

**Testimony of Mary Ann Wright
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**Before the United States Senate Committee on Appropriations
Energy and Water Development Subcommittee**

Hearing on the Future of Electric Vehicles

February 23, 2010

Mr. Chairman and members of the subcommittee, my name is MaryAnn Wright. I am the Vice President and Managing Director, Business Accelerator Project, Power Solutions Division of Johnson Controls, Inc. We are the leading independent supplier of battery systems for hybrid vehicles, plug-in hybrid vehicles, and electric vehicles. Johnson Controls is a founding member of the Electrification Coalition. In addition, I serve on the Board of Directors of the Electric Drive Transportation Association (EDTA).

I greatly appreciate the opportunity to discuss with you today the current status of batteries for electric vehicles and the opportunities and challenges we face. I am honored that you have asked me to speak before you today on a topic so critical to the security, economic vitality, and environmental stability of our country and planet.

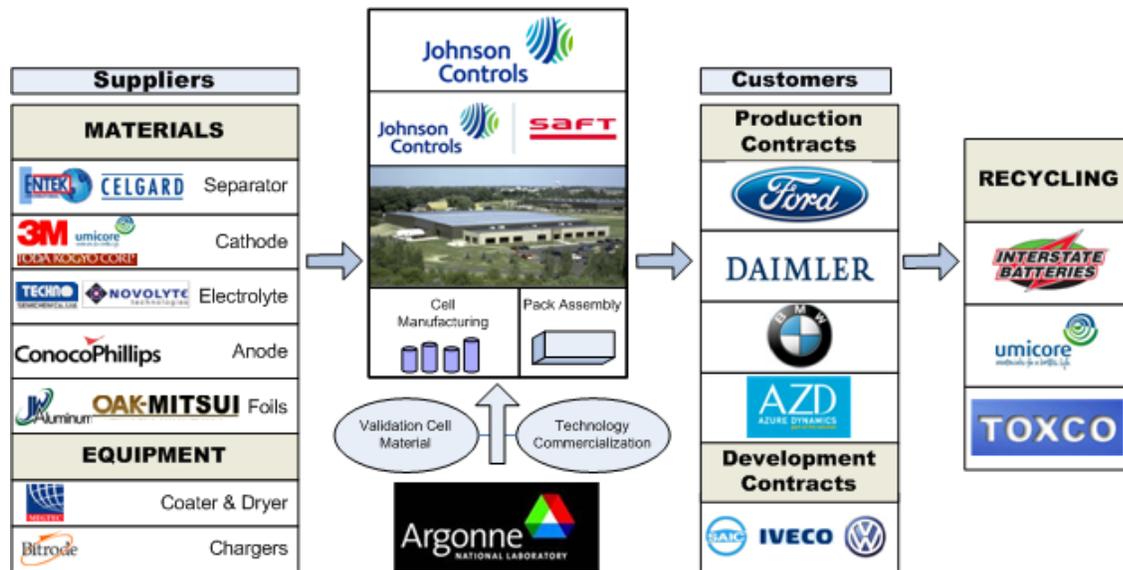
Our New Li-Ion Battery Production Facility

Let me start with an important status update on our first lithium-ion automotive battery manufacturing plant in the United States. 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 an ARRA 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 built our second lithium-ion battery plant in Europe or Asia.

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. The Recovery Act funding

for advanced battery manufacturing is stimulating economic activity in many industry sectors including one of critical strategic importance – the development of a lithium mine in northern Nevada. 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. 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 ARRA 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 supply batteries for the Mercedes S-Class and BMW 7-Series mild hybrids, presently produced in France.



Ford Transit Connect Electric

Designed for fleet customers – On Sale in late 2010

Battery: Johnson Controls 28 kWhr Lithium-Ion, expected to last the life of the vehicle

Top Speed: 75 mph

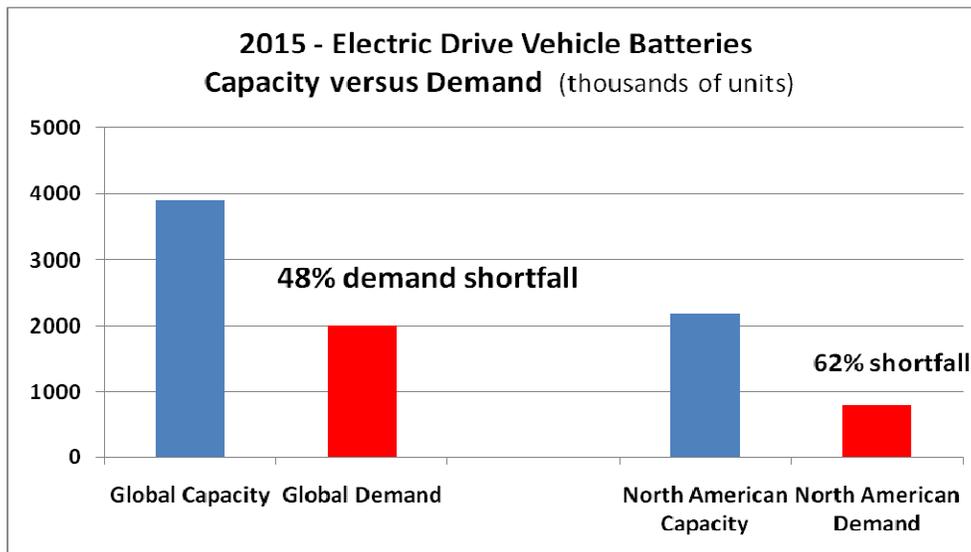
Range: 80 miles on a single charge

Charging: Both 120V and 240V

The Challenge – Demand for Electric Vehicles

Congress has shown vision and determination in appropriating \$2 billion in ARRA funding to support the development of a U.S. manufacturing industry for advanced batteries and for electric drive components. 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 ARRA Manufacturing Investment

In order to stimulate demand through government agency purchases of electrified vehicles for their fleets, we will need to leverage our existing ARRA 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 ARRA 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.

Electrification Coalition Ecosystem Cities

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.

By concentrating investments in a limited number of communities, we can maximize leverage from the opportunity to demonstrate that grid-enabled vehicles can meet drivers' needs. As the Roadmap stated:

“Electrification ecosystems will demonstrate that a community is capable of putting the infrastructure in place, operating the vehicles over their lifetimes, and disposing of them after their useful life has ended, all in a manner that profits the participants in the value chain. In short, electrification ecosystems provide the best opportunity to give consumers confidence in the safety, performance, and benefits of the vehicles themselves and the reliability of the surrounding infrastructure.” (Electrification Roadmap, November, 2009, Electrification Coalition, page 141.)

A third and critical element 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.

Research and Development – The Future

As we execute our plan to create an advanced battery manufacturing industry we cannot ignore 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-hydride 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 ARRA 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 ARRA 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 ARRA grants. If not, the IRS may need a statutory ability to grant an exclusion and not consider these ARRA grants as taxable income.

ARRA 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 and developing new technologies that will propel American companies forward and enable them to compete with foreign manufacturers. Facilities such as ours can be great successes for the ARRA. 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. However, our progress must be maintained by creating demand for these vehicles by electrifying our fleets, establishing valuable demonstration projects, 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.