



Accelerating the Electrification of U.S. Drive Trains: Ready and Affordable Technology Solutions for Domestically Manufactured Advanced Batteries

Larry Atkins

Exide Technologies

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Project ID #
ARRAVT004

Overview

Timeline

- Start Project - Dec 2009
- Project Finish - Dec 2012
- **Percent complete – 88.3%**
(through Feb 2012)

Budget

- Total project budget - \$70.0M
 - DOE share - \$34.3M (49%)
 - Exide share - \$35.7M (51%)
- **Funds received to date = \$ 30.3M**
(through of Feb 2012)
- Plan remainder of FY12 = \$ 3.3M
FY13 = \$ 0.7M

Barriers & Targets

- Advanced Battery Production Capacity - (Domestic) to Enable Advanced Vehicles
 - Improved Energy Efficiency
 - Reduced Dependence on Foreign Oil
 - Reduction in Greenhouse Gasses
 - Enhancing National Security
- ARRA Targets
 - Stimulate Economy
 - Increase Domestic Employment

Partners

- No Project Partnerships
 - Exide Share – Internally Funded
- Customer Support
 - 17 Commitment/Support Letters
- Material Vendor Support
 - Strategic Supply Agreements

Project Objectives

DOE Merit Review - 2012

- ❖ This project covers the expansion of Exide Technologies' manufacturing capacity for producing advanced batteries in existing U.S. battery plants
 - The project plan is to implement a combined increase in yearly production capacity of 1.5 million additional units at two of Exide's current manufacturing locations
 - Columbus, Georgia
 - Bristol, Tennessee
 - These advanced battery technologies are targeted to have an accelerated near-term impact (in high volume) for micro-hybrid vehicles, idle reduction commercial vehicles, and other strategic market segments

Project Objectives

DOE Merit Review - 2012

- ❖ This manufacturing expansion project involves two of Exide's global technologies: a Flat Plate Absorbed Glass Mat (AGM) design and a Spiral Wound AGM design, both of which will be manufactured with advanced carbon technology as required by customer specific advanced vehicle applications.



Flat Plate AGM Battery



Spiral Wound AGM Battery

Project Objectives

DOE Merit Review - 2012

- ❖ The Exide Advanced Battery Expansion Project Addresses Key Program Targets - ARRA and VT Program
 - \$70M in direct economic activity in two domestic locations over the 3 year scope of the project
 - 320 manufacturing jobs at existing plant locations
 - 200 jobs targeted in Columbus GA
 - 120 jobs targeted in Bristol TN
 - When installed in vehicles incorporating energy management technologies, these advanced batteries enable a savings potential of
 - 75 million gallons of fuel per year → more than \$200M at the pump
 - 3 million barrels reduction of imported oil per year
 - 600,000 metric tons of CO₂ per year in reduced emissions

Project Milestones

DOE Merit Review - 2012

- **FY10***
 - DOE Agreement Finalized – December 2009
 - DCAA Audit Report Accepted – March 2010
 - Go/No-Go NEPA EA (FONSI) – March 2010
 - 22% Project Completion at end of FY10; spending based
- **FY11**
 - Continued with Procurement & Installation Phase
 - Began Debug & Qualification Phase at Columbus Site
 - 73.7% Project Completion at end of FY11
- **FY12 – to date, through Feb 2012**
 - Completing Procurement & Installation Phase at Bristol Site
 - Continuing Debug & Qualification Phase at Columbus Site
 - 88.3% Project Completion at end of Feb 2012

* Based on U.S. Government fiscal years (FY##) - throughout this report

- ❖ This project is being carried out in four major project phases at each location over the 3-year life of the project

– Project Phases

- 1) Design Project and Arrange Funding
- 2) Procurement & Installation
- 3) Process Debug & Qualification
- 4) Production Ramp-up & Market Deployment

Approach /Strategy

DOE Merit Review - 2012

❖ The project deployment plan - key items

– Project Task Areas

- 1) Pre-Agreement Planning
 - a) Prepare documents for NEPA EA
 - b) Preliminary product engineering planning
 - c) Order long lead time equipment
- 2) Project Management and Planning
 - a) Product design and planning
 - b) Order remaining equipment
 - c) Environmental Permitting
- 3) Equipment Installation, Debug, and Qualification
 - a) Receive, Install and Debug Equipment
 - b) Deliver to the DOE designated National Laboratory – 18 batteries manufactured from each completed manufacturing facility from low rate initial production for validation purposes
- 4) Production Scale-up Including Hiring and Training of New Manufacturing Employees
- 5) Achieve Production and Product Performance Targets

Accomplishments

DOE Merit Review - 2012

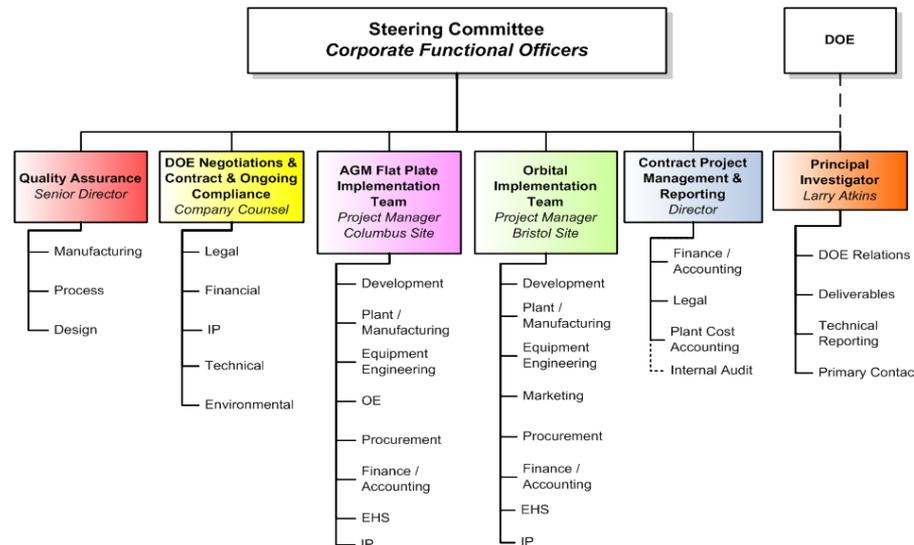
- ❖ The Exide ARRA Battery Project has progressed through the Procurement and Installation Phase at both sites, and well into the Product Qualification Phase at Columbus during FY11 and into FY12
 - *Project Managers in place for both production sites*
 - *Formal Project Management software system implemented*
 - *Capital equipment procured and in place (or in final stages) at both sites*
 - *Production ready state for first customer products achieved at Columbus Site; Deliverable Batteries Scheduled for Shipment to DOE Testing Laboratory in March 2012*
 - *Nationally Publicized Media Event for Columbus site – March 13, 2012 – to Formally Introduce new Advanced AGM Battery Manufacturing Operation*
 - *Bristol Site progressing within plan timeline, but at a slower pace in light of stronger customer demand for the flat plate AGM product platform*

Accomplishments

DOE Merit Review - 2012

❖ Project Management

- A formal organization has been implemented
 - High-level Steering Committee was formed with corporate leadership
 - Periodic meeting schedule - established & on track
 - Functional teams were formed with experienced leaders



❖ Project Management

- Implementation team established
- System software decisions and upgrades
- Special refresher training completed
 - PMBOK Principles
 - Common deployment across project sites
- Project Management Plan (PMP) – original proposal PMP was updated and resubmitted to DOE covering the project through FY11.
 - Updated project planning was confirmed
 - Composite spending trends and forecasts were posted
 - Actual & forecasted employee hiring plans were included

Accomplishments

DOE Merit Review - 2012

- Direct Domestic Job Creation
 - Actual headcount additions are progressing at both sites, in line with our project plans. Ultimate headcounts will be based on actual customer orders and the resulting level of production demand.
 - » Columbus GA – target 200 when at full production
 - » Bristol TN – target 120 when at full production

 - » Total Project – target of 320 incremental jobs

 - Progression of direct headcount additions for this project:

	Actual to date (Feb 2012)	Planned end of FY12 (Sept 2012)	Target added jobs @ full production
Columbus GA	55	76	200
Bristol TN	9	24	120
Total Project	64	100	320

Accomplishments

DOE Merit Review - 2012

- ❖ Project Deployment Progress
 - Columbus GA Site ~ Flat Plate AGM
 - **Process & Product Qualification on Track**
 - Procurement of manufacturing equipment is complete
 - Installation of major production operations are complete
 - Production ready state for first customer products achieved
 - Deliverable batteries scheduled for shipment to DOE testing laboratory in March 2012
 - Added new customer product qualifications are progressing
 - Employee hiring & training activities are being implemented in close coordination with progression of new manufacturing operation. Actual production efficiencies will determine final required operational headcount.
 - There has been no slippage in project timing from the original plan; no changes that would impact either the scope or cost of the project, and no foreseen problems that would prevent a successful completion of the project.

Accomplishments

DOE Merit Review - 2012

❖ Project Deployment Progress

- Columbus GA Site ~ Flat Plate AGM



New State-of-the-Art AGM Battery Assembly Operation in Columbus, Georgia Exide Battery Plant



New World-Class Continuous Plate Manufacturing Operation in Columbus, Georgia Exide Battery Plant



Significant Additional Production Capacity in Battery Formation Department – Columbus, Georgia Exide Battery Plant



Production Validation is Proceeding on the New Advanced AGM Battery Assembly Expansion Line – Columbus, Georgia Exide Battery Plant

Accomplishments

DOE Merit Review - 2012

- ❖ Project Deployment Progress
 - Bristol TN Site ~ Spiral Wound AGM
 - Process Qualification Progressing; Product Validation is Approaching
 - Procurement of manufacturing equipment is complete
 - Installation of major production lines - nearing final stages
 - Manufacturing process qualification is advancing
 - Product validation builds are planned during next quarter
 - Due to customer demand for flat plate lead acid AGM, the Company has shifted technical resources to accelerate project implementation at the Columbus, GA plant site.
 - » Due to the technical resource adjustments there have been modifications to the planned implementation schedules for both sites – Columbus milestones and spending remain on track, while Bristol’s plan is strategically delayed by several months (still within overall project timing targets).
 - » These changes have not impacted either the scope or cost of the project; and, there are no foreseen problems that would prevent a successful completion of the project on the original completion date of 12-21-2012.

Accomplishments

DOE Merit Review - 2012

- ❖ Project Deployment Progress
 - Bristol TN Site ~ Spiral Wound AGM



New High Purity Lead Oxide Manufacturing Operation in the new AGM area in the Bristol, Tennessee Exide Battery Plant



State of the Art Grid Manufacturing Operation in the new AGM Battery Operation in Bristol, Tennessee Exide Plant



Automated Spiral Wound Plate Manufacturing Line in New Advanced AGM Battery Area in Bristol, Tennessee Exide Plant



Overall View of new AGM Battery Production area in Bristol, Tennessee Exide Battery Plant

Collaboration

DOE Merit Review - 2012

- The Exide Advanced Battery Capacity Expansion Project Does Not Involve Direct Project Partners
 - Internally managed manufacturing capacity expansion
 - Company share internally funded
- Customer Commitments/Agreements
 - Proprietary listing of 17 supporting agreements with world-class Automotive / Truck / Military OEMs; as well as, associated Industrial products customers
- Material Vendor Agreements and Support
 - Support from all material and supply vendors within the required time frame to meet full production capacity goals

Upcoming Work

DOE Merit Review - 2012

- ❖ Final equipment deployment, production validation and moving toward actual production planned for the remainder of FY12 and early FY13 – Project ends 12/21/12.
 - Spending plans to complete the project, including prior period actual, shown below
 - 21.6% of total project spending occurred during FY10
 - 52.1% of total project spending occurred during FY11
 - ~26.3% of total project spending planned for FY12
 - < 1% of project spending planned for FY13
 - Production lines were implemented in Bristol during FY11 and early FY 12 according to the revised schedule – validation will be extending to the end of FY12
 - Production Validation in Bristol will be progressing as planned, but at a slower pace due to reallocation of resources toward the Columbus site.
 - Hiring will continue, and will begin to accelerate as we move toward actual production.

Summary

DOE Merit Review - 2012

❖ Exide's Advanced Battery Manufacturing Expansion Project

- **Relevance** - Ready and affordable technology solutions for domestically manufactured advanced batteries / accelerating the electrification of U.S. drive trains. Helps achieve domestic targeted goals for economic growth and employment, while enabling advanced vehicles that will reduce dependence on foreign oil, reduce emissions, and reduce green house gasses – all enhancing our national security.
- **Approach/Strategy** – Project management planning and system implemented for structured earned value management approach. Four project phases administered at two production sites with centralized direction and local deployment teams. Task structured and planned to achieve project objectives according to plan and budget.
- **Accomplishments** – Both project sites active with project teams and activities progressing according to revised plan. Revised PMP has prioritized Columbus site ahead of Bristol site due to customer demand. Major equipment and manufacturing lines installed, and progressing toward final stages. Hiring and training activities are progressing in close coordination with production planning requirements and progressing toward production ready state. There has been no slippage in project timing from the original plan; no changes that would impact either the scope or cost of the project, and no foreseen problems that would prevent a successful completion of the overall project as planned.
- **Collaboration** – Exide's project does not include partner relationships. The company share of the funding is supplied fully from internal sources. Key customer relationships and strategic vendor support agreements will enable commercialization plan.
- **Upcoming Work** – Final deployment and qualification activities are planned for the remainder of FY12 with approximately 26% of the total project spending during that period. Hiring will be accelerating as we move toward actual production.