



East Anglian Alternative Fuels Strategy

March 2022

1 INTRODUCTION

1.1 Action needs to be taken now

Emissions from human activity has caused approximately 1°C of warming since pre-industrial levels. The effects of this are already being felt globally with more frequent extreme weather events, sea level rise and loss of habitats.

In 2019 the UK became the first major economy to pass a net zero emissions law which requires the UK to bring greenhouse gas emissions to net zero by 2050. Collaborative efforts between national and local government is vital in order to meet the national net zero ambition.

The transport sector accounts for the highest share of national CO₂ emissions (~25%), and therefore will need to undergo deep transformation in order to meet the UK's 2050 net zero target. In order to successfully reduce transport emissions a two-fold approach is needed; **switching to Alternative Fuels Vehicles (AFVs)** and **changing consumers transport behaviour** through incentivising modal shift.

The UK government have set three key objects to support transport decarbonisation which include:

- Accelerating the shift to AFVs by funding charging infrastructure and trialling zero emission Heavy Goods Vehicles (HGVs)
- Investing in green public transport, including the electrification of railways and bus routes
- 'Phase out' of internal combustion engine (ICE) vehicles through possible sales bans. These include the phase out of ICE cars and vans by 2030, diesel buses by 2030 and diesel HGVs by 2035-2040

Degrees of Impact

The IPCC has estimated that global warming of 1.5°C and 2°C will be exceeded this century unless deep reductions in greenhouse gas emissions occur in the coming decades.

We have already started to experience climate related impacts and risks to health, livelihoods, food security, water supply, human security, and economic growth.

The magnitude of these impacts varies a lot depending on the amount of warming. Changes in several climatic drivers will be more widespread at 2°C compared to 1.5°C of warming and even more pronounced for higher warming levels.



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1.2 Objectives of the Alternative Fuels Strategy

The Cambridgeshire and Peterborough Combined Authority (CPCA) and New Anglia LEP are undertaking work to decide informed action to mitigate and adapt to climate change. A key component of this is to establish an integrated and sustainable transport network that supports local growth.

The Combined Authority and New Anglia LEP have commissioned an Alternative Fuels Strategy (AFS) for East Anglia, being developed alongside The Combined Authority's Local Transport and Connectivity Plan and the work conducted by the Norfolk and Suffolk Clean Growth Taskforce. The key aims of the AFS are to:

1. **Support clean growth**
2. **Support the decarbonisation aims of Local Authorities**
3. **Accelerate the uptake of AFVs in the region**
4. **Improve air quality**
5. **Provide a combined collaborative vision**
6. **Support the creation of commercial opportunities**

1.3 Scope of the Alternative Fuels Strategy

This strategy focuses on how the **uptake of alternatively fuelled land vehicles** can be boosted across East Anglia, **what and how much infrastructure** (such as electric vehicles charge points) needs to be delivered to support this transition, and other policies and actions that will be necessary to deliver a decarbonised transport system. The AFVs covered in this strategy include battery electric, hydrogen fuel cell and renewable natural gas vehicles, in each case the study considers the emissions of the production and use of the fuels but not the production of the vehicles.

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1.4 AFS focus area overview and review of the current transport system

1.4.1 AFS focus area overview

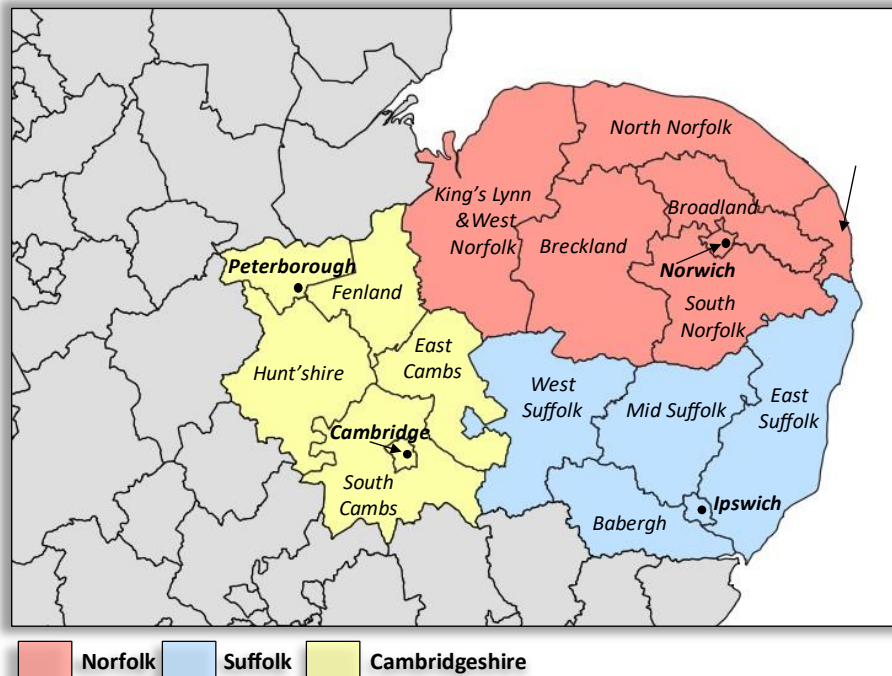


Figure 1: Map of the in-scope study region

The area covered by the East Anglia AFS includes the 18 local authorities that together comprise Norfolk, Suffolk and Cambridgeshire.

From a transport perspective, the area is also governed by two sub-national transport bodies: Transport East in Norfolk and Suffolk (also Essex, Southend-on-Sea and Thurrock) and England's Economic Heartlands in Cambridgeshire and Peterborough.

Spatially, East Anglia is predominately rural, with rural areas making up 88% of landmass¹. However, the region also includes the 4 major settlements of Norwich, Cambridge, Peterborough and Ipswich. Moreover, the majority of residents live in urban cities or towns, which together host over half of the population. There are therefore significant variations in the requirements of both people and places across the region.

Many solutions that could deliver a decarbonised transport system in urban areas will be less effective in a rural setting, and vice-versa. This AFS has hence sought to cater to regional variations, by suggesting solutions that can be applied flexibly with a place-based approach.

1.4.2 Where we are now: Transport modal share and emissions

Cars remain the mode of choice for passenger transport in East Anglia. Nearly two-thirds of all journeys in the region are made by car, making car dependence much higher than England as a whole, a difference reflective of the area's rurality. Car trips equate to an even higher proportion of the distance travelled per person, and proportion of transport emissions.

Active travel (walking and cycling) is the next most popular form of passenger transport across the region, if popularity is measured by the proportion of trips. Just under a third of all trips are either walked or cycled, however this inevitably translates to a much smaller proportion of the distance travelled per person, due to the relative shortness of active travel journeys.

Public transport (PT) makes up less than a tenth of trips in East Anglia. However, PT journeys (in particular rail) tend to be longer. This means that a fifth of the distance travelled per person is by bus, rail, coach or minibuss.

¹ Office for National Statistics. 57% of the population of the region live in urban cities or towns.

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Freight transport by rail, HGV and vans has also been considered in this strategy. Freight moved by these modes contributes two-fifths of the emissions of the East Anglian transport system as a whole, clearly indicating that decarbonising passenger transport can only get us part of the way to net zero transport. Actions to decarbonise freight have hence been recommended as part of the AFS.

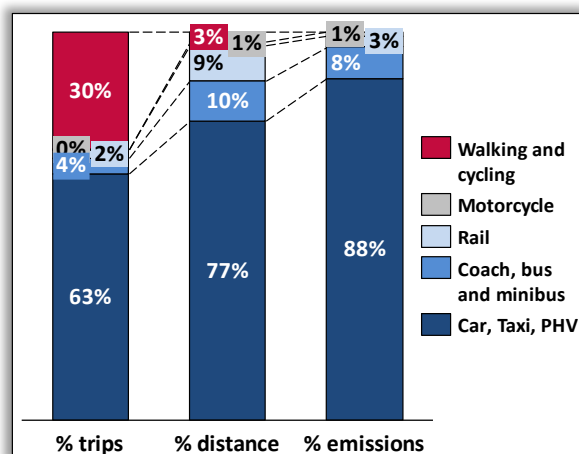


Figure 2: Breakdown of passenger trips, distance and emissions by mode

1.4.3 Where we are now: AFV uptake and supporting infrastructure

AFV uptake and the roll-out of supporting infrastructure in East Anglia remains low. **Less than one percent of private cars and vans in the region are currently EVs.** There is significant variation in uptake across the 18 present local authorities - Peterborough and Cambridge have the highest uptake, while Fenland and Great Yarmouth have the lowest.

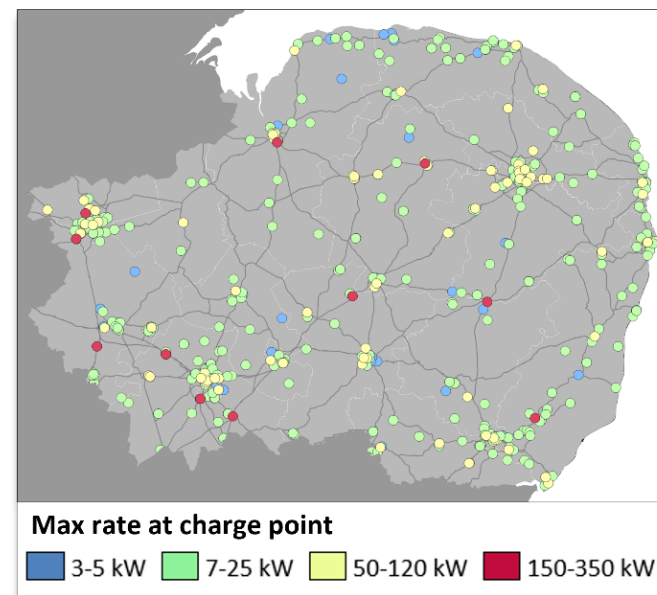


Figure 3: Map of the East Anglian public charging network

The public charging network across East Anglia is also at a relatively early stage of development. Figure 3 shows the current sites of public electric vehicle charge points, as well as the major roads connecting the region. The majority of charge points are clustered around key settlements, or distributed along the road network, with relatively few charge points found in between. The focus of the charge point network is expected to shift away from en-route charging as BEV range improves.

Uptake of alternative fuels heavy duty vehicles is also low. Of the over 5,000 buses in East Anglia, just two are electric (in Cambridge)². In addition, of the over 24,000 HGVs registered in the region, less than fifty are known to run on natural gas. There are just two semi-private gas stations in East Anglia, and no known plans for a hydrogen refuelling station.

² This is due to increase however, following the successful applications of CPCA and Norfolk County Council to the ZEBRA funding scheme, who will deliver 30 double-decker and 15 single-decker electric buses respectively.

1 UNDERSTANDING THE FUTURE OF TRANSPORT IN EAST ANGLIA

The East Anglian transport system will need to transform in the coming decades to meet the climate targets. To achieve a decarbonised transport system, changes to the types of vehicles, the fuels used for transport, the supporting infrastructure and the way in which we interact with all of these are needed. Crucial to smoothly navigating this is a quantification of the exact extent of changes needed and expected, especially in terms of:

- The number and type of different AFVs that could enter the transport system in the coming years
- The infrastructure that will be needed to support these AFVs and also deliver economic growth
- The future demand for energy vectors that are currently in relatively low use for transport, including electricity, hydrogen and renewable natural gas
- The level of behavioural change needed to achieve a decarbonised transport system in time to avoid significant levels of global warming

To that effect, the development of this strategy has included quantitative modelling of a variety of scenarios leading to the decarbonisation of the East Anglian transport system, which have been used to inform the development of the AFS. Figure 4 from the modelling, which highlight the difference in timescales expected for the decarbonisation of the light and heavy-duty sectors in East Anglia.

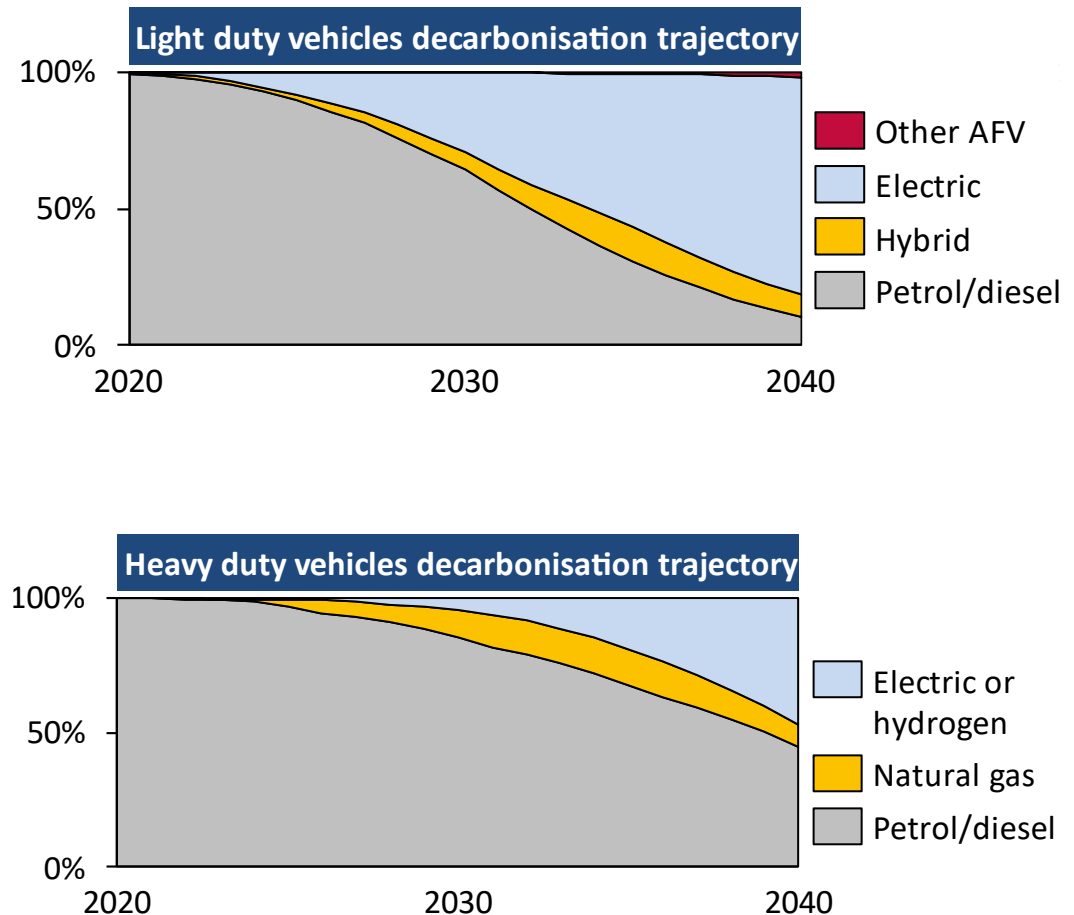


Figure 4: Forecasts for the decarbonisation trajectories of the light and heavy-duty vehicle stock in East Anglia out to 2040

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The purpose of the AFS is to chart a course that can be taken to boost AFV uptake in East Anglia and ultimately achieve a decarbonised transport system.

Therefore, an action plan and roadmap for action have been developed, and summarised in this document. The process for developing the action plan and roadmap is shown in Figure 5. Figure 5 illustrates how the evidence base generated has been converted into the final action plan and roadmap, in collaboration with local stakeholders such as local authorities and key representatives of the private sector such as the Cambridge Norwich Tech Corridor.

With input from local stakeholders, the evidence base from the modelling and policy review was used to generate a preliminary long-list of actions that need to be taken to boost AFV uptake. This long-list was then refined based on cost, deliverability, co-benefits and CO₂ impact, with further input from local stakeholders, and has consequently been developed into the action plan and summarised in the roadmap for action.

The actions are split into the three broad categories below, which are explained in more detail in the ensuing sections.

1. Actions to expand electric vehicle charging infrastructure
2. Actions to encourage AFV uptake
3. Actions to deliver a modal shift and encourage behavioural change

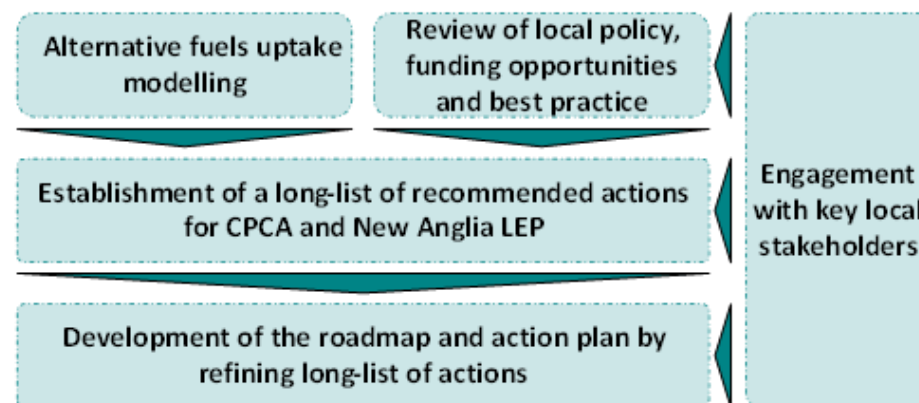


Figure 5: Forecast public EVCPs required in East Anglia in key years

3.1 Transitioning to alternative fuels: Expanding EV charging infrastructure

Access to charging infrastructure is a key enabler of electric vehicle uptake. Current EV owners do the majority (~75%)³ of their charging privately, at their home driveway or garage. Public infrastructure is then used to occasionally supplement this when EV owners are parking at a destination or travelling long distances and charging en-route. As EV uptake grows the demand for public charging infrastructure will grow significantly⁴. In part this will be due to the increased number of EVs, but the problem will be exacerbated by the fact that **later EV adopters are more likely not to have access to off-street parking** (driveways/garages), and so will be more reliant on public charging infrastructure

For public charging infrastructure to fully enable EV uptake, charge points need to be equitably distributed, and a suitable number and

³ Electric Vehicle Charging Behaviour National Grid ESO

⁴ Element Energy modelling based on UKPN Consumer Transformation scenario

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technology type need to be available. In addition, to avoid slowing EV adoption charging infrastructure needs to be deployed ahead of charging demand.

To achieve the successful deployment of a public charging network across East Anglia:

- There should be a unified vision and approach to charging infrastructure deployment to ensure interoperability.
- The deployment of public charging infrastructure by private sector players should prioritise regions with low off-street parking access.
- The deployment of charging infrastructure needs supporting in more challenging/ uncommercial areas to ensure there is an equitable distribution of charge points across the region.
- Wider public infrastructure could be supported by co-locating public transport services (bus, rail, park and ride), cycling infrastructure, freight consolidation centres and refuelling stations alongside charging infrastructure.

Continued and regular communication between all players is needed. This includes between public sector members such as; the Combined

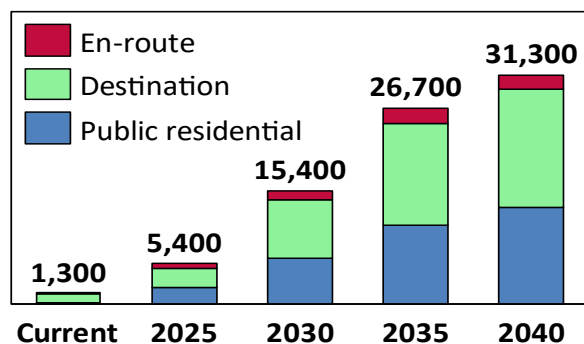


Figure 6: Forecast public EVCPs required in East Anglia in key years

Authority, New Anglia LEP, Local Authorities, and local transport bodies, and private sector players such as; local businesses, the electricity supplier, charge point operators and private land owners.

3.2 Transitioning to alternative fuels: Wider action

In recent years there has been an increase in the uptake of electric light duty vehicles such as battery electric and plug-in hybrid cars and vans, but uptake remains low across the stock as a whole. Uptake has started to accelerate due to support from government policy, an improvement in EV products and a decrease in the upfront purchase price. AFV uptake in lorries has also started to increase at a national level, however, uptake greatly lags behind cars and vans

Significant support remains essential to the uptake of AFV's, to achieve local and regional transport decarbonisation targets. This is particularly important for fleets and harder to decarbonise market segments (such as the heaviest HGVs). Key actions needed to accelerate the uptake of AFVs should especially focus on high emitting groups, including:

High mileage vehicles: User groups such as taxi's, private hire vehicles (PHVs) and shared car fleets contribute a significantly higher proportion of emissions per vehicle than an average car or van due to their high mileages. Greater emissions savings are therefore achieved by converting each of these vehicles to an EV early.

Business fleets: Businesses have influence over a high number of vehicles, such as company cars, service fleets or even employees' personal cars being used for work ('grey fleets'). Local government should try to support local businesses to transition their fleets to ZEVs and address grey fleet emissions. To help their employees switch to an EV, businesses need to make EVs an option and ensure access to sufficient charging infrastructure at work and home.

HGVs: Hydrogen and battery electric HGVs are currently undergoing government funded trials. Local government can advertise trial opportunities to local fleets and support a local plan for a connected refuelling/recharging network across the region.

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Bus operators: Local operators should try to set concrete decarbonisation targets to work towards. Local government can support these efforts through their enhanced partnerships. Financial and logistical barriers need to be removed to allow targets to be met for example through leveraging national grants and sharing best practice advice.

Alongside directly encouraging AFV uptake, AFVs need to be made a more attractive option than using a petrol or diesel vehicles. This includes prioritising EVs over higher emission vehicles when implementing regulations and licencing conditions.

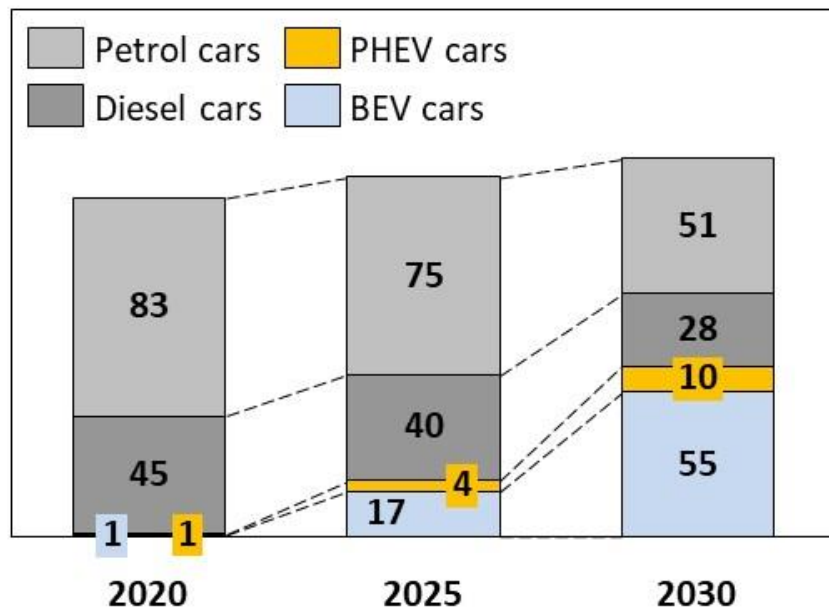
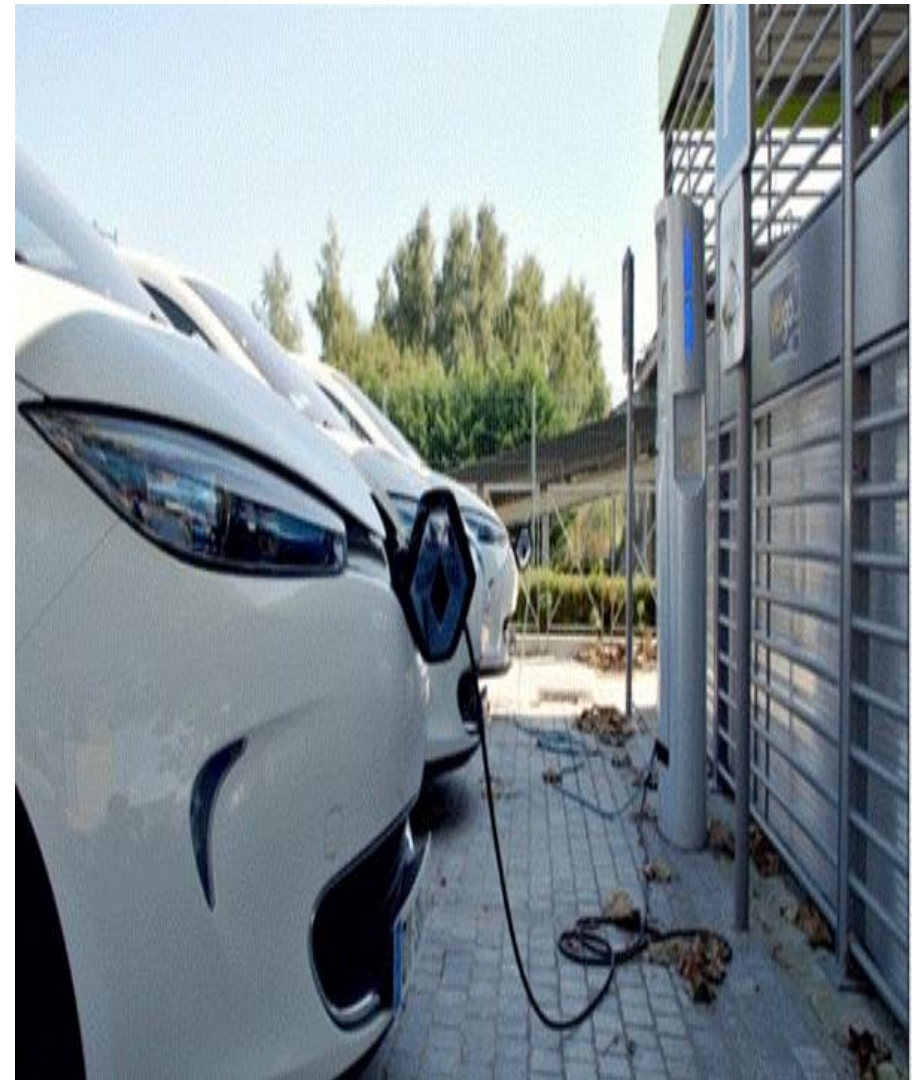


Figure 7: Potential breakdown by fuel type of car stock across East Anglia (tens of thousands)



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3.3 Delivering a modal shift and encouraging behaviour change

3.3.1 The need for actions which target modal shift and behaviour change

Relying on the uptake of AFV technologies alone, however, can only go so far in achieving decarbonisation. Moreover, to ensure that global warming targets are not exceeded, it is paramount that significant emissions reductions are achieved **before 2030**, this means relying on AFV and behaviour change together. In such a scenario **East Anglia transport emissions could be reduced to almost half current levels by 2030**.

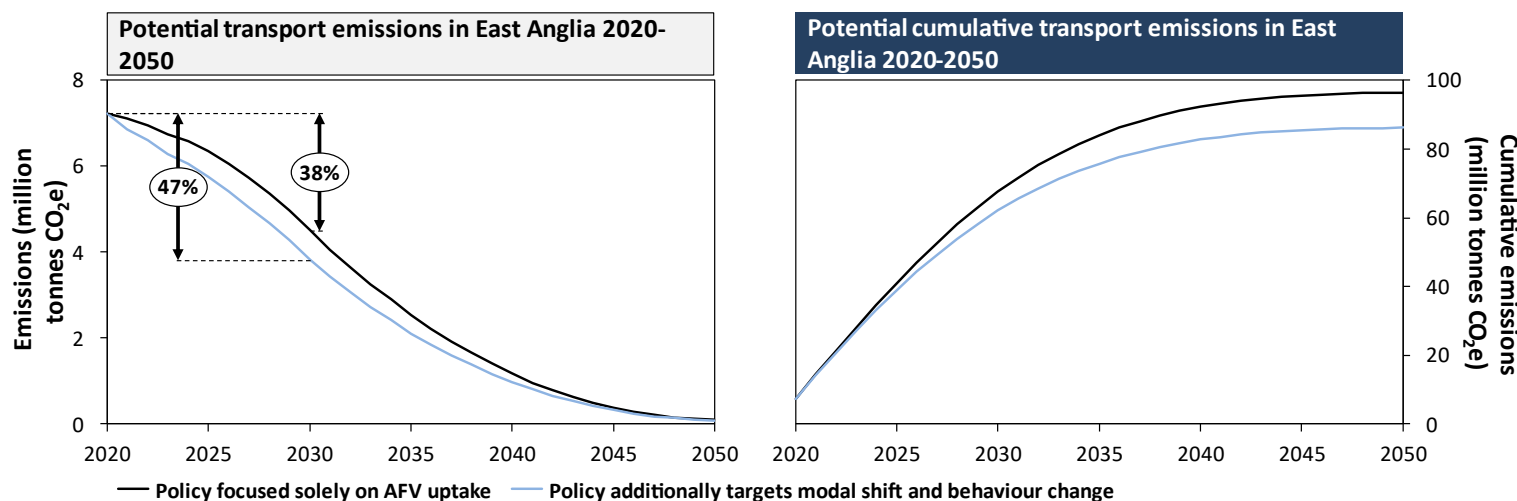


Figure 8: Year-on-year and cumulative emissions profiles for the East Anglia transport system in two different scenarios, highlighting the importance of policy that focuses on modal shift and behaviour change ahead of 2030⁵

⁵ Note that the value of all emissions has been calculated on a well-to-wheel basis (considering all emissions related to fuel production, processing, distribution, and end use).

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3.4 Actions to deliver a modal shift and behaviour change

Actions to achieve emissions reductions of this scale and in the given timescale should target both passenger and freight transport.

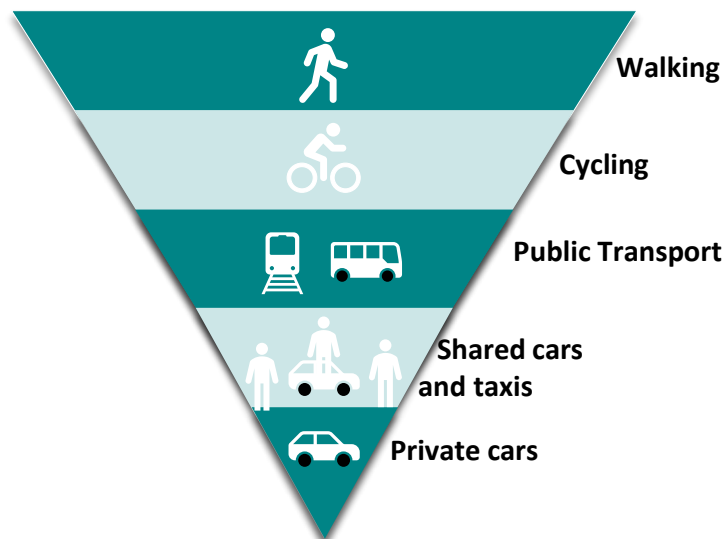


Figure 9: Travel hierarchy for passenger transport

Passenger:

When it comes to passenger transport the aim should be to move as many journeys as possible up the travel hierarchy which is shown in Figure 9.

To achieve this there are two main themes to actions that should be taken. Firstly, alternatives to private cars should be strongly incentivised. This includes making public transport cheaper and more efficient as well as making active travel safer and more attractive. There will always be some journeys that need to be made by car – and for these, car clubs

offer a more sustainable option. Secondly, private car use should be made a less attractive option for certain journeys, and in some instances disincentivised. This could include measures such as limiting new road building and establishing pedestrianised zones in urban areas.

Clearly, there is variation in private car dependence between rural and urban communities, and any disincentives may impact low-income households to a greater extent than others. It is therefore essential to achieving a **just transition** that all action is taken coherently. Where private cars are disincentivised, a cheaper and better alternative transport option always needs to be offered.

Freight:

A modal shift is also vital with respect to freight movements. There are a few key actions, which if taken would significantly contribute to reducing emissions.

- **Shifting freight from HGVs to rail** – moving more goods onto railways is more sustainable than moving goods by road. In East Anglia a key way to achieve this would be increasing the capacity at bottlenecks such as along the route from Felixstowe to the midlands.
- **Consolidation** – Establishing consolidation centres for freight is an essential step to having fewer HGV and van journeys across the region.
- **Last mile delivery** - Cargo bikes are a more sustainable option than vans for 'last mile' delivery services, and should be used in place where possible.

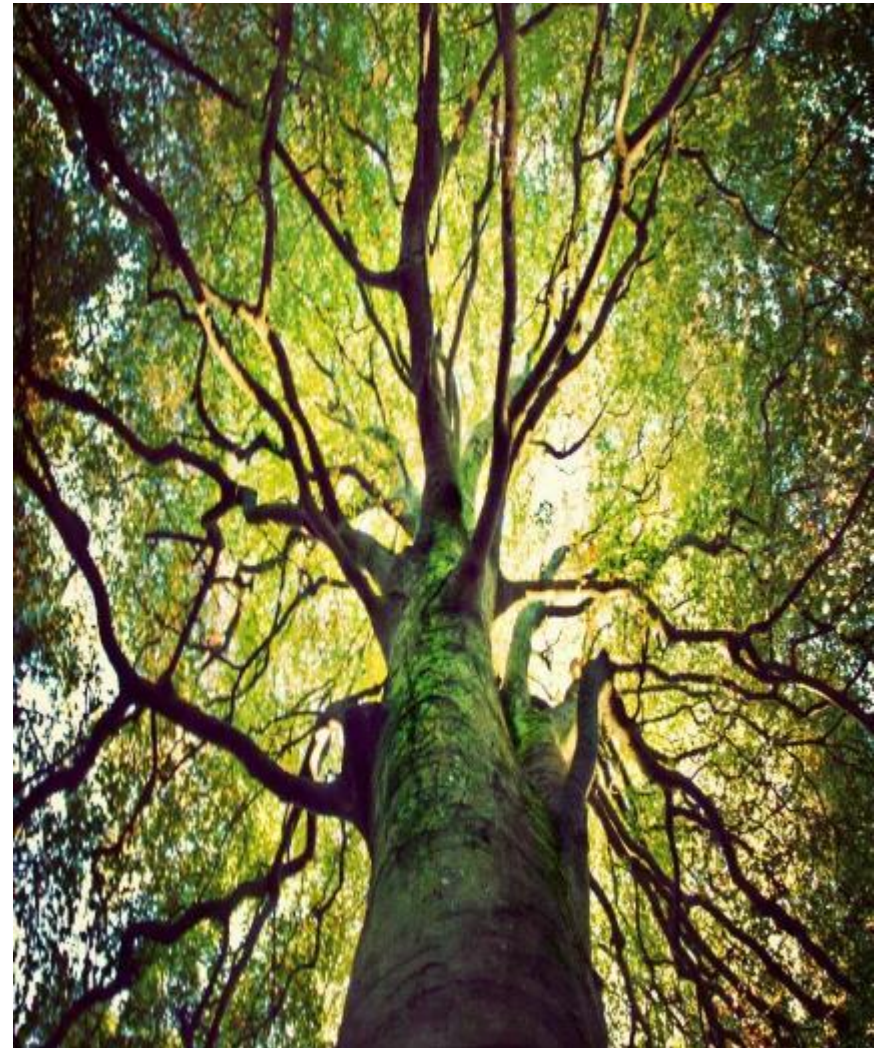
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3.5 Roadmap for action

The roadmap for action is shown in Figure 9 overleaf. The roadmap summarises key recommended actions and also includes target milestones for transport decarbonisation by 2030 and 2040. The actions included are those considered most essential from the accompanying action plan, while the milestones are outputs from the technical modelling conducted as part of the earlier development of the strategy.

The roadmap is broken down into three main categories. The categories are the same as the themes described in Section 4 of this document. The categories displayed on the roadmap are as follows:

- **AFV uptake (EV charging)** – the actions and milestones relevant to deploying EV charging infrastructure. The milestones are an estimated upper bound for the number of public EVCPs that could be needed in that year (both public and private sector), split by en-route, destination and public residential charge points
- **AFV uptake (wider-action)** – the actions and milestones that will either directly or indirectly lead to the uptake of AFVs. The milestones in this category focus on the percentage of the regional vehicle stock that could be AFVs at the given date, split out by mode
- **Modal shift** – these are the actions and milestones related to shifting both passenger and freight transport onto more sustainable modes. The milestones are an indication of the shift modelled as achievable in the given year.



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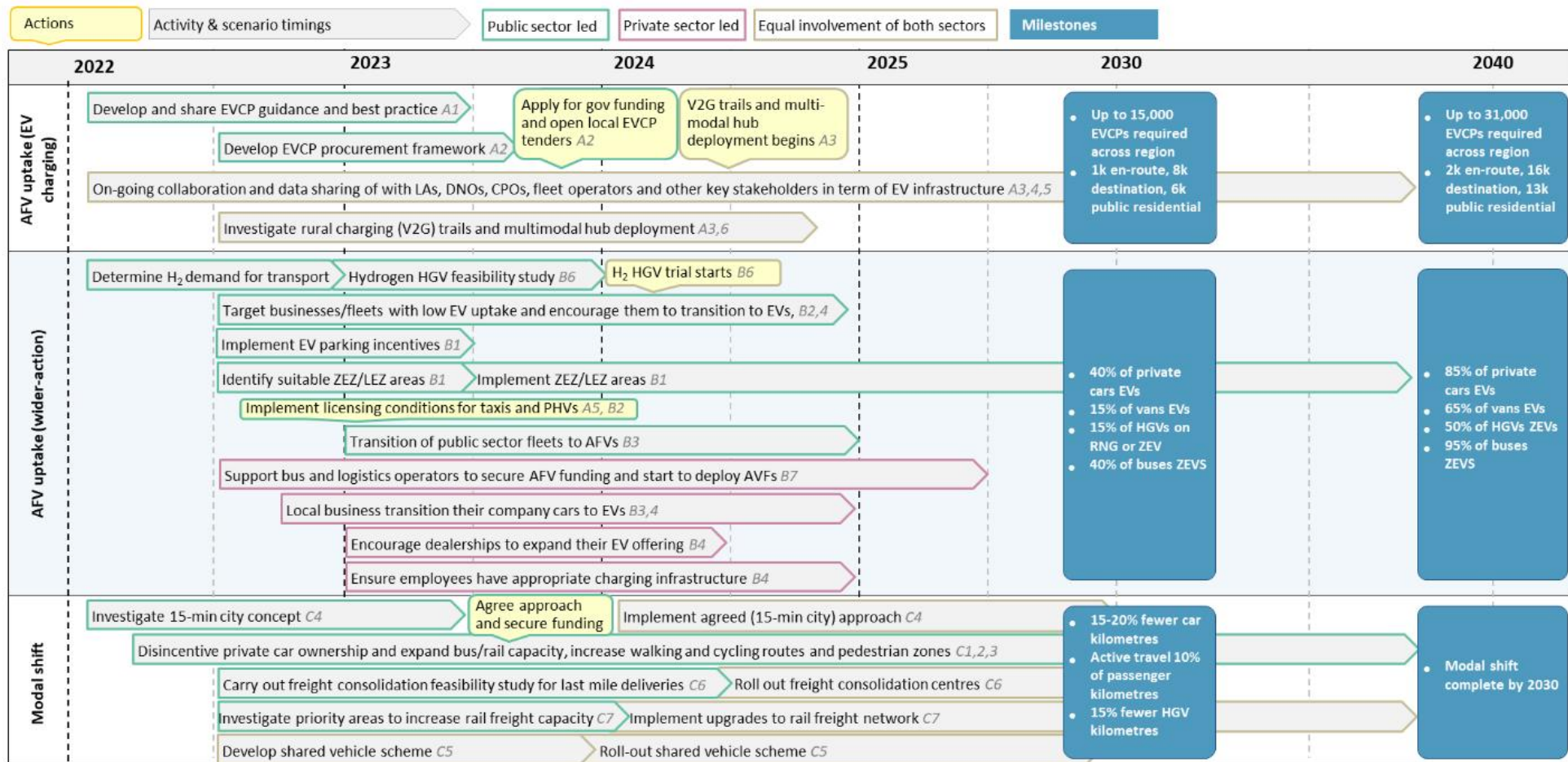


Figure 10: Roadmap summarising key actions set-out in the action plan as well as milestone targets

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The East Anglia Alternative Fuels Strategy was developed by Element Energy on behalf of the Cambridgeshire and Peterborough Combined Authority (CPCA) and the New Anglia Local Enterprise Partnership (New Anglia LEP). This document is one of three core reports underpinning the strategy. A technical report compiling all evidence used, and a detailed action plan are also in the ownership of The Combined Authority and New Anglia LEP.

All work undertaken for the Alternative Fuels Strategy was done so with input from local stakeholders. Many attended multiple workshops, providing key data and insights that have been vital in developing the study. The authors would like to thank the following groups:

- Babergh District Council
- Breckland District Council
- Cambridge City Council
- Cambridge Norwich Tech Corridor (private sector focused)
- Cambridgeshire and Peterborough Combined Authority
- Cambridgeshire County Council
- East Cambridgeshire District Council
- East Suffolk Council
- Fenland District Council
- Great Yarmouth Borough Council
- Greater South East Energy Hub
- New Anglia Local Enterprise Partnership
- Norfolk and Suffolk Clean Growth Taskforce
- Norfolk and Suffolk Transport Board
- Norfolk Broads Authority
- Norfolk County Council
- North Norfolk District Council
- Norwich City Council
- Peterborough City Council
- South Cambridgeshire District Council
- South Norfolk and Broadland District Council
- Suffolk County Council