

TODAY EVERY BRAKE LIGHT
IS A WARNING OF POLLUTION,

TOGETHER WE CAN MAKE EVERY ONE
A SIGNAL OF PROGRESS.

FRICITIONLESS BRAKE TECHNOLOGY



Executive Summary



Polestar IPS FZCO is pioneering FBS — a patented hydraulic braking technology that eliminates friction-based components (discs, pads, calipers), delivering zero particulate emissions, energy recovery (for A/C, refrigeration, or electricity), and passive ABS without electronics.

Zero carcinogenic brake dust, 5–10% fuel/energy savings via Kinetic Energy Recovery (KER), passive ABS.
Patents fully granted in Europe, Turkey, USA, and China.

Seeking Investment over 3–5 years to reach TRL 9, establish Dubai R&D center, and commercialize.

Join the frictionless revolution for cleaner, safer, more efficient mobility.



Brake Dust. The Silent Polluter Health Crisis.

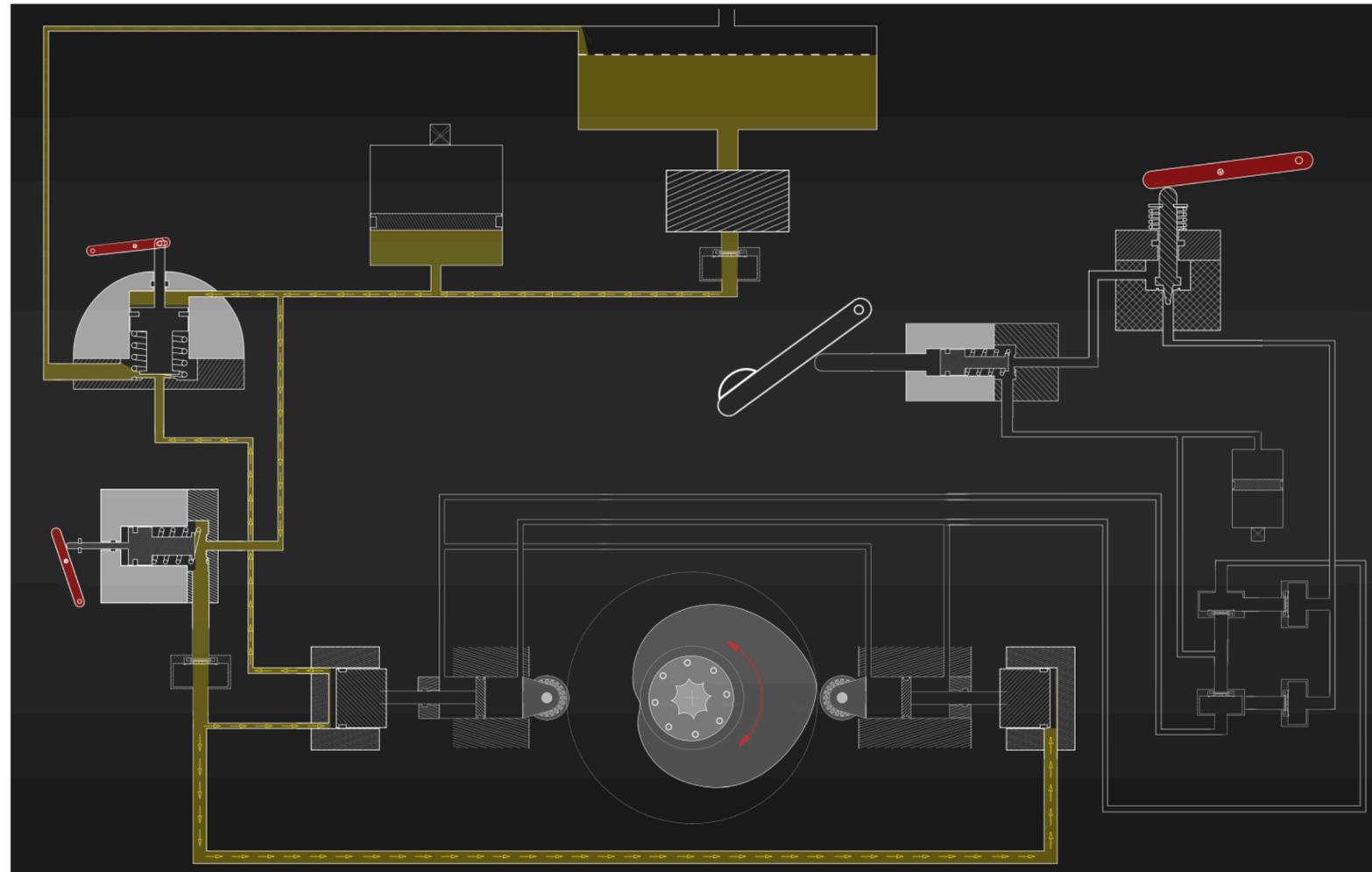
Brake wear contributes 20–30%+ of non-exhaust PM_{2.5} from road transport; in urban areas, up to 55–60% of traffic-related particulates (EEA, UK DEFRA, EIT Urban Mobility 2025).

Contains carcinogens (copper, antimony, heavy metals); linked to lung cancer, asthma, cardiovascular disease (WHO: millions of premature deaths from air pollution).

Non-exhaust emissions now dominate in many cities (e.g., 60% in UK); brake dust often more toxic than diesel exhaust in lung cell studies (Southampton University 2025).

Wasted heat: Up to 80% of braking energy lost as heat (SAE), equivalent to ~0.28 kWh per stop in a mid-size car.

FBS: Revolutionary Hydraulic Braking Without Friction



How It Works (simplified):

Double-acting hydraulic cylinders engage a cam on the transmission output shaft.

Handbrake valve: ON locks system; OFF routes to master cylinder.

Brake pedal restricts oil flow → hydraulic force retards shaft proportionally.

Variants: Pure hydraulic | Passive ABS (no computers) | With KER for energy recapture.



Inventor – Charan Nelms (Jim)



Proven Track Record of Automotive Innovation

Bio Highlights:

30+ years as independent inventor/designer.

Q-Damper: Gold standard damping; adopted by all F1 teams.

The Quadrant adjustable shocks; crank-less engines; frictionless clutches; zero-displacement absorbers; consumer inventions.

Credibility: £2M already invested in FBS patents; FBS builds on legacy of practical, high-impact tech.

KEY ADVANTAGES



Advantage	Benefit	Impact
Zero Particulates	No brake dust	Cleaner air; reduces cancer risks; meets EU CAFE/Euro 7
Energy Recycling (KER)	Recaptures heat for A/C, refrigeration, electricity	5–10% fuel savings; lowers CO ₂ ; offsets 20–30% cooling needs
Integrated Passive ABS	No electronics; inherent lock prevention	Reliable, cost-effective
Weather-Independent	No fade in rain/snow	Enhanced safety
Lower Servicing/Costs	Fewer parts; no pad/disc replacements	30–50% cheaper lifecycle
Reduced Unsprung Mass	Lighter components	2–5% better handling/efficiency
Aviation Safety	Zero brake fire risk	No friction materials

- **Market Fit:** Applicable to ICE, EV, hybrid; targets £60B+ automotive brake market (global ~\$46–77B in 2025 forecasts, growing to \$74B+ by 2030s).

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MASSIVE & TIMELY DISRUPTION



£60B+ global brake market (automotive); plus mass transit/aviation.

Rising regulations: EU 2035 ICE ban; Euro 7 (2026+) limits brake PM emissions (first-ever non-exhaust rules).

Consumer shift: 70% favour eco-friendly vehicles.

PolestarFBS fills EV regen gap (applies universally) while eliminating remaining friction braking issues



CLEAR ROADMAP TO COMMERCIALISATION

TRL in engineering stands for Technology Readiness Level, a system for assessing the maturity of a technology on a scale of 1 to 9. It tracks a technology's journey from basic research (TRL 1) to being flight-proven or commercially available (TRL 9) and is widely used in complex projects like aerospace and automotive engineering for project management, risk assessment, and funding applications.

TRL 1–2: Achieved (£2M sunk).

TRL 3–9: £16.5M new funding over ~4 years (with overlaps).

Milestones:

Year 1 — Patents finalised/prototypes;

Year 2 — Rig testing/TRL 6–8;

Years 3–5 — Field trials, certifications, licensing.

**PLEASE SEE POLESTAR WEBSITE
FOR FULL DESCRIPTION OF ALL STAGES TO TRL9**



Funding & Use of Funds



Ask: £16,500,000 over 3–5 years.

Allocation: Advance to TRL 9; Dubai Free Zone R&D centre (prototyping/testing/certification); sales/marketing (OEM partnerships).

Total Project Value: £18.5M (including £2M sunk).



Investment Opportunity & Returns

Attractive Upside in Cleantech Projected (Conservative):

Acquisition/licensing → 5–10x ROI in 5–7 years (benchmarks: 20–50x dev cost).

Revenue: 3.5% royalties/unit; JVs; full-system sales.

Upside: £500M+ annual royalties by 2035 on global adoption.

Investor Fit:

Strategic (auto suppliers, brake giants, refrigeration, cleantech VCs); expertise in engineering/marketing/R&D.



Let's Discuss

Contact:

Charan "Jim" Nelms

Mob: +971 504 263 134

Email: jimnelms@polestarips.com

Polestar IPS FZCO

IFZA Business Park,

Dubai Silicon Oasis, UAE.

