

## Instructions for Using this RFP Template

1. The template below is an RFP template for the Lowest Price Technically Acceptable (LPTA) solicitation method, when the anticipated purchase is **fairly simple in nature, and above \$3,500 USD**. This is appropriate **for goods only**, such as a generator, building materials, or other products required. Minor services (such as internet cabling installation) included as part of the delivery of goods can also be included. When completed, this template will result in a relatively small (approximately 2 to 4 pages) solicitation, as compared to the 20 page version for complex procurements.
2. Use **Work Instructions 9.7: Considerations for Types of Solicitation Methods and 9.10: Developing Solicitations: Lowest Price Technically Acceptable** to aid in your understanding of using this source selection method correctly.
3. The template provides for **YELLOW** text throughout the document which must be completed prior to the release of the solicitation. Each solicitation will be different, due to different or unique requirements, and careful attention must be taken to fully complete the sections properly.
4. Use the notes found in the right hand column to understand the requirements or to determine if a subsection is appropriate to use. **Delete all comments and remaining yellow highlights before releasing the solicitation.**
5. For Lowest Price Technically Acceptable there are typically three sets of requirements 1) Technical Specifications and quantities of goods requested, 2) Significant technical non-cost factors, and 3) Other unique requirements. Keep in mind that the goal of Lowest Price Technically Acceptable is to award to the offeror who meets all of the technical requirements, not whose technical proposal is better than another offerors proposal. Technical requirements and acceptability requirements **are not weighted or ranked, offerors either meet them or do not meet them.** For the ability to rank and weight proposal requirements between offerors, choose the Trade Off Method instead.
6. Do not delete any section unless it specifically states it can be removed.
7. Determine if there are any additional country or contract specific flow down clauses and include them at the bottom of Attachment B.
8. **Print out and include a copy of Forms 3.9 and 3.10** for Unique Entity ID (SAM) requirements and include with each solicitation.
9. The one page synopsis found on the first page can be extracted and posted publicly and/or advertised in newspapers to provide the summary information for the solicitation, with instructions that the full solicitation and its requirements will be issued or could be collected. This synopsis should contain only the major or summary elements of information, and the rest of the solicitation will describe specific instructions or conditions.

## 1. Synopsis of the RFP

DAI, implementer of the USAID/Haiti Water Security and Systems Strengthening Activity (USAID Eau) Project, invites qualified vendors to submit proposals/bids to supply and deliver **Photovoltaic System and water pumping equipment for Pignon water system**, as outlined below.

1. RFP No.	REQ-Eau-24-0032
2. Issue Date	June 3 <sup>rd</sup> , 2024.
3. Title	Procurement of photovoltaic and Water pumping equipment.
4. Issuing Office & Email/Physical Address for Submission of Proposals	<a href="mailto:Eau_Procurement@dai.com">Eau_Procurement@dai.com</a>
5. Deadline for Receipt of Questions	June 18, 2024
6. Deadline for Receipt of Proposals.	June 21, 2024
7. Contact Person	<a href="mailto:Eau_Procurement-info@dai.com">Eau_Procurement-info@dai.com</a>
8. Anticipated Award Type	<p>Firm Fixed Price Purchase Order will be issued for this procurement. Payment will be made after inspection and acceptance of the equipment at the point of delivery in Pignon.</p> <p>Issuance of this RFP in no way obligates DAI to award a subcontract or purchase order and offerors will not be reimbursed for any costs associated with the preparation of their bid.</p>
9. Basis for Award	An award will be made based on the Lowest Price, Technically Acceptable Source Selection process. The award will be issued to the responsible Offeror submitting the lowest evaluated price that meets or exceeds the acceptability requirements for technical/non-cost factors described in this RFP.

*Interested Offerors may obtain a full copy of the RFP which contains detailed instructions for preparation of the proposal. The RFP may be collected from the address and/or contact person above.*

DAI conducts business under the strictest ethical standards to assure fairness in competition, reasonable prices and successful performance or delivery of quality goods and equipment. DAI does not tolerate corruption, bribery, collusion or conflicts of interest. Any requests for payment or favors by DAI employees should be reported as soon as possible to [ethics@dai.com](mailto:ethics@dai.com) or by visiting [www.dai.ethicspoint.com](http://www.dai.ethicspoint.com). Further, any attempts by an offeror or subcontractor to offer inducements to a DAI employee to influence a decision will not be tolerated and will be grounds for disqualification, termination and possible debarment. See provision No. 18 for more details.

## 2. Request for Proposal - Goods

<p>10. General Instructions to Offerors</p>	<ul style="list-style-type: none"> <li>• The deadline for submission is <b>June 21, 2024</b>. Late offers will be rejected except under extraordinary circumstances at DAI's discretion.</li> <li>• Offerors shall submit proposals electronically to <b>email: <a href="mailto:Eau_Procurement@dai.com">Eau_Procurement@dai.com</a></b>. Include RFP No.: REQ-Eau-24-0032 and the activity name: Photovoltaic and water pumping equipment in the email subject line.</li> <li>• Offerors shall Include a statement that the vendor fully understands that their quote must be valid for a period of <b>60 days</b> from the deadline of submission.</li> <li>• Offerors shall sign and date their Proposal.</li> <li>• Offerors shall complete Attachment A: Price Schedule template. Value Added Tax (VAT) shall be included on a separate line.</li> <li>• These services are eligible for VAT exemption under the DAI prime contract.</li> <li>• Bidders may submit offers for all or part of the equipment that can be assembled to be a functioning system when combined with other equipment as described in the list of equipment and specifications.</li> </ul>
<p>11. Questions Regarding the RFP</p>	<p>Each Offeror is responsible for reading very carefully and understanding fully the terms and conditions of this RFP. All communications regarding this solicitation are to be made solely through the Issuing Office and must be submitted via email or in writing delivered to the Issuing Office no later than the date specified above. All questions received will be compiled and answered in writing and distributed to all interested Offerors.</p>
<p>12. Technical Specifications and requirements for Technical Acceptability</p>	<ol style="list-style-type: none"> <li>1. The list of goods and services and their specifications or requirements are listed in the Attachment C below.</li> <li>2. Final delivery is required not later than 8 weeks after the order date.</li> <li>3. In addition to meeting or exceeding the Technical Specifications of the equipment listed below, offerors are required to meet or exceed the significant non-cost factors listed below:             <ol style="list-style-type: none"> <li>3.1 <i>Offeror must possess previous experience in selling photovoltaic and/or water pumps equipment in Haiti, demonstrated through the list of previous customers, contact and period of performance.</i></li> </ol> </li> </ol>

	<p>3.2 Offeror must have documented ability to meet required delivery time lines, as demonstrated through reference letters from prior clients.</p> <p>3.3 Offeror must provide an up to date Patente</p> <p>3.4 Offeror must provide copies of the required business licenses to operate in Haiti.</p>
<p>13. Prohibited Technology</p>	<p>Offerors MUST NOT provide any goods and/or services that utilize telecommunications and video surveillance products from the following companies: <b>Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company, or any subsidiary or affiliate thereof</b>, in compliance with FAR 52.204-25.</p>
<p>14. Determination of Responsibility</p>	<p>DAI will not enter into any type of agreement with an Offeror prior to ensuring the Offeror’s responsibility. When assessing an Offeror’s responsibility, the following factors are taken into consideration:</p> <ol style="list-style-type: none"> <li>1. Provide copies of the required business licenses to operate in Haiti.</li> <li>2. Evidence of a Unique Entity ID (SAM) (explained below and instructions contained in the Annex).</li> <li>3. The source, origin and nationality of the services are not from a Prohibited Country (explained below).</li> <li>4. Having adequate financial resources to deliver goods or the ability to obtain financial resources.</li> <li>5. Ability to comply with required or proposed delivery or performance schedules.</li> <li>6. Have a satisfactory past performance record.</li> <li>7. Have a satisfactory record of integrity and business ethics.</li> <li>8. Be qualified and eligible to perform work under applicable laws and regulations.</li> </ol>
<p>15. Geographic Code</p>	<ul style="list-style-type: none"> <li>• Under the authorized geographic code for its contract DAI may only procure goods and services from the following countries.</li> <li>• Geographic Code 937: Goods and services from the United States, the cooperating country, and "Developing Countries" other than "Advanced Developing Countries"; excluding prohibited countries. A list of the "Developing Countries" as well as "Advanced Developing Countries" can be found at: <a href="https://www.usaid.gov/about-us/agency-policy/series-300/references-chapter/310maa">https://www.usaid.gov/about-us/agency-policy/series-300/references-chapter/310maa</a> and <a href="https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups">https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups</a>, respectively. (An “advanced developing country” means any country categorized by the World Bank as an upper middle-income country according to its gross national income per capita. Goods and services with an advanced</li> </ul>

	<p>developing country source or nationality are only eligible under 937 when the procurement is for a USAID program in that advanced developing country, i.e., it is the “cooperating” or “recipient” country).</p> <ul style="list-style-type: none"> <li>• DAI must verify the source, nationality, and origin, of goods and services and ensure (to the fullest extent possible) that DAI does not procure any services from prohibited countries listed by the Office of Foreign Assets Control (OFAC) as sanctioned countries. The current list of countries under comprehensive sanctions include: Cuba, Iran, North Korea, Sudan, and Syria. DAI is prohibited from facilitating any transaction by a third party if that transaction would be prohibited if performed by DAI.</li> <li>• By submitting a proposal in response to this RFP, Offerors confirm that they are not violating the Source and Nationality requirements and that the services comply with the Geographic Code and the exclusions for prohibited countries.</li> </ul>
<p>16. Unique Entity ID (SAM)</p>	<p>All U.S. and foreign organizations which receive first-tier subcontracts/ purchase orders with a value of \$30,000 and above <b>are required</b> to obtain a Unique Entity ID (SAM) prior to signing of the agreement. Organizations are exempt from this requirement if the gross income received from all sources in the previous tax year was under \$300,000. DAI requires that Offerors sign the self-certification statement if the Offeror claims exemption for this reason.</p> <p>For those required to obtain a Unique Entity ID (SAM), you may request Attachment C: Instructions for Obtaining a Unique Entity ID (SAM). For those not required to obtain a Unique Entity ID (SAM), you may request Attachment D: Self-Certification for Exemption from Unique Entity ID (SAM) Requirement</p>
<p>17. Compliance with Terms and Conditions</p>	<p>Offerors shall be aware of the general terms and conditions for an award resulting from this RFP. The selected Offeror shall comply with all Representations and Certifications of Compliance listed in Attachment B.</p>
<p>18. Anti-Corruption and Anti-Bribery Policy and Reporting Responsibilities</p>	<p>DAI conducts business under the strictest ethical standards to assure fairness in competition, reasonable prices and successful performance or delivery of quality goods and equipment. <b>DAI does not tolerate the following acts of corruption:</b></p> <ul style="list-style-type: none"> <li>• Any requests for a bribe, kickback, facilitation payment or gratuity in the form of payment, gift or special consideration by a DAI employee, Government official, or their representatives, to influence an award or approval decision.</li> </ul>

- Any offer of a bribe, kickback, facilitation payment or gratuity in the form of payment, gift or special consideration by an offeror or subcontractor to influence an award or approval decision.
- Any fraud, such as mis-stating or withholding information to benefit the offeror or subcontractor.
- Any collusion or conflicts of interest in which a DAI employee, consultant, or representative has a business or personal relationship with a principal or owner of the offeror or subcontractor that may appear to unfairly favor the offeror or subcontractor. Subcontractors must also avoid collusion or conflicts of interest in their procurements from vendors. Any such relationship must be disclosed immediately to DAI management for review and appropriate action, including possible exclusion from award.

These acts of corruption are not tolerated and may result in serious consequences, including termination of the award and possible suspension and debarment by the U.S. Government, excluding the offeror or subcontractor from participating in future U.S. Government business.

Any attempted or actual corruption should be reported immediately by either the offeror, subcontractor or DAI staff to:

- Toll-free Ethics and Compliance Anonymous Hotline at (U.S.) +1-503-597-4328
- Hotline website – [www.DAI.ethicspoint.com](http://www.DAI.ethicspoint.com), or
- Email to [Ethics@DAI.com](mailto:Ethics@DAI.com)
- USAID’s Office of the Inspector General Hotline at <https://oigportal.ains.com/eCasePortal>

By signing this proposal, the offeror confirms adherence to this standard and ensures that no attempts shall be made to influence DAI or Government staff through bribes, gratuities, facilitation payments, kickbacks or fraud. The offeror also acknowledges that violation of this policy may result in termination, repayment of funds disallowed by the corrupt actions and possible suspension and debarment by the U.S. Government.

**1.1 Attachment A: Price Schedule**

Item Number	Item Name	Specifications	Quantity	Unit Price	Total Price
1a	<i>List the goods that are to be supplied</i>				
1b					
1c					
2	VAT				
<b>GRAND TOTAL IN</b> <a href="#">Click here to enter text.</a>					
<b>GRAND TOTAL IN UNITED STATES DOLLARS</b>					\$

**Delivery Date:**

We, the undersigned, provide the attached proposal in accordance RFP # \_\_\_\_\_ dated \_\_\_\_\_ Our attached proposal is for the total price of \_\_\_\_\_ (figure and in words)

I certify a validity period of \_\_\_ days for the prices provided in the attached Price Schedule/Bill of Quantities. Our proposal shall be binding upon us subject to the modifications resulting from any discussions.

We understand that DAI is not bound to accept any proposal it receives.

Authorized Signature:  
 Name and Title of Signatory:  
 Name of Firm:  
 Address:  
 Telephone:  
 Email:

Company Seal/Stamp:



## Attachment B: Representations and Certifications of Compliance

1. Federal Excluded Parties List - The Bidder Select is not presently debarred, suspended, or determined ineligible for an award of a contract by any Federal agency.
2. Executive Compensation Certification- FAR 52.204-10 requires DAI, as prime contractor of U.S. federal government contracts, to report compensation levels of the five most highly compensated subcontractor executives to the Federal Funding Accountability and Transparency Act Sub-Award Report System (FSRS)
3. Executive Order on Terrorism Financing- The Contractor is reminded that U.S. Executive Orders and U.S. law prohibits transactions with, and the provision of resources and support to, individuals and organizations associated with terrorism. It is the legal responsibility of the Contractor/Recipient to ensure compliance with these Executive Orders and laws. Recipients may not engage with, or provide resources or support to, individuals and organizations associated with terrorism. No support or resources may be provided to individuals or entities that appear on the Specially Designated Nationals and Blocked persons List maintained by the US Treasury (online at [www.SAM.gov](http://www.SAM.gov)) or the United Nations Security Designation List (online at: [http://www.un.org/sc/committees/1267/aq\\_sanctions\\_list.shtml](http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml)). This provision must be included in all subcontracts/sub awards issued under this Contract.
4. Trafficking of Persons – The Contractor may not traffic in persons (as defined in the Protocol to Prevent, Suppress, and Punish Trafficking of persons, especially Women and Children, supplementing the UN Convention against Transnational Organized Crime), procure commercial sex, and use forced labor during the period of this award.
5. Certification and Disclosure Regarding Payment to Influence Certain Federal Transactions – The Bidder certifies that it currently is and will remain in compliance with FAR 52.203-11, Certification and Disclosure Regarding Payment to Influence Certain Federal Transactions.
6. Organizational Conflict of Interest – The Bidder certifies that will comply FAR Part 9.5, Organizational Conflict of Interest. The Bidder certifies that is not aware of any information bearing on the existence of any potential organizational conflict of interest. The Bidder further certifies that if the Bidder becomes aware of information bearing on whether a potential conflict may exist, that Bidder shall immediately provide DAI with a disclosure statement describing this information.
7. Business Size and Classification(s) – The Bidder certifies that is has accurately and completely identified its business size and classification(s) herein in accordance with the definitions and requirements set forth in FAR Part 19, Small Business Programs.
8. Prohibition of Segregated Facilities - The Bidder certifies that it is compliant with FAR 52.222-21, Prohibition of Segregated Facilities.
9. Equal Opportunity – The Bidder certifies that it does not discriminate against any employee or applicant for employment because of age, sex, religion, handicap, race, creed, color or national origin.
10. Labor Laws – The Bidder certifies that it is in compliance with all labor laws.
11. Federal Acquisition Regulation (FAR) – The Bidder certifies that it is familiar with the Federal Acquisition Regulation (FAR) and is in not in violation of any certifications required in the applicable clauses of the FAR, including but not limited to certifications regarding lobbying, kickbacks, equal employment opportunity, affirmation action, and payments to influence Federal transactions.
12. Employee Compliance – The Bidder warrants that it will require all employees, entities and individuals providing services in connection with the performance of an DAI Purchase Order to comply with the provisions of the resulting Purchase Order and with all Federal, State, and local laws and regulations in connection with the work associated therein.

By submitting a proposal, offerors agree to fully comply with the terms and conditions above and all applicable U.S. federal government clauses included herein, and will be asked to sign these Representations and Certifications upon award.

## Attachment C: Detailed Technical Specifications

### Technical Specifications and Requirements for technical acceptability

The required equipment is as follows:

1. Pump and motor to provide 150 GPM (9.5 l/s) at 295 ft (90 m) of total dynamic head. The pump and motor must be able to operate off power from the photovoltaic system or from a diesel power generator.
2. A solar grid to power the pump. The system must be able to generate a minimum of 20kW of power at peak power production. The system includes the panels and racking system.
3. The solar inverter and inverter charger system for the panels
4. A battery bank of Lithium batteries capable of providing 60 kWh of storage with a multi-battery management unit and an appropriate battery enclosure.
5. A three-phase master control panel and three-phase slave unit.
6. A remote data management system that allows for real-time monitoring of the energy production by the system.
7. The necessary wires, conduits, and fittings to connect the system together.

The supplier will also provide training in the use of the remote data management system. All equipment is to be delivered to Pignon. A sample equipment list for this system is as follows:

Item Name	Description	Quantity
Solar Panels	Trina 455W Solar Panels	50
Solar Inverter	SMA SB 7.7-US Solar Inverter	3
Inverter/Charger	SMA Sunny Island 6048-US Inverter Charger	3
LiFePO4 Battery Bank	BYD B-Box LVL 15.5kWh LFP Battery Unit	4
Multi-Battery Management Unit	BYD B-Box Premium LV BMU Management System	1
3 Phase E-Panel "Master"	Midnite Solar SMA E-Panel Master (3 Phase)	1
3 Phase E-Panel "Slave"	Midnite Solar SMA E-Panel Slave (3 Phase)	2
Battery Combiner	Midnite Solar Battery Combiner Enclosure	1
SMA Data Manage M	SMA System Monitoring Unit	1
SMA Comm Gateway	SMA System Monitoring Communication Unit	1
Internet Connection	Router with Ethernet Port and internet	1
Solar Racking	Expand existing racking to new # of panels	1
Grundfos RSI	Grundfos RSI VFD - 20HP	1
Grundfos 15HP Submersible Pump	Grundfos 15HP Submersible 3-Phase AC Pump	1
Balance of System Components	BOS - Wires, conduit, fittings, WM Adv. Mon, etc.	1
Transportation to Pignon		1

The design document for the system is attached in annex as reference.

# Pignon 2024

## Overview Outline

### Topics Covered

<b>1. Context</b>	A brief background of the motivation for this document  Explanations of assumptions and unknown project variables
<b>2. Re-Design Assumptions</b>	High-level system explanation and overview
<b>3. System Overview</b>	Simple system one-line and system layout diagrams
<b>4. Simple System Diagrams</b>	
<b>5. Major Components and Cost Estimates</b>	List of major system components and estimated costs
<b>6. Major System Specifications</b>	
<b>7. References</b>	System specifications in case of differing components  Links to important equipment information

### Electrical Standards

- NEC, IEC, IEEE

## 2. Basic Design Criteria:

1. Off-grid battery-based Photovoltaic (PV) system in Pignon, Haiti to power municipal water supply pumps.
2. Primary design load: 15HP Grundfos submersible pump controlled by a Grundfos Renewable Solar Inverter (RSI) variable frequency drive (VFD).
3. Secondary design loads including but not limited to: 3HP existing pump (alternative/backup), lighting, and remote monitoring.
4. Maximize water pumping each day for the 15HP pump with solar PV, ~60kWh of battery storage, and a 3-phase backup generator.

## 3. Design Assumptions

### 3.1 *Approximate Water Demand*

- There are approximately 300 households that will utilize the water from this source.
- Each household uses approximately 1300 gallons of water per month.
- It is assumed that the system losses are currently 40-80%.

The assumed water demands are as follows:

- At 0% losses: 390,000 gal/month; 12,800 gal/day
- At 40% losses: 650,000 gal/month; 21,400 gal/day
- At 80% losses: 1.95 million gal/month at 80% losses; 64,100 gal/day

The daily water demand range (accounting for losses): 21,400gal/day-64,100 gal/day

For design purposes, an assumed 54,000gal/day was used, resulting in the need for the 15HP pump (150GPM) to operate for 6 hours per day (150GPM x 60 min x 6 hrs = 54,000 gal/day).

### 3.2 *PV and Battery System Sizing*

According to the pump curves, the 15HP pump will pull approximately 14.34kW at 295 feet of head. For design purposes with some losses, an assumed 15kW was used for PV array and battery sizing. With an assumed 15kW needing to operate for 6 hours, the total daily energy requirement for the system is 90kWh/day.

With pricing and battery availability, the battery design criteria is roughly 60kWh (4 battery units). This could be increased at a higher cost for more battery storage and less generator use.

### 3.3 *Water Source and Piping System Assumptions*

The current borehole can produce a maximum of roughly 33,800 gal/day (~23.5 GPM or 1.5LPS) when pumping 24 hours/day. There are several assumptions with the likely eventual addition of a new borehole in which the 15HP pump will be installed:

- The borehole drilling will be successful and that a reliable water source will be accessed.
- The TDH and pump selected in Northwater's "Preliminary Well Pump Specification" Option 1 is appropriate for the system.
- Total Pumping Head: 295 ft

- Design Flow: 150 gal/min
- Grundfos Submersible Pump: 3x208Vac, 15HP
- Borehole yield will be able to keep up with the pumping rate of the 15HP pump selected by Northwater.
- The total dynamic head based on the depth of the borehole, elevation of the tank, and piping system is appropriate for the 15HP pump selected by Northwater.

It should be noted that the 15HP pump will operate a full speed (full power) since it will be powered by AC (solar inverters) unless it is programmed to for lower maximum speed.

### ***3.4 Generator Assumptions (NOT BEING PROVIDED THROUGH THIS RFP)\***

The existing 8kW generator is too small to power a 15HP pump by itself. The operator will replace the generator with a larger capacity generator. The installation of the generator is outside of the scope of this procurement. It is also assumed that eventually a new generator will be purchased with the capacity to be able to power the 15HP pump, so it can be used as a backup power source if the PV inverter system ever fails.

### ***3.5 Equipment Assumptions***

This design components and manufacturers are based on what seems to be locally available in Haiti. This is especially important for the batteries as importing batteries has proven to be especially challenging. Other components of equal or greater functionality could be substituted if they can be found locally or reliably sourced elsewhere. Different manufacturers and equipment have various components and accessories, which could cause overall pricing to vary substantially.

## **4. System Overview**

### ***4.1 Hybrid System***

This design will utilize solar PV to charge a lithium-ion battery bank, which will then be inverted to AC that will feed a VFD which will control the submersible pump. The inverter system will also include inverterchargers, which can take an AC input (in this case diesel generator) to charge the batteries.

If the PV inverter system ever failed, the solar panels and generator could each be rewired to power the VFD as needed with a manual transfer switch or power blending unit until the inverter system could be repaired or replaced. These two options for backup power are important for increased resiliency.

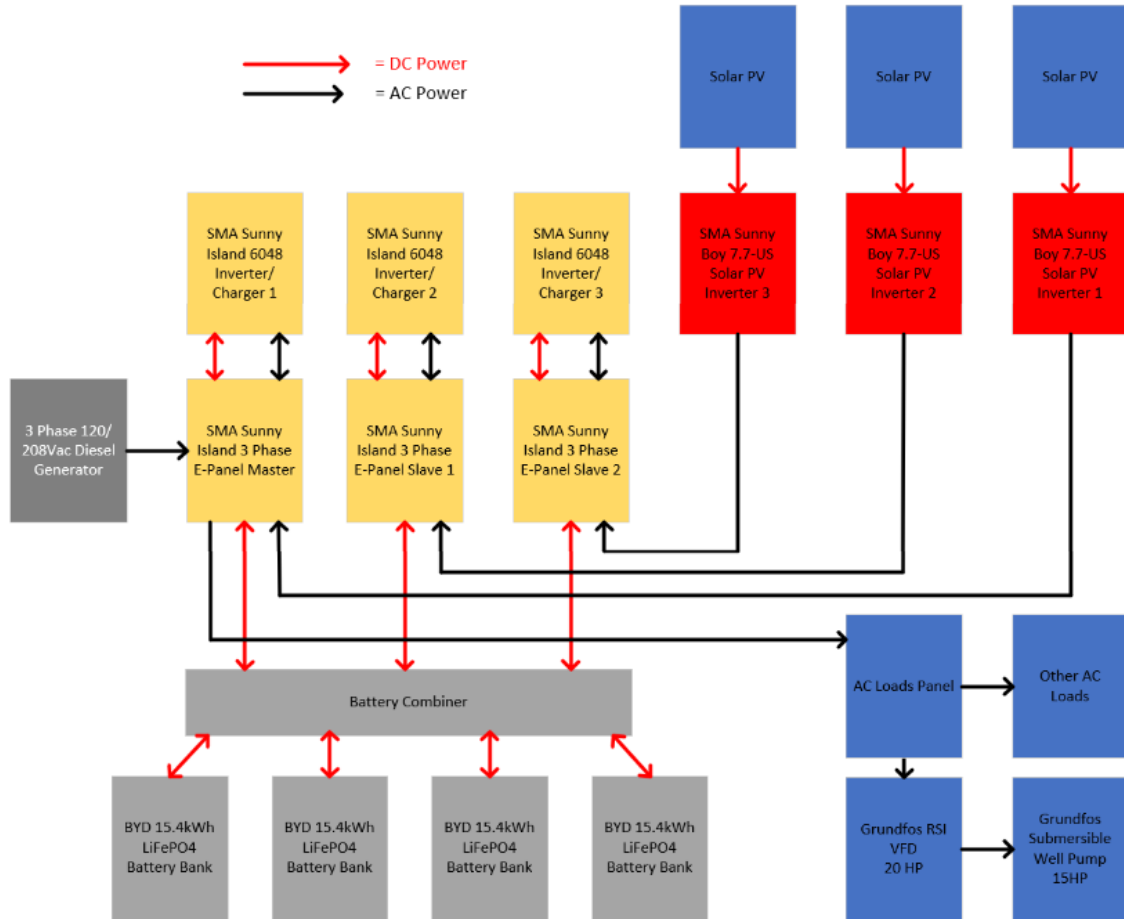
This design utilizes a three-phase inverter system and a three-phase generator rather than a single-phase inverter (split-phase) and generator. The three-phase inverter system consists of three individual solar inverter chargers that communicate with each other, each creating one of the three phases that work together to create three-phase power. The outdated terminology used by many manufacturers is known as “master” and “slave” where to “master” inverter is the primary decisionmaker of the system and communicates with the “slave” units to create 3-phase power. The three-phase diesel generator is then wired to the system to be able to charge the batteries or pass through (bypass mode) to power the loads directly (assuming the generator has enough capacity).

#### ***4. Simple System Diagrams***

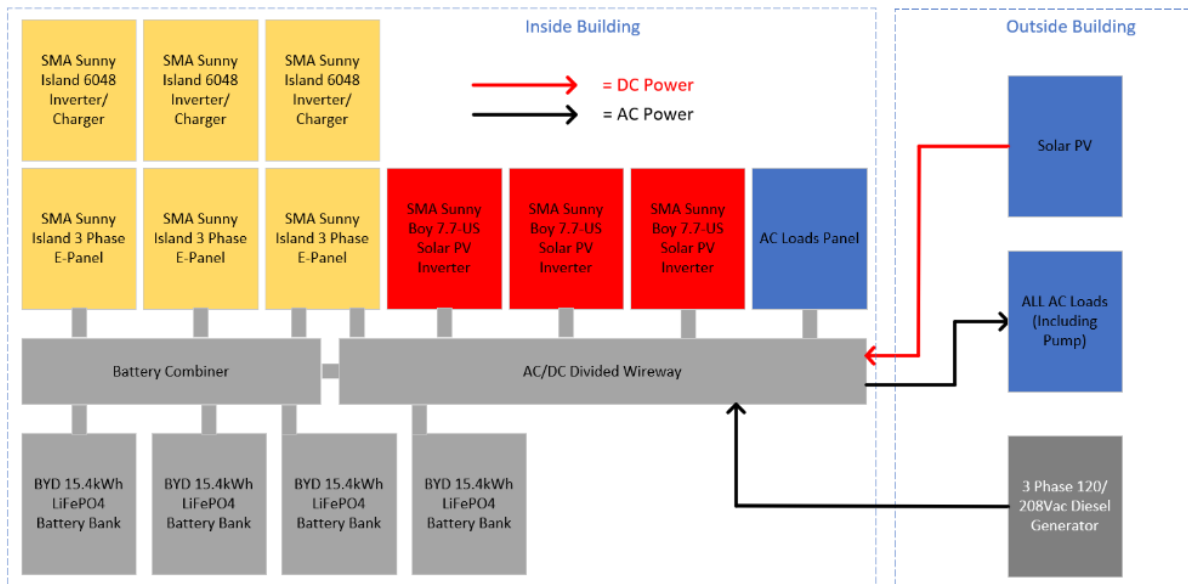
The diagrams in this section include a One-Line Diagram that outlines power flows through the system specifying AC and DC power. The Suggested System Layout includes a logical installation method considering the equipment and flow of power. This can potentially be modified by the installers based on space constraints or other factors.

(continue to next page)

## 4.2 One-Line Diagram



## 4.3 Suggested System Layout



### 5. List of Major Components and Estimated quantities

This is a list of major components only with estimated quantities. Smaller, but still critical, additional components such as wires, conduits, fittings, and more are implied in the catch-all category of “Balance of System Components.” It is assumed that as many components as possible will be purchased in-country, but that many items may need to be shipped from the United States.

Item Name	Description	Quantity
Solar Panels	Trina 455W Solar Panels	50
Solar Inverter	SMA SB 7.7-US Solar Inverter	3
Inverter/Charger	SMA Sunny Island 6048-US Inverter Charger	3
LiFePO4 Battery Bank	BYD B-Box LVL 15.5kWh LFP Battery Unit	4
Multi-Battery Management Unit	BYD B-Box Premium LV BMU Management System	1
3 Phase E-Panel "Master"	Midnite Solar SMA E-Panel Master (3 Phase)	1
3 Phase E-Panel "Slave"	Midnite Solar SMA E-Panel Slave (3 Phase)	2
Battery Combiner	Midnite Solar Battery Combiner Enclosure	1
SMA Data Manage M	SMA System Monitoring Unit	1
SMA Comm Gateway	SMA System Monitoring Communication Unit	1
Internet Connection	Router with Ethernet Port and internet	1
Solar Racking	Expand existing racking to new # of panels	1
Grundfos RSI	Grundfos RSI VFD - 20HP	1
Grundfos 15HP Submersible Pump	Grundfos 15HP Submersible 3-Phase AC Pump	1
Balance of System Components	BOS - Wires, conduit, fittings, WM Adv. Mon, etc	1

### 6. Major System Specifications

If different product lines are to be used based on product availability and installer preference/quotes, below is a list of high-level system parameters that should be met by whichever equipment is selected:

Equipment	Major Specification	Additional Notes
Pump	150GPM at 295 ft of total dynamic head	Likely around 15HP, inverter duty rated
Solar VFD	Larger HP than pump	likely around 20HP
3 Phase Inverter System	18kW or greater 3 phase 120/208V output	Includes solar inverter + inverter/charger
Lithium Ion Battery System	minimum of 60kWh of storage	Must be compatible with inverter system
Solar PV Array	~20-22kW	Voltage must be compatible with VFD and Inverter
Diesel Generator	~18kW, 120/208V 3-Phase	Must be able to power pump by itself



## **7. References**

[Trina 455W Solar Panel Spec Sheet](#)

[SMA SB 7.7-US Inverter](#)

[SMA Sunny Island 6048-US Inverter Charger](#)

[BYD B-Box LVL 15.4 kWh LFP Battery Unit](#)

[BYD B-Box Premium LV BMU Management System](#)

[Sunny Island Operating Manual](#)

[Sunny Island System Guide](#)

[Midnite Solar SMA E-Panel Installation Manual](#)

[Midnite Solar E-Panels and Battery Combiner](#)

[Sunny Portal](#)

[SMA Data Manager M](#)

[SMA Energy App](#)