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COMMERCIAL JET FUEL SUPPLY: IMPACT AND COST ON THE UNITED STATES AIRLINE INDUSTRY

(109–45)

HEARING

BEFORE THE

SUBCOMMITTEE ON
AVIATION

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

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COMMERCIAL JET FUEL SUPPLY: IMPACT AND COST ON THE UNITED STATES AIRLINE INDUSTRY

Wednesday, February 15, 2006

HOUSE OF REPRESENTATIVES, COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE, SUBCOMMITTEE ON AVIATION, WASHINGTON, D.C.

The committee met, pursuant to call, at 10:00 a.m. in room 2167, Rayburn House Office Building, Hon. John Mica [chairman of the committee] presiding.

Mr. MICA. Good morning. I would like to call this hearing of the House Aviation Subcommittee to order.

The topic of today's hearing is Commercial Jet Fuel Supply: The Impact and Cost on the U.S. Airline Industry. I would like to welcome our participants and members. What we are going to do as far as proceeding is start with opening statements. Then we have two panels of witnesses, and we will recognize them.

With that, I will start with my opening statement and then yield to other members.

One of the principal reasons why the United States airline industry lost an estimated $10 billion last year is due to the supply and cost of commercial jet fuel, which is the subject of our hearing today. America's commercial aviation industry was nearly brought to its knees last year when Hurricanes Katrina and Rita crippled our Gulf Coast refineries and two major pipelines. The resulting supply disruption propelled commercial jet fuel prices to a record high of $3.13 per gallon.

In January 2005, the average market price of a gallon of commercial jet fuel by contrast was $1.33. To put this into perspective, every penny in increase in the price of a gallon of jet fuel results in an additional $195 million in annual fuel costs for the United States airline industry. Airlines cannot be profitable when the average price of jet fuel exceeds $70 per barrel or about $1.67 per gallon.

The average price for commercial jet fuel was about $72 per barrel, or $1.81 per gallon last month. The price of commercial jet fuel has more than doubled over the past five years.

In order for the U.S. airline industry to reverse its recent string of multi-billion annual losses, several critical challenges relating to jet fuel must be addressed by Government and industry initiatives. First, I think we need some mechanism for stabilization of jet fuel prices. Secondly, expansion of our domestic refining capacity is also a challenge that we face. Third, improvements to the Nation's oil and refined product distribution network need attention. And fi-

nally, further gains in commercial aircraft fuel efficiency can also be an important element.

There are many reasons why the cost of jet fuel remains at record highs. It is more expensive and less profitable for a limited number of U.S. refiners to produce jet fuel. Another factor is the high cost of crude oil from which jet fuel is refined. Although the oil costs remain high for many reasons, most industry analysts cite limited U.S. refining capacity, increased demand around the world, including India and China, and also geopolitical events which affect price and supply.

Jet fuel supply problems were compounded last fall by Hurricanes Katrina and Rita, which eliminated about 25 percent of the domestic jet fuel production capacity. The jet fuel supply problem following the hurricanes prompted some oil and aviation industry analysts to propose the creation of a jet fuel reserve, similar to the existing Strategic Petroleum Reserve.

With the damaging impact of soaring oil prices and in light of jet fuel supply crises following the hurricanes, I believe we should seriously consider establishing some type of jet fuel reserve. I understand many European countries have taken similar measures to ensure an adequate supply of fuel.

Although most of the U.S. jet fuel supply is refined in the United States, 60 percent of our oil, of course, comes from overseas and is imported, oil prices will no doubt increase further if Iran, the world's fourth largest exporter of oil, follows through on its recent threat to stop exporting oil to the United States due to diplomatic and other concerns relating to Iran's nuclear weapons program. A major terrorist attack in the Middle East would also have a really bad effect on our oil supply and could result in even higher jet fuel costs for the airline industry.

I am also concerned that the U.S. jet fuel supply is being further constrained by the export of U.S.-produced jet fuel abroad, where jet fuel is even more profitable today. At least one U.S. producer has taken voluntary steps to restrict exports that other producers have not taken similar steps to limit.

Regrettably, regulators in Washington are also contributing to higher jet fuel prices and supply problems. The Department of Energy recently warned that the distribution of jet fuel and other refined petroleum products may be impeded later this year due to the phase-in of more emissions friendly ultra-low sulfur diesel fuel, which has been mandated by EPA. Suppliers and refiners will have to take special measures to prevent contamination of ultra-low sulfur diesel during the petroleum refining process, as well as the storage and transport of jet fuel and other refined products. The added cost of these measures most likely will be passed on to the airlines in the form of even higher jet fuel market prices later this year.

Another regulatory threat to jet fuel price stability in 2006 is the proposed increase in the standard, the Federal Energy Regulatory Commission tariff rate that owners and operators of oil and refined products pipelines can charge their customers. Virtually every drop of commercial jet fuel passes through the Nation's vast network of pipelines. Ironically, I understand that the stronger pipeline security mandates from the Department of Transportation is one of the

main reasons why the major pipeline association is seeking a higher than usual tariff rate this year.

Although the result of these new regulatory burdens could be just a penny or two increase in the cost of jet fuel, as I mentioned previously, this is a very significant added cost to the airlines, given that, as I said before, every one cent increase in the price of jet fuel adds $195 million to their operating costs. If jet fuel prices had remained at 2004 levels last year, the U.S. airline industry would have recorded a profit instead of an estimated $10 billion loss. The airline industry could make a strong recovery if somehow jet fuel costs stabilized in the $60 per barrel range.

One creative way the airline industry has coped with the rising jet fuel costs is through the practice of hedging, in which airlines lock in a fixed price or maximum cap for fuel in the future by buying a contract at a specified price. Due to the hedges made when jet fuel prices were low, Southwest Airlines and Alaska Airlines are currently paying or have been currently paying between 40 and 48 percent less for a significant portion of their current fuel needs.

Unfortunately, legacy carriers have not had the cash or creditworthiness to pay for fuel hedge contracts. With oil prices so high for so long, fuel hedges will almost run out, be non-existent by 2010. By this time, the core business of the airlines industry will be the one way ticket to sustain profitability.

Although there is little that the Federal Government can do in the short term to lower oil prices or jet fuel prices, industry and Government can work in tandem on several fronts. First, to stabilize the jet fuel supply by possibly establishing some sort of jet fuel reserve. Secondly, by lowering regulatory barriers that impede the Nation's oil and refined product distribution network. Third, by increased domestic refining capacity or some incentives or assistance in that regard. And fourth, by reducing demand and taking steps to further improve commercial aircraft fuel efficiency.

I have also directed our Subcommittee staff to begin looking into the various factors behind the soaring costs and some of the sort of jacked up costs after the recent natural disasters we have seen, take a very serious look at what has taken place and is there price gouging or what is going on.

The U.S. airlines have improved fuel efficiency by 18 percent over the last five years by changing operating procedures and utilizing technology to make their aircraft more fuel efficient. In addition, the use of composites and other advanced aircraft manufacturing technologies will make future commercial jet liners more fuel efficient. We will hear a little bit more about what is being developed by one of our witnesses, Mr. Hawk, from Boeing.

The Subcommittee, through its oversight responsibilities, can also help airlines further improve fuel efficiency by ensuring that certain air traffic control modernization programs remain on track and on budget to move forward. We will also hear from FAA's air traffic organization to discuss some of those programs in detail.

Finally, I just want to mention for the record, I am concerned about reports that the operator of London Heathrow Airport, BAA, is engaged in a fuel rationing scheme that discriminates against U.S. airlines. The fuel rationing system was established after a fire and explosion damaged the airport's major fuel depot in December.

We will also hear from some folks from the Air Transport Association who will testify on our second panel and give us an update on this situation.

I am pleased to recognize at this time the Ranking Member, Mr. Costello.

Mr. COSTELLO. Mr. Chairman, thank you, and I thank you for calling the hearing today. The last time this Subcommittee held a hearing on jet fuel was in October of 2000, after crude oil had climbed to a 10 year historic high of almost $38 a barrel. At that hearing, the former Chairman of this Subcommittee, Mr. Duncan, said rising fuel costs had created havoc in all of the transportation sectors and threatened to derail global economic growth.

To put today's hearing in perspective, the average price for a barrel of crude oil in 2005 was $56 a barrel and $72 a barrel for jet fuel. To further put it in perspective, every penny, as you noted, in the increase in price in a gallon of jet fuel results in an additional $195 million in annual fuel costs for the U.S. airline industry.

Although average air fares are still low, and lower than in 2000, it has been reported that rising fuel costs have led U.S. airlines to raise fares 12 times in 2005 and once so far in 2006. In total, the industry has lost $44 billion since the beginning of 2001. Roughly a quarter of the U.S. aviation capacity is in chapter 11.

Consequently, airlines have made efforts to drive down their operating costs, particularly labor costs. In total, U.S. passenger carriers cut labor costs by almost $3 billion between 2000 and 2005. During that period, 140,000 airline workers have lost their jobs, thousands have accepted pay cuts and benefit cuts, and still thousands more have lost their pensions or have significantly seen their pensions reduced.

However, the labor cuts have been more than offset by the rising fuel costs. In total, U.S. passenger carrier fuel costs have increased by more than $11 billion between 2000 and 2005. Fuel unit costs have risen despite the fact that airlines are operating more efficiently through fleet changes, weight reductions and operational changes. U.S. passenger and cargo airlines are projected to consume 19.5 billion gallons of jet fuel in 2005, 800 million gallons less than the peak experience in the year 2000. Unfortunately, the airline industry analysts predict that jet fuel will likely remain at $70 a barrel in 2006.

Mr. Chairman, as you noted, during Hurricanes Katrina and Rita, U.S. production of commercial jet fuel dropped by almost 25 percent. The U.S. relied heavily on foreign imports, which more than doubled during that period, including some imports from European emergency stocks. Some have suggested that in addition to the Strategic Petroleum Reserve, which contains crude oil, the U.S. should form a strategic reserve comprised of refined petroleum products like jet fuel. I am interested in hearing from our witnesses today about their thoughts concerning that issue as well as other ideas that they may have.

Our greatest hope for addressing high fuel prices may lie in technological advancements, both in the air traffic infrastructure and in aircraft itself. The bottom line is that there is a very clear connection between infrastructure, airline profitability and the ulti-

mate issue of American jobs. This Subcommittee must ensure that adequate resources are dedicated to modernizing the national air space system.

Airlines must continue to invest in equipment upgrades and new aircraft that will enable them to take full advantage of Government infrastructure and investments. Regarding new aircraft, I am pleased that we have a witness here from the Boeing Company today to testify about advances in aircraft manufacturing, including the use of lighter composite plastic air frames, improved aerodynamics and innovations in engine design.

Mr. Chairman, that summarizes my statement, and I will put my entire statement in the record. I look forward to hearing from our witnesses today.

Mr. MICA. I thank the Ranking Member. We will include his entire statement in the record.

Mr. LoBiondo.

Mr. LOBIONDO. Thank you, Mr. Chairman. I appreciate your holding this hearing.

I understand the difficulties that the aviation industry is having in dealing with the high prices of jet fuel. I think one of the best ways that the Government can be helpful is by increasing the fuel efficiencies through the modernization of our air traffic control system.

As you, Mr. Chairman, know, and have highlighted on many occasions, we are managing air traffic with technology and procedures developed in the 1970's that were not intended nor are suited to the traffic demands of today. As a result, there is an enormous amount of fuel that is wasted: thousands, possibly tens of thousands of gallons from sitting in line to takeoff or circling, to wait to land or some other problem with traffic or weather.

Efforts by the FAA to implement new air traffic control technology and procedures are woefully behind schedule. In order to keep our aviation system efficient and safe, I think we need to find ways to step up the pressure, pressure and/or investment in traffic flow management technologies in the next generation of air traffic systems. Once again, Mr. Chairman, I thank you very much for holding this hearing and your interest in this particular topic.

Mr. MICA. Thank you.

Mr. DeFazio.

Mr. DEFAZIO. Thank you, Mr. Chairman. Thanks for this timely hearing.

When I look at the numbers here, it causes tremendous concern. With United Airlines' emergence from bankruptcy, I saw a number of assumptions they made. Their assumption regarding the future price of fuel for the airline to succeed is far less than what is projected in our memos and by many industry experts. So that raises a concern about how long they are going to stay out of bankruptcy and the viability of that airline. There are many other airlines that are jeopardized in a similar way by the high price of fuel.

Unlike the crisis, or so-called crisis, we saw after Katrina, odd that on the West Coast they jacked up prices almost as much as the East Coast, even though we are in a different supply area, but anyway, so-called refinery capacity or whatever, there is sufficient refinery capacity for aviation fuel. The problem is, the industry di-

verts from that production to gasoline production when they are extorting consumers with artificially high prices and making bigger profits on that side.

I think Government oversight and action in this area is necessary, both for consumers of gasoline for their automobiles and to protect the crucial aviation sector. Exxon-Mobil made $100 million a day last year. That means airlines, some of our airlines are losing $1 million a day, and Mobil is making 100 times that in profits, in one day. It is not from free market exercise here.

And then we should be looking at other innovative ideas. Maybe since the Republicans want to move more tax cuts and they want to talk about energy efficiency, maybe we should provide some incentives to airlines to upgrade or make their fleets more efficient with U.S. manufactured aircraft, providing jobs here and also providing some help in that area. Many of them need to upgrade their fleets anyway, but can't afford to do it because of the pressures of fuel prices and other things.

So I think there are some very interesting and perhaps some innovative and different ways to look at this, the petroleum reserve, which my colleague from Illinois mentioned, to offset when the oil industry diverts over to gasoline, perhaps a gasoline reserve too, to help drive down their extortion of profits in that area and remove the incentive for them to divert production from jet fuel and be able to jack up the price on both sides.

So I am hopeful that we will hear some very plain talk from folks today and some interesting new ideas and perhaps the idea that the so-called free market is not working in this area. Thank you, Mr. Chairman.

Mr. MICA. Thank you, Mr. DeFazio.

Are there additional opening statements? Mr. Brown?

Mr. BROWN. No, thank you, Mr. Chairman.

Mr. MICA. Mr. Kuhl?

Mr. KUHL. Nothing, thank you, Mr. Chairman.

Mr. MICA. All right. No additional opening statements.

Then we will proceed with our first panel, and our first panel consists of Mr. John D. Shages, Deputy Assistant Secretary of the Office of Petroleum Reserves in the Department of Energy. The second witness is Mr. Michael A. Cirillo. He is Vice President of Systems Operation Services, the Air Traffic Organization under FAA. I would like to welcome both of you. If you have lengthy material or information, background you would like to be made part of the record, we would welcome that and also summarizing any of your statements.

I will first call on Mr. Shages with the Department of Energy. Welcome and you are recognized, sir.

TESTIMONY OF JOHN D. SHAGES, DEPUTY ASSISTANT SECRETARY, OFFICE OF PETROLEUM RESERVES, UNITED STATES DEPARTMENT OF ENERGY; MICHAEL A. CIRILLO, VICE PRESIDENT, SYSTEMS OPERATIONS SERVICES, AIR TRAFFIC ORGANIZATION, FEDERAL AVIATION ADMINISTRATION

Mr. SHAGES. Thank you very much, Mr. Chairman. I have submitted my statement for the record.

Mr. MICA. Without objection, the entire statement will be made part of the record. Please proceed.

Mr. SHAGES. Thank you very much.

I am honored to be here today to talk about jet fuel and the U.S. Strategic Petroleum Reserve. The Strategic Petroleum Reserve is a very large and robust crude oil stockpile, located at four sites along the Gulf of Mexico and Louisiana and Texas. It is the most efficient stockpiling system in the world.

We currently have 685 million barrels of oil in storage. We can draw it down at a rate of 4.4 million barrels per day. The Reserve is authorized by the Energy Policy and Conservation Act to protect us against petroleum supply interruptions and in their event, to offset their impacts on the United States. The Reserve has been used under presidential authority to respond to severe energy supply interruptions only twice. The first time was in 1991 in conjunction with Operation Desert Storm; the second time in September 2005 in response to the damage caused by Hurricane Katrina.

The sale last September immediately followed loans to refiners made under authority of the Secretary of Energy who would otherwise have stopped refining for lack of feedstock. Between the loans and sales, we made almost 21 million barrels of oil available. In addition to the Strategic Petroleum Reserve, the United States is a charter member of the International Energy Agency. It is our policy that we will coordinate with the other member countries of the IEA during a supply emergency.

In the case of the 2005 hurricanes, that coordination was critically important. While the United States offered 30 million barrels of oil for sale, the other member countries made available 33 million barrels of crude oil and products. A large portion of that was refined products.

The release of those products allowed U.S. imports, including jet fuel, to surge during September, October and November. As a result, fears of shortages were quickly dispelled and prices began to retreat. The United States has a strong infrastructure of producing, refining, transporting and selling petroleum. While the hurricanes of 2005 dealt that infrastructure a devastating blow, systems recovered amazingly quickly. Thankfully, the Strategic Petroleum Reserve and our partners in the International Energy Agency backstopped the private sector, as designed, at the heart of the devastation.

Since then, we and industry have been cataloging ways to improve infrastructure and respond to future disruptions. It is our duty to protect the United States, its people and its businesses from disruptions of supply. We have done it in the past and we believe we are well equipped to do it in the future.

Mr. Chairman, that ends my opening statement.

Mr. MICA. Thank you. We will now hear from Michael Cirillo, Vice President of Systems Operations Services under FAA. We will save questions until we have heard from both of you.

Mr. CIRILLO. Good morning, Chairman Mica, Congressman Costello and members of the Subcommittee. I would please like to ask that my written statement be entered into the record.

Mr. MICA. Without objection, the entire statement will be made part of the record. Please proceed.

Mr. CIRILLO. Thank you. I am here today representing the Department of Transportation, the Federal Aviation Administration and the Air Traffic Organization on the topic of fuel consumption in the commercial jet fuel market, and its impact on the U.S. aviation industry. This is an extremely important issue to us all.

We know that fuel costs have increased dramatically and we feel the impact, as do our customers. Through daily collaboration with them, we are providing services that maximize the most efficient routing from point A to point B.

The good news is that we have developed new technologies and procedures, many already in place, which help our customers reduce fuel consumption. I would like to tell you a little bit about them today. Some of these programs have been in place for a while, programs like TMA and URET. The FAA's traffic flow management program provides about $340 million in benefits to our customers every year, while the user request evaluation tool, or URET, saved airlines approximately 25 million miles and $175 million in fiscal year 2005.

Last year we made significant progress when we doubled the number of usable altitudes in the high altitude air space with domestic reduced vertical separation minima, or DRVSM. The procedure essentially allows more planes to fly fuel-efficient routes over the United States.

All the estimates were that DRVSM would save airlines approximately $5.3 billion through 2016. That estimate now appears to be conservative in light of the dramatic increase in fuel prices in the last year.

In 2005, our new oceanic air traffic control system, ATOP, became operational. This system uses state of the art technology to reduce the separation minima from 100 to as few as 30 miles. This allows more airplanes to fly fuel efficient routes over the oceans.

Another new initiative, Area Navigation, or ARNAV, uses more precise routes for takeoffs and landings, reducing the amount of fuel burned and the time between takeoffs and landings, with no impact on safety. Delta Airlines expects that ARNAV procedures at Atlanta will save them $30 million. Projections for savings from ARNAV procedures at Dallas-Fort Worth are approximately $10 million a year.

Another tool, Required Navigation Performance, or RNP, promises to add to capacity and save fuel. This is because RNP uses onboard technology that allows pilots to fly more direct routes. RNP provides both lateral and vertical guidance and impacts all aspects of the flight, departure, enroute, arrival and approach. This not only will allow for more efficient air space management, but will also provide significant savings in fuel.

Last year, we partnered with Alaska Airlines to implement new RNP approach procedures at Palm Springs International Airport. Under the conventional procedures in use today at Palm Springs, planes cannot land unless the ceiling and visibility are at least 2,300 feet and 3 miles. With these new RNP procedures, airlines can land in all sorts of weather, with a ceiling and visibility as low as 734 feet and 1 mile. In the first 11 months of 2005, this allowed Alaska Airlines to complete 27 flights that would otherwise have been diverted to an airport 70 miles away.

RNP approaches also reduce the distance an aircraft has to fly by as much as 30 miles. This translates into fuel savings for our customers.

Finally, we continue to work with our customers on our Nation's air space design. The Florida Air Space Optimization Project is a result of collaboration between the airline industry and FAA to redesign the air space in Florida to improve air traffic efficiency by reducing the complexity of the air space. The benefits include shorter distances on routes into south Florida airports and reduced departure delays from Boston, New York and Washington, D.C. to Florida destinations. The projected cost savings as a result of the Florida Air Space Optimization is $18.2 million a year.

In summary, the FAA and its Air Traffic Organization are working hard to help our customers save fuel. We will continue to work collaboratively with industry, academia and the Congress to ensure our future technologies meet the needs of our air space system. We take this commitment seriously, as we continuously strive to provide the safest, most efficient, national air space system possible.

Mr. Chairman, this concludes my testimony. I would be happy to answer any questions you may have.

Mr. MICA. I thank both of our witnesses.

We will jump right into questions. I have a few. Mr. Shages, during the hurricane, I quoted, we eliminated about 25 percent of our daily production of jet fuel. Subsequent to the hurricane, we saw a situation where we could have literally run out of jet fuel.

Can you lay down the pros and cons, or give us any of your thoughts, about establishing some type of jet fuel strategic reserve? Right now, you are not having specifically any jet fuel as a component in your reserve, is that correct?

Mr. SHAGES. That is absolutely correct. The Strategic Petroleum Reserve has 685 million barrels of crude oil. A separate but related program is the Northeast Home Heating Oil Reserve, we have a very small reserve of 2 million barrels of heating oil. But those are the only two components of the Nation's Strategic stockpiles.

The choice to make the reserve almost solely crude oil goes all the way back to 1976, after the original enactment of the Energy Policy and Conservation Act. The Act had required regional refined product reserves, but gave planners the option of substituting crude oil and centralizing storage of that crude oil, if it was justified for economic purposes, or cross-purposes. In addition, if we had a high level of certainty that the centralized storage could actually satisfy the needs in the regions.

So the original SPR plan submitted to the Congress did actually substitute crude oil and centrally stored facilities for all the requirements for all products in our regional reserves. We continue that way to this day. It is still primarily driven by cost.

Mr. MICA. What about, again, setting aside a specific reserve for jet fuel?

Mr. SHAGES. We could do that. We have the authority to do it. If we were to build facilities for jet fuel——

Mr. MICA. Would you need legislative authority, or do you have existing authority, do you feel, to set that up?

Mr. SHAGES. The authority that we have in the Energy Policy and Conservation Act authorizes a reserve of up to a billion bar-

rels. The definitions allow us to store any petroleum product, refined or crude oil.

Mr. MICA. So you think you have that authority?

Mr. SHAGES. We have that authority.

Mr. MICA. One of the problems I heard was the shelf life of jet fuel is only about a year. Would it be necessary to sort of have that a rotating or revolving supply?

Mr. SHAGES. That would be absolutely the case. You would have to rotate it on a regular basis. Depending on how you stored it, that would determine the frequency of the rotation.

Mr. MICA. I am also told that in Europe, they require, I guess, the airlines to maintain a reserve a little bit different. I am not sure how all of them do it, but I understand some of them have reserves. Are you familiar with that?

Mr. SHAGES. I am not intimately familiar. I do in general know that each of the member countries has a separate system, and each country differs a little bit from the others. Mostly, it is a regulatory system where the companies, whether they are the oil companies or the individual airlines are forced to keep excess inventories at their expense.

Mr. MICA. We have nothing of that?

Mr. SHAGES. We have nothing like that or any regulatory——

Mr. MICA. Also we have the difficulty with so many of them in financial trouble, they can't even hedge, let alone keep a supply on hand.

Well, again, we are trying to find some way to stabilize the supply. Refining capacity is another issue. Is there anything else we can do? Do either of you gentlemen want to speak to refining capacity, which again is somewhat limited? We import all that fuel, as I said, the crude oil. Most of it is refined, aviation fuel, in the United States, and then much of it is exported. Is that the case? And do you have any recommendations on refining capacity?

Mr. SHAGES. Well, of course, we would like to see there be more refining capacity in the United States. There have been announcements of expansions in refining capacity. Currently we are at about 17.1 million barrels a day of capacity. By the year 2010 we expect that to be up almost 2 million barrels a day. So that is a significant growth in the actual capacity.

There will also be improvements in capacity, so that you can generate more high quality fuels from low quality crude oil. It is a very robust industry. And we do, there is no question, we do import products and we also export some small amounts. But we don't see that there is a crisis in refining. It would be a good thing to have more refineries.

Mr. MICA. Well, finally, one of the things I heard that we have a problem with is that much of this refined product is in fact shipped overseas, or a significant amount. And there aren't any, there aren't controls on what is exported in in an emergency situation. Some of what is done now is sort of voluntary. The rest finds its highest price on the world market. Is that correct?

Mr. SHAGES. Yes, that is essentially correct. The United States actually benefits from imports. If we are talking about jet fuel, we are importing about 150,000 barrels of day of jet fuel and exporting

about 50,000 barrels of jet fuel. So on average, we regularly benefit. In general, it is that way with other products.

But at any given point in time, the flow could be in either direction. Frankly, it is critically important that there not be any controls on that, because take the situation with Hurricane Katrina. Without imports, the entire East Coast of the United States would have been critically short of products. Those products came from Europe, for the most part. That wouldn't have been possible unless the Europeans would have released their strategic reserves.

So it is very important that we not stop our exports for fear of stopping the imports from those people that we otherwise export to.

Mr. MICA. I appreciate your viewpoint. Let me defer now to the Ranking Member, Mr. Costello.

Mr. COSTELLO. Mr. Chairman, I do have some questions, but I would ask at this time that we recognize Mr. DeFazio.

Mr. MICA. OK, Mr. DeFazio.

Mr. DEFAZIO. Thank you, Mr. Chairman. And thanks to my friend, the Ranking Member. I have a very important meeting later in my office and I am going to have to go. Not that this is not important.

But I have a concern which has been brought up by another industry. I am not sure whether Mr. Shages can really address it. And this is a concern of truckers as we move toward the introduction of the ultra-low sulfur diesel and because of the multiple uses of our pipelines. They are saying because of the standards that are going to be imposed that there will be huge penalties for just minuscule amounts of sulfur contamination, which will be likely in some portion of the fuel when you are moving different fuels through the same line. You send through fuel that doesn't require the ultra-low sulfur diesel and then you send another slug of fuel behind it and there is no real way to prevent an interim amount of fuel that is mixed. The question is OK, what are you going to do with all that, how is this all going to work?

And the airlines are going to potentially, it seems to me, have problems in the same area. I am seeing yet another excuse for the industry to jack up prices, saying, oh, my God, it is that new Federal regulation on ultra-low sulfur diesel in the pipelines.

Can you address what actions, are you aware of any actions that have been taken by the Administration either to look at some sort of regulatory relief for the minuscule amounts of contamination that might be in some of this interim fuel or other things that would assure us that the pipelines are going to continue to be used effectively during this transition?

Mr. SHAGES. I have some knowledge of the issue. I can't speak authoritatively for the Administration, and I don't know of any regulatory relief that might be had. I do know that you do move, especially through the Colonial and Plantation pipelines, you move all sorts of products, some of them very high sulfur, and obviously with the ultra-low sulfur, you need to not only leach out sulfur from the pipeline from other products that would cause you to go above spec.

My understanding is that the refiners understand that problem and that they are refining to a standard that will allow for the pickup of some sulfur. I believe the standard is less than 15 parts

sulfur per million. They are actually planning on shipping ultra-low sulfur diesel that is down in the range of 8 parts, because they use——

Mr. DEFAZIO. But what I am saying about the trucking industry is they don't think that all the capacity is going to be there to move to that ultra low, so that it can pick up the contamination, and they think it is going to be an excuse for a jack-up in diesel prices in trucks. Have you heard any inklings of that?

Mr. SHAGES. No, I haven't actually heard that or been told that.

Mr. DEFAZIO. OK. So do you think the way they are going to compensate, then, is to do this ultra-clean refining and then pick up some contamination along the way and still be below the standard?

Mr. SHAGES. Well, it is not regulated. I think that is a possible solution. I think there may be other things that may have to happen. There may have to be longer runs of any specific product. Of course, the reason this all happens is because things are batched. And you may have to have longer runs of any given fuel to minimize the amount of contamination.

Mr. DEFAZIO. If there is adequate storage for that fuel at the other end. Some of it is because of just in time problems and not being adequate storage, which is why the dispatch in smaller slugs, right?

Mr. SHAGES. That is right. So I have, I am not an expert on that subject. I brought a few experts on other matters, but I don't have anybody here that can actually address that problem per se.

Mr. DEFAZIO. OK. I appreciate that. I knew it wasn't your particular area of expertise.

Just one quick question on the storage issue. You would need an appropriation, I assume, to construct——

Mr. SHAGES. If we were going to deviate from our current configuration, we don't have any facilities that could store any kind of refined product. So we would need a separate appropriation to either build or lease those facilities.

Mr. DEFAZIO. OK. Do you think it might be a possibility?

Mr. SHAGES. The budget that we have just sent to Congress, we do not ask for any appropriation.

Mr. DEFAZIO. No, but I am not saying, I am saying is there leasable capacity out there potentially?

Mr. SHAGES. Well, it depends on what we are talking about. Actually, I would say right at the moment, there is probably not enough. If you are thinking in terms of a very large reserve, since inventories have been building for the better part of a year, if we actually went out and tried to store some large volume in existing facilities the way we do with the Northeast Home Heating Oil Reserve, we would end up driving up prices dramatically, because we would suck up virtually all of the available tankage. And it being a free market, the price of storage would go up dramatically.

We can see that now, just to give you an indication, we have been storing heating oil, 2 million barrels in commercial facilities, in the Northeast for the last five years. We are paying about $2.50 per barrel per year to store that in commercial facilities.

If we were to go out for a contract today, the price would be more in the range of $4 per barrel, simply because the inventories are

so much higher today than they were five years ago when we created it. And so if we can, we are so big, that whenever we do something like this, we can drive prices around, not just for parts, but for the actual storage facilities. So we have to be a bit careful.

Mr. DEFAZIO. OK, thank you. Thank you, Mr. Chairman.

Mr. MICA. Thank you. Mr. Duncan?

Mr. DUNCAN. Thank you, Mr. Chairman, and thank you for calling this hearing on this very important topic.

I want to first, I want to commend the FAA and Mr. Cirillo for the innovations and the progress they have made on air traffic management, because I think that has helped this situation quite a bit. I want to commend Boeing and others in the aviation industry for making their planes so much more fuel efficient than they were 30 or 40 years ago. That has helped quite a bit.

As Mr. Heimlich from the ATA, a later witness will testify, or at least it is in his testimony, that each one penny increase in jet fuel costs the aviation industry $195 million, and I have heard similar figures like that from the ATA for several years, so this is a very serious problem. Oil has gone down a little bit over the last few days. I think it is under $60 a barrel now, and that is hopeful.

But we also have some of these experts saying that it could go way up from here. Some even predicting as high as $100 a barrel, and I don't believe that is going to happen. I certainly hope it doesn't. But this is something that we all need to talk about and work on as much as possible and see if there are other steps that can be taken.

I think part, a big part of the problem is the fact that you have some of these groups around the Country, they don't want any natural resource production in this Country. They don't want you to cut any trees, they don't want you to produce any natural gas, they don't want you to dig for any coal, and they especially don't want you to drill for any oil.

I have noticed that most of the people in those groups come from very wealthy or very upper income families. But who that hurts the most, when they stop all natural resource production, it hurts the poor and the lower income working people, because it drives up prices and destroys jobs. I think the key to this whole thing is, Mr. Felmy from the American Petroleum Institute, in his testimony later, he says we can no longer afford to place off-limits vast areas of the Eastern Gulf of Mexico or off the Atlantic and Pacific Coast, and offshore Alaska. Similarly, we cannot afford to deny American consumers the benefits that will come from opening the Arctic National Wildlife Refuge and from improving and expecting approval processes for developing the substantial resources on Federal multi-use lands in the West.

Whenever you talk about doing any natural resource production, people, somebody on the other side will always say, well, you know, there is just not enough there. But if we just increased our production just a little bit, I am convinced that some of these foreign energy producers would get so concerned or so worried that they would start coming down on their prices, or at least hold them down.

And then in my home of Knoxville, we have just been through, as many cities around this Country have been through, the unfor-

tunate experience with Independence Air, who had such a big presence in Knoxville. They based all their projections, as I understand, on $35 a barrel oil. So even though they had more start-up capital than any new airline, I think, in the history of the Country, they couldn't make it.

So I think that is just, at least some slight increase in our natural resource production in this Country, domestically, is probably the key to either bring down prices or at least hopefully holding them stable. Because that is going to be the biggest challenge or the biggest problem, biggest concern that I see that airlines could have. A strong aviation industry is important even to people who don't fly, because it is the key to our whole economy, not only for the movement of people, but for the movement of goods and services.

Let me just ask one question, and maybe you don't know this, but I will ask Secretary Shages. We always hear, too, about alternative fuels or alternative sources. Are there any alternative fuels that you know of in the near future, other products that we could put into jet fuel that will hopefully bring the price down? Is anything like that realistic in the next five or ten years, or do you know anything about that?

Mr. SHAGES. I know a bit about it, in the Energy Policy Act. My office was given responsibilities for strategic fuels. We are looking at those things. The time frame that you talk about, five years, there is virtually nothing. There are hundreds and millions of dollars being poured into alternative fuels. But the R&D timelines and the development timelines are vast.

Mr. DUNCAN. Right.

Mr. SHAGES. We have one of the largest untapped resources in the world out in the Rocky Mountain area, it is oil shale. We have as much oil in oil shale as Saudi Arabia has oil. And we have never produced any on a fully commercial basis. There was production, heavily subsidized production, back in the 1970's. Now there is no production.

However, companies are pouring hundreds of millions of dollars into doing research. But they have to go through all the steps: they have to do the research, pilot level programs, commercial demonstrations and we are talking an industry that might have 2 million barrels of production, but 20 years from now, not 5 to 10 years. It is very similar to the Canadian tar sands that are very, very successful now. But that was because they started in the 1970's and didn't give up on it.

Mr. DUNCAN. Actually, that is what I assumed you would say, that we are still pretty far off. I hope that we can make progress in that direction.

But then the other key thing is, you can't go as long as we have in this Country without opening up any new refineries, at a time that demand has increased greatly, not only in this Country but all over the world. That is something else that is going to have to be done if we are not going to just drive prices out the window.

We have, air traffic, air passenger traffic has been greatly increasing. We just saw a report yesterday about the Washington airports having a record 45 million passengers. There is a lot of hopeful signs out there if we don't blow the whole thing up once again

with some huge increases in the price of oil. I certainly hope that we don't do that.

Mr. Chairman, thank you very much.

Mr. MICA. I thank the gentleman. Mr. Boswell.

Mr. BOSWELL. Thank you, Mr. Chairman. I think pretty much what I was going to say has been said. I would like to just submit a statement for the record.

But I really appreciate the dilemma for our airline industry on fuel. I am one of the several general aviation pilots around here, and that has certainly hit my pocketbook, to keep trying to fly even though I am buying navgas versus jet fuel. But I am a big supporter, as you all probably know, of the airline industry, and I want to see it succeed. We are intrigued with this idea of jet fuel reserve, patterned after the Strategic Petroleum Reserve.

Having said that, I would just like to, Mr. Chairman, if I could, I think it is germane to this discussion, but Mr. Duncan and others have made some very good remarks, as well as yourself and others. We have a fuel crisis in this Country. And we are in bondage to OPEC, we all know that. I would submit to you, and I would hope we would have some hearings, discussions, whatever, that we have developed some alternatives: ethanol, biodiesel and so on. There is no reason that science will let us get into jet fuel as well, from our own natural resources, that are biodegradable. This is important.

I don't think that the alternative is any threat to petroleum whatsoever. They just can't produce that much. With the increase in China and India, usage, and so on, we are going to still be importing. If we use all the alternatives we can use and all the oil we can use, we are going to still be importing. And what we can do for our own economy, it seems like our time has come. The tests are done. We know the alternatives work. We are done. We have run them in commercial vehicles, we have run them, in the State of Iowa, we have run alternatives in State automobiles for several years. I was in on it. I know a lot about it.

There is just no threat. I know the petroleum industry has a lot of clout, a lot of lobby clout here. I think it is time to move on beyond that. The biggest problem we have in alternatives, Mr. Chairman, is transportation. We have the transportation, it is buried in the ground, the pipelines. I don't know why, Mr. Shages, you couldn't be part of maybe, if I can persuade you to start talking about this, first, it is not a threat. We have the transportation. The oil industry that owns the pipelines could take a piece of the pie to transport. And we could have biodiesels and ethanols and whatever else we wanted to produce all over the Country. It would help.

Still, we are going to import. I fully believe that, and I think you do, too. So I just, Mr. Chairman, would lay that out there, that we need to get into that discussion very badly. I thank you for your time.

Mr. MICA. I thank the gentleman.

Are there other members with questions? Mr. Costello.

Mr. COSTELLO. Mr. Chairman, thank you.

Mr. Shages, let me ask you to clarify a point. The Chairman asked you a question about the European Union. I took it that your answer was that from a regulatory standpoint, that the reserves

are the responsibility of the airlines and each airline has a different procedure.

It is my understanding that there is a regulation that actually puts the responsibility on the oil companies as opposed to the airlines. Can you clarify that point for me?

Mr. SHAGES. Yes, I believe that the vast majority of it is on the oil companies. It may also be on the airlines. I don't know that for a fact. I do know that most of what I hear about it is on the oil companies.

Mr. COSTELLO. Well, I would further ask what your opinion is as to implementing that type of a policy in the United States. The Chairman made the point that many of the U.S. airlines are, as I mentioned, a third of our capacity is in bankruptcy right now, chapter 11. So they may not be able to afford to take the risk. But certainly the oil companies can, as Mr. DeFazio mentioned, they are making huge profits, record profits. What would be wrong with having a regulation that places the responsibility on the oil companies to in fact have a strategic product reserve for jet fuel?

Mr. SHAGES. Well, I think it is philosophical. When the Strategic Petroleum Reserve was created and it was authorized, there were originally choices. You had a Federal reserve and you also had a possibility of regulating and causing industry to store oil. The original plan said we are going to do it all federally owned and absorb all the costs and the taxpayers will pick up all the costs and reap whatever benefits there are, if there are benefits, to owning it. That was chosen, a plan was put together for that, sent to the Congress, Congress agreed.

Then later, in the year 2000, the authority to actually have industry do this was deleted from the line in the Energy Act of 2000. So it is a philosophical matter who picks up the cost and who reaps the benefits.

I don't think, I can't speak for the Administration from my position on making a change in that philosophy. It is just a philosophy, it has been there for a long time, which I think has actually worked well. Despite having been branded with the idea that we buy high and sell low, of course, the average costs to do all that we have bought to put into the reserve is about $27. It is clearly worth a lot more than that now if we were to sell it. The taxpayer would profit.

If you regulate it and you make a company hold it when it's actually sold, if the price is high the company will profit. It is a philosophical question.

Mr. COSTELLO. It is indeed, and I know you can't speak for this Administration and this policy has been in place for a number of years through not only this Administration but previous Administrations. But can you offer your opinion? Do you think, speaking for yourself, would this be a good thing?

Mr. SHAGES. Speaking for myself, I like the situation as it is. I tend to think that the benefits of reserves are general, broad-brush, they are not specific to individuals or companies. It is appropriate for the taxpayer to pay for it and for the taxpayer to reap the benefits when the oil is sold.

Mr. COSTELLO. Final question for you is, we talked about, I think Congressman Duncan talked about alternative fuels. We have

talked about strategic product reserves. We have talked about, in my opening statement, technological advances and improving the ATC system. Is there any one single thing that you think should be at the top of the list?

Mr. SHAGES. I am sorry, I don't think of any one thing that just jumps out to me. If you like, I can respond later to the record.

Mr. COSTELLO. Mr. Chairman, thank you.

Mr. MICA. Thank you.

Well, we may have some additional questions that we will submit, if there are no other questions for the panel at this time. What I will do is excuse you and thank you again for your participation today.

Let me introduce our second panel of witnesses and have the staff go ahead and put their name cards out. We have Mr. John Heimlich, Vice President and Chief Economist of the Air Transport Association of America. Mr. John Felmy, who is the Chief Economist and Director of the Statistics Department of the American Petroleum Institute. And Mr. Jeffrey Hawk, who is the Director of Government Certification and Environment with the Boeing Company.

I would like to welcome the witnesses on our second panel and as I mentioned to our first witnesses, if you have lengthy statements or documents you would like to have made part of the record, or referred to in the record, just request that through the Chair. Lengthy statements will be made part of the official record.

So let me introduce and welcome for his testimony John Heimlich, Vice President of Air Transport Association of America. Welcome, and you are recognized.

TESTIMONY OF JOHN P. HEIMLICH, VICE PRESIDENT AND CHIEF ECONOMIST, AIR TRANSPORT ASSOCIATION OF AMERICA, INC.; JOHN FELMY, CHIEF ECONOMIST, AMERICAN PETROLEUM INSTITUTE; JEFFREY HAWK, DIRECTOR, CERTIFICATION, ENVIRONMENT AND GOVERNMENT RELATIONS, THE BOEING COMPANY

Mr. HEIMLICH. Thank you, Mr. Chairman, and good morning. I appreciate the opportunity to address the issue of jet fuel supply and its impact on commercial aviation. ATA's members have a vested interest in ensuring access to an affordable, reliable supply of jet fuel.

Today I will describe the effect of rising jet fuel prices, provide examples of unprecedented measures U.S. airlines have taken to reduce fuel costs and explain how modernization of our Nation's air traffic control system can help all system users minimize fuel consumption.

From 1991 through 1999, jet fuel prices averaged 56 cents per gallon, and never exceeded 65 cents. The significance is not only the reasonable average price, but also its stability. It is against that backdrop that operational decisions and investments were made. Airline financial planners did anticipate higher fuel prices, but nowhere to the extent and duration they witnessed over the last few years. For most carriers, fuel has now tied or overtaken labor as their largest expense.

Between 2003 and 2005, the average market price of jet fuel soared from 88 cents to $1.72 per gallon. In the period during and after Hurricanes Katrina and Rita, prices in the Gulf Coast spiked to $3.13. The outlook for 2006 is no better, with experts projecting an average in excess of $1.80.

This forecast is especially critical at this time because airlines are increasingly exposed to fluctuating market prices as their fuel hedge positions deteriorate. This includes leading low cost carriers, all of whom likely would have lost money in 2004 and 2005, had it not been for their hedges. On the other hand, at 2003 fuel prices, nearly every U.S. carrier would have recorded meaningful profits.

At today's consumption rate, every penny increase in the price of a gallon of jet fuel does drive an additional $195 million in annual industry operating expenses. In fact, from 2000 to 2005, the industry's fuel tab doubled from $16.4 billion to an estimated $33 billion, even though it consumed less, thanks to increased fuel efficiency.

That is just staggering. Like any other tax, fee or cost increase, it is virtually impossible to pass through to the consumer in this environment of limited pricing power.

Our airlines have an enormous built-in financial incentive to reduce consumption. Indeed, the industry's track record shows just that. Fuel efficiency has risen an impressive 18 percent since 2000, and tripled since 1971. Airlines have left no stone unturned in identifying ways to conserve fuel, through improved aerodynamics, weight reduction and operational procedures. The use of winglets, which cut fuel consumption 3 to 5 percent, the removal of ovens or entire galleys to reduce aircraft weight, and procedures like continuous descent approaches are just a few examples.

Jet fuel is similar in composition to diesel fuel and home heating oil and consumers of those other products compete with airlines and other jet fuel users for that portion of refinery output. Also, because the price of jet fuel is principally determined by the underlying price of crude oil, any efforts to conserve energy across the broader economy ultimately provide some relief to the aviation community. We strongly encourage other industries to take similar actions.

In short, airlines have not been able to cut costs or raise fares fast enough to keep up with skyrocketing fuel costs. While we recognize that the U.S. Government can do relatively little in the short term to reduce jet fuel prices, it should first do no harm. I refer you to recent fuel tax changes and a pipeline rate case before the Federal Energy Regulatory Commission detailed in my written comments submitted to the record.

Finally, I want to end by emphasizing how air traffic control modernization could mitigate fuel expenses. The existing ATC system has generally served our Nation well. However, it was not designed with fuel conservation in mind. Nor was it built to accommodate the anticipated growth in volume and complexity. A modernized system, utilizing available technologies and recently developed procedures, could save hundreds of millions of gallons per year.

In addition to reducing costs to operators, fuel savings achieved through ATC improvements produce significant environmental ben-

efits. For every gallon of fuel not burned, related emissions are not released into the atmosphere.

In conclusion, no other industry is more conscious of energy consumption than the airlines. In the best of times, conservation and efficiency are a way of life. In the worst of times, they are a matter of survival. We are proud of our fuel efficiency gains over the past 30 years, and we intend to continue.

With the pending aviation reauthorizations, Congress has an opportunity and an obligation to leverage advancements in technology and bring about long-needed changes in our national airspace system. This must be a cooperative effort among all participants in our Nation's aviation system. We look forward to working together to save fuel, save time and save jobs. Thank you.

Mr. MICA. Thank you, and we will withhold questions until we have heard from all the panelists. Mr. John Felmy, with the American Petroleum Institute, you are recognized next.

Mr. FELMY. Thank you, Mr. Chairman.

I am John Felmy, Chief Economist of the American Petroleum Institute, the national trade association of the U.S. oil and natural gas industry, representing all sectors of the industry including companies that make, transport and market jet fuel. We very much appreciate this opportunity to discuss commercial jet fuel supply and its impact on the airline industry.

Our companies are making the maximum effort to meet the demand of airlines for jet fuel. However, to better meet the long term fuel needs of U.S. consumers and businesses, changes are needed in our energy policy. We need to increase oil and natural gas supply, reduce demand and expand and diversify our energy infrastructure.

Let me summarize our current situation. For the week ended February 3rd, national inventories of kerosene jet fuel were 43.5 million barrels. This level is 2 percent above last year's level and 6 percent above the average for 2001 to 2005 levels for the week. Production of kerosene jet fuel so far in 2006 has been about equal to the average of the years 2001 to 2005.

Last year, even with the major disruption to refineries caused by Hurricanes Katrina and Rita, jet fuel production nearly matched 2004's four year high. These results are consistent with the very high level of refinery utilization with which the industry has been operating. Over the past year, the Nation's refineries have operated at more than 90 percent of capacity for nearly two-thirds of the time and above 85 percent for nearly 95 percent of the time.

While the refinery system is running all out to produce jet fuel and other oil products to meet consumers' fuel needs, there is a limit to how hard refineries can run. The operations of a refinery is subject to decisions by each refinery manager, and most importantly, involve decisions on operations that are dominated by health and safety concerns. The U.S. oil and natural gas industry will not compromise the health and safety of its workers or surrounding communities for any reason.

The United States uses about 1.6 million barrels per day of jet fuel. Of this amount, about 1.5 million barrels a day are produced domestically and about 148,000 are imported. A small amount, 52,000 barrels a day, are exported, 77 percent to Canada and

United Kingdom, primarily as fuel for international flights. Jet fuel usage peaked in 2000 and then after September 2001, declined sharply with a complete shutdown of air travel for a period and a sharp decline in travel with operations resumed. It has remained at about 1.6 million barrels a day since 2002.

Prices of jet fuel have generally followed the price of crude oil. Since 2000, the correlation between spot jet fuel prices and spot crude oil prices has been about .98, indicating a strong relationship between the cost of crude oil to produce jet fuel and the price of jet fuel. This relationship varies at times due to the relative supply and demand conditions in the jet fuel market, and is particularly affected by major supply disruptions, such as we experienced after the hurricanes in 2005.

We recognize how the price of jet fuel has been a serious problem for airlines. For example, about 20 billion gallons of jet fuel are used each year, so this has meant that for every penny increase in the cost of jet fuel, it means over a $200 million increase in the cost of jet fuel annually.

We believe that positive changes in U.S. energy policy can help alleviate this burden on the airline industry and better meet the energy needs of American consumers and the U.S. economy as a whole. API is prepared to work with the Congress and the Administration to bring these changes about.

Thank you, Mr. Chairman. I am prepared to answer any questions you might have.

Mr. MICA. Thank you, and we will hear from our last witness on this panel, Mr. Jeffrey Hawk, with the Boeing Company. Welcome, sir, and you are recognized.

Mr. HAWK. Good morning, Mr. Chairman and members of the Committee.

On behalf of the Boeing Company and in my capacity as Director of Certification, Environment and Government Relations on the 787 program, I thank you for the opportunity to address the Aviation Subcommittee. I have submitted written testimony for inclusion in the record.

Mr. MICA. Without objection, the entire statement will be made part of the record. Please proceed.

Mr. HAWK. I would like to briefly summarize that material.

The prepared testimony addresses the demand side of fuel consumption. Three areas are covered: the newest Boeing airplane, the 787 Dreamliner; secondly, the incorporation of continuous improvements in our existing product lines; and lastly, our request for Congressional support for the necessary improvements in our air traffic control system to enable aircraft to move more efficiently in the world's air space, thereby saving fuel and time.

The Boeing Company is committed to continuous improvements in the fuel efficiencies of our airplanes. Sine the dawn of jet travel, there has been a reduction of more than 60 percent in fuel consumption compared to the 707 era aircraft. Our latest program, the 787 Dreamliner, is a revolutionary step forward in this pursuit. One of the significant features of the 787 is the use of carbon fiber composites for the primary structure. This material saves weight, thereby saving fuel.

A new airplane program allows us to use new engines from GE and Rolls Royce, new aircraft systems, the latest aerodynamic techniques to reduce drag and lightweight composites to produce a revolutionary new airplane that burns 20 percent less fuel and 20 percent less CO2 than the aircraft it replaces. The 20 percent fuel savings results in a 10 percent reduction in airline operating costs, much needed for their financial recovery.

A fleet of Boeing 787s would save over 3 billion gallons of aviation fuel in 20 years. The 787 is the right airplane at the right time. The airline response has been exceptional, with 379 announced orders to date. Our existing products have incorporated many changes to ensure fuel efficiency. New and derivative engines, more efficient aircraft systems and aerodynamic systems, such as winglets and swept wingtips, are examples.

Our newly announced 747–8 family of aircraft will be using the same very fuel efficient 787 engines to produce the next member of the durable 747 family of aircraft. Our airplanes today are equipped with modern navigational equipment. We need an air traffic control system that is compatible with this capability. Boeing is doing its part to improve fuel efficiency. We ask Congress and the Aviation Subcommittee to do the same by sponsoring and supporting necessary legislation to create the next generation air traffic controlled system.

The ability of aircraft to fly directly to their destination, unimpeded by ATC, will save time and precious fuel resources. The future air traffic control system needs to match the improvements the industry is making in our airplanes.

In conclusion, the Boeing Company is pleased to present this testimony before your Committee. Our performance and demonstrated commitment to improvements in fuel consumption will continue.

Mr. Chairman, thank you for the opportunity to address you and the Committee on this subject of our Nation's fuel supply.

Mr. MICA. Thank you, and now we will get into some questions. Mr. Heimlich, what about requiring some sort of jet fuel reserve? There are several ways that this can be done. I guess in Europe they require the airlines, some of the folks on the panel have talked about the oil companies, petroleum companies, being saddled with the responsibility, maybe the Government. Any ideas?

Mr. HEIMLICH. Yes, I think it is an idea worth exploring. This is a classic case where the devil is in the details. Would the reserves be held in geographically diverse areas? What would the fill rate of the reserve be? Would it be filled at opportune times, considering market prices, so it would not aggravate the price in the marketplace?

As far as the European situation, I do believe they obligate the oil marketers, rather than the airlines, to hold the stocks. And there you get into, as Mr. Shages said, a control issue. Would the Government have the leeway to release the products at will, or as we saw in the hurricanes, when the IEA stock release occurred, they allowed, they freed the marketers from their obligations and hoped that high prices in the U.S. would bring product to the United States, and that in case did happen. So I think the punch line is, it is worth evaluating further. We don't have definitive position.

Mr. MICA. And right now we have, Mr. Felmy, what, about a one month's supply, did you say, of jet fuel?

Mr. FELMY. In terms of the inventory level, we have around 40, at least according to my data, about 43 million barrels in inventory. With a consumption of 1.6 million barrels a day that puts it roughly at about a one month inventory, just from inventories. But remember, please remember that most of the supply comes contemporaneously from the refinery operations. So it is a little misleading to use those calculations.

Mr. MICA. What is your viewpoint on having, actually, Mr. Heimlich corrected what I think I was saying, that the burden would fall on the airlines in Europe. It is actually on the petroleum companies. What do you think about that?

Mr. FELMY. Well, again, as Mr. Heimlich has pointed out, it is clearly a devil in the details issue. Philosophically, I believe we have adequate inventories. We faced a once in a century impact from Hurricanes Katrina and Rita, and we did have a challenge in terms of meeting supplies.

But it was also the case that we had a huge surge in imports, as was mentioned earlier, by a doubling of them. We also saw a dramatic drop in exports, which are small to begin with. And that was because the pricing was such that the spot prices in September, October and November for jet fuel were higher in the United States in the three major harbors than they were in Singapore or Rotterdam.

So I think we have a functioning system. I think the other issues that have to be addressed in terms of mandating higher minimum inventories than we have right now are one of cost and where is the product going to come from. We are already running the refineries at very high levels of utilization. There isn't a lot of excess capacity worldwide. So you have the potential of trying to mandate higher inventories, of potentially driving up costs.

Mr. MICA. Mr. Heimlich, what percentage now is fuel of the cost, of your cost for commercial passenger service?

Mr. HEIMLICH. I think it has exceeded 20 percent for most of the carriers. The historical range was probably 10 to 15, now we are talking in the 20 percent range, maybe 25.

Mr. MICA. Again, I think others have testified, I think my testimony also indicated that it is really sort of the backbreaker, right now of the industry, the fuel costs. I guess that is a correct assumption. You have tackled some of the labor issues mainly by going into bankruptcy, those costs. And you have cut back.

Most of the legacy carriers are now some version of a discount carrier. Fuel seems to be the nut that you have to crack as far as staying on top of prices. I think we had information that last year you raised your fares about 10 times, something like that, 10 or 12 times and maybe once already this year. What is the problem with keeping up with those costs and passing them on to the consumer?

Mr. HEIMLICH. Well, we keep trying, and fortunately, we have seen some modest progress in the last few months in the willingness of the customer to pay. High fuel prices have interestingly forced some capacity reduction on the part of the carriers, supporting a little better pricing environment. The difficulty is in, I had mentioned that our fuel prices doubled over the last couple of years

from $16 billion to $33 billion. It is difficult to pass through $17 billion in fare increases over a two year period.

So it is really the magnitude of the increase, can it all be passed through fares. We are making some modest progress, but of course, if we could pass all our costs through, we would never lose money. So it is a continual battle.

Mr. MICA. I have a question relating to, I don't know if anybody can answer it, maybe we will go back to you. The Europeans are now considering some sort of a fuel tax because of jet fuel or airplane fuel pollution effects on the environment. Are you following that at all, Mr. Heimlich?

Mr. HEIMLICH. Yes. We have some folks who are very engaged in international environmental matters and we do not support that tax. As I said, we have a tremendous built-in incentive, being price, to be as conservation oriented as possible. I think the best thing for us would be to hope that other industries can follow our lead in that regard.

Mr. MICA. Finally, Mr. Hawk, you have increased the fuel efficiency of some of your aircraft. Maybe you could give us some idea where your latest models stand. Of course, one of the things that I think anyone in the market for acquiring commercial aircraft would look at is your fuel efficiency. How do you stand in competing in the international market maybe with your latest product?

Mr. HAWK. We have seen a trend since 1990 of the average size of jet transports getting smaller. Part of the reason for that is the demand for airlines to move point to point, from city of origin to final destination without making an intermediate stop, the classic hub and spoke environment.

We were developing technology in the late 1990's originally aimed at increased speed. That is where the origin of more extensive use of composite materials was envisioned, and also new engines. That was known as the sonic cruiser program.

Because of the exogenous shocks of 9/11 and the significant increase in cost of aviation fuel, and the request of the airlines, we migrated that efficiency originally aimed at speed, about a 20 percent increase in speed, to be specifically targeted at fuel efficiency, essentially traded at 20 percent increase in speed for 20 percent reduction in fuel consumption. That is brought about by using new engines that are more efficient, a higher bypass engines, operates by passing more of the air around the outside of the engine. That is good for fuel efficiency.

Lightweight materials, as cited previously, were the composites. The latest in aerodynamics to reduce the drag of the airplane and lightweight, efficient systems that again, in interaction and integration with the engines, to not exact hot, high pressure bleed air from the engines. The classic airplane systems that had previously been powered by that bleed air on the 787 will be powered electrically. The integration of all four of those are what achieved the 20 percent reduction in fuel consumption, compared to, say, today's 767 aircraft.

Mr. MICA. OK, thank you.

What we will do is, I will yield now to Mr. Larsen. I may get back with a couple of questions.

Mr. LARSEN. Thank you, Mr. Chairman.

Mr. Heimlich, you didn't mention in your oral testimony the issue of hedging. It is in your written testimony. I won't ask you to define for us, I think we have a good idea what it is about. But what is interesting about the hedging policies are the various airlines, because they are all over the map. There is no consistent policy. We talked about a lot of solutions, a lot of ideas.

One idea we haven't explored is what the airlines do themselves and sometimes do to themselves by having a good hedging policy or a terrible hedging policy. Can you explain to us exactly what kinds of choices airlines go through to decide on their hedging policy?

Mr. HEIMLICH. Absolutely. Let's start off by remembering that hedging is a gamble. And you win some, you lose some. In the past, there have been some charter airlines or smaller airlines that have hedged themselves into bankruptcy by locking in at prices that were too high. I think few would have foreseen the very high prices we see today.

Having said that, the individual airlines look at hedging as one, a matter of financial planning to limit volatility, so they know exactly what they are going to pay, even if sometimes they bet wrong, they bet too high. And some of them look at it as a luxury, if they have the cash wherewithal to do it. Today if you go in the market and you do find a willing counter party, you are not going to get someone to give you the $26 a barrel price——

Mr. LARSEN. Not any more.

Mr. HEIMLICH.—that Southwest had a couple of years ago. And even their positions are eroding. I think the other thing to recognize is, there were carriers like United that had hedge positions and were forced to rescind those contracts as part of bankruptcy. Delta had, in early 2004, had to liquidate its hedge positions to free up cash for immediate obligation.

So basically, the airlines and their treasury groups have, they look at their cash capability, what the market will offer, a projection of what the energy prices will be, and then see if there is a counter party willing to do it. You are absolutely right, that some look at those more as strategic financial planning rather than bets. But in the end, it does come back to a gamble for them.

Mr. LARSEN. In testimony, you mentioned fuel prices varying in different parts of the Country. Can you explain why?

Mr. HEIMLICH. Yes. We do pay very different prices in different regions of the Country, as we do throughout the world, as Mr. Felmy also mentioned, Singapore and some other areas. It has a lot to do with the quality of the physical infrastructure, the pipeline network, trucking capability across mountains, the percent that comes in from overseas. So those things tend to make the West Coast higher with a limited trucking and refining capability, compared to the East where you have three or so major pipelines, you can move things by far in a probably more competitive area.

So we do, because of that reason, some economic tankering, where sometimes even if there is not a hurricane, we might ferry fuel, let's say, from Baltimore-Washington International to the West Coast on a transcontinental flight if the price is sufficiently cheaper.

Mr. LARSEN. So for the same reasons that Whatcomb County in my district, home of two refineries, has the highest price at the pump of any county in the State of Washington, the same principle applies to jet fuel? It doesn't matter where the source is, it is how it gets there, the different ways you can get oil to the pump?

Mr. HEIMLICH. That is absolutely correct. Supply and demand at the local level and the transport costs associated with getting it there are critical to the ultimate price to the consumer.

Mr. LARSEN. Mr. Felmy, I have a question here about where the major refinery questions are located. That is more of a set of questions. I will just jump through it. Of the five refineries in Northern California, on the West Coast, four of them are in my district. The fifth one is U.S. Oil and just serves the two bases in Puget Sound.

So we have these refineries, four refineries in the district. In your testimony you mentioned that refineries overall have operated at more than 90 percent capacity for nearly two-thirds of the time, and 85 percent for nearly 90 percent of the time. My question to you is, what stops them from operating at, say, 95 percent two-thirds of the time and 95 percent 90 percent of the time? What stops them from getting closer to 100 percent more of the time?

Mr. HEIMLICH. Several things. The statistics you have, of course, are affected by the hurricanes. So in terms of some of those impacts, that is clear as was mentioned earlier, 25 percent of the refining capacity was affected by the hurricanes. Secondly, we regularly have maintenance that has to be done. Also significant upgrades in terms of producing new fuels. You can't run the refineries at the same time that you're adding pieces of equipment and so on and so forth.

That refinery utilization is very high, as compared to other industries, which is more in the 80 percent area. But the key thing that dominates why you don't run them harder than we are is health and safety concerns. You have to do required maintenance, and on a twice a year basis, you typically have to go through a turnaround or maintenance schedule, just to be able to make sure these high temperature, high pressure facilities are operating safely.

Mr. LARSEN. OK. I will have further questions on a second round, but if I could, for Mr. Hawk, welcome to Washington, D.C. and I hope you get to fly home tomorrow, if not sooner. Can you talk about the migration of composite technology to the 747–8 program, and from 787 to other, you talked about the engines, but can you talk about the composite technology?

Mr. HAWK. We have actually seen an interesting growth of the use of composites throughout the jet aviation program. The first generation of aircraft back in the late 1950's, early 1960's, used about 1 percent of the air frame in various forms of composites. Aircraft of the 1980's used about 3 percent, 777 from 10 years ago used about 11 percent of the air frame weight in composite materials.

The 787 makes a more fundamental step forward, where about half of the structural rate is the carbon fiber composite material. We see this as an appropriate emerging trend. We think new aircraft will continue that same technology. The 747–8 is a derivative of the current 747 family, so there will not be a significant change

in the percentage of composite use, other than its current application and flaps and spoilers and areas like that on the air frame.

But we expect new aircraft from virtually all manufacturers to make much more extensive use of this lightweight, low corrosion, low key characteristic, very durable material.

Mr. MICA. I thank the gentleman.

Mr. Moran?

Mr. MORAN. Mr. Chairman, thank you very much.

You indicated in your testimony that 25 percent of the refining capacity was affected by the hurricanes of the Gulf Coast. Has that capacity now been fully restored, and has the price consequence of that lack of refining capacity for that period of time been taken into account? Are prices now no longer affected by the hurricanes of the Gulf Coast?

Mr. FELMY. First, we have still some lingering damage from refineries. There are a couple that are still offline. We are going through some level of restarts, so that there still is some lingering damage.

In terms of the price impacts across the fuels, what we saw after the hurricanes, even with the capacity offline, we saw prices spike up, markets function, huge surges in imports, and demand was affected. So you have seen prices come down dramatically where jet fuel is now, well, in New York Harbor, I guess it is around $1.79 a gallon from the previous highs that you were experiencing back in the post-hurricane impact.

So there still are some lingering impacts in terms of supply, but fortunately, we had imports which have come in to help fill the gaps that have been there.

Mr. MORAN. Is jet fuel refined at specific refineries or is it refined at a broad array of refineries? If you are a refinery, do you specialize in jet fuel?

Mr. FELMY. It is refined in many refineries. Virtually all refineries have, I guess, the capability to be able, but it depends on whether or not you take the cut that goes out of jet fuel from either the middle distillate pool. So some don't produce any jet fuel. But most do, which is an interesting point, because one of the unfortunate rumors that was floating around after Katrina was that the one refinery, one of the refineries that was severely impacted was the sold provider of jet fuel in the Country. And that was simply wrong.

Mr. MORAN. The complaint in Kansas is often diesel fuel, Mr. Felmy, that the price consequence of Katrina and supply and demand has been reduced for gasoline consumption and the automobile, you are telling me somewhat, or jet fuel. But the one that seems to linger the highest, particularly in my agriculture communities, is the continued concern that diesel fuel has not responded subsequent to Katrina.

Mr. FELMY. Well, it has responded some. It has come down from somewhere, I forget exactly what the peak was, but it is now around $2.58 nationwide, something like that. Diesel fuel market has been fundamentally different from gasoline, as you note. It is because one, you have had much stronger demand for diesel, where you saw, for example, diesel demand in 2005 was up 2.1 percent, whereas motor gasoline was only up .4 percent.

But a lot more importantly in the case of diesel fuel, we did not see the surge in diesel imports that you saw in the case of gasoline. Gasoline imports surged to almost 1.5 million barrels a day from an average of 1, whereas diesel was up a little but not that. At the same time, you had post-hurricanes, you had right the timing for harvest demand and also a lot of construction demand for rebuilding and so on. So fundamentally two different markets.

Mr. MORAN. Why the difference in imports between jet fuel and diesel?

Mr. FELMY. As near as I can figure out, it is because Europe continues to, I guess you would say, diesel-fy its motor fleet where consumers there are buying a much larger share of diesel engines than motor gasoline. So you have gasoline, they have gasoline to export, but not as much diesel.

Mr. MORAN. One of the things that I guess I should know before I came to Congress, and having been her a while now is that there is a set of principles, of laws, of supply and demand, and perhaps what we need to often remember is that we can't overcome those laws of supply and demand. They exist, as much as Congress would like to change the consequences. Have you seen any policy steps that the Federal Government has taken that fundamentally would affect supply and demand, the supply of jet fuel, demand for jet fuel, or just energy in general? Are we doing anything right or wrong?

Mr. FELMY. Well, I think the Energy Policy Act of last year, signed on August 8th, was a first step. It had provisions in there for conservation, renewables, it had quite a bit of provisions for coal, for nuclear power, electric transmission and some natural gas distribution lines. It had very little for oil and gas, however. So what remains to be done is still policies that can help us open up and explore for more oil and gas in this Country. You can also improve conservation and energy efficiency to help that, and improve the infrastructure.

So we still need more policies in that area to help American consumers.

Mr. MORAN. Thank you, sir. Thank you, Mr. Chairman.

Mr. MICA. Thank you. Mr. Pascrell?

Mr. PASCRELL. Thank you, Mr. Chairman.

Mr. Felmy, the largest ten refiners of oil operating in the United States have control over 78 percent of the domestic refining capacity. The oil industry has indicated that jet fuel supply will be limited indefinitely because of difficulties getting permits to expand or build domestic refineries, adding to a pre-existing shortage of refineries due to the under-investment in the 1990's.

The crack spread, as it is called, for jet fuel hit an all time high of $42.23 in late September of 2005. It remains at $11.88. The historical average has been $5. According to the Congressional Research Service, in 2004, the largest net income increases were in the independent refining and marketing segments, which rose a whopping 190 percent. The simultaneous occurrence of these circumstances could be interpreted in many ways, including the appearance of collusion or price gouging on jet fuel.

Aside from the given fact of high crude oil prices for all sectors of the petroleum industry, how do you explain this? How do you explain this?

Mr. FELMY. Markets at work, sir.

Mr. PASCRELL. What did you say?

Mr. FELMY. Markets at work.

Mr. PASCRELL. Markets at work?

Mr. FELMY. That's correct.

Mr. PASCRELL. Would you explain that? What do you mean by that?

Mr. FELMY. What we had was fundamentally tight markets. As indicated earlier, you had a huge shift to the supply chain and in order to be able to allocate scarce supplies, you have price movements, which do that in a market economy. In terms of the concentration that you mentioned, yes, our industries are in that range. But that puts them along with many other consumer industries in terms of the concentration ratios that serve consumers. You have to be large and have scale to be able to cost effectively serve consumers.

In terms of adjustments, as I said, you have seen increases in imports as a result of those price signals. You have had some alleviation of demand and you have seen a decline in prices as a result. But it is fundamentally markets at work, moving prices around.

Mr. PASCRELL. Markets at work I find to be a fascinating term. It was the same term used by the Enron folks in 2000 and 2001 out in California, the markets are at work. The industry is moving forward. And you can wonder, I guess you don't, I think you understand why there is question about all of these things coming together at the same time. Circumstances are unusual. And I am not so sure it is the markets at work. I believe in the free market. I believe in an open market. I believe in competitive systems.

But at the same time, I think the very parts of the market at work bring about just the opposite situation, markets controlled. I am not so sure these outlandish increases, I mean, 190 percent is just unbelievable. How do you explain that in terms of market operations or market activity?

Mr. FELMY. It is fundamentally a function of the price determination of the buyers and sellers who are in the product markets. Comparing 190 percent is a misleading number, because you have to look at what the returns to the refinery industry were for a very long time.

Mr. PASCRELL. Well, tell us about them.

Mr. FELMY. They were very low, very low returns for much of the 1990's. Going back 20 years, we have had low rates of return. You had an improvement in that sector over the past couple of years, but you still don't have a great rate of return in terms of some of the refiners, if you look at their margins. And if you look at the overall industry, our profit rate, our earnings rate, is only about 8, 8 and a half cents on the dollar.

That is less than many other industries. It is slightly above the national average for all industries. But it is well below other markets, other industries, such as pharmaceuticals, banks, computer companies, software, and so on.

Mr. PASCRELL. What is the influence, specific influence of demand on those prices?

Mr. FELMY. Demand is a very powerful influence. We saw that specifically in the gasoline market and as was mentioned earlier, the difference with the diesel market. Gasoline demand was down post-hurricanes, and that combined with an increase in imports, restoration of production, you saw prices come down dramatically. In the case of diesel, demand continued high because of the harvest and because of construction demand and continuing economic growth. Demand is very, very important to markets.

Mr. PASCRELL. Can I ask one elemental question, Mr. Chairman? I am interested in the subject of demand. The argument is that the increase in demand keeps the price elevated. I would conclude from that, then, the problem being that if you had an increase in, if you lowered the price, there would be an increase in demand. Correct?

Mr. FELMY. That is correct, sir. An economist can believe nothing else.

Mr. PASCRELL. Oh, really? You know what I think? I think, Mr. Chairman, and I apologize for being late, I had three hearings at the same time. I think, Mr. Chairman, when one looks at the machinations of the market, in a so-called free market, when one looks at the machinations of this market economy, there are a lot of questions. The consumer is a victim most of the time. We are all victims. You are a victim yourself. We are all victims.

But I don't think it is the economists that you claim are not so sure about what brings rise to the prices. Demand is one part of it, no question about it. But there are many other factors that are involved. What you consider to be below average earnings in the 1990's, you could take a look at that also. We don't have the time here today.

But these numbers are not acceptable. The numbers I presented to you are legitimate numbers. I didn't make them up. You understand that, correct?

Mr. FELMY. Yes.

Mr. PASCRELL. Thank you.

Mr. MICA. I thank the gentleman.

Are there other questions from any of our members? Mr. Larsen, I will let you go again.

Mr. LARSEN. Mr. Hawk, in your testimony you talk about, in your oral testimony you touched on improvements to the air traffic control system. Your written testimony goes into a little more detail. Can you tell us why Required Navigation Performance, tailored arrivals and trajectory based operations would help the efficiency of the system? Then could you tell us if those things were in place, what our current ATC system would have to do to accommodate that?

Mr. HAWK. The capability of modern aircraft allows much greater navigation precision than what we saw in place 20 plus years ago. So an aircraft can be properly positioned in space and time as directed by the air traffic control system.

Ideally, you would like an aircraft to move from the gate to the departure end of the runway and take off without an undue hold. So the ability to move more aircraft through our congested airspace today is fundamental to that desired efficiency. The aircraft are

ready. The somewhat antiquated air traffic control system is a bit of a hindrance there.

An example was cited by the FAA in panel one, referring to something called continuous descent approaches. That four-dimensional navigation capability that could be enabled with a revision to the air traffic control system would allow an aircraft about 150 miles out to have a programmed path that would allow the aircraft to descend at idle power from the cruise altitude and make a turning descent to the runway, and not do what we typically see today, which is an intermediate step descent using increased power. That consumes more fuel and time.

So a continuous descent allows aircraft to move in from the side to approach ends of the runway. That is one example.

Required Navigation Performance is consistent with what was also cited by the FAA, the RVSM, the reduced vertical separation system. The airplanes are ready. We just need the air traffic control system in place to position those aircraft in time and space in the most efficient manner.

Mr. LARSEN. Mr. Felmy, as I understand refineries, and I took a tour of one of the refineries in my district a couple weeks back, and they showed me the chart, how the crude oil comes in and gets separated out into various lines and refined into various products, including jet fuel, in this particular refinery, and diesel, and of course the basic product that most of us use.

Given the ultra-low sulfur diesel requirements that are coming on, do you anticipate, does the industry anticipate that squeezing out refining capacity, replacing refining capacity, say on jet fuel or any of the others? Or is the industry doing everything it can do to accommodate those requirements, so that you are still getting 1.6 million barrels of jet fuel a day, plus whatever else you need?

Mr. FELMY. First of all, the industry is doing a lot on this program. It is an enormous challenge, going from roughly 300 parts per million sulfur to 15 parts per million. We are investing on the order of $8 billion in terms of meeting those requirements. Not all refiners will choose to produce that fuel, so they could produce other things. One of the things they could produce is more jet fuel, because that is an alternative, or a more high sulfur heating oil, something along that line, or offer a diesel, things like that.

It depends on the individual refiner. The smaller ones have more of a challenge in terms of the investments they have to put in place to produce those fuels.

But the ultra-low sulfur diesel program is an enormous change and it has enormous challenges. I believe we have invested, required to produce sulfur levels in the refineries at well below 15 parts. But as was mentioned earlier in the discussion, when you transport it through long distances, you can have the fuel pick up more sulfur throughout. So we are working closely with EPA to have the appropriate policies and regulations and practices and trying to make certain that we introduce this change as smoothly as possible.

Mr. LARSEN. You don't anticipate any squeezing out of any other products?

Mr. FELMY. Well, the one change that we are just uncertain about is that high sulfur jet kerosene is used for other applications,

both as thinning diesel fuel, to keep it from gelling in the winter, and for some heating and so on. With the introduction of the ultra-low sulfur diesel, you will not be able to add that high sulfur thinning agent to the diesel fuel.

So the individual companies are looking at how do they have a product to be able to market to meet those needs. I can't say with any confidence what the impacts would be, but it is something we are looking at very carefully.

Mr. LARSEN. Mr. Heimlich, a quick question. I don't know how quick the answer will be. One point six million barrels per day now, what is the projection per day over the next five years?

Mr. HEIMLICH. I don't have that without the calculator. Our current run rate is 19.5 billion gallons a year. As volumes grow, I see that expanding a bit. Granted, that 1.6 is demanded. My figure for 19.5 billion is for U.S. airlines operating worldwide. So we also buy some fuel outside the 1.6 overseas and foreign carriers and miliary carrier also buy some of their jet fuel in the U.S. So we could get back to you with a more precise figure.

Overall, I expect the U.S. airlines total to probably grow, but grow at a lower rate thanks to fuel efficiency.

Mr. LARSEN. Thank you.

Mr. MICA. Any other members? Mr. Pascrell.

Mr. PASCRELL. Thank you, Mr. Chairman.

Mr. Felmy, according to the Congressional Research Service, in 2004, there was 25 percent profit among the independent oil refineries. That is what the Congressional Research Service says. My question is this. Does that jive with your numbers, Mr. Felmy? And number two, should there ever be any limit on profits? Two questions.

Mr. FELMY. The first number I believe is a return on investment, which is a different measure than a gross return that I had given you earlier. So yes, they are absolutely consistent. If you look at the refiner's profit rate, if you will, it is probably even now only on the order of, I believe the last quarter was around 4 or 5 cents on the dollar. So there are two fundamental different measures of rates of return.

In terms of limitations on profit, philosophically no. I think it is the marketplace that disciplines that. It is the marketplace that determines what supply and demand factors come together to yield a rate of return. The market giveth, the market taketh away.

Mr. PASCRELL. So whatever the profit is, and what sounds outlandish to me, this is simply a result of a free market system, granted there is a free market?

Mr. FELMY. Yes, sir. And it is, from our perspective, it is a competitive market with, you mentioned 10 competitors with a 70 percent rate. That is a competitive market. If you look at other industries, they have much higher concentrations of market concentration than our industry. In fact, if you look at the most concentrated industries, microprocessors, you have two competitors and they beat each other's brains out.

Mr. PASCRELL. I am familiar with some of the other industries, Mr. Felmy. But I can't come to grips with, I find it difficult to come to grips with your conclusion that whatever the industry, and we are talking about a very specific industry now, that whatever the

markets will bear the markets will bear, and that even in tough times, even in difficult times, even if it means high costs to users, whatever you can get, you should try to get. I mean, this is a, in your interpretation, a free and open market system. There are no limits to profit.

Mr. FELMY. Yes, sir. It is the marketplace that determines what are the prices. It is the management of the firms that determine what their costs of operations are. It is a combination of those factors. It is a combination of market operations and management.

Mr. PASCRELL. But when you have a product, Mr. Felmy, that the public needs, and if the public doesn't have it, it can't conduct business, and you choose to continue to increase the cost of that product, knowing quite well that demands have increased, knowing quite well that the consumer has no other place to turn, simply because you can get it at that particular moment, is that part of the free market system, Mr. Felmy?

Mr. FELMY. It is the free market system that determines the outcome in price of the products that are delivered. The costs of fundamentals of our business is crude oil costs, which are determined by international market forces. As I said, the market giveth, the market taketh away.

The alternative to not letting the market work is the disasters we faced in the 1970's with long gas lines, allocation scenes and the complete disaster of energy performance.

Mr. PASCRELL. Well, there was a number of reasons for that, Mr. Felmy. You know that. There were a number of reasons, not just one reason. And I am not an advocate of price controls. I am not talking about that. We want a market system. See, I want to make that market system more open, more transparent, more open so that we know where dollars are going and the reasons why prices are increasing. The average American, the average Congressman does not understand why certain prices increase when particular demand is not accelerating to that degree.

And we have every right to ask about profits in a country where we not only believe in the free market system, we believe in fairness. That's what makes us different than the bad guys. So I am no so sure I can accept your definition of the open market or the free market.

But I must say this: the President of the United States agrees with your definition. I noticed his response when we talked about Exxon's profits last year. I think that this is an absolute disgrace.

Mr. FELMY. Sir, the marketplace determines what these prices are. If you look at our earnings as compared to other industries, we are above average, but we are well below other industries that do it. It is a fair rate of return for all the risk that we have to——

Mr. PASCRELL. I understand. I understand your position, and I have mine. I respect your position, I hope you will respect mine. Thank you, Mr. Chairman.

Mr. FELMY. Yes, sir, I do.

Mr. MORAN. [Presiding] Mr. Pascrell, thank you.

Mr. Heimlich, the privately held airport operating in London Heathrow International Airport recently began rationing jet fuel at Heathrow due to supply shortage due to a an explosion and fire at a major depot.

Mr. HEIMLICH. Yes, sir.

Mr. MORAN. And there was some concern about discrimination for U.S. airlines. Can you bring us up to date on the status of that issue?

Mr. HEIMLICH. Yes, thank you, it is a very important issue. I think it highlights that issues of supply disruption and their consequences are by no means limited to the United States. The Bunsfield fire outside of the Heathrow area in December did erase about 30 percent of supplies there. The supply situation really has not ameliorated and does not seem to be going to be fixed any time soon.

BIAA, the airport authority, did impose a rationing scheme. ATA strongly opposes any rationing scheme. Our carriers bore the brunt of tankering in and cost to respond to hurricanes. The international carriers did not suffer at all. A similar thing happened outside of Sydney, when this happened in Australia, Qantas bore the brunt.

The situation at Heathrow now, they have, well a physical fix is available. There is very little pressure to make one happen, which is frustrating. The degree of discrimination in the rationing scheme has abated somewhat, but a gap remains, particularly if fuel supplies on any given day fall below a certain level. So they basically, and the discrimination is by the flag of the airline. So it is home based carriers on long haul routes versus visiting carriers on long haul routs, and a similar scheme on short hall.

The key is for us, it is a matter of principle. We don't want this to be thrown back in our face at any airport any time in the future. It flies in the face of what we experienced in the hurricanes.

Mr. MORAN. Is this the only instance in which this has occurred or is occurring?

Mr. HEIMLICH. To our knowledge, yes. Every other precedent, I mentioned Australia and all through the hurricanes, we have had shortages elsewhere. We have always seen a cooperative effort between the airport operator, the suppliers, the oil suppliers and the airlines to work it out. There was just a natural expectation that those who were most operationally capable of bearing the brunt were those who took the lead. So yes, Heathrow's situation is unique in the history while I have been in this business.

Mr. MORAN. We will see if we can end this hearing on a positive note. Yesterday, the price of crude was less than $60 a barrel for the first time this year. Is that an aberration or is there a signal in the market that jet fuel and other energy prices will be more stable or lower in 2006?

Mr. FELMY. It is going to be very much a function of, as economists love to say, the supply and demand conditions to go into the price. Fortunately, we have had a mild winter, although Punxsatawney Phil had a forecast for a longer amount of winter.

It is also going to be very much a function of the supply hot spots around the globe, which we have been watching for several years now, whether it be the latest being Iran, Iraq, Nigeria, Venezuela and so on. There is one thing that we can always hope, that markets will respond and we will see an improvement in the conditions.

Mr. MORAN. I think you took me back to my words earlier about supply and demand.

Anything else?

Mr. FELMY. No, I appreciate it. I would just add that the price, I usually like to wait two or three months before I call anything a trend. We have seen, as some alluded to before, a speculation about $80 or $90 or $100 a barrel. So we will wait and see. But the last couple of days are positive.

Remember that jet fuel prices can sometimes stay high, even as crude falls down. Mr. Pascrell alluded to the crack spread earlier.

And I would like to emphasize that any solution for us needs to consider both the elements of supply and demand, and that conservation in any refined product of crude oil or for crude itself has an ultimate flow-through to jet fuel prices. So when we are talking about alternatives or conservation, it shouldn't focus just on the demand for jet fuel itself. It should look at other products.

Mr. MORAN. Thank you. I thank the panel very much.

Mr. Larsen, anything further?

Mr. LARSEN. No, thank you.

Mr. MORAN. I would ask unanimous consent that we leave the record open for 10 days for additional comments and responses from the witnesses at today's hearing. With that, the Subcommittee on Aviation is adjourned.

[Whereupon, at 12:02 p.m., the subcommittee was adjourned.]

STATEMENT OF CONGRESSMAN LEONARD BOSWELL
AVIATION SUBCOMMITTEE HEARING ON THE IMPACT
AND COST ON THE U.S. AIRLINE INDUSTRY OF THE
COMMERCIAL JET FUEL SUPPLY

Mr. Chairman, I am pleased to participate in today's hearing on the important issue of the impact on the U.S. Airline Industry of the commercial jet fuel supply. As one of several GA pilots serving on this committee, I know first hand the tremendous cost associated with the recent rising cost of fuel. These costs have made the operating costs more than double over the past 6 years. The fuel costs for our commercial airline industry are staggering.

As a strong supporter of our commercial airline industry, who wants it to succeed, I am intrigued by the concept of establishing a strategic jet fuel reserve. This would be modeled after the Strategic Petroleum Reserve, which is designed to help mitigate the effects of oil shortages or sudden price spikes. I supported the Administration's decision last Fall to release oil from the Reserve to deal with the problems related to the effect of hurricanes on our Gulf Coast refineries. However, This did little to help the price spikes for jet fuel.

I realize that jet fuel presents certain challenges to store it in a reserve for an extended period, but I believe today's technology can overcome these obstacles. This would help a troubled industry and preserve a key component to our nation's economy. We can and must examine closely how to move into this area.

I also recognize the air carriers can and must do more to seek fuel efficiencies in their operations. By reducing aircraft weight or adopting conservation operation practices, air carriers can further reduce the crushing weight of high fuel costs. These savings must continue to be found where ever possible or practical.

I look forward to hearing today's testimony on this pressing issue of great importance. I stand ready to work with my colleagues in seeking alternative solutions to addressing this problem.

Thank you.

Congressman Russ Carnahan (D-MO)
House Transportation Committee
Aviation Subcommittee
Hearing on the Commercial Jet Fuel Supply: Impact and Cost on the U.S. Airline Industry
Opening Statement
February 15, 2006

Mr. Chairman, I would like to thank you for holding this very important hearing today on the impacts of the supply and cost of commercial jet fuel on the aviation industry.

In the years following the September 11, 2001 terrorist attacks, the commercial airline industry has experienced serious financial difficulty. Several airlines have been forced to file for bankruptcy and many more struggle to remain solvent. As an industry that employs tens of thousands of people nationwide, this situation has significant implications for our national economy. In my home state of Missouri alone, American Airlines employs thousands of workers directly, and thousands more are employed by Lambert International Airport.

While there are a wide range of reasons for the economic condition of the commercial airline industry, one significant factor commonly cited by all airlines is the cost of jet fuel. I look forward to closely examining this issue to understand what is causing the volatility in jet fuel prices and what actions the federal government can take to help the airline industry cope with these costs.

I look forward to hearing the testimony of our esteemed experts. I thank you all for being here today.

STATEMENT OF MICHAEL A. CIRILLO, VICE PRESIDENT FOR SYSTEMS OPERATIONS SERVICES, AIR TRAFFIC ORGANIZATION OF THE FEDERAL AVIATION ADMINISTRATION, BEFORE THE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE, SUBCOMMITTEE ON AVIATION, ON COMMERCIAL JET FUEL SUPPLY: IMPACT AND COST ON THE U.S. AIRLINE INDUSTRY

FEBRUARY 15, 2006

Good morning Chairman Mica, Congressman Costello, and Members of the Subcommittee. I'm happy to be here today, testifying on the commercial jet fuel market and its impact and cost to the U.S. aviation industry; and how we can reduce fuel consumption in the aviation industry. This is an enormously important issue, not only for commercial carriers, but for business and general aviation, as well. The Federal Aviation Administration is well aware of the dramatically increasing fuel costs, and we are actively implementing new technologies and procedures to help reduce fuel consumption, while maintaining the highest levels of safety.

Today's aircraft are on average about 70 percent more fuel efficient than aircraft were 40 years ago. Modern aircraft achieve fuel efficiencies of 67 passenger-miles per US gallon. In terms of energy intensity, or the amount of energy consumed to transport one passenger one mile (a useful metric that allows comparisons across transportation modes), an aircraft's energy intensity has improved dramatically since the mid-1960s, and nearly matches that of automobiles today.

The Department of Transportation has a goal to improve aviation fuel efficiency per revenue plane-mile by 1 percent per year, through Fiscal Year 2009. In the near term,

new technologies and procedures to improve air traffic management will help reduce fuel usage and emissions. I would like to take a moment to describe some of these technologies and procedures, and how they will help reduce fuel consumption.

One important fuel savings procedure was implemented by the FAA last year. It is known as Domestic Reduced Vertical Separation Minima or DRVSM. DRVSM has significantly increased capacity in the en route airspace by doubling the number of usable altitudes between 29,000 and 41,000 feet. The procedure permits controllers to reduce minimum vertical separation at altitudes between 29,000 and 41,000 feet from 2,000 feet to 1,000 feet for properly equipped aircraft. DRVSM allows greater access to fuel efficient routes that was previously unavailable due to the increased separation requirements. We originally estimated DRVSM would save airlines approximately $5 billion through 2016, an estimate that now appears to be conservative in light of the dramatic increase in fuel prices in the last year.

Another major initiative is expanding the implementation of Area Navigation (RNAV) procedures to additional airports. RNAV procedures are performing successfully at Las Vegas, Philadelphia, and Dulles airports. Last year, 13 RNAV departure procedures and four RNAV arrival procedures went into full operation at Atlanta Hartsfield-Jackson International Airport – the world's busiest airport. These procedures promote reduced fuel usage through more efficient climb and descent gradients; shorter, more predictable, and more repeatable ground tracks, and reduced delays. RNAV procedures provide flight path guidance that is incorporated into onboard aircraft avionics systems, requiring minimal air traffic instructions. This significantly reduces routine controller-pilot

communications, allowing more time on frequency for pilots and controllers to handle other safety-critical flight activities. Also, RNAV procedures use more precise routes for take-offs and landings, reducing fuel burn and time intervals between aircraft on the runways, and allowing for increases in traffic, while enhancing safety. Key benefits of the RNAV procedures include more efficient use of airspace, with improved flight profiles, resulting in significant fuel efficiencies to the airlines. In post-implementation studies by MITRE/CAASD, the annual operational benefits from RNAV procedures at Atlanta are estimated to be $15 million. Delta Airlines anticipates potential benefits up to $30 million with refinements to the procedures published in 2005. Additionally, 16 RNAV departures implemented at Dallas/Fort Worth International Airport in 2005 are expected to provide operators with estimated savings of $10 million annually through reduced delays. American Airlines anticipates operational benefits up to $20 million with increased throughput and departure capacity gains. The FAA has over 75 RNAV procedures under development this year.

In the en route environment we plan to publish more than 20 low-altitude and high altitude RNAV routes. The high altitude routes eliminate the need to over-fly ground-based navigation aids and allow the design of more direct, efficient routes. Low altitude RNAV routes allow direct routing through terminal airspace for Global Navigation Satellite System (GNSS) equipped aircraft. These routes are especially useful for general aviation flights, which previously would have been vectored around the terminal airspace. Additionally, last fall nine high altitude off-shore RNAV routes were implemented in Florida as part of airspace optimization efforts which I will address in a moment.

Another technological innovation, known as Required Navigation Performance or RNP, promises to add to capacity and reduce fuel consumption. RNP uses on-board technology that allows pilots to fly more direct point-to-point routes reliably and accurately. RNP is extremely accurate, and gives pilots not only lateral guidance, but vertical precision as well. RNP reaches all aspects of the flight – departure, en route, arrival, and approach. This not only will allow more efficient airspace management, but also provide savings in fuel costs for the airlines. For example, in January 2005, in partnership with Alaska Airlines, we implemented new RNP approach procedures at Palm Springs International Airport, which is located in very mountainous terrain. Under the conventional procedures in use today at Palm Springs, planes cannot land unless the ceiling and visibility are at least 2,300 feet and 3 miles. With these new RNP procedures, approved air carriers can now operate with a ceiling and visibility as low as 734 feet and one mile. This lower landing minima has allowed Alaska Airlines to "save" 27 flights between January and November, 2005, flights which would have otherwise had to divert to Ontario, California, an added distance of at least 70 miles. Additionally, when compared to the conventional procedures at Palm Springs, the RNP approaches will reduce the distance an aircraft has to fly from between 3 miles to nearly 30 miles – which translates into fuel savings for operators. These RNP procedures also provide laterally and vertically guided flight paths from the initial approach fix to the runway end. This attribute keeps aircraft safely separated from terrain and obstacles and in stabilized flight until landing, thus adding a critical margin of safety in prevention of the two major causes of commercial-aviation fatalities: controlled flight into terrain (CFIT) and approach-and-landing accidents (ALAs).

RNP procedures were also published in 2005 for Ronald Reagan Washington National Airport; Portland, Oregon; Hailey, Idaho; and San Francisco. The U.S. is leading the world in RNP. We are working with the international community to establish global standards.

We must also make sure we are using the best technology to maintain a safe and efficient air traffic system. The en route air traffic control computer system is considered the heart of the National Airspace System (NAS). En Route Automation Modernization (ERAM) replaces the software for the Host Computer System and its backup. The ERAM system will be deployed at all 20 Air Route Traffic Control Centers by Fiscal Year 2009. ERAM will enable the FAA to increase capacity and improve efficiency in a way that cannot be realized with the current system, which is a mix of different technologies that evolved over the years and is extremely difficult to expand or upgrade. ERAM will process more than double the number of flight plans, and use almost triple the number of surveillance sources as the current system.

Traffic Flow Management (TFM) is the "brain" of the NAS. The TFM system is the nation's single source for capturing and disseminating traffic information for the purposes of coordinating traffic across the aviation community. As the NAS is impacted by severe weather, congestion and/or outages, the TFM system provides timely information to our customers to expedite traffic and minimize system delays. The FAA is currently in the process of modernizing the TFM infrastructure through its TFM Modernization program. This spring we will introduce the Airspace Flow Management technology to reduce the impact of delays incurred during the severe weather season. FAA estimates show that

TFM provides roughly $340 million in benefits to our customers on a yearly basis in reduced direct operating costs through delay reductions. ERAM and TFM together will enable flexible routing around congestion, weather, and flight restrictions, and help controllers to automatically coordinate flights, during periods of increased workload.

Another area where technology has made it possible to increase capacity, and improve fuel efficiency is Advanced Technologies and Oceanic Procedures (ATOP), or Ocean 21. Ocean 21/ATOP automation adds dependent surveillance, satellite communications, and conflict probe capabilities for oceanic airspace, so that air traffic control can provide more efficient air traffic services, reducing current separation minimums from 100 nautical miles to 50 nautical miles, or 30 nautical miles for appropriately equipped aircraft. This capability permits more aircraft to have access to more fuel efficient trajectories because routes can be spaced more closely together, and aircraft can operate more closely in trail. These more efficient trajectories allow aircraft to operate on better time tracks, with less excess fuel reserves, consequently allowing them to carry extra payload. ATOP went operational at New York last June, and at Oakland last October. Since implementation, oceanic controllers using ATOP are granting 24 percent more requests for changes in altitudes and controller response time has improved by 30 percent. This increased efficiency is even more remarkable considering the 20 percent increase in requests for altitude changes observed in the last year.

The Air Traffic Organization of FAA has also implemented a new technology called the User Request Evaluation Tool or URET. URET permits the controller to predict potential aircraft to aircraft, and aircraft to airspace conflicts earlier, allowing them to

construct alternative flight paths or cancel climb or descent restrictions. URET allows these conflicts to be addressed in a strategic sense rather than a tactical sense, with fewer deviations to the route or altitude and less restrictive climb or descent profiles. Fewer deviations can result in less fuel burn. The system makes it easier for controllers to respond to pilot requests for more efficient routings, more fuel efficient altitudes, and wind-optimal routes, all of which can lead to fuel savings. Estimated savings for the aviation industry from URET in FY 2005 are 25 million miles in aircraft travel, and $175 million in operating expenses.

Throughout 2005, a joint team of industry and FAA representatives collaboratively redesigned the airspace in Florida to improve air traffic management efficiency and to reduce airspace complexity. This project is known as the Florida Airspace Optimization. The expected benefits of the airspace redesign for customers include: reduced flight distances on standard arrival and preferential routes into south Florida airports; reduced re-routes into adjoining foreign airspace which cause additional foreign over-flight fees; and reduced departure delays from Boston, New York and Washington, DC metropolitan airports to south Florida destinations. Pre-deployment estimates indicated a cost savings of nearly $20 million per year for airlines. Delays at key south Florida airports have been reduced by 50 percent or more.

The Wide Area Augmentation System, known as WAAS, is another example of using new technology to improve fuel efficiency. WAAS is a satellite-based navigation system that enhances the satellite signals from the Global Positioning System (GPS) to provide increased accuracy and reliability necessary for pilots to rely on satellite navigation

during all phases of flight. Because the system is satellite-based, WAAS procedures cost a lot less to implement and maintain than procedures based on traditional ground-based navigation systems. WAAS makes more airspace usable to pilots, provides more direct en route paths, and provides new precision-like approach services to runway ends, all of which can result in fuel savings for operators. The integration of WAAS into the NAS will result in safety and capacity improvements, in addition to reducing fuel consumption. WAAS was commissioned in July 2003 and as of tomorrow there will be nearly 3,800 instrument approaches available to WAAS users, including nearly 1,200 precision-like approaches that offer vertical guidance.

Lastly, one recent development with the potential for significant improvements in reducing fuel consumption for the aviation industry is successful negotiations with Russia to open additional polar routes over Russian airspace. Polar routes are used by traffic between the United States, Russian, and Southeast Asian destinations. These routes significantly reduce fuel burn in comparison to the traditional "Great Circle" routes over the Pacific Ocean. Increased traffic is expected on these routes in future years.

What steps are being taken to reduce aviation fuel consumption in the future? The pace of technological change across the aviation industry is increasing. Aerospace manufacturers continue to develop engine and aircraft designs that are improving fuel efficiency further by reducing weight and improving aerodynamics. Aircraft design improvements mostly fall into one of three categories: weight reduction, aerodynamics, and control systems. New and improved metal alloys and composite materials are being developed to reduce aircraft weight while simultaneously improving structural

performance. Aerodynamic improvements include the design of winglets for wing tips, which reduce turbulence and vortex generation by the wings. Significant improvement in control systems has come about by replacing mechanical and hydraulic systems with electrical systems, which often reduce weight while providing more precise control. Improvements of these systems will contribute to improved overall fuel efficiency. However, aircraft technology development follows relatively long cycles, which limits the pace of fundamental changes in design. Therefore, in the near term, the FAA and its Air Traffic Organization are undertaking the air traffic technology development, and operations and procedures improvements spelled out above to help the aviation sector reduce fuel consumption. We take this commitment seriously, and we continuously strive to improve our systems and procedures to provide the safest, most efficient National Airspace System possible.

Mr. Chairman, this concludes my testimony, and I would be happy to answer any questions you may have.

U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

Don Young
Chairman

Lloyd A. Jones, Chief of Staff
Elizabeth Megginson, Chief Counsel

James L. Oberstar
Ranking Democratic Member

David Heymsfeld, Democratic Chief of Staff

February 23, 2006

Ms. Mary Walsh - AGC60
Assistant Chief Counsel for Legislation Staff
Federal Aviation Administration
800 Independence Avenue, S.W. - Room 923I
Washington, D.C. 20591

Dear Ms. Walsh:

On February 15, 2006, the Subcommittee on Aviation held a hearing on "Commercial Jet Fuel Supply: Impact and Cost on the U.S. Airline Industry."

Attached are questions for Mr. Michael A. Cirillo to answer for the record. I would appreciate receiving your written response to these questions within 30 days so that they may be made a part of the hearing record.

Sincerely,

Jerry F. Costello
Ranking Democratic Member
Subcommittee on Aviation

JFC:pk
Attachment

February 15, 2006
Subcommittee on Aviation
HEARING on
"Commercial Jet Fuel Supply:
Impact and Cost on the U.S. Airline Industry"

Questions from Rep. Jerry F. Costello to:

Mr. Michael A. Cirillo
Vice President for Systems Operations Services
Air Traffic Organization
Federal Aviation Administration

1. Mr. Cirillo, in your written statement you mention that Domestic Reduced Vertical Separation Minima (DRVSM) allows greater access to more fuel efficient routes. What precisely would make one route or altitude more fuel efficient than another?

2. Mr. Cirillo, in your written statement you mention that Area Navigation (RNAV) procedures use more precise routes for take-offs and landings, reducing fuel burn. Why exactly do more precise routes for take-off and landing reduce fuel burn?

3. Mr. Cirillo, your written statement you mention that RNAV procedures "promote reduced fuel usage through more efficient climb and descent gradients." Please explain.

4. Mr. Cirillo, in your written testimony you mention that Advanced Technologies and Oceanic Procedures (ATOP) enables reduced separation between aircraft and allows more aircraft to have access to the most fuel efficient trajectories. What would make one trajectory more fuel efficient than another?

5. Mr. Cirillo, it is my understanding that based on trials of Automatic Dependant Surveillance Broadcast (ADS-B) enabled Continuous Descent Approach (CDA) by United Parcel Service (UPS) in Louisville, UPS believes that CDA could save it up to 1.6 million gallons of fuel per year, or approximately $3.5 million. Can you explain precisely how CDA enables aircraft to burn less fuel?

1. **Mr. Cirillo, in your written statement you mention that Domestic Reduced Vertical Separation Minima (DRVSM) allows greater access to more fuel efficient routes. What precisely would make one route or altitude more fuel efficient than another?**

Answer: DRVSM has significantly increased capacity in the en route airspace by doubling the number of usable altitudes between 29,000 and 41,000 feet. The procedure permits controllers to reduce minimum vertical separation at altitudes between 29,000 and 41,000 feet from 2,000 feet to 1,000 feet for properly equipped aircraft, thereby making six new altitudes available that were previously unusable (FL's 300, 320, 340, 360, 380, and 400). With the additional capacity, aircraft can fly more fuel efficient routes through airspace that, prior to DRVSM, could not accommodate the additional traffic. In addition to the more fuel efficient routings, the additional altitudes allow more opportunities for aircraft to operate at, or closer to their optimal altitude for minimal fuel consumption.

2. **Mr. Cirillo, in your written statement you mention that Area Navigation (RNAV) procedures use more precise routes for take-offs and landings, reducing fuel burn. Why exactly do more precise routes for take-off and landing reduce fuel burn?**

Answer: RNAV procedures provide a pre-defined lateral (LNAV) and vertical (VNAV) path for aircraft to follow. This is a significant difference from conventional procedures in that the RNAV path is not based on the location of ground based navigation aids. This allows procedure designers the flexibility to optimize the aircraft path and provide for more efficient routings. Having pre-defined routings allow the aircraft onboard avionics to fly a more precise (closer to centerline) track than when compared to procedures flown by hand. These two factors (efficient routing and more precise path) provide the basis for the reductions in fuel burn.

3. **Mr. Cirillo, in your written statement you mention that RNAV procedures "promote reduced fuel usage through more efficient climb and descent gradients." Please explain.**

Answer: As mentioned in the response to question 2, aircraft flying RNAV procedures have defined LNAV and VNAV paths that they are following. By providing these repeatable paths to every aircraft, air traffic control and procedure designers can develop procedures that optimize the vertical path for arrival and departure traffic. In the case of departures, a vertical path can be designed to allow for earlier climbs to higher more fuel efficient altitudes. For arrivals, optimized paths can be developed that allow for more efficient descent paths. This can be accomplished through the use of later descents from cruise altitude or a reduction in the number intermediate level-offs required prior to landing.

4. **Mr. Cirillo, in your written statement you mention that Advanced Technologies and Oceanic Procedures (ATOP) enables reduced separation between aircraft and allows more aircraft to have access to the most fuel efficient trajectories. What would make one trajectory more fuel efficient than another?**

Answer: Two main contributors to the efficiency of a flown trajectory are winds en route and vertical (altitude) profile of the flight. Flight winds are not only variable by geographic location but also by altitude in the same geographic location. Depending on aircraft weight and its speed, a specific altitude will typically be more preferable then others simply because it provides conditions for optimal fuel consumption; in addition to winds en route, these conditions include air density, pressure and temperature.

As the flight progresses, the weight of the aircraft will decrease as fuel is consumed, which leads to an increase in the optimal altitude (under zero winds). Therefore, an efficient flight profile would require a continuous change of altitude (a.k.a., cruise climb) corresponding to the most efficient operations. However, flights are typically limited to fixed flight levels, necessitating a transformation of cruise climbs into a series of step climbs. In addition to the winds, aircraft weight and speed, the exact locations of the actual (as opposed to optimal) steps for any given flight will also be dependant on the traffic density.

Therefore, a reduction in separation standards, as enabled by ATOP, provides for an increase in airspace capacity and higher use of the most efficient trajectories – more optimal lateral routes, flight levels and speed profiles. The resulting operational benefits are obtained through decreased fuel requirements, shorter flight durations, and additional cargo revenue potential.

5. **Mr. Cirillo, it is my understanding that based on trials of Automated Dependent Surveillance Broadcast (ADS-B) enabled Continuous Descent Approach (CDA) by United Parcel Service (UPS) in Louisville, UPS believes that CDA could save it up to 1.6 million gallons of fuel per year, or approximately $3.5 million. Can you explain precisely how CDA enables aircraft to burn less fuel?**

Answer: ADS-B enabled CDA minimizes low altitude maneuvering. Turbine and turbojet engines operate more efficiently at higher altitudes than at lower altitudes. Currently, because of traffic congestion of arriving airliners into busy terminal airspace, aircraft are often given successive descents to intermediate lower altitudes as they approach their destination, a practice sometimes called "step descents." These step descents require the aircraft to level off temporarily at these lower altitudes. Flight at lower altitude results in higher fuel consumption and engine emissions, and it is environmentally unfriendly because of the increased noise signature on the ground. Traffic congestion frequently results in air traffic controllers vectoring arriving aircraft for spacing, resulting in more miles flown. By using ADS-B to better space these arriving aircraft earlier in their flight profiles and merge them into a more efficient arrival stream, it allows the aircraft to remain at higher altitudes longer, then perform a

continuous descent arrival – a CDA – from that en route altitude to their final approach fix. The step descents and vectoring are avoided and the projected fuel savings are the result.

OPENING STATEMENT OF
THE HONORABLE JERRY F. COSTELLO
AVIATION SUBCOMMITTEE HEARING
COMMERCIAL JET FUEL SUPPLY: IMPACT AND COST ON THE U.S. AIRLINE INDUSTRY
FEBRUARY 15, 2006

- I want to thank Chairman Mica for calling today's hearing on the *Commercial Jet Fuel Supply: Impact and Cost on the U.S. Airline Industry.* Since 2000, U.S. airlines have suffered massive financial losses due to the September 11th attacks, SARS, the Iraq war, and the unwillingness of many business travelers to pay premium fares. Today, this Subcommittee will explore yet another factor that could surpass all others in terms of its long-term adverse affect on the industry: *rising fuel costs.*

- Mr. Chairman, the last time this Subcommittee held a hearing on jet fuel was in October 2000 after crude oil had climbed to a ten year historic high of almost $38 per barrel the proceeding month. At that hearing, the distinguished gentleman from Tennessee and former Chairman of this Subcommittee, Mr. Duncan stated, "Rising fuel costs have created havoc in all of the transportation sectors and threaten to derail global economic growth."

- To put today's hearing in perspective, the average price for a barrel of crude-oil in 2005 was $56 per barrel, and $72 per barrel for jet fuel. To further put it into perspective, every sustained penny increase in the price of a gallon of jet fuel results in an additional $195 million in annual fuel costs for the U.S. airline industry. Although average air fares are still lower than 2000, it has been reported that rising fuel costs led U.S. airlines to raise fares 12 times in 2005, and once so far in 2006.

- In total, U.S. airlines have lost over $44 billion since the beginning of 2001. **Roughly a quarter of U.S. aviation capacity (measured by available seat miles (ASMs)) is in Chapter 11.** Consequently, airlines have made strenuous efforts to drive down their operating costs, particularly labor costs. In total, U.S. passenger carriers cut labor costs by almost $3 billion between 2000 and 2005. During that period, over 140,000 airline workers have lost their jobs, thousands more have accepted pay and benefit cuts, and still thousands more have had their pensions significantly reduced.

- However, labor cuts have been more than offset by rising fuel costs. BTS figures show that between 2000 and 2005 fuel unit costs (per ASM) for all U.S. airlines have increased by 68%. In total, U.S. passenger carrier fuel costs have increased by more than $11 billion between 2000 and 2005. Fuel now accounts for almost a quarter of airline operating costs, practically equaling labor as airlines' largest operating expense.

- Furthermore, fuel unit costs have risen despite the fact that airlines are operating more efficiently through fleet changes, weight reduction and operational changes. In total, U.S. passenger and cargo airlines are projected to consume 19.5 billion gallons of jet fuel in 2005 -- 800 million gallons less than the peak experienced in 2000.

- Unfortunately, airline industry analysts predict that jet fuel will likely remain at $70 per barrel in 2006. Witnesses today will testify about structural issues within the energy sector that point to continued high fuel prices. A reduction in the number of domestic refineries and high capacity utilization rates have slimmed the margin to meet increasing demand and heightened the potential for shortages or disruption – a lesson we learned a few month ago during Hurricane Katrina.

- During Hurricanes Katrina and Rita, U.S. production of commercial jet fuel dropped almost 25%. The U.S. relied heavily on foreign imports, which more than doubled during that period, including some imports from European emergency stocks. Some have suggested that in addition to the Strategic Petroleum Reserve (SPR), which contains crude oil, the U.S. should form a "Strategic Product Reserve" comprised of refined petroleum products like jet fuel. I am interested in our witnesses' thoughts about this concept.

- Additionally, changing fuel specifications, most notably the transition to lower sulfur diesel fuel, will make it more difficult to distribute high sulfur jet fuel. And, of course, unpredictable events, like unrest in oil producing areas or the war, could clearly influence fuel prices.

- Mr. Chairman, our greatest hope for addressing high fuel prices may lie in technological advancements both in air traffic infrastructure and in aircraft itself.

- Regarding infrastructure, satellite-enabled procedures and technologies like Area Navigation (RNAV), Advanced Technologies and Oceanic Procedures (ATOP) and Automatic Dependant Surveillance – Broadcast (ADS-B) will save airlines millions of dollars in fuel costs by providing more direct routing, allowing more aircraft to access the most fuel efficient routes, and enabling more efficient climb and descent patterns.

- The bottom line is that there is a very clear and tangible connection between our infrastructure, airline profitability and ultimately American jobs. This Subcommittee must ensure that adequate resources are dedicated to modernizing the national airspace system.

- Likewise, many of these technologies rely heavily on advanced aircraft avionics. Airlines must continue to invest in equipment upgrades and new aircraft that will enable them to take full advantage of government infrastructure investments. Regarding new aircraft, I am pleased that we have a witness from the Boeing Company to testify about advances in aircraft manufacturing, including the use of lighter composite plastic airframes, improved aerodynamics, and innovations in engine design.

- Mr. Chairman, I look forward to hearing from our distinguished witnesses.

Statement of John Felmy, Chief Economist, American Petroleum Institute, before the House Transportation and Infrastructure Subcommittee on Aviation

February 15, 2006

I am John Felmy, chief economist of the American Petroleum Institute – the national trade association of the U.S. oil and natural gas industry, representing all sectors of the industry, including companies that make, transport, and market jet fuel.

We very much appreciate this opportunity to discuss commercial jet fuel supply and its impact on -- and cost to -- the U.S. airline industry. Our companies are making the maximum effort to meet the demand of U.S. airlines for jet fuel.

However, to meet the long-term fuel needs of U.S. consumers and businesses, changes are needed in our energy policy: we need to increase oil and natural gas supply, reduce demand, and expand and diversify our energy infrastructure – and equally important, do no harm. The worst thing that Congress could do now would be to repeat the mistakes of the past by disrupting the free marketplace. Imposing new controls, allocation schemes, new taxes on industry, or other obstacles would only serve to make the situation worse.

Current Situation

For the week ended February 3, national inventories of kerosene jet fuel were 43.5 million barrels. This level is 2 percent above last year's level and 6 percent above the

average for 2001-2005 levels for the week. Production of kerosene jet fuel so far in 2006 has been about equal to the average for 2001-2005.

Last year, even with the major disruption to refineries caused by Hurricanes Katrina and Rita, jet fuel production nearly matched 2004's four-year high. These results are consistent with the very high level of refinery utilization with which the industry has been operating. Over the past year, the nation's refineries have operated at more than 90 percent of capacity for nearly two-thirds of the time and above 85 percent for nearly 90 percent of the time. Refineries have been running very hard to produce the wide range of petroleum products, such as gasoline, diesel fuel, heating oil and jet fuel that our customers need.

What Can Be Done

While the refinery system is running all-out to produce jet fuel and other crude oil products to meet customers' fuel needs, there is a limit to how hard refineries can run. The operations of a refinery are subject to decisions by each refinery manager and, most importantly, involve decisions on operations that are dominated by health and safety concerns. The U.S. oil and natural gas industry will not compromise the health and safety of its workers or surrounding communities for any reason. The industry is working hard to meet customer needs, but maintenance is necessary for safety and efficient operations and to meet regulatory requirements. I cannot foresee the future operations of our refinery

system, but I want to stress that refineries have been operating at high levels of utilization over the past year, and that, if maintenance is required, it will be done.

Background: The Jet Fuel Market

Jet fuel is produced in most of the 145 operable refineries in the U.S. As the attached chart shows, there are major refining centers throughout the country. These refining centers are connected by a web of petroleum products pipelines that deliver the jet fuel along with other petroleum products. The major flow of product is from the major refining areas in the Gulf coast to the East and Midwest. There are also other smaller movements of jet fuel between the other Petroleum Administration for Defense Districts.

The U.S. uses about 1.6 million barrels per day of jet fuel. Of this amount, about 1.5 million barrels per day are produced domestically and about 148,000 barrels per day are imported. A small amount – 52,000 barrels per day are exported – 77 percent to Canada and the United Kingdom primarily as fuel for international flights. The jet fuel loaded on aircraft for international flights is considered an export.

Jet fuel is bought and sold in spot markets such as New York Harbor, the Gulf Coast of the U.S., Los Angeles, Rotterdam and Singapore. It is also bought and sold between refiners and other major suppliers and airlines.

Kerosine-type jet fuel is also used by consumers for blending with diesel fuel in cold climates and as a heating fuel for over 7 million American homes. It is a high-sulfur fuel

that will not be allowed in the diesel fuel supply with the introduction of ultra-low sulfur diesel fuel later this year.

Jet fuel usage peaked in 2000 – but then, after September 11, 2001, declined sharply with the complete shutdown of air travel for a period and the sharp decline in travel when operations resumed. It has remained at about 1.6 million barrels per day since 2002.

Prices of jet fuel have generally followed the price of crude oil. The attached chart shows the variation in crude oil prices and jet fuel prices. Since 2000, the correlation between spot jet fuel prices and spot crude oil prices has been about 0.98 – indicating a strong relationship between the cost of crude oil to produce jet fuel and the price of jet fuel. This relationship varies at times due to the relative supply and demand conditions in the jet fuel market – and is particularly affected by major supply disruptions, such as we experienced after the hurricanes in 2005.

We recognize how the price of jet fuel has been a serious problem for the airlines. For example, about 25 billion gallons of jet fuel are used each year, so this has meant that the jet fuel costs rose by about $250 million per year for every penny increase in the cost of jet fuel.

We believe that positive changes in U.S. energy policy can help to alleviate this burden on the airline industry – and better meet the energy needs of American consumers and the

U.S. economy as a whole. API is prepared to work with the Congress and the Administration to bring these changes about.

Higher Energy Costs

The oil and natural gas industry recognizes the concerns across the country over the higher energy costs American consumers and businesses have been facing over the past year, including higher jet fuel costs. In order to understand these higher costs, we need to consider them in the context of the world energy supply situation.

A brief overview of the industry's status is in order. With the hurricane season past and much, but not all, of the lost Gulf of Mexico production and refining back on line, oil and natural gas prices have receded. But no one should conclude that we aren't facing some tremendous energy challenges ahead. The most recent forecasts of the U. S. Department of Energy's Energy Information Administration (EIA) indicate we still haven't escaped our energy predicament. Its sobering message to consumers: Strong demand, hurricane-affected production and infrastructure limitations could help keep markets tight and prices volatile for the foreseeable future.

As noted, crude oil is the single largest component of the price of a gallon of jet fuel. Before Hurricanes Katrina and Rita struck, the price of jet fuel was rising primarily because U.S. refiners have been paying more for crude oil.

It is important to remember that oil companies do not set the price of crude oil. Crude oil is bought and sold in international markets and the price paid for a barrel of crude oil reflects the market conditions of the day. There is a fragile balance between the world's supply and demand for crude oil. Because of this tight market, any disruption of oil supply – or even the threat of disruption – can push prices upward as buyers and sellers in the worldwide marketplace look to secure supplies for their customers. Obviously, the disruptions caused by the hurricanes were significant, as were the effects of these disruptions on fuel prices.

World oil demand reached unprecedented levels in 2004 and continues to grow. Strong economic growth, particularly in China and the United States, has fueled a surge in oil demand. EIA reports that global oil demand in 2004 grew by 3.2 percent – the strongest growth since 1978 – and projected growth to average 1.8 percent for 2005 and 2006. By comparison, world demand between 1993 and 2003 grew at an average rate of 1.6 percent.

At the same time, world oil spare production capacity – crude that can be brought online quickly during a supply emergency or during surges in demand – is at its lowest level in 30 years. Current spare capacity is equal to only about 1 percent of world demand. Thus, the world's oil production has lagged, forcing suppliers to struggle to keep up with the strong growth in demand.

The delicate supply/demand balance in the global crude oil market makes this market extremely sensitive to political and economic uncertainty, unusual weather conditions, and other factors. Over the past several years, we have seen how the market has reacted to such diverse developments as dollar depreciation, cold winters, the post-war insurgency in Iraq, hurricanes in the Gulf of Mexico, the Venezuelan oil workers' strike in 2002-2003, uncertainty in the Russian oil patch, ongoing ethnic and civil strife in Nigeria's key oil producing region, and decisions by OPEC.

We currently import more than 60 percent of the crude oil and petroleum products we consume. American refiners pay the world price for crude and distributors pay the world price for imported petroleum products. U.S. oil companies don't set crude oil prices. The world market does. Whether a barrel is produced in Texas or Saudi Arabia, it is sold on the world market, which is comprised of hundreds of thousands of buyers and sellers of crude oil from around the world.

Complicating the overall U.S. fuel supply/demand situation are numerous contributing factors. The new Energy Policy Act eliminates the reformulated gasoline oxygen requirement in May, and ultra-low sulfur diesel will be introduced starting June 1. The industry is working hard to meet these new requirements, but they are major transitions and will present a challenge.

Meeting U.S. Energy Challenges

In attempting to meet the energy challenges we face, it is important to do no harm. The worst thing Congress could do now would be to repeat the mistakes of the past by overriding the structures of the free marketplace. Imposing new controls, allocation schemes, new taxes on industry, or other obstacles will only serve to make the situation much worse.

Because the market does remain healthy and competitive, it is imperative that it be permitted to continue functioning as freely of artificial restraints as possible. As we have consistently maintained, the answer to our energy situation is to increase supply, reduce demand and expand and diversify infrastructure.

The Energy Policy Act of 2005 signals a first step in a much-needed effort to enhance energy security and ensure the reliable delivery of affordable energy to consumers. Nevertheless, much remains to be done.

We can no longer afford to place off limits vast areas of the Eastern Gulf of Mexico, off the Atlantic and Pacific coasts, and offshore Alaska. Similarly, we cannot afford to deny Americans consumers the benefits that will come from opening the Arctic National Wildlife Refuge and from improving and expediting approval processes for developing the substantial resources on federal, multi-use lands in the West.

In fact, we do have an abundance of competitive domestic oil and gas resources in the U.S. According to the latest published estimates, there are more than 131 billion barrels of oil and more than 1000 TCF of natural gas remaining to be discovered in the United States.

Much of these oil and gas resources – 78 percent of the remaining to be discovered oil and 62 percent of the gas – are expected to be found beneath federal lands and coastal waters. The amount here is enough oil to power 55 million cars for 30 years *and* heat 24 million homes for 30 years. And there is enough natural gas to heat 60 million homes that use natural gas for 120 years.

Federal restrictions on leasing put significant volumes of these resources off limits, while post-lease restrictions on operations effectively preclude development of both federal and non-federal resources. Addressing these restrictions is critical.

And, while we must focus on producing more energy here at home, we do not have the luxury of ignoring the global energy situation. In the world of energy, the U.S. operates in a global marketplace. What others do in that market matters greatly.

For this country to secure energy for our economy, government policies must create a level playing field for U.S. companies to ensure international supply competitiveness. With the net effect of current U.S. policy serving to decrease U.S. oil and gas production

and to increase our reliance on imports, this international competitiveness point is vital. In fact, it is a matter of national security.

Natural Gas

An important, related issue is natural gas, which fuels our economy – not only heating and cooling homes and businesses but also generating electricity. It is used by a wide array of industries – fertilizer and agriculture; food packaging; pulp and paper; rubber; cement; glass; aluminum, iron and steel; and chemicals and plastics. And, natural gas is an essential feedstock for many of the products used in our daily lives – clothing, carpets, sports equipment, pharmaceuticals and medical equipment, computers, and auto parts.

Only four to five years ago, natural gas prices were in the $2 to $3 per million Btu (MMBtu) range. Recently, prices have settled in the $12-14 per MMBtu range, reaching record levels in October 2005. Higher natural gas prices have taken their toll – more than 2.8 million U.S. manufacturing jobs have been lost since 2000, and chemical companies closed 70 facilities in the year 2004 alone and have tagged at least 40 more for shutdown.

Unlike oil, natural gas imports in the form of liquefied natural gas (LNG) are limited by the lack of import terminals. There are only five operating in the United States. A number of additional terminals have been proposed but many have run into not-in-my-backyard opponents and complex permitting requirements. While natural gas imports from Canada

have been important, Canada's own needs are growing. Expanding our ability to tap into global natural gas supplies is essential.

The National Petroleum Council (NPC) study, "Balancing Natural Gas Policy: Fueling the Demands of A Growing Economy" (2003), highlighted the significant costs associated with current policies – such as access restrictions on the Outer Continental Shelf and process impediments to development in the West – that impede the development of America's abundant natural gas resources. The NPC estimated that continuing on our current policy path could result in $300 billion more in consumer costs over 20 years.

The Need for Increased Refining Capacity

Beyond easing the way for greater development of oil and natural gas, we must also address the nation's refinery capacity challenge. The record-high fuel prices, while primarily caused by increased crude oil prices and exacerbated by Hurricanes Katrina and Rita, have underscored the fact that U.S. demand for petroleum products has been growing faster than – and even exceeds – domestic refining capacity. While refiners have increased the efficiency, utilization and capacity of existing refineries, these efforts have not enabled them to keep up with growing demand.

The U.S. refining industry has been expanding a little more than 1 percent per year over the past decade – the equivalent of a mid-size refinery being built each year. In order to

create the opportunity for increasing the growth of U.S. refining capacity, government policies are needed to create a climate more conducive to investments in the refining industry.

In addition, many of the steps the federal government could take to help the refinery capacity situation are covered in the December 2004 National Petroleum Council (NPC) study, *Observations on Petroleum Product Supply – A Supplement to the NPC Reports "U.S. Petroleum Product Supply – Inventory Dynamics, 1998" and 'U.S. Petroleum Refining – Assuring the Adequacy and Affordability of Cleaner Fuels, 2000."*

The NPC study suggested that the federal government should take steps to streamline the permitting process to ensure the timely review of federal, state and local permits to expand capacity at existing refineries.

For example, new-source review (NSR) requirements of the Clean Air Act need to be reformed to clarify what triggers these reviews. Some refineries may be able to increase capacity with relatively minor adjustments, but are unsure if the entire facility's permit review would be triggered – a burdensome and time-consuming process.

In addition to the administrative issues deterring new refining capacity investments, there are financial constraints as well. Attracting capital for new refining capacity has been difficult with refining rates of return historically averaging well below the average for

S&P Industrials. Over the 10-year 1994-2003 period, the return on investment for the refining and marketing sector was 6.2 percent or less than half as much as the 13.5 percent for S&P Industrials. In only one year between 1977 and 2003 did the average return of refiners exceed the average for the S&P Industrials.

While taking these factors into account, it is important to remember that the oil and natural gas industry operates in a global marketplace. Many oil and gas companies are global companies, whose U.S. investment decisions compete not only with decisions as to how to allocate capital investments in the U.S. among various sectors of the industry, but also with competing demands and investment needs overseas. In a global marketplace, companies will make the best economic investment decisions in order to bring affordable petroleum products to consumers. Imports may be the more economical option than new U.S. refineries, but that is a decision to be left to the global marketplace. Government policies must encourage, not interfere with, the global marketplace.

Oil and Natural Gas Company Earnings in Perspective

There has been considerable misunderstanding and misinformation about the earnings of U.S. oil and natural gas companies. It is our hope that a better understanding of those earnings and how they compare with other industries will discourage potentially harmful action on the part of our national leadership. The oil and natural gas industry is among the world's largest industries. Its revenues are large, but so are its costs of providing

consumers with the energy they need. Included are the costs of finding and producing oil and natural gas and the costs of refining, distributing and retailing it.

The energy Americans consume today is brought to us by investments made years or even decades ago. Today's oil and natural gas industry earnings are invested in new technology, new production, and environmental and product quality improvements to meet tomorrow's energy needs. *Oil & Gas Journal* estimated that the industry's total U.S. spending in 2005 was $85.7 billion, compared with $80.7 billion in 2004 and $75.5 billion in 2003. It also estimated that exploration and production spending in the U.S. grew 6 percent and that total upstream oil and gas spending in the United States was nearly $66 billion.

The industry's earnings are very much in line with other industries and often they are lower. This fact is not well understood, in part, because the reports typically focus on only half the story – the total earnings reported. Earnings reflect the size of an industry, but they're not necessarily a good reflection of financial performance. Earnings per dollar of sales (measured as net income divided by sales) provide a more relevant and accurate measure of a company's or an industry's health, and also provide a useful way of comparing financial performance between industries, large and small.

For the third quarter of 2005, the oil and natural gas industry earned 8.2 cents for every dollar of sales compared to an average of 6.8 cents for all U.S. industry. For the second

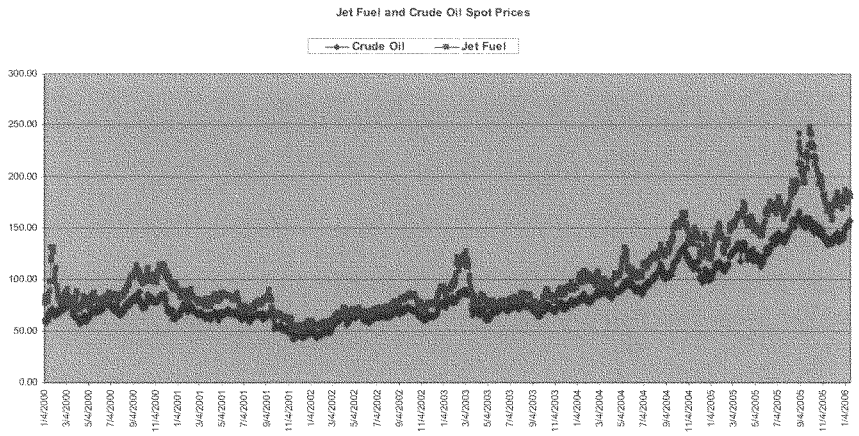
quarter of 2005, the oil and natural gas industry earned 7.7 cents for every dollar of sales compared to an average of 7.9 cents for all U.S. industry. Over the last five years, the oil and natural gas industry's earnings averaged 5.8 cents compared to an average for all U.S. industry of 5.5 cents for every dollar of sales.

It is also important to understand that those benefiting from healthy oil and natural gas industry earnings include numerous private and government pension plans, including 401K plans, as well as many thousands of individual American investors. While many shares are owned by individual investors, firms, and mutual funds, pension plans own 41 percent of oil and natural gas company stock. To protect the interest of their shareholders and help meet future energy demand, companies are investing heavily in finding and producing new supplies and in new refinery capacity.

Conclusion

The U.S. oil and natural gas industry recognizes the impact that high commercial jet fuel costs are having on the U.S. airline industry. The industry is making the maximum effort to produce the jet fuel supply needed to meet demand. However, the industry cannot meet U.S. energy challenges alone. Positive changes are needed in U.S. energy policies if we are to meet future U.S. energy needs. Access to domestic energy resources must be provided, and our energy infrastructure needs to be strengthened.

Addressing the nation's energy problems is an enormous long-term challenge. If we all do our part—industry providing energy products, government removing barriers and increasing access to supplies, and consumers using fuel more wisely—the United States will be able to meet its energy and economic needs in the years ahead.


Jet Fuel and Crude Oil Spot Prices
Crude Oil
Jet Fuel
300.00
250.00
200.00
150.00
100.00
50.00
0.00
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3/4/2000
5/4/2000
7/4/2000
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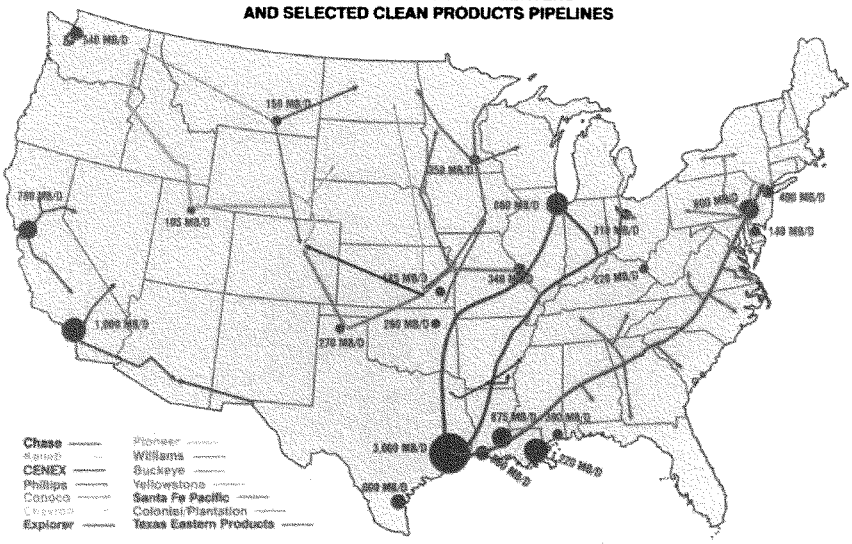
UNITED STATES REFINING CENTERS [1]
AND SELECTED CLEAN PRODUCTS PIPELINES



[1] Based on Crude Capacity from 12/21/98 *Oil & Gas Journal*.

TESTIMONY OF JEFF HAWK – DIRECTOR
CERTIFICATION, ENVIRONMENT AND GOVERNMENT RELATIONS
THE BOEING COMPANY

BEFORE THE HOUSE AVIATION SUBCOMMITTEE

February 15, 2006

Introduction

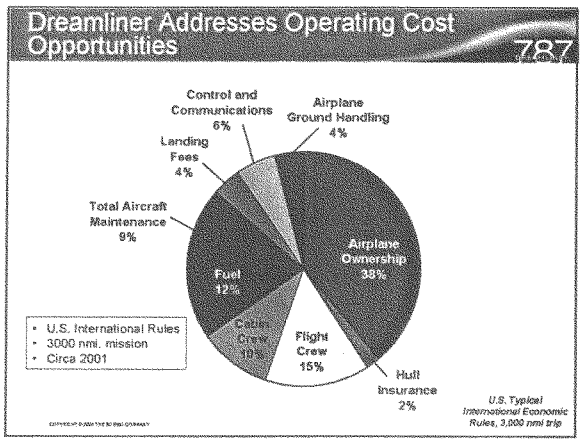
Good morning. I am Jeff Hawk, the director of Environment, Certification and Government Relations for the Boeing 787 Dreamliner program. It is my pleasure to be here today representing the thousands of Boeing workers who design, build and support the world's finest commercial jetliners. I have worked at Boeing for more than 30 years and have worked on every airplane since the 727. I have seen first hand how Boeing continually improves its products in terms of the fuel efficiency and overall environmental performance and how Boeing introduces new levels of performance with each new airplane it brings to market. Our engineers and technical experts have devoted themselves to making meaningful improvements year after year as new technologies and approaches have been developed.

I have been asked to talk today about Boeing's commitment to continuous improvement in the environmental performance of our commercial jet transports –with specific focus on fuel efficiency. I would like to begin by explaining how we came to the decision to build the 787 and explain to the committee the characteristics that make it a new airplane for a new world. I plan to also briefly explain the integration of technology that made these advancements possible. I will also highlight recent advancements in the fuel efficiencies of other Boeing aircraft and then I will conclude by pointing out how building a new and more efficient air traffic control regime will also aid in reducing fuel consumption in the future.

There are two reasons we take our commitment to improved fuel efficiency so seriously at Boeing. First, it is the right thing to do. We know that our planet does not offer inexhaustible resources to be used thoughtlessly. It is incumbent upon us to deploy the new technologies that will help our industry to use our resources most wisely. This has caused us to take a lifecycle approach to our development efforts. In this way, we look at the entire life of an airplane – from its initial design to manufacturing to its in-service operation and support to eventual retirement of the airframe - to ensure we are incorporating all that is feasible to reduce the use of precious resources, and limit the emissions created while maximizing the ability to recycle and reuse airplane materials.

Secondly, like any other business, Boeing must respond to the needs of our customers, understand the trends within our industry and face our competition with superior products. Our work with airlines here in the U.S. and around the world has made it exceedingly clear that they need more efficient aircraft and tools to operate their businesses. The current financial challenges of the U.S. industry are well known and widespread. Much of the financial difficulty in the U.S. industry is related to the cost of fuel. We developed the 787 in large part to address these concerns, and clearly, the airline marketplace is positively responding to our new product.

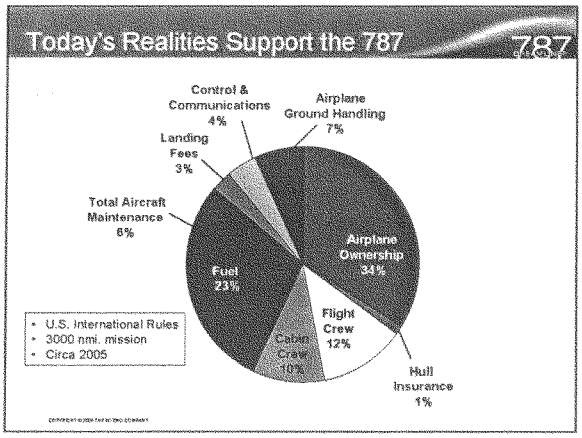
The Genesis of the 787



Total airplane operating costs, based on 2001 fuel prices

When Boeing looked at the elements of cost associated with operating an airplane in 2001, fuel was 12 percent of the operating cost. At that time, Boeing engineers and designers were considering the best application of technological advances to make a new and better airplane. We talked to our customers about two options:
1) Speed: (the Sonic Cruiser, which flew 15-20 percent faster than exiting models), or 2) fuel efficiency (the new 787 Dreamliner which offered a 20 percent improvement in fuel usage). The response of our customers was consistent and, by late 2003, it became strikingly clear what our customers wanted: a more fuel efficient airplane. This process of listening to the customer and understanding the real needs in the industry is the reason Boeing has been so successful for so long. This is how we always make our product decisions and it has allowed us to remain the industry leader.

Even when fuel was 12 percent of airline operating costs, it was a significant enough concern to point the entire industry toward improving fuel efficiency. A look at how those costs have changed with the rising price of fuel makes it even more obvious why efficiency is the right answer for our industry.



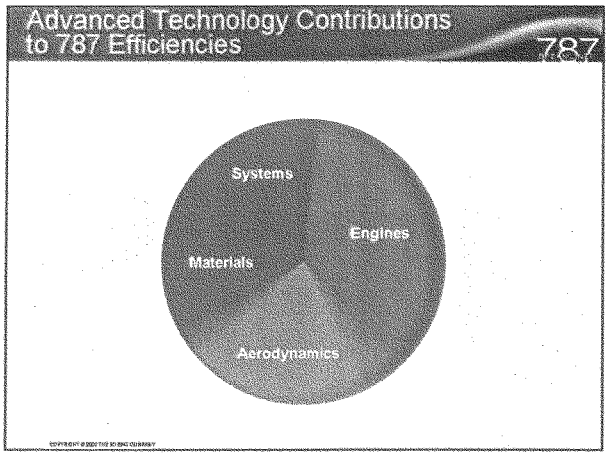
Operating costs in 2005, with increased cost of aviation fuel

By 2005, fuel prices had doubled, making the all-new 787 Dreamliner an even more compelling product.

787- The Most Fuel Efficient Commercial Jet Airliner

In December 2003, the Boeing Company announced it would begin offering the 787 Dreamliner to the airline industry. The reaction to the plane was immediate and extremely positive. In the 787, customers saw a new design and efficiencies that were once unthinkable, including:

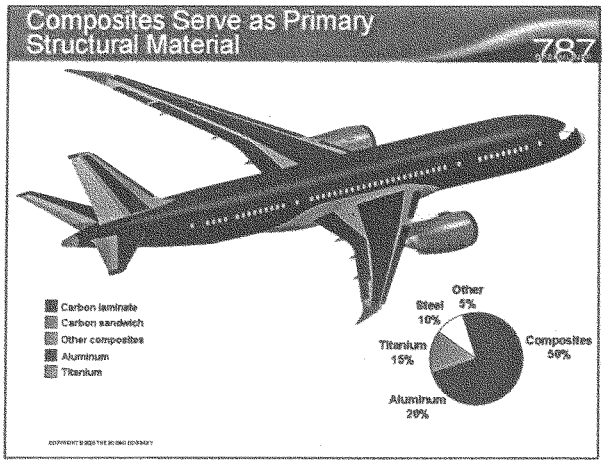
- The first airplane made primarily of light-weight sturdy carbon composites
- A mid-sized airplane that could travel the distances that only large airplanes had previously achieved
- More cargo capability than similarly sized airplanes
- Maintenance schedules that could offer them significantly more flying days
- Next generation "no-bleed" engines with higher bypass ratios
- An enlarged cabin interior with windows 50 percent larger than competing aircraft
- An airplane that offers a 20 percent improvement in fuel use as part of an overall improvement of 10 percent lower operating costs



Technology advances combine to provide a 20 percent improvement in fuel use

How was Boeing able to bring these efficiencies to the 787? Stated simply, fuel use improvements come from technological innovations in **materials** (what the airplanes are made of), **systems** (the hardware and software that make the airplane work), **aerodynamics** (our ability to optimize the airplane shape and weight for efficiency) and **engines**. At different times in history, gains have been made in different proportions for each of these areas. On the 787, significant gains in each of these disciplines have created a revolutionary airplane.

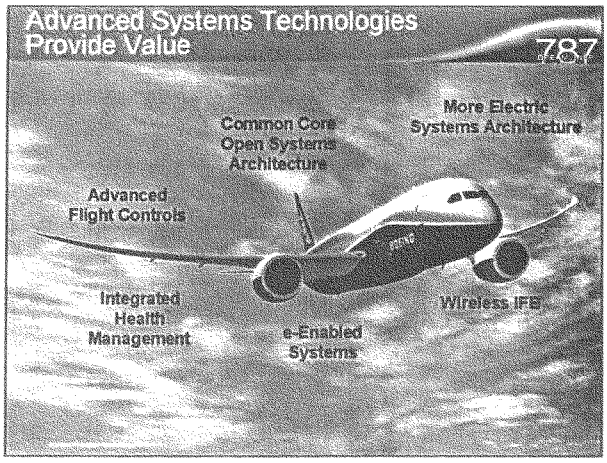
Independent of one another, these four technologies (materials, systems, aerodynamics, engines) provide about a 17 percent improvement in fuel use. By integrating them together and creating an all-new airplane designed with these technologies, Boeing is able to gain an overall improvement of 20 percent. This is one case where the sum is truly greater than just a combination of the parts. Each of these technologies will be addressed in the following pages.



Composites provide significant weight savings

Materials – The Boeing 787 will be the first commercial jetliner made primarily of composite materials. This development is the foundation of the ground-breaking airplane. Lightweight materials directly reduce the amount of fuel needed. This same composite material has been in service on Boeing 777 jetliners for more than 10 years. Boeing understands this material and its advantages very well. Just 10 years ago, the ability to manufacture large pieces of airplane structure from this material simply did not exist. The processes were labor intensive creating an economic challenge in using this superior material. Boeing and the 787 team of international partners have invented new methodologies to close this economic gap and enable the use of this lighter, more efficient material for major pieces of airframe structure.

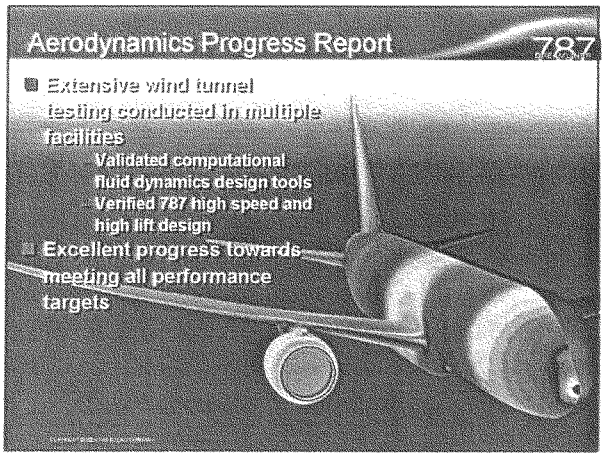
The advantages offered by composite materials go well beyond their light weight, high strength performance. This material is extremely resistant to fatigue and corrosion – the natural enemies of aluminum that drive so much maintenance and cost on today's airplanes. Boeing is guaranteeing the airlines 30 percent reduction in maintenance costs with the 787, largely because of the extensive use of these superior composite materials. Also, because it is so strong, Boeing can create a better flying experience for passengers by offering bigger windows, a lower altitude in the cabin (which increases the amount of oxygen) and increasing the moisture in the air for more comfort.



Advanced airplane systems save weight and fuel

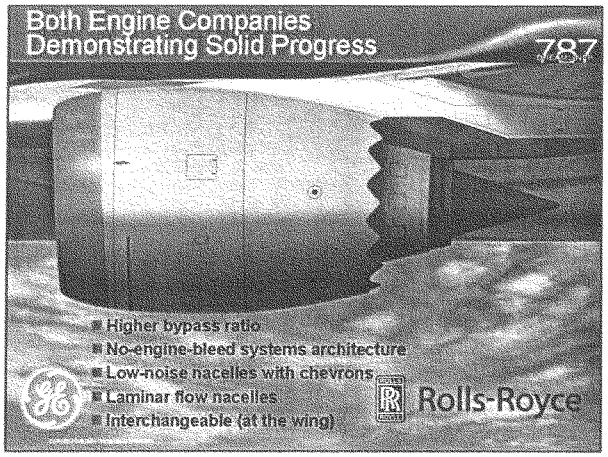
Systems – Advances in the reliability and sizing of power electronics have allowed Boeing to create an all-new more-electric systems architecture for the 787 Dreamliner. There are several advantages to this new systems approach. First, the electric systems eliminate the need to extract "bleed" air from the engines. Bleed-air systems rob engines of efficiency, add weight to the airplane and increase the maintenance burden. In the 787, they are removed. Instead of investing in trying to make this old pneumatic technology more efficient, Boeing is taking advantage of advances made in electronics to completely replace it, increasing the reliability of the airplane, reducing maintenance and lowering weight.

Improvements in flight deck systems – like standard dual head up displays and new larger format displays – will provide pilots with greater situational awareness further improving the safety of each flight. This enables the 787 to be well prepared for next-generation air traffic control systems.



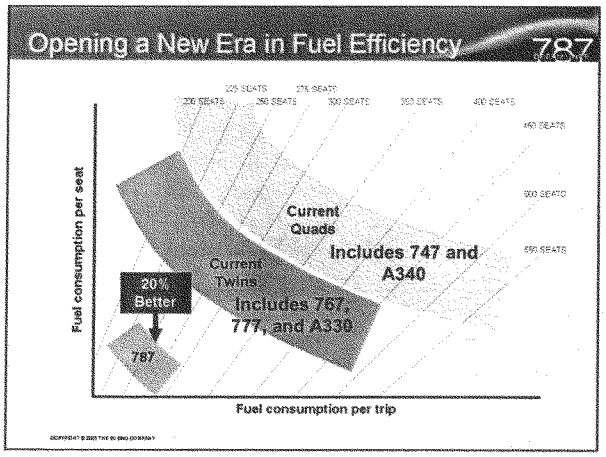
Use of modern computational fluid dynamics and wind tunnels reduce drag fuel

Aerodynamics – Through the use of advanced computational codes run on Cray supercomputers, the Boeing team has been able to consider numerous refinements of the aerodynamic shaping of the 787. Aerodynamic shaping relies on very small changes to the external structure of the airplane to create a better flow of air over those surfaces in flight. By optimizing the design with the use of these tools, the team was able to create about 3 percent of the total fuel savings for the 787.



Modern high bypass ratio engines are fuel efficient

Engines – Both General Electric and Rolls-Royce are developing new engines for the 787 Dreamliner. These engines use new materials and new technologies to create about 8 percent of the overall fuel savings experience with the 787.



The 787 Dreamliner provides a significant improvement in fuel efficiency

When compared to comparably sized airplanes from either Boeing or Airbus; the 787 is opening up a new level of performance in the fuel efficiency arena. This 20 percent savings in fuel results in a 10 percent or more reduction in airline operating costs. For an industry operating on negative to slim margins, a 10 percent improvement in operating costs is very significant.

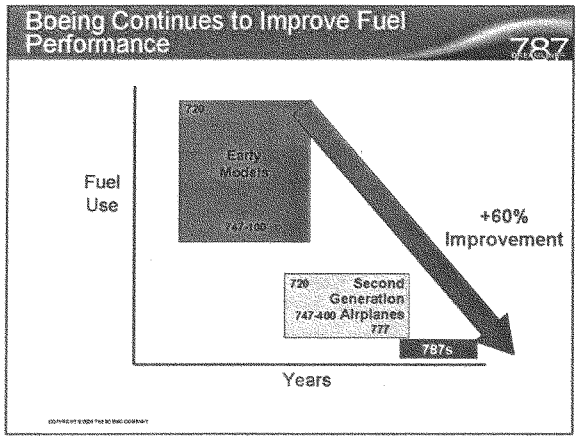
The Boeing order book is proof of how this technology is being received by the aviation marketplace. With 27 customers from around the world and 291 firm orders and another 88 committed orders, it is clear the 787 is providing a new level of performance that will provide value to the airlines and save substantial fuel resources.

The diversity of the customer base – with operators from five continents, large carriers, small carriers, established carriers, start-up carriers, those with regularly scheduled service and those with charter business or exclusive tour arrangements, as well as leasing companies – also demonstrates the flexibility of the aircraft in helping to serve a variety of business case needs.

Compared to a 767 or A330-200 a 787 will save about 5,000 gallons of fuel per flight on a 6,000 nautical mile mission. In a one year period, this results in a savings of two million gallons per airplane. Even if we estimate that Boeing only receives half of the orders for the anticipated size of the market for this airplane, that is a savings of 3.6 billion gallons of fuel saved over the next 20 years. If Boeing continues to experience the strong market demand it has already seen, that number will increase.

In terms of fuel consumption, the Boeing 787 Dreamliner is the right airplane at the right time.

Improvements Introduced in Other Boeing Aircraft



Significant fuel savings with each new generation of jet transport

With each new airplane Boeing has developed, technologies have evolved to improve fuel use. From the introduction of the 707 into revenue service on Oct. 26, 1958, to the all-new Boeing 787 Dreamliner being designed today, Boeing commercial jetliners have achieved a more than 60 percent improvement in fuel use.

737 – There have been two major rounds of improvements offered on the 737 airplane. Today's 737s have new a wingtip design, know as winglets, that help improve fuel efficiency. In addition, advances in engines, materials and systems have led to a series of improvements in fuel use. In the first major step, fuel use was improved by about 20 percent. The most recent models use 15 percent less than the improved 737s.

777 – Even the newest of our commercial jetliners have seen improvements introduced to help reduce fuel use. New raked wingtips are helping to reduce fuel use as are advances in materials and systems. In addition, today's 777 engines are even more fuel efficient than those delivered just a few years ago.

747-8 – 787 technologies are now being leveraged to help improve the fuel efficiency, overall performance and market appeal of other Boeing Commercial jetliners. The Boeing 747-8 Intercontinental and 747-8 Freighter are the new high-capacity 747s that offer airlines the lowest operating costs and best economics of any large passenger or freighter airplane. Boeing launched the airplane on November 14.

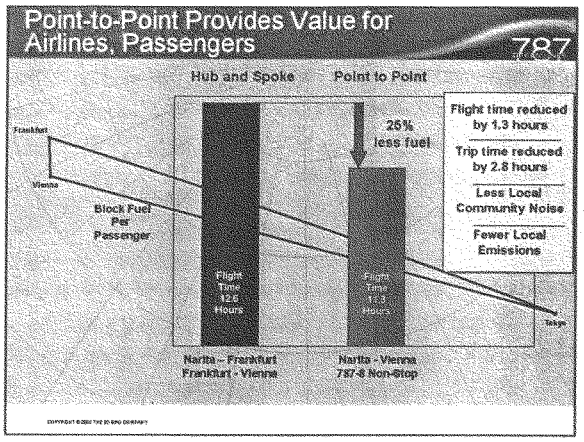
Boeing had been studying the market feasibility of a new 747 for some time, working with operators to establish their requirements for an incrementally larger 747 to continue the profitability of current 747 fleets. By working together with

customers and applying the innovative new technologies of the 787 Dreamliner (e.g. 787 engines), Boeing is able to create the 747-8 family. In fact, the designation 747-8 was chosen to show the technology connection between the 787 and the new 747.

The 747-8 Intercontinental is more than 13 percent lighter per seat than the A380, and consumes 14 percent less fuel per passenger. That translates into a trip-cost reduction of 22 percent and a seat-mile cost reduction of more than 6 percent compared to the A380

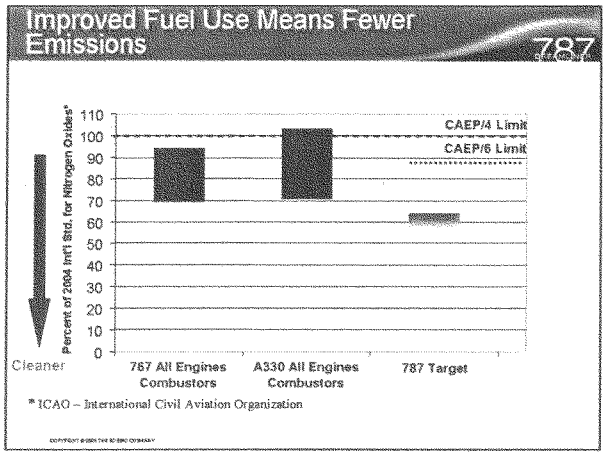
Future Airplanes – The technologies being introduced on the 787 will continue to mature and improve in the years ahead, offering fertile ground for the next all-new Boeing airplanes for decades to come. Composite materials will continue to evolve to be lighter and more durable. Power electronics will become more powerful and lighter weight, aerodynamics codes will become more sophisticated and engines will become more efficient. This is the constant rhythm of improvement that Boeing helps to drive to ensure that each new airplane offers better performance and better value.

OTHER 787 ADVANTAGES, ENVIRONMENTAL BENEFITS



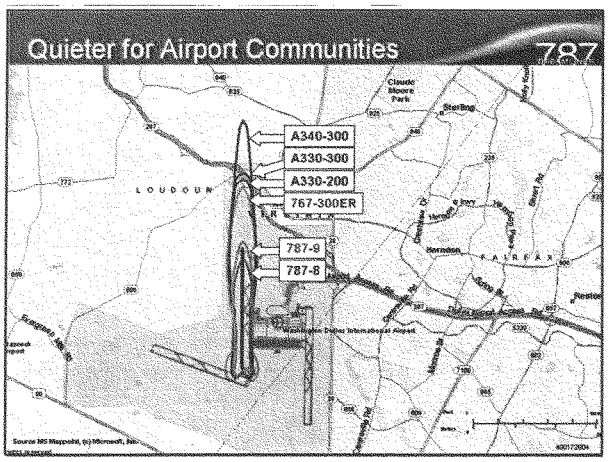
By using less fuel and providing direct routes, the 787 offers improvements

Point-to-Point – By connecting mid-sized cities directly, the 787 will relieve traffic from overcrowded hubs and allow passengers to travel directly from their point of origin to their destinations. The 787 will have ETOPS capabilities – permission from regulators to use more direct routes over water. It will travel less distance in connecting long-haul city pairs. These two factors will help save fuel and a resource that passengers also consider precious – their time.

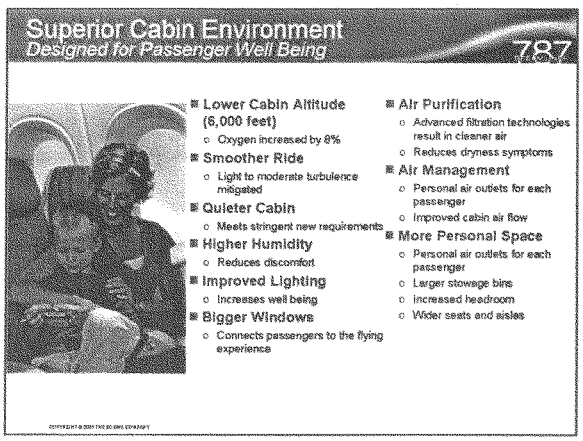


The 787 meets current and anticipated emissions regulations

Emissions – A 20 percent reduction in fuel use equates to a 20 percent reduction in carbon dioxide emission. Compared to today's airplanes, the 787 will produce fewer nitrogen oxides emissions, meeting and exceeding current environmental standards.



Noise – Community noise is another environmental performance issue that airplanes have continuously improved throughout the jet age. The 787 has a 66 percent smaller footprint at the 85 dBA level (roughly equivalent to the sound heard when standing near a busy street and large truck passes by). In fact, for every airport studied so far, this 85dBA noise stays within airport boundaries for the 787.



The 787 offers passengers a better flying experience

Cabin Environment – Another key environmental consideration in the design of commercial aircraft is the environment for passengers traveling inside the cabin. We have introduced a number of new technologies – ranging from cleaner air to higher humidity and larger windows to help passengers better enjoy their flying experience onboard the 787 Dreamliner.

The Air Traffic Control System – Improvement Is Needed

Given everything I have already said about the fuel efficiency of our newer aircraft, we must recognize that aircraft technology is only part of the equation. The efficiency of the airspace system directly impacts the fuel usage of an aircraft in operation. The benefits of fuel efficient aircraft technology cannot be fully achieved if aircraft cannot perform at optimal levels and are required to fly inefficient routes or approaches, fly in holding patterns, fly at less than optimum speeds, or sit idling on the ground.

The progress of improvements in air traffic management has not kept pace with the dramatic advancement in technology onboard the aircraft. As a result, our aircraft are not being utilized to their fullest potential. As aircraft and engine manufacturers continue to bring fuel efficiency improvements to the market, the FAA must also improve the efficiency of the airspace system to ensure that the full benefits of these improvements can be realized.

Let me give you a few examples of airspace improvements that could dramatically improve fuel efficiency of aircraft flying in the system:

- **Required Navigation Performance (RNP)** – developing approaches to airports based on RNP allows aircraft to take advantage of onboard precision

instrumentation to fly more optimal routes. Instead of flying a route based on where ground based equipment is located, an aircraft can fly a more direct route into the airport.

- **Tailored Arrivals** – Tailored arrivals allow an air traffic controller to use data-link to send a 4 dimensional (route plus time) flight profile directly to the flight deck of an approaching aircraft when it is ready to begin its descent, about 140 miles away from its final destination. Once reviewed by the flight crew, the optimized trajectory is entered into the flight management system (FMS) with a simple keystroke. The FMS then flies the given trajectory to touchdown with a high degree of accuracy. Air traffic management computers calculate and submit the most efficient approach path, given local traffic and weather conditions, hazardous terrain, noise restrictions and the aircraft's own performance capabilities. Using the aircraft's area navigation (R-NAV) capabilities, which frees the crew from having to follow fixed navigation points on the ground, aircraft can follow efficient, curved, continuous descent approaches, rather than a traditional step-down approach. The aircraft stays higher longer and descends quicker at a very low throttle setting. In 2004 Boeing and the Air Traffic Alliance (Airbus, EADS, and Thales) jointly tested the Tailored Arrivals concept with Qantas in Sydney and Melbourne, Australia. Results of that test showed savings of between 400-800 pounds of fuel per flight, which adds up to more than $100,000 per year per aircraft. Tailored Arrivals can be implemented using the existing equipment found on current generation commercial aircraft flying in the air traffic control system today.

- **Trajectory Based Operations** – fuel efficiencies enroute will also be realized with a move to trajectory based operations and more precise airspace usage. Reducing ground holds, in trail spacing and other flow restrictions, improving weather avoidance efficiencies, oceanic spacing reductions and flexible climb clearances, as well as allowing optimum speed use and passing -- all of these are fuel saving benefits (and emissions as well).

Mr. Chairman, Boeing is doing its part to make better, more fuel efficient aircraft. However, these gains could be totally eclipsed if the current air traffic control system does not realize similar efficiencies in the future. This is one area where this sub-committee and the Congress can help in creating a more fuel efficient air traffic control system. As you look toward reauthorizing the FAA in 2007, please keep this in mind.

CONCLUSION

The Boeing 787 Dreamliner will be the most fuel efficient commercial airliner in the world

Improved fuel efficiency and overall environmental performance is the right thing to do both in terms of conserving precious resources and in providing a business tool for airlines that will help them to stabilize their business models. Boeing has developed the 787 because it is the airplane our customers want and need. We have taken similar strides with the 737, 747, 767 and 777. This is how we have developed airplanes for decades and is the reason we are more successful than any other manufacturer. It is one reason we are confident that the 787 will be a market success. These technologies will continue to mature allowing Boeing to develop and deliver new airplanes with better performance in the years to come.

With this airplane Boeing is once again reshaping the commercial airline industry -- from the way we do business to the business opportunities provided to our customers. While we often measure the improvements offered by our airplanes on a customer-by-customer basis, it is equally true that the advantages offered by the 787 will result in savings for the entire commercial transport system. Combined with other industry efforts, like advances in air traffic control technologies, Boeing's new more fuel efficient jetliners will make a difference in reducing the resources used to transport people over long distances.

Again, Mr. Chairman, I appreciate this opportunity to testify before the subcommittee.

STATEMENT OF

JOHN P. HEIMLICH
VICE PRESIDENT AND CHIEF ECONOMIST
OF THE
AIR TRANSPORT ASSOCIATION OF AMERICA, INC.

"COMMERCIAL JET FUEL SUPPLY: IMPACT ON U.S. AIRLINES"

BEFORE THE
AVIATION SUBCOMMITTEE
OF THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
OF THE HOUSE OF REPRESENTATIVES

FEBRUARY 15, 2006

Good morning. I am John Heimlich, vice president and chief economist for the Air Transport Association of America, Inc. I appreciate the opportunity to speak with you today about jet-fuel supply and the commercial air transport industry.

The Air Transport Association of America, Inc. (ATA), the trade association of the principal U.S. passenger and cargo airlines, welcomes and appreciates the opportunity to submit these comments for the record regarding jet-fuel supply and the commercial air transport industry. ATA's 19 member airlines have a combined fleet of more than 4,400 aircraft and account for more than 90 percent of U.S. airline passenger and cargo traffic. ATA and all of its members have a vested interest in ensuring access to an affordable and reliable supply of jet-fuel.

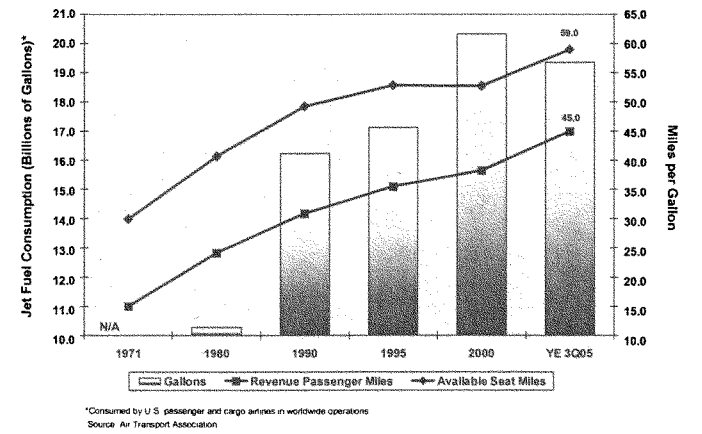
Today I would like to discuss the impact of three years of increasingly expensive jet-fuel on U.S. air carriers, provide some examples of the unprecedented measures they have taken to reduce their fuel costs during and preceding this period, and explain how modernization of the air traffic control (ATC) system is one of the best ways to help all system users minimize their fuel expenditures.

Fuel Prices Outpace Airline Cuts and Conservation

With fuel expense ranking as the number-one or number-two cost category, airlines have an enormous built-in financial incentive to reduce consumption. Indeed, the industry's track record for fuel efficiency gains demonstrates just that. During the last two years, this incentive has risen dramatically, and the carriers have responded by leaving no stone unturned in identifying operational or other means of fuel conservation.

Aviation Fuel Efficiency Has Tripled Since 1971

Conservation Accelerated Post-9/11, Keeping Consumption Below 2000 Peak



Since 2000, airline fuel efficiency has risen an impressive 18.1 percent, on average, from 38.2 revenue passenger-miles (RPMs) per gallon to 45.1. Of course, part of that gain is driven by higher passenger load factors. If we look strictly at capacity per gallon, we find a 12.1 percent increase during that same period, from 52.8 to 59.0 available seat-miles (ASMs) per gallon. Viewed over a longer time span, U.S. airlines have tripled passenger-miles flown per gallon since our first data point in 1971. ASMs per gallon doubled in that period.

Airlines have developed many different operational and planning techniques aimed at saving fuel and optimizing fuel purchases. On the operational front, the following measures are among those utilized in recent years by air carriers to conserve fuel:

- Initial Climb-Out Profile Management – protocols for more fuel-efficient coordination of flight speed and flap utilization during post-takeoff climb out
- Aircraft Track Management – more in-depth analyses of weather conditions (temperatures at altitude, winds aloft, etc) and runway selection having allowed for significant fuel savings
- Vertical Profile Management – greater use of aircraft flight-management systems in selecting flight levels, profiles and speeds to conserve fuel
- Fleet-wide Fuel-Management Systems – allowing air carriers to optimize certain aircraft types for specific routes, with fuel conservation as a greater consideration
- Single-engine taxiing during normal operations and selective engine shutdowns during ground delays
- Reducing and measuring more accurately onboard weight, and redistributing cargo
- Cruising longer at higher altitudes and employing shorter, steeper approaches

In terms of planning for fuel usage, airlines are:

- Working with the Federal Aviation Administration (FAA) to change en route fuel-reserve requirements, to reflect state-of-the-art navigation, communication, surveillance and wind forecast systems
- Employing self-imposed ground delays, to reduce airborne holding
- Modernizing their fleets with more fuel-efficient airplanes
- Investing in winglets, to reduce aircraft drag and thereby increase fuel conservation
- Redesigning hubs and schedules, to alleviate congestion
- Advocating expanded and improved airfield capacity
- Using airport power rather than onboard auxiliary power units when at the gates
- Changing paint schemes, to minimize heat absorption
- Altering the location at which fuel is purchased
- Pooling resources, to purchase fuel in bulk through alliances with other carriers

In addition to fleet modernization, certain capital investments that might not have made financial sense in the late 1990s have newfound economic appeal. For example, in "Every Drop Counts" (*Alaska Airlines Magazine*, January 2006), Alaska Airlines Chairman and CEO Bill Ayer notes that winglet extensions, which make the wings more aerodynamic, cut fuel consumption between three and five percent, saving more than 100,000 gallons of fuel per aircraft per year, not to mention reducing noise and emissions.

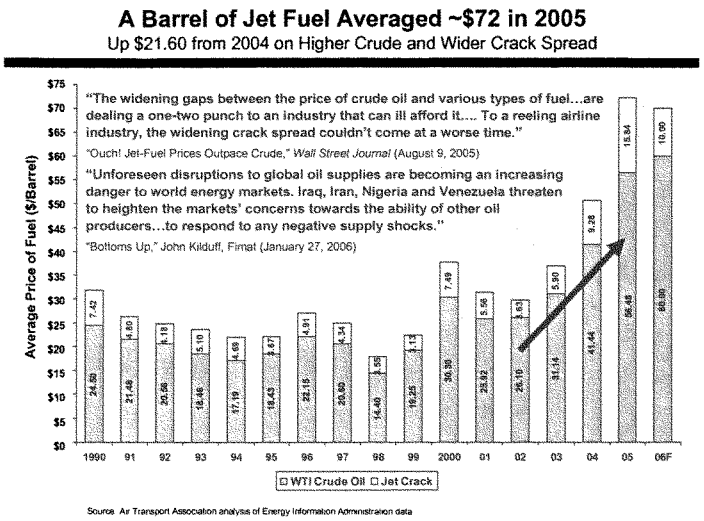
While examples of weight reduction to conserve fuel abound throughout the industry, some recent developments deserve mention. Just last week, American Airlines announced plans to remove the rear galleys from its 327 MD-80 aircraft, which make up half its fleet, and, replace them with four seats, beginning in September. American expects the move to improve earnings by $34 million annually. Delta is considering a similar move, and Northwest has already removed ovens from the galleys of several aircraft used on domestic flights, to reduce aircraft weight. Low-cost carriers, too, may take such steps as carrying less drinking water, pulling off unused electronic equipment, counting the number of children onboard (to carry less fuel) or even replacing glass mirrors with acrylic ones.

Jet-fuel Costs: A Look Back at Prices and Their Consequences

In evaluating the pain airlines and their workers have been facing from soaring jet-fuel prices in the last few years, it is helpful to consider the price range to which they had become accustomed. It is against that backdrop that operational and other investments were made. From 1991 through 1999, U.S. airlines enjoyed an average annual jet-fuel price of 56 cents per gallon. During this period, the annual average never exceeded 65 cents. In fact, in six of those nine years, the price fell between 50 and 60 cents. The significance, therefore, is not only the reasonable average price, but also its stability.

In 2000, the average market price rose to 90 cents, but the market for air travel at the time supported much higher fares than is the case today. Again, it was in this context in that the airlines made decisions about staffing, aircraft orders, route planning and other areas throughout the business. Airline financial planners did anticipate drops in demand and increases in fuel price, but nowhere to the extent and duration of what they have witnessed

during the last few years. In 2001, accelerated by the drop in global energy demand after 9/11, jet-fuel prices fell to an average of 75 cents per gallon, and again in 2002 to 71 cents.

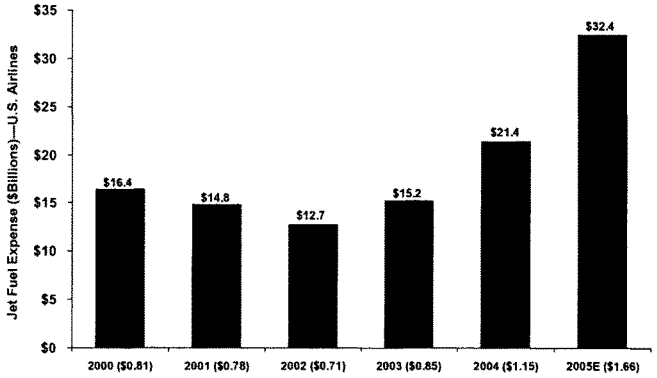


As global energy demand resumed, aviation volumes began to recover and geopolitics and market speculation ruled the day, the price of crude oil and its refined products began to surge. During the next three years (2003-2005), the market price of jet-fuel averaged $0.88, $1.21 and $1.72, respectively. The outlook for 2006 is no rosier from the airlines' perspective when it comes to jet-fuel prices. Through February 10, U.S. spot markets were averaging $1.85, and the PIRA Energy Group, a leading energy analysis firm, is projecting a full-year average in excess of $1.80. As of February 7, the U.S. Energy Information Administration's Short-Term Energy Outlook forecasts $1.86 for 2006 and $1.76 for 2007. This forecast is especially critical at this time because of the airlines' increasing exposure to fluctuating market prices as their fuel hedge positions deteriorate. This includes leading low-cost carriers, who likely would have lost money in 2004 and 2005 had it not been for their hedges.

Keep in mind that U.S. passenger and cargo airlines consume about 19.5 billion gallons annually. Thanks to improved fuel efficiency, that figure remains below the 2000 peak of 20.3 billion gallons. Also keep in mind that airlines need little incentive to improve jet-fuel efficiency, because unlike other modes of transport, they have no alternative source of energy. Nonetheless, at today's consumption rate every penny increase in the price of a gallon of jet-fuel drives an additional $195 million in annual operating expenses for the industry. So if the price were a dollar higher over the course of a year, we're talking about a $19.5 billion increase in expenses. In fact, from 2000 to 2005, the industry's fuel tab doubled from $16.4 billion to an estimated $33 billion, even though it consumed less. The increase from 2004 to 2005 alone exceeded $11 billion.

Industry Fuel Expense Estimated to Have Risen $11B in '05

Higher Crude, Crack Spread, Consumption All Fueling Increase vs. '04



Sources: Air Transport Association, Energy Information Administration, Department of Transportation

That's just staggering, and virtually impossible to pass through in an environment of limited pricing power for air transportation services. Consider how higher fuel prices affect an individual flight. As cited in a September 12, 2005, Bear Stearns research report, "It costs an airline over $12,000 in fuel alone to fly a [Boeing] 757 from L.A. to New York, which means that flying coast-to-coast is over $4,000 more expensive per trip today than it was in 2004." Just two days later, the *Washington Post* quoted now defunct Independence Air's Jeff Pollack as follows: "Flying to L.A. burns a lot of fuel, and we're not seeing average fares that cover that. We burn about 3,500 gallons on a trip to the West Coast, and since fuel is up by a dollar in recent months, that's another $3,500 per trip we need to recoup. The current fares people are willing to pay to the West Coast just aren't able to cover the expense of flying there."

On a unit-cost basis, for most carriers fuel has now tied or overtaken labor as the industry's largest expense. More precisely, a historically three-to-one labor-to-fuel cost ratio has become a dead heat at best. This turn of events speaks volumes about the self-help efforts of the airlines and the workforce-at-large while grappling with price spikes in other areas of the business over which they have such little control. Of course as most of us know, fares have fallen markedly during this same time period. In 2005, domestic passenger yields, the prices customers pay to the airlines to fly one mile before taxes, were an estimated 19 percent below 2000 levels. In short, passenger airlines have not been able to cut costs or raise fares fast enough to keep up with skyrocketing fuel costs. Driven largely by an estimated $11 billion increase in fuel expense from 2004, U.S. airlines lost an estimated $10 billion in 2005. At 2004 fuel prices, the industry would have broken even or recorded a small profit. At 2002 or 2003 fuel prices, nearly every U.S. carrier would have recorded meaningful profits.

While the U.S. government can do relatively little in the short term to reduce jet-fuel prices, it can do its part to minimize non-fuel expenses, such as unfunded security mandates or aviation taxes and fees with little or no benefit to airlines. Also, keep in mind that because the price of jet-fuel is principally determined by the underlying price of crude oil, any efforts to encourage conservation of crude oil across the broader economy ultimately provide relief to the aviation community.

High fuel prices have also compounded the demand-related effects of 9/11 in forcing airlines to reduce the industry payroll. According to the latest government figures, network carriers had already eliminated 162,000 jobs, or nearly one out of every four workers, by the end of 2005. In 2005, it cost the airlines an average of $75,000 to employ one worker. That means that the $11 billion increase in jet-fuel expense from 2004 could have supported over 133,000 airline employees. While this statement is not intended to establish direct causation between the increase in fuel and the number of jobs lost we do have estimates from third-party econometric models.

Analysis conducted for ATA by Guerilla Economics estimated that every billion-dollar increase in annual jet-fuel expense on the industry leads to 862 lost jobs. Perhaps more significantly, the study found that "large price increases in air transportation can curtail demand in other industries," as the industry will be forced to pass on extra fuel costs through higher ticket prices, reduced service or additional charges for in-flight items. In examining the 2005 increase from 2004, study author John Dunham found that even "if the costs are passed on to domestic business consumers only, over 114,000 American jobs could be lost," including 6,600 in restaurants and bars, 6,300 in wholesale trade and thousands more in hospitals, retail, real estate, management consulting and other U.S. industries. "Even if the industry were to absorb the entire [cost]," he writes, "the cost to other sectors of the economy from reduced supplier contracts, lower salaries and benefits for employees and reduced industry spending could be as high as 35,000 jobs."

Fuel Costs: Obscure Federal Taxes, Regulations Also Take Their Toll

In addition to facing record high fuel costs during the last few years, Congress has passed several pieces of legislation that have effectively increased the airlines' cost of purchasing jet-fuel. The American Jobs Creation Act of 2004 included provisions that were aimed at eliminating perceived tax fraud involving the federal excise tax on highway diesel fuel. The tax writers believed that untaxed jet-fuel was being diverted for use as diesel fuel, without the appropriate excise taxes being paid. Although the airlines were never accused of doing anything wrong, they have been saddled with a significant financial burden in an attempt to fix a problem they did not create.

The federal excise tax on commercial aviation fuel is 4.4 cents per gallon for fuel used in domestic flights, and zero for fuel used in international flights. Prior to passage of the American Jobs Creation Act, airlines either paid their fuel supplier the appropriate tax, or self-assessed the tax by making semi-monthly tax deposits. Under the new law, at airports that receive their fuel supplies by truck rather than by pipeline, airlines were generally required to pay 21.9 cents per gallon in tax at the time they received the fuel (even though the actual tax rates of 4.4 cents or zero still applied) and then file a claim for refund of the overpaid taxes. This has resulted in the airlines being required to initially overpay their

taxes by in excess of $520 million per year, and then claim a credit or seek a refund of that amount. Forcing taxpayers to overpay their tax liability is not only destructive tax policy, but the added financial and administrative burden on the airlines comes at a time when they can least afford it.

The "Safe, Accountable, Flexible, Efficient Transportation Equity Act" passed in 2005 only made things worse. It increased the amount of tax airlines must prepay at non-pipeline supplied airports from 21.9 cents per gallon to 24.4 cents per gallon, again without any increase in the amount of tax ultimately due. This change added approximately $80 million to the amount the airlines must prepay, and then recover, adding to their financial burden.

But Congress didn't stop there. The Energy Policy Act of 2005 imposed an additional fuel tax on the airlines. Fuel used in foreign trade has long been exempt from the 0.1 cents per gallon Leaking Underground Storage Tank (LUST) Trust Fund tax. The Energy Act removed that exemption. This new tax will cost U.S. airlines almost $3 million per year. However, the potential cost to U.S. airlines is much greater. This tax now also applies to foreign air carriers purchasing fuel in the United States. Taxing fuel purchased by foreign airlines violates the taxation policies adopted by the United Nations-based International Civil Aviation Organization, to which the United States has agreed. More importantly, imposing this tax on foreign carriers violates numerous bilateral aviation services treaties that the United States has entered into with other countries. These agreements provide that no tax will be imposed by a country on fuel purchased by a carrier from the other contracting country. However, this provision is based on reciprocity. Now that the United States has imposed a tax on fuel purchased in the United States by foreign carriers, U.S. carriers are exposed to taxes imposed by foreign countries, at rates potentially much greater than that imposed by the United States.

In summary, over the span of one year, Congress increased the airline industry's fuel tax burden three times, either directly, through higher taxes or indirectly by increasing payment requirements and forcing cash-starved carriers to seek reimbursement for overpayments.

Another fuel-cost concern looming on the horizon for air carriers and all consumers of refined products, is the request to the Federal Energy Regulatory Commission (FERC) by the association representing oil pipelines for a base-line rate increase. As part of its every five-year review of oil pipeline tariff rates, FERC is considering what annual rate increase that oil-pipeline owners and operators should be allowed to charge their customers. Currently, oil pipelines used to carry oil, gasoline, diesel, home heating oil and jet-fuel are allowed to increase their rates each year by a percentage no greater than the Producer Price Index (PPI). The PPI is widely regarded as the rate of inflation for wholesale goods and services. However, the petition from the oil pipeline association would raise that ceiling to "PPI + 1.3 percent," allowing pipelines to increase their base-rate each year by the rate of inflation plus an additional 1.3 percent. Such an increase would have an even greater inflationary impact on the cost of virtually all fuels and over time would build upon itself at a rate that would quickly outpace the cost increases in other sectors of the economy. Furthermore, many of the major pipelines that are seeking this increase are owned or partly owned by oil companies or refineries, an industry that, in the current economic climate, hardly needs a federally mandated rate increase.

ATA has submitted comments to FERC on this issue opposing an increase in the price index for oil pipelines, and we call upon members of this Committee to send a strong message to the Commission that giving rate increases to monopoly energy pipelines at the expense of consumers is a bad idea.

Jet-fuel: From Well to Wing

Oil production in the United States is becoming more and more concentrated in the Gulf of Mexico, not because more oil is being discovered there, but rather because there are fewer and fewer areas that are open for exploration and production. With increasing demand throughout the economy and limited access to domestic supplies, it is obvious that U.S. consumers must rely on foreign suppliers to make up the difference. Today our nation buys oil from a globally diverse group of suppliers including private domestic producers from Alaska to Louisiana, to a mix of private and state-owned suppliers in nations like Kuwait, Mexico, Russia, Canada and Venezuela. With global demand averaging 85 million barrels per day in 2006, political uncertainty in key parts of the world and very limited spare capacity it is no wonder we face today's high crude-oil prices.

Producers or their representatives sell the oil through myriad arrangements, including both private bilateral contracts as well as market contracts that are priced through a commodity exchange such as the New York Mercantile Exchange (NYMEX).

Once extracted from the ground, oil comes to U.S. refineries via pipeline, ocean-going tanker or barge. Whether as oil, as partially refined or fully refined product, each time petroleum is transported there is a cost associated with it, so going back to the proposed increase in the oil pipeline index, any increase in transportation costs will likely be passed through to the ultimate consumers of the product. As it is not uncommon for gasoline and jet-fuel to be transported through pipelines at multiple stages in the production and distribution process, any increase in the regulated tariff rates for oil pipelines would have a multi-stage cost impact.

As noted above, jet-fuel is similar in its formulation to diesel fuel and home heating oil. Refineries that produce jet-fuel will often shift production output between similar products, depending on what is most profitable, although their ability to shift production between the various products is limited. This goes back to the price link between jet-fuel and similarly constituted fuels. As is the case with crude oil, refineries or their representatives sell their products through various contractual arrangements or commodity markets, with prices being negotiated between parties or set by price indicators such as the NYMEX.

Once refined, jet-fuel and other fuels travel by pipeline to storage sites or airports or fuel terminals where it is distributed by truck, barge or, again, pipelines to the final points of sale, in our case to airports. Fuel distribution at airports can happen in many different ways. Some airports have internal pipeline systems (not subject to FERC regulation) that are used to carry the fuel from the "fuel farm," a fuel-storage site at or near the airport, under ground to the terminal gates, where hoses span the final distance to the wing of the airliner. At airports without internal pipeline systems refueling trucks are used to move fuel from the fuel farm to the aircraft. There are many variations on this structure,

including combinations of each but, by and large, this is the way fuel moves about an airport.

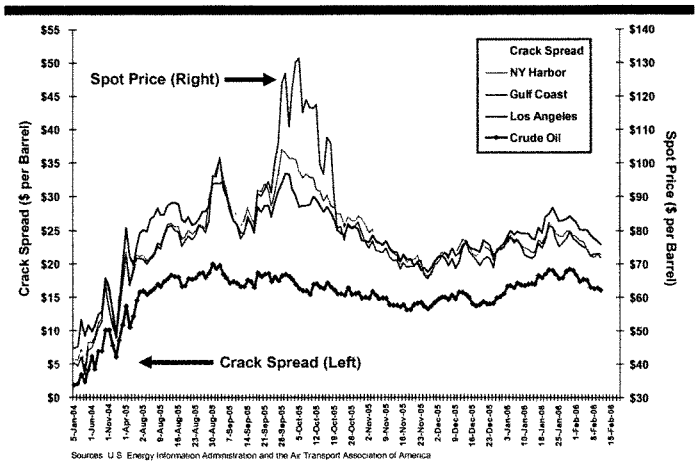
Unlike other fuels, such as gasoline, heating oil and natural gas, jet-fuel is not traded on any of the major exchanges. Air carriers buy fuel in several different ways, from multiple suppliers and at differing rates. Not every supplier operates at every domestic airport that a carrier may serve, so multiple arrangements are necessary. Furthermore, airline schedules make fuel demand generally predictable, allowing carriers to purchase fuel months or years in advance and, therefore, receive a discounted rate from the supplier. As a result, most airline fuel purchases are conducted on a bilateral basis, between supplier and carrier rather than through a market such as the NYMEX or other commodity trading markets. In most cases, the terms of these contracts are not reported for competitive reasons to protect both parties. When you see regional jet-fuel prices quoted in energy and other publications they reflect an estimated "snap shot" of the contracts within that region as disclosed by suppliers or buyers in that region.

Jet-fuel is linked to the commodities markets principally through home heating oil, a refined product similar in consistency. Because home heating oil is traded on public exchanges, it is often used as a pricing reference for jet-fuel. So when the price of heating oil rises, so does the price of jet-fuel. The inverse is also true in that jet-fuel prices often move heating oil prices.

Just as motorists pay different prices for gasoline in different parts of the country, airlines pay different prices for jet-fuel in the Gulf Coast than they do in New York and Los Angeles. West Coast prices traditionally run higher, because of overall refining capacity, storage, logistics and distribution inferiority. In addition to the mountainous terrain, which limits trucking capability, the West Coast lacks the more robust pipeline network of the East, although the latter is becoming increasingly strained by today's demand and competing product needs (i.e., gasoline vs. diesel vs. jet). Much of the product in the West Coast is imported, often from countries with even higher prices. [Note that an estimated 48 percent of the jet-fuel supplied at LAX arrived by boat in 2005.] Final prices may also include the expense of shipping product across the Pacific Ocean. Prices quoted in Los Angeles have exceeded their Gulf Coast counterparts in 174 of the last 185 months, beginning in September 1990, when the Department of Energy began recording geographic differentials. The differential hit a monthly high of 29 cents per gallon in April 2004, averaging 13 cents for the year and disproportionately affecting those airlines with extensive western-U.S. operations. The differential thus far in 2006 stands at 12 cents per gallon.

Jet Fuel @ $70-80/bbl on High Crude Prices

Post-Rita, Average Crack Spread Surpassed $43/bbl (incl. $69 for Gulf Coast)



In contrast, because prices in any marketplace are driven by supply and demand, in the period during and surrounding Hurricanes Katrina and Rita, prices in the Gulf Coast soared to $3.13 per gallon, a staggering $1.06 higher than in Los Angeles. During the hurricanes, airlines purchasing a majority of their fuel in the Gulf or under term-contracts priced off of Gulf Coast indices suffered disproportionately, in addition to incurring exorbitant costs for tankering. As illustrated above, the U.S. market for jet-fuel and other petroleum products is faced not only with challenging logistics, but also with extreme volatility.

Hedging v. Spot Market

The primary means through which airlines purchase jet-fuel is actually via "term contracts" based upon a projected volume for a given period. For example, United Airlines might agree with supplier X to supply its requirements in Chicago for a one-year term from February 1, 2006, through January 31, 2007, estimated at five million gallons per year on a Platts Gulf Coast index (based on the week prior to delivery) plus or minus a fixed differential (usually stated in cents per gallon).

Existence of the futures market and other derivative instruments also allows any participant to "lock in" the prevailing price for future deliveries, such as home heating-oil prices for the winter heating season. Such a strategy, called a "hedge," involves a series of transactions, offsetting profits or losses on a futures transaction against losses or profits on the physical purchase or sale of oil. By limiting the uncertainty over future costs, the hedge allows companies to mitigate volatility and thereby improve financial planning. A hedge instrument may or may not accompany the specific physical delivery. In most cases it does not. An airline could hedge volume at a fixed price, but most frequently hedges occur in paper markets or on an exchange, typically settled on a monthly or quarterly basis between the airline and an oil company or bank.

Spot market purchases[1] constitute a minute portion of the industry's jet-fuel consumption. These purchases tend to be limited to larger, more sophisticated airlines that have become integrated into the supply chain for reasons of price or supply surety. And even those airlines only tap the spot market for well under 10 percent of annual purchases.

Much attention has been given to the hedging positions of passenger airlines in recent years. Traditionally, airlines have hedged a portion of their fuel requirements by locking in future purchases at a set price. However, hedging is a gamble, rather than an arbitrage opportunity, and it requires a relatively healthy financial condition (i.e., investment-grade credit), a willing counter-party, and often a hefty upfront transaction cost. In a period with abysmal credit ratings, it is virtually impossible to secure a good deal for many carriers. Some carriers had to liquidate hedges, either in the course of filing for bankruptcy protection or to free up cash to meet immediate financial obligations. No airline is 100 percent hedged, and those with favorable hedges see them eroding over the next few years. While airlines are possibly the most visible sufferer of the run-up in energy costs they are by no means alone. No industry in America foresaw oil prices in excess of $50 per barrel at this point, let alone $70.

The Hurricanes and Their Effect on Jet-fuel

Like all U.S. consumers of products refined from oil, air carriers feel the financial pain when there is a disruption in the supply chain. In the days and weeks immediately after hurricanes Katrina and Rita, when oil production in the Gulf of Mexico and refining capacity along the Gulf Coast was shut down, air carriers were forced to take extraordinary measures to avert fuel supply-related service curtailments. For several weeks air carriers, fuel suppliers and airport fuel-system operators worked closely to identify airports where fuel supplies were tight and make operational changes such as "tankering," to slow supply draw-downs. Tankering, the process of flying additional fuel into an airport on an aircraft so as to minimize fuel uplift at that destination, can be extremely expensive and inefficient. In the period after the hurricanes, carriers operating into airports with tight fuel supplies not only suffered from record-high fuel prices but were forced to burn extra fuel when tankering, in order to maintain those routes.

It is critical for the public and public officials to realize that though airlines were able to take heroic steps to avoid disrupting customers during the hurricanes, they did so at great incremental operating costs. They have a unique capability to ferry fuel from one location to another and, ironically, may have a tendency to take a back seat to other modes of transportation or fuels in terms of priority in pipeline queue, for example, if gasoline stations run out of fuel and motorists increase pressure on local officials.

The airline experience and indeed the experience of all consumers after the hurricanes demonstrated the fragility of our system for providing the fuels we all depend upon. The hurricanes also demonstrated the risk our nation has exposed itself to by concentrating so

[1] As defined by the U.S. Energy Information Administration, "A spot transaction is an agreement to sell or buy one shipment of oil under a price agreed-upon at the time of the arrangement."

much of its oil production, refining and energy transportation infrastructure in one region of the country. By not expanding and diversifying our supply and refining options we are destined to depend increasingly on foreign sources of crude-oil, as well as refined products. This lengthens the supply chain and increases the chances for disruption, which, along with the complicated logistics and distribution system, should concern all U.S. consumers, not merely the airlines.

ATC Modernization: Conserving Fuel and Time

The existing air traffic control (ATC) system has generally served our nation well. However, it was not designed with fuel conservation in mind, nor was it built to accommodate the traffic levels that we face today and into future. A modernized system utilizing available technologies and recently developed procedures could save millions of gallons of fuel per year, eliminate many unnecessary delays and expand system capacity. Examples of current system limitations and their operational results include:

- Because of the "first-come, first-served" policy in place today, a Boeing 777 en route from Hong Kong to the United States in 2005 was forced to divert after 14 hours of flight when a local flight was allowed to land first because it had contacted the tower first
- Excessively prescriptive ATC speed-control measures used in meeting "miles-in-trail" separation requirements force pilots to make frequent throttle adjustments, increasing fuel consumption and emissions
- Lack of continuity across FAA en route centers often force aircraft away from their optimum cruise altitudes, resulting in greater fuel burn and emissions

Extra time in the air or on the ground means aggravation for passengers and added expense or forgone revenue for airlines. In particular, airlines incur additional crew costs and burn extra fuel. A given route by air may also become less time-competitive versus train or auto trips of similar distance. As airlines are forced to lengthen advertised flight ("block") times for routes to account for congestion in the national airspace system, they are unable to build as many schedule connections in reservation systems, resulting in substantial forgone revenue. In 2004, an extra minute of operations cost the airlines an average of $57.09. In our analysis of the New York LaGuardia (LGA)-Ronald Reagan Washington National (DCA) route segment, ATA found that the average block time grew by nine minutes from 1995 to 2005.

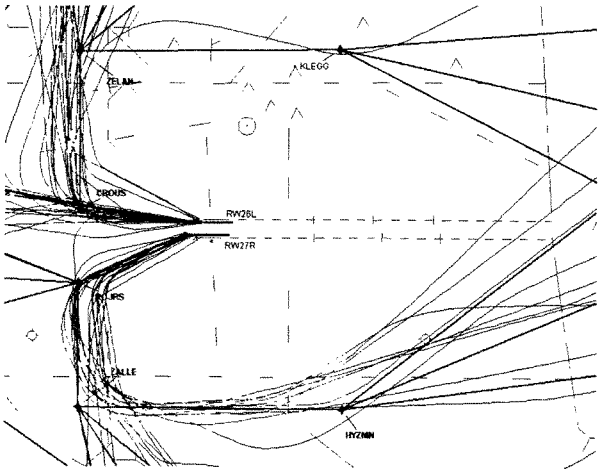
While nine minutes might not seem like much, there's an adage in this business that says small things can be big. Just taking one daily flight at 2004 costs, these extra nine minutes per mission translate to $189,000 in incremental annual expenses, for that operation alone. Extrapolating that flight across all U.S. airlines that fly the LGA-DCA route further translates to $12.7 million in additional annual expenses for the industry. Based on the average fare in that route, those airlines would need to carry 113,000 additional passengers each way. Stated differently, the additional funds needed to accommodate congestion on that route alone could be used to employ 169 airline workers at a cost of $75,000 per worker. And that's just on that single route.

While the current system is straining to keep up in some areas, we are seeing examples of the benefits that the next-generation ATC could hold. A very real example is that of "area navigation," commonly referred to as RNAV. Air carriers have been working with the Federal Aviation Administration (FAA) to introduce new air traffic control procedures that will reduce fuel burn, as well as bear other benefits. A perfect example of this is the implementation of RNAV approach-and-departure procedures at Atlanta and Dallas-Fort Worth airports.

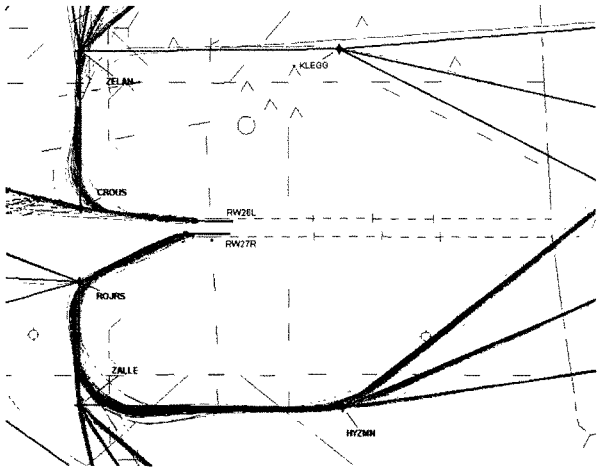
RNAV is a method of navigation that permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these. RNAV routes and terminal procedures, including departure procedures and standard terminal arrivals, are designed with RNAV systems in mind. In addition to reduced fuel burn, RNAV routes and procedures also reduce dependence on radar vectoring, altitude and speed assignments, the associated ATC radio transmissions, and better maximize airspace capacity.

Below are graphic illustrations of operations during an RNAV trail at Atlanta Hartsfield-Jackson Airport before and after "turning on" RNAV. The first shows approaches to runways 26L and 27L prior to RNAV utilization, the second with RNAV procedures in use.

Traditionally Controlled Tracks



Aircraft-Guided RNAV Tracks



In addition to reducing costs to operators, fuel savings achieved through ATC improvements produce significant environmental benefits. For every gallon of fuel not burned, the related emissions are not released into the atmosphere. These include carbon dioxide, as well as substances that affect local air quality, such as oxides of nitrogen, which can contribute to ozone formation.

Moreover, specific revisions in air traffic management procedures can produce environmental benefits. A promising example is the Continuous Descent Approach (CDA) technique that the FAA is developing through its PARTNER Center of Excellence. CDA is a landing technique that uses a gradual descent slope rather than the staged plateaus used in today's standard procedures. In tests conducted on nighttime operations of B767 aircraft at Louisville, the CDA approach produced, per aircraft: a 4 to 6 dB reduction in peak noise, a 30 percent reduction in NOx emissions, a 500-pound fuel-burn reduction and a 100 second reduction in flight time. The FAA is actively working to identify other airports where the CDA approach can be deployed, develop guidelines specific to those airports and design appropriate controller procedures.

Other examples of ATC improvements that would help reduce fuel burn and emissions are:

- Airspace design and airplane/airport equipage are capable of near-constant arrival and departure rates, regardless of visibility conditions. With some exceptions, today's system works well during fair weather. However, airport throughput decreases during low-visibility conditions. Adoption of enabling technologies that will reduce the impacts of weather.

- Rationally segregate different types of aircraft can optimize traffic flow. Different aircraft types operate at different altitudes and speeds. Large transport aircraft generally fly faster and higher than smaller, noncommercial aircraft. Combining various types means that they all fly at the slower speed, reducing flows into an airport or on a route. Segregation could recapture capacity that is lost today by restricting speeds and forcing aircraft to operate at less than optimum efficiency.
- Management of total system performance. The airspace system of today is a patchwork of individually managed sectors of airspace. Flow restrictions that make sense for a particular area can be detrimental to system performance elsewhere. Decision-makers must adopt a broader view, managing capacity at the national level.

While the exact potential for fuel conservation and emissions reductions is difficult to quantify, because of the many variables yet to be resolved, these tests in Louisville, coupled with the RNAV implementations, demonstrate real-world benefits that give us a glimpse of what could be.

Finally, virtually all of the benefits of ATC modernization, not just fuel-related benefits, flow from improving the system to allow planes to spend less time in it. It has often been said that our planes don't make money on the ground, but it is equally true that they don't make money spending unnecessary time in the air. Shorter flight times mean fewer operational hours, which translates into reduced maintenance and more efficient crew utilization. Shortened flight times and reduced delays also make for happier customers. Happy customers translate into greater demand and when you mix that with lower operational costs you just might have the recipe for an industry turnaround.

Conclusion

In conclusion, no other industry is as conscious of energy consumption as passenger and cargo airlines. In the best of times conservation and efficiency are a way of life. In the worst of times they are a matter of survival. We are proud to tout the efficiency improvements that our members and the industry as a whole have posted over the past 30, years and we intend to keep up the pace, not just because we want to, but because we have to. But this is a cooperative effort between all participants in our nation's aviation system, not the least of which is the federal government.

With the pending reauthorization of the Airport and Airway Trust Fund this Committee has a unique opportunity to leverage advancements in technology and apply new ways of thinking in an effort to bring about long-needed changes in the way the national airspace system operates. ATA promises to continue to work with Congress and the FAA to take advantage of this opportunity, for the benefit our members, their customers and our nation's economy.

SENIOR DEMOCRATIC WHIP

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Eddie Bernice Johnson
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Opening Statement for the Honorable Eddie Bernice Johnson
House Subcommittee on Aviation
Commercial Jet Fuel Supply: Impact and Cost on the U.S. Airline Industry
Wednesday, February 15, 2006 – 2167 RHOB

Thank you Mr. Chairman.

I want to thank you and Ranking Member Costello for holding this important hearing this morning.

Obviously, a healthy airline industry is a vital component to our Nation's economy.

In my district alone, the industry's payroll impact is over sixty-two million dollars to thousands of my constituents and serves as a catalyst in the economic growth of the North Texas region.

PRINTED ON RECYCLED PAPER

Although the industry has made significant gains over the past few years, the pain currently experienced within the commercial airline industry due to staggering jet fuel cost continues to weigh the industry down.

According to the Department of Energy, the average cost of a gallon of commercial jet fuel has more than doubled since the year 2000—from 78 cents per gallon to $1.81 per gallon in January of this year.

Recent fare hikes over the past quarter have started to help airline yields, and this, coupled with a growing number of passengers flying, has started to help bolster the revenue line.

However, this positive impact has still been more than offset by rising oil prices which have continually hit new record highs in recent weeks.

As the second largest expense behind labor, fuel price's impact on profitability is significant, and has made the difference between profits and losses.

Industry officials estimate fuel costs are expected to surpass last year's cost by ten billion.

Signs of revenue recovery remain elusive, putting into doubt whether traditional carriers can turn a profit this year, or even next year. Standard and Poor's estimates that the top ten carriers lost approximately ten billion in 2004, and expects continued losses for 2005.

The airlines have responded vigorously to matters within their control. These actions have been painful for a number of parties, but none more so than the employees.

A number of industries depend on air travel for their very existence. Continued instability in the industry could have a ripple effect that would further hurt the U.S. economy.

As a result of this, it is important that we stay one step ahead of potential pitfalls that could hinder our ability as a body to act.

I welcome our witnesses this morning, and look forward to their frank assessments on the current and future implications of jet fuel prices for the aviation industry.

Thank you.

OPENING STATEMENT OF
THE HONORABLE JAMES L. OBERSTAR
AVIATION SUBCOMMITTEE HEARING
COMMERCIAL JET FUEL SUPPLY: IMPACT AND COST ON THE U.S. AIRLINE INDUSTRY
FEBRUARY 15, 2006

- I want to thank Chairman Mica and Ranking Member Costello for calling today's hearing on the *Commercial Jet Fuel Supply: Impact and Cost on the U.S. Airline Industry.* Since 2000, U.S. airlines have suffered massive financial losses due to the September 11th attacks, SARS, the Iraq war, and the unwillingness of many business travelers to pay premium fares. In total, U.S. airlines have lost over $44 billion since the beginning of 2001, and currently, there are several carriers in Chapter 11, representing roughly a quarter of industry market share in available seat miles (ASMs). Today, this Subcommittee will explore yet another factor that could surpass all others in terms of its long-term adverse affect on the industry: *rising fuel costs.*

- Mr. Chairman, this is what I had to say at this Subcommittee's last hearing on jet fuel prices in October 2000 -

  The impact of [fuel price] increases has been felt all across our economy, from food prices to home heating bills and from the gas pump to airline ticket prices. The price of crude oil has steadily increased from a low of $10 a barrel in late 1998, to a ten-year historic high of $37.80 per barrel on September 20th.

- To put today's hearing in perspective, the average price for a barrel of crude-oil in 2005 was $56 per barrel, and $72 per barrel for jet fuel. To further put it into perspective, every sustained penny increase in the price of a gallon of jet fuel results in an additional $195 million in annual fuel costs for the U.S. airline industry. Although average air fares are still lower than 2000, it has been reported that rising fuel costs led U.S. airlines to raise fares 12 times in 2005, and once so far in 2006.

- Since 2000, airlines have made strenuous efforts to drive down their operating costs, particularly labor costs. Between 2000 and 2005, Bureau of Transportation Statistics (BTS) figures reveal that labor unit costs (per ASM) for all U.S. passenger airlines have declined almost 12%. In total, U.S. passenger carriers cut labor costs by almost $3 billion between 2000 and 2005. During that period, over 140,000 airline workers have lost their jobs, thousands more have accepted pay and benefit cuts, and still thousands more have had their pensions significantly reduced.

- However, labor cuts have been more than offset by rising fuel costs. BTS figures show that between 2000 and 2005 fuel unit costs (per ASM) for all U.S. airlines have increased by 68%. In total, U.S. passenger carrier fuel costs have increased by more than $11 billion between 2000 and 2005. Fuel now accounts for almost a quarter of airline operating costs, practically equaling labor as airlines' largest operating expense.

- Furthermore, fuel unit costs have risen despite the fact that airlines are operating more efficiently through fleet changes, weight reduction and operational changes. In total, U.S. passenger and cargo airlines are projected to consume 19.5 billion gallons of jet fuel in 2005 -- 800 million gallons less than the 2000 peak. While lower consumption can be partly attributed to fewer departures, BTS figures show that in October 2005 U.S. passenger airlines on average collectively consumed 330 less gallons of fuel for every hour their aircraft were in flight compared to October 2000.

- Unfortunately, airline industry analysts predict that jet fuel will likely remain at $70 per barrel in 2006. Witnesses today will testify about structural issues within the energy sector that point to continued high fuel prices. A reduction in the number of domestic refineries and high capacity utilization rates have slimmed the margin to meet increasing demand and heightened the potential for shortages or disruption – a lesson we learned a few month ago during Hurricane Katrina.

- During Hurricanes Katrina and Rita, U.S. production of commercial jet fuel dropped almost 25%. The U.S. relied heavily on foreign imports, which more than doubled during that period, including some imports from European emergency stocks. Some have suggested that in addition to the Strategic Petroleum Reserve (SPR), which contains crude oil, the U.S. should form a "Strategic Product Reserve" comprised of refined petroleum products like jet fuel. I am interested in our witnesses' thoughts about this concept.

- Additionally, changing fuel specifications, most notably the transition to lower sulfur fuels, will make it more difficult to distribute high sulfur jet fuel. And, of course, unpredictable events, like unrest in oil producing areas or U.S. involvement in another war, could clearly influence fuel prices.

- Mr. Chairman, our greatest hope for addressing high fuel prices may lie in technological advancements both in air traffic infrastructure and in aircraft itself. Regarding infrastructure, satellite-enabled procedures and technologies like Area Navigation (RNAV), Advanced Technologies and Oceanic Procedures (ATOP) and Automatic Dependant Surveillance – Broadcast (ADS-B) will save airlines millions of dollars in fuel costs by providing more direct routing, allowing more aircraft to access the most fuel efficient routes, and enabling more efficient climb and descent patterns. The bottom line is that there is a very clear and tangible connection

between our infrastructure, airline profitability and ultimately American jobs. This Subcommittee must ensure that adequate resources are dedicated to modernizing the national airspace system.

- Likewise, many of these technologies rely heavily on advanced aircraft avionics. Airlines must continue to invest in equipment upgrades and new aircraft that will enable them to take full advantage of government infrastructure investments. Regarding new aircraft, I am pleased that we have a witness from the Boeing Company to testify about advances in aircraft manufacturing, including the use of lighter composite plastic airframes, improved aerodynamics, and innovations in engine design.

- Mr. Chairman, I look forward to hearing from our distinguished witnesses.

The Honorable Bill Pascrell, Jr.
Opening Statement
Aviation Subcommittee
Hearing on the Commercial Jet Fuel Supply: Impact and Cost on the U.S. Airline Industry
Feb. 15, 2006 at 10am

- Chairman Mica, Ranking Member Costello, I thank you for holding a hearing on the unprecedented high prices for and limited quantities of jet fuel.

- The years 2004 and 2005 exposed America's dangerous dependence on fossil fuel.

- While Americans were facing steep prices at the gas pump, a similar crisis faced the U.S. airlines that rely basic access to jet fuel. The crisis continues.

- Currently, the largest ten refiners of oil operating in the United States have control over 78% of domestic refining capacity. This level of concentration is far greater than it was a decade ago.

- U.S. airlines consume about 1.6 million barrels of jet fuel on a daily basis. That is 19.5 billion gallons per year. So, fluctuations in price have serious consequences.

- The average cost of a gallon of commercial jet fuel has more than doubled since 2000 – from 78 cents-per-gallon in January 2000 to $1.81 per-gallon in January 2006. That translates into $72 a barrel.

- While incomes of the nine integrated oil companies rose by a hefty 39% in 2004, by far the ***largest income increases have been in the independent refining and marketing segments*** which rose a whopping 190% over the same time period.

- Long before Katrina and Rita, domestic refining capacity was too low and damage to refineries and pipelines in the Gulf Coast following the hurricanes further exacerbated the problem by eliminating about 25% of daily domestic jet fuel production.

- Jet fuel production is down, not for lack of crude oil, but because refineries had little spare

capacity to refine crude oil into jet fuel. **Namely, because of a lack of sufficient refineries and the fact that refining gasoline is more profitable.**

- Last year, U.S. imports of jet fuel increased from 3.1 million barrels per month to 7.9 million barrels per month.

- **Not only do we rely on foreign countries for our crude oil, we now depend on them for refined production like jet fuel**.

- Having a reliable, stable supply of jet fuel is essential to our U.S. airline industry and our overall economy.

- During the past few years, airlines have put heavy emphasis on controlling soaring fuel through improved fleets and increased fuel.

- The FAA has sought to increase fuel efficiency through new air traffic control measures. Aircraft manufacturers have also recognized the importance of lowering fuel costs by designing new generation composite aircraft.

- I look forward to hearing from the one sector represented here that has not been involved in efforts to ensure a sufficient affordable domestic fuel.

TESTIMONY OF JOHN D. SHAGES

DEPUTY ASSISTANT SECRETARY FOR PETROLEUM RESERVES

BEFORE THE SUBCOMMITTEE ON AVIATION

COMMITTEE ON TRANSPORTATION & INFRASTRUCTURE

U.S. HOUSE OF REPRESENTATIVES

February 15, 2006

Mr. Chairman and members of the Subcommittee, I am pleased to be here today to discuss the current status of the jet fuel market. I will also discuss airline industry and infrastructure trends and their implications for the future aviation fuel market. Finally, I will address our Strategic Petroleum Reserve, its characteristics and how it has been used to protect the Nation from disruptions in petroleum supplies.

Jet Fuel

Jet fuel is refined from crude oil and is one of the products in the portion of the barrel called the middle distillates. During the most basic refining process of simple distillation, crude oil is heated in a distillation column to separate components according to their boiling points. The light products -- liquefied petroleum gases (LPG), naphtha, and so-called "straight run" gasoline – with the lowest boiling points are recovered at the top of the column. Middle distillates -- jet fuel, kerosene, diesel fuel and heating oil -- come next in the middle section of the distillation column. Middle distillates comprise about 34 percent of the total barrel in the United States, with jet fuel accounting for between four and ten percent. In the United States, Jet fuel is the third-highest product in demand

behind gasoline and diesel fuel. In addition to its primary use as a transportation fuel there is limited use as a stationary turbine fuel, and occasionally it is used to blend into heating oil to stretch supplies during periods of peak demand and very cold weather. Today almost all commercial and military jet fuel is kerosene based.

The United States domestic refining industry, which has the capacity to refine about 17 million barrels of crude oil per day, has historically been able to provide virtually all of the jet fuel needed to satisfy both commercial and military demand. However, in the aftermath of Hurricanes Katrina and Rita, as much as 5 million barrels per day of refining capacity was closed for a short time, and the U.S. refining industry was not capable of satisfying demand for major products.

Jet Fuel Markets

Commercial airlines can buy their jet fuel in several ways, including direct purchases, through consortiums or from an airport distributor. The method used depends upon the size of the airport, the extent of the airline's presence at any given location and institutional requirements at the airport. Airlines are subject to volatility in the price of fuel. In the case of airlines, fuel is usually the second biggest portion of their cost after labor, but at times it may become the biggest portion of cost, as occurred last September with the surge in jet fuel prices. The airlines can accept the risk of price volatility or they can manage the cost uncertainty by buying petroleum futures or financial derivatives.

Because gasoline and diesel fuel are the major components of demand, they drive the world's demand for crude oil, and the price of crude oil is the major determinant of the

price of jet fuel as well as those other products. Obviously, the price of crude oil is subject to many diverse forces, has been volatile, and is not easily predictable.

Although an airline might like to eliminate cost volatility by buying jet fuel for future delivery, there is no established market for jet fuel futures. The closest product to jet fuel traded on the New York Mercantile Exchange (NYMEX) is heating oil, which is not a perfect proxy for the jet fuel market. In the northern hemisphere, heating oil price fluctuates by season with an obvious winter peak. While it is not self-evident that peak jet fuel demand should coincide with peak heating oil demand, during the winter months, as refiners maximize heating oil production, the prices of all middle distillates move in relation to the severity of the winter weather. Consequently, airlines may use the NYMEX heating oil contract to hedge their jet fuel price and partially protect themselves from price volatility. Whether this is a good strategy will depend on how markets perform. For example, if an airline bought futures contracts in early 1997, it would have locked itself into relatively high costs when prices collapsed in late 1997 and 1998. However, once markets recovered and started moving up in 1999, futures prices shifted lower than current prices and remained so for five years. During that entire period, a strategy of buying heating oil futures would not only have reduced price volatility, but would have proved to be a winning strategy for reducing costs relative to simply buying jet fuel at current market prices.

Unfortunately for many of the Nation's airlines, after the events of September 11, 2001, the ability of their managers to choose to hedge was constrained by their strained financial conditions. Media reports indicated that many of the legacy carriers were not

hedged during 2003 and 2004, thus leaving them exposed to price volatility and financial risks. This exposure, along with other factors, hurt their competitive positions.

Logistics

Much domestic jet fuel and other products move from major refinery centers through multi-product pipelines to end use destinations. The largest refinery center is on the Gulf Coast, with most remaining capacity concentrated near Philadelphia, Chicago, Seattle, and California. The West Coast is isolated from the supply and distribution infrastructure of the rest of the country. As such, local refiners supply most of the jet fuel to the West Coast. The Gulf Coast refiners account for about 70 percent of the jet fuel supplied to the rest of the country outside of the West Coast. About 80 percent of Gulf Coast jet fuel production is moved out of the region, mostly via pipeline, into the Midwest and East Coast. More than three-fourths of East Coast jet fuel demand is satisfied by refiners outside of the region, mainly from the Gulf Coast, and 7 percent of East Coast demand is met from imports. Over one-third of Midwest jet fuel demand is met from Gulf Coast refiners.

The movement of jet fuel and other refined products is normally very reliable; pipeline stoppages are infrequent and short-lived. However, when much of the Central Gulf Coast was left without power following Hurricane Katrina, both the Colonial and Plantation Pipelines were incapacitated. Within weeks of the time power was restored and the pipelines were operable, Hurricane Rita caused the closure of so many refineries that there was not enough available product to fill the reopened pipelines. Fortunately, despite very low inventories at some airports, at no time did outages of jet fuel occur.

While pipeline outages are capable of causing major problems in gasoline and diesel supply, the nature of the airline industry provides some insulation from regional shortages of jet fuel. The range of modern aircraft along with their fuel storage capabilities works to limit the risk of absolute regional shortages. Airlines have shown their ability to forgo fueling their planes at airports where supplies may be low or prices too high, by carrying additional fuel for their outbound journeys. Although this may prove to be expensive for airlines and passengers, in the event of a regional supply disruption it provides an alternative to an absolute outage.

Looking towards the future, the introduction of ultra-low-sulfur-diesel fuel (ULSD) scheduled to begin this coming summer, raised concerns over the degree to which high-sulfur jet fuel might increase contamination potential for this new clean fuel. At this time, all pipelines are still planning on carrying jet fuel, but should contamination be a larger problem than anticipated, jet fuel logistics may become an issue down the road. We note the European Union required a similar change to ULSD, and while the changeover was accompanied by a price increase while the distribution system was being adjusted, the price increase was short lived. However, Europe does not rely on the extensive pipeline systems and long-distance travel from refineries to end users that the United States does.

2005 – The Hurricanes

The petroleum situation during 2005 was much different from what we have grown to expect. Recent world economic growth caused a surge in oil demand that outstripped

forecasts. Worldwide investment in oil exploration and production over the last ten years has been insufficient to maintain the wide margin of production capability above demand that we have been used to. In addition, investment in refining has lagged demand growth, in large part because of the low returns on capital that beset the industry for many years. Excess capacity has shrunk to a minimal level, and Saudi Arabia and other member countries of the Organization of Petroleum Exporting Countries currently have limited ability to increase production and rapidly stabilize or reduce oil prices. During the summer of 2005, everyone realized that fuels for heating, including distillates, would be expensive this winter. However, inventories were building and we expected to go into the winter with the best inventory picture in years.

Hurricane season changed that. In late August, Hurricane Katrina devastated the Central Gulf Coast. Barely three weeks later, Hurricane Rita did the same to the Western Gulf Coast. The impact on the domestic oil industry was significant. At its worst points, virtually all production of oil and gas from the Gulf of Mexico was halted.

The Administration responded immediately to the hurricanes by taking a number of measures to minimize the impact of the storm on energy supply including:

- The Departments of Energy and Transportation worked to get power to the interstate pipelines that were essential to ensuring adequate supplies of refined products to the southeast and east coast.
- The Environmental Protection Agency provided temporary waivers allowing the early use of winter blend gasoline.

- The Department of Homeland Security suspended legal restrictions on the use of foreign tankers in transportation of fuel supplies between U.S. ports.
- The Department of the Interior's Minerals Management Service immediately began to streamline processes for various permit approvals to resume production and expedited reviews of requests for temporary barging of oil until pipelines could be repaired.
- The Treasury Department increased the flexibility available to fuel distributors to meet diesel fuel demand by waiving penalties for highway use of "dyed" diesel fuel normally restricted to off-highway use.
- The Navy and Coast Guard worked to clear shipping channels in the Gulf and the Lower Mississippi River.

Additional facilities were subsequently shut-in due to Hurricane Rita. Approximately 100 platforms and rigs were destroyed by the storms. Shut in oil production as of February 8, was 364 thousand barrels per day, or 24.3 percent of expected daily production from the Gulf. Similarly, shut in gas production from the Gulf is 1.55 billion cubic feet per day, equal to 15.5 percent of expected production. At last report from the Minerals Management Service, the country has experienced a delay in the production of 120 million barrels of oil and 610 billion cubic feet of gas since late August 2005.

On shore, hurricane damage to refineries, gas processing plants, and power lines was equally serious. Immediately after Rita struck about 5 million barrels of daily refining capacity was shut down. While onshore pipelines were not damaged, the widespread

lack of power meant drastically reduced operations. And when the pipelines came back into service there was not enough refined product to keep them operating at capacity.

The U.S. petroleum industry has since made tremendous progress in recovering from the hurricanes, and it is a tribute to the workers in the Gulf region, many of whom lost their homes and possessions, that they have done so much to restore electricity, pipelines, refineries and producing operations to service so quickly. At this time there are still 2 refineries with about 557 thousand barrels of daily capacity that have not returned to production.

All crude and petroleum product pipelines that were affected by the Gulf Coast hurricanes are back to normal operations. While crude oil production in the Gulf of Mexico is still not back to full force, imports are more than sufficient to meet demand, and inventories of crude oil are above the average range for this time of year. Furthermore, as refineries have come back on line and product imports have continued at a high rate, gasoline and distillate stocks are now also above the average range for this time of year. In all, supply, demand and prices have largely recovered from the hurricanes.

The Strategic Petroleum Reserve Response

The experience of the 2005 hurricane season has highlighted the vulnerabilities of the Gulf Coast crude oil and product infrastructure and the value of holding strategic stocks. After Katrina came ashore on the Louisiana/Mississippi coast, the President and the

Secretary of Energy made the decision to use the Strategic Petroleum Reserve. First the Secretary used his authority to loan 9.8 million barrels of crude oil to individual refineries that were not damaged by the storms, ensuring they had timely supplies to continue operations. In addition, on September 2, 2005, the President authorized the drawdown and sale of oil from the Reserve and the Department offered 30 million barrels of crude oil for competitive sale, and eleven million barrels of oil were sold. This was the United States share of the International Energy Agency coordinated response which made 63.6 million barrels of petroleum in total available to the markets. In concert with this drawdown, the Department of Commerce waived the 30-day export licensing requirement for the corresponding import of refined product if there were a need for Strategic Petroleum Reserve crude oil to be exported for refinement.

The refined products released by the other member countries of the International Energy Agency had a very direct impact on the United States as our imports surged. This was in large part because the release of those products from strategic storage in Europe and Asia, as well as increased refinery runs in those locations, created the necessary price differentials for traders to export the products to the United States. These product imports were crucial in September to replace the products normally supplied to the East Coast from the Gulf Coast, and demonstrate the importance of cooperative responses among consuming countries.

The Strategic Petroleum Reserve

The Strategic Petroleum Reserve is comprised of four Government-owned sites storing nearly 700 million barrels of crude oil in caverns created in underground salt domes along the U.S. Gulf Coast. All sites are connected to the commercial pipelines serving the Gulf Coast and Midwest. They are also connected to marine terminals that allow the SPR oil to reach 95 percent of the Nation's refining capacity. The location of the caverns approximately 2000 feet below the earth's surface provides a secure storage environment with little vulnerability to natural or man-made dangers. The surface facilities are designed with the susceptibility of the region to hurricanes in mind. All of the critical systems are designed to withstand 150 mile per hour winds. Although Hurricane Katrina dealt a glancing blow to our storage site near Baton Rouge, that site was prepared to deliver oil within 48 hours of the hurricane passing, and most of the 9.8 million barrels of loans were delivered from that location. More seriously, Hurricane Rita passed very close to our West Hackberry, Louisiana site near Lake Charles, Louisiana, completely devastating local towns and the homes of our employees. Nevertheless, damage to the site was minimal, and as soon as roads were reopened and electricity restored, that site delivered the preponderance of the 11 million barrels of oil sold in response to Hurricane Katrina.

The Reserve's existing storage caverns were developed at a cost of $2-3 per barrel, and annual cost for operations and maintenance is $0.20-0.25 per barrel. Salt dome cavern storage is far more physically secure and cost efficient than other media such as above ground steel tanks, which cost $15-25 per barrel to construct or at least $2.50 per barrel per year to lease. All SPR sites are operational and capable of physically moving oil to

industry in as little as 24 hours. When a competitive sale is required in response to a Presidential directive, the oil can usually begin flowing in less than two weeks.

While there are periodic proposals to create strategic reserves of various refined products, the benefits of such reserves do not compare favorably to a crude oil reserve in the Gulf coast. Regional product stocks were required in the 1975 legislation that authorized the Strategic Petroleum Reserve. However, the original plan to develop the SPR prepared in 1976 substituted crude oil in central storage. The substitution was justified on the basis of cost savings.

Periodic reviews of this issue by the Office of Petroleum Reserves have found the original decision to store only crude oil continues to be valid. The low cost and flexibility of a crude oil reserve, together with a robust refining industry and logistics network to process and move stocks where most valued, are a superior strategic configuration compared to alternatives.

In general, product reserves are difficult and costly to maintain and administer, and may be ill-suited to address a supply shortage for a particular product due to specific events. While the Office of Petroleum Reserves does maintain the two-million barrel Northeast Home Heating Oil Reserve, that reserve is very small, is maintained in private facilities, and satisfies a very specific requirement for a geographically small part of the country. Crude oil strategic storage in the Gulf is the most flexible, cost effective option to protect against an array of disruption scenarios.

While the effect of the hurricanes of 2005 was devastating beyond any expectations, the Strategic Petroleum Reserve performed very well. In addition, a new appreciation of the importance of commercial power to restoring the whole petroleum industry infrastructure after disasters of this type, will cause systems to be hardened and backup systems to be in place to lessen the effect of any such future event.

This concludes my prepared testimony and I will be happy to answer any questions you may have.

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