# Global Energy View and Army Energy in the 21st Century

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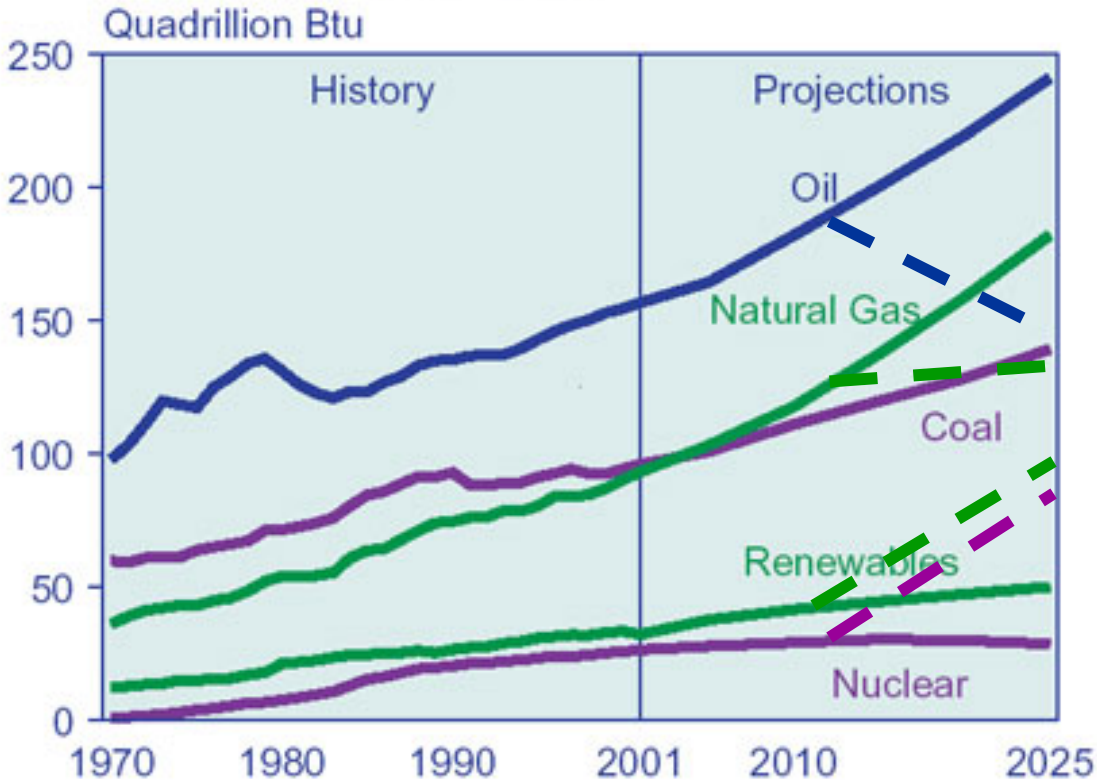
# Introduction

- World and national energy situation.
- Army energy management in the new millennium:
  - How will the Army be impacted?
  - How does that work with new goals and priorities?
  - What measures can we take?

**Figure 7. World Energy Consumption by Energy Source, 1970-2025**




Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2001*, DOE/EIA-0219(2001) (Washington, DC, February 2003), web site www.eia.doe.gov/iea/. **Projections:** EIA, System for the Analysis of Global Energy Markets (2003).

# What About the Future?

- Linkage with the environment:
  - Climate change is real and effects are already being felt.  It is best to think about adaptation and what the impact on installations will be.
  - The renewed scramble for nonrenewable fossil resources will have a large environmental impact.
  - Transitioning to ever cleaner energy sources is an historical trend that will continue (dung to wood to coal to oil to natural gas to hydrogen and renewables).
  - The Army has been part of that positive trend and needs to keep up the momentum.

# Deregulation and the Utility Mess

- The deregulated market has not been what you would call a great success:
  - Utility stocks have dropped in value twice as much as the market in general.
  - Some utilities on the verge of bankruptcy.
  - Investigations and lawsuits abound.
  - Most of the big traders have gotten out of the business and the banks are moving in.
- Texas may be the most successful, but even there problems have shown up.

# Deregulation and the Utility Mess

- Deregulation is on hold or being modified by many states.  We'll probably end up with some form of hybrid market.
- Some states are seeking a return to cost-of-service regulation with California leading the pack.
- Electric rates had been dropping anyway and deregulation is not the cause.  Reduced demand from the recession is, but we may have seen the bottom here as natural gas prices push up electric prices.
- There should be enough plant capacity with what has been built and planned to get us through the next 5 years or so (in fact plants are being mothballed).

# Deregulation and the Utility Mess

- Although plant capacity will be OK, transmission capacity is still a problem.
- Investment is not what is should be due to the unknowns of deregulation.
- Bottlenecks will cause some problems as the system is beyond its limits.
- 2/3 of the states have a problem.
- The reliability of the systems is causing major concerns.

# What About the Future?

- Programmatic issues:
  - New baseline and goals (HR6/S14)
  - Army Barracks and Family Housing Construction Programs
  - The cost of efficiency
  - Residential Communities Initiative

# New Baseline and Goals

- House and Senate have agreed on federal issues for baseline and goals:
  - FY 2000 or 2001 will be new baseline (97 kBtu/sf or 94 kBtu/sf).
  - Goals are 2% per year reduction FY 2004 to 2013 (78kBtu/sf) – assuming same Army square footage this is a 17 TBtu delta.
- Act now in committee, will it pass?  Hmmm.

# Barracks Upgrade and Barracks Complex Construction Impact

| FY | $M | Sq Ft | Mbtu Savings |
|---|---|---|---|
| 99-01 | 2,004 | 2,647,392 | 173,409 |
| 02 | 700 | 1,930,608 | 126,055 |
| 03 | 835 | 2,220,984 | 143,006 |
| 04 | 807 | 1,926,684 | 126,219 |
| 05 | 758 | 1,926,684 | 126,219 |
| 06 | 791 | 1,489,812 | 96,821 |
| 07 | 800 | 1,730,484 | 112,077 |
| | 6,695 | 13,872,648 | 903,807 |

# Housing Construction Impacts

| | | | New Units | Sq. Ft. | Annual Energy Savings per Base (Mbtu) |
|---|---|---|---|---|---|
| 2001 | | | | | |
| | | FT CARSON | 2,663 | 4,260,800 | **46,869** |
| | | FT HOOD | 5,912 | 9,459,200 | **(457)** |
| | | FT LEWIS | 3,982 | 6,371,200 | **94,113** |
| | | FT MEADE | 3,170 | 5,072,000 | **20,288** |
| 2002 | | | | | |
| | | FT BRAGG | 4,744 | 7,590,400 | **30,362** |
| | | FT CAMPBELL | 4,240 | 6,784,000 | **155,397** |
| | | FT IRWIN | 2,755 | 4,408,000 | **(46,535)** |
| | | FT POLK | 3,648 | 5,836,800 | **(58,368)** |
| | | FT STEWART | 2,927 | 4,683,200 | **(17,157)** |
| | | FT EUSTIS | 1,115 | 1,784,000 | **7,116** |
| | | PRESIDIO OF MONTERE | 2,276 | 3,641,600 | **71,556** |
| | | FT BELVOIR | 2,070 | 3,312,000 | **52,992** |
| | | FT HAMILTON | 436 | 697,600 | **3,494** |
| 2003 | | | | | |
| | | FT DRUM | 2,272 | 3,635,200 | **93,654** |
| 2004 | | | | | |
| | | CARLISLE BARRACKS | 315 | 504,000 | **17,369** |
| | | FT BLISS | 2,763 | 4,420,800 | **(26,525)** |
| | | FT LEONARD WOOD | 2,472 | 3,955,200 | **95,652** |
| 2005 | | | | | |
| | | FT BENNING | 4,109 | 6,574,400 | **3,710** |
| | | FT GORDON | 876 | 1,401,600 | **16,819** |
| | | FT LEAVENWORTH | 1,586 | 2,537,600 | **28,573** |
| | | FT RUCKER | 1,516 | 2,425,600 | **(14,475)** |
| | | | | Grand Total | **574,446** |

# Funding Energy Projects

- Something has to give on funding issues. Costs to save a TBtu is:
- 17 TBtu must be saved.
- You do the numbers.
- Program funding is necessary to meet goals (which will be law not EO).

| | |
|---|---|
| New Construction | $10M |
| Retrofits | $51M |
| Renewables | $68M |
| ESPC (past) | $150M |
| Super ESPC | $120M |

17 TBtu = $2.55 Billion under present paradigm

# Residential Communities Initiative

- Family housing is the most efficient square footage (~70kBtu/sf).
- 58% percent of the inventory to be privatized (71,790 units).
- This will raise havoc with the baseline unless units are either removed from the 2000/2001 baseline or kept in DUERS for energy tracking purposes.  Doing nothing will result in about a 5% increase in kBtu/sf.

# Army Energy in the New Millennium

- Management opportunities:
  - Make energy management part of the bigger picture of installation management and the transition to sustainable installations. Energy management must now be more than just goals, it must include security, reliability, resilience, & efficiency.
  - Ensure a revitalized and more visible program meshes with other ongoing programs for modernization and security.
  - Establish a High Performance Workplace Initiative to rebuild the Army infrastructure not covered by the Army housing and barracks master plans. Bring all buildings to SPiRiT Silver or Gold.

# Army Energy in the New Millennium

- Management opportunities (cont):
  - Establish an installation energy management protocol based upon a recognized standard such as Georgia Tech's Management System for Energy 2000 (ANSI/MSE 2000).
  - It will be the management process that produces the desired outcomes.
  - MSE 2000:
    - Proactive system.
    - Combines technical aspects with effective management.
    - Mandates continuous improvement.
    - Defines an ordered structure of management without being bureaucratic or stifling innovation and initiative.
    - Similar to ISO 9000 and ISO 14000.

# Energy Initiatives

- Develop initiatives for effective funding or focus current funding for energy efficiency and high performance buildings:
  - High performance buildings retrofit program.
  - High performance central utilities/decentralization initiative.
  - Advanced metering and energy analysis techniques initiative (metering will be required anyway).
  - New technology infusion initiative for renewables and distributed generation.
  - Energy resiliency program – storage, diversity, combined heating and power, and energy web initiatives.

# Army Energy in the New Millennium

- Technological Opportunities:
  - Use a revitalized energy program to move us toward a high performance built environment.
  - New smart technologies are out there and need to be incorporated both into new construction and retrofits and revitalizations.
  - New construction needs enhanced energy requirements – 30% better than IECC for housing and 30% better than ASHRAE 90.1 and 90.2 for other buildings (will be required under EPAct 2003).
  - A bolder technical approach is required:
    - Advanced technology
    - Emphasis on renewable energy
    - Life cycle costing
    - SPiRiT at high point levels

# Army Energy in the New Millennium

- Program integration:
  - Each installation needs a strategic energy plan balanced with all the other programs with a vision that has short, mid, and long term goals.
  - All parts of the program must mesh.
  - Installation strategic energy plans must be rolled up into regional plans and then to an overall Army plan. Target goals can then be addressed where they make sense.
  - Funding must be adequate for thoughtful planning and establishing a management program with teeth both regionally and installation specific.
  - The IMA funding process should make more project money available – it must be spend in a sensible manner that gives long term results – this means oversight and planning.

# Army Energy in the New Millennium

- Program integration (cont)
  - The MCA program will be crucial to achieving effective results. Business as usual will not make the goals. We need truly high performance, safe buildings that make maximum use of passive tempering, renewables, and advanced technology.
  - The private sector must be employed in mutually advantageous ways.
    - ESPC, EUL, UESC enhancement and effectiveness
    - Grant programs

# Conclusions

- It is a changing world and we are entering unstable times.
- Comprehensive approaches are required – integrated resource planning.
- Piecemeal approaches will lose their effectiveness over next few years as existing ESPCs play out and funding remains scarce -- comprehensive, top driven regional approaches are required.
- The time is right, the organizational structure is right, so now is the time to enhance the Army's energy management process.