



WHITE PAPER

Using Performance Contracting and Incentives to Accelerate Energy Efficiency Projects

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Introduction

Energy Services Companies (ESCOs) are in the business of creating efficient environments. The ESCO industry is highly competitive and diverse, made up of large diversified companies, regional companies, and small local companies. Efficiency improvements performed by ESCOs typically take the form of whole-building retrofits and/or water utility upgrades. These retrofits reduce emissions while saving governments and businesses money. Lowering the energy spend for governments, large and small, will enable them to improve services to constituents, and in the case of businesses, better compete in the global economy. Smarter, more efficient buildings not only have lower utility bills and lower costs of operation, but also improve the health, safety, and comfort of the people living and working in them.

Emissions

The potential impact of energy efficiency on the US economy is large, but it is also the least-cost way of meeting emission reduction targets.¹

Get right to work

ESCOs are able to bring efficiency solutions to governments and businesses in a few months through building retrofits and/or water utility upgrades. An ESCO does a preliminary audit to determine project feasibility, followed by an in-depth engineering audit to determine recommended efficiency measures once the customer is committed to the project. Once a contract is signed, technicians, construction crews, engineers and others begin implementing the project.

Creates Jobs

Energy efficiency has the potential to create a substantial wave of new domestic green-collar jobs across the country. Efficiency improvement projects are relatively labor-intensive and require local skilled workers. Using national statistics from the Bureau of Economic Analysis, a \$2 million energy efficiency construction-related project can create 50 jobs. A \$4.5 million water utility project can create 112 jobs.² Using local contractors keeps the economic benefits close to home. Meeting our energy challenges and goals will require thousands of new green workers – building technicians, building operators, energy engineers, construction crews, and manufacturing workers.

ESCOs use Performance Contracting

Performance contracting has been a successful model for procuring energy efficiency retrofits in the public sector for over twenty years. In this program, energy and operational savings over a specified time period are used to fund infrastructure improvements through a financial arrangement provided by a third-party financial institution. The projects are designed so that the annual energy and operational savings are greater than or equal to the required payments over the term of the contract, leaving a net neutral impact on a customer's budget.

Performance contracting provides a number of advantages that are important elements of a successful energy and climate policy. This programmatic approach to building retrofits and water utility upgrades results in energy reductions and lower long-term operating costs.



The South St. Paul Housing and Redevelopment Authority (HRA) recently completed a project designed to enhance fire safety for two high-rise apartment buildings. The improvements were made possible by a \$529,480 Fire Prevention and Safety grant from the Federal Emergency Management Agency (FEMA), awarded to the organization in June 2011.

“These improvements enable us to further our mission of providing affordable housing to residents, while also keeping the families in our community safe. In challenging economic times, funding from the U.S. Department of Housing and Urban Development (HUD) continues to decline, making grants such as this one incredibly important,” said Branna Lindell, executive director, South St. Paul HRA.

Guaranteed Performance

Some or all of the energy and operational savings are **guaranteed** by the ESCO over the term of the contract. If the guaranteed savings are not realized, the ESCO pays the customer the difference between what is saved and the guaranteed savings amount. Using performance contracting, the *risk of performance belongs to the ESCO*.

The ESCO takes complete turn-key responsibility for the project, including the performance of preliminary energy audits, detailed design and engineering, business case analysis, installation, commissioning, performance measurement and verification. These projects typically include a variety of building improvements including lighting and mechanical system retrofits, technology upgrades, renewable energy installations, water efficiency upgrades, operator training and occupant education.

Performance Contracting and Incentives can stretch the impact

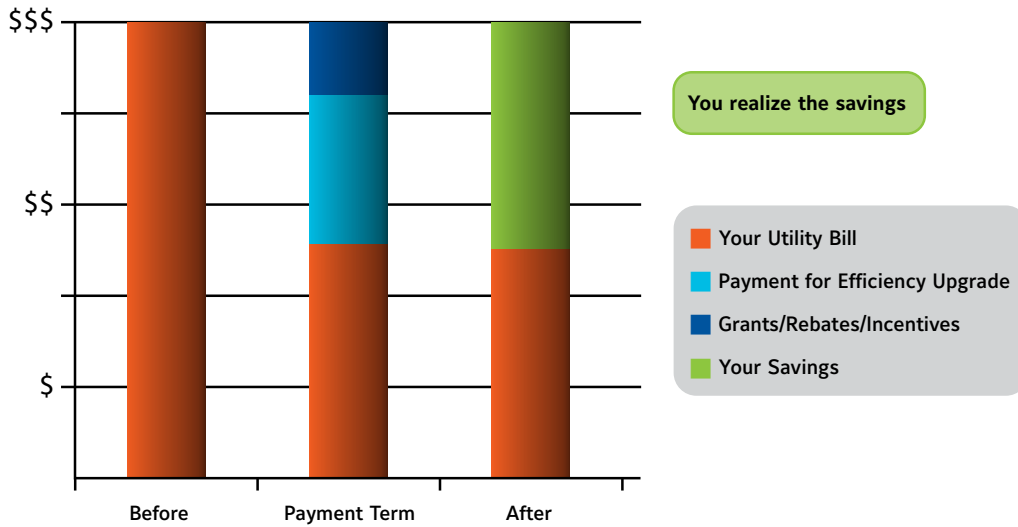
Alternative sources of funding, such as grants, loans, incentives, rebates, bonds, and innovative financing structures provide you with affordable energy efficiency solutions. Diverse funds provide low-cost financial support to reduce total cash outlay and achieve quicker paybacks through the purchase of new and more efficient equipment to move forward with retrofit work.

Having knowledge of multiple funding sources available from public and private organizations, as well as on national, state and local levels, helps you expedite your project timeline. Proactive knowledge of funding availability creates a competitive edge when contending with other competitors for limited dollars. With customers continuing to face budget shortfalls, it is critical to increase intelligence on available funding opportunities. Arming your customers with funding information will help ensure their infrastructure can be maintained and renovated for future efficiencies and energy usage.

Integrated Approach

An ESCO uses performance contracting for a *comprehensive* approach by analyzing all parts of a building environment – lighting, HVAC systems, building management systems, water efficiency, etc. – to create a project that will maximize the efficiency, savings and carbon reductions. This distinguishes ESCOs from most contractors who focus on a core competency or single portion of an efficiency project, such as lighting.

Projects leveraging **BOTH** grants & incentives and performance contracting lead to significantly higher energy savings



Measurement and Verification

A significant benefit of using performance contracting as a project delivery method is the programmatic component of annual validation of customer savings. Measurement and verification ensure projects are successfully managed. This critical component of the performance contracting program provides customers with the annual data to share for the life of the contract.

Summary

Energy efficiency projects using the performance contracting approach create jobs, focus investment in new growth industries, lower energy and operating costs, reduce carbon emissions, mitigate risk, create healthier, safer and more comfortable environments for Americans.

Performance Contracting case studies: Energy efficiency, carbon reductions, accountability

University of Massachusetts, Amherst, MA

Under a 10-year performance contract beginning in 2004, Johnson Controls implemented 38 energy conservation measures worth \$40 million at the University of Massachusetts. The measures are guaranteed to more than pay for themselves over the life of the contract. Johnson Controls conducted a detailed audit to refine the costs and savings estimates for each conservation measure.

Improvements include adding electric cogeneration at the power plant, installing electrical infrastructure upgrades, adding variable speed drives to motors, and upgrading fume hoods. New, more energy efficient chillers were installed, steam lines were replaced, lighting retrofits were made and water conservation measures were implemented.

KaBOOM! Playground Equipment Grants

With the help of Johnson Controls' Grants team, the **Helena Housing Authority, Danville Housing Authority and Marin Housing Authority** each received \$15,000 KaBOOM! Dr. Pepper Snapple Grants to build new on-site playgrounds. In partnership with community volunteers and local vendors, these housing authorities will build their playgrounds, which will increase access to safe play spaces for both the PHA families and the surrounding community to share and use.



University of Massachusetts Amherst

Measurement and verification ensure projects are successfully managed.



Wyandotte Public Schools, MI



Back River Wastewater Treatment Plant

Technology implementation includes extensive use of a building management system for improved monitoring and control of equipment throughout the campus.

- A \$40 million investment in energy savings projects
- \$54 million in guaranteed energy and operational savings over a 10-year contract term
- A reduced deferred maintenance backlog
- Significant long-term savings, allowing the university to invest in new projects
- An improved learning environment for students and staff

Johnson Controls is supporting the University of Massachusetts during the 10-year contract with a full time performance assurance specialist. The specialist's primary responsibility is the measurement and verification of energy savings. As an energy consultant, the specialist works closely with university staff to identify and quantify additional energy savings opportunities.

Johnson Controls also participates in campus outreach programs, such as offering training classes in energy conservation. Energy conservation contests between dorms have highlighted the role each of us can play in reducing energy use, reinforcing the economic and environmental importance of energy and water conservation in the campus community.

Wyandotte Public Schools, Wyandotte, MI

The Wyandotte Public Schools district serves 4,700 students in 11 facilities spanning more than 900,000 square feet. The district has implemented three back-to-back performance contracts that have allowed significant building and energy efficiency improvements while delivering \$6.9 million in cost savings to the district.

Johnson Controls replaced windows and doors at the high school, conducted many upgrades and enhancements to the heating and cooling systems, and installed a building management system at all schools. The roof at the middle school was replaced and a 10 kilowatt solar photovoltaic system was installed.

The high school was restored to its role as the centerpiece of the Wyandotte community. In addition to energy savings, the photovoltaic system provides students with first-hand experience in learning about solar energy. Johnson Controls involvement included helping to develop a curriculum to teach about energy efficiency and sustainability. As a result of these efforts, the Wyandotte School District became the first district in Michigan to be fully certified under the US Environmental Protection Agency's ENERGY STAR® program.

Back River Wastewater Treatment Plant, Baltimore, MD

Johnson Controls has developed a combined heat and power plant in Baltimore that uses the residual of treated wastewater as fuel. The plant will generate more than 2.4 megawatts of electricity per year, provide steam to offset process heating requirements, and produce hot water for boilers. As an added benefit, the digester gas cogeneration plant at Baltimore's Back River Wastewater Treatment Plant will reduce emissions, save taxpayer dollars, address workforce development, and support the local economy.

Each year, the City of Baltimore spends about \$40 million on energy, including electric, steam and natural gas. With this project, Johnson Controls is helping the city reduce energy costs – both by consuming less energy and by producing it more efficiently. The existing wastewater treatment process results in solids that are digested, producing methane gas which is 21 times more harmful to the atmosphere than carbon dioxide and often burned off with 20-foot flares. Johnson Controls' cogeneration process will clean and use the methane, providing an efficient fuel and eliminating the need for flares. Some gas will be used in existing boilers and heaters, and the remainder will power the generators that produce electricity.

The Back River plant will reduce the city's energy bill by \$1.4 million each year, while reducing emissions by 12.9 million pounds of carbon monoxide and 7.7 million grams of nitrogen oxide. It also increases energy security as gas is piped directly to its end use and provides an excellent hedge against fluctuations in fuel and electricity prices.

Johnson Controls will implement a total of \$14 million in energy conservation and facility improvement measures through a performance contract, which will save the city \$1.8 million in energy and operational savings annually over 10 years.

More than 25 percent of the project work has been done by local MBE/WBE contractors. Johnson Controls also developed a partnership with the city for a summer program to provide Baltimore youth with leadership development and meaningful summer jobs in conservation.

Hamilton Health Sciences, Hamilton, Ontario, Canada

Facing outdated infrastructure across multiple facilities on several campuses, increased demand to be more sustainable, and the need to continue to provide the best patient care, Hamilton Health Sciences (HHS) in Hamilton, Ontario, Canada needed to find a comprehensive solution to its business, energy and financial challenges. It wanted a solution that would change the way they operated and help the system become a best practice benchmark for other hospitals in Ontario.

They chose to do a performance contract with Johnson Controls to address outdated infrastructure across multiple facilities and enhance its environment of patient care. The aggressive energy retrofit is saving HHS \$5.5 million annually for ten years. The organization continues to deliver best-in-class care while controlling costs and promoting environmental stewardship.

HHS worked collaboratively with Johnson Controls to find funding vehicles for the project such as energy efficiency savings and energy rebates, without increasing its operating budget. Under the contract, the savings from the energy, operational and infrastructure improvements will repay the project's capital investment over the ten year span. Funds that would normally pay for monthly utility (electric and gas) expenses will be redirected to repay the investment on the project.

Improvements included:

- Upgrades to 9000 lighting fixtures
- Installation of upgraded air handling units
- Johnson Controls Metasys® building management system installed
- Improved waste heat utilization of its cogeneration plants

Resources

¹ Intergovernmental Panel on Climate Change (Working Group III to the Fourth Assessment Report of the IPCC), Climate Change 2007: Mitigation 9, 10 tbl.SPM.3 (Bert Metz et al. eds. 2007), available at <http://www.ipcc.ch/ipccreports/ar4-wg3.htm>.

² This data is based on construction industry economic multipliers generated by the Regional Input-Output Modeling system (RIMS) from the Bureau of Economic Analysis, a bureau of the U.S. Department of Commerce.



*Hamilton Health Sciences,
Hamilton, Ontario, Canada*



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