RESEARCH IN SUSTAINABILITY

TRANSPORT

A need for a less CO_2emitting transport system

Since the first Danish car was built in 1888, the transport system has become increasingly CO_2-emitting, and transport plays a growing role in climate policy.

The transport sector is expected to account for almost 40 per cent of Danish CO_2 emissions by 2030, according to the Danish Svarer committee's report from 2024. A similar development is seen internationally.

If Denmark is to achieve its goal of a total reduction of CO_2 emissions by 70 per cent by 2030, the transport sector's CO_2 emissions must be radically reduced as soon as possible. This requires increased research and development in electrification, the development of alternative fuels, battery technology, and optimization in the logistics sector, as well as in passenger transport.

Research-based knowledge about framework conditions and incentives is essential to ensure that new technologies are adopted and used effectively.

At DTU, we conduct research in:

- Electrification of the transport sector
- Power-to-X, battery technology, and alternative fuels
- Planning and design of infrastructure and environmental assessments
- Eco-friendly transport behaviour
- Transport economics
- Optimization of transport systems, including digital solutions
- Sustainability and Life Cycle Analyses (LCA)

At DTU we are committed to a responsible future

In Europe we must transition towards a more viable society based on more sustainable solutions.

At DTU, we lead cutting-edge research in engineering and natural sciences, supported by one of Europe's most robust innovation ecosystems.

Our strength lies in interdisciplinary collaboration, where we develop advanced technologies and sustainable solutions to benefit society.

Kind regards,

Christine Nellemann, provost

Electrification of the transport sector

The energy system must increasingly be based on renewable energy, and battery technology must be based on more sustainable materials. Therefore, DTU conducts research in:

- Development of production and extraction methods for battery production
- Energy storage and bidirectional charging
- Charging infrastructure that meets the need for accessibility, cost-effectiveness, and flexibility

Alternative fuels for aviation and maritime transport

DTU holds a strong position within Power-to-X, including:

- Electrolysis processes to produce fuels (hydrogen, ammonia, etc.) from electricity from renewable energy sources
- Pyrolysis technologies for converting residues and waste, e.g. from agriculture, into bio-oil and coke (CCS)
- Methanol from CO_2, hydrogen, and biogas for, e.g., maritime transport
- CO_2, hydrogen, synthesis gas, and bio-oil for green fuels for aviation, shipping, and heavy transport

Behaviour and transport optimization

Transforming the transport sector requires an understanding of how a society best implements new technology. An important element is people's behaviour and interaction with technological solutions. This allows for the optimization of infrastructure, logistics chains, and transport services, ensuring efficient use of resources.

Therefore, DTU conducts research in:

- Regulation and incentives promoting the green transition
- Socio-economic consequences of transport investments
- Reduction of barriers to the green transition, including behavioural changes
- Design and optimization of logistics, transport systems, and infrastructure

Smart mobility—digitalization and satellite data

The digital development offers opportunities for better management and monitoring of transport and navigation. This helps to enhance mobility and thereby save resources.

Data is the foundation of DTU's research in:

- Mapping of transport behaviour, transport supply, as well as payment and measurement systems
- Monitoring and controlling navigation using space data

CONTACT

Lone Falsig Hansen
Tel.: +45 4030 5067
lfal@dtu.dk

dtu.dk/transportation

DTU's Centre for Absolute Sustainability develops models to calculate the absolute sustainability of products and our behaviour based on our planet's resources and biophysical planetary boundaries limits. The models show whether something is sustainable in an absolute sense and not just less environmentally harmful than the alternatives.