The Structural Necessity of Engineering Automation in C&I Solar Underwriting

The deployment of institutional capital into the United Kingdom's commercial and industrial (C&I) solar sector is structurally constrained not by capital liquidity, but by ~10.5 qualified human-hours of distributed engineering audit required per property[1]. Trident OS compresses this to ~45 seconds across three operational pillars, replacing manual underwriting with a deterministic, data-first workflow. While utility-scale solar benefits from standardised financing, the C&I market remains burdened by a manual qualification process that creates a "transaction-cost wall" — preventing the efficient aggregation of the rooftop assets required to meet the UK's 70 GW solar-by-2035 target.

Operating on-demand against the authoritative UK property graph — integrating OS NGD, EPC, and Companies House registries — Trident OS transforms site qualification into a bankable input to PPA underwriting, allowing allocators to deploy capital with the precision of utility-scale infrastructure. By accumulating a proprietary engineering dataset per audit, the platform provides the digital infrastructure required to align UK rooftop capacity with institutional risk mandates, prioritising engineering correctness over speculative volume.

~45s	~10.5h	57%	N=7
MACHINE TIME (P1+P2+P3)	MANUAL BASELINE[1] (P1+P2+P3)	STRUCTURAL PRE-SCREEN CATCH RATE (1.50 FLOOR)	VALIDATED STRUCTURAL PILOTS

CAPABILITY MAP · PIPELINE VERIFICATION

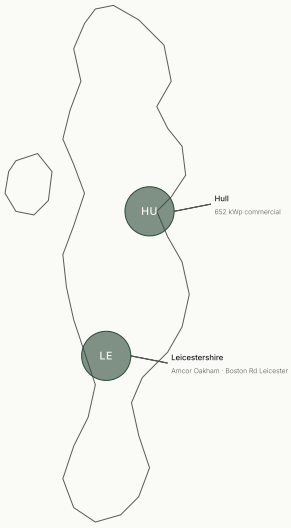
Postcode-Level Engineering Pilots

Verification of the engineering pipeline against a structural pilot cohort (N=7) audited under EN 1991-1-4 (wind) and EN 1991-1-3 (snow) against a 1.50 capacity floor. The 57% catch rate is the commercial advantage: every site in an underwritten portfolio is screened against engineering reality before capital is committed, eliminating the post-deployment structural surprises that erode portfolio IRR. Cohort expansion to N>50 sites with installer-validated ground-truth is Gate 1 of the commercial-readiness roadmap.

HU Hull — 652 kWp commercial; C&I inverters, parallel MPPT

LE Amcor Oakham — flat industrial, tandem obstacle detection

LE Boston Road, Leicester — cinematic-reveal demo site



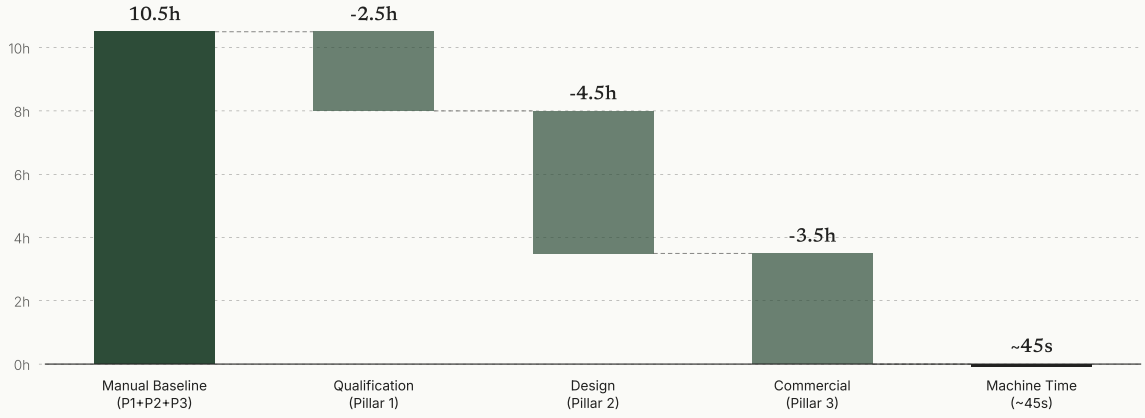
Registry footprint: OS NGD · EPC · Companies House

Pipeline operates on-demand; no pre-indexed property cache.

[1] Trident OS internal estimate. Pillar 1 (Qualification) 2.5h + Pillar 2 (Design) 4.5h + Pillar 3 (Commercial) 3.5h = 10.5h cumulative per property (C&I commercial typology, ROADMAP-validated). Pillar 4 (DNO/Compliance) adds a further manual saving and is on the roadmap as Gate 4. Source: *reference/ROADMAP.md*.

ORIGINATION CYCLE-TIME RECONCILIATION

Underwriting Latency Waterfall — Manual Baseline to Machine Time



ROADMAP · PATH TO COMMERCIAL-READY STATUS

Active Workstream	Cost Build-Up (North Star §6 calibration)
Gate 1	Structural cohort expansion to N>50 with installer-validated ground-truth
Gate 2	Pillar 2 → Pillar 3 Bill of Materials (BOM) bridge
Gate 3	Pillar 0 automated lead generation activation
Gate 4	Institutional-voice market promotion

TECHNICAL BANKABILITY CHECKLIST

Standard-Aligned Engineering Audit Coverage

✓ Structural	EN 1991-1-4 (Wind) · EN 1991-1-3 (Snow) · 1.50 capacity floor
✓ Yield	PVGIS 8,760-hr simulation · P50 / P90 / P99 probabilistic output
✓ Electrical	4-gate string check · G98/G99 compliance · <1% cable drop
✓ Obstacles	DSM 0.1 m/px spatial audit + Vision-tandem obstacle masking
✓ BOM	Pydantic-validated SKU catalogue matching installer-ready BOMs
✓ Data Provenance	OS NGD subject-clip · EPC + Companies House precision entity match
✓ Pipeline Validation	End-to-end processing of residential test case (Ashtree Garth, LS24)