

The Plant After the Contract: Residual Value at PWPA Expiry

A decision framework for handback, life extension, repowering and transfer

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Abstract

A power and water purchase agreement can expire while the underlying plant remains technically capable of operating. The end of contracted capacity and output payments therefore creates a multi-dimensional decision: whether the asset should transfer, continue under an extension, compete for a new contract, operate with market exposure, be repowered or retire. Residual value depends on physical condition, enforceable rights, future demand, required capital expenditure and the quality of the transition process.

This paper develops the PWPA Expiry Residual Value Framework. It separates contractual handback compliance from market value; maps title, land, grid, fuel, water, permits, operations, data, workforce and financing; and links a condition audit to remaining useful life, lifecycle expenditure, security and distribution controls. It then values contracted cash flow, post-contract income, replacement cost and option value across life-extension, repowering, transfer, reprocurement and retirement cases.

World Bank and Global Infrastructure Hub guidance emphasises early expiry planning, measurable handback condition, remaining useful life, independent assessment and protection against deterioration before transfer [1]-[5]. The framework applies those principles to power, desalination and integrated power-and-water assets and connects them to financing, procurement and service continuity.

The central conclusion is that terminal value should follow a verified end-state pathway. Contract rights, asset condition and post-expiry revenue must be demonstrated together. Four tables and three figures translate the framework into a transaction method. All numerical examples are hypothetical management assumptions used solely to demonstrate the method; they are not observations, forecasts, valuation conclusions or investment recommendations.

JEL Classification: G12, G31, G32, H54, L94, Q25, Q40, Q48

Keywords: PWPA expiry, residual value, plant handback, life extension, repowering, power and water PPP, asset transfer, project finance

This paper is an educational and structural analysis prepared for research purposes. It is not investment advice, an offer, or a solicitation. It contains no client information.

1. DEFINE THE EXPIRY DECISION

A PWPA expiry is a coordinated contract, asset and market decision. The parties must choose whether the plant should transfer, continue, repower, be reprocured or retire, and support that choice with verified evidence.

The working file should identify the governing contract clause, asset evidence, responsible party and decision date. Legal, technical, commercial and financial conclusions should remain traceable to the source on which they rely.

A practical review asks what transfers, in what condition, with which continuing rights, at what cost and under which post-expiry revenue path. The answer should produce a testable end-state recommendation rather than a single unsupported terminal value.

2. SEPARATE CONTRACT EXPIRY FROM ASSET DEATH

The end of contracted capacity and output payments rarely coincides exactly with the end of technical life. Residual value depends on the plant's condition, rights and post-contract revenue prospects.

The assessment should distinguish verified condition from management assumptions and future scenarios. The purchaser, owner, lenders and advisers should use one reconciled asset register, expiry timetable and evidence log.

The parties should translate the issue into dated actions, acceptance criteria and quantified valuation adjustments. Mandatory handback work, optional value creation and contingent liabilities should remain visible as separate lines.

3. DISTINGUISH HANDBACK VALUE FROM MARKET VALUE

Handback compliance measures whether the asset meets contractual transfer standards. Market value measures cash flows and options available after expiry. Both require separate evidence and can produce different conclusions.

The decision should be completed while the parties still have time to inspect, fund, procure and implement the required work. Any assumption affecting value should have an owner, validation method and expiry date.

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4. ESTABLISH THE END-STATE OPTIONS

The base options are transfer, negotiated extension, competitive repurchase, life extension, partial repowering, full repowering and retirement. A disciplined process keeps viable options open until evidence supports selection.

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5. BUILD THE CONTRACT AND ASSET MAP

The map should connect the PWPA, land, grid, fuel, water, permits, O&M, financing, insurance and government rights to physical systems, ownership and expiry dates.

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Table 1. End-state option, evidence and principal risk

End state	Required evidence	Principal value source	Principal risk	Completion test
Transfer	Enforceable transfer, accepted condition and permits	Service continuity and usable remaining life	Defects or rights fail to transfer	Signed acceptance and operational control
Life extension	Condition, overhaul scope and future revenue	Continued use of installed asset	Reliability and capex overrun	Funded plan and performance warranty
Repowering	Site, grid, permits and integration design	Better efficiency, flexibility and life	Construction and interface risk	Bankable contract and financing
Reprocurement	Lawful process, demand and bidder appetite	Competitive price discovery	Timetable exceeds expiry	Award and transition complete
Retirement	Replacement capacity and closure plan	Avoided losses and liabilities	Unfunded remediation	Funded decommissioning and site outcome

The alternatives are generic and require transaction-specific legal, technical and market review.

6. CONFIRM TITLE AND OWNERSHIP

Plant ownership may sit with the project company while land, interconnection equipment, intake works or shared facilities sit elsewhere. The transfer perimeter must identify title, encumbrances and excluded assets.

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7. READ THE TRANSFER TERMS LITERALLY

Transfer provisions should identify the recipient, date, consideration, condition, documentation, taxes, liabilities and completion mechanics. Commercial assumptions cannot substitute for the executed language.

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8. CONVERT HANDBACK STANDARDS INTO TESTS

General duties such as good operating condition need measurable acceptance criteria. The protocol should specify reliability, efficiency, output, safety, integrity, records and remaining-life tests.

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9. DEFINE REQUIRED REMAINING USEFUL LIFE

The contract may require individual systems to retain a stated life after transfer. The engineering assessment should distinguish design life, consumed life, condition-adjusted life and economically useful life.

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10. COMMISSION THE CONDITION AUDIT EARLY

A first independent audit several years before expiry creates time to cure defects and fund lifecycle work. A late audit converts manageable maintenance into negotiation and service-continuity risk.

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11. FREEZE THE BASELINE ASSET REGISTER

The register should identify every material unit, serial number, ownership, age, overhaul history, warranty, spares position and expected handback status. Changes require controlled updates.

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12. IDENTIFY CRITICAL EQUIPMENT

Turbines, generators, boilers, heat-recovery systems, membranes, pumps, intake and outfall works, transformers, switchgear and control systems should be ranked by service consequence and replacement lead time.

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13. RECONCILE MAINTENANCE HISTORY

Work orders, outage records, inspection reports and vendor recommendations reveal whether the apparent condition is supported by executed maintenance. Missing records reduce confidence and may increase required reserves.

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14. QUANTIFY DEFERRED MAINTENANCE

Deferred work should be separated into safety-critical, handback-required, reliability, efficiency and discretionary categories. The valuation deducts only supported obligations and scenario-specific capital expenditure.

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15. ANALYSE PERFORMANCE HISTORY

Availability, output, heat rate, auxiliary load, specific fuel consumption, water recovery, quality and unplanned outage data should be normalised for dispatch, ambient conditions and contract tests.

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16. TEST RELIABILITY AND AVAILABILITY

A plant can pass a spot performance test while carrying high failure risk. Reliability analysis should use forced-outage frequency, mean time between failures and component condition.

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17. TEST EFFICIENCY AND VARIABLE COST

Post-expiry competitiveness depends on fuel efficiency, energy consumption, chemicals, labour and maintenance. Historic contract pass-throughs may disappear under merchant or repocured arrangements.

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18. TEST WATER OUTPUT AND QUALITY

For IWPs and IWPPs, residual value depends on sustained production, salinity management, membrane condition, water quality, intake reliability and discharge compliance.

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19. VERIFY ENVIRONMENTAL COMPLIANCE

Air emissions, marine impacts, brine, wastewater, noise, waste and hazardous materials can create upgrade or remediation obligations. The diligence should include permits, monitoring and unresolved notices.

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20. MAP PERMIT CONTINUITY

Operating, environmental, generation, water, grid, land and fuel rights may expire, require consent or remain personal to the project company. Continuity conditions should be documented before valuation.

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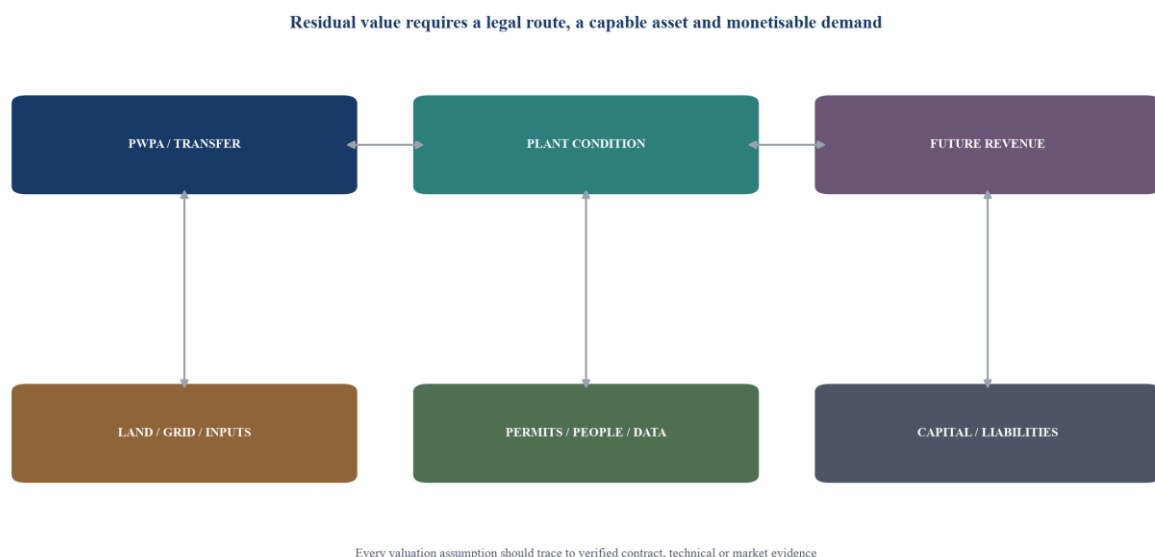


Figure 1. Contract and asset map at PWPA expiry
The diagram shows the evidence chain required to support residual value.

21. PRESERVE LAND, GRID AND INPUT RIGHTS

A technically viable plant has limited value without enforceable site access, transmission, water intake, fuel and shared-infrastructure rights. Each right needs duration, transferability and capacity evidence.

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22. RECONCILE THE O&M POSITION

The O&M agreement may expire with the PWPA or contain change-of-control and termination provisions. The transition plan should retain capability, manuals, licences and critical supplier support.

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23. PROTECT WORKFORCE AND OPERATING KNOWLEDGE

Experienced staff hold plant-specific knowledge that is difficult to recreate. Retention, transfer, consultation, training and pension or benefit obligations should be assessed under applicable law.

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24. SECURE DATA, SOFTWARE AND SPARES

Control-system licences, source code, passwords, models, maintenance data, vendor tools and strategic spares should transfer with verified rights. Unsupported systems can impair operations immediately after handover.

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25. MAP WARRANTIES AND CLAIMS

Remaining warranties, latent-defect claims, insurance recoveries and contractor disputes should be assigned deliberately. A transfer should preserve value without duplicating recovery.

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26. QUANTIFY DECOMMISSIONING OBLIGATIONS

Closure can require dismantling, contamination remediation, waste disposal, land restoration and marine works. The responsible party, security and timing should be reflected in every end-state case.

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27. TEST HANDBACK SECURITY

A bond, reserve, retention or distribution lock-up can protect the purchaser against an underfunded handback. The amount should follow evidence of required work rather than a mechanical percentage.

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28. CONTROL THE LIFECYCLE RESERVE

The lifecycle account should reconcile forecast work, actual condition, available cash and remaining obligations. Releases should follow independent certification and preserve the ability to complete mandatory work.

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29. DESIGN THE FINAL DISTRIBUTION LOCK-UP

Distributions near expiry can weaken maintenance incentives. A calibrated lock-up links cash release to audit findings, funded work, transfer documents and verified completion.

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30. ALIGN FINAL DEBT MATURITY

Debt should mature early enough to resolve defects, discharge security and complete transfer. A short tail can leave lenders dependent on an untested terminal-value assumption.

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Table 2. Expiry risk-allocation matrix

Risk	Project-company responsibility	Purchaser protection	Shared control	Evidence
Asset deterioration	Maintain and complete required work	Audit, security and acceptance tests	Agreed condition protocol	Records, inspections and test results
Rights discontinuity	Maintain permits and transfer documents	Withhold acceptance until effective	Consent and transition plan	Valid licences, land and grid rights
Deferred capex	Fund contractual lifecycle work	Reserve and distribution lock-up	Independent certification	Costed work plan and completion evidence
Service interruption	Operate safely through transition	Continuity and emergency rights	Joint handover command	Staffing, spares and operating plan
Residual-value shortfall	Bear risk allocated by financing	Avoid unsupported transfer payment	Agreed valuation process	Scenario model and assessor report
Environmental liability	Comply and remediate as contracted	Retain claims and security	Site baseline and allocation schedule	Permits, monitoring and closure estimate

Allocation should follow the executed PWPA, applicable law and the selected end state.

31. TEST REFINANCING TAIL RISK

Refinancing close to expiry may rely on extension, merchant value or transfer proceeds. Lenders should test contractual rights and downside cash flows before crediting any residual value.

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32. DEFINE THE VALUATION PERIMETER

The perimeter should include transferable physical assets, rights, working capital, spares, claims and liabilities. Non-transferable contracts and stranded costs require explicit treatment.

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33. VALUE CONTRACTED CASH FLOW

Remaining PWPA cash flow is valued using the executed tariff, availability, performance, deductions, costs and debt service. Terminal value should not mask weak near-term performance.

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34. VALUE POST-CONTRACT CASH FLOW

Post-expiry income depends on extension terms, market dispatch, capacity payments, ancillary services, water procurement, fuel and environmental costs. Each scenario needs an identified legal and commercial route.

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35. USE REPLACEMENT COST CAREFULLY

Replacement cost can benchmark scarcity and avoided development time. It does not by itself prove value because an older plant may have lower efficiency, shorter life and different rights.

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36. USE DEPRECIATED REPLACEMENT COST

Depreciated replacement cost adjusts a modern equivalent asset for physical deterioration, functional obsolescence and economic obsolescence. It is most useful where income evidence is limited.

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37. APPLY THE INCOME APPROACH

The income approach discounts scenario-specific free cash flow after required capital expenditure, tax, working capital and decommissioning. Probabilities should be supported and shown separately.

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38. RECOGNISE OPTION VALUE

An operating site with grid, permits and experienced staff can create options for repowering, storage, desalination or hybrid use. Option value requires executable rights, time and capital.

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39. BUILD THE LIFE-EXTENSION CASE

Life extension preserves existing configuration through targeted overhaul. The case should show the work scope, outage, warranties, remaining life, performance and contractual route.

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40. BUILD THE REPOWERING CASE

Repowering replaces or upgrades major systems to improve efficiency, flexibility, emissions or water performance. The model should separate retained infrastructure from new capital and integration risk.

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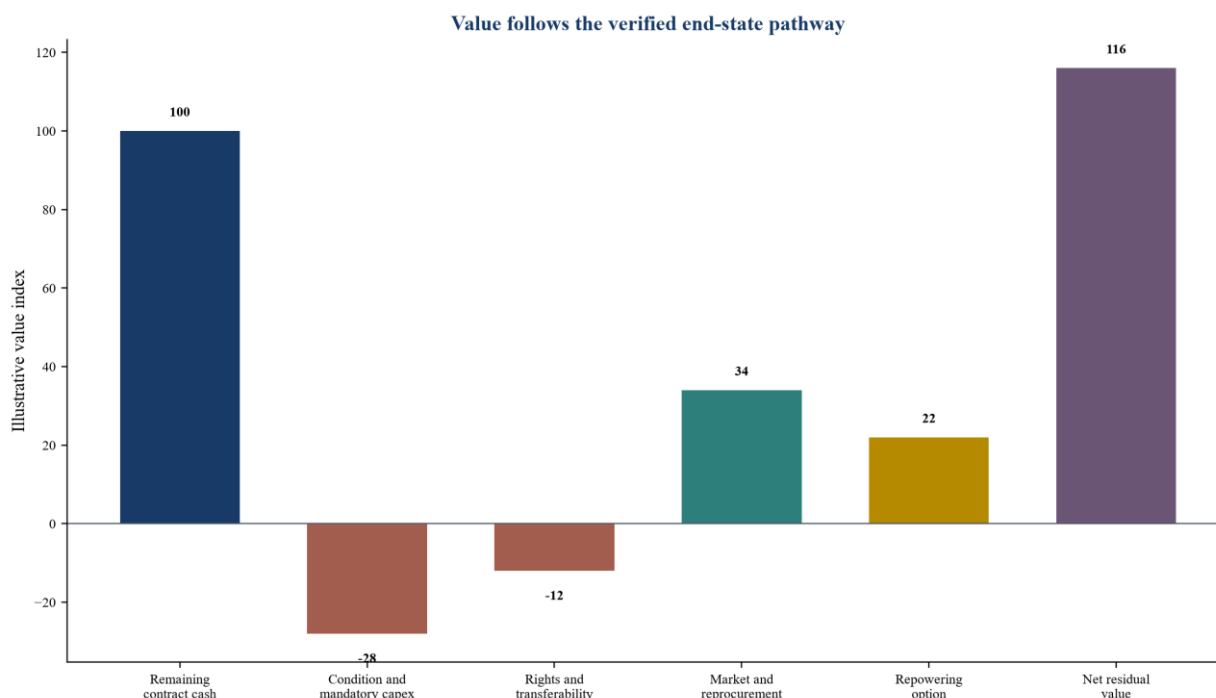


Figure 2. Residual-value bridge from contract cash flow to post-expiry value

The bridge is conceptual; amounts require asset-specific evidence.

41. BUILD THE TRANSFER CASE

The transfer case should specify condition, price, liabilities, security release, records, people, permits and operational control. Completion tests should support uninterrupted service.

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42. BUILD THE REPROCUREMENT CASE

A new competitive contract can preserve the site while resetting price and risk allocation. The timetable must allow tendering, approvals, financing and transition before expiry.

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43. BUILD THE RETIREMENT CASE

Retirement may be rational where efficiency, emissions, demand or remediation overwhelms value. The case needs a funded closure plan and replacement capacity strategy.

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44. PRICE TRANSITION AND CARBON RISK

Fuel and emissions exposure can change sharply after contract expiry. Scenarios should include carbon policy, fuel availability, efficiency standards and customer decarbonisation objectives.

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45. PRICE FUEL AND INPUT RISK

Gas, electricity, chemicals and feedwater terms can determine post-expiry margin. The model should distinguish contracted pass-through from risks borne by the future operator.

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46. TEST POWER AND WATER MARKET DEMAND

Demand, reserve margin, system flexibility, water security and procurement plans determine whether capacity remains useful. Forecasts should be sourced and stress-tested.

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47. TEST TECHNOLOGY OBSOLESCENCE

New generation, storage, desalination and demand-side technologies can lower the value of an older configuration. Obsolescence analysis should compare service capability and total system cost.

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48. TEST CYBER AND CONTROL-SYSTEM OBSOLESCENCE

Unsupported control hardware or software can create reliability and security risk. Upgrade cost, outage, vendor access and data migration belong in the capital plan.

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49. BUILD THE CAPITAL PLAN

The capital plan should connect each audit finding to timing, cost, outage, contingency, responsible party and value effect. Mandatory and option-dependent expenditure should remain distinct.

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50. BUILD SOURCES AND USES

The transition financing plan should identify reserves, operating cash, sponsor capital, purchaser funding, new debt, grants and asset-sale proceeds against all required uses.

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Table 3. Hypothetical residual-value and debt-service sensitivity

Scenario	Transition capex, USD m	Post-expiry life	Revenue basis	Minimum DSCR	Hypothetical residual value, USD m
Transfer at contractual standard	35	12 years	Regulated continuation	1.30x	210
Targeted life extension	90	15 years	Five-year extension plus market	1.18x	245
Efficiency repowering	260	25 years	New contracted capacity	1.12x	330
Delayed reprourement	70	12 years	Two-year gap then contract	0.88x	145
Retirement and remediation	55	None	Salvage only	Not applicable	Negative 25

Values are hypothetical management assumptions used only to demonstrate the framework. They are not observations, forecasts or valuation conclusions.

51. TEST DEBT-SERVICE SENSITIVITY

Lenders should test lower availability, higher overhaul cost, delayed extension, weaker tariff, higher interest and reduced terminal value. The model should show minimum DSCR and refinancing dependence.

The decision should be completed while the parties still have time to inspect, fund, procure and implement the required work. Any assumption affecting value should have an owner, validation method and expiry date.

The objective is a reliable transition that preserves service and allocates value and responsibility transparently. A plant retains residual value only where technical capability and the legal route to monetise that capability can both be demonstrated.

52. ADDRESS TAX AND ACCOUNTING

Transfer taxes, capital allowances, asset retirement obligations, impairment, deferred tax and lease or concession classification can change proceeds and reported value. Specialist review should follow the actual structure.

The working file should identify the governing contract clause, asset evidence, responsible party and decision date. Legal, technical, commercial and financial conclusions should remain traceable to the source on which they rely.

A practical review asks what transfers, in what condition, with which continuing rights, at what cost and under which post-expiry revenue path. The answer should produce a testable end-state recommendation rather than a single unsupported terminal value.

53. RECONCILE EXPIRY AND TERMINATION PAYMENTS

Natural expiry, default termination and voluntary termination can produce different payments and liabilities. The transaction model should not use one formula for all outcomes.

The assessment should distinguish verified condition from management assumptions and future scenarios. The purchaser, owner, lenders and advisers should use one reconciled asset register, expiry timetable and evidence log.

The parties should translate the issue into dated actions, acceptance criteria and quantified valuation adjustments. Mandatory handback work, optional value creation and contingent liabilities should remain visible as separate lines.

54. PROTECT PROCUREMENT AND COMPETITION

Extension or direct award may require legal authority and value-for-money evidence. Competition analysis should test whether transition choices foreclose credible alternatives.

The decision should be completed while the parties still have time to inspect, fund, procure and implement the required work. Any assumption affecting value should have an owner, validation method and expiry date.

The objective is a reliable transition that preserves service and allocates value and responsibility transparently. A plant retains residual value only where technical capability and the legal route to monetise that capability can both be demonstrated.

55. APPOINT THE INDEPENDENT ASSESSOR

The assessor should have a clear scope, access, standards, sampling method, reporting timetable and dispute role. Independence and conflicts should be documented.

The working file should identify the governing contract clause, asset evidence, responsible party and decision date. Legal, technical, commercial and financial conclusions should remain traceable to the source on which they rely.

A practical review asks what transfers, in what condition, with which continuing rights, at what cost and under which post-expiry revenue path. The answer should produce a testable end-state recommendation rather than a single unsupported terminal value.

56. CREATE A DISPUTE PATHWAY

Technical disagreements should progress through joint review, independent expert and formal dispute mechanisms while maintenance and service obligations continue.

The assessment should distinguish verified condition from management assumptions and future scenarios. The purchaser, owner, lenders and advisers should use one reconciled asset register, expiry timetable and evidence log.

The parties should translate the issue into dated actions, acceptance criteria and quantified valuation adjustments. Mandatory handback work, optional value creation and contingent liabilities should remain visible as separate lines.

57. RUN THE CONTRACT GATE

This gate confirms transfer rights, payment, condition, liabilities, permits and security. Missing provisions require an agreed legal route before value is credited.

The decision should be completed while the parties still have time to inspect, fund, procure and implement the required work. Any assumption affecting value should have an owner, validation method and expiry date.

The objective is a reliable transition that preserves service and allocates value and responsibility transparently. A plant retains residual value only where technical capability and the legal route to monetise that capability can both be demonstrated.

58. RUN THE TECHNICAL GATE

This gate confirms condition, performance, remaining life, mandatory work, outage and decommissioning. Findings should link directly to cost and acceptance tests.

The working file should identify the governing contract clause, asset evidence, responsible party and decision date. Legal, technical, commercial and financial conclusions should remain traceable to the source on which they rely.

A practical review asks what transfers, in what condition, with which continuing rights, at what cost and under which post-expiry revenue path. The answer should produce a testable end-state recommendation rather than a single unsupported terminal value.

59. RUN THE COMMERCIAL GATE

This gate tests demand, tariff, operating cost, capital, financing and option value for each end state. The comparison uses consistent assumptions and explicit probabilities.

The assessment should distinguish verified condition from management assumptions and future scenarios. The purchaser, owner, lenders and advisers should use one reconciled asset register, expiry timetable and evidence log.

The parties should translate the issue into dated actions, acceptance criteria and quantified valuation adjustments. Mandatory handback work, optional value creation and contingent liabilities should remain visible as separate lines.

60. ADOPT THE DECISION RECORD AND 90-DAY PLAN

The final record names the preferred end state, conditions, funding, owners, milestones and fallback. The first 90 days should close the highest-value evidence gaps and preserve alternatives.

The decision should be completed while the parties still have time to inspect, fund, procure and implement the required work. Any assumption affecting value should have an owner, validation method and expiry date.

The objective is a reliable transition that preserves service and allocates value and responsibility transparently. A plant retains residual value only where technical capability and the legal route to monetise that capability can both be demonstrated.

Table 4. Illustrative 90-day expiry-readiness plan

Period	Workstream	Core actions	Decision output	Accountable owner
Days 1-15	Contract perimeter	Reconcile expiry, transfer, payment, security and dispute provisions	Confirmed legal perimeter	Transaction counsel
Days 16-30	Asset baseline	Freeze register; review records; plan tests and inspections	Condition-audit scope	Independent engineer
Days 31-45	Rights and continuity	Verify land, grid, fuel, water, permits, people, data and spares	Transferability register	Project and purchaser teams
Days 46-60	End-state cases	Model transfer, extension, repowering, reprocurement and retirement	Comparable valuation cases	Financial adviser
Days 61-75	Funding and procurement	Size capex, reserves and financing; test competition route	Executable financing plan	Sponsors, lenders and purchaser
Days 76-90	Decision record	Select preferred path, conditions, owners, milestones and fallback	Approved transition programme	Authorised project board

Timing is indicative and should be adapted to the remaining contract term and asset complexity.

A terminal value is credible only after all five gates close



The decision record links evidence, capital and accountability to the selected end state

Figure 3. Five gates for a defensible expiry decision

Each gate requires documented evidence before the preferred end state is approved.

The framework places expiry planning on the same footing as financial close and operations. It converts a distant contractual event into a controlled programme for evidence, funding, value and service continuity.

Execution should begin while the current operator retains incentives and while procurement, financing and capital works can still be completed. A verified residual-value case gives the parties a defensible basis for extension, transfer, repowering, reprocurement or retirement.

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His career spans Morgan Stanley, HSBC, Lloyds Banking Group, EWEC, ADQ portfolio companies and Emirates Growth Fund, across TMT, real estate, fintech, deeptech, cleantech, infrastructure and energy. He has partnered with C-suite leaders, private equity and venture funds, sovereign wealth funds and family offices to finance complex fund raises and scale-up ventures, and has led M&A due diligence, post-merger integration and business-transformation initiatives to create value.

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