NOW-GMBH.DE

Shaping and moderating at the interface
of politics, industry and science

for an innovative and sustainable mobility and energy system

More information about NOW
at now-gmbh.de

CONTENTS PAGE

Challenge

The world of energy and transport is changing

Integrating renewable energies in our energy system, including the transport sector, is a highly complex task. Innovative technologies and new infrastructures must be developed and integrated that bring together the generation of, as well as demand for, renewable electricity, hydrogen or power-to-x in a technical, profitable and above all timely and regionally flexible manner.

At the same time we need to intelligently link the energy sectors – electricity, transport and heat – in order to achieve the optimum on the path to decarbonising the energy system. Only by developing renewable energies will the energy supply system become oriented towards the future on national, European and global levels and stem climate change.

The use of electricity-based fuels means that previously isolated energy sectors can be linked. So that electricity can truly become a cross-sectoral energy source and in order for the benefits in terms of climate change, energy security and growth to really come into effect, adjustments are needed in the existing market structures as well as the technical and regulatory framework conditions.

Energy facts[1]

In 2015

4.7 TWH

of electricity were lost that could have been stored as hydrogen.

This corresponds to the energy consumption of almost

300,000

households in Germany.

[1] Federal Network Agency

The starting point for the new restructuring of the energy world is positive. The transport sector is currently experiencing the largest revolution since the invention of the automobile. Automated driving is at the starting gate. Transport is becoming networked. The triumphant advance of alternative drives has begun. The electrification of drives and fuels is inevitable. Electric mobility makes road, rail, water and air transport cleaner, safer and more efficient. The same applies to the heating sector. Not only greater building efficiency, but also increased use of combined heat and power or using electricity-based fuels for heat generation are indispensable for achieving the emission reduction targets in this energy sector.

Climate goals can only be achieved by integrating green electricity by means of hydrogen, fuel cells and battery technology. Intensive work is being undertaken to test business models, answer infrastructural questions and adapt the various drive technologies to respective user needs. At the same time solutions to storing renewable energies are being developed so that in future they will always be readily available as and when they are needed.

Transport facts[2]

The transport sector in Germany accounts for around 25 % of final energy consumption.

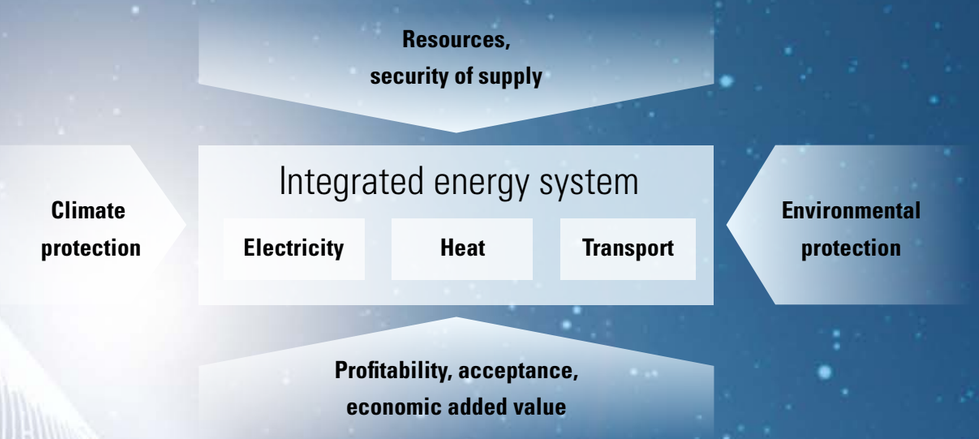
The transport sector causes around 164 million tonnes of CO_2 emissions, which represents a good 18 % of total CO_2 emissions in Germany.

Over 90 % of fuels used are sourced from mineral oil.
Biofuel and electricity still play a marginal role.

In other words: the share of renewable energies in transport amounts to a mere 5.6 % (2014 status), of which 0.5 % represents renewable electricity.

[2] Federal Environment Agency, umweltbundesamt.de/en
Renewable Energies Agency, unendlich-viel-energie.de/english
Federal Ministry for Economic Affairs and Energy, bmwi.de/en
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, bmu.de/en

Goal


Resources,
security of supply
Climate
protection
Integrated energy system
Electricity
Heat
Transport
Environmental
protection
Profitability, acceptance,
economic added value

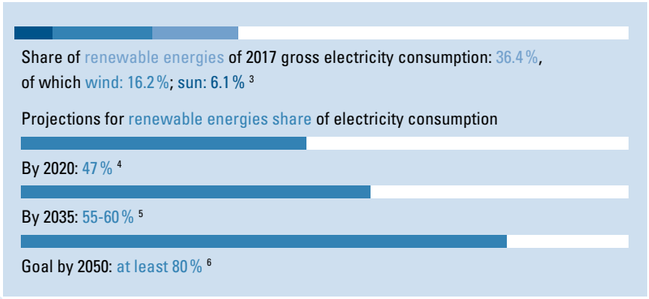
Connect the concepts of energy and mobility

Goal: Increase share of renewable energies

Clean and efficient mobility in an integrated energy system must be thought of holistically. In other words it must include electricity and batteries as well as hydrogen and fuel cells as key technologies.

NOW is the neutral and open interface of politics, industry and science. It initiates, evaluates, bundles and supports research and demonstration projects. NOW is the platform for the formation of industry alliances, connects different players, undertakes public relations work for these future-oriented technologies and is active on an international level.

Furthermore, NOW manages the evaluation and dissemination of results from project work and the associated scientific accompanying research. NOW is also tasked with devising national strategy plans in the framework of EU measures as well as the advancement of the Mobility and Fuel Strategy. The evolution of energy supply is a global issue. In this context NOW supports the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) in the framework of the Environmental Technologies Export Initiative in activities for the use of climate-friendly hydrogen and fuel cell technologies.



[3] AG Energiebilanzen, ag-energiebilanzen.de

[4] Forecast of the German Renewable Energy Federation (BEE), bee-ev.de/english and the Renewable Energies Agency, unendlich-viel-energie.de

[5] Forecast of the Federal Ministry for Economic Affairs and Energy (BMWi), www.bmwi.de/en

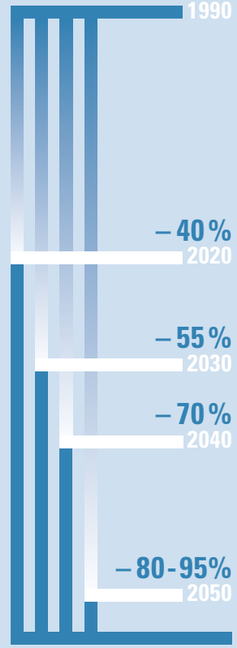
[6] Goal of the German federal government

Goal: Clean air for all

Centralised coordination of the projects allows experiences to be exchanged in the framework of an integrated process and existing synergies to be exploited. As a programme management association, NOW brings developers, researchers and politicians together in its committees, thereby offering them the opportunity to be able to further develop issues flexibly according to market requirements. Formulating political goals, promoting technologies and preparing markets is an integrated process where partners give each other fresh impetus and valuable feedback.

NOW is actively involved in European and international committees. It is also crucial to continually inform other groups of stakeholders about the technologies and the results from the programmes in order to campaign for acceptance and involve them in further development.

In the framework of their energy concept, the federal government wants to significantly reduce greenhouse gas emissions by 2050.



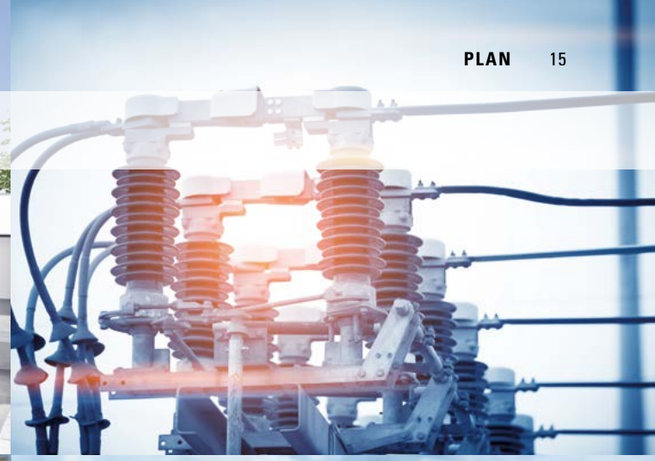
Target values for the reduction of greenhouse gas emissions.[7]

[7] Energy concept of the German federal government

Task

Coordination
Visibility
Market preparation
NOW
NOW-GMBH.DE
Expert networks
Technology
Information exchange
Mobility
Acceptance
Environment

Plan



Renewable energies

Wind power

Solar energy

Hydropower

Energy from renewable sources

Hydrogen generation in the electrolysis process

Natural gas enrichment with hydrogen + methanation (H_2-to-X)

Hydrogen storage

Hydrogen infrastructure

Hydrogen reconversion via fuel cell

Power-to-liquid

Electricity grid

Gas network

Off-grid energy supply

Off-grid autonomous energy supply via fuel cell. Uninterruptible power supply, back-up power, emergency power systems

Integrated energy system

Smart Grids

Base load supply

Fuel cell power system with combined heat and power

Power storage

Heat storage

Legend

- Electricity
- Hydrogen
- Fuel cell
- Natural gas
- Heat
- Steam
- Cooling
- Power-to-liquid
- Fire protection

Trade and industry

Industry

Offices | Hotels | Large buildings

Public buildings

Building energy

Single and two-family homes

Apartment buildings

Hydrogen infrastructure

Electricity grid

Gas network

Logistics and mobility

Charging stations for electric vehicles

Intralogistics | Airport

E-bike

Car

Light commercial vehicle

Bus

Heavy commercial vehicle

Hydrogen refuelling stations

Ship | Harbour

Airplane

Train

Car

Light commercial vehicle

Bus

Heavy commercial vehicle

Electricity grid

Gas network

Strategies and programmes

The mission of the federally-owned NOW is to implement and coordinate national strategies and public-private programmes in the technology field of alternative mobility and energy supply. NOW advocates the development of an integrated and sustainable energy system, in which the energy sectors of electricity, heat, industry and mobility are connected together through the energy sources of electricity and hydrogen.

If we are to achieve national and international climate protection targets, generating electricity from renewable energy sources and energy storage are paramount.

	Facilitating the use of renewable energies in an integrated energy system	**Facilitating emission-free mobility**	**Guaranteeing efficient and secure energy supply**
Programmatic content	- Energy sources - Energy converters - Energy storage media in particular in the interaction between power grids as well as gas and mobility infrastructures	- Alternative fuels - Alternative drives	- Combined heat and power (CHP) with fuel cells - Special applications for fuel cells
Focus areas	- Industrialisation of water electrolysis - Integrating vehicle traction batteries in the electricity grid (vehicle-to-grid) - Generation of hydrogen from renewable energies for the transport and heating markets (power-to-gas | power-to-x)	- Battery-electric vehicles and charging infrastructure - Fuel cell electric vehicles with hydrogen refuelling station infrastructure	- Fuel cell heating systems for household energy supply - Trade and industry CHP with fuel cells - Energy supply using hydrogen / fuel cell technology for neighbourhoods - Hydrogen / fuel cell island systems (autonomous energy supply)
Monitoring developments	- Expanding production capacities of both renewable energies and the electricity grid - Hydrogen gas turbines - Redox flow batteries	- Biogenic fuels - Optimisation of combustion engine technology (including hydrogen combustion) - Autonomous and networked driving	- Battery systems - Heating market

NOW

NOW is both shaper and moderator at the interface of politics, industry and science, driving forward the complex task of change, particularly in the transport area. It does this technologically and strategically in view of customer demands and societal acceptance, and within alliances with international partners. In the framework of national programmes, NOW evaluates project ideas from companies and academic institutes.

Aside from project evaluation, NOW's spectrum of activities comprises strategic programme design, market development, supporting technical studies and analyses as well as increasing visibility and acceptance for alternative technologies as a basis for the further development of the federal government's national programmes. NOW is a reliable and trusted partner which acts in a politically neutral and, in terms of goals, technologically-open and issue-oriented manner.

Competence
Performance
Cooperation

NOW shapes

Technical expertise

Programmes

Industrial policy

Federal government

Projects

With their technical expertise, NOW advises the federal government, analyses and evaluates relevant projects and studies, develops strategies to implement new and existing programmes and instruments, and provides input to the federal government on the regulatory framework on both national and European levels. NOW pursues climate protection and industrial policy.

Consultancy

Studies

Instruments

Climate protection

NOW coordinates

Science **Politics**
Industry Society

NOW connects relevant actors across sectors from industry, science, politics and society, and serves as a national point of contact. On European and international levels NOW supports and represents the federal government in relevant committees and institutions and promotes international cooperation.

Contact partner

Cross-linking
Market preparation
Collaboration

International
European
National

NOW implements national funding programmes

Solution orientation

Process management

Assessment

Technical benchmarks

NOW assesses project applications and supports technical projects. Working together with the relevant ministries, it defines the content of funding calls. It then analyses and evaluates their results.

Project control

Result analysis

Funding

Ministries

NOW builds visibility and acceptance for climate protection technologies

Conferences

Parliamentary evenings

NOW represents all its thematic fields at trade fairs and conferences. It is the point of contact for the media and the public and organises workshops, parliamentary evenings and networking events both alone and with partners.

Publicity

Media

Workshops

Partnerships

Trade fairs

Networking events

NOW is competent

Worldwide partner network

Process reliability

In all programme areas NOW staff have profound technological evaluation capabilities coupled with regulatory know-how. A global contact and partner network at the top levels of industry, science and politics facilitates short and direct information paths.

The NOW team's impressive solution-oriented thinking and efficiency is demonstrated by professional, high-quality services. The work is supported by clear and transparent management processes, responsibilities and procedures.

Professionalism

Regulatory know-how

Political neutrality

Highly-qualified

Technological evaluation capability

Decision-maker contacts

Networks and partnerships

NOW is embedded in a broad network. The NOW Advisory Board is tasked with providing substantive content-related advice to the management of the programme management association about its work. It consists of representatives from the worlds of politics (federal and state level), science as well as all industry sectors that are relevant to the implementation of the programmes in the NOW portfolio. As an important steering committee, it supports the strategic design of existing programmes and the further development of a coordinated support framework for clean mobility. Adapting the energy and mobility systems to the needs of climate protection can only happen when forces and joined and with the cooperation of all actors involved.

European

- Fuel Cell and Hydrogen Joint Undertaking (FCHJU)
- Hydrogen Europe (HE)
- EU Directorate Climate, Transport, Energy and Research and Innovation
- Government Support Group (GSG)
- European Committee for Standardization (CEN)
- European Committee for Electrotechnical Standardization (CENELEC)

International

- International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE)
- International Energy Agency (IEA) Hydrogen Implementing Agreement
- Fuel Cell Technologies Office (FCTO) of the US Department of Energy (DoE)
- New Energy and Industrial Technology Development Organization (NEDO), Japan
- China Automotive Technology and Research Center (CATARC)
- Gesellschaft für internationale Zusammenarbeit (GIZ)

Drive


MOBILITÄT
WASSERSTOFF-TANKSTELLEN
DIESEL

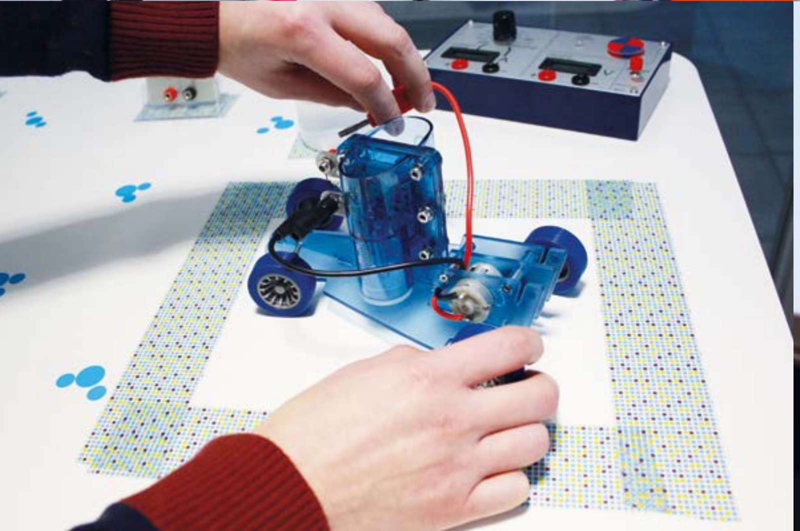

STROM
POWER


ALSTOM

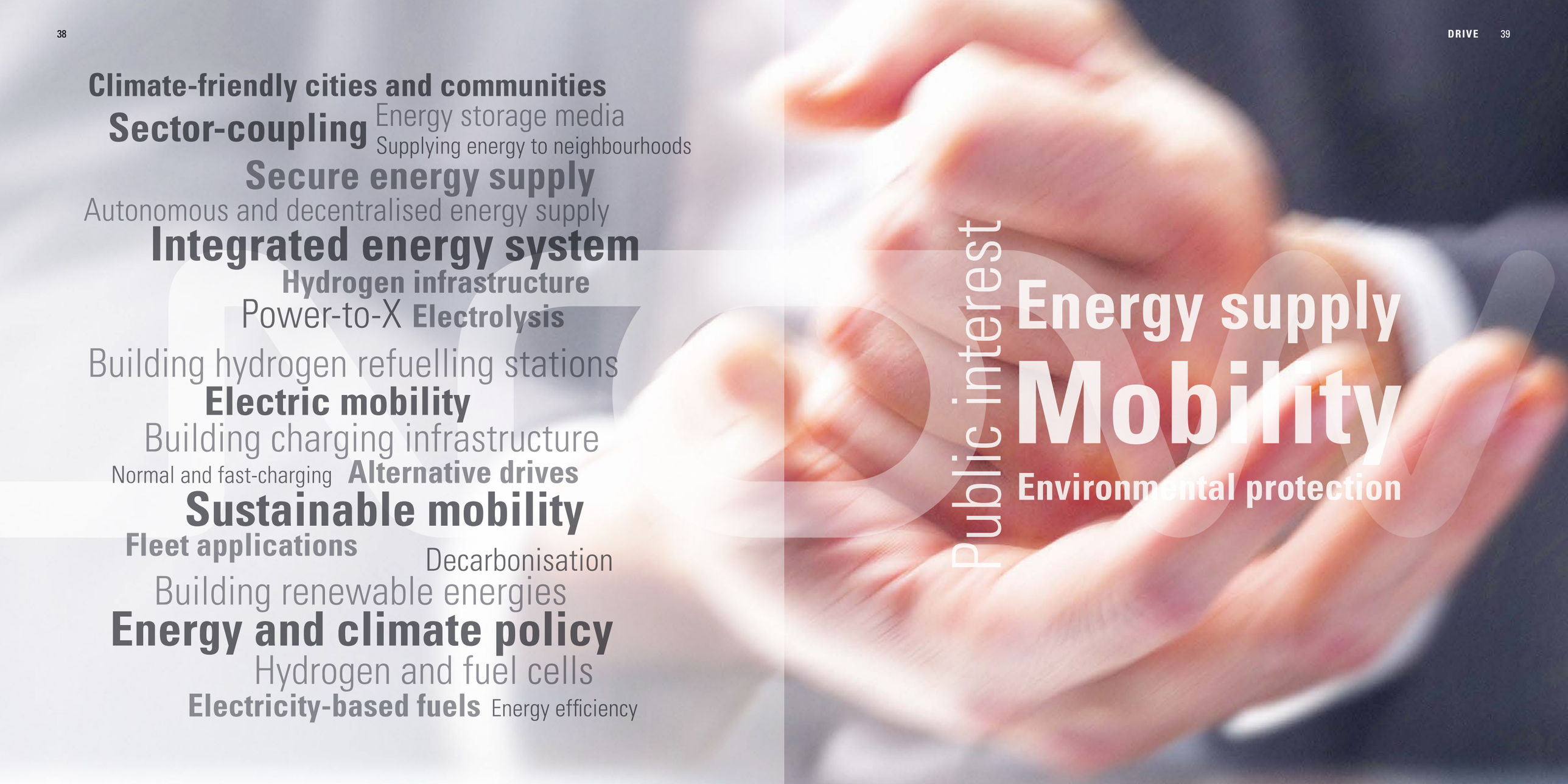

NOW
NOW
ALSTOM


BEHALA
BEHALA


Integrating renewable energ
VARDS ZERO EMISSION
CO2-free
NOW




Bundesministerium für Verkehr und digitale Infrastruktur
Bundesministerium für Verkehr und digitale Infrastruktur


Climate-friendly cities and communities
Sector-coupling
Energy storage media
Supplying energy to neighbourhoods
Secure energy supply
Autonomous and decentralised energy supply
Integrated energy system
Hydrogen infrastructure
Power-to-X
Electrolysis
Building hydrogen refuelling stations
Electric mobility
Building charging infrastructure
Normal and fast-charging
Alternative drives
Sustainable mobility
Fleet applications
Decarbonisation
Building renewable energies
Energy and climate policy
Hydrogen and fuel cells
Electricity-based fuels
Energy efficiency
Public interest
Energy supply
Mobility
Environmental protection

CONTACT
NOW GmbH
Tilman Wilhelm
Divisional Head Communication and Knowledge Management
Fasanenstrasse 5
10623 Berlin
Telephone +49 30 311 61 16-15
Fax +49 30 311 61 16-99
Email tilman-wilhelm@now-gmbh.de

COORDINATED BY / PUBLISHER
NOW GmbH
Fasanenstrasse 5
10623 Berlin

EDITING
Alexandra Huss,
AKOMBE Technology and Market Communication

GRAPHIC DESIGN
Friedhelm Schmidt, Schmidtworks

TRANSLATION | SUB-EDITING
Markus Woltmann
slant' PR & Native English Text

PRINTING
Druckerei Mack GmbH, Schönaich

PAPER
Printed on 100% recycling paper

PUBLICATION
12/2018

PICTURE CREDITS
Image rights: NOW GmbH with the kind support of our partners from the funding projects.
Additionally licensed motifs: Adobe Stock, Thinkstock
Adapted web platform icons: flaticon.com