

# RESEARCH NEWS

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**Fraunhofer at the Hannover Messe Press Preview**

## **New perspectives on sustainability and the circular economy**

**A concrete solution for pressing challenges: In the CYCLOMETRIC project, researchers from the Fraunhofer Institute for Industrial Engineering IAO have devised a solution that allows companies to incorporate sustainability assessments and circular economy concepts into the early phases of development processes — right where there is the most leverage for ecofriendly design.**

Whenever the task is to develop sustainable technologies and products, there are many dependencies to consider across all the phases of development and the product's life cycle. The challenge is that right now, a standard life cycle assessment (LCA) can only be performed during later phases of development, when many of the design decisions can no longer be undone. In addition, a product's sustainability depends to a considerable degree on its later life cycle, which starts when the individual products are put to use and ends with their disposal.

This is where the experts at Fraunhofer IAO and their partners in the CYCLOMETRIC project come in: Their solution moves the sustainability evaluation forward to the early phase of development, charting a course for sustainable products suitable for the circular economy as early as during conceptual design.

### **Balancing innovation and standards**

One key element of their solution is a software program that fits seamlessly into existing development environments. Right from the first product idea, it provides estimates of carbon dioxide emissions, expected life cycles and other environmental aspects. As the product grows more defined, the forecasts also take on greater detail and allow for targeted adjustments. Dr. Lukas Block, head of the Mobility Transformation team at Fraunhofer IAO, explains one special feature: "The software visualizes potential vulnerabilities in the life cycle and gives specific recommendations for actions to take, like choosing recyclable materials or modular designs. At the same time, the solution is based on existing LCA standards so we can ensure compatibility with regulatory requirements."

The experts took a parallel approach. In addition to the software itself, they teamed up with an automotive manufacturer, a design agency and an engineering service provider to design an automotive center console as an example so they can see in practice how design, materials and life cycle requirements influence each other.

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This method turned out to spur mutual learning processes but also involved some challenges. “We had to let go of the traditional approaches in design and come up with a whole new methodology,” says Franziska Braun, expert for innovation design. She is also the project manager responsible for developing the methodological approach and the cross-partner design of a circularity-oriented center console on which this is based.

### **Revolution through integration**

This center console combines innovative materials, such as sustainable bio-based fiber composites and apple leather, with modular designs that make repairs and reuse simple. The researchers have also developed a supporting service concept that not only facilitates swapping individual components but also extends the product’s life.

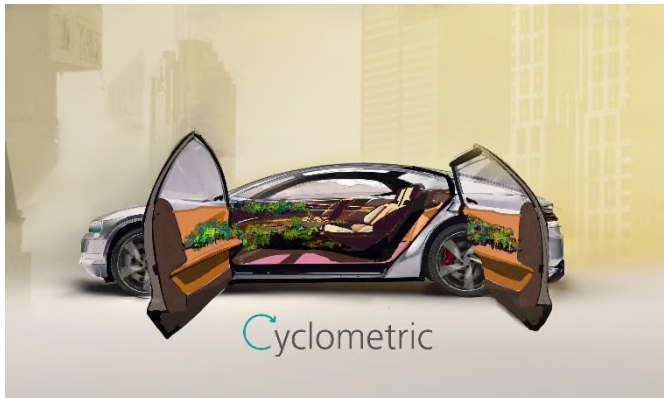
Another of the project’s stated goals is to bring tangible sustainability to customers and promote the acceptance of sustainable solutions. The materials and design were deliberately chosen in such a way that their circularity can be experienced not only in practical terms but also visually as a positive feature. “Our goal is to foster a new mindset, both in industry and among consumers,” Braun explains.

The close connection between software development and component design ensures that the results can be applied to industrial practice — even far beyond the automotive industry. Because the software and the assessment system have a compatible structure, the project’s results will also translate excellently to other sectors, opening up new avenues for promoting sustainable value creation across different industries.

### **Sustainability as experience**

“We don’t just think about sustainability. We make it something you can see and feel,” Braun explains. In line with this approach, attendees at Hannover Messe 2025 can visit the joint booth of the Fraunhofer-Gesellschaft (Hall 2, Booth B24) to see not only the software in action but also the center console for themselves. The experts from Fraunhofer IAO will also be presenting their CYCLOMETRIC solution at the Hannover Messe preview event on February 19, 2025.

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**Fig. 1** CYCLOMETRIC proves the importance of combining technical solutions, innovative methodological approaches and a shift in awareness.

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**Fig. 2** This center console lets trade show attendees experience sustainability for themselves.

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