

# alphaDIRECT MANAGEMENT SERIES

SEPTEMBER 4, 2019

## IN FOCUS: POLAR POWER, INC., AND OPPORTUNITIES AND DRIVERS IN THE INTERNATIONAL TELECOM MARKET

This report focuses on Polar Power, Inc. (NASDAQ: POLA) and opportunities and drivers in the international telecom market.



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

### THE alphaDIRECT INSIGHT

With more than 5.4 million telecom sites globally, the international telecom market offers a significant opportunity for Polar and the company has been taking steps to accelerate the commercialization of these markets. In our view Polar has some distinct technology advantages over incumbent AC technologies and existing DC suppliers. These include the ability to manage multiple technologies, such as renewables, energy conversion, digital control systems and system integration. The company has invested heavily in developing this market over the past couple of years and we believe the initiatives could have a positive impact in 2020 and beyond as current product demonstrations are converted into commercial deals. Another feature of the international market is the opportunity to expand revenue per site as Polar offers peripheral services and products to become a more comprehensive supplier to international telecoms. Furthermore, we believe the opportunity isn't limited to telecom as new product offerings around LPG could help expand Polar into new markets such as residential and commercial.

### POLA Business Snapshot

**Founded:** 1979  
**Headquarters:** Gardena, California  
**Ticker:** POLA (NASDAQ)  
**Stock Price:** \$3.68\*  
**Market Cap:** \$33.98M\*  
**Website:** [www.polarpower.com](http://www.polarpower.com)  
 \*As of September 3, 2019



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 in 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 of 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).



*Polar's CEO, Arthur D. Sams*  
Source: [www.polarpower.com](http://www.polarpower.com)

**Shawn Severson:** Thank you, Arthur, for taking the time today to speak with us in our ongoing alphaDIRECT Management Series. The last time that we spoke, [we discussed the investments you have made in the business](#) and today we will discuss Polar's opportunities and strategy in the international telecom markets. Can you begin by helping us understand the size of the international market and what makes Polar competitive in these markets?

**Arthur Sams:** Thank you, Shawn. The size of the International telecom market for power systems is so large that it is difficult to quantify it in a single measure. For us, small percentages of market share translate in significant revenues. There are more than 5.4 Million cell sites internationally of which 3.7 Million are in Asia and Africa alone. Infrastructure spending for the telecom industry overseas is expected to cross 2 trillion USD over the next 5 years. A significant portion of this cost goes to power / energy infrastructure and network hardening, which in my view, provides superior technology to the incumbent solutions. Needless to say, the market opportunity for us is very large.

In regard to the competitive environment, Polar Power has the ability to manage multiple technologies including energy conversion, digital control systems, cooling systems, system integration and manufacturing. Most of our competitors are limited to managing one or two technologies in their power solutions. And most of our competitors do not have a full-time staff of R&D engineers; because they do not provide tailored solutions to their customers. Instead, these companies rely on the customer to put together their own tailored systems. I would

also note that most customers in telecom are not willing to cover the cost of customizing products so there is limited financial support for R&D. Additionally, managing an R&D group can be expensive and not yield profitable results for inexperienced companies. At Polar, we are unique and have an advantage because our military, industrial and special project work covers a good portion of our R&D costs and enables us to innovate and perfect our technology platform for larger commercial applications including telecom.

Another advantage I believe we have is that we are vertically integrated in our manufacturing process. In my experience there is the tendency of most clean tech and high-tech companies to subcontract their production, leading to them performing light or no assembly. We believe our strategy enables us to reduce production delivery time and product cost.

To summarize, the international market is extremely large, which is why it is important to our future. Furthermore, I believe we possess some distinct advantages over our competition in international markets and we have been working hard to position ourselves to attack this market and leverage our capabilities.

**Shawn Severson:** How important are the emerging markets for Polar's international strategy?

**Arthur Sams:** It is important to understand that the telecommunications and broadband services are the backbone for growth in all emerging economies. We also believe that much of this infrastructure development is less

economically sensitive than other parts of the global economy which should reduce our sensitivity to economic variables in these markets. This is especially true in bad grid/no grid, extreme weather, or first responder/law enforcement and military installations. This holds true both domestically and internationally in our view and has been demonstrated over the past recessions. As I mentioned earlier, we have some distinct advantages over existing technologies and offer a differentiated and better solution relative to existing DC suppliers.

**Shawn Severson:** Thank you, Arthur. As you mentioned, the international market is a significant market opportunity due to its size, but will you expand a bit more on why it is important for Polar as it seems the domestic market alone would be enough?

**Arthur Sams:** That's a great question, Shawn. Firstly, companies that want sustainable growth must think globally when it comes to revenues and markets, supply chains, engineering talent, strategic relationships, and labor efficiencies in production. For example, you have US IC chip manufacturers like Nvidia, Qualcomm and Intel taking a major role in supporting the electronic technology requirements of 4 and 5G. You have Eriksson, Nokia Siemens and Huawei incorporating these electronic technologies into the 4 and 5G systems and these companies are all headquartered overseas. Polar needs direct relationships with these overseas system providers so that our products can be integrated with theirs and we need to be viewed as a global company. There are also competitive reasons we want to build our presence overseas. I expect more competition will come from international

players going forward and I believe they will also eventually compete with Polar here domestically, so we need to be proactive overseas today. Our strategic initiatives are to take market share early and grow overseas revenues and establish Polar in these markets. We want to be a global brand and win the battle before it starts.

Hybrid power systems that incorporate DC generators typically have lower OPEX and CAPEX costs than those systems that have incorporated AC Generators. But many of our customers do not compare the differences in systems costs instead their departmentalized procurement process focuses on the cost differences between DC and AC generator alone. So, another reason to pursue the international market is to increase of production volume. I believe that we could make DC generators at a lower cost than AC generators if we can get to similar production volumes as our domestic AC generator competitors; who are in the 100,000 plus volumes annually. To reach these high volumes, we do not want to subsidize or greatly reduce our profit margins, so combining domestic and international specialty / premium markets will allow us to grow volumes but do it profitably and avoid the commodity like products most of our competitors offer.

Lastly, I think by gaining a foothold with our hybrid power systems, sales and service internationally will lead to other market opportunities outside of telecom in the residential, commercial and military for example, both in developing and in developed countries.

**Shawn Severson:** Can you discuss your good, bad and no grid applications and solutions for the international market as well as domestically?

**Arthur Sams:** Absolutely, Shawn. As you would expect, conventional backup systems are targeted toward good grid countries such as Australia, USA and Japan, while Europe is becoming a focus for non-generator type technologies for backup such as super capacitors. The key drivers in most good grid international markets are that telecom providers are pushing towards network hardening, which is especially critical for 5G infrastructure, which require more reliable and compact power solutions.

Over the long-term I expect the 5G global rollout will be a strong demand driver for our business. Although not related to our international customers specifically, domestically there has been some short-term budget shifts in favor of 5G electronics, which resulted in some spending on back-up systems to be deferred until next year as we discussed on our last quarterly call. This combined with shorter lead times has impacted our short-term visibility but does not change the multi-year growth curve we expect to see. Keep in mind we have yet to see much demand for back-up systems for 5G, but it will come as part of the roll-out as providers get a better handle on their power requirements and architecture. We have made considerable progress in markets like Australia, but we are still waiting for the contracts.

Next, looking at the bad grid applications, the quality and reliability of the power grid is poor and has intermittent drops or extended

periods of power outages. We are presently demonstrating our DC power solutions for this type of environment in countries like Sri Lanka, Philippines, Thailand, Indonesia, Malaysia and Southern Africa.

Based on the duration and frequency of the power outages, we select the appropriate size of the generator, fuel storage volume, battery bank storage capacity, and a possible solar PV array. At a bad grid site, the goal is to lower the cost of energy while providing reliable power. We compare the CAPEX and OPEX costs of fuel energy against the cost of utility energy stored in a battery. Additional factors with the available space for solar PV. One of our many tasks is to computerize this selection process, which is a critical capability to reduce our proposal costs and time to submission.

For off-grid sites, our solar DC hybrid solutions have a significant edge over the competition. We have the credibility in the industry as a company that engineers the right mix of solar renewables with the right mix of fuel energy. The “right mix” lowers both the CAPEX and OPEX costs and provides improved overall efficiency. It is estimated that there are more than 300,000 off-grid sites in the emerging world. This is a huge market and presently a majority of these sites are running on AC generators and lead acid batteries resulting in outrageously high capex and opex costs. We have demonstrated that our hybrid systems can reduce the site expenditures by more than 70% while offering a high degree of reliability.

As with most disruptive technologies, the challenge is educating the customer with demonstrations and instilling the confidence

to move away from old technologies and engineering practices. As we increase our sales and technical support infrastructure, we will increase our efforts in pursuing these opportunities. Polar is in the process of increasing its marketing and educational materials to target these customers, but this has occurred more slowly than I would have liked due to Tier 1 customers absorbing much of our resource.

**Shawn Severson:** Can you talk about how you managed to establish your international presence?

**Arthur Sams:** Polar launched its overseas initiative with the introduction of DC Generators at the World ITU Exhibition / conference in Geneva Switzerland around 1998, where I met approx. 5,000 attendees. Since then Polar has participated in some 35 to 45 international exhibitions. When we were still a private company and before taking on Verizon as a major customer, more than 50% of our telecom sales were overseas.

When Polar left the overseas markets to service Verizon we left a vacuum for DC generators and solar hybrid systems using DC generators. This gap was then pursued by European manufacturers and these companies also successfully demonstrated the fuel saving of DC generators over AC, which led to even more market interest. What is key to point out is that all these overseas companies were new to building any type of DC generators and others had no experience with assembling either AC or DC generators. As a result, quality and reliability was not there and this created a headwind for the technology overall and the market was set back with the result being Telecom

companies wanting longer field trials, which pushed out the sales cycle even longer. Nonetheless, there are Telecom operators who are satisfied with their current supplier of DC generators, but this comes with higher maintenance costs relative to Polar's solution. So, we must demonstrate that we have a superior product (which we do) and regain market share in Europe.

**Shawn Severson:** Can you talk a bit about your marketing and education efforts that you are implementing?

**Arthur Sams:** Absolutely, Shawn. It is very important that we spend time and effort on educating and marketing to potential customers. The fact of the matter is that most telecom companies do not have buyers and engineers with a high degree of expertise in selecting generators. Many simply do not know what to look for when choosing a generator or hybrid power system for their cell sites, so they go for the lower upfront cost product. Brand recognition is important and Polar has an advantage here, but we need to push harder. Most of the Telco carriers have split their operations into multiple departments, there is Purchasing who focuses on CAPEX and within purchasing you can have various groups within the department responsible for purchasing specific items that make up the power system (examples: automatic transfer switches, rectifier/battery chargers, monitoring controls, batteries). If for example the cost of operating the DC generator is 30% to 70% better than the AC generator this still has a limited impact because Procurement (CAPEX) and maintenance operations (OPEX) are separate departments with separate budgets. Polar must work at the

higher management levels to focus corporate attention to the overall cost of ownership.

**Shawn Severson:** Can you explain some of the unique aspects of selling abroad, especially in emerging markets?

**Arthur Sams:** Selling overseas comes with a unique set of challenges, but one can convert these challenges into opportunities with the right strategies. We are employing one such strategy in Africa and believe we are on the path to success there. Telecom companies in general (both overseas and domestically) prefer limiting their sourcing needs to fewer companies. Vendors who have capabilities of providing turnkey solutions to telecom's infrastructure needs were more prone to winning contracts overseas. We have lost contracts in the past in Africa to companies that are known as tower builders who were preferred vendors to provide power systems as well. Therefore, we put together an experienced team of professionals in southern Africa that have the experience building more than 6,000 cell sites. With this team we were able to go to the customer and win contracts as a turnkey solutions provider from building the sites, installing the radio equipment, providing the power solutions and maintaining them.

A successful stint during phase 1 of this contract has positioned us as a reputable vendor not only for this client but has also opened avenues to several telecom clients throughout Africa. This approach not only augments our ability to be a preferred vendor to the client but also helps us monetize the opportunity to the fullest since average

revenue of a turnkey solution is typically 4 to 5 times that of a backup generator.

Another thing that is different from our domestic customers is that the international market places a greater emphasis on the suppliers to provide the site monitoring and maintenance for their own equipment. Domestically its more popular to assign these tasks to the lowest bidder and have this successful bidder service all makes and manufactures of generators. We feel that this is not a good idea; it's like having one auto mechanic service all brands of automobiles. We to look forward to recurring revenue from customers for monitoring and maintaining our own equipment. This will also be a game changer in the future for Energy as a Service Company (ESCO) model because the service networks would be in place.

Telecom companies and tower companies are divesting off the power infrastructure from their balance sheets and this trend is becoming a popular strategy in the developing world. Since our solutions have a low total cost of ownership, we will naturally benefit from such a transition. We are currently engaged in discussions with a few clients and are exploring this model. This model will give our shareholders predictability, growth and a good return for their money. The challenge here is the amount of time that it takes to calculate their current ownership costs and putting the financing and contracts together for the leasing model.

**Shawn Severson:** Can you mention some markets outside of the emerging markets that you are targeting and talk about some of the challenges you are facing?

**Arthur Sams:** In Europe, Telco operators claim that the grid reliability is very high, which means that backup generators are not a high priority. In Germany some of the Telco's go as far as to have no backup, that is no generators or batteries. However, those sites without battery power are learning that there is no such thing as perfect utility power, as visually demonstrated by the slightest flicker of light bulb caused by a few cycles of utility interruption is sufficient to disrupt a data stream and cause the servers to reboot. Here we are proposing the use of super capacitors that can ideally provide 5 to 60 seconds of backup. In the very near future we plan to enter field trials with a few Telco's.

**Shawn Severson:** You have previously mentioned an engine project with Toyota and Bosch. Can you expand on that a bit and what it is and why it is important for international?

**Arthur Sams:** Our installations at Telco sites throughout the world will showcase our technology and I expect it will also lead to other applications and markets. With the Toyota / Bosch / Polar engine project we will be expanding our marketing activities to engage customers in the residential and commercial markets.

Our third major exhibition is the World LPG Convention in Amsterdam coming this Sept 24-27th. Here we will showcase a combined heat and power system for both on grid and off grid applications. Our audience is major producers and distributors of LPG (propane) fuel.

Consider, I had a discussion with an Australian LPG distributor, and they have over 40,000 customers who are off the grid. These

customers are farmers, ranchers, homes and resorts. They would deliver LPG for cooking, space, and hot water heating, and a separate company would deliver diesel for the generator. I noted that there is something wrong with that "picture"; there should be only one fuel delivery, clean burning propane, which would not only reduce the carbon footprint, but the waste heat of the generator should be put to use heating the water and HVAC. Another advantage is that using a DC based system makes it easy to incorporate solar.

So, the question is why an "off the shelf" packaged Solar Hybrid system that also makes use of the waste heat has not been available before? The answer to that questions would be that propane generators under 50 kW were not available in the prime power class with good fuel efficiency and at a reasonable cost. This is no longer the case and we are in the process of launching such solution.

**Shawn Severson:** What about emissions and the role that plays in technology adoption?

**Arthur Sams:** Europe is serious about reducing carbon emissions and as an example, new restrictions are being placed on generators used for temporary power at construction sites. The solution in our view is a hybrid power system combining a DC generator, lithium ion battery, DC to AC inverter, and possibly some integrated solar PV and the entire system mounted on a trailer for portability. The hybrid system can cut fuel consumption by as much as 200%. Generator sales for this type of application have historically been very large for companies like Generac and FG Wilson and in fact we believe it is even larger than

Telecom. We now have a solution to attack this market and I am excited about the opportunity here for applications that are under 50 kWp demand.

I wanted to highlight this because although Polar is still highly focused on Telecommunications, we have a variety of other applications that are well suited for our technology and power solutions.

**Shawn Severson:** The development of the international markets seems to be taking longer than originally planned – can you address this as to why?

**Arthur Sams:** Since our IPO we have described the long process of bringing a telecom customer to fruition. We had assumed that our previous demonstrations overseas and the close relationships that our experienced sales staff had with the customers would shorten the process. As we initiated this effort, we have had to adapt to more variables than anticipated including the fact that the turnover of the customers' project personnel was high, the equipment budgets more volatile, and our sales staff needed more application engineering support than we anticipated.

As I have mentioned numerous times before, there is more competition abroad, but these are generally small players. We have now adapted and better understand the market dynamics and expect our results to improve

with new product offerings and a more effective sales strategy. We are making the necessary adjustments to shorten our sales cycle in these markets.

**Shawn Severson:** Can you expand on that and are there any additional steps you can take or strategic shifts to accelerate the process going forward?

**Arthur Sams:** Absolutely. To begin with, we are increasing the number of application engineers to support sales, which I expect will improve our ability to close sales and build stronger relationships with customers. Secondly, we are increasing the technical training of our sales staff so that they can better highlight the technical advantages we have over other technologies and competitor's products. Third, we are increasing our product range and service now that we have a better understanding of the operators needs and limitations. This should lead to the most powerful factor of all, which is increasing the number of demonstrations in the field. I am confident that when customers experience our product in the field, we will accelerate our sales cycle and move customers to commercial volumes.

**Shawn Severson:** Thank you very much, Arthur, and this clarified the strategy behind Polar's initiatives in the international markets. We look forward to talking to you again soon.

## 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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