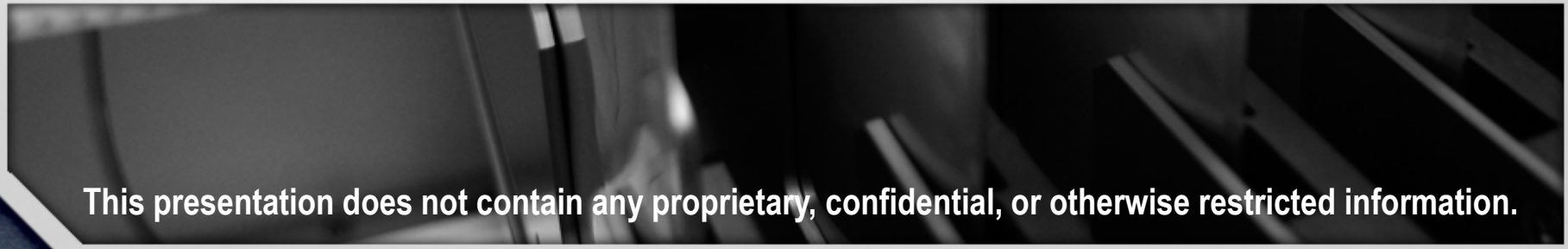
Dow Kokam Lithium Ion Battery Production Facilities

Principle Investigator: John Pham
Presenter: David Pankratz

Dow Kokam
Project ID:
ARRAVT006



The Future is Here

Program Overview

Timeline

- Project Start: Dec 9, 2009
- Project End: Dec 8, 2012
- 87% Complete

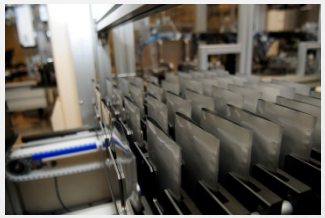
Budget

Total Project Funding

- DOE : $160,971,404
- Dow Kokam: $161,000,000

Funding Received in FY 2011

- $92,985,956



Barriers/Risks

- Volume Effect on Cost Down
- Schedule Delays
- EV Demand Uncertainty
- Raw Material Volatility and Availability
- Lack of Standardization

Partners

- DOE (National Labs)
- DOD
- KCP&L, SDTC
- Dow (Materials and Components)
- EV Partners (Motiv, Corvus, Quantum, Zero Truck)
- State of Michigan

Program Objectives

- The Project objectives are:
  - to design, construct, and commission a facility in Michigan to manufacture cells and batteries to power electric and/or hybrid electric vehicles
  - to advance the battery manufacturing and development processes to make the battery affordable, safer, more reliable, and longer lasting, and
  - to support the Nation's goal of promoting less dependence on foreign oil for the transition to petroleum or emission free vehicles.

To accomplish the Project objectives, the Recipient will execute a three phased approach. The three phases and their objectives are:

- ***Phase I (Design, Engineering & Planning)*** ***Complete***
- ***Phase II (Procurement, Construction & Equipment Startup)*** ***In Progress***
- ***Phase III (Operations & Maintenance)*** ***1H 2012***

Relevance/Impact

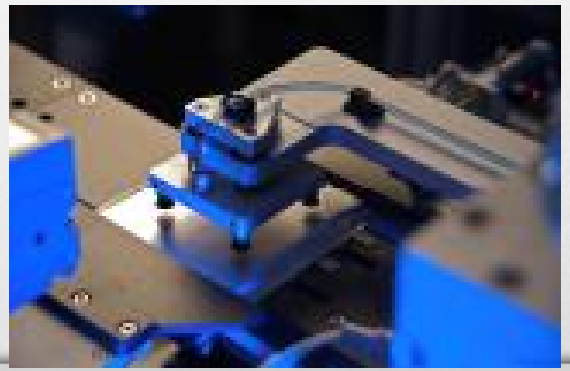
- Establishing traction battery manufacturing in the United States which enables mass adoption of EVs and reduces dependence on foreign oil and emission of green house gas
- Mass adoption of EVs triggers investments along the value chain and enables cost efficiency through scale
- Construction of the plant to date has required 669,000 man hours, worked by more than 1,000 different individuals.
- To date, Dow Kokam has filled 95 manufacturing positions, approximately one third of the 320 the facility expects to employ at full capacity.

Approach - Phase I (Design, Engineering & Planning)

1. Identify appropriate site and secure rights to construct facility
2. Design a facility and manufacturing process that will manufacture cells and batteries to power electric or hybrid electric vehicles
3. Complete the detailed construction drawings
4. Obtain all required related permits sufficient to begin construction

Approach - Phase II
(Procurement, Construction & Equipment Startup)

1. Prepare site for construction
2. Procure manufacturing equipment
3. Construct the manufacturing plant
4. Install all manufacturing process equipment – ***2H 2011 – 1H 2012***
5. Hire staff plant operations and maintenance - ***In Progress***
6. Commission manufacturing process – ***1H 2012***



Approach - Phase III (Operations & Maintenance)

- Train operators and maintenance staff – ***In Progress***
- Manufacture cells and batteries in accordance with OEM specifications ***- 2012***
- Continuously improve upon battery and manufacturing processes ***– On Going***

Milestones

July 2009: Dow Kokam joint venture received a $161 million matching grant from the U.S. DOE to build the Midland manufacturing facility

November 2009: Executive management team named

March 2010: NEPA and Air Permit approval granted

November 2010: All major manufacturing equipment designed and ordered

April 2011: *FAST START* Training with local college for candidates for permanent hiring for Midland facility began

September 2009: Dow Kokam LLC officially formed

January 2010: Midland City Council voted on resolution supporting MSF Designated Ren Zone

June 2010 Ground breaking /construction began on Midland manufacturing facility

December 2010 Michigan Plant enclosed with roof and walls

Mid 2012: Full production at Midland manufacturing facility to begin

Collaborations / Partnerships

- DOE (National Labs)
  - ORNL - Next Generation Cathode Technology
  - ANL - Battery Performance
- DOD
  - Tactical / Non-tactical vehicles development
  - B3590 – Soldier Communication Pack
  - US Air Force - JSF35
  - US Army - Kiowa Warrior helicopter
- Utilities / Grid
  - Kansas City Power and Light - ARRA funded Smart Grid demonstration
  - SDTC (Sustainment Development Technology of Canada)/Ontario Utility - Community smart grid energy storage

Collaborations / Partnerships

- Dow (Materials and Components) –
  - Localizing electrode material manufacturing
  - Development of advanced materials
- EV Partners
  - Quantum – Plug-in Electric Ford F-150
  - Motiv Power Systems - Power Control Systems which enable electric-drive commercial vehicles
  - Corvus Energy – Marine, Solar, Wind, Trucking, Commercial, Submersibles
  - Zero Trucks – Zero emission full electric medium duty truck
- State of Michigan – Supporting project financially and create a positive business environment

Future Work

- Hire and train operators
- Take delivery of equipment and install
- Start-up and qualify
- Technology transfer/integration
- Seeding the market and build demand

Summary

- Midland Battery Park program is well underway
- ARRA funding awarded in December of 2009 and is projected to be 95% completed by May 2012
- Building is complete and most equipment is installed
- Construction of the plant to date has required 669,000 man hours, worked by more than 1,000 different individuals and has hired approximately one third of the full-time employees expected to run the facility at full capacity.
- Dow Kokam has worked closely with the State of Michigan on Fast Start training. Three class have been completed.

Acknowledgements

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