

**Testimony of Mary Ann Wright  
Johnson Controls, Inc.**

**Before the United States House Select Committee on  
Energy Independence and Global Warming**

**Hearing on The Clean Energy Recovery:  
Creating Jobs, Building New Industries and Saving Money**

**March 10, 2010**

Mr. Chairman and members of the Committee, my name is MaryAnn Wright. I am the Vice President and Managing Director, Business Accelerator Project, Johnson Controls, Inc. In addition to being the world's largest provider and recycler of starter batteries, we are the leading independent supplier of battery systems for hybrid vehicles, plug-in hybrid vehicles, and electric vehicles.

I greatly appreciate the opportunity to discuss with you today the current status of our American Recovery and Reinvestment Act grant, the opportunity it is creating and the challenges we face. I am honored that you have asked me to speak before you today regarding the domestic advanced battery industry, a topic which is critical to the security, economic vitality, and environmental stability of our country and planet.

I would like to address three main points in my testimony:

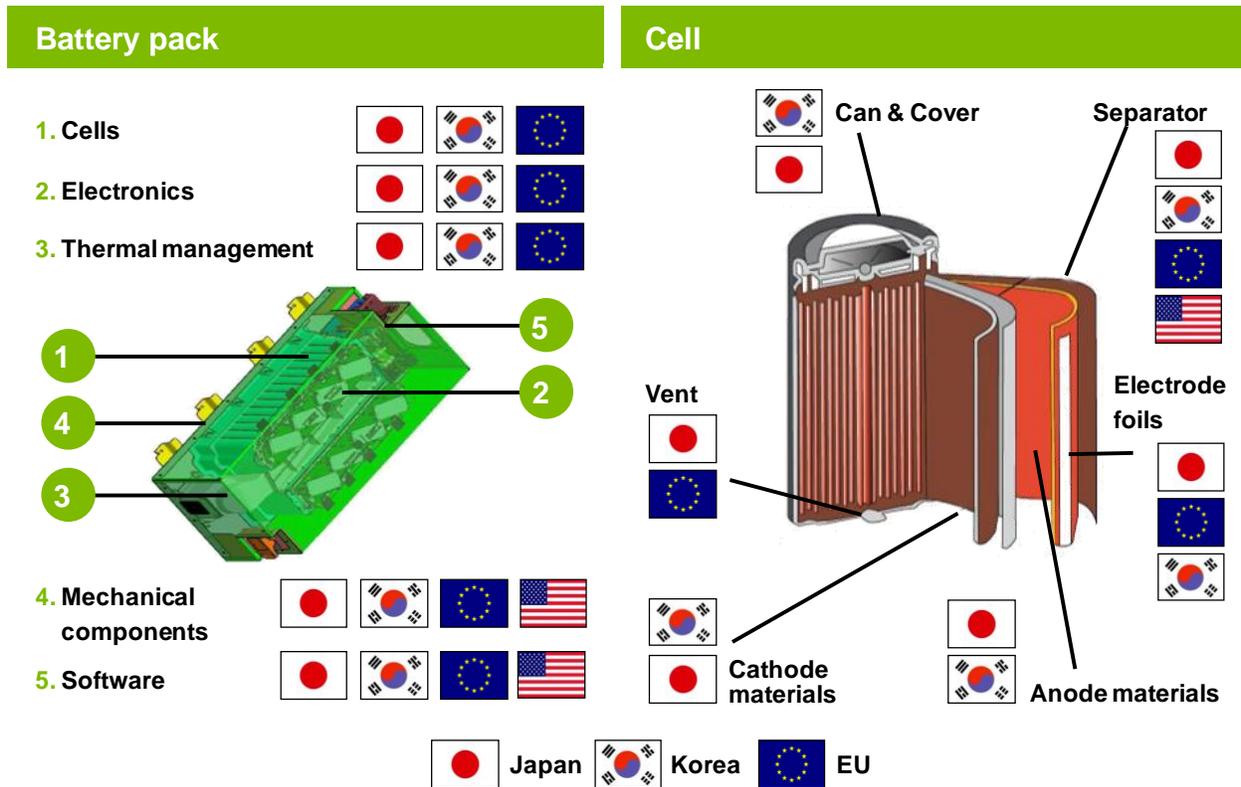
1. The current state of the advanced battery industry globally;
2. Where we are in executing our Recovery Act grant; and
3. The industry's challenges.

**Current State of the Advanced Battery Industry**

Today, nearly all the batteries for hybrid electric vehicles and plug-in electric vehicles, along with the materials and equipment to manufacture them, are made in Pacific Rim countries. Also, most of the other key electric power train components are available today only from offshore sources, primarily in Asia.

Without a domestic manufacturing and supply base for advanced battery systems, America's energy security will continue to be held hostage, exacerbating our economic problems, most notably our vanishing manufacturing base and corresponding massive trade deficit. As we begin to replace petroleum with electricity to power our vehicles, America must not swap today's foreign oil cartel for a foreign battery cartel.

Below is a representation of the country of origin of the critical materials and components for a lithium-ion battery pack and its individual cells. It is not a pretty picture because most of the key supply base is in foreign countries.



Moreover, our foreign competitors are not standing still. Other countries are making huge investments to seize the opportunity to shift from fossil-based fuels and embrace electrified vehicles and new battery technology. We must reverse the decline in domestic manufacturing investment and eliminate the malignant transfer of our national wealth that results from our purchase of foreign energy.

Fortunately, we have taken an important step to address this problem through the Recovery Act grant awards for electric drive vehicle battery and component manufacturing. I am pleased to say that Johnson Controls was one of nine advanced battery manufacturing grant recipients under this important initiative. Let me provide a status update on our first lithium-ion automotive battery manufacturing plant in the United States.

## **Our New Li-Ion Battery Production Facility**

As background, Johnson Controls, in a joint venture with Saft America, named Johnson Controls-Saft Advanced Power Solutions, launched the world's first automotive lithium-ion cell manufacturing and battery assembly facility in Nersac, France in 2008. That facility is currently mass producing lithium-ion cells and packs for Mercedes and BMW hybrid vehicles.

In August 2009 we were awarded a Recovery Act matching grant to create an advanced battery manufacturing industry in the United States. This grant, along with significant incentives from the State of Michigan, played a key role in our decision to build a manufacturing plant for advanced batteries in this country. Without this support from the DOE, we would have likely expanded our manufacturing footprint in Europe or Asia. As a result of the Recovery Act grant, we also re-located our electronics engineering from France to Holland, MI creating new, high quality jobs.

It is important to understand that we are not just building a domestic advanced battery manufacturing plant. We are also building a domestic supply chain and recycling infrastructure for the manufacture of lithium-ion batteries for electric drive vehicles.

This initiative includes suppliers of critical materials and components in addition to U.S. equipment suppliers for the specialized machinery the industry will need. To date, we have helped recruit two Asian materials suppliers to the U.S. (Michigan). We have formed strategic partnerships with global battery recyclers to implement battery collection, transportation, recycling and material recovery and reuse processes. Presently, Johnson Controls is the world's largest recycler of lead-acid (starter) batteries. We have a mature infrastructure that includes coordinated fleets for delivery of new batteries coupled with pick-up and reverse distribution of spent batteries to our recycling partners. We will leverage this successful template to develop the technology and capability to replicate a close-loop process for the lithium-ion industry. We have contracted with an equipment manufacturer in our home state of Wisconsin to supply the coating and drying line -- one of the most critical machines used in the process of making lithium-ion cells.

For the cells alone, there are nine major components that will be sourced on-shore as the result of our decision to produce this technology in the United States, a decision catalyzed by the Recovery Act funding:

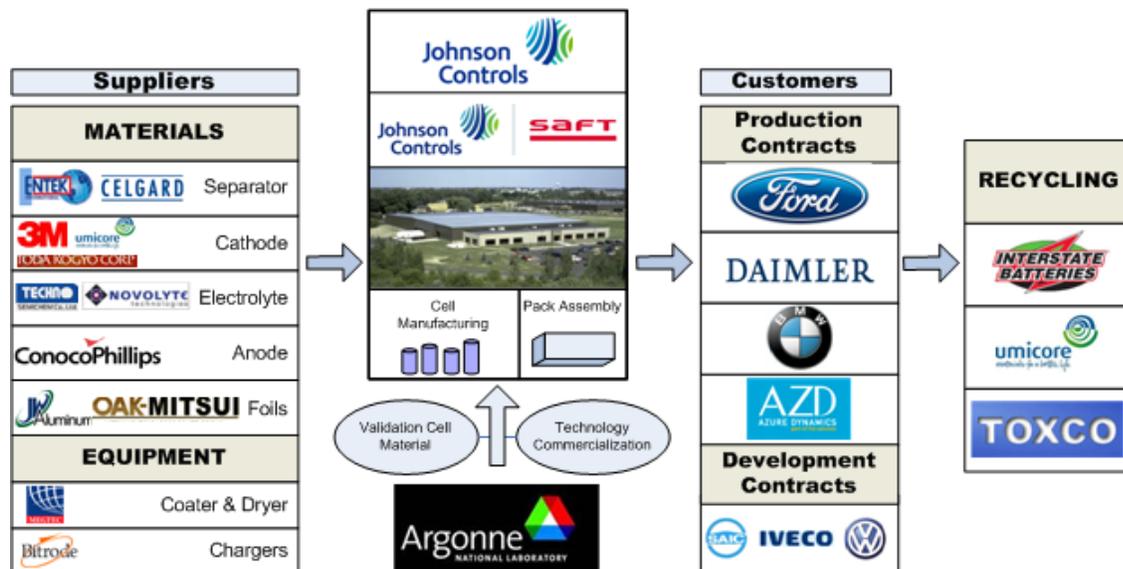
- 1) aluminum foil
- 2) copper foil
- 3) cathode powder
- 4) anode powder
- 5) separator
- 6) electrolyte
- 7) container/cover
- 8) binder
- 9) solvent

It is important to note that some of these materials, the cathode powder in particular, represent the vanguard of materials science and advanced process technologies that will help the U.S. regain its position as the most innovative country on earth.

The Recovery Act funding for advanced battery manufacturing is stimulating economic activity in many industry sectors including one of strategic importance – the development of a lithium mine in northern Nevada. Currently, global reserves of lithium metal equivalent are estimated at 31 million metric tons. The mine in northern Nevada will add another 2.2 million metric tons to this total or approximately 7%. Moreover, this new mine will add 40% to the current North American reserves of 5.7 million metric tons.

Our technology partners include the Department of Energy’s Argonne National Laboratory, who will help us accelerate commercialization and validation of cell materials. We also have partnered with the DOE’s Oak Ridge National Laboratory under a separate contract to validate and implement manufacturing process enhancements for lithium-ion cells. Ford Motor Company, a sponsor of both our Michigan incentive award as well DOE Recovery grant, awarded Johnson Controls-Saft the development and production contract for their PHEV program launching in 2012.

We have established commercial viability through customers who have awarded us long-term production contracts. We have production contracts with Ford, Daimler, BMW and Azure Dynamics. Notably, we have pre-production development contracts with several global customers, including Jaguar Land Rover and Volkswagen, in support of their production program plans. Below is a diagram of our advanced battery initiative funded in part by the Recovery Act grant.



We have chosen an existing manufacturing location on our technical campus in Holland, Michigan to site the plant. We are drawing on a workforce from an area rich with skilled automotive workers. Through the reemployment of local talent, we will help reverse the recent trend of job loss in the automotive industry generally and the Midwest specifically.



***Johnson Controls Li-ion Cell Manufacturing and Battery System Assembly Plant, Holland, Michigan***

This investment is an important step toward creating and building an industry in the United States that addresses market requirements and long-term opportunities for growth and new jobs in this country. Construction of our plant in Holland, Michigan is progressing as planned with battery pack assembly set to begin in August of this year and cell production starting in 2011.

We will support several important customers from this facility. Johnson Controls is the exclusive supplier for the complete battery system for Ford Motor Company's first series production plug-in hybrid electric vehicle (PHEV), which will be introduced in 2012. In October it was announced that we will supply batteries for the Ford Transit Connect commercial van in 2010 in collaboration with Azure Dynamics. We are working with Azure to supply batteries for other commercial delivery trucks that will start in production in 2010. In addition, we will transfer to the U.S. our production of batteries for the Mercedes S-Class and BMW 7-Series mild hybrids, presently produced in France.

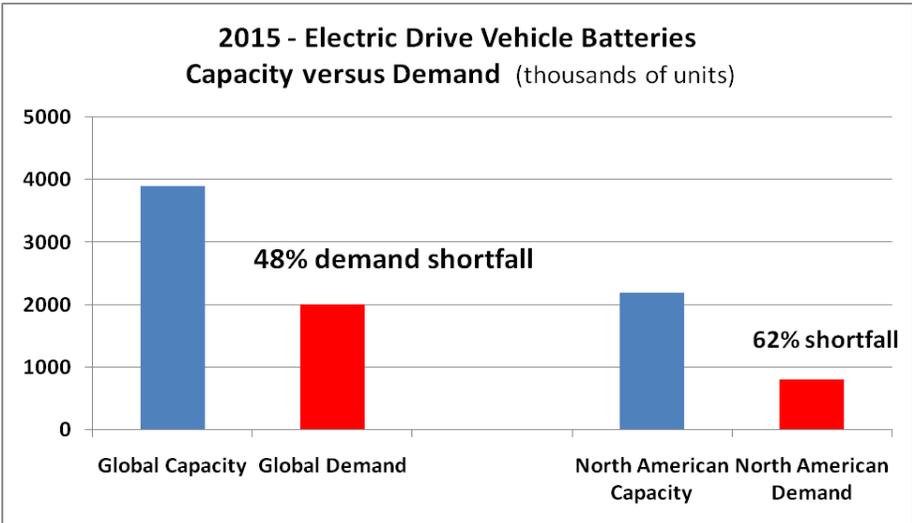
Earlier I spoke about the importance of re-establishing the United States as the world leader in transferring R&D innovations into commercially successful products – manufactured in the U.S. As part of Johnson Controls corporate commitment to support this initiative we have created a Hybrid Battery Business Accelerator team, which I lead at our headquarters in Milwaukee. The purpose of this team is to leverage the business opportunities created in large part by the Recovery Act funding by helping to accelerate market demand and the pace of energy storage innovation as we simultaneously stand up the plant in Michigan. The Business Accelerator was chartered last fall and has recruited significant industry expertise including many technical and management experts from defunct Imara Corporation. Additionally our Battery Technology Center is undergoing major upgrades in both facilities and equipment including a 50% increase

in the size of our Battery Test Facility which was built just two years ago. Although our Recovery Act award cannot be used to fund R&D expansion; it is being done exclusively with Johnson Controls and Johnson Controls-Saft funds, clearly ARRA funds have become a force multiplier which will directly drive excellence in domestic manufacturing and indirectly provide the impetus and confidence for companies such as ours to invent the future rather than attempt to predict it.

**The Challenge – Demand for Electric Vehicles**

Congress has shown vision and determination in appropriating \$2 billion in Recovery Act funding to support the development of a U.S. manufacturing industry for advanced batteries and for electric drive components. Job creation and retention will result from our ability to “fill up our plant” with customer orders. At capacity, our first plant will employ 550 people. Historically, the creation of one job at the Tier 1 level such as Johnson Controls will have a multiplier effect of approximately 3 additional jobs in the lower tier supply base. Studies by both the Economic Policy Institute and the Council for Automotive Research support this jobs multiplier factor. In summary we expect that when running at capacity the total employee impact of our Holland , MI plant will approach 2,000 industry jobs. This doesn’t include supporting business infrastructure jobs such as restaurants, barber shops, shops, etc. However, the sustained success of this investment will depend ultimately upon creating demand for electric drive vehicles. We run the risk of creating more capacity to build batteries and critical components for new electric drive vehicles than what the market will demand, particularly during the early stage of commercialization. Of concern is the near-term, i.e., 2010 through 2015 when market demand, if left uncatalyzed, will lag manufacturing capacity. The bar chart shown below underscores the challenge – we estimate that by 2015 domestic capacity in vehicle units will exceed demand by approximately 1.35 million units, a gap of 62 percent.

Electrified Vehicle Demand vs. Capacity - North America  
(in thousands of units)



Early in the life cycle of any new product or technology, scale is one of the critical factors enabling manufacturing success, as well as cost reductions. Electrification of vehicle fleets, including government fleets, can be a major contributor towards rapidly achieving scale.

Combined, the U.S. General Services Administration, Postal Service, and Department of Defense operate approximately 1 million non-tactical vehicles. Many of these vehicles, particularly Postal Delivery LLV vans, are excellent candidates from an economic standpoint for some level of power train electrification. The average Postal Delivery vehicle travels 18 miles a day at very low speeds in stop-start mode and averages only 10 mpg. The Postal Service's Inspector General Office estimates that a full electric version of a delivery vehicle will save \$1,500 per year in fuel cost if gasoline is priced between 3-4 dollars per gallon. Many other federal fleet vehicles are also good candidates for electrification and would help create demand.

Beyond the federal government, the 50 states collectively operate another 1 million vehicles. Electrification of state and local government fleets would have a significant impact on creating demand. Johnson Controls Building Efficiency business operates a service vehicle fleet of 5,548 vehicles. Seventy-seven percent of these vehicle travel less than 60 miles daily and 25 percent travel less than 40 miles per day. This represents a tremendous opportunity for us to electrify our own vehicles and gain invaluable field experience and help to build demand. We have implemented a pilot program in Milwaukee and will be taking delivery of our first fully electric service van within the next month.

### **Leveraging the Recovery Act Manufacturing Investment**

In order to stimulate demand through government agency purchases of electrified vehicles for their fleets, we will need to leverage our existing Recovery Act investments. This could be done by establishing a preference to purchase electric drive vehicles for government fleets that contain batteries and components manufactured in facilities supported by Recovery Act grants. The risk if we do not leverage our investment is that our tax dollars could go to purchase electrified vehicles assembled in the United States but with batteries and components made in foreign countries. This could have the unintended consequence of stunting the utilization of domestic capacity, ultimately resulting in shuttered facilities and lost jobs.

In his Joint Address to Congress on February 24, 2009, one week after signing the Recovery Act, President Obama said:

“New plug-in hybrids roll off our assembly lines, but they will run on batteries made in Korea. I do not accept a future where the jobs and industries of tomorrow take root beyond our borders – and I know you don’t either. It is time for America to lead again.”

In addition to fleets, another critical policy to help spur demand is the continuation of tax incentives for the purchase of electrified vehicles. These incentives are proven demand boosters that must be maintained. Failure to continue these important tax policies at this time would send exactly the wrong signal to the marketplace and individual customers.

Another approach to stimulating market demand is advocated in the Electrification Coalition's Roadmap – the creation of Electrification Ecosystems. Investing in a series of large-scale demonstration projects will encourage the adoption of electric vehicles and prove their market readiness. The establishment of Electrification Ecosystems has three important goals:

- 1) Prove that wide scale deployment of grid-enabled vehicles is not only possible, but desirable;
- 2) Take advantage of economies of scale; and
- 3) Support research to answer critical questions about usage and recycling patterns.

### **Research and Development – The Future**

As we execute our plan to create an advanced battery manufacturing industry we must also keep a focus on the future. The nature of technology is that there is always something better on the horizon. For the United States to achieve global product and manufacturing leadership in this technology is just the first step; we must sustain it with continuing and robust Federal R&D funding. In the same manner that lithium-ion is now supplanting nickel metal-hydrate as the technology of choice for electric drive vehicles, the next game-changing chemistry is already being pursued by our global competitors in partnership with their governments. Japan has set a national technology goal for a 7X improvement in specific energy coupled with a 94 percent cost reduction for electric drive vehicle batteries by 2030. Commercialization of these technologies will depend on not only fundamental chemistry and materials breakthroughs, but also substantial innovations in manufacturing processes and equipment.

Technology R&D on this scale is risky and costly, requiring more resources, both capital and intellectual, than what is available in the private sector alone. Continuing federal support through the DOE and its national laboratory network is critical to ensuring that the technology of the future is made here at home. The near collapse of U.S. financial markets over the last two years has made it painfully clear that our eroded manufacturing base must be rebuilt and returned to its time-tested position as the cornerstone of a healthy economy.

We need to develop next generation lithium-ion batteries by improving electro-chemistries, as well as the battery systems which support and extend cell life. We must discover and develop the successor electrochemistry to lithium-ion. There are several technologies under consideration as the next transformation in battery technology. Equally important is the rest of the battery system, which includes sensors and thermal management components. Federal R&D support must be maintained in these areas in order for our domestic industry to remain competitive. We need to foster a collaborative relationship with the national labs and private industry to enable technology ideas to go from the labs to commercial success in the market place.

### **Additional Consideration – Tax Treatment of Recovery Act Grants**

Currently, recipients of ARRA grants for advanced battery and critical components manufacturing, as well as the recipients of Smart Grid technology grants, need clarification on the tax treatment of these funds. Nothing in the Recovery Act indicates that these grants are

taxable. Legislation gave a clear intent of a 50:50 cost-share grant structure. Should the IRS interpret these grants as being taxable income, we may find that at a 30 percent taxation rate, many millions of dollars from the grants merely will go back to the government and not be spent on actual manufacturing and jobs. We understand that the IRS may be able to interpret their current authority and the intent of the legislation to not tax the Recovery Act grants. If not, the IRS may need a statutory ability to grant an exclusion and not consider these grants as taxable income.

The Recovery Act was designed to help create jobs and innovation in the United States in a tough economy and a hard competitive environment. Every dollar of the grant should be spent on hiring workers, developing new technologies, and putting manufacturing infrastructure in place that will propel American companies forward and enable them to compete with foreign manufacturers. Facilities such as ours can be great successes for the Recovery Act. We hope that the intent of the legislation will be clarified and the entire sum of the grant will go towards our facilities.

In conclusion, let me thank the Committee for this opportunity to testify. We are making important investments needed to develop a domestic and sustainable manufacturing base for the commercialization of electric drive vehicles. These investments will result in good paying, sustainable jobs, not only at our facility, but also throughout the domestic supply chain that we are building. Going forward, these investments to develop a domestic battery manufacturing infrastructure will enhance our global competitive position in the development and production of electrified vehicles. However, our progress must be maintained by creating demand for these vehicles by electrifying our fleets, maintaining tax incentives, and investing in research and development. The success of these initiatives is critical to the security, economic vitality, and environmental stability of our country and planet.

Let me close by saying that Professor John Goodenough, an American, is widely credited with having invented Li-Ion energy storage technology in the 1980s. Congress has shown vision and wisdom in providing funding through the Recovery Act to ensure that the world class technology previously invented in America is now going to be manufactured here. Thank you