

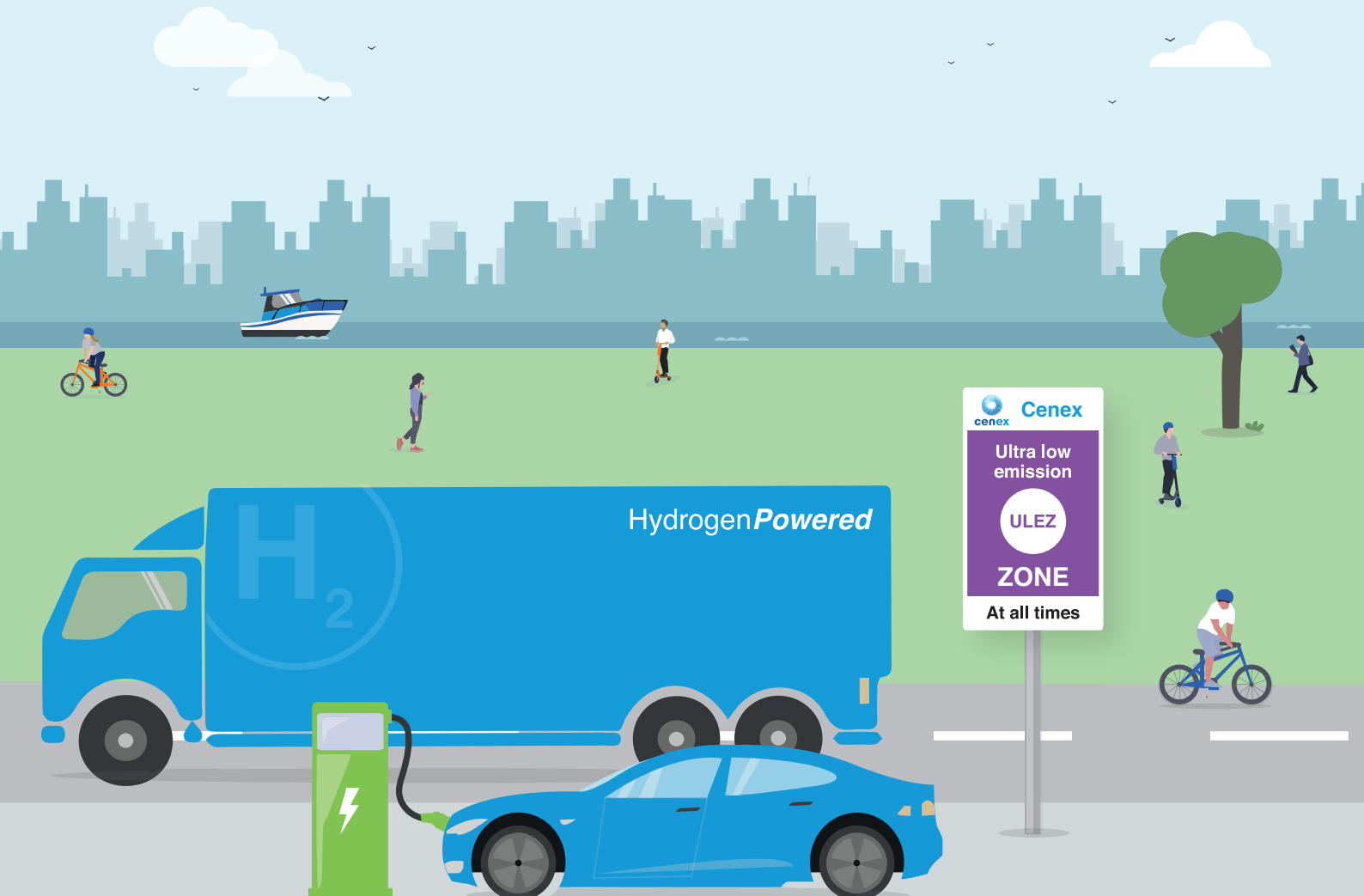
 Transport

 Energy
Infrastructure

 Knowledge
& Enterprise

Cenex

Information Brochure



Welcome to Cenex



Robert Evans, CEO

"Through 15 years of innovative R&D programmes, we have developed knowledge and expertise in the applications and performance of cleaner transport solutions and their integration into the wider energy landscape.

We prioritise partnership working, seeking to understand your values, drivers and motivations, and identify solutions tailored to your specific needs.

The support we provide draws on our technical expertise and our access to those leading the development of the technologies that can ensure a cost-effective transition to Net Zero. We use data collection and analysis to forecast and validate benefits including lower emissions, increased efficiency and reduced costs.

This brochure includes examples of the work we're involved in and the services we have provided to our partners related to planning for and implementing new technology as well as strategy and policy development.

Your journey to lower emissions is our priority. Please don't hesitate to get in touch with our friendly team."



Steve Carroll, Head of Transport

Emissions from transport continue to rise, causing environmental issues such as climate change and poor urban air quality that affect us all today, and will continue to do so in the future, unless we act now.

Whether you are an individual fleet, a city region or a technology developer – the low emission transport sector is finally getting some of the focus and support it needs, and it is important to be at the forefront of this change allowing you to adapt to a rapidly changing world and changing legislation.

In the Transport Team at Cenex we understand the implications of different low emission vehicle choices. We help fleet operators to develop their low emission fleet replacement cycles, regional bodies to set their low emission transport strategies and technology developers to understand the real-world duties and applications of their products.

We are always keen to help our clients with their low emission transport questions and love the challenge of a tough question."



Keith Budden, Head of Knowledge and Enterprise

"Collaboration and sharing knowledge are fundamental practises in overcoming the

challenges of zero emission transport and innovating the solutions that achieve our net zero sustainability targets.

Our Knowledge and Enterprise team bring together the learning from 16 years of work in low emission mobility and use this to shape future strategies and programmes and to keep you at the forefront of technical and social innovation.

We have shaped strategies and programmes across the UK and provided independent advice and guidance to the World Bank in Rwanda, and UK Foreign Office in Hungary and Korea.

You can be confident that the long- and short-term decisions you make will meet the needs of your key stakeholders, and therefore establish yourself as an exemplar for others to follow."



Chris Cox, Head of Energy Systems & Infrastructure

"It is essential zero emission transport is supplied with the energy it needs in the right place,

at the right time, at the right price and from renewable sources in order to achieve the maximum environmental benefits.

Current challenges include deploying the right infrastructure to enable an equitable and easy transition to electric vehicles and optimising low carbon electricity to maximise the emission and cost savings.

With over a decade of trustworthy, evidence-based expertise and insights available, this team is uniquely positioned to offer guidance and strategy for your low emission energy supplies.

We're excited to work with you to overcome your infrastructure challenges and to innovate chargepoint solutions that meet your demands."

About Cenex



Independent



Not-for-profit



Experts

Cenex was established as the UK's first Centre of Excellence for Low Carbon and Fuel Cell technologies in 2005.

Today, Cenex focuses on low emission transport & associated energy infrastructure and operates as an independent, not-for-profit research technology organisation (RTO) and consultancy, specialising in project delivery, innovation support and market development.

We also organise Cenex-LCV, the UK's premier low carbon vehicle event, to showcase the latest technology and innovation in the industry on behalf of the UK Government and industry.

Our independence ensures impartial, trustworthy advice, and, as a not-for-profit, we are driven by the outcomes that are right for you, your industry and your environment, not by the work which pays the most or favours one technology.

Finally, as trusted advisors with expert knowledge, we are the go-to source of guidance and support for public and private sector organisations along their transition to a zero-carbon future and will always provide you with the insights and solutions that reduce pollution, increase efficiency and lower costs.

Together, we can lower your emissions through innovation in transport and energy infrastructure.

Lowering your emissions through innovation in transport and energy infrastructure



Transport



Zero Emission Fleets

Net zero targets, and imminent bans on the sale of petrol, diesel and hybrid vehicles, will require zero-emission vehicles to be deployed in fleets across all industry sectors.

Adopting battery or hydrogen electric vehicles will lower your emissions and can reduce your costs, and taking early action will maximise the benefits.

Cenex will work with you to identify sustainable, zero tailpipe emission alternatives for your fleet by assessing your current and future economic, operational and environmental impacts.

Notable projects and partners:

- Hydrogen Mobility Europe (H2ME2)
- bpost Fleet Decarbonisation Strategy
- North East Scotland Hydrogen Review
- Nottingham ULEV Experience



Renewable Fuels

Fleets which operate heavy goods vehicles must cut emissions to achieve Net Zero targets, however there are still technical challenges to overcome to electrify (using batteries and/or hydrogen) the commercial vehicle sector and, in particular, longer distance road freight.

Renewable fuels have significant potential to deliver near-term carbon emissions savings for HGV operators and are cost-effective alternatives to diesel.

Cenex will work with you to identify sustainable, low emission alternatives for your fleet by assessing the current and future economic, operational and environmental impacts.

Notable projects:

- Dedicated to Gas
- Coca-Cola HGV Trial
- Midlands Connect Alternative Fuels for Freight & Logistics
- Zemo Renewable Fuels Guide

Project - H2GVMids

The H2GVMids project brings together all of the elements of developing a hydrogen fuel cell (HFC) 44 tonne Heavy Goods Vehicle solution for the Midlands. It is funded by Innovate UK on behalf of the Department of Transport.

It aims to identify the required hydrogen production, refuelling infrastructure and locations, vehicle performance characteristics, and local supply chains.

The project will set out the business case for investment, build confidence for private sector investment and identify areas where there is optimal need for public sector investment to offset risk and costs associated with transitioning a new product to market.

Cenex is responsible for defining the end user requirements for the HFC 44 tone articulated HGV as well as the scope of a future trial including planning, data assessment requirements and total cost of ownership modelling.



Transport



Non-Road Transport

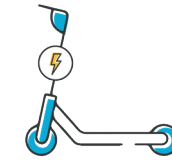
Transitioning cars, vans, and trucks to electric, hydrogen or biofuels is only part of solution to meeting sustainability and net zero targets for transport.

Vehicles used in construction and agriculture, as well as marine vessels and aviation, also must play their role in finding low emission alternatives that meet operational, environmental and financial demands.

Cenex can apply the powertrain and infrastructure lessons from the automotive industry to these sectors, with many R&D projects already underway to demonstrate innovative solutions.

Notable projects and partners:

- Red Diesel Replacement Study
- Plymouth City Council
- RS Electric



Shared Mobility

Shared mobility strategies and solutions contribute to decarbonised transport systems accessible to all levels of society, with the added benefits of reduced congestion, improved journey times and healthier populations.

Encouraging communities to move out of private vehicles to using active travel, public transport and Mobility-as-a-Service (MaaS) – including ebike, scooter and car club schemes – will offer cost-effective, sustainable and environmentally friendly solutions to the transport challenges we face.

Cenex will work with you and your key stakeholders to inform recommendations and best practices, encourage modal shift and implement shared mobility strategies within a low emission transport system.

Notable projects and partners:

- CoMoUK Shared Transport Workplace Toolkit
- Plymouth Mobility Hub
- Sustainable Urban and Shared Mobility
- Nottingham City Council EV Car Club Engagement

“The phased implementation plan developed will allow us to make financially viable decisions on our fleet electrification investments, both from a vehicle as well as infrastructural perspective. As the electrification market is rapidly evolving, the completed study has identified flexible and dynamic phasing to enable bpost to stay up to speed and react adequately to future technological changes.”

- bpost – Belgian Postal Service



Energy Systems and Infrastructure



Innovative Chargepoint Infrastructure

EV chargepoints are a relatively new technology and further innovation is needed in order to ensure an equitable transition and meet the diverse needs of all drivers.

Current challenges include removing the barriers for those with restricted access to parking and chargepoints, specifically those with disabilities and without off-street parking, as well as grid management and the electrification of high duty vehicles, such as taxis.

Many of the innovative technologies bring multiple benefits beyond solving the initial problem, and can encourage a wider uptake of electric vehicles.

Cenex is currently exploring a range of innovative charging solutions to validate their business case and bring solutions to market.

Notable projects and partners:

- Wireless Charging of Electric Taxis Trial
- Dynamic Charging of Vehicles
- Virgin Media Park and Charge 2
- Geo-spatial EV Charging Optimisation



Chargepoint Infrastructure

In the transition to zero emission electric vehicles, appropriate charging infrastructure is necessary in a variety of volumes, locations (destination to transit) and speeds (slow to ultra-rapid) that are dictated by a number of factors.

Predicting future EV usage with Cenex's modelling tools, and utilising decades worth of knowledge and experience, can optimise chargepoint deployment and ensure all drivers have access to one when necessary.

Cenex will assess your site's requirements to inform on chargepoint procurement and installation strategies in line with current and future demand.

Notable projects and partners:

- Plymouth Chargepoint Location Study
- OZEV Domestic Chargepoint Audits
- UK EVSE EV Chargepoint Procurement Guide
- West Midlands Combined Authority Park and Ride Strategy

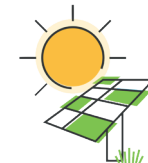
“Cenex liaised closely with us throughout the project. Project updates were clearly communicated and professional. Cenex tailored the work to requests made as the project evolved and were quick to respond to requests for information. It was a real pleasure working with such a professional team who worked hard to ensure project outcomes were met and we are pleased with the end result.”

- Midlands Energy Hub



Get in touch to see how you can lower your emissions:

Energy Systems and Infrastructure



Energy Systems

Where and how electricity is generated to charge EVs is proving ever more important, as is its relationship in the wider energy system to ensure optimum efficiency.

Using real-world and simulated data, our bespoke modelling tools can be used to predict energy demands, emissions, and costs for multiple uptake scenarios, over a range of timescales, including public chargepoints, vehicle-to-grid, static energy storage and renewable energy generation.

Cenex will combine this information with our extensive R&D experience to provide bespoke and accurate advice that will inform your long- and short-term energy decisions.

Notable projects and partners:

- GreenSCIES
- Western Isle Project COMET
- Belper Heritage Site Electric Revolution
- Energy Revolution for Caldicot Market Town



Vehicle-to-Grid

Vehicle-to-Grid (V2G) is a system whereby plugin electric vehicles, when connected to a V2G charger, can provide bi-directional flows of energy and data. This technology enables EV batteries to charge, store and discharge electricity when required.

Cenex has been an active innovator in the research and development of V2G technologies and business models since 2016, delivering 11+ public V2G projects and collaborating with leading organisations in the industry to deliver some truly amazing milestones, such as:

- building and installing the first domestic V2G unit in Europe,
- installing the first industrial V2G unit in the UK,
- delivering the largest domestic V2G demonstrator in the world.

Cenex will work with you to validate your V2G business case, inform installation strategies and develop the technology for bespoke markets.

Notable projects and partners:

- Project Sciurus
- EV-Elocity
- E-Flex
- EFES

Case Study – Renewable Electricity for FYTbus

Following the Isle of Wight climate emergency declaration in 2019, FYTbus, a charity bus service, decided to reduce air pollution in their area's sensitive environment and benefit everyone living in and visiting the island.

It aimed to replace the current fleet of six diesel minibuses with electric vehicles over the next five years, and to source electricity for charging from a zero carbon or near-zero carbon source.

Cenex modelled and evaluated designs of both off-grid

and on-grid systems and concluded that an on-grid system with a 25 kW ground-mounted solar panels and a 10 kW wind turbine accompanied with onsite energy storage would be a feasible on-grid renewably-powered scheme which can support the electrification of the community minibuses.

Modelling analysis showed that if implemented, it has the potential to decrease the annual operating cost, offer high levels of energy autonomy and reduce CO2 emissions.

Knowledge & Enterprise



Regional Strategies and Policy

Cenex can help you develop a clear and focused low emission mobility programme, with specific actions and policy designed to drive forward action that meets your sustainability goals and ambitions.

The strategies, based on currently mature technologies and future road maps and tailored to complement existing policies and strategies, will improve air quality, reduce emissions, and encourage economic development.

Cenex will conduct market research and assessments to form an understanding of how to best accelerate the uptake of low emission vehicles in your transport system, sharing best practice from the many public and private authorities we have worked with.

Notable projects and partners:

- Midlands Engine Hydrogen Technologies Strategy
- Cardiff Capital Region ULEV Taxi Strategy
- Black Country ULEV Strategy
- Low Carbon Transport in Scotland



Events and Training

Understanding the latest innovations can be confusing, therefore Cenex host a series of events, seminars and workshops to explain the leading alternative technologies so you can make informed decisions. As a CPD-accredited training provider, these can be organised and tailored to your needs to educate and inform, or disseminate key project findings.

Online courses through the FutureLearn platform are also available for you to develop your knowledge of key sustainable transport technologies. More courses are being created in line with the latest industry trends.

Notable projects and partners:

- Cenex-LCV & Cenex-CAM
- Midlands Truck and Van Training Course
- North East Taxi Trade - EV Engagement Workshops
- Event panellists and speakers

“Thank you for facilitating the eVan training for us. I know all of the team at Wolverhampton have benefited from the training, and have gained a valuable insight into the future developments of the electric van market. We now have a comprehensive understanding of how this will fit the needs of our customers. The delivery was perfect, and content of the subject was wide ranging and was well received with good engagement.”

- Midlands Trucks and Vans



Get in touch to see how you can lower your emissions:

Knowledge & Enterprise



Product Development

We all know that developing or introducing new products and technologies isn't easy – whether it's understanding the market, or ensuring that it complies with the right standards, the journey can be filled with challenges.

Cenex's long experience of delivering trials means that we can inform your product development process by providing key insights, analysis, and advice (including the environmental and financial impacts) to ensure that your products perform in a way which delivers the greatest value for you and your customers.

Notable projects and partners:

- Ultra-durable electric powertrains (RUBICON)
- Electric Trucks for Rwanda
- India EV Web Portal
- Autonomous and Connected vehicles for CleanE Air (ACCRA)



Partnerships

By collaborating and sharing knowledge and innovation across the transport sector, we can find the best solutions for the different decarbonisation challenges you face.

That's why Cenex have teamed up with international partners to deliver projects, coordinate experts and impart extensive, practical and real-world experience across the globe in order to lower emissions and provide sustainable and accessible mobility solutions for all.

Partnerships include:

- Global Sustainable Mobility Partnership
- EV8 Technologies
- Cenex Nederland
- Cenex Korea
- Niche Vehicle Network

Project – Zero Emission Refrigerated Operations

The Innovate UK funded Zero Emission Refrigerated Operations project is a collaboration between Sunswap and Cenex to develop a novel and bespoke electrical architecture for a solar & battery powered Transport Refrigeration Unit (TRU).

Cenex compiled energy and operational requirements from customers and fed these into the development process to meet real customer needs.

Cenex then independently modelled the use of the novel electrical system under a range of typical food delivery scenarios.

The results verify that the technology is a viable alternative solution to current highly polluting diesel refrigeration systems, and has the potential to offer significant environmental and economic savings.

The next steps will be to trial the system with UK fleets and evaluate the modelled results in the real world.

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Cenex-LCV & CAM



Cenex-LCV, since 2008, is Europe’s premier Low Carbon Vehicle innovation event that showcases the latest technology and innovation in the industry across two days of Seminar programmes, Ride and Drive, Exhibitions and Networking, plus a growing online presence for international audiences, with over 4500 visitors, 250 exhibitors and 170 speakers each year.

It is co-located with Cenex-CAM, an exhibition and seminar programme showcasing the latest innovations in Connected Autonomous Mobility (CAV) technology and projects.

Together they provide an ideal platform for UK capabilities to showcase and engage with major stakeholders to discuss emerging technologies, industry issues and what the future holds.

The events aim to:

- Provide a showcase for UK capabilities, positioning the UK as a leader in technology development and exploitation
- Build organisations' awareness and confidence to adopt Zero Emission Vehicle technologies in vehicles and in fleet operations

For sponsorship, exhibition or presenter opportunities, contact lcvsales@cenex.co.uk

To find out more visit
www.cenex-lcv.co.uk
www.cenex-cam.co.uk



Useful Links

Free-to-Access Educational Resources

Cenex has launched free-to-access educational resources on low emission transport to inform, and give you confidence in, your transport decisions.

The FutureLearn courses explore the key transport technologies, trends, and policies that are enabling a transition to low emission vehicles.

They are designed to develop your knowledge of key sustainable transport technologies and bring you up to speed on a rapidly advancing sector. This may include those of you with a special interest in low emission solutions or transport policy, as well as professionals who are responsible for sustainability or Net Zero targets.

These are self-guided courses and you can learn at your

own pace. On every step of the course you can meet other learners, share your ideas and join in with active discussions in the comments.

Current courses cover

- Electric, Hydrogen and Biofuel Vehicles and Infrastructure
- Shared Mobility
- Vehicle-to-Grid

Learn more here:
www.futurelearn.com/partners/cenex

The FutureLearn course is complemented by a series of Insight documents explaining the latest low emission road transport technologies in a handy PDF guide.

An Introduction to Battery Electric Vehicles
Cenex Insight - May 2021

An Introduction to Biofuels for Road Transport
Cenex Insight - July 2021

An Introduction to Hydrogen Fuel Cell Electric Vehicles and Refuelling Stations
Cenex Insight - May 2021

An Introduction to Innovative Electric Vehicle Charging Infrastructure
Cenex Insight - August 2021

EV8 Switch App
Discover Your 'Switchability' Score
Download the FREE EV8 Switch app now!
ev8-tech.com

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Key Services

Transport

- Low emission vehicle capability reports, strategy advice and decision-making tools
- Economic, operational and emission performance assessments of low emission vehicles in the real world
- Research and validation into low emission vehicle performance, as well as connected and autonomous vehicle technologies
- Identify the most cost effective and operationally suitable low emission vehicles and implementation strategy
- Simulation and data modelling of low emission vehicle designs in real-world scenarios

- Identification, analysis and evaluation of existing and required infrastructure to build an evidence-based business case
- In-depth insights into the market trends, mechanisms, drivers and opportunities relating to ULEV infrastructure
- Assessments of current chargepoint networks and detailed analysis of their effectiveness
- Insights into potential revenue streams and costs available to EV operators
- Assess the viability of appropriate charging infrastructure by exploring renewable energy sources, storage devices and electric vehicles to optimise energy supply and reduce demand



Energy Infrastructure



Knowledge & Enterprise

- Inform policy and increase industry confidence in the benefits of low carbon alternative transport from evidence gathered.
- Quantify potential markets and identify risks and opportunities for new low emission vehicle products and services.
- Low emission vehicle and infrastructure training to prepare your organisation for the low emission road ahead.
- Innovation project support, ranging from bid writing and partner identification to project management and delivery.
- Development and implementation of low emission vehicle and infrastructure strategies to support a regional low carbon mobility economy.



Independent



Not-for-profit



Experts