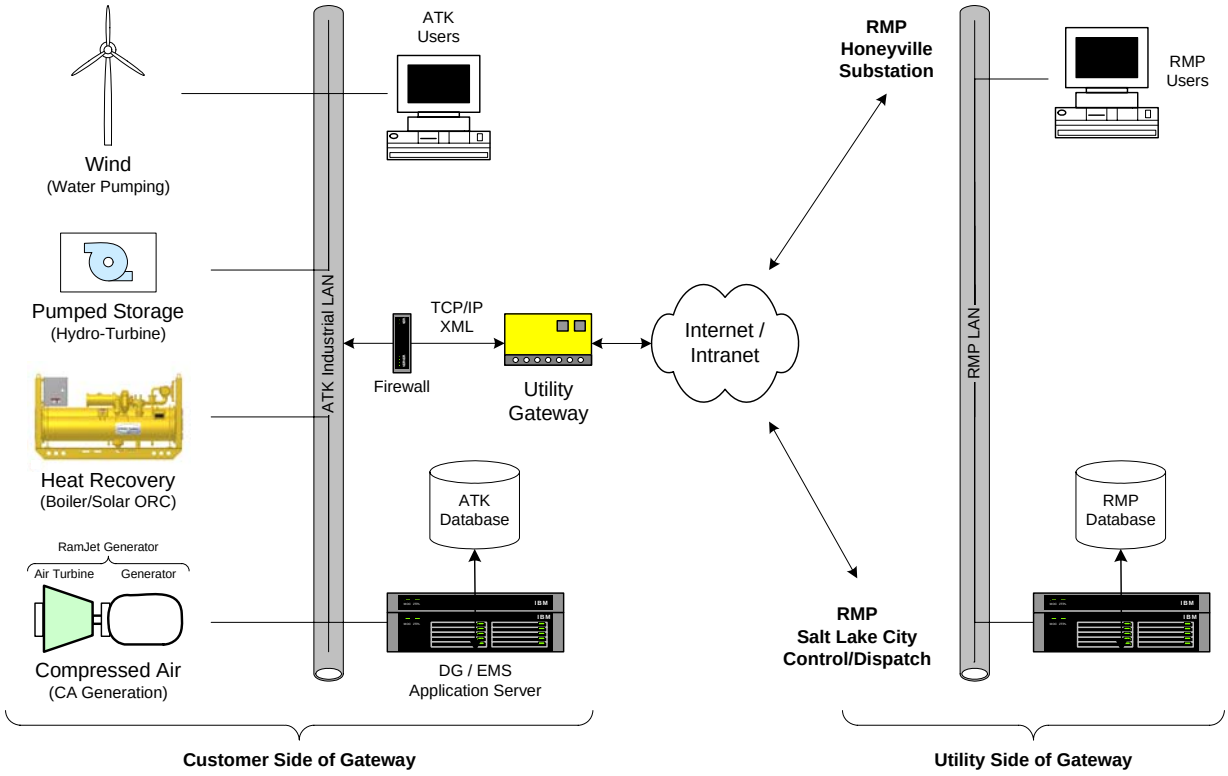
ATK Launch Systems RDSI Demonstration Project
"Integrated, Automated DG Technologies Demonstration"



ATK Project Overview

The ATK Launch Systems project takes place at a single customer site – but, it's a large one. ATK Launch Systems in Promontory, Utah comprises over 540 buildings on a sprawling 19,900-acre site accessible by 75 miles of roads. Their power system of three main substations and 60 miles of power lines deliver about 17 MW (on-peak) to the facilities, with an annual energy bill of over $15 million. In recent years, utility tariff changes have significantly increased the portion of the monthly bills attributable to demand charges. ATK's Corporate Energy Team, established in 2003, and has already implemented a number of energy saving projects, realizing energy costs reductions of $2 million/year or more. As a result of a comprehensive plant-wide energy assessment (partially funded by DOE) in 2006/2007, ATK identified a new set of energy projects at the Promontory site.

The purpose of this project is to develop and demonstrate a diverse system of renewable distributed generation (DG) technologies that are integrated into an intelligent system-wide automation system with two-way communications to the utility and that will produce a verifiable on-demand reduction of at least 15 percent of substation load with no disruption of facility operations. Major milestones include the following:

1) Design and test renewable DG systems controls

2) Design and test the utility/customer gateway

3) Engineer and install about 2.5 MW of diverse, renewable DG

4) Demonstrate system operations

5) Measure and validate savings and systems benefits

ATK hopes to demonstrate that with effective utility/customer interfaces, customer-owned DG using renewable technologies on a small scale can provide tangible, predictable savings to the customer, and at the same time provide system benefits to the utility and the interconnected grid.

DOE Renewable and Distributed Systems Integration (RDSI) Demonstration Projects

In 2008, DOE selected nine microgrid projects for federal funding, totaling $55 million over five years. The objective of these Renewable and Distributed Systems Integration (RDSI) Demonstration Projects is to increase the use of renewable and distributed generation and decrease peak loads on a distribution feeder by 15%. The systems can operate in both grid parallel and islanded modes. The projects are aligned with RDSI goals of increasing reliability, reducing emissions, using fuel more efficiently, resolving cyber system vulnerabilities and allowing consumers to manage their energy costs. Five of the projects are in the western half of the continental U.S., three are in the eastern half, and one is in Hawaii.

Project Criteria 6 Critical Elements

ATK's Smart Grid project can be aligned with the six critical elements that EPRI has identified as key criteria to achieve the goals of its five-year Smart Grid Initiative.

Integration of multiple distributed resource types

To further expose issues that need to be addressed and enable widespread integration of DER.

This project will integrate an ambitious and highly diverse set of distributed resources. These include four heat recovery systems using organic Rankin cycle (ORC) generators connected to Ormat energy converters, for a total of 1400 kW. Heat for the system will be supplied by a concentrating solar thermal array, air compressor waste heat and low pressure steam. The project will also incorporate about 140 kW of wind turbines, a yet-to-be-determined amount of hydro turbine capacity, and about 40 kW of micro-hydro turbines. For storage, the project includes up to 1440 kW of pumped hydro capacity for two - four hours, and an above-ground compressed air energy storage (CAES) and generation system (80 kW capacity for 30-60 minutes).

Application of critical integration technologies and standards

To identify gaps associated with standards, harden critical integration technologies, and advance adoption.

This project aims to adopt EPRI's IntelliGrid control protocols, use open, non-proprietary control elements and technologies, and use off-the-shelf equipment from vendors, whenever possible. This includes use of a non-proprietary database architecture that

project IT personnel can maintain. While some of the information systems will be Web-based, the project will adhere to ATK's own internal stringent security requirements.

Incorporation of dynamic rates or other approaches to link wholesale conditions to customers

To evaluate integration issues and incentives associated with customer response and linking supply with demand.

The intent of the project is to reduce peak demand by 15 percent without adoption of new dynamic rates. Using the current rate structure at the local utility (and project partner) Rocky Mountain Power (RMP), this reduction will significantly reduce ATK's electric bill. Because the total capacity of planned projects is about 2.5 MW and ATK's off-peak load is about 12 MW, ATK will use all of the project's capacity onsite and export no power to the grid.

Integration into system planning and operations

Demonstrate integration tools and techniques to achieve full integration into system planning and operations.

ATK operates on the end of an RMP feeder, and due to ATK's high demand, the company cannot island from RMP. Through a customer/utility gateway and Web portal, RMP will be able to access all relevant information on ATK's power system operation and incorporate this information as applicable into its power system operation and planning processes.

ATK, which owns and operates the power generation and power delivery system on its vast property, will integrate the RDSI program components into its internal system operation and planning functions in a variety of ways. For example, ATK will dispatch and control its DG resources as needed to serve load. ATK will also build various additional functionality into its control systems that may be implemented in the future. These capabilities include load aggregation/shedding and monitoring, fault detection and diagnostics, net metering, alarm and event notification, black start, remote monitoring and control, and historical trending and reports.

Compatibility with initiative goals and approach

Enable high-penetration of DER and advance interoperability and integration for the electric power industry.

This project will demonstrate how a widespread facility or campus can effectively integrate a variety of distributed resources. The work is particularly applicable to facilities/campuses with centralized, interconnected electric, water, and compressed air systems. Boasting perhaps the most diverse set of distributed resources among the RDSI projects, this project's integration of both above-ground compressed air storage and pumped hydro storage, traditional renewable DG, waste heat recovery, and plant micro-climates for wind will yield some transferrable lessons learned.

Leverage of additional funding sources

Secure required participation, commitment, and funding for a successful project.

Partners in this project are ATK Launch Systems, P&E Automation (San Diego, CA), and Rocky Mountain Power (a division of PacifiCorp.) ATK is the willing host for the $3.7 million, five-year project and the project manager. P&E provides the knowledge and

experience in DG renewable projects and controls, including SCADA systems, metering, data collection, and data reduction. P&E also contributes a 5 percent cost share in phase I (FY'09) and a 10 percent cost share in phase II (FY'10-'13). RMP's comprehensive energy incentive program will provide incentive payments based on kW and kWh reductions, improving the cost effectiveness of the project. RMP will also work with P&E to develop the utility/customer interface. DOE is contributing 80 percent of phase I costs and 50 percent of phase II costs. From ATK's perspective, the project is likely to pay for itself in as little as one year, assuming it receives a significant RMP incentive (reimbursement).

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