

## Impact case study (REF3)

<b>Institution:</b> Coventry University		
<b>Unit of Assessment:</b> 17 Business and Management Studies		
<b>Title of case study:</b> Transitions in the automotive sector: challenges in delivering a low emission strategy		
<b>Period when the underpinning research was undertaken:</b> 2009 - 2020		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI:</b>
Dr Jason Begley	Associate Professor	2009 - present
Professor Nigel Berkeley	Associate Dean (Research)	1989 - present
Dr Elizabeth Bos	Research Assistant	2012 - 2019
Professor Nick Henry	Professor of Economic Geography	2013 - present
Dr David Jarvis	Co-Director, CBiS	2009 - present
Dr Andrew Jones	Research Assistant	2015 - present
<b>Period when the claimed impact occurred:</b> 2015 - 2020		
<b>Is this case study continued from a case study submitted in 2014?</b> No.		

**1. Summary of the impact** (indicative maximum 100 words)

UK policy to ban sales of new petrol, diesel and hybrid vehicles by 2030, to support the achievement of zero-carbon emissions targets, presents considerable challenges for people, businesses and places. The research of Begley, Berkeley, Bos, Henry, Jarvis and Jones unpacks these challenges, delivering policy solutions and positively influencing behaviours, including: (1) a material and substantial effect in **changing attitudes and behaviour** towards the adoption of electric vehicles among small businesses, and uniquely rural small businesses; and (2) **influencing strategic thinking and policy decisions** around the challenges of adapting places to zero-emissions infrastructure in both metropolitan and non-metropolitan settings.

**2. Underpinning research** (indicative maximum 500 words)

The challenges of people and places adopting zero-carbon transport solutions has been the subject of research at Coventry University since the 2009 evaluation of the Coventry and Birmingham Electric Vehicle demonstrator trial (G1). This highlighted consumer and infrastructural challenges to mass market electric vehicle (EV) adoption. These issues were explored further in research sponsored by the EU (G5); Defra (G2); Coventry and Warwickshire Local Enterprise Partnership (CWLEP) (G3); the Automobile Association (G4); and most recently Coventry City Council (G6). Work has involved theory building, empirical testing at unparalleled scale, and elaboration of practical policy implications.

**Consumer adoption of EVs**

Research by Berkeley and Jarvis unpacked consumer attitudes and behaviour towards adoption and the mechanisms by which government can influence motorists to switch to EVs, drawing attention to this emerging area of debate (R1). More recently, evidence from research by Berkeley, Jones and Jarvis theorised multi-level forces influencing the adoption of EVs (R2). These forces were explored further by the same authors through a survey of 26,000 UK motorists in 2016. Data analysis produced a categorisation of barriers to mass market adoption of EVs into 'economic uncertainty' and 'socio-technical'; the former more strongly associated with older drivers; the latter more an issue for women (R3). In addition, Berkeley, Begley, and Jarvis reconceptualised the appeal of EVs as a new form of automobility that may be exploited by policymakers in influencing take-up (R4).

**Business adoption of EVs**

Research underpinned by R1-R4 explored EV adoption from a business use and suitability perspective, uniquely also in rural areas (R6). Rural spaces have been overlooked in debates about EV transitions, thereby ignoring distinctive challenges to EV adoption, and placing already precarious rural communities and economies at increased future risk in light of the UK's

## Impact case study (REF3)

proposed ban on the sale of all but EVs from 2030. Evaluation of the Defra funded Warwickshire Rural Electric Vehicle (WREV) trial (2014-2016), involved an examination of the real-world experience of business drivers across a variety of sectors, and captured both individual and cohort experiences. Findings from the eighteen-month trial showed firms with strongly routinised vehicle use patterns were better placed to capitalise upon the established advantages of EVs, while others exploited EV adoption in cultivating an image of sustainability and social responsibility. Beyond these cases, however, a range of technological, infrastructural and financial challenges hindering adoption remained.

### Local Infrastructure and smart cities

The Urban Rural Connectivity in Non-Metropolitan Regions (URRUC) project brought together public authorities and academics in four European territories (R5). Findings revealed that in an era of public austerity, non-metropolitan local government in England has neither the financial capability nor human capital to bring forward infrastructural solutions to the zero-emissions mobility challenge. Moreover, it has limited influence in shaping wider strategic transport and accessibility policies, which are typically urban focused. Recognising that this may serve to disadvantage further smaller centres of population, recommendations targeted cost-effective solutions on the most deprived, isolated communities.

In a metropolitan setting, the evaluation of the Intelligent Variable Messaging Systems (iVMS) pilot project (G3) revealed further challenges associated with establishing smart city infrastructure. Research found and tackled the interoperability of technology platforms, and the problem of organisational silos; issues that act against the realisation of a low carbon urban mobility paradigm. Subsequently, during Summer 2020, the COVID-19 and Future Transport project (G6) utilised scenario planning techniques with Coventry City Council in order to co-create three 'futures' for urban mobility, which supported the design of policy interventions for the post-Covid transport space.

### 3. References to the research (indicative maximum of six references)

**R1.** Berkeley, N. and Jarvis, D. (2012) 'Low carbon mobility: Opportunities and challenges for local economic development'. *Local Economy* 27(7), 689-691. DOI: <https://doi.org/10.1177%2F0269094212455005>.

**R2.** Berkeley N., Bailey D., Jones A. and Jarvis D. (2017) 'Assessing the transition towards battery electric vehicles: A Multi-Level Perspective on drivers of, and barriers to, take up'. *Transportation Research Part A: Policy and Practice* 106, 20-332. DOI: <https://doi.org/10.1016/j.tra.2017.10.004>.

**R3.** Berkeley, N., Jarvis, D. and Jones, A. (2018) 'Analysing the take up of battery electric vehicles: An empirical investigation of barriers amongst drivers in the UK'. *Transportation Research Part D: Transport and Environment* 63, 466-481. DOI: <https://doi.org/10.1016/j.trd.2018.06.016>.

**R4.** Kershaw, J., Berkeley, N., Begley, J. and Jarvis, A. (2018) 'A feeling for change: Exploring the lived and un-lived experiences of drivers to inform a transition to an electric automobility'. *Transportation Research Part D: Transport and Environment* 65, 674-686. DOI: <https://doi.org/10.1016/j.trd.2018.10.011>.

**R5.** Begley, J., Jarvis, D., Jones, A., Macneill, S., Cotella, G., Scudellari, J., Staricco, L., Vitale Brovarone, E., Grunfelder, J., Kristensen, I., Löfving, L., Ferrandis, A., Noguera, J., Riera, M. and Scardaccione G. (2019) *Urban-Rural Connectivity in Non-Metropolitan Regions: Targeted Analysis Activity Final Report*. Luxembourg: ESPON EGTC. Available from [https://www.espon.eu/sites/default/files/attachments/ESPON%20URRUC%20Main%20Report\\_0.pdf](https://www.espon.eu/sites/default/files/attachments/ESPON%20URRUC%20Main%20Report_0.pdf) [24 February 2021].

**Impact case study (REF3)**

**R6.** Jones, A., Begley J., Berkeley, N., Jarvis D. and Bos, E. (2020) 'Electric vehicles and rural business: Findings from the Warwickshire electric vehicle trial'. *Journal of Rural Studies* 79, 395-408. DOI: <https://doi.org/10.1016/j.jrurstud.2020.08.007>.

**Grants and Projects**

**G1.** Berkeley, N. (PI) (2009 to 2012) *Coventry & Birmingham Low Emission Vehicle Demonstrator Programme (CABLED)*. Advantage West Midlands and Technology Strategy Board (now Innovate UK). Total grant amount: £166,500.00.

**G2.** Begley, J. (PI) and Jones, A. (Col) (2014 to 2016) *Warwickshire Rural Electric Vehicle Trial (WREV)*. Department for Environment Food & Rural Affairs (Defra). Total grant amount: £1,000.00 + in-kind contribution.

**G3.** Henry, N. (PI), Jarvis, D. and Jones, A. (Cols) (2016 to 2018) *Intelligent Vehicle Messaging Systems (iVMS)*. Coventry and Warwickshire Local Enterprise Partnership. Total grant amount: £40,000.00.

**G4.** Berkeley, N. (PI), Jarvis D. and Jones, A. (Cols) (2018) *Co-created survey of 180,000 Populus Motoring Panel members*. Automobile Association. Total grant amount: In-kind.

**G5.** Begley, J. (PI), Jarvis, D. and Jones, A. (Cols) (2018 to 2019) *Urban and Rural Connectivity in Non-Metropolitan Regions (URRUC)*. European Union: ESPON EGTC. Total grant amount: €258,766.13 (£227,023.29). funding to Coventry University: €75,236.23 (£66,007.00). Available from <https://www.espon.eu/URRUC> [24 February 2021].

**G6.** Jones, A. (PI) and Jarvis, D. (Col) (2020) *COVID-19 and Future Transport*. Coventry City Council. Total grant amount: £9,270.00.

**The quality of the research is conveyed through its publication in top-ranking journals in field, its use by other researchers, and through the award of grants from international and national funders.**

**4. Details of the impact** (indicative maximum 750 words)

**A material and substantial effect in influencing debates and changing attitudes and behaviour towards the adoption of electric vehicles amongst businesses; uniquely in the rural economy**

R2 and R3 directly informed the BEIS Select Committee's 2018 investigation of the transition to electric vehicles (S1). Research was cited in relation to barriers to adoption such as cost (para 27 p17), charging and infrastructure (para 48 p25 / para 59 p31 / para 74 p37). Insights into the impact of charging infrastructure availability on consumer behaviour were used to frame a key argument in the Select Committee's report relating to inadequacies in current charging networks, and in the government moving to regulate to improve consumer experiences:

*"The Automated and Electric Vehicles Bill progressed through Parliament and received Royal Assent during the course of our inquiry. The Act introduces enabling provisions for electric vehicle charging... These provisions address many of the concerns about charging infrastructure that we heard, and in general were welcomed by witnesses" (S1, para 59 p31).*

R6 involved a co-created evaluation informing and influencing the behaviour of 17 rural small businesses as well as providing potential solutions to overcome barriers to EV adoption. This enabled rural businesses to learn from each other in informing their own transport investment decisions, and to influence the behaviour of businesses beyond the trial. This impact has endured, with seven organisations retaining an electric vehicle beyond the conclusion of the trial period (2014-2016). Another participating business subsequently adopted a hybrid vehicle, so

### Impact case study (REF3)

almost half of triallists continue to utilise EV technologies in their vehicle fleets five years after the trial ended formally:

*“WREV was a starting point for using an electric vehicle and helped to validate what could be achieved by this technology. Involvement in WREV gave me the confidence to suggest [to clients that] electric vehicles were a viable solution, not only through personal experiences but also those shared by other participants and the evaluation process” (S2).*

The evaluation of EV running costs undertaken through R6 also encouraged some participants to see EV adoption as part of the cultivation of an image of sustainability. In turn, this led businesses to explore and adopt other low carbon technologies:

*“The electric vehicle is just part of the sustainable solutions used by the business, as there has been increased investment in solar and battery storage since acquiring the vehicle... Sustainability is a big part of the business and the electric vehicle is part of this package” (S3).*

### **Influencing strategic thinking and policy decisions around the challenges of adapting places and spaces to zero-emissions infrastructure in both metropolitan and non-metropolitan areas**

Scarborough Borough Council are actively using recommendations from R5 in ongoing efforts to lobby regional and national bodies for transport related investment. The research (2018-2019) has also informed Scarborough’s current approach to local transport challenges, providing them with a template for new service provision. A specific example is the introduction of a new shuttle bus service:

*“The shuttle bus will provide on demand passenger service within one of Scarborough most socially deprived communities... It is the aspiration of the project for the service to be operated by a Community Interest Company and utilise Low Carbon emission technology” (S4).*

R5 and R6 are also impacting beyond the UK through knowledge transfer with public administrations elsewhere in the world. R5 is being used as a framework for reviewing and informing ongoing policy developments in Liepajaa (Latvia) (S5). Similarly, R6 has gained interest from US state governments in North Carolina, Montana, Wisconsin, and Minnesota. Organised through the British Consulate in San Francisco, Officers from each state participated in a knowledge exchange visit to the UK in early 2020, focused on decarbonisation planning. On the recommendation of Defra, they made a special visit to Coventry to learn how they could adapt and implement the WREV trial and evaluation in the extensive rural parts of their own state jurisdictions (S6).

In a metropolitan context, the most substantial impact of the iVMS pilot (G3) has been to develop and extend Coventry’s local test bed environment for vehicle technologies (and related smart city activity) across a number of dimensions; and the impact of its implementation, delivery and evaluation over the period 2016 to 2019 has underlined the critical importance of collaborative relationships:

*“...demonstrating the real value that this technology will bring to motorists, the economy and the environment” (S7).*

In turn, G3 has enabled the formulation of a strategic roadmap, shaping transport policy and investment decisions, and the evaluation of new transport related project and funding opportunities (S8). Building upon this, most recently and as a rapid response to the first UK Covid-19 lockdown in March 2020, G6 co-created future transport planning scenarios, related to urban mobility, with stakeholders from Coventry City Council, influencing directly the development of Coventry’s post-Covid strategies:

*“The post-Covid urban mobility scenarios developed by Drs Jones and Jarvis have been used internally with various teams across the Council, as part of our recovery work and future planning. They have also been shared with our partner organisations regionally to ensure the potential policy impact of the report is maximised” (S8).*

Beyond Coventry, learning from G3 is impacting upon transport planning and strategy development in other UK and European cities:

*“Learning from the evaluation of iVMS has enabled us to share experiences and lessons with other UK cities, influencing their thinking around transport planning innovation. Good examples are Wakefield and Cardiff. In addition, disseminating our newly gained knowledge through ongoing INTERREG projects, has meant that we’ve been able to influence thinking in EU cities, particularly in Rome” (S9).*

### **5. Sources to corroborate the impact** (indicative maximum of 10 references)

---

- S1.** House of Commons Business Energy and Industrial Strategy Select Committee (2018). Electric vehicles: driving the transition, 14th Report of the Session 2017-2019. Paragraphs 27, 48, 59, 74 & 86. Available from <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/383/383.pdf> [24 February 2021].
- S2.** WREV Driver 1 (2019) Impact of WREV project, interview extract [10 September 2019].
- S3.** WREV Driver 2 (2019) Impact of WREV project, interview extract [10 September 2019].
- S4.** Head of Economic Development, Scarborough Borough Council (2020) Testimonial Email to Dr Andrew Jones [01 April 2020].
- S5.** Project Expert, ESPON EGTC (2020) Testimonial Email to Dr Jason Begley [23 October 2019].
- S6.** Foreign & Commonwealth Office (2020) Itinerary for US decarbonisation planning delegation [10 January 2020].
- S7.** Coventry and Warwickshire Local Enterprise Partnership (2018) Innovative app leads to upgraded transport infrastructure in Coventry. Available from <https://www.cwlep.com/news/innovative-app-leads-upgraded-transport-infrastructure-coventry> [25 February 2021].
- S8.** Senior Officer – Transport Strategy, Coventry City Council (2020) *Testimonial Email* to Dr Andrew Jones [26 February 2021].
- S9.** Transport Innovation Manager, Coventry City Council (2019) Impact of iVMS, interview extract [08 July 2019].