E-SPEED for Vehicles
(Excellence in Sustainable Performance
& Environmentally Efficient Design)

The Sustainable Vehicle Rating System

PRELIMINARY DRAFT

September 25, 2006

By Leonardo Academy Inc.
E-SPEED FOR VEHICLES DEVELOPMENT PROCESS

This is the Preliminary Draft of E-SPEED for Vehicles, The Sustainable Vehicle Rating System. It provides the starting point for the development of a pilot version of the rating system by the E-SPEED for Vehicles Committee. The Committee will review, evaluate and refine the Preliminary Draft to create the Pilot Draft of the rating system. This document intentionally casts a wide net over potential prerequisites and credits to ensure that the Committee has a broad base from which to work.

The E-SPEED for Vehicles Committee’s work on developing the Pilot Draft of the rating system will address the following issues:

- Are all the appropriate components of sustainability addressed?
  - Are there additional components of sustainability that need to be included?
  - Should any of the prerequisites or credits in the Preliminary Draft be removed?
- Are each of the prerequisites and credits included practical and measurable?
  - Can the appropriate standards and metrics for measuring the level of achievement for each prerequisite and credit be identified?
  - What are the appropriate levels of achievement to include in each prerequisite and credit?
  - What other improvements are needed for each prerequisite and credit?
- Are the point weightings of each of the credits appropriate based on the relative sustainability impacts of each of the credits?

When the Pilot Draft of the rating system has been developed, pilot testing will commence to further refine the program. After pilot testing, the final version of E-SPEED for Vehicles will be developed and launched, reflecting the insights provided by the pilot test experience.

E-SPEED FOR VEHICLES RATING SYSTEM DESCRIPTION

The development of E-SPEED for Vehicles will create a graduated measurement system to describe vehicle sustainability, thereby establishing a vocabulary and providing consumers with a simple system to identify vehicles with reduced environmental impact. It will also provide a map for manufacturers and suppliers to increase the sustainability of their processes and products, and it will provide an instrument to communicate this dedication to potential and existing customers.

Just as the U.S. Green Building Council’s LEED™ Rating System is transforming the building market, the Leonardo Academy’s E-SPEED for Vehicles Rating System allows consumers to be the driving force and push the vehicle market toward sustainability. The shift toward sustainable vehicles is inevitable; companies in the industry will choose to lead this movement or be forced to follow their competitors. However, early participants in vehicle sustainability will hold the market advantage as the demand for sustainable vehicles grows.
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ORGANIZATIONAL SUSTAINABILITY (OS)

OS CREDIT 1.1-1.6 – ORGANIZATIONAL SUSTAINABILITY – 6 POINTS

Objective
Reduce the overall environmental impact of vehicle manufacturing while ensuring the company has a positive social impact.

Requirements
Obtain a Cleaner and Greener® Sustainable Organization score.

<table>
<thead>
<tr>
<th>Cleaner and Greener® Sustainable Organization Certification Level</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified</td>
<td>1</td>
</tr>
<tr>
<td>Silver</td>
<td>2</td>
</tr>
<tr>
<td>Gold</td>
<td>4</td>
</tr>
<tr>
<td>Platinum</td>
<td>6</td>
</tr>
</tbody>
</table>

Submittals – E-SPEED for Vehicles Certification
Provide the vehicle manufacturer’s Cleaner and Greener® Sustainable Organization certification score.

Potential Technologies & Strategies
Work to implement sustainable actions throughout the organization to increase the company’s Cleaner and Greener® score.

Referenced Standards
Cleaner and Greener® Organizational Sustainability Certification

Resources
Cleaner and Greener Organizational Sustainability Certification
www.cleanerandgreener.org
REPT CREDIT 1 – RESOURCE EXTRACTION – 1 POINT

Objective
Encourage organizations to follow environmental best practices in materials extraction, processing and delivery.

Requirements
Document adherence to industry ‘best practice’ standards for environmental protection in supplier resource extraction, processing and transportation. Have in place a permanent program to monitor supplier performance relative to best practices, and document ongoing compliance with that program. This includes the extraction of resources (including fuel) and materials used in vehicles and the vehicle production.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Require supply chain to implement and follow industry ‘best practice’ standards for environmental protection in supplier resource extraction.

Referenced Standards
Existing standards for ‘best practices’ for resource extraction are to be identified and developed by the E-SPEED for Vehicles Committee.

Resources

*Overview of Best Practice Environmental Management in Mining*
Best Practice Environmental Management in Mining series, Commonwealth of Australia and UNEP, August 2002
REPT CREDIT 2 – RESOURCE PROCESSING – 1 POINT

Objective
Encourage organizations to follow environmental best practices in materials extraction, processing and delivery.

Requirements
Document adherence to industry ‘best practice’ standards in supplier resource processing. Have in place a permanent program to monitor supplier performance relative to best practices, and document ongoing compliance with that program. This includes the processing of resources (including fuel) and materials used in vehicles and the vehicle production.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Require supply chain to implement and follow industry ‘best practice’ standards for environmental protection in resource processing.

Referenced Standards
Existing standards for ‘best practices’ for resource extraction are to be identified and developed by the E-SPEED for Vehicles Committee.

Resources

*Overview of Best Practice Environmental Management in Mining*
Best Practice Environmental Management in Mining series, Commonwealth of Australia and UNEP, August 2002
REPT CREDIT 3 – RESOURCE AND MATERIALS TRANSPORTATION – 1 POINT

Objective
Encourage organizations to follow environmental best practices in materials extraction, processing and transportation.

Requirements
Document adherence to industry ‘best practice’ standards in supplier resource and materials transportation. Have in place a permanent program to monitor supplier performance relative to best practices, and document ongoing compliance with that program. This includes the transportation of resources (including fuel) and materials used in vehicles and the vehicle production.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Require supply chain to implement and follow industry ‘best practice’ standards for environmental protection in supplier resource and materials transportation.

Referenced Standards
Existing standards for ‘best practices’ for resource and materials transportation are to be identified and developed by the E-SPEED for Vehicles Committee.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
MANUFACTURING (M)

M PREREQUISITE 1 – NO-USE MATERIALS – REQUIRED

Objective
Encourage organizations to eliminate the use of environmentally harmful materials in vehicles and their manufacture.

Requirements
Zero use of the following materials in vehicles or manufacturing processes:
- Zero mercury use in vehicles, excluding light bulbs. For any mercury-containing light bulbs, the amount of mercury must be below 100 picograms per lumen hour.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Find appropriate substitute technologies and materials to replace mercury use.

Referenced Standards
Global Automotive Declarable Substance List (GADSL)

Resources

INFORM
http://www.informinc.org/fact_P3vehicles.php#wheremercury
M PREREQUISITE 2 – MINIMUM STAFF ENVIRONMENT – 0 POINTS

Objective
Maintain staff environment above minimum standards throughout the supply chain.

Requirements
Maintain staff environment above minimum standards throughout the supply chain.
• Safety
• Pay meeting or exceeding local pay standards
• Healthy work environment

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
To be identified and developed by the E-SPEED for Vehicles Committee.

Referenced Standards
To be identified and developed by the E-SPEED for Vehicles Committee.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
**M CREDIT 1.1-1.5 – ENERGY USE – PER VEHICLE MANUFACTURED – 5 POINTS**

**Objective**
Encourage vehicle manufacturers to measure and reduce manufacturing energy use per vehicle.

**Requirements**
Document energy inputs for the manufacturing and assembly process on a per-unit basis for the vehicle being certified. This can be done for the specific factories that produce the vehicle being certified or this can be done on a companywide basis with that average being used for the vehicle being certified. Energy use by both the vehicle manufacturer and its suppliers needs to be included in this energy per vehicle calculation.

**Calculation of the Fixed Baseline for energy use per vehicle**

The fixed baseline is calculated as ____ MMBTU per pound of finished vehicle weight.

OR

The fixed baseline is calculated as ____ MMBTU per pound carrying capacity of finished vehicle.

**Calculation of Points**

<table>
<thead>
<tr>
<th>Percent Reduction from Energy Use per Vehicle Baseline</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>1</td>
</tr>
<tr>
<td>20%</td>
<td>2</td>
</tr>
<tr>
<td>30%</td>
<td>3</td>
</tr>
<tr>
<td>40%</td>
<td>4</td>
</tr>
<tr>
<td>50%</td>
<td>5</td>
</tr>
</tbody>
</table>

**Submittals – E-SPEED for Vehicles Certification**

- Provide documentation on a facility-by-facility basis, including all facilities at which the make and model is manufactured and assembled.
  - Vehicle production volumes for both the current (submission) year and the preceding three years.
  - Total facility energy inputs for both the current (submission) year and the preceding three years.
- For facilities that manufacture or assemble multiple models or vehicle types, document the proportion of total facility energy use assigned to the production of the certifying model, as based on a weighted average from the masses of each type of vehicle produced. For example: If Facility A produces 750 Model X’s that weigh 4000 pounds and 250 Model Y’s that weigh 6000 pounds in a year, the fraction of the total facility energy consumption that should be allocated to Model X is:

  \[
  \frac{(750 \times 4000)}{((750 \times 4000) + (250 \times 6000))} \times \text{Energy Use}
  \]
Potential Technologies & Strategies
Increasing energy efficiency is one of the greatest opportunities to reduce a facility’s operating costs. Due to the rising cost of energy, most energy efficiency investments have a rapid payback period due to lower energy use over the building lifetime, downsized equipment, reduced space needs for mechanical equipment and utility rebates. In addition, energy efficiency in manufacturing facilities reduces pollution from fossil fuel use, and increases building occupant comfort.

Energy efficiency strategies can include improvements in manufacturing equipment as well as building systems. Consider energy efficiency opportunities in industrial systems, HVAC, lighting and controls systems.

- Conduct a plant-wide energy efficiency assessment or energy audit (U.S. DOE’s Four industrial System Areas: motors and pumps, compressed air, steam, and process heating).
- Based on plant-wide energy efficiency assessment or energy audit:
  - Identify systems and operations that are good candidates for energy efficiency and waste minimization improvements.
  - Plan and implement specific energy and cost-saving projects.
  - Contact an energy service company and consider an energy savings performance contract if warranted.
- Implement energy efficiency retrofits, effective building and equipment maintenance and other energy saving techniques to reduce energy use on an ongoing basis.
- Plan ahead to replace motors with high-efficiency replacement motors so they can be delivered and installed quickly when existing motors break down.

Referenced Standards
There is no standard cited for this credit.

Resources

U.S. Department of Energy Office of Industrial Technologies
http://www1.eere.energy.gov/industry/bestpractices/technical.html

National Association of Manufacturers (NAM) Manufacturing Improvement Center (MIC)
The research and education arm of the National Association of Manufacturers created to help make efficiency a part of manufacturers' and employees' daily routine.
http://www.nam.org/institute
Objective
Increase use of onsite and offsite renewable energy in vehicle manufacturing facilities in order to reduce the environmental impacts associated with fossil fuel energy use.

Requirements
Annually meet a percentage of the energy used in vehicle manufacture with renewable energy through the use of onsite or offsite renewable energy systems. Points are earned according to the table below. The renewable percentages shown in the table are the percentage of the total energy used during the manufacture of the vehicle being certified.

Offsite renewable energy sources are as defined by the Center for Resource Solutions (CRS) Green-e products certification requirements or the equivalent. Green power may be procured from a Green-e certified power marketer, a Green-e accredited utility program, or through Green-e certified Tradable Renewable Certificates or the equivalent. For all renewable energy that is claimed for E-SPEED for Vehicles credit, the associated environmental attributes must be permanently retired through a third party and cannot be sold.

<table>
<thead>
<tr>
<th>Renewable Energy</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 %</td>
<td>1</td>
</tr>
<tr>
<td>6 %</td>
<td>2</td>
</tr>
<tr>
<td>9 %</td>
<td>3</td>
</tr>
<tr>
<td>12 %</td>
<td>4</td>
</tr>
<tr>
<td>15 %</td>
<td>5</td>
</tr>
</tbody>
</table>

If at least three (3) percent of the renewable energy is from onsite sources, one (1) additional point is earned.

Submittals – E-SPEED for Vehicles Certification
For any renewable energy systems present at company facilities (onsite):
- Provide system schematic diagrams and narrative highlighting renewable energy system design and operation.
- Provide metered energy output of onsite renewable energy system over the performance period.
- Provide calculations documenting the percentage of the total companywide energy requirements that was supplied by onsite renewable energy systems for the performance period.

OR
E-SPEED for Vehicles

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For any offsite renewable energy sources:

• Document the percentage of the companywide total energy requirements that was met with renewable power or certificates over the performance period.
• Provide documentation demonstrating that the supplied renewable power or certificates over the performance period met the referenced Green-e requirements or the equivalent.
• Provide a letter stating a commitment to continue purchases of renewable power or certificates at the same or higher level over the next performance period.

Potential Technologies & Strategies

Design and specify the use of onsite nonpolluting renewable technologies to contribute to the companywide total energy requirements. Consider and employ solar, geothermal, wind, biomass (other than unsustainably harvested wood) and biogas technologies.

Purchase renewable energy or renewable energy tradable certificates to meet some or all of the companywide energy requirements. Review historic companywide electrical consumption trends. Research power providers for each facility and select those with guarantees that a fraction of its delivered electric power is derived from net nonpolluting renewable technologies. Grid power that qualifies for this credit originates from solar, wind, geothermal, biomass or low-impact hydro sources.

Referenced Standards

Center for Resource Solutions Green-e Products Certification Requirements

The Center for Resource Solutions

The Green-e Program is a voluntary certification and verification program for green electricity products. The program sets consumer protection and environmental standards for electricity products and verifies that Green-e certified products meet these standards.

Green-e Program Criteria:

1. Products must contain 50% or more renewable content averaged over one year.
2. Fossil portions of the products must have equal or lower air emissions (SOx, NOx, CO2) than an equivalent amount of system power.
3. Air emissions from a renewable energy generator using waste materials for fuel must be equal to or less than the emissions that would otherwise be produced from the most common alternative disposal of the waste.
4. Product must not contain any nuclear power other than what is contained in system power purchased for the eligible product’s portfolio.
5. Product must contain at least 5% “new renewable” electricity one year after regulation, 10% the second year (with pending increases of 5% each year until 25%).
The Sustainable Vehicle Rating System

Standards Cited:

Center for Resource Solutions (CRS) Green-e Requirements
Topic Cited: Green-e standards for renewable electricity.
415-561-2100
www.resource-solutions.org

Low Impact Hydropower Rating system
Topic Cited: Green-e standards for Low Impact Hydropower Rating system.
Green-e Renewable Energy rating system/Low Impact Hydro Power Institute
(888) 634-7336 (Green-e) or (503) 227-1763 (Low Impact Hydropower Institute)
www.green-e.org, www.lowimpacthydro.org

Resources

The Office of Energy Efficiency and Renewable Energy (EERE)
The EERE develops and deploys efficient and clean energy technologies to meet the nation’s energy needs.
w w w.e e r e.e n e r g y.g o v/

Database of State Incentives for Renewable Energy (DSIRE)
This database was developed by the North Carolina Solar Center and is designed to contain all available information on state financial and regulatory incentives (e.g., tax credits, grants, and special utility rates) that are designed to promote the application of renewable energy technologies. DSIRE also offers additional features such as reports that detail incentives on a state-by-state basis.
www.dsireusa.org

U.S. Department of Energy Photovoltaics Program
A DOE website with the mission of making photovoltaics (PV) a significant part of the domestic economy as an industry as well as an energy resource.
http://www.eere.energy.gov/solar/photovoltaics.html

National Center for Photovoltaics (NCPV)
This site provides clearinghouse information on all aspects of PV systems.
www.nrel.gov/ncpv/

American Wind Energy Association (AWEA)
AWEA is a national trade association representing wind power plant developers, wind turbine manufacturers, utilities, consultants, insurers, financiers, researchers, and others involved in the wind industry.
www.awea.org

American Bio-energy Association
An industry trade association dedicated to developing the entire breadth of the bio-energy industry from power to fuels to bio-based chemicals.
www.biomass.org
DOE Bio-Power
This site includes information on the current state of the biomass industry. Of particular interest is the page describing the Small Modular Bio-Power Initiative. The Initiative is aimed at determining the feasibility of developing systems that are fuel-flexible, efficient, simple to operate, and whose operation will have minimum negative impacts on the environment. The intended power range for these systems is from five kilowatts to five megawatts.
www.eere.energy.gov/biomass

U.S. EPA Green Power Partnership
http://www.epa.gov/greenpower/index.htm

Green Power Buyers Guide
This guide explains how to buy green power and a listing of providers of green power in each state.
www.epa.gov/greenpower/buygreenpower/guide.htm

Green Power Network
The Green Power Network provides news and information on green power markets and related activities and is maintained by the National Renewable Energy Laboratory for the U.S. Department of Energy.
www.eere.energy.gov/greenpower

National Renewable Energy Laboratory
The National Renewable Energy Laboratory (NREL) is a leader in the U.S. Department of Energy’s effort to secure an energy future for the nation that is environmentally and economically sustainable.
www.nrel.gov

ENERGYGuide
The EnergyGuide includes information on different power types, including green power, as well as general information on energy efficiency and tools for selecting power providers based on various economic, environmental and other criteria.
www.energyguide.com
M CREDIT 3.1-3.5 – REDUCED USE OF WATCH LIST (REPORTABLE) MATERIALS – 5 POINTS

Objective
Reduce or eliminate use of watch list (reportable) materials in vehicle manufacturing and assembly.

Requirements
Reduce or eliminate materials listed on the IMDS International List of Reportable Substances.

Baseline for each reportable material
Industry average use per vehicle in 2000

Calculation of points

<table>
<thead>
<tr>
<th>Weighted Average Percent Reduction from Baseline for All Reportable</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>1</td>
</tr>
<tr>
<td>40%</td>
<td>2</td>
</tr>
<tr>
<td>60%</td>
<td>3</td>
</tr>
<tr>
<td>80%</td>
<td>4</td>
</tr>
<tr>
<td>95%</td>
<td>5</td>
</tr>
</tbody>
</table>

Submittals – E-SPEED for Vehicles Certification
- Table based on IMDS STD001 of all reportable substances contained or released in the process of manufacturing or assembling the vehicle. Table should include:
  1. Weight of each reportable substance used per vehicle.
  2. Industry average (by weight) of each reportable substance used or released during vehicle manufacturing and assembly in 2000.
  3. Percent reduction of each reportable substances.
  4. Weighted average percent reduction of all reportable substances.
- Narrative explaining methods and strategies for achieving reduction in use of reportable substances from the industry standard.

Potential Technologies & Strategies
The IMDS International List of Reportable Substances lists those materials which, ‘when contained or released from finished materials and components from the automotive industry, are of concern to human health, environmental safety, and/or recycling.’ These materials are prohibited, restricted or monitored by the auto industry using existing legislation or voluntary self-regulation.
The Sustainable Vehicle Rating System

Referenced Standards

*Global Automotive Declarable Substance List (GADSL)*

*International Material Data System (IMDS)*


Resources

To be identified and developed by the E-SPEED for Vehicles Committee.
M CREDIT 4.1-4.5 – PERCENTAGE OF RECYCLED MATERIALS – 5 POINTS

Objective
Encourage vehicle manufacturers to maximize the percentage of materials employed for vehicle production that are made in part or entirely from recycled materials.

Requirements
Document the portion (by weight) of total materials employed for vehicle production that contains recycled materials. Points are distributed as per the table below.

Calculation of Points

<table>
<thead>
<tr>
<th>Percent of Vehicle by Weight that is Recycled Materials</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>1</td>
</tr>
<tr>
<td>40%</td>
<td>2</td>
</tr>
<tr>
<td>60%</td>
<td>3</td>
</tr>
<tr>
<td>80%</td>
<td>4</td>
</tr>
<tr>
<td>95%</td>
<td>5</td>
</tr>
</tbody>
</table>

Submittals – E-SPEED for Vehicles Certification
- Document the types and weights of materials used to produce one vehicle and the percentage of each type of material that has recycled content.
- Provide the percentage of the vehicle by weight that is recycled material.
- Document the sources and feedstock of the recycled materials.

Potential Technologies & Strategies
The use of recycled materials in vehicle production minimizes the environmental impacts associated with the production of materials from virgin resources. Using recycled materials additionally creates healthy markets for diverting recyclable materials from landfills into recycling programs.

Referenced Standards
There is no standard referenced for this credit.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
Objective
Encourage vehicle manufacturers to maximize the percentage of total materials employed for vehicle production that can be reused and recycled at the vehicle’s end of life.

Requirements
Document (by weight) the portion of total materials employed for vehicle production that can be reused and recycled at the vehicle’s end of life. Establish the percentage of materials employed for vehicle production that can be reused and recycled at the vehicle’s end of life.

Calculation of Points

<table>
<thead>
<tr>
<th>Percent of Vehicle Materials by Weight that is Recyclable</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>70%</td>
<td>1</td>
</tr>
<tr>
<td>80%</td>
<td>2</td>
</tr>
</tbody>
</table>

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
To be identified and developed by the E-SPEED for Vehicles Committee.

Referenced Standards
To be identified and developed by the E-SPEED for Vehicles Committee.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
M CREDIT 6 – PERCENTAGE OF RENEWABLE MATERIALS USED – 1 POINT

Objective
Encourage vehicle manufacturers to maximize the percentage of total materials employed for vehicle production that are made in part or entirely from renewable materials.

Requirements
Document the portion of total materials (by weight) employed for vehicle production that are made in part or entirely from renewable materials. Establish the percentage of materials employed for vehicle production are made in part or entirely from renewable materials.

Calculation of Points

<table>
<thead>
<tr>
<th>Percent of Vehicle Materials by Weight that is Recyclable</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>1</td>
</tr>
</tbody>
</table>

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
To be identified and developed by the E-SPEED for Vehicles Committee.

Referenced Standards
There are no standards cited for this credit.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
M CREDIT 7 – EMISSIONS DURING MANUFACTURING PROCESS – 1 POINT

Objective
Encourage vehicle manufacturers to monitor, track, and minimize environmentally damaging emissions produced during the vehicle manufacturing process.

Requirements
Document all annual emissions of the listed pollutants in accordance with their respective regulatory compliance requirements. For pollutants without a regulatory framework, document emissions based on alternative framework (requires Advisory Committee guidance as to the large range of permitted industrial pollutants that Cleaner & Greener® does not or should not address).

Document emissions reduction benefits of manufacturing efficiency actions, retire a portion of the reductions, and reduce emissions in the supply chain.

- Track and record emission reductions delivered by energy efficiency, renewable energy and other building emissions reduction actions.
- Report emission reductions using a third-party voluntary rating system.
- Retire at least 10% of the reported emission reductions through a third-party voluntary rating system. (To meet this requirement, the third-party voluntary emission reduction certification and retirement programs must be programs of credible organizations. Third-party programs shall notify any applicable local or regional emission reduction registries of the reported emission reductions.)
- Ask the suppliers of goods and services for the building to do the same by implementing the actions described above.

Submittals – E-SPEED for Vehicles Certification

- Document all annual emissions of listed pollutants in accordance with their respective regulatory compliance requirements. For pollutants without a regulatory framework, document emissions based on Leonardo Academy’s draft standard for emission inventories reduction credits and offsets.
- Provide reporting of all manufacturing process performance parameters that reduce energy use and calculate the total savings for each type of energy reduction.
- Provide reporting of renewable energy use and other emission reduction actions.
- Calculate and provide a report of the emission reductions resulting from the energy-efficiency and other emission reduction actions by using the calculation protocol of a third-party voluntary rating system. Emission reductions to be documented include carbon dioxide (CO$_2$), sulfur dioxide (SO$_2$), nitrogen oxides (NOx), mercury (Hg), small particulates (PM2.5), large particulates (PM10) and volatile organic compounds (VOCs).
- Provide documentation of the retirement of at least 10% of the reported emission reductions through a third-party voluntary rating system.
- Provide documentation that all suppliers for the manufacturer have been asked to:
  - Report energy savings, energy-efficiency actions, renewable energy use and other emission reduction actions.
  - Report all types of resulting emissions reductions.
E-SPEED for Vehicles

The Sustainable Vehicle Rating System

- Retire at least 10% of these reductions through a third-party voluntary rating system.
- Ask their suppliers of goods and services to do the same.

- Provide documentation that a third-party voluntary rating system has notified any applicable local or regional emission reduction registries of the reported emission reductions.

Potential Technologies & Strategies

Pollutants such as carbon dioxide (CO₂), sulfur dioxide (SO₂), nitrogen oxides (NOx), mercury (Hg), small particulates (PM2.5), large particulates (PM10), and volatile organic compounds (VOCs) degrade the environment and cause negative health effects. Energy efficiency, renewable energy use and other building emission reduction actions help reduce these health and environmental impacts at a low cost.

Use a program that helps building owners calculate and report all the different types of emission reductions delivered by their energy efficiency improvements and other emission reduction actions.

- Establish whole-facility energy utility data collection and analysis procedure.
- Track and compare the target utility use goals and/or install equipment to measure base building systems to allow for comparison, management, and optimization of actual vs. target energy and water performance.
- Employ building automation systems to perform measurement and verification (M&V) functions where applicable.
- Provide for ongoing M&V system maintenance and operating plan in facility operations and maintenance manuals.

Referenced Standards

There is no standard referenced for this credit.

Resources

Cleaner and Greener® Rating System

Cleaner and Greener® certifies organizations for their positive environmental actions.
Leonardo Academy, 608-280-0255
www.cleanerandgreener.org/certification/program.htm
M CREDIT 8.1 – WASTE MANAGEMENT–AUDITING – 1 POINT

Objective
Establish a program to encourage and promote source reduction and recycling actions at all applicable phases of the vehicle manufacturing process. Monitor and quantify current waste stream production volume.

Requirements
Conduct a waste stream audit of the ongoing waste stream (not specific upgrade project waste) to establish a current building waste baseline that identifies the types and amounts of waste in the waste stream. At a minimum, the audit should determine the amount of paper, glass, plastics, cardboard and metals in the waste stream. Implement a procurement/management policy to reduce the waste stream through purchasing strategies, collection station equipment and occupant education.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Conduct a waste stream audit to determine waste sources and calculate a facility waste baseline. When developing a manufacturing waste reduction plan, evaluate the reduction potential for each type of waste through source reduction, reuse and recycling. Develop, implement and maintain a waste reduction plan that includes purchasing, reuse, worker education and recycling strategies.

Referenced Standard
There is no standard referenced for this credit.

Resources
To be identified and developed by E-SPEED for Vehicles Committee.
M CREDIT 8.2-8.3 – WASTE MANAGEMENT – WASTE REDUCTION, REUSE AND DONATION – 2 POINTS

Objective
Implement practices and equipment that reduce waste through material source reduction, reuse and donations.

Requirements
• Divert ___ % of total waste stream through material source reduction, reuse and donations. (1 point)
• Divert an additional ___ % of total waste stream through material source reduction, reuse and donations. (1 point)

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Source reduction is the most effective component of waste reduction. Use less material whenever possible. Source reduction reduces waste generation by changing the design, manufacture, purchase or use of materials. One source reduction strategy involves improving product design and/or manufacture to use less material.

Another component of waste reduction is materials reuse. Reusing products and packaging prolongs the useful life of these materials, thus delaying final disposal or recycling. A good example of this is promoting the use of coffee mugs instead of disposable paper or polystyrene cups.

Organizations can also donate products or materials such as office or building supplies to charities or nonprofits, or exchange materials through a commercial materials exchange. This can reduce waste and purchasing, as well as generate additional tax write-offs for your organization.

• Analyze your facilities’ waste stream and establish a current building waste baseline to understand waste production patterns.
• Evaluate how each type of waste in the waste stream can be reduced through source reduction, reuse, or donation.
• Develop, implement and maintain a waste reduction plan that includes procurement/management policies and annual waste reduction goals.
• Establish a materials and supplies purchasing policy that reduces waste generation from its source.
• Eliminate unnecessary packaging, switch to reusable materials, redesign packaging to eliminate excess material while maintaining strength, work with customers to develop a packaging return program, reuse corrugated boxes internally, and switch to reusable transport containers.
• Align your waste hauler’s financial incentives with your facility’s waste reduction goals.
• Use reusable bottles, ceramic coffee mugs, bags, and other containers.
• Reduce office paper waste by implementing a formal policy to duplex all draft reports and make training manuals and personnel information available electronically.
• Improve product design to use fewer materials.
The Sustainable Vehicle Rating System

- Purchase products in bulk.
- Reuse office furniture and supplies such as interoffice envelopes and file folders.
- Donate unwanted supplies to local schools or nonprofit organizations.

Referenced Standards
There is no standard referenced for this credit.

Resources

US EPA Waste Wise Program
A free, voluntary EPA program helping U.S. organizations eliminate costly municipal solid waste, benefiting the bottom line and the environment.
www.epa.gov/wastewise/about/index.htm

Waste at Work
(212) 788-7900
An online document from Inform, Inc. and the Council on the Environment of New York City on strategies and case studies to reduce workplace waste generation.
www.informinc.org/wasteatwork.php

Municipal Solid Waste in the United States, 2001 Facts and Figures
This report from the U.S. EPA includes information on waste generation, recovery, and disposal trends; source reduction; and infrastructure data for waste management.

Small Business Waste Reduction Guide
This resource from the University of Wisconsin Extension Center identifies waste reduction opportunities and strategies for small businesses, including manufacturing firms. It includes a number of case studies, including electronics manufacturing, plastics manufacturing, printing, and wood products companies.
www.uwex.edu/ces/ag/sus/sbdc/tocdetl.htm

Business Resource Efficiency and Waste Reduction
A program from the California Integrated Waste Management Board to assist in office recycling and waste reduction efforts.
http://www.calrecycle.ca.gov/ReduceWaste/Business/
M CREDIT 8.4-8.5 – WASTEMANAGEMENT – RECYCLING – 2 POINTS

Objective
Utilize practices that divert waste through the recycling of materials.

Requirements
• Divert ___ % of your total waste stream through material recycling. (1 Point)
• Divert an additional ___ % of your total waste stream through material recycling. (1 Additional Point)

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Recycling collection is the segregation, collection, storage, and removal of recyclable or compostable materials. Recycling collection can generate substantial revenue in addition to reducing waste. By recycling metal, glass, plastic, paper and other waste, the materials contained within those products can be reused. Vermicomposting, or using worm bins for vegetable food waste, is another recycling example.

• Have in place a building occupant recycling program that addresses the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, cardboard/OCC, metals, batteries and fluorescent lamps and diversion from landfill disposal.
• Place recycling containers throughout the building and conduct occupant and maintenance personnel awareness campaigns on building recycling procedures.
• Research local recycling efforts to find the best method of diverting recyclable materials from the waste stream.
• Identify local waste handlers and buyers for glass, plastic, office paper, newspaper, cardboard, metals and organic wastes.
• Consider employing cardboard balers, aluminum can crushers, recycling chutes and other waste management techniques to further enhance the recycling program.
• Purchase lamps with low mercury content, and recycle them after use.
• Investigate external markets for recyclables and expand collection to include new, marketable materials.
• Increase the recycled content of materials in your manufactured goods to perpetuate the recycling market.

Referenced Standards
There is no standard referenced for this credit.

Resources

US EPA Waste Wise Program
A free, voluntary EPA program helping U.S. organizations eliminate costly municipal solid waste, benefiting the bottom line and the environment.
www.epa.gov/wastewise/about/index.htm
E-SPEED for Vehicles

The Sustainable Vehicle Rating System

Waste at Work
(212) 788-7900
An online document from Inform, Inc. and the Council on the Environment of New York City on strategies and case studies to reduce workplace waste generation.
www.informinc.org/wasteatwork.php

National Recycling Coalition
All kinds of information on recycling ranging from “how to set up a recycling program” to “where to find buyers/markets for recycled goods”.
www.nrc-recycle.org/

Business Resource Efficiency and Waste Reduction
A program from the California Integrated Waste Management Board to assist in office recycling and waste reduction efforts.
http://www.calrecycle.ca.gov/ReduceWaste/Business/

Recycling at Work
(202) 293-7330
A program of the U.S. Conference of Mayors that provides information on workplace recycling efforts.
http://usmayors.org/recycle/
M CREDIT 9 – WORKPLACE SAFETY – 1 POINT

Objective
Encourage continual improvements to improve safety and health in the workplace.

Requirements
Follow applicable OSHA Occupational Safety and Health Standards in all company facilities.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that applicable OSHA Standards have been followed in all company facilities.

Potential Technologies & Strategies
Follow applicable OSHA requirements in all facilities. Provide easy access to Material Safety Data Sheets (MSDS) for materials used in your facilities and appropriate safety equipment in all areas of the facility. Go above and beyond recommended OSHA requirements for high-traffic areas and those with intensive manufacturing processes.

Referenced Standards

**OHSAS 18001 Health & Safety Standard**
Provides injury rates or OSHA violation rates: lost time, and accidents.
www.osha.gov/

Resources

**Material Safety Data Sheets (MSDS)**
Subscription service for MSDS online database library.
MSDS Sheets for Health & Safety Compliance - Search & Manage Data Sheets | MSDSonline.com
M CREDIT 10 – REDUCED WATER USE – 1-3 POINTS

Objective
Reduce water usage in manufacturing of vehicles.

Requirements
Maintain water usage below specified levels for vehicle manufacture.

- Water use below ___ gallons per Vehicle = 1 point
- Water use below ___ gallons per Vehicle = 1 point
- Water use below ___ gallons per Vehicle = 1 point

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Implement water efficiency actions.

Referenced Standards
To be identified and developed by the E-SPEED for Vehicles Committee.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
M CREDIT 11 – VEHICLE DISTRIBUTION – 1 POINT

Objective
Follow environmental best practices in the distribution of vehicles to dealerships and other retail outlets.

Requirements
Follow environmental best practices in the distribution of vehicles to dealerships and other retail outlets.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
To be identified and developed by the E-SPEED for Vehicles Committee.

Referenced Standards
There is no standard cited for this credit.

Resources
To be identified and developed by E-SPEED for Vehicles Committee.
**Objective**
Follow environmental best practices in operation of buildings where vehicles are manufactured.

**Requirements**
Maintain at least LEED-EB Silver Level certification for buildings where vehicles are manufactured. Recertify buildings at least once every 2 years.

**Table 1  E-SPEED for Vehicles Points Earned Based on Floor-Area Weighted Average LEED-EB Rating of Buildings Where Vehicles are Manufactured**

<table>
<thead>
<tr>
<th>Percent of Manufacturing Building Floor-Area Certified</th>
<th>Certified</th>
<th>Silver</th>
<th>Gold</th>
<th>Platinum</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>0.0</td>
<td>1.0</td>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td>40%</td>
<td>0.5</td>
<td>1.5</td>
<td>2.5</td>
<td>3.5</td>
</tr>
<tr>
<td>60%</td>
<td>1.0</td>
<td>2.0</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>80%</td>
<td>1.5</td>
<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td>95%</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Submittals – E-SPEED for Vehicles Certification**
Provide documentation signed by the responsible party that the requirements for this credit have been met.

**Potential Technologies & Strategies**
Certify building(s) used in manufacturing of vehicles under LEED-EB. Work to increase over time the percentage of the buildings used in manufacturing of vehicles that are LEED-EB certified. Work to raise LEED-EB ratings of the buildings used in manufacturing of vehicles that are LEED-EB certified.

**Referenced Standards**
*The U.S. Green Building Council’s LEED Rating System for Existing Buildings*
[www.usgbc.org](http://www.usgbc.org)
The Sustainable Vehicle Rating System

Resources

U.S. Green Building Council’s LEED Rating System for Existing Buildings

- Rating System
- Reference Guide
- Online Resources

www.usgbc.org
VEHICLE USE AND OPERATION (VUO)

VUO PREREQUISITE 1 – VEHICLE SAFETY – REQUIRED

Objective
Encourage and promote vehicles that are safe for occupants, do not pose danger to occupants in other vehicles, utilize crash-prevention technologies, and perform well in crash test simulations.

Requirements
Vehicle must earn at least a 2-Star rating in each testing category of the National Highway Traffic Safety Administration’s (NHTSA) Five Star crash test rating.

Submittals – E-SPEED for Vehicles Certification
Provide documentation of the 5-Star Rating in each testing category of the NHTSA crash test rating, signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Beyond federal safety requirements, there are many options for increasing vehicle safety. Some of these strategies include three-point seatbelts for all passengers, front and side air bags, and improved head restraints. Daytime running lamps reduce the probability of a crash, and are inexpensive from a manufacturing point of view.

Vehicles with advanced composite structures perform better in crash tests than steel, and can absorb five times the collision energy per pound without crumpling. Additionally, they can significantly reduce the weight of a vehicle, increasing fuel efficiency and acceleration, while decreasing the damage produced in an accident.

Referenced Standards

National Highway Traffic Safety Administration (NHTSA) 5-Star Crash Test Results
A division of the U.S. Department of Transportation concerned with vehicle safety testing and ratings.
http://www.safercar.gov/

Resources

Insurance Institute for Highway Safety (IIHS)
An independent, nonprofit, scientific and educational organization dedicated to reducing losses associated with crashes. This organization is funded by insurance companies and performs comprehensive crash tests on vehicles.
http://www.iihs.org/
Sipping Fuel and Saving Lives: Increasing Fuel Economy Without Sacrificing Safety

Safe Car Guide
An informative introduction to auto safety and crash testing.
http://www.safecarguide.com/exp/exp.htm
VVO CREDIT 1.1-1.6 – FUEL ECONOMY – 6 POINTS

**Objective**
Improve vehicle fuel efficiency in order to reduce emissions and decrease dependence on petroleum-based fuel sources.

**Requirements**
Provide comparison of known fuel economy rates for vehicle being certified relative to the CAFE Standards for the vehicle category.

**Fixed Baseline**
CAFE Standards for fuel economy for the vehicle category.

**Calculation of Points**

<table>
<thead>
<tr>
<th>Percent Increase (miles per gallon) Above Baseline</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>1</td>
</tr>
<tr>
<td>100%</td>
<td>2</td>
</tr>
<tr>
<td>150%</td>
<td>3</td>
</tr>
<tr>
<td>200%</td>
<td>4</td>
</tr>
<tr>
<td>250%</td>
<td>5</td>
</tr>
<tr>
<td>300%</td>
<td>6</td>
</tr>
</tbody>
</table>

**Table 2  Fuel Economy Baselines (Miles per Gallon)**

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light Trucks</td>
<td></td>
<td>21.0</td>
<td>21.6</td>
<td>22.2</td>
</tr>
</tbody>
</table>

**Submittals – E-SPEED for Vehicles Certification**
Provide documentation of the DOT fuel economy tests for the vehicle and a statement signed by the responsible party.

**Potential Technologies & Strategies**
There are many strategies to increase fuel efficiency in a vehicle, including reduction of interior and exterior component mass, aerodynamic streamlining, efficiency-optimized transmissions, and high-efficiency, precision-
controlled engines. Simple improvements in non-driving functions such as air conditioning and power steering can also have an affect on fuel efficiency, and advanced tire design can reduce rolling resistance.

Referenced Standards

*USEPA’s Guide to Fuel Economy*  
Information on fuel economy standards and testing from the U.S. Environmental Protection Agency.  

Resources

*Technical Options for Improving the Fuel Economy of U.S. Cars and Light Trucks*  
A plan for improving fuel economy by the American Council for an Energy-Efficient Economy.  
[http://www.aceee.org/pubs/t012.htm](http://www.aceee.org/pubs/t012.htm)

*U.S. DOE Fuel Economy Guide*  
A website by the U.S. Department of Energy and the EPA that compares and rates vehicles according to fuel efficiency and emissions.  

*California Air Resources Board (CARB)*  
Current text of local, state, and federal statutes, as well as state and local regulations affecting air quality management in California.  
[http://www.arb.ca.gov/html/lawsregs.htm](http://www.arb.ca.gov/html/lawsregs.htm)
VUO CREDIT 2.1-2.4 – RENEWABLE FUELS – 4 POINTS

Objective
Encourage the use of renewable fuels that decrease fossil fuel dependence.

Requirements
Arrange for renewable fuels to be available and used by these vehicles. Points are awarded based on net reduction from 100% fossil energy provided by the renewable fuel. Calculations of net reductions must include any use of fossil fuels used to produce renewable fuels. Net renewable energy equals renewable energy less energy from fossil fuels.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>5% of Vehicles</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
</tr>
<tr>
<td>10%</td>
<td>10% of Vehicles</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
</tr>
<tr>
<td>15%</td>
<td>15% of Vehicles</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
</tr>
<tr>
<td>20%</td>
<td>20% of Vehicles</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
</tr>
<tr>
<td>25%</td>
<td>25% of Vehicles</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
<td>0.2 points</td>
</tr>
</tbody>
</table>

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party of the net renewable energy contained in the vehicle’s fuel over its operating life:
- Documentation of the net renewable energy of the fuel.
- Documentation that this fuel is available for the vehicle over its operation life.

Potential Technologies & Strategies
Design the vehicle to accommodate renewable fuels, arrange for these fuels to be available, and provide consumer incentives to use these renewable fuels.

Referenced Standards
There is no standard referenced for this credit.
The Sustainable Vehicle Rating System

Resources

**American Hydrogen Association**
A web site with information on hydrogen engines and fuel cells.
http://www.clean-air.org/

**Clean Cities Program**
A program of the U.S. DOE’s division of Energy Efficiency and Renewable Energy that advances the nation’s economic, environmental, and energy security by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption.
http://www.eere.energy.gov/cleancities/index.html

**Electric Auto Association**
A nonprofit educational organization that promotes the advancement and widespread adoption of electric vehicles.
http://www.eaaev.org/

**Methanol Institute**
A web site with information on methanol, fuel cells and alternative fuels.
http://www.methanol.org/

**Natural Gas Vehicle Coalition**
An organization providing information on natural gas vehicles and their benefits.
http://www.ngvc.org/

**Transportation Fuels, Technologies and Infrastructure Assessment Report**
A report from the California Energy Commission regarding increased fossil fuel use and the associated problems. (note: large file size)
http://www.energy.ca.gov/reports/100-03-013F.PDF

**Propane Education and Research Council**
An organization dedicated to promoting the safe, efficient use of propane as a preferred energy source.
http://www.propanecouncil.org/

**Renewable Fuels Association**
The national trade association for the U.S. ethanol industry.
http://www.ethanolrfa.org/

**U.S. DOE Alternative Fuel Data Center**
http://www.eere.energy.gov/afdc/index.html
Objective
Reduce emissions from vehicle use.

Requirements
Reduce major vehicle emissions per mile from the baseline.

Table 1  Emissions Baselines By Type of Vehicle

<table>
<thead>
<tr>
<th>Type of Emission</th>
<th>Baseline For Light-Duty Vehicles (Grams per mile)</th>
<th>Baseline For Light-Duty Trucks 1 (Grams per mile)</th>
<th>Baseline For Light-Duty Trucks 2 (Grams per mile)</th>
<th>Baseline For Light-Duty Trucks 3 (Grams per mile)</th>
<th>Baseline For Light-Duty Trucks 4 (Grams per mile)</th>
<th>Baseline For Motor Cycles (Grams per mile)</th>
<th>Baseline For Heavy Duty Vehicles (grams per brake horsepower)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hydro Carbons (THC)</td>
<td>1.0</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Non Methane Hydrocarbons (NMHC)</td>
<td>0.31</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Non-Methane Organic Compounds (NMOG)</td>
<td>1.56</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td>4.2</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>NOx</td>
<td>0.6</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0.2</td>
</tr>
<tr>
<td>Particulates</td>
<td>0.1</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0.1</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>0.18</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Greenhouse Gases (CO₂ Equivalent)</td>
<td>500</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

* - Appropriate Figure Needs to Be Determined
Table 2  Emissions Reductions and Points Earned by Type of Emission

<table>
<thead>
<tr>
<th>Type of Emission</th>
<th>Percent Reduction From Baseline</th>
<th>Points for 20% Reduction from Baseline</th>
<th>Points for 40% Reduction from Baseline</th>
<th>Points for 60% Reduction from Baseline</th>
<th>Points for 80% Reduction from Baseline</th>
<th>Points for 95% Reduction from Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hydro Carbons (THC)</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Non Methane Hydrocarbons (NMHC)</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Non-Methane Organic Compounds (NMOG)</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>NOx</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Particulates</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Greenhouse Gases (CO₂ Equivalent)</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Points earned equals the sum of all the points earned in matrix

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Since emissions are reduced by reduced fuel use, many of the strategies and technologies listed in VUO Credit 1: Fuel Economy will also contribute to reducing emissions. These include increased drive system fuel efficiency, reduced vehicle weight, making the vehicle more aerodynamic, and reduce rolling resistance. Emissions Control Systems and proper maintenance also reduce emissions.

Referenced Standards

U.S. EPA Emissions Standards
http://www.epa.gov/otaq/stds-ld.htm

California Air Resources Board (CARB)
Current text of local, state, and federal statutes, as well as state and local regulations affecting air quality management in California.
http://www.arb.ca.gov/html/lawsregs.htm
The Sustainable Vehicle Rating System

Resources

*California Air Resources Board’s Drive Clean Program*
A guide of zero and near-zero emissions vehicles from the State of California.
http://www.driveclean.ca.gov/

*Greenhouse Gas Emissions*
A web site by U.S. DOE and the EPA that compares and rates vehicles according to fuel efficiency and emissions.

*Average Annual Light Vehicle Emissions*
http://www.epa.gov/otaq/consumer/f00013.htm

*Air Toxics Emissions from Vehicles*
http://www.epa.gov/otaq/toxics.htm
**Objective**
Encourage and promote vehicles that are safe for occupants, do not pose danger to occupants in other vehicles, utilize crash-prevention technologies, and perform well in crash test simulations.

**Requirements**

**Fixed Baseline**
National Highway Traffic Safety Administration’s (NHTSA) 5-Star crash test rating.

**Calculation of Points**
Calculate the average star ratings for all testing categories and compare this number to the table below.

<table>
<thead>
<tr>
<th>(NHTSA) Crash Test Star Rating</th>
<th>E-SPEED for Vehicles Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Star</td>
<td>1</td>
</tr>
<tr>
<td>4-Star</td>
<td>3</td>
</tr>
<tr>
<td>5-Star</td>
<td>5</td>
</tr>
</tbody>
</table>

**Submittals – E-SPEED for Vehicles Certification**
Provide documentation of the (NHTSA) 5-Star crash test rating for this vehicle.

**Potential Technologies & Strategies**
Beyond federal safety requirements, there are many options for increasing vehicle safety. Some of these strategies include three-point seatbelts for all passengers, front and side air bags, and improved head restraints. Daytime running lamps reduce the probability of a crash, and are inexpensive from a manufacturing point of view.

Vehicles with advanced composite structures perform better in crash tests than steel, and can absorb five times the collision energy per pound without crumpling. Additionally, they can significantly reduce the weight of a vehicle, therefore increasing fuel efficiency and acceleration, and decreasing the damage produced in an accident.

**Referenced Standards**

*National Highway Traffic Safety Administration (NHTSA) 5-Star Crash Test Results*
A division of the US Department of Transportation concerned with vehicle safety testing and ratings.
The Sustainable Vehicle Rating System

Resources

Insurance Institute for Highway Safety (IIHS)
An independent, nonprofit, scientific and educational organization dedicated to reducing losses associated with crashes. This organization is funded by insurance companies and performs comprehensive crash tests on vehicles.
http://www.iihs.org/

Sipping Fuel and Saving Lives: Increasing Fuel Economy Without Sacrificing Safety

Safe Car Guide
An informative introduction to auto safety and crash testing.
http://www.safecarguide.com/exp/exp.htm
VUO CREDIT 5.1-5.2 – RELIABILITY AND REPAIR COSTS – 2 POINTS

Objective
Promote vehicles that are reliable and inexpensive to maintain, creating value for the consumer while reducing waste and increasing the life of the vehicle.

Requirements
Vehicle Reliability Above Average = 1 point
  • Advisory Committee - Is there a good metric for vehicle reliability?
Vehicle Repair Costs Below Average = 1 point
  • Advisory Committee - Is there a good metric for vehicle repairs costs?

Submittals – E-SPEED for Vehicles Certification
Provide documentation that the requirements are met.

Potential Technologies & Strategies
Vehicle reliability is an important element of overall environmental impact. Repairs and unscheduled maintenance events generate a variety of solid and liquid wastes, as well as reducing the overall life of the vehicle. Design and build vehicles so they are reliable and have low repair costs.

Referenced Standards
There is no standard referenced for this credit.

Resources

Consumer Guide Auto Ratings
Information from consumers about specific vehicle reliability, fuel economy, safety, and more.
http://auto.consumerguide.com/

J.D. Power Consumer Center
Information and automotive ratings based on feedback from vehicle owners.
http://www.jdpower.com/autos

Insurance Institute for Highway Safety (IIHS)
An independent, nonprofit, scientific and educational organization dedicated to reducing losses associated with crashes. This organization is funded by insurance companies and performs comprehensive crash tests on vehicles.
http://www.iihs.org/
VUO CREDIT 6.1-6.3 – OWNER GOOD VEHICLE MAINTENANCE PROGRAMS – 3 POINTS

Objective
Encourage life cycle choices for vehicle maintenance of tires, batteries, and oil.

Requirements
Implement a vehicle owner program that encourages good maintenance and disposal practices for vehicle tires, batteries and oil.

Vehicle Owner Education Program: 1 Point
Program must address:
- Tires – How to extend tire life and properly dispose of.
- Batteries – How to extend life and recycle at end of life.
- Oil – Frequency of oil changes and recycling of used oil.
- Vehicle Systems – Maintenance and proper disposal of used components.

Owner Vehicle Maintenance Incentive Programs for Tires, Batteries and Oil: 1 Point
- Program covering tires, batteries and oil.
- Program must provide free maintenance and recycling for tires, batteries and oil for the life of vehicle or equivalent incentive for vehicle owner.

Owner Vehicle Maintenance Incentive Programs for All Additional Vehicle Systems: 1 point
- Program must provide free maintenance for all additional vehicle systems and proper disposal of used components for life of vehicle or equivalent incentive for vehicle owner.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
The simplest way to increase vehicle reliability is to educate consumers on proper vehicle maintenance. Maintenance requirements should be included in the owner’s manual or a separate document, and should include schedules for oil changes and tune-ups, along with a guide for common repairs. In-dash active information systems can alert vehicle users to scheduled maintenance activities, oil changes, lamp replacements, engine problems, and other events. Also, vehicle warranties can include scheduled maintenance for a specified time period or mileage.

Referenced Standards
There is no standard referenced for this credit.
The Sustainable Vehicle Rating System

Resources

**Battery Council International**
Information on lead-acid battery recycling and environmental regulations from an organization that establishes technical standards in the automotive battery industry.

**Recycled Used Oil Management Standards**
A list of all EPA Standards concerning used oil disposal and recycling.
[Document Display | NSCEP | US EPA](http://www.batterycouncil.org/Home/tabid/36/Default.aspx)

**Tire Retread Information Bureau**
A nonprofit industry association that provides information about the economic and environmental benefits of tire retreading and tire repairing.
Objective
Decrease vehicle fuel consumption through the use of vehicle navigation systems.

Requirements
Standard vehicle equipment includes a vehicle navigation system that has the capability of identifying the shortest route to a selected destination and notifying the driver of local and regional traffic information (where these capabilities exist).

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Many cities now offer assistance to vehicle operators in how to avoid congested roadways through the use of vehicle navigation systems.

Numerous intelligent vehicle technologies also exist to assist the driver in operating the vehicle safely. Systems are available to aid with navigation, while others, such as vision enhancement and speed control systems, are intended to facilitate safe driving during adverse conditions. Other systems assist with difficult driving tasks such as transit and commercial vehicle docking.

Referenced Standards
There is no standard referenced for this credit.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
VUO CREDIT 8 – VEHICLE INTERIOR ERGONOMICS – 1 POINT

Objective
Improve occupant comfort through innovative ergonomic design

Requirements
Exceed the ergonomic regulations and equations from the Society of Automotive Engineers (SAE) and the Federal Motor Vehicle Safety Standards (FMVSS).

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Referenced Standards

Society of Automotive Engineers (SAE)
Ergonomic regulations and equations

Federal Motor Vehicle Safety Standards (FMVSS)
Ergonomic regulations and equations

Resources

Society of Automotive Engineers
A directory of ground vehicle standards, including standards concerning ergonomics and vehicle interiors.
http://www.sae.org/standardsdev/

Software for Evaluation of Vehicle Interior Ergonomics
Automated Vehicle Interior Packaging Process (AVIPP) is a software package that simulates and tests vehicle interior ergonomics. This software is produced by Engineering Solid Solutions Inc.
END OF LIFE VEHICLE RECYCLING AND DISPOSAL (ELVRD)

ELVRD CREDIT 1 – DESIGN FOR RECYCLING MATERIALS AT END OF VEHICLE LIFE – 6 POINTS

Objective
Encourage design that facilitates greater recycling of materials at end of vehicle life.

Requirements
Design vehicle to facilitate recycling of materials (by weight or volume):

<table>
<thead>
<tr>
<th>Percent Recycling the Design Facilitates</th>
<th>Recycling to a Lower Use</th>
<th>Recycling to an Equal or Higher Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>75%</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>85%</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>95%</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
Design vehicle to facilitate recycling.

Referenced Standards
There is no standard referenced for this credit.

Resources

EU’s End of Life Vehicles (ELV) Directive
A site on the ELV Directive from the European Commission.
http://ec.europa.eu/environment/waste/elv_index.htm

USCAR Vehicle Recycling Partnership
http://www.uscar.org/guest/view_team.php?teams_id=16

Environmental Impact of End-of-Life Vehicles: An Information Paper
Publication of the Australian Government.
ELVRD CREDIT 2 – IMPLEMENTATION PROGRAM FOR RECYCLING MATERIALS AT END OF VEHICLE LIFE – 6 POINTS

**Objective**
Encourage programs that ensure greater recycling of materials at end of vehicle life.

**Requirements**
Have program in place that ensures that 90 percent of vehicles will be recycled:

<table>
<thead>
<tr>
<th>Percent Recycling the Program Assures</th>
<th>Recycling to a Lower Use</th>
<th>Recycling to an Equal or Higher Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>75%</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>85%</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>95%</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Submittals – E-SPEED for Vehicles Certification**
Provide documentation signed by the responsible party that the requirements for this credit have been met.

**Potential Technologies & Strategies**
Design vehicle to facilitate recycling.

**Referenced Standards**
There is no standard referenced for this credit.

**Resources**

*EU’s End of Life Vehicles (ELV) Directive*
A site on the ELV Directive from the European Commission.
http://ec.europa.eu/environment/waste/elv_index.htm

*USCAR Vehicle Recycling Partnership*
http://www.uscar.org/guest/view_team.php?teams_id=16

*Environmental Impact of End-of-Life Vehicles: An Information Paper*
An environmental paper from the Australian Government.
INNOVATION AND ADDITIONAL ACHIEVEMENT CREDITS (IAAC)

IAAC CREDIT 1.1-1.4 – INNOVATION AND ADDITIONAL ACHIEVEMENT – 4 POINTS

Objective
Encourage innovations and additional achievements.

Requirements
Implement innovations or additional achievements.
Innovation and Additional Achievement Credits (IAAC) can be earned in three ways:
1. Innovation in the production and delivery of sustainable vehicles.
2. Addressing in a substantial way a sustainability issue not addressed by the E-SPEED for Vehicles prerequisites and credits.
3. Substantial additional achievement beyond the requirements of one of the E-SPEED for Vehicles prerequisites or credits.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
To be identified and developed by the E-SPEED for Vehicles Committee.

Referenced Standards
To be identified and developed by the E-SPEED for Vehicles Committee.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.
IAAC CREDIT 2.0 – E-SPEED FOR VEHICLES ACCREDITED PROFESSIONAL – 1 POINT

Objective
Improve sustainable vehicle development and manufacturing by including an E-SPEED for Vehicles Accredited Professional on the E-SPEED for Vehicles team for this vehicle.

Requirements
Include an E-SPEED for Vehicles Accredited Professional on the E-SPEED for Vehicles team for this vehicle.

Submittals – E-SPEED for Vehicles Certification
Provide documentation signed by the responsible party that the requirements for this credit have been met.

Potential Technologies & Strategies
E-SPEED for Vehicles Accredited Professional Standard.

Referenced Standards
To be identified and developed by the E-SPEED for Vehicles Committee.

Resources
To be identified and developed by the E-SPEED for Vehicles Committee.