

DECISION AND SCOPE

A small workshop that can grow

A specific layout and purchasing brief, with price evidence separated from design allowances. UK commercial site assumed; no supplier contacted or order placed.

Recommendation: start with a folding materials room, a separate dry metal bay, solar plus a LiFePO4 battery, a small plastic injector and an electric crucible furnace. Add HHO only after a supplier proves the required melting job. A complete all-material recovery plant within £20,000 was not verified.

Configuration	Planning capital*	What changes
A / budget starter	£18,285	Prepared plastic feed; electric metal trials; solar and folding shell. No shredder or HHO.
B / on-site shredding	£20,585	A plus a compact guarded shredder.
C / HHO included	£26,910	B plus a complete HHO station; retain the electric furnace until HHO melting is proven.

*Estimates include 15% contingency and commercial VAT allowances. These are not quotations or guaranteed all-in business start-up costs. Site, permitting and other exclusions are on page 3.

Outputs designed into the starter

Small HDPE or PP components, such as knobs, spacers and repair parts; small test castings from known aluminium alloys; sorted reusable metal stock. Plastic moulding is limited by the selected 20 cm³ shot size. Aluminium batch capacity must be confirmed in litres and kg of aluminium.

What needs a later, separately funded line

Large sheets and house blocks; steel melting; mixed-plastic chemical recycling; solvent recovery; contaminated scrap treatment; washing and wastewater treatment. No structural building product certification or municipal-scale throughput is implied.

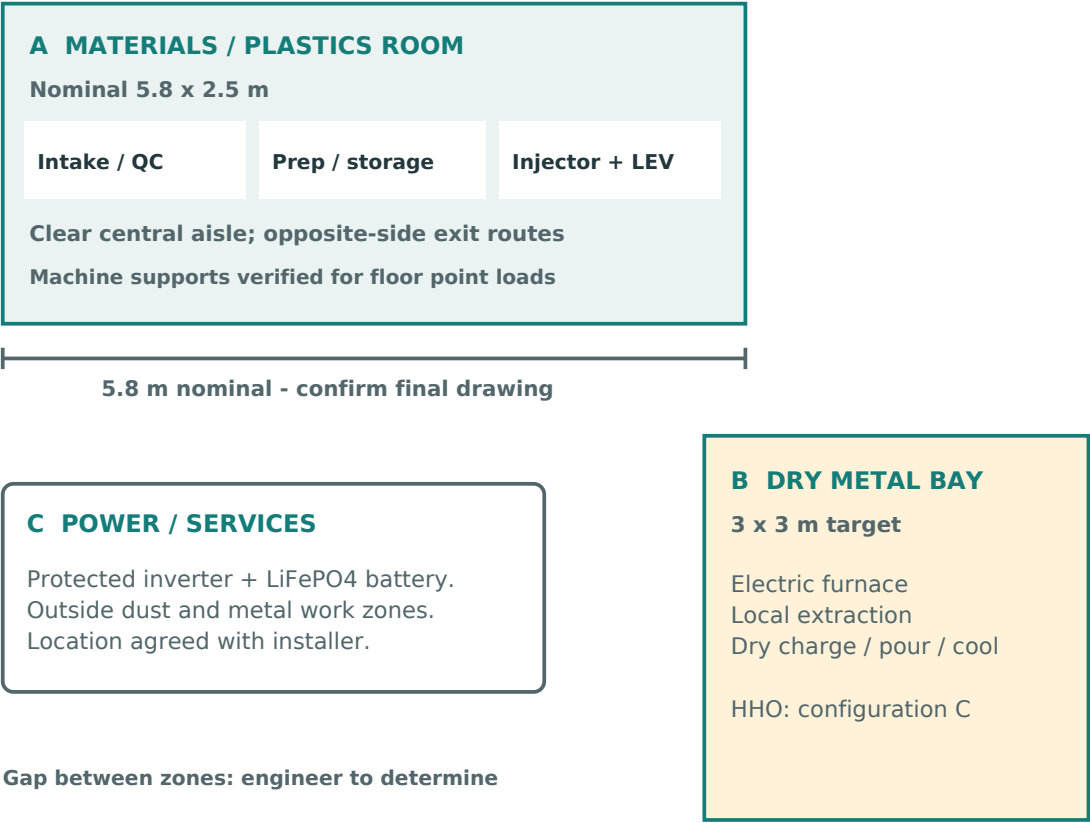
An existing example to copy

[Precious Plastic built and shipped a container recycling workspace](#) with shredding and plastic-forming equipment to the Maldives. It is a useful real layout precedent, but I found no current complete price including solar, HHO and a metal bay. [1]

FUNCTIONAL ARRANGEMENT

Two work zones, one power system

Nominal dimensions for supplier coordination. Door positions, internal clearances, fire separation, foundations, anchoring and extraction discharge require site-specific approval.



Solar: six ground-mounted panels. The listed panel dimensions give about 11.7 m² of module face area, before tilt, row spacing and access. Do not put panels on a folding roof without structural verification. [8]

Zone	Fit-out instruction
Materials room	Specify documented mineral-wool wall/roof panels and suitable noncombustible linings around the heater. One bench along each side only if a clear aisle and the machine operating envelope remain. No metal pouring here.
Metal bay	Roofed, weather-protected, noncombustible work area on a suitable existing dry base. Separate charge, pouring and cooling positions. Dry metal, tools and moulds; prevent rain entry. [12,13]
Extract / exhaust	Dedicated capture at the plastic heater and metal furnace. Separate appropriate systems; do not send sparks or hot metal particles into a plastic carbon filter. Allow replacement air. [11,12]

CAPITAL MODEL

Price the whole installation

All figures in GBP. Allowances include VAT where applicable, estimated delivery and installation as described. They are procurement targets, not supplier offers.

Item	£	Basis
Folding shell, delivered and set	4,000	[2] one-unit price; freight, unload, fit-out and panel allowance.
Separate dry metal bay	1,800	Local fabrication / roof / screen allowance; existing suitable base.
Solar kit and delivery reserve	2,600	[8] £2,571.76 inc VAT seen; delivery terms need confirmation.
PV mount, wiring and electrician	1,400	Ground mount, protection, circuits and commissioning allowance.
Small injector + basic mould	1,000	[6] \$480 machine; shipping, VAT, guard/clamp and simple mould provision.
Electric furnace and accessories	1,000	230 V, at most 2-3 kW; aluminium suitability is a purchasing condition. [10]
Two appropriate LEV systems	2,600	Plastic and metal capture / exhaust allowance; specialist quote required.
Process commissioning / training	700	Allowance; electrician is above. Must include extraction verification.
Benches, bins, basic tools / PPE	800	Starter set, not a fully equipped machine shop.
A subtotal	15,900	Prepared feed; no on-site shredder.
A contingency - 15%	2,385	Price, freight and ordinary scope uncertainty.
A total	18,285	Unpriced site and regulatory items below remain additional.

B: add £2,000 for a landed compact shredder and £300 contingency = **£20,585**. **C:** add a further £5,500 HHO station allowance and £825 contingency = **£26,910**. HHO allowance: about £4,350 landed generator plus £1,150 for a supplier-matched burner/crucible arrangement and integration. No melting performance is yet verified.

Import model: planning exchange rate \$1 = £0.80 (not a live FX quote); 5% duty provision is a placeholder, not the tariff. Use actual commodity codes and freight quotes. Indicative shell calculation: $(\$1,688 \times 0.80 + £1,000 \text{ freight}) \times 1.05 \times 1.20 = £2,961$; the balance to £4,000 covers unload/fit-out. VAT assumptions follow [15,16].

Excluded / not priced: land or rent, new slab/drainage, utility connection, planning and environmental permit fees/advice, substantial redesign, insurance, wages, stock, ongoing filter/residue costs and product certification. Those costs could break the £20,000 ceiling. Use an already serviced, appropriately authorised site; obtain quotes before committing.

POWER AND MATERIALS

Solar can help; HHO uses power

Design calculations below are estimates. Use the exact supplied equipment ratings and a measured acceptance trial before assigning daily production capacity.

HHO calculation: if 1,000 litres/hour means combined dry H₂ + O₂ at normal conditions, only two-thirds is hydrogen. $0.667 \text{ Nm}^3/\text{hour} \times 3.0 \text{ kWh/Nm}^3 = \text{about } 2.0 \text{ kW of fuel heat}$, before furnace losses. The listing claims about 3 kW electrical input. A very hot flame does not establish useful batch size. [5,17]

For this budget I recommend direct electric melting first: electricity heats the furnace without the electrolysis-and-burner conversion chain. Treat HHO as a separately justified small-batch tool. Use a complete engineered system with appropriate flashback protection; no storage of premixed hydrogen and oxygen. [18]

Supply / load	Design basis
Solar supply	2.58 kWp of panels, 5 kW inverter and 5.12 kWh LiFePO4 battery. These three ratings mean different things. [8]
Working load limit	Target at most 3.5 kW at once, subject to confirmed battery, inverter and motor-start capability. Run furnace, HHO or shredder separately; leave power for extraction.
Battery-only illustration	$5.12 \text{ kWh} \times 80\% \text{ usable fraction} \times 90\% \text{ conversion} = 3.69 \text{ kWh AC}$. A 3.3 kW load lasts roughly 1.1 hours; actual runtime varies.
Solar-day illustration	At 2 equivalent peak-sun hours and 80% net system yield: $2.58 \times 2 \times 0.8 = 4.13 \text{ kWh/day}$. This is a scenario, not a UK winter forecast. Existing grid backup or reduced operating hours is needed.

A deliberately narrow feedstock list

Feed	Route / output / residual
Known clean HDPE or PP	Keep grades separate; prepared flake or granules to injector. Trial a small useful part. Segregate clean sprues for controlled re-use; do not repeatedly overheat degraded material.
Known clean aluminium alloy	Dry, supplier-approved charge into a suitable crucible furnace. Test castings or stock for specified buyers. Collect dross separately; melting does not remove alloy contamination.
Steel, copper and other stock	Sort, repair, cut and reuse where possible; specialist reprocessor for material outside the accepted line. No refining performance is assumed.

The starter has no wet-wash or solvent line. Reject dirty, unknown, PVC, composite, battery and electronic waste feed. Filters, dross and contaminated residues still need a documented recovery or disposal route. Capture is not proof that a residue has become harmless.

ALIBABA BUILDING SHORTLIST

Buy a shell to fit out

Prices displayed for one unit or the smallest applicable tier. Shipping, taxes and selected modifications are not verified. A residential shell is not evidence of foundry suitability.

1 / SG CBOX FC-01 folding shell

US\$1,688 for 1-9 units | [Open exact Alibaba listing](#) [2]

Nominal 20ft model; the page lists rock-wool or EPS panels and an optional MgO floor. This is the most useful quote candidate. Require the mineral-wool configuration, documented floor point loads and a final drawing: internal/external dimensions conflict within the listing.

2 / Xinyu Integrated Housing folding shell

US\$1,399 for 1-9 units | [Open exact Alibaba listing](#) [3]

Cheaper 20ft candidate. The page mixes EPS attributes with a rock-wool description. Request an exact material schedule and packed dimensions; the small-parcel shipping fields are implausible for the whole building. Use only after resolving those conflicts.

3 / ALUDREAM expandable shell

US\$3,508 for 1-4 units | [Open exact Alibaba listing](#) [4]

An alternative for more opening space, but the listing combines residential and size variants. Confirm what the one-unit price actually buys. Its floor and insulation are not verified for machinery or hot work; it is not my budget base.

Specify with the shell order: no kitchen or bathroom; verified wall/roof assembly; sealed weatherproof floor with assessed machine supports; two usable escape routes where required by the final assessment; UK-compatible electrical design; anchoring and wind-load details; lifting points and deployment instructions. Do not rely on a general “workshop” keyword.

Compare locally before importing: CS Containers advertises used 20ft units from £1,550 + VAT, delivery extra. It needs its own fit-out and condition check, but the simpler local logistics may compete with a single imported folding unit. [View UK benchmark](#) [19]

Already built for recycling: [Precious Plastic container workspace](#) is a real constructed example. It is the strongest functional reference here; the Alibaba results are shell and equipment candidates, not an independently verified complete recycling plant. [1]

EQUIPMENT SOURCING SHORTLIST

Ask for these exact variants

Seller statements are unverified specifications. A price is useful only when matched to a complete bill of materials, voltage, duty rating, protection and delivery terms.

HHO / Okay Energy

US\$4,000 for 1-9 sets | [Product page](#) [5]

Listing claims 1,000 L/h gas and 3,000 W, but other power fields contradict this. Advertised for welding/brazing. Require a witnessed aluminium melting trial and a complete compatible burner/furnace package; do not buy it as a proven foundry line.

Plastic injector / Shenzhen Borx

US\$480 for 1-2 sets | [Product page](#) [6]

20 cm³ maximum shot; small parts only. Confirm 230 V/50 Hz, heater wattage, clamp force, guarding, mould inclusion and ability to feed the intended clean flake. A tiny injector does not make house blocks.

Solar / Foshan ESG

US\$3,800 for 1-4 sets | [Product page](#) [7]

Advertises 5 kW inverter, configurable 3-5 kW panels and lithium battery variants. Require a fixed LiFePO₄ specification and packing list. Unpriced freight and configuration differences make this a comparison quote, not the base kit.

Solar / UK Photonic Universe KIT2-5K

£2,571.76 inc VAT displayed | [Product page](#) [8]

6 × 430 W panels, 5 kW inverter, 5.12 kWh LiFePO₄. Price and advertised delivery must be reconfirmed; the page has a separate pallet-delivery caveat. Mounting and electrician are budgeted separately.

Shredder / Kwell WT200

Quote required; £2,000 budget allowance | [Product page](#) [9]

Manufacturer offers small 1.5/2.2 kW variants. Request a 230 V version, guarded hopper, interlock, reversing control and inverter-start compatibility. This is a manufacturer lead, not a verified priced Alibaba offer.

Electric furnace / UK benchmark

£705.95 + VAT (£847.14 at 20%) | [Product page](#) [10]

HS Walsh TF58B is a gold-furnace price benchmark, not an approved aluminium selection. “3 kg” is not 3 kg of aluminium. Supplier must confirm alloy/crucible compatibility, working volume and power before selection.

Extraction is intentionally a specialist design allowance, not a generic desktop filter purchase. Ask the contractor to demonstrate capture at each source and specify the discharge, filtration and maintenance regime for the actual material/process. [11,12]

BUILD AND ACCEPTANCE BRIEF

Make the specification enforceable

This page can be used to obtain matching quotes from a shell supplier, machinery supplier, electrician, metal-bay fabricator and LEV contractor. No enquiries have been sent.

1. Fix the site and accepted materials

Confirm the existing base, drainage, access for unloading, neighbour/exhaust constraints and planning position. Agree the applicable waste permissions with the regulator. In England, U9 specifically excludes heat treatment of plastics/rubber; it is not blanket permission for this moulding line. A recycled-material supplier must substantiate any claimed non-waste product status. [14]

2. Request a single-unit delivered quote

Ask for exact model/BOM, 230 V 50 Hz single-phase requirements, continuous current and start-up surge, English instructions, applicable conformity documents, warranty/parts support, packed dimensions/mass and a delivered UK price with customs/VAT/unloading separately identified. [20]

3. Verify the shell and installation

Approve an actual drawing with working clearances, supports, access and extraction openings. Fabricate the dry metal bay, install PV on its own engineered support, and commission electrical protection and load sequencing. The layout on page 2 is functional, not a foundation or fire-engineering drawing.

4. Run a material-specific factory trial

Use representative known HDPE/PP and aluminium samples. For the injector, record shot mass, cycle time and acceptable parts. For a furnace/HHO package, record actual kg of aluminium per batch, time from cold, kWh consumed and metal yield. Reject “flame temperature” as a substitute for these results.

5. Commission the controls before production

Demonstrate extraction capture and adequate replacement air, guards/interlocks, emergency stopping, low-water/overtemperature protection where applicable, dry-charge procedures and safe handling. HHO gas-side safety must be specified by its supplier/integrator for the complete system. [11-13,18]

6. Measure the business before expanding

Log feed kg, saleable kg, rejects, dross/filter waste, kWh, operator hours and £/part for trial batches. Obtain buyer acceptance. Contribution = sales minus feed, energy, consumables, residue handling and direct labour. Expansion only follows demonstrated margin and sufficient local supply.

Purchase decision: if £20,000 is a hard all-in ceiling, do not order the complete HHO configuration from these estimates. Obtain fixed installation quotes and resolve permissions first. Use the reduced starter scope or existing suitable premises; retain extraction and commissioning.

SOURCES AND EVIDENCE

Open the primary sources

Sources checked on 10 October 2026. Prices are the displayed single-unit or relevant minimum-tier prices, not negotiated quotes. Hyperlinks open the underlying pages.

- [01] [Precious Plastic: built container workspace](#)
- [02] [Alibaba: SG CBOX FC-01 folding shell](#)
- [03] [Alibaba: Xinyu/Cbox 20ft folding shell](#)
- [04] [Alibaba: ALUDREAM expandable shell](#)
- [05] [Alibaba: Okay Energy 3000W oxyhydrogen unit](#)
- [06] [Alibaba: Shenzhen Borx mini injection machine](#)
- [07] [Alibaba: Foshan ESG solar kit](#)
- [08] [Eco Wizard: Photonic Universe KIT2-5K](#)
- [09] [Kwell: WT200 mini shredder](#)
- [10] [HS Walsh: TF58B electric furnace price benchmark](#)
- [11] [HSE: controlling plastics-processing fumes](#)
- [12] [HSE: FD2 melting and casting metals](#)
- [13] [HSE: molten-metal safety hazards](#)
- [14] [Environment Agency: U9 waste exemption, England](#)
- [15] [GOV.UK: tax and duty on imports](#)
- [16] [GOV.UK: standard VAT rate](#)
- [17] [Enapter: hydrogen energy content](#)
- [18] [WITT: HHO-specific flashback protection](#)
- [19] [CS Containers: used 20ft container benchmark](#)
- [20] [HSE: machinery conformity and supply](#)

Evidence labels: product pages establish advertised price/specification only. Calculations and budget allowances are this design's estimates. No supplier audit, performance test, conformity assessment or installed-price offer has been completed. All purchase candidates remain subject to the acceptance brief.