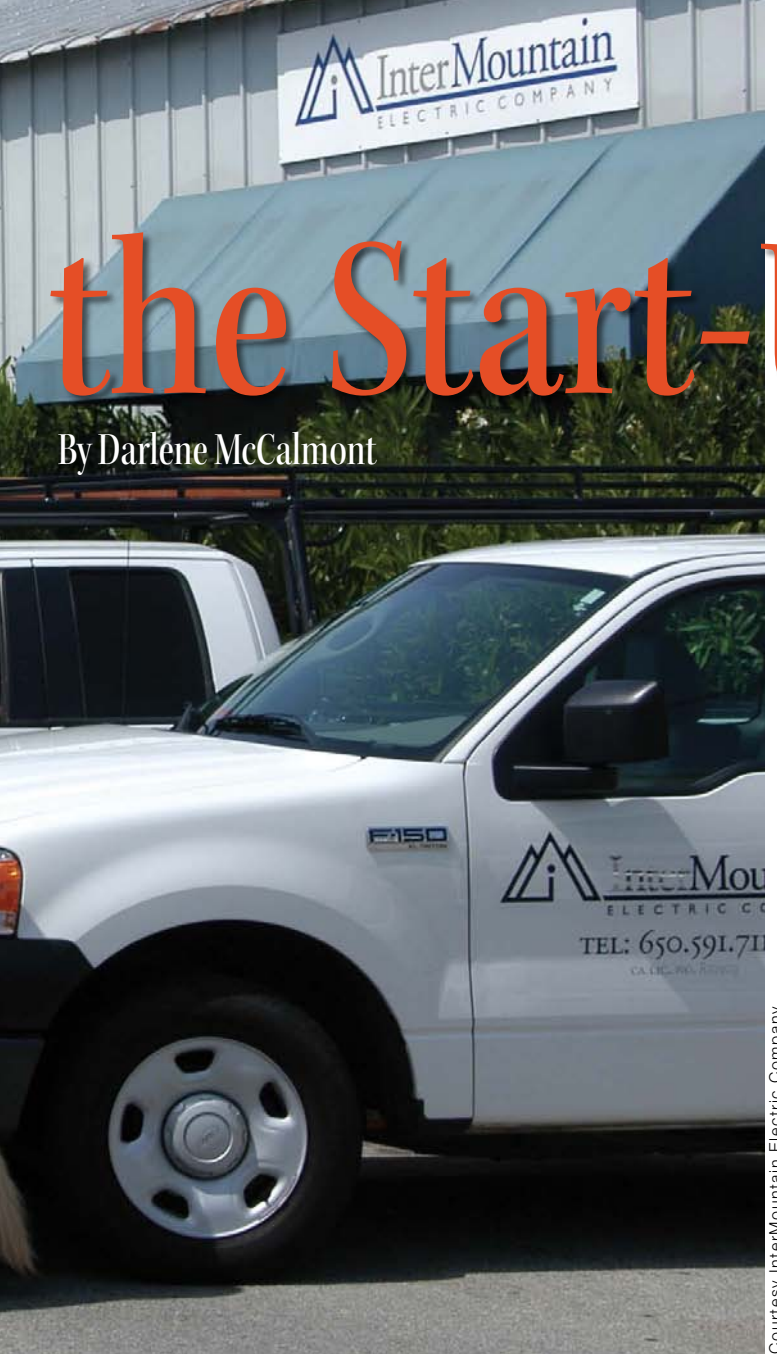
Growing Beyond

Most solar integrators start their business with a lot of idealism and only one installation crew. In many companies, this same crew divides up the duties of sales, operations and finance. The first step to grow the company is to separate the crew from the office personnel—in other words, have a crew that focuses only on installations. But even when the company has one crew exclusively in the field, the office staff still has to wear multiple hats. There might be only one or two people selling, and one of those probably also does marketing. Likely one person comprises the entire operations department. This person prepares permits, visits building departments, schedules customers, orders parts, directs the crew and performs inspections. Either the sales or operations person handles the financial tasks, such as claiming incentives and invoicing customers. This business structure is not sustainable for growing PV integrators.

the Start-Up Stage

By Darlene McCalmont



Courtesy InterMountain Electric Company

ADDING A SECOND CREW AND TRUCK

When the backlog of installations is more than 2 months worth of work, it is time to add another truck and crew. The type, size and layout of the second truck should be identical to the first so that any installer or warehouse stocker moving between trucks can easily find or replenish parts. This increases efficiency and lowers costs since no one wastes time looking for items. Ideally, the second most experienced person from the first crew becomes the crew lead for the new truck. This helps to carry company processes and acceptable safety practices to the new crew and to ensure that quality standards are maintained.

It is best to work the same crewmembers together on the same truck as much as possible. They get to know their colleagues and each other's knowledge level, so they work together more efficiently. It is even more important to have regular crew meetings once you add more crews. It is very easy for company standards to slip once there are two or more installation teams. Before you know it, one crew does a particular task one way, and the other does it differently. This is very confusing for less experienced crewmembers. More importantly, jobs may not get done to the required company standards.

EXPANDING OPERATIONS

Figure 1 (p. 72) is a good representation for the operations function within an integrator company. As the business grows, the personnel wearing numerous hats begin assuming discrete job functions. (Refer to "Operations Management for Solar Integrators," Oct/Nov, 2010, *SolarPro* magazine.)

The first step needs to be a separation between predominantly in-house functions, such as customer scheduling, and in-field functions, such as visiting permit offices and meeting the AHJ for inspections. Customers who call the office should not get an answering machine—they should reach a live person. At this stage of growth, the customer care specialist could also act as the operations manager and direct the permit design specialist, the crews and other operations personnel.

To keep a quality control specialist busy full time generally requires two inspections or commissionings per day. This likely will not happen until a minimum of three crew trucks is operating full time. One possibility until then would be to have the quality control specialist perform an inspection each afternoon and stock trucks and inventory the warehouse in the evenings. The quality control specialist should also look for inconsistencies among crew leaders and provide training.

Courtesy Green Logic

Truck logistics As installation teams are added, truck layouts should be identical so that any installer or warehouse stocker moving between trucks can easily find or replenish parts. This increases efficiency and lowers costs as no one wastes time looking for items.

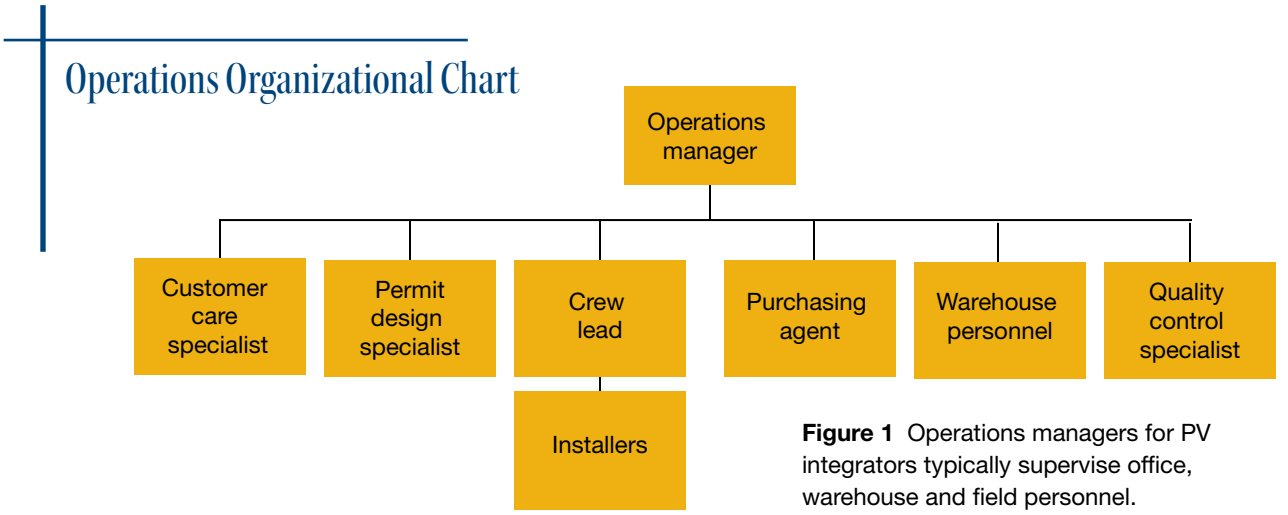


Figure 1 Operations managers for PV integrators typically supervise office, warehouse and field personnel.

Courtesy McCalmont Engineering

Having documented standard operating procedures becomes even more important as the company grows. These should be located on each crew truck. The operations managers need to be responsible for training at their locations, and the quality control specialist can ensure that quality in the field is maintained.

By the time a company has three fully deployed crews and is large enough to have filled the positions of customer care specialist, permit design specialist, quality control specialist and full time warehouse personnel, it is big enough to justify a separate operations manager. At this stage, the sales department will likely have grown to several salespeople, and the company will have someone acting as a CEO (and not wearing too many other hats).

The operations manager would report to the CEO. An integrator company probably does not need a COO or VP of operations until there are multiple locations supporting multiple operations managers who need higher-level management. The COO's or VP's primary responsibility is to give high-level direction to the operations managers while standardizing processes that drive efficiency, cost reduction, quality and customer satisfaction. This person also works with the CEO to drive the direction of the company.

ADDING THAT SECOND LOCATION

Adding a second crew out of one location is not too difficult, but adding a second location for the company is a big step. Many issues arise, such as identifying what should be centralized at headquarters, how to manage a second location without senior management on-site and how to maintain consistent standards.

As solar integrators expand geographically, many companies open an additional location strictly to have a crew closer to where installations are planned. In this case, the only people at the site might be the salesperson(s) and one crew and its truck. The issues are then how to take deliveries at this site, how to provide permitting and crew packages, and so on. Having done this in my previous company, I know how hard it can be.

I had a crew in a warehouse about an hour and a half drive from company headquarters. We coordinated deliveries so that the central warehouse person could be on-site at the remote office. To minimize this inconvenience, modules, inverters, and racking were the only parts delivered to that site via freight. Racking was bought in bulk so that it was necessary for someone to be there to accept delivery only about every month or two. Modules and inverters were typically delivered once per month. The warehouse person brought all other small parts to the remote office, based on a list that the crew lead provided a day or two ahead of each visit. The warehouse person could also take modules, inverters or racking in his truck in case of an unplanned shortage. Permit packages and crew instructions were delivered by the warehouse person, emailed or mailed to the remote office. We used the same permit design specialist and quality control specialist for both offices. If you think this sounds tough to manage, you are correct. I did it for 3 years.

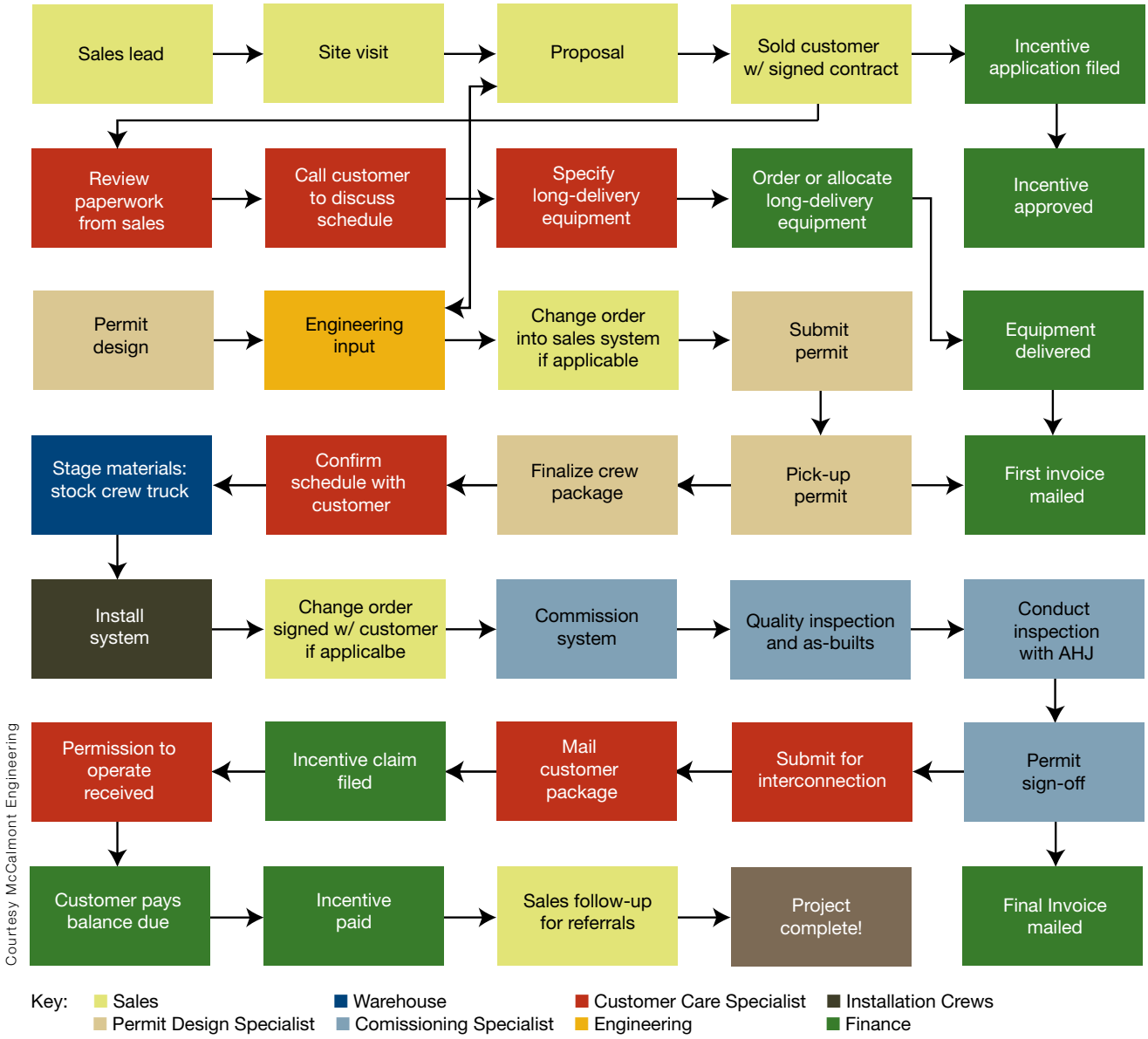
The second time I was faced with needing a local installation office, a combination permit design specialist and warehouse person was justified as part of opening that location. The logistics worked much better after that decision. The operations manager and customer care specialist were shared between two locations that were about an hour and a half apart. The whole idea of separate installation warehouses for housing crews is to maximize revenue by minimizing crew travel time. Paying rent on a small warehouse is much more cost effective than paying a crew to drive for 2 to 3 hours per day to remote sites.

Another office my company opened was about 3 hours away from headquarters and started with one manager/lead installer, one additional installer CONTINUED ON PAGE 74

and one truck. The manager also handled sales. Headquarters handled purchasing of modules, inverters and racking, while small parts were sourced locally. As sales in this office grew, the manager removed himself from the field and hired more installers. The next addition was a combination customer care and permit design specialist. A second salesperson quickly came on board. Within a year, a larger space was needed. Within a couple of years, the location was supporting several salespeople, a full complement of operations staff and several crews. Financing, marketing and engineering functions remained centralized at the main location, with the general manager from the remote office reporting into the senior management at headquarters.

While expanding and growing is exciting, it takes careful thought and planning to succeed. Most of all, it takes the right people. The key to adding a location is to first identify

Workflow Diagram for Solar Integrator Company



Courtesy McCalmont Engineering

Figure 2 While the workflow represented here is simplified, it does indicate the complexity of ongoing interactions among the various solar company departments. Two-way communications are key.

the person who will be responsible for the financial outcome of that office. The company needs to hire a local person who knows his or her market territory well and has a strong work ethic and desire to succeed.

WORKFLOW BETWEEN DEPARTMENTS

A growing company needs to develop separate departments for each of the major functions within a solar business: sales, marketing, engineering, finance, administration and operations. The operations department must change to support that growth and increased need for inter-company communications. Figure 2 illustrates a simplified workflow of interaction among the various departments. It is critical for operations to have healthy two-way communications with other departments. It is the sum of the whole that makes the company successful.

SALES

The two-way relationship between sales and operations is vital to creating satisfied customers. Salespeople need to know that operations serves the customer well, so they can get referrals from happy customers. Operations needs to receive the information from sales that allows them to meet customers' expectations. Having been in operations my entire career, I can state honestly that sales and operations often interact more like oil and water than like a well-oiled machine. The sales staff do not always think their customers are being handled carefully or quickly enough; operations staff do not always think that sales has set realistic expectations with the customer or provided all of the data that operations needs. By the very nature of their jobs, salespeople need to be strongly people-oriented, while operations people need to be strongly task-oriented. Since the operations interaction with the customer is a critical bridge from sales to operations, the customer care specialist needs to be both a people person and a task-oriented person. The customer care specialist can make or break the sales and operations relationship.

Handoff between sales and operations. Proper handoff from sales to operations increases the likelihood of success in processing customers. For efficiency, in most cases the salesperson should be the only staffer to visit a residential site prior to the installation crew's arrival. Therefore, operations must have a clear idea where the system is to be installed, where the inverter and disconnects are to be mounted and what the customer's expectations are, including any concerns regarding external conduit runs or other aesthetic requirements. Pictures are invaluable to effect a smooth handoff, so salespeople should be provided with digital cameras and encouraged to take many photos. (Refer to the following sidebar for a list of items the salesperson should provide in the handoff.)

Required Sales Items for Handoff

To ensure that operations has everything it needs to proceed to permitting without requiring a second site visit, salespersons must include all of the following details in their handoff.

- All customer contact information
- Signed contract, including purchase order and work order, and a deposit check
- Utility-interconnection information, including a copy of a recent bill showing company, rate schedule, service ID and meter number
- Signed interconnection agreement
- Shade report from Solmetric or Solar Pathfinder site analysis tools
- Sketch of the roof layout—preferably in a simple CAD program like AutoSketch—including dimensions of the roof surface (overlaying the modules onto a Pictometry or similar software picture is a great method)
- For roof-mounted installations: type of roofing material, rafter spacing and size, roof pitch, number of roof layers, roof condition, ceiling rafter exposure under the area of array, and desired slope of array (if any) and mounting azimuth
- For ground-mounted installations: average N/S and E/W ground pitch/slope, desired array pitch, desired mounting azimuth, soil type and trenching distance
- Electrical service information: system ac voltage and phase, load center manufacturer and busbar rating, main circuit breaker rating, distance from array to inverter(s) and distance from inverter(s) to point of interconnection
- Photos: front of structure; array-mounting location from ground; several views of all mounting locations; proposed inverter location; main load center (showing all breakers; main load center without cover; load center main circuit breaker); subpanel (if applicable); structure's electric meter and vicinity ●

Various methods for the handoff between sales and operations are available, but it is best to computerize the process. A companywide server is invaluable for companywide file sharing. The worst-case scenario is a paper file. Even so, if the handoff is done properly, there should be little need for face-to-face communication. This enables salespeople to be out selling and operations to proceed with permitting and scheduling.

Sales reentry. There are times after the sale, however, when operations needs sales to come back into the picture. Whenever there is a change in array layout from what the customer was shown, a module substitution, an engineering issue that requires a different grid interconnection or any issue that affects customer expectations, operations will likely request that sales goes back to the customer. Once sales has resolved the issue and reported back to operations, the installation can proceed. These issues are best worked out before a crew is on-site.

In the unfortunate circumstance when the crew arrives at the site with a layout that does not fit the roof or there is another issue requiring a change, the salesperson should be contacted immediately. Good practice also dictates that any change that affects the contracted price to the customer requires a new purchase order or a signed change order. Those changes must be uploaded into the company system to track sales contracts.

ENGINEERING

Interaction between operations and engineering is important whether engineering is a standalone department, part of operations or even an outsourced firm. Many integrator companies, large and small, find it can be cost-effective to outsource the electrical plan portion of a permit. If the integrator provides the right inputs from the site survey, a good engineering firm can offer an economical, centralized option over having dedicated engineers on staff. Non-engineers who are familiar with a CAD program can do the roof layout portion internally.

Operations and engineering departments usually work well together, as they are both task-oriented. The role of engineering is to make sure that the systems are designed to *Code*. A solar company's life will be very

Positive morale Employees are your best asset. They establish your company's reputation, and a contractor business is built on reputation.

Courtesy Pro-Tech Energy Solutions

short if even one system is not properly engineered or installed and the customer sues. Material as well as reputation damages may not be recoverable via insurance. With the advent of the Internet blogosphere, a complaint from just one unhappy customer can quickly become public.


Shawn Schreiner

Outsourced engineering Many integrator companies find it can be cost-effective to outsource the electrical plan portion of a permit. If the integrator provides the right inputs from the site survey, a good engineering firm can offer an economical, centralized option over having dedicated engineers on staff.

FINANCE

There are four main areas in which communication between finance and operations is important: purchasing, invoicing, change orders as they relate to revenue and incentive claim filing.

Communication regarding purchasing is critical to ensure that all parts are available for an installation at the appropriate time so the crews can work efficiently on a job from start to finish. Good communication between the finance and operations departments is also important for processing invoices and getting paid promptly. Whether this is done automatically through the use of software or via some other internal method, it is important that there be a clean handoff between the two departments.

Company management needs to decide at what stages they wish to invoice customers. For cash flow purposes, most companies generate two invoices in addition to the deposit. The first invoice can be triggered by obtaining the building permit or by parts being delivered to the customer site. The final invoice could be triggered by the AHJ approving the inspection of the finished system or the interconnection being signed off by the utility.

Change orders in the field can affect the price a customer pays. The contract should cover the potential reasons for any change orders. If someone at the company makes a mistake—an inverter was too small for the number of modules, for instance—the company should not add any charges to the customer's invoice as a result of that mistake. However, if the customer requests a change when the crew is on-site—wanting the modules to be installed differently than they were sold, for example—or if something is discovered that was not apparent at the time of sale, such as a structural issue, that charge should be discussed with the customer and considered a change from the original order. If the crew discovers that the number of modules must be decreased from the original sale, this should be discussed with the customer and the price should be adjusted.

No matter what the reason for a change to the original cost of the system, the finance department must be made aware of it through a change-order process. This ensures that the invoice generated has the correct balance due. The cleanest way to do this is by having the salesperson update the change order paperwork appropriately and getting the customer to sign it. Sales must then upload the change into the company's system for tracking.

Ideally, since incentives are associated with revenue, the finance department should handle the incentives. However,

Referrals

A substantial percentage of a good integrator's sales should come from referrals, and every employee in the company should be expected to bring in customer referrals. Referrals not only save marketing dollars, but these leads also have the best chance of closing.

Operations can help with referrals in several ways: first, by being courteous with the customer; second, by making sure crews install systems in an aesthetically pleasing manner and clean up at the end of each day; and third, by meeting and exceeding customer expectations.

There are other ways that operations can help:

- Keep a supply of generic company business cards on each company vehicle so that when a neighbor or someone walking by asks the installers about the system, they have a card to give them;
- Supply a window hanger with company flyers for each truck, and have the crew put it outside a truck window at each site. Passers-by may be more likely to grab a flyer than to bother a crew up on the roof;
- Encourage crews to network outside of work and be proud to discuss what they do. Almost everyone loves solar and enjoys talking with knowledgeable people from our industry; and
- Pay a referral fee, not only to your customers but also to your employees, for every signed customer they bring in. ●

most incentive programs require data from sales and from operations to make an incentive reservation and file an incentive claim. Sales should provide the signed incentive forms to finance following the completion of the sale. Depending on the incentive program, operations typically provides a checklist of all required items for the claim process, including as-built data, the signed-off permit and proof of interconnection. The use of tracking software can aid this process significantly and reduce costs by automating many steps.

Courtesy Alteris Renewables

Experience Emphasis should be put on assigning an experienced crew lead to a new installation team. This helps to carry company processes and acceptable safety practices to the new crew and to ensure that quality standards are maintained.

MANAGEMENT CHALLENGES & GROWTH

Growing a company past the first crew truck and especially past the first location carries its own set of management challenges.

COMMUNICATION

Since it is hard for management to interact with employees on a daily or even weekly basis as the company grows and adds locations, good communication is the most important challenge. There are several ways to address this challenge. Face-to-face communication is always best, so, at a minimum, upper management should hold quarterly get-togethers at each location. It is nice if at least one of these is a more informal event, such as a holiday party or picnic, where management can present information about the company and hold a question and answer session. Including spouses and significant others in these sessions is really helpful. Each year at my company, we shared the results of the company's performance at an annual holiday party. Since employees discuss issues concerning their job at home, it helps if the spouse or significant other can appreciate the company as well.

Companywide conference calls are great for sharing information that cannot wait for a quarterly meeting. Everyone can be included, with a question and answer session at the end. A company newsletter that highlights some of the installations and company accomplishments, and introduces new employees is another great way to share information, not only with the employees but also with those at home.

Each location's manager should hold monthly meetings to share ideas and company information and to maintain company standards. Local management should visit customer sites and do walk-arounds in the office and warehouse to check the pulse among the employees.

EXPANSION AND THE BOTTOM LINE

Always keep the focus on efficiency, cost control and quality. There is always room for improvement, and people at all levels of the organization have ideas. Listen to your employees and do not hesitate to make decisions that move the company forward.

As the company grows and overhead increases, it is important to hire at a rate that maintains profitability. Every position in the company should be justified as it relates to revenue. Be sure that the workload justifies a long-term hire, or consider temporary help or outsourcing.

Your operations staff can protect the bottom line by controlling inventory. As the company grows, it can gain increasing price leverage with vendors. Continue to minimize the number of vendors. For example, use only one racking vendor companywide to increase the price leverage. The cost savings of bulk racking orders is huge—as much as 60% off list price depending on volumes. Consider volume purchase agreements with module and inverter companies. There is no real advantage to carrying more than one or two inverter lines. Not only is there a lost cost advantage, but there may also be increased training costs and wiring mistakes. Since the major suppliers are not that varied in cost, pick the most reliable inverter to save the company many service calls and forfeited revenue in the future.

Last, but certainly not least, maintain positive morale. I truly believe that your employees are your best asset. If you do not take care of your employees, everything else is for naught. They establish your company's reputation, and a contractor business is built on reputation. Every manager has to make unpopular decisions at times, but being open in the discussion of these decisions breeds respect among your employees. ⏚

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