Somerset Councils

ELECTRIC VEHICLE CHARGING STRATEGY

Final Report

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QUALITY CONTROL

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INTRODUCTION

We are facing a climate crisis and all Somerset authorities have declared a climate emergency, working towards carbon neutrality by 2030. The emerging Somerset Climate Emergency Strategy recognises that a reduction in total vehicle miles travelled and electrification of surface transport is needed to meet both climate and air quality goals, and that Electric Vehicle (EV) charging infrastructure in Somerset needs to scale up significantly.

The number of EVs in Somerset is growing rapidly, with nearly three times as many EVs registered in Somerset compared to just three years ago. There are high levels of interest in EVs in the county, combined with high levels of potential tourist demand for EV charging infrastructure. A range of EV charging infrastructure projects are already underway to support and enable this growth.

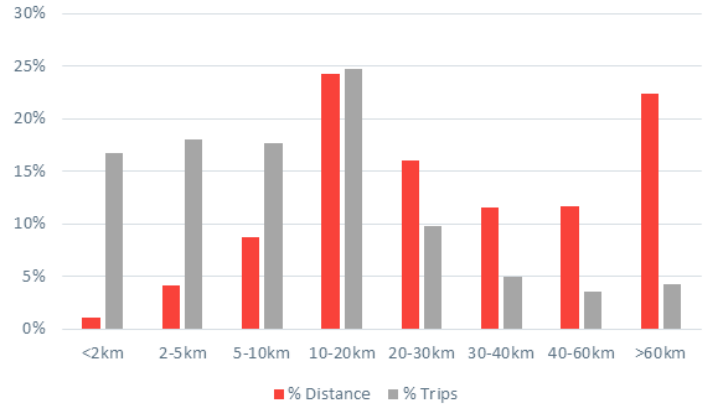
Being a mostly rural county, Somerset faces a number of specific challenges and there is a risk that more rural locations are left behind in the shift to EV. However, there is greater dependence on car travel, with longer trip distances than urban areas, providing a significant opportunity to reduce carbon emissions.

This document sets out a strategy for the Somerset local authorities to help effectively deliver the necessary electric vehicle charging network for Somerset.

SETTING THE SCENE

The United Nations says we could have less than 10 years to limit a climate catastrophe. Transport is responsible for 46.5% of carbon dioxide emissions in Somerset and is the now the largest source of emissions nationally. Electric vehicles will have a significant role to play in tackling emissions from transport, especially for longer distance trips and in more rural areas less well served by public transport. The majority of carbon emissions from transport come from longer distance trips, with over 80% of emissions from car commuting in Somerset from trips of 10km (6.25 miles) or more. Tackling these longer distance trips offers the greatest potential for carbon reductions

Commuting trips by distance in Somerset (Source: Census 2011)



MARKET REVIEW

The registration of electric vehicles is increasing year on year, with more makes and models coming to the market, costs decreasing, and range increasing. In the next few years, the purchase price of electric vehicles is expected to reach parity with, and then become cheaper, than the equivalent petrol or diesel vehicles, and uptake of electric vehicles will increase dramatically. A second-hand electric vehicle market is already emerging, making the vehicles affordable for more people.

A range of electric taxis, vans, lorries, and buses are already on the market, with new models planned, opening up wider possibilities for an electric future.

Similarly, the range of charging solutions for electric vehicles is evolving rapidly and reflects the ongoing technological developments and increasing investment in this market. There are now a range of well established off-street and on-street charging solution to cater for a range of use cases.

With the number of EVs on the road increasing, private sector investment in charge point provision is also increasing. This gives local authorities a number of delivery approaches with a sliding scale of risk and reward, ranging from full public ownership and operation, concessions based approaches, to options fully funded and delivered by the private sector.

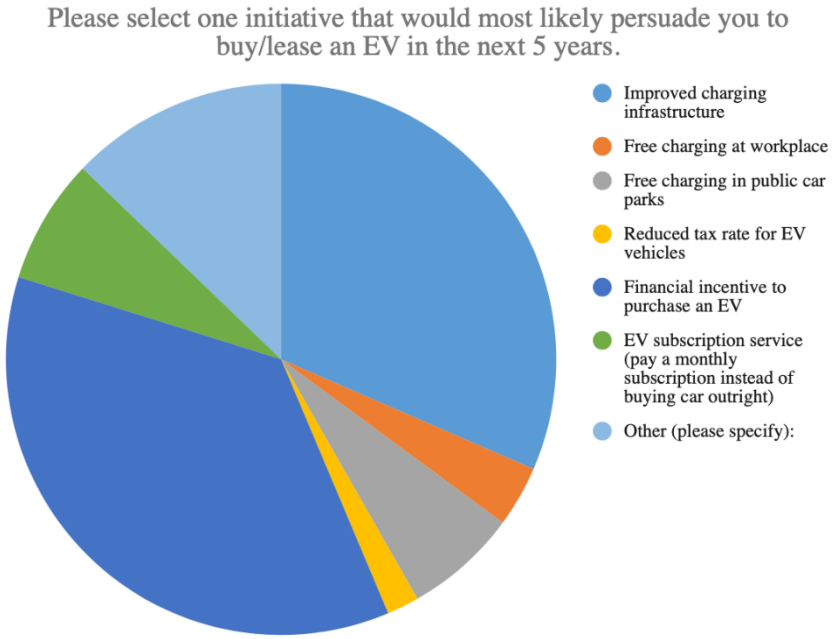
SOMERSET BASELINE REVIEW

There were 1,667 Plug-In Electric Vehicles registered in Somerset in June 2020, with this number growing rapidly. To support this there are currently 87 non-domestic based electric vehicle charge point locations, providing 223 non-domestic charge point connections. Of these, there are 16 slow chargers (3kW), 149 fast chargers (7-22kW) and 56 rapid chargers (43+ KW).

Electric grid capacity was reviewed, and found that grid capacity is unlikely to be a significant barrier to the roll out of clusters of slow/fast EV charge points. However, specific local circumstances may result in the need for grid reinforcement in a limited number of locations. The installation of new rapid charge points is much more likely to result in grid capacity issues, although there is currently spare capacity on the majority of primary and secondary level substations.

A range of internal and external stakeholders have contributed to this strategy through a series of virtual meetings. This includes a range of representatives from the Somerset authorities, Highways England, the Western Power Distribution and Scottish and Southern Energy Networks, local employers, and a community energy group.

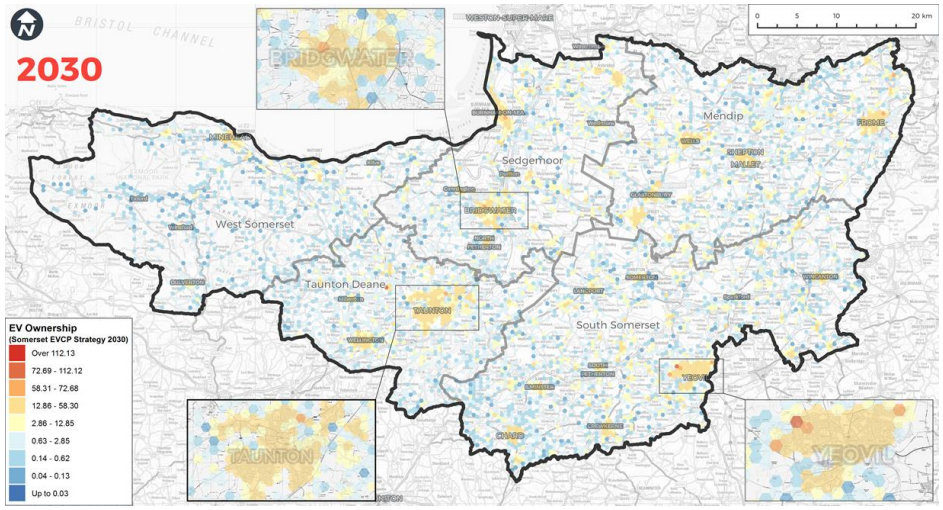
The strategy is also informed by a Somerset Electric Vehicle Survey undertaken in June 2020, with over 1,000 responses from residents across Somerset. The high response rate reflecting the strong interest in EVs locally. 63% of respondents stated they have either switched to an EV or have considered it, with 78% of respondents considering EVs to be positive in general terms. The survey confirmed national research that the largest barriers to EV uptake in Somerset are charging infrastructure and cost of purchase.



FORECASTING

In order to inform our recommendations for charge point rollout, a range of EV uptake scenarios for Somerset were developed using WSP's EV:Ready tool. A "Somerset EVCP" scenario, reflects the impact of increased action at a local level, and crucially, bringing forward the ban on the sale of new petrol and diesel vehicles nationally to 2032. In this scenario around 30% of the vehicle fleet is converted to EV by 2030, compared to just 14% in a business as usual scenario. The Figure below shows the forecast distribution of EV ownership in 2030 under this scenario, with hotpots in the main urban areas of Taunton, Bridgewater, and Yeovil.

Somerset EVCP Scenario (2030) – EV Ownership



Areas of high potential EV demand and on-street parking were also identified to help inform the future roll-out of on-street charge points. These locations include Minehead, Taunton, Bridgwater, Burnham-on-Sea, Yeovil, Chard, Street, Glastonbury, and Frome.

RECOMMENDATIONS

Drawing on the findings of the market review, baseline review, stakeholder engagement, and EV forecasts, a total of 24 recommendations were identified:

Lead by example

1. Undertake a Fleet Review to identify opportunities
2. Install charge points at Council depots, with associated driver training
3. Install charge points at key Council offices

Work with central government and industry to increase uptake of EVs

4. Urge Government to bring forward the ban on sales of new petrol and diesel cars and vans to 2030 or earlier
5. Urge Government to further reduce the costs of EV purchase and ownership compared to petrol and diesel vehicles
6. Explore additional local incentives to increase EV uptake beyond additional charge point infrastructure
7. Identify opportunities to support research and innovation in EVs in Somerset

Home charging

8. Explore additional local incentives to increase EV uptake beyond additional charge point infrastructure
9. For existing households, promote the Homecharge Scheme
10. Promote home charging share schemes such as Zap-Home
11. Provide guidance for the use of cable covers and covered ducts by residents
12. Submit a bid to the OLEV On-street Residential Chargepoint Scheme
13. Adopt design standards for on-street chargers to enable and manage future private sector roll-out of charge points

Workplace charging

14. Adopt EV parking standards for new workplaces
15. For existing workplaces, promote the OLEV Workplace Charging Scheme
16. Promote the Energy Saving Trust fleet reviews
17. Promote workplace charging share schemes such as Zap-Work

Other destination charging

18. Adopt EV parking standards for other new non-residential developments
19. Develop charging hubs at Taunton Gateway and Silk Mills Park & Ride
20. Install charge points at council owned public car parks
21. Encourage stakeholders to deliver EV charge points at other key destinations including supermarkets and rail stations
22. Engage with tourist destinations and explore tourism opportunities associated with EV
23. Consider the potential to integrate EV charging with other energy and transport services as part of new Mobility Hubs

On route charging

24. Engage a private sector supplier to deliver rapid charge points where there are currently gaps in provision (specific areas based on mapping) and to explore delivery of rapids chargers for use in urban centres including by taxis in locations near to taxi ranks

The intention is for a cross-authority EV working group to be established within the wider Somerset Climate Emergency response governance structure. This should help ensure that EV work across the authorities is coordinated, and links to wider climate and energy workstreams. The EV working group will have overall responsibility for maintaining momentum and delivering the recommendations. A stakeholder forum of key external stakeholders and delivery partners could also be established, to help guide delivery of the strategy.

The EV market is continually changing and rapidly evolving, and as such this strategy should be regularly monitored and reviewed.

1 INTRODUCTION

CONTEXT

We are facing a climate crisis and all Somerset authorities have declared a climate emergency, working towards carbon neutrality by 2030. The emerging Somerset Climate Emergency Strategy recognises that a reduction in total vehicle miles travelled and electrification of surface transport is needed to meet both climate and air quality goals, and that Electric Vehicle (EV) charging infrastructure in Somerset needs to scale up significantly.

The number of EVs in Somerset is growing rapidly, with nearly three times as many EVs registered in Somerset compared to just three years ago. There are high levels of interest in EVs in the county, combined with high levels of potential tourist demand for EV charging infrastructure, both for local destinations and on strategic routes connecting to the wider South West.

A range of EV charging infrastructure projects are already underway to support and enable this growth. This includes a world first pilot of a new type of rapid charging hub in Taunton, the roll out of charge points across public car parks in South Somerset, and the "Gravity" smart campus near Bridgwater which aims to attract world-leaders in EVs. The private sector is showing increasing interest in delivering charge points across Somerset, and there is a need for the public sector to lead and enable ongoing investment.

Being a mostly rural county, Somerset faces a number of specific challenges and there is a risk that more rural locations are left behind in the shift to EV. These include a lack of mobile coverage, and an ageing population, who may need different support to transition to EVs than younger urban populations. However, there is greater dependence on car travel, with longer trip distances than urban areas, providing a significant opportunity to reduce carbon emissions.

The impact of the coronavirus crisis on travel patterns is still unclear but is likely to result in increased travel by private car, at least in the short term, increasing the need for EVs. However, industry and the public may be less willing to invest in EV in a period of economic uncertainty. The "green recovery" from the crisis provides a once in a generation opportunity to shift to more sustainable lifestyles, with additional national funding made available for the transition to zero carbon transport. The strategy will need to consider these issues and is set within the wider Future Mobility context including increased automation, new business models, data & connectivity, and changing attitudes.

Concerted additional action is needed from the whole community, locally, nationally, regionally and internationally – working together. Close partnership working with Government, industry, and other stakeholders will be needed to bring about change.

This document sets out a strategy for the Somerset local authorities to help effectively deliver the necessary EV charging network for Somerset. The authorities considered are Somerset County Council (highway authority), Mendip District Council, Somerset West and Taunton District Council, Sedgemoor District Council, South Somerset District Council and Exmoor National Park Authority. The strategy will provide a basis to:

- Develop and deliver specific projects on their own land and assets as appropriate, informed by the best way to futureproof investment, maximise opportunities and benefits;
- Influence investment in the grid and work to release capacity in the grid by the Distribution Network Operators;
- Set policies and guidance and allocate specific sites for charge point development through Local Plans and other means;

- Lobby Government and others on what prerequisites are required in order to proliferate EVs in Somerset; and
- Understand what their role should be on delivering charge points going forward.

The EV sector is rapidly changing, and this strategy will need to be regularly reviewed and updated.

DOCUMENT STRUCTURE

Following this brief introduction, the report is structured as follows:

2. Setting the scene: relevant context including the role of EVs and their potential impacts on the electric grid
3. Policy review: outlines existing national and local policy relevant to electric vehicle charging
4. Market review: existing and emerging vehicle technologies, charging point infrastructure and related technologies.
5. Somerset baseline review: existing uptake of EVs and charging point infrastructure in Somerset.
6. Stakeholder engagement: summary of stakeholder engagement, issues and options raised
7. Forecasting: EV uptake forecasts specific to Somerset to inform the options appraisal.
8. Recommendations: Makes recommendations relating to the provision of EVs for the Somerset authorities to consider.

In this document the term electric vehicles is applied to refer to the following vehicle types:

Battery Electric Vehicles (BEV)

100% pure or battery electric vehicles are powered by a battery which drives the electric motor.

Plug in Hybrid Electric Vehicle (PHEV)

Plug-in hybrid or range-extended electric vehicles also have a conventional diesel or petrol engine to provide generating capability, meaning they can have a longer range than with a battery alone.

Fuel Cell Electric Vehicle (FCEV)

Hydrogen fuel cell electric vehicles have a fuel cell which uses hydrogen to produce electricity to power the drivetrain. They are currently significantly more expensive than other types of electric vehicle and face other barriers to widespread adoption.

2 SETTING THE SCENE

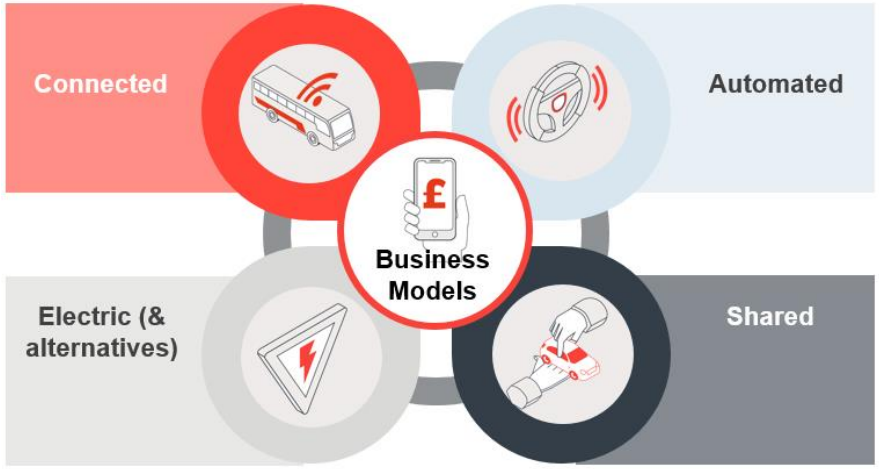
THE FUTURE OF MOBILITY

Over the last few decades our society has changed dramatically. How we work, learn, play, shop and stay healthy has radically shifted, largely due to the digitisation of many of our day-to-day activities.

In the not-too distant future, further changes bought upon by automation, cleaner transport, new business models, new modes, increasing availability of data and connectivity and a change in transport attitudes could have an even greater radical impact.

The potential for cleaner forms of transport, balancing supply and demand, and tailored to the customer could provide for a very different future for our built environment.

Figure 1 Future mobility diagram



Connected

Digital connectivity is already underpinning many of our daily activities where access to communications networks (fixed or mobile) is possible. Music, video and other streaming services are now available on the move and journey planning is readily available to all.

Equipping the transportation network with high quality, continuous digital connectivity will aid the delivery of capacity, safety and productivity benefits. Continuous connectivity also provides the foundations (in some use cases) for autonomous functionality. Digital connectivity will be essential in providing the digital backbone that will allow many other innovations to be fully developed in both mobility and wider applications across the economy.

Opportunities

- Improved safety through sharing of traffic / movement data
- Using 'big data' to manage supply and demand
- Improved productivity on the move
- Enhanced customer and user experience on the move
- Access to goods, services and activities irrespective of location
- Improved personal and community connectivity
- Reduced 'traditional' infrastructure needs (e.g. information, signals, signage)

Risks

- Cost of access / functionality precludes those with low incomes
- Danger of digital inequity, particularly in hard to reach and/or rural areas
- Potential reduction in face-to-face human interactions
- Resilience of digital networks, key to maintaining service
- No escape from always 'being connected'

- Dependence upon (in some cases) 3rd party communications infrastructure

Automated

The automated agenda is gathering pace with advances in computing power and sensor capabilities having led to well publicised advancements in road, rail, water and aerial technology. Automation in the transport sector will significantly impact how they function and perform as well as having potential impacts on place-making and utilisation of space.

Opportunities

- Potential safety benefits as a result of autonomous systems (between 80% and 95% of vehicle collisions are due to human error, depending on source)
- Productivity benefits on the move (with high levels of automation)
- Capacity benefits once large-scale fleet penetration is established
- Removal of humans from undesirable industrial applications
- Improved access to independent mobility for those currently excluded (the young, the elderly, the disabled)

Risks

- Inequality and social exclusion due to cost of access / ownership of autonomous vehicles and service models
- Disparity between urban and rural take-up and deployment for automated solutions.
- Automated systems would need to be fit for rural areas, such as navigating narrow lanes, absence of road markings and other potential hazards
- Potential trend to increase single occupancy and zero occupancy vehicles and resultant increased traffic
- Potential to reduce active transport

Electric & Alternatives

Alternative propulsion systems in transport are rapidly expanding. Fully electric and plug-in hybrid electric cars are readily available. Hybrid, electric and hydrogen buses are on the UK roads and hybrid, battery and hydrogen trains have been tested on the rail network. Battery shipping is also being trialled. Fuel cell vehicles (FCV) or fuel cell electric vehicles (FCEV), which generally use hydrogen instead of / in combination with a battery, are due to be available in the next few years. Advances in LGV and HGV technologies will see wider deployment of alternative fuelled freight including on railway.

E-bike sales are on the increase with electric bikes being used for personal and commercial cargo use, and the UK is beginning widespread trialling of shared e-scooters.

This shift away from fossil fuels, driven in part by policies such as taxation, low emission zones and the planned phasing out of petrol and diesel will lead to new infrastructure needs in terms of electricity generation, distribution and storage and in the case of hydrogen, new distribution and filling networks. There may also need to be different service operating patterns to allow for difference in fuelling frequencies. Whilst the benefits are obvious there will be challenges for rapid and wide scale deployment.

Opportunities

- Zero emissions at point of use and associated air quality improvements
- Reduced noise at point of use
- Recued maintenance cycles and consumables
- Parked EVs could be an opportunity for V2G (vehicle to grid) and energy storage/balancing for a local community

Risks

- Exclusion from EV modes due to high vehicle costs and/or lack of off-street parking

- Current EV vehicles not suitable for all use cases
- Street clutter with EV charging infrastructure
- Impacts on and capabilities of local electricity grids
- Taxation impacts and associated incentives

Shared

Sharing of assets between users has been a developing and disruptive trend in transportation over the last few years. Facilitated by digital connectivity solutions match demand (customers) with supply (available assets or journeys) generally via app-based solutions. Many feature on-account payment systems streamlining the customer experience, and some encourage feedback or incentivise positive customer behaviours. Shared access to mobility solutions in the form of bike hire, car hire, taxi or pooled transit and bus offer people alternatives to 'owning' a car particularly in urban areas where services are accessible most of the time. Many shared mobility solutions are blurring traditional transport modes and testing existing regulatory and other frameworks.

Opportunities

- Provides alternative to low utilised vehicles
- Reduced dependency on the private car and could potentially reduce overall numbers
- Provides a suite of choices for different mobility needs and circumstances
- Provides sustainable solutions (in the case of bike hire)

Risks

- Impact of 'parked' assets on the built environment
- Competing suppliers in some areas confuses the overall offer
- Ease of engagement for new or traditional customers
- Dependency of app-based technology may exclude some

Business Models

With the trends above disrupting the traditional models of booking, paying for and access transport and mobility new business models are starting to emerge offering improved customer choice, flexibility and experience. Largely driven by underlying data aggregation such solutions not only simplify ticketing but also provide tailored and personalised travel information. In addition, bundled energy generation and storage solutions are being offered with new EVs offering a completely different mobility model.

Opportunities

- Truly seamless and integrated access to a choice of mobility solutions
- On account, single payment across multiple (or ultimately all) modes
- Improved operator understanding of customer choices
- Potential ability to balance supply and demand across all modes

Risks

- Public acceptance and willingness to use
- Privacy and data concerns
- Cyber security and fraud

Conclusion

These changes are already beginning to impact the shape and form of Somerset's workplaces and high streets. The Somerset Electric Vehicle Strategy aims to help Somerset County Council and the District Authorities reduce transport related emissions and make sure that transport is sustainable in the long-term. The Strategy can act also as a tie-in for boosting travel by active modes, increasing public transport uptake and help with the provision of interventions such as mobility hubs which could combine access to services.

THE ROLE OF ELECTRIC VEHICLES

The United Nations says we could have less than 10 years to limit a climate catastrophe. All Somerset councils and the Exmoor National Park Authority have now declared a climate emergency, aiming at working towards carbon neutrality by 2030.

The majority of emissions are generated by the most affluent citizens, both globally and at a local level. Across the UK, the highest income group has more than three times the household emissions of the lowest income group. Figure 2 shows UK household emissions from different sources by income decile. It shows that the most affluent in society have by far the largest share of transport emissions, primarily because of increased travel distances both by car and aviation.

The Somerset Climate Emergency Strategy (2020) states that transport is responsible for 46.5% of carbon dioxide emissions in Somerset and is the now the largest source of emissions nationally. EVs will have a significant role to play in tackling carbon emissions from transport, especially for longer distance trips and in more rural areas less well served by public transport.

Figure 3 shows car commuting trips by distance in Somerset. It shows that although over a third of car commute trips within Somerset are under 5km (approx. 3 miles) in length and within walking or cycling distance for many, these only account for 5% of car commute distance travelled. Many of these journeys come under the government aim that journeys of under 2 miles should be made on foot or by bike. Trips over 20km (12.5 miles) account for under a quarter of car commute trips, but account for 62% of the total car commute distance travelled and a similar proportion of carbon emissions.

Figure 2 UK household emissions from different sources by income decile (1 – lowest income households, 10 – highest income households) - Source: CSE (2019)

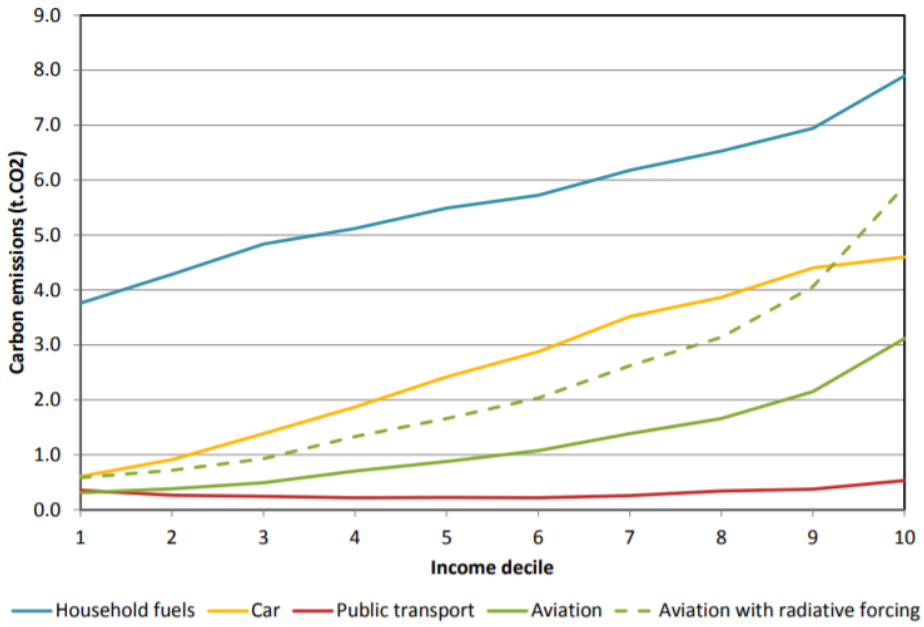
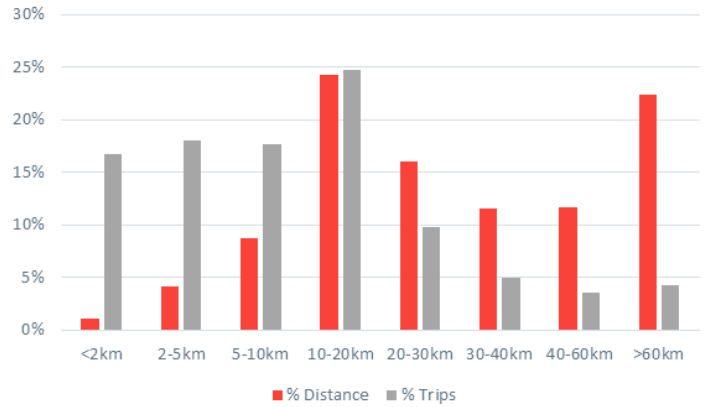


Figure 3 Commuting trips by distance in Somerset (Source: Census 2011)



Therefore, tackling longer distance trips offers the greatest potential for carbon reductions, and EVs can play a leading role. Locally EVs also have an important role in reducing harmful local air pollution, in the form of nitrogen dioxide, from our streets.

Whilst the EV sector has matured considerably over the past few years, it remains an emerging and fast changing market. It has long been recognised that key barriers to a transition to EVs is the lack of a comprehensive charging network, and the higher purchase price of the vehicles, as will be detailed in the EV questionnaire carried out by SCC graduates in Section 6.

ROLE OF PUBLIC CHARGE POINTS

EV charging infrastructure in Somerset needs to scale up significantly to enable the growth in EVs and meet personal and commercial charging needs. Research shows that the availability of publicly available EV charge points is currently a key factor affecting the decision to buy an EV. Research from Green et al (2020) published in Transport & Environment states that public charging infrastructure has both a tangible effect in reducing range anxiety (which is one of the biggest barriers to widespread EV adoption) and an intangible effect in signalling confidence in the emerging market.

Research from Transport Environment (2018) states that only 5% of charges are made at publicly available charge points, and as such a small number of public charge points are able to serve a relatively large number of EVs. Increases in battery size are likely to reduce the dependence on public charge points for some groups, however, this is likely to be offset by the widespread adoption of EVs by residents with no off-street parking who are dependent on public charge point infrastructure.

There is an element of ‘chicken and egg’ in this scenario as people want the security that there are sufficient charge points to make the switch. However, commercial charge point providers also want the security that there are enough EVs on the road to justify the investment in infrastructure. Research from Deloitte (2017) states that at present most charge points do not make a profit due to low EV adoption rates. Once an initial public charging network is in place to overcome range anxiety concerns, the link between the number of public charge points and the number of EVs becomes less clear.

IMPACT ON ELECTRIC DEMAND

In the UK, Distribution Network Operators (DNO) are responsible for the distribution of electricity from the transmission network to end users. Electricity is distributed at different voltages, which are stepped up and down using transformers at various substations. The analysis in this report considers "primary" substations, which generally have a higher voltage of 11kV or 6.6kV and "secondary" substations, which have a lower voltage of 400V and distribute electricity to domestic properties.

Individual chargers, such as single domestic or fast chargers typically have a demand of 3kW-7kW (single phase) to 22kW (three phase) and will typically connect to the low voltage network (240v AC). Individual chargers have the potential to overload the secondary substations if there is a cluster of chargers in the same street or estate, if demand is not managed.

Table 1 Types of charge point

Type	Typical Kilowatt per hour
Domestic (3 pin socket)	2.3
Slow charging point	3.7
Fast charging point	22
Rapid charging point	50
Ultra-rapid charging point	100

Large groups of chargers or rapid charging hubs will likely connect to the 11kV network or direct to primary substations.

The county of Somerset encompasses 61 primary substations, of which 80% are owned and operated by Western Power Distribution (WPD), whilst the remainder belong to Scottish and Southern Energy Networks (SSEN).

The uptake of EVs across the county will increase the demand on the network. Electrification of other sectors including home heating, as use of gas is replaced with heat pumps and other technologies, will also increase demand on the grid. This may require reinforcements to be made to the electrical network to ensure that the grid can supply and match the nationwide demand. However, a large proportion of demand from EVs could be deferred through "smart charging." This refers to charging stations monitoring, managing, and restricting the use of charging devices to optimize energy consumption shifting demand consumption away from periods where the energy network is busiest (peak demand).

Figure 4 Electric vehicles impact on energy demand

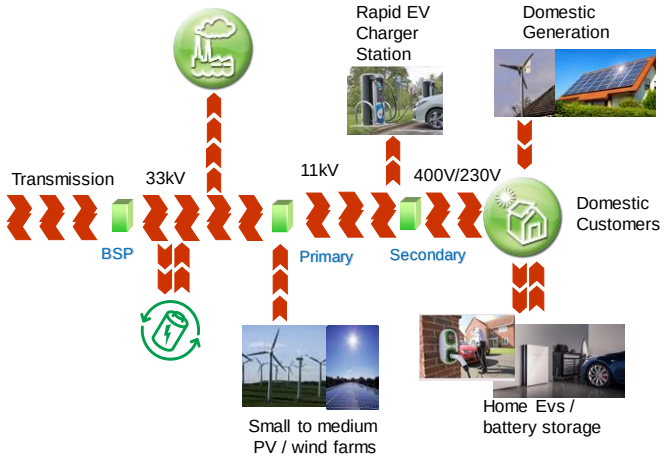


Figure 5 Typical EV charging profile (source: HM Government, Electric Vehicle Smart Charging, 2019)

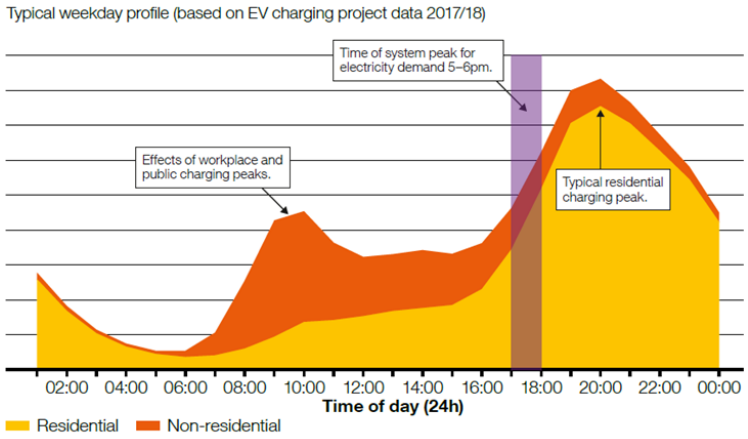
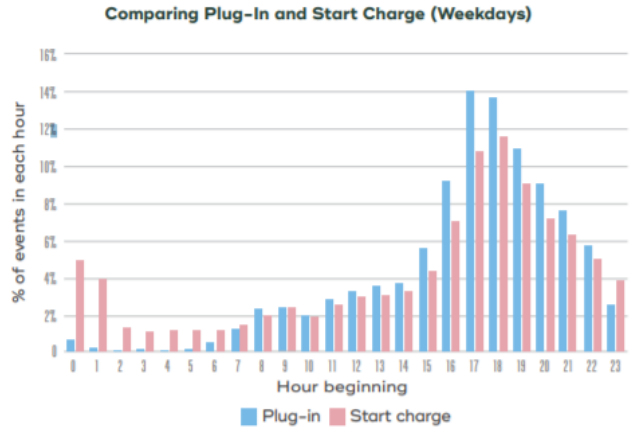


Figure 6 Residential charging profile (source: Electric Nation, Powered Up, 2019)

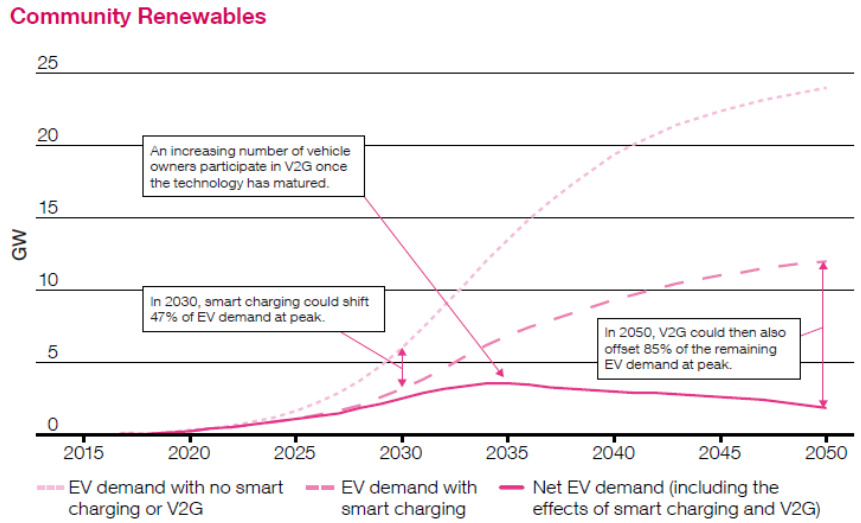


Various smart technologies have been developed which focus on tackling the problems associated with EVs and charging strategies. Smart EV charging can reduce grid constraints by, for example, utilising various Time of Use (ToU) tariffs – which offer cheaper electricity rates during off-peak hours (e.g. 12am – 5am).

Charging an EV during these hours offsets the demand of the customer and flattens the load demand profile. However, this is a fairly simple way of deferring demand and has the potential to create a new peak when the cost decreases. Smarter load deferring would involve communications between the network operator or potentially constrained equipment and chargers to reduce charging rates as appropriate.

If local renewable energy sources were to be used in conjunction with this technology it would reduce demand on local networks, providing a higher capacity for EV charging. Both technologies would be advantageous during a power outage (caused by storms, falling trees, vehicle collisions etc.) as (EV) battery storage could aid the supply of electrical demand through vehicle to grid (V2G) technology as described later in Section 4. Smart charging vehicles could enable the storage of roughly one fifth of GB's solar generation for when this energy is needed.

Figure 7 Impact of smart charging and vehicle to grid solutions on EV electricity grid demand (source: National Grid, Future Energy Scenarios July 2020)



Lifecycle impacts

A lifecycle analysis of Electric Vehicles by Transport & Environment shows that even when powered by the most carbon intensive electricity in Europe, they emit less greenhouse gases than an ICE vehicle. The additional carbon emissions during manufacture of the batteries are quickly offset during operation.

As more renewable electricity enters the grid, and as smart charging enables vehicles to charge overnight when grid emissions are lowest, the climate impact of EVs will further diminish.

Likewise, technological improvement of battery chemistry and battery energy (meaning more energy can be stored in smaller batteries), the reuse of EV batteries for energy storage purposes, and the development of a recycling industry for EV batteries, will all further enhance their sustainability.

The study also highlights that, contrary to some speculation, access to critical metals and rare earth minerals are not likely to be constrained in the coming decades, and so will not present a barrier to EV transition. However, supply of these materials will have to be closely monitored and diversified. The study notes that cleaning up road transport should not come at the price of the environmental catastrophes the oil industry has become familiar with, such as the Exxon Valdez or Deepwater Horizon oil spills, or the social and environmental damage in Nigeria. The study suggests the EV supply chain should be closely monitored, for instance through certification schemes.

3 POLICY CONTEXT

This section summarises a review of relevant policies, plans, strategies and legislation undertaken with regards to Ultra Low Emission Vehicles (ULEVs).

Nationally, central government has a key role to play in legislation for the emergence of EVs, in order to achieve national targets for reducing greenhouse gas emissions and improving air quality in the country as a whole.

The 2018 Automated and Electric Vehicles Act makes provision for the creation of regulations relating to the installation and operation of charging points for EVs.

The diagram overleaf gives an overview of national policy, strategy and legalisation.

National Electric Vehicle incentives

Company car tax savings

From April 2020, zero emission cars pay no Benefit in Kind tax in 2020/2021, just 1% in 2021/22 and 2% in 2022/23, with savings of up to £1,000 per month compared to a petrol equivalent. With around half of new cars purchased as company cars, this represents a very effective way for government to encourage adoption of the lowest emission vehicles.

Plug-in Vehicle Grant Scheme

Residents of the UK are eligible to get a discount on the price of new electric vehicles:

- Cars – 35% of the purchase price up to £3,000 for cars less than £50,000 (inclusive of VAT and delivery fee's)
- Vans – 20% of the purchase price up to £8,000
- Large vans and trucks – 20% of the purchase price up to £20,000
- Motorcycles – 20% of the purchase price up to £1,500
- Mopeds – 20% of the purchase price up to £1,500
- Taxis – 20% of the purchase price up to £7,500

Green Fleet Reviews

Green Fleet Reviews are funded by the Department for Transport and are delivered by the Energy Saving Trust. These are provided at no charge for eligible organisations including SME businesses operating between 20 – 100 vehicles (cars/vans under 3.5 tonnes) based in England, as well as all public sector organisations in England.

Road tax savings

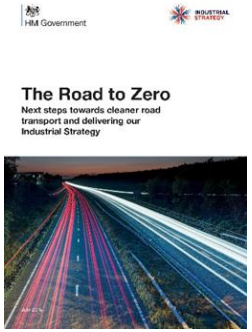
Fully electric cars costing up to £40,000 are exempt from all road tax in the UK.

OLEV infrastructure grants

Detailed later in the document.

National policy and strategy

Outlines the approach the Government will take to reduce all sources of pollution, not just road transport pollution, leading to a healthier country.

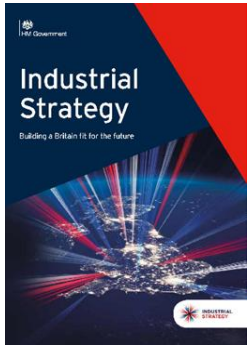


Aims to cement the UK as a leader in the design and manufacturing of EVs. States that all new cars and vans to be zero emission by 2040, and almost every car to be zero emission by 2050.

The target for ending the sale of new diesel and electric was bought forward to 2035 at the COP26; and expanded to include hybrid cars and vans. Recent announcements from government hint that this could be brought further forward.

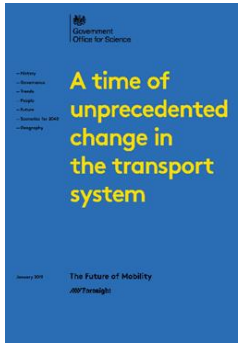
The NO_2 plan outlines the government's plan to bring NO_2 air pollution within its statutory limits in the shortest possible time.

It also outlines the aims and funding that the Government have committed to.



Sets out Grand Challenges to put the UK at the forefront of the industries of the future, including clean growth and the future of mobility.

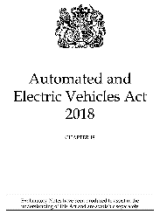
This puts emphasis on cleaner economic growth from low carbon technologies and focusing on the UK's road network to dramatically reduce carbon emissions.



Details new opportunities and the implications of current travel trends across the whole transport system leading up to 2040, building four plausible future scenarios to help guide mobility decisions.

The Future of Mobility: Urban Strategy sets out the governments approach to to maximising the benefits from transport innovation in cities and towns.

Legislation



The Act will enable consumers to benefit from improvements in transport technology.

The act will make provision for the creation of regulations relating to the installation and operation of charging points for electric vehicles.

Office for Low Emission Vehicles (OLEV) have consulted on changes to Building Regulations to ensure every new home and new non-residential development with over 10 spaces has a charge point.

Proposals are fir all spaces at new homes to have a charge point and for at least one active charging point in existing non-residential buildings from 2025.

LOCAL POLICY CONTEXT

Local Authorities have a role to play in helping EVs to overcome these barriers, and in turn achieving their own objectives for improving local air quality and reducing greenhouse gas emissions. Local Authorities have a variety of mechanisms for influencing EV uptake; as custodians of the local road network, the authors of policy, as planning authorities, land owners, fleet operators, asset managers, major local investors and influencers in their own right. The charging ecosystem is still evolving, with a range of charging technologies, formats and business models emerging. Their suitability for a user or area is subject to a wide range of factors, including:

- Population demographics and density;
- Land uses;
- Commuting patterns;
- The existing charging network;
- Availability of off-street parking; and
- Planned development.

As such the local context is often key in shaping this charging ecosystem, and typically requires intervention from the public sector to secure access to local authority managed roads and parking.

Somerset's Climate Emergency Strategy (2020)

The Strategy is Somerset's response to the Climate Emergency. Led by Somerset's five Local Authorities, the strategy serves as:

1. An evidence base, setting out how our climate is changing and the challenges and opportunities we face
2. A policy document, outlining goals and ambitions for tackling Climate Change in Somerset
3. A high level action plan, setting out the critical actions needed

Four transport sector outcomes are set by the Strategy, comprising:

1. Change in Vehicle Types: By 2030, carbon emissions generated on Somerset's roads are reduced through the change to electric vehicles, ultra-low emission commercial vehicles and an overall reduction in road use.
2. Behaviour Change: By 2030, carbon emissions from transport are reduced by encouraging and facilitating behaviour change, including reducing single occupancy vehicle journeys, increased public transport use, combining trips, and increased walking and cycling.
3. Adaptation Planning: To build and maintain the resilience of Somerset's transport infrastructure.
4. Spatial Planning: Reducing the need for car travel through improved spatial planning, public transport options/availability and public service delivery

The Strategy notes that barriers and challenges to delivering these outcomes include: funding and capacity to deliver; lack of national standards for electric vehicle infrastructure; and, cost of electric vehicles preventing wider adoption.

Somerset County Council

Key Somerset County Council policies relating to EV charging are set out below. Overall, local policy is already supportive of EVs, with several policies including specific requirements to support the role-out of EVs. However, this could be strengthened in some areas, as set out in the recommendations in section 8.

Future Transport Plan 2011-2026 (2011), Somerset County Council

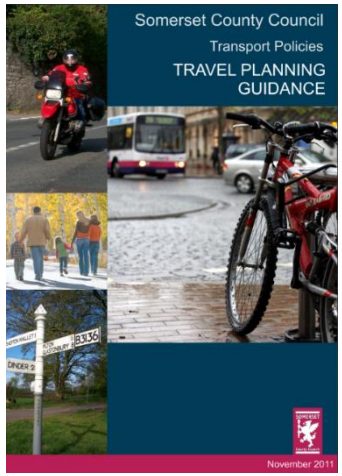
- SCC will consider how EVs, responsibly sourced biofuels, and other new technologies could help us meet our goals and challenges.

Parking Strategy (2013), Somerset County Council

- Developers will be encouraged to install electric charging points in new developments. (Policy PM2.4)
- Residential standards have been developed to ensure charge point provision is sufficient to meet the needs of both current and future occupiers including 16 amp charging points, or any future standardised equipment, for electric cars, (Policy PP2)
- Offer preferential parking spaces for disabled parkers and car sharers and/or EVs where appropriate. (Policy PP 3.3)
- Electric car charging facilities for on-street parking spaces will be encouraged. (Policy PM7.4)

Travel Planning Guidance (2011), Somerset County Council

- Developers must provide a proportion of car parking spaces (to be agreed on a case by case basis) in employment sites for dedicated uses such as car sharing and low carbon vehicles with EV charging points. (Policy TPG-TVS10)



Towards a Delivery Plan for Tourism in Somerset 2015-2020 (2015), Somerset County Council

- The delivery plan for tourism states that the ceremonial county of Somerset (i.e. including North Somerset) receives approximately 25.63 million day and staying visits per year, spending approximately £1.28 billion, supporting around 26,000 full time job equivalents
- Somerset's main assets are its attractive rural countryside and coastline (including seaside towns of Minehead and Burnham-on-Sea), together with a wide distribution of attractions and heritage sites (such as Glastonbury and Wells).
- There are some 184 visitor attractions, a number of which are quite sizeable such as the world renowned Cheddar Gorge and Caves. Around 30 sites in the County of Somerset receive over 50,000 visitors per year.
- Whilst the plan does not explicitly mention EV, the Delivery Plan aspires to promote the provision and use of public transport and other forms of sustainable travel. The plan notes that the current level of visit arrivals by car in Somerset (80%) is higher than the average for other destinations benchmarked through visitor surveys.

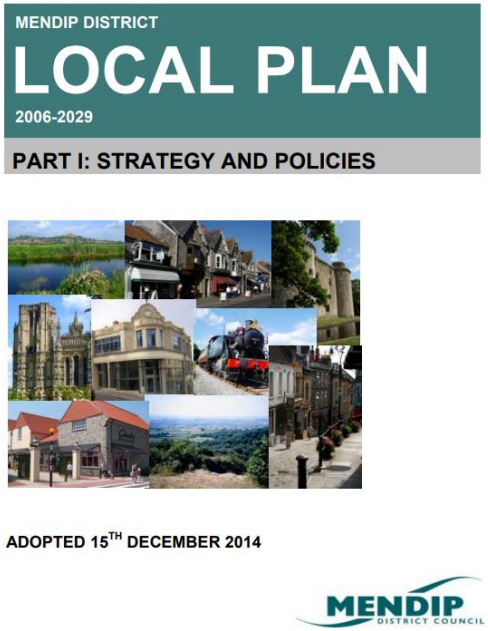
It should be noted that the policies described above are beginning to age and are due to be refreshed.

District Council and National Park Authority Policy

Key local authority policies relating to EV charging are detailed below.

Mendip District Council

- The Mendip District Council **Local Plan** (2014) does not make explicit reference to either EVs or de-carbonising transport.
- The Mendip District Council **Climate Emergency** (2020) document acknowledges MDC as one of 265 councils to have declared a 'Climate Emergency' and acknowledges commitment made to make best endeavours to enable the district to be carbon neutral by 2030. The document states that the transport sector accounts for 34% of Mendips carbon footprint and identifies that the number of ULEVs in Mendip stands at approximately 250 in 2018 (0.3% of all registered cars in the district.)
- The **Climate Emergency Plan** (2020) aims to supports and enable the transition to zero emission transport in the district.
- A **report to cabinet** recommends authority is delegated to allow the Group Manager and Portfolio Holder for Neighbourhood Services to undertake a procurement exercise seeking suppliers willing to apply EV charging infrastructure (for no more than 4 EV units across the district) at no cost to the council, focusing on areas where EV facilities are not in high concentration. The report recommends that above noted procurement will take account of the risks associated with exclusivity and agree a maximum exclusivity period of 5 years. This option would be considered to be in line with the Climate Change & Ecological Emergency Group (CEEG) action plan and as such would evidence to the public that the Council is looking to meet its noted commitment.
- The **electric vehicle infrastructure specification** states, in brief, that the supplier must:
  - Deliver all infrastructure associated with charging EVs at no onward cost to the council in support of the infrastructure.
  - Ensure that they can deliver a range of charging options to manage the needs of the district residents both now and in the future.
  - The supplier must ensure that there is both a robust annual and a robust reactive maintenance plan in place.
  - The council will explore all options associated with exclusivity (if required) arrangements for any land in its ownership including car park.

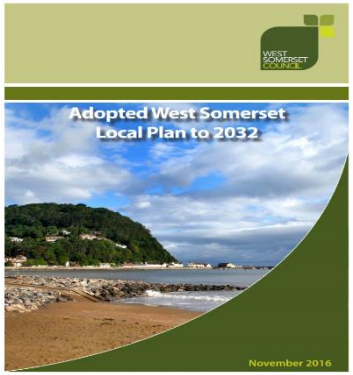


South Somerset District Council

- Policy TA1 of the **South Somerset Local Plan** (2015) states that all new residential / employment developments should provide for the charging of EVs with an external charging point of at least 16 amps.
- Policy YV5 states that car parking management at the Yeovil Sustainable Urban Extensions should give priority to EVs, low emission and shared vehicles and non-car modes to discourage car use for these short journeys. It should be noted that the Local Plan is currently under review. The Local Plan Preferred Options Consultation report indicates that the above policy approach is likely to be taken forward, although may evolve as new evidence emerges.

- The **SSDC Charging Point Locations & Specifications** (2019) report show that 23 locations have been identified as capable of delivering a grand total of 48 charging points subject to connection viability. These locations are aimed at covering numerous journey purposes in the largest towns in South Somerset (Yeovil, Chard, Crewkerne, Wincanton, Ilminster and South Petherton).
- The specification states that the EV charging point provider should deliver approximately 40 units across 20 sites by 2021, providing a range of charging options including ultra-fast charging vehicle grid charging for both alternate and AC/DC. The supplier is to own, maintain, operate and upgrade all network assets and take on all responsibility dealing with DNO's on grid access.
- The **SSDC Environment Strategy** (October 2019) commits SSDC to reduce their carbon emissions by 80% by 2030. SSDC aim to reduce their reliance on fossil fuels, reduce emissions, minimise waste and increase recycling and offset any residual carbon emissions.

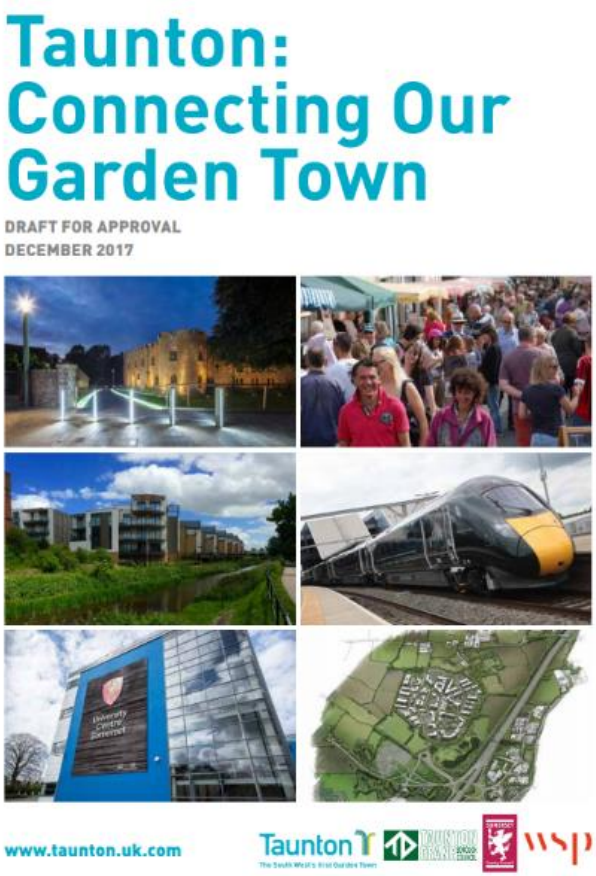
Somerset West and Taunton District Council – Former Districts Local Plans



- Policy CP6 of **Taunton Deane Borough Council's Core Strategy** (2012) mentions that transport policy should help to mitigate climate change; but does not explicitly refer to EVs.
- Policy A2 sets requirements around travel planning, which may result in the need for charge points, but this is not explicitly required.
- Policy TR1 of **West Somerset District Council's Local Plan** (2016) sets requirements around travel planning, which may result in the need for charge points, but this is not explicitly required.
- SWT is now in the process of merging and renewing the former districts Local Plans. An Issues & Options Document consulted on in Spring 2020 gives clear direction of intent with regards to EVs and climate related policy more generally.
- Additional policy approach 1C/2 references the need to future proof new developments including the requirement to provide for EV charging in all new residential parking spaces.
- Additional policy approach 1C/4 references the need to support community de-centralised renewable energy schemes and micro-generation.

Somerset West and Taunton District Council – Emerging Plans for New District Council

- SWT is also in the process of developing a **Taunton Transport Strategy** to update and improve upon the **Connecting Our Garden Town** (2017) document.
- The **Garden Town Vision** (2019) document mentions the need to provide '*ample electric vehicle charging points in public places*,' the need to '*de-carbonise transport and proliferate electric vehicles'* and to provide '*charging points for electric vehicles in new neighbourhoods*.'
- SWT's emerging **Carbon Neutrality and Climate Resilience Plan** will sit underneath the emerging Somerset Climate Emergency Strategy.
- A Framework CNCR Plan was consulted on in January 2020, clearly identifying the important role that EVs are likely to play in meeting our targets. The emerging "final" Action Plan will have a focus on Year One action and identification of broad Year 2+ route maps for key issues including EVs.



Somerset West and Taunton District Council – Electric Vehicle Projects

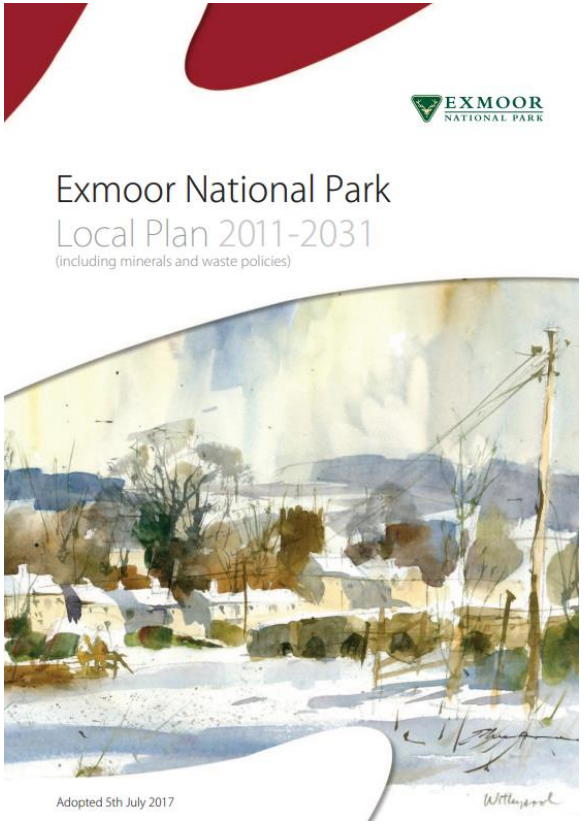
- SWT is currently administering a £20k **Community Charge Point Fund** (2020) which has been available for town and parish councils to apply to for grant funding to support installation of community charge points around the district. So far SWT have approved 4 schemes, 2 of which have been installed and gone live (Luxborough and Brushford). Some have now already been installed (e.g. Brushford).
- SWT has been chosen as the "Host Authority" for WPD's Electricity Network Innovation Competition winning DC Share project. This project will provide an opportunity to explore the utilisation of latent capacity in distribution networks and how distribution networks will provide rapid charging facilities at scale and in the locations where they are needed.
- SWT are working with the local transport authority (SCC) to identify ways to put the Taunton Park and Ride Service on an economically and environmentally sustainable footing. The strategic location of the Gateway P&R site in particular, as well as the potential for decarbonising the bus fleet, may present an opportunity for development of a fast charging hub that could help support the economic viability of the service.
- SWT has been approached by multiple charge point providers offering their various business models to install charge points on Council assets and share the profits. In response, the Council is in the process of exploring options and opportunities with regards to its car parks.

Sedgemoor District Council

- EVs are not mentioned explicitly in the **Local Plan**. Policy S5 of the Local Plan states that developments should contribute to mitigating and adapting to climate change and reduce carbon emissions.
- Other planning policy documents produced by SDC were investigated for references to EVs and associated infrastructure. Section 1.27 of the **Sedgemoor 2050 Transport Investment Strategy Report** states that the District Council will require the promoting of sustainable transport measures through planning policies and guidelines for developers, including EV charging points.
- Policy EV1 states that Sedgemoor will support the transition to cleaner fuels through the provision of EV charging infrastructure and by encouraging developers to provide fast charging infrastructure for all forms of electric transport in domestic, commercial and public areas throughout Sedgemoor.

Exmoor National Park Authority

- Policy AC-S1 of the **Local Plan** states the National Park Authority will encourage sustainable modes of transport. Section 9.3 & Policy AC-D1 of the Local Plan states that the National Park Authority will encourage the provision of electric charging points in new developments where these are in keeping with local character (para 9.10 Local Plan p256)
- Policy AC-S2 states the street furniture should be constructed such that the beauty of the National Park is conserved/enhanced, using materials and finishes that are appropriate to the character of the National Park.
- Policy AC-D6 (Fixed Line Transmission Infrastructure) states that any development proposals that require electricity or telecommunication service lines will be expected to provide underground routing subject to policies CE-S1 Landscape and Seascape Character, CE-S3 Biodiversity and Green Infrastructure and CE-S4 Cultural Heritage and Historic Environment.



DNO POLICY CONTEXT

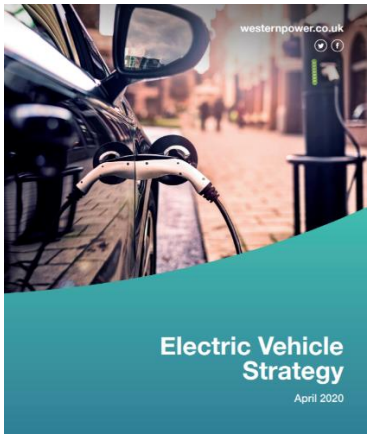
Scottish and Southern Energy Networks released an Electric Vehicle Strategy in March 2020 outlining their commitments to help the rollout of EVs with the overarching aim of decarbonising transport.

SSEN have committed to:

- Cut carbon intensity of electricity generated by 50% by 2030, compared to 2018 levels.
- Help accommodate 10million EVs in Great Britain by 2030
- Treble renewable energy output (to 30trillion Watts a year)
- SSEN will release these goals by the following principles:
- Using data and analytics to anticipate issues, support decision making and make sure our networks are ready for EV uptake
- Having a suite of tools (including self-connection tests, tourism hotspot analysis and offering active network management) available to support widespread EV uptake
- Using Local Development Plans inform and establish strategic investment programmes
- Using innovation, digitalisation, new skill sets and operational capabilities to meet the forecast growth
- Supporting stakeholder and customer ambitions to decarbonise

Western Power Distribution released an Electric Vehicle Strategy in April 2020. As part of the strategy WPD have committed to the following commitments:

- Releasing existing network capacity – The existing network includes a finite amount of spare capacity to accommodate charging infrastructure. WPD have developed a heatmap of capacity at each local distribution transformer (as detailed for the study area in Section 5).
- Motorway services and major road filing stations – WPD have developed a NIA project to help fulfil the governments targets regarding major charging hubs at large fuel retailers.
- New and existing homes – WPD continue to evolve their practices to accommodate charging at new homes and to improve the methodology of retro-fitting capacity improvements to old homes
- On-Street Charging - To prepare the infrastructure required for charging WPD are expecting to provide bespoke street lighting mains cable in new streets.
- WPD are trialling emerging forms of charging including vehicle to grid, smart charging, and EV clustering.



4 MARKET REVIEW

INTRODUCTION

This section reviews market trends in relation to EVs, off-street and on-street charge point technology, upcoming developments, delivery approaches, and case studies setting out progress in neighbouring authorities and best practice in the UK and internationally.

VEHICLES

Electric vehicles

The registration of EVs is increasing year on year, with more makes and models coming to the market, costs decreasing, and range increasing. In the next few years it is expected we will reach the tipping point where a battery costing under $100 (£78) per kilowatt hour will be developed. When this happens, the purchase price of EVs is expected to reach parity with, and then become cheaper, than the equivalent petrol or diesel vehicles, and uptake of EVs will increase dramatically. A second-hand EV market is already emerging, making the vehicles affordable for more people.

Declining battery costs and larger batteries are improving vehicle ranges and can also enable faster charging. Table 3 shows numerous vehicles with a range of over 300 miles, with 400-500 mile range vehicles expected to be announced soon. Longevity of batteries is also increasing, with most car batteries currently offering warranties for 60,000-150,000 miles. Contemporary Amperex Technology (CATL), a company that supplies many auto manufacturers, has recently claimed to have developed a battery that will last over a million miles.

In the UK, Government incentives include the plug-in vehicle grant, recent changes to the company car tax treatment of EVs, and the upcoming ban on petrol and diesel new cars sales currently planned for 2035, which are all likely to further boost uptake in the short term. The number of EVs in the UK is still small, comprising less than 1% of the total car fleet and approximately 6% of new car sales in 2020. As the average car in the UK remains in use for around 13 years after purchase, there is a need to rapidly increase the uptake of EVs to meet all Somerset Councils carbon neutrality target for 2030.

Other emerging low carbon vehicle technologies

Whilst EVs could be considered the most well established emerging technology, it should be noted that there are other emerging fuels with the capability of decarbonising transport.

Hydrogen fuel cell powered vehicles emits pure water at the tailpipe and take the same amount of time to fill the tank as it would a petrol or diesel car and have a similar range. However, one of the main reasons why hydrogen fuel vehicles have not yet established a strong market is that (at present) the cost of vehicles is prohibitively expensive and public fuelling infrastructure is very sparse. The indicative fuel cost of travelling 100km (62.5 miles) by each 'fuel' type for a standard car is shown below; on the basis of a study done by AutoTrader in 2018.

Table 2 Fuel costs to travel 100km by fuel type

Fuel Type	Fuel Cost	Cost per kw/ kg / litre	Fuel efficiency assumptions
Hydrogen	£11.40	£12 per kg	0.95kg per 100km
Electricity	£2.28	16 pence per kilowatt (approximate household rate) *Note: charging is free at some charge points or can raise to around 40 pence for rapid charge points.*	14.3 kWh per 100km
Petrol	£7.11	£1.27 a litre	5.6 litres per 100km
Diesel	£5.81	£1.32 a litre	4.4 litres per 100km

At present there are only 13 re-fuelling stations offering hydrogen fuel in the UK.

It is expected that as the technology improves and economies of scale can be achieved that the price of hydrogen fuel could decrease by as much as 70%; although this would still mean that electricity used to power EVs is cheaper per kilometre. The vast majority of hydrogen fuel is currently converted from natural gas, which has associated carbon emissions. In future commercial production of hydrogen via electrolysis from clean electricity sources offers the potential for zero carbon fuel.

There are other renewable forms of fuel (collectively referred to as biofuels including biogas). The supply of biofuels is measured annually as required under the Renewable Transport Fuel Obligation (RTFO). Figures for each reporting year are updated and published quarterly and revised several times until final.

In 2019, Renewable fuels made up approximately 5.1% of total road and nonroad mobile machinery fuel used. These fuels were commonly biodiesel (mainly made from used cooking oil) and bioethanol (mainly derived from feedstocks such as corn). Verified renewable fuels achieved an average greenhouse gas saving of 82% compared to the use of vehicles powered by petrol. It should be noted that biofuels do little to improve local air quality as nitrous oxide is still emitted in similar quantities per kilometre. This, combined with land-use impacts primarily in developing countries, is likely to inhibit the growth of the market going forward.

Cars

As of July 2020, there are over 130 models for sale in the UK, and it is expected that many more will be released over the coming year. There are models available at nearly all price points, ranging from the Renault Twizy at £7,000 to electric supercars such as the Rimac C Two at almost £2 million.

Most electric car manufacturers are now focusing on BEV production in the medium term, shifting away from petrol and diesel, and also from PHEV cars which are being made redundant by increasing battery range. Table 3 shows a selection of ULEVs established on the UK market in the 2020s.

Table 3 Selected recently released and upcoming EVs

Make	Model	Release date	Indicative price*	Type	Battery size (kWh)	Zero Emission Range (miles)	Slow (3.7kWh) charging time (hrs)	Fast (7Wh) charging time (hrs)	Rapid (50kWh) charging time (hrs)	Government Grant Eligibility
Audi	e-tron GT	2021	£100,000	BEV	90	255	24.5	13.0	1.8	No
Audi	Q4 e-tron	2020	£47,000	BEV	82	260	22.0	11.5	1.6	No
DS (Citroen)	Crossback E-Tense	Jan-20	£32,350	BEV	50	199	13.5	7.0	1.0	Yes
Kia	Soul EV 39 kWh	2020	£28,000	BEV	39	172	10.5	5.5	0.8	Yes
Nissan	Leaf mk2	2018	£22,000	BEV	40	235	11.0	5.5	0.8	Yes
Mini	Electric	Mar-20	£24,400	BEV	30	144	8.0	4.5	0.6	Yes
Peugeot	e-2008 SUV	2020	£30,000	BEV	50	170	13.5	7.0	1.0	Yes
Peugeot	e-208	2020	£26,500	BEV	50	211	13.5	7.0	1.0	Yes
Polestar	2	Mar-20	£49,000	BEV	78	311	21.0	11.0	1.6	Yes
Porsche	Taycan	2020	£120,000	BEV	96	245	26.0	13.5	1.9	No
Renault	Zoe	2020	£28,800	BEV	52	245	14.0	7.5	1.0	Yes
Seat	Mii Electric	Feb-20	£16,000	BEV	37	162	10.0	5.5	0.7	Yes
Skoda	CITIGOe iV	Jan-20	£16,000	BEV	37	165	10.0	5.5	0.7	Yes
Skoda	Vision iV	2020	£30,000	BEV	83	310	22.5	12.0	1.7	Yes
Tesla	Semi	TBC	£135,000	BEV	1000	600	270.5	143.0	20.0	Yes
Tesla	Roadster	2020	£170,000	BEV	200	620	54.0	28.5	4.0	No
Tesla	Model 3	2019	£40,500	BEV	50	250	13.5	7.0	1.0	Yes
Tesla	Model Y (Long Range)	2021	£47,000	BEV	75	336	20.5	10.5	1.5	Yes
Vauxhall	Corsa-e	2020	£26,490	BEV	50	211	13.5	7.0	1.0	Yes
Volvo	XC40 Electric	2020	£49,000	BEV	75	245	20.5	10.5	1.5	Yes
VW	ID.3 Long Range	2020	£37,000	BEV	82	295	22.0	11.5	1.6	Yes

Taxis

Electric Hackney Carriages, such as the London Electric Vehicle Company TX and the Nissan Dynamo, can now cost less than petrol and diesel equivalents once running costs, maintenance, and other costs are considered. Table 5 below is based on data from The Low Emission Taxi Guide (LowCVP 2018), and compares the total running costs of BEV, PHEV, and ICE taxis, assuming 30,000 miles driven per year over four years.

Table 5 Selected recently released and upcoming EVs

	Nissan Leaf Acenta 40kW 	Hyundai Ioniq 1.6h GDi Premium PHEV 	Skoda Octavia 1.6 TDi S 	LEVC TX 	LTI/LTC TX4 
Fuel Type	BEV	PHEV	ICE	PHEV	ICE
Fuel cost (4 years)	£5,020	£10,380	£11,744	£10,852	£24,376
VED cost (4 years)	£0	£390	£585	£390	£3,110
Vehicle price (OTR)	£25,190	£25,345	£19,810	£55,599	£45,955
Total (4 years)	**£30,210**	**£36,115**	**£32,139**	**£66,841**	**£73,441**

Taxi licencing is the remit of local authorities, meaning there are around 350 taxi licencing authorities in the country. There are currently no national minimum standards and licensing authorities may develop their own policies.

Private Hire Vehicles may be licensed anywhere and operate anywhere providing the driver, vehicle and operator are licensed by the same licensing authority. Hackney Carriages must do more than half of their business within the licencing authority. Coordination is needed at the national level to develop a joined up national strategy for taxi licencing to promote electric taxis.

Current taxi licencing policy in Somerset requires all licensed hackney carriages to be wheelchair accessible. Several authorities have a minimum requirement for a minimum 1250cc engine, which could currently exclude the use of EVs.

Vans

There are several electric vans already available, such as the Renault Kangoo ZE. Electric vans are currently marketed as a “last mile” delivery option, and while purchase costs are still high, this is offset by lower running costs. The number of larger electric vans available is set to increase substantially over the next few years with Citroen, Ford, Man, Mercedes and Volkswagen among those launching new models soon. The Arrival electric van has secured a £340 million order for UPS for 10,000 vehicles.

Business users benefit from favourable tax rates for electric vans, including up to £8,000 off list price from the Government Plug-in Van Grant.

Heavy Goods Vehicles

For Heavy Goods Vehicles there are a number of emerging technologies, with a range of options in early stages of development and deployment.

Tesla are planning to release an all-electric Heavy Goods Vehicle (HGV) in 2020, which the company claim will have a 600-mile range when fully loaded with 36 tonnes of cargo. New high speed “Mega chargers” will allow the trucks to add about 400 miles in 30 minutes. However, the 44 tonne weight limit in the UK means the weight of batteries required is likely to be a significant barrier, reducing the available storage capacity per vehicle.

In Germany, trials are underway to test overhead lines on strategic roads so that HGVs can charge on-route and allow for smaller battery sizes and increased loads. The Centre for Sustainable Road Freight has suggested that a UK equivalent would cost £19.3 billion and could recap that cost in 15 years through electricity sales.

Hydrogen fuelled HGVs could potentially offer increased range, maintain load capacities, and minimise time spent re-fuelling. Compared to diesel powered HGV overall maintenance costs are cheaper (as they are for electric trucks) because there are fewer moving parts. The disadvantage of hydrogen powered

HGVs is that, at present and as recapped in Table 2, the fuel cost is prohibitively expensive. As the cost and sustainability of hydrogen fuel improves it is thought it will play a substantive role in the HGV fleet going forward. Hyundai are currently trialling hydrogen fuel cell powered HGV's in Switzerland; delivering 1,600 trucks between 2020 and 2025.

Buses

Electric buses are already operating on the roads of London and other areas of the UK, with electric buses operator and/or manufactured by companies such as Optare, Wrightbus, Volvo and Irizar. In 2020, local authorities were invited to apply to become the UK's first all-electric bus town, which will be awarded up to £50m funding to convert its entire bus fleet to electric. The Confederation of Passenger Transport, which represents most bus operators in the UK including the big five firms (Arriva, FirstGroup, Go Ahead, National Express and Stagecoach), has pledged to buy only ultra-low or zero emission buses from 2025 onwards for markets in the UK.

In Bristol, First have two hybrid electric buses operating with GPS technology enabled such that the buses run on electric only mode in areas of low air quality. These buses charge at a wireless induction plate installed at UWE's Frenchay Campus. Additional biomethane powered busses have been introduced on routes across Bristol in 2020 after the implementation of such buses on the Number 2 bus route in the city.

In Somerset, it is anticipated that bus vehicle charging would initially be undertaken by the bus operators at their depots at charge points they own and maintain. This option is thought to be the less costly and would allow overnight charging. However, other options including terminal/layover charging, hydrogen fuel and bio-gas fuel solutions that can be zero carbon (also trialled in Bristol) may also warrant consideration.

E-bikes and micro-mobility

E-bikes are growing in popularity and can help achieve carbon neutral transport goals, making it easier for people to switch to cycling and increasing the distances it is possible to cycle. In 2019, Co-bikes launched the UK's first on-street electric bicycle hire scheme in Exeter, with plans to expand to new sites across the city including at additional rail stations, new housing developments and key employment hubs. E-bikes charge from a normal 3-pin socket and have minimal charging infrastructure requirements. Many e-bikes are equipped with a 36V battery, taking approximately 4 hours to fully charge with a 3-pin socket.

Privately owned e-scooters are currently illegal on public roads in Great Britain as they do not comply with a number of legal requirements. As of 4th July 2020, rental e-scooter are legal on public roads subject to some strict conditions. Some local authorities have received government backing to trial schemes for a 12 month period, with TROs changed by the highways authority for designated trial areas only for scooters provided by an e-scooter rental provider only and not for private owners. Trial areas include Taunton, Yeovil, Milton Keynes, Greater Norwich, and Gloucestershire. The government is currently reviewing the regulations as part of its Future Transport Programme. As with e-bikes, domestic e-scooters are charged through a standard 3-pin socket. However docked, rental versions may have proprietary solutions.

E-motorcycles and e-mopeds are also coming to the market, with existing manufacturers including BMW, and models from Harley-Davidson and Ducatti expected in the early 2020s. E-motorcycles currently represent less than 0.2% of all registered motorcycles in the UK and may remain a niche vehicle type for some time to come.

OFF-STREET CHARGE POINTS

The range of charging solutions for EVs is evolving rapidly and reflects the ongoing technological developments and increasing investment in this market. The suitability of a particular charging technology is dependent on a wide range of factors, including the use case of the individual, their vehicle type, the type of location and the available power supply. The table below provides a summary of the key charge point types currently available.

Most EVs are supplied with two cables for slow and fast AC charging; one with a three-pin plug and the other with a Type 2 connector charger-side, and both fitted with a compatible connector for the car's inlet port. These cables enable an EV to connect to most untethered charge points, while use of tethered units require using the cable with the correct connector type for the vehicle.

Table 6 Off-Street Charge Point Types

Picture	Charge Point Types	Power Output	Supply Type	Socket / Plugs	Connector types	Typical Charge Rates (per KWh)	Typical use-case
	Domestic Socket	2.4 kW	AC	Type 1/2	Type 1  Type 2  CHAdeMO  CCS 	<u>Typical domestic rates</u> ~14p flat tariff ~5p off peak Can be paid to charge if linked to feed-in-tariff renewables or using time of use tariffs <u>Typical commercial charge point rates</u> ~20-30p Free at some sites Some sites include parking charges	Not recommended (for occasional use by visitors or a back-up)
	Slow	3.7 kW	AC	Type 1/2			Home
	Standard	7.4 kW	AC	Type 1/2			Home & Long stay destination
	Fast	11-22 kW	AC	Type 2			Short stay destination
	Rapid	43 kW	AC	Type 2		~Up to 50p	Short stay destination & On-route
		20-50 kW	DC	CHAdeMO / CCS			
	Ultra-rapid	100 kW+	DC	Type 2		~Up to 50p	

Key considerations

Installation costs

The costs of installing charge points are typically significantly lower for new builds as opposed to retrofits of existing sites, particularly where trenching would otherwise be required. Costs can be split in to charge point unit costs, grid connection costs, and ongoing operating and maintenance costs.

Typical unit costs for new build slow, standard, and fast charge points range from £1,000 to £5,000 with 7kW wall mounted chargers at the lower cost end, and 22kW dual ground mounted chargers at the higher end. Rapid chargers are significantly more expensive, typically between £15,000 and £25,000 for the unit itself. There are typically opportunities for cost reductions through negotiated deals with suppliers, often linked to wider commercial agreements, or through bulk-buying.

There can be significant variability in the grid connection costs, subject to the local conditions and available power supplies as shown in Figure 7. Where grid reinforcement is needed costs can quickly escalate, and in some cases a new substation is needed costing hundreds of thousands of pounds. In these cases, it is often advisable to find an alternative site. Due to the large power requirements, rapid chargers are most likely to require significant grid upgrades. Smart charging, load balancing, on-site generation and renewables and battery storage can all help to reduce grid connection costs.

Annual operating and maintenance costs will also vary by site and by size of network but are typically in the region of £200-£300 per annum per charge point.

Figure 8 Illustrative DNO costs and timescales (source: UK EVSE Making the right connections (2019))

Small	Medium	Large
(up to 70kVA)	(200kVA - 1,000kVA)	(above 1,000kVA)
Number of charge points		
1-3 Fast or 1 Rapid	10-50 Fast, 4-20 Rapid or 1-6 Ultra-Rapid	50+ Fast, 20+ Rapid or 6+ Ultra-Rapid
Approximate Connection Time		
8-12 Weeks	8-12 Weeks	6 Months +
Approximate Connection Cost		
£1,000 - £3,000	£4,500 - £75,000	£60,000 - £2 million
Other Consideration Affecting Cost		
- Street work costs	- Street work costs - Legal costs for easement and wayleaves	- Street work costs - Legal costs for easement and wayleaves - Planning Permission - Space for a Substation

Smart charging

All charge points deployed in the UK must now be capable of smart charging in order to access grant funding. Smart chargers enable active communications between the charging point and the car (so called Mode 3 charging), which requires suitable mobile network coverage in the area in order for these chargers to be implemented. This communication includes information on the available charge rates, the ability for the car to instruct the charging point to turn off the power when the car is fully charged and can enable faster charging. Crucially, smart chargers can also enable charge scheduling, so for example, users can benefit from lower electricity prices by charging overnight and provide usage reports. From a wider grid balancing perspective. It will also be possible to control groups of chargers to manage demand in peak periods. They also enable remote diagnostics, and remote resolution of technical faults by the back-office support team. Much like a smart phone, their connectivity means they are able to receive "over the air" (OTA) updates to software, to ensure they are kept up to date, and can account for subtle differences in how new vehicles to market behave while charging or benefit from the rollout of software enhancements or new product features.

Scalability

Scalability is a key consideration in ensuring that beyond the initial tranche of charge points installed, additional points can be added later, in line with demand. If the first units that are installed are dumb sockets rather than smart chargers, and not able to optimise their use of the available electricity supply, this will significantly limit the number of additional charge points that can be added, before a costly upgrade will be required to the grid connection.

Load management & phase balancing

Load management is a critical function in supporting scalability. The charging station automatically divides the available power over the vehicles that are actively charging, potentially delaying the need for expensive grid upgrades. This maximises the number of vehicles that can charge simultaneously, while enabling faster charging when only a small number of vehicles are charging. Dynamic load managing of the power usage can reduce the load by around two-thirds relative to a static load managed installation. Phase balancing works in a similar way and the charge point is able to balance the load across a 3-phase electric supply, selecting the phase with the most space capacity.

Technical Standards

The Office for Low Emission Vehicles (OLEV) have produced minimum technical specifications for a range of charge points types including workplace and home charge points, and on-street charge points (unrestricted and access restricted to residential use).

Relevant British Standards include BS 61851 Electric vehicle conductive charging system and BS 62196 Plugs, socket-outlets, vehicle connectors and vehicle inlets. Installations should also be accordance with IET Wiring Regulations (BS 7671) and the recommendations of the IET Code of Practice for Electric Vehicle Charging Equipment Installations (as amended). For lamppost charge points, regulatory approval for working in the UK with unmetered supplies is also required.

Open Charge Point Protocol

The Open Charge Point Protocol (OCPP) is an application protocol for communication between EV charging stations and a central management system, also known as a charging station network, similar to cell phones and cell phone networks.

From 2019 the use of OCPP (or equivalent) is required for new chargepoints in the UK. The aim of OCPP is to improve the user interface of charging stations and increase interoperability between providers; avoiding a situation where an EV user has to have many different applications on a mobile device in order to use nearby charge points.

The latest version of OCCP (v2.0.1) integrates 1S0 15118, which allows for 'plug-and-go' charging (i.e. no additional user authorization needed in the form of an app) and enables co-ordination across projects using a small number of preferred suppliers / delivery partners.

Enforcement and Signage

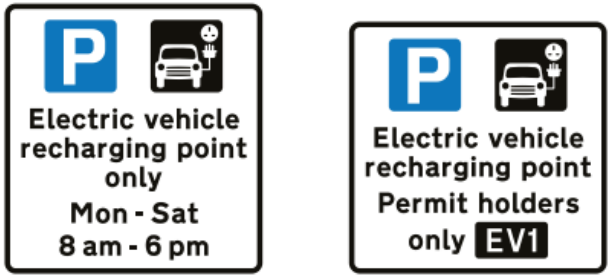
The Somerset Councils already have the enforcement powers necessary to enforce on-street and off-street EV charging bays under current legislation (Traffic Management Act), including contravention code 14 for on-street parking, and contravention code 71 for off-street parking. To enable enforcement, a relevant Traffic Regulation Order (TRO) must be put in place by the local authority.

For on-street parking, some local authorities have marked out dedicated EV Charging Bays, supported with an accompanying TRO to enable enforcement. However, the TRO process adds cost, uncertainty, and delay to the installation process, and a range of options to avoid the use of TROs could be considered, including clustering on-street charge points to help ensure that one is available when needed.

Relevant signage and bay marking for on-street EV bays is set out in Chapter 3 (Figure 13-44) of the Traffic Signs Manual. An on-street parking place may be reserved for EVs, with examples of the relevant signage shown below.

Some authorities including Bristol City Council are preparing bespoke design guidance for EV charging bays to promote best practice and ensure high quality design.

Figure 9 Examples of EVCP signs (source: Traffic Signs Manual Figure 13-44)



Upcoming developments

There are a number of upcoming developments for charge points, as more innovative solutions are sought to further encourage the uptake of EVs. These new charging innovations should be monitored but are not currently mainstream options.

Inductive charging

The wireless system uses the principle of electromagnetic induction. A magnetic field generated by an alternating current in a nearby secondary coil (the EV). The charging pads can be embedded within parking bays. Whilst inductive charging technologies have been around for a number of years, the issues have always been cost and efficiency. A lack of standardisation and interoperability means bespoke kit is required for each vehicle type which does not come as standard on vehicles. The market is however beginning to catch up with the technology in this area and in the medium term may begin to be more prevalent for off-street charging. In Bristol an inductive charging solution is used to serve the two hybrid-electric buses operating route 72 and the number 7 route in Milton Keynes charges close to its termini.

Mobile Charging

In 2018 BP invested in US-based manufacturer FreeWire Technologie, the founder of the Mobi mobile charger units. The units are pre-charged, then wheeled over to the vehicle in need of charging. Their models include a 15kW and 50kW DC model. The most likely application for these units are as part of a concierge service and in workplaces.

Vehicle to Grid (V2G)

V2G enables certain EVs to feed electricity back into a home, workplace, or grid, when demand is at its highest, before then charging at off-peak times during the day or night. In effect, using an EV as a portable energy storage system, enabling the user to generate revenues when cars are parked (the majority of the time). Energy company EDF offers V2G revenue to participating businesses and is aiming to roll this out to residential customers soon. However, EV owners will need to consider the higher price of a V2G charger, and current uncertainty amount impacts on battery life that several trials are exploring further. The wider application and benefits of the technology are currently being explored in several UK trials, with National Grid suggesting just 2% of EVs will provide V2G services by 2030.

Battery Swap

A number of companies, including NIO in China, are exploring battery swap technologies ecosystems. This is because, in part, because as EV ranges increase and batteries get larger, ultra-rapid charging becomes more challenging.

Left: A drive through battery swapping facility
Right: Mobile charging unit to allow for charging away from a chargepoint

Co-location with battery storage and renewable generation

The current indiciative cost of installing a 50kW rapid charge point is highly dependent on the connection costs which may include grid upgrades. High grid upgrade costs are likely to become an even greater issue as more charge points are added per site, and with higher power capacities. Installing batteries at the rapid charging sites is a method of avoiding these costly grid upgrades.

The batteries act as a buffer, charging at a low rate during off-peak times or when on-site renewable generation is available, and then discharging to support the grid connection when demand exceeds the site's capacity limit. This enables the charging site to access low cost electricity, while the revenues could also be supplemented through using the batteries to provide grid services.

Through the DC Share project in Taunton and a project at Exeter Services, Western Power Distribution are exploring alternative ways to minimise grid connection costs associated with rapid charge points.

ON-STREET CHARGE POINTS

As with off-street charging, the range of on-street charging solutions for EVs is evolving rapidly and reflects the ongoing technological developments and increasing investment in this market. The table below provides a summary of the key charge point types currently available.

Table 7 Established On-Street Charge Point Options

Picture	Charge Point Types	Power Output	Typical Charging Duration (40 kw battery)	Typical Installation Costs	Access type	Commercial Maturity	Advantages / Disadvantages
	Conventional freestanding public charger	3.5 – 22 KW	2 –11 Hours	Approximately £10,000 (incl. unit, civils and electricity connection)	Public	Established	▪ Familiar charging method for existing ULEV owners ▪ Relatively easy to install and upgrade ▪ Can support fast and rapid charging speeds ▪ Additional street clutter that may negatively impact pedestrians ▪ Needs to be cited such that wires are as unobtrusive as possible ▪ Previous case studies have highlighted issues with vandalism
	Lamppost	3.5 – 5.5 KW	11 Hours	Approximately £2,000 for retro-fitting (incl. unit, civils and electricity connection; with no capacity constraints)	Public	Established	▪ Cost effective to install, although may require upgrades to street lighting cables ▪ Makes use of asset which is already installed and maintained ▪ Little additional space requirements ▪ A small accompanying charging bollard can be used for lampposts at the rear of the footway to avoid trailing wires ▪ Limited number of lampposts limits the total number of charge points ▪ Less flexibility when installing to suit existing parking situations

Table 8 Emerging On-Street Charge Point Options

Picture	Charge Point Types	Power Output	Typical Charging Duration (40 kw battery)	Typical Installation Costs	Access type	Commercial Maturity	Advantages / Disadvantages
	Emerging solutions including "Connected Kerb" and Pop-up chargers	7 KW	6 Hours	Not available	Public	Not established	▪ Potentially overcomes street clutter issues associated with other on-street options, particularly for historic and sensitive locations or locations where mobility could otherwise be impaired by conventional chargers ▪ Can be used to monitor local real time traffic and air quality data ▪ Not established in the market and technology still at trial stage ▪ Concern over trip hazard and equity of access for elderly / infirmed for some technologies
	Cable cover from residential charge point	3.5 – 7kW	6- 11 hours	Starting £300 for unit and cable cover	Private	Improvised solution	▪ Could be installed by residents ▪ Enables access to lower domestic energy prices, reducing vehicle running costs ▪ Concerns over street access for pedestrians if these are commonplace They can constitute a trip hazard and cause issues for wheelchair users, pushchairs and other groups ▪ Risk of public indemnity to resident and local authority ▪ Requires a guaranteed parking space outside of property for regular use
	Covered duct/cable channel from residential charge point	3.5 – 7kW	6-11 hours	Approximate £1,800 (incl. unit and civils)	Private	Improvised solution	▪ Similar to the cable cover option above, however, this option creates a more even footway, reducing issues for wheelchair users, pushchairs and other groups ▪ Risk of public indemnity to resident and local authority

Case study: Oxford on-street charging trials

Between 2017 - 2019 Oxford City Council and Oxfordshire County Council trialled five on-street electric vehicle charging technologies across 28 locations on public streets via OLEV funding.

Oxford City Council developed a bespoke concessions framework that considers the relatively lower income generated by on-street chargepoints. The Council will retain ownership of the chargepoints, which are leased to a commercial operator for four year periods. All units are Open Charge Point Protocol (OCCP) compliant, ensuring they are compatible with a single back-office system provider. The following on-street options were trialled:

- 29 lamppost chargers on 11 streets. No dedicated bays were allocated.
- Three types of bollard charger
- Home charger
- Co-wheels electric car club vehicle, with a dedicated bay.

Key findings from the trial were:

- **Lamppost chargers performed best**. They are a low cost solution which proved popular amongst users, being reliable and easy to use. Even when sited away from the kerb, the existing electricity supply can be directed through a paired small bollard or cable channel. Promotional signage should be deployed to boost usage and promote uptake.
- **Privately funded home chargers and cable channels should be encouraged with clear guidance for installation.** There were no reports of trips or accidents associated with trailing cables.
- **The business case for installing on-street charging bollards in residential areas considered in not currently attractive.** The requirement for new electric grid connections, dedicated parking bays, make the cost of installation high when compared with lamppost conversions or home chargers. Over the course of the trial the free-standing bollard chargers were subject to a high level of vandalism, ranging from graffiti to critical damage.
- **TROs were perceived negatively by many stakeholders and residents, and were cited as the cause of substantial delays during the trial.** Several options are available for local authorities to avoid issuing TROs. These include deploying multiple installations simultaneously; encouraging residents to negotiate parking themselves; and the use of informal arrangements such as advisory signage. Where a TRO was put in place, signage caused confusion, particularly when EV bays were within a Residents Parking Zone.

Lamppost chargers

Type:	Ubitricity Lamppost Charger
Power output:	3.2 – 5.5kW
Access:	Accessible with smart cable only.
Payment:	Ubitricity payment account
Features:	Can be retrofitted into existing lampposts. 1 socket per installation. 3 per site.

Bollard chargers

Type:	Zeta Smartscape Charging Bollard
Power output:	7.2kW
Access:	RFID card and app access
Payment:	New Motion payment account
Features:	Slim-line design suitable for narrow footways. 1 socket per bollard. This is a prototype, developed by a local Oxfordshire company.

Type:	eVolve e-Post Charging Bollard
Power output:	7.4kW
Access:	RFID card and app access
Payment:	New Motion payment account
Features:	Instructions available on-screen. 2 sockets per bollard.

Type:	Chago Station Charging Bollard
Power output:	7.4kW
Access:	RFID card and app access
Payment:	New Motion payment account
Features:	Load balancing available to manage output. 2 sockets per bollard.

Home chargers

Type:	APT eVolt Home Charger and Cable Channel
Power output:	3.7kW
Access:	Smart energy meter
Payment:	Domestic electricity tariff
Features:	Resident can use own home power supply

CASE STUDIES – NATIONAL AND INTERNATIONAL

This section explores national and international best practice for EV charging projects. Case studies more local to Somerset can be found in the following section discussing delivery approaches.

UK

In the UK, London is leading the way, with 3% of new car sales in 2018 registered as an EV (national average of 2%) in 2018 and 0.8% of the total vehicle fleet (national average of 0.5%) being electric. Elsewhere, most local authorities delivering EV charge points have received significant funding from OLEV. For example, Nottingham City Council have launched 'Go Ultra Low Nottingham' initiative to help support the uptake of ULEVs in the wake of being awarded £6.1 million by OLEV.

Nottingham is installing over 400 charge points to support the switch to EVs, has the UKs first Bus and ULEV lane, converted a significant proportion of the Council fleet to EV, launched an electric taxi 'try before you buy' scheme, and a local authority run ULEV service centre. The Council will be providing a procurement pack and toolkit to assist other local authorities with EV rollout.

North of the border Dundee is leading the way; with the city having one of highest concentrations in the UK. Dundee City Council has installed 4 x 50kw chargers and 14 x 22kw chargers into the surrounding region meaning that you are never more than 20 minutes from a public EV charging point. In Falkirk, WSP recently supported delivery of the largest EV charging station in Scotland, with capacity for 26 electric vehicles (10 rapid 50kW, and 16 fast 22kW), generating 30% of it's power from a solar canopy over the car park.

Additional UK case studies can be found in the 'Procuring electric vehicle charging infrastructure as a local authority' document produced in 2019 by the Energy Saving Trust.

Taxi Fleets (OLEV funded)

A number of authorities have included conversion of taxi fleets in the OLEV funded projects, including:

- West Yorkshire – taxi and private hire drivers can book time slots at new charge points, in one of the biggest charge points for taxi projects outside London
- Birmingham – taxi drivers will be offered a payment grant towards the purchase or lease of a ULEV taxi. The council is also looking to purchase a fleet of ULEV taxis to lease.
- Coventry – Taxis receive preferential charge point rates and discounts

Norway

Norway is the world leader in the adoption of electric cars. The country has set a 2025 deadline for a ban on new petrol and diesel cars. The progressive tax system makes most EV models cheaper to buy compared to a similar petrol model, even if the import price for EVs are much higher. This is why the Norwegian EV market is so successful compared to any other country. Petrol and diesel vehicles are also subjected to increased taxation through low emissions zones, residential parking zone payments, congestion taxes and increased toll road charges.

In March 2019, 60% of new car sales in Norway were EVs, with ULEVs now representing over 11% of the total passenger car fleet compared to just 1% in the UK. For more information visit: https://elbil.no/english/norwegian-ev-policy

Austria

Austria has announced EVs will be able to keep travelling at 80 mph on motorways, even when other vehicles have to slow down to 62 mph to reduce their harmful air pollution emissions.

A reduced speed limit on higher speed roads could be proposed until the climate emergency is averted, with EVs exempt from this. This could be a highly effective way to tackle the longest distance car trips that contribute the most to the climate crisis. The measures would encourage modal and vehicle shift for the longer journeys undertaken by the richest in society who would be less impacted by road charging but would also require new powers and would be controversial.

Mobility hubs

Mobility hubs create space designed specifically to house public and shared mobility modes and improve the public realm for local residents and businesses as well as travellers. The concept is being applied to the streetscape in many European and North American cities, with the West of England, Plymouth and other local authorities in the region developing mobility hub projects.

Mobility hubs raise the profile and visibility of a range of shared and sustainable transport modes, providing a convenience and a choice of modes for the user. For example, this could involve bringing together public EV charge points, e-bike sharing, bike parking, car sharing, bicycle pumps, seating, bus stops, and transport information in to a single location. Mobility hubs can be used to improve public realm, reduce street clutter, and may also provide a local attractor helping to regenerate declining highstreets.

DELIVERY APPROACHES

The majority of public charge points installed in the UK to date have been funded by public sector grants from the Office for Low Emission Vehicles (OLEV) and elsewhere. However, private sector partnerships and revenue share arrangements are becoming increasingly common and can be a good choice for some local authorities. There are a number of payment models available for delivering charge point infrastructure, which are summarised below.

In the longer term, EV charge points are likely to be commercially delivered in response to the growing EV market, and the public sector role is likely to increasingly shift to an enabling one; helping to provide infrastructure for other use cases such as car clubs.

Table 9 Summary of Delivery Approaches

Delivery Model	Description	Potential income	Potential risk	Advantages	Disadvantages
Public ownership	All charge point costs are paid for by the public sector, with capital and maintenance costs recouped from usage charges. Charge points are owned by the public sector, with back-office and operation of charge points typically contracted to a private sector partner (PSP) for a fixed fee.	Highest	Highest	• Highest potential income • Local authority can determine locations, irrespective of commercial viability ensuring equity of access • Easiest to incorporate wider environmental and social value goals	• Requires significant grant funding which may not be available or may require local match funding (typically 25%). • Highest risk in terms of ongoing liability, stranded assets, and maintenance costs • Use of public funds comes with accountability to taxpayer and political risk • PSP has least incentive to repair faults
Concessionary Model – public funded	Charge points are installed and funded by the public sector, using available grant funding, and then operated and maintained by a PSP for an agreed period under a profit share arrangement.			• Some income shared (higher levels of potential public sector income from higher initial public sector investment) • PSP incentivised and responsible for maintenance of the network, leading to better end-user experience • Reduced risk for public sector • Depending on agreement, public sector may maintain ongoing ownership, and can incorporate wider goals	• Reduced income share compared to full ownership • Requires a greater understanding of what the market can offer, and tender process may be more complex than public ownership • Risk that PSPs will not accept the agreement terms, leading to negotiation or a failed tender • Needs to be a relatively large number of sites (>25) so that PSP can balance risk across sites. • Potential for disputes over responsibility for site failures and expensive termination clauses
Concessionary Model – public/private funded	Charge points are part funded by the public sector, with a PSP also investing in capital costs. The PSP then operates and maintains the charge points for an agreed period under a profit share agreement.				
Fully funded options – revenue share	All costs are borne by the PSP, with a long-term lease/licence over which the PSP can recover their costs.	Lowest	Lowest	• Lowest risk. Rental agreements can provide guaranteed income over a number of years. • PSP heavily incentivised to provide good end user experience.	• Lowest potential income • Least control and ability to incorporate wider goals • Likely to involve long agreement periods or exclusion areas • Many areas currently unlikely to be commercially viable without public investment

Public sector funding

A large amount of public charging point schemes in the UK have been funded by the Office for Low Emission Vehicles. This included £40m funding announced in 2016 to deliver charge point networks in Nottingham, Bristol, Milton Keynes and London.

Current OLEV funding streams for charge points include:

- The Electric Vehicle Homecharge Scheme (EVHS) provides grant funding of up to 75% (up to a maximum of £350) towards the cost of installing EV charge points at domestic properties (which have off-street parking) across the UK.
- The On-Street Residential Chargepoint Scheme, for local authorities, provides a 75% contribution towards the cost of the charge point (£7,500 limit per charge point). Alternative sources of funding include the £400 million Charging Infrastructure Investment Fund or developing a framework for suppliers.

To encourage businesses to install charging points, the Government also offers the Workplace Charging Scheme grant. This is up to £350 (formerly £500) for each charging socket, up to a limit of 20.The Government has also previously awarded the 'Ultra Low Emission Taxi Infrastructure Scheme' to local authorities via a competition fund.

In addition to OLEV, public sector funding for charge points has also been awarded by:

- Innovate UK
- European Regional Development Fund (ERDF)
- Local authority budgets

Existing frameworks

Various national frameworks are available to simplify chargepoint procurement for public sector bodies and ensure that the procurement process is compliant with UK/ EU legislation. The main examples are:

- ESPO Framework 636 Vehicle Charging Infrastructure. The ESPO Framework allows both the purchase and lease of chargepoints.
- Crown Commercial Service Traffic Management Technology 2, Lot 10 Sustainable Transport Infrastructure.
- Central Southern Regional Electric Vehicle Charging Framework by Hampshire County Council, already used by over 50 organisations, and open to public bodies across the South of England.

In addition to existing frameworks, previous specifications for electric vehicle charging can be modified to create a bespoke framework agreement. For example, both Nottingham City Council and Devon County Council are due to produce a procurement toolkit for local authorities, based on their experiences of procuring charge points under a concessions arrangement.

Fully funded options

As the EV market matures and more vehicles enter the fleet, private sector investment in charge points becomes increasingly viable, as costs can be recouped from usage charges. At present, this typically involves long leases of 10 to 20 years, with charge point providers aiming to make a return at the end of this period by banking charge point sites in the short term and establishing themselves in the market. Most fully funded options have focused on rapid chargers due to the higher potential cost per charge and turnover, however, fully funded options for "fast" chargers are also becoming more common.

A typical fully funded offer is likely to include the most attractive charge point sites in an area, with income to the landowner through a flat rate rental income, percentage profit share, or combination of both.

While these options can be very attractive, with terms constantly improving, key issues to consider with fully funded offers include:

- Length of contract - Minimum contract lengths in Somerset are likely to be between 10 and 20 years, with some operators and rapid chargers requiring longer commitments, potentially up to 30 years.
- Response times - With some landowners suffering from charge points that are out of action with no effective way to enforce.
- Ownership of the grid connection, ducts/cables, and charge points at the end of the agreement period. The aim should be to avoid being tied to the provider after the end of the initial agreement period and all underground equipment and grid connection points should revert to the landowner.
- Termination damages - The aim should be to minimise any damages payable if the landowner needs to cancel the lease/concession. If termination damages are required by the operator, these should ideally be capped and not linked to forecast revenue.
- Exclusivity. Some operators require exclusive rights over a site or wider area, which may prevent the installation of additional charge points at a later date.
- Other impacts - Maximising the "green" credentials and social value of the charge points. For example, including use of green tariffs or local renewables, considering lifecycle impacts, and local job creation.
- Advertising - Suppliers are increasingly gaining money from advertising, with one supplier including advertising on 6-inch screens on EV charging units.
- Interoperability - Provision of AC charging accounts for approximately 70% of the market. Some free rapid charger offers include only DC charging, which can exclude some vehicle types. Similarly, some charge points only provide a tethered connection for a limited number of vehicle types.

CASE STUDIES – REGIONAL

West of England

Go Ultra Low West (Public Ownership)

Go Ultra Low West is a £7m OLEV funded project that aims to accelerate the purchase of EVs. The project will install over 120 new charge point connections, branded as the "Revive" charging network, which is fully owned by the West of England Councils and operated by a contracted private sector supplier. The majority of charge points will be supplied with 100% renewable energy provided by Bristol Energy. The project will also install four rapid charging hubs, new electric car clubs, business grants, and conversion of council fleets to EV.

The "Revive" network launched in November 2019, to coincide with the opening of the region's first rapid charging hub. Each hub will house four to eight rapid charging connections that can charge an EV up to 80% from 30 minutes charging. For more information visit: www.revivecharging.net

Devon

A number of chargepoint schemes in Devon are progressing, using a range of delivery models.

Deletti (Concessionary model – public/private funded)

DELETTI (DEvon Low carbon Energy & Transport Technology Innovator) is a European Regional Development Fund (ERDF) part-funded programme that will develop EV charge points and solar car ports across Devon and South Somerset. A minimum of 50 EVCPs will be delivered, primarily in public car parks, with a total public sector contribution of £10k per site.

A charge point provider will be procured to design, build, operate, and maintain chargepoints through a concessions agreement, and will be granted a 10 year lease for the EVCP locations, with an option to renew. Specific requirements of the tender include a minimum of 100% green energy tariff, with a preference for use of local renewable energy and reduction in lifecycle emissions, a minimum 22kW charge point specification, passive provision for additional charge points in future, industry leading response times, and caps on any termination damages in the event some of the car parks are redeveloped for housing or other uses.

StreetHUBZ (Fully funded - private sector led with public funding)

StreetHUBZ is a private sector led project with ZAPINAMO, Gamma Energy, and Devon County Council. The £4m scheme is funded by Innovate UK, and aims to install and operate 150 on-street EVCPs in Exeter. ZAPINAMO will design, build, and maintain the EV 'StreetHUBZ' chargers that fit around existing street furniture and Gamma Energy will own and operate the infrastructure. The project will roll out "semi-rapid" 35KW EV chargers. Co-cars car clubs will provide on-street pay as you go EV rental cars to boost awareness and EV adoption.

Mid-Devon Instavolt (Fully funded - private sector led and funded)

Mid Devon District Council appointed InstaVolt to install rapid EVcharging points at a limited number of locations across the district. The chargers were delivered at no cost to the taxpayer and Mid Devon Council will receive rental income from InstaVolt for the next 30 years.

Dorset (Fully funded – private sector led and funded)

JoJu Central Southern Regional Electric Vehicle Charging Framework

Dorset County Council have used the Central Southern Regional Electric Vehicle Charging Framework to partner with EV charge point provider, JoJu. The supplier has undertaken all feasibility work and will be rolling out 22kW charge points at 25 public car parks across Dorset in 2020. Management of the Council's existing rapid charge points will also transfer to JoJu. Key elements of the agreement include:

- No Council funding required, with small amount of profit share returned to the Council
- 15 year lease on the sites, with a 300 meter exclusion area
- Renewable energy supply
- Strong service level agreement, with termination costs limited to the cost of installation.

5 SOMERSET BASELINE REVIEW

ULEV UPTAKE IN SOMERSET

The rate of uptake of ULEVs has been described with use of the Department for Transport Vehicle Licensing Statistics.

It should be noted that the postcode reflects the postcode of the registered keeper. This is the keeper's address for privately owned vehicles or the company's registered address for company owned vehicles. The address does not necessarily reflect where the vehicle is kept.

It should also be noted that postcode districts lie across county and district boundaries. The most obvious issue this presents is the postcode of BA3 which is situated within both the County of Somerset and the County of Bath and North East Somerset. This postcode has been included in the below table for Somerset.

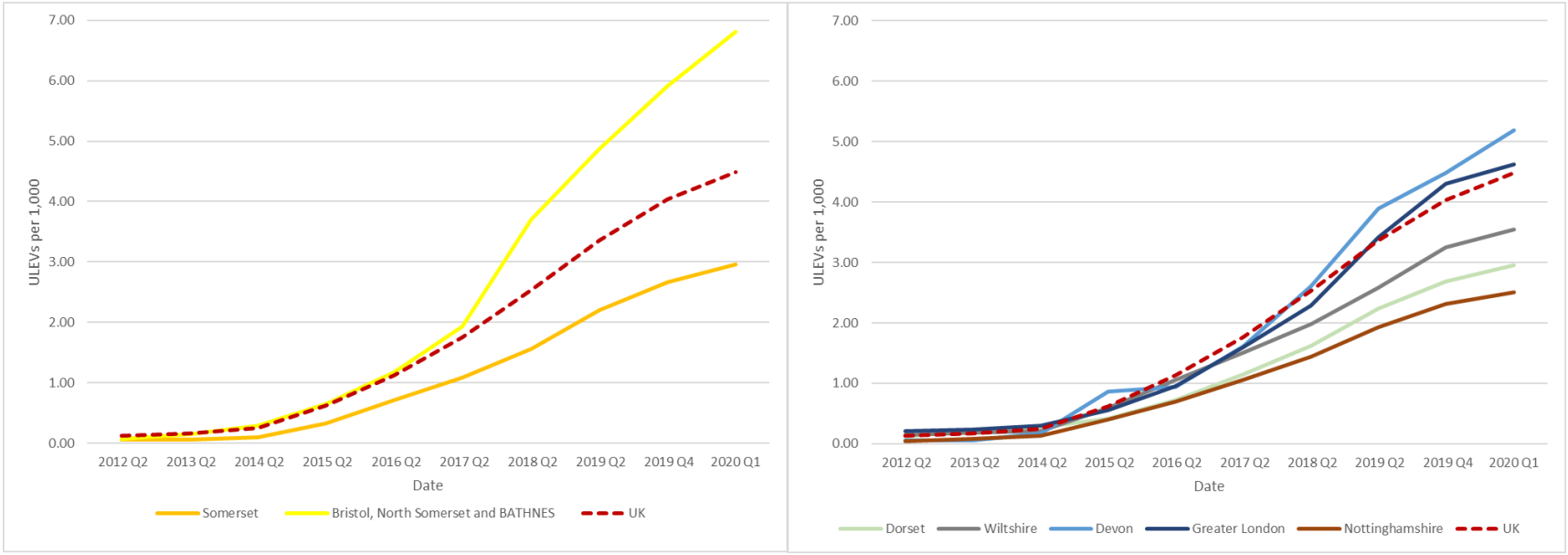
Table 10 shows the number of ULEVs registered in Somerset as well as other local authority areas and the UK average. This has been obtained from the DfT's Vehicle Licensing Statistics Table 0134A which records the number of ULEV's (battery electric, plug-in hybrid electric and fuel cell electric vehicles) registered in each UK postcode area district per quarter from 2012. This dataset is the most complete for detailing information regarding the rate of uptake of ULEVs.

Figure 10 shows the number of ULEVs registered per 1,000 persons (based on ONS mid-year population estimates). Figure 10 shows that at present, per capita, Somerset has a lower rate of ULEVs registered than neighbouring counties. Uptake per capita is approximately two thirds that of the UK average.

Table 10 ULEV's registered in Somerset and nearby

Area	2012 Q2	2013 Q2	2014 Q2	2015 Q2	2016 Q2	2017 Q2	2018 Q2	2019 Q2	2019 Q4	2020 Q1
Somerset	33	32	53	180	392	606	870	1,239	1,501	1,667
Dorset	44	81	100	156	270	428	608	848	1,017	1,119
Wiltshire	70	87	102	288	519	744	985	1,295	1,627	1,775
Devon	25	29	81	427	466	809	1,324	1,996	2,300	2,665
Bristol, North Somerset and Bath and North East Somerset	57	123	241	544	1,002	1,664	3,219	4,250	5,153	5,937
Greater London	1,708	1,878	2,480	4,552	7,969	13,442	19,497	29,255	36,776	39,564
Nottinghamshire	44	90	151	454	799	1,208	1,657	2,245	2,687	2,913
UK	8,156	10,554	16,156	40,748	74,114	116,193	168,324	224,695	269,350	299,853

Figure 10 ULEVs registered per 1,000 persons



The table below shows the number of ULEVs restricted in each local authority district. It can be seen that the number of ULEVs registered in South Somerset and Mendip is higher than in other local authorities. As above, it should be noted that the postcode district data does not exactly align with district authority boundaries.

Table 11 Number of Registered ULEVs in each District

District Council	2012 Q2	2013 Q2	2014 Q2	2015 Q2	2016 Q2	2017 Q2	2018 Q2	2019 Q2	2019 Q4	2020 Q1
Mendip	0	5	9	36	89	143	231	356	453	510
Sedgemoor	0	0	5	19	63	93	142	210	254	277
Somerset West and Taunton	18	14	21	56	103	183	226	298	357	392
South Somerset	15	13	18	69	137	187	271	375	437	488
Grand Total	**33**	**32**	**53**	**180**	**392**	**606**	**870**	**1,239**	**1,501**	**1,667**

Figure 11 ULEVs registered per 1,000 persons in each District

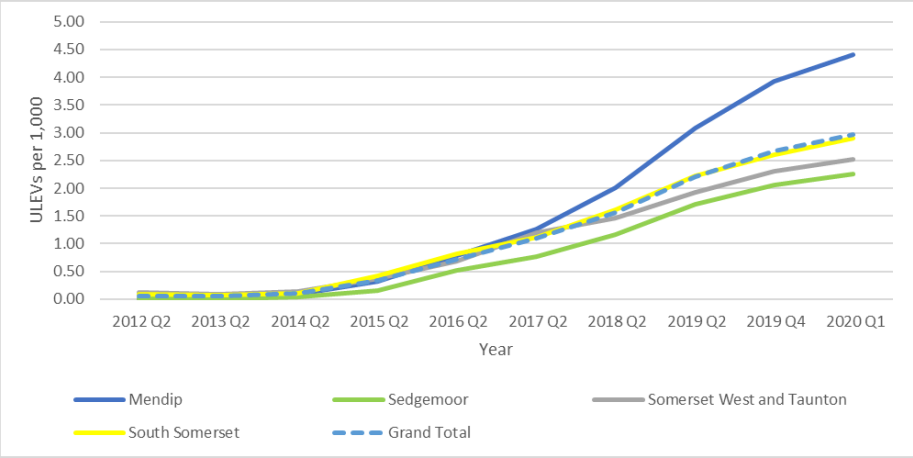


Figure 12 shows the number of ULEVs registered in Somerset by postcode district. Figure 12 shows that Mendip has the highest number in ULEVs in Somerset.

Figure 12 ULEVs registered in Somerset by postcode district (Q1 2020)

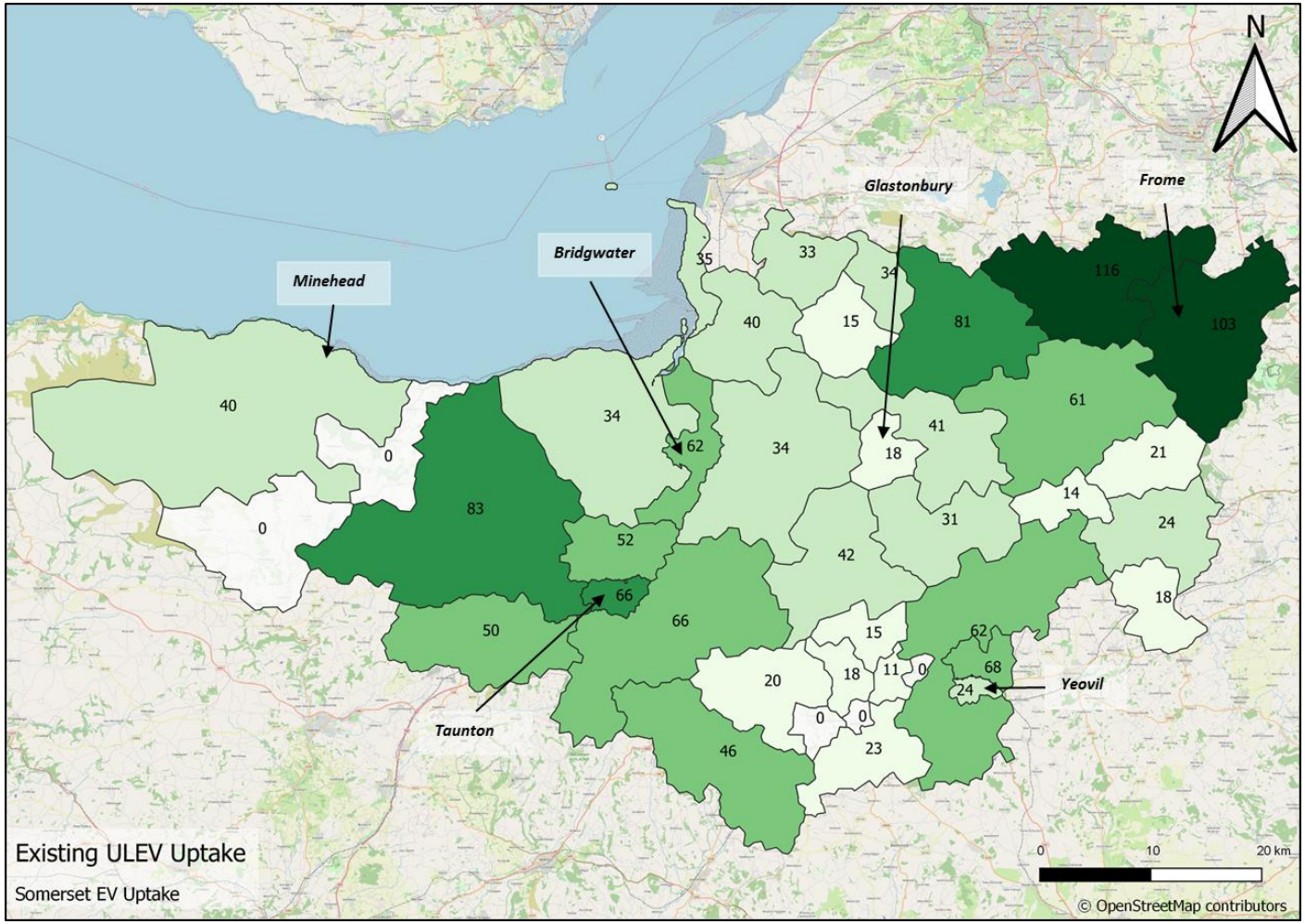
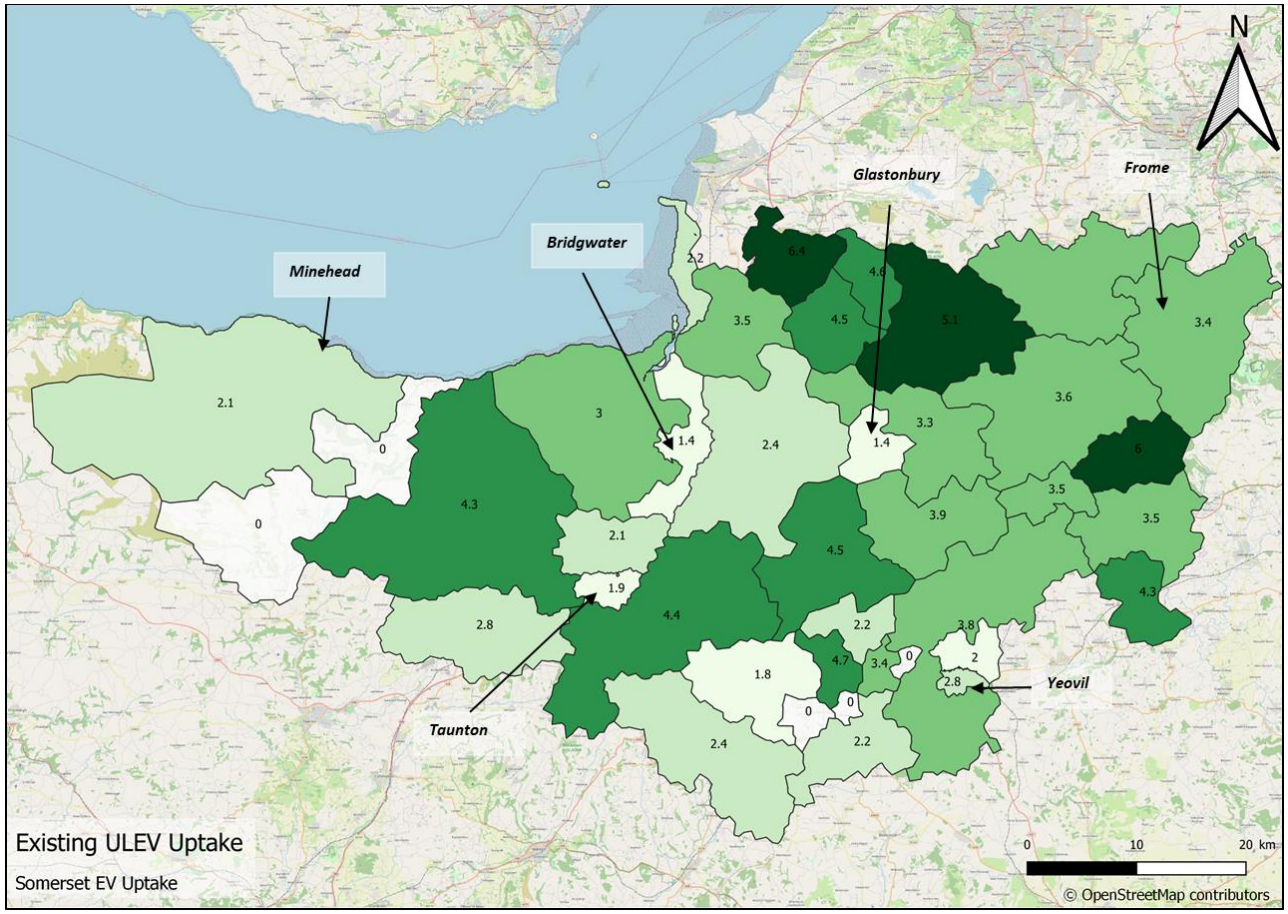


Figure 13 shows the number of ULEVs per 1,000 persons registered in Somerset by postcode district. The ONS does not provide population estimates by postcode district. The only data which provides population per postcode district is the 2011 census. In order to get a population estimate for each postcode district in Q1 2020, the 2011 census population for each postcode district has been multiplied by the growth in population in each local authority district. Figure 13 shows that Mendip has the highest number of ULEVs per capita.

Figure 13 ULEVs registered in Somerset by postcode district (Q1 2020)



EXISTING CHARGE POINT PROVISION

According to www.zap-map.com, across the UK there were 31,849 charge point connectors, in 18,319 devices, at 11,401 locations as of June 2020. The total number of connectors increased from just over 13,000 in November 2017 to more than 19,000 in December 2018. Of the 31,849 charge point connectors, 7,813 of these are rapid. To see charge point locations visit https://www.zap-map.com/live/ .

The European Alternative Fuels Observatory states the number of EV charge points per 100km (62.5 miles) of road in the UK has increased from 42 in 2011 to 570 in 2019. The Committee on Climate Change, however, argues this figure will need to increase further to match the rising number of ULEVs on the road.

Across Somerset there are a total of 87 non-domestic based electric vehicle charge point locations, providing 223 non-domestic charge points. There are 16 slow chargers (3kW), 149 fast chargers (7-22kW) and 56 rapid chargers (43+kW). This total includes charging points at locations which may only be publicly accessible if you are a visitor / customer of that facility i.e. at supermarkets and hotels; and also includes the Taunton Park & Ride charge points which are not currently operational.

The locations are shown overleaf in Figure 14. The map shows that the M5 corridor encompassing Bridgwater and Taunton is comparatively well served; as is the A361 corridor from Glastonbury to Frome. Charging point provision in South Somerset is in line with the average; whilst charging points are few and far between in Exmoor National Park and the former district of West Somerset.

It should be noted that this map includes public and semi-public locations (such as hotels and restaurants) but excludes private locations (residential charging points).

Charge points with reasonable public accessibility (i.e. including motorway service areas and superstores but excluding hotels) are shown Figure 15. Charge points known to be inactive (specifically, the charge points at SCC offices and at each Taunton P & R site) have been removed.

Figure 16 shows where there are no rapid chargers within 10km (6.25 miles).

The former district of West Somerset is the area which suffers from a lack of electric vehicle charge point accessibility the most.

Figure 14 All non-domestic ULEV charging points in Somerset.

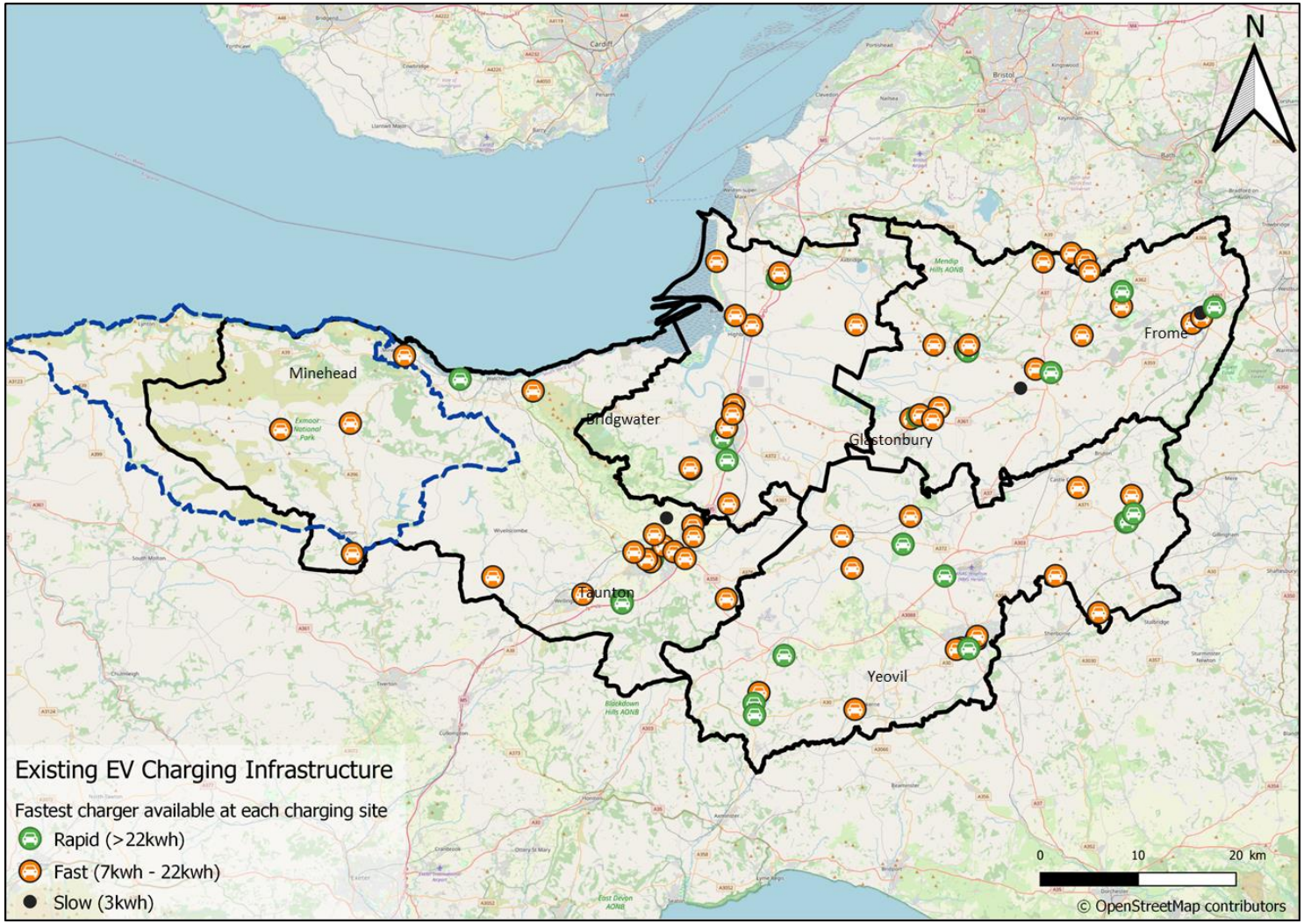


Figure 15 All semi-publicly accessible ULEV charging points in Somerset (i.e. public car parks, Motorway Service Areas (MSAs) and food superstores, excluding hotels and local shops).

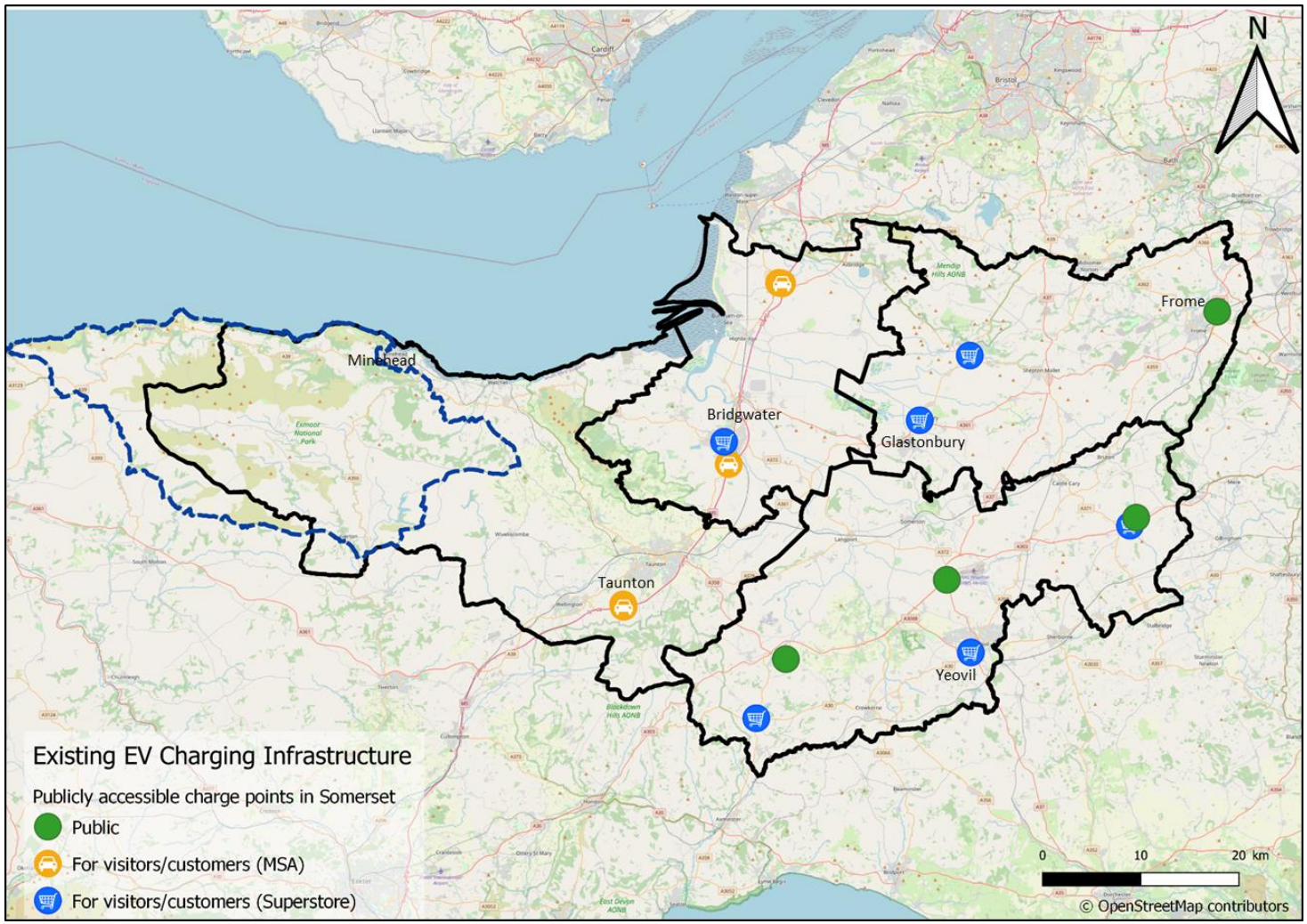
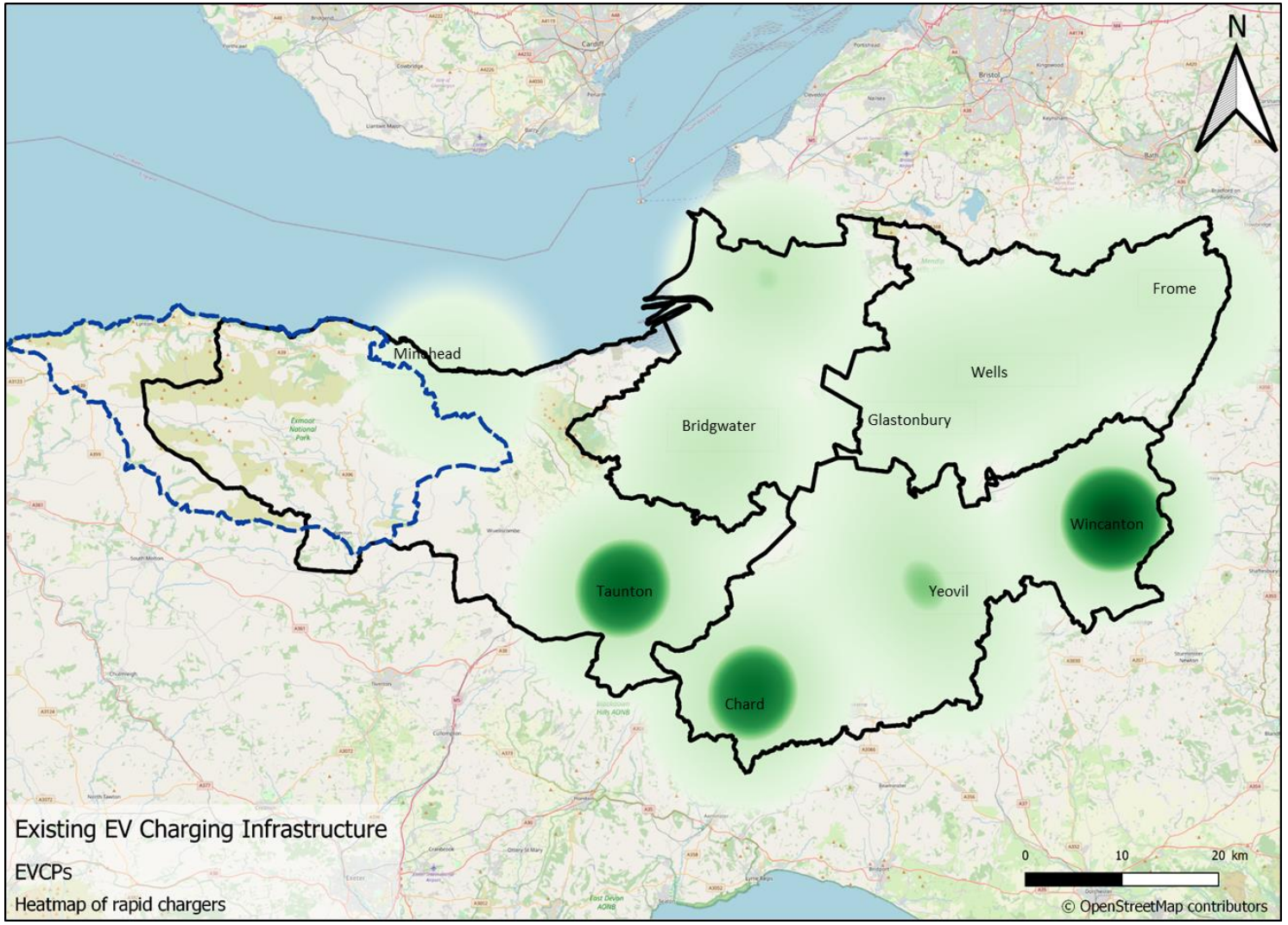


Figure 16 Locations within 10km (6.25 miles) of a rapid charger



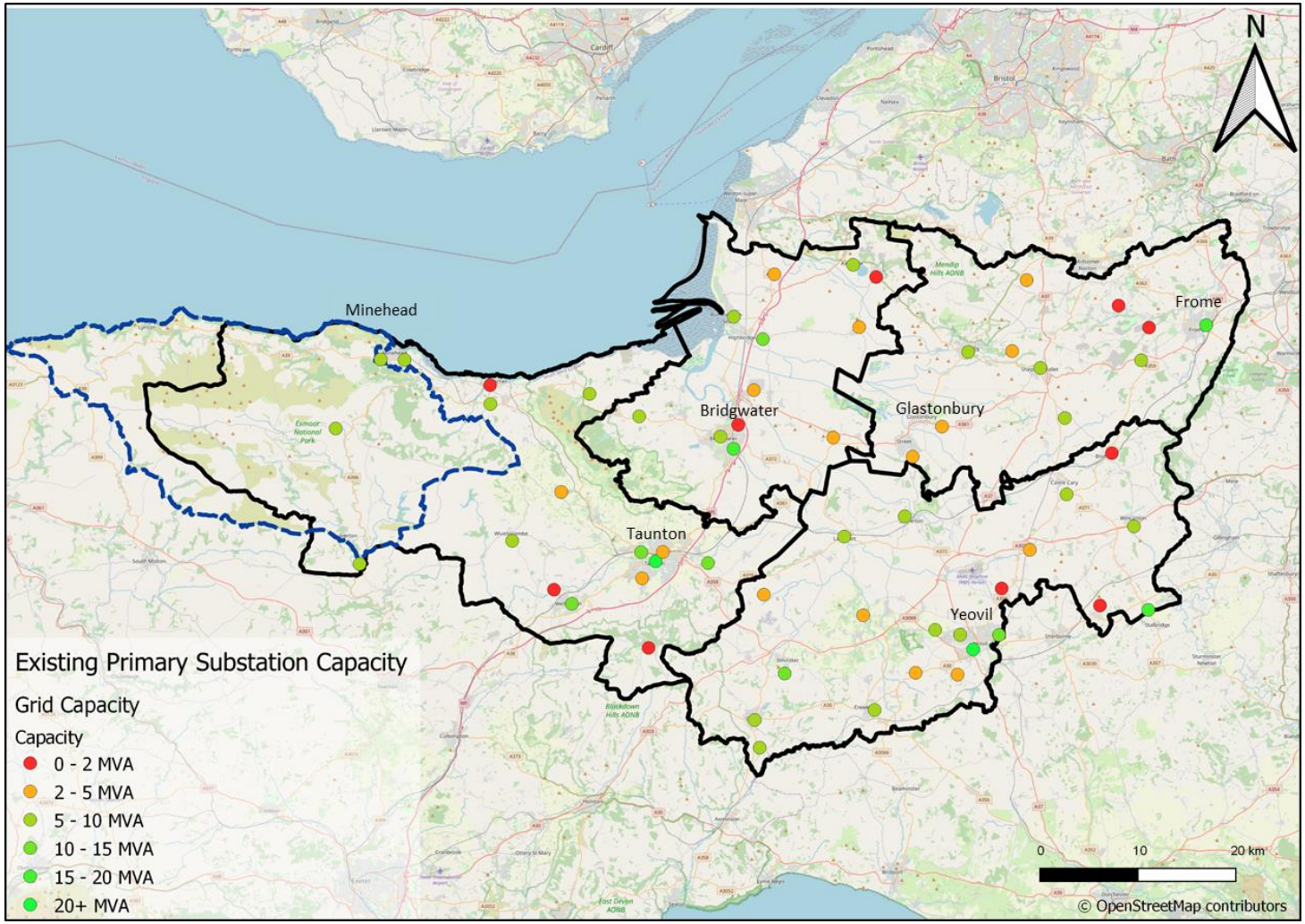
Grid Assessment

Section 2 details how electricity is distributed from the transmission network to end users in the UK.

The county of Somerset encompasses 61 primary substations, of which 80% are owned and operated by Western Power Distribution (WPD) whilst the remainder belong to Scottish and Southern Energy Networks (SSEN). By analysing data published by each of these DNO's, the estimated available capacity (MVA) can be approximated by taking the maximum forecasted demand and the amount of capacity available at each primary substation. This gives a worst-case high-level indication of how much further demand can be added at this level before network reinforcements would be required. Some of the primary substations in this area are limited by availability in voltage levels above the connection point - at the Bulk Supply Point (BSP), i.e. the higher voltage substations that supply these primary substations have no capacity, even though the primary itself has available capacity. Therefore, expensive reinforcements at higher voltages would be required to increase demand headroom at these substations.

Figure 17 shows a constraint map of Somerset, listing the estimated available spare capacities at each primary substation.

Figure 17 Primary Substation Constraint Map



It should be noted that, although there may be no spare capacity at the primary level (unless reinforcements are introduced), there may be spare capacity at the secondary substation level for small-scale chargers. Throughout Somerset, a significant proportion of primary substations show no/limited spare capacity, however by analysing further data from WPD, it is shown that there is EV capacity at the secondary substation level.

WPD have advised that both the capacity and EV maps, alongside Long Term Development Statement (LTDS) data, are based on a worse-case scenario, i.e. assuming maximum load at all times. Additionally, the EV capacity map (for available capacity) assumes 7kW fast chargers are to be connected into the network.

Table 12 shows each category that WPD have used to define the amount of EV capacity at each secondary substation. WPD secondary substations have a maximum capacity of 500kVA (though older ones could be as low as 25kVA), thus those substations with extensive capacity available could facilitate larger charging stations.

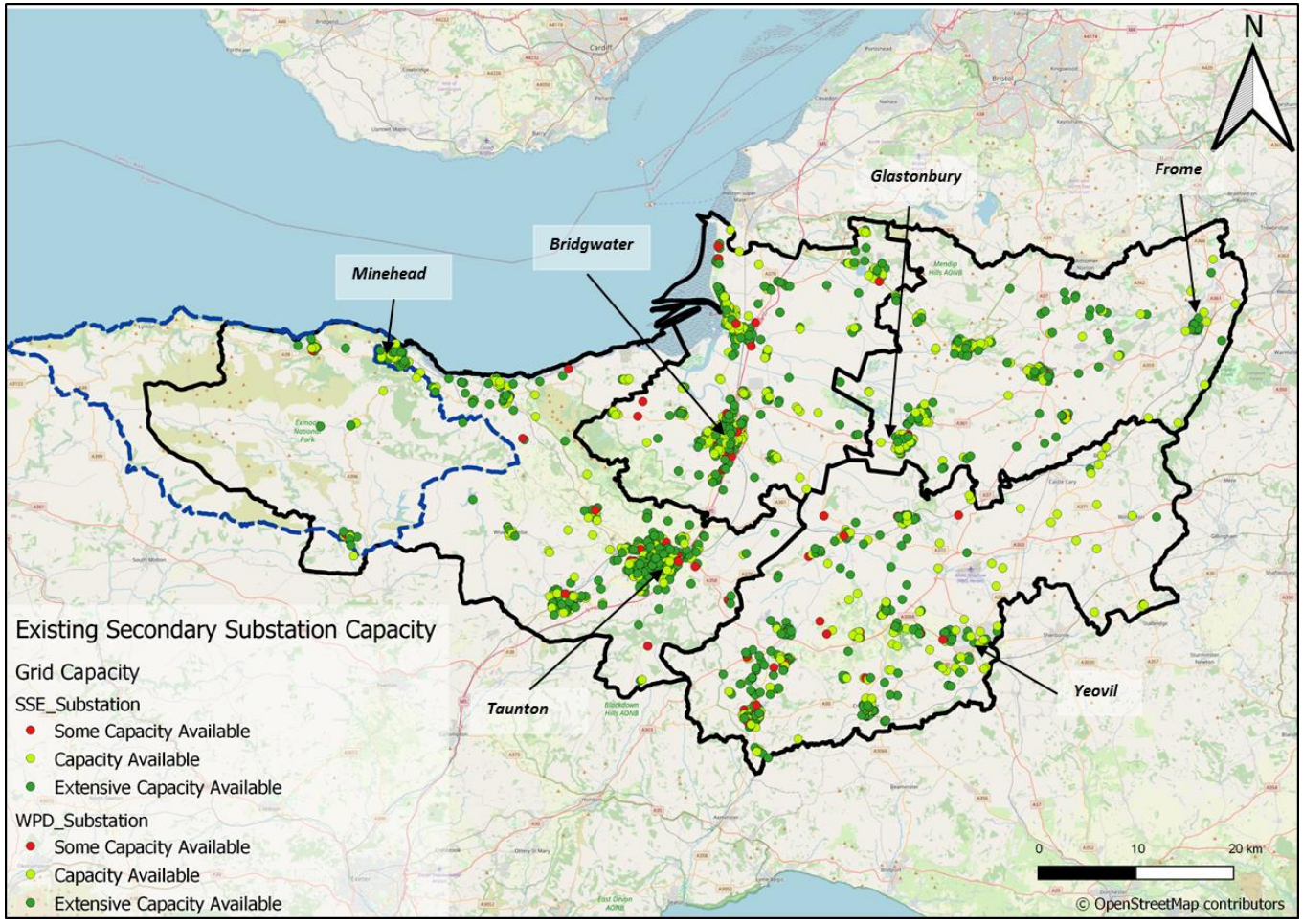
The uptake of Electric Vehicles (EVs) across the county will increase the demand on the network and will likely require reinforcements be made to the electrical network to ensure that the grid can supply and match the nationwide demand. Although reinforcements will be necessary, some demand could be deferred through “smart charging”, increasing demand diversification, by deferring the load, and reducing the load during the times at which the network is busiest (peak demand), including through use of local renewable energy generation.

Table 12 Banding of available EV capacity at secondary substation level

Capacity	Description
Extensive Capacity Available	Significant overhead capacity available when network at full demand.
Capacity Available	Capacity available when network at full demand however reaching upper limit of transformer limitations.
Limited Capacity Available	Little capacity available when network at full demand and transformers are at limits. There may be potential to connect a small number of chargers depending on quantity/rating.

Figure 18 shows the secondary substations across Somerset and their corresponding availability for EV capacity.

Figure 18 Secondary Substation Constraint Map of Substations



EXISTING EV CHARGE POINT SCHEMES

Through engagement with Council officers, a number of EV charge point schemes in development in Somerset have been identified:

Table 13 Existing EV Charge Point Schemes in Somerset

Scheme Name	Description	Charge points delivered
DC Share, Taunton	In a UK first pilot, Western Power Distribution will explore a novel solution to provide a rapid charging hub in Taunton. The project will balance spare grid capacity across a number of nearby substations to reduce the costs of rapid charging hubs. For more information visit: https://www.westernpower.co.uk/projects/dc-share	15 rapids, Taunton
DELETTI, South Somerset	South Somerset District Council has joined the DELETTI project, a partnership project of Devon County Council and Devon District Councils. The project will deliver two 22kW charging points in up to 25 car park locations in South Somerset, delivered through a concession agreement in 2021/22.	25 fast, public car parks, South Somerset
Highways England Rapids	Highways England have recently delivered a project ensure that 95% of the Strategic Road Network is within 20 miles of a rapid charge point, including new 3 new sites on the A303 in Somerset.	3 rapids, A303
Mendip Charge Points	Mendip District Council have begun a procurement exercise, seeking suppliers willing to install EV charging infrastructure at no cost to the Council, focused on areas where EV facilities are not in high concentration.	Minimum 4 units (type not specified)
SWT Grants	Somerset West and Taunton Council has awarded grants from a £20,000 fund to parish and town Councils to install EV charge points. Following an initial round of applications 3 grants were awarded for up to £1,000 each.	Up to 20 standard/fast units
Others	Other schemes identified through stakeholder engagement include: • Installation of charge points at supermarkets including Morrisons and Tescos in Somerset • Community led charge points in Wedmore in a local pub • Some Parish and Town Councils within South Somerset have accepted "fully funded" charge point offers.	

We understand several Somerset District Councils have been approached by a range of charge point operators, offering "fully funded" charge points, indicating the market is willing to invest in EV charge points in Somerset.

6 STAKEHOLDER ENGAGEMENT

STAKEHOLDER MAPPING & METHODOLOGY

The project team identified relevant internal and external stakeholders, identified an engagement approach and invited each stakeholder to give their input into the emerging Somerset Electric Vehicle Strategy.

Relevant staff from the County / District Councils were invited to a 1 hour long virtual meeting. Stakeholders who could not make the meeting were asked to email through their views. The stakeholders were asked for their views on the following:

- Issues and / or opportunities that you can identify regarding electric vehicle infrastructure in Somerset;
- Any existing EV charge point (EVCP) schemes;
- Any approaches from EVCP suppliers/ operators;
- Current and emerging local authority asset/investment plans (e.g. street lighting renewal programmes);
- Any forthcoming renovation works to local authority assets including car parks that could be early wins; and
- Any residential areas which you think may be particularly suitable for on-street charging and hubs; based on your local knowledge of both the demographics of the local area and based on the suitability of the street scene.

The project team also engaged with Western Power Distribution, Scottish and Southern Energy Networks, and Somerset Community Energy. These groups were asked for their views on the following:

- Understanding of grid capacity opportunities and constraints in Somerset in the short term.
- Understanding of grid capacity opportunities and constraints in Somerset in the long term; i.e. any potential upgrades.
- Availability of free / paid for online mapping of substation capacity.

The project team also engaged with local employers to understand what their fleet plans are; and Highways England who were asked about their plans regarding providing for electric vehicles on or near to the SRN.

A summary of the stakeholder engagement exercise results are shown overleaf for topics not covered elsewhere in this report.

STAKEHOLDER ENGAGEMENT EXERCISE RESULTS

Delivery approach

Somerset County Council is awaiting the outcome of this study to help inform the Council's roles and responsibilities in relation to EV charging and noted that it considers its role is likely to be to provide electric vehicles charging points in areas where the private sector at the moment will not.

A number of the district councils have been approached from the private sector and in the process of developing their own specifications. Specifically, Mendip District Council stated that their preference is a revenue gain share model with a preferred minimum contact of 7 years.

All district councils expressed a desire for consistent provision and coordination across project and acknowledged the need to create a legible network for users whilst avoiding a monopoly of supply.

WSP note that there is the potential for a framework agreement which can be accessed by both the county and district councils, standardising the delivery approach and partners. This would enable co-ordination across projects and avoid delays.

EV parking standards for new developments

Somerset County Council Highways Development Control (HDC) stated that they would like recommendations on EV parking standards for new Somerset County Council Parking Strategy and Travel Plan Guidance. It was noted that Somerset County Council HDC recommendations/standards not always implemented by the Local Planning Authority (a standard two tier authority issue). Somerset County Council HDC and the districts acknowledged that most new residential parking spaces in Somerset are off-street; which is useful in facilitate at-home charging.

South Somerset District Council are intending to reflect building regulation proposals in new EV parking standard guidance.

Off-street Charge Points

All county and district authorities felt that off-street charging was better suited to providing for EV infrastructure at the moment.

All district councils have, at a minimum, begun preliminary investigation regarding the viability of EV charging points at certain public off-street car parks (subject to connection viability).

Sedgemoor District Council stated their preliminary investigations have thrown up issues regarding electricity capacity in the area. However, they were keen to incorporate EV charging at Northgate car park as part a council led redevelopment.

Exmoor National Park Authority are currently investigating the viability of EV charging points at Simonsbath (Ashcombe) car park, Exford car park and Tarr Steps car park.

A number of authorities noted that charge points would be best placed in town centres and areas of high tourist demand.

On-street Charge Points

Somerset County Council and all district authorities are much keener to focus on off-street charging first with less emphasis placed on on-street. The most common reasons cited were that the rurality of the districts would inhibit demand for on-street charging, and that where there could feasibly be some demand (such as town centres) pedestrian footways and roads were too narrow and constrained to the point of reducing the viability of on-street parking charging facilities.

Sedgemoor District Council & South West & Taunton District Council have mentioned the upcoming King Street development in Bridgwater and Firepool development in Taunton respectively as examples of where on-street charging or a mobility hub tie-in could work.

Exmoor National Park Authority reiterated the need for any on-street design in Exmoor to be sympathetic to the sites National Park status.

Approaches from operators

Somerset County Council has not engaged in any operator discussions. This is because Somerset County Council are awaiting the outcome of the EV strategy in order to ensure that the overall strategic approach and requirements are clear before engaging with the market.

Fleet

Somerset County Council manage an annual rolling fleet replacement programme for all service departments within SCC where consideration for electric vehicles is taken seriously. The SCC fleet management team study the electric vehicle market closely and attend various industry trade events throughout the year which showcase emerging technology.

Somerset County Council note that procuring the right electric vehicle, which not only brings the environmental benefits but also meets their specific operational needs whilst demonstrating best value; is the ultimate goal.

Somerset County Council note that their energy team have entered a partnership with EDF to explore V2G solutions at County Hall. It is expected that this will be installed by the middle of 2021.

South West & Taunton District Council are converting 90% of pool car fleet (30 vehicles) to EV by 2022 using the DC Share schemes as the primary chargers. There are no plans for 130 light commercial vehicles nor the fleet of for heavy vehicles.

Most other district authorities and the National Park Authority had small-scale plans to electrify their pool car fleet. In the majority of cases this is to be done on a piecemeal basis replacing ICE vehicles with electric vehicles when they reach the end of their current lease / lifespan. No plans for full scale adoption given lack of charging facilities at the district councils.

Park & Ride

South West & Taunton District Council were keen to find additional income to support Taunton P&R.

Somerset County Council were keen to find EVCP solutions at the park and ride. SCC noted that their in-house minibuses are stored at Silk Millls but noted that previous dialogue with the DNO has suggested there is not enough capacity to charge these vehicles without a transformer being installed.

Enforcement

There is single county wide enforcement contract, which is how EV parking bays should be enforced.

South West & Taunton District Council stated that their existing car park TRO doesn't cover EVs and would need to be updated.

Mendip District Council have installed EVCP in car parks where there would not need to be any change to parking order.

SRN in Somerset

Highways England (HE) have installed 3 rapid EV charge points in Somerset (SWARCO installed in Wincanton, Ilminster and Ilchester).

Highways England have met their criteria to have 95% of the SRN within 20 miles of a rapid charge point in Somerset and note that funding via this avenue has closed for the moment. Any future HE charging points are likely to be delivered at Motorway Service Areas (Sedgemoor and Taunton Deane in Somerset) in line with demand rather than to stimulate demand.

DNO's

Consultation with the DNO's highlighted that in general there is a reasonable amount of grid capacity in many areas, particularly when compared to cities. Taunton's capacity has recently upgraded.

WPD don't see EV growth as a big problem as the demand load can be managed as 'it is easy to incentivise load to move to off-peak when needed.'

There is capacity for growth in fast charging most areas, but individual sites need to be confirmed on a site-by-site basis. However, rapid charging hubs will come up against grid constraints quite quickly in many areas.

Other

A number of districts mentioned that the mobile network coverage in Somerset presented issues with regard to app-based charging solutions.

A number of district authorities stated that a key prohibitor in providing EVCP's was lead times and legal issues (such as developing the tender and negotiating revenue share and exclusivity arrangements). They stated a preference for a solution like DELETTI's in which all the legal's have already been completed.

South Somerset District Council and Mendip District Council both identified electric taxis and electric car clubs as an option to stimulate EV demand.

Mendip District Council would like real-time data on usage (only 25% of suppliers they talked to could do this).

Mendip District Council keen to colour EVCP bays green in public car parks.

Mendip District Council are developing an on-street parking strategy, which could incorporate consideration of on-street charge points.

Districts have received approaches from Town & Parish councils regarding EVCP's.

Community energy groups find it hard to see their role in EV at present but can see a potential role in providing local renewable energy to serve the charge points.

BP, Shell, and Tesco all have rolling programmes to roll out EV charge points at petrol stations and supermarkets, however, information on exactly which locations are due to be delivered and when is not readily available.

SOMERSET ELECTRIC VEHICLE SURVEY

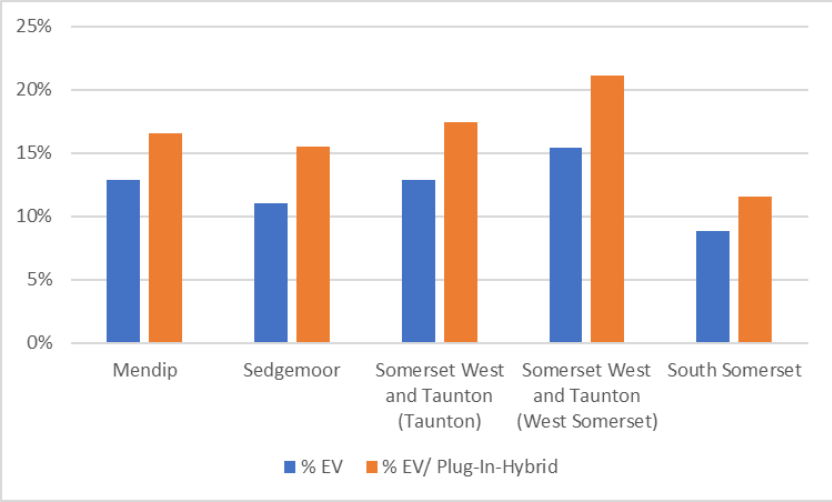
The Somerset Local Government Graduate Scheme published the 'Somerset Electric Vehicle (EV) Survey' with the aim of better understanding the environmental behaviours and attitudes of residents across Somerset towards EVs.

The EV Survey was published on Monday 8th June 2020 and was open for responses for two weeks, before closing on Monday 22nd June 2020. The EV Survey was publicised through various communications channels at each of the local authorities in Somerset, namely Somerset County Council, Mendip District Council, Sedgemoor District Council, Somerset West and Taunton District Council and South Somerset District Council.

The EV survey received 1,034 completed responses from residents across Somerset, which was a relatively high response rate given the short time period that the survey was live. A short summary of the findings is included below.

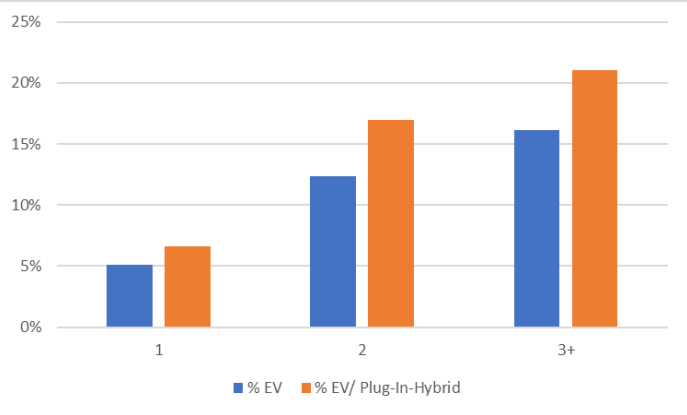
Demographics and EV Propensity

- Overall, middle-aged males were the most likely respondent group to already own EVs.
- The respondents from the former district of West Somerset showed the greatest EV ownership rate (15% fully electric and 21% either electric or plug-in hybrid). Respondents from South Somerset respondents had the lowest EV ownership rate (9% fully electric and 11% either electric or plug-in hybrid).
- A much higher level of respondents overall have EVs than in the Somerset population as shown in Table and Figure 12 in this report. This is to be expected given the self-selected nature of sampling; i.e. you are more likely to complete an EV survey if you have strong feelings in either direction.



Vehicle Ownership and Behaviour

- Those with 3+ cars in their household were more likely to already own an EV (15%) than those who 2 cars in their household (12%) or 1 car in their household (5%).

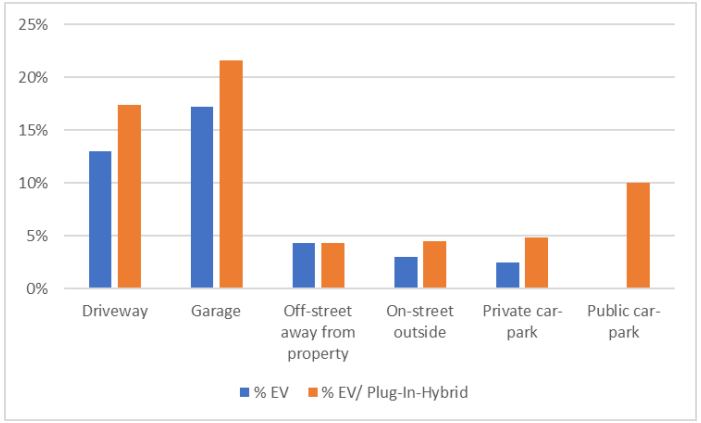


Vehicle Use

- The average annual mileage of respondents was higher than the national average annual mileage reflecting the rurality of the county and likely reflecting the demographics of residents that responded to the survey.
- The highest proportion of respondents who already own an EV drive more than 10,000 miles per annum. 18.44% of respondents who drove 10,000 miles per annum or more already own an EV compared with 7.8 % of those who drove 100 – 7,000 miles per annum and 13.4% of those who drove 7,000 miles per annum to 10,000 miles per annum.
- There were no significant differences found between distance travelled and considering purchasing an EV in the next five years (once owners who already own an EV are removed).

Parking

- Respondents with private parking were more likely to purchase an EV in the next 5 years (26.83%), compared to those with on-street parking (21.26%).
- Respondents with private / garages parking were more likely to already own an EV / Plug in hybrid as shown below.



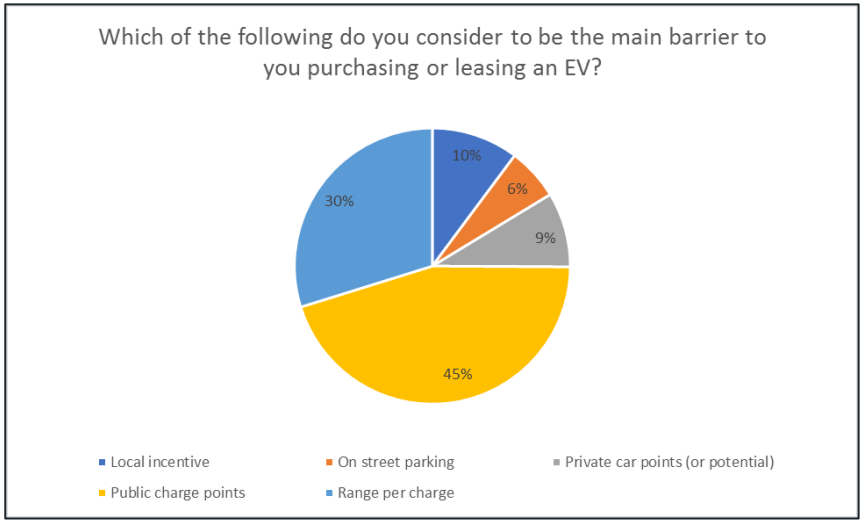
Barriers to EV use in Somerset

- Respondents reported a willingness to switch to and embrace EV technology; with 515 out of 807 respondents (63%) indicating that they have either switched to an EV or have considered it. 78% of respondents considered EVs either good or very good in general terms.
- Cost to charge, performance, range per charge, environmental benefits and initial purchase cost are key factors that influence the choice to buy or lease an EV.
- Respondents also reported that charging infrastructure, including public, private and accessible charging infrastructure, to be a barrier to EV uptake in Somerset.

- The average salary in Somerset means that the initial cost and maintenance costs of EVs are a key barrier to EV uptake within the county. This barrier of cost is compounded by the lack of a second-hand EV market.
- Incentive schemes, both local and national, could facilitate EV uptake in Somerset.
- Respondents reported that EV batteries are a key barrier to EV uptake in Somerset.
- The perceived environmental impact of manufacturing and disposing of EVs is a barrier to EV uptake in Somerset.
- Figure 19 shows that a high proportion of the respondents in Taunton, Minehead, Yeovil and Wells are considering buying an EV.

Attitudes towards Environmental Impacts

- More respondents considered the environmental impact of their vehicle use (85%) than the number of respondents who reported willingness to reduce their vehicle use to reduce their environmental impact (64.6%).



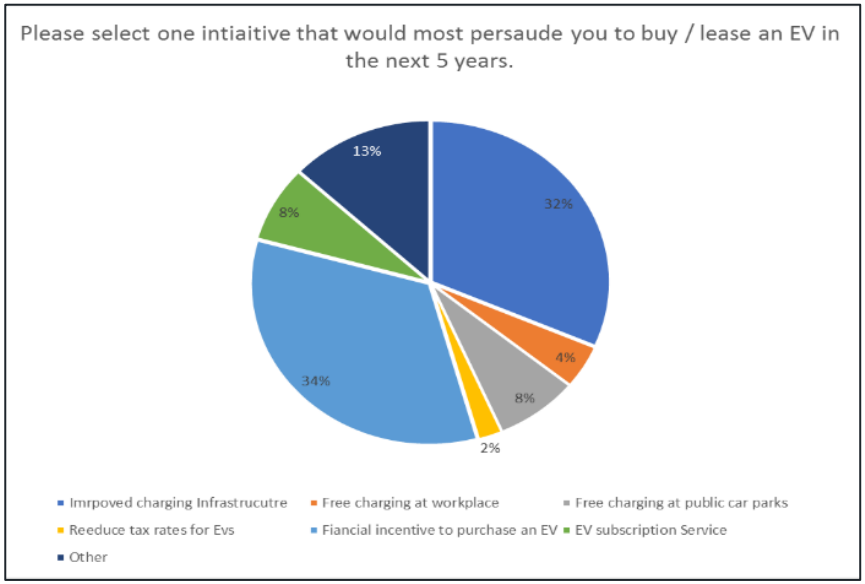
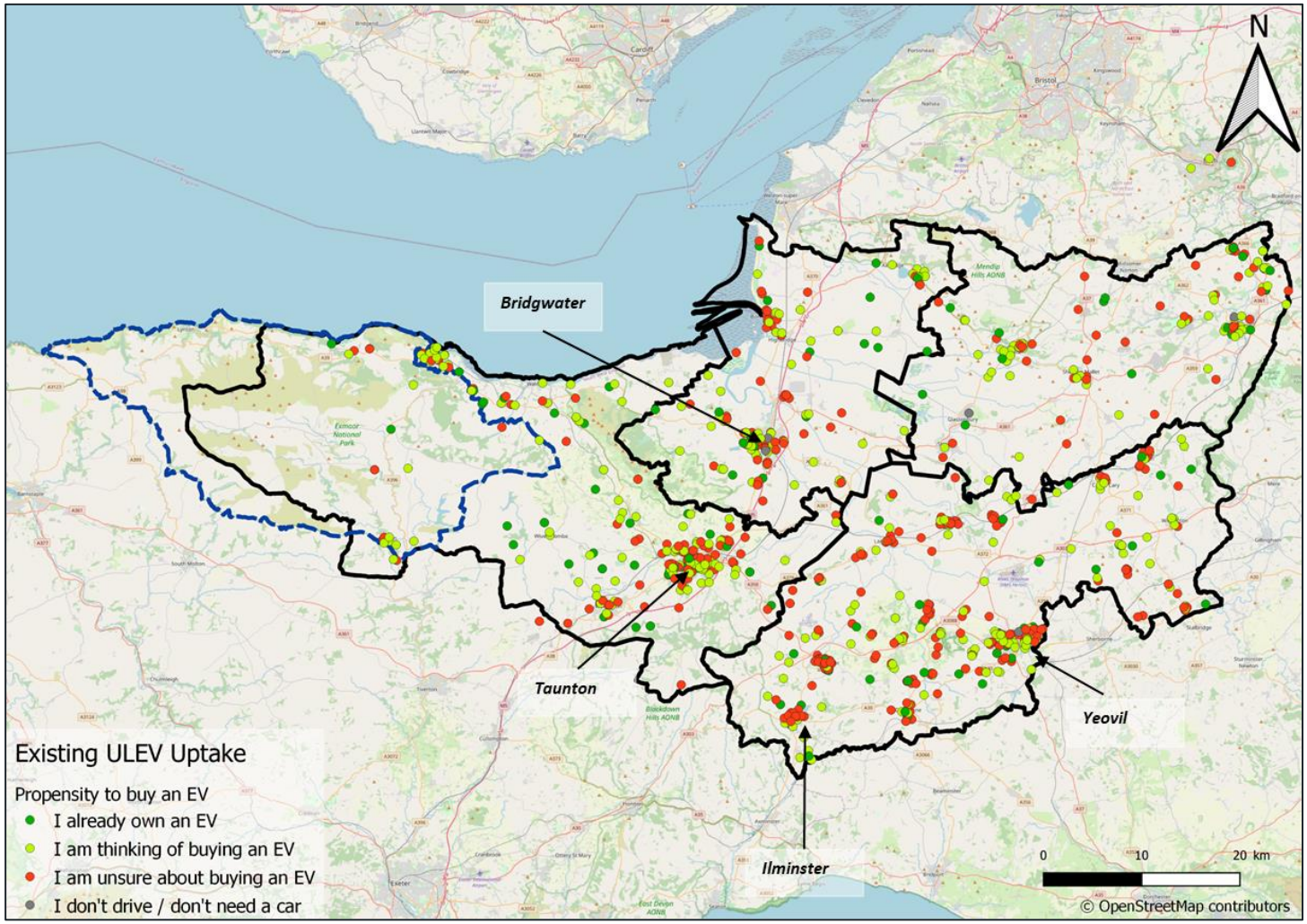


Figure 19 Stated intention to buy an EV by location



Conclusions

To conclude, the EV survey carried out by the Somerset Local Government Graduate Scheme had an extremely good response rate. The sample contains a greater percentage of people who own EVs than the DfT data shows for Somerset – indicating that the method of deriving the sample (open response, advertised by local districts websites) skews the sample towards those who are favourable to EVs.

It should be noted that the survey data relating to EV ownership within the districts does not align with the DfT vehicle licensing statistics.

The survey showed both some results that are in line with the expectations. For example, the survey showed that those with more cars are more likely to own EVs and that respondents who have access to private parking facilities are more likely to own EVs.

The survey highlighted that most respondents had considered switching to an EV (if they haven't already) and that their general perception of EVs were positive. The survey highlighted the lack of charging infrastructure, including public, private and accessible charging infrastructure, was considered to be a barrier to EV uptake in Somerset. The survey therefore backs up research from the literature and opinions from the stakeholder engagement that public charge points play an important role in overcoming range anxiety and that on-street parking is not a key consideration.

7 FORECASTING

INTRODUCTION

In order to inform our recommendations for charge point rollout, a range of EV uptake scenarios for Somerset were developed using WSP's *EV:Ready* tool. The tool enables EV uptake forecasting and flexible scenario testing, to generate forecasts to a neighbourhood level. It accounts for highly localised spatial variations in the key determinants of EV uptake rates, including:

- Consumer profiles and socio-demographics
- Availability of off-street parking
- Vehicle ownership
- Vehicle sales and turnover

The scenarios developed for this strategy included two reference case scenarios, and a third 'do something' scenario, which reflects the impact of recommendations proposed within this strategy.

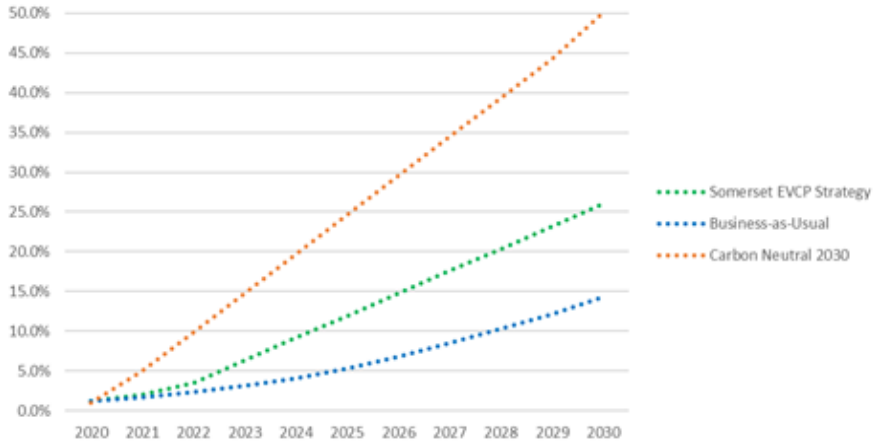
- **Business-as-Usual -** which takes the DfT WebTAG forecast percentage share of miles completed by electric vehicle vehicles within the recently revised (Table A 1.3.9, July 2020) figures.
- **Somerset EVCP Strategy** - this scenario reflects the impact of the recommendations proposed in section 8 over and above the Business-as-Usual baseline, including a ban on the sale of new petrol and diesel vehicles from 2032, the rollout of a comprehensive public charging network, further tax incentives and supportive measures from national Government, as well as local incentives.
- **Carbon Neutral 2030** – is a hypothetical scenario for a very rapid uptake of electrical vehicles, as would be required to come as close as possible to achieving the aspirations for being carbon neutral by 2030.

For each scenario a national level EV uptake forecast was defined, which either referenced a recognised industry forecast (DfT WebTAG) or were a derived forecast for uptake based on meeting a particular policy goal (Carbon Neutral 2030).

Existing EV registrations were then input at a district level using DfT data published quarterly. The national level forecasts are then assigned to a localised neighbourhood level using Experian Mosaic UK Generation 6 datasets, which are detailed to full postcode level. This latest version of Mosaic UK includes a wealth of richly detailed information on all individuals in the UK and the neighbourhoods in which they reside, as well as property and tenure information, economic indicators, census data. As well as earnings, demographics and lifestyles, they also account for technology adoption and attitudes to environmental issues, and EV and hybrid ownership (derived from DVLA data).

The scenarios also account for vehicle ownership based on ONS data by household, and importantly the extent which areas have access to off-street parking or are reliant on-street parking. In the Carbon Neutral and Somerset EVCP Strategy scenarios the deflator factor applied for on-street parking reliance is reduced based on more public electric vehicle charging points being provided.

Figure 20 Proportion of car distance travelled that is by EV in each scenario



The Figure above compares the uptake rates for EVs as a proportion of the total distance travelled by car in Somerset for each of the scenarios.

The **Business-as-Usual** based scenario projects that around 12.4% of total car distance travelled will be EVs by 2030.

The **Somerset EVCP Strategy** scenario projects that with the comprehensive package of measures outlined within this strategy enacted, and in particular the 2032 ban on the sale of new petrol and diesel vehicles, around 25% of the car distance travelled could be EVs by 2030.

The **Carbon Neutral 2030** scenario reaches around 50% of car distanced travelled by 2030, reflecting the maximum possible change based on standard vehicle turn over and sales rates. This scenario would require an immediate ban on the sale of new petrol and diesel cars, and significant carbon offsetting would be required to achieve carbon neutrality. To achieve an even higher uptake of EVs, extreme measures such as widespread roll-out of zero emission zones and national vehicle scrappage schemes would be required, with accompanying social and environmental impacts.

The figures on the following pages demonstrate how these scenarios for EV uptake are forecast to be distributed across Somerset by 2030, accounting for localised variations in consumer profiles, socio-demographics, availability of off-street parking, vehicle ownership and vehicle sales and turnover. Each hex represents a cluster of postcodes and households, to provide a clear view of the variations in uptake across the County. Areas not covered by a hex feature no, or very few, households.

Figure 21 Business-as-Usual 2030 Scenario - % EV Share

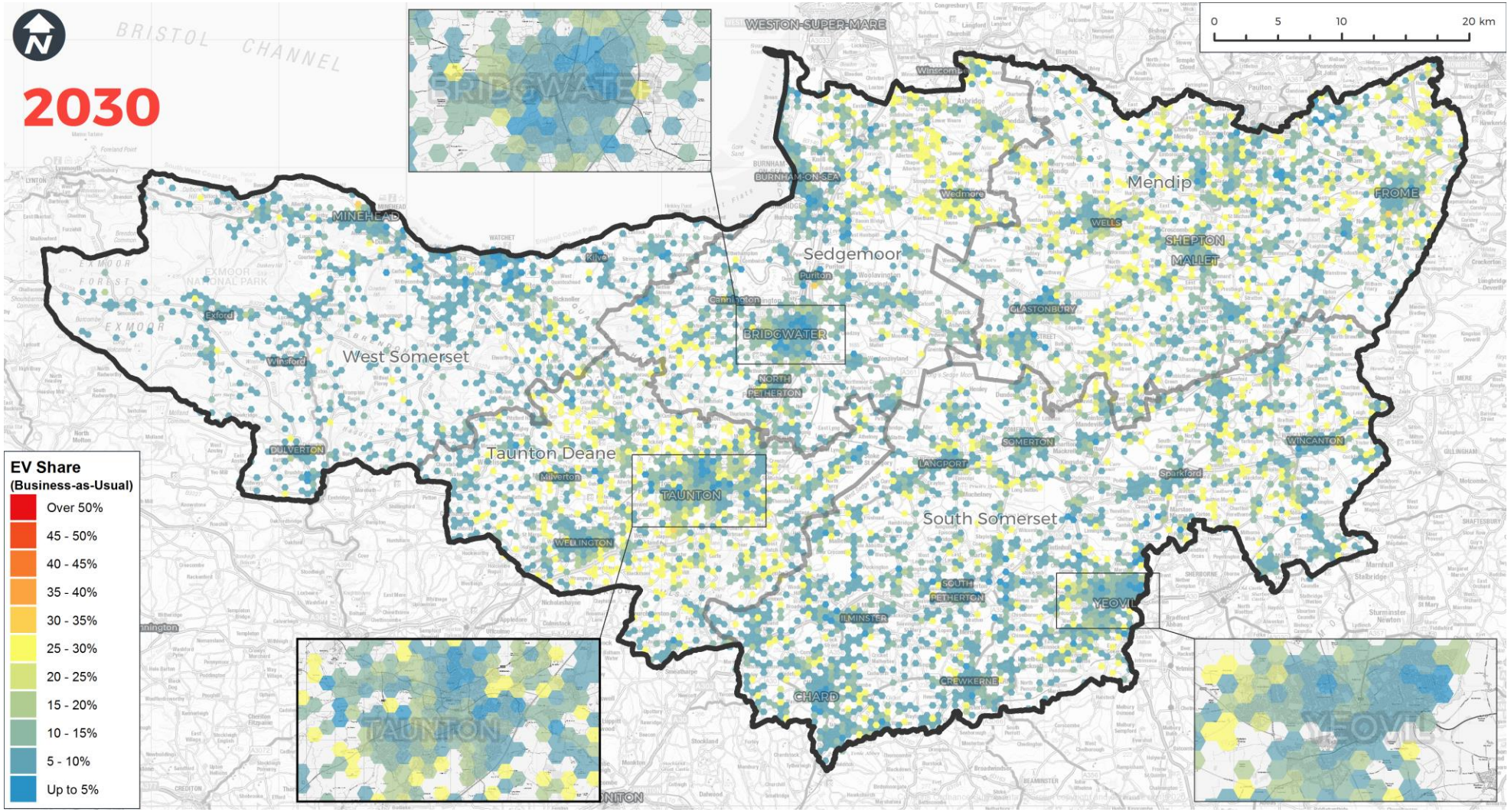


Figure 22 Business-as-Usual 2030 Scenario - Total EVs Registered

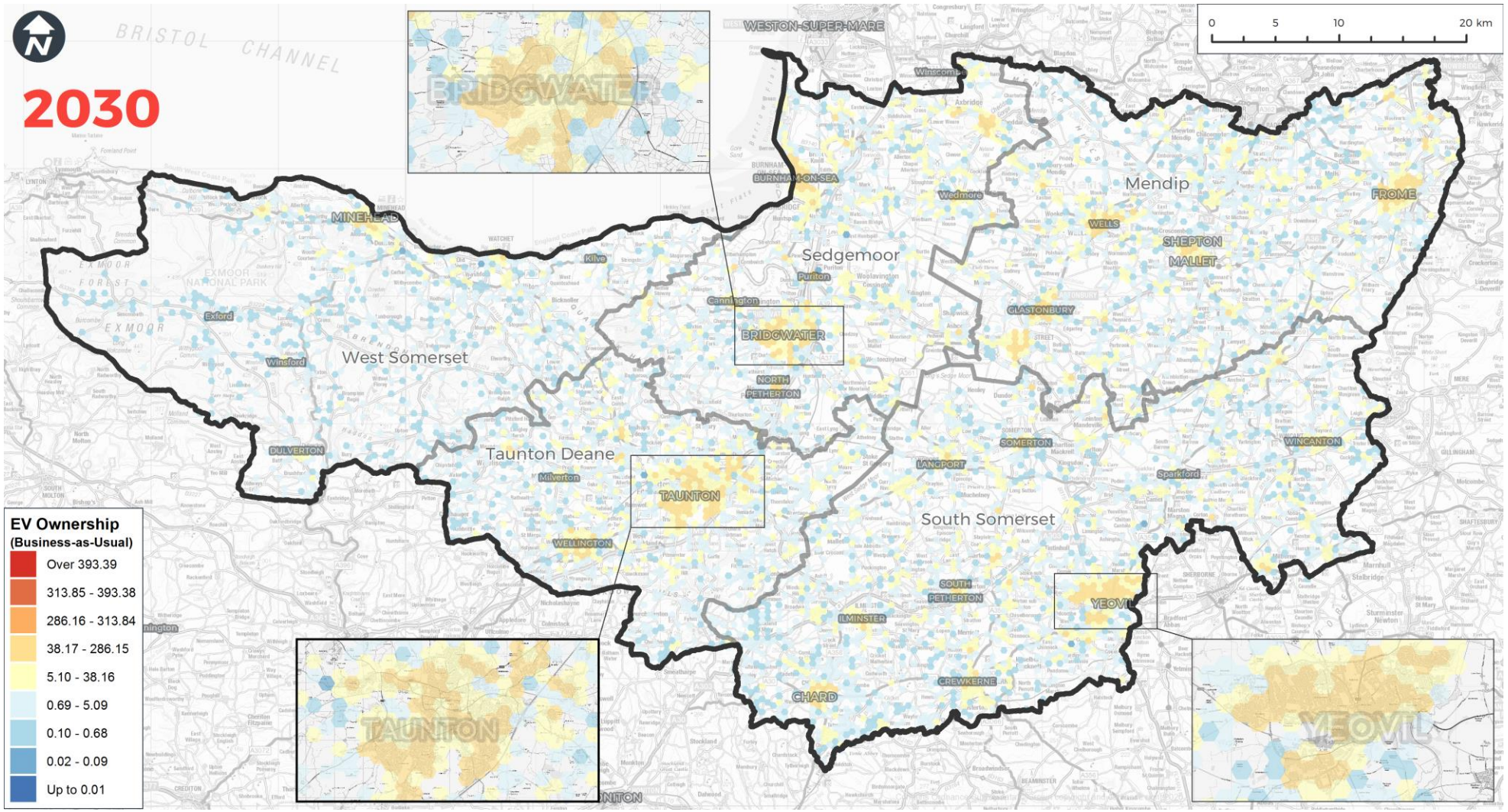


Figure 23 Somerset EVCP Strategy (2030) - % EV Share

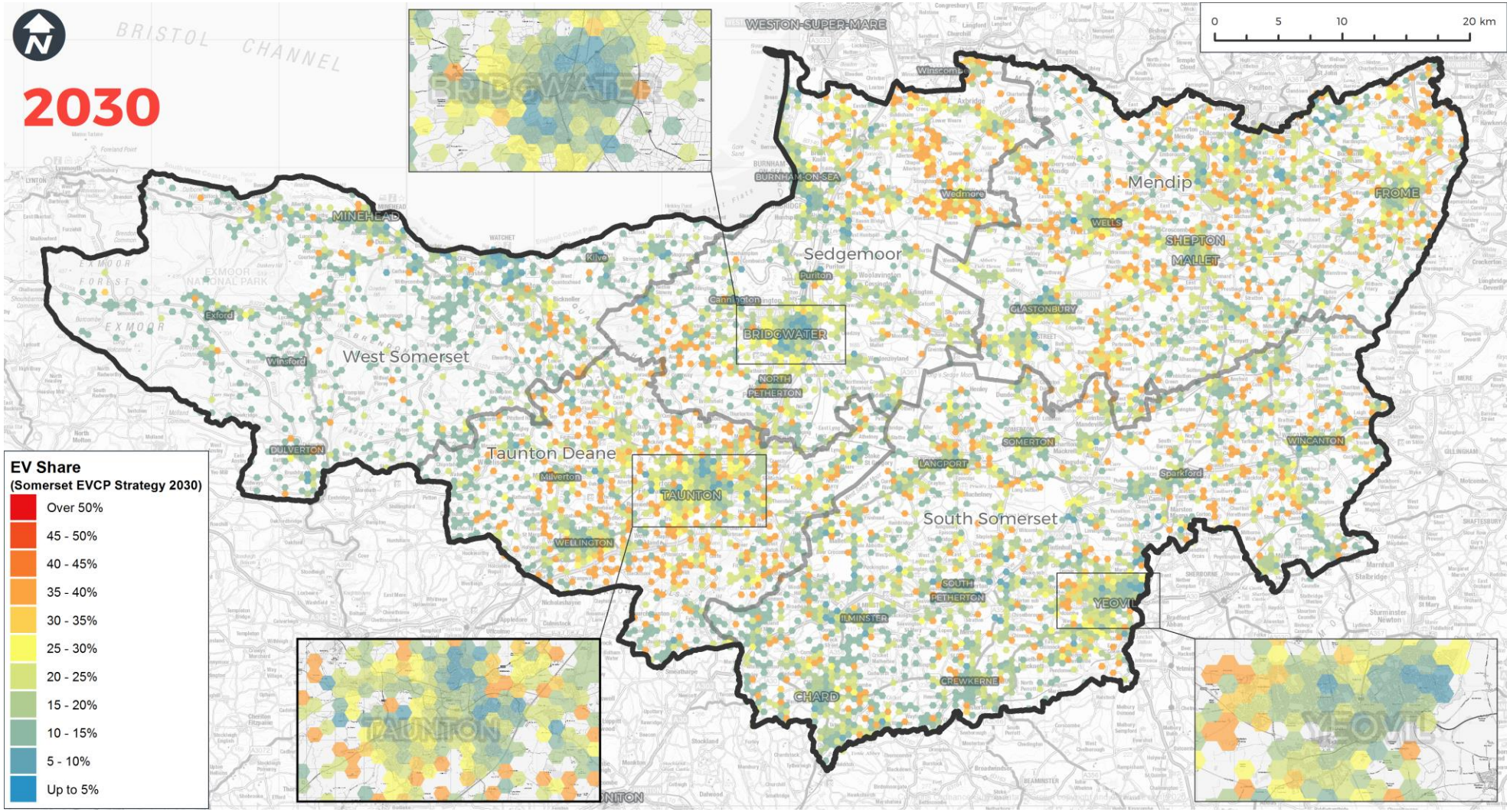


Figure 24 Somerset EVCP Strategy (2030) - Total EVs Registered

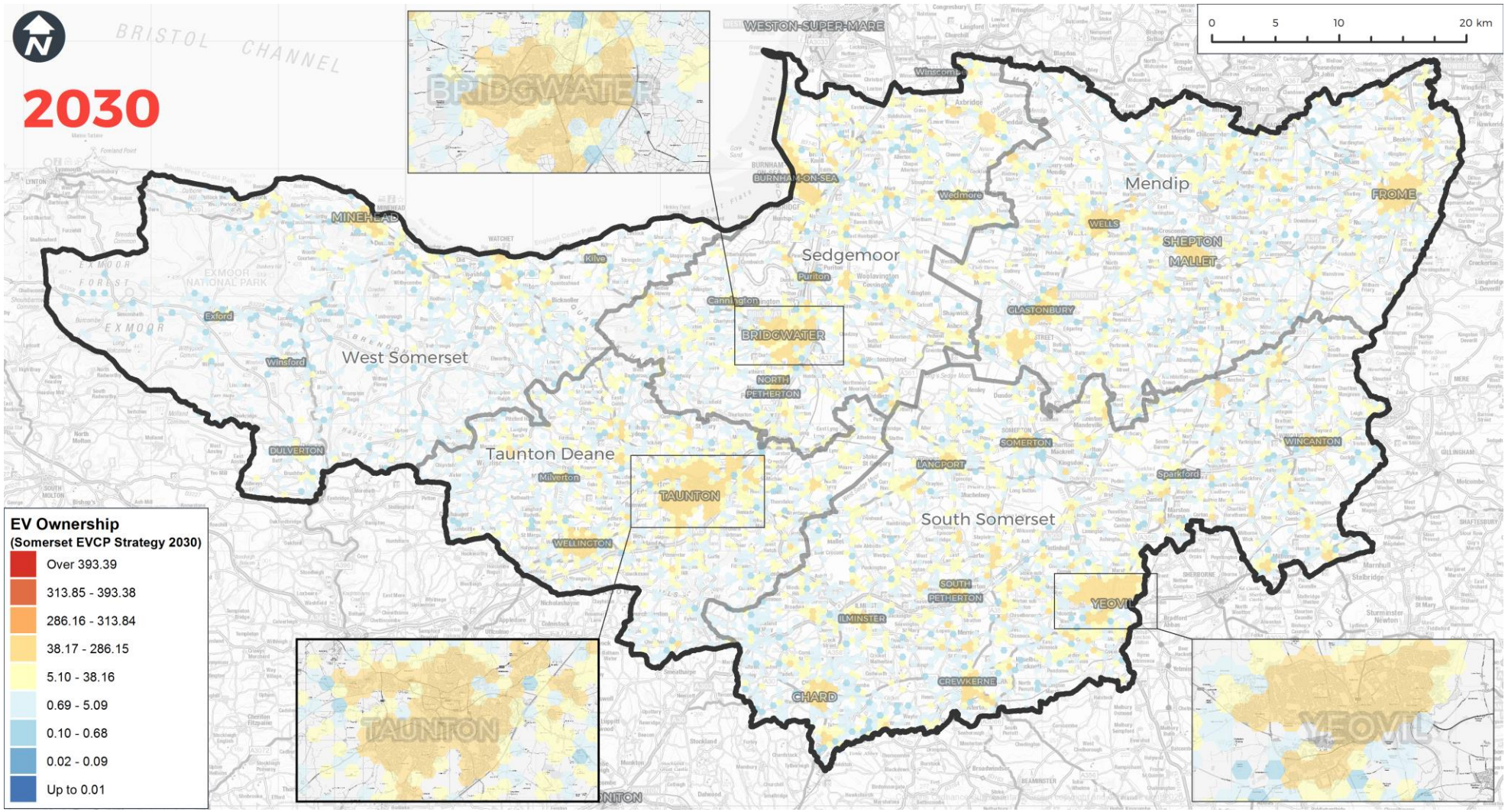


Figure 25 Carbon Neutral 2030 Scenario (2030) - % EV Share

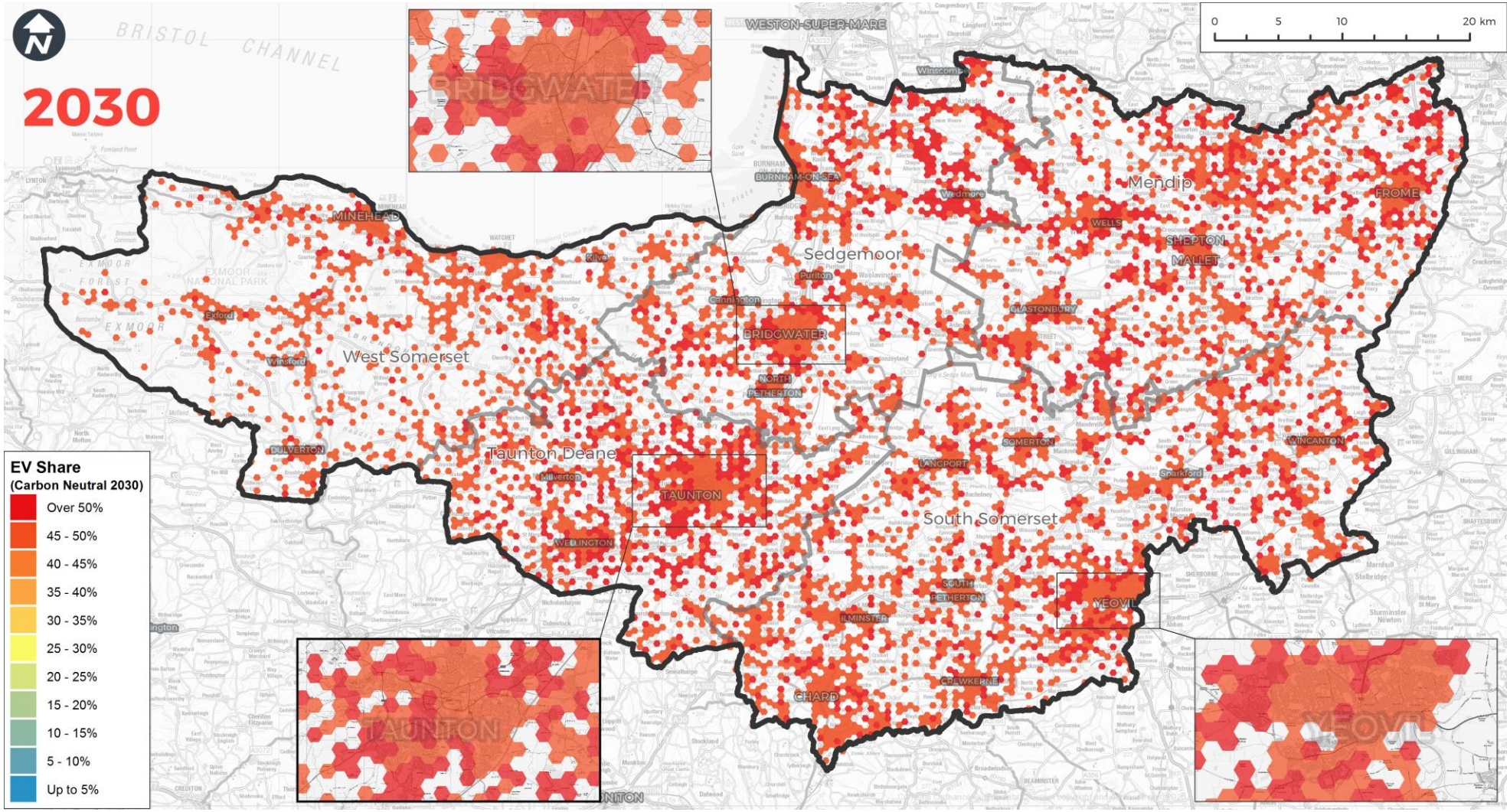
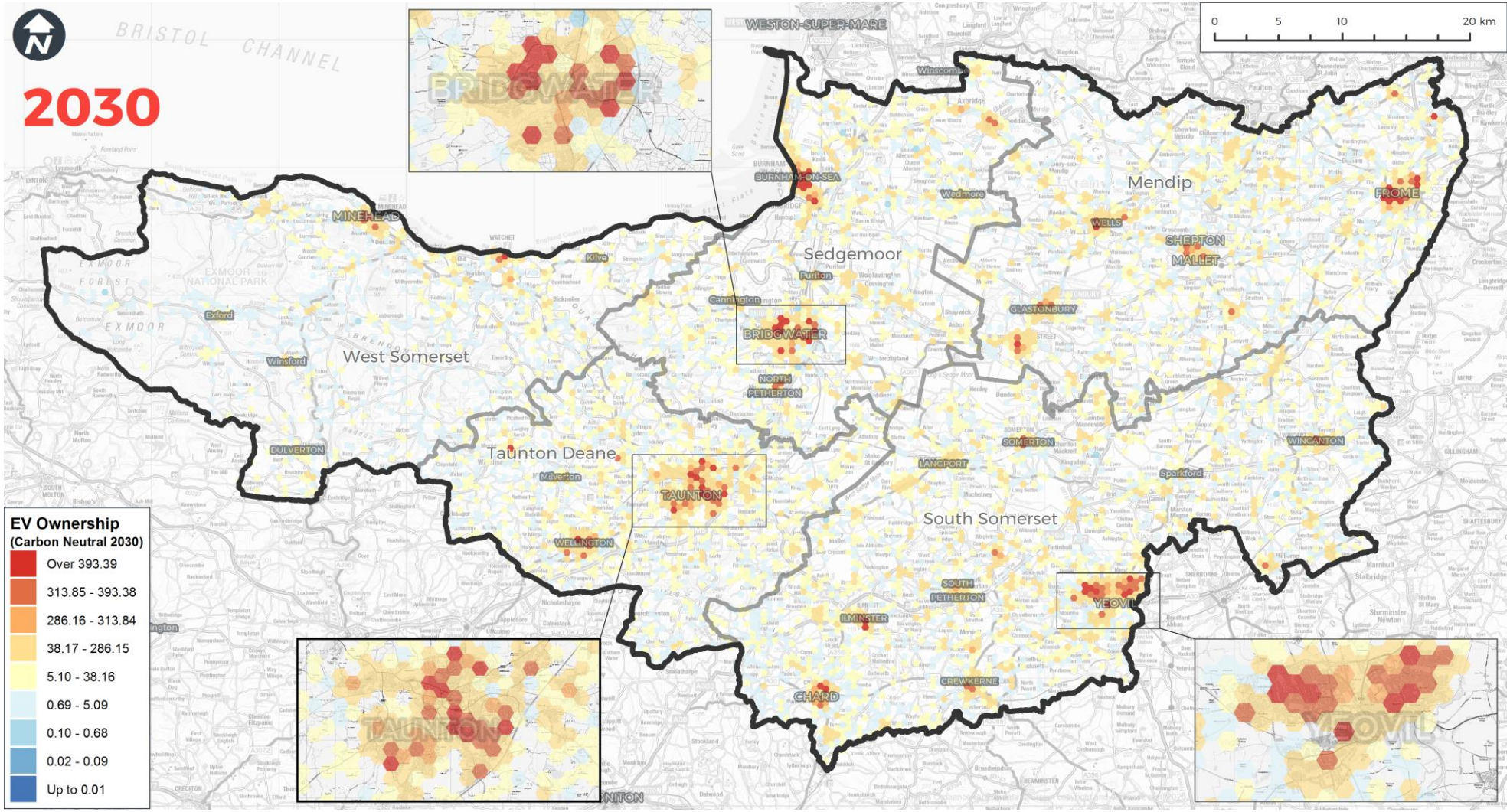


Figure 26 Carbon Neutral 2030 Scenario (2030) - Total EVs Registered



The *EV:Ready* forecasts account for a number of factors in determining localised variations in EV uptake, these include:

- Propensity to register an EV - socio demographics and consumer attitudes
- Car ownership
- Reliance on on-street parking

The differing attitudes and socio-demographic circumstances of local populations were analysed to identify their likely propensity for registering an electric vehicle, using the latest version of Experian's Mosaic UK (Generation 6 datasets). This includes a wealth of richly detailed information on all individuals in the UK and the neighbourhoods in which they reside, detailed to full postcode level as well as property and tenure information, economic indicators, census data. As well as earnings, demographics and lifestyles, they also account for technology adoption and attitudes to environmental issues, as well as their likelihood to buy a new vehicle and have vehicle, and hybrid vehicle ownership (derived from DVLA data). Each of the 66 Mosaic UK consumer groups is scored for the propensity to switch to an EV based on 10 different indices, which provide a statistical measure of variation across a representative group of individual data points. In Somerset the average propensity is slightly higher than the UK average. The highest propensities towards EV uptake were forecast in Taunton, and lowest in Somerton.

The scenarios also account for vehicle ownership based on ONS data by household, as whilst the household may fit the characteristics of an early adopter in terms of their propensity, but if they are not a vehicle owner, they would not be expected to become one just to purchase an EV. In Somerset the average vehicle ownership is above the UK average, with some the highest levels of vehicle ownership concentrated in South Somerset, and lowest in Taunton, though there is considerable variation within each district.

A further important factor is the extent which areas have access to off-street parking or are reliant on-street parking. To date those with access to off-street parking where they can conveniently and reliably charge their vehicle overnight have been over 3 times more likely to switch to an EV, with 93% of EVs estimated to have access to home charging by NextGreenCar in the Committee on Climate Change's (CCC) 'Plugging the Gap' (2018) study, despite between 20-40% of vehicles nationally having no such access to off-street parking. The detrimental impact of a lack off-street parking is however expected to lessen over time as EV ranges increase, recharging times shorten, and public infrastructure improves.

The likelihood of an area having access to off-street parking is assessed based on the typical property types of the predominant mosaic group at a postcode level, and assumes that terraced dwellings and converted flats would be reliant on on-street parking. All other housing types, such as detached dwellings, semi-detached dwellings and purpose-built flats, are assumed to have dedicated off-street parking and therefore not reliant on on-street parking. In Somerset fewer homes are estimated to be reliant on on-street parking than the UK average. The more urban areas are not surprisingly the areas with the highest proportion of households reliant on on-street parking, including Bridgewater, Yeovil and Taunton.

The competing influences of the local populations propensity for switching to EV, their car ownership levels, and the extent to which they are reliant on on-street parking, serves to create a nuanced picture of EV ownership across the County, as areas with high propensity towards EV ownership are often partly offset by also being areas of lower car ownership and greater reliance on on-street parking. In Somerset however, as on-street parking generally presents less of an issue than in other parts of the UK, individuals' propensity for EV uptake and variations in vehicle ownership levels have a greater bearing on localised uptake.

In broad terms, the areas of higher forecast uptake in Somerset are projected to be focused around the Taunton area, Burnham-on-Sea and the northern portion of Sedgemoor District, and the wider areas around Frome and Yeovil. EV uptake is forecast to be slower in the West of the County.

INDICATIVE NUMBER OF PUBLIC CHARGE POINTS

Table 13 Indicative public EVCP requirement in each scenario in 2030

	Business as Usual		Somerset EV Strategy		Carbon Neutral 2030	
District	**EVs**	**Public EVCPs**	**EVs**	**Public EVCPs**	**EVs**	**Public EVCPs**
Mendip	13,500	160-200	23,500	280-350	45,000	550-680
Sedgemoor	11,500	140-170	21,500	260-320	46,500	560-700
South Somerset	14,000	170-210	28,000	340-430	65,500	800-1000
Somerset West & Taunton	11,000	130-170	22,500	280-340	55,500	680-840
SOMERSET TOTAL	50,000	600-750	95,500	1160-1440	212,500	2590-3220

Table 13 summarises the total number of EVs predicted in each scenario, by district, in 2030. The number of EVs was used to calculate an indicative number of public charge points needed. The number of EVCPs is based on a large number of assumptions and as such should be treated with caution. However, it does provide an indication of the scale of public charging infrastructure needed, and how this changes in each scenario. It is important to note that the majority of public charge points would likely be delivered on private land such as at supermarkets, retail destinations, and other publicly accessible locations, rather than delivered directly by the public sector.

Assumptions informing the number of public EVCPs include:

- Average mileage of vehicles in 2030;
- Miles per kW of various vehicle types in 2030;
- Proportion of plug-in hybrids, and assumed distanced travelled in pure EV mode in 2030;
- Proportion of charging undertaken at public charge points in 2030, assumed to rise from 5% in 2020 to 9% in 2030;
- Maximum number of charging events per charge point per day; and,
- Ratio of fast to rapid chargers in 2030, assumed to be 95% fast, 5% rapid.

AREAS OF HIGH POTENTIAL EV DEMAND AND ON-STREET PARKING

Of the forecast uptake detailed in the preceding scenarios, the key areas that are likely to require intervention from the public sector are areas of the County where there is a:

- High propensity to switch to electric vehicles
- Moderate or high vehicle ownership
- High proportion of on-street parking

Figure 27 on the next page highlights areas where residents are more reliant on on-street parking, and are also forecast to be areas of moderate to high EV ownership, based on the 'Somerset EVCP Strategy (2030) Scenario'.

The areas shown in blue and green represent areas with moderate levels of EV growth, whilst the yellow and red areas highlight areas with relatively high levels of forecast EV growth. In order to support and enable EV uptake in these areas, prospective EV owners will need to be able to access convenient publicly accessible charge points, to remove any barriers posed to those without access to off-street parking, which will otherwise stifle uptake.

The towns of Minehead, Taunton, Bridgwater, Burnham-on-Sea, Yeovil, Chard Street, Glastonbury and Frome have a greater need for intervention given there is a greater reliance on on-street parking and a greater propensity to switch to EVs.

On-street charging points at these locations should be considered, where the street layout can accommodate the infrastructure. Alternatively, residential charging hubs in nearby off-street car parks could be considered where they are located nearby and readily accessible.

Figure 27 Areas of high potential EV demand and on-street parking (Somerset EVCP Strategy 2030 Scenario)

8 RECOMMENDATIONS

The following section sets out recommendations to deliver the Somerset EV charge point network, drawing on the findings of the market review, baseline review, stakeholder engagement, and EV forecasts for Somerset.

Lead by example

1. Undertake a Fleet Review to identify opportunities

As identified through the stakeholder consultation, the Somerset authorities are at different stages of converting their vehicle fleets to EV. We recommend the authorities undertake a fleet review and adopt a stretching but achievable target to convert fleets to EV, recognising that not all vehicle types, use cases and duty cycles currently have a viable EV alternative. For example, we understand around 70% of SCC fleet comprises larger vehicles (>3.5tns). Consider the potential for cross-district collaboration and sharing of fleet vehicles.

2. Install charge points at Council depots, with associated driver awareness and training

Linked to the findings of the Fleet Review, install appropriate charge points and other infrastructure at Council depots to support the conversion to a low carbon fleet. We recommend these charge points are fully owned and operated by the Council. It should be noted that these two devices are currently installed at County Hall; albeit they are out of service at time of writing.

3. Install charge points at key Council offices

To show the councils commitment to electric vehicles it is recommend that all council offices have charge points installed, which are made available for public use where possible. It is recommended that the charge points are installed at the following sites:

- Somerset West and Taunton - Killock Way in Williton
- Exmoor National Park Authority - Exmoor House in Dulverton
- Somerset West and Taunton – Belvedere House in Taunton
- Sedgemoor – Bridgwater House in Bridgwater
- South Somerset – Byrmpton Way Offices in Yeovil
- Mendip – Canards Grove in Shepton Mallet

The recommendation is made on the basis that Somerset West and Taunton, as well as Sedgemoor, have a lack of publicly available charging points. County Hall already has two charge points installed.

These sites could be delivered as part of a wider charge point project as set out later in the recommendations and could utilise funding from the Workplace Charging Scheme.

Work with central government and industry to increase uptake of Electric Vehicles

Central government has the most powerful levers available to accelerate the uptake of Electric Vehicles, which in turn will drive demand and uptake of EV charge points. To achieve carbon neutral 2030 goals the Somerset Councils will need to work with central government and industry to bring about change over and above requirements for the National Net Zero 2050 target.

4. Urge Government to bring forward the ban on sales of new petrol and diesel cars and vans to 2030 or earlier

The Committee on Climate Change recommends that the ban should be brought forward to 2032 to meet existing UK Net Zero 2050 climate goals. However, to meet the more ambitious carbon neutral 2030 goal, the date will need to be brought forward further to as soon as practicably possible.

5. **Urge Government to further reduce the costs of electric vehicle purchase, leasing and ownership compared to petrol and diesel vehicles**

For example, this could include changes to vehicle sales tax, stopping the freeze on fuel duty which has seen fuel duty in real terms reduce by around 30% since the year 2000, and national scrappage schemes. A House of Commons Briefing Paper (2020) states that as the proportion of electric vehicles on our roads increases, total taxation from fuel duty will fall significantly and some form of road user charging or other taxation is likely to be required to replace this tax income.

6. **Explore additional local incentives to increase EV uptake beyond additional charge point infrastructure**

Local authorities across the country are developing non-charge point based measures to encourage take up of Electric Vehicles, for example through OLEV funded projects, Clean Air Plans, carbon neutral 2030 plans, and other initiatives. These range from:

- Marketing and promotion of EVs, linked to wider travel behaviour projects
- "Try an EV" schemes and EV experience centres (such as at Milton Keynes)
- reduced cost of parking permits and public parking for EVs
- local scrappage schemes and mobility credits; and,
- Zero Emission Zones in Oxford and London.

As set out in section 4, Austria is already using differential speed limits to help incentivise Electric Vehicles, linked to the need to tackle poor air quality. A reduced speed limit on higher speed roads, such as the Strategic and Major Road Networks, could be proposed until the climate emergency is averted, with EVs exempt from this. This could be a highly effective way to tackle the longest distance car trips that contribute the most to the climate crisis, but would require changes to legislation at the national level. The measures would encourage modal and vehicle shift for the longer journeys undertaken by the richest in society who would be less impacted by road charging but would also require new powers and would be controversial.

7. **Identify opportunities to support research and innovation in Electric Vehicles in Somerset**

For example, by encouraging EV specialist industries to local in Somerset, including at the Gravity campus, and fostering collaboration within the sector. This could also include further engagement with educational establishments in Somerset on EV issues.

Home charging

Around 80% of EV charging is currently done at home, and as set out in this document, charging at home offers the cheapest cost per charge for users. With smart charging, it offers the biggest potential to shift electricity demand to the middle of the night, when demand on the grid is at its lowest and the proportion of low carbon energy in the grid is at its highest.

8. **Adopt EV parking standards to ensure every new home with a parking space has a smart EV charge point**

This recommendation brings forward Governments existing proposals for changes to building regulations. The detailed recommendations and supporting text are contained in Appendix A.

9. For existing households, promote the OLEV Electric Vehicle Homecharge Scheme

The scheme can contribute up to £350 towards the installation of a home charging unit.

10. Promote home charging share schemes such as Zap-Home

Combined with increased roll-out of home chargers through recommendations 8 and 9, this measure could significantly increase the public charge point network at minimal cost. Research from ZapMap suggests 50% of EV drivers are willing to share their home charge point with other users.

11. Provide guidance for the use of cable covers and covered ducts by residents

As detailed in section 4, cable covers and covered ducts offer residents the opportunity to charge their vehicle relatively easily with little Council intervention, and benefit from domestic electricity prices.

Hampshire Council has issued guidance to residents wishing to use cable covers, including length and placement of the cable, and avoiding creating a public nuisance. The guidance also states that any legal liability arising from the placement of the cable or protector is the resident's responsibility, and advises residents to speak to their home insurer to confirm their home insurance policy covers this situation Further details can be found at the following hyperlink: https://www.hants.gov.uk/transport/ev-charging-points/ev-charging-guidance

We recommend the use of cable covers would only be acceptable in areas of extremely low or zero footfall to avoid creating a public nuisance, and only in areas of low parking stress where a resident can park outside their address with reasonable certainty.

Similarly, the Oxford on-street charging trial recommended that the use of cable channels is encouraged, with the installations undertaken by a suitably qualified contractor. We recommend the use of cable channels would be acceptable in areas of low to medium footfall, and in areas of low parking stress where a resident can park outside their address with reasonable certainty.

12. Submit a bid to the OLEV On-street Residential Chargepoint Scheme

The OLEV On-street Residential Chargepoint Scheme pays for 75% of the capital costs of charge points, with an indicative limit of up to £100k per district authority. OLEV set out minimum technical specifications for on-street charge points that any provider would need to adhere to. A private sector partner can contribute the remaining 25% of funding, meaning charge points can be delivered with no local authority investment. We would recommend a private sector delivery partner is identified prior to the funding bid submission. Applications to install charge points in public car parks in residential areas will be considered provided that an option is available for local residents looking to charge their car both during the day and overnight.

Areas of potential demand for on-street charging has been identified through the public survey and in Section 7. Requests to the Council for on-street charge points should be logged, and an additional public survey to identify hotspots of demand for on-street charge points could also be used to inform a bid.

Section 7 identified that the main towns in Somerset (Taunton, Minehead, Bridgwater, Yeovil, Street, Glastonbury, Chard) would be suitable for on-street residential charegpoint schemes. The stakeholder engagement exercise also identified the following locations for on-street charge points:

- Kings Square in Bridgwater
- Upcoming Firepool Development in Taunton

A range of on-street solutions charge point solutions are likely to be needed. As set out in section 4, trials in Oxford showed that lamppost charge points performed best, however, standalone bollard charge points may need to be considered in some areas. The Oxford trial recommended against the use of enforcement via Traffic Regulation Order (TRO) if possible.

13. Adopt design standards for on-street chargers to enable and manage future private sector roll-out of charge points

Key principles should be to maintain minimum footway widths of 2m, provide accessible charge points for disabled users, and avoid trailing wires. The London EV Charge Point Design Guidance provides a useful reference point.

http://lruc.content.tfl.gov.uk/london-electric-vehicle-charge-point-installation-guidance-december-2019.pdf

Workplace charging

Workplace charging provides an opportunity to charge vehicles where they are routinely parked for long periods of time during the day, reducing the demands on the electric grid.

14. Adopt EV parking standards for new workplaces

This recommendation brings forward Governments existing proposals for changes to building regulations, with 10% active provision and 20% passive provision at new workplaces. The detailed recommendations and supporting text is contained in Appendix A.

15. For existing workplaces, promote the OLEV Workplace Charging Scheme

The scheme can reduce the cost of workplace chargepoints by up to £10,000. The grant is capped at £350 per socket, up to a maximum of 40 sockets

16. Promote the Energy Saving Trust fleet reviews

Green Fleet Reviews are carried at no cost for most private and public sector organisations. They evaluate how sustainable a fleet operation is and identify opportunities to reduce emissions, fuel costs and expenditure.

17. Promote workplace charging share schemes such as Zap-Work

Similar to home charging share schemes, this measure could significantly increase the public charge point network at minimal cost. Research from ZapMap suggests 30% of workplaces are willing to share their charge point with other users.

Other destination charging

While only a small percentage of charging is currently conducted away from the home or workplace, with only 5% of charges undertaken at public charge points. However, 35% of survey respondents stated that lack of public charging infrastructure was a barrier to them purchasing an EV.

At this stage, the geographical distribution and availability of public charge points is far more important than the total number of charge points provided. With the roll-out charge points recommended in this section, there is likely to be ample overall charging capacity, however, there may be localised demand hotspots that are extremely challenging to predict. Therefore, the recommended approach is to ensure a wide geographical spread of charge points, with passive provision at each site allowing for expansion of the number of charge points per site at a later date where the observed real world demand supports this.

18. Adopt EV parking standards for other new non-residential developments

This recommendation brings forward Governments existing proposals for changes to building regulations, with 10% active provision and 20% passive

provision. The detailed recommendation and supporting text is contained in Appendix A.

19. Develop charging hubs at Taunton Gateway and Silk Mills Park & Ride

Park & Ride sites could be transformed into EV charge point hubs, creating an additional incentive to use them and reduce traffic volumes in congested central areas. Due to the long length of stay, relatively low power charge points can be used, and in the longer term the charge points can provide an additional income stream to help support Park & Ride services. Our grid assessment shows there is spare capacity in the vicinity of both Park & Ride sites, however, the potential to use local renewables generation at or near the sites could also be explored to further reduce the impact on the grid.

20. Install charge points at council owned public car parks

A prioritised list of public car parks is contained in Appendix C and shown in Figure 28. Sites have been prioritised based on:

- EV uptake forecasts in the surrounding area, as outlined section 7
- Areas subject to higher tourist / visitor demand
- Car park size
- Car park stay length

While there is likely to be sufficient local grid capacity at the majority of sites, a further sift will be required based on detailed assessments of each site individually by the DNO.

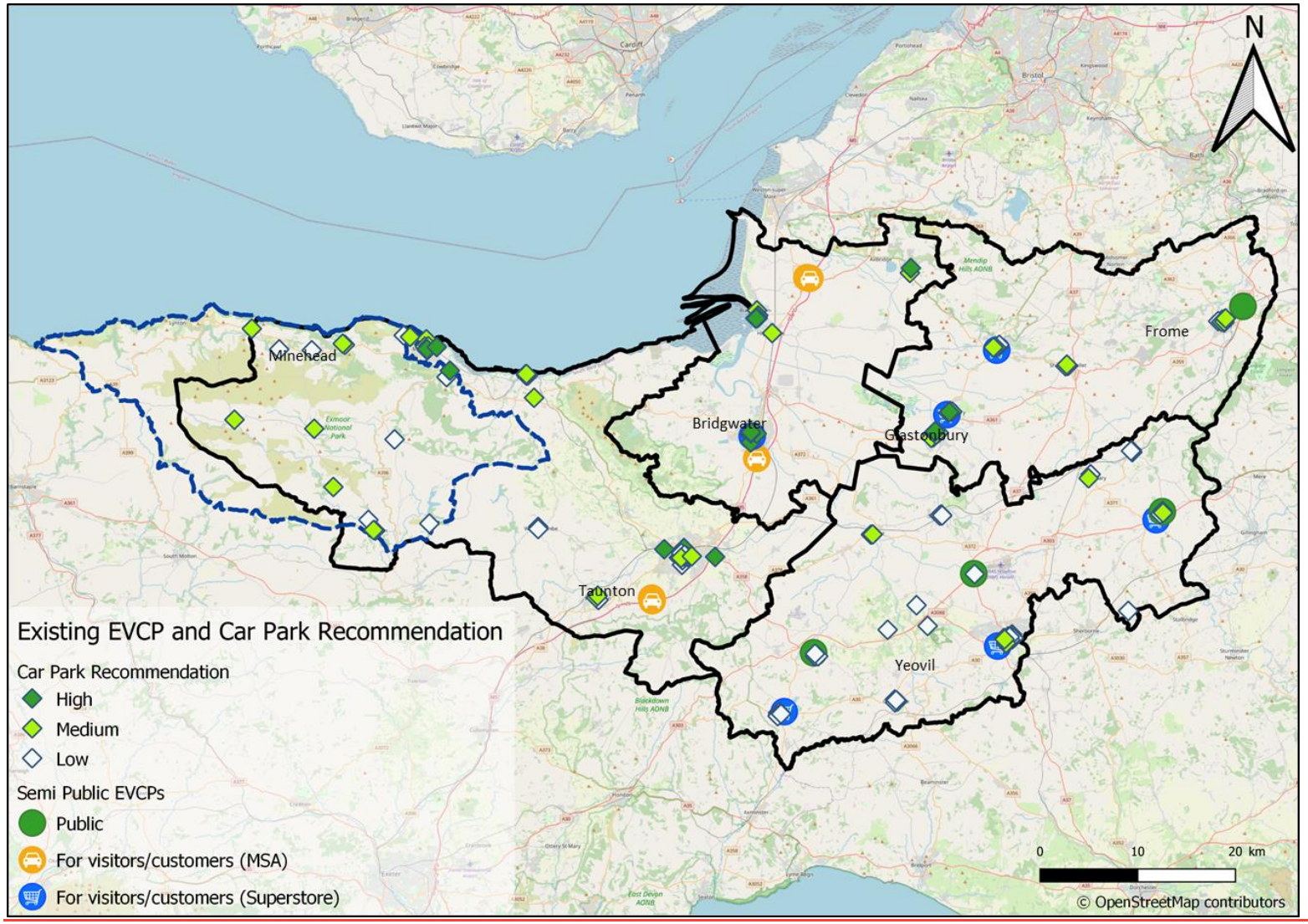
The right charge point for the right place is required. For most public car parks identified this is likely to be a 22kW charge point capable of smart charging and load balancing. The cost of 22kW charge point equipment is not significantly different from 7kW units and the ability to load balance means that impacts on the grid can be minimised. Having said this, in car parks with long dwell times, 7kW may also be sufficient.

Following the preferred approach with the DELETTI project in Devon, we would recommend parking charges continue to apply for all vehicles including EVs to help manage congestion. At present provision of EV charging bays at each car park, with passive provision for a further six bays is likely to accommodate existing demand and allow for future expansion, whilst minimising the need for grid upgrades that may not be needed. Once charge points are installed, their usage can be monitored, and additional sockets added if there is sufficient demand.

As with all charge point delivery that the Somerset authorities can influence, key elements of the specification should include:

- Service levels – service level agreements (that can be enforced) should seek to ensure the charge point is operational all of the time
- Interoperability – charge points should work with the maximum number of vehicle types.
- Accessibility – for disabled and mobility impaired users, including accessible user interfaces for any app-based payment solutions
- East of payment - with the ability to make ad-hoc payments by standard payment card (including over the phone), with no preferential rates for membership schemes
- Renewable energy – electric sourced from renewable sources to further minimise the climate impact of EVs
- No exclusivity or exclusion zones, with reasonable termination clauses

Figure 28 Public charge point priorities shown with existing semi-public existing EVCPs.



21. Encourage stakeholders to deliver EV charge points at other key destinations including supermarkets and rail stations

Supermarkets and railway station car parks offer an excellent opportunity for EV charging. Supermarkets typically visited several times a week for 30 minutes or more, offering a potential alternative to home charging, with many supermarket chains already rolling out charge points. Similarly, rail stations attract frequent repeat visits by longer staying customers, which are well suited to use by EVs.

22. Engage with tourist destinations and explore tourism opportunities associated with EV

EV charge points in Somerset could play an important role for tourism, both for visitors to Somerset and for people travelling through Somerset on the M5 and A303 towards Devon and Cornwall. Key tourist and shopping destinations including, Glastonbury, Clarks Village and Street, and English Heritage properties offer strong potential for the uptake of EV charge points in a similar way to the National Trust's planned roll-out of charge points. EV charge points may also help attract visitors and build on the "green tourism" offer.

23. Consider the potential to integrate EV charging with other energy and transport services as part of new Mobility Hubs

At public car parks and other locations, there may be opportunities to co-locate car-clubs, bike hire, bike storage, and other transport services to create new mobility hubs and multi-modal transport solutions for people that need more than one form of transport to reach their destination. EV car clubs in particular, could offer more people the opportunity to try and have access to an electric car, removing the purchase cost barrier.

There is also the potential to group EV charge points with local renewable energy generation to reduce the impact on the grid. Rooftop solar on nearby buildings or wind power is likely to be the most cost effective approach, although battery storage and solar car ports may become more competitive in future. Future adoption of Vehicle-to-Grid (V2G) technology could also be used to minimise grid impacts, linked to EV charging hubs.

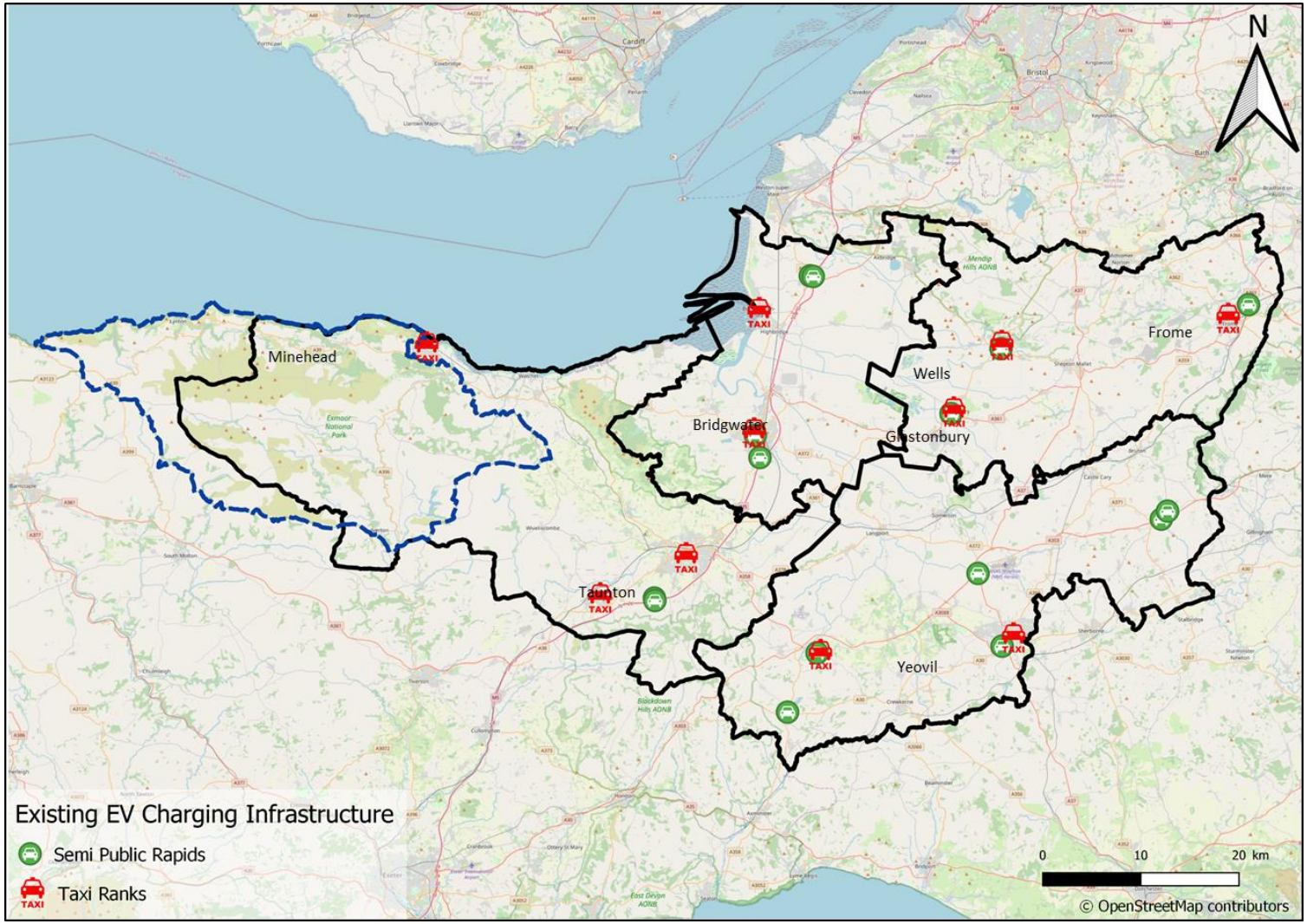
On route charging

On route charging using rapid chargers can help overcome range anxiety issues and can also provide an alternative, if expensive, means of charging for people without access to home or destination charging. Many "fully funded" charge point offers focus on rapid charging, with a market preference for highly trafficked routes with good waiting facilities.

24. Engage a private sector supplier to deliver rapid charge points where there are currently gaps in provision (specific areas based on mapping) and to explore delivery of rapids chargers for use in urban centres including by taxis in locations near to taxi ranks

Figure 29 shows that the taxi ranks in Minehead, Burnham-on-Sea and Wells are not located near to a semi-publicly accessible rapid charger; thus, inhibiting taxi drivers operating in those towns from switching to EVs.

Figure 29 Taxi ranks proximity to semi-public rapid charge points (i.e. including MSAs and superstores, excluding hotels)



Governance

The proposed governance approach to deliver the recommendations of this strategy was discussed at a stakeholder workshop. While the final governance arrangements are to be confirmed, the intention is for an EV working group to be established within the wider Somerset Climate Emergency response governance structure, and reporting to a transport working group. It is recommended the EV working group is formed from an EV lead from each authority, bringing in wider officer support and expertise where needed.

This should help ensure that EV work across the authorities is coordinated, and links to wider climate and energy workstreams. The EV working group will have overall responsibility for maintaining momentum and delivering on the recommendations.

A stakeholder forum of key external stakeholders and delivery partners could also be established, to help guide delivery of the strategy. For example, this could include Highways England, EV users, local EV businesses, and others.

Delivery approach

The Somerset authorities are relatively early in the journey towards delivery of a comprehensive EV charging network. There is an initial role for the authorities to attract public sector grant funding combined with private sector investment, to help develop the network.

Based on engagement with officers in the Somerset authorities the preference appears to be for a low risk approach, recognising limited Council funds and resources, particularly for revenue funding that would be needed to operate and maintain a public charge point network. The coronavirus crisis is likely to further reduce public sector budgets, limiting the options available. There is a general desire for a long-term delivery partner to assist with EV roll-out. Some Somerset authorities, including South Somerset District Council, have shown a willingness to invest Council funds in charge points, and there have been a number of private sector approaches to Councils for fully funded delivery models. As such, we recommend the following delivery approaches:

Public ownership

The recommended approach to deliver charge points at Council depots, giving full control and ownership. If used entirely for fleet purposes the management of the charge points can be undertaken in-house.

Concessionary model – public/private funded

A concessionary model would be the preferred approach to deliver the following recommendations:

3. Install charge points at key Council offices

12. Submit a bid to the OLEV On-Street Residential Chargepoint Scheme

19. Develop charging hubs at Taunton Gateway and Silk Mills Park & Ride

20. Install charge points at council owned car parks

This approach will maximise the effectiveness of public sector funding for charge points, leveraging private sector investment in charging infrastructure in Somerset. We would recommend a revenue sharing arrangement is used to share the potential benefits, with a maximum concession period of 10 years allowing the Somerset authorities to take stock and review once the EV market has matured. A private sector partner should be procured, with the simplest mechanism being to use an existing framework arrangement.

Fully funded

Delivery of rapid charge points via a fully funded offer should be considered, either as a standalone contract or, as Dorset Council have done, as a bolt on to their main charge point contract. Provision of rapid chargers should be market led.

9 CONCLUSIONS & NEXT STEPS

We are facing a climate crisis and all Somerset authorities have declared a climate emergency, working towards becoming carbon neutral by 2030. The emerging Somerset Climate Emergency Strategy recognises that extensive electrification of surface transport is needed, and that Electric Vehicles (EV) charging infrastructure in Somerset needs to scale up significantly.

This document sets out a strategy for the Somerset local authorities to help effectively deliver the necessary electric vehicle charging network for Somerset. It has considered:

- relevant policy context
- the potential role of electric vehicles
- existing and emerging vehicle and charge point technologies
- the local context in Somerset
- stakeholder views
- EV uptake scenarios and forecasts

A total of 24 recommendations have been made to help deliver a comprehensive charge point network for Somerset. A draft implementation plan showing the Council's role for each recommendation, responsibilities, timescales, is shown in Table 14 overleaf.

The EV market is continually changing and rapidly evolving, and as such this strategy should be regularly monitored and reviewed. It is proposed that this strategy is reviewed every 3-4 years to account for the rapidly evolving electric vehicle market.

Table 14 Action Plan

Workstream	Council role	Action by	Recommended Timescales
Review fleet			
1. Undertake a Fleet Review to identify opportunities 2. Install charge points at Council/EPNA depots, with associated driver awareness and training	Lead	All authorities Fleet managers	Short term (by end of 2021) / Ongoing
Work with central Government			
4. Urge Government to bring forward the ban on sales of new petrol and diesel cars and vans to 2030 or earlier 5. Urge Government to further reduce the costs of electric vehicle purchase and ownership compared to petrol and diesel vehicles (6. Urge Government for additional funding and powers to implement local EV incentives if required following action 6).	Encourage	All authorities Cllrs/MPs/Chief Execs	Ongoing
Update EV Parking Standards and Design Standards			
8. Adopt EV parking standards to ensure every new home with a parking space has an EV charge point 14. Adopt EV parking standards for new workplaces 18. Adopt EV parking standards for other new non-residential developments	Require	SCC Highways Development Control Lead with support from all authorities	Short term (by end of 2021)
13. Adopt design standards for on-street chargers to enable and manage future private sector roll-out of charge points	Require / Encourage		Medium/ Long term (by end of 2023)
11. Provide guidance for the use of cable covers and covered ducts by residents	Enable		Short term Short term (by end of 2021)
Promotion & information			
9. For existing households, promote the OLEV Electric Vehicle Homecharge Scheme 10. Promote home charging share schemes such as Zap-Home 15. For existing workplaces, promote the OLEV Workplace Charging Scheme 16. Promote the Energy Saving Trust fleet reviews 17. Promote workplace charging share schemes such as Zap-Work	Encourage	All authorities Comms/Engagement Teams (link to wider travel behaviour change programmes if possible)	Ongoing

Workstream	Council role	Action by	Recommended Timescales
21. Encourage stakeholders to deliver EV charge points at other key destinations including supermarkets and train stations	Encourage	All authorities	Ongoing
22. Engage with tourist destinations and explore tourism opportunities associated with EV			
Procure charge points			
3. Install charge points at key Council offices	Lead	All authorities working in partnership, with coordination by SCC	Short term (by end of 2022)
20. Install charge points at council owned public car parks			Short term Short term (by end of 2021)
19. Develop charging hubs at Taunton Gateway and Silk Mills Park & Ride			Medium term (by end of 2023)
12. Submit a bid to the OLEV On-Street Residential Chargepoint Scheme			Short term (by end of 2021)
24. Engage a private sector supplier to deliver rapid charge points			Medium term ((by end of 2023)
23. Consider the potential to integrate EV charging with other energy and transport services as part of new Mobility Hubs	Explore		Ongoing
Explore wider measures			
6. Explore additional local incentives to increase EV uptake beyond additional charge point infrastructure	Explore	SCC Transport Lead with support from all authorities	Ongoing
7. Identify opportunities to support research and innovation in Electric Vehicles in Somerset	Enable	All authorities Transport & Economy Teams	Ongoing

Appendix A: Recommended parking standards

Land Use	Active Provision	Passive Provision
Residential	All new residential developments with an allocated car parking space to have a charge point. All new residential developments with more than 10 unallocated off-street and/or on-street car parking spaces to have active provision for 10% of unallocated spaces.	n/a 20%
Non-residential	All new non-residential buildings with more than 10 car parking spaces to have at least one charge point, with active provision for 10% of spaces. At least 1 charging unit should be provided for every 5 disabled parking spaces. Where 50 parking spaces or more are provided then 1 rapid charging unit (minimum 43 kW) per 50 spaces shall be provided and parking time limited to 1 hour.	20% 20%

Charge point specifications

- Minimum 7kW charge point for both residential and non-residential buildings, to ensure some future proofing to service increasing battery sizes. Most new homes have a 100 Amp connection as standard, and in most cases, it will be possible to accommodate a 7 kW charge point within this connection.
- Capable for at least Mode 3 charging, to enable smart charging. The Automated and Electric Vehicles Act 2018 mandates out that all new charging points should be smart-capable.
- Untethered connections (i.e. only a socket, no built in cable)
- Location of the charge point must comply with the Equality Act 2010
- Meet relevant safety standards
- On-street charge points should be designed to ensure a minimum of 2m footway width is maintained, either through provision of wide footways or by provision of footway build-outs to accommodate charge points.

Definition of passive provision

- Passive provision refers to the installation of cable routes only.
- NOTE: Cenex are developing proposals for a standard ducting/charge point interface, likely to comprise of a concrete pad and a standardised socket connector. This requirement could be included in the requirements if/when the Cenex recommendations are finalised.

Costs

- Installing charge points in new residential buildings will incur an additional cost of approximately £976 per car parking space for the average home (compared to £2,040 for a retrofitted charge point).
- New homes requiring significant electrical capacity reinforcements to accommodate charge points may be exempted from the requirement to provide a charge point, with an indicative maximum limit of reinforcement costs of £3,600 per charge point.

- 7kW charge points for non-residential developments typically cost around £1,500, in addition to grid connection costs which are typically between £1,000-£10,000.
- 43kW+ rapid charge points can cost up to £35,000, and electric grid constraints may make rapid chargers unviable in some areas.
- Installing charge points in new buildings is around £1,100 less expensive than retrofitting a charge point at a later date.
- If applied nationally, the savings to society of installing charge points up front in new residential developments is estimated at £434.6 million over 31 years, and £255.9 million for non-residential developments over the same time period.
- The costings have been derived from the HM Government document Electric Vehicle Charging in Residential and Non-Residential Buildings from 2019 available from the following source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/818810/electric-vehicle-charging-in-residential-and-non-residential-buildings.pdf

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Appendix C: Prioritised List of Car Parks

Note: This list does not contain Exmoor National Park Authority car parks which are located in the county of Devon.

Car Park Name	Location	x	y	Spaces	Recommendation for EVCP	Stay
Blake	Bridgwater	329693	136161	66	High	Long
Eastover & St. John Street	Bridgwater	330314	137049	94	High	Long
Mount Street (East)	Bridgwater	329719	137207	216	High	Long
Mount Street (West)	Bridgwater	329637	137166	93	High	Long
Northgate	Bridgwater	329709	137087	162	High	Long
High Street	Burnham-on-Sea	330569	148736	112	High	Long
Oxford Street	Burnham-on-Sea	330628	149008	103	High	Long
Pier Street (South)	Burnham-on-Sea	330415	148693	186	High	Long
Cliff Street	Cheddar	346110	153604	129	High	Long
Dunster Steep	Dunster	299321	143941	161	High	Long
St John's	Glastonbury	349869	139012	142	High	Long
Summerland	Minehead	297054	146155	125	High	Long
Warren Road Upper	Minehead	298037	146353	129	High	Long
Clarks Village, Grange One	Street	348372	137008	368	High	Long
Clarks Village, Grange Two	Street	348397	137068	441	High	Long
Belvedere Road	Taunton	322559	125196	117	High	Long
Canon Street	Taunton	323017	124726	304	High	Long
Enfield	Taunton	322373	124577	141	High	Long
Firepool	Taunton	322760	125459	120	High	Long
High Street	Taunton	322784	124313	269	High	Long
Kilkenny	Taunton	322751	125557	224	High	Long
Orchard	Taunton	322784	124313	573	High	Long
Tangier	Taunton	322230	124575	209	High	Long
Taunton P & R Gateway	Taunton	325909	124607	850	High	Long
Taunton P & R Silk Mills	Taunton	320749	125460	760	High	Long
Wood Street	Taunton	322468	124927	162	High	Long
Box Factory	Yeovil	355876	115842	150	High	Long
Court Ash	Yeovil	355622	116182	104	High	Long
Goldcroft	Yeovil	356019	116385	114	High	Long
Petters Way	Yeovil	355463	115751	214	High	Long
Discount Berrow Road	Burnham-on-Sea	330499	149518	73	Medium	Long

Pier Street (East)	Burnham-on-Sea	330417	148737	58	Medium	Long
Milbrook Gardens	Castle Cary	363924	132178	100	Medium	Long
Church Street	Cheddar	346009	153114	64	Medium	Long
Exmoor House	Dulverton	291254	127945	45	Medium	Long
Lion Stables	Dulverton	291422	127886	35	Medium	Long
Exford	Exford	285450	138350	30	Medium	Long
Cattle Market	Frome	377797	148236	339	Medium	Long
Merchants Barton	Frome	377777	147960	68	Medium	Long
North Parade	Frome	377899	148277	87	Medium	Long
South Parade	Frome	377482	147946	33	Medium	Long
Butt Close	Glastonbury	350141	139047	74	Medium	Long
Norbins Road	Glastonbury	349941	139115	53	Medium	Long
Northload Street West	Glastonbury	349747	138939	35	Medium	Long
Tarr Steps	Hawkridge	287262	132405	120	Medium	Long
Bank Street	Highbridge	332009	147203	109	Medium	Long
Cocklemoor (East)	Langport	341947	126682	117	Medium	Long
County Gate	Malmsmead	279362	148617	47	Medium	Long
Alexandra Road	Minehead	297066	146042	93	Medium	Long
Clanville	Minehead	296841	146424	40	Medium	Long
North Hill Moor Wood	Minehead	295353	147436	98	Medium	Long
North Road	Minehead	297185	146449	59	Medium	Long
Quay West	Minehead	297004	147162	32	Medium	Long
Doverhay	Porlock	288750	146772	36	Medium	Long
Porlock Central	Porlock	288527	146897	71	Medium	Long
Commercial Road	Shepton Mallet	361679	143535	131	Medium	Long
Great Ostry	Shepton Mallet	361805	143704	78	Medium	Long
Simonsbath (Ashcombe)	Simonsbath	277386	139449	54	Medium	Long
Cranhill Road	Street	348000	136408	316	Medium	Long
Northside	Street	348181	136719	245	Medium	Long
Southleaze	Street	348090	136789	272	Medium	Long
Southside	Street	348216	136469	106	Medium	Long
Strode Road	Street	348765	136918	31	Medium	Long
Wilfrid Road	Street	348484	136735	46	Medium	Long
Castle Street	Taunton	322443	124565	44	Medium	Long
The Crescent	Taunton	322579	124328	234	Medium	Short
Victoria Gate	Taunton	323540	124708	71	Medium	Long
Anchor Street	Watchet	307063	143273	31	Medium	Long
Harbour Road	Watchet	307213	143305	40	Medium	Long
Market Street	Watchet	307065	143448	53	Medium	Long

Swain Street	Watchet	307128	143320	41	Medium	Long
Longforth Road	Wellington	313910	120841	167	Medium	Long
North Street	Wellington	313721	120668	107	Medium	Long
Princes Road	Wells	354648	145507	69	Medium	Long
Tucker Street	Wells	354384	145510	71	Medium	Long
Williton Central	Williton	307795	141035	102	Medium	Long
Memorial Hall	Wincanton	371461	128628	130	Medium	Long
Brunswick Street	Yeovil	355401	115500	59	Medium	Long
Fairfield	Yeovil	355257	115893	91	Medium	Long
Goldenstones	Yeovil	355405	115443	144	Medium	Short
Huish	Yeovil	355209	116035	223	Medium	Short
Stars Lane	Yeovil	356007	115868	200	Medium	Short
West Hendford	Yeovil	355488	115923	153	Medium	Short
Dampiet Street	Bridgwater	329978	136954	49	Low	Short
Eastover	Bridgwater	330150	137164	26	Low	Long
Market Street	Bridgwater	329578	137010	29	Low	Long
Higher Backway	Bruton	368330	134972	10	Low	Long
Packhorse Bridge	Bruton	368383	134798	7	Low	Long
Tolbury Mill	Bruton	368246	134924	28	Low	Long
Pier Street (West)	Burnham-on-Sea	330327	148714	130	Low	Short
Catherines Close	Castle Cary	364135	132576	38	Low	Long
Bath Street	Chard	332115	108434	120	Low	Short
Boden Street	Chard	332289	108488	60	Low	Short
Combe Street	Chard	332095	108654	29	Low	Long
Crowshute	Chard	332054	108322	65	Low	Long
Essex Close	Chard	332293	108703	92	Low	Short
Market Field	Chard	332400	108548	71	Low	Long
The Minnows	Chard	332072	108407	43	Low	Long
Abbey Street	Crewkerne	344024	109882	55	Low	Long
Henhayes	Crewkerne	344278	109702	33	Low	Long
Market Square	Crewkerne	344144	109802	14	Low	Short
South Street (Lidl)	Crewkerne	344235	109727	64	Low	Short
South Street (Waitrose)	Crewkerne	344275	109674	273	Low	Short
West Street	Crewkerne	344036	109593	70	Low	Long
Guildhall	Dulverton	291307	127938	28	Low	Long
Marsh Bridge	Dulverton	290744	128987	6	Low	Long
Park Street	Dunster	298967	143291	22	Low	Long
Badcox	Frome	377149	148008	22	Low	Short
Cork Street	Frome	377562	148147	65	Low	Short

Vicarage Street	Frome	377755	147863	17	Low	Short
Limington Road	Ilchester	352266	122553	33	Low	Long
Orchard Vale	Ilminster	335950	114361	33	Low	Long
Shudrick Lane	Ilminster	336257	114373	43	Low	Long
West Street	Ilminster	335941	114629	44	Low	Long
Cocklemoor (West)	Langport	341934	126685	33	Low	Long
Stacey's Court	Langport	341767	126666	27	Low	Long
Moorlands	Martock	346325	119442	70	Low	Long
Town Hall	Milborne Port	367871	118686	7	Low	Long
North Hill Burgandy Combe	Minehead	294717	147602	12	Low	Long
Robbers Bridge	Oare	282086	146459	45	Low	Long
Porlock Common	Porlock	285383	146293	23	Low	Long
Quarme Hill	Quarme Hill	293571	137089	2	Low	Long
Regal Road East	Shepton Mallet	361926	143576	17	Low	Long
Brunel Shopping Precinct	Somerton	348871	128531	92	Low	Short
Half Moon	Somerton	348767	128532	47	Low	Short
Market Square	Somerton	349023	128531	11	Low	Short
Paddock House	Somerton	348949	128642	56	Low	Short
Unicorn	Somerton	348852	128571	55	Low	Short
Prigg Lane	South Petherton	343365	116976	26	Low	Long
Ham Hill Road	Stoke Sub Hamdon	347435	117327	34	Low	Long
Greenbank Swimming Pool	Street	348501	136724	22	Low	Long
Ash Meadows	Taunton	322579	124328	39	Low	Short
Coal Orchard	Taunton	322788	124871	22	Low	Short
Duke Street	Taunton	323125	124630	58	Low	Short
Elms Parade	Taunton	322469	125044	28	Low	Short
Fons George	Taunton	322534	123849	79	Low	Short
Whirligig	Taunton	322827	124659	37	Low	Short
Haddon Hill	Upton	296938	128486	45	Low	Long
West Pier	Watchet	307005	143455	16	Low	Long
South Street	Wellington	313979	120414	93	Low	Long
Market Place	Wells	354982	145764	21	Low	Short
South Street	Wells	354979	145623	40	Low	Short
Carrington Way	Wincanton	371413	128812	99	Low	Long
Church Fields	Wincanton	371185	128496	36	Low	Long
Croft Way	Wiveliscombe	307972	127729	80	Low	Long
North Street	Wiveliscombe	307976	127940	45	Low	Long
Earle Street	Yeovil	355955	116136	69	Low	Short
Market Street	Yeovil	355778	116133	27	Low	Long

Newton Road	Yeovil	356188	116004	16	Low	Short
North Lane	Yeovil	355619	116138	50	Low	Short
Park Street	Yeovil	355823	115842	15	Low	Short
Peter Street	Yeovil	355809	115897	19	Low	Short
South Street East	Yeovil	355877	115890	28	Low	Short
South Street Market	Yeovil	355575	115858	45	Low	Short

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