



The Economics of Imaging — I

Leasing Advantages vs. Purchasing Benefits of Radiology Equipment

A CEO-Level Strategy Monograph for Indian and International Hospitals

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Date of Submission: 03-05-2026

Date of Acceptance: 13-05-2026

Abstract

तेन त्यक्तेन भुञ्जीथाः — "*enjoy by renunciation.*" The opening verse of the Īśa Upaniṣad anticipates by three millennia the modern doctrine of the circular economy: the user prospers not by hoarding the asset but by stewarding its flow of value. For the modern hospital, where a single magnetic resonance imaging (MRI) suite can absorb the equivalent of three years of a department's discretionary capital, that ancient counsel is now boardroom mathematics. This monograph examines the strategic economics of acquiring high-cost radiology equipment — Computed Tomography (CT), MRI, Cardiac Catheterization Laboratories (Cath Labs), Positron Emission Tomography-CT (PET-CT), Digital Radiography (DR), and Interventional Angiography Suites — through the dual lens of ownership and leasing. Drawing on guidance from the World Health Organization (WHO), the American Hospital Association (AHA), the American Society for Healthcare Engineering (ASHE), the American College of Clinical Engineering (ACCE), AAMI, the Health Facility Guidelines (iHFG/TAHPI and Indian HFG), and Johns Hopkins teaching practice, the paper synthesises a framework for four hospital archetypes — autonomous, fully-funded, public, and private — anchored in the Indian context but engineered for international portability. It evaluates Pay-per-Use, Operating Lease, Capital (Finance) Lease, and Managed Equipment Service (MES) constructs against the priorities of long-term asset building, technology modernisation, and financial predictability. It imports the aviation industry's Power-by-the-Hour (PBH) outcome-based contracting model — pioneered by Rolls-Royce TotalCare — as a directly transferable analogue for imaging "Pay-per-Scan" arrangements. The monograph concludes that no single instrument dominates the matrix; the correct answer is a portfolio strategy in which the Chief Executive treats

radiology capital as a flow of clinical productivity, not a stock of metal — a posture summarised in the Bhagavad Gītā's discipline of *yajña* (reciprocal exchange) and the principle of *aparigraha* (non-attachment to assets), recast as a 21st-century governance choice between balance-sheet weight and operational agility.

Keywords: *medical imaging economics; equipment leasing; capital procurement; managed equipment services; total cost of ownership; pay-per-scan; turnkey design-build; circular economy in healthcare; Ind AS 116; IFRS 16.*

I. Introduction: The Capital Gravity of Imaging

Radiology has, in two decades, migrated from being a diagnostic adjunct to being the single largest non-clinical capital line item in most tertiary hospitals. In a hospital environment, radiology capital needs are typically very large compared to other departments, alongside operating rooms, endoscopy, and information technology (Yousem & Beauchamp, 2007). A 3.0T MRI commands ₹14–22 crore (USD 1.7–2.6 million) when installation, magnetic shielding, helium reserves, and Faraday cage construction are aggregated; a bi-plane Cath Lab ₹8–14 crore; a 128-slice CT ₹4–9 crore. The Total Cost of Ownership (TCO) over a ten-year horizon — service, parts, contrast, energy, software upgrades, and decommissioning — typically equals or exceeds the acquisition price (GE HealthCare, 2024). For the Chief Executive, the question is therefore never simply "*can we afford this?*" but "*can we operate, maintain, refresh, and ultimately retire this without creating new clinical and financial bottlenecks?*" (Medical Group Management Association [MGMA], 2026).

This paper is written for that decision-maker. It is anchored in the Indian operating context



— Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) procurements, AIIMS public-private partnership models, the post-September 2025 GST 2.0 regime, and Section 32 depreciation — but its architecture is portable to any jurisdiction operating under IFRS-equivalent lease accounting standards. The reader will find seven analytical pillars: strategic priorities; lease constructs; site-preparation strategies; maintenance philosophy; payment architecture; project lifecycle from initiation to decommissioning; and Return on Investment (ROI) methods adapted for high-cost imaging. A concluding framework maps these pillars onto four hospital archetypes — autonomous, fully-funded, public, and private — so that the CEO can locate the institution and read the appropriate strategy directly off the matrix.

II. The Three CEO Priorities and Their Tensions

Before any lease-versus-buy spreadsheet is opened, the executive must declare the institution's primary capital priority. The three priorities below are not mutually exclusive, but they compete for the same rupee or dollar, and the choice silently determines which acquisition instrument is correct.

2.1 Long-Term Asset Building

This priority treats imaging equipment as productive infrastructure that should accrete to the institution's balance sheet — comparable to land, buildings, or operating rooms. It is dominant in legacy public hospitals, religious-trust hospitals, autonomous teaching institutions (AIIMS, PGIMER, CMC Vellore), and family-owned private chains

2.4 The Priority-Instrument Map

The matrix below condenses two decades of practitioner observation into a CEO-readable rule of thumb.

Dominant Priority	Best-Fit Instrument	Trade-Off Accepted
Long-term asset building	Outright purchase / capital (finance) lease with bargain purchase option	Obsolescence and refresh-funding risk
Technology modernisation	Operating lease (3–5 yr) or Pay-per-Use / MES	Higher cumulative cost; no terminal asset
Financial predictability	Operating lease bundled with full-service AMC; MES	Loss of vendor-switching flexibility
Mixed (most tertiary hospitals)	Portfolio: own mature modalities, lease frontier modalities	Higher procurement-team complexity

where succession value matters. Ownership delivers full residual control over service vendors, replacement timing, and modality utilisation, and — once the loan is amortised — the equipment continues to generate revenue at near-zero capital cost (National Funding, 2020).

2.2 Technology Modernisation

Imaging technology obsolesces faster than any other hospital capital category. MRI gradient performance, CT detector rows, AI reconstruction pipelines, and PET-CT digital silicon photomultiplier (SiPM) detectors evolve on three- to five-year cycles, while plain-film radiography may remain serviceable for twelve to fifteen years (Yousem & Beauchamp, 2007). A hospital that prioritises modernisation accepts that the depreciation tail of an owned MRI is an *obsolescence liability* rather than an asset. Leasing is structurally aligned with this priority because lease termini coincide with technology-refresh windows (Crestmont Capital, 2026).

2.3 Financial Predictability

CFOs and bond-rating committees prize the ability to forecast cash outflows and EBITDA margins. Ownership produces lumpy capital expenditure and unpredictable major-repair shocks; pre-IFRS 16 operating leases were favoured for their off-balance-sheet predictability. Under Ind AS 116 and IFRS 16, that smoothing benefit on the balance sheet has narrowed — most leases now sit on the books as a Right-of-Use (ROU) asset and a corresponding lease liability — but the cash-flow predictability of fixed monthly instalments remains a real and bankable benefit (Nomos One, 2024); Taxbizmantra, 2025).



III. Anatomy of the Leasing Models

Four contractual archetypes dominate the imaging-equipment market. Each carries a distinct risk-transfer profile, accounting consequence, and operational commitment.

3.1 Capital (Finance) Lease

A capital lease functions much like a traditional purchase, in that it allows the borrower to own the equipment at the end of the lease term, typically through a bargain purchase option of one rupee or one US dollar (HFM Magazine, 2015). Under Ind AS 116, the transfer of substantially all risks and rewards of ownership obliges the lessee to capitalise the ROU asset and recognise a lease liability at the present value of payments (ClearTax, 2025). The interest component of each instalment is expensed; the asset is depreciated. This is, in economic substance, a debt-financed purchase wrapped in a lease document, and is often used when the hospital wishes to preserve trade credit lines or break a single large capital expenditure into a five-to-seven-year repayment schedule.

3.2 Operating Lease

In an operating lease, the lessor retains substantial residual risk and the equipment is returned at term end. With an operating lease, borrowers will typically pay only seventy to eighty percent of the total equipment cost over the lease term (HFM Magazine, 2015). Term lengths of 36–60 months align cleanly with imaging refresh cycles, and end-of-term options — return, renew, upgrade, or buy out at fair market value — make this the instrument of choice when technology evolution is the dominant risk (Associates in Medical Imaging, 2024). Under Ind AS 116, lessees still recognise a ROU asset, but lessors continue to classify the lease as operating and recognise income on a straight-line basis (Taxbizmantra, 2025).

3.3 Pay-per-Use (Pay-per-Scan / Pay-per-Click) Leasing

Pay-per-Use models bind the lease payment to actual clinical throughput. Part of the lease payment is based on the actual usage of the equipment, like pay-per-scan, with floor-volume protection for the lessor (Philips Capital, 2023). A fee-per-scan agreement requires the imaging facility to pay a fixed price per study; equipment maintenance is typically embedded in the contract; the facility never owns the asset (Resonant Healthcare Imaging Solutions, 2017). This is the most attractive instrument for greenfield diagnostic centres, district-hospital outreach programmes, and any facility uncertain about steady-

state volumes — risk migrates to the OEM, who holds the deepest data on utilisation patterns.

3.4 Managed Equipment Service (MES)

MES is the most comprehensive construct. The hospital outsources to a single specialist provider — frequently the OEM or a financier such as Philips Capital, Siemens Financial Services, GE HealthCare Financial, or independent specialists like CHG-MERIDIAN — the entire equipment portfolio across one or several departments, for an agreed monthly, quarterly, or annual fee, typically over ten to fifteen years (CHG-MERIDIAN, 2024). The provider is responsible for asset selection, financing, installation, maintenance, training, technology refresh, and decommissioning. The NHS Supply Chain in the United Kingdom has formalised this through a 72-month Managed Equipment and Clinical Service Solutions framework offering bespoke MES across imaging and theatre (NHS Supply Chain, 2025). AIIMS Bhopal's "7+3 year" PPP MRI tender at AIIMS Bhopal, in which the vendor supplies, installs, commissions, and operates a new 3T MRI on-site, is a representative Indian articulation of this model (AIIMS Bhopal, 2025).

IV. Site Preparation: Hospital-Build vs. Vendor Design-Build

No conversation about imaging economics is complete without site preparation. For an MRI, the magnet, Faraday cage, RF shielding, structural reinforcement, helium quench duct, chiller plant, and cryogen-handling provisions can equal 15–25% of the equipment price. For a Cath Lab, lead-lined walls, hybrid OR-grade laminar flow, and uninterruptible power supply may add 18–30%. The iHFG (TAHPI) and Indian HFG provide detailed normative guidance on structural support for ceiling-mounted equipment, distance from moving metallic objects (a 12-metre keep-out for MRI), radiation shielding, ventilation, and infection control (TAHPI, 2022); Indian HFG, 2014).

4.1 Strategy A — Hospital-Constructs / Vendor-Installs

In this classical pattern, the hospital engages its own architects and contractors to deliver a building shell that meets the OEM's pre-installation manual; the OEM then ships and commissions the imaging unit. The Clinical Imaging Board guidance for the United Kingdom's Institute of Physics and Engineering in Medicine (IPEM) and the World Bank Medical Diagnostic Imaging procurement guidance both treat this as the default workflow, with the procurement,



project initiation, design, construction, and commissioning sequenced as discrete phases (IPEM, 2023); World Bank, 2019).

Advantages

- The hospital owns the civil asset; useful where the suite forms part of a larger campus expansion.
- Flexibility to change OEM at the next refresh cycle without civil rework, provided the shell is built to a generic, modality-agnostic specification.
- Local contractor employment and easier integration with hospital fire, IT, and biomedical engineering systems.

Disadvantages

- Interface risk: a delayed civil completion delays equipment installation, attracting penalty and commissioning-engineer standby costs.
- Specification gaps — particularly RF shielding effectiveness, vibration isolation, and cryogen venting — can require rework after factory acceptance test (FAT) failures.
- Requires a strong in-house Project Management Office (PMO) with biomedical, civil, electrical, and radiation-physics literacy.

4.2 Strategy B — Vendor Design-Build / Turnkey

Under a turnkey contract, the OEM (or an integrated modular-building partner) delivers a single contractual package — design, civil works, shielding, equipment supply, installation, and commissioning. Modular vendors such as Williams Scotsman, in partnership with Toshiba and Siemens, have demonstrated factory-built imaging suites at hospitals such as Pioneers Memorial (California) and Kittitas Valley Community Hospital (Washington), with the imaging magnet, patient areas, and technician workspaces delivered as a single fiscally bundled lease (Healthcare Design Magazine, 2010). Equipment finance partners such as MXR Imaging explicitly include soft costs — architectural drawings, site planning, lead shielding — within the financing envelope (MXR Imaging, 2026).

Advantages

- Single-throat-to-choke accountability for performance, schedule, and warranty.
- Speed-to-occupancy: modular suites compress build time by 30–50% versus stick-built construction.

- Risk of civil-equipment interface defects is borne by the vendor.
- Capital efficiency: site preparation can be financed alongside the equipment in a single lease instrument.

Disadvantages

- Vendor lock-in at the next refresh cycle — the bespoke shell may not accept a competitor's footprint without rework.
- Lower local employment multiplier; in public-procurement contexts, may attract scrutiny under Make-in-India / preferential market access norms.
- Premium pricing — the convenience and risk transfer carry a 10–18% margin uplift.

4.3 The CEO Decision Rule

Adopt vendor design-build / turnkey when (a) speed to revenue dominates, (b) the institution lacks deep in-house engineering capability, or (c) site-prep risk is concentrated in highly specialised modalities (3T MRI, hybrid Cath Labs, PET-CT). Adopt hospital-build when (a) the suite is part of a master-plan civil project already underway, (b) competitive procurement and Make-in-India considerations require disaggregated tendering, or (c) the institution intends to swap OEMs at the next cycle.

V. Maintenance Strategy: Buy vs. Lease

Maintenance is the silent half of imaging economics. WHO's medical-equipment management framework defines maintenance strategy as a triad of inspection, preventive maintenance, and corrective maintenance, with performance and safety inspections protecting the patient and operator (WHO, 2011). ANSI/AAMI EQ89:2015, "Guidance for the use of medical equipment maintenance strategies and procedures," is the global reference standard for documenting alternative maintenance strategies; following EQ89 is the defensible answer when the regulator or accreditor asks why the institution deviated from manufacturer recommendations (AAMI, 2015).

5.1 The Maintenance-Cost Benchmark

Benchmark data from Radiology Business indicates that annual maintenance cost as a percentage of equipment acquisition cost runs at 10–14% under OEM full-service contracts, 8.3% under third-party contracts, 7.4% under insurance-style arrangements, and 4–6% under in-house Healthcare Technology Management (HTM) programmes — with the latter requiring credible biomedical engineering capacity (Sferrella, 2022). Hospitals that purchase equipment can in principle access any of



these strategies; hospitals that lease are typically restricted to the OEM full-service contract, since the lessor demands certainty over residual value.

5.2 Buy: Maintenance as a Strategic Capability

Effective clinical engineering programmes can materially reduce the high cost of acquiring and maintaining patient care equipment (ACCE, n.d.). The clinical engineer's playbook — second-sourcing parts, eliminating full-service contracts where appropriate, refurbishing equipment to extend useful life, adjusting preventive-maintenance frequencies — can drive the maintenance line from 12% to 5% of acquisition cost on equipment with stable, well-documented service histories (Humatem, n.d.). India's National Health Mission has institutionalised a variant of this through its Biomedical Equipment Maintenance Management Programme (BEMMP), in which one or more state-level service providers are paid based on uptime delivered (National Health Mission, n.d.).

5.3 Lease: Maintenance as Outcome

Leasing — particularly under MES or Pay-per-Scan — collapses maintenance, parts, software upgrades, training, and uptime guarantees into a single operating expense line. The leasing company technically owns the equipment, wishes to preserve residual value, and therefore underwrites maintenance as part of the agreement (National Funding, 2020). The hospital trades the upside of in-house cost-down for the certainty of contractually guaranteed uptime — typically 95–98% — with liquidated damages for breach. For institutions that lack mature HTM departments, this is often the rational trade.

VI. Payment Architecture: Capex Lump, Debt Schedule, or Operating Spend

6.1 Outright Purchase

Cash-funded acquisition is, paradoxically, both the cheapest and the rarest modality of payment for high-cost imaging in Indian hospitals. It works when the institution has surplus cash from corpus, philanthropy, or government grant, and where Section 32 of the Income-tax Act, 1961, permits a 40% accelerated depreciation rate on life-saving medical equipment — including MRI, vascular angiography systems, defibrillators, and SPECT gamma cameras — substantially compressing the post-tax payback (ClearTax, 2025). Under GST 2.0, effective 22 September 2025, imaging equipment classified under HSN 9022 (X-ray, MRI, CT, radiology) attracts a reduced 5% GST rate (down

from 12%), with full Input Tax Credit available to GST-registered hospitals using the equipment for taxable services (BUSY, 2025); Mindray India, 2025).

6.2 Debt-Financed Purchase

A term loan from a scheduled commercial bank, NBFC, or specialist healthcare financier converts the lump capex into a servicing schedule. The hospital owns the equipment from day one, claims depreciation, and amortises principal over 5–10 years. Interest is tax-deductible. This is the standard architecture for medium private chains in India and for AHA-member smaller hospitals in the United States, where federal vehicles such as the HUD Section 242 Mortgage Insurance programme can wrap construction and equipment under a single 25-year, 99% loan guarantee on a first-mortgage basis.

AHA-published guidance frames seven strategies for hospital capital access — understanding strategic financial position, evaluating the full range of options, considering local and state support, considering partnership, selecting the best financing strategy, involving the right professionals, and staying closely connected to the capital markets (American Hospital Association, 2010).

6.3 Lease Payment Streams

- Fixed monthly / quarterly / biannual instalments — the dominant operating-lease pattern; aligns with budget cycles.
- Step-up structures — lower initial payments rising in years three to five — useful when ramp-up volumes are forecast.
- Pay-per-Scan with floor — variable payment with a guaranteed minimum monthly draw to protect the lessor; below the floor volume, the facility pays a low fixed installment.
- Milestone-linked payments tied to FAT, Site Acceptance Test (SAT), and clinical-go-live — common in turnkey constructs and most strongly recommended by the World Bank procurement guidance.

6.4 Foreign-Exchange and Currency Risk

Imaging equipment is overwhelmingly imported into India in USD or EUR. The CEO must instruct the CFO to address (a) exchange-rate hedging of equipment payment milestones, (b) USD-denominated annual maintenance contract escalators, and (c) the rupee depreciation embedded in long-tenure MES contracts. Operating leases denominated in INR with the lessor retaining FX risk are a



powerful but commercially expensive way to transfer this risk.

VII. Project Lifecycle: From Initiation to Decommissioning

IPEM's Clinical Imaging Board has codified the imaging-project lifecycle into seven canonical steps: appointment of essential medical-physics personnel, pre-procurement, procurement, project initiation, project design, construction and installation, and commissioning and acceptance (IPEM, 2023). The accountability for each phase varies materially between the buy and lease pathways.

7.1 Initiation and Needs Assessment

Capital equipment planning in healthcare encompasses needs assessment, cost estimates, vendor analysis, cybersecurity risk, and regulatory considerations rather than product selection alone (TechNation / ECRI, 2024). ASHE's qualitative methodology proposes asset-age, estimated useful life, depreciation, maintenance expenditures, and reliability as the proven metrics for prioritisation (ASHE, 2007). Whether the chosen acquisition is buy or lease, this phase is identical and must be completed before any tender goes to market.

7.2 Installation and Handover to Operations

Under a purchase, the project closes with FAT, SAT, applicator and software acceptance, radiation-safety verification by the Atomic Energy Regulatory Board (AERB) — for X-ray, CT, Cath Lab, and PET-CT in India — handover to the biomedical engineering department, and warranty start. Under a lease or MES, the lessor retains operational responsibility and the "handover" is in effect a hot-swap into a service contract; the hospital's biomedical team becomes a witness-and-audit function rather than a custodian. In both pathways, the hospital must maintain a working asset register listing owner, location, serial number, warranty status, service vendor, preventive-maintenance schedule, last and next service dates, downtime history, software and patch status, recall status, and target replacement year (MGMA, 2026).

7.3 Mid-Life Refresh

Owned equipment can be refreshed through software upgrade contracts, gradient or tube replacement, and detector-module retrofit — often at 30–50% of new-equipment cost. Leased equipment is refreshed contractually at term end; some MES contracts include guaranteed mid-life technology refresh clauses, particularly for AI software stacks, where the OEM has commercial incentive to maintain installed-base modernity.

7.4 Decommissioning

Decommissioning is the most under-managed phase of the imaging lifecycle. Networked imaging equipment may store patient, user, and system data; the United States National Institute of Standards and Technology (NIST) defines media sanitisation as making access to target data infeasible and frames sanitisation decisions around the confidentiality of the information (MGMA, 2026). Owned equipment must be sanitised, removed from the asset register, and either resold (used-equipment broker), donated (typically to lower-tier facilities under philanthropic or CSR frameworks), or recycled as electronic waste under India's E-Waste (Management) Rules, 2022. Leased equipment is returned to the lessor under contractual de-installation provisions; the lessor inherits the residual-value and disposal risk.

7.5 The Circular-Economy Dimension

Modern hospital boards are now asked to align capital decisions with sustainability commitments. The healthcare system is responsible for an estimated 4.4% of global net emissions, with mishandled medical waste and obsolete equipment contributing materially to that footprint (Scientific Reports, 2025). Lease and MES constructs, by virtue of compelling the OEM to take back, refurbish, and redeploy equipment — Rolls-Royce reports up to 95% of a used aero engine can be recovered and recycled — natively encode circular-economy logic (Simple Flying, 2023). For the Indian hospital pursuing Business Responsibility and Sustainability Reporting (BRSR) compliance under SEBI norms, this is no longer cosmetic; it is a measurable scope-3 lever.

VIII. Return on Investment: Methods Adapted for High-Cost Imaging

CEO-grade decisions require not one ROI number but a panel of complementary measures, applied consistently across buy-and-lease scenarios.

8.1 Net Present Value (NPV)

NPV discounts the projected cash flows — revenue per study \times volume, less operating cost, maintenance, energy, contrast, staffing, and capital outflow — at the institution's weighted average cost of capital (WACC). For Indian private hospitals this is 11–13%; for autonomous and government institutions, the social discount rate (8–10%) is appropriate. Buy-versus-lease must be evaluated on identical NPV horizons, typically the longer of the equipment's useful life or the lease term.

8.2 Internal Rate of Return (IRR)

IRR identifies the discount rate at which NPV equals zero, allowing the CEO to compare the radiology project against the hurdle rate set by the board. A new MRI suite at a metropolitan tertiary hospital should



clear an IRR of 18–22% to justify capital allocation; below that, the institution is destroying value relative to alternative deployments.

8.3 Payback Period and Discounted Payback

Simple payback — undiscounted years to recover the capital outlay — remains the most board-readable metric. For a CT, payback typically clears in 18–30 months in a busy hospital; for a 3T MRI, 30–48 months. Discounted payback corrects for the time value of money and is the version that should appear in audit committee papers.

8.4 Total Cost of Ownership (TCO)

TCO captures every expense tied to the life of the system: initial acquisition, installation, training, ongoing service and maintenance, energy, consumables, software upgrades, and disposal (GE HealthCare, 2024). ECRI-linked benchmarks reveal that range of service-contract spend across hospitals can vary by a factor of five, with one-quarter of hospitals spending 50% above the average and 10% paying double — a powerful CEO datapoint when negotiating with OEMs (HealthManagement.org, 2017).

8.5 Equivalent Annual Cost (EAC)

When comparing assets with unequal useful lives — a 5-year operating lease versus an owned 10-year MRI — EAC normalises lifetime cost into an annualised figure, eliminating the apples-to-oranges distortion that plagues simple NPV comparisons. EAC is the single most under-used metric in Indian hospital procurement evaluation committees.

8.6 Cost-per-Study

Cost-per-Study divides the all-in annual cost (capital amortisation, maintenance, staffing, consumables, energy, overhead) by clinical volume. It is the operational metric that translates capital decisions into a number radiologists, finance, and payers all understand. A 3T MRI with a capital cost of ₹16 crore, ten-year amortisation, ₹2 crore annual maintenance, and 7,000 studies per year yields a ~₹4,300 capital-and-service cost-per-study; a Pay-per-Scan contract can be benchmarked directly against this number.

8.7 The CEO Dashboard

Run all six metrics on every option. If five out of six favour leasing and only TCO favours ownership, the institution's implicit hurdle rate has overweighted upfront cash and underweighted technological obsolescence — a common, expensive bias.

IX. Cross-Industry Analogue: Power-by-the-Hour for Imaging

Power-by-the-Hour (PBH) is a trademarked Rolls-Royce model first deployed in 1962 to support

the Viper engine on the de Havilland 125 business jet. It replaced separate engine purchase and maintenance contracts with a complete engine-and-accessory replacement service charged on a fixed cost-per-flying-hour basis (Performance Based Contracting Blog, 2020). The modern variant, TotalCare, transfers both time-on-wing and shop-visit cost risks back to Rolls-Royce; customers pay an agreed amount per engine flight hour, and the OEM manages predictive maintenance, work-scope creation, off-wing repair, and overhaul (Rolls-Royce, n.d.); Simple Flying, 2023).

9.1 Why It Translates to Imaging

Imaging equipment shares the defining characteristics that made PBH a fit for jet engines: very high acquisition cost; long service life; deep OEM informational advantage on failure modes; revenue generation tightly coupled to availability ("if the engine is working, the aircraft flies and generates revenue"); and the OEM holds the deepest cost-down levers (predictive analytics, fleet-wide spare-part pooling, in-situ inspection technology). Substitute "scan" for "flight hour" and the model maps almost without distortion.

9.2 The Imaging PBH Construct

- Cost-per-Scan rate: a fixed rupee or dollar figure per qualifying study across modalities (CT, MRI, PET-CT, X-ray).
- Risk transfer: vendor underwrites uptime, parts, labour, software upgrades, and contractual obsolescence (typically 8–10 year horizon).
- Floor and ceiling: minimum monthly volume protects the OEM; ceiling protects the hospital from runaway costs in pandemic-style demand spikes.
- Refresh trigger: contractual mid-life upgrade if a defined performance benchmark is no longer attainable on the installed unit.
- Buy-out option: hospital can convert to ownership at a pre-agreed residual value at term end.

9.3 Fit with the Indian Public Sector

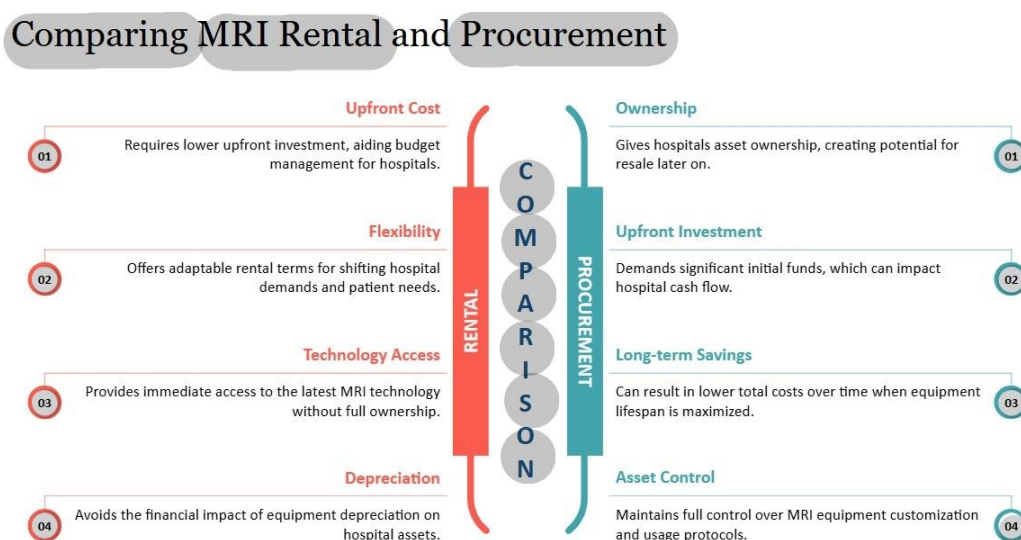
AIIMS Bhopal's PPP MRI tender — a "7+3 year" agreement under which the vendor supplies, installs, commissions, and operates a new 3T MRI inside the hospital with revenue-share or fee-per-scan economics — is, in substance, a PBH-equivalent construct adapted to Indian public-procurement law (AIIMS Bhopal, 2025). PMSSY-funded AIIMS expansions, where HLL Infra Tech Services Limited



(HITES) acts as the Procurement Support Agency, have similarly bundled supply, installation, and managed-service elements (Rawat, 2025). The

construct is therefore not theoretical; it is now a live procurement option for any Indian public, autonomous, or aspirational private hospital.

9.4 An Example of Pictorial comparison of Buy Vs Lease for MRI



X. Strategic Framework by Hospital Archetype

The lease-versus-buy decision is irreducibly contextual. The framework below condenses the analysis into a CEO-facing matrix for the four archetypes most relevant to the Indian and international hospital landscape.

Dimension	Autonomous Hospital (e.g., AIIMS, PGIMER, JIPMER)	Fully-Funded / Trust Hospital (e.g., Tata, CMC Vellore, religious trust)	Public Hospital (state / district / municipal)	Private Hospital (corporate chain or standalone)
Dominant priority	Asset-building + technology modernisation	Long-term asset building; mission permanence	Service availability under capex constraint	Financial predictability + EBITDA optimisation
Recommended primary instrument	Hybrid: own mature modalities; PPP/MES for frontier (3T MRI, PET-CT)	Outright purchase or capital lease with bargain buyout	Pay-per-Scan / MES with state-level pooled framework	Operating lease for frontier; debt-financed buy for high-volume CT, X-ray
Site preparation	Hospital-construct for routine; vendor design-build for hybrid Cath Lab and 3T MRI	Hospital-construct under in-house PMO	Vendor design-build under turnkey contract	Vendor design-build to compress speed-to-revenue
Maintenance	In-house HTM + selective OEM AMC; deploy	In-house HTM with third-party / insurance backstop	Outsourced uptime-linked SP under BEMMP-style contract	OEM AMC bundled in lease; KPI-driven uptime SLA



	AAMI EQ89 framework			
Funding source	Government grant + PMSSY + PPP fee-share	Corpus, philanthropy, CSR, internal accruals	State plan budget + central scheme + viability gap funding	Term loan, NCDs, equity, OEM-backed finance
Refresh strategy	Software upgrades + 8–10 yr replacement; PPP refresh at term end	10–12 yr refresh with major upgrade at year 5	Pooled refresh at framework re-tender; vendor-led	5-yr refresh on operating lease end
Decommissioning	Donate to district hospitals; refurbish via OEM trade-in	Resell; donate; rigorous data sanitisation per NIST	Return to vendor under MES; circular-economy compliant	Trade-in to OEM; resale through certified broker
Key risk	Procurement-process delay; CAG / CVC scrutiny on PPP economics	Trustee-board governance lag in approving capex	Budget cycle volatility; political turnover	Volume risk if catchment competition intensifies

11. Consolidated Advantages and Disadvantages

Decision Dimension	Purchase / Ownership	Lease / MES / Pay-per-Scan
Capital & Cash Flow	<p>Advantage: Equipment becomes a balance-sheet asset; once amortised, generates revenue at near-zero capital cost. Bank loan interest is tax-deductible.</p> <p>Disadvantage: Heavy upfront cash drain; opportunity cost on alternative capital deployment; repair shocks hit cash directly.</p>	<p>Advantage: Low or zero down payment preserves working capital; predictable monthly opex frees capital for higher-priority deployments.</p> <p>Disadvantage: Long-term cumulative cash outflow exceeds outright purchase by 15–35% on a typical operating lease.</p>
Tax & Accounting (India)	<p>Advantage: 40% accelerated depreciation under Section 32 on life-saving imaging equipment; GST 2.0 cuts effective acquisition tax to 5% on most imaging (HSN 9022).</p> <p>Disadvantage: GST input credit available only against taxable services; charitable / exempt hospitals face credit restrictions.</p>	<p>Advantage: Operating-lease rentals are fully expensed; lessor bears depreciation and residual-value risk.</p> <p>Disadvantage: Under Ind AS 116 / IFRS 16, ROU asset and lease liability appear on the balance sheet — historical off-balance-sheet benefit has narrowed.</p>
Technology & Obsolescence	<p>Advantage: Full control over upgrade timing; software and hardware retrofits can extend useful life at 30–50% of new-equipment cost.</p> <p>Disadvantage: Full obsolescence risk borne by hospital; refresh requires a new capex cycle and board approval.</p>	<p>Advantage: Refresh aligned with lease term; OEM has commercial incentive to keep installed base current; mid-life upgrade clauses common in MES.</p> <p>Disadvantage: No terminal asset at end of term; nothing to sell, donate, or carry forward.</p>



Maintenance & Uptime	<p>Advantage: Choice across OEM AMC, third-party, insurance-style, or in-house HTM — disciplined clinical engineering can drive maintenance from ~12% to ~5% of acquisition cost.</p> <p>Disadvantage: Direct exposure to repair shocks; downtime is the hospital's operational and financial risk.</p>	<p>Advantage: Bundled OEM service with contractually guaranteed uptime SLAs (typically 95–98%) and liquidated damages for breach; predictable monthly cost.</p> <p>Disadvantage: No flexibility to switch to a lower-cost third-party or in-house service provider during the contract term.</p>
Operations & Control	<p>Advantage: Direct control over modality utilisation, staffing, scheduling, and clinical protocols.</p> <p>Disadvantage: Hospital owns recall, cybersecurity, and end-of-software-support exposures throughout asset life.</p>	<p>Advantage: Speed-to-revenue via turnkey design-build; ability to trial new technology before long-term commitment; vendor flexibility at term end.</p> <p>Disadvantage: Less direct control; vendor priorities may not match hospital priorities during volume spikes or pandemic-style demand.</p>
Decommissioning & Sustainability	<p>Advantage: Hospital captures residual value via resale, trade-in, or donation to lower-tier facilities under CSR frameworks.</p> <p>Disadvantage: Hospital bears full responsibility for NIST-grade data sanitisation and E-Waste Rules 2022 compliance.</p>	<p>Advantage: Vendor takes back, refurbishes, and redeploys — natively circular-economy; supports BRSR scope-3 reporting.</p> <p>Disadvantage: Loss of donation / CSR optionality; residual value flows to lessor, not to the hospital community.</p>

12. Conclusion: A Portfolio Posture for the Modern Hospital CEO

No serious analysis of imaging economics ends with a binary verdict. The MGMA "lifecycle readiness" test puts the matter most cleanly: leaders should ask, in order, what problem the equipment solves; what it will cost over its useful life; which acquisition model — buy, lease, or rent — best fits; and what controls must be in place from day one through disposition (MGMA, 2026). The most attractive monthly payment is not a sign of the strongest decision; the strongest decision is the one that survives a ten-year stress test of clinical demand, technology evolution, regulatory change, and capital-market access.

For the CEO of an Indian or international hospital, the practical recommendation is therefore a portfolio posture: own the mature, high-volume, slow-evolving modalities where in-house maintenance can drive cost down (digital radiography, ultrasound, mobile C-arm); operate-lease the mid-life modalities where 3–5-year refresh is a clinical imperative (CT, mid-field MRI); and adopt Pay-per-Scan / MES for the frontier modalities where OEM informational advantage and capital intensity together make ownership uneconomic (3T

MRI, hybrid Cath Lab, PET-CT). Layer this with vendor design-build for the frontier suites and hospital-build for the mature ones; layer it with AAMI EQ89-compliant maintenance documentation; and layer it, finally, with a circular-economy decommissioning policy that returns equipment to the value chain rather than the landfill.

Tena tyaktena bhujjithāh — enjoy by renunciation. The hospital that is most successful in serving its patients and shareholders over the next decade will be the one whose CEO no longer asks "do we own this MRI?" but asks instead "are we extracting the optimal flow of clinical and economic value from it?" That single mental shift — from stock to flow, from possession to stewardship, from *parigraha* to *aparigraha* — is the durable competitive advantage of imaging-economics literacy in the modern hospital boardroom.

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