

PRACTICAL GUIDELINES FOR SHIPPING OFF-GRID APPLIANCES

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EFFICIENCY FOR ACCESS COALITION



This shipping guide provides practical guidance to manufacturers, distributors or other actors to help them ship off-grid appliances more efficiently. The guide explores items such as shipping costs, import and export requirements and steps to prepare a product for shipment.

This guide was developed by CLASP as part of the Low Energy Inclusive Appliances program, a flagship program of the Efficiency for Access Coalition. Efficiency for Access is a global coalition promoting energy efficiency as a potent catalyst in clean energy access efforts. Currently Efficiency for Access Coalition members lead 12 programs and initiatives spanning three continents, 44 countries, and 22 key technologies.

The Efficiency for Access Coalition is jointly coordinated by CLASP, an international appliance energy efficiency and market development specialist non-for-profit organization, and the UK's Energy Saving Trust, which specializes in energy efficiency product verification, data and insight, advice, and research.

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Bill of Exchange	A binding written order that requires one party to pay another party on a predetermined date
Certificate of Conformity (CoC)	Document necessary for customs clearance of exports to many countries. It shows that goods being exported comply with the relevant technical regulations and national, regional or international standards of the country of import
Certificate of Origin	A signed statement as to the origin of the export product that are validated by a semi-official organization in order to be imported by some countries
Clearing Agent	Private companies that importers hire to help them get products into a country and through customs
Commercial Invoice	For shipping purposes, an invoice used for sending a commercial shipment with a commercial value
Conformity Assessment (CA)	An evaluation process performed by the custom agent in order to issue a Certificate of Conformity (CoC)
Cost Insurance and Freight (CIF) Price	Cost of product assuming seller covers cost, insurance, and freight against any loss or damages to goods while in transit to country of export
Cubic Meter (CBM)	The cargo volume of the shipment for domestic and international freights. This volume is calculated by multiplying the width, height and length
Customs Duty	A fee charged by a government for the import or export of goods
Delivered Duty Paid (DDP)	Exporter is responsible for paying duties
Delivery at Place (DAP)	Importer is responsible for paying duties
Dimensional Weight	Calculated by multiplying product length, width and height over a divisor determined by shipping agent
Foreign Exchange Monetary Act (FEMA) Declaration	Document required by Indian Customs authorities that verifies that shipping bills are accurate and complete
Free on Board (FOB) Price	Cost of product assuming buyer covers cost, insurance, and freight against any loss or damages to goods while in transit to country of export
Harmonized System (HS) Code	An international coding system that allows participating countries to classify traded goods on a common basis for customs purposes
Importer-Exporter Code (IEC)	A ten digit registration number issued by DGFT (Directorate General of Foreign Trade), Ministry of Commerce and Industries, Government of India
Permanent Account Number (PAN)	A ten-character alphanumeric identifier issued by the Indian Income Tax Department
Pre-Export Verification of Conformity to Standards (PVoC)	Guidelines issued by the country of import to ensure compliance to safety and quality of the imported products, and to protect manufacturers at the country of import from unfair competition
Pro Forma Invoice	For shipping purposes, an invoice used for a non-commercial shipment for a non-business purpose (e.g. research testing)
Registration Cum Member Certificate (RCMC)	Provides proof of registration with the Export Promotional Councils in India
Tariff	A tax or duty to be paid on a product of import or export. For this paper, we define tariff as the combination of VAT and customs duties
Value Added Tax (VAT)	An indirect tax levied at various stages of production. This tax rate is applied for all intrastate sales including imported products

Background and Purpose

With a lack of market intelligence on the logistics requirements for off-grid appliances (e.g. shipping, importing, and customs), many off-grid appliance manufacturers and distributors face challenges bringing their products into new markets. Knowledge of these processes is essential to help companies navigate the complex shipping requirements and bring high-quality products to off-grid consumers more efficiently and effectively.

The Efficiency for Access Coalition has documented lessons learned and developed a set of practical guidelines for manufacturers, distributors, or other agents to inform their considerations and actions when shipping off-grid appliances. This information and data were collected from our work shipping appliances to and from various countries for Equip Data¹ and the Global LEAP Awards², and from interviews with shipping companies, test labs, and manufacturers. The majority of information included is applicable to small-order shipments shipped through air freight.

While the Efficiency for Access team has taken every effort to make this document as accurate as possible, it should be used only as general guidance and it is not a comprehensive overview of the shipping process. The guide will cover a cost analysis, an overview of import and export regulations, and practical steps to prepare a product for shipment for three appliance categories: small household appliances (e.g. TVs and fans), refrigerators and solar water pumps.

Unraveling the Costs for Product Shipping

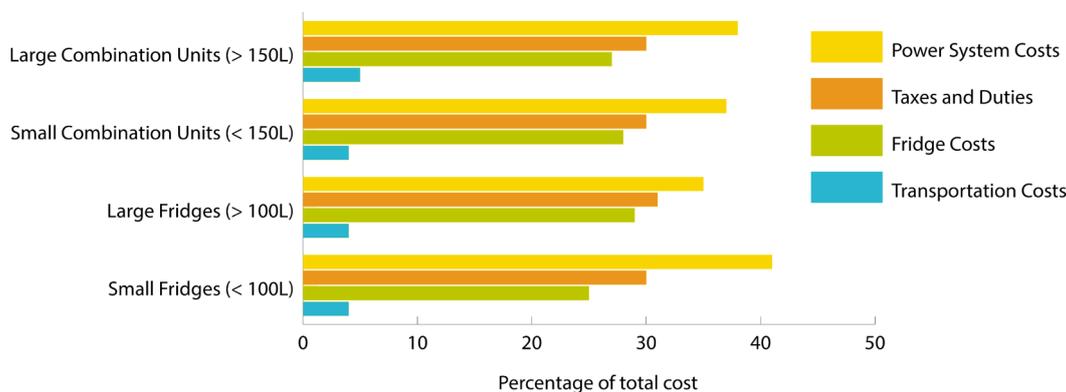
For some companies, shipping and tariffs can represent a significant portion of a product’s total cost. In a forthcoming Efficiency for Access publication, the authors found that for a solar home system kit with an off-grid refrigerator, tariffs and shipping via sea from China to Kenya can represent between 28-34% of the total system cost as seen in Figure 1.³ Considering the price-sensitivity of off-grid consumers, it is especially important to keep costs low and prepare for shipping-related expenses accordingly. By providing cost ranges and averages across different products and countries, and information on tariffs and HS codes, we hope to provide a small glimpse into the types of costs companies can expect.

The below analysis should only be used for general guidance, and not to calculate actual shipping or tariff costs. Providing estimates for shipping is complex because costs are driven by a number of key variables including the courier-specific rate, dimensions, weight, and country of import/export. Although some of these data are estimates of shipping rates via air, we do not have visibility on exact rates from different agents (e.g. DHL, FedEx, etc.). Companies will need to talk to shipping companies beforehand to estimate actual shipping costs.

Shipping Considerations: Air or Sea Freight

The choice to ship via air or sea depends on a company’s production timeline and budget. Products that are shipped via air typically arrive at country of import’s clearing agency between one to two days after they have cleared inspection

Figure 1: Relative System Costs and Breakdowns for Refrigerators Tested as Part of the 2017 Global LEAP Competition



Note: Averages are calculated from individual system designs assuming environmental conditions in a region of Kenya and a use case of cold drink storage. Kenyan import duty rates and VAT are applied on a component-by-component basis accounting for trade partner countries and shipping rates are calculated assuming shipment from China to Kenya via sea freight. Results are generated from the Schatz Energy Research Center at Humboldt State University’s Off-Grid Appliance Cost Modeling Tool.

1. Equip Data is a central repository for all relevant technical capacity building, product sampling, testing, and performance data sharing. Learn more: www.encyforaccess.org/equip-data
 2. The Global LEAP Awards identify best-in-class off-grid appliances through a competition-based approach to drive innovation and performance in early stage product markets. Learn more: www.globalleapawards.org.
 3. Source: With support from the LEIA Program, Use Cases & Cost Breakdowns of Off-Grid Refrigeration Systems has been produced by Energy Saving Trust in collaboration with Schatz Energy Research Center & 60 decibels. Forthcoming. LEIA is a DFID-funded project jointly managed by CLASP (www.clasp.ngo) and the Energy Saving Trust (www.energysavingtrust.org.uk).

from the country of export. However, this shipping route is more expensive as evident by the 2019 Global LEAP Awards Competition where the average shipment was around US\$12/kg. Companies often choose to use this route only during new product development when products are undergoing design revisions and need to be shipped back and forth in smaller quantities. Unlike shipping via air, the price of shipping via sea will vary depending on the destination city and the overland distance, especially for landlocked countries. Still, shipping via sea represents a relatively small proportion of total product cost as shown in Figure 1 (page 5).

Although shipping via sea is significantly cheaper-up five times cheaper than shipping via air in some cases⁴-it can take anywhere between 4 to 6 weeks for the goods to arrive at the country of import. Companies shipping via sea can choose between 20ft and 40ft cargo containers to pack products, with the 40ft container typically only costing 25% more than the 20ft container. Companies should pay more attention to the product dimensions than weight and make sure they abide to each container size's cubic meters (CBM) limit. Calculations of CBM will need to be provided on the packing list and invoice during goods inspection out of country of export. If a company cannot meet the minimum CBM requirement for export, in countries such as China they can also do a consolidated shipment which combines various shippers' products into one full container. Consolidated shipping makes sense for smaller orders, but is more expensive than shipping via regular cargo.

Air Freight Shipping Costs

While most companies choose to ship via sea rather than air considering the significant difference in price, our data

and experience is largely related to air shipments. We use air freight shipping costs for our analysis as a proxy to understand the cost of shipping more generally.

One common question related to air freight shipping is how a product's weight and volume affect the cost. As a rule of thumb, shipping agents will charge using the greater of the two values between actual weight and dimensional weight. The dimensional weight (i.e. how much space a product takes up on the plane) is calculated by $(l*w*h)/x$, where l is length, w is width, h is height, and x is a divisor determined by the shipping agent. For example, if you're shipping with DHL and the package's actual weight is 20 kg and the dimensional weight is 70 kg $((101\text{ cm}*40\text{ cm}*90\text{ cm})/5000)$, you will be charged for the greater of the two values (70 kg).

Table 1 presents examples of region- and product-specific shipping costs. To calculate these estimates, we used existing cost data from products shipped for the Global LEAP Awards and from product testing for Equip Data. Because most of these products were shipped from Africa or China to the UK, India, or Netherlands for testing, we also used DHL's rate calculator to estimate the reverse (shipping from China or India to Africa) – a more common scenario for off-grid companies. We selected DHL in order to be more comparable with our other cost data using DHL rates.

This analysis treats Africa as one region because the DHL rate is the same or very similar regardless of which country you ship to or from in Africa, unlike other regions (e.g. all countries in Asia or Europe do not have the same rate). We also used a relatively small sample size of products (42 TVs and fans, 24

Table 1: Region and Product Air Freight Shipping Cost Analysis

Product	Origin	Destination	Size range for calculation (kg) ⁵	Cost range per kg (USD)	Average cost per kg (USD)
TV/Fan [c]	Africa	United Kingdom	4.5-120	13-46	23
TV/Fan [b]	China	Africa	4.5-120	40-50	47
TV/Fan [c]	China	India	15-120	11-14	13
Refrigerator [a]	China	Netherlands	20-129	3-17	12
Refrigerator [c]	Africa	Netherlands	40-330	13-19	16
Refrigerator [b]	China	Africa	40-150	43	43
Refrigerator [b]	India	Africa	40-150	26	26
Solar Water Pump [a]	India	United States	73-228	6-17	10
Solar Water Pump [b]	China	Africa	70-228	42	42
Solar Water Pump [b]	India	Africa	70-228	26	26

Data source:

[a] Actual rates paid by CLASP/manufacturers for the Global LEAP Awards shipped via DHL or other shipping agents.

[b] Estimated rates via [DHL's rate calculator](#) using CLASP's discounted account rate.

[c] Both actual rates paid by CLASP shipped via DHL and estimated rates via [DHL's rate calculator](#) using CLASP's discounted account rate.

4. Source: Freightos, <https://www.freightos.com>

5. With the highest value for size range calculation corresponding to the lowest value for cost range (i.e. the higher the weight, the lower the USD\$/kg).

refrigerators, and 15 solar water pumps) all shipped via air to develop the cost estimates. Key findings from this analysis are summarized below.

Cost analysis key findings:

- There is a relatively high initial cost to ship products. This means it is more cost effective to ship a heavier package because the US\$/kg rate continues to drop the heavier the package. For example, we shipped one 4.5 kg TV from Dar es Salaam, Tanzania to Milton Keynes, United Kingdom for US\$195.45 (US\$43/kg). From those same two locations we also shipped an 82 kg package of TVs for US\$1,056.69 (US\$13/kg).
- If shipping semi-frequently, check to see if you can set up a company account with a shipping agent. Making an account should be free and you should receive discounted rates.
- It is significantly more expensive to ship from China or India to Africa than vice versa.
- Prepare to pay oversize charges for refrigerators or large pallets (e.g. DHL charges US\$89/piece for products over 70 kg or with any single side greater than 120 cm).
- Packaging can add significant weight, thus resulting in higher shipping costs. For example, when calculating refrigerator shipping costs, expect to add somewhere between 12 kg to 40 kg per refrigerator for packaging weight depending on the size of the refrigerator.

Harmonized System (HS) Codes

A Harmonized System (HS) code is needed on the custom’s declaration to classify the type of product(s) to be shipped. This code is also used to determine what tariffs (if any) should be charged.⁶ For most off-grid appliances, there are no specific codes to classify them as solar, and so they are categorized the same as their on-grid counterparts. This means off-grid appliances are usually classified as non-exempt from duties, even if there is a policy in place that makes solar products exempt.

Table 2 lists HS codes for common appliances that will be sold commercially. If the product is a prototype that will be used for research or testing purposes, use HS code: 9023000000 (which should make the product duty-free).

Tariffs

This section does not include information about specific value-added tax (VAT) or customs duty rates because they are constantly changing and can vary depending on several factors including the country of import and export, country of manufacture, system component, and more. We do, however, want to call out tariffs as an important cost

Table 2: HS Codes for Common Appliances

Product	HS Code
TV	8528599000
Fan	8414590000
Household refrigerator (with compressor)	8418210000
Refrigerator-freezer combination	8418100000
Chest refrigerator/freezer (<800 L)	8418300000
Centrifugal pumps	8413700000
Centrifugal or positive displacement screw pumps	8413810000
Portable radio	8527990000
Hair clipper	8510101000

consideration and companies should spend time researching these rates. It is important to note that refrigerators and other appliances imported into off-grid markets may be taxed as luxury goods, and so will have high tariff rates. Online tools like the World Trade Organisation’s [Tariff Analysis Online](#) or [Customsdutyfree.com](#) can be used to estimate country-level tariff ranges or duty amounts using the product-specific HS codes provided in Table 2. Some agents, like DHL, may also provide current tariff rates over the phone.

Although some countries have policies in place that make solar products (e.g. solar panels) exempt from import duties, off-grid appliances are not typically classified as exempt. However, in some cases, shipping appliances with their complete systems (solar panel and control unit) may classify them as exempt.⁷ Companies should check with the port authority or online to determine what qualifies a product as “solar.”

Some companies might also ship components instead of a fully assembled product in order to be charged lower duty rates. For example, a refrigerator compressor shipped to Kenya could have a duty rate around 8.3% whereas a fully assembled refrigerator could have a duty rate around 25%.⁸ Companies considering shipping components instead of a fully assembled product also need to take into account the additional costs and investments necessary to build local assembly capacity.

Understanding the Importing and Exporting Requirements

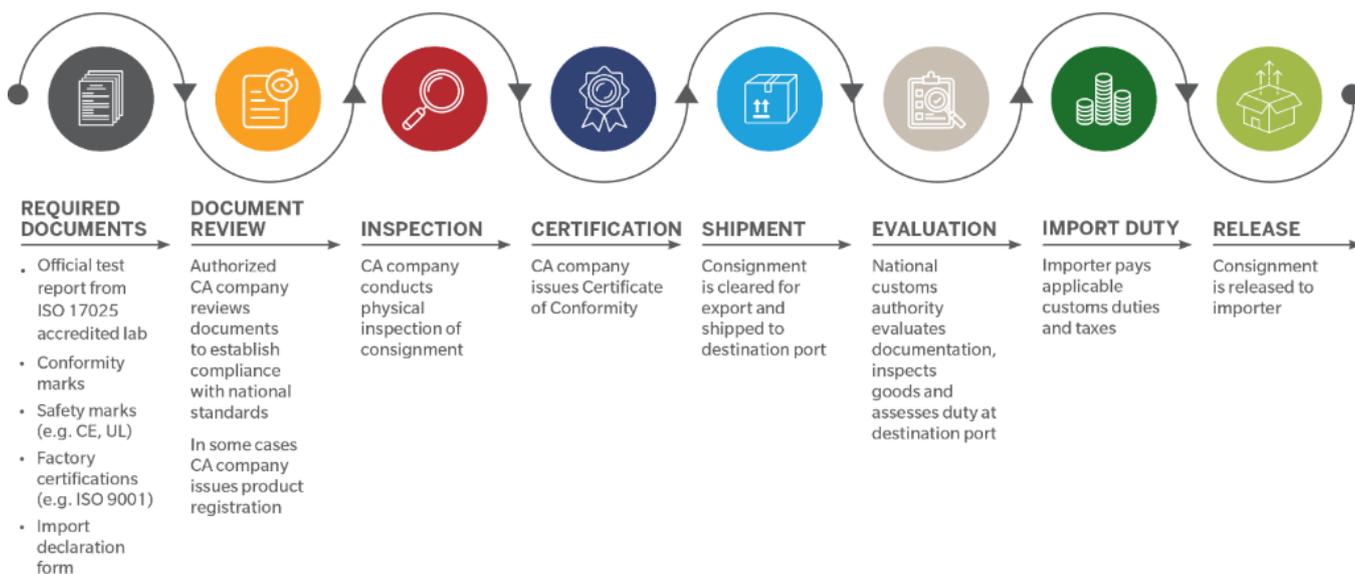
It is important to understand the importing regulations at the destination country before shipping. Some countries have a Pre-Export Verification of Conformity to Standards (PVoC) program as a part of their standards enforcement process. Exports to these countries require that an authorized agent issues a Certificate of Conformity (CoC) document prior to shipment. In order to issue a CoC, products must first undergo a Conformity Assessment (CA). The CA is an evaluation process performed by the same agent that issues the CoC. Depending

6. In some countries such as Kenya, if there is a dispute regarding HS classification the importing company can apply for a tariff ruling, which, if accepted by the committee, is a binding re-classification of the product.

7. In many African countries, solar panels and controllers are exempt from duties, while the batteries and appliances are likely non-exempt.

8. Data source: [Schatz Energy Research Center at Humboldt State University’s Off-Grid Appliance Cost Modeling Tool](#).

Figure 2: Pre-shipment Conformity Assessment Process (Source: Lighting Global)



on the export country’s requirements, the CA process may include evaluation of required documents (e.g. test reports, conformity marks, safety marks, etc.) to establish compliance with national standards as well as a physical inspection or testing of the product.⁹

Figure 2 shows the typical pre-shipment conformity assessment process of products, which is followed by additional details for steps in the process.

The cost of obtaining a CoC for a shipment depends on the PVoC company, the type of goods, and the route for certification that is followed. In general, PVoC companies charge a fee of up to 0.5% of the free on board (FOB) value of the goods, with a maximum fee per shipment of approximately US\$3000.

Finding a reliable logistics partner who is based in the county of import and has knowledge of local requirements can be extremely helpful to manage the customs process. It is also recommended, if possible, to develop a point of contact at whatever agency is in charge of clearing customs (e.g. port authority, revenue authority) prior to shipping. Having a contact person at these agencies can mean being notified of any problems more quickly. Many importers hire clearing agents which are private companies that have contacts and expert knowledge of the process for getting a product into a given country.

Country Highlight: Importing Refrigerators to Uganda

For the first round of the Global LEAP Awards competition for off-grid refrigerators in 2017, CLASP helped coordinate the shipment of 36 refrigerators (19 different models) to Uganda to

conduct user experience and field testing. The entire process -from initiating shipping in the Netherlands to delivery of the refrigerators to 36 locations in Uganda - took six months, from January to June 2018. Through this process, we gathered first-hand insights and experiences on the refrigerator shipping requirements to Uganda.

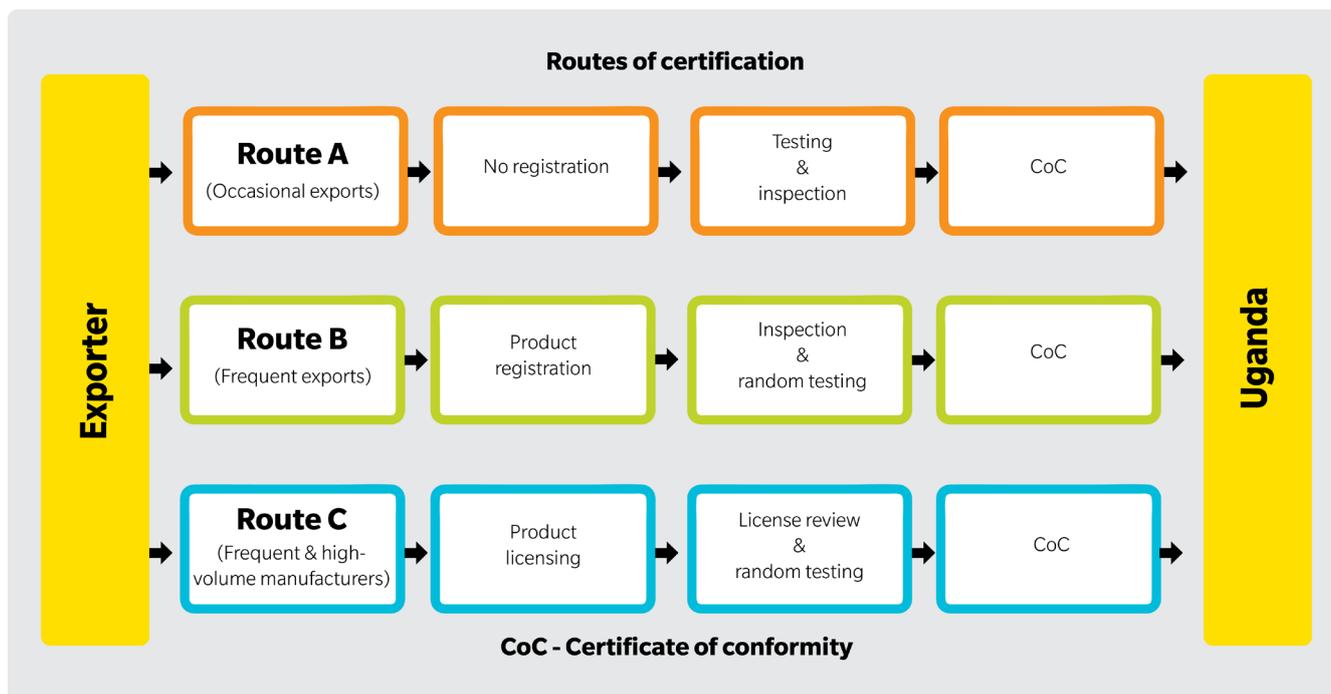
The Uganda National Bureau of Standards (UNBS) mandated that all regulated products undergo PVoC in order to demonstrate compliance with the Ugandan Standards. Non-compliance can be subject to a penalty of 15% of the cost, insurance, and freight (CIF) price. For products that are less than US\$2,000 in value, the shipments will be inspected by the UNBS or port authority upon arrival at the Ugandan Ports.

There are three routes of certification for Uganda – and each route requires different stringency level of verification based on the importing frequency and volume as seen in Figure 3 (page 9). Because the shipping volume was relative low (only 36 refrigerators) we were able to use Route A. This route does not require product registration and follows a simpler product testing and shipment inspection process to demonstrate compliance to the standards.

In the case of refrigerators, products that are categorized under HS code 8418.40 – 8418.69¹⁰ are required to meet the Ugandan standards outlined in Table 3. The standards required for refrigerators are primarily an evaluation on the general safety of household refrigerators, e.g. whether the product has proper markings for power input, voltage, or warning signs; or whether a user manual is included and provides proper instructions. For refrigerators that will be sold in Uganda, user manuals are required to be in English and preferably also in the Luganda language.¹¹

9. As long as the shipment value is under a certain currency amount, most countries don’t require a CoC. Make sure to check the minimum shipment value that requires a CoC at the country of import.

Figure 3: Routes to certification in Uganda (Source: Intertek)



Even though refrigerators were being shipped for non-commercial and research purposes, the rules of the Bureau of Standards still apply to import the refrigerators to Uganda, and therefore demanded inclusion of documents such as details of seller and buyer and invoices. Because the refrigerators had been unboxed and used for laboratory testing, the import control authority was concerned about importing second-hand refrigerators into the market due to the anti-dumping regulations. Upon arrival in Kampala, these refrigerators were inspected and scrutinized further by the Uganda Revenue Authority and released after a detailed inspection was conducted.

- Engage PVoC companies and experts to help streamline the process of pre-shipment assessment and a CoC.
- Consider engaging local custom clearance agencies at the destination to provide additional support.
- Be prepared for additional inspection by the port authorities which can cause significant delays in the clearance process.

Shipping requirements to countries where off-grid products are sold can be particularly complex. We hope these guidelines will provide a good starting point as off-grid manufacturers, distributors, or others prepare for the shipment process.

The key lessons learned are:

- Research and investigate early about the appropriate HS codes, importing regulations, and testing and inspection requirements for products.

Table 3: Ugandan Standards for Refrigerating Appliances

Ugandan standards	Referenced international standards	Scope
US IEC 60335-1	IEC 60335-1	Household and similar electrical appliances (general requirement)
US IEC 60335-2-4	IEC 60335-2-24	Refrigerating appliances, ice-cream appliances, and ice-makers
US IEC 60335-2-89	IEC 60335-2-89	Commercial refrigerating appliance with an incorporate or remote refrigerant condensing unit or compressor

10. Including any refrigerating appliances, freezers, ice-cream appliances, and ice-makers up to a maximum capacity of 50 cubic feet.

11. Source: <https://efficiencyforaccess.org/publications/learning-paper-the-challenges-of-testing-off-grid-refrigerators>

KEY FINDINGS

The key findings for shipment are:

- Research if the country of import requires a CoC for the product you're shipping and the minimum shipment value that would require a CoC. Reach out to an authorized company that can issue a CoC to initiate the process.
- Determine whether the products should be shipped via air or sea. Air freight typically takes less than a week, while sea freight can take up to a month and is significantly cheaper.
- Talk to shipping agents to get rate quotes and take these costs into consideration as early as possible.
- Check the current duty and VAT rates at the country of import using the product-specific HS code.

- If possible, work with a local logistics company at the country of import and develop contacts with agents at the port or revenue authority.
- Package your products securely and aim to ship as many products in one shipment following the courier's weight restrictions.

Please reference the below section for step-by-step guidance to prepare products for shipment. If you have any insights or questions related to this guide, please reach out to the Efficiency for Access team at info@efficiencyforaccess.org.

COUNTRY HIGHLIGHT

Exporting Products from India

In our experience, India has a more complicated and time-intensive process for exporting products compared to other countries where we work. The export process will vary depending on whether you're a manufacturer already established in India, or an individual or organization trying to ship products out of India on a limited basis.

Individuals or organizations (or manufacturers who are not interested in exporting on a regular basis) will need to hire a logistics company that can arrange shipment of the product. Most importantly, this company needs to have an Importer-Exporter Code (IEC) which is required for export. While the logistics company should handle the majority of the exporting process, you may be asked to provide some information such as an invoice, a letter of credit, or a product's certificate of origin.

Manufacturers who are interested in exporting products from India will likely already have a bank account and permanent account number (PAN) which are required for export. They will also need to obtain a registration cum membership certificate (RCMC), which provides proof of

registration with the Export Promotional Councils, and an IEC (companies can apply for an IEC [here](#)). The company will also need to prepare an export tax invoice and packing list describing the contents for the shipping agent. Finally, the company will need to send their bank the following documents within 21 days in order to receive payment from a foreign bank:

- Bill of exchange
- Letter of credit
- Invoice
- Packing list
- Airway bill
- Certificate of origin
- FEMA declaration ([visit here](#) for a template)
- When necessary, inspection certificate¹²

Exporting from India can be challenging, even for those who have experience. We recommend preparing for the export process at least a month before the desired shipping date.

12. Source: Indian Trade Portal, <https://www.indiantradeportal.in/vs.jsp?lang=0&id=0,25,44>

STEPS TO PREPARE A PRODUCT FOR SHIPPING

The below steps aim to provide practical guidance on how to prepare a product for shipment, from gathering information on the products to shipping them. Note that these requirements may vary if shipping via sea freight.

Step 1: Research regulations at the country of import and gather information on the samples to be shipped

Import Regulations

Some countries have programs in place that require products to demonstrate compliance to their national standards prior to shipment. Research if the country of import has such a program in order to initiate the process and avoid shipping delays. Please refer to the "Understanding the Importing and Exporting Requirements" section on pages 7-9 for more information.

Product Information

Before reaching out to the shipping agent, it will be helpful to know some of the basic product information which will be required for shipment including:

- Weight (kg)¹³
- Length, width, and height (cm)¹⁴
- Country of origin
- Unit value and total shipment value
- For refrigerators only- product type (e.g. refrigerator, refrigerator-freezer combination unit, etc.)
- For refrigerators only - refrigerant type and quantity (g). If the refrigerants need to be drained for shipping, any other instructions for refilling the sample should be communicated so the recipient can refill them correctly

Figure 4: Example of Refrigerator Packaging



Figure 5: Example of Refrigerator Crating (Source: [Gateway Crate and Freight](#))



Figure 6: Example of Solar Water Pump Packaging



13. The weight will change after the product has been packaged in crating, but this information will be important for initial contact with the shipping agent.

14. The dimensions will change after the product has been packaged in crating, but this information will be important for initial contact with the shipping agent.

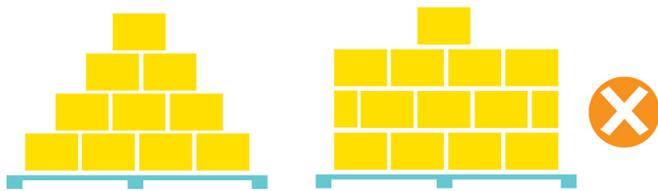
Step 2: Reach out to shipping agent at least two weeks in advance and prepare the products for shipment

Packaging

If a product isn't already protected by foam, it's important to cover the sample completely with foam before putting it into its box, especially for refrigerators. For TVs, fans, and solar water pumps, either foam or bubble wrap will likely provide sufficient padding. The box itself can also be wrapped again for extra protection. If shipping more than one sample in one package, the package should be wrapped together with cellophane to hold the samples together.

If the product weighs more than 70 kg, most shipping companies require that the sample be packaged in a crate or securely loaded to a pallet (although crates or pallets are also recommended for products from 30 kg to 70 kg). Ask the shipping company about the packaging requirements and whether or not they can provide the crating or packaging. If not, the crate will have to be custom built. The shipping company is looking for something hard-sided (not necessarily solid sides, close together slats are okay- see Figure 6) that is built to the size of the package so it doesn't shift within the crating during shipment. These can take some time to construct, so be sure to allocate a sufficient amount. Packages stacked on a pallet should be either in a column or interlocking structure (see Figure 8 on page 12). If the packages are stacked as a pyramid or overhanging from the pallet (see Figure 7 on page 12), they may be charged an additional fee (e.g. DHL charges a US\$189 unstackable pallet fee per pallet).

Figure 7: Pallets Should Not be Pyramid Stacked

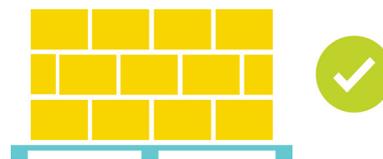


Step 3: Create a commercial or pro forma invoice

An invoice must be given to the shipping agent prior to shipment. First, you will need to determine which type of invoice to use. For the purpose of shipping, a commercial invoice is typically used to send a commercial shipment with a commercial value whereas a pro forma invoice is used to send a non-commercial shipment for non-business purposes (e.g. research testing). If you are unsure of where to obtain a commercial or pro forma invoice template, please reference DHL's [Step-by-Step Guide](#). Both invoices may include the following:

- Company name, full name of contact person, address and phone number of both shipper and receiver
- Invoice number and date
- HS code for the products
- Detailed description of products to be shipped. This should include materials and size information, purpose of export, and any other product identification
- Value of each item in package and total package value
- Country of origin of products
- Type of export (e.g. permanent) and purpose of export
- Payment terms (e.g. Net 30)
- Delivery terms (Incoterms). The most common two options are DDP (Delivered Duty Paid) (i.e. exporter is

Figure 8: Pallets Should be Interlocking or Column Stacked



responsible for duties) or DAP (Delivery at Place) (i.e. importer is responsible for duties). Note that some countries do not allow DDP both in and out of country (e.g. Sierra Leone), and so you must select another option

- Authorized signature and company stamp

Make sure to have an electronic copy of the signed and stamped invoice in case it's needed after shipment.

Step 4: Ship the product

After the product has been packaged and the invoice is prepared, shipping should be scheduled with the shipping agent. The product can either be brought to the shipping agent or a remote pick-up can be scheduled ahead of time. After shipping, make sure the shipping agent provides you with a receipt and tracking number to track the package and take action as needed. After the product has arrived at the destination, you may also need to work with a local agency to clear the product through customs. Be prepared to coordinate with the agency and provide product information as needed.

A Note on Shipping Refrigerators via Air

Refrigerators are classified as a dangerous good for air freight because of their refrigerant gases. Under the UN, they will either be classified as UN3358, for products with one type of refrigerant gas, or UN2857, for products with multiple types of refrigerant gases. It is advisable to reach out to the desired shipping agent at least two weeks before shipment to better understand their requirements for shipment. If possible, it's easiest to ship the refrigerator with the refrigerants already filled. Depending on the case and at the discretion of the carrier, the refrigerants may need to be removed partially or completely from the sample. **Please note: this should be done by a trained technician.** If available in your country, companies specialized in shipping dangerous goods like Hazmat Global are recommended to help navigate these challenges.

When talking with the shipping agent, it will be helpful to cite that refrigerators can travel through air if it meets the [ICAO](#) special provision: A26 (119) Refrigerating machines include air conditioning units and machines or other appliances which have been designed for the specific purpose of keeping food or other items at low temperature in an internal compartment. Refrigerating machines and refrigerating machine components are considered not subject to these Instructions if containing less than 12 kg of a gas in Division 2.2 or if containing less than 12 L ammonia solution (UN 2672).¹⁵

For reference, [this document](#) has the special provision.

15. You can affix the statement: "NOT RESTRICTED AS PER SP A26" on the product's packaging.

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