QuantumSpectra — Investor & municipality one-pager

2 pages · deterministic · live KPIs · 2026-11-24 12:51 UTC · anchor 0x3615025815ec826aa5…

We fuse hyperspectral imaging, satellite feeds, quantum-enhanced AI, structural simulation and custodial blockchain finance into one platform for sustainable agriculture, earthquake-safe urban renewal and auditable public services in Türkiye. Every measurement, contract, pickup and payment is SHA-256 anchored, so citizens, municipalities and funders look at the same evidence.

Problem	Solution
• Fragmented rural production, unreliable provenance and unfair prices — shoppers cannot see field quality, farmers do not earn the premium. • Millions of earthquake-vulnerable homes; renewal finance is slow, opaque and dependent on outside capital. • Rural health, mining and urban-planning decisions rest on data nobody can measure or audit.	• Soil → produce → product quality passports, fair price bands and a collective treasury; CSA boxes, QR pickups and shopper ratings. • URAR-style appraisal, transparent ML risk, renewal bonds, staged draws and monthly coupons — all anchored. • Rural health triage, province mining reports, 9D tender feasibility and a per-city Justice Index with citizen attestations.

Three integrated pillars · one evidence ledger

Urban Digital Twin & Disaster Scenarios

A 3D simulation platform for sustainable urban planning: hyperspectral material health on every member, OpenSees non-linear analysis (time-history + modal pushover), a TBDY 2018 strength-margin map, retrofit what-if scenarios and council-ready, hash-anchored reports.

• Real Turkish strong-motion records (Düzce, Kocaeli…) scaled to the TBDY target spectrum
• FRP · steel jacket · shear wall · base isolation vs demolish-and-rebuild feasibility
• Crack-growth alerts, weekly twin summary, PDF archive with council receipt stamps

7 strong-motion records · **0** timeline photos · **0** crack-growth alerts · **0** margin reports sent
demo live · simulated data

Sustainable Mining — High-Value Rare & Strategic Elements

Hyperspectral SWIR mineral mapping, kriged resource inventory, cut-off and NPV economics, tailings / acid-mine-drainage risk and a rehabilitation score; flowsheets that sell processed product — not raw ore — for rare earths, lithium, antimony, tungsten, graphite and boron.

• Supply-risk × economic-importance matrix aligned with the EU Critical Raw Materials list
• Price-feed-linked NPV; planners alerted automatically when a project flips sign
• Province reports, settlement-buffer zoning verdicts adopted via Justice attestations

16 research sites · **0** engineered studies · **11** strategic commodities modelled · **1** province reports live · reference prices

Hyperspectral Big-Data Diagnostic Model — Collected the İMECE Way

Cooperatives, field teams and citizens feed one cube library: nutrient passports, pesticide and chemical-waste detection, SWIR health indices, materials durability. Three trust tiers — simulated model → 7-in-1 probe calibration → laboratory verification — keep every data point comparable.

• Variable-rate fertiliser prescriptions (GeoJSON + ISO-XML) with rates learned from strip trials
• Farm-to-fork traceability via QR passports, shopper ratings and a hash chain
• Per-field soil trends against the platform median — for zero-carbon targets and accountability

6 nutrient-panel scans · **0** lab-verified · **0** probe-calibrated · 0 sheets · **6** field captures · 6 coops
live · simulated spectra + field probes

Fourteen domains · one backbone

Identity wallet · ledger	**Hyperspectral registry**	**İmece Commons market**	**Farming pilot** CSA	**Quality QR passports**	**God's Eye Justice Index**	**Renewal Finance bonds**
Social housing & donations	**9D BIM tenders**	**Rural health diagnostics**	**Sustainable mining**	**Micronutrients** value chains	**AI** quantum · integrations	**Disaster governance** 3D terrain

Live KPIs — read from the platform database · 2026-11-24 12:51 UTC

53 hyperspectral / satellite scans	**56** safety & carbon certificates	**727 kg** farm-to-fork traded · 10 orders	**6** cooperatives on the market
0 CSA households · treasury 0 TRY	**117.2 M TRY** renewal bond capital · 19 cases	**36** earthquake-safe units renewed · 36 high-risk retired	**19** rural health screenings · loop closure 0.0 %
16 mining research sites · 0 surveys	**0** quality QR batches	**0** shopper ratings · avg —/5	**6.6 M TRY** social-housing donations · 7 sites · 41 citizen claims

Spectral, health and mining values are SIMULATED research-grade outputs until live sensors stream; wallets and bonds run on simulated TRY; blockchain anchors are SHA-256 hashes stored in MongoDB.

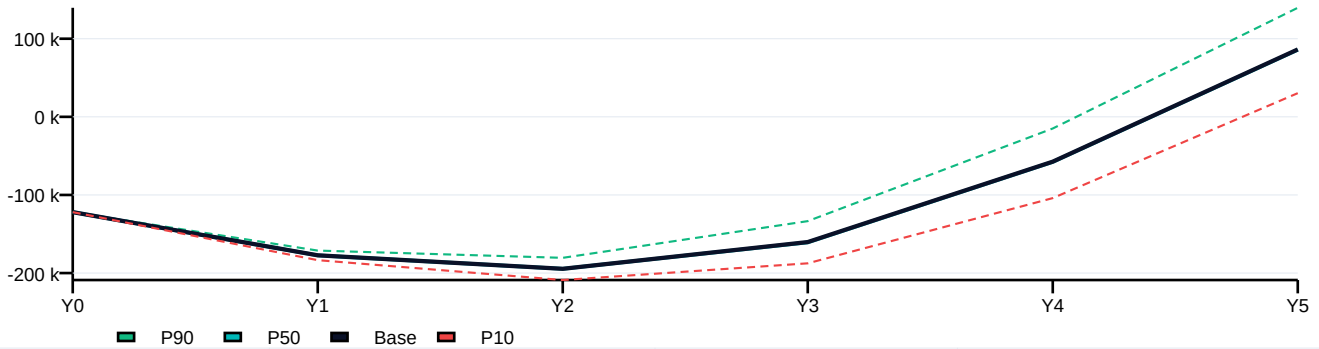
Pilot economics — Kastamonu — Taşköprü collective farming pilot · model v1

Land	120.0 ha · 45 plots → 12 blocks	Crop split	Siyez 50 % · onion 30 % · salep 20 %
CSA	80 households · 24 weeks · share 8 k TRY	Capex	46.5 M TRY (840,669 EUR) · grant 60 % · equity 18.6 M TRY
Y1 EBITDA	10.1 M TRY	Steady EBITDA	31.9 M TRY · ROI 68.5 %
Payback	2.8 yrs (equity 1.8)	5-yr NPV	16.4 M TRY @ 20 %
Solar pump	60 kWp · required 139 kW · coverage 43.1 %	Labour	4,092 days · 18.6 FTE · 3.7 M TRY

Feasibility risk band — İmece pilot (hyperspectral + AI, €250 k)

The base case of the İmece Kollektif Üretim A.Ş. feasibility study is turned into a probability band by sampling its top-5 sensitivity drivers together (N = 2,000, triangular distribution, Gaussian copula). The band pictures assumption uncertainty around the base line — it is not a forecast.

Cumulative cash flow (€ k) — Y0 = CAPEX



NPV incl. TV P10 · P50 · P90	€662,269 · €822,713 · €1,013,207	P(NPV > 0)	100.0 %
Payback P50 (months)	52.7 · ≤ 60: 97.9 %	Peak need P90 / envelope	€208,920 / €250,000 (100.0 %)

Drivers: Discount rate (± 2 pp) · Structural inspection price € (± 20 %) · Price growth (± 2 pp) · Structural inspections (all years) (± 20 %) · Team size FTE (all years) (± 20 %) · Open the feasibility study: https://spaceseax.tech/feasibility

Funding alignment — Türkiye · EU · World Bank

Body	Programme	Pillars	What we request
Türkiye	TÜBİTAK 1501 / 1507 · KOSGEB Ar-Ge	spectral · twin	R&D co-finance for the hyperspectral cube library and SWIR InGaAs field sensors
Türkiye	Ministry of Environment, Urbanisation & Climate Change · Law 6306	twin	Acceptance of twin + OpenSees reports in risky-building determination; renewal-bond pilot
Türkiye	Ministry of Agriculture & Forestry · TAGEM / provincial directorates	spectral	Extension programme and scan subsidies for probe- and lab-calibrated variable-rate fertilisation
EU	Horizon Europe · Cluster 4 / 5 / 6	twin · mining · spectral	Digital-twin resilience, critical-raw-materials and sustainable-agriculture consortia
EU	Critical Raw Materials Act · Strategic Projects · EIT RawMaterials	mining	Strategic-project application for rare-earth / lithium / antimony processed-product flowsheets
EU	IPA III · EU Mission: Adaptation to Climate Change	twin · spectral	Municipal twin adoption and climate-smart farming pilots
World Bank	Türkiye Earthquake Recovery & Reconstruction Project (TERRP)	twin	Twin + seismic-lab reports for reconstruction prioritisation; council-stamped evidence archive
World Bank	Türkiye Climate-Smart & Competitive Agricultural Growth Project (TUCSAP)	spectral	Measurable fertiliser and CO_2e reductions reported from probe-calibrated prescriptions
World Bank	IFC / MIGA	mining · twin	Private co-finance and guarantees for renewal bonds and processed-product mining

Revenue model

Market levy	0–10 % (default 3 %) on every İmece order → city treasury: floor-price support, scan subsidies, imece work-days	live · simulated TRY
CSA shares	Season share × households; three instalments relative to join date; institutional 5× shares	live
Renewal bonds	Bond units from investor wallets; monthly coupon runs; secondary market; origination & servicing fee	live · simulated
Quality & provenance services	QR passports, stall labels/posters, lab calibration, certificates — for coops and municipalities	live
Municipal data & reports	Justice Index, province mining report, 9D tender feasibility, health equity dashboards	live
Carbon credits	Zero-carbon credits from clean farms and renewed buildings	simulated ledger

What we ask

Municipalities **Funders**

- Pilot land allocation and a market-hall stall for the Kastamonu — Taşköprü CSA hubs
- Adopt the Justice Index and Safety Registry as open civic data
- Co-fund scan subsidies through the treasury levy
- Appoint planners (public-authority role) for tenders, social housing and mining verdicts
- Anchor investor for the pilot capex equity: 18.6 M TRY (of 46.5 M TRY, 60 % grant)
- Seed renewal-bond capital for the first high-risk blocks
- SWIR InGaAs field sensors to replace the simulated feeds
- 24-month runway for the Başkent University validation studies

Roadmap

Now	14 domains live (simulated spectral models), anchored ledger, Claude assistants, 5 platform crons, EN/TR, Expo field app
6 months	Kastamonu — Taşköprü season 1 (80 CSA households); first field SWIR cubes replace simulated scans; Twilio SMS & metals.dev once keys arrive
12 months	IBM Quantum hardware validation (QAOA/QSVM) with credentials; public testnet anchors; mobile app in stores
24 months	Başkent University validation publications; second province; renewal bonds with real underwriting partners

Contact & provenance

Every number in this summary is read live from the platform database; the text is deterministic (no LLM) and sealed with a content hash + SHA-256 anchor. Evidence: the anchored ledger, a PDF archive with verification links, council receipt stamps, laboratory and probe calibration records.

partners@quantumspectra.io · Academic partner: Başkent University · https://spaceseax.tech/architecture · https://spaceseax.tech/pitch

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