BISON™

# Efficient Handling of ISO Containers in the Energy Sector

A PRACTICAL GUIDE

# EFFICIENT HANDLING OF ISO CONTAINERS IN THE ENERGY SECTOR: A PRACTICAL GUIDE.

If you are an energy executive, engineer, operations manager or logistics professional who uses - or plans to use - ISO containers in your operations then this eBook is for you.

From storing energy, through to deploying containerized battery technologies, ISO containers are contributing to the emergence of clean energy, However, containers are big and heavy assets that require well-designed infrastructure and suitable handling equipment to ensure smooth and safe operations.

The purpose of this eBook is to sum up your options and key considerations into a single, practical guide, giving you fresh insight and better clarity on which container handling solutions will work best for you.

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# Option 1 - Keep The Container On The Trailer

- **PROS**

  Keeping the container on the trailer is obviously the simplest option. It's best suited to sites where the container doesn't dwell in any one place for long; a good example being operations that regularly fill, discharge and transport MEGCs. It allows for simplified and streamlined processes and eliminates the need for container handling and additional equipment, such as cranes or forklifts.

- **CONS**

  This option doesn't work so well if you need to keep the container at sites for longer periods. Tying up trailers can lead to costly detention charges from your transport provider. You could avoid this by investing in your own trailer fleet, but this will tie up capital and may not scale effectively. And for manufacturers of UPS or BESS, keeping the container on the trailer may add constraints and potential inefficiencies to your production processes.

# Option 2 - Contract A Lift Service From A Third Party

- **PROS**

  In most industrial areas, you can hire mobile container handling services to lift, move and stack your ISO containers. The advantage of contract lift services is you don't need to own and operate the handling equipment yourself. You only pay for what you use. And the type of equipment you hire can flex, depending on your specific lifting requirement.

- **CONS**

  However, there are drawbacks with lift services. The obvious one is the hire cost, which can really add up if you're handling containers regularly. Getting the right rental equipment, into the right place, at the right time can be a challenge too. The bigger and heavier your container, and the more remote or inaccessible your location, the bigger the headache. Being dependent on external providers can lead to delays, downtime and inefficiencies that might be resolved by bringing container handling in-house.

# Option 3 -Adopt Your Own Container Handling Equipment

- **PROS**

  Having your own handling equipment available 24/7 on location will deliver more control and autonomy over your operations, leading to increased flexibility and efficiency. The equipment you adopt can be tailored to your specific needs and workflows, increasing productivity. And long-term cost savings might be achieved by avoiding third party lift service fees.

- **CONS**

  On the other hand, the high upfront investment required to purchase container handling equipment can be significant. Regular maintenance will be needed, to keep the equipment in optimal condition and ensure its longevity. And owning your own container handling equipment means assuming full responsibility for training operators and ensuring compliance with safety regulations.

# 20 Point Checklist For Setting Up To Handle Containers

| | |
|---|---|
| **1. CONTAINER SIZES** | How big are the containers you need to handle? |
| **2. CONTAINER WEIGHTS** | What is the maximum weight of your containers? |
| **3. CONTAINER LOAD DISTRIBUTION** | For modified containers, will the load be evenly balanced? |
| **4. CONTAINER TYPE** | Are they genuine ISO containers? |
| **5. CONTAINER CONFIGURATION** | Are there appendages on the outside of the container that you need to protect and work around? |
| **6. LOCATION** | Where do you need to handle the containers - at your facility only, or at third party sites as well? |
| **7. ACCESS** | How accessible are the specific areas you want to work with containers in? |
| **8. SPACE** | For modified containers, will the load be evenly balanced? |
| **9. GROUND SURFACE** | Will the ground support the equipment and the loads? |
| **10. BUILDING** | If you're considering an overhead gantry, will the building support the equipment and the loads? |
| **11. HANDLING REQUIREMENT** | Do you need to lift only; or lift and move; or lift, move and stack? |
| **12. HAZARDS** | What hazards will you need to manage - falling objects, explosive, electrical, environmental, other? |
| **13. AVAILABILITY** | Will the equipment be available at the locations and times needed? |
| **14. TRAINING** | What training do your people need to operate the equipment safely? |
| **15. PERMITS** | What permits or certifications will people and equipment need to operate legally? |
| **16. VOLUME** | How many containers will you be handling? Think about the short, medium and long term. |
| **17. REDUNDANCY** | What are the consequences and back-up options if the handling option is unavailable? |
| **18. CAPITAL COSTS** | What are the capital costs involved with each option? Alongside the handling equipment, consider any related costs of engineering, procurement, construction and ancillary equipment. |
| **19. OPERATING COSTS** | What are the operating costs associated with each option? Consider service charges, maintenance, repairs, fuel, wages, training, insurance, permits, depreciation, and storage. |
| **20. LONGETIVITY** | How adaptable and future proof is each option? |

# In-House Container Handling Solutions

For operators wanting to bring container handling in-house, what are your options?

There is no one-size-fits-all solution. The following profile of the five different categories of on-site container handling equipment highlights the pros and cons of each. The solutions progress from economical to more capital hungry. As you explore each category in the market, you'll find there's a range of equipment configurations and brands available with their own unique combinations of features, costs and benefits.

# #1 Container Jacks

Container jacks are sturdy hydraulic or mechanical devices used to transfer ISO containers between the ground and truck trailers. They are portable machines that come in various sizes and lift capacities, depending on the size and weight of the containers they are designed to lift. Some jacks have automatic self leveling and advanced safety features built in.

To transfer a container from the ground up onto a trailer, the jacks are attached to the ISO corners of the container. The system is then activated, lifting the container high enough for the trailer to reverse under, so the container can be lowered onto the trailer. That process is reversed to offload containers from trailers back to the ground or onto container skates.

## ADVANTAGES

- Low capital and operating cost
- High load capacity (88,000 lb | 40,000 kg)
- Handles all ISO container types & sizes
- Portability enables multi-site use

## DISADVANTAGES

- Vertical lift only
- Doesnt move or stack containers
- Takes time to set up & operate

# #2 Container Skates

Container skates, also known as container trolleys or castors, are specialized wheeled platforms designed to facilitate the movement of ISO containers. They usually consist of a sturdy frame fitted with multiple heavy-duty castor wheels, allowing containers to be towed or pushed across relatively smooth, level surfaces. They are typically placed underneath the corners of the container.

Container skates offer a practical and efficient solution for repositioning or relocating containers within limited spaces, such as manufacturing facilities, reducing the need for heavy machinery.

## ADVANTAGES

- Low capital and operating cost
- High load capacities available
- Works with most ISO Container types and sizes
- Compact size operates in tight spaces

## DISADVANTAGES

- Not suited to rough or uneven surfaces
- Takes time to sep up & operate
- Requires a seperate lift solution (eg. Bison C-Lift)
- Requires a tug or forklif to move container

# #3 Forklifts

Forklifts come in many different sizes, with load capacities ranging from 3,000 lb (1,500 kg) up to over 88,000 lb (40,000 kg). Smaller forklifts, such as those commonly used in warehouses, are not usually capable of handling ISO containers. However larger forklifts may be suitable, provided they have high enough lift capacity, stability features like counterweights, and wide tyres.

With a suitably rated forklift you will be able to lift and move containers around a site. You will also have a versatile machine that can handle other loads when needed.

## ADVANTAGES

- Lift and move containers quickly
- Mobility supports multiple operating areas
- Multi-dimensional i.e. can handle other loads

## DISADVANTAGES

- Load capacity limitations
- Usually not suited to 40’ containers
- Medium capital and operating costs
- Does not stack containers

# #4 Heavy Container Handlers

Heavy container handlers are mobile machines, capable of lifting long (40 foot) and heavy (up to 70,000 lb or 32,000 kg) ISO containers and moving them over short distances around a facility. Some machines will stack containers on top of each other too. There are a few different equipment types that sit inside this category:

**Reach Stackers & Top Loaders**

These machines have long, telescoping booms that can extend up to multiple containers high, allowing them to lift, move and stack heavy containers.

**Mini Straddle Carriers**

A mini-straddle carrier is a more compact wheeled machine that straddles the container, lifting it on and off trailers and moving them around a facility. Compared with a reach stacker or top loader, a mini straddle is generally more maneuverable, and has lower ground pressure, meaning they cause less damage to unreinforced surfaces.

## ADVANTAGES

- High load capacity
- Lift, move and stack containers quickly
- Mobility supports multiple operating areas
- Advanced safety features available

## DISADVANTAGES

- High capital and operating cost
- Requires wide, open space to operate
- Risk of damage to ground surface
- Requires ticketed operator
- Large storage footprint

FIVE IN-HOUSE CONTAINER HANDLING SOLUTIONS PROFILED

# #5 Overhead Gantry

An overhead gantry crane is a large steel structure with horizontal beams that span a designated area. A hoist mechanism, typically powered by an electric motor and controlled by an operator located on the ground, traverses the beams and lifts ISO containers from the top corners. Containers can be lifted, moved, and in some cases, stacked on top of each other. A gantry crane can be installed both outdoors and inside a building.

## ADVANTAGES

- Allows for efficient use of indoor space
- Lift, move and stack containers quickly
- Electric powered means no indoor emissions
- Advanced safety features available

## DISADVANTAGES

- High capital and maintenance cost
- Handling is limited to specific area
- Fixed installation
- Requires compatible building or space

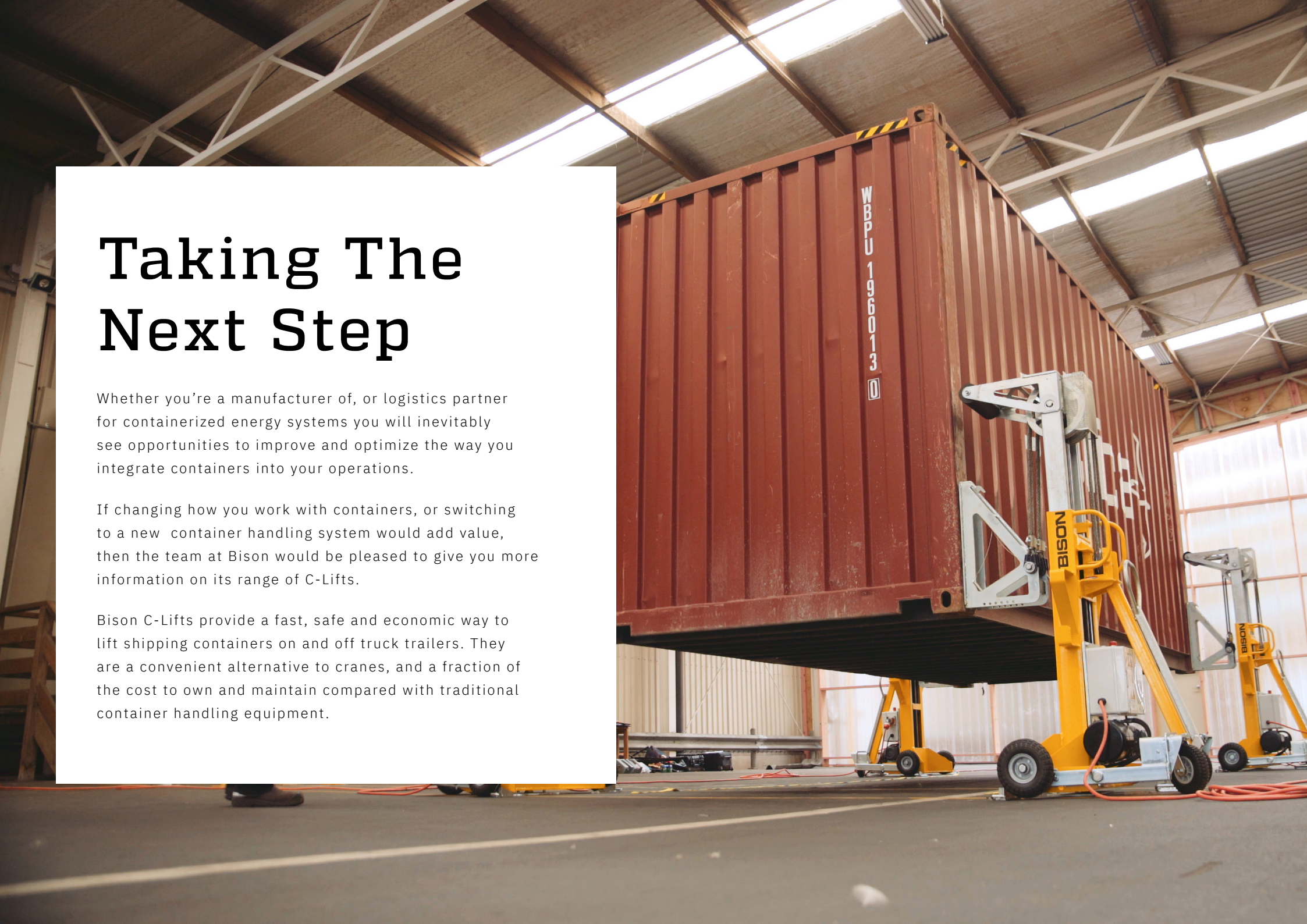

*Source: Mobicon*

# Taking The Next Step

Whether you're a manufacturer of, or logistics partner for containerized energy systems you will inevitably see opportunities to improve and optimize the way you integrate containers into your operations.

If changing how you work with containers, or switching to a new  container handling system would add value, then the team at Bison would be pleased to give you more information on its range of C-Lifts.

Bison C-Lifts provide a fast, safe and economic way to lift shipping containers on and off truck trailers. They are a convenient alternative to cranes, and a fraction of the cost to own and maintain compared with traditional container handling equipment.



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