

Sustainability Compliance Value Management



Bioengineering
GROUP
Building Sustainable Communities
on an Ecological Foundation

Bioengineering Group is experienced with a method for accelerated attainment of key energy, water, and waste management objectives in connection with installation sustainability and net-zero performance using a **tailored Value Management process**. This approach not only achieves cost savings, but also results in improved compliance with key legal and policy requirements, often improving livability and environmental impacts—offering truly sustainable Triple Bottom Line solutions. We stand ready to build on recent successes **to aid installation managers in solving current problems rapidly**.

Problem 1 – Planned one way and now expected to deliver another.

Often facilities were planned and budgets were established before design standards (such as Guiding Principles in High Performance and Sustainable Buildings, USGBC LEED Silver, ASHRAE 189.1, etc) became mandates. The performance requirement now exists, but the planned approach falls short of delivering it, leaving an accountability gap that is just becoming recognized within the military Service Branches. Value Management can be tailored to provide a just-in-time course correction, even quite late, including during the advanced phases of construction.

Problem 2 – Planning individual buildings misses the opportunity to capture performance synergies.

Most frequently each building stands alone as a construction contract, often driven by separate funding sources, end users, or schedules. However, efficiencies can be achieved by considering how a current batch of buildings can be coordinated. In one recent case, beneficial changes to buildings (combined multi-story rather than sprawling separate structures) saved construction cost and future energy consumption while also making the base more walkable. The bottom line is that the savings allowed **existing appropriations** to address adding newly identified renewable energy development on base.

Problem 3 – Buildings and infrastructure are addressed separately, without accessing potential efficiencies.

One well-documented approach to reducing energy demand from buildings is through district heating and cooling systems, especially those featuring use of ground source geothermal resources with **energy reductions of 30 to 70 percent being common**. However, use of geothermal systems is routinely dismissed when it fails to make economic sense for one sole building, or when a shared system would be redundant with the existing mechanical systems already paid for. Thermal resources from treated wastewater nearly always fail to become utilized for their heating and cooling value, despite robust return periods and excellent environmental footprints.

Our expertise includes:

- Energy Policy Act of 2005 (EPA Act 2005)
- Energy Independence and Security Act of 2007 (EISA 2007)
- Executive Orders 13423 and 13514
- ASHRAE 189.1 (2013)
- LEED Certification
- NPDES Phase II Compliance
- Sustainable Site Initiative
- Net-Zero Initiative
- Integrated Resource Management for Energy/Water/Waste
- Life Cycle Cost Analysis

Our professionals include:

- Geotechnical/Geothermal, Structural, Mechanical, and Civil Engineers
- Water Resources Engineers
- Building Science Professionals
- Building Energy Modelers
- Landscape Architects
- LID and Pre-Development Hydrology Designers
- Renewable Energy Planner/Designers
- Relevant Specialized Cost Estimators
- Certified Value Specialists
- Policy Experts
- Trained Facilitators

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OUR APPROACH

Our firm has deployed diverse methods for supporting elements of DOD's sustainability mission in practical ways. Most recently, having been involved in USACE-funded research through ERDC-CERL to investigate ultra-low energy consumption patterns with the greatest merit on military installations, **we identified several highly applicable, yet underutilized, practices.** Additionally, we have studied results of multiple facilitated sessions through SAME which fostered candid sharing of insights on the **common obstacles to achieving sustainable design, construction, and operations** on military installations, as understood by seasoned government and industry leaders.

In our recent Value Management Study assignments for diverse military clients, we have been able to refine and tailor a methodology allowing us to use existing financial resources and contract vehicles for conducting energy efficiency and renewable energy compliance assessments and to prepare well supported recommendations. Our science, policy, and engineering experts were part of the large teams of installation personnel, researchers, Design-Build contractors, and other stakeholders that spent up to a full week assessing an entire installation, or even multiple installations.

The approach starts by ensuring all participants understand not only the construction program details, including current status and identified issues. Also, key mandates required to ensure the entire installation and its command structure are fulfilling all requirements for compliance, including supporting agency-wide objectives are explained. Often there are key gaps in understanding this essential information.

Next, problems and opportunities are explored through functional analysis techniques. During the process, stakeholders are solicited to generate "out of box" ideas. Subsequently in breakout groups, ideas are developed and critically evaluated based on life cycle costs and overall value.



Area-wide VM study for demonstrating EISA compliance of 14 ongoing projects yielded building cost savings sufficient to cover adding renewable energy at Fort Campbell



When building energy demand is reduced, renewable energy scale and cost can be substantially smaller than often presumed

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The life cycle cost analysis component is weighted heavily in order to capture realistic and probabilistic operational costs over the expected life, while also furnishing first costs that were acceptable and feasible. Recommended solutions typically are able to allow construction of individual buildings to proceed without failing to comply with all the regulations and goals that had previously been unrecognized at the building, cluster, and installation scale.

This approach has been used on single buildings, clusters of buildings, including barracks, battalion and brigade headquarters, administration, and maintenance facilities. It has been used on buildings that are in early design stages, late design stages, or during construction or even building commissioning. Perhaps more significantly, it has proven fruitful to allow an integrated and coordinated study of an entire area within an installation, and even been used successfully across a multi-state region encompassing Army, Navy, Air Force, GSA, and DOE facilities and stakeholders.

In the end, savings drive the process, consistent with the long-proven track record of Value Management in delivering reduced cost balanced with improved performance. The key feature here is **addressing the complex and rapidly evolving sphere of regulations and policies** driving planners, designers, and managers towards **adopting often unfamiliar sustainable energy and water management methods**. Value Management is a fast, accessible, and proven tool for addressing sustainability compliance on military installations.



Educating team members hands-on about best practices and proven successes increases awareness, comfort level, and motivation.



Regional Scale VM study for large-scale renewable energy development on federal lands established action plan for four Pacific Northwest states

bioengineering.com

Salem, MA (HQ)
978-740-0096

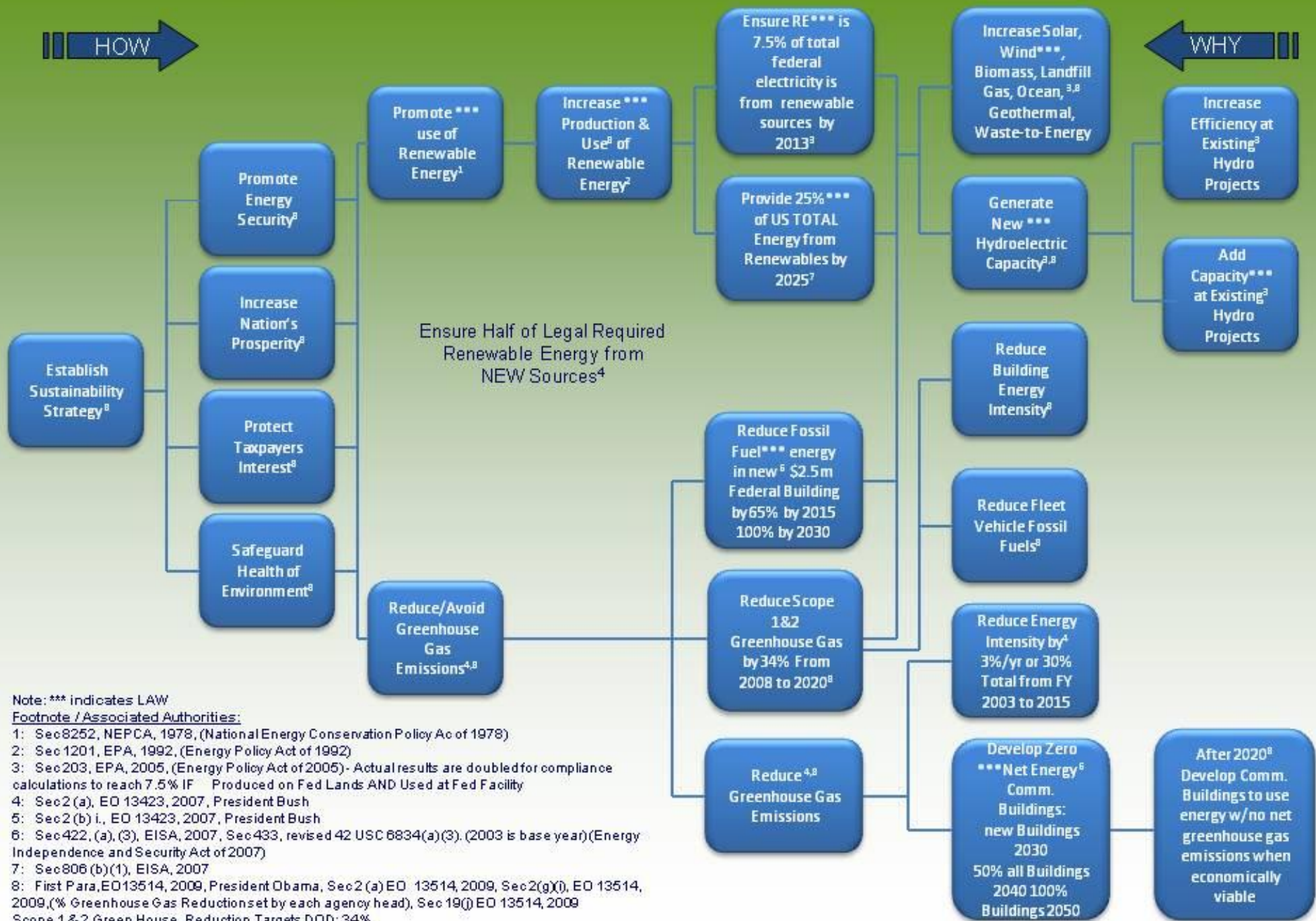
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Value Management/Value Engineering "FAST" Diagram for Energy Compliance, as of June 2011



Note: *** indicates LAW

Footnote / Associated Authorities:

- 1: Sec 8252, NEPCA, 1978, (National Energy Conservation Policy Act of 1978)
- 2: Sec 1201, EPA, 1992, (Energy Policy Act of 1992)
- 3: Sec 203, EPA, 2005, (Energy Policy Act of 2005)- Actual results are doubled for compliance calculations to reach 7.5% IF Produced on Fed Lands AND Used at Fed Facility
- 4: Sec 2 (a), EO 13423, 2007, President Bush
- 5: Sec 2 (b) i., EO 13423, 2007, President Bush
- 6: Sec 422, (a), (3), EISA, 2007, Sec 433, revised 42 USC 6834(a)(3). (2003 is base year)(Energy Independence and Security Act of 2007)
- 7: Sec 806 (b)(1), EISA, 2007
- 8: First Para, EO 13514, 2009, President Obama, Sec 2 (a) EO 13514, 2009, Sec 2(g)(i), EO 13514, 2009, (% Greenhouse Gas Reduction set by each agency head), Sec 19(j) EO 13514, 2009 Scope 1 & 2 Green House, Reduction Targets DOD: 34%