

Engine purchase and leaseback transactions are regarded as specialised and practised by a handful of lessors. Lease terms are short and returns rely on strong residual values. Engine types have to be picked carefully, but good returns can be made.

Mechanics of engine purchase and leasebacks

Engine sale/purchase and leaseback transactions are specialist deals carried out by a handful of lessors. The benefits to lessees are the removal of their ownership risk and the raising of liquidity from spare engines. Lessors can make profits on the residual value of the engines, because they often have good residual value retention.

Principles

The basis of purchase and leaseback transactions for engines is that the lessee will benefit by gaining liquidity from an engine sale. Lessees can only sell their spare engines to lessors, since banks and lessors that finance aircraft for airlines do not want their aircraft without engines.

“There are difficulties with installed engines with the primary lien holder,” says Charlie Willis of Willis Lease Finance Corporation (WLFC). “An aircraft owner does not want to share the aircraft and engines with another lessor”.

Lessees also benefit when disposing of an engine they are phasing out.

Lessees most often benefit if they can conclude a deal for a young fleet of spare engines. Major lessors, such as ILFC, have been known to get purchase discounts of 20-30%. Major airlines may not be able to get such large discounts, but 10-20% is possible. Airlines have to invest in spare engine inventories. Engines with a market value of \$5 million could therefore make a profit of up to \$1 million when sold to a lessor and leased back.

Lessors take ownership risk, but will profit if the re-sale value at the end of a lease is high enough to repay outstanding debt with significant margin.

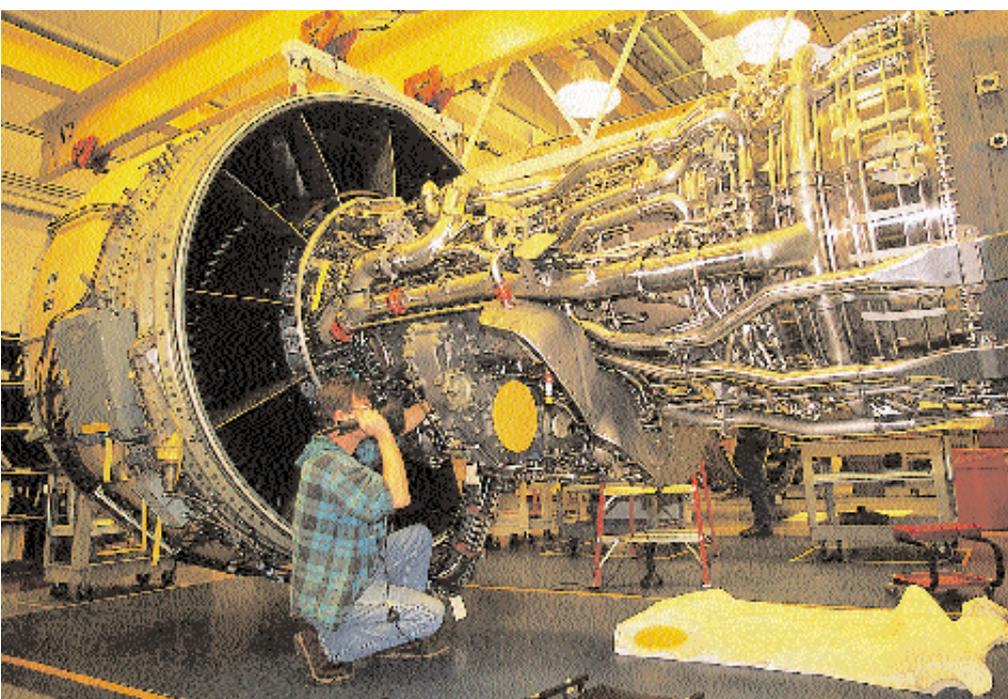
Lessors will finance purchases with equity and debt. Debt will typically be up to 80%. A lessor will make a profit from residual value if, once the debt balloon has been repaid after re-sale, the equity portion has increased from its original level of 20%. Lessors often sell engines part way through the lease term with a lease attached, and generate profits from residual value this way. This is cashflow.

Book profitability also depends on depreciation and the depreciated value increasing by a larger amount than the outstanding balloon throughout the term. Lessors therefore also have to consider profit or loss on disposal of asset.

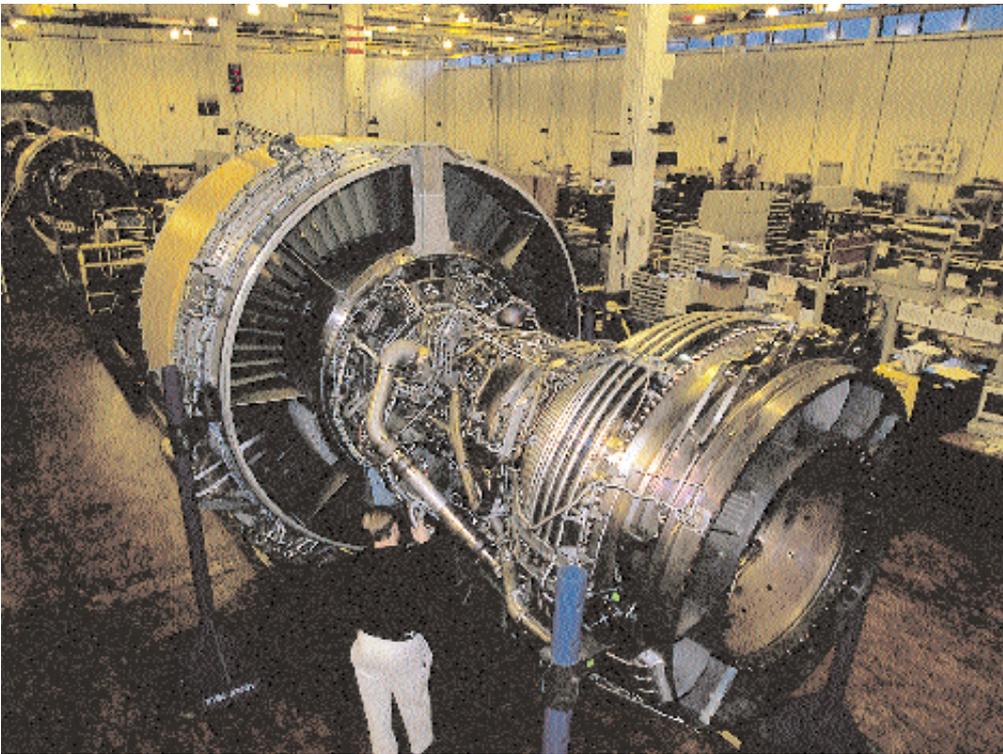
Depreciation rates are relatively shallow, with many lessors using annual straight line rates of 3-5%. Book value at the end of a five-year term will then still be 75-85% of the purchase value. This slow depreciation can be practised for young engines, since they have good residual value performance.

Lessors can also benefit from lease rentals being high enough to cover debt repayment and their direct and fixed costs, while still leaving a margin for return on equity invested.

Lease terms are normally 3-7 years. Terms longer than this can make transactions unprofitable, since the market value of engines will have



Airlines selling engines benefit if they bought spare units at a discount and released liquidity from the asset. Lessors take a risk on residual value, but can make good returns in a short time.



decreased too much compared to outstanding debt. Debt service or repayment is relatively low, since lease rentals also have to cover lessor costs and engine depreciation. The majority of debt service payments consist of interest and only a small amount of principal repayment.

“Another reason for medium-term leases is that it is harder for lessors to predict residual values accurately over a longer term, exposing them to greater risk,” explains Robert Peart, senior vice president and general manager of AAR Engine Sales and Leasing. “It is easier to predict residual value over consecutive short-term leases. Lessors will therefore re-finance an engine at the end of each short-term lease and increase its chances of making a profit on residual value on each term”.

Lease rentals are normally in the range of 1.1-1.4% per month, but the actual rate depends on the lessee’s creditworthiness. Rates are affected by an engine’s popularity. The leasing market is also competitive and lease rates are being forced down.

Separate to lease rentals, lessees and lessors have to agree terms for managing the engine with respect to maintenance. Lessees will have to pay maintenance reserves by contract.

An engine will require maintenance during or at the end of the lease term, and the replacement of life limited parts (LLPs) at some stage. An engine’s utilisation, predicted shop visit intervals and costs, and timing of LLP replacement, will all have to be considered. The lessor will have to stipulate maintenance return conditions at the end of the lease. Estimated resale

value, on which the profitability of the transaction lies, is based on no time since overhaul (NTSO) conditions. Maintenance reserves will cover the value reduction if the return condition is as predicted. If it is different, then the lessee and lessor must come to an agreement to make a value adjustment.

Engine NTSO values are adjusted for the use of LLPs, as well as for the effect of inflation over the lease term.

Engine candidates

The potential of engine purchase and leaseback transactions relies on residual value performance. Lessors therefore take a risk with the engine types. Only engines that are likely to remain popular and retain good values will be considered.

Types such as the baby JT8D series, older JT9Ds and most RB211 variants will not be desirable, since they are diminishing in number and demand has collapsed in many cases.

Other types, such as the GE90, PW4000-100/-112, Trent 700/800 and RB211-535, are operated in limited numbers or their manufacturers have a high degree of control over their aftermarkets. There is no secondary market for these engine types.

This leaves the JT8D-200, PW2000, PW4000-94, CF6-50/-80, RB211-535 and CFM56 family as the most likely candidates. Lessors will still have to view some of these types carefully, because of an uncertain future. The CF6-50 is a particular case, since there is a surplus of DC-10s. This may change if a large number become converted to freighters and demand for engines is increased. Supply of engines can even become short.

The difference between residual value and outstanding debt is the biggest determining factor in profitability. Popular engines have residual values in the order of 80% of their original cost after five years.

This will boost CF6-50 values to a level higher than they are currently trading for, making large profits for lessors – and taking away the risk of investment.

If a large number of DC-10s remain surplus then CF6-50s values will fall further. This is an example of high risk in older engines.

Older engines also have to be fully or more aggressively depreciated or the debt invested repaid at a higher rate during the lease term. This can only work with higher lease rentals. These are less likely to reflect the engine’s market value and popularity, and will make transactions unattractive to a lessee. As an engine gets older and declines in popularity the economics of the transaction become harder to justify.

Most younger engine types all have reasonable or good market shares, are operated by large numbers of airlines and power aircraft that are popular. This will make their values predictable and stable over 3-7 year terms. Thus, the CFM56-3/-5/-7 series, PW2000, PW4000, CF6-80 and RB211-535 all present good opportunities for lessors considering purchase and leaseback transactions.

Technical considerations

The first technical issue to consider is maintenance return conditions. “These are very specific with respect to exhaust gas temperature (EGT) margin, LLPs and the time on-wing since last overhaul,” explains Bill Cumberlandidge, executive vice president at The Ages Group. “A cash adjustment can be made at the end of the lease if actual and required return conditions vary”.

Lessees also have to pay maintenance reserves, which are determined by predicted utilisation and cost of shop visits. “The lessor takes ownership risk, but the airline lessee takes maintenance risk,” says Peart. “The lessee is responsible for maintenance and this is enforced by contract. Our technical group manages the engine with respect to monitoring maintenance and airworthiness directives (ADs) being issued, which could affect values and remarketability. Our technical group also states the engine’s return conditions. We often ask for engines to be returned in a NTSO condition, and with a minimum life of 3,000-5,000 flight cycles remaining on the LLPs. We also use a formula to make adjustments to the value. Airlines

keep the maintenance reserves, since they have to perform it to return the engines at the end of the lease. We want to have engines at the end of the lease that we can re-market, so they must be popular”.

Other technical considerations are the risks of the obsolescence of engines due to technical advances or regulatory changes. Again, older engines pose a higher risk. “If ADs are issued then these have to be accomplished by the operator, increasing their cost,” says Peart. “EGT margin is also risky, since it is sometimes unpredictable. These two factors are the downside for a lessee”.

Market values & lease rates

Lease rates charged will be based on the market value of an engine adjusted for its maintenance condition. Market values of new engines are more stable and become less predictable as they age.

A lease rate for a new or young engine is therefore relatively easy to assess. The normal method for assessing values and so lease rates will be by an appraisal from an engine appraiser. “Lessors often try to get an appraised value for an engine higher than the actual market value or what they paid for it,” explains Mort Beyer, president of MBA. “Monthly lease rates are usually in the 1.1-1.4% per month range. An appraised value of \$5 million for a new or young engine will then have a monthly lease rate of \$55,000-70,000”.

Market values will fall as the engine ages. The actual value will determine the profit margin for the lessor, so it will be relying on a reliable prediction of residual value by the appraiser on which to base its financial calculations. “The appraised value by us for an engine at the end of a lease term is based on NTSO, the use of LLP lives and annual inflation of 2.5%,” says Beyer. “Typically, a new or young engine with an appraised value of \$5 million at the start of the lease will have an NTSO value of about \$4 million after five years. It is much harder to predict

values of older engines, since they can go up and down with varying popularity and demand. For example, a JT8D-17 two years ago had a value of about \$1.5 million, but now it is worth less than half that.

“Values of CF6-80s and PW4000s should maintain 80% of their original value, accounting for LLP consumption, for some time. Engine values do not deteriorate much for the first 15-20 years,” continues Beyer.

Actual residual value realised by the engine is key to profitability. “This means engines have to be easy to remarket,” says Willis. “We have purchase and leasebacks with T8D-200s and CFM56s”.

AAR is in a similar situation to WLFC, since they both have the option of stripping down engines for parts, which can be sold or, in the case of WLFC, used in its own engine shop. “We therefore also take into consideration scrap value if we get involved in older engines types,” says Peart at AAR.

“WLFC can lease engines, tear them down for parts, sell them or put them through the shop,” says Willis. “This exposes us to less risk on a particular transaction. Many lessors are often restricted about what they can do with an engine, because of ownership issues. We have the option of selling engines for parts and so can minimise risk this way”.

The CFM56-3C1 is an example of market value assessment of an engine. Avitas’ current market value assessment is \$4.2 million for a bare engine, and \$3.2 million in 2005. This is a reduction in real value of about \$200,000 per year and 24% over five years. This fall in value assumes no reduction in maintenance condition. This level of reduction will be similar for the CF6 and PW4000.

“Monthly rentals are typically in the region of 1.0-1.25% a month, but depend on the age, lessee credit and the lease terms. Ultimately, though, they are market rate dictated,” continues Willis.

Finance & economics

Profitability hinges on residual value. Residual value performance also influences the amount of outstanding debt the lessor is allowed to repay as a balloon at the end of the lease.

A new or young engine purchased for \$5 million might be expected to have a residual value of 80%, or \$4 million.

The lessor will have to determine what debt : equity ratio presents an acceptable level of risk. Most transactions will have a debt portion of up to 80%. A lessor acquiring an engine for \$5 million will then have to invest \$1 million.

Debt service is the major factor in deciding profitability. Lessors are not required by banks to service all debt during the lease term. A total of \$4 million of debt to be repaid in 60 months would require a monthly payment of more than \$80,000; \$22,500 more than the lease rental.

Lessors negotiate a balloon payment of outstanding debt to be repaid at the end of the lease when the engine is sold. This reduces debt service payments, which have to be funded from lease rentals. Debt balloons are essential to make the cashflow viable. The larger the balloon, the smaller the monthly debt service payments and the easier the cashflow.

“To be confident of having the entire debt balloon repaid, banks base the balloon amount on a percentage of the appraised estimated value of the engine throughout and at the end of the lease,” explains Peart. “The allowed balloon as a percentage of estimated value will be the same or less than the debt portion to purchase the engine. A debt portion of 80% to finance purchase will mean the debt balloon will be 65-80% of the uninflated estimated re-sale value”.

A debt balloon of this magnitude is only usually secured if the debt provider has recourse to the lessor’s balance sheet. If the debt provider is relying entirely on the asset, then debt balloons of only up to

50% may be granted.

The estimated re-sale value of a \$5 million engine after five years might be \$4 million. The allowed debt balloon will be up to \$3.2 million and this will determine the required loan payments, which are available from the lease rentals. A more conservative debt balloon of 67.5% and \$2.7 million would require a higher debt service payment of about \$42,000 per month if an interest rate of 7% was secured. "Cost of capital for most lessors will be 50-150 basis points above base rate, or 7-9% per annum," says Willis. A 1.15% monthly lease rate will result in lessee payments of \$57,500 per month.

The lessors will have to consider their costs and engine value on a continuous basis to ensure the transaction remains viable. A lessor's costs and cash commitments will be debt service and its own fixed and direct costs; insurance, engine management and general overheads. The lessor's costs will have to be derived from the lease rental. Monthly lessor costs of \$3,000 will leave a net lease rental of \$54,500 to service debt and possibly leave a return on equity for the lessor. From net lease rental, debt payments leave \$12,500 a month for return on equity.

Depreciation rates are low at only 3-5% per year. A \$5 million engine

depreciated at 3% annually will have a book depreciation of \$12,500 a month. A 60-month lease will then see the book value reduced to \$4.25 million. This rate of depreciation leaves a risk of book value exceeding residual value. A steeper depreciation of 4% a year will leave a book value of \$4 million, closer to the expected re-sale value.

To summarise: purchase is \$5 million and monthly lease rentals \$57,500. Equity is \$1 million and debt \$4 million. The lease rental stream over the lease is therefore \$3.45 million.

Lessor costs depend on circumstances, but, in this example, they total \$180,000. Book depreciation is \$1 million; debt repayments are \$2.511 million. Re-sale and depreciated book value is \$4 million.

The latter is used to repay the \$2.7 million debt balloon, which leaves an income statement of \$7.45 million for lease rentals and engine sale. This compares to cash outgoings of \$6.391 million, providing an overall cashflow of \$1.059 million.

Such a figure is a good return after five years for a lessor that invested \$1 million equity in an engine. A lessor that has only been able to secure a smaller debt balloon of \$2.1 million would require higher debt service payments. This would also reduce the return on

equity gained from each month's lease rental. Although there is a trade between debt balloon, monthly payments and equity return, it would have little effect on the overall cash expenditure and cashflow over the lease.

The need for a higher equity injection would reduce the debt portion. Relative to the same debt balloon repayment, monthly debt payments would be reduced. This again would not have much effect on the overall cashflow of the transaction.

Some lessors will have to pay higher interest rates and so debt payments to meet the same debt balloon. In this example, an 8% interest rate would raise monthly debt payments by about \$2,700, or a total of \$162,000 over the whole period. This would nevertheless leave a positive cashflow of about \$900,000 across the whole deal.

Other costs that influence the cashflow of the deal will be lessor costs. Large lessors can benefit from economies of scale and so reduce cost per engine.

The biggest influence on overall cashflow is therefore residual value and lease rentals. A higher lease rental of 1.2% would be \$60,000; increasing cashflow by \$150,000 over the term. This additional revenue is about the same as the sensitivity of the residual value. 