



Solar-Tunnel Raisin Drying Line

Complete Turnkey Business Proposal



Supplier reference: real fruit preparation and controlled drying equipment representative of the food-handling stages around raisin drying.

200-500 kg/batch starter fresh-grape load	3-10 days weather-dependent drying cycle	15-18% typical target raisin moisture	3-6 entry operators
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Prepared for investment planning in Afghanistan and regional export markets. Final specifications, pricing, civil works, and utility loads require supplier quotation and site survey.

Executive Summary

This farm or cooperative-scale system converts fresh grapes into raisins inside a protected, ventilated solar tunnel rather than in open dust and rain exposure. Grapes are sorted, optionally treated under an approved market-specific recipe, spread in shallow layers, dried with controlled solar heat and forced airflow, then conditioned so moisture equalizes before grading and packing. A small auxiliary heat source protects quality during cloudy periods and at the end of drying.

Why this project fits Afghanistan

- Afghan grapes can be converted near vineyards, reducing fresh-fruit loss and transport pressure.
- An enclosed tunnel protects fruit from dust, insects and sudden light rain better than open drying.
- Solar heat reduces routine fuel use while an auxiliary heater improves completion reliability.
- Modular tunnels let growers add capacity after one harvest season proves the product and market.

Sanaatchi delivery scope

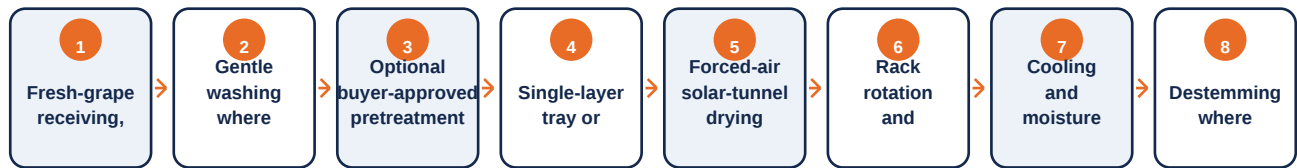
- Factory setup planning, supplier pre-qualification, and technical comparison
- Complete production-line and individual equipment supply
- Factory layout, utilities, civil-work coordination, installation, and commissioning
- Raw-material sourcing, trial-batch qualification, and repeat supply planning
- International logistics, customs documentation, operator training, spare parts, and after-sales support

Recommended configuration

For the lowest credible entry, select a modular solar tunnel holding 200-500 kg of fresh grapes per batch, with food-grade racks, solar-powered fans, temperature and humidity sensors and a small auxiliary heater. Prove drying time, color, final moisture and yield with the selected Afghan grape variety before replicating tunnel modules.

Manufacturing Process & Product Portfolio

Integrated process flow



Target products

Product	Typical specification	Primary market
Solar-dried green raisins	Buyer-approved color, moisture, cleanliness and texture	Domestic premium and export-oriented buyers
Solar-dried dark raisins	Uniform natural color and stable moisture	Retail, bakery and ingredient buyers
Industrial raisin grade	Food-safe smaller fruit within processor contract limits	Bakeries, confectionery and further processing

Supplier market references distinguish batch, tunnel and solar-assisted raisin dryers and indicate hybrid solar-mechanical capacities around 200-800 kg/day. These figures are only planning references because solar performance depends on weather, tunnel geometry, grape size, pretreatment and loading depth. The project must use local climate data and harvest trials; no fixed drying time is guaranteed.

Core Equipment Schedule

Step	Equipment	Function	Indicative parameter
1	Sorting and preparation tables	Removes damaged grapes and prepares uniform lots	Shaded, washable food-contact surfaces
2	Wash and drain station	Cleans grapes only where the process specification requires it	Potable water and complete surface drainage
3	Food-grade drying trays and racks	Holds grapes in shallow ventilated layers	Removable, washable and corrosion-resistant
4	Solar tunnel enclosure	Captures heat while shielding fruit from dust, pests and rain	UV-stable cover, screened air inlets and service aisle
5	Solar air collector and circulation fans	Raises air temperature and moves moisture out of the tunnel	Variable airflow with photovoltaic supply
6	Auxiliary indirect-air heater	Completes drying during weak sun or high humidity	Small clean-energy backup with no flue gas on product
7	Temperature, humidity and product-moisture instruments	Guides airflow, rack rotation and batch release	Logged inlet, outlet and product readings
8	Conditioning bins and pack sealer	Equalizes moisture and packs stable raisins	Food-grade covered bins and semi-manual packing

Equipment models are indicative and will be matched to the selected capacity, local raw-material tests, available utilities, and preferred automation level.

Reference Equipment Gallery



Supplier reference: real fruit preparation and controlled drying equipment representative of the food-handling stages around raisin drying.



Supplier reference: real photovoltaic equipment illustrating the independent fan-power source used with a solar-assisted tunnel.

Images are supplier references for configuration discussion; final equipment appearance and model may differ.

Plant, Raw Materials & Utility Requirements

Raw materials

- Sound Afghan grapes from varieties proven suitable for raisins
- Potable water
- Only legally permitted pretreatment materials accepted by the target market
- Food-grade trays, liners, pouches and cartons
- Labels and lot-coding consumables

Utilities & infrastructure

- High-sun drying site with safe drainage and wind protection
- Photovoltaic supply or stable electricity for fans and instruments
- Small clean auxiliary heat source
- Potable water and hygienic preparation area
- Dry, cool conditioning and finished-raisin storage

Quality, safety and environmental controls

- Approve grape variety, maturity, sugar level, damage and pesticide compliance
- Validate any pretreatment for legality, residue limits, color and taste
- Record load weight, layer depth, tunnel temperature, humidity and weather
- Rotate racks and inspect for uneven drying, mold, scorching or insect entry
- Measure final moisture and water activity before conditioning and packing
- Verify clean flavor, color, texture, pack seal and traceability

A final factory layout must reserve safe forklift routes, maintenance clearances, raw-material segregation, finished-goods storage, fire protection, ventilation, and future expansion space.

Indicative Investment & Implementation Plan

LOW-ENTRY CONFIGURATION

Lowest entry uses one modular solar tunnel, food-grade racks, photovoltaic fans, basic instruments and a small auxiliary heater. Land, permanent building, grape inventory, cold storage, optical sorting and additional tunnel modules are excluded.

Component	Indicative range	Notes
Sorting, washing and preparation equipment	US\$2k-5k	Simple food-grade launch area
Solar tunnel, collector, trays and racks	US\$5k-13k	One 200-500 kg/batch module
Fans, instruments and auxiliary heater	US\$3k-8k	Hybrid completion capability
Conditioning, grading and semi-manual packing	US\$3k-7k	Basic finished-product section
Installation, freight and initial spares	US\$3k-7k	Use safe local civil fabrication where practical
Indicative low-entry total	US\$16k-40k	Land, building, grapes, cold store and optical sorter excluded

Implementation sequence

Phase 1	2-4 weeks	Confirm grape variety, site climate, product grade and permitted pretreatment
Phase 2	3-5 weeks	Design tunnel airflow, trays, auxiliary heat and monitoring plan
Phase 3	5-9 weeks	Fabricate, inspect, deliver and install the first module
Phase 4	One harvest cycle	Train operators, validate batches and approve shelf life before expansion

Ranges are planning targets for a low-cost entry configuration, exclude land, and remain subject to confirmed capacity, supplier quotation, freight, duties, exchange rates and site conditions.

Next Steps & Contact Information

Recommended next steps

- Confirm target products, hourly output, and packaging formats
- Test representative raw materials and document quality requirements
- Complete site survey covering electricity, water, fuel, drainage, roads, and warehouse space
- Request comparable technical and commercial quotations from shortlisted suppliers
- Finalize financing, logistics, installation, training, and spare-parts plan

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Research and image references

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