CARBON		Kuraray	N/A	30.0	2.7	1.8	17.1
CYTEC INDUSTRIES INC.		Solvay SA	N/A	30.0	3.6	2.6	14.4
PALL CORP.		Danaher	N/A	50.2	8.3	4.8	19.3

Also, as a reference,

- Cytec Industries was acquired by Solvay SA at 2.6 times TTM revenues (19.7 EV/EBITDA)
- Pall Corp. was acquired by Danaher (DHR) at 4.8 times TTM revenues (20.3 EV/EBITDA) and
- Calgon Carbon was acquired by Kuraray SA at 1.8 times TTM revenues (16.1 EV/EBITDA).

Utilizing a second quartile industry average P/S ratio of 4.71 on TTM sales, a **price target of $1.09** is indicated.

We are optimistic the ultimate success of ME_2C Environmental. The company should experience increases in revenues over the next couple years as more coal-fired utilities license SEA Technology to control mercury emissions and sign contracts for ME_2C's sorbent product.

RISKS

- The targeted utilities for ME_2C's chemisorption products and services are driven by those coal-fired plants employing activated carbon for mercury emissions reduction.
- Investors should be aware of the potential dilution from options and warrants as the company becomes profitable. The fully diluted share count is higher than the 89,871,132 shares outstanding (as of September 30, 2022) with an additional 19,108,576 shares exercisable through options and 4,285,000 shares exercisable through warrants.

BALANCE SHEET

Midwest Energy Emissions Corp.					
	2018	2019	2020	2021	3Q 2022
Year ending December 31st	12/31/2018	12/31/2019	12/31/2020	12/31/2021	9/30/2022
ASSETS					
Cash and cash equivalents	584,877	1,499,287	591,019	1,388,307	1,257,148
Accounts receivable	1,642,126	1,222,874	1,116,082	1,015,053	3,298,449
Inventory	509,416	513,498	560,127	1,075,401	959,589
Prepaid expenses and other assets	136,628	316,199	107,443	312,008	562,805
Customer acquisition costs	34,467	0	0	0	0
Total Current Assets	**2,907,514**	**3,551,858**	**2,374,671**	**3,790,769**	**6,077,991**
Security deposits	-	-	-	10,175	10,175
Property and Equipment, net	2,397,691	2,082,343	1,887,029	1,829,544	1,829,067
Right of use asset - operating lease	-	1,106,575	795,869	390,098	108,577
Intellectual property, net	2,733,662	2,532,462	2,318,796	2,114,197	1,960,747
TOTAL ASSETS	**8,038,867**	**9,273,238**	**7,376,365**	**8,134,783**	**9,986,557**
Liabilities and Stockholders' Equity					
Accounts payable and accrued expenses	1,858,326	1,676,757	1,611,956	2,267,711	3,086,097
Curr. portion of equipment notes payable	63,424	53,304	29,255	2,677	-
Curr. portion of operating lease liability	-	383,307	407,975	340,207	78,494
Curr. portion of note payable	-	-	34,661	0	0
Curr. portion of convertible notes payable	-	990,000	-	-	-
Accrued interest	96,902	226,065	259,230	0	0
Customer credits	167,000	167,000	167,000	167,000	189,500
Accrued salaries	555,877	357,095	848,706	562,430	287,341
Short term debt – related party	-	-	-	-	250,000
Secured note payable – related party	-	-	-	271,686	-
Unsecured note payable – related party	-	-	-	11,871,254	-
Total Current Liabilities	**2,741,529**	**3,853,528**	**3,358,783**	**15,482,965**	**3,891,432**
Equipment notes payable	104,226	22,386	789	0	0
Operating lease liability	-	807,409	394,625	54,551	33,190
Notes payable	-	-	299,300	0	0
Convertible notes payable	1,760,570	2,951,137	4,055,122	-	-
Secured note payable – related party	271,686	271,686	271,686	-	271,686
Unsecured note payable	11,781,952	7,911,898	9,894,284		12,666,657
Profit share liability – related party	-	2,328,845	2,305,308	2,836,743	3,312,896
TOTAL LIABILITIES	**16,659,963**	**18,146,889**	**20,579,897**	**18,374,259**	**20,175,861**
Common stock	76,246	76,748	78,096	89,116	89,871
Additional paid-in-capital	42,785,990	48,708,085	50,202,478	56,788,321	57,773,207
Accumulated deficit	(51,483,332)	(57,658,484)	(63,484,106)	(67,116,913)	(68,052,382)
Total Stockholders' Equity	**(8,621,096)**	**(8,873,651)**	**(13,203,532)**	**(10,239,476)**	**(10,189,304)**
TOTAL LIAB. & STOCKHOLDERS' EQUITY	**8,038,867**	**9,273,238**	**7,376,365**	**8,134,783**	**9,986,557**
Shares outstanding	76,246,113	76,747,750	78,096,326	89,115,951	89,871,132

PROJECTED INCOME STATEMENT

Midwest Energy Emissions Corp.

Income Statement

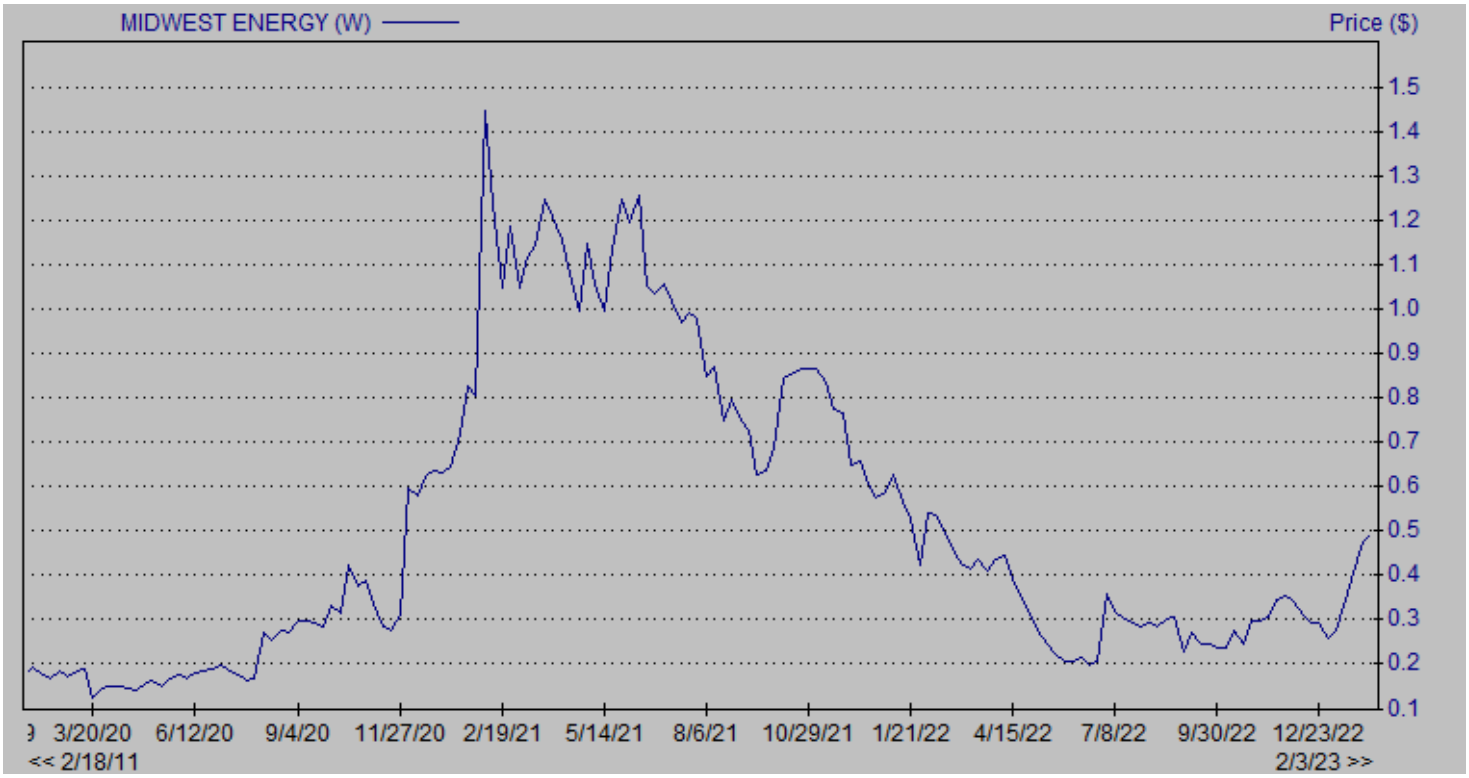
Period ending	2019 12/31/2019	2000 12/31/2020	2021 12/31/2021	2022 E 12/31/2022	2023 E 12/31/2023
Revenues	**11,417,027**	**8,158,448**	**13,012,049**	**21,575,000**	**29,000,000**
Costs and operating expenses:					
Cost of sales	8,335,436	5,440,395	7,938,947	14,743,358	19,430,000
Selling, general & administrative exp.	6,428,580	5,935,517	5,934,132	5,585,638	5,400,000
Total operating expenses	**14,764,016**	**11,375,912**	**13,873,079**	**20,328,996**	**24,830,000**
Operating gain (loss)	**(3,346,989)**	**(3,217,464)**	**(861,030)**	**1,246,004**	**4,170,000**
Other income (expense):					
Interest (expense)	(2,391,395)	(2,657,554)	(2,817,895)	(1,325,872)	(26,928)
Gain (loss) on disposal of fixed assets	29,560	35,859	0	0	0
Gain (Loss) on chg in FV of profit share liab.	(374,462)	23,537	(531,435)	(654,153)	0
Gain (loss) on debt restructuring	0	0	600,677	0	0
Total other income (expense)	**(2,736,297)**	**(2,598,158)**	**(2,748,653)**	**(1,980,025)**	**(26,928)**
Net loss before taxes	**(6,083,286)**	**(5,815,622)**	**(3,609,683)**	**(734,021)**	**4,143,072**
Income tax benefit (expense)	(14,000)	(10,000)	(23,000)	0	(414,307)
Net Income (Loss)	**(6,097,286)**	**(5,825,622)**	**(3,632,683)**	**(734,021)**	**3,728,765**
Net Gain (Loss) from Continuing Ops.	**(6,097,286)**	**(5,825,622)**	**(4,233,360)**	**(734,021)**	**3,728,765**
Net loss per share:					
Diluted loss per share	**(0.08)**	**(0.07)**	**(0.04)**	**(0.01)**	**0.03**
Diluted op. EPS before non-reoccuring items	**(0.08)**	**(0.07)**	**(0.05)**	**(0.01)**	**0.03**
Wgted avg. shares - basic	76,534,957	77,818,780	85,856,336	89,615,383	94,000,000
Wgted avg. shares - diluted	**76,534,957**	**77,818,780**	**85,856,336**	**89,615,383**	**117,400,000**
Adjusted EBITDA	**(953,000)**	**(735,000)**	**297,000**	**2,143,700**	**N/A**

QUARTERLY INCOME STATEMENTS

Midwest Energy Emissions Corp.						
Income Statement		**1Q**	**2Q**	**3Q**	**4Q**	
	2020	**2021**	**2021**	**2021**	**2021**	**2021**
Period ending	**12/31/2020**	**3/31/2021**	**6/30/2021**	**9/30/2021**	**12/31/2021**	**12/31/2021**
Revenues	**8,158,448**	**3,026,638**	**2,270,696**	**5,019,717**	**2,694,998**	**13,012,049**
Costs and operating expenses:						
Cost of sales	5,440,395	1,490,733	1,489,833	3,240,507	1,717,874	7,938,947
Selling, general & administrative exp.	5,935,517	1,453,225	1,261,689	1,342,140	1,877,078	5,934,132
Total operating expenses	**11,375,912**	**2,943,958**	**2,751,522**	**4,582,647**	**3,594,952**	**13,873,079**
Operating gain (loss)	**(3,217,464)**	**82,680**	**(480,826)**	**437,070**	**(899,954)**	**(861,030)**
Other income (expense):						
Interest (expense)	(2,657,554)	(675,620)	(1,120,086)	(506,592)	(515,597)	(2,817,895)
Gain (loss) on disposal of fixed assets	35,859	0	0	0	0	0
Gain (Loss) on chg in FV of profit share liab.	23,537	(121,054)	(128,771)	(137,126)	(144,484)	(531,435)
Gain (loss) on debt restructuring		299,300	0	0	301,377	600,677
Total other income (expense)	**(2,598,158)**	**(497,374)**	**(1,248,857)**	**(643,718)**	**(358,704)**	**(2,748,653)**
Net loss before taxes	**(5,815,622)**	**(414,694)**	**(1,729,683)**	**(206,648)**	**(1,258,658)**	**(3,609,683)**
Income tax benefit (expense)	(10,000)	(3,240)				(23,000)
Net Income (Loss)	**(5,825,622)**	**(417,934)**	**(1,729,683)**	**(206,648)**	**(1,258,658)**	**(3,632,683)**
Net Gain (Loss) from Continuing Ops.	**(5,825,622)**	**(717,234)**	**(1,729,683)**	**(206,648)**	**(1,560,035)**	**(4,233,360)**
Net loss per share:						
Diluted loss per share	**(0.07)**	**(0.01)**	**(0.02)**	**(0.00)**	**(0.01)**	**(0.04)**
Diluted op. EPS before non-reoccuring items	**(0.07)**	**(0.01)**	**(0.02)**	**(0.00)**	**(0.02)**	**(0.05)**
Wgted avg. shares - basic	77,818,780	80,409,603	84,190,073	89,255,299	89,573,000	85,856,336
Wgted avg. shares - diluted	**77,818,780**	**80,409,603**	**84,190,073**	**89,255,299**	**89,573,000**	**85,856,336**
Adjusted EBITDA	**(735,000)**	**69,000**	**(314,000)**	**697,000**	**(155,000)**	**297,000**

Midwest Energy Emissions Corp.						
Income Statement		**1Q**	**2Q**	**3Q**	**4Q E**	
	2021	**2022**	**2022**	**2022**	**2022**	**2022 E**
Period ending	**12/31/2021**	**3/31/2022**	**6/30/2022**	**9/30/2022**	**12/31/2022**	**12/31/2022**
Revenues	**13,012,049**	**3,341,585**	**5,128,882**	**7,485,972**	**5,618,561**	**21,575,000**
Costs and operating expenses:						
Cost of sales	7,938,947	2,342,031	3,363,447	5,104,887	3,932,993	14,743,358
Selling, general & administrative exp.	5,934,132	1,500,419	1,459,759	1,325,460	1,300,000	5,585,638
Total operating expenses	**13,873,079**	**3,842,450**	**4,823,206**	**6,430,347**	**5,232,993**	**20,328,996**
Operating gain (loss)	**(861,030)**	**(500,865)**	**305,676**	**1,055,625**	**385,568**	**1,246,004**
Other income (expense):						
Interest (expense)	(2,817,895)	(498,355)	(503,887)	(317,510)	(6,120)	(1,325,872)
Gain (loss) on disposal of fixed assets	0				0	0
Gain (Loss) on chg in FV of profit share liab.	(531,435)	(148,961)	(158,456)	(168,736)	(178,000)	(654,153)
Gain (loss) on debt restructuring	600,677	0	0	0	0	0
Total other income (expense)	**(2,748,653)**	**(647,316)**	**(662,343)**	**(486,246)**	**(184,120)**	**(1,980,025)**
Net loss before taxes	**(3,609,683)**	**(1,148,181)**	**(356,667)**	**569,379**	**201,448**	**(734,021)**
Income tax benefit (expense)	(23,000)	0	0	0	0	0
Net Income (Loss)	**(3,632,683)**	**(1,148,181)**	**(356,667)**	**569,379**	**201,448**	**(734,021)**
Net Gain (Loss) from Continuing Ops.	**(4,233,360)**	**(1,148,181)**	**(356,667)**	**569,379**	**201,448**	**(734,021)**
Net loss per share:						
Diluted loss per share	**(0.04)**	**(0.01)**	**(0.00)**	**0.01**	**0.00**	**(0.01)**
Diluted op. EPS before non-reoccuring items	**(0.05)**	**(0.01)**	**(0.00)**	**0.01**	**0.00**	**(0.01)**
Wgted avg. shares - basic	85,856,336	89,119,269	89,371,132	89,871,132	90,100,000	89,615,383
Wgted avg. shares - diluted	**85,856,336**	**89,119,269**	**89,371,132**	**93,530,946**	**90,100,000**	**89,615,383**
Adjusted EBITDA	**297,000**	**(408,000)**	**468,000**	**1,165,000**	**918,700**	**2,143,700**

HISTORICAL STOCK PRICE



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[i] Control of Mercury Emissions from Coal-fired Electric Utility Boilers, U.S. Environmental Protection Agency, March 2004.
[ii] Process Optimization Guidance for Reducing Mercury Emissions from Coal Combustion in Power Plants, United Nations Environment Programme, Division of Technology, Industry and Economics, November 2010, page 13.
[iii] Bowen, Brian, Basic Mercury Data & Coal Fired Power Plants, Indiana Center for Coal Technology Research, August 2007, Slide 4.