

Improving the Economic and Environmental Performance of the North American Automotive Industry Supply Chain

2011 Project Report

Prepared for:



Commission for Environmental Cooperation (CEC)

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INTRODUCTION

The CEC embarked on this project of “Improving the Economic and Environmental Performance of the North American Automotive Industry Supply Chain” with the objective of re-engaging key automotive companies for the development and implementation of green supply-chain programs across North America. This builds precisely on the language within the 2010–2015 CEC Strategic Plan of: “building on our success in the automotive manufacturing sector through continued efforts to green critical components of supply chains across the continent and support the ongoing recovery of this important sector.”

Initiatives for greening the North American automotive industry have been supported by the CEC in the past, specifically in the 2009–2010 Operational Plan and Council Resolution 06-06. Past CEC efforts succeeded in stimulating competitiveness to the sector and reducing environmental impacts through collaboration with the Suppliers Partnership for the Environment (SP) organization in the United States. Expansion of an automotive supply chain program into Canada and Mexico was also near completion when it was suspended by the misfortune of the unexpected economic downturn.

This project proposes now to extend work in greening the automotive supply chain throughout Canada and Mexico to create a "one window" North American program. Continuing the work already started by the CEC in the automotive sector is important to establish a successful cooperative trilateral initiative and achieve a business-driven, self-supported North American partnership that will promote greening of the automotive supply chain in North America.

Given the success of the work already underway within the United States and the strong integration of the auto sector across all three countries, this project will allow both Canada and Mexico to benefit from existing efforts in the United States, level the playing field across North America, and permit trilateral cooperation. These programs can be the foundation for automotive manufacturers and their suppliers to share information and practices that will improve environmental and economic performance within this North American sector supply chain.

In June of 2011, CEC announced the launch of this new project on “Improving the Economic and Environmental Performance of the North American Automotive Industry Supply Chain” at the National Environmental Sustainability Summit (NESS) in Detroit, Michigan, United States. Throughout the remainder of the year, the CEC worked to engage automotive manufacturers, suppliers and government representatives in the United States, Mexico and Canada in its mission to develop green automotive supply chain programs in both Mexico and Canada. By year’s end, a conceptual framework for new organizations in each country had been proposed and a series of activities had been planned to drive continued progress in each country in 2012.

The following report summarizes the project activities of June 2011 – December 2011 as the CEC worked to engage a core of key stakeholders in the initiatives in each country; identify unique environmental challenges and opportunities impacting the automotive supply chain ideally suited to the project; support the exchange of existing tools, resources and information of relevance to the sector; and, build the foundation for the creation of business-driven self-supported green automotive supply chain programs in North America.

2011 PROJECT RESULTS: SHORT - TERM OBJECTIVES

Reporting Period: June 2011 – December 2011

Objective: Organize a core of automotive manufacturers and suppliers to green their supply chains within Canada and Mexico.

Result

71 Organizations Were Engaged in CEC Automotive Supply Chain Activities across North America in 2011, including:

- **11** in Canada
- **18** in Mexico
- **59** in United States

*See following page for detailed list of engaged organizations

Objective: Exchange of resources, information, and tools within the sector towards greening the supply chain between manufacturers and suppliers.

Results

Meetings of Automotive OEMs and Suppliers Were Organized Across North America to Share Tools & Resources and Provide a Forum for Strategic Discussions on Environmental Issues Impacting the Supply Chain

- **Canada**
 - Strategic Planning Session – December 13, 2011 in Toronto, Ontario
- **Mexico**
 - Roundtable Discussion – December 7, 2011 in Mexico City
 - Strategic Planning Session – November 17, 2011 in Mexico City
 - Meetings with Key Project Stakeholders – Week of September 26, 2011 in Mexico City
- **United States**
 - Workshop on Environmental Assistance Programs and Resources for Automotive Original Equipment Manufacturers (OEMs) and Suppliers – September 7, 2011 in Spring Hill, Tennessee
 - Special Panel at the National Environmental Sustainability Summit – June, 7 2011 in Detroit, Michigan

Concept Papers for the New Automotive Supply Chain Organizations in Mexico and Canada Were Developed Outlining the Vision, Mission, Key Issues and Next Steps

- Alianza Verde Automotriz (AP Mexico)
- Suppliers Partnership for the Environment – Canada (SP Canada)

Government Tools / Resources Were Shared With Participants through Project Meetings Including

- [E3: Economy, Energy and the Environment](#) (US)
- [Environmental Leadership for Competitiveness](#) (Mexico)
- [EPA Lean and Environment Toolkit / \[Spanish Version\]](#) (US)
- [EPA Lean and Energy Toolkit](#) (US)
- [EPA Lean and Chemicals Toolkit](#) (US)
- [EPA Environmental Professional's Guide to Lean and Six Sigma](#) (US)
- [EPA Climate Leaders Small Business Tools](#) (US)
- [Green Suppliers Network](#) (US)
- [Green Suppliers Network Online Training Course](#) (US)
- [National Environmental Audit Program](#) (Mexico)
- [NIST Manufacturing Extension Partnership \(MEP\)](#) (US)

ORGANIZATIONS ENGAGED IN CEC AUTOMOTIVE SUPPLY CHAIN ACTIVITIES ACROSS NORTH AMERICA IN 2011

<i>Organization</i>	<i>Canada</i>	<i>Mexico</i>	<i>United States</i>
2V Industries, Inc.			X
Aevitas Specialty Services Corp	X		X
Albemarle Corporation			X
ARCADIS	X		X
Arcalis Scientific			X
Arneses Electricos Condumex		X	
Asset Recovery & Management Group LTD			X
Association of International Automobile Manufacturers of Canada (AIAMC)	X		
Atwater Steel Trading Co			X
Automotive Parts Manufacturers' Association (APMA)	X		
BAE Industries			X
Bridgestone Americas, Inc.			X
Canadian Vehicle Manufacturers' Association (CVMA)	X		
ChemicoMays		X	X
Chrysler Group LLC		X	X
Continental Automotive		X	
Covanta4Recovery			X
Crystal Filtration			X
Decoplas Magna		X	
DELPHI		X	
DENSO International America, Inc.			X
EDSS			X
Electricfil Corporation			X
Environment Canada	X		X
EQ – The Environmental Quality Company		X	X
Faurecia		X	
Federal-Mogul Corporation			X
Flex-N-Gate			X
Ford Motor Company		X	X
FTS Technologies	X		X
Gage Products Company			X
Gayle Technologies, Inc.		X	X
GDC Inc.			X
General Motors Company	X	X	X
Global Automakers			X
Goodwill Industries of Greater Detroit			X
Goodwill's GreenWorks			X
Green Tree Products and Technologies LLC			X
Haley & Aldrich, Inc.			X
Heritage Interactive Services	X	X	X
Hyundai-Kia			X
ICL-IP			X

Johnson Controls Inc.			X
Lear Corporation		X	X
Marketing for Green, LLC			X
Mercedes-Benz			X
Michigan Department of Environmental Quality (MDEQ)			X
Mobile Fluid Recovery, Inc.			X
MPS Group			X
National Institute of Standards & Technology (NIST)			X
Navista, Inc.	X	X	X
Nemak		X	
Oemeta			X
Office of Recovery for Auto Communities and Workers, US DOL			X
Performance Environmental Services			X
Peter Feamster & Associates, Inc.			X
PROFEPA		X	X
Quaker Chemical			X
RTI Laboratories			X
SEMARNAT		X	
Sustainable Research Group			X
Tennessee Automotive Manufacturers Association (TAMA)			X
Terrachord			X
TestAmerica Laboratories, Inc.			X
The Polar Companies			X
U.S. Environmental Protection Agency (EPA)			X
US Industrial Technologies, Inc.			X
Vitro Automotriz		X	
VMX International Inc.			X
Woodbridge Group	X		
Work Force Network Inc.			X
Companies Engaged in Each Country in 2011	11	18	59*

Diverse Range of Participating Organizations Including

- Vehicle Manufacturers
- Parts / Components Suppliers
- Federal / State Government Agencies
- Chemical Manufacturers / Distributors
- Environmental Laboratories
- Environmental / Energy Service Providers
- Recycling / Waste Management Specialists
- Automotive Trade Associations

**includes the 2011 membership of the Suppliers Partnership for the Environment (SP) – an active organization which is serving as a model for the development of new supply chain organizations in Canada and Mexico.*

IMPORTANCE OF GREENING THE NORTH AMERICAN SUPPLY CHAIN

I think that the North American approach to greening the supply chain is important because for the manufacturing base in North America to be strong, for it to be successful, for it to be sustainable, we have to work with the entire supply chain.

And in North America, especially in the United States right now, we have been able to bring resources together to work together with original equipment manufacturers and their supply chains

and we are beginning to see some real improvement in the way that those manufacturers are operating. We have been able to see some processes efficiencies that we did not see before, we are beginning to see some true environmental performance improvements that we had not seen before and now we are actually starting to see a lot of energy efficiency improvements as well.

So by focusing on the supply chain you affect the entire supply chain all the way up to the original equipment manufacturers and I think that's a successful way of operating.

**Tom Murray, Chief, Prevention Analysis Branch, U.S. Environmental Protection Agency (EPA)
Chair, Ad-Hoc Advisory Group, CEC Auto Supply Chain Project**



The North American approach to greening the supply chain is so very important because those supply chains interact within North America as a whole. Materials move from Canada to the United States to Mexico, and in all different directions from the North to the South, the South to the North. Because of that our environmental impact and those projects that relate to those impacts need to be implemented.

We need to work together as a North American continent as a whole.

**John Bradburn, GM's Manager of Waste Reduction Efforts
SP Materials Efficiency Chair**



2011 PROJECT ACTIVITIES IN THE UNITED STATES

In 2011, CEC sponsored two project meetings in the United States, including a Special Project Launch Panel at the National Environmental Sustainability Summit in Detroit, Michigan on June 7, 2011; and a Workshop on Environmental Assistance Programs and Resources for Automotive Original Equipment Manufacturers (OEMs) and Suppliers in Spring Hill, Tennessee on September 7, 2011.

In addition, Benjamin Teitelbaum, Special Projects Coordinator, CEC spoke at the 2nd Quarter Meeting of the Suppliers Partnership for the Environment (SP) on June 7, 2011 and project contractor Steve Hellem, Navista reported on the project's activities at SP's 4th Quarter Meeting on November 8, 2011 in Detroit, Michigan. Information on the CEC project activities was also shared with SP's members through the SP Newsletter and website.

Special Panel at the National Environmental Sustainability Summit (NESS)

On June 7, 2011 the CEC hosted a Special Panel at the National Environmental Sustainability Summit (NESS) in Detroit, Michigan to launch its project "On Improving the Economic and Environmental Performance of the North American Automotive Industry Supply Chain". The NESS is an annual gathering of national environmental sustainability leaders from nonprofits, government, academia, and business co-hosted by the U.S. EPA, the National Pollution Prevention Roundtable, the Michigan Department of Environmental Quality and Terrachord.

The Panel provided an overview of CEC's automotive supply chain project, as well as CEC's history of support for automotive supply chain initiatives. CEC's work on greening North America's automotive supply chain first began in 2007 with discussions to extend the [Suppliers Partnership for the Environment \(SP\)](#) – an innovative partnership between

automobile original equipment manufacturers and their suppliers and the U.S. EPA already on track in the United States – to Canada and Mexico. Unfortunately, the project was put on hold in 2009 due to economic challenges facing the industry at that time. The project proposes now to re-engage key automotive companies in Canada, Mexico and the United States for the development and implementation of green supply-chain programs across North America. The project aims to create a network of industry partners to share tools and best practices including work already done in the United States, and share how companies are improving the environment and creating economic opportunity throughout the manufacturing process in each of the three countries.



Benjamin Teitelbaum, CEC

Environmental Vision

- Reduce environmental impacts of the automotive manufacturing supply chain while enhancing competitiveness through engaging experts to facilitate the development and implementation of formalized Automotive Green Supply Chain programs in Canada, Mexico and the United States.

Short-Term Objectives

- Organize a core of automotive manufacturers and suppliers to green their supply chains within Canada and Mexico
- Exchange of resources, information, and tools within the sector towards greening the supply chain between manufacturers and suppliers

Mid-Term Objectives

- Create and expand business-driven self-supported auto supplier partnerships in North America (Canada, Mexico and the United States)
- Reduce environmental impacts and improve economic capacity through activities adopted by auto supplier partnership programs
- Reduce the environmental footprint of the automotive supply chain and improve competitiveness for the automotive sector

The panel for this session included government and automotive industry representatives from Canada, Mexico and the United States, including:

- Maria Petrou, Chemical Management Plan Coordinator, Environment Canada
- Sandra Galindo, Profepa
- Tom Murray, Chief, Prevention Analysis Branch, U.S. Environmental Protection Agency (EPA)
- John Bradburn, Staff Environmental Engineer, Global Environmental Programs, Design for the Environment, General Motors
- Jim Laney, Senior Manager, ES&H, DENSO International America, Inc.



Panelists pictured as listed above, from left to right

The panelists reviewed ongoing efforts in their country of potential interest to the project, including the Green Suppliers Network (GSN), E3: Economy, Energy and the Environment, Environmental Leadership for Competitiveness, the National Environmental Audit Program, and success stories / best practices learned through the Suppliers Partnership for the Environment (SP). In addition, they discussed the opportunities to continue to build on the CEC's work in "Improving the Economic and Environmental Performance of the North American Automotive Industry Supply Chain", such as:

- Developing resources and training programs for manufacturers in the automotive industry in Canada and Mexico similar to GSN / E3 in the United States
- Collaborating and sharing best practices and technology opportunities from SP and other programs across the North America automotive supply chain
- Sharing tools and resources that have already been developed, and ensuring that these are easily accessible and applied.

Workshop on Environmental Assistance Programs and Resources for Automotive Original Equipment Manufacturers (OEMs) and Suppliers

On September 7, 2011 the CEC hosted a *Workshop on Environmental Assistance Programs and Resources for Automotive Original Equipment Manufacturers (OEMs) and Suppliers* in Spring Hill, Tennessee in conjunction with the 3rd Quarter Membership Meeting of the Suppliers Partnership for the Environment (SP) and the Tennessee Automotive Manufacturers Association (TAMA). The Workshop provided an opportunity for government and industry participants to provide and share existing tools, resources and voluntary programs available to manufacturers in the US, Mexico and Canada to improve the environmental and economic sustainability of their operations. Participants shared relevant national experiences on environmental issues impacting the automotive supply chain across North America as well as identified opportunities to expand and develop collaborative programs to improve the environmental and economic performance of the North American automotive supply chain.



Benjamin Teitelbaum, CEC

The Workshop featured three panel discussions highlighting existing tools and resources available in the United States, Mexico and Canada.

UNITED STATES

The panel of representatives from the United States included:

- Ben Vickery, Senior Technical Analyst, Department of Commerce, National Institute of Standards & Technology (NIST), Manufacturing Extension Partnership (MEP) Program
- Tom Murray, Chief, Prevention Analysis Branch, US Environmental Protection Agency (EPA)
- Lynn Lane, Human Resources Manager, Electricfil Corporation

NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY (NIST) MANUFACTURING EXTENSION PARTNERSHIP (MEP) PROGRAM

The Workshop provided an overview of [NIST's MEP program](#) which works with small and mid-sized U.S. manufacturers to help them create and retain jobs, increase profits, and save time and money. The MEP is a national network with centers located in all 50 states, which include 60 centers with over 370 field locations.

MEP Centers focus on meeting manufacturers' short term needs, but in the context of their overall company strategy. MEP Center areas of common strength include: Engineering Services for products and processes; Growth Services – new or expanded market opportunities; Lean Manufacturing; Quality Systems; Sustainability; and, Workforce Development.

MEP's process of working with manufacturers includes:

- **Initial contact** – group sessions, referral
- **Assessment** – informal walk-through, detailed company analysis
- **Identify** potential issues, define proposed project and approach for solving it
- **Negotiate** with company and sign project contract with fee paid to center
- **Project execution** – center staff, partner organization, and/or third party consultants

After completion, centers follow-up on a project to assure customer satisfaction and explore further project opportunities. That project impact data is



Chart 1

collected by a contractor for NIST for approximately 6 months after completion.

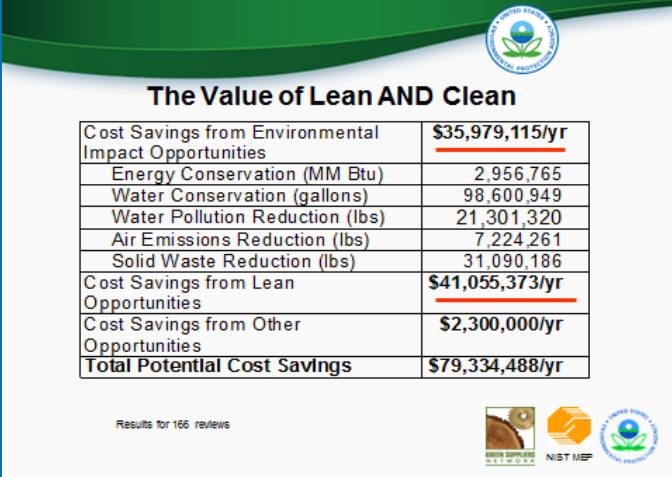
MEP Centers reach over 34,000 manufacturing firms and complete over 10,000 projects per year based on FY2009 MEP Center reported performance data, resulting in significant business growth. (Chart 1)

The Workshop also touched on NIST MEP's next generation strategy of increasing manufacturers' capacity for innovation resulting in profitable sales growth. The five key areas of NIST MEP's next generation strategy include: Continuous Improvement, Technology Acceleration, Supply Chain, Sustainability and Workforce.

GREEN SUPPLIERS NETWORK

The [Green Suppliers Network \(GSN\)](#) is a collaborative effort between the US EPA and the US Department of Commerce's NIST MEP that partners with suppliers to identify lean and clean improvement opportunities in companies' facilities.

GSN expands the lean definition of waste to include environmental considerations as well. A traditional lean review eliminates: Defects, Overproduction, Waiting, Non-utilized resources, Transportation, Inventory, Motion and Extra processing. A clean review adds to this an assessment of Full use of Raw Material; Energy Efficiency; Water conservation; Eliminating Toxic Material; and, Reduction of: Packaging Wastes, Emissions to Air and Water, Solid & Hazardous Wastes, and Regulatory obligations and risks. The GSN program has found that in addition to the potential environmental reductions of a clean review, the potential annual cost savings opportunities nearly double when combining lean and clean assessments versus considering lean alone. (Chart 2)



The Value of Lean AND Clean	
Cost Savings from Environmental Impact Opportunities	\$35,979,115/yr
Energy Conservation (MM Btu)	2,956,765
Water Conservation (gallons)	98,600,949
Water Pollution Reduction (lbs)	21,301,320
Air Emissions Reduction (lbs)	7,224,261
Solid Waste Reduction (lbs)	31,090,186
Cost Savings from Lean Opportunities	\$41,055,373/yr
Cost Savings from Other Opportunities	\$2,300,000/yr
Total Potential Cost Savings	\$79,334,488/yr

Results for 166 reviews

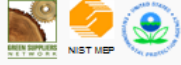


Chart 2

Several tools have been developed through GSN which are available online at no cost. These tools include:

- [Green Suppliers Network Online Training Course](#)
- [EPA Lean and Environment Toolkit / \[Spanish Version\]](#)
- [EPA Lean and Energy Toolkit](#)
- [EPA Lean and Chemicals Toolkit](#)
- [EPA Environmental Professional's Guide to Lean and Six Sigma](#)

On October 27-29, 2008, CEC in collaboration with Monterrey Tech, the US EPA and Ford Motor Company Mexico conducted a Lean and Clean training workshop in Chihuahua, Mexico focused on the Green Suppliers Network program. Representatives from the NIST MEP program conducted the training, which was held at a Ford engine plant in Chihuahua. Participants learned about the basics of lean manufacturing and opportunities for their companies, and about 25 manufacturers and technical assistance providers in and around the state of Chihuahua attended the workshop. There is now an opportunity through the current project for a facility in Mexico or Canada to participate in a Lean and Clean assessment based on



Participants in 2008 Lean and Clean Training

the program. Lessons learned from this effort will subsequently be documented and shared amongst automotive suppliers and manufacturers participating in the project in Canada and Mexico.

E3: ECONOMY, ENERGY, AND ENVIRONMENT

[E3: Economy, Energy, and Environment](#) is a collaboration among several US federal agency programs including: the NIST MEP; Department of Energy (DOE) Industrial Technologies Programs and Industrial Assessment Centers (IAC); MEP/EPA Green Suppliers Network; EPA Pollution Prevention and Climate Leaders Programs; Department of Labor (DOL) Employment and Training; and, the Small Business Administration (SBA) and its Small Business Development Centers. E3 was developed as a model for collaboration among manufacturers, utilities, local government, and federal resources intended to: invest in local communities, address energy and sustainability challenges, provide valuable technical training and assessments and enable economic growth and job creation.

The E3 model takes advantage of each the collaborating federal agency programs to expand on the GSN technical assessment process, as well as add implementation support. This includes:



Tom Murray, US EPA

E3 Technical Assessment

- A **Lean Review** which leads to increased productivity and reduced costs
- A **Clean Review** resulting in water and energy conservation, reduced emissions, and additional cost savings
- A **Greenhouse Gas (GHG) Evaluation** that teaches manufacturers how to calculate GHG emissions and evaluate reduction strategies
- **Post-Assessment Recommendations** that guide each facility toward improvements in overall efficiency, reduced waste, more efficient use of resources including energy and water, and cost savings

E3 Implementation Support

- **SBA** and its **Small Business Development Centers (SBDCs)** provide business excellence counseling services and financing through guaranteed loan programs
- **DOL** and its **Workforce Investment Boards** provide green job and skills training and apprenticeships supported by workforce development and training grants
- **Local and Regional E3 Team** provides additional resources and support such as utility incentives, state recognition, internship programs and local funding and grant opportunities

Although EPA's [Climate Leaders](#) partnership program has been phased out, the tools developed by the program are still available and being used as part of the E3 model. The E3 model is now being adopted by States, such as Alabama in which several automotive companies have participated in the program.

Electricfil Corporation, a manufacturer of automotive ignition systems including engine and transmission sensors and member of SP in the United States, is one of many companies that have participated in Alabama's E3 Program. Early in 2010 Electricfil worked with E3 partner and local MEP Center, Alabama Technology Network (ATN), on a Practical Energy Assessment of their operation. This involved a detailed review of their facility and daily work practices coupled with brainstorming sessions geared at identifying key improvement areas. Following this assessment, the company was given a list of recommended improvements along with potential energy and cost savings. By implementing several of the

recommended improvements from this initial energy assessment, Electricfil reduced its annual energy consumption by 120,000 kWh for an estimated annual savings of \$10,800, a reduction of 81 metric tons of CO2 emissions. (Chart 3)

ATN representatives lead two 5-day long Kaizen events at the facility focused on equipment and process improvements to reduce time and energy usage. The first event concentrated on reducing tooling changeover times at the company's over molding presses. Through the creation of standardized changeover operating procedures, revamping hose connections and access points for easier connections and access, adding thermolators to preheat tools, locating tools between the machine centers, and training the team was able to reduce tooling changeover times from approximately 2 hours to 20-30 minutes each; a savings of 8 hours per day between the two presses. This savings of 8 hours a day reduced Electricfil's energy usage by 114,000 kWh annually for an annual estimated savings of \$10,200 annually, a reduction of 77 metric tons of CO2 emissions. The company projects that it will have as many as 12 over mold presses in the future, potentially multiplying the savings identified.

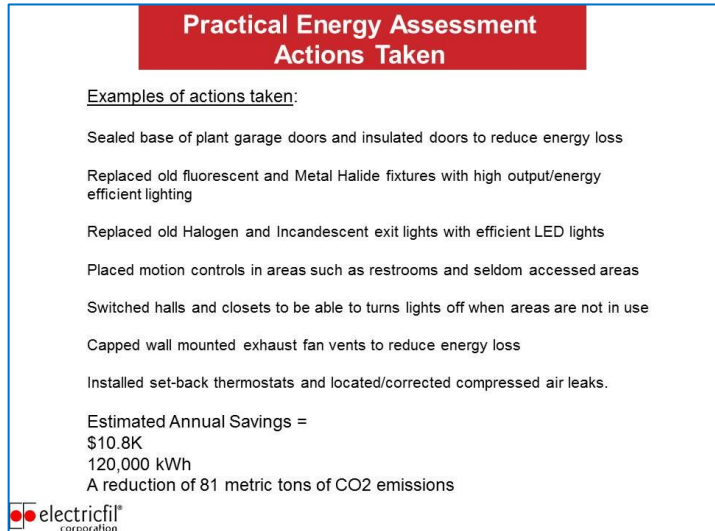
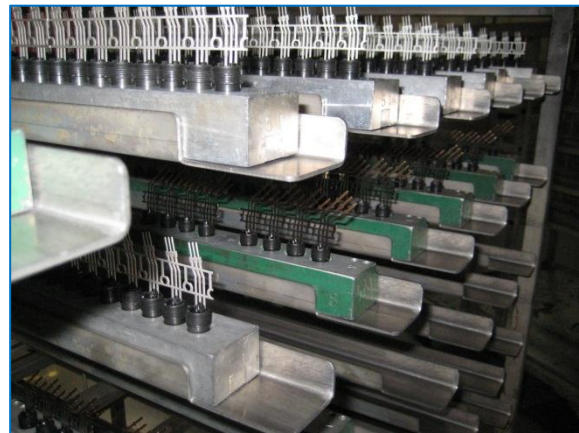


Chart 3

The second Kaizen event focused on modifications to Electricfil's resin potting and curing processes. The team set out to reduce oven curing times through changing from batching to mixed model production through potting/curing process and achieved a reduction of 25% in curing oven usage via mixed model (equivalent of 1 out of 4 ovens). This 25% reduction in curing oven usage reduced Electricfil's energy usage by 198,000 kWh for an estimated annual savings of \$18,800, a reduction of 135 metric tons of CO2 emissions.



Pictured: Electricfil Corporation's Potting and Curing Operations

As a result of participation in the Alabama E3 Initiative Electricfil Corporation reduced its energy consumption by 25% or approximately \$40,000 annually. The company was also awarded Tennessee Valley Authority (TVA) Valley Investment Initiative (VII) 5 year utilities credits for energy conservation and investment and another incentive for participation in their Commercial Efficiency Advice and Incentives (CEAI) energy efficiency program. The estimated value of these utility services, payments, and credits is \$45,000. In addition, Electricfil Corporation reduced landfill bound waste from nearly 40 yards to less than 4 yards per week through recycling of nearly all production scrap and general waste products.

MEXICO

Mr. Alejandro Sosa, Director, Navista Mexico, led this section of the Workshop.

The Workshop provided an Overview of Voluntary Environmental Programs in Mexico, including Profepa's (La Procuraduría Federal de Protección al Ambiente) three voluntary environmental mechanisms: the Environmental Excellence Award (Excelencia Ambiental), the National Audit Program (Programa Nacional de Auditoría Ambiental) and the Environmental Leadership for Competitiveness Program (Liderazgo Ambiental para la Competitividad).

The [National Audit Program](#), also known as the Clean Industry Program, is a voluntary certification program targeted at large and medium sized manufacturing and heavy industry companies. The program provides a certificate, valid for 2 years with the possibility for renewal, and a green seal for use by certified companies, as well as certain tax incentives. Companies are evaluated against a set of key performance indicators to achieve certification. At the time of the Workshop, 12 automotive companies were participating in the Audit Program, including large manufacturers such as Ford, General Motors, Nissan, VW, Honda and Chrysler. To date companies have saved over 6 million m³ of water and 860 million kWh of energy as a result of participation in the National Audit Program.



The [Environmental Leadership for Competitiveness Program](#) (PLAC) is a cooperative effort between industry, business support institutions, local governments and federal government through Profepa and Semarnat (Secretaría de Medio Ambiente y Recursos Naturales). The program includes suppliers of large manufacturing companies as well as some service providers. The PLAC program is free to participate in and requires no binding commitments on behalf of the participating company.



Through a process of learning by doing and using simple tools, participants are able to identify continuous improvement opportunities and develop projects to improve economic and environmental performance. Companies may receive official recognition for their participation in the PLAC program. To date, more than 1,500 companies have participated in the PLAC program, including 38 automotive facilities. Through participation in the PLAC program automotive companies have saved more than 73,000 m³ of water, 9.7 million kWh of energy, 8,800 ton CO₂ per year and \$3.3 million dollars to date.



Alejandro Sosa, Navista Mexico

For example, Ford Manufacturing facilities located in Hermosillo, Cuautitlán and Chihuahua joined the Voluntary Clean Industry Process in 1997 and since this time, all Ford facilities in Mexico have been evaluated on a regular basis, including the current year (2011). The Clean Industry process provided Ford Mexico an opportunity to evaluate and confirm its own environmental compliance assurance process and also to identify improvement opportunities to favorably impact its current environmental metrics. Ford's Hermosillo and Chihuahua plants are participating in the PLAC program with their local suppliers and have identified significant potential savings. In addition, Ford's Cuautitlán plant is planned to join the program in the next year. (Chart 4)



ENVIRONMENTAL LEADERSHIP FOR COMPETITIVENES

FORD IN MEXICO HIGHLIGHTS



Ford Hermosillo and local suppliers (Apr 2011):

- Identified potential savings: \$900,587.00 USD / year.
- Number of individual projects: 17
- Water savings: 60.5 M3 / year
- Energy savings: 5,182,901.00 Kwh / year
- Fuels savings: 33.81 M3/year.
- Reduction in air emissions: 3,446.00 tons of CO2/year
- Waste reduction: 686 tons/year
- Participants: 17 companies and 32 people trained.

Ford Chihuahua and local suppliers (Dec 2010):

- Identified potential savings: \$ 783,575.00 USD / year
- Number of projects: 19
- Water savings: 32,416 m3/year
- Energy savings: 6,260,373 Kwh / year
- Fuels savings: 0.49 m3 /year
- Reduction in air emissions: 4,761 tons CO2/year
- Waste reduction: 103 tons/year
- Participants; 15 companies and 15 people trained

Ford Cuautitlán:

- Because of evident environmental and economic benefits, Cuautitlán plant is planned to join initiative late Nov 2011 and, for 2012, all plants to internally apply for similar program.

Chart 4

CANADA

The panel of representatives representing Canada included:

- Maria Petrou, Environmental Protection Operations, Environment Canada
- Rahul Naik, Principal In-Charge, ARCADIS

The Workshop provided an overview of the history of CEC support for automotive supply chain activities in Canada, as well as Environment Canada's history of active participation in the Suppliers Partnership for the Environment (SP) and other industry initiatives.

Case studies of projects that had been performed by companies in Canada, Mexico and the U.S., and the results of the projects were reviewed, including: Plant Environmental Compliance and Management System Onsite Support; Regulatory Training Webinars; Management Systems Implementation (ISO 14001); and, Water Reduction Assessments and Training for Automotive Facilities.

The Workshop provided an in-depth review of the opportunities in the areas of infrastructure, environment, buildings and water that could be addressed by a new automotive supply chain organization in Canada, including:

- lean and clean processes within the value chain
 - advisory
 - operations
 - products
 - supply chain areas
- energy/carbon management



Maria Petrou, Environment Canada and Rahul Naik, ARCADIS

- global product regulatory compliance
- safety and environment; and,
- training needs for the automotive sector.

Opportunities for the Project

Participants identified environmental challenges impacting the automotive supply chain across North America as potential opportunities for action through the CEC auto industry supply chain project, including:

- Regulatory complexity –federal vs. state vs. local regulations, prescriptive vs. performance, conflicting regulations; opportunity for harmonization of regulations across North America
- Emerging chemical regulations / chemicals in products
- Inconsistencies in regulations across OEMs
- Gaining support of upper management / funding for environmental projects
- Bridging generations / cultural differences
- Gaining employee buy-in for environmental programs
- Customer quality / driven specs
- Communicating / driving small business environmental innovation to decision makers at OEMs and Tier 1 Suppliers
- Understanding of Return on Investment (ROI); business value of environmental projects
- Improved interaction with Mexico and Canada and better understanding of shared objectives
- Returnables
- Consistency
- Residential sorting
- Political tactics (US)
- Water, output performance (Mexico)
- Mixed waste, standards, energy from waste (Canada)

Good Practices in Engaging Stakeholders

Participants identified techniques that had been successful in the past in engaging stakeholders in environmental activities, including:

- Incentives
- Recognition
- Benchmarking / metrics
- Area leaders / cascade training
- Communication / training
- Building into processes
- OEM involvement
- Voluntary government involvement
- Top level management support
- Bottom up approaches
- Collaboration
- Utilizing small suppliers
- Seeking out / tapping into creativity
- (Policing is an unsuccessful technique)

2011 PROJECT ACTIVITIES IN MEXICO

In 2011, CEC sponsored several project meetings in Mexico including Stakeholder Meetings on September 26 in Mexico City; a Strategic Planning Session in Mexico City on November 17, 2011 hosted by Ford Mexico; and, a Roundtable Discussion in Mexico City on December 7, 2011 hosted by General Motors Mexico.

Stakeholder Meetings (September – Mexico City)

During the week of September 26, 2011 the CEC Project Team, including Benjamin Teitelbaum, CEC and Navista, organized a series of meetings in Mexico City designed to lay the foundation for a larger meeting of automobile OEMs and their suppliers to kick off the project in Mexico. The team met with project stakeholders such as GM Mexico and Ford Mexico – major automotive manufacturers; SEMARNAT and PROFEPA – government agencies in Mexico with responsibility for the environment; and Heritage Interactive Services, a service provider to the automotive industry that has been an active participant in the SP organization in the United States.

The project team provided an overview of the vision and objectives for the project as well as received feedback from stakeholders on organizational engagement and priority environmental sustainability issues in Mexico that would be key to the development of a value driven organization for the automotive supply chain in Mexico.

As a result of the meetings, a small group Strategic Planning Discussion was scheduled for November 17 at Ford Mexico's Headquarters in Mexico City and a broad project meeting of OEMs and suppliers was scheduled for December 7, 2011 at GM Mexico's Headquarters in Mexico City. In addition, a webinar to share information on voluntary environmental programs for industry offered by the governments of Mexico, Canada and the United States was proposed as a future objective for the project.

Strategic Planning Discussion (November – Mexico City)

On November 17, 2011 CEC sponsored a Strategic Planning Discussion at Ford Mexico's Headquarters in Mexico City to identify opportunities to best support the CEC project in Mexico and develop the foundation for the creation of an automotive industry supply chain organization in Mexico, similar to the Suppliers Partnership for the Environment (SP) in the United States. The meeting included representatives from CEC, Chrysler Mexico, Ford Mexico, GM Mexico and Navista.

The meeting included a discussion of SP including how it was created, how it is organized, the activities the organization is presently addressing and its successes. Participants discussed activities that are currently underway in Mexico and identified the unique activities that would improve environmental and economic performance in the automotive supply chain and provide value to participating organizations. It was agreed that water efficiency and use, energy efficiency, and waste management & resource creation are key issues impacting automotive companies in Mexico that should be addressed by the new organization.

At the conclusion of the meeting, the participants had developed a draft concept paper including a proposed Vision, Mission and Key Issues to be addressed by a new supply chain organization in Mexico to be presented by representatives of Chrysler, Ford and GM and discussed at a December 7 project meeting at GM's Headquarters. It was agreed that the new organization would be known in Mexico as Alianza Verde Automotriz, or AP Mexico. An invitation letter was developed to suppliers of each of the manufacturers, inviting the companies to participate in the December 7 meeting to learn about the CEC project and Alianza Verde Automotriz and discuss opportunities to improve the environmental sustainability of the automotive supply chain in Mexico.

Alianza Verde Automotriz - Roundtable Discussion (December - Mexico City)

On December 7, 2011 the CEC sponsored a Roundtable Discussion of Alianza Verde Automotriz (AP Mexico) at the Headquarters of General Motors in Mexico City, Mexico. The meeting included a diverse group of participants including representatives of automotive OEMs, suppliers and government agencies in Mexico.



Pictured: Benjamin Teitelbaum, CEC; Luis Lara, Ford Mexico; Evan Lloyd, CEC; Delia Rivas, Chrysler Mexico; Arnulfo Berlanga, GM Mexico

The meeting provided an opportunity for automotive suppliers in Mexico to learn about the CEC North American Automotive Industry Project, the Suppliers Partnership for the Environment (SP) organization in the United States and the opportunity created by the CEC project to develop a new organization such as AP Mexico that will address new, innovative and voluntary environmental sustainability projects and activities for the automotive supply chain in Mexico. Participants reviewed the draft concept paper for the new AP Mexico organization that had been circulated in advance of the meeting and discussed environmental issues and opportunities for AP Mexico to address in 2012.

At the close of the meeting, the participants agreed on the following vision and mission for Alianza Verde Automotriz:

Vision: To be a private sector leadership organization that will provide automobile original equipment manufacturers and their suppliers the opportunity to address new, innovative and voluntary environmental sustainability projects and activities that will improve their environmental performance while providing value throughout the automobile supply chain in Mexico with the foster and support of the Mexican Government.

Mission: Identify, develop, promote and offer tools, as well as identify and foster synergies through cooperation, providing competitive advantage through projects and activities that will provide economic and environmental value throughout the automobile supply chain for issues identified by participants within Alianza Verde Automotriz.

In addition, the participants agreed that Work Groups would be formed focused on three key issues in 2012. Each of the Work Groups has planned to organize by conference call in the first quarter of 2012 and develop Work Group program agendas by June 2012.

The Three AP Mexico Work Groups for 2012 Will Be:

- Water Efficiency and Use
- Energy Efficiency
- Materials and Waste Management & Resource Creation

The next meeting of AP Mexico is planned to be organized in the first quarter of 2012.

2011 PROJECT ACTIVITIES IN CANADA

Strategic Planning Session

On December 13, 2011 the CEC sponsored a Strategic Planning Session at the offices of the Automotive Parts Manufacturers' Association (APMA) to begin identifying key issues and approaches for the Canadian portion of the CEC Auto Industry Supply Chain project. The meeting was designed to establish the groundwork for a larger project launch meeting in the first Quarter of 2012 that would include a broader range of participants including OEMs, suppliers and government representatives in Canada to continue discussion of the identified topics.

The meeting continued discussions from two preceding meetings held in Toronto with automotive OEMs and suppliers in November 2010 and January 2011 with the support of Environment Canada. As the Canadian Government's programs on Chemical Issues Management had been raised as a potential area of interest for the manufacturing sector during these meetings, Environment Canada was requested to give a presentation on the program during this meeting.

The meeting provided an overview of the [Canadian Environmental Protection Act, 1999 \(CEPA 1999\)](#) which provides authorities for managing substances that are found to be harmful to human health and/or the environment and is jointly administered by Environment Canada and Health Canada. In addition, it provided a technical overview of planned CEPA risk assessment and management related activities in the next phase of the [Chemicals Management Plan \(CMP\)](#), including the ["Groupings" Initiative](#).

The meeting provided an overview of the CEC North American Automotive Industry Supply Chain Project and the opportunity to develop a new supply chain organization that would address environmental and economic sustainability projects and activities in the automotive supply chain in Canada. The participants discussed the Suppliers Partnership for the Environment (SP) in the United States and the key Work Group activities the organization is currently addressing, as well as activities presently underway in Canada through organizations such as the [Association of International Automobile Manufacturers of Canada \(AIAMC\)](#), the [Automotive Parts Manufacturers' Association \(APMA\)](#) and the [Canadian Vehicle Manufacturers' Association \(CVMA\)](#).

Participants identified potential opportunities that a new automotive supply chain organization could address to improve the economic and environmental performance of the automotive industry supply chain in Canada, including:

- Sharing tools / resources related to Chemicals Management. However, a challenge for the project in Canada would be to identify a Chemicals Management project deliverable that would be unique and more advanced than what Environment Canada is already doing with the Chemicals Management Plan.
- On a North American basis, the CEC project could be a valuable networking tool for companies; a resource to share global best practices and solve environmental challenges in the auto supply

chain; tool on how companies can help a supplier to be more sustainable, respond faster to challenges, connect to local resources and do their jobs better.

- Develop a forum of subject matter experts in each country that can drive solutions to environmental challenges
- Regulatory burdens on manufacturers in Canada are increasing, including: advanced greenhouse gas verification and reporting requirements, ongoing air standards reviews, compliance certificate reviews and toxics reductions requirements. Recommend a focus on outcomes based projects
- There is a concern for U.S. based businesses regarding import of record vs. non-resident importer issues in Canada
- Addressing creative approaches to toxics reductions challenges; e.g. guidance documents.
- Increasing harmonization of federal and provincial environmental regulations
- Building on existing systems / processes and models that have demonstrated success
- Working with government entities to highlight regulatory challenges that if addressed would lead to increased economic development in the Canadian automotive manufacturing sector
- Developing case studies on North American environmental technology implementation challenges, and strategies to progress forward. Companies have encountered challenges introducing new technologies in Canada because of increased complexity and cost of doing business.
- Sharing approaches and best practices that have worked well in one country and adopting / adjusting them for use in other countries
- It is important that the project address unique issues that are not already being addressed by existing organizations – for example, there are a number of organizations in Canada that have as their mission advocacy for the automotive industry.

At the close of the meeting, a draft concept paper had been reviewed for a new automotive supply chain organization in Canada, the Suppliers Partnership for the Environment – Canada (SP Canada). The concept paper includes the following vision, mission and proposed key issues for the new organization:

Vision: Create a member driven organization that will provide automobile original equipment manufacturers and their suppliers the opportunity to address new, innovative and voluntary environmental sustainability projects and activities that will improve environmental performance while providing value throughout the automobile supply chain in Canada with the Government of Canada in a technical resource and departmental liaison capacity.

Mission: Create and provide tools, identify and support synergies through collaboration and cooperation, and provide competitive advantage through projects and activities that will provide economic and environmental value throughout the automobile supply chain for issues identified by participants within SP Canada.

Potential Key Issues:

- Energy Efficiency
- Technology and Innovation
- Waste Management and Resource Creation
- Water Sustainability

A follow up meeting of the SP Canada organization that would include a broad range of OEMs, suppliers and government representatives is planned for the first quarter of 2012. Next steps for the organization will include finalizing the vision, mission and key focus issues at the first quarter meeting, and organizing Work Groups to address the issues identified.

IV. CONCLUSION

From June – December 2011, CEC's Project on "Improving the Economic and Environmental Performance of the North American Automotive Industry Supply Chain" engaged a core of stakeholders in green supply chain programs in Canada, Mexico and the United States; identified unique environmental challenges and opportunities impacting the automotive supply chain ideally suited to the project; supported the exchange of existing tools, resources and information of relevance to the automotive sector; and, built the foundation for the creation of business-driven self-supported green automotive supply chain programs in North America.

Through this CEC project, a core original equipment manufacturers, suppliers and government representatives have been engaged in both Mexico and Canada and the Suppliers Partnership for the Environment (SP) in the United States has been engaged as a key supporter and participant in the project. Conceptual frameworks for new green auto supply chain programs in both Mexico and Canada have been developed through industry working sessions and a foundation has been laid for the introduction of independent organizations in each country in 2012.

A series of specific recommendations and actions has now been proposed to continue progress in the development of green supply chain programs in each country in 2012 and establish Working Group activities that will improve environmental performance and economic competitiveness in the automotive supply chain. The CEC looks forward to continuing this important work with the automotive sector in 2012.

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APPENDIX A: POTENTIAL PROJECT OPPORTUNITIES

The following is a summary of potential opportunities suggested throughout the year for consideration by project participants in the United States, Mexico and Canada as CEC works towards “Improving the Economic and Environmental Performance of the North American Automotive Industry Supply Chain”.

- Developing resources and training programs for manufacturers in the automotive industry in Canada and Mexico similar to GSN / E3 in the United States
- Collaborating and sharing best practices and technology opportunities from SP and other programs across the North America automotive supply chain
- Sharing tools and resources that have already been developed, and ensuring that these are easily accessible and applied
- Addressing regulatory complexity –federal vs. state vs. local regulations, prescriptive vs. performance, conflicting regulations; opportunity for harmonization of regulations across North America
- Emerging chemical regulations / chemicals in products
- Inconsistencies in regulations across OEMs
- Gaining support of upper management / funding for environmental projects
- Bridging generations / cultural differences
- Gaining employee buy-in for environmental programs
- Customer quality / driven specs
- Communicating / driving small business environmental innovation to decision makers at OEMs and Tier 1 Suppliers
- Understanding of Return on Investment (ROI); business value of environmental projects
- Improved interaction between United States, Mexico and Canada and better understanding of shared objectives
- Returnables
- Consistency
- Residential sorting
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- Sharing tools / resources related to Chemicals Management. However, a challenge for the project in Canada would be to identify a Chemicals Management project deliverable that would be unique and more advanced than what Environment Canada is already doing with the Chemicals Management Plan
- On a North American basis, the CEC project could be a valuable networking tool for companies; a resource to share global best practices and solve environmental challenges in the auto supply chain; tool on how companies can help a supplier to be more sustainable, respond faster to challenges, connect to local resources and do their jobs better
- Develop a forum of subject matter experts in each country that can drive solutions to environmental challenges
- Regulatory burdens on manufacturers in Canada are increasing, including: advanced greenhouse gas verification and reporting requirements, ongoing air standards reviews, compliance certificate reviews and toxics reductions requirements. Recommend a focus on outcomes based projects
- There is a concern for U.S. based businesses regarding import of record vs. non-resident importer issues in Canada
- Addressing creative approaches to toxics reductions challenges; e.g. guidance documents
- Increasing harmonization of federal and provincial environmental regulations
- Building on existing systems / processes and models that have demonstrated success
- Working with government entities to highlight regulatory challenges that if addressed would lead to increased economic development in the Canadian automotive manufacturing sector
- Developing case studies on North American environmental technology implementation challenges, and strategies to progress forward. Companies have encountered challenges introducing new technologies in Canada because of increased complexity and cost of doing business
- Sharing approaches and best practices that have worked well in one country and adopting / adjusting them for use in other countries
- It is important that the project address unique issues that are not already being addressed by existing organizations – for example, there are a number of organizations in Canada that have as their mission advocacy for the automotive industry