



Let me begin by reminding you of the principal energy challenges that confront naval aviation (Figure 1). I think everyone is familiar with my first two sub-bullets, which were cited earlier by Dr. L. Dean Simmons. So, I will call your attention to the third bullet. Between the year 2000 and the year 2010, the DoD's petroleum costs more than tripled from \$3.6 billion to \$13.7 billion.

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*A native of Huntington Beach, California, Captain Randall J. Lynch attended the University of California at San Diego under the Naval Reserve Officers Training Corps and graduated in 1988 with a B.A. in U.S. history. After flight training in Pensacola, he was designated a Naval Flight Officer in March 1990 and completed three tours in the S-3A and S-3B, one as a Junior Officer, one as a Fleet Replacement Squadron flight instructor, and the third as a department head. After transition training in the EA-6B, Captain Lynch joined the Garudas of VAQ-134 as the Executive Officer, where he completed a combat deployment in support of Operation Enduring Freedom. He then led the Garudas as the Commanding Officer through the transition to the ICAP II Block III Prowler and a subsequent deployment once again in support of Enduring Freedom. While attached to the Garudas, the squadron received the Admiral Arthur B. Radford Award for Tactical Electronic Warfare Excellence. Captain Lynch's shore and non-flight-related assignments include Flag Lieutenant/Aide to the Abraham Lincoln Battle Group Commander and assignment to the Naval War College in Newport, Rhode Island, where he graduated with academic distinction and was selected as the President's Honor Graduate. He also served as the Naval and Amphibious Liaison Officer at the Combined Air Operations Center (CAOC) in Qatar and as a Joint Staff Officer at U.S. Africa Command (AFRICOM) in Stuttgart, Germany. Currently, Captain Lynch is serving as a Federal Executive Fellow at JHU/APL and is the Prospective Commanding Officer for Naval Station Great Lakes in Illinois.*

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Over that same period, however, the volume of fuel purchased increased by only 13%. The difference can be attributed solely to the increasing cost of fuel. My final sub-bullet points out that 75% of the energy consumed by the DoD is petroleum based.

• **Challenges:**

- Each Middle East “crisis” leads to rising fuel costs
- Every \$1 per barrel increase in oil equates to a \$130 million increase in the DoD’s annual fuel budget
- The Pentagon’s petroleum costs more than tripled to \$13.7 billion in 2010 from \$3.6 billion in 2000
- The volume of fuel purchased increased 13% to 118 million barrels from 104 million barrels during this same time
- >75% of energy consumed by the DoD is petroleum based

• **Increase Alternative Energy Use Navy-wide**

- By 2020, 50% of total Department of the Navy energy consumption will come from alternative sources

• **The Department of the Navy will demonstrate a Green Strike Group in local operations by 2012 and deploy it by 2016**

- Nuclear ships
- Surface combatants using biofuels with hybrid electric power systems
- Aircraft flying on biofuels



### Figure 1. Department of the Navy Energy Goals

So, what is the Navy doing in response to these challenges? The Secretary of the Navy has set two goals. First, he has directed the Navy to increase use of alternative energy, so that by the year 2020, 50% of total Department of the Navy energy will come from alternative sources. Second, the Secretary has directed the Navy to demonstrate an all-green Carrier Strike Group by 2012 and then to deploy that Strike Group by 2016. The aircraft flying from that Group are to rely on biofuels for at least half of their total fuel usage.

Overall, the Secretary and the Chief of Naval Operations have set three energy-related goals for the Navy, namely to:

- Reduce consumption
- Increase efficiency
- Increase use of alternative energy sources

To provide some perspective on what these goals might mean for naval aviation, I am going to recall my most recent experience in Afghanistan (Figure 2). As commanding officer for an expeditionary squadron of EA-6Bs, my job was to provide electronic attack coverage for U.S. and coalition forces on the ground.

- Expeditionary EA-6B Squadron
- 4–6 missions/day, 2.5–6 hours each
- Fuel from:
  - Airborne tankers
  - Over land from the Former Soviet Union and other neighbor countries
- Supply
  - Logistics challenges
  - Security
  - Cost
  - Type
  - Daily Levels?
- Realizing that logistics is still the key to delivery in this scenario, alternative fuel source(s) would provide increased flexibility and reduce some of our dependency on current supply pipelines



Figure 2. Operational Experience

We typically flew four to six missions per day, and each mission was anywhere from 2.5 to about 6 hours in duration. While airborne, we were being refueled from tanker aircraft that were flying out of former Soviet states. We were also receiving fuel from over-land sources coming in by truck. As you might suspect, that was the weak link in that chain. If you have read the press in the last 6 months, you are aware that there have been some real issues getting fuel into different countries in the Middle East. In some cases, the host nation has not allowed us to bring the fuel into country. In other cases, there have been problems at the border or with terrorists blowing up trucks. As a commanding officer, one of the things that really got my attention was when I was informed that the wing had only 8 days' worth of fuel left at one point in our deployment. If we ran out of fuel, we were going to have to cease operations. Luckily, we never got to that point, but there were several occasions when it got very close. The overall national security implications of such concerns appear obvious.

Realizing that logistics is still the key to getting any type of fuel into an expeditionary environment such as Afghanistan, alternative fuel sources would have given us increased flexibility. We would have had another source for fuel, which in my view would have made things a little bit easier for us in our daily planning and operational efforts.