

Financing DESCOS : A framework of financing working capital for Distributed Energy Services Companies

Chris Aidun and Dirk Muench

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Introduction

Distributed Energy Services Companies (DESCOs)¹ have been growing rapidly, providing renewable energy to off-grid customers in sub-Saharan Africa. New DESCOs are launching across Africa. With more than 300,000 off-grid households and businesses served and over \$200 million of financing and grants raised in little more than 4 years, the prospect for accelerated growth seems certain. Indeed, the goal of electrifying off-grid Africa with distributed renewable energy may be within view.

An estimated \$15 to \$30 billion in capital is required for DESCOs to reach sub-Saharan Africa's >100 million off grid households and businesses with entry level energy services. This is a large amount of capital that will strain the capacity of impact investors and the development community. Given the potential profitability of DESCOs, it makes sense to expect that market-based financing will become available to contribute to the capitalization of the DESCO sector.

DESCOs run capital-intensive businesses as they generally hold significant amounts of inventory and receivables.² As they grow, this working capital needs increase.

The capital needed to develop and grow DESCOs to scale must come from one of three sources:

1. equity investment,³
2. operating profits (i.e., the excess of revenues over costs of operations), and
3. loans.

This paper looks at the growing need of Distributed Energy Services Companies (DESCOs) to secure working capital financing for growth. After considering the three sources of capital to finance a business, the paper offers a Borrowing Capacity Model, employing parameters used by market-based lenders, to provide working capital financing. This model is proposed to assist DESCOs in evaluating the financing potential of their businesses. The paper concludes by suggesting variations on the basic approach to working capital financing that could enhance DESCO borrowing opportunities. Our goal is that DESCOs will be able to use the BCM in their analysis of their capital needs – both debt and equity – to assist them in accessing market-based capital.

¹ See "A commercial solution to the energy access challenge" by Pepukaye Bardouille and Dirk Muench, June 2014

² As described in "A commercial solution" (note 1), there are two basic DESCO models: sales finance businesses (pay to own) and energy services businesses (pay to use). Sales finance DESCOs are working capital intensive businesses in the conventional sense because they purchase inventory, sell it on a time basis, and finance the receivables. What is inventory for a sales finance DESCO is a capital good for an energy services DESCO, i.e., the energy services DESCO holds the assets of the solar microgrid or individual solar home systems that it is "renting" to customers as a capital asset. In fact the financial analysis of the two types of DESCOs is the same. For ease of analysis, the Borrowing Capacity Model presented with this paper assumes the business is a sales finance DESCO. The model, however, can easily be adapted to an energy services DESCO.

³ While grant capital may be available for early stage DESCOs to launch and build, this can best be thought of as equity capital – except the grantor does not seek any ownership in the company.



What is Working Capital?

There is broad agreement that the DESCO sector needs working capital for growth. But, to avoid confusion, we distinguish between *working capital* and *working capital loans*. Working capital and working capital financing are two different things.

“Working capital” is current assets (i.e., cash, receivables, inventory, etc.) minus current liabilities (i.e., accounts payable and other short term debt).⁴ This excess of current assets over current liabilities is essential to operate a business. If working capital is zero or negative, there is no capital to buy inventory, pay employees or otherwise operate the business.

Working capital is a measure of a company’s liquidity and its ability to operate and grow. When we analyze the needs of the DESCO sector, we all agree that more excess current assets (i.e., available cash to buy more inventory, sell or lease it, and thereby create more receivables) is essential to grow a DESCO’s business. Rapidly expanding DESCOs will have a constant need for greater and greater amounts of working capital.

Total Capital Needs of a DESCO

Before digging deeper into the working capital challenge, it is worthwhile to take a look at the whole DESCO. In fact a DESCO needs capital to finance more than its current assets. In simple terms, the DESCO needs capital to:

- Pay for day-to-day operations such as buying inventory, and financing receivables
- Pay for property, plant and equipment for the business (trucks, facilities, software and servers, etc.), and
- Pay for other operating costs.

While DESCOs do need capital for property, plant and equipment, these amounts are relatively small in comparison to working capital needed.⁵

Sources/kinds of Capital

A DESCO has three potential sources of capital for growth:

- Equity raised from investors.
- The revenues generated in the business.
- Debt raised from lenders.

Equity capital including grants to early stage DESCOs⁶ - raised to launch a new business and must finance the business until it either generates revenue to support it and/or until it can borrow loans.

⁴ <http://www.investopedia.com/terms/w/workingcapital.asp>

⁵ The exception to this assumption would be for DESCOs that have incurred significant development costs in launching their products. These costs are typically funded entirely with equity.

⁶ See note 3.



Revenues generated in the business - used in the first instance to pay operating costs. The excess of revenues over costs will be operating profit that can be applied to finance working capital, invest in capital goods or pay dividends to shareholders.

Debt - a very attractive source of capital for DESCOS. If the interest rate on the loan is less than the DESCOS's effective rate of return on assets, the difference will increase the return on capital to the DESCOS's equity investors. This leverage can increase investor returns, making the DESCOS's equity more valuable.⁷

Though the DESCOS sector is still in the process of attracting market-based lenders, by looking at market-based working capital lending in mature sectors, one can understand the criteria lenders would apply in determining whether to lend to DESCOSs and if so, how much. Knowing this will give DESCOSs an insight as to how much equity capital is needed at various stages of growth to support debt raised and how best to build a strong balance sheet. Understanding what drives market-based lenders will also help us explore whether creating structured finance products, like asset-backed DESCOS receivables, will bring market-based lenders into the DESCOS sector sooner and/or lower borrowing costs for DESCOSs.

Market-based Lenders' Approach to DESCOSs

Lenders can be expected to rely on three measures to determine whether to lend to DESCOSs on market-driven terms and how much working capital to lend. These three measures are:

- Collateral Coverage
- Debt – Equity Ratio
- Debt Service Coverage Ratio (DSCR)

Collateral Coverage Receivables

Market-based lenders will make working capital loans secured by the borrower's receivables. As a threshold decision whether to lend against these assets, a lender will evaluate the quality of a borrower's receivables, i.e., default and delinquency rates. It will also evaluate the borrower's systems for collecting receivables and servicing customers. In the case of a DESCOS that remotely controls customer access to systems, the lender will evaluate the robustness of the integrated payment, monitoring and control system. The lender may also want conditional access to this system, i.e., the ability step into the borrower's place and operate the system to collect the

⁷ There are also risks in borrowing loans. The borrower could be subject to foreign exchange risk if paying in a different currency than its revenue source. Most working capital loans are relatively short term and, unless the company is shrinking, must be refinanced. Unless the DESCOS is in liquidation – collecting out its current assets - it would only be able to repay a working capital loan from operations if it were generating enough profits to repay the loan and finance its growth. Securing refinancing will depend on the DESCOS's performance, market conditions for borrowing at the time and other factors not in the DESCOS's control. In this sense, equity investment is more forgiving than borrowing.



borrower's receivables. A lender might act on this ability in the event the lender accelerates the loan after a default.

An established business pledging high quality receivables to secure a working capital loan will typically be able to borrow an amount equal to between 60% and 80% of the face value of its receivables. To our knowledge, no DESCO has borrowed loans from a commercial lender on this basis.

Inventory

Market-based lenders will secure working capital loans secured with the borrower's inventory. The lender will evaluate the salability of the borrower's inventory to determine whether and how much to lend against the borrower's inventory. For example, the borrower's meter/locking system may be proprietary and not usable by any other DESCO. Or it may be part of a licensed system that can only be resold through the licensor (who may offer the lender only a fraction of its value). Even standardized components such as batteries and solar panels may be difficult to resell in local markets. A lender, inexperienced in such operational matters, knows it will incur significant costs in such resale process. Lenders are aware of this and consequently tend to heavily discount the value of inventory as collateral.

Because lenders expect to realize only a small portion of the value of a borrower's inventory in a disaster scenario, they would typically lend no more than 50% of the purchase price to the borrower against a pledge of its inventory. In immature markets, like the DESCO sector, the advance rate could be much lower.

Debt to Equity Ratio

Even though a lender may be substantially over collateralized in making a market-based working capital loan, it nonetheless recognizes that there is no substitute for the success of the borrower. Even at low advance rates for inventory and receivables, no lender wants to be forced to seize these assets and collect its loan by liquidating a borrower. Certainly one key to ensure a borrower's success is that the borrower has an adequate capital base, i.e., enough equity invested in the business to withstand difficulties and setbacks the business might encounter.

To evaluate a borrower's ability to ride the ups and downs of a business, a lender will typically look at the ratio of a borrower's debt to equity.⁸ The debt to equity ratio is usually expressed as a percentage. For example, a business that has \$2 of debt for every \$1 of equity investment has a debt to equity ratio of 2.0 (200%).

Large companies in mature markets have very low debt/equity ratios. For example, the energy sector has a debt/equity ratio of 0.34, i.e., there is only 34¢ of debt for every \$1 of equity invested in businesses in the energy sector. In contrast, the financial services sector has \$2.68 of debt for every \$1 invested. Utilities have \$1.35 of debt for every \$1 invested.⁹ In fact, these ratios do not represent the potential to borrowing available to a successful small and medium-sized

⁸ It is also sometimes described as a company's leverage ratio.

⁹ Source: CSI Market. <http://csimarket.com/screening/index.php?s=de&pageS=1&fis=>



business. Private equity firms leverage their mature, stable portfolio companies at much higher levels than those reported above, sometimes reaching ratios of 5.0 in mature markets.

What is the likely “market” debt to equity ratio for a DESCO as the sector matures? We think that DESCOs should be able to leverage at least in the 2.0 to 3.0 range (at a similar level of a financial services business).¹⁰ As the industry moves into the mainstream, debt/equity ratios could approach 5.0.

Debt Service Coverage Ratio (DSCR)

A lender will also look at the borrower’s ability to service – pay – the debt provided by the lender plus the borrower’s other debt payment obligations. This is usually done by looking at the borrower’s *Debt Service Coverage Ratio (DSCR)*.¹¹ The DSCR measures the amount of cash flow available to meet a borrower’s annual interest and principal payment obligations (*Total Debt Service*). It is calculated as follows:

$$DSCR = \frac{\text{Free Cash Flow}}{\text{Total Debt Service}}$$

If a business has a DSCR of less than 1.0, then the borrower does not have enough free cash flow available to meet its debt obligations. The borrower will have negative cash flow. Except in unusual circumstances,¹² DESCO companies will likely need to first achieve breakeven and generate 1.0 DSCR before taking on market-based debt.

What will be an acceptable DSCR for a DESCO to borrow a market-based loan? Market-based lenders will typically look for DSCRs comfortably above 1.0 for good credits (i.e., in the range of 1.15 to 1.3). In private equity leveraged buyouts in mature markets, lenders will often lend at an initial DSCR of +/- 1.0, provided that the ratio increases toward 1.3 as the loan enters its second and subsequent years. We would expect market-based lenders to initially require DSCR levels above 1.0. If, however, lenders accept the rapid growth potential of the DESCO sector, lenders may be willing to accept DSCR levels closer to 1.0, anticipating that their DESCO borrowers will increase their net operating profit through increased sales on a year-to-year basis.

The DESCO Borrowing Capacity Model

Accompanying this paper is a Borrowing Capacity Model (BCM) that can be used to determine how much working capital financing a DESCO can reasonably expect to raise based on the three standard measures market-based lenders use.

¹⁰ The lender will also look at how that equity is working. A lender may discount equity that has only funded operating losses or that has funded product development where the product may not have value if the business is liquidated. Equity that is invested in working capital assets (inventory and receivables) would be valued more highly.

¹¹ Debt service coverage ratio is sometimes referred to as *debt coverage ratio (DCR)*.

¹² A lender might lend to a DESCO with a negative DSCR situation where (a) the DESCO is growing fast and is rapidly approaching a 1.0 DSCR, or (b) the DESCO’s assets can be isolated and financed on a highly secured basis by the lender.



- The BCM establishes key inputs - cost, price of system, payment period, DESCO growth rate, cost of operations, lead time for order to sale, etc. The model starts with an assumption that the DESCO has installed 1,000 systems, is installing 500 a month in month 1, and has incurred \$4m in startup costs at month #1 (line 24).
- Using these key inputs, the model expresses in column O the total amount of external capital (i.e., capital in excess of net cash flow) needed by a DESCO to reach a given number of customers. For example, line 40 shows that \$10.7m of capital will be needed for the DESCO to reach 17,600 customers in month 17.
- The model then estimates how much of the capital needed could be raised as debt based on (a) a selected Debt/Equity ratio, (b) selected advance rates against inventory and receivables, (c) a selected DSCR.

These parameters will allow a DESCO to analyze its needs and borrowing capability based on lending criteria that interested lenders may require under the three common tests. One can adjust the inputs in the BCM to illustrate the impact of different assumptions:

- System costs, sales price, payment terms,¹³ discount factor in valuing receivables, growth rate and inventory lead time can be adjusted in column C, lines 3-14.
- The DESCO's profit margin on sales can be adjusted in cell L9.
- The minimum annual operating cost of the DESCO can be adjusted in cell L12.
- Initial costs of operations (i.e., investment in product development, operating losses and other costs incurred for the DESCO to reach its first 1,000 systems) can be adjusted in cell N24 based on the DESCO's actual costs to reach that point.
- The debt/equity ratio, collateral advance rates (for each of receivables and inventory) and DSCR can be adjusted based on expected lender criteria in cells 10 P, Q, R.

Varying the inputs as described above will show how much equity would have to be invested in the business to achieve a target level of sales. For example, reading line 40, the company will require approximately \$10.7m of capital to achieve sales of 17,600 systems. If the debt/equity ratio is 3:1 the business could carry \$8m in debt when it achieves that level of sales; if the advance rate is 80% against receivables and 50% against inventory, the DESCO can raise \$4.8m in debt based on the present value of the receivable pool as it approaches that level of sales; and if the DSCR requirement is 1.5 based on a 24 month working capital loan term, the DESCO can only raise \$2.4m in debt as it reached that sales level.¹⁴

Keep in mind that existing debt – even if concessionary – would have to be accounted for in determining debt/equity ratio and DSCR. Moreover, if existing debt also has a lien on inventory and receivables, a new working capital lender would likely require that the existing loan be repaid

¹³ A DESCO that uses an energy services model would adjust payment terms to reflect the targeted useful life of the leased asset.

¹⁴ The model is essentially a more sophisticated version of our earlier model that measured AIPU (Average Investment Per User) x number of customers against revenue. See "A commercial solution to the energy access challenge" (note 1).



as a condition to lending, since competing claims on collateral would undermine the new lender's credit underwriting.

This BCM is stated in dollars but should be converted into the local currency in which a DESCO's revenue is generated, when applicable¹⁵. This would give the DESCO a more accurate picture of its borrowing capacity before accounting for the foreign exchange risk of borrowing in another currency. Where a DESCO is borrowing in an international currency such as dollars, it will of course need to account for the foreign exchange risk of paying in a different currency than its revenue. This currency risk can be priced into a DESCO's borrowing; at some point there may even be hedging products available to hedge this risk. We will address the currency risk and pricing/hedging strategies for the DESCO sector in more detail in a future article.

The DESCO Borrowing Capacity Model vs. Real World

The purpose of the Borrowing Capacity Model is to illustrate DESCOs' borrowing potential under various parameters that equate to efficient market-based lending. As such the BCM may aid DESCOs in more precisely anticipating their equity capital and debt needs, perhaps making raising equity capital more predictable.

There are several limitations and variations on the model that are important to keep in mind:

When will there be market-based lending to the DESCO sector?

While we believe that development of the distributed renewable energy sector will succeed in attracting both domestic and global market-based lenders to the DESCO sector, it is impossible to predict the point in the sector's development when this will happen. Nonetheless, the BCM provides a tool to show lenders the potential to lend securely to growing DESCOs.

Non-Market Lending is Available and Could Satisfy much of the Sector's Needs

Currently several larger DESCOs have had success raising debt that either has concessionary terms or that has quasi-equity features. Both concessionary debt and quasi-equity debt usually do not require a fixed advance rate against collateral; concessionary debt may carry an interest rate significantly below market, while quasi-equity debt seeks an equity-like return on investment but has priority in repayment ahead shareholders. One of the larger transactions to date involved a concessionary lender subordinating – providing first loss protection– to a commercial lender.

There are signs that some concessionary debt financing will be available as the DESCO sector grows: The recently closed ResponsAbility Energy Access Fund will provide working capital on rigorous but still concessionary terms when compared to mature market working capital lending. ElectriFi, the Electrification Financing Initiative under development by the EU, proposes to make

¹⁵ DESCOs generating revenue in multiple currencies will have to elect a single currency to measure in or to use the BCM on a country-by-country basis.



concessionary loans in the energy access sector.¹⁶ Large development finance institutions such as OPIC are also interested in opportunities to lend to the DESCO sector. While also rigorous and commercial, OPIC would be expected to be more flexible in terms than a conventional working capital lender. In addition, other development finance institutions, impact investors and foundations have expressed an interest in lending to DESCOS. These loans may be on terms that are more flexible than what market-based working capital lenders would provide.

Whether flexible and/or concessionary lenders waiting in the wings to lend will be able to absorb the demand for credit needed by the DESCO sector remains to be seen. Our prototype DESCO in the BCM will need approximately \$50m to reach ~200,000 customers. If flexible/concessionary lending can provide 80% of that funding, one could extrapolate that the DESCO sector would need \$4 billion of such loans from flexible and/or concessionary lenders to reach 20 million customers. Working capital needs will vastly grow to reach the ~100 million potential customers with basic entry level distributed renewable energy products and services.

Engineering Faster Access to Market-Based Financing

Many working in the DESCO sector believe that market-based financing solutions will come to DESCOS sooner if we can structure debt to de-risk certain debt instruments, while shrinking the amount of borrowing needed using higher risk, higher yielding debt.

Securitization

By isolating cash flows from a DESCO's receivables, the DESCO could sell asset-backed securities. It was only in 2014 that the first asset securitization of solar home system receivables was done in the United States.¹⁷ Although many characteristics of a securitization market remain to be developed in the DESCO sector,¹⁸ several DESCOS and a few prospective investors are developing pilot transactions.

Trade Finance

Trade finance may be available to finance the creation and shipment of inventory to the DESCO from third party suppliers. As the amount of trade financing required by a DESCO at any time routinely exceeds several million dollars (see column G of the BCM) and turns over approximately every 90 days, trade finance institutions may become interested in extending credit on attractive terms.

¹⁶ Under consideration are subordinated loans and grants that would convert into subordinated loans. One objective would be to encourage commercial lenders to lend working capital which would be senior in repayment. See Working Document for Rural Electrification Workshop, 29-30 September 2014, Brussels.

¹⁷ <http://www.greentechmedia.com/articles/read/SolarCitys-New-201M-Securitized-Solar-Portfolio-Keeps-the-Capital-Flowing>

¹⁸ Such as historical portfolio performance data, customer credit data and legal and banking sector mechanisms that make segregation of DESCO receivables protected for the benefit of lenders.



Warehouse Line of Credit

If receivables can be pooled and securitized in an ongoing program, the DESCO will continue to originate new receivables as it sells or leases more systems. Unless the DESCO's securitization program has a reinvestment feature,¹⁹ these new receivables will need to be pooled until the amount is large enough to be financed in an additional securitization tranche. Receivables waiting to be pooled and securitized could be financed by a small warehouse line of credit, i.e., a small working capital line secured by unsecuritized receivables at an agreed advance rate.

Financing Remaining Inventory

Similarly, whether or not inventory in transit can be efficiently financed through trade financing, remaining inventory of a DESCO could be financed with a smaller working capital facility. This facility could be combined with the warehouse line of credit.

Term and Mezzanine Debt

While DESCOs have appropriately focused on raising working capital financing – i.e., short-term debt that carries the lowest interest rate – there will likely be opportunities to layer other types of debt into a growing DESCO's capital structure. Term debt can be used to finance capital goods. As cash flow becomes significant and predictable, financing working capital against assets may become unnecessary; revolving loans measured only against debt/equity ratio, DSCR and other performance-based covenants may be obtainable. There are also market-based lenders that seek higher risk debt – known as mezzanine lenders. These financiers will lend unsecured debt that carries some of the risk attributes of equity. If working capital or other debt is in the company's capital structure, mezzanine lenders will subordinate to those lenders, effectively taking the first loss among creditors. Mezzanine debt may be an effective source of capital to DESCOs. Mezzanine loans bear a higher interest rate than working capital financing but may still be accretive to shareholders (i.e., its cost is lower than the DESCO's return on assets, leveraging return on equity).

Conclusion

Understanding market-based approaches to finance in the context of DESCOs' projected future growth will be critical to all market participants in the robust development of the sector. The BCM can provide a basis for borrowers and lenders to analyze the opportunities for financing in a more precise way.

¹⁹ Some securitizations have a "revolving" feature whereby proceeds collected can be used to finance newly created receivables during a reinvestment period.