Construction of a Li Ion Battery (LIB) Cathode Production Plant in Elyria, Ohio

Project ID# ARRAVT008

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BASF Corporation
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Overview

Timeline

- Project Start – April 1, 2010
- Project End – June 30, 2014
- 3-10% Complete

Budget

- $49,209,564 Million Award
  - 50% DOE ($24,604,782)
  - 50% BASF ($24,604,782)
- FY10 Funding Received = $ 700K
- FY11 Funding Received = $ 14M

Barriers

- Cycle Life
- Safety
- High Energy Density

Partners

- Various North American Cell Manufactures
Objectives

- Construct a Lithium-Ion Cathode Manufacturing Facility Capable of Supplying Batteries for 100,000 PHEVs

- Augment the Cathode Manufacturing Facility by Adding Capability to Process Raw Materials
<table>
<thead>
<tr>
<th>Month/Year</th>
<th>Milestone</th>
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<tbody>
<tr>
<td>October 2010</td>
<td>Complete Conceptual Design Phase of Program and Kick-off Construction Program with a Ground Breaking Ceremony. (COMPLETED)</td>
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<td>March 2011</td>
<td>Complete Extended Conceptual Design of Program and Obtain BASF Board Approval for Implementation of Phase I of Program, “Cathode Facility”. (COMPLETED)</td>
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<tr>
<td>November 2011</td>
<td>Complete Construction of Cathode Facility Building and Begin Installation of Equipment</td>
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Approach

- Obtain License for the NCM Cathode Materials from Argonne National Lab.

- Complete Construction of Pilot Facility in Beachwood, Ohio and Begin Qualification with Key Global Customers.

- Construct our Production Facility in Elyria, Ohio as Part of the Recovery Act Program.
Accomplishments

- BASF Completed an exhaustive Market Survey that Confirmed the NMC Cathode Materials are the Choice of Several Major OEMs for Automotive Applications.

- BASF Finalized the Specifications for NCM Materials (NCM 111, 523, 424) and Produces Pilot Samples for Qualification.

- BASF Materials Passed First Stage Qualification at Several Major Global Customers.

- BASF Begins Construction of a Manufacturing Facility to Produce These Important Cathode Materials.
Collaboration

- Technology Transfer: BASF Has Worked Extensively With Argonne National Lab to Transfer Their NCM Technology From Laboratory Scale to Production Scale.

- BASF Continues to Maintain Multiple Global R&D Partnerships to Ensure the Highest Quality Products in Terms of Performance, Reproducibility, Safety, and Cost
May 2011 – May 2012
Project Objectives

- Complete Construction of our Cathode Facility Building
- Begin Work on our Raw Material Facility for Next Generation Products
- Complete Second Stage Qualification with Target Customers
- Have a Majority of Our Manufacturing Equipment Installed
Summary

- BASF Has Successfully Passed Stage 1 Qualification at Several Key Global Customers.

- BASF has Broken Ground on our Production Facility in Elryia, Ohio and Will Complete Building Construction by November 2011.

- BASF is Making Good Progress on our Cathode Facility and is Well Positioned to Enact the Next Year of our Program