

Solar **Survival** Guide // Challenge Five

Team Efficiency on Site





HOW'S YOUR TEAM- WORK?

Be greater than the sum of your parts.

Sir Edmund Hillary, the New Zealand mountaineer known as the first person to ascend Mount Everest, refused to accept sole credit for the achievement. Returning from the 1953 expedition, Hillary said he and the Nepalese Sherpa, Tenzing Norgay, reached the summit at the same time, even though Norgay said Hillary got there first. It was, in fact, the ultimate team effort, made possible by an expedition of more than 400 people, most of them porters carrying 10,000 lbs. of baggage.

Whether your company installs 100 or 10,000 solar modules in the weeks ahead, you'll need a highly organized team that approaches each day's work with preparation and purpose. The installation crews and companies that are the most efficient tune their workflow so that it is smooth and reduces wasted time and energy.

This section offers tips to help your crew reach its highest potential, from assigning roles and responsibilities to embracing a culture of continuous improvement.

WHO'S ON FIRST?

CLARIFYING TEAM ROLES AND RESPONSIBILITIES

The best teamwork depends on having not only a well-trained team, but also a team that is clear about each member's roles and responsibilities. Based on observations of many installer's crews, discussions with industry experts, and our Field Application Engineers' experience, most installation crews have four roles.



The Electrician



The Roof Lead



The Roof Crew



The Comms Lead

Designating these four roles is essential for a successful system installation. The tasks in each role must be completed for a proper installation. You may assign one person to fulfill multiple roles, or one crew member to each role. But this should always be clearly determined before reaching the site.



THE ELECTRICIAN

The team's electrician is responsible for all the wiring and electrical code compliance. If the wiring is not installed properly, the installation may fail inspection or, worse yet, present an electrical hazard, potentially injuring installers or causing fires.

Although electricians are responsible for the electrical work on site, they may request a rooftop installer to assist them in accomplishing some of the electrical tasks, such as pulling wire through conduit or completing basic cable terminations.



THE ROOF LEAD

The roof lead is generally the crew foreman and is one of the most experienced members of an installation crew. Along with overseeing many of the installation tasks, the roof lead also ensures that the system is being built to design.

The roof lead is usually also the person designated to interface with the homeowner on day one of the job to set expectations for the duration of the installation.



THE ROOF CREW

The roof crew is responsible for completing all rooftop-based installation labor and non-electrician tasks. This role may be assigned other installation tasks in the workflow either ahead of time or as the job progresses. The roof crew is also usually responsible for site clean up at the end of each day's work. Some crews may have more than one person in this role, particularly for larger projects.



ASK YOURSELF

Whose role is customer satisfaction?

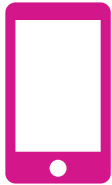
Solar installation companies look to hire professionals who have the skills to do the job right. But if crew members view their roles as simply installing solar, they are missing an opportunity. The crew represents the solar company they work for, so every interaction they have with the customer, and even their neighbors, reflects on the installation company.

Customer acquisition is a significant expense for any solar installation company. Market research indicates that 50% of new business in solar comes through referrals, so one customer's positive installation experience is crucial for future business.

The goal for everyone on your crew should be **customer satisfaction**.

50%

**OF NEW
BUSINESS IN
SOLAR COMES
THROUGH
REFERRALS**



COMMS LEAD

The comms lead role refers to the person given the responsibility of ensuring the proper installation of monitoring equipment, and working with all IT related devices and interfaces. Often times this role falls on the electrician, but it can be given to another team member.

Without a properly operating communications system, both installer and customer will have a hard time fielding questions about future system performance.

Best Practices for Enphase Communications

Four ways to simplify Enphase installations:

- 1** Plug in the Envoy and connect it to the Internet the night before or when you arrive at site. This enables it to update firmware before commissioning begins.
- 2** Install a dedicated outlet for the Envoy communications gateway to cut down on troubleshooting when commissioning the system. Down the road, it will provide better system monitoring.
- 3** Commission the Envoy communications gateway with the Installer Toolkit. This mobile app, available for iOS or Android, verifies that installed microinverters have been detected, and they are communicating and producing power.
- 4** Consider using the AC Combiner Box: it simplifies installation, can be installed outside, and provides more reliable communications.

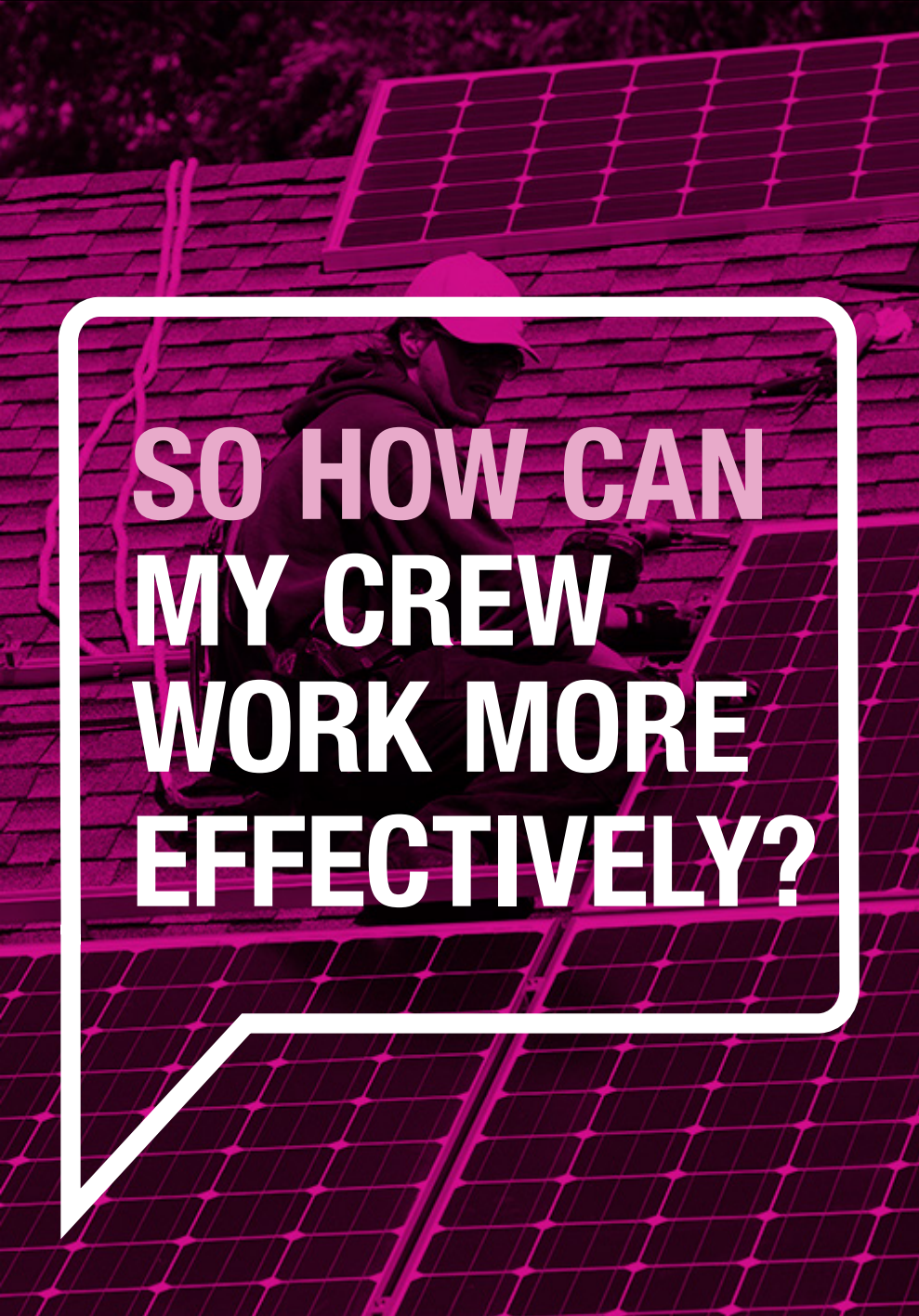
Once the installation is complete, the installer can view a system status summary to confirm that the job was a success.

THE GOLDBLOCKS QUESTION: WHAT SIZE CREW IS JUST RIGHT?

OBSERVATIONS FROM THE FIELD

An Enphase Field Application Engineer (FAE) observed a number of installations by several sub-contractors of a large installer in Australia. The installer had invested very little time in determining the true cost of their current installations, and as a result, subcontractors frequently reported that they were losing money on jobs. After observing installs by two, three and four person crews on typical residential installs, this is what the FAE reported:

- With the two-person crew, the higher skilled and compensated electrician was often performing general labor.
- With the four-person crew, while they completed the job quickly, the total install time was determined by the need to complete all electrician-specific tasks. This demonstrated that the crew was overstaffed.
- The three-person installation crew, with one electrician and two general laborers, was by far the most efficient and effective. **The time of both laborers and electricians was utilized most effectively in this setup.**



**SO HOW CAN
MY CREW
WORK MORE
EFFECTIVELY?**

MEASURE WHAT'S MEANINGFUL TO FIND OUT HOW TO IMPROVE

Following a recent report on solar installation labor costs, the Rocky Mountain Institute (RMI) and Georgia Tech Research Institute (GTRI) designed a template for installers to document the essential variables that influence efficiency. You already have useful data from your payroll records, work orders, and time sheets. If you include additional data points from the field, using the list on the next page, you'll be able to measure how changes in roof type, roof pitch, and mounting system hardware – amongst other variables – affect your installation speed.

Armed with this information, you will be able to evaluate the ripest opportunities for optimizing value-added activities and eliminating nonvalue-added activities.

MEASURING TEAMWORK

Managing labor costs means paying close attention to the following during the installation process:

- the number of activities crew members perform
- the time it takes to complete each activity
- whether or not the activities are value-added

You'll need this information to evaluate the effectiveness of your workflow and identify labor-saving opportunities. If you're wondering how to start streamlining labor roles, there's no better way to begin than by collecting data.

LINGO CHECK

DATA VS. INFORMATION

Data is raw, unorganized facts that need to be processed. Data can be something simple and seemingly random and useless until it is organized. Once data is processed, organized, or presented in context so as to make it useful, it is information.

HERE'S THE DATA YOU NEED TO KNOW:

+ Job and Location Information

- Site name
- Date
- Permitting jurisdiction

+ Site Information

- Building floors
- Type of roof
- Roof pitch (degrees)

+ Crew Information

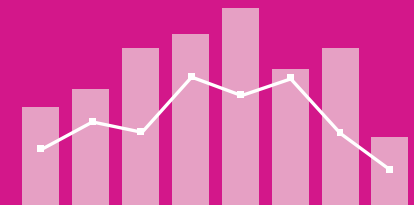
- Time (total worker-hours)
- Number of electricians
- Number of non-electricians
- Electricians' hourly pay rate
- Non-electricians' hourly pay rate


+ Time and Cost Metrics

- Site size (Watts)
- Hours per kilowatt
- Seconds per Watt
- Hours per module

+ System Information

- Module type
- Number of modules
- Number of array corners
- Module size (Watts)
- Rail type
- Mount type
- Inverter type





HOW MUCH SHOULD WE SPECIALIZE?

SIMPLIFY, STANDARDIZE, AND STREAMLINE

Are there jobs you should skip? RMI and GTRI found that clay-tile based installations in the US cost four times more than non-clay-tile based installations. Depending on your company size, you should decide:

- Can I afford to have a crew that specializes in clay tile roofs? OR
- Should I pass on those jobs?

You can apply the same principle for deciding on jobs with steep roofs, flat roofs, the type of module/inverter/racking system required, or a host of other installation criteria. Use the same 80/20 rule we described in Survival Guide Challenge One.

Another option is to designate employees in the office who specialize on complex matters like engineering, code expertise, inspections issues, or monitoring, and let them provide support to less specialized crew members in the field. This way, all progress doesn't necessarily come to a halt if the crew runs into a situation that's difficult to resolve.



**SO, THAT'S
IT FOR THE
CREW?**

You're well on your way to streamlining, but there's always more you can do.

If you get your team running effectively and efficiently, you are setting up your whole system for success. Want to dig deeper? Here are some resources to check out:

Solar Survival Guide

Sign up to receive the entire Solar Survival Guide for streamlining the back office, the warehouse, your work vehicle, and more.

enphase.com/solarsurvival

Enphase training

Ensure your team is well trained in using the Enphase efficiency tools. Check out videos, webinars and live training sessions covering all aspects of designing and installing Enphase Systems.

enphase.com/en-us/support/training

Enphase apps

Enphase's Installer Toolkit mobile app offers a simple way to commission your system on site.

enphase.com/en-us/products-and-services/enlighten-and-apps