



Solar Water-Heater Assembly Line

Complete Turnkey Business Proposal



Made-in-China supplier reference: real solar water-heater assembly line equipment.

150-200 L launch tank	1 model controlled family	8-20 units/day entry output	10-16 entry workforce
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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

A small/medium line assembling one non-pressure evacuated-tube solar water-heater family through stainless inner-tank and coated outer-shell sheet cutting, punching, rolling and longitudinal/seam joining, end-cover forming, port welding, pressure/leak inspection, concentric tank assembly, metered polyurethane insulation foaming and curing, collector-tube and frame fitting, hydraulic and thermal performance tests, cleaning, serial marking and protective packing.

Why this project fits Afghanistan

- Solar water heating reduces electricity and fuel use for homes and institutions.
- Local tank/assembly work can add value while critical tubes are imported.
- One tank volume controls jigs, ports, foam and packaging.
- Leak, insulation, stagnation and thermal-output tests determine safety and performance.

Sanaatchi delivery scope

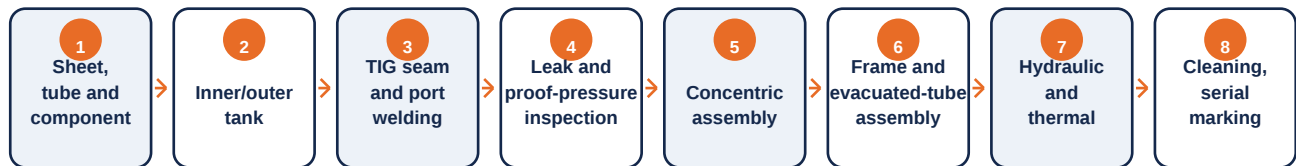
- Factory setup planning, supplier pre-qualification, and technical comparison
- Complete production-line and individual equipment supply
- Factory layout, utilities, civil-work coordination, installation, and commissioning
- Raw-material sourcing, trial-batch qualification, and repeat supply planning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

Recommended configuration

Launch one 150-200 L non-pressure evacuated-tube model while buying certified vacuum tubes and prefabricated frames initially. Include tank sheet cutting/punching/rolling, TIG seam and port welding, end-cover tools, leak/pressure test, concentric foaming fixture with metered PU machine, assembly jigs and a thermal test rig. Pressurized enamel tanks and flat-plate collectors are separate technologies.

Manufacturing Process & Product Portfolio

Integrated process flow



Target products

Product	Typical specification	Primary market
Non-pressure evacuated-tube solar water heater	Tank volume, tube count, materials, insulation, leak/proof test, heat loss, thermal output, stagnation protection and frame	Afghan households, clinics, hotels and institutions

Non-pressure evacuated-tube, pressurized indirect and flat-plate heaters are not interchangeable. Acceptance records weld penetration, tank dimensions, port alignment, leak/proof result, foam density/fill, jacket fit, tube seal and frame stability. A representative outdoor or solar-simulator test checks heat loss, daily energy output, stagnation/overheat behaviour and cold-weather drain/freeze provisions for the target province.

Core Equipment Schedule

Step	Equipment	Function	Indicative parameter
1	Sheet shear, punch and rolling tools	Forms inner and outer tanks	150-200 L model
2	TIG seam/port welding fixtures	Joins tank and connections	Weld procedure controlled
3	End-cover forming and assembly jigs	Controls geometry and concentricity	One diameter
4	Leak and proof-pressure test bench	Releases tank integrity	Every tank
5	Metered PU foaming machine/fixture	Forms uniform insulation	Density/fill controlled
6	Thermal/hydraulic test rig	Verifies heat loss and output	Named test method

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



Made-in-China supplier reference: real solar water-heater assembly line equipment.



Made-in-China supplier reference: second real machine configuration for solar water-heater assembly line.

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

Plant, Raw Materials & Utility Requirements

Raw materials

- Certified stainless inner-tank and coated outer-shell sheet
- Purchased evacuated tubes, seals and prefabricated frame parts
- Approved PU polyol/isocyanate insulation system
- Ports, valves, fasteners, labels, cartons and protective inserts

Utilities & infrastructure

- Stable three-phase electricity with verified connected load
- Guarded machinery, lockout, ventilation and fire protection
- Dry segregated raw-material and finished-goods storage
- Maintenance tools, safe lifting and critical spare parts
- TIG shielding gas and welding fume extraction
- PU chemical store, metered ventilation and spill response
- Clean water and outdoor/solar-simulator thermal test area

Quality, safety and environmental controls

- Verify sheet, tube, seal and PU certificates
- Inspect weld procedure and port alignment
- Leak/proof-test every tank
- Control foam ratio, density, fill and cure
- Test frame, seals, plumbing and tube installation
- Verify heat loss, thermal output and stagnation behaviour

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

The low-entry route fabricates one non-pressure tank and assembles purchased certified tubes and frames. Pressurized enamel tanks, collector manufacture and full automation are excluded.

Component	Indicative range	Notes
Tank forming and welding equipment	US\$28k-72k	One non-pressure model
Leak testing, PU foaming and jigs	US\$22k-58k	Every-tank integrity
Assembly and thermal laboratory	US\$16k-42k	Tubes/frames purchased
Freight, installation and spares	US\$15k-38k	Pilot units included
Indicative installed low-entry total	US\$81k-210k	Building, tubes, frames and working stock excluded

Implementation sequence

Phase 1	2-5 weeks	Confirm product specification, representative raw material, buyer, capacity, site and utilities
Phase 2	3-7 weeks	Run supplier trials with the buyer material and freeze the balanced machine, tooling and utility scope
Phase 3	8-22 weeks	Manufacture or refurbish, inspect, document and ship the contracted equipment
Phase 4	3-12 weeks	Install, commission, train operators and pass material-specific acceptance tests

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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