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OXFORD FUTURE OF COOLING: COOLING FOR COP26 WEBINAR SERIES

October 4, 2021: Models for Sustainable Cold Chains with Prof. Toby Peters (University of Birmingham) and Nnaemeka Ikegwuonu (CEO of ColdHubs)

Cold chains: A critical blank spot for climate action and wider sustainable development

Cold chains are critical to socio-economic development. 50% of the food we consume requires cooling. On the one hand, cold chains in industrialised countries already account for roughly **1% of global greenhouse gas emissions**, the **average age of cold storage assets is 42 years** in the US, and capacity is growing **three times quicker** than global GDP. On the other hand, cold chains are **virtually non-existent** in low-income countries, especially in rural areas, up to **35% of perishable food is lost post-harvest in developing economies** due to a lack of cold chains, and **90% of medical facilities** lack access to modern cold chain equipment.

Decarbonising cold chains is a complex problem. Cold chains combine the food, energy, and transport systems, and not only have large impacts on climate, but also most other Sustainable Development Goals (SDGs). Current design principles, policy regulations and finance allocation, however, **largely neglect these systemic linkages**, instead focusing mostly on low-risk projects that meet cooling demand in a low-cost fashion.

As we move towards one of the most important rounds of the UNFCCC Climate Negotiations, the Oxford **Future of Cooling Programme** is hosting a series of online seminars leading up to COP26, linking to the programme's **framework on sustainable cooling**. The fourth webinar in the series, **Models for Sustainable Cold Chains**, engaged in conversation with Nnaemeka Ikegwuonu, CEO of ColdHubs, and Toby Peters, Professor in Cold Economy, University of Birmingham.



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Five critical enablers for sustainable, low-carbon cold chains

To provide cold chains for all sustainably, there is a key need for **integrated approaches that cut across the energy, transport, food, and wider sustainable development systems** to scale sustainable cold chains – both in emerging and industrialised economies. To achieve this, 5 enablers are critical, namely (1) new integrative business models, and adequate support structures comprised of (2) cross-sectoral governance, (3) tailored finance instruments, (4) policies and (5) skill development.

(1) Business model innovations bridging sustainable cold chain barriers. Businesses providing cold chain solutions need to create and capture cross-sectoral value. In the webinar, Nnaemeka presented his company's ColdHubs business model innovation which is capable to reap multiple SDG benefits through an integrated approach to cold chain expansion in Nigeria. ColdHubs is a plug and play modular, solar-powered walk-in cold room, offering 24/7 off-grid cold storage service to small farmers. ColdHubs charges for cooling services by the kg of food stored, overcoming the barrier of farmers' and food vendors' low income. The economic value from avoiding food loss and increasing food quality is large enough to both double farmers' and food vendors' monthly income and recover CAPEX for the ColdHubs unit after less than 2 years even if utilisation rate is only 50%. Last year, ColdHubs operated 54 cooling units, cooling 42,000 tons of food, transforming the income of 5250 farmers and retailers, saving on emissions and creating jobs for 66 women in local communities to date.

(2) Cross-sectoral governance to allow for collaborative, systemic approaches.

Sustainable cold chains must capitalise on synergies among sustainable development goals including energy access, food security, income generation, job creation, women's empowerment, and mitigation of emissions and land use governance. This requires a governance approach that creates spaces in which actors from the private and public sectors, finance, development, and local communities can work together. In the webinar, Prof Toby Peters discussed The African Centre of Excellence for Sustainable Cooling and Cold-chain (ACES) which ensures local and global field-to-fork connectivity whilst also protecting and economically empowering small-scale farmers. ACES offers a holistic, whole systems approach to cooling and cold chains with a technology hub, research centre, business incubator and knowledge hub.

(3) Finance instruments de-risking integrated business models. Complex problems require integrated solutions that go beyond individual sectors and SDGs. However, available finance schemes, both within development and climate finance, do not target integrated solutions but target narrow approaches. Yet the role of public finance is to de-risk business models which have the potential to foster sustainable development at



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scale, especially where the models are difficult to grasp. Creating lighthouse projects that prove the socio-economic feasibility of new business models have the potential to rapidly scale through context-specific replication in other contexts.

(4) Policy mixes which provide both long-term support and direction for businesses.

A critical start is for governments to recognise cold chains as critical to food, energy, transport and climate change mitigation and adaptation infrastructure. Policy mixes conducive to business model innovation tend to combine support structures such as long-term commitments to expanding a sector and financial incentives with constraints such as low-carbon system design and ensuring widespread availability. This mix of support and constraint can create productive spaces in which companies are forced and incentivised to innovate their business model.

(5) Adequate skills development.

Cold chain transformation requires adequate skills at scale. In industrialised economies, system integration is needed to capitalise on energy-specific synergies and energy-efficient solutions, including digitalising cold chains through farm-to-shelf temperature and humidity monitoring. In emerging economies, skills to operate low-carbon food cooling units need to be developed decentrally.

For questions on the policy recommendations above, please contact Philipp Trotter, Honorary Research Associate at the Smith School of Enterprise and the Environment at the University of Oxford (philipp.trotter@smithschool.ox.ac.uk) or Sindra Sharma, Policy Advisor at E3G (sindra.sharma@e3g.org).

Watch a recording of the webinar here.

About E3G

E3G is an independent climate change think tank accelerating the transition to a climate-safe world. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere.

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