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From Policy to Compliance: Federal Energy Efficient Product Procurement

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Energy Technologies Area

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Executive Summary

Federal buyers are required to purchase energy-efficient products in an effort to minimize energy use in the federal sector, save the federal government money, and spur market development of efficient products. The Federal Energy Management Program (FEMP)'s Energy Efficient Product Procurement (EEPP) Program helps federal agencies comply with the requirement to purchase energy-efficient products by providing technical assistance and guidance and setting efficiency requirements for certain product categories. Past studies have estimated the savings potential of purchasing energy-efficient products at over $500 million per year in energy costs across federal agencies.[1] Despite the strong policy support for EEPP and resources available, energy-efficient product purchasing operates within complex decision-making processes and operational structures; implementation challenges exist that may hinder agencies' ability to comply with purchasing requirements. The shift to purchasing green products, including energy-efficient products, relies on "buy in" from a variety of potential actors throughout different purchasing pathways. Challenges may be especially high for EEPP relative to other sustainable acquisition programs given that efficient products frequently have a higher first cost than non-efficient ones, which may be perceived as a conflict with fiscal responsibility, or more simply problematic for agency personnel trying to stretch limited budgets. Federal buyers may also face challenges in determining whether a given product is subject to EEPP requirements.

Previous analysis on agency compliance with EEPP, conducted by the Alliance to Save Energy (ASE), shows that federal agencies are getting better at purchasing energy-efficient products. ASE conducted two reviews of relevant solicitations for product and service contracts listed on Federal Business Opportunities (FBO), the centralized website where federal agencies are required to post procurements greater than $25,000. In 2010, ASE estimated a compliance rate of 46% in 2010, up from an estimate of 12% in 2008.

Our work updates and expands on ASE's 2010 analysis to gauge agency compliance with EEPP requirements. We analyzed a dataset of 765 solicitations posted to FBO during the federal fiscal year 2015 and developed two metrics to evaluate compliance: legal and effective. Legal compliance measures whether a solicitation has met a minimum standard of compliance with EEPP mandates, while effective compliance is a more subjective measure that goes beyond legal compliance to assess the likelihood of a given solicitation's leading to a compliant purchase. Our results reveal:

- There is significant missed opportunity for achieving energy savings in the federal government
- Federal compliance with EEPP is below 50%, suggesting that strong policy is insufficient to ensure compliance
- The variation within both agency-level and office-level compliance highlights that there are institutional features that improve or hinder the ability to comply
- If a product category is covered by ENERGY STAR it is more likely that the agency will receive an efficient product than if the product category is covered exclusively by FEMP
- Effective compliance is achieved differently for various solicitation types, and messaging and materials directed at federal agencies should address these differences

[1] Taylor, Margaret and K. Sydny Fujita. 2012. "Program Potential: Estimate of Federal Energy Cost Savings from Energy Efficient Procurement." Lawrence Berkeley National Laboratory. $559 million in estimated annual savings is from "full compliance" scenario, p 6.

Energy-efficient product procurement in particular and sustainable acquisition more generally are two of many federal goals competing for time and resources. Efforts to understand what structural factors can easily improve compliance without additional burdens on staff will be critical in improving compliance. To that end, we intend to continue this research by conducting in-depth interviews with federal contracting officers and other staff to unravel the systems that lead to higher or lower compliance rates. We expect that this analysis and our continued work will be useful to federal organizations providing guidance to agencies and others working to implement sustainability goals within institutions.

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Introduction

Federal agencies are required by law to purchase energy-efficient products, but there remains uncertainty as to how often federal buyers actually purchase energy-efficient products. This section: outlines the Federal Energy Management Program (FEMP)'s Energy Efficient Product Procurement (EEPP) program that supports federal agencies in complying with requirements to purchase energy-efficient products, discusses challenges that federal buyers face in procuring efficient products, examines past work on compliance with EEPP mandates, and provides a brief overview of our project goals.

Energy-Efficient Product Procurement (EEPP)

The federal government is one of the largest purchasers of goods and services as well as the nation's largest consumer of energy[2]. Since the early 1990s federal agencies have been required to purchase energy-efficient products. The EEPP program has a number of goals, including minimizing energy consumption in the federal sector, saving the federal government money, and spurring market development for more efficient products. Past studies have estimated the savings potential of purchasing energy-efficient products at over $500 million per year in energy costs across federal agencies.[3]

Although purchasing energy-efficient products is one of many sustainable acquisition requirements[4] with which federal agencies must comply, it has a particularly long-standing and strong policy basis. Currently, five legal authorities require agencies to purchase energy-efficient products: The Energy Policy Act of 2005; the Energy Security and Independence Act of 2007; Federal Acquisition Regulation (FAR) Part 52.223-15; Executive Order (E.O.) 13693: Planning for Federal Sustainability in the Next Decade; and E.O. 13221: Energy-Efficient Standby Power Devices. [5] FEMP's EEPP program establishes guidance for agencies on how to purchase energy-efficient products. For product categories covered by ENERGY STAR (typically residential appliances, electronics, lighting, heating, and cooling products and commercial food service equipment), agencies can comply with the EEPP requirement by purchasing ENERGY STAR-qualified products. FEMP also sets minimum efficiency requirements for a number of other product categories, which are typically commercial products not covered by ENERGY STAR. For these product categories, agencies must purchase products that meet the FEMP-designated efficiency levels.[6] FEMP provides product overview documents on its website to provide purchasing guidance for both ENERGY STAR and FEMP-designated product categories. Additional resources and tools to support sustainable acquisition are provided through the Environmental Protection Agency (EPA), FedCenter, and GSA's Green Procurement Compilation (GPC).

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[2] United States Department of Energy. Office of Energy Efficiency & Renewable Energy. "Government Energy Management." Visited October, 2015. http://energy.gov/eere/efficiency/government-energy-management

[3] Taylor, Margaret and K. Sydny Fujita. 2012. "Program Potential: Estimate of Federal Energy Cost Savings from Energy Efficient Procurement." Lawrence Berkeley National Laboratory. $559 million in estimated annual savings is from "full compliance" scenario, p 6.

[4] Sustainable acquisition product categories: energy-efficient; water-efficient; bio-based; environmentally preferable products (EPP); non-ozone depleting; and recycled content

[5] Agencies can request an exception from this requirement if there is not a sufficient number of companies to make the procurement competitive, or if the product will not be lifecycle cost-effective in the given application (e.g., if it is a backup appliance that will not be frequently used).

[6] FEMP-designated and ENERGY STAR-qualified covered product categories include chillers, boilers, and other products that contribute to a building's overall energy use. A full list of covered products is available on the FEMP website: http://energy.gov/eere/femp/find-product-categories-covered-efficiency-programs

CHALLENGES TO EEPP

Despite the strong policy support for EEPP and resources available, energy-efficient product purchasing operates within complex decision-making processes and operational structures; implementation challenges exist that may hinder agencies' ability to comply. One example of the complexity involved in purchasing efficient products is that the pathways vary depending on price and quantity of the product being purchased. Relatively small purchases of energy-consuming products are made through direct pathways: purchase cards (p-cards, like a company charge card), and e-retailers (e.g., GSA *Advantage!* and DLA EMall). Larger purchases are usually made through indirect pathways that involve procurement officials: purchase orders, product contracts, and service contracts.[7] Please see Appendix C for a flowchart of the purchasing pathways. Each of these pathways may include any number of barriers to EEPP and sustainable acquisition more broadly, and may involve any number of parties with responsibility for ensuring the sustainable acquisition requirement is met. For example, a buyer shopping on GSA *Advantage!* may have to go through additional steps to identify and purchase green products. Or, in the case of product contracts, the person who has requested the product may not be aware of a sustainability requirement and have specified a non-compliant product. The procurement official, who has the responsibility both to comply with procurement requirements and satisfy the needs of the end-user, may not wish to override what the end-user has asked for. In both of these cases and numerous others, sustainable acquisition entails a change to the default process for evaluating and procuring products. The default tends to be a preference for products with the lowest first cost rather than those that may have other desirable attributes (e.g., bio-based content) or products that are actually cheaper when looking at the cost over the entire life of the product.

The shift to purchasing green products, including energy-efficient products, relies on "buy in" from a variety of potential actors throughout the different purchasing pathways. Challenges may be especially high for buyers of efficient products because efficient products almost always have a higher first cost than non-efficient ones, which may be perceived as a conflict with fiscal responsibility or problematic for federal buyers trying to stretch their budgets. Federal buyers may also face challenges in determining whether a given product category is subject to EEPP requirements, and this challenge may be greater for EEPP than other sustainable acquisition programs. For instance, in the case of purchasing products with recycled content, identifying that paper is subject to the requirement is straightforward since it is relatively well known that paper products can be made with recycled content. By contrast, energy efficiency requirements apply to expensive and technically complex products such as chillers and boilers, and two models of the same product type may be subject to different efficiency requirements, or have no applicable requirement, depending on size and other technical features.

If agencies do not purchase efficient products, they miss opportunities for cost and energy savings and meeting greater sustainability goals like reduced greenhouse gas emissions. Despite the value of EEPP and known challenges, a comprehensive and current assessment of the level of compliance is non-existent. Understanding why federal agencies fail or succeed in meeting EEPP requirements can provide insight into how both public and private organizations can structure their operations to achieve energy efficiency and other sustainability goals.

[7] Taylor, Margaret and Sydney Fujita. "Who Buys What? Understanding Federal Procurement of Energy Efficient Products." Lawrence Berkeley National Laboratory. 2012. p 3-8.

Past Work in this Area

Previous analysis on EEPP compliance conducted by the Alliance to Save Energy (ASE) shows that federal agencies are getting better at purchasing energy efficient products. ASE conducted two reviews of relevant solicitations for product and service contracts listed on Federal Business Opportunities (FBO), the centralized website where federal agencies are required to post procurements greater than $25,000. ASE defined a solicitation as "compliant" if it contained any reference to EEPP policies or guidelines. In 2010, ASE estimated a compliance rate of 46%, up from an estimate of 12% in 2008. [8] Although the FBO website, and therefore the analysis, only represents one pathway for the purchase of energy-consuming products, it captures large purchases and is a useful dataset due to its accessibility and aggregation of purchases across agencies.

Project Overview

Our work updates and expands on ASE's 2010 analysis to gauge agency compliance with EEPP requirements. We conducted a deep dive into agency purchasing patterns on FBO, examining product category, solicitation type, overall agency trends, and even performance at different offices within the same agency. With a deeper understanding of EEPP and a mechanism for ongoing monitoring of agency performance, efforts to improve compliance rates can be more informed and tailored. We provide the basis for future analysis on the institutional factors that hinder or are conducive to fulfilling the requirement to purchase energy-efficient products. These lessons may apply more broadly to other sustainable acquisition programs and institutional sustainability goals overall. This paper discusses the project method in detail, presents findings, and concludes with a discussion of the implications of these results for policy interventions and future research.

Method

We conducted a review of solicitations posted to the Federal Business Opportunities (FBO) website in fiscal year 2015. This section discusses our data source, data selection procedure, and our method for reviewing and evaluating solicitations.

Data Source

Federal agencies procure goods and services through numerous solicitation channels. For procurements over $25,000, agencies are typically required to post acquisition information to the centralized FBO website. We used solicitations posted to FBO as a dataset to analyze procurement activity and EEPP compliance in the federal sector. Procurement postings to FBO originate as one of nine generic types:

1. sources sought
2. presolicitation
3. combined synopsis/solicitation
4. award notice
5. fair opportunity/limited sources justification
6. modification/amendment/cancellation
7. special notice
8. justification and approval, or
9. sale of surplus property.

[8] Siciliano, Graziella. "2010 Review of Federal Agency Compliance with Energy-Efficient Procurement Laws." Alliance to Save Energy. 2010. p 3.

To obtain data, we utilized an XML file available from FBO that captures daily activity. Posts are identified by their type and include any modifications.[9]

Data Selection Procedure

There are thousands of solicitations and other notices posted to FBO each day, the vast majority of which do not include any energy-consuming products. Unfortunately, these posts do not necessarily broadcast whether they include a covered product category or not. We therefore developed a set of search criteria, detailed in Appendix A, to identify those solicitations that are most likely to be relevant for this project. Our search agents are based on the FEMP-designated and ENERGY STAR covered product categories and are designed to identify specific covered products or project types that are likely to include relevant solicitations. After filtering the full dataset using these search terms, we had a large number of potentially relevant solicitations, of which approximately 50% were relevant. We first removed the irrelevant solicitations, then manually reviewed each relevant solicitation to extract data for analysis. There were some solicitations with insufficient information to evaluate for relevance, which were also removed.

There are several caveats to our solicitation review and its depiction of federal procurement activity. First, as mentioned previously, FBO does not provide a complete picture of federal procurement. Smaller procurements, such as those purchased through p-cards, are not captured by FBO. Second, our search process is not 100% accurate – we are certain to miss some solicitations that ultimately result in the purchase of energy-consuming products. Third, the solicitation process itself is dynamic. On occasion, agencies remove their posts from FBO without acquiring a product. These limitations mean that our review of posts on FBO should not be considered definitive, but rather that our estimate likely represents a lower bound of the number of covered products purchased in the federal sector.

Reviewing Solicitations

Identifying Covered Products: What's in a Post?

The first task in our review was to identify which covered product categories were represented in a relevant FBO post identified during our data selection process. Sometimes this was easy; e.g., if a solicitation has the title "50 MacBook Airs" we can easily identify the covered product category (a notebook computer). More often than not, however, the information about a covered product in a solicitation was less obvious and required additional work to find.

Our ability to evaluate a solicitation changes over the procurement lifecycle

Most solicitations are not initiated with full information about the project. Many agencies will post sources sought notices with minimal detail to confirm that there are sufficient contractors interested in the project. Agencies are required to post presolicitations in advance of a formal solicitation, unless they are following a simplified procurement process for commercial products, in which case they will post a combined synopsis/solicitation. Presolicitations vary in terms of how much information is included. They may include all the technical documents associated with a project, or they may include only a general project description. We can only be sure we have all the relevant information when a post reaches the solicitation (or combined synopsis/solicitation) stage. For our purposes, solicitations that were likely to include covered products but could not be evaluated at the

[9] FBO maintains archives dating back to 1999, which are incomplete only when an agency removes a post. The archives, however, are not easily searchable using the XML file. We are therefore able to conduct historical analysis to the degree that posts were still active on FBO at the time we first downloaded the XML file in early December, 2014. Different methods may be able to better extract historical information from FBO, and we intend to explore this in future work.

time of publication were put on a watch list for future review as more information becomes available.

Although the XML file furnished from FBO is complete with respect to the information contained on FBO, there may nonetheless be cases when a solicitation cannot be evaluated. Sometimes agencies post award notices for solicitations that did not follow traditional procurement procedures. These notices may contain very limited information about the specific products procured. These are noted in general agency procurement activity totals but cannot be utilized for any further analysis. In other cases, much of the detailed information on projects is contained in attachments to the FBO post, which may be hosted on external agency sites and periodically removed. In this case, we are unable to identify specific product information even if a post was likely to have originally included covered product categories. Depending on how much information was contained in the FBO posting, we counted these towards agency procurement activity totals or removed them from the dataset completely. Altogether we were able to review and include in this study about 60% of total relevant solicitations.

Our ability to evaluate a solicitation depends on the solicitation type: Direct versus indirect
The majority of solicitations in our dataset were for what we consider "direct" solicitations. They are for products or services that include the purchase of one or more covered energy-consuming products, such as the purchase of washing machines for a dormitory or a service contract for renovation of a building with the associated technical plans and specifications.

We also encountered what we consider "indirect" solicitations. Indirect solicitations relevant to our project do not include the purchase of energy-consuming products at the time of entering into the contract, but may include covered product acquisition in the future. Indirect solicitations are typically service contracts that are not specific to a given building project, but are for construction or design needs in the future, primarily Architectural/Engineering (A/E) services or Indefinite Quantity Indefinite Delivery (IDIQ), Multiple Award Task Order Contract (MATOC), design-build, or design-bid-build construction contracts. There are also many construction or A/E service solicitations that happen in two phases, with a primary phase to identify a short list of potential contractors and the second phase to release detailed project information only to this short list and not to the public. With an indirect solicitation, the contractor (and, therefore, the researcher) is provided with project-level information but the buyer does not specify detailed product-level information that we would use from a direct solicitation. Indirect solicitations represent about 30% of the solicitations in our dataset but leave us with no ability to identify the type and quantity of covered products that will be purchased. We proceeded with a modified review process for indirect solicitations, excluding consideration of product-level compliance. A consideration of direct versus indirect solicitations is discussed further in our findings section.

Measuring Compliance

After we identified the covered product categories included in a solicitation, we evaluated for compliance. To measure compliance, we defined two broad compliance categories: legal and effective. Legal compliance measures whether a solicitation has met a minimum standard of compliance with EEPP mandates. A solicitation is considered legally compliant if it includes the applicable FAR clause (52.223-15) or if it specifies a compliant efficiency level for a particular product. Effective compliance is a more subjective measure that goes beyond legal compliance to assess the likelihood of a given solicitation's leading to a compliant purchase. The legal and effective compliance metrics are not mutually exclusive. We automatically counted a solicitation as legally

compliant if it met our definition of effective compliance. This means that effectively compliant solicitations are a subset of legally compliant solicitations.

A direct solicitation is considered effectively compliant if it includes a compliant efficiency level or requires a product to be ENERGY STAR-qualified/FEMP-designated in the technical specification. An indirect solicitation is considered effectively compliant if it includes some requirement that the contractor procure energy-efficient products in the future. Underlying these measures is a compliance assessment framework that breaks solicitations down into four sections: contract clauses, technical specifications, evaluation factors, and descriptive sections (like the scope of work). Solicitations are given a rank from 0-4, with 0 being non-compliant and 4 being fully compliant. See Appendix B for a full discussion of the compliance assessment framework.

Results and Findings

We provide a snapshot of which agencies issued solicitations for energy-consuming products and how often these solicitations included references to energy efficiency in our study. We analyzed solicitations using a number of lenses in an effort to understand what federal agencies buy, whether they specify compliant efficiency levels, which project types we see more or less frequently, and how compliance varies across or within agencies. Data from this analysis can guide interventions to improve compliance and inform future research.

Summary of Procurement Activity and Compliance

We identified 1,220 relevant solicitations in FY15[10] from 32 federal agencies. Of these, 765 contained sufficient information to evaluate compliance (although not necessarily product-specific information). We found procurements for the vast majority of covered product categories.

Table 1. Summary results show compliance rates below 50%

Total Relevant Solicitations	1,220
Reviewable Solicitations	765
Legal Compliance Rate	49%
Effective Compliance Rate (Direct)	39%
Effective Compliance Rate (Indirect)	17%

Our summary results (Table 1) show a legal compliance rate of 49% across all contract types. This means that about half of the time, solicitations included either a compliant efficiency level or the appropriate FAR clause. Digging deeper, we saw an effective compliance rate of 39% for direct solicitations. This means that of purchases for which we could identify specific product procurements, only 39% included a compliant efficiency level.[11] Looking at indirect solicitations, we saw an effective compliance rate of 17%, which means that indirect solicitations rarely communicated to vendors the requirement to purchase efficient products. This suggests that there is significant room for improvement in all areas. Even by our modest definition of compliance, agencies are unlikely to receive efficient products more than half the time. This means that more often than not, the benefits of EEPP policies are not being realized. We conclude that **strong policy is insufficient to ensure compliance.**

[10] Note that this project is ongoing. All figures are current as of September 15, 2015.

[11] Effective compliance for direct solicitations is evaluated on the product level. Many solicitations include procurements for multiple products, which we evaluate independently of each other for effective compliance. This means that our effective compliance figure for direct solicitations is identical to our assessment of effective compliant for products.

We further assessed this set of solicitations along four dimensions to gain insight into procurement activity: agency, product, applicable standard, and solicitation type.

Compliance By Agency

We counted the number of reviewable solicitations by agency and developed agency-specific compliance rates. We saw the highest solicitation activity from the Department of the Army, Department of the Navy, Department of the Air Force, and the Department of Veterans Affairs. Looking at legal compliance, the General Services Administration was well above average with over 80% legal compliance, as was the Department of the Interior at 70%. The Air Force was below average at 43% and the Department of Labor was well below average at 23%. This demonstrates that legal compliance varies substantially across agencies, which may be the result of any number of factors from which project types are most common to institutional structures that support or hinder energy-efficient purchasing.

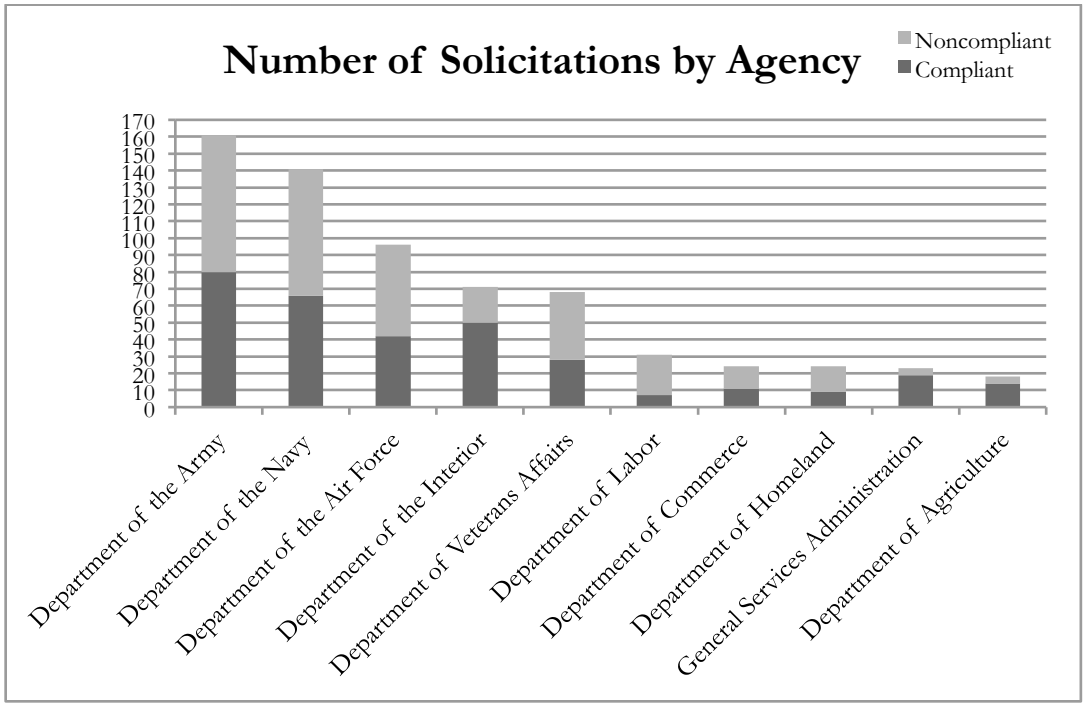


Figure 1. Number of legally compliant and non-compliant solicitations, 10 agencies with the most solicitations.

We further explored agency-level compliance by looking at legal compliance at individual offices within agencies. We focus on one example to illustrate what variation in legal compliance looks like within agencies.[12]

Department of the Navy

The Navy had 141 solicitations in our dataset with an overall legal compliance rate of 47%, which is about average. Of the 141 solicitations we reviewed, 102 were from four offices: Naval Sea Systems Command, Space and Naval Warfare Systems Command, Naval Supply Systems Command, and Naval Facilities Engineering Command. These four offices had legal compliance rates of 29%, 56%,

[12] We can also examine effective compliance but focus here on legal compliance because it may be an easier intervention target. That is, strategies to improve legal compliance may be easier to implement than strategies to improve effective compliance. We consider improving legal compliance a necessary but insufficient first step towards improving EEPP in the federal sector.

45%, and 94% respectively. Despite being in the same agency, we saw wide variation in compliance. These data suggest that the Naval Facilities Engineering Command is doing something differently than the other commands in its procurement activities. Further research could help identify why this is the case and how to replicate that success.

The variation within both agency-level and office-level compliance suggests that there are institutional practices that improve or hinder the ability to comply. Past work in this area has identified a few institutional barriers that could be at play. For example, it is difficult to make the purchase of energy-efficient products standard operating practice when there is a lack of training, training is not well-targeted, or there is an inability to enter or obtain data from business management systems to track progress.[13]

Compliance by Product Category

Our review identified 56 out of 62 distinct covered product categories covering a wide range of product types from residential water heaters, dishwashers, and refrigerators, to uninterruptible power supplies, industrial lighting, and commercial boilers. When looking at product categories, we tracked how many times we saw a product category specified and the quantity specified (if available). We saw the most procurement activity for HVAC and IT & Electronics product types. Among heating and cooling product categories, we found air-cooled electric chillers most frequently solicited, although residential air conditioners and heat pumps were purchased in larger volumes and represent a substantial portion of the total number of individual products we found. Among IT & Electronics categories, we found over 60 solicitations for enterprise servers with a total of over 500 individual servers being procured. Many IT & Electronics product categories were bought in large volumes. For instance, we found 28 solicitations for workstations for a total of 1,225 workstations. We saw a similar trend in appliances, with 69 solicitations for a total of 10,645 products. Clothes washers in particular were purchased in very large volumes at once.

Effective compliance was highest for appliances at 48% and lowest for lighting products at 22%. Within appliances, effective compliance was particularly high for residential refrigerators at nearly 70%. Lighting products, on the other hand, were often specified with vague efficiency requirements or none at all. One exception is for exterior lighting products – a number of solicitations included a copy of the FEMP efficiency table in the specifications for exterior lighting, although effective compliance was only somewhat above average at 47% for outdoor pole-mounted and roadway luminaires. Table 2 summarizes effective compliance by major product category types.

Table 2. Effective compliance by product category type

Product Type	Effective Compliance
Heating and Cooling	44%
IT & Electronics	36%
Lighting	22%
Appliances	52%
Commercial Food Service Equipment	44%
Other	0%
All product types	**39%**

[13] Payne, Christopher, Andrew Webber, and Abby Semple. "Energy-efficient Public Procurement: Best Practice in Program Delivery." SEAD Initiative Procurement Working Group. Lawrence Berkeley National Laboratory. 2013. p 62.

When considering how to target interventions, it may be important to focus on product categories with high energy-savings potential and low effective compliance. Past work at the Lawrence Berkeley National Laboratory identified which categories offered the highest energy savings potential for the federal government.[14] A few of the top product categories were commercial boilers, fluorescent ballasts, air- and water-cooled chillers, commercial dishwashers, and commercial water heaters. Table 3 shows procurement volumes and effective compliance for these products excluding fluorescent ballasts.[15] We saw average or below average effective compliance rates for all of these categories with the exception of commercial gas water heaters.

Table 3. Purchase volumes and effective compliance for product categories with high energy-savings potential

Product Category	Times Solicited	Total # Solicited	Effective Compliance
Air-Cooled Electric Chiller	36	41	25%
Boiler (Commercial)	30	61	37%
Water-Cooled Electric Chiller	22	44	41%
Gas Water Heater (Commercial)	17	31	53%
Dishwasher (Commercial)	11	13	36%

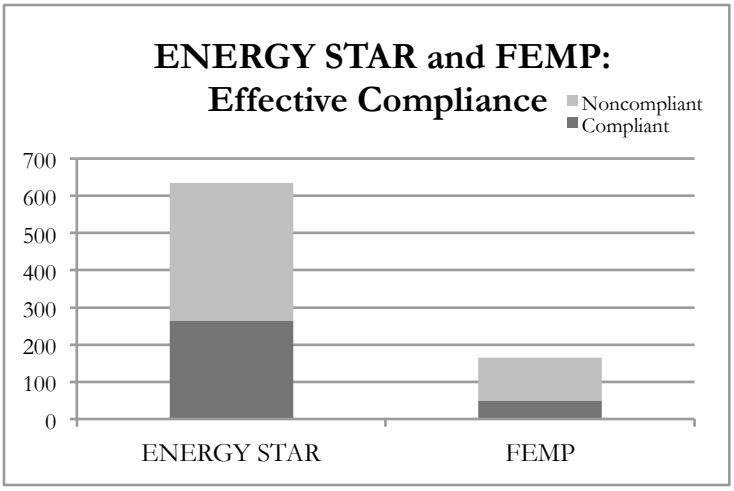
Although there are some bright spots in our compliance figures, our results confirm that **there is significant missed opportunity for achieving energy savings in the federal government**. We saw that effective compliance for lighting product categories is below 25% and, more often than not, agencies did not specify compliant efficiencies for the categories with the highest energy-savings potential.

Compliance By Standard

Covered product categories are either ENERGY STAR-qualified, which means that efficient ones will be labeled with an ENERGY STAR label, or they are FEMP-designated, which means their efficiency requirements must meet the FEMP-designated efficiency level. We looked at compliance by standard (ENERGY STAR versus FEMP) to gain insight into whether agencies are more likely to properly specify an ENERGY STAR-qualified or FEMP-designated product.
Looking at all the products in our dataset, we identified 634 instances of an ENERGY STAR-qualified product category with effective compliance at 42% and 165 instances of a FEMP-designated product category with effective compliance at only 30%, summarized in **Error! Reference source not found.**.

The difference in compliance rates suggests that when an agency procures a product category (through this pathway), **if the product category is covered by ENERGY STAR it is more likely that the agency will receive an efficient product than if the product category is covered by**

[14] Taylor, Margaret and K. Sydny Fujita. "Program Potential: Estimate of Federal Energy Cost Savings from Energy Efficient Procurement." Lawrence Berkeley National Laboratory. 2012. p 35.
[15] We did not see substantial procurement volumes for fluorescent ballasts, which suggests they are likely procured through purchase vehicles other than contracts posted to FBO. Ballasts are also often purchased as components of luminaires, which fall under other product categories such as exterior lighting or industrial luminaires.



FEMP. This is problematic because many FEMP-designated product categories offer the highest energy savings potential.[16]

Figure 2. Number of effectively compliant and non-compliant purchases by standard

There may be a number of reasons for this difference. The most obvious is that requiring a vendor to provide an ENERGY STAR-qualified product, which can be identified by a label, is more straightforward than specifying an efficiency level. The question is complicated by the types of product categories that are covered by FEMP versus ENERGY STAR. FEMP-designated product categories include large commercial heating and cooling equipment like chillers and large boilers, which are likely to be included in more complex solicitations.

Compliance by Solicitation Type

As mentioned previously, we sorted solicitations into two broad categories: direct and indirect.[17] About 30% of total reviewable solicitations we identified were for indirect procurements. For example, many agencies solicit for design-build construction services, which means that the technical plans (and therefore associated products) do not yet exist for a building. Because the same firm provides the design and the construction, the technical specifications for the products in the building and their energy performance requirements will never appear on FBO, even though the solicitation ultimately results in the acquisition of energy-consuming products. When we cannot evaluate the technical specifications, as is the case for indirect solicitations, effective compliance of the solicitation is measured by the inclusion of energy efficiency as an evaluation factor for contractors. Of the 215 indirect procurements in our set, only 17% can be considered effectively compliant, and many of these compliant evaluation factors were not as specific or stringent as would be ideal.

Indirect solicitations are of particular importance because they may set in place contracts that last for several years and lead to the purchase of many more covered products than an individual direct solicitation.

If we removed maintenance solicitations from our dataset, a common indirect solicitation type, we saw an increase in overall legal compliance to 56%. Looking only at the subset of indirect

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[16] Taylor, Margaret and K. Sydny Fujita. "Program Potential: Estimates of Federal Energy Cost Savings from Energy Efficient Procurement." Lawrence Berkeley National Laboratory. 2012. p 35.

[17] We distinguish here from past work in the procurement area that referred to direct (e.g., p-cards) and indirect (e.g., solicitation) pathways. Among solicitations, some directly specify products, while others call for services that will indirectly lead to purchases of covered product categories.

solicitations without maintenance solicitations removed, we had 77 remaining with a legal compliance of 78% and effective compliance at 38%.[18] This suggests that indirect solicitations for services other than maintenance (such as design-build or IDIQ construction services) are substantially more likely to include appropriate efficiency requirements, which may not be particularly surprising. Although maintenance services may not always lead to procurements of covered products, they cover a wide range of covered product categories including HVAC systems, uninterruptible power supplies, and lighting. The lack of efficiency requirements becomes an issue when maintenance contractors replace items, which may be especially likely for smaller but important items like lighting products.

There are a number of ways to analyze and interpret these data. A broader lesson regards how information is targeted – **effective compliance is achieved differently for direct and indirect solicitations, and messaging and materials directed at federal agencies should address these differences.**

Conclusion

Our analysis has demonstrated that federal agencies are not fully complying with the requirement to purchase energy-efficient products, although there appears to be have been improvement since ASE's 2010 review. We repeat here our primary findings and expand on their current significance and how they can be leveraged to improve compliance.

- **There is significant missed opportunity for achieving energy savings in the federal government**
- **Federal compliance with EEPP is below 50%, thus strong policy is insufficient for compliance**
- **The variation within both agency-level and office-level compliance suggests that there are institutional practices that improve or hinder the ability to comply**
- **If a product category is covered by ENERGY STAR it is more likely that the agency will receive an efficient product than if the product category is covered by FEMP**
- **Effective compliance is achieved differently for direct and indirect solicitations, and messaging and materials directed at federal agencies should address these differences**

We wish to particularly emphasize the role of institutional factors in considering how to improve EEPP programming and other sustainable acquisition programs. Each contracting officer in our study was subject to the same requirements, yet we saw wide variation depending on agency, office, product category, and solicitation type. EEPP in particular and sustainable acquisition more generally are two of many federal goals competing for time and resources. Efforts to understand what structural factors can easily improve compliance without additional burdens on staff will be critical in improving compliance. To that end, we intend to continue this research by conducting in-depth interviews with federal contracting officers and other staff to unravel the systems that lead to higher or lower compliance rates. We expect that this analysis and our continued work will be useful to federal organizations providing guidance to agencies (like FEMP) and others working to implement sustainability goals within institutions.

[18] Note that since all maintenance solicitations are considered indirect, we see no impact on our direct effective compliance rate when they are removed.

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Appendix A: Search Parameters and Data Dictionary

The following search parameters were developed using a random sample of 10,000 solicitations from FY14. We began with a broad set of potentially relevant keywords and searched for them in the subject and description of these solicitations. We analyzed these results to extract the combinations of keywords, classification codes, and NAICS code searches that were most likely to capture the majority of solicitations of interest while minimizing the number of irrelevant solicitations. We found that for some keywords, searching with codes is overly restrictive and would cause us to miss relevant solicitations. In others, we found that searching by keywords was overly broad and should be restricted using codes. The set of relevant FBO posts from these searches represent the lower bound of contract actions that include covered products.

Product Category	Search Agent	CLASSCOD	NAICS	KEYWORDS
Heating and Cooling	1			hvac OR chiller OR water heater OR ventilation fan
Heating and Cooling	2	R; W; Y; Z; 41; 45; J; C	236220; 238220; 541310; 811310;	heating; cooling; boiler; A/C; air conditioner; air conditioning; furnace; heat pump
Heating and Cooling	3	236210		
IT & Electronics	4	59; 70		computer;laptop; workstation; monitor; server [in subject]; uninterruptible power supply; uninterruptible power supplies
IT & Electronics	5			uninterruptible power
IT & Electronics	6	70; 74; 75; W; J		copier; scanner; printer; NOT 3D PRINTER; mail machine
IT & Electronics	7	58; 70; 74		TV
IT & Electronics	8	58		phone AND (VOIP OR voice over IP OR phone system OR telephone system) in SUBJECT ONLY
Lighting	9	62, Y, Z		light; lamp
Commercial Food Service Equipment	10	73		food service; dishwasher; fryer; hot food holding cabinet; griddle; ice machine; oven; steamer; refrigerator; freezer
Commercial Food Service Equipment	11			cafeteria service; vending machine; kitchen; washing machine
Appliances	12	41, 72, 73		refrigerator; freezer; dehumidifier
Appliances	13	35; 72; W		washer

Data Dictionary

FIELDS INCLUDED IN FBO XML FILE	
DATE	Date of base FBO Post (we use this to identify the Fiscal Year)
AGENCY	
OFFICE	
LOCATION	
ZIP	
CLASSCOD	FBO Classification Code
NAICS	North American Industrial Classification Code
OFFADD	
SUBJECT	FBO Post Subject or Title
SOLNBR	Solicitation Number (unique ID)
RESPDATE	
ARCHDATE	
CONTACT	
DESC	Full text of FBO Post
LINK	Permalink to FBO Post
SETASIDE	
RECOVERY_ACT	
DOCUMENT_PACKAGES	List of the titles of attachments to the original post
POPCOUNTRY	
POPZIP	
POPADDRESS	
CHANGES	List of all modifications made to original post. We store these data in a separate file since this field can quickly become very large. Each modification has the same fields as a full post.
EMAIL	
AWDNBR	
AWDAMT	
AWDDATE	
AWARDEE	
STAUTH	
LINENBR	
MODNBR	
FOJA	
DONBR	
FIELDS ADDED AUTOMATICALLY IN R	
BASE POST TYPE	sources sought, presolicitation, combined synopsis/solicitation, award notice, fair opportunity/limited sources justification, modification/amendment/cancellation, special notice, justification and approval, or sale of surplus property.
CALENDAR YEAR	Calendar Year of base post
FISCAL YEAR	Fiscal Year of base post, beginning on October 1
PRODUCT CATEGORY	Heating and Cooling, Commercial Food Service Equipment, IT & Electronics, Appliances, Lighting, Other
FIELDS COMPLETED MANUALLY	
RELEVANT	0 = irrelevant, 1 = relevant

SOLICITATION TYPE	product, services, subproduct (for solicitations with multiple products)
SOLICITATION TYPE SUBCATEGORY	product: new/lease/replacement services: food, construction, construction – IDIQ, construction – MATOC, construction – Design/Build, construction – Design/Bid/Build, A/E, A/E – IDIQ, maintenance
The following fields are completed for each product in a solicitation	
FEMP COVERED PRODUCT SUBCATEGORY	
PRODUCT	
QUANTITY	
SPEC	Size, dimensions, or other features of the product
STANDARD	FEMP, ENERGY STAR
CONTRACT CLAUSES	1 = Solicitation includes FAR Clause 52.223-15, 0 = not included, n/a = no contract clause section
TECHNICAL SPECIFICATIONS	1 = Compliant technical specifications, 0 = tech specs below standard or no efficiency mentioned, n/a = no technical information available
LOCATION	Where are the technical specifications for this product in the solicitation?
NOTES	Notes on the technical specifications
EVALUATION FACTORS	1 = Evaluation factors mention life-cycle cost or energy efficiency/FEMP/ ENERGY STAR, 0 = no mention, n/a = evaluation factors not included in post
LOCATION	Where are the evaluation factors related to energy located in the solicitation?
NOTES	Notes on the evaluation factors
DESCRIPTIVE	1 = descriptive sections about this product/project mention energy efficiency, FEMP, or ENERGY STAR, 0 = no mention, n/a = no descriptive section included
LOCATION	Where is the relevant descriptive section located?
NOTES	Notes on descriptive section
COMPLIANCE LEVEL	*See Compliance Framework documentation for explanation of compliance levels*
COMPLIANT DUMMY	0 = non-compliant, 1 = compliant
WATCH LIST	0 = not on watch list, 1 = watch list, 2 = canceled
SOLICITATION REVIEWABLE	0 = do not yet have sufficient information to review solicitation, 1 = solicitation can be reviewed for compliance
PRODUCT REVIEWABLE	0 = insufficient information for product-level review, 1 = technical information available to review product for compliance

Appendix B: Compliance Assessment Framework

Solicitation Sections

A typical federal solicitation includes standard sections A-M. Several of these sections may be relevant in evaluating a solicitation for compliance with energy efficiency standards. The easiest section to evaluate for compliance is section I, which lists the applicable **contract clauses** incorporated either by reference or full text. Inclusion of the FAR clause 52.223-15 meets the formal threshold for compliance, but without further references to efficiency standards in the solicitation may not lead to a compliant purchase. We therefore look to other sections to gain further insight into a solicitation's likelihood of leading to a compliant purchase.

In considering how a potential contractor reads and interprets the priorities of the agency issuing a solicitation, one might look to three broad sections beyond the contract clauses: descriptive sections, technical specifications, and evaluation criteria. **Descriptive sections** have the potential to communicate to the contractor that energy efficiency is a priority for the project, and we would therefore hope to see some mention of the requirement in the high-level descriptive sections (e.g. Scope of Work, Project Summary, etc.). However, they are unlikely to be specific enough to lead to compliant purchases without further reference to energy efficiency in other solicitation sections. There are also a number of places where the **technical specifications** for the product(s) may be listed, including within Section C or in specification attachments (listed in section J). Technical specifications are arguably the most important place for detailed efficiency requirements to be included, since it is where contractors will reference all the other required technical factors for the product(s). Finally, section M details the list of **evaluation factors** for award—how the agency will decide which offer is chosen. Particularly if the technical specifications are vague, it is important for the evaluation factors to include energy performance or a lifecycle cost approach, particularly because it is quite common for lowest price to be the sole or primary evaluation criterion.

Many solicitations for commercial products follow a simplified version of the formal solicitation structure. Often a written solicitation is not issued and a Combined Synopsis/Solicitation will be posted to FBO. The posting may include attachments like a Statement of Work or Specifications, or the relevant information may be contained within the text of the posting itself. The FAR requires that these solicitations include contract line item numbers, a list of relevant clauses, and a discussion of evaluation procedures. Although these solicitations follow a different structure, the sections described above can map easily onto the simplified format.

Evaluating a Solicitation

Criteria for a Compliance Assessment Framework

The compliance assessment framework was designed with the following criteria in mind:

Applicability: The compliance framework should apply to a broad range of solicitation types and across agencies .
Analytical utility: The compliance framework should allow the researcher to gain insight regarding the extent to which energy efficiency language is incorporated into federal solicitations.
Clarity: The framework should be designed so that it can easily be understood by solicitation officers and researchers.

Levels of Compliance

Level 0 (Non-Compliant)

Solicitation does not mention energy efficiency in any section and technical specifications either do not include efficiency requirements or include an efficiency level that is below the relevant standard.

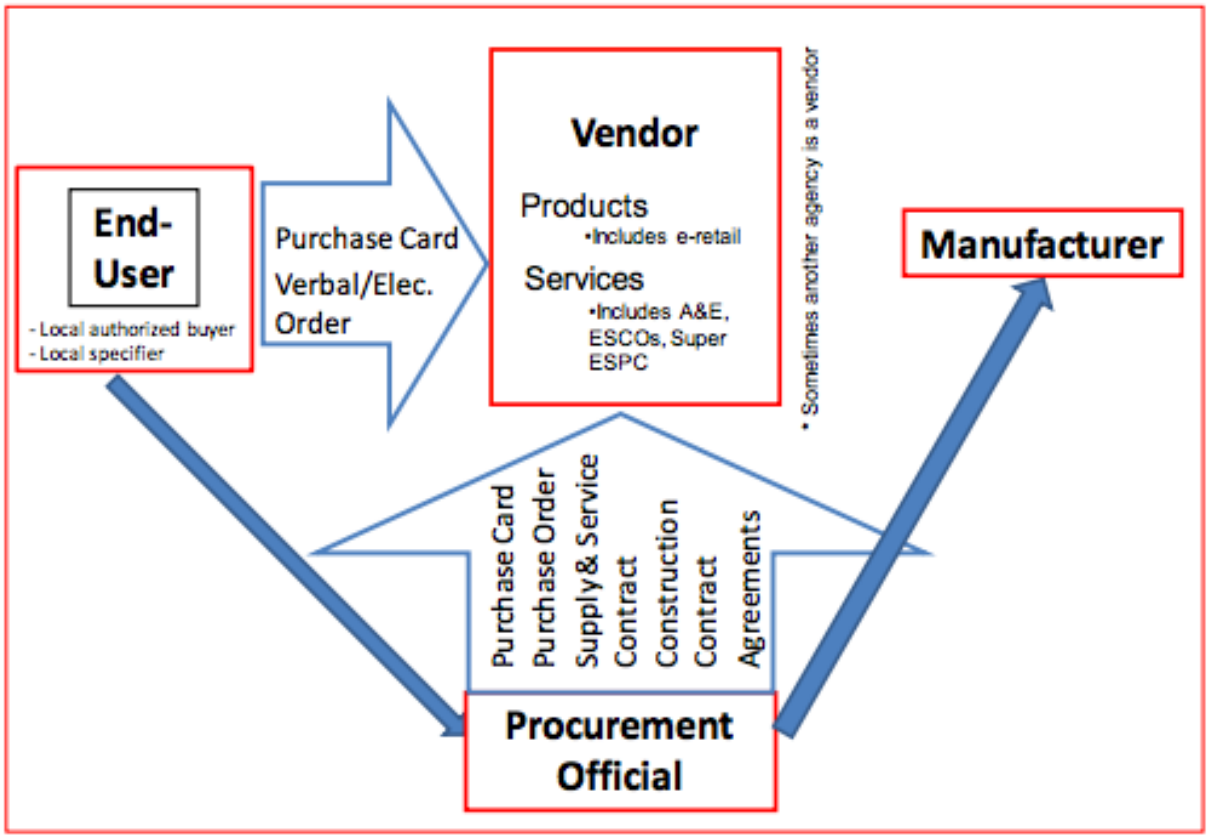
Level 1 (Legally compliant)
Solicitation meets legal level of compliance by including FAR clause 52.233-15 but does not include a compliant technical specification and does not consider energy performance or life-cycle cost in evaluation factors.

Level 2 (Effectively compliant)
Solicitation includes compliant technical specifications OR includes energy performance or life-cycle cost in evaluation factors. May or may not include FAR clause 52.233-15. Note that

Level 3 (Effectively compliant)
Solicitation includes correct technical specifications AND includes lifecycle cost or energy performance. May or may not include FAR clause 52.233-15.

Level 4 (Effectively compliant)
Solicitation includes correct technical specifications AND lifecycle cost or energy performance in evaluation factors AND mentions energy efficiency as a priority in project summary or other descriptive sections. May or may not include FAR clause 52.233-15.

Note that all levels above Level 2 are considered legally compliant as well as effectively compliant. Effectively compliant solicitations are a subset of legally compliant solicitations.

Appendix C: The transaction level of the federal procurement system

Reprinted from: Taylor, Margaret and Sydney Fujita. "The Path to Savings: Understanding the Federal Purchase of Energy Consuming Products." Lawrence Berkeley National Laboratory. 2012. p 10, Figure 2.