A large number of 200- to 300-seat widebodies have become unviable with higher fuel costs. While replacing them with the A350 & 787 is straightforward; delays with new aircraft, a shortage of widebodies and the need for fuel surcharges raises the issue of whether airlines should keep or replace these older aircraft.

Do small & medium widebodies need replacing?

Demand for aircraft has outstripped supply in recent years. A shortage of capacity has led to rising widebody values and lease rates. Lease rates for 767-300ERs, for example, have doubled to $650,000 per month from their low levels of 2002/03. Recent projections of continued traffic growth suggest that the current shortage of widebodies will persist until 2012-13. Oil prices continue to rise, however, and modern types can offer lower fuel and maintenance costs. While this suggests that older aircraft should be replaced, the 787 and A350, will not be delivered in large numbers for another five to eight years.

However, the shortage of aircraft may be short-lived. Some airlines are preparing to reduce capacity in an attempt to force up yields, and demand will also be suppressed by fuel surcharges imposed to overcome the ever-increasing price of fuel. It remains to be seen how large fuel surcharges need to be, and how much these higher fares will affect passenger demand and airlines' need for aircraft.

Capacity reductions will inevitably lead to an increased supply of older aircraft. Even if large numbers of these are parked and retired because of higher oil and fuel prices, airlines will still try to acquire more fuel-efficient modern types in order to improve their long-term efficiency.

Fleet profile

Replacing older widebodies in the 200- to 300-seat category concerns the A300-600, A310, 767-200/-300, DC-10-30 and MD-11. There may even be a case for replacing the oldest A330-300s and A340-200/-300s.

There are 40 L-1011s and DC-10-30s ranging in age from 23-30 years old in passenger operation *(see table, page 41)*, mainly operated at low rates of utilisation by charter carriers. Airlines operating these types will only acquire younger widebodies, like the 767 or A330, when they become available at low market values.

There remain 27 MD-11s in passenger operation, mainly with Finnair and KLM. These are 10-18 years old, and will be replaced with modern types. Finnair will phase in A330s and later A350s.

There are 143 A300-600s, 87 of which are more than 15 years old. There are also 90 A310-300s of this age in passenger service, and another 29 younger aircraft. There are also 82 767-200/-200ERs and 250 767-300/-300ERs more than 15 years old *(see table, page 41)*. This means that almost 500 of these 1980s medium widebody twins are older than 15 years of age, and still in passenger service. The 767s will be in their fourth base maintenance cycles, and the A300-600s/A310s will be in their third.

Overall, there are 570 L-1011s, DC-10-30s, MD-11s and widebody twins more than than 15 years old in passenger service. These are prime replacement candidates.

There are also 220 1980s-generation widebody twins in service that are 10-15 years of age. These aircraft are now all on their second or higher base maintenance cycles, so their fuel and maintenance costs make them possible candidates for replacement. These two groups comprise 885 aircraft.

There are 74 A330-300s, 19 A340-200s, 119 A340-300s, 65 777-200s and 98 777-200ERs, totalling 375, that are 10 years or older in passenger service *(see table, page 41)*.

Replacement economics

The current shortage of widebodies at first suggests that the relative operating costs of these older types to the new aircraft are academic. Most order books are full and production slots are booked for several years ahead, so many airlines will be forced to keep their current fleets operational. The ever-increasing price of fuel means that airlines are forced to add fuel surcharges, resulting in higher operating costs, reduced passenger demand and aircraft being parked. The effect of higher fuel costs on the relative operating economics of each aircraft is examined.

The types listed *(see table, page 45)* are compared with replacement options: the 787-8 and -9, and A350-800 and -900.

Aircraft have been examined on typical route lengths. These are 1,500nm for the A300-600 and A310-300, which are compared with the A350-800 and 787-8. These are all assumed to have annual utilisations of 3,000 flight hours (FH).

The other types have all been examined on a 3,000nm mission, and are assumed to have an annual utilisation of 4,500FH. Seat numbers influence relative unit costs per available seat mile (ASM). The assumed seat numbers for each are summarised *(see table, page 45)*. The seat numbers reflect typical two-class configurations for international operations. Seat counts vary from 185 for the 767-200ER to 290/295 for the 777-200ER and A350-900, which are the largest aircraft studied here.

Direct operating costs (DOCs) have

been examined against a fuel price of $2.50 per USG and $3.50 per USG. Relative differences between types and a change in the relative differences between competing types can then be analysed with these two fuel prices.

The three categories of DOCs that differ between aircraft types are fuel, maintenance and lease rentals. These can be examined as both trip costs and unit costs per ASM. The total trip costs of these three categories are changing regularly as the price of oil constantly increases.

Flightcrew costs can also be analysed. Pilot salaries and most associated employment costs will be the same or close, however, for similar-sized types. The only possible differences will be that new aircraft may have small advantages in training-related costs as a result of flightdeck commonality between types.

Options for replacing older aircraft include the 777-200ER, 777-300ER, A330-200/-300, A340-500, A340-600, 787-8/-9 and A350-800/-900. The A340-500 and -600 have not sold well and orders have dried up.

Airlines are only realistically considering four families, whose economic benefits are well documented: the 777, 787, A330 and A350. The twin-engined design of each aircraft will bring weight and fuel burn savings. The A350 and 787 families offer the latest engine technology, and combined with aerodynamic efficiency, they are expected to have 15-20% lower fuel burn than similar-sized previous generation aircraft. Each generation of aircraft provides a saving. Finnair has ordered A330-300s and A340-300s as interim replacements for its seven MD-11s. "We ordered the A330s and A340s because the A350XWB was delayed. We decided to replace the MD-11 for a number of reasons: the supply of additional used passenger aircraft was becoming less reliable; we had concerns over operating costs; the MD-11 has an image problem with many of our interlining Asian customers; and it is getting harder to maintain technical reliability with few MD-11s being supported at our outstations in the Asia Pacific," explains Maunu Visuri, assistant vice president of fleet management at Finnair. "You can generally say that the A340-300 will have 10% lower fuel burn per seat than the MD-11, and that the A330 will have 20% lower burn per seat than the MD-11. We have selected the A350-900, which will have 29 more seats than the A330-300, and will have 30% lower fuel burn than the MD-11."

The new generation Trent 1000 and GEnx engines that power these two families are also expected to provide some benefits with longer removal intervals between shop visits compared to the CF6-80E1, GE90, Trent 700/800 and PW4000-100/-112 engines that power the A330 and 777 families. While longer removal intervals are likely with the Trent 1000 and GEnx, maintenance costs per engine flight hour (EFH) are also highly dependent on material and parts prices. These include turbomachinery blades and vanes, and life limited parts (LLPs). The list price of these materials increases at rates similar to inflation each year, and it is likely that these price rises will offset any advantage gained from longer removal intervals. "The problem is that the more an engine design pushes for fuel savings, then the smaller the savings that can be made in maintenance costs. In some cases engine maintenance costs even increase, because higher core temperatures, larger turbines and larger fans are required to obtain lower fuel burns," explains Visuri. "You also now have total care packages more often with engines, and these maintenance rates have little to do with engine technology."

The 787 is well-known for its extensive use of carbon fibre in the airframe. The principal benefits of this will be: lower weight, which affects its fuel burn performance; the ability to allow longer intervals between structural inspections; and a lower non-routine ratio and man-hours (MH) used in base checks. The use of carbon fibre should also mean fewer inspections for the detection and prevention of corrosion, and it may even be possible for no inspections of this nature to be required at all. This will reduce routine inspections, and contribute to fewer MH being used than on previous generation aircraft.

The 787's maintenance programme will start with a calendar interval of 36 months, twice the 767's base interval. The 787 will also have an A check interval of 1,000FH, which compares to 500FH for the 767 and 600FH for the A330. The 787 can clearly be expected to have lower airframe maintenance costs. Base checks will, however, still require MH for routine tasks, non-routine rectifications, modifications and airworthiness directives (ADs), interior cleaning and refurbishment, management of in-flight entertainment equipment (IFE), and the testing and removal of rotable components. The savings from carbon fibre will bring some benefits, but the savings for A and base check reserves are expected to be 15-20% compared to current generation aircraft when analysed on a $ per FH basis.

The A350's maintenance programme will follow the same format as the A330's eight checks, including two heavy visits. The A350's base check interval will be 24 months. Moreover, the A350 will contain less carbon fibre than the 787. The A350's base check reserves are therefore expected to be $100-105 per FH, making them higher than the 787's.

"You know a new aircraft's planned maintenance programme and the possible savings it will deliver," says Visuri. "You also have the power-by-the-hour rates proposed by engine manufacturers, and if you know the percentage of maintenance cost accounted for by engines and airframe, then you can estimate the total maintenance costs for the aircraft, and so compare them with those for your current fleet. While there are savings from technology in new aircraft, cabin maintenance is increasingly important

200- TO 300-SEAT WIDEBODY FLEET PROFILE

Year	More than 20 years old	16 to 20 years old	10 to 15 years old	Total aircraft
L-1011	22			22
DC-10-30	16	3		19
A300-600	13	60	56	143
A310-300	25	74	29	118
767-200	44	38	5	87
767-300	21	230	218	469
MD-11	0	5	22	27
A330-300		2	72	74
A340-200			19	19
A340-300			119	119
777-200			65	65
777-200ER			98	98
Total	**141**	**416**	**703**	**1,260**

and accounts for a larger percentage of maintenance costs. Cabin maintenance has little to do with aircraft type, but has a big influence on total maintenance cost."

Fuel cost

The price of jet fuel per US Gallon (USG) comprises the price of a barrel of oil plus about $25 for the cost of refining, or 'crack spread', divided by 42. An oil price of $80 therefore equals a fuel price of $2.50 per USG. A higher oil price of $122 per barrel equals a jet fuel price of $3.50 per USG. Each change of $21 in the price of oil equals a $0.50 change in the price of jet fuel.

The market oil price has risen from $74 per barrel in April 2006 to $120 in late April 2008. This is equal to jet fuel increasing from $2.25 to $3.45 per USG. This $1.20 increase will have a large effect on the relative differences in DOCs of competing aircraft. It will clearly favour the most modern types with the highest fuel efficiency.

This rise in the price of oil only directly affects US carriers. As oil is denominated in US dollars, and the dollar has depreciated against all currencies in recent years, this has offset the rising cost of oil to a degree for airlines outside the US.

The price of oil stood at $74 per barrel in April 2006 and, after trading up and down, was almost the same in August 2007 at $75. Since then, the price has risen steadily, reaching $110 in early April 2008, and almost $124 in early May 2008. In parallel, the Euro has gained strength against the Dollar over the same period, rising from $1.23 in April 2006 to $1.56 in April 2008. This has seen the Euro price for oil change from Eur 60 to Eur 70 over the same two-year period: an increase of 17% versus a 49% rise in the Dollar price of oil. The last month's rise of another $14 to $124, has seen the Euro price climb to Eur 80, an increase of 33% since April 2006.

A similar effect is seen with other currencies. The Chinese Yuan also appreciated from Rmb 8.07 to Rmb 7.00 to the US Dollar between April 2006 and April 2007, resulting in a 29% rise in the Rmb price versus 49% for the Dollar price of oil. A rise of just 32% in the Indian Rupee price of oil was seen over the same period. The depreciating dollar has therefore offset some of the rise in the price of oil, and consequently jet fuel, meaning that airlines outside the US are less affected than those in the US by higher oil prices.

Fuel burn

Approximate or expected fuel burns for the different aircraft types on the used mission lengths are summarised *(see table, page 45)*.

The superior fuel burn performance of the modern types clearly has a large influence on total operating costs. The two 787 variants have lower fuel burns than the two larger A350 variants. The A350-800 is positioned between the 787-8 and -9, while the A350-900 is the largest aircraft.

Fuel, however, is only one element accounting for a fraction of operating costs. With fuel costs at $0.60-1.0 per USG, the fuel burn advantage of new generation aircraft was often not enough to offset their high financing charges or lease rentals compared to those of older aircraft. Overall, older aircraft often had total lower costs per ASM than new aircraft. Airlines had to acquire new aircraft, however, in order to accommodate traffic growth and avoid the inevitable long-term increase in maintenance costs of older aircraft.

The current high fuel prices will favour new aircraft more, although they may now have higher financing costs as a result of the credit crunch and more expensive financing terms.

Maintenance costs

Some of the advantages that the 787 and A350 may have with respect to maintenance costs have been described. The five main elements of maintenance costs are: line and ramp maintenance; A checks; base checks; heavy components; rotable inventory support; and engine maintenance.

The costs of these per flight hour (FH) are summarised for the aircraft types analysed at the flight cycle (FC) times commensurate with the mission lengths of 1,500nm and 3,000nm *(see table, page 45)*.

Some line and ramp checks for most types can now be performed by flightcrew. The workscopes of tasks for these checks are also similar for all types, which means that there will be little difference between them in respect of costs of line and ramp maintenance. Younger aircraft, however, will have an advantage over older types, since they experience fewer technical defects and non-routines during operation. These are most often cleared during weekly and A checks.

Heavy components such as wheels, brake units, landing gears and auxiliary power units (APUs) again vary little between types. Heavy component costs will be high for aircraft operated on short FC times.

There is also little difference between the costs of supplying and maintaining rotable components between types. The 787 may be able to provide some saving here because some system components will be eliminated and it will also have fewer avionic units. The differences in rotable-related costs per FH are therefore likely to be small between most competing aircraft types. The 787 can be expected to have a small advantage in this cost category.

The elements of maintenance that could make the largest differences between types are A checks, base maintenance, and engine-related costs.

Young and modern types will benefit in A checks because their intervals are longer than those of older aircraft. Younger types will also have a lower rate of non-routine maintenance and fewer deferred defects to clear.

Base maintenance is one key area in which airlines will be expecting savings from modern and young aircraft. These have the benefits of longer check intervals, reduced tasks because of more efficient maintenance programmes and lower non-routine ratios. This will bring some savings, but other elements of base check workscopes will still be present. The 787, for example, is therefore expected to have reserves of $80 per FH, compared to $100 for the A350, $130 per FH for mature A330s and 777s, $165 per FH for A340-200/-300s and mature 767s, and $250-260 per FH for the DC-10-30 and MD-11 *(see table, page 45)*.

Base check reserves rise for shorter FC times, and are $175-180 per FH for the A300-600 and A310-300, $115 for the A350-800 and $85 for the 787-8.

Engine reserves are the other main element influencing maintenance costs between aircraft types. The CF6-80C2 and PW4000-94 engines on the A300-600 and A310 both have reserves in the region of $245 per engine flight hour (EFH).

The CF6-50C2 has a high reserve of $260 per EFH, even when operating at a cycle time of close to seven hours. By comparison, the CF6-80C2 and PW4000-94 powering the 767 family and MD-11 are $175 per EFH at 7EFH. The CF6-80E1, PW4000-100 and Trent 768/772 vary, but average $235-245 per EFH at 7EFH for the A330-200 and -300 *(see A330-200/-300 maintenance analysis & budget, page 20*). Larger GE90, PW4000-112 and Trent 800 series average $345 per EFH for the 777-200ER at 7EFH per cycle.

While the new Trent 1000 and GEnx

While the A340-300 has already been overshadowed by the A330-300 and 777-200ER on a cost per seat basis, the A350-900 and 787-9 have a cost per seat up to 25% lower than the A340-300.

are expected to have longer shop visit removal intervals, shop costs are likely to be higher mainly because of higher material and parts prices. Estimates for reserves on these two engines average $250 per EFH for the A350-800 and 787-8, and $260 per EFH for the A350-900 and 787-9 when operating at 7EFH per cycle. These reserves increase to $355 per EFH at 3EFH per cycle *(see table, page 45)*.

On this basis, the A350-800 and 787-8 are overall unable to have significantly lower maintenance costs than the A300-600 and A310-300 on medium-haul missions. While the 787 and A350 benefit from lower airframe maintenance, this advantage is countered by higher engine reserves.

On the longer 3,000nm mission, the 787 and A350 variants have total maintenance costs of $1,030-1,130 per FH. These are up to $550 per FH less than the similar-sized DC-10-30, MD-11, A340 and 777-200ER. The 787 and A350 have little advantage in maintenance costs over the A330-200/-300. This is again because the high reserves of the new engines offset the 787's and A350's lower airframe costs.

The 787 and A350 variants have slightly higher maintenance costs than the smaller 767 variants.

Lease rentals

Financing charges and lease rentals have traditionally been the highest of all operating costs. Lease rentals have risen for all aircraft types generally with the shortage of aircraft, while those for new aircraft may be higher than in recent years because of lack of available financing.

Lease rates for used aircraft vary according to age, and the rentals used here reflect earlier built examples for each type *(see table, page 45)*. This is because it is expected that earlier built aircraft are more likely replacement candidates. This includes the 777-200ER. The monthly rentals used are summarised *(see table, page 45)*.

In calculating the lease rentals used for the new 787 and A350 models, probable purchase discounts of 20% are assumed, and monthly lease rate factors in the order of 0.9%.

Overall economics

While lease rentals and finance charges used to account for the highest element of operating costs, the current economic climate means that fuel is now one of the highest costs faced by operators. With a price of $2.50 per USG, fuel is the clearly the highest of the three costs analysed in the case of all used aircraft types. While this may imply that used aircraft are likely to have higher operating costs than new aircraft, high lease rentals make the 787-8 and A350-800 more expensive per seat by $14-24 than the A300-600 and A310-300 on medium-haul operations *(see table, page 45)*.

On longer missions of 3,000nm the 787-8 is also more economic than the similar-sized 767-300ER by almost $30 per seat. The A350-800 has almost the same seat-cost as a 767-400ER and less than the A330-200, despite the 767-400 and A330-200 having a lease rate advantage of $260,000 per month. The seat costs of the A350-800 and 787-8 are $38-56 lower than those of the A340-200 *(see table, page 45)*.

The A350-900, 787-9 and A330-300 have similar economic performance. Moreover, at this fuel price the A350-900 has lower costs per seat than the A340-300 and 777-200ER by $18-45 per seat, despite the A350's $300,000 higher lease rental *(see table, page 45)*.

This indicates that older aircraft should be replaced with the appropriate 787 and A350 models whenever possible in most operating scenarios, but only when operated in a Dollar revenue and cost environment. As described, the Dollar's depreciation has offset some of the rise in oil and fuel prices for those airlines operating outside the US. Fuel prices are nevertheless relatively high for all airlines, wherever they are in the world, compared to the historically low levels of 1998 to 2002. The analysis here still indicates the relative operating costs of different types under current economic conditions.

At a higher fuel price of $3.50 per USG, the gap in cost per seat between old and new competing aircraft increases in most cases. The 787-8 and A350-800 still have costs per seat $7-18 higher than the A300-600 and A310.

The differences between used and new aircraft widen on 3,000nm missions. The 787-8 has a $40 lower cost per seat than the 767-300ER, $34 lower than the 767-400ER, $42 lower than the 767-200ER, $41 lower than the A330-200, and $77 lower than the A340-200 *(see table, page 45)*.

The A350-800 also outperforms the 767-300ER, 767-400ER, A330-200 and A340-200 by $11-54 per seat.

The 787-9 and A350-900 have $13-25 lower seat costs than the A330-300. The A350-900 outperforms the A340-300 and 777-200ER by $61 and $27 per seat.

In addition to costs per seat, absolute trip costs should also considered. The 787-8 and A350-800 have trip costs higher than the A300-600 and A310 by $6,000-10,000 on medium-haul operations *(see table, page 45)*. This represents a risk to operators, since these additional costs have to be covered by revenue.

In the case of a 3,000nm mission, the only aircraft to have lower trip costs than the 787-8 is the 767-200ER. This is only a difference of $2,000, the 787-8 has about 45 more seats. Only the 767-200ER and -300ER have lower trip costs than the A350-800 and 787-9, which

OPERATING COST PERFORMANCE OF SMALL- & MEDIUM-SIZED WIDEBODIES

Aircraft type	Seats 2-class	Sector length nm	Fuel burn	Fuel cost $ @ $.350	Maintenance $ per FH USG	Maintenance trip cost $	Monthly lease	Lease trip cost $	Trip cost $	Total cost per seat $	Total cost per ASM Cents
A300-600	225	1,500	5,700	19,950	1,345	5,044	350,000	5,250	30,244	134	8.96
A310-300	195	1,500	4,900	17,150	1,325	4,969	300,000	4,500	26,619	137	9.10
A350-800	245	1,500	5,300	18,550	1,345	5,044	960,000	14,400	37,994	155	10.34
787-8	230	1,500	4,500	15,750	1,260	4,725	800,000	12,000	32,475	141	9.41
DC-10-30	245	3,000	16,400	57,400	1,580	10,928	200,000	4,150	72,478	296	9.86
767-200ER	185	3,000	8,800	30,800	1,025	7,260	450,000	8,500	46,560	252	8.39
767-300ER	215	3,000	9,800	34,300	1,025	7,260	650,000	12,278	53,838	250	8.35
767-400	240	3,000	10,900	38,150	1,025	7,260	700,000	13,222	58,633	244	8.14
MD-11	288	3,000	14,000	49,000	1,425	9,856	550,000	10,144	69,000	240	7.99
A330-200	236	3,000	11,000	38,500	1,130	7,816	700,000	12,911	59,227	251	8.37
A330-300	287	3,000	12,500	43,750	1,150	7,954	800,000	14,756	66,460	232	7.72
A340-200	245	3,000	13,400	46,900	1,660	11,482	650,000	11,989	70,371	287	9.57
A340-300	275	3,000	14,500	50,750	1,660	11,482	800,000	14,756	76,987	280	9.33
777-200ER	290	3,000	13,500	47,250	1,445	9,754	800,000	14,400	71,404	246	8.21
A350-800	245	3,000	9,300	32,550	1,105	7,643	960,000	16,775	56,968	233	7.75
A350-900	295	3,000	10,700	37,450	1,130	7,816	1,100,000	19,221	64,487	219	7.29
787-8	230	3,000	7,800	27,300	1,030	7,124	800,000	13,979	48,403	210	7.01
787-9	275	3,000	9,200	32,200	1,050	7,263	1,000,000	17,474	56,936	207	6.90

have 30-90 more seats. The A350-900 outperforms the MD-11, A330-300, A340-200/-300 and 777-200ER.

Fuel surcharges

The long-term price of oil and jet fuel remains uncertain. With a price of $2.50-2.75 per USG, or $80-90 per barrel of oil, the global industry is just at break-even point.

Higher fuel prices are forcing airlines to issue fuel surcharges. In the case of medium-haul operations, a $1 rise in the price of jet fuel results in higher costs per seat of $25 for the A300-600 and A310, but also $20 for the A350-800 and 787-8. Load factor must be taken into account before an airline can calculate the surcharge it needs to apply to cover the additional cost of fuel. As surcharges will suppress demand and load factors, this makes the calculation a complicated issue.

The additional cost per seat due to higher fuel prices is naturally larger with 3,000nm long-haul missions. These are $35-40 for the 787 and A350 variants, but $45-55 per seat for the older types, with the A340-200/-300 the worst affected.

This raises the issue of demand elasticity in reaction to fuel surcharges, and the consequent effects on global traffic volumes, and the long-term demand from airlines for aircraft if high fuel prices persist.

Vaughn Cordle, president of Airline Forecasts, explains the effects in terms of the US domestic market. "The elasticity of demand varies from 0.84% to 1.24% for each change of 1% in air fares," says Cordle. "The range of elasticity is because airlines are affected differently by a 1% change in air fares. The change in demand also depends on the stage of the economic cycle that the industry is at. The change in demand is higher in a downturn, as it is now.

"The problem now is that the US industry needs to raise its fares by 15% or more to cover the increase in fuel costs," continues Cordle. "This is because, although US airlines generated $108 billion in passenger revenues in 2007, they only managed to make a net profit of $3.8 billion. They also used 14 billion USG of jet fuel at an average cost of $2.1 per USG. The fuel price has now reached $3.5 per USG, so on a pro-rata basis the US industry's annual fuel bill has climbed by $20-22 billion. Even if the industry aims only to break even, it must raise an additional $16-18 billion per year in passenger revenues on a pro-rata basis, which means that fare rises of 15-17% are necessary. A 15-20% reduction in capacity will be needed in turn if these higher fares are to be sustained. The problem is that the industry as a whole has not made high enough fare rises or big enough cuts in capacity. Nevertheless, there are more signs that larger reductions in capacity will have to come."

The first aircraft to be affected by the rise in fuel prices are likely to be the older narrowbodies with higher operating costs. Possible victims of fleet reductions are Northwest's DC-9s after it merges with Delta.

The effects of higher fuel prices will also be felt in other markets. As described, although airlines outside the US are not as affected by the US Dollar increase in oil prices, they are still experiencing enough of a rise to force them into issuing fuel surcharges and fare increases. The same applies to long-haul markets, so passenger demand will be affected generally. This contraction in passenger demand will ultimately lead to a dampening of the requirement for aircraft. While this may alleviate the current shortage of widebodies, most 787 deliveries will still be delayed by two years, and the A350 is not due to enter service until 2012/13.

Airlines will therefore still be forced to continue operating older types, which have relatively high rates of fuel burn. While these aircraft certainly need to be replaced, airlines will be unable to do so for several years.

Although oil and fuel prices have climbed to unprecedented highs in recent months, and may peak at even higher levels as some analysts predict, there are forecasts that the price of oil may decline to $105 per barrel by the end of 2008 or early 2009, equal to a jet fuel price of about $3.1 per USG. Demand for oil, however, looks set to remain ahead of supply by 5 million barrels a day for the foreseeable future, which will continue to keep prices high. AC