

Solutions

# Much Cooler.







# Post-Harvest Challenges.

Food loss and waste is a global problem that negatively impacts the bottom lines of producers and agri-businesses, wastes limited resources, and contributes to climate change.<sup>1</sup>

Post-harvest loss can be referred to as a multisectoral crisis that needs a multifaceted approach to deal with its profound consequences stretching from a rise in poverty and malnutrition to an increase of healthcare expenses and lost productivity to educational setbacks and other socioeconomic impacts.<sup>2</sup>



**„Senegal imports almost 70% food because the food production covers only 30% of the consumption needs.“**

Gnagna Cambel Dieng, CEO of Off-Grid Africa

**„Africa loses \$48 billion worth of food every year due to post-harvest losses.“**

This is food that we've already produced. To address food security, we must invest in better storage, processing and distribution infrastructure to reduce these losses.”

Akinwumi Adesina, President African Development Bank



**Battle climate change**

Climate change is causing unpredictable weather patterns which severely affect agricultural output.



**30% Post-Harvest Losses**

Smallholder farmers in Senegal lose around 30% of their harvest due to spoilage and quality decline, largely from inadequate storage and handling. Improving storage and preservation methods is crucial to boosting food security and farmer incomes.

<sup>1</sup>Maier, D.E.; Chickez, H. Recent Innovations in Post-Harvest Preservation and Protection of Agricultural Products. Agriculture 2021, 11,1275.

<sup>2</sup>Mehra D, Rael T and Bloem MW A review of the intersection between climate change, agriculture, health, and nutrition in Africa: costs and programmatic options. Front. Sustain. Food Syst. 2024, 8:1389730.

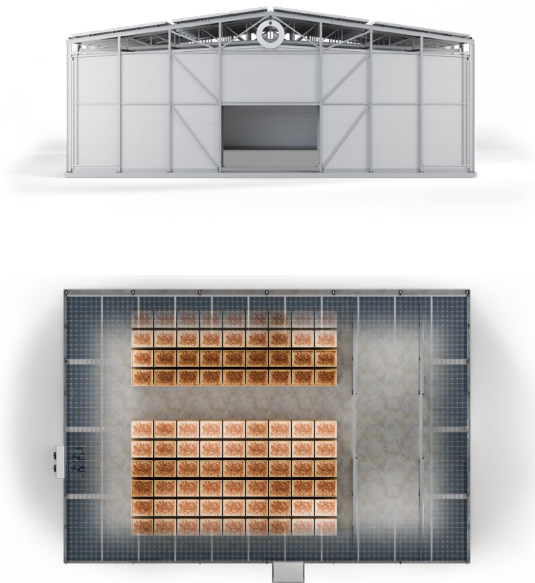


# Much Cooler.

Much Cooler, an insulated cooling hall, embodies our commitment to sustainable agriculture, combating post-harvest loss, reducing carbon footprint, and ensuring long-term food sovereignty.

Much Cooler ensures complete energy independence and reliable supply through integrated Photovoltaics and battery energy storage (Ohms Box by Off-Grid Europe). The cooling system is designed to maintain optimal temperature and humidity levels for long-term storage of vegetables and fruits. Integrated software ensures intelligent energy management and the longest lifespan-possible.

The off-grid cooling hall is a model for an environmentally responsible storage facility as well as a demonstration of innovative design, high quality components and fast installation. The system is a direct form of bringing solar power to good use. For an improved supply chain management.



# Innovative Hall Design.



Much Cooler includes everything from building construction and renewable energy setup to cooling infrastructure and processing areas.

We offer a simple and versatile structure that adapts to your specific requirements.

The ultimate solution for post-harvest cooling and processing needs. Designed for efficiency and optimal performance, our state-of-the-art cooling warehouse features an Insulated Cooling Section that maintains the perfect temperature for your produce, extending shelf life and preserving quality.

The spacious Processing Area allows for seamless handling and preparation of your harvest, ensuring that your products meet the highest standards before reaching the market. With customizable layouts, you can tailor the space to suit your specific operational requirements.

For added convenience, we offer an Optional Office space, providing a comfortable area for your team to manage operations, plan logistics, and oversee processing activities without the distractions of the warehouse environment.

## Technical specifications

- Turnkey solution for the agricultural sector
- Exoskeletal metal structure for PV panel mounting
- Cooling system integrated with PV and LFP battery storage system
- Providing space for long-term storage of vegetables and fruits
- Optimal temperature and humidity levels
- Processing area, equipment and storage boxes included
- Advanced monitoring & control for precise energy management

## Benefits



### Nutrition security

Optimal for the long-term storage of harvest.



### Food quality

If food is stored correctly, it stays nutritious and healthy.



### Price stability

Food can be sold all year round.



Much Cooler has been selected by the expert panel as one of the Finalists of the smarter E AWARD 2024 in the category „Smart Integrated Energy“.

# Renewable Energy Hardware.

Much Cooler operates independently through integrated Photovoltaics (PV) and Battery Energy Storage Systems (BESS), ensuring a reliable energy supply.

Our renewable energy hardware, featuring solar power, battery storage, and advanced inverters, is the ideal solution for post-harvest cooling systems. By harnessing solar energy, you can significantly reduce operational costs and minimize reliance on traditional energy sources, ensuring your cooling system runs sustainably and efficiently.

The integrated battery storage (Ohms Box by Off-Grid Europe) allows for consistent energy supply, even during cloudy days or at night,

providing uninterrupted cooling for your valuable produce. Our smart inverters optimize energy usage, ensuring that every bit of solar power is harnessed effectively, reducing waste and enhancing system reliability.

This combination not only supports environmental sustainability but also enhances the quality and longevity of your harvest.



## Solar Power

50 - 300 kWp



## Battery Storage

160 kWh - 1,5 MWh



## Inverter Power

50 kVA - 500 kVA

# Technical specifications.

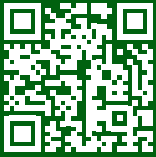
<b>Cooling Section</b>	Operation temperature	1 °C to + 35 °C (34 °F to +95 °F)
	Ambient external temperature	-10 °C to +50 °C (14 °F to +122 °F)
	Humidity	5 % – 90 %
	Maximum installation altitude (above sea level)	2000 m
<b>Cold Store Hardware</b>	Storage capacity 300t to 5000t vegetables and fruit (scalable by modular approach beyond 5000t)	
	R32 based cooling stack engineered for extreme environments (Ozone depletion potential, ODP)	
<b>Grid/Genset/ Off-Grid options</b>	Grid power export when battery is full and excess solar production	
	Grid stabilization mode for remote areas to push/pull power	
	Genset option for areas where solar penetration is not optimal	
<b>Interface</b>	User interface Ethernet (Modbus TCP / UDP, Web Server)	2 x RJ-45 (switched)
	System interface (module connection, backplane)	RS-485 (RJ-45)
	Optional: cloud based server	
<b>Software</b>	MuchCooler ERM Cold Store management software	
	OffGridController Power Management software	
	Much Cooler Environmental Local Management software	
<b>Additional options</b>	Electric forklift 2.5t	
	1'st floor Mezzanine office area	
	Stackable Storage boxes for optimal use of space	
<b>Standards</b>	EU directives (CE)	
	Electromagnetic compatibility directive	2014/30/EU
	EN 62040-2 2006/AC:	2006 class 1
	EN 62109-1 2010	
	Safety (C, US)	
	CSA C22.2	No. 107.1 – 16
	UL 1741 / 62109-1	Second Edition / National Differences
IEC 62109-1	First Edition	

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