



Meeting Review

Vietnam
March 7-8, 2018

World Cold Chain Summit Vietnam – Together Reducing Food Losses (March 2018)



March 7th marked the kickoff of Carrier's fourth annual *World Cold Chain Summit to Reduce Food*

Loss. Following the inaugural session in London (2014) and sessions in Singapore (2015 and 2016), this year's event – Together Reducing Food Losses – was held in Ho Chi Minh City, Vietnam. With a growing economy, rapid urbanization, warm climate, inconsistent cold chain infrastructure and high consumption of fresh (perishable) foods, Vietnam was in many ways a perfect choice to bring together thought leaders from multiple disciplines to discuss challenges and solutions related to reducing food loss and waste.

Day 1: Opening

Jon Shaw, Carrier Transicold & Refrigeration System's Director, Global Communications & Sustainability, kicked off Day 1 of the Summit with a critically important point: Of all the perishable food produced in the world today, only 10% is refrigerated, and the amount of refrigerated transport and storage assets in developing countries is one-tenth that of developed countries, which leads to three times more food loss. Roughly 1.3 billion tons of food is lost or wasted annually, with fruits and vegetables (i.e., high-nutrition items) comprising 44% of that amount. We're clearly missing an enormous opportunity to put the global food supply to its ultimate purpose – consumption – which

in turn enables global citizens to thrive and lead productive lives. As Jon noted, one high-potential solution involves implementation of an improved cold chain, which as a specific Carrier [pilot project in India](#) shows, can sharply reduce food loss and greenhouse gas emissions together.

In addition to tracing the history of the Summits, from goals to issue identification to solution development to implementation, Jon displayed a breakdown of attendees (diverse leaders from multiple sectors) – noting that “we have the right people in the room to make a difference in food loss and waste and hunger.” That has been one of the key goals of the Summits from inception.



David Appel, President, Carrier Transicold & Refrigeration Systems, followed with an overview of how the company seeks to secure the future of food. The business

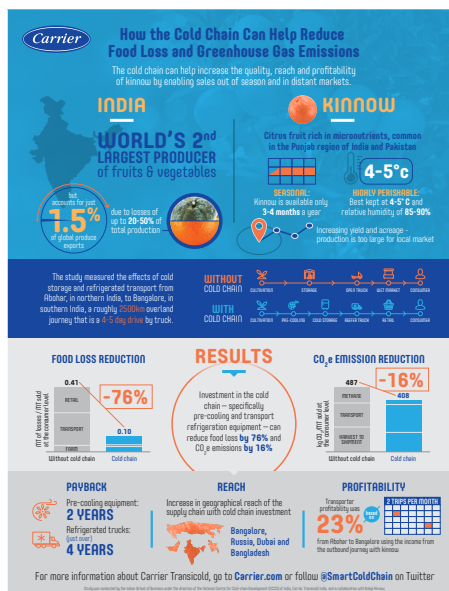
covers the entire food supply chain, from farm to fork, through the production and service of refrigeration units for container ships, truck/trailers, commercial refrigeration and food service. Appel noted that the company takes its role in protecting the world's food supply very seriously, believing that by delivering improved refrigeration it can significantly help reduce food loss and waste, feed more people and reduce greenhouse gas emissions.

Carrier is innovation-focused and is investing in the digital cold chain. Through advanced telematics, the company has the ability to track the temperature and geolocation of 13 million shipments around the world. Sustainability is also a key business

driver. Appel noted that as the cold chain expands in less-developed countries, we must ensure that greenhouse gas emissions don't increase along with it but rather *decline* (in other words, we must do more with less – the notion of sustainable intensification). As a result, Carrier offers engineless technology for the transport sector in which the vehicle's main engine drives the hydraulics on the cooling unit – thus eliminating an engine and associated fuel and emissions. Further, Carrier offers carbon dioxide (CO₂) refrigerant units with ultra-low global warming potential (GWP) in marine container and commercial refrigeration, and is demonstrating the use of CO₂ as a natural refrigerant technology for road transport.

showed that post-harvest losses could be reduced by 76%, with a 16% reduction in metric tonnes of carbon dioxide equivalent (MT of CO₂e). As a result, profits increased at each layer of the supply chain, more people were able to consume nutritious fruit and the selling season was extended by up to eight weeks. In short, implementation of an effective cold chain provides a triple win – more people are fed, environmental impact (in the form of greenhouse gas emissions) is reduced and profits along the supply chain rise.

John Mandyck, former Chief Sustainability Officer at United Technologies,¹ followed Appel by drawing on material from the book he co-authored, *Food Foolish: The Hidden Connection Between Food Waste, Hunger and Climate Change*. Mandyck noted that we have a “hidden” source of food that can feed up to 4 billion global citizens. From an environmental standpoint, it can save the equivalent emissions impact of every car on every road annually, while saving enough water to fill the annual water needs for all of Africa. That hidden source is the food that we waste, about 30% annually across the globe.



As a tangible example of the positive impact of cold chain technology, Appel cited Carrier's [case study involving kinnow](#), a highly perishable citrus fruit (rich in micronutrients) that is grown in

Mandyck noted that while we grow enough food to feed about 10 billion people compared to the current global population of just over 7 billion, we are successfully feeding only about 6 billion. And the challenge of sustainably feeding the world population by 2050 will only grow more intense with rising competition for resources and increased urbanization. By 2050, 66% of the world's population will live in cities. This is a key issue for Vietnam, where the urbanization rate is higher than that of China and India. Broadly, people are moving further away from their sources of food, which requires infrastructure investment to ensure that food supplies can be successfully transported to them with minimal waste.

the Punjab region of India and Pakistan. The 2016 case study measured the effects of cold storage and refrigerated transport of kinnow shipments from the growing region in northern India to markets in southern India – a 2,500 kilometer journey that can take four to five days with high spoilage rates due to fruit moving in open trucks exposed to high ambient temperatures and rough roads. With pre-cooling and transport refrigeration equipment, the study

Where does global food loss and waste occur? Mandyck noted that 63% of global food wastage occurs at the production and distribution levels, while 37% occurs at the consumer level. In Vietnam, as in the U.S., the leading item in municipal landfills is food. And yet while 30% of our food goes to waste globally, 2 billion people suffer from micronutrient deficiencies across the globe, lacking access to proper nutrition to lead productive lives. That wastage is also a serious climate problem, leading to 4.4 billion metric tonnes of CO₂ emissions annually. Mandyck also cited a compelling fact from the United Nations Food and Agriculture Organization (FAO): If ranked as a country, food waste would be the third largest emitter of greenhouse gas emissions, behind the U.S. and China. Those emissions also harm our oceans, which absorb one-third of global CO₂ emissions. The resulting increase in acidity levels (26% over the last 200 years) threatens a critical source of food in the coming decades – particularly for the developing world.

Food is also critically linked to fresh water, which comprises only 1.3% of the planet's overall water. Since agriculture consumes 70% of the world's fresh water supplies, and we waste roughly 30% of our food, it's more than appropriate to note that food waste *is* water waste. For perspective, Mandyck pointed out that the water we waste in food annually is greater than the annual irrigated water use of any nation on earth.

Clearly food waste is a pressing global challenge on many fronts, but it must also be viewed as a tremendous *opportunity* for social and environmental progress as the population surges toward 10 billion by 2050. As Mandyck advised, to address this opportunity, we must collaborate – connecting thought

leaders from multiple sectors who often are working in silos – and we must utilize technology to sustainably extend the world's food supply to feed more people. Carrier is working to do both through the educational and connective power of the World Cold Chain Summits as well as through innovation in refrigeration to safely deliver more food to more people.

The innovation aspect is key, as it is natural to assume that an expansion of refrigeration units around the globe will increase greenhouse gas emissions. The benefit of reducing emissions by preventing food loss and waste through an expanded and improved cold chain, however, outweighs the associated increase in emissions by a factor of 10 to one. As Mandyck concluded, this proves that an expanded cold chain throughout the developing world is an essential strategy in the quest to sustainably feed the planet, and it makes him optimistic that we can uncover this vast, hidden source of food.

Day 1/Session 1: Keynote Remarks



The first session of the day covered three keynote talks on food loss and waste (FLW) and agricultural issues in Asia and Vietnam. **Dr. Tony Shih-Hsun Hsu**, Professor, Department of Agricultural

Economics, National Taiwan University, started this segment with an overview of APEC (Asia-Pacific Economic Cooperation, a forum which encompasses 21 economies from the Pacific Rim that promote free trade) efforts on food loss and waste reduction. Dr. Hsu noted that reducing food losses has been

“repeatedly underscored as one of the primary tasks” to safeguarding the food security of APEC economies. Impressively, APEC nations have set a near-term goal to reduce food loss and waste by 10% by 2020 compared to 2011-2012 levels. APEC economies are engaged in a multi-year project to strengthen public-private partnerships to reduce food loss and waste in the supply chain by identifying key issues to be addressed, seeking best practices in the private and public sectors, and finding practical solutions while enhancing capacity building. They seek to understand food loss and waste through three lenses – systemic (viewing food loss and waste as an integral part of the food system), sustainability (social, environmental and economic dimensions), and food security (a focus on human consumption).

Dr. Hsu stated that the APEC economies are using the FAO methodology to address food loss and waste at all levels of the food supply chain – from production and harvest to consumption. He pointed to high loss percentages of fruits, vegetables, fish and meat in the pre-consumption stage due to the lack of adequate cold chain infrastructure, and noted that they are utilizing resources such as the [ReFED report](#) to view costs and benefits of interventions (with a focus on “no regret” options – i.e., only winners, no losers). In addition, he displayed summary results in cost-benefit format for a 10% reduction in APEC food loss and waste, noting positive net annual economic value, substantial reductions in greenhouse gas emissions and water consumption, and sharp increases in meals recovered and jobs created. In closing, he stressed the APEC economies’ commitment to 10% FLW reduction now, while a call to action for the 50% reduction goal specified in UN Sustainable Development Goal (SDG) Target 12.3 will occur at a June conference in Taipei.

Julien Brun, Managing Partner, CEL Consulting, a

firm specialized in emerging supply chains, followed with preliminary survey results quantifying food loss in Vietnam. Brun gave a broad “flyover” of the farming sector in Vietnam, noting that some 42% of its population (of 92 million) is engaged at some level in the food chain, representing 18% of GDP. He also noted that the average size of farms is small (0.4 hectares for the average fruit farm), the food supply chain is fragmented, and there is considerable room to improve efficiency and traceability. He stressed a key aspect of food in Vietnam – it is predominantly “fresh” while processed food is limited – and with the absence of an extensive cold chain, perishability is high.

Brun’s survey of 150 farmers revealed that 32% of fruits and vegetables, 14% of meat and 12% of fish and seafood products failed to reach market due to spoilage, leading him to conclude that nearly 60% of food produced in Vietnam is not consumed. Despite these losses, Brun found that only 14% of surveyed food chain actors (farmers, collectors, distributors) make use of a cold chain, resulting in substantial lost revenue, lost time, wasted water and greenhouse gas emissions. In terms of land use, Brun estimates that 11% of Vietnam’s land is used to produce food that is not consumed – an area roughly the size of North Carolina. He summarized by urging collective action to address the structural issues behind these numbers.



Nguyen Duc Loc,
Acting Director of SCAP
(Southern Center of
Agriculture Policy and
Strategy/Institute of
Policy and Strategy

for Agriculture and Rural Development-IPSARD) gave the third keynote address, discussing issues in development of the agri-cold chain in modern

Vietnam. Loc started with positive factors related to agriculture in Vietnam, including recent high growth rates, supply surplus and a sharp increase in trade as the country's agricultural sector has been rapidly integrated into the world economy through the addition of free trade agreements (now 12 with 56 countries). He then cited several challenges facing the sector. Growth and competitiveness have weakened, due to small-scale, scattered production; negative impacts of climate change; and strong competition associated with international integration. The development of supporting industries is low; for example, Vietnam's food retail network is very small compared to other Asian countries. There also are a multitude of bottlenecks in the value chain of Vietnamese agriculture, including high input costs stemming from overuse of fertilizers and inefficient use of water; low-quality, inefficient production due to the small-scale, scattered nature of the growers; high transaction costs and high post-harvest losses; low technology processing; and low-quality, low-priced exports.

Loc noted that inefficient logistics led to reduced competitiveness for Vietnamese products, and that a restructuring plan is in place to enhance market orientation (promoting key products of advantage), reorganize production to increase scale and promote value chain linkages, and strongly promote the application of science and technology within Vietnam's agricultural system. Future plans involve the restructuring of resources and labor around products and markets aligned with advantages for Vietnam.

Session 2: Highlights of the Vietnam Cold Chain
Dao The Anh, Vice President of the Vietnam Academy of Agricultural Sciences (VAAS), kicked off the second session with an overview of challenges and opportunities in Vietnam's cold agricultural value



chain. Anh noted that Vietnam's agricultural exports totaled \$36.5 billion (US) in 2017, up 4 percent over the prior year. He pointed out that Vietnam's

agricultural system is facing several constraints. On the production side, these constraints include high chemical input, high resource costs and high greenhouse gas emissions, along with high post-harvest loss percentages in major food categories as well as food safety and quality challenges. On the export side, constraints include low quality and low income for farmers, lack of value chain institutions and farmer organizations, and poor logistics infrastructure and servicing. He noted that Vietnam lacks sufficient cold storage, cold transport and logistics communication integration, and that the high cost of cold storage is a barrier to adoption.

Regarding the current state of cold storage in the agri-chain, Anh stated that the efficiency of existing cold storage is low. At the same time, investment costs and energy costs are high, putting downward pressure on new investment. Further, private investment in the cold value chain is not integrated, and cold chain service providers are lacking. Anh also suggested that fruit and vegetable producers remain reluctant to invest in cold chain technology due to the seasonality of their business and revenue streams, and that skepticism remains about the ultimate financial viability of cold storage investment. Additional constraints for expansion of cold chain technology include lack of consumer demand for it, weak value chain coordination, limited access to credit and lack of advisory capacity for small farms in remote areas.

Significantly, Anh noted that the concept of sustainable food systems is new to Vietnam, and that research on appropriate low-cost technology for cold chain management is lacking.

All of these challenges and constraints, of course, spell opportunity. Anh cited Vietnam's export focus, growth in the domestic modern retail market and the high levels of loss across multiple food categories as opportunities for cold chain investment, while also calling for international cooperation in cold technology research along with effective policies to attract private investment in cold value chain services.



Luong Quang Thi, General Director, ABA Cooltrans Vietnam, followed with a logistics perspective on the cold chain in Vietnam. Thi noted that while the cold chain in Vietnam was highly underdeveloped 10 years ago, rapid urbanization is bringing significant opportunity.

The challenge involves how to ensure that food is transported from farms to cities in good quality, while still fresh and safe. Thi noted that Vietnam currently has a fragmented and underdeveloped cold chain, with a low application rate of cold chain to fresh food products (meat, dairy, fruits and vegetables) as a result.

Thi also stated that the birth of modern retail is driving the opportunity for cold chain development, although the predominance of small format (convenience) stores creates logistical challenges for cold chain providers. He pointed to three specific local cold chain challenges, including 1) extreme

focus on cost, which leads to decreased quality as supply chain participants take shortcuts to save money, 2) breaks in the cold chain that occur due to excessive fragmentation (i.e., too many participants with too many operating methods), and 3) not enough customers see the value of the cold chain, which impacts demand for it.

Thi closed by stressing the importance of collaboration and partnerships to upgrade the cold chain while balancing investment costs reasonably to deliver a greener and more sustainable Vietnam.



Hamza Harti, Country Director, FM Logistic Vietnam, followed, providing a detailed operational view of food transport issues. Harti began by noting

that fresh food comprises more than 60% of consumption in Vietnam as compared to 35-40% in Western Europe – again signifying the importance of a robust cold chain. He noted that consumer expectations around food revolve around three issues: safety and hygiene (which depend upon a proper cold chain), price and quality. Delving into operational details, Harti explained the differences between dry retail and fresh retail, noting that fresh food operations come with high intensity, requiring temperature monitoring and that *any* time delays can lead to a problem. He provided an example of a warehouse in Russia which processes up to 100,000 boxes per day, noting that such volume leaves no margin for error. Harti noted that timely inbound processing of fresh food is critical as it affects the ultimate quality of the products.

Session 3: Workshops on Food Loss Issues and Root Causes



Session 3 consisted of a series of 80-minute workshops related to root causes of food losses from cold chain gaps

in Vietnam within four major sectors – fruits and vegetables, seafood/fish, storage and transport, and retail and distribution.

Several root causes were identified in the **Retail/Distribution** workshop that also applied to the others, including lack of visibility over tracking and monitoring, lack of infrastructure and integrated cold chain providers, inadequate quality control related to receiving and packaging, lack of storage and cooling equipment along the food supply chain, and equipment maintenance challenges. Others included a lack of awareness of the link between food safety and cold chain, inadequate workforce training, a focus on cost over cold, and a general lack of consistency throughout the Vietnamese food supply chain related to perishables.

The **Storage/Transport** workshop also identified several root causes of food loss, including knowledge and process issues such as limited cold chain knowledge, inability to share best practices and lack of commitment from customers, suppliers and logistics providers to ensure product temperature; supplier issues including improper quality assurance of product before shipping, poor packaging quality and highly fragmented producers limiting effective traceability; customer issues such as lack of interest in the cold chain, poor quality

control and a focus on cost savings as a barrier to implementing cold chain practices; environmental issues including higher ambient temperatures and exposure to extreme temperatures; and regulatory issues such as lack of supporting policies to promote the cold chain and to address food loss in seasonal peaks.

Throughout all of these sessions, a recurring theme was a focus on short-term cost reduction versus investment for greater longer-term income through reduced food loss and improved product quality – a challenge that is not unique to Vietnam.



Capping the discussion in this session, **Mark Mitchell** of Supercool Asia Pacific emphasized the distinction between a series of refrigerated events and a proper cold chain – noting that the latter conveys that a consistent level of cold was achieved throughout the entire food supply chain journey.

John Mandyck summarized the day noting that it was data-rich, with 147 individuals from 17 countries focused on the higher purpose of minimizing food loss and waste to sustainably feed the world.

Day 2/Session 4: Exploration of Cold Chain Projects in the Philippines

Day 2 began with a look at a cold chain project in the Caraga region of the Philippines, presented by **Nic Richards**, Chief of Party, Philippines Cold Chain Project (PCCP), Winrock International. Richards described the PCCP, a five-year effort (2013-2018) funded by the U.S. Department of Agriculture and

implemented by Winrock in conjunction with several partner agencies in the Philippines.

The project has a number of goals, including expanding the supply and quality of horticulture, fisheries and swine-sector food products; improving practices and facilities for perishable and non-perishable food production; better access to and application of improved post-harvest practices and technologies; improved marketing linkages and outcomes; and better access to financial and agribusiness services and products. The location of the PCCP supports cold and dry storage and nine slaughterhouses in the region.

Specific cold chain development challenges for the Caraga region are many and include a lack of coordinated and planned agricultural value chains, poor infrastructure (limited, sporadic power), security issues (unrest over land disputes), a poor “image” of Caraga, high poverty, limited private sector investment (and limited attraction), a predominance of small-scale agriculture, logistical challenges (inter-island transport) and limited access to microfinance.

Richards discussed two case studies with PCCP-supported facilities, the Caraga Regional Integrated Marketing Center (CRIMC) – a multipurpose building for dry and cold storage processing and handling (without cold storage) – and the Santa Josefa Slaughterhouse for pig processing. As Richards noted, the CRIMC faces several challenges. The facility is not yet ready for business operations, it lacks a business plan, a local government operations team has not yet been established, local government politics can be inconsistent, aggregators and shippers (especially for bananas) have extensive power and are not quality-focused, no funds exist

for cold room storage, and agribusiness partners are difficult to establish.

Richards believes that progress is being made, however, as work is being done with a local government unit to make the facility accessible and ready for business while also developing a feasibility study for business development.

Absent new technology interventions, old practices remain in use – as is the case with bananas.

Richards provided several impactful photographs of bananas jammed into wooden crates, exposed to the elements, and interspersed with 40 Kg blocks of ice. The crammed crates and the heavy blocks of ice lead to losses due to crushing, and the open access allows access to rainwater. Further, Richards conveyed a fascinating detail: The heavy blocks of ice melt during transportation and the exposure to water naturally results in losses. The traders like this, however, and have no incentive to change the process fraught with food loss since they are paid by the pound and the melting ice results in a higher price at market for them.

The Santa Josefa Slaughterhouse is operating, although at only 40% of capacity, and it does not contain cold storage facilities. There are several challenges related to pork production: The volume and quality of local pork is inferior to that of other market areas, small “backyard” producers dominate production, there is limited access to microfinance, there is limited access to and affordability of pig rations and semen for breeding, and there is severe competition between pig breeding and pig production. Despite these challenges, Richards feels that progress is being made through continual support of local government unit operators to train

the slaughterhouse team in safe food handling, humane slaughtering and animal inspection; support the slaughterhouse business plan development; promote the legal requirements to use the slaughterhouse for animal slaughter (as opposed to backyard slaughtering); and link the slaughterhouse to the pork value chain actors.

Richards concluded with several key lessons learned from the Philippines Cold Chain Project, noting that fragmented cold chain linkages result from poorly coordinated, poorly planned and poorly resourced food systems, limited private sector investment attraction, mostly smallholder-based agricultural production, lack of regulations and enforcement along the food system and cold chain, food producers (farmers) that are disempowered and not getting sufficient compensation, distributors and aggregators that have the majority of leverage and get most of the profits, and the absence of effective value chains in place.

Riccardo Savigliano, Industrial Development Officer, United Nations Industrial Development Organization (UNIDO), opened in praise of the role that women play in the cold chain, in recognition of International Women's Day. UNIDO works around the world with an emphasis on Sustainable Development Goal 9 – Industry, Innovation, and Infrastructure – believing that everyone benefits from industrial growth coupled with an environmental sustainability frame.

Savigliano pointed out that using the existing model for food production and distribution, global food production would need to grow by 70% to feed the additional 2+ billion people anticipated by 2050, the majority of whom will be located in developing countries. He further noted that 40% of food losses



in developing countries occur at the post-harvest and processing levels in large part due to inadequate cold storage and cold transport infrastructure. He highlighted some compelling statistics in support of an expanded, efficient cold chain, pointing out that less than 4% of India's fresh products are transported under low-temperature conditions, versus a comparable figure of over 90% in the UK. Further, China has half the refrigerated vehicles of France, but more than 20 times the population.

After briefly discussing cold chain projects in Jordan and Vietnam, Savigliano discussed a current, three-year global project for improving the cold chain in the Philippines. The project's objective is to "identify, develop, and stimulate the application of low-carbon, energy-efficient refrigeration innovation technologies and business practices throughout the food cold chain while increasing food safety and security." The project also involves the establishment of a global partnership with the private sector and collaboration with financial institutions for the promotion of investment and the transfer of technology and best practices. A cold chain hub will be a core part of the project, with the goal of making the cold chain in the Philippines more sustainable. Ultimately, the intent of the project is to foster market transformation. Savigliano noted in the ensuing question and answer segment that the innovation hub model of the Philippines project could be implemented in Vietnam, and that UNIDO is looking to operate elsewhere.

Session 5: Implementation Programs and Targets



The final session of the Summit, moderated by **Gerald Cavalier**, President, Tecnea–Cemafruid, comprised a panel discussion of implementation programs and targets with **Mark Mitchell**, Managing Director, Supercool Asia Pacific; **Mathilde Tran**, Senior Manager, PwC Vietnam; and **Ngo Quang Trung**, General Director, Emergent Cold Vietnam.

Cavalier began the session by summing up effective implementation of programs with three words: organization (required for a sound cold chain), performance (of equipment and people) and compliance (assessment and performance checking). He also referenced two components – “cold” and “chain” – and stressed that both are needed to safely preserve and transport food.

The panel discussion was fast-paced and compelling. **Tran** noted that in her experience, all actors must be involved to have a sound cold chain. **Trung** pointed to two problems in Vietnam – the lack of cold chain knowledge, and the absence of an obvious organization to provide information and best practices – and launched a call for a cold chain coordination group in Vietnam. **Mitchell** stressed the importance of people and “training, training, training.” He also pointed to the need for

commitment to transparency, cooperation and professionalism.

Tran added that many of the farmers growing the food in Vietnam do not have a refrigerator, which limits their understanding of the need for a strong cold chain to ensure safety and minimize food loss. She also called for refrigeration equipment that is less expensive and easier to maintain, which does not require master technicians in remote areas. **Mitchell** made an impassioned plea that we must close links in the cold chain – it is a series of handoffs and every participant must be fully transparent at every step. He added that there are hundreds of ways to do it, but the essential thing is to act.

John Mandyck summarized the event following the last session, leaving Summit participants with three main points:

1. Reflecting back to the first Summit in 2014, he noted that the goal of that event was to start a new dialogue around the food system and feeding the planet, with a focus on reducing food loss and waste rather than continuing the “grow more to waste more” model. He noted that we have definitely been successful in raising awareness about the scale of the food loss and waste problem and reiterated the need to address it.
2. He referred to the evolution of the Summits as a journey “from the why, to the how, to the now.” The 2014 Summit focused on discussions about why food loss and waste exist around the world. In 2015 and 2016, we moved to the “how,” focusing on case studies and analysis, and we moved from awareness building to knowledge

building. And in 2018 he suggested that we are moving to the “now” – a time where we have data to act on to drive meaningful reductions in food loss and waste. He noted that we can now focus on opportunities in individual countries, which will provide global environmental benefit.

effort on the road to reducing food loss and waste and sustainably feeding 10 billion global citizens by 2050.

¹ John Mandyck joined the Urban Green Council in New York City in 2018 as its first-ever CEO.

3. He returned to the vast amount of food that is lost and wasted annually – that hidden source of food that can feed up to 4 billion people, remove extensive carbon emissions and save an enormous amount of water. He noted that together, we have the opportunity to address that hidden solution.



Lastly, bringing the entire event to fruition in a very compelling way, Carrier Transicold & Refrigeration Systems President

David Appel signed an agreement with **Dr. Pham Van Tan**, Deputy Director of the Vietnam Institute of Agricultural Engineering and Post-harvest technology (VIAEP), to cooperate on developing the cold chain throughout the country. A fully developed cold chain will enable Vietnam to overcome many of the agricultural challenges that emerged over the two days of the Summit, dramatically reducing food losses, feeding more people, reducing greenhouse gas emissions and unnecessary water and resource consumption, expanding food exports and more. This initiative is a fitting development in the evolution of the Summits from inception in London nearly five years ago, and a significant public-private partnership