

# **DC Bus Capacitor Manufacturing Facility for Electric Drive Vehicles**

John Charles Boan, Ph.D.  
KEMET Electronics Corporation  
May 2011

Project ID #  
ARRAVT028

# Overview

## **Timeline**

- Start: February 2010
- Finish: February 2013
- 30% Percent complete

## **Budget**

- Total project funding
  - ✓ DOE = \$15,140,000
  - ✓ KEC = \$16,534,213

## **Barriers**

- Global Economy
- Consumer Acceptance of EDV
- Price of Oil

## **Partners**

- Not Applicable

# *Relevance*

- **OBJECTIVE**

- The project objective is to build and equip a factory in Simpsonville, SC to manufacture DC bus capacitors as defined by the ARRA Electric Drive Vehicle Battery and Component Manufacturing Initiative (Area of interest 6; Electric Drive Subcomponent Manufacturing Facilities)
- The factory will be ready to manufacture DC bus capacitors in 2011

- **IMPACT**

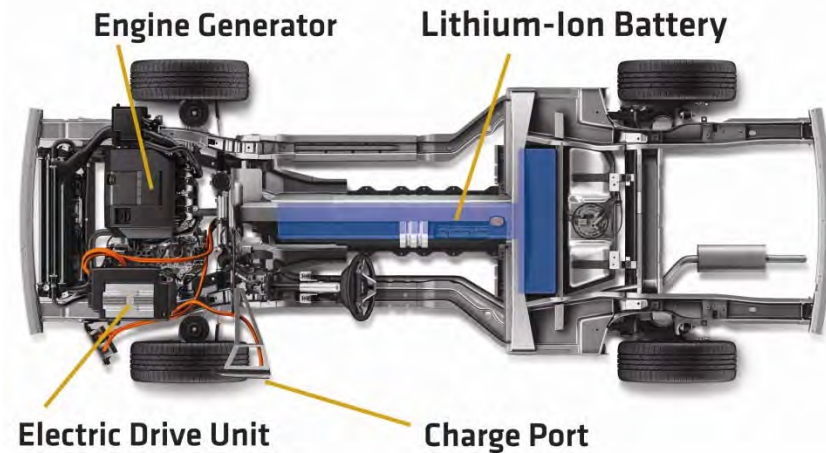
- Increase the available capacity in the USA for DC bus capacitors and therefore reduce the supply chain risk to the EDV manufactures
  - Capacity to support the manufacture of up to up to 100,000 EDVs
- Development of domestic expertise
- Fully operational, this factory will employ up to 113 people and support KEMET's efforts in retaining an additional 450 US employees

# Approach

- KEMET will prepare manufacturing space within an existing facility in Simpsonville, SC, purchase the necessary capital equipment, and hire the necessary personnel within the three year window to run up to 6 manufacturing lines capable of manufacturing different types of DC bus capacitors in volumes necessary to meet or exceed the required 100,000 Electric Drive Vehicles
- KEMET will manage the work using its traditional project management tools and will staff the project with experienced personnel who are considered industry experts in the construction and operation of capacitor manufacturing factories
- Work began immediately upon notification that the funding was available

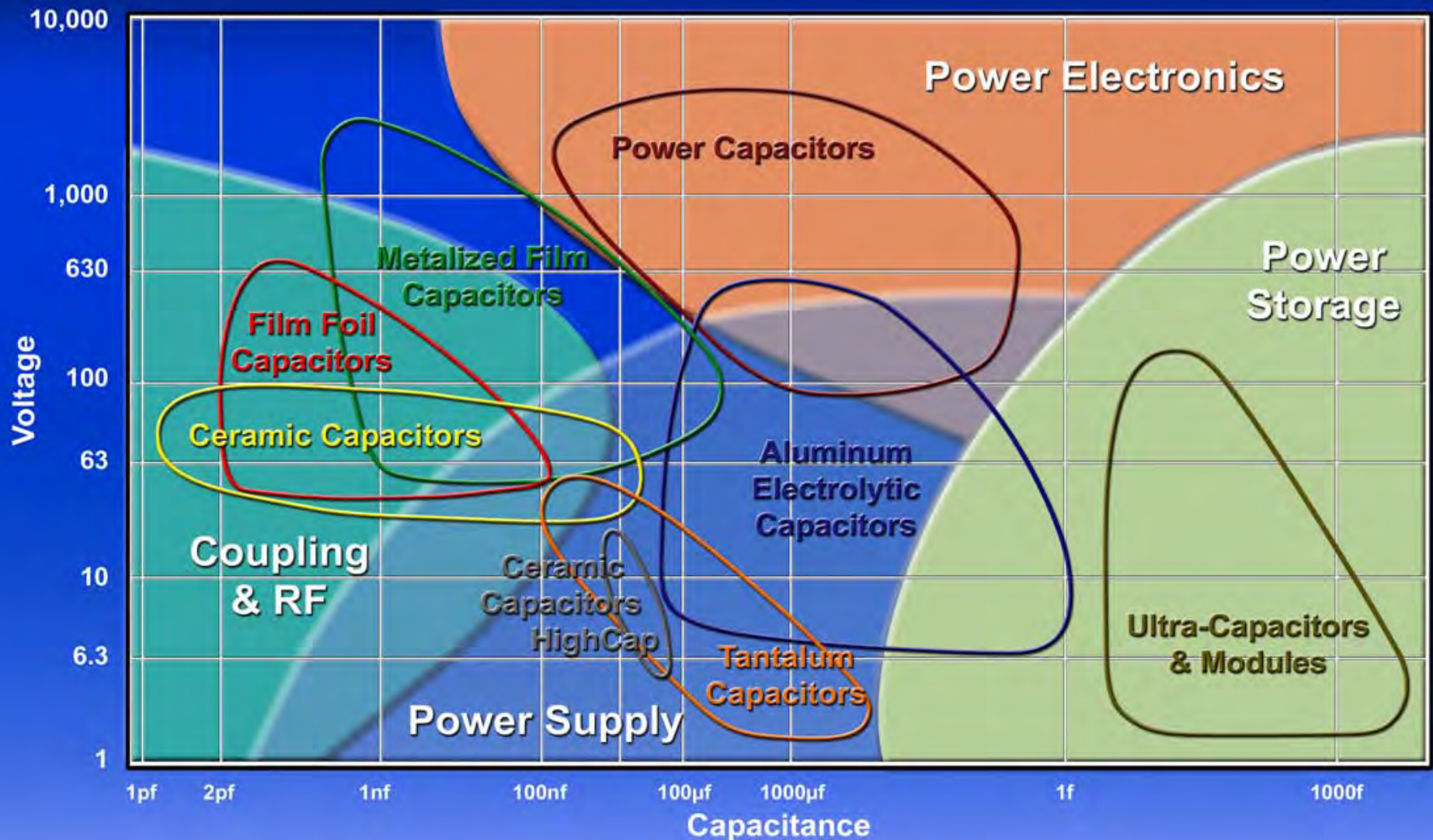
# Technical Accomplishments

- AC electric motor drives of the type used in Electric Drive Vehicles require an energy storage capacitor (the “DC bus capacitor”) at the input to the inverter which powers the motor
- Based on customer input and research KEMET will offer the EDV Manufacturers three (3) different technological solutions that should solve any DC bus capacitor requirement:
  - Soft Wound Film Capacitors
  - Stacked Film Capacitors
  - Aluminum Electrolytic Capacitors



# Technical Accomplishments

## Project's Products



## Technical Accomplishments

# Project's Products

### **DC Bus (Link) Capacitors**

- Large Aluminum Electrolytics
- Soft Wound Films
- Stacked Films

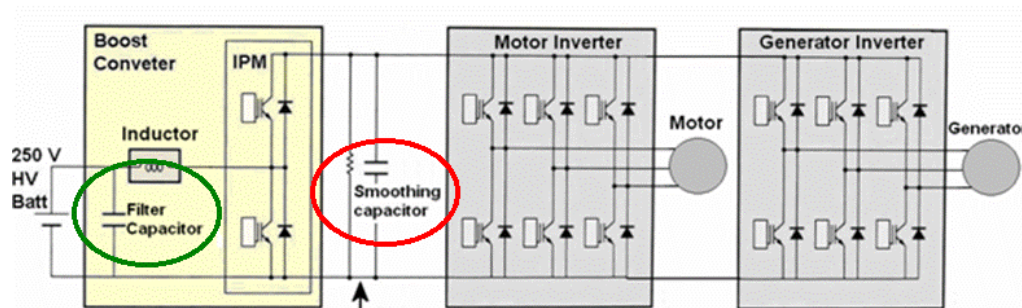




# Technical Accomplishments

## Potential Applications

- Hybrid Electric Vehicles
  - ✓ *Micro Hybrid*
  - ✓ *Mild Hybrid*
  - ✓ *Full Hybrid*
- Full Electric Vehicles and Chargers
- Neighborhood Electric Vehicles and Charger





# Progress & Future Work

2010	2011	2012	2013
<ul style="list-style-type: none"><li>• Contract Signed</li><li>• Design &amp; Order Equipment</li><li>• Professional staffing</li><li>• Customer Identification</li></ul>	<ul style="list-style-type: none"><li>• Factory preparation</li><li>• 1<sup>ST</sup> Equipment set</li><li>• Employee staffing</li><li>• Customer qualifications</li></ul>	<ul style="list-style-type: none"><li>• 2<sup>nd</sup> Equipment set</li><li>• Employee staffing</li></ul>	<ul style="list-style-type: none"><li>• 3<sup>rd</sup> Equipment set</li><li>• Employee staffing</li></ul>

# Summary Slide

- KEMET will build and equip a factory in Simpsonville, SC to manufacture DC bus capacitors for up to 100,000 Electric Drive Vehicles
- The factory will be ready to manufacture DC bus capacitors in 2011 and when fully utilized will support 113 new jobs.

