SUSTAINABLE ICE QUILT COST SHEET + FABRICATION GUIDE

Product: Modular Reflective Ice Quilt Panel (10×10 meters, 100 m²)\ **Inventor & Author:** Matthew Cameron Kotapish\ **Goal:** Biosustainable fabrication for cryosphere preservation applications\ **Public Domain Dedication:** This work is released fully and permanently into the public domain under Creative Commons Zero (CC0 1.0 Universal). It may never be privatized, patented, or restricted.

COMPONENT COST BREAKDOWN – BIOSUSTAINABLE MATERIALS

Component	Material Type	Unit Cost (m² or m)	Total Cost (100 m² Panel)	Notes
Reflective Surface	White bio-polyethylene or bio-Mylar	\$2.50–3.00/m²	\$250–300	High reflectivity, biodegradable or bio-sourced
Backing Layer	Recycled LDPE (GRS-certified)	\$1.00/m²	\$100	Environmentally safe film substrate
Buoyancy Layer	Recycled or biodegradable foam	\$2.00–2.50/m²	\$200–250	Closed-cell foam or plant-starch variant
Edge Connectors	Cotton rope or bioplastic clips	\$0.30–0.50/m (40m)	\$12–20	40m perimeter total
Drainage & Anchoring	Natural fiber ties / rope loops	\$0.10/m²	\$10	No synthetic or metal components
Adhesive or Sealing Method	Water-based glue or heat seal	\$0.25/m²	\$25	Low-emission assembly
Ethical Labor	Eco-partner, fair wage production	\$2.00–3.00/m²	\$200–300	Community-based or off-grid small-shop
Packaging & Transport	Flat-pack or rolled bundles	\$1.00/m²	\$100	Local/regional delivery to staging zones
Quality Testing + Handling	Field simulation & water/UV exposure	\~\$0.50/m²	\~\$50	Basic QA step for durability

ESTIMATED PANEL TOTAL COST:

- **Prototype Scale (1–10 units):** \$800–1,100 per 100 m² panel
- **Bulk Scale (100+ units):** \$500–750 per 100 m² panel

OPTIONAL ADD-ONS:

Add-on	Cost Estimate	Description
QR or GPS Eco-Tagging	\$2–10 per unit	For inventory, tracking, or donor visibility
Organic Dye Labeling	\$1–2 per unit	Biodegradable ink logos or tags
Compostable Anchor Stakes	\$20 per 4-piece set	For temporary, reversible installation
Monitoring Sensor Module	\$30–50 per panel	Optional environmental sensors (temp/UV)

COST PER KM² COVERAGE:

- **1 km² = 10,000 panels (10x10m each)**
- **Bulk Cost (per km²):** \$5M–7.5M
- **Impact:** Reflectivity restored over critical polar or glacial zones; passive temperature control system

FABRICATION INSTRUCTIONS – HOW TO MAKE AN ICE QUILT PANEL

1. CUTTING THE MATERIALS

- Cut two 10m x 10m sheets: one from reflective film (top), one from recycled LDPE (bottom).
- Cut 100 m² of buoyant material (foam or sealed bottles) to fit inside.

2. ASSEMBLING THE QUILT

- Lay bottom layer (LDPE) flat on a clean surface.
- Arrange the buoyancy material in a grid across the surface (in foam pads or bottle rows).
- Apply adhesive or heat-seal around each buoyancy section to secure.
- Place the reflective sheet over the top and align edges.
- Heat-seal or glue all edges shut, leaving a small flap for final sealing after inflation (if air is used).

3. ATTACHING CONNECTORS AND ANCHORS

- Sew, glue, or loop cotton rope through reinforced edge slits every 2 meters.
- Attach rope loops or clips at corners for linking panels together.
- Punch or slice drainage holes in low points, if needed.

4. ROLLING AND PACKING

- Once complete and dry, roll the panel with reflective side inward.
- Secure with twine or jute rope.
- Store in a dry, shaded place or waterproof sack for transport.

5. DEPLOYMENT IN FIELD

- Carry by sled, drone, or person.
- Unroll flat over target ice or water.
- Connect to adjacent panels using rope or clips.
- Anchor corners using compostable stakes or tied rocks.

Summary: This cost sheet and fabrication guide support the development and deployment of environmentally sustainable modular reflective quilt panels for the purpose of ice preservation. All pricing and processes reflect eco-friendly and ethical production values, including biodegradable materials, fair labor, and circularity.

Prepared for: Global public access and climate emergency response\ Author & Originator: Matthew Cameron Kotapish\ Date: [6/29/2025]