



# CONTACT REPORT

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**SUBJECT:** SAE Environmental Sustainability Conference,  
April 8-10, 2002, Graz, Austria

**PURPOSE:** Background and context of developments in environmental issues, policies, and competitive performance

**SUMMARY:**

- DCX and Ford (including Volvo) make extensive use of Life Cycle Assessment (LCA) in Vehicle Development Programs.
- An EU Integrated Product Policy white paper due this summer could possibly lead to life-cycle-based product labeling.
- Ford is planning a 50% headcount increase at their Aachen research facility with specific focus on environmental issues.
- All European OEMs are dedicating engineering resources to meet the specific end-of-life and CO<sub>2</sub> reduction standards.
- European OEMs are making significant progress incorporating recycled content and renewable materials into production parts.
- Carbon emissions trading is increasingly being used in preparation for mandatory CO<sub>2</sub> reductions scheduled for 2008.
- Data support the energy efficiency and CO<sub>2</sub> emissions benefits of bioethanol from cellulose (as opposed to feed stocks).

**IMPLICATIONS:**

- CO<sub>2</sub> reduction, use of recycled materials, and life-cycle-based design processes are becoming competitive factors in Europe.
- Directives in the EU and Japan (under development) will require OEMs to improve design for recyclability and support development of an end-of-life vehicle infrastructure.

**SOURCE ASSESSMENT:** Formal presentations and personal contacts at the SAE Environmental Sustainability Conference

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**ATTACHMENTS:** Conference Summary and Implications

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## Conference Summary and Implications

### 2002 Environmental Sustainability Conference and Exhibition April 8-10, 2002 Graz, Austria

- Sustainability is a term increasingly in vogue to describe the ability to meet the environmental, social, and economic needs of the future.
- There is no consensus on how sustainability can be measured or evaluated, but tools are emerging for this purpose and are being increasingly used in the transportation industry.
- Current efforts toward improved environmental sustainability are largely based on life cycle concepts aimed at optimizing the use of raw materials, minimizing the environmental burdens of manufacturing and use, and maximizing the re-use, recoverability, and recyclability of end-of-life products. There is a UNEP program aimed at developing the databases required to conduct Life Cycle Analysis (LCA).
- Environmental sustainability is broadly perceived as including local, regional, and global effects. Local and regional effects are largely dictated by water consumption, waterborne releases, landfill wastes, and airborne releases such as NO<sub>x</sub>, SO<sub>x</sub>, PM, HC (i.e. smog and acid-rain precursors). Global impacts are largely dictated by natural resource depletion (including raw materials and petroleum) and global warming gas releases (e.g. CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, SF<sub>6</sub>, and CFCs). The effort required to gather such data across vehicle life cycles is enormous.
- There is an influential green faction in many parts of Europe. The EU has established the most stringent requirements for ELV recyclability/recoverability. This standard has led to enormous investments of resources by all OEMs doing business in Europe. In a process similar to that which led to the EU ELV standards, there is a white paper due this summer on an Integrated Product Policy (IPP). This could potentially lead to EU standards that require life-cycle-based environmental product labeling with consequent requirements for enormous investments of resources.
- DCX, Ford, and Volvo are OEMs leading in the use of LCAs for both evaluation of their products' environmental performance and in the use of LCA in the VDP to improve product performance. It is conceivable that IPP could lead to requirements for extensive LCA work in the automobile industry. DCX, Ford, and Volvo would be best prepared to fulfill such potential requirements. Volvo claims to have conducted 150 LCAs over 12 years. Ford claims to have conducted "hundreds." DCX has also been conducting LCAs for 10 years and now has eco-teams that use LCA-based approaches to DFE with every Product Development Team to support the choice of materials and processes used in all new vehicle programs.
- Sustainable development in the transportation sector also includes the demands upon the infrastructure, e.g. adequate space for rail and roadways. In Europe, rail systems are now nearly fully utilized. Some cities in Germany and Switzerland are now using car-sharing programs to reduce congestion. Car-sharing programs could ultimately lead to alternative markets for transportation services, not only within mature automobile markets, but also emerging markets. Highway construction in China is currently 41,000 km/yr in an attempt to build the infrastructure to support transport needs. But populations,

particularly in China's major cities, could dictate that alternative personal transport solutions be developed. For example, populations are estimated at 200-250 people/hectare in China versus about 50/hectare in Europe and 10/hectare in the US.

- The EU ELV requirements are increasing the recyclability of non-metal materials used in vehicles. This has the potential of increasing the market availability of recycled materials and lowering their costs. DCX and Ford claim to have made significant progress in using non-metallic recycled materials in production parts. Ford of Europe claims to be incorporating 140M pounds/year of non-metallic materials into 800 production parts. The sources of these recycled materials include TPO bumpers, battery housings, old tires, and carpets. DCX has worked with NRI Industries to develop a process to recycle old tires into Syamar-T™ a thermoplastic elastomer, itself recyclable, and used in 40 to 50 components incorporating 5M pounds of tire-derived recycled content. NRI itself, is recycling 15M tires/year. DCX also challenged 60 of their suppliers to develop a use for recycled paint sludge resulting in a patented process that was used to produce 20M floor pan plugs containing 600k pounds of recycled paint sludge.
- European OEMs are working to incorporate natural renewable materials into production parts to minimize natural resource consumption. Ford claims to be incorporating 5 to 16.5 kg/vehicle of renewable materials into components such as the package tray, headliner/sun visors, interior trim, insulation, and carpets.
- The EU ELV directive dictates recyclability/recoverability standards. Recoverability refers to the fraction of ELV that can be used for energy recovery processes. A process known as RESHMENT is being commercialized and a plant is under construction in Switzerland to collect and incinerate ASR to produce energy and other useable material outflows.
- Global warming continues to be a major concern in Europe. The EU might be moving toward a 5L/100 km fuel consumption standard.
- Data were presented at the conference to show that switchgrass could be grown as a lignocellulosic source of bioethanol, a CO<sub>2</sub> neutral fuel, yielding 3800 to 4750 L/hectare at a net energy balance of 16,700 kJ/L. Iogen is constructing a pilot plant in Ottawa, Canada to produce ethanol from lignocellulose from agricultural waste. Several other plants in North America are in various stages of development.
- During the Global Climate Change Panel, it was predicted that attainment of stabilized atmospheric CO<sub>2</sub> concentrations would require an 80% CO<sub>2</sub> emissions reduction worldwide.
- BP uses an internal carbon-trading scheme that requires divisions to reduce CO<sub>2</sub> emissions or buy credits from other divisions that have reduced CO<sub>2</sub>. It was also reported that carbon trading in Europe is now happening as a voluntary means to attain CO<sub>2</sub> reductions that will be mandatory in 2008.

**Glossary of Terms:**

- ASR – Automotive shredder residue
- DFE – Design for the environment
- ELV – End-of-life vehicle
- GHG – Greenhouse gas
- IPP – Integrated Product Policy
- LCA – Life Cycle Assessment
- TPE – Thermal plastic elastomer
- TPO – Thermal plastic olefin
- UNEP – United Nations Environment Program
- VDP – Vehicle development programs