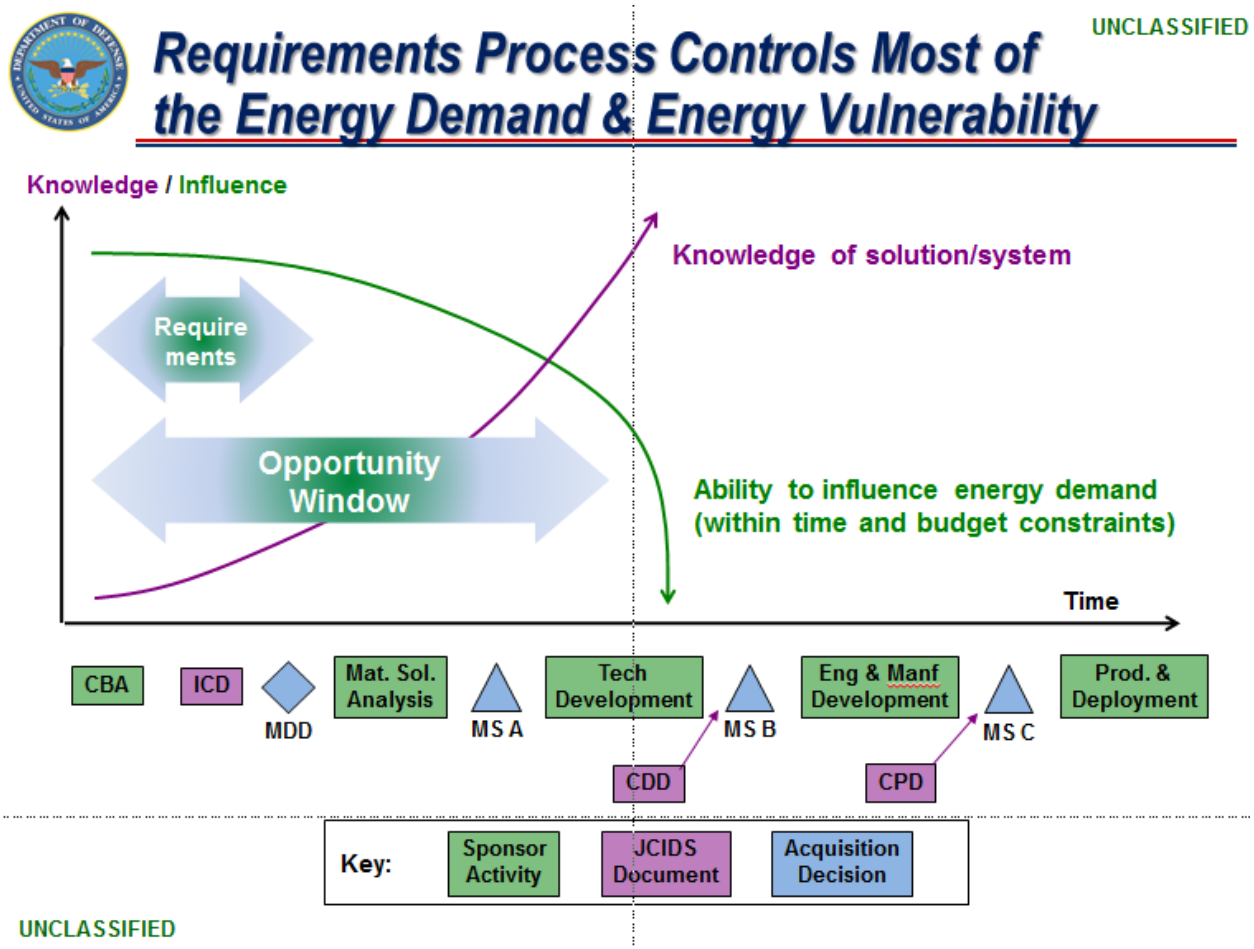
An Overview of the Energy Key Performance Parameter (KPP)
By Alan Bohnwagner | December 09, 2013

Editor's Note: This is the first part of a two part series on addressing fuel logistics in DoD's requirements and acquisition processes.

The Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 introduced the concept of an energy efficiency key performance parameter. Section 332 directed "The Secretary of Defense shall develop and implement a methodology to enable the implementation of a fuel efficiency key performance parameter in the requirements development process for the modification of existing or development of new fuel consuming systems."



Since 2009, the Department of Defense has expanded the concept beyond efficiency to one that looks at energy holistically. We've done this to better account for the increased capabilities of new weapons systems (think ships, planes, and combat vehicles among others). A pure "energy efficiency" approach would make it difficult to compare, for example, a platform built using the requirements and technology from 1980s to a platform built using the requirements and technology of today. The threat has changed, technology has changed, and our ability to harness that technology has changed.

The Joint Staff's JCIDS Manual, (updated 12 Feb 2015) which guides development of requirements in future systems, reads, "The intent of the Energy KPP is to optimize fuel and electric power demand in

capability solutions as it directly affects the burden on the force to provide and protect critical energy supplies" and "The purpose of the Energy KPP is to address growing threats against the provisioning of energy to systems (forces) during operations while sustaining the capabilities required by the operational commander."

More simply put, the energy KPP tries to address these questions: can this platform successfully perform its mission as intended and is it sustainable using planned force structure, CONOPS, and TTP (tactics, techniques, and procedures)?

There are two steps to determining the energy KPP for a new or updated platform. Step 1 is the most difficult; assessing the supply chain capacity and the energy demands for the **full "unit of maneuver"** (i.e. a brigade combat team in the Army) where the platform will be employed. For this step, the Service must determine, using scenario-based analysis, how much energy is needed for the unit of maneuver to conduct its combat mission. **This operational scenario should be stressing, of sufficient duration to require at least one refueling operation, allow for RED combat force action on BLUE's logistical tail and other logistic constraints (e.g. choke points), and account for the attrition (combat and non-combat) of both combat and support forces**. The analysis should use current or projected force structure, planning factors, CONOPS, TTP, etc. to determine both the supply chain's capacity to move energy forward and demand patterns. Finally, the analysis should determine the percentage of fuel available in the supply chain that will be apportioned to the legacy platform.

Step 2, which is simpler, determines the energy performance factors of the new platform in familiar terms, such as miles per gallon or gallons per hour. That metric is then compared to what the supply chain can deliver (the apportioned fraction of the supply chain capacity). If the new platform can perform using the apportioned fuel, the analysis is complete. However, if the new platform uses more fuel than is available, the Service needs to then determine how to provide that additional fuel. There are several options: require the new platform to improve its performance, change the force structure to increase the capacity of the fuel resupply assets and personnel, or change the CONOPS or TTP to decrease fuel consumption in the rest of the unit of maneuver.

This 2-step process is extremely important. Many new platforms have additional capabilities, but they may also consume much more fuel, in some cases as much double the legacy platform. Analyzing each platform in isolation will not fully identify the impact of growing fuel demand on operational effectiveness. Unresourced increasing demand will negatively impact war plans and contingency plans. Fully characterizing the impact of increased fuel demand allows the Combatant Commands to work with the Services to balance the total demand required and with the capacity to get that fuel into the theater and distributed to the various combat units.

Recently I presented a briefing to the Defense Acquisition University on the Energy KPP. The Power Point slide above show when analysis of Energy KPP is most effective (earlier is better), and those areas bolded in this article highlight critical factors considered when calculating Energy KPP.

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