


# PLANNING GUIDE



## PROTECTING VACCINES DURING AN EMERGENCY POWER OUTAGE

The Risk, Cost and Benefit of  
Emergency Backup Power

**MEDI+PRODUCTS**

BACK-UP POWER SYSTEMS

**FOR MORE  
INFORMATION:**

**800 765 3237**

[www.mediproducts.net](http://www.mediproducts.net)

**MEDI+PRODUCTS**

**BACK-UP POWER SYSTEMS**



## 02 CHALLENGES & THREATS TO VACCINE STORAGE

- 03 CDC Guidelines for Vaccine Storage and Monitoring
- 04 The Cold Chain Background
- 05 How Power Outages affect the Cold Chain
- 06-07 Weather Causing Increased Power Outages
- 08 Why Wait For Disaster to Strike?



## 09 SOLUTIONS FOR SUPPORTING YOUR REFRIGERATED PHARMACEUTICALS DURING A POWER OUTAGE

- 10 Transporting Vaccines During Power Outages
- 11 Use an Ice Lined Refrigerator to Endure an Extended Outage
- 12 Installing a Fuel Powered Generator to Support your Appliances
- 13 Use Battery Backup System to Support your Refrigerators & Freezers



## 14 WHY BATTERY BACKUP IS THE MOST VIABLE SOLUTION

- 15 Common Questions About Battery Backup Power
- 16 How to Select the Right Battery Backup System
- 17 Can You Afford To Not Take Action?
- 18 Enjoy the Safeguard & Peace of Mind with a Battery Backup Power System?
- 19 Moving Forward With Your Backup Plan
- 20 Ensure Patient Safety as You Realize ROI

# PROTECTING VACCINES DURING AN EMERGENCY OUTAGE

With vaccine costs rising, and the demand for larger inventories, the need to protect these valuable products has also grown. This primarily involves implementing a plan to safeguard vaccines from power outages.

Without power to the refrigerators and freezers that store the vaccines, the necessary temperature can not be maintained.

## This Guide Serves as a Resource for:

- Challenges & Threats to Vaccine Storage
- Solutions for Supporting Your Refrigerated Pharmaceuticals During a Power Outage
- Why Battery Backup is the Most Viable Solution



# CHALLENGES & THREATS TO VACCINE STORAGE

Vaccines have proven to be an efficient and economical way of preventing numerous diseases and saving millions of lives. However, vaccines are fragile products, and can be easily damaged by light and temperature fluctuations.

Power outages, due to extreme weather, can cause the refrigerators and freezers in which the vaccines are stored to no longer maintain their temperatures, leaving their contents damaged and ineffective.

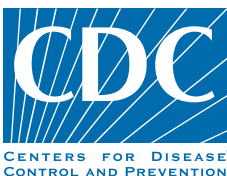
# CDC GUIDELINES FOR VACCINE STORAGE AND MONITORING



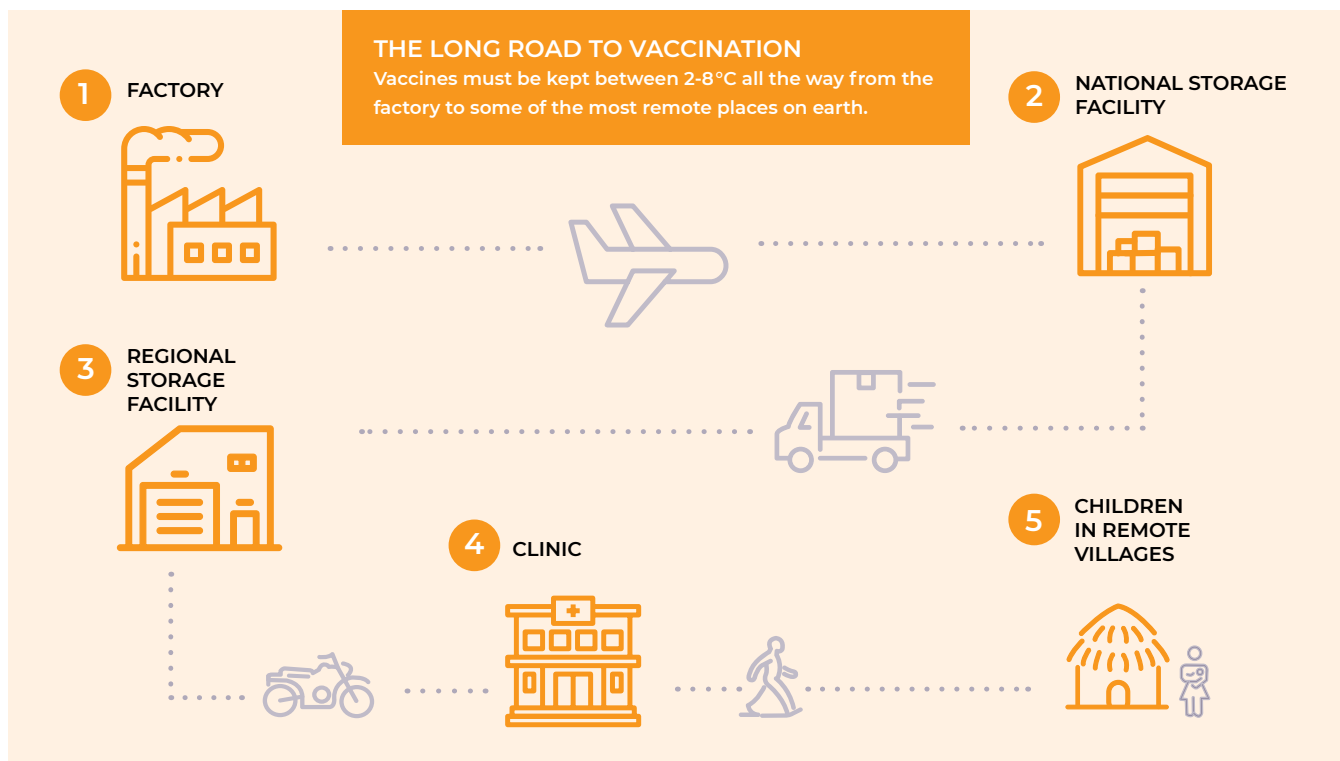
## THE FOLLOWING IS A SUMMARY OF 7 STORAGE & MONITORING GUIDELINES IN THE CDC VACCINE STORAGE AND HANDLING TOOLKIT:

1. Preferably use purpose-built pharmaceutical-grade refrigerators or freezers. These units generally have a microprocessor-based temperature control, a digital temperature sensor, and fan-forced air circulation.
2. Maintain temperatures in refrigerators between 2° to 8° C (36° to 46° F) , and between -50° to -15° C (-58° to +5° F) in freezers. Some newly developed COVID-19 vaccines must be stored as low as -70°C.
3. Use a DDL (digital data logger) on every storage unit which will record any 'temperature excursions'. The DDL should be equipped with a 'buffered temperature probe', an alarm for out-of-range temperatures, low battery indicator, min-max-current temperature display, +/- .5° C (+/- 1° F) tolerance, and 30 minute logging capabilities.
4. Check storage unit temperature each time vaccines are accessed.
5. Check and record storage unit minimum and maximum temperatures at the start of each day.
6. In the event of a 'temperature excursion', document time and magnitude that temperatures went of range, label vaccines 'DO NOT USE', notify your immunization program or vaccine manufacturer and consult your SOPs.

**7. HAVE EITHER A FUEL GENERATOR OR BATTERY BACKUP SYSTEM INSTALLED TO PREVENT THE NEED TO TRANSPORT VACCINES TO AN ALTERNATIVE STORAGE FACILITY DURING A POWER OUTAGE. PERFORM REGULAR TESTING AND MAINTENANCE ACCORDING TO MANUFACTURER GUIDELINES.**



# THE COLD CHAIN BACKGROUND



**The CDC Toolkit states that ‘proper storage and handling begin with an effective vaccine cold chain’.**

Vaccines must be kept within the temperature ranges suggested by their manufacturers or they can lose their potency, and can no longer be administered. This can result in entire inventories being discarded, costing the provider thousands of dollars.

To prevent this, a process called the ‘cold chain’ must be maintained.

This is the process of transporting, storing, and distributing the vaccines within these temperature ranges, from the time they are manufactured to the time they are administered. To deliver these vaccines to every part of the country while maintaining this process is a complicated and difficult task. The need of dependable equipment, trained personnel at each step, and detailed documentation is required to make this possible.

With the population growing, diseases evolving, and manufacturers increasing the number of vaccines on the market, these supply chains have not been able to keep up. The challenges are also significantly increased in areas where transportation methods are limited, climates are extreme, and electricity less reliable. Power outages are a major obstacle to this process, and the leading cause of breaks in the ‘cold chain’.





## HOW POWER OUTAGES AFFECT THE COLD CHAIN

### POWER OUTAGES ARE LONGER LASTING AND MORE FREQUENT

**Our electrical grid is outdated and at its limits. Most of the grid was installed in the 50's and 60's, and only designed to last 50 years. Population increases and changes in technology continue growing, causing severe strain on the system. Along with this, extreme temperatures due to climate change are increasing the need for heating and cooling, driving power demands even higher.**

As a result, the grid is left vulnerable to storms with high winds and heavy precipitation, which can damage the grid leaving thousands without power, sometimes for days. What can be done? Many power companies are taking measures to “harden” their grid – involving burying lines, using steel telephone poles, adding poles to shorten spans, etc. However this is expensive, and due to the fact that many utility companies are privately owned, many do not want to make this investment. Furthermore, none of these improvements can prevent all outages. Even underground lines can be damaged by flooding, and are not exempt from failure. What is causing these storms?

**OUR ELECTRICAL  
GRID IS  
OUTDATED AND  
AT IT'S LIMITS.**



# WEATHER CAUSING INCREASED POWER OUTAGES

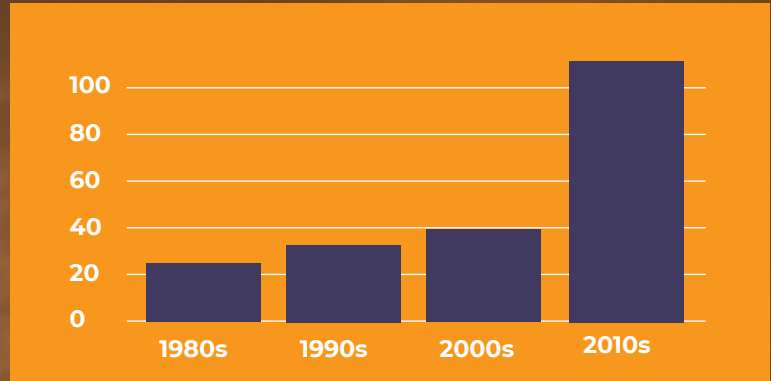
## EXTREME WEATHER PATTERNS ARE INCREASING

Severe weather events are becoming more common, more expensive and more dangerous. Extreme wetness, dryness and abnormally warm or cold weather can cause climate disasters such as floods, droughts, wildfires and hurricanes. These volatile events are also becoming a serious health issue, causing direct injuries and deaths, losses of homes, disruption of food supplies, and water contamination.

Why is this happening? While the exact cause may not be known, scientists have been observing the earth's climate growing steadily warmer over the last century. This could be caused by natural cycles, human activities, or a combination of both. These higher temperatures boost evaporation, leading to more moisture in the atmosphere, and causing increased precipitation and heavier storms. What do we do to protect ourselves?

**SEVERE WEATHER EVENTS ARE BECOMING MORE COMMON.**

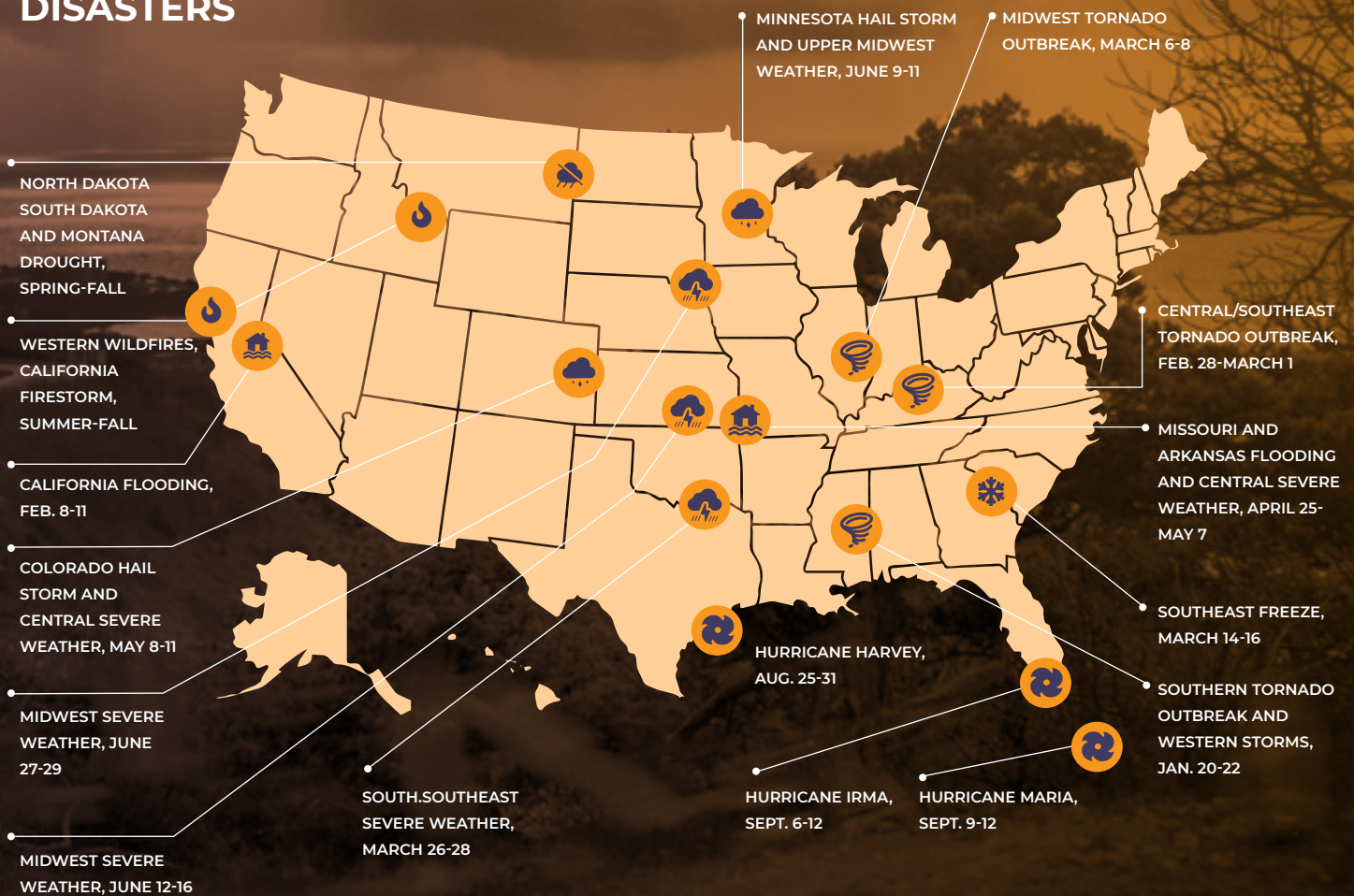
# UNITED STATES BILLION-DOLLAR DISASTERS WEATHER & CLIMATE EVENTS



1980-2019 BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS (CPI-ADJUSTED). SOURCE: NOAA/NCEI. PRODUCED 2/12/2020

CLIMATE CENTRAL

## 2017 U.S. BILLION DOLLAR WEATHER AND CLIMATE DISASTERS



THIS MAP DENOTES THE APPROXIMATE LOCATION FOR EACH OF THE 16 BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS THAT IMPACTED THE UNITED STATES IN 2017.

SOURCE: NOAA

## WHY WAIT FOR DISASTER TO STRIKE?



**WITH VACCINE COSTS RISING, AND THE DEMAND FOR LARGER INVENTORIES INCREASING, THE NEED TO PROTECT THESE VALUABLE PRODUCTS IS EVER GROWING. IMPLEMENTING A PLAN TO GUARD AGAINST POWER OUTAGES IS NO LONGER AN OPTION, BUT A NECESSITY.**

The advent of COVID-19 has only increased the importance of taking action. If cold storage device loses power, not only will this mean the large expense of lost inventory, but a loss of time to reorder, restock , and in some cases re-vaccinate patients as well. There is also the likely possibility that supply chain will be limited at least initially, meaning longer delays in receiving new inventory. With people dying everyday from this virus, this time cannot be lost.







# SOLUTIONS FOR SUPPORTING YOUR REFRIGERATED PHARMACEUTICALS DURING A POWER OUTAGE

CDC guidelines suggest each practice have a backup plan in place in the event of a power outage. This section will detail four different types of backup plans and the pros and cons of each option, enabling you to determine which plan or combination of plans will work best for your practice or facility.

- 1 Transport Vaccines:** Designate an alternative site where vaccines could be transported to, such as a local hospital, health department or pharmacy. En-sure the needed number transport containers, ice packs thermometers, flash-lights and other emergency materials are on hand, and follow CDC recommendations.
- 2 Using an Ice Lined Refrigerator:** A heavily insulated chest refrigerator will keep vaccines cold longer than a standard refrigerator, but may be too small and cumbersome to use as a day to day option.
- 3 Install an Outdoor Fuel Generator:** An outdoor generator is a dependable option, but can be costly, and may not work in all locations, such as leased spaces as you may not want to make such an investment in a space you do now own.
- 4 Purchase a Battery Powered Backup:** The battery powered backup is the most dependable and cost effective solution, as you can use your existing appliances, initial cost is low, and installation is quick and easy.

# TRANSPORTING VACCINES DURING POWER OUTAGES

Although this is the least desirable solution, every practice should implement this plan in case one of the other plans fails, such as generator malfunction or power outage is extended. There are pros and cons:

## PROS:

**Lowest Cost:** Require little investment. Can be implemented with hard-sided coolers and frozen water bottles.

**Need for an Alternate Plan:** The CDC recommends all practices have this plan in place in case backup generator fails or power outage is extended. An alternate plan is not required.

## CONS:

1. **Requires Extensive Preparation:** Prepare ahead - make a list of emergency contacts, set up data loggers on all equipment, secure backup power source, post an emergency plan, train staff, and ensure staff has access to the building - spare keys, alarm codes, etc.

2. **Dangerous:** Transporting vaccines in the dark and during a power outage can be risky and dangerous, and there are numerous avenues for failure.
3. **Dependence on Another Facility:** In order for this to work another facility must be opened, and have the vaccine storage space available during an emergency.
4. **Requires Many Materials on Hand:** Designate an alternative site where vaccines could be transported to, such as a local hospital, health department or pharmacy. Ensure the needed number transport containers, ice packs, thermometers, flashlights and other emergency materials are on hand.
5. **Largest Margin for Error:** Depends on staff being well trained and using best practices for packing and transportation as outlined in the CDC Guidelines.



VACCINE  
TRANSPORTATION BAG

# USE AN ICE LINED REFRIGERATOR TO ENDURE AN EXTENDED OUTAGE

This type of refrigerator depends on its thick insulated walls and chest style design to maintain temperatures longer than standard upright refrigerators. There are pros and cons:

## PROS:

**Energy Efficient:** Runs well on battery backup power due to limited power consumption.

## CONS:

**Uses Large Amount of Floor Space:** Chest style design makes inefficient use of floorspace, making it a poor choice in practices where space is limited.

**Limited Capacity:** Due to its thick insulated walls, storage capacity is severely limited.

**Does Not Maintain Steady Temperature:** Will not maintain a steady temperature during a power outage. Temperature will continue to rise as long as power outage exists.

**Cumbersome for Daily Use:** Chest style design is cumbersome for daily use. Time and effort is increased to access inventory at the bottom of the refrigerator.

## Not clear how long

**it will last:** There is no guarantee as to how many hours it will last. As the temperature gradually rises, including

temperature in room, how many times door is opened and closed, etc. will affect the time the temperature will be kept within range.

**Visibility Limited:** Vaccines are stored in baskets on top of each other limiting visibility to inventory below. Convenient glass doors are not an option.

**No Fan to Circulate Air:** Purpose built pharmaceutical grade refrigerators include a fan to circulate air ensuring even temperature throughout, which these do not typically include.

## Does not protect existing fridges and freezers:

Unlike a backup power system, all existing refrigerators and freezers containing vaccines will still be vulnerable to power failure.



ICE-LINED REFRIGERATOR



# INSTALLING A FUEL POWERED GENERATOR TO SUPPORT YOUR APPLIANCES

When it comes to backup power for a vaccine refrigerator there are two types of backup power systems - battery power or fuel powered systems. There are advantages and disadvantages to each:

## PROS:

**Unlimited Runtime:** Runtime would only be limited by fuel supply. No need to relocate vaccines.

**Powerful:** Generally will have enough power to supply a whole building, not only the refrigerators.

## CONS:

**Cost of Purchase:** Generally a battery system will be much more cost effective. It would not be uncommon for a generator for a medium sized building to cost upwards of \$50,000.

**Electrical Wiring Expense:** An electrical contractor will be needed to run cabling through the building from the generator to the electrical panel.

**Permits Needed:** Building permits, inspections, noise ordinances and emissions regulations will need to be obtained and adhered to.

**Installation Cost:** A skilled team with a crane will be needed for installation. Other costs involve a concrete pad foundation, fencing enclosures, etc.

**Space Requirements:** The size of a generator and its space surroundings can easily be 600 sq ft.

**Fuel Delivery Expense:** With a fuel powered generator you would need to consider what type of fuel you will want to run off of. The main types are diesel, natural gas and propane. Fuel delivery would need to be considered: trenching and excavation will need to be considered for gas and propane. Fuel truck accessibility for diesel.

**Maintenance Expense:** Oil changes, service contracts, outdoor weather corrosion need to be considered.



FUEL GENERATOR

# USE BATTERY BACKUP SYSTEM TO SUPPORT YOUR REFRIGERATORS & FREEZERS

## BATTERY BACKUP IS AN EXCELLENT CHOICE



BATTERY BACKUP SYSTEM

### PROS:

**Simple Installation:** Many Medi-Products systems are plug and play— simply plug into an existing wall outlet. No need for an electrician, building permits, etc.

**Modular:** Batteries can be added to existing systems to increase run time if needed.

**Runs All Appliances:** Can be sized to run any number or combination of appliances.

**Space Saving:** Uses less than 1 sq ft. of floor space.

**No Maintenance Required:** The system includes all solid state electronics so there are no moving parts to wear out, eliminating regular maintenance tasks.

**Simplified Testing:** Any member of the office staff can test the system by simply unplugging to simulate a power outage.

**Power Outage Alert System:** The system comes with an optional power outage alert system, notifying up to three phone numbers when the power goes out.

### CONS:

**Battery Replacements:** Batteries will need to be replaced every four years. This could be about up to 20% of the cost of the system.

**SIMPLY PLUG INTO AN EXISTING WALL OUTLET. NO NEED FOR AN ELECTRICIAN, BUILDING PERMITS, ETC.**



# WHY BATTERY BACKUP IS THE MOST VIABLE SOLUTION

- Common questions about battery backup power
- How to select the right battery backup system
- Can you afford to not take action?
- Enjoy the safeguard & peace of mind with a battery back-up power system?
- Moving forward with your backup plan

# COMMON QUESTIONS ABOUT BATTERY BACKUP POWER



## ✓ CAN A REFRIGERATOR RUN ON BATTERY POWER?

Yes. The Mediproducts backup power system includes an internal inverter which converts 12 volt (DC) power to standard 120 volt (AC) power. Batteries are quickly replacing fossil fuels as the preferred source of energy.

## ✓ HOW LONG WILL IT LAST?

There are really no limits on how long the system will last. We design each system to run each of your appliances for the amount of run time you specify.

## ✓ DOES IT GIVE OFF HEAT?

No, the system give off very little heat and is fairly insignificant, eliminating ventilation requirements.

## ✓ ARE THERE ANY FUMES?

No, the system uses sealed gel batteries that do not give off any fumes. The systems conforms to all NFPA fire code regulations.

## ✓ CAN IT USE LITHIUM ION BATTERIES?

Yes, lithium ion batteries are an option. However, they do cost more and are really only needed where weight or size is an issue.

## ✓ IS THERE ANY MAINTENANCE REQUIRED?

No, the system includes all solid state electronics, so there are no moving parts to maintain.

## ✓ CAN IT RUN MORE THAN ONE APPLIANCE?

Yes. The systems can run multiple appliances. However, if you have a plug and play system, you will want to take into account the breaker size on the circuit you are plugging into.

## ✓ CAN I GET A SHOCK WHEN INSTALLING?

No, the batteries are 12V and cannot shock you.

## ✓ DO I NEED AN ELECTRICIAN FOR INSTALLATION?

No. Most Mediproducts systems are plug and play.

## ✓ CAN I HARDWIRE TO ELECTRICAL PANEL?

Yes. Mediproducts has a hardwire system as well.

## ✓ IS THERE A MOBILE MODEL?

Yes, Mediproducts has a mobile system as well.



# HOW TO SELECT THE RIGHT BATTERY BACKUP SYSTEM:



MOBILE  
SYSTEMS



STANDALONE  
SYSTEMS



HARDWIRE  
SYSTEMS

Mediproducts manufactures a variety of battery backup systems. How will you decide which solution is the right one for your needs? Here are a few points to consider:

**Wall Mounted or Mobile?** The mobile system has the advantage that no installation is required and can be moved easily, however the wall-mounted option has the advantage of using less floor space.

**Standalone or Hardwire?** The hardwire system has the advantage that it can be installed anywhere in the building, but will also require an electrician to run wiring through the building. The standalone has the advantage that installation simply requires plugging the system into a standard wall outlet, but it also must remain close enough that your refrigerator/freezer can plug into it.

**How Much Power Will I Need?** Your power requirements will be determined by the number of appliances you are running, and the amount of power each one uses.

**How Much Runtime Will I Need?** The amount of runtime you will need is really up to you. Keep in mind the longer you want to run your appliances, the more batteries you will need, and the more expensive the system will be.

**Should I Include the Power Outage Alert Option?** The power outage alert system is a great option that can send you text messages or phone calls to alert you when your power has gone out. This can be very useful at times when you are not in the office such as on a weekend, and cannot hear an alarm on the fridge.

**Is There an Option to Monitor Refrigerator Temperature?** Yes, as an added option along with the power outage alert system is an option to be notified when the temperature in your refrigerator has gone out of range. In this case you will be alerted even if the power is still on, but the appliance has malfunctioned.

**MEDIPRODUCTS  
MANUFACTURES  
A VARIETY OF  
BATTERY BACKUP  
SYSTEMS.**



# CAN YOU AFFORD TO NOT TAKE ACTION?

## CONSIDER THE COST OF INACTION FOR 12 CU. FT. FRIDGE:

THE REFRIGERATOR MAY HOLD 500 DOSES:

**500**  
  
**\$70/DOSE**

Total value of refrigerator contents:

=  
**\$35,000**

 **1** PER/YR  
**X**  
 **5** YRS

Average number of power outages per year

Total cost of in-action over 5 years

=  
**\$175,000**



Cost of a power system that will power this size appliance

**\$3,590**

### Potential savings:

**1 yr = \$31,410**

**5 yrs = \$157,050**

As you can see the risk greatly outweighs the investment of a battery backup system.



# ENJOY THE SAFEGUARD & PEACE OF MIND WITH A BATTERY BACKUP POWER SYSTEM?

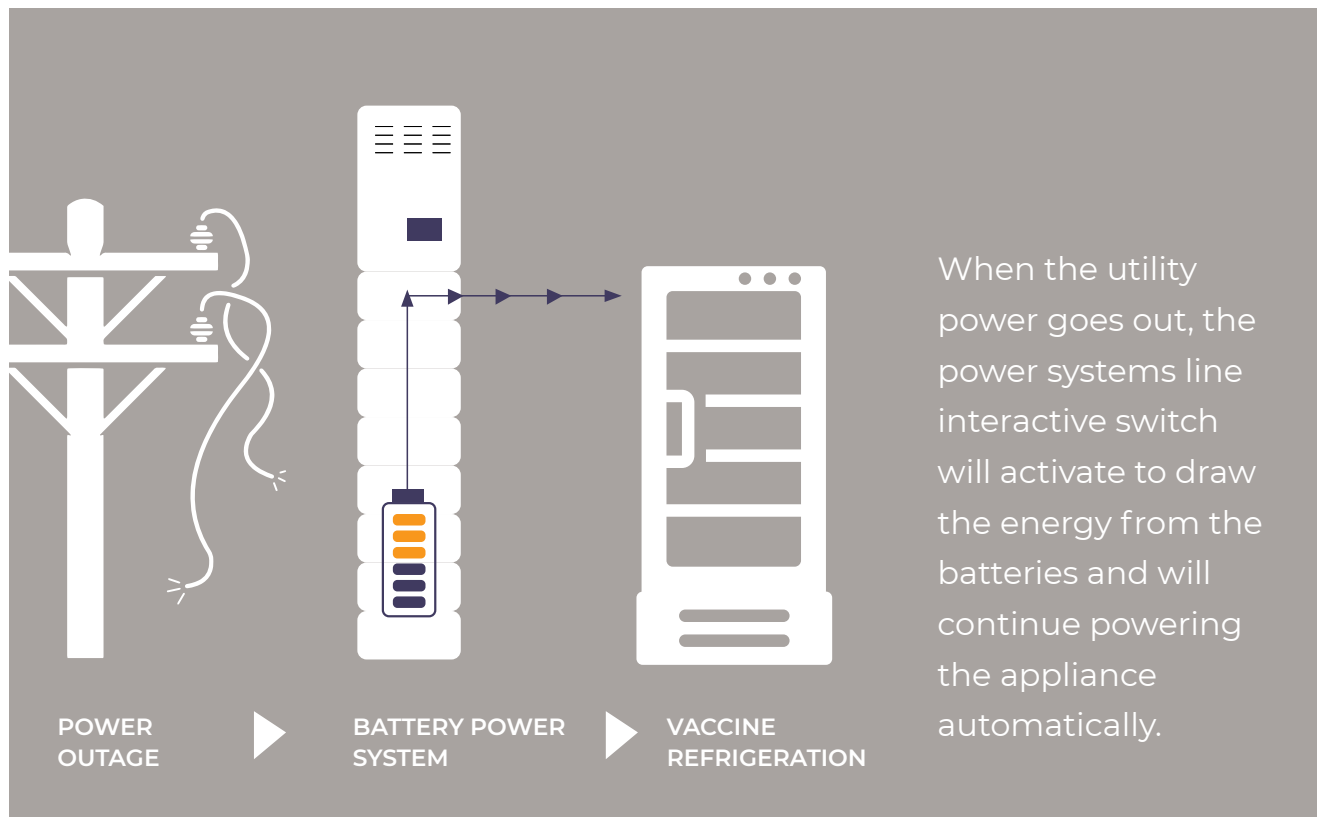
**Rest easier knowing that your inventory investment has an extra level of protection.**

The Auto Transfer from Utility Power to Battery Power for an unexpected outage, is on 24/7

Optional Alarm alerts you so you are always aware of a power outage occurrence

Save on your liability Insurance. Depending on your insurance carrier and plan you might be able to enjoy the savings offered by having the extra level of protection with a power system.

Knowing that you will not have to question the efficacy of your vaccines after a power outage, will give you greater confidence in your level of patient care.



# MOVING FORWARD WITH YOUR BACKUP PLAN



**If you do not already have a backup plan to protect your vaccines, it is important get started. With the power outages on the rise due to higher intensity and number of climate disasters, and the value of vaccine inventories continually growing, inaction is no longer an option.**

We have looked at a four different types of plans, and the pros and cons of each. While the best plan for any practice will vary, there are factors of each that will be important to all, including price, space needed and ease of use.

The battery backup system meets all three of these requirements simultaneously. Pricing is mid-range, the least amount of space is needed, and without the cost of maintenance to consider and the convenience of using your existing appliances, it is the best fit for most needs.

Mediproducts, has been an experienced manufacturer of these systems for many years, with many satisfied customers nationwide. Reach out to us for an assessment of your needs, and to move forward with your emergency backup plan.

**MEDIPRODUCTS,  
HAS BEEN AN  
EXPERIENCED  
MANUFACTURER  
OF THESE  
SYSTEMS FOR  
MANY YEARS.**

# ENSURE PATIENT SAFETY **AS YOU REALIZE AN ROI**

We can help you meet the toughest vaccine cold chain requirement. **Learn how in a virtual power assessment.**

## HERE'S OUR SIMPLE 3-STEP PROCESS:

- 1 We gather your appliance info
- 2 Our experts analyze the data
- 3 We present you with options

Calculate your potential savings with our Online Calculator:  
[www.mediproducts.net/refrigerator-battery-backup-roi-calculator](http://www.mediproducts.net/refrigerator-battery-backup-roi-calculator)

 **Call or click** to schedule your assessment today

 **800 765 3237**  
[mediproducts.net/assessment](http://mediproducts.net/assessment)

**MEDI+PRODUCTS**

BACK-UP POWER SYSTEMS

