

Military Power and Energy Model (MPEM)



MPEM is an enumerative simulation that enables logisticians, planners, and wargame participants to calculate energy consumption of a force. It does so by examining the inventory of fuel and electricity consuming assets deployed by each unit while accounting for the operational and environmental factors that drive changes in each unit's individual fuel demand.

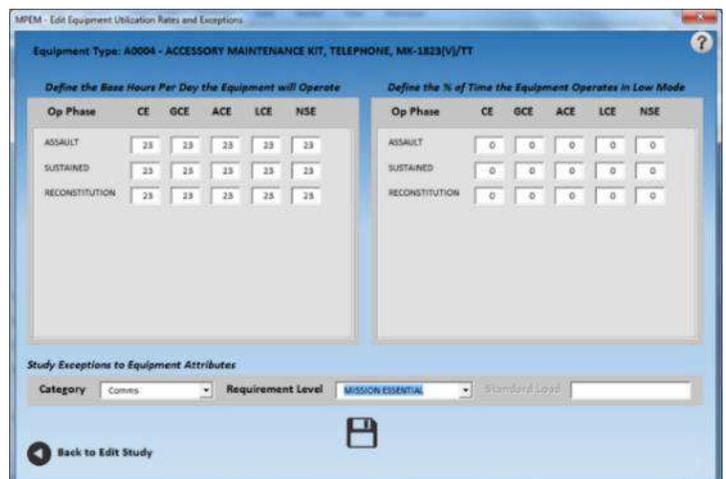
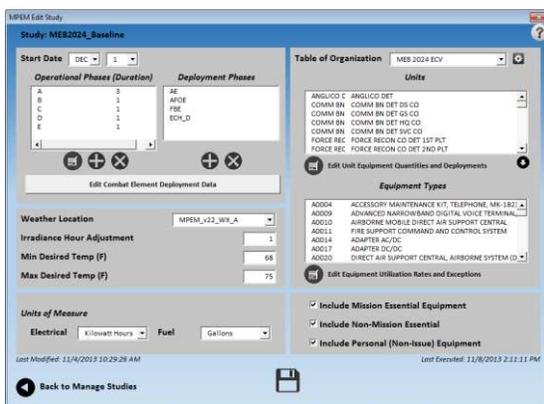
With minimal training, MPEM users can quickly quantify battlefield energy consumption of individual units, unit types, battlefield zones, equipment categories or any other desired grouping while varying factors such as force task organization, unit personnel quantities, unit equipment quantities, operational tempo and equipment usage rates. This enables estimation of the energy impacts of force structure and maneuver decisions, thereby assisting in exercise or operational planning by providing more accurate estimates than found in historical planning factors.



MPEM's conceptual model, where a specific scenario is instantiated and executed



MPEM is non-proprietary and owned by the government. It is written in Visual Basic for Applications (VBA), and delivered via an MS Excel file. It requires no installation by users who possess Excel. MPEM contains a graphical user interface that provides users efficient navigation of the model. The following images present example screenshots of MPEM's user interface.





By accounting for force build up in an Area of Operations from a by-system, by-day perspective and accounting for the major drivers of energy consumption, MPEM forecasts energy demand more accurately than traditional methods.

Fuel Calculation Example 					
Type	Qty	Fuel Burn Rate	Utilization Rate	Idle Rate	Energy Demand
HMMWV	3	5 gallons/hr	6 hours/day	0%	90 gallons
Lawn Mower	1	1 gallons/hr	2 hours/day	0%	2 gallons
Total					92 gallons

Electrical Calculation Example 					
Type	Qty	Power	Utilization Rate	Idle Rate	Energy Demand
Laptop	2	65 watts	23 hours/day	0%	2,990 watt hours
Lighting	4	60 watts	12 hours/day	0%	2,880 watt hours
Total					5,870 Wh (5.87 kWh)

Fuel Calculation Example			
Type	Qty	Unit Demand	Total Demand
Engineers	2	92 gallons	184 gallons

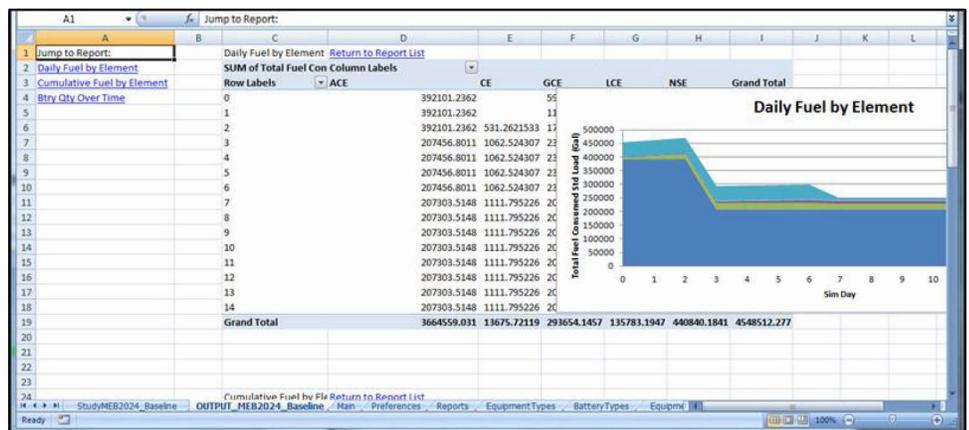


Electrical Calculation Example			
Type	Qty	Unit Demand	Total Demand
Infantry	3	5.87 kWh	17.61 kWh



PROJECT STATUS:

MPEM is a fully functional model containing a generalized set of consumption data that can be refined by the user. It has been used to estimate the impacts that future systems will have on force fuel demand in support of system energy KPP analysis. MPEM user training has been provided to the MAGTF Staff Training Program (MSTP) instructors and a mobile training team can train key MARFOR staff members on the use of MPEM during exercise planning and OPLAN supportability analysis. Group W, Inc. is the developer and supports the maintenance and upkeep of the model and data.



DEMO VIDEO:

<https://youtu.be/lw2-CNr7XC8>

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