

# ETI alphaDIRECT MANAGEMENT SERIES

DECEMBER 18, 2018

## IN FOCUS: POLA POWER, INC. AND ITS CORPORATE STRUCTURE, ORGANIZATION AND BUSINESS STRATEGY.

This report focuses on Polar Power, Inc. (NASDAQ: POLA) and its corporate structure, organization and business strategy.



Source: [www.polarpower.com](http://www.polarpower.com)

### THE alphaDIRECT INSIGHT

Polar Power develops technologies and products that produce reliable energy for off-grid and backup power applications with a major focus on the telecom market. The company also produces energy efficient cooling and refrigeration systems. Polar has the unique ability to integrate multiple technologies into a single solution meeting the customer's specific needs. To protect its IP and deliver the most cost-effective solution Polar maintains a vertically integrated manufacturing facility. We believe the company is beginning to deliver on its key strategic initiative of diversifying its exposure within top-tier telecom providers, expanding internationally and developing non-telecom markets such as military and onsite primary power generation for residential and commercial markets. These initiatives are beginning to show in the company's backlog with a record \$19.1 million as of November 26th. In this report we review the company's overall strategy, technology and markets.

### POLA Business Snapshot

**Founded:** 1979  
**Headquarters:** Gardena, Calif  
**Ticker:** POLA (NASDAQ)  
**Stock Price:** \$5.19\*  
**Market Cap:** \$51.325M\*  
**Website:** [www.polarpower.com](http://www.polarpower.com)  
 \*As of December 17, 2018



**About alphaDIRECT  
EnergyTech Investor**

alphaDIRECT Advisors, a division of EnergyTech Investor, LLC (ETI), is a Publishing and Investor Intelligence firm that creates and implements digital content and programs to help investors better understand a company's key drivers including industry dynamics, technology, strategy, outlook and risks as well as the impact they could have on the stock price. alphaDIRECT's expertise encompasses a variety of sectors including Clean Transportation, Emerging EnergyTech, Energy Services, Smart Buildings, Solar, Water Value Chain and Industrial. alphaDIRECT was founded by Wall Street veteran and research analyst, Shawn Severson, after seeing a significant shift in the investment industry that resulted in less fundamental research conducted on small cap companies and a significant decline in information available to all investors. alphaDIRECT's mission is to bridge that information gap and engage companies and investors in a way that opens information flow and analytical insights.

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## Participants

**Mr. Arthur D. Sams**  
**President, Chief Executive Officer and**  
**Chairman of the Board of Directors**  
**Polar Power, Inc.**

Arthur D. Sams co-founded Polar in 1979. In 1991 Polar was restructured as a C Corp and Mr. Sams officially became president, Chief Executive Officer and Chairman of Polar Power's board of directors. Under his leadership, they have grown to be a leading brand name in the design and manufacturing of DC power and cooling systems for the telecommunications, military, automotive, marine and industrial markets. He specializes system integration and thermodynamics and designs power generation and refrigeration systems. During his early career, he gained vast industry experience while working as a machinist, engineer, project manager, chief technical officer and consultant for various Fortune 500 companies and the U.S. Department of Defense and the U.S. Department of Energy. Mr. Sams studied at California State Polytechnic University Pomona and the University California at Irvine with a dual major in biology and engineering.

**Mr. Shawn Severson**  
**Founding Partner**  
**alphaDIRECT Advisors**

Mr. Severson is the Founding Partner of alphaDIRECT Advisors, a division of EnergyTech Investor, LLC (ETI). He has over 20 years of experience as a senior research analyst covering the technology and cleantech industries. Prior to founding alphaDIRECT Advisors, he led the Energy, Environmental and Industrial Technologies practice at the Blueshirt Group. Mr. Severson was frequently ranked as a top research analyst including one of the Wall Street Journal's "Best on the Street" stock pickers and multiple awards as Starmine's top three stock pickers.



## **ABOUT POLAR POWER, INC.**

Gardena, California-based Polar Power, Inc. (NASDAQ: POLA), designs, manufactures and sells: power systems, lithium battery storage, solar hybrid systems for applications in the telecommunications market and, in other markets, including military, electric vehicle charging, cogeneration, distributed power and uninterruptable power supply. Within the telecommunications market, Polar's systems provide reliable and low-cost energy for off-grid and bad-grid cell sites with critical power needs that cannot be without power in the event of utility grid failure. For more information, please visit [www.polarpower.com](http://www.polarpower.com).



## **DC GENERATORS**

The Polar DC Generators are designed and optimized to deliver high currents at low voltages which is required for battery charging and operating DC loads. No battery chargers or power supplies are required. Polar has designed this DC generator incorporating state-of-the-art technologies and all new tooling to meet the increased performance demand.

Source: [www.polarpower.com](http://www.polarpower.com)

**Shawn Severson:** First, I would like to thank you, Arthur for taking the time to speak with us today. I would like to cover an overview of Polar Power's corporate organization and structure and a brief review of your market strategy. However, before we get started, could you give us a brief introduction of yourself and what made you start Polar Power?

**Arthur Sams:** Absolutely, Shawn. I am a stereotype of an inventor, engineer, and entrepreneur. I began before I was nine years of age working at various jobs and spending my cash on hobbies and inventions. Hobbies included amateur rockets, SCUBA, target shooting, camping, travel, and sailing. My early businesses and various jobs provided me with experience and a nice income starting as early as Jr. school and continued throughout college. In college I had a dual major of engineering and pre-med. Leaving college in 1975 I incorporated my first international import/export business which was unsuccessful due to government intervention and lack of capital. In 1979 I co-founded Polar, a technology company, that developed world's first practical solar powered refrigerator to solve the cold chain problem with vaccine storage in rural areas for United Nations World Health Organization Immunization project. A few years later our technology developed into larger military cooling and power systems.

**Shawn Severson:** Thank you, Arthur. Can you provide us with a brief introduction of Polar Power (what you do, products, technology etc.)?

**Arthur Sams:** Polar develops technologies and products that produce reliable off-grid energy or backup power. Our technology and products provide reliable low-cost electrical power generation for off-grid

applications and backup power for grid connected applications. We also serve mobile applications with prime power for powering electronics, refrigeration, or other payload needs. We provide DC generators and batteries for series type hybrid drive vehicles; these specialty vehicles are used for material handling, moving aircraft, etc.

Telecommunication's cell towers are becoming one of the largest consumers of energy and therefore becoming one of our largest target markets for backup and prime power. Since 2014 we have experienced a significant growth in our telecom market where we provide integrated solutions of Solar, DC generators and battery storage technologies to address backup power and off-grid energy needs. Our products are available in Diesel, LPG and Natural Gas configurations. One of our key differentiators is that Polar's sells directly to our key accounts without use of any intermediaries, which has helped us in identifying customer needs early giving us an edge in getting product to the market ahead of competition. In the U.S. markets our products have been certified and approved by top four Tier-1 telecom providers while globally we are certified by 32 Tier-1 telecom providers. Regarding the technology, what makes our products unique is our ability to combine multiple technologies into one single solution to fit the customer's needs.

As an example, we optimized a Solar Hybrid Power system by replacing the AC generator with a more efficient DC generator and the lead acid batteries with fast charging lithium ion. These improvements resulted in lowering capital cost while reducing operating cost due to component reduction, eliminating the unnecessary conversion of AC to DC, thereby increasing reliability and lower maintenance. To accomplish this, we engineer and

manufacture our own components. We designed and manufactured a DC generator for efficiency and lower maintenance (there was none on the market) The DC generator eliminates the cost and efficiency losses in the conversion of AC to DC as required to charge the battery. To integrate the Lithium Ion battery into the system required monitoring of each cell in the battery bank and providing precise charging, Polar developed its own Battery Management System (BMS) that directly communicates with the DC generator for precise charge regulation. Polar is the only company on the market today with this feature.

Most companies that manufacture AC generators do not provide DC and they do not integrate batteries and solar into their products. Customers are left up to hiring engineers/consultants to select the system controls, generator, batteries, battery charging equipment, and provide the thermal management of the system. Most solar companies, engineers and consultants are purchasing off the shelf components from many vendors to assemble a system and this is very expensive and difficult to provide long term maintenance and support.

Since our inception in 1979, Polar has always first identified the market need and then developed the technology and products to most cost effectively and efficiently meet the application needs. Unlike many clean tech companies, we do not develop the technology first then look for the applications and customers.

**Shawn Severson:** What would you say are the four most important drivers of your business over the next three years?

**Arthur Sams:** For US Markets I would say the emphasis on upgrading and repairing of

telecom infrastructure by all telecom providers has created opportunities for backup power systems in both on-grid and off-grid markets.

Climate change and emphasis on reducing pollution and fuel costs at telecom towers has created opportunity for higher efficiency solar hybrid backup power systems.

National security concerns over energy and telecommunication grids has started a renewed investment by federal government into public private partnerships to create a nationwide emergency telecommunication infrastructure which is equipped with improved backup power systems. As the severity and frequency of natural disasters increases, cell sites are having to increase the autonomy of backup storage from 2 – 8 hours to 48 – 72 hours and this is not practical with battery storage (for most sites). The DC generator is the best solution.

Increased use of video streaming, introduction of 5G to compete with Cable providers, IOT applications on autonomous vehicles requiring 100% reliable networks has resulted in expansion of urban and rural networks requiring additional backup systems nationwide are positive trends for our business.

Modern warfare is moving towards rapid deployments of troops via air as opposed to ship. Everything must be more compact, lighter in weight, and more rapidly deployed. Also, military is making significant investment into autonomous vehicles and mules, which can be used to carry logistic supply and security functions 24/7. This effort is aimed at reducing casualties. Use of DC power system in these robotic mules is a paradigm shift in power needs of military when forward deployed. We have benefitted from initial

orders for compact generator to power future military robots.

Regarding International Markets, emerging markets are the fastest growing markets for expansion of telecommunication infrastructure. Lack of reliable electric utility infrastructure and higher percentage of population located in rural areas has led to significant percentage of telecom infrastructure located in bad grid or off-grid areas. Backup generators, solar hybrid systems are essential part of each telecom tower site in these markets and therefore a key growth market for our products in the near term.

**Shawn Severson:** Can you briefly discuss your different target markets for your power solutions?

**Arthur Sams:** Our core technologies and products service diverse markets which range from telecom, military, automotive, industrial, marine, mining and distributed power. Due to significant expansion of telecommunication networks worldwide over 90% of our sales is generated from telecom customers.

We are currently focusing most of our resource on Telecommunications both domestically and internationally.

As Polar builds its production and customer service and support, we will expand sales into Military, Data center, commercial and residential and electric car charging.

Polar is operating on a staged growth bases, supply chain, production facilities, marketing and field service all have to be elevated at the same time and in relation to our sales revenues. Otherwise our annual losses along with business risk will be similar to other clean-tech and high-tech companies.

**Shawn Severson:** What differentiates them on the market today compared to competitors' applications?

**Arthur Sams:** Polar has a unique position business model. Polar manages and masters multiple technologies and our competition focuses on a few technologies. For example, I have never seen major generator manufacturers include battery charging or battery banks, or solar hybrid systems into their product lines, like we do.

Polar markets its products directly to our customers rather than using intermediaries. We have tried distribution channels in the past but found it difficult to launch new technologies, there is a tendency to "filter" information exchange between the customer and our engineering at Polar. Also, with distribution there is always the issue regarding the time resource split between our Polar needs and that of other companies being represented by the sales rep. Direct communication with the customers has allowed us to maintain long term relationships with our customers and this gives us insights into their future needs in terms of products and services. We believe our ability to be the first on the market to provide the solution to our customer requirements is a key competitive strength.

The U.S military offsets some of our costs to develop our technologies. Over the last 3 decades, we successfully commercialized these technologies into DC power systems and solar hybrid products. The competition process to obtain US military contracts helps to ensure our engineering and quality control talent is competitive. Telecom rarely cover product development costs. Competition must cover their product development cost and include this cost into their product.

Over the years, Polar has successfully developed key technologies and then invested capital in manufacturing these technologies in-house. This strategy has protected our technologies in competitive landscape and allowed us greater control over quality of these components and supply chain.

**Shawn Severson:** Can you discuss the reliability and long life of your DC systems and how that makes them desirable on the market, especially within the telecom market?

**Arthur Sams:** During the initial phase of our company, Engineering, Maintenance, and Repair Services were performed by the same people. If equipment failed in the field the engineer of the system was the one that travelled to location to repair the product. So, consider the situation where the engineer who designed the equipment has travel from Los Angeles to a remote area in Alaska in the winter to urgently repair a generator supporting a fiber link relating to NASA communications, a memorable experience and not one anyone wants to repeat, so the engineer learns a valuable lesson on product design. Servicing the globe with specialized power systems with less than five technicians created a culture of "lets design it so it does not break" and "if it does break, let's make it really simple to repair".

We did not pursue the path of planned obsolescence and finite service life on parts to support after sale revenues. Our value proposition was long life and low maintenance providing higher reliability. We felt that the opportunity to sell long life low maintenance power and cooling systems was greater profit and growth strategy than engineering components with limited service

life to enhance revenues derived from replacement parts and labor. Eventually, with a large installation base revenue from parts and labor will eventually come, but in relative smaller proportions.

**Shawn Severson:** Do you consider the telecom industry in emerging markets to be your biggest market and how do you plan on increasing your market share as part of your growth strategy?

**Arthur Sams:** I have heard it said that USA represents only 5% of the world market. Not only are there great telecom opportunities in developing countries but it is a gateway for other power and cooling products and services. We are continuing to build our overseas sales, marketing, and service resource.

With the launch our new LPG and natural gas power, HVAC and refrigeration solutions we see significant growth within North America.

**Shawn Severson:** Can you talk about some of your biggest customers, specifically within the telecom and military market?

**Arthur Sams:** Our technologies are designed to provide higher efficiency in off-grid power generation market. More than two decades ago we began our relationship with our telecom customers. In telecom markets certain regions in the U.S. market purchased our products due to high reliability in areas with temperature extremes and in other cases they purchased our products due to lower operating costs. Our largest telecom customers today are the top Tier-1 telecom providers in the nation. Lower volumes during initial phase of our relationship allowed us to further customize, configure and harden technologies to meet application needs.

The fact that our warrantee costs are approximately 0.1% of the product cost reflects the reliability our design and production methods. 0.1% is significantly lower than industry average. Today we are known as highest quality providers in the telecom backup power generation market, with increase in volumes we have successfully reduced the cost to compete with legacy AC technologies.

We are not yet strongly active in military marketing and sales. We are servicing those military projects that knock on our door.

**Shawn Severson:** Can you explain your position as a complete systems provider and how you divide your risk by operating on a global basis with a broad customer base?

**Arthur Sams:** In the telecommunications market we have seen the business model change a few times over the past two decades. Initially it started off as telecom providers themselves investing in technologies and infrastructure costs to provide coverage to selling off these infrastructure assets to tower operators. Telecom providers became Mobile Network Operators (MNO). Tower Operators are actually just Real Estate investment companies and seeking relationship with technology companies to provide complete solutions. We believe in emerging markets there are new opportunities for companies like Polar, as an Energy Service Providers (ESP) who can provide the complete energy infrastructure for telecom towers thereby removing the technology risks in purchasing, installing, maintenance and the CAPEX of an energy efficient solution. Presently most of our customers are not pursuing the ESP services; they prefer to purchase the system and not spend extra money on the value-added service of the ESP.

We believe the future is to combine PV, battery storage with DC generator for prime power off-grid and bad grid applications. And for on-grid sites add a simple 500 W to 1 kW of peak solar to each site.

Polar is here to lower the operating expenses of the MNO's and tower operators while profiting as a solutions provider. Our aim is to avoid the smaller profit margins as a commodity manufacturer.

In the global market place, we have started developing the infrastructure that resembles what we have in the U.S. market. We have setup subsidiaries in Australia, Namibia and Romania to develop localized product solutions and sales infrastructure to address regional needs. In a short period of less than 12 months we have started to see initial results of these investments in forms of product qualifications and initial test and demonstration purchases by Tier-1 telecom providers. We believe once these regions scale further we will look into adding value added operations at these facilities to further reduce costs and thereby gain competitive strength.

**Shawn Severson:** You describe yourself as being ahead of the technology curve, can you please elaborate on that and touch on your IP?

**Arthur Sams:** Sometimes technology is just a component, product or service that most efficiently solves customer problems or enhances customer experiences. Our strategy of direct sales to large customers has always benefited us by giving us insight into inefficiencies or needs of the customer. Most of technologies are aimed at removing these inefficiencies through integrating multiple

technologies to produce an efficient outcome.

Although we do have IP related to our hardware components such as system controls, alternator technology and cooling systems we believe the main IP is in our software integration and “knowhow” that efficiently combines renewable energy with energy storage and fuel-based power generation to produce reliable lowest cost energy in off-grid, bad-grid and on-grid applications worldwide. We continue to monitor, test and experiment with new upcoming storage and power generation technologies to ensure our technologies and software can successfully integrate these technologies with any current or future power needs of our customers.

**Shawn Severson:** What do you consider to be your main competitive advantage within power systems?

**Arthur Sams:** Vertical integration of manufacturing and control over our supply chain is a key competitive advantage for Polar in combination with our company departments of Quality Control, Production, Engineering, Marketing, Sales, and customer service.

We are also proud to be able to find the right talent with the realization that growth is not possible without good employees.

**Shawn Severson:** Lastly, where do you want to take Polar. What are your growth goals?

**Arthur Sams:** Polar was founded on the goal of taking the right technology and applying the technology is such a way that benefits both the environment and the end user. We did not want to develop a technology or product and apply it to applications where

this technology was not well suited. Polar would instead develop another technology and product that would be more competitive in a solution for the customer. Many companies develop a technology first then look for applications and customers. Polar looks at a customer needs first then develops the technology, this is a faster way to market and profitability.

In the 1970's we saw the need and technology advantages of DC (direct current) based solutions for mobile / portable, off-grid, bad grid, and good grid applications. Given the financial resources of Polar at that time we pursued small niche markets that had the potential to grow into larger niche markets. For example: solar energy, electric vehicle charging, power generation for both backup and off-grid applications, wireless communications, advancement of electronics into military applications.

Expansion of telecom networks in bad grid and off-grid emerging markets has resulted in backup generators consuming more fossil fuel than transportation in countries like India and Nigeria, this trend will result in shift of focus from automotive industry to lower pollution stationary power technologies for telecom towers.

In conclusion, our journey that began 40 years ago as solar powered vaccine refrigerator and special equipment provider to the military has now become main stream renewable energy product that reduces operating costs and air pollution. We believe our success is based on our ability to deliver environmentally sustainable power generation solution that combines fossil fuel and renewable energy solutions to provide the most cost effective, smallest carbon footprint for our telecom customers worldwide. Our entry into some of the emerging markets has ensured that new

telecom infrastructure development in these regions is based on environmentally sustainable footprint while ensuring economic viability and product reliability.

looking forward to our next conversation in the near future.

**Arthurs Sams:** Thank you, Shawn.

I would like to take Polar to \$500 million and above in revenues while expanding our efforts in reducing pollution and improving the oceans and rural environments. Meeting our clients' energy needs efficiently and without a negative impact on the environment.

When we reached between \$7 to \$8 M in sales our first round of capital raise was \$1.2 M, and with this \$1.2 Million we grew to \$24 M in sales and this performance gave us the creditability for the next raise, a \$17 net capital raise via IPO. The IPO raised the minimum amount of funds that would allow us to reach our sales goals (\$75 - \$100 million) and even if we wanted to raise more capital our business plan and creditability would not allow it. Also, the management infrastructure was not in place to effectively make use of a larger capital placement. We will need a third capital raise to assemble a much larger, more automated factory with the necessary inventory that will take to the \$500 M and above sales revenue. We are conservative in our capital raises and subsequent expenditures as we have our investors best interest at heart, including myself.

**Shawn Severson:** Thank you very much, Arthur. I think investors have a better understanding of Polar Power and I am

## SHAWN SEVERSON FOUNDING PARTNER

Mr. Severson founded *alphaDIRECT* Advisors, a division of EnergyTech Investor, LLC in 2016 after seeing a significant communication and information gap developing between small and micro-cap companies and the financial community. Mr. Severson has over 20 years of experience as a senior research analyst covering the technology and cleantech industries. Previously, he was Managing Director at the Blueshirt Group where he was the head of the Energy, Environmental and Industrial Technologies practice. Prior to the Blueshirt Group, Mr. Severson was at JMP Securities where he was a Senior Equity Research Analyst and Managing Director of the firm's Energy, Environmental & Industrial Technologies research team. Before joining JMP, he held senior positions at ThinkEquity, Robert W. Baird (London) and Raymond James. He began his career as an Equity Research Associate at Kemper Securities. He was frequently ranked as a top research analyst including one of the Wall Street Journal's "Best on the Street" stock pickers and multiple awards as Starmine's top three stock pickers.



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