

Although a specialised type of financial transaction, engine sale & leasebacks are attractive to airlines and the right type of investor. The mechanics and economics of how sale & leaseback transactions for popular narrowbody engines might be structured are examined here.

# The economics of engine sale & leaseback transactions

**E**ngines have become more attractive assets to investors. The number of organisations offering engine leases continues to grow.

One popular type of transaction with investors and specialised engine lessors is an engine sale-and-leaseback (SLB). This allows lessors to increase engine portfolios, and airlines to raise liquidity. There are a number of original equipment manufacturer (OEM)-backed engine lessors that are partnered with financial institutions, and independent leasing companies that are interested in acquiring engines through SLB opportunities.

Current trends in SLBs, including the most popular engine variants involved, are examined here, together with the potential economics of typical SLB transactions.

## Definition and benefits

Engine SLB transactions generally involve the sale of a spare engine by an airline to a lessor. The lessor will then lease the engine back to the airline for a fixed term in return for a monthly lease rental fee. The airline will usually have to pay maintenance reserves.

“There are three reasons why an engine SLB might appeal to airlines,” explains Joseph O’Brien, executive vice president of sales at ELFC. “First, selling the asset and leasing it back allows the airline to raise money. Second, removing the engine from the airline’s balance sheet passes any residual value risk to the lessor.”

There is a residual value risk associated with potential engine obsolescence. An engine can become obsolete as a result of technical advances

or regulatory issues. The introduction of a new variant to an existing engine family or of a completely new aircraft and engine type can negatively impact engine residual values.

“A third potential benefit of engine SLB transactions for airlines is the ability to realise cash on the sale of an asset,” continues O’Brien. “Airlines might be offered a discount off the list price when buying spare engines from the OEM. They could then sell the engine shortly after at full list price to the lessor as part of a SLB transaction, thereby making a gain on their initial investment.”

Engines are attractive assets because of the way the most popular types tend to hold their residual values. Provided the residual value remains high, lessors might sell the engine at the end of the lease term at a price that allows them to realise a satisfactory profit margin over book value on their initial investment.

“Historically investors have been more cautious about investing in engines than they have in aircraft because of technical concerns relating to the more complex management of the asset,” says Olga Razzhivina, senior ISTAT appraiser at Oriel. “In recent years investing in aircraft has not yielded the desired double digit returns, and there has been more interest in engines.”

Engines often retain their residual value more effectively than airframes. “You can restore the value of an engine through the overhaul process, but you cannot do this with airframes,” says Al Wood, chief commercial officer at AeroTurbine.

“Engines retain maintenance value well during their life due to the large number of parts changed at each shop

visit,” explains Bobby Janagan, general manager at Rolls-Royce & Partners Finance (RRPF). “This is one factor that helps support residual values.”

## Engine lessors

As described, engine lessors now fall into the two distinct categories of engine OEMs and independents. The OEMs are increasing the portion of engines included in total care packages, while reducing the number of engines under simpler fixed-rate-per-hour maintenance contracts. These can be coupled with spare engine provisioning.

The increased portion of engines under OEM total care contracts is making it harder for independent lessors, that offer short- and long-term leases, but do not provide other technical support.

Willis Lease Finance Corporation (WLFC) and Engine Lease Finance Corp (ELFC) are the two largest independent lessors. Both are now vertically integrated with financial institutions, which makes it easier for them to finance acquisitions and lease transactions. ELFC was recently fully acquired by Mitsubishi UFJ Lease.

Total Engine Support (TES), a smaller lessor, is 40% owned by DVB Bank. TES specialises in engine maintenance and technical management, and so can offer airlines a broader service as an alternative to OEM support products.

Sumisho Aero Engine Lease was formed in 2013 as a joint venture between Sumishop Corp and MTU. Sumitomo has a 90% shareholding, and MTU the remaining 10%.

Sumisho has been set up with the aim of entering the independent engine lessor market. It has so far acquired an engine



portfolio of seven engines, two widebody aircraft engines and the remainder narrowbody engines.

“Our portfolio is worth about \$100 million,” says Ichiro Tatara, managing director and chief executive officer at Sumisho. “We plan to expand our portfolio over the next five years to about \$500 million, and 60 engines. We will specialise in long-term leases, while our sister company, which has the same shareholders, specialises in short-term leases. We are therefore in the market to acquire engines from airlines and complete SLB transactions, and to buy engines from lessors with leases attached.

“It is hard to compete with the financial muscle of the OEMs and larger independent lessors,” continues Tatara. “We are able to, however, because we have internal financing sources, and are fully funded by our shareholders.”

### Financing the acquisition

The amount of equity a lessor will need to invest in procuring an engine will depend on the level of debt it can secure from debt providers.

“It totally depends on the lessor,” explains Koichi Tagei, director and vice president at Total Engine Asset Management (TEAM). “Some may raise all the money from their parent company, while others prefer to use asset-backed lending or securities from the market.”

“In recent years, there has been an increase in finance sources available to engine investors, since the asset type has matured and become more understood in different markets and with different investors,” says Janagan. “RRPF recently raised funds in a large US private placement transaction. Other engine

investors have also raised funds through the capital markets and German KG market. These sources have supplemented the traditional sources of bank debt facilities.”

Tagei believes that for those lessors seeking debt finance for engine investments, the average loan-to-value (LTV) available in the current market is 65-85%. This means that the lessor will have to make an equity investment of 15-35% of the engine’s value.

Debt balloons are a common, and often necessary, part of engine financing terms. They permit the lessor to repay a portion of the overall debt in one go at the end of the lease term. This is more desirable than repaying all of the debt over the term, which will be short compared to the engine’s economic life. A lessor with 70% of debt financing and a debt balloon of 50% would only need to repay 20% of the engine’s purchase value over the lease term. Interest would still accrue, however, on the outstanding debt during the repayment term. The 50% balloon would then be repaid in one instalment at the end of the lease, following the sale or re-financing of the engine by the lessor.

### Costs and revenues

Lessors will aim to generate positive monthly cashflow from lease rentals, and to generate a positive cashflow from the sale or refinancing of the engine, and the repayment of the debt balloon. They will also aim to realise a profit at the end of the lease term, based on the difference between the engine’s depreciated book value and its actual residual resale value.

To realise a positive monthly cash flow, monthly lease rentals will need to

*Engine sale & leaseback transactions are popular with the right type of investor. Current generations have strong residual value retention, which minimises risk and is a main contributor to transaction profitability.*

exceed the lessor’s costs. These include the cost of debt, insurance, engine management and general overheads.

Monthly lease rentals or lease rate factors can be expressed as a percentage or lease rate factor of the engine’s purchase value.

Janagan estimates that typical lease rate factors in the current market are 0.65%-0.75% for narrowbody engines and 0.75-0.85% for widebody types. “These factors assume the current interest rate environment, and can vary a lot depending on the overall deal terms,” explains Janagan. “The lease factor is largely dictated by the lessee’s credit and lease term, but also other deal terms such as purchase price and redelivery conditions.”

Typical lease terms in SLB transactions can vary. “A typical term for narrowbody engines is seven years, although it could range from five to 10 years,” suggests O’Brien. “A typical lease term for a widebody engine is 10 years, but can be eight to 12 years.” These lease terms apply to engines up to two years old.

Al Wood explains that SLB transactions can also be used to meet shorter-term requirements. “Airlines may use SLB transactions in end-of-life scenarios, or for maintenance mitigation.” An end-of-life scenario is where an airline is looking to retire an aircraft and engine variant from its fleet, and no longer requires spare engines on a long-term basis. Wood suggests that in such circumstances airlines may only need a one- or two-year lease term.

The lessor will realise a positive residual value (RV) margin if the engine’s RV at the end of the lease term is greater than the sum of the debt balloon payment and the equity the lessor invested. If the sum of the equity and debt balloon is greater, the lessor will make a loss on the residual value.

The lessor’s total cashflow for the transaction is calculated by subtracting the accrued monthly costs from the sum of the residual value margin and lease rental revenue.

From a profit-and-loss perspective, the lessor will make a book profit on the transaction if the lease rental revenue accrued over the lease term exceeds the costs associated with book depreciation, interest payments and overheads.

The lessor can realise an engine value

book profit if it achieves a positive margin on the difference between the engine's depreciated book value and its actual residual value.

The end book value will depend on the rate of depreciation. Total book profit is the sum of the profit made from lease rentals and the engine value book profit.

## Maintenance reserves

Lessors need to be compensated for the loss of market value associated with reduced maintenance condition over the lease term. They need to ensure there are funds available to cover the cost of a shop visit when it comes due.

There may be an agreement in place that the engine should be returned at the end of its lease fresh from an overhaul. This could lead to excessive costs for the lessee, since a complete engine refurbishment might not be needed based on the level of use during the lease term.

The traditional way of compensating for the reduced maintenance condition of engines is to charge maintenance reserves. The reserves collected during the lease are sometimes enough to cover the restoration of the engine to its pre-lease maintenance condition. Maintenance reserves will be agreed between the lessor and lessee at the start of the lease and should cover the replacement of life limited parts (LLP) and shop visits as they come due. The share of shop-visit costs paid by the lessee should be proportionate to the use of the engine.

In a paper from March 2014 Gary Fitzgerald, managing director at Stratos, highlights how a growing trend among engine OEMs to maintain control of the aftermarket for their products, has affected collection of maintenance reserves.

"The sensible market practice of collecting maintenance reserves has been receding over the past few years, affected by the shift by many airlines from traditional 'time and material' maintenance contracts to all-inclusive engine service agreements," explains Fitzgerald. "Engine OEMs are controlling more of the aftermarket and increasingly winning new engine sales by guaranteeing the lowest flight hour cost for the airline placing the order. Use of these all-inclusive support packages has grown dramatically over the past decade, and is now estimated to account for nearly 50% of all new aircraft delivered."

Fitzgerald notes that all-inclusive OEM support packages are generally designed to account for uncertainties relating to future maintenance costs, such as unscheduled engine removals. Airlines pay a premium, possibly on a flight hour (FH) basis, to cover every eventuality.

"Most OEM packages share a common feature which affects investors

universally: regular cash collection for continuous support that in most circumstances forces investors to forfeit valuable engine-related maintenance reserve cash flows," adds Fitzgerald.

Lessors such as TES and Sumisho have added more choice for airlines. "Our partner, MTU, offers airlines technical and maintenance support, so we can provide a wider package and an alternative to airlines that want to remain independent of the OEMs," says Tatara.

## Current market

"Over the past 25 years we have seen a steady increase in demand for spare engine SLB transactions," says Janagan. "This is due to the general trend of airlines focusing on their core businesses, and shedding risk in non-core activities such as aircraft equipment trading."

Despite the trend for increasing transactions, there are potential threats to the current market structure. Some have

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## ENGINE SALE &amp; LEASEBACK TRANSACTION FINANCIALS

Engine type	CFM56-5B/3	CFM56-7BE	V2500-A5 S1
Acquisition value-\$	7,400,000	7,500,000	7,350,000
Term-months	84	84	84
Annual depreciation-%	5.0	5.0	5.0
End book value-\$	4,810,000	4,875,000	4,777,500
Residual value-\$	6,600,000	7,150,000	6,200,000
Equity-%	25	25	25
Equity-\$	1,850,000	1,875,000	1,837,500
Debt-%	75	75	75
Debt-\$	5,550,000	5,625,000	5,512,500
Debt balloon @ 84 months-%	25	25	25
Debt balloon-\$	1,387,500	1,406,250	1,378,125
Debt to repay-\$	4,162,500	4,218,750	4,134,375
Cost of debt-%	5.0	5.0	5.0
Monthly debt repayment-\$	64,346	65,215	63,911
Total monthly costs-\$ (exc overheads)	64,346	65,215	63,911
Lease rate factor-%	0.75	0.75	0.75
Lease rental-\$	55,500	56,250	55,125
Cashflow over debt-\$	-8,846	-8,965	-8,786
Margin over term-\$	-743,064	-753,060	-738,024
Residual value less debt-\$ balloon & equity	3,362,500	3,868,750	2,984,375
<b>Total cashflow-\$</b>	<b>2,619,436</b>	<b>3,115,690</b>	<b>2,246,351</b>
Lease rentals-\$	4,662,000	4,725,000	4,630,500
Book depreciation-\$	2,590,000	2,625,000	2,572,500
Interest-\$	1,275,310	1,292,553	1,266,697
Profit-\$	796,690	807,447	791,303
Engine value book profit-\$	1,790,000	2,275,000	1,422,500
Total book profit	2,586,690	3,082,447	2,213,803

pinpointed the growing trend of OEM aftermarket control as a potential problem for independent lessors.

“The engine leasing market is all about residual value,” says O’Brien. “Lessors need to be able to sell an engine for part-out at the end of its useful life. OEM support packages, based on FH agreements are squeezing the market”.

If more airlines are tied into OEM support packages the number of independent maintenance, repair & overhaul (MROs) organisations is likely to decline. Fewer independent MROs will result in a smaller market for spares from engine part-outs. This could reduce engine residual values to levels that would make them uneconomic investments for lessors under the prevailing investor return requirements and residual value assumptions.

At this stage, OEM aftermarket control is more prominent for widebody engines, but some believe this could become more prevalent among narrowbody types.

“By our definition, today there are no truly independent MROs servicing Rolls-Royce Trent engines, whereas there are 30 or so entities competing in the CFM56 market,” says Fitzgerald. “The three

nominally independent MROs maintaining Trents are fully aligned with the RR manuals and practices, and neither develop independent repairs nor install any used material.”

Fitzgerald adds that this pattern is likely to be repeated for narrowbody engines. “In our view the number of independent MROs working on narrowbody engines will probably fall by at least half in the next decade. OEMs are more likely to prioritise their links with strategic airline partners. Parts and spare engines are becoming less tradable,” he says.

### Main engine candidates

Current generation narrowbody engine types are likely to be the most popular for SLB transactions.

“The V2500-A5 and CFM56-5B and -7B are the most popular assets because of their large installed base,” says Wood. “A320 and 737NG family aircraft are in service in most global regions. This provides flexibility to a lessor in terms of the number of potential clients and geographic markets, if it is required to move or re-position its engine asset.”

The V2500-A5 series is an engine

option for the A319, A320 and A321. For a V2500-A5 S1 (S1 suffix denotes SelectOne standard) engine in a half-life maintenance condition, the International Bureau of Aviation (IBA) estimates a current market value (CMV) of \$4.50-7.35 million. IBA forecasts an RV range of \$3.95-6.20 million after seven years. That is, a net drop in value of 12-19%.

The CFM56-5B is an option for the A318, A319, A320 and A321.

IBA estimates a CMV range of \$4.80-7.40 million for a CFM56-5B/3 engine in half-life maintenance condition. It forecasts an RV range of \$4.05-6.60 after seven years; a drop of 11-15%.

The CFM56-7B series is the only engine option for the 737-600, -700, -800 and -900.

IBA estimates that a CFM56-7BE (latest standard) engine in a half-life maintenance condition would have a CMV range of \$5.05-7.50 million. It forecasts that this engine variant would have an RV range of \$4.70-7.15 million after seven years; a drop of 6-8%.

“Widebody engines may also feature in SLB transactions, but they have a higher price and smaller operator base than narrowbody engines,” says Janagan. “The remarketing risk associated with this means that OEM-affiliated lessors are more likely than independents to be involved in transactions for widebody engines. Having said that, independent lessors have completed a number of widebody engine transactions in the past three years, indicating that they are becoming comfortable with these larger engines,” adds Janagan.

In addition to the higher costs and smaller operator base associated with widebody engines, greater OEM control of the aftermarket in this area could lead to fewer lessors taking the residual value risk on these assets.

### Transaction economics

*Aircraft Commerce* has simulated figures for engine SLB transactions, based on some of the typical financial assumptions previously discussed. This will help to understand the potential cashflow and profit and loss performance of an engine SLB transaction from the lessor’s perspective (*see table, this page*).

The main assumptions used were an engine age of two years, a typical lease term of seven years, a debt/equity ratio of 75:25, and a debt balloon of 25%. A depreciation rate of 5% of book value per year was used, and the cost of debt was assumed to be 5%. The assumed lease rate factor was 0.75%.

It should be noted that the assumptions used are only intended to offer an example of the potential economics of engine SLB transactions. In reality many of the stated assumptions

can be highly variable depending on the lessor, the way the engine asset has been financed and accounting practices. In addition, lessor overheads have not been included. Any overheads would need to be subtracted from the stated cashflow and profit figures.

The figures were run for three engine variants that are likely to be among the most popular for this type of transaction: the V2500-A5 S1, CFM56-5B/3 and CFM56-7BE. The CMVs and RVs used were at the top end of IBA's appraised and estimated values for these engines in a half-life maintenance condition.

The CMVs used were \$7.40 million for the CFM56-5B/3, \$7.50 million for the CFM56-7BE, and \$7.35 million for the V2500-A5 S1 (see table, page 10). The estimated RVs after seven years were \$6.60 million, \$7.15 million and \$6.20 million respectively.

The higher values of the CFM56-7BE might be because this engine series is the only option for 737NGs, while A320 family operators may choose from the CFM56-5B and V2500-A5 families.

Transactions involving all three engines would have resulted in negative monthly cashflow for the lessor, with debt repayments exceeding lease rental revenue (see table, page 10).

A 75:25 debt/equity ratio means that the lessor would need to invest \$1.85 million in equity in a CFM56-7BE and

secure \$5.55 million of debt (see table, page 10). With a 25% debt balloon, the lessor would need to repay \$4.16 million in monthly instalments over the lease period, and a single instalment of \$1.39 million at the end of the lease term. With a cost of debt at 5%, the lessor would need to make monthly debt repayments of \$64,346. The lease rate factor of 0.75% results in a monthly lease rental of \$55,500 for the CFM56-7BE. The monthly cashflow, not considering overheads, would be a loss of \$8,846 for this engine (see table, page 10).

Despite negative monthly cashflows, the transactions for all three engines would have resulted in a positive total cashflow, because the RVs for each engine were high enough to cover the combined cost of the debt balloon and equity, as well as the sum of monthly cashflow losses, and still provide a positive cashflow over the whole transaction.

The CFM56-7BE provided the largest total cashflow of \$3.12 million, compared to \$2.62 million for the CFM56-5B/3, and \$2.23 million for the V2500-A5 S1 (see table, page 10).

The CFM56-7BE also provided the best profit and loss returns.

The CFM56-7BE generated a total revenue of \$4.73 million in lease rentals over the seven-year term (see table, page 10). When book depreciation of \$2.63 million and interest costs of \$1.29 million

are deducted, the remaining profit, excluding an allowance for overheads, is \$807,000. The profits from lease rentals for the CFM56-5B/3 and V2500-A5 S1 are close behind at \$797,000 and \$791,000.

The CFM56-7BE's higher residual value results in a larger discrepancy in total book profits between this variant and the other two engines types.

Deducting the book depreciation for the lease term from the CMV leaves an end book value of \$4.88 million for the CFM56-7BE (see table, page 10). Deducting this end book value from the RV gives an engine value book profit of \$2.28 million. This is added to the profit of \$807,000 from lease rentals for a total book profit of \$3.08 million for this engine variant, compared to a book profit of \$2.59 million for the CFM56-5B/3 and \$2.21 million for the V2500-A5 S1.

Based on the assumptions used in this analysis, the CFM56-7BE represents the best investment out of the three engine types. The engine with highest residual value provided the best returns. This emphasises the importance of residual value to a lessor's cashflow and profit expectations for SLB transactions. **AC**

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