

FINANCIAL ALLY IMPLEMENTATION MODEL

EFFICIENCY SERVICES AGREEMENT (ESA) IN BAE FACILITIES NATIONWIDE



LOCATION

New York and New Hampshire (total of four facilities and 2 million square feet), with additional facilities under development across the country

CHALLENGE

Programmatically deploying multi-measure energy efficiency retrofits across a national portfolio of mixed-use office, manufacturing, and environmental facilities

FINANCING SOLUTION

Efficiency Services Agreement (ESA); No upfront cost to facility, facility shares in savings

FUNDS COMMITTED

\$7.7 million (to date) across four facilities

PROGRAM START DATE

December 2010

PROGRAM STATUS

Ongoing. Most recent efforts included project construction completion on two new projects in March of 2013. Program currently generates more than \$1.1 million of annual energy savings and represents 3 million kilowatt hours reduced annually, which exceeds the original projections.

PROGRAM PARTNERS

BAE Systems, Metrus Energy, Siemens Industry

Overview and Background

In Q1 2013, construction was completed on two projects that are part of an ongoing multi-phased, multi-facility integrated energy efficiency retrofit program. The program has been financed under Metrus Energy's Efficiency Services Agreement (ESA), with Siemens Industry designing and installing the efficiency project equipment. To date, Metrus and Siemens have financed and constructed four

integrated retrofit projects at BAE facilities in New York and New Hampshire, with several additional facilities currently under development. Total investment is approaching \$8 million, with zero out of pocket costs to BAE. The program currently generates more than \$1.1 million of annual energy savings and represents 3 million kilowatt hours reduced annually.

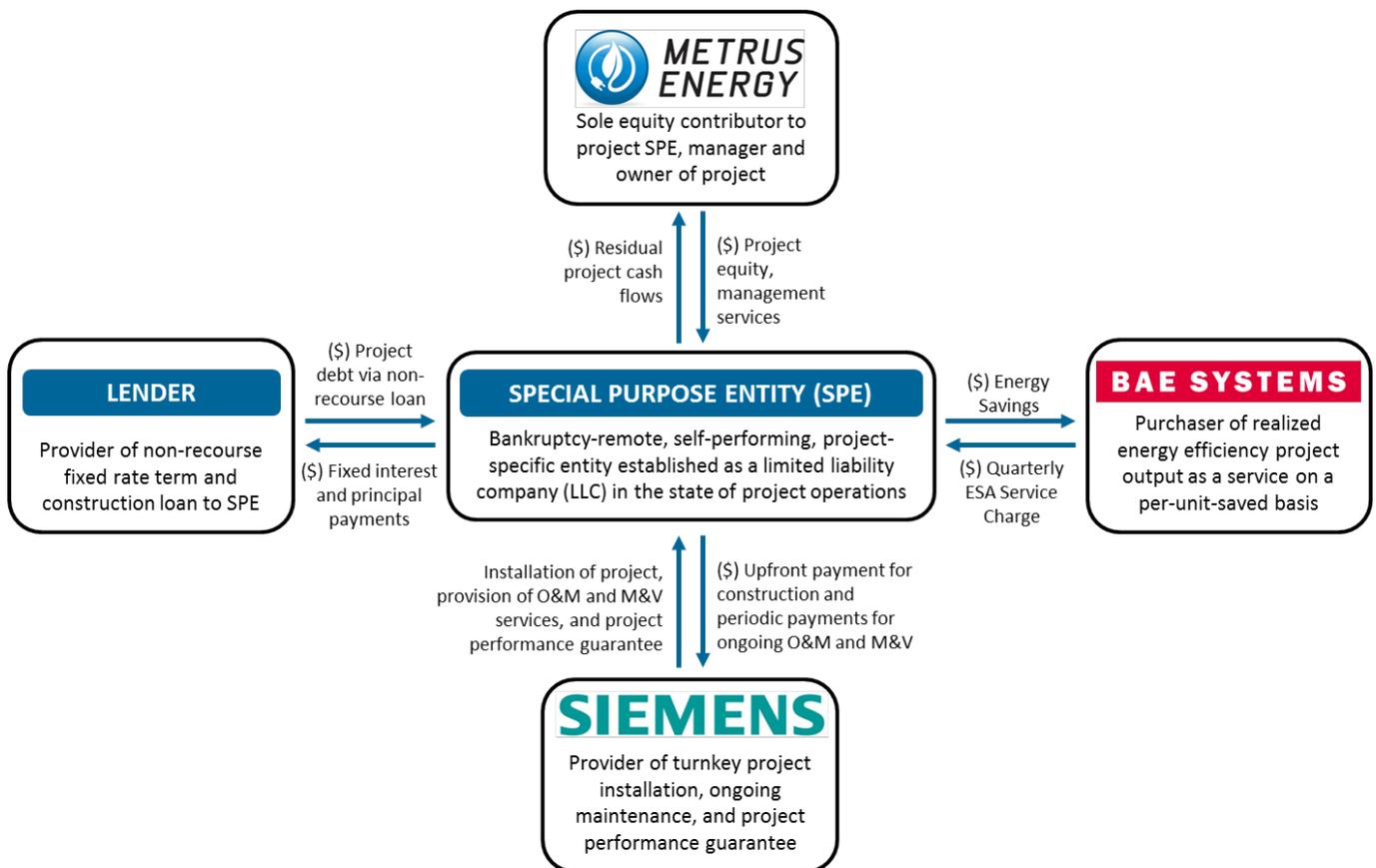
BAE Systems Program Roadmap

ESA Financing Structure



Metrus' ESA is a pay-for-performance financing solution that allows customers to implement energy efficiency projects with zero upfront capital expenditure. Through the ESA, Metrus pays for all project development and construction costs. After a project is operational, the customer uses a portion of the cost savings associated with reduced energy consumption to make service payments to Metrus.

Like a typical utility bill or a solar power purchase agreement (PPA), ESA payments to Metrus are based on a measured quantity of energy units (e.g., kilowatt-hours of electricity or therms of natural gas). However, ESA payments are based on energy units saved (e.g., "negawatts" or avoided kWh of electricity), enabling customers to treat energy efficiency as a resource that improves their bottom line. The price per unit of energy savings is a fixed, output-based charge that is set at or below a customer's existing utility price, resulting in immediate reduced operating expenses. Customers benefit both from reduced overall energy consumption (volume) and a lower unit cost of energy (price).



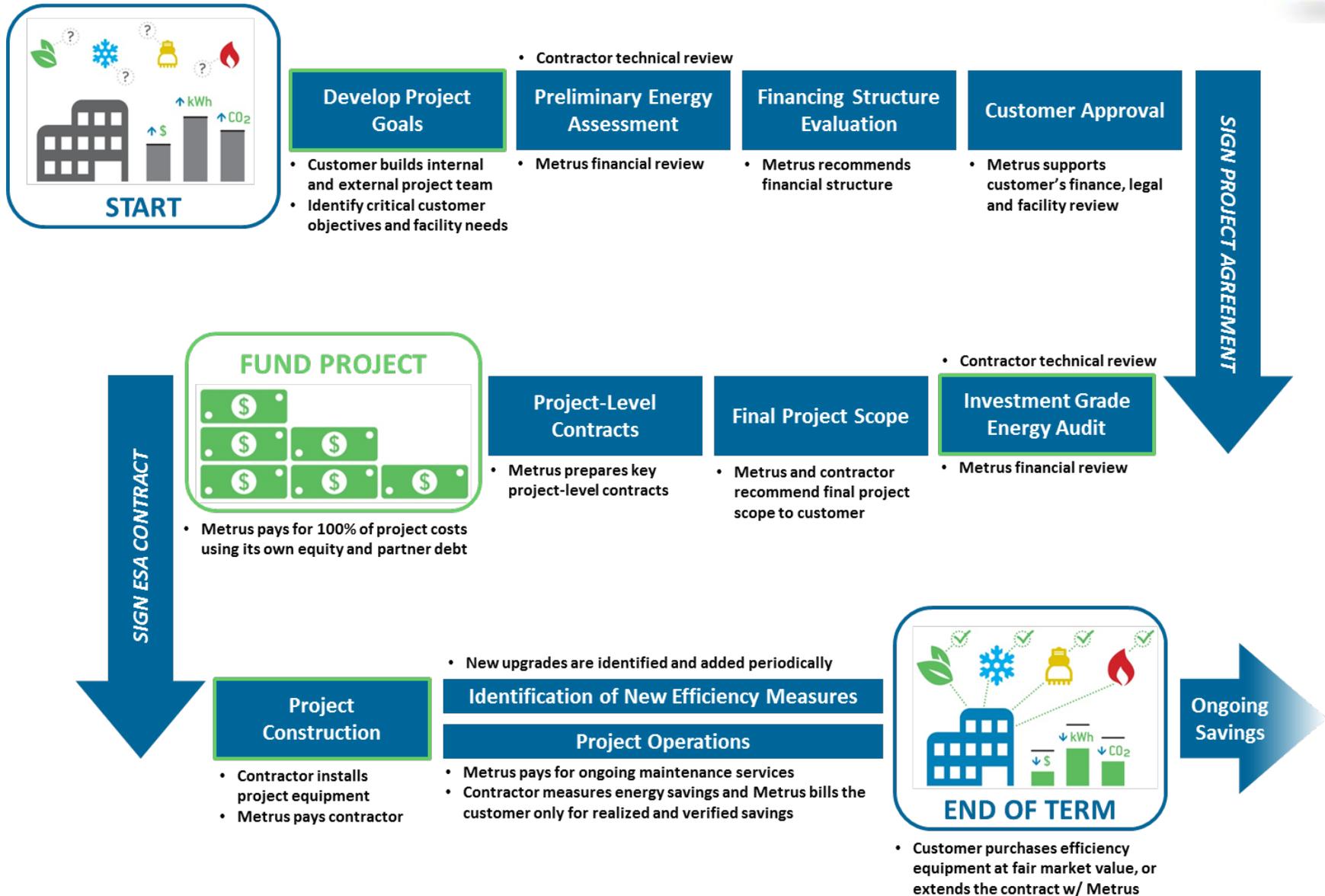
As illustrated in the figure above, for each project under the program, Metrus enters into an ESA directly with the customer and pays a third-party contractor (Siemens for this project) to engineer, implement and maintain the energy efficiency project (i.e., Energy Savings Performance Contract (ESPC) agreement). Metrus retains ownership of all project-related assets for the duration of the ESA term and pays for associated maintenance services to ensure

long-term reliability and optimal performance of the systems. In each billing period, the performance of the project is quantified using agreed-upon measurement and verification (M&V) protocols, compliant with International Performance Measurement and Verification Protocol (IPMVP) established by the U.S. Department of Energy. These verified savings provide the basis for the ESA service charge. After the ESA term expires, the customer has the option to purchase the equipment at fair market value.

Metrus' ESA structure has the following characteristics for customers:

- **Avoided Capital Outlay** – Metrus pays for all project design and implementation costs, enabling customers to conserve scarce capital funds for investment in their core business.
- **Use Energy Savings to Pay for Projects** – Metrus enables customers to redirect a portion of their current utility spending to pay for efficiency improvements; ESA payments reflect realized energy and operational savings.
- **Reduced Operating Costs** – ESA payments are set below the current utility price.
- **Enhanced Reliability of Operations** – Metrus pays for periodic maintenance services to ensure long-term reliability and performance of the project equipment.
- **ESA Payments Treated as an Operating Expense** – The ESA is a services agreement with regular payments that are treated as an operating expense (similar to a utility bill or PPA).
- **Reduced Exposure to Utility Price Uncertainty** – ESA payments escalate at a pre-negotiated, fixed annual rate that is set below historical annual utility price increases.
- **Flexible & Scalable Financing** – Under Metrus' ESA, new opportunities for savings are identified and funded as they emerge, and rolled out to additional buildings across facilities.

When Siemens and Metrus first spoke to BAE Systems, BAE was seeking a third-party financing alternative that would allow for comprehensive capital improvements across their entire nationwide portfolio of properties. Metrus' ESA allowed BAE to implement the facility improvements they needed, with the scalability and flexibility of an ongoing energy efficiency procurement program. This has helped BAE to engage more deeply in energy efficiency (i.e., implement longer payback projects) with no upfront cost, preserving capital for its core business investments.



The BAE Program has followed the standard Metrus ESA development process that is illustrated above. Project development falls into three main stages: (1) Project Design & Scoping, (2) Project Construction, and (3) Project Operation.

- **Stage 1: Project Design & Scoping** – In late 2010, BAE committed to work together with Siemens and Metrus to evaluate the potential for energy efficiency upgrades across several key BAE facilities. Although BAE began the process with a robust list of focus improvements, a key first step in the development pathway was for Siemens to conduct preliminary energy audits across a wide range of BAE properties. These preliminary audit results (which included both the initial energy conservation measures highlighted by BAE and others identified by Siemens' engineering team) were then evaluated in the context of Metrus' ESA financing model, helping BAE to prioritize ECMs and facilities so that the proposed scope was both technically sound and financially feasible. This integration of technical and financial engineering into the design phase was critical to the success of the first phase of project development, and has continued to shorten the development cycle in subsequent phases. Following the preliminary energy audit, BAE entered into a binding project agreement with Siemens and Metrus, triggering the investment grade audit (IGA) process at the specific facilities selected by BAE in coordination with Siemens and Metrus. During the 2-3 month IGA, Siemens finalized its engineering and design work (including developing ECM-level baselines to be used for ongoing measurement and verification) while Metrus worked with BAE to structure the financing and negotiate the necessary contracts. Stage 1 concluded with the presentation to BAE by Metrus and Siemens of the final project scope financing terms, which were captured in the project-level ESA and ESPC contracts.
- **Stage 2: Project Construction** – Upon signing the project-level contracts (the ESA between Metrus and BAE and the ESPC between Metrus and Siemens), project construction began. On average, the construction phase lasted roughly 7 months per site, with Siemens coordinating construction across the four different projects. During construction, Metrus made periodic progress-based construction payments to Siemens. Phase 1, Merrimack and Greenlawn, achieved substantial completion in Q4 2010 and Q3 2011, respectively. Phase 2 (Nashua and BAE's New Hampshire headquarters) achieved substantial completion in Q1 2013.
- **Stage 3: Project Operation** – During the operations phase (from completion of construction to the end of the ESA term), Metrus pays Siemens for quarterly maintenance of all installed efficiency equipment, as well as for annual measurement and verification of energy savings. On an annual basis, Siemens conducts measurements of project energy savings at an ECM by ECM level according to IPMVP and in a manner consistent with the methodologies set out in the ESA and ESPC contracts. Siemens then delivers the results of the M&V assessment to Metrus (typically stating the kilowatt hours, therms, etc. saved during the measurement period), which Metrus uses to invoice BAE. Under the ESA arrangement, BAE is responsible only for paying for the actual, realized energy savings that are verified by Siemens. In the event that actual savings underperform expected savings, BAE pays only for actual savings. Further, the contract is set such that BAE pays a lower rate (e.g., \$/kWh or \$/therm) to Metrus as a service charge for avoided energy than it would pay its utility for energy consumed. As such, BAE is cash flow positive throughout project operation and has an option to purchase the project equipment at the end of the term. Also importantly, Metrus' ownership of project equipment and Siemens' ongoing maintenance activity means that all parties are continually identifying and incorporating additional ECMs into the program.

While the above process details BAE's project-level development process, it is important to note that BAE has approached energy efficiency on a broad, programmatic scale. BAE is currently working with Siemens and Metrus to evaluate, scope, finance and construct efficiency retrofit projects at additional facilities across the country.

- **Tools:**
 - [BAE Project Case Study](#)



Building Description

BAE has engaged Metrus and Siemens to conduct efficiency upgrades across its entire United States facility portfolio. To date, completed retrofit projects include:

- **Merrimack, New Hampshire** – 467,000 square foot manufacturing facility
- **Greenlawn, New York** – 492,000 square foot mixed use office space
- **Nashua, New Hampshire** – 686,000 square foot mixed use office space
- **Nashua, New Hampshire** – 509,000 square foot corporate headquarters



Project Partners

BAE Systems is a global company engaged in the development, delivery and support of advanced defense, security and aerospace systems. BAE is committed to mitigating the environmental impacts of its diverse business by becoming increasingly energy efficient, and has employed the ESA to make complex projects easy to find, fund, and implement with minimal disruptions to ongoing operations.

Metrus Energy is a San Francisco, California based specialty finance company that focused on providing a wide range of energy efficiency retrofit financing solutions, including its pioneering Efficiency Services Agreement. Metrus steered the financial structuring and development of the project, working closely alongside the technical scoping process managed by Siemens, and is both an equity investor in the project and the tax, legal, and accounting owner of project efficiency equipment.

Siemens Industry is a leading supplier of production, transportation, lighting and building technologies, and is the energy services division of Siemens AG, a global powerhouse in electronics and electrical engineering. Siemens managed the technical development of BAE's projects, including conducting energy audits, delivering turnkey design and construction of retrofit measures, maintaining project equipment, and measuring and verifying energy savings. As a part of the ESA, Siemens also provides Metrus with a performance guarantee for a portion of energy savings, a critical ingredient to the project financing arrangement.

- **Tools:**
 - [Metrus Energy Brochure](#)
 - [Metrus Energy FAQ](#)



Project Scope & Impact Summary

The table below summarizes key aspects of the four projects that have been constructed to date under Metrus' program with BAE Systems. The Merrick and Greenlawn projects have both been operational for over a year and have generated savings that exceed the original estimates. The net result to BAE is avoided upfront cost plus a share of ongoing energy savings, resulting in positive cash flow throughout the life of the ESA term.

	Merrimack, NH	Greenlawn, NY	Nashua, NH	NH Headquarters
Facility	<ul style="list-style-type: none"> 467,000 ft² mixed-use office, manufacturing, environmental testing 	<ul style="list-style-type: none"> 492,000 ft² mixed-use office, manufacturing, environmental testing 	<ul style="list-style-type: none"> 686,000 ft² mixed-use office, manufacturing, environmental testing 	<ul style="list-style-type: none"> 509,000 ft² mixed-use office, manufacturing, environmental testing
Project Scope	<ul style="list-style-type: none"> Lighting Retrofits Building Automation Air Compressor Replacement Transformer Replacement Demand Control Ventilation Operational Best Practices 	<ul style="list-style-type: none"> Lighting Retrofits Building Automation Boiler & Chiller Replacement Demand Control Ventilation Variable Frequency Drives for AHU & Water Pumps 	<ul style="list-style-type: none"> Lighting Retrofits Boiler Plant Improvements VAV & Control Upgrades Energy Policy Building Envelope 	<ul style="list-style-type: none"> Lighting Retrofits Boiler Replacements Variable Frequency Drives & Motors Energy Policy Building Envelope
Project Cost	<ul style="list-style-type: none"> ~ \$1.0 million 	<ul style="list-style-type: none"> ~ \$2.2 million 	<ul style="list-style-type: none"> ~ \$2.3 million 	<ul style="list-style-type: none"> ~ \$2.2 million
Annual Savings	<ul style="list-style-type: none"> > \$200,000 in Energy Savings > 1.1 million kWh of Electricity > 31,000 therms of Natural Gas Various Non-Energy Operational Savings ~ 400 tons of CO₂ 	<ul style="list-style-type: none"> Total Expected Annual Savings > \$300,000 > 300,000 kWh of Electricity > 125,000 therms of Natural Gas Various Non-Energy Operational Savings ~ 800 tons of CO₂ 	<ul style="list-style-type: none"> Total Expected Annual Savings > \$310,000 > 700,000 kWh of Electricity > 125,000 gals Fuel Oil Various Non-Energy Operational Savings ~ 950 tons of CO₂ 	<ul style="list-style-type: none"> Total Expected Annual Savings > \$310,000 > 875,000 kWh of Electricity > 135,000 gals Fuel Oil Various Non-Energy Operational Savings ~ 1,150 tons of CO₂
Term	<ul style="list-style-type: none"> Simple Payback: > 5 years ESA Term: 10 Years 	<ul style="list-style-type: none"> Simple Payback: > 7 years ESA Term: 11 Years 	<ul style="list-style-type: none"> Simple Payback: >6 years ESA Term: 10 Years 	<ul style="list-style-type: none"> Simple Payback: >6 years ESA Term: 10 Years
Ongoing Services Provided	<ul style="list-style-type: none"> Metrus covers over \$60,000 in annual project O&M and M&V services 	<ul style="list-style-type: none"> Metrus covers over \$35,000 in annual project O&M and M&V services 	<ul style="list-style-type: none"> Metrus covers over \$37,000 in annual project O&M and M&V services 	<ul style="list-style-type: none"> Metrus covers over \$50,000 in annual project O&M and M&V services



Financing Terms & Sources

Metrus covered 100 percent of upfront project costs as well as ongoing maintenance, measurement and verification costs. The program has been funded with Metrus equity and non-recourse debt from various lending partners.