



**Philippines Cold Chain
Standards and
Innovation
Virtual Workshop**



**AFTER ACTION REPORT:
U.S. – PHILIPPINES COLD CHAIN
STANDARDS AND INNOVATION
WORKSHOP**

October 18-19, 2022

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EXECUTIVE SUMMARY

On October 18-19, 2022, the American National Standards Institute (ANSI), through the United States Trade and Development Agency (USTDA) funded U.S.-Indo-Pacific Standards and Technology Cooperation Program (STCP), coordinated with the Bureau of Philippine Standards (BPS) and the Board of Investments (BOI) under the Department of Trade and Industry Philippines (DTI) to present the U.S.-Philippines Cold Chain Standards and Innovation Workshop. The virtual workshop took place online via Zoom. Highlights from the workshop are as follows:

- Many Filipino government officials from the co-organizers (BPS and BOI) and other departments attended the workshop and delivered remarks or presentations during various sessions.
- Representatives from U.S. industries and standard development organizations introduced global and U.S. standards and best practices in cold chain management and refrigeration systems, including the Global Cold Chain Alliance (GCCA), the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), the International Institute of Ammonia Refrigeration (IIAR), and Xylem Inc, etc.
- The workshop reached a total of 52 unique participants from the U.S., Philippines, and other ASEAN countries, and included participants from both the public and private sectors.
- **89%** of surveyed respondents indicated that they felt the workshop met their objectives.
- **78%** of surveyed respondents thought that the workshop will help accelerate regional and international harmonization.
- **89%** of surveyed respondents indicated that the workshop is likely to encourage the adoption of standards and regulations to improve the safety, security, and efficiency of critical cold chain systems.

This Public Report includes the following elements: (i) Executive Summary, (ii) Final Agenda, (iii) Detailed Workshop Summary, including technical analysis and links to workshop video recordings, photos and presentations, (iv) Participant and Stakeholder Feedback.

FINAL AGENDA



October 19-20, 2022 | 8:30-10:30 AM (PHT)
 October 18-19, 2022 | 8:30-10:30 PM (EDT)
 Zoom

Day 1

TIME	TOPIC	SPEAKERS
8:25 – 8:30 AM/PM	Registration/Signing On	
8:30 – 8:50 AM/PM	Welcome and Opening Remarks	<ul style="list-style-type: none"> Ferdinand L. Manfoste, Assistant Director, Bureau of Philippine Standards Verinda Fike, Regional Director, Indo-Pacific, USTDA
8:50 – 9:40 AM/PM	<p>Session 1: Current State of Standards and Regulations in the Philippines and Global Trends – PANEL DISCUSSION</p> <ul style="list-style-type: none"> Existing and recent developments on cold chain supply chain standards Introduction of relevant international and U.S. standards <p>Q&A (10 min)</p>	<p>Moderator: Laiyin Yuan, Program Manager, American National Standards Institute (ANSI)</p> <p>Panelists:</p> <ul style="list-style-type: none"> Lowell Randel, Senior Vice President of Government and Legal Affairs, Global Cold Chain Alliance (GCCA) Ma. Teresita G. Del Rosario, Chief Trade-Industry Development Specialist, Standards Development Division, Bureau of Philippine Standards
9:40 – 10:25 AM/PM	<p>Session 2: The Philippines’ Cold Chain Industry Roadmap and Strategies for Developments – PRESENTATIONS</p>	<p>Presenter:</p> <ul style="list-style-type: none"> Raquel Echague, Director, Resource-Based Industries Service, Board of

	<ul style="list-style-type: none"> • Introduction and interpretation of the Roadmap by the drafters • Standards and conformance-related priorities of the government and the industry <p>Q&A (15 min)</p>	Investments, Philippines Department of Trade and Industry (DTI)
10:25 – 10:30 AM/PM	Closing Remarks/End of Day 1	<ul style="list-style-type: none"> • Alissa Lee, Senior Country Manager for the Indo-Pacific and East Asia, USTDA

Day 2

TIME	TOPIC	SPEAKERS
8:25 – 8:30 AM/PM	Registration/Signing On	
8:30 – 8:35 AM/PM	Welcome/Recap of Day 1	<ul style="list-style-type: none"> • Alissa Lee, Senior Country Manager for the Indo-Pacific and East Asia, USTDA
8:35 – 9:30 AM/PM	<p>Session 3: Standards for Energy-Efficient and Modern Cold Storage and Transportation Facilities – PANEL DISCUSSION</p> <ul style="list-style-type: none"> • International standards and their applications in the Filipino market • Conformance requirements and compliance for import and export between the Philippines and the U.S. • Sustainability standards and best practices in rural/urban environments • Global Partnership for Improving the food cold chain in the Philippines Project • Philippine Energy Efficiency requirements and MEPS for Cold Chain Industry Project with UNIDO, DENR-EMB and BOI <p>Q&A (10 min)</p>	<p>Moderator: Paul Taylor, Senior Commercial Officer, U.S. Embassy, Manila</p> <p>Panelists:</p> <ul style="list-style-type: none"> • Douglas Reindl, Fellow and Course Instructor, American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) • Allan Javier, Product Manager - Xylem Southeast Asia (SEA) • Mae Valdez-Irong, National Policy and Regulations Coordinator, Cold Chain Innovation Hub, Philippines • Atty. Patrick T. Aquino, CESO III, Director, Energy Utilization Management Bureau, Philippines Department of Energy
9:30 – 10:25 AM/PM	Session 4: Operating Procedures in Ammonia Refrigeration Systems – PRESENTATION	Presenter:

	<ul style="list-style-type: none"> IIAR Suite of Standards for the design, installation, inspection, testing, and maintenance of closed-circuit ammonia refrigeration systems and relevant operation procedures <p>Q&A (10 min)</p>	<ul style="list-style-type: none"> Tony Lundell, Senior Director of Standards and Safety, International Institute of Ammonia Refrigeration (IIAR)
10:25 – 10:30 AM/PM	Closing Remarks/Wrap-up	<ul style="list-style-type: none"> Alissa Lee, Senior Country Manager for the Indo-Pacific and East Asia, USTDA

DETAILED WORKSHOP SUMMARY

Background

As the fifth workshop held under the U.S.-Indo-Pacific STCP, the U.S.-Philippines Cold Chain Standards and Innovation Workshop was designed for the American industry to understand the latest developments in Filipino cold chain regulations and standardization, exchange commercial and industrial standards information and best practices with the Filipino stakeholders, and support the Filipino government to develop and implement cold chain and agribusiness-related standards and regulatory procedures that align with international best practices and encourage foreign investment and participation.

Globally, the logistics sector has a market cap of \$8.6 trillion, of which the Asia-Pacific region accounts for \$3.9 trillion.¹ As a fast-growing Asia-Pacific country, the Philippines' GDP currently stands at \$394.09 billion. Additionally, the country has shown a GDP growth rate of 5.7% annually.² Currently, the Philippines has a cold chain holding capacity for roughly 500,000 tons of goods. A recent analysis by the Cold Chain Association of the Philippines (CCAP) shows that the cold chain logistics industry itself could grow 8% to 10% annually over the next 5 years.³ However, challenges still exist in both the implementation and operation of the cold chain supply chain in the Philippines. Among them, the major bottleneck is the lack of robust, reliable, and energy-efficient infrastructure as the backbone of the industry, including refrigerated and secure storage, and extensive land and maritime transportation to meet the diverse economy and consumer demands among varied islands. The issue is further exacerbated in rural areas due to the development gap between urban and rural areas, which is also a major bottleneck for the supply chain from farm to table. These logistics and infrastructure issues compound and result in problems with spoilage and unsafe storage of time-sensitive agricultural and medicinal products. The severe losses and waste occur early in the supply chain before any further value addition can occur, massively increasing prices for consumers.⁴

¹ <https://www.statista.com/statistics/1069868/total-global-logistics-market-size-region/>

² <https://data.worldbank.org/country/philippines>

³ <https://www.pna.gov.ph/articles/1157939>

⁴ "Evaluating the Food Cold Chain in the Philippines," & *Final Project Completion Report: High Level Public -Private Forum on Cold Chain to Strengthen Agriculture & Food's Global Value Chain*, Agricultural Technical Cooperation Working Group. December 2015

Recognizing the importance of a robust cold chain, and reflecting a shift in trade, the Philippine government has set out to craft new regulations, programs, and other governmental actions targeting the sector. The recent [Cold Chain Industry Roadmap 2020-2025](#) published by BOI aims to develop the sector into a more sustainable and green industry while increasing the scope and energy efficiency of the sector overall. In particular, the strategies described in the Roadmap focus on creating more robust systems to support the storage and transportation of products from the country's large agricultural center.

Summary of Workshop Topics

The target audience of this workshop included government officials and industry representatives from the Philippines and the U.S., with a few from other ASEAN countries. The experts from the public and private sectors of both countries shared their insights on the current regulatory and standards landscape of cold chain infrastructure in food and pharmaceutical sectors, introduced government strategies and outlook for future development, and deep-dived into key issues such as cold chain energy efficiency, hydrofluorocarbon (HFC) phasing out, operating procedures of ammonia systems, and more.

The two-day workshop, consisting of 2-hour sessions each day, covered various topics as described below:

Key Highlights

- Many Philippines government officials from the co-organizers (BPS and BOI) and other departments attended the workshop and delivered remarks or presentations during various sessions to introduce the Filipino efforts and initiatives to transform and upgrade the cold chain facilities, including Ferdinand L. Manfoste, Assistant Director, and Ma. Teresita G. Del Rosario, Chief Trade-Industry Development Specialist at the Standards Development Division, both from the Bureau of Philippine Standards (BPS); Raquel Echague, Director of Resource-Based Industries Service at the Board of Investments (BOI); and also Atty. Patrick T. Aquino, CESO III, Director of the Energy Utilization Management Bureau at the Philippines Department of Energy (DOE).
- U.S. experts from standards development organizations (SDOs) and private companies shared their expertise and best practices to help reshape the cold chain infrastructure to be more sustainable, safe, and cost-efficient. They also addressed the critical concerns that the Filipino industry raised, and offered future follow-up capacity-building and collaboration opportunities for Filipino stakeholders.

Session 1

Current State of Standards and Regulations in the Philippines and Global Trends

Moderated by the American National Standards Institute (ANSI), this session consisted of two panelists from the Global Cold Chain Alliance (GCCA), and the Standards Development Division at the Bureau of Philippine Standards (BPS).

GCCA provided a comprehensive overview of the global standards in industrial refrigeration, food safety, cold chain logistics, refrigerated transportation, and energy efficiency. Industrial refrigeration is fundamental to the cold chain, and the safe and efficient operation of ammonia as the primary refrigerant is critical to industrial refrigeration systems. The relevant standards created by the ANSI-accredited standards development organization, International Institute of Ammonia Refrigeration (IIAR), are globally

recognized and widely applied in the industry (see more in Session 4). GCCA elaborated on the future trends of the industry, including the evolution of ammonia technology (such as the low-charge ammonia systems) and the development of CO₂ refrigeration and hydrocarbon systems, as well as the phase-down of Freon-based (HFC) refrigerants. Regarding food safety, the Global Food Safety Initiative (GFSI) is a global effort to advance food safety and quality by harmonizing standards and accrediting certification programs, such as the British Retail Consortium (BRC) or the Safe Quality Food Initiative (SQF). GCCA also addressed the standards that are developed or under development by ISO/TC 315: Cold chain logistics, GCCA's [Best Practices Guide on Refrigerated Transportation](#) and certification programs for cold carriers, and the Energy Excellence certification program.

As the national standards body of the Philippines, BPS promulgates Filipino national standards on cold chain logistics. BPS introduced the current status of the cold chain-related standards in the Philippines, which is relatively limited but aligns with the existing ISO standards. PNS ISO 23412:2021, adopted in 2021 by the BPS, is entitled to indirect temperature-controlled refrigerated delivery services, and land transport of parcels with the intermediate transfer. Since the Philippines is not a participating member of ISO/TC 315, BPS called for interested stakeholders to participate in this technical committee as experts and voice the national interest in the international arena.

The panelists also answered the questions from the audience regarding the relationship between global standards and government regulations, the opportunities and challenges brought to the industry by automation and digital transformation, the Filipino government's timeline for developing and implementing standards, and sustainability-related standards and global efforts.

Session 2

The Philippines' Cold Chain Industry Roadmap and Strategies for Developments

In her presentation, Raquel, B. Echague, Director of Resource-Based Industries Service at the Board of Investments (BOI) of the Philippines Department of Trade and Industry (DTI) introduced the *Cold Chain Industry Roadmap 2020-2025*, and the standards and conformance-related priorities and policies.

As the leader and drafter of the Roadmap, BOI analyzed the existing gaps and potential interventions on selected value chain corridors covering the main geographic clusters of the National Capital Region (North Luzon, South Luzon, Visayas, and Mindanao), and provided strategies and recommended actions to support the industry development to achieve the short to medium-term goals.

With the estimated cold storage warehouse (CSW) capacity in the Philippines at 550,000 pallets (or equivalent to about 500,000 tons) in 2021, the gap is approximately 100,000 pallets, and the new investments in cold chain storage are expected to achieve the increase in capacity of 50,000 pallet positions per year from 2021 to 2023. BOI initiated the "Go-5 Synergy", which includes 5 goals, focus industries, and an action agenda for the next 5 years, and acts as the guideline for industry development:

5 industry goals:

- An organized cold chain industry with synergistic partnerships among all stakeholders working in unison for the good of all
- A strong logistics provider to implement continuous cold chain protocol in transit and handling
- Availability of a more efficient, skilled, and fairly-compensated labor force
- Favorable government and public support
- Increase awareness of food safety

5 focus industries:

- Meat / processed meat
- Fisheries and aquaculture
- Dairy
- Fruits and vegetables
- Non-food (pharmaceuticals, electronics, etc.)

5 action agenda:

- Investments in cold chain facilities
- Investments in cold chain logistics services
- Demand enhancement
- Food safety education
- Policies and regulations

BOI also introduced its efforts to support energy efficiency, involving small producers by developing relevant databases, and specific regulations and incentives for halal and kosher products and related accreditation. The full Roadmap can be downloaded [here](#).

Session 3

Standards for Energy-Efficient and Modern Cold Storage and Transportation Facilities

This session was moderated by the U.S. Embassy in Manila, with four speakers from the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), Xylem Southeast Asia, the Cold Chain Innovation Hub of the Philippines (CCI Hub), and the Energy Utilization Management Bureau of the Philippines Department of Energy (EUMB DOE). They shared varied perspectives on international standards related to energy efficiency and their applications in the cold chain supply chain for agricultural and pharmaceutical products in the Philippines.

ASHRAE introduced the energy efficiency standards related to cold chain in the U.S., including the federal regulations established by the U.S. Department of Energy that set minimum efficiency requirements for commercial refrigeration systems & equipment, walk-in coolers/freezers (up to 279 m²), and other cold equipment that is insulated for energy efficiency purpose. At the end of 2020, the U.S. adopted phase-down requirements for HFC refrigerants that were part of the Kigali Amendments to the Montreal Protocol. In 2024, there will be a major step down in the production and consumption of hydrofluorocarbons, and the next generation of refrigerants is aimed to replace them. However, challenges still remain with competing priorities, in terms of improving the efficiency of new refrigerants to make them as effective as HFC, supply chain constraints and costs in producing and replacing the new equipment, lack of skilled technicians, and the flammability and safety concerns of certain new refrigerants, such as hydrofluoroolefins (HFO).

From a different perspective, Xylem Southeast Asia focused on the cold chain standards and regulations for pharmaceutical and healthcare products in the Philippines and globally. Compared to the food industry, pharmaceutical products require more stable and accurate environmental control in the cold chain, from the early stage of drug manufacturing to the pharmacy stores until it reaches the consumers. The World Health Organization is compiling all of the most important provisions for environmental control in its *Guide to Good Storage Practices for Pharmaceuticals*. The main difference between the standards of

the food and pharma industry in the Philippines is that the thermal mapping and other environmental control in food export are mainly following the requirements of the British Retail Consortium and the U.S. FDA, while the pharma products are mostly following the U.S. Pharmacopeia, ISO, and WTO's good practices.

CCI Hub illustrated their Global Partnership for Improving the Food Cold Chain Project, which focuses on energy efficiency and safety standards in partnership with the Filipino governments. The project is funded by the Global Environment Facility (GEF) with a funding of 2 million, and it's implemented by the Department of Natural Resources with the United Nations Industrial Development Organization (UNIDO), the Technical Education and Skills Development Authority, and Shecco. With three key components: 1) Policy and Regulatory Assessment, 2) Awareness and Capacity Building, and 3) Technology Transfer, the project aims to identify, develop and stimulate the development of low-carbon, energy-efficient refrigeration innovation technologies and business practices in the Philippines for the food cold chain and safety. The project has been working with the Bureau of Philippine Standards on updating the PNS IEC 60335-2-89—Safety standard for commercial refrigerating appliances, and supported the development of a Cold Chain Integrated Supply Chain Solution (DeliverE2.0), an online platform for evidence-based policymaking and investment programming. CCI Hub also mentioned the challenges and opportunities that the Hub has encountered when working with the government and the industry.

EUMB DOE presented the policies plans and programs of the Energy Efficiency and Conservation Act that covers the cold chain industry in the Philippines. The EUMB is one of six bureaus of the DOE and is mandated to formulate policies, plans, and programs related to energy efficiency and conservation, alternative fuels, and emerging energy technologies. The Filipino cold chain industry has a direct projected carbon emission of 11.13 million metric tons of CO₂ by 2030. By launching the Philippine Energy Labeling Program (BELP), the national energy labeling program for energy-consuming products based on energy performance, as well as the Minimum Energy Performance for Products (MEPP), which sets the minimum energy performance rating for energy-consuming products, the DOE is striving to enhance energy security by promoting a healthy and competitive market for energy-efficient products and encouraging the shift of consumer behaviors.

Session 4

Operating Procedures in Ammonia Refrigeration Systems

To meet the demands and interests of the industry participants in the workshop, the International Institute of Ammonia Refrigeration (IIAR) provided a high-level framework overview of the IIAR Suite of Standards for the safe design, ammonia refrigeration valves, installation, startup, inspection, testing, maintenance, operating procedures, decommissioning, and minimum system safety requirements for the of closed-circuit ammonia refrigeration systems. Natural refrigerant, such as hydrocarbon and anhydrous ammonia, has zero ozone depletion and zero global warming potential, thus they are seen as the next generation of environmental-friendly refrigerants.

IIAR introduced the purpose, importance, and requirements specifically for the operating procedures for ammonia refrigeration systems, including:

- 1) Steps for each operating phase: initial startup, normal operations, temporary operations, emergency and normal shutdown, and other situations such as lockout, pump down, oil draining, etc.

- 2) Operating limits: the consequences, correction, avoidance of deviation, and other functions to consider.
- 3) Safety & health considerations: use Material Safety Data Sheet (MSDS) with properties of chemical used, hazards, and precautions to prevent exposure.
- 4) Precautions & control measures: control measures, quality control, safety systems, etc.
- 5) Safe work practice considerations.
- 6) Piping & Instrumentation Diagrams (P&IDs).

In the U.S., the Occupational Safety and Health Administration (OSHA) regulates and enforces the Process Safety Management (PSM) program. The employer must develop and implement written operating procedures that provide a benchmark for quality and uniformity in instructions. OSHA also believes it is important to maintain the mechanical integrity of critical process equipment to ensure it is designed and installed correctly and operates properly. The employer must maintain the ongoing integrity of process equipment, review and update the operation procedures periodically, and develop and implement “Safe Work Practices” to provide for the control of hazards during work activities. Inspection and testing also need to be performed on process equipment, using procedures that follow “Recognized and Generally Accepted Good Engineering Practices” (RAGAGEP).

IIAR also shared insights on the location and environmental considerations for the ammonia refrigeration systems that apply to the Filipino climate with higher humidity, pressure, and temperature requirements.

Relevant Links

Links to a flyer, the final agenda, and other materials from the workshop are available on the U.S.-Indo-Pacific STCP website:

https://www.standardsportal.org/usa_en/toolbox/US%E2%80%93Indo-Pacific-STCP.aspx

PARTICIPANT AND STAKEHOLDER FEEDBACK

9 participants, or approximately 17% of workshop participants, filled out an AAR questionnaire, which was hosted online via Google Forms. Links to the questionnaire were shown in the closing slide shown on both days of the event, put in the Zoom Chat for all participants, and distributed via email to participants following the workshop, with two reminders sent. Highlights from the questionnaires include:

- **89%** of respondents indicated that they felt the workshop met their objectives.
- **78%** of respondents felt that the workshop will have a positive impact on the adoption of standards and new technologies in the cold chain sector in line with international best practices.
- **78%** of respondents indicated that the workshop will positively impact the investment environment in the Philippines.
- **78%** thought that the workshop will help accelerate regional and international harmonization.
- **89%** indicated that the workshop is likely to encourage the adoption of standards and regulations to improve the safety, security, and efficiency of critical cold chain systems.

Additional details from survey responses include:

A U.S. special interest organization indicated that the workshop will have a positive impact on the adoption of modern refrigerant standards and they feel like they have made inroads in connecting to relevant government and private sector stakeholders.

A private cold chain firm appreciated the introduction to and discussion of the sector roadmap and is now seeking to engage with the relevant stakeholders moving forward.

A government agency was particularly interested in the discussion of new and emerging technologies in the sector, and indicated that they felt the event would have significant impacts on the adoption of updated regulations and more inclusive standardization processes.