1 **"Building smart cities, the just way. A critical review of "smart" and "just"**
2 **initiatives in Bristol, UK"**

3 **Journal: Sustainable Cities and Society**

4 Aleksandra (Ola) Michalec[a]*, Enda Hayes[a], James Longhurst[a]

5 aThe University of the West of England, Faculty of Environment and Technology,

6 Coldharbour Lane, Frenchay, Stoke Gifford, Bristol BS16 1QY

7 *Corresponding author, Email: Aleksandra.michalec@uwe.ac.uk

8

9 **ABSTRACT** This article investigates the application of the "smart cities" and "urban

10 climate justice" concepts to two urban initiatives based in Bristol, UK. Both ideas are

11 increasingly popular in academic literature. Yet, little is known about their

12 understanding by the practitioners such as policymakers, third sector organisations

13 and citizens. Two case studies, a community-based energy efficiency initiative, and a

14 local authority electric vehicle policy were critically reviewed using discourse analysis.

15 The method helped to reveal the explicit, implied and obscured aims of the examined

16 initiatives. Using discourse analysis, the researchers developed a heuristic which

17 could improve traditional policy analysis approaches. The examination of case studies

18 illustrates how practitioners understand the notions of "urban climate justice" and

19 "smart cities" and whether their conceptualisations differ from those present in the

20 academic literature. Finally, the paper offers methodological suggestions for

21 embedding justice in "smart" initiatives at each stage of policy and project design.

22

23 **Keywords** smart city/ urban policy / Bristol / climate justice / discourse analysis

24

27   foundation helping to protect life and property by supporting engineering-related

28   education, public engagement and application of research.

29   The funding sources were not involved in study design, data collection and analysis

30   of the data.

31

32   **Conflicts of interest:** The research is part-funded by the Bristol City Council

33

34   **Printing** No need to use colour when printing

35

36   **Abbreviations**

37   EV- Electric Vehicles

38   CHEESE – Cold Homes Energy Efficiency Surveying

39   DA – Discourse Analysis

40   GHG – Greenhouse Gases

41   KPI – Key Performance Indicators

42   SDGs – Sustainable Development Goals

43   ULEV – Ultra-low-emission-vehicles

44   WEF – World Economic Forum

45

46

47   **1. Introduction**

48   **1.1 Towards "smart" and "just" cities?**

49   The "grand challenges" of the future such as climate change, limited resources

50   availability and widening social inequalities are likely to transform how cities are

51   governed. Meanwhile, the unprecedented development of technologies promises

52 solutions to these issues. Yet, without an inclusive deliberation, technology poses

53 further risks to security or democracy (Stilgoe, 2017).

54 Sustainable urbanisation is indeed a subject of lively debates amongst academics and

55 policymakers. The initiatives promoting "smart cities" and "urban climate justice" are

56 components of this debate generating questions about the nature of the transition to

57 a sustainable future such as:

58   • How to harness the potential of technology?

59   • How will the residents be affected by the transition? Who will benefit, pay,

60   decide, be excluded or included?

61 Both concepts are relatively new in the urban policy realm, therefore they create a

62 potential for terminological confusion (de Jong *et al*., 2015; Bulkeley *et al.,* 2014).

63 Additionally, it is not clear whether politicians, local civil servants, collaborating start-

64 ups and grassroots communities apply these ideas in the manner as intended or

65 expected by theorists who had proposed them.

66 In the context of this study, we define "smart cities" and "urban climate justice" as

67 follows:

68   • "Smart cities" as an agenda aiming to implement technological innovations and

69   utilise digital data collected about society as a means of policymaking and

70   urban development (Shelton *et al*., 2015).

71   • Urban climate justice is theorised as the consideration for ethical issues in

72   policymaking. The key concerns are the distribution of resources, procedures

73   of inclusion, rights to emit GHG emissions, responsibility to ameliorate climate

74   change and the recognition of pre-existing injustices (Bulkeley *et al.,* 2014).

75 **1.2. Policy developments to date**

76 The idea of "smart cities" has gained remarkable popularity over the last few years (De

77 Jong *et al*., 2015). For example, one of the strategic priorities of the World Economic

78 Forum (WEF) is co-creating "Fourth Industrial Revolution". This involves multi-

79 stakeholder dialogue and concrete cooperation on urban governance challenges and

80 opportunities presented by advanced technologies (WEF, 2019). Similarly, the

81 European Commission (EC) established the European Innovation Partnership on

82 Smart Cities and Communities which aims to provide a "marketplace of ideas" for

83 smart mobility, procurement, planning etc. (EC, 2019). Following the agenda set by

84 the international organisations, tech companies and universities have mobilised their

85 resources to describe, account and rank the emerging "smart cities" (Huawei, 2017;

86 IESE, 2018, Eden Strategy Institute, 2018). Drawing from the smart city rankings

87 (ibid.), Table 1 outlines the instances of the "smart city" agenda applied in practice:

88

89

90

91 **Table 1.** Examples of smart city projects implemented around the world.

Name	Description	Cities	Reference
GrowSmarter	Setting up a network of charging terminals for electric vehicles at strategic locations in the city.	Barcelona, Stockholm, Cologne	European Commission, 2019
Matchup – Internet of Things	Gathering urban data and designing Key Performance Indicator (KPI) dashboards to manage all of the city's assets in the mobility, transport and energy sectors.	Valencia, Dresden, Antalya	European Commission, 2009

Project-DISC	Informing policy and strategic service developments using unified data, simulation, and modelling. This will be applied to the construction of a new rail terminus.	Birmingham	Huawei, 2017
Smart Street Lighting	Improving energy efficiency while supporting other applications such as monitoring movement (footfall and traffic flow), air, and noise pollution levels.	Glasgow	Huawei, 2017
Tech Skills Accelerator	Training over 27,000 people in data analytics, artificial intelligence, and cybersecurity.	Singapore	Eden Strategy Institute, 2018
Ofo Bike sharing	Sharing the location, distribution data and utilization heatmaps with the government. The data allows the city to support new bus routes planning.	Shanghai	Eden Strategy Institute, 2018

92

93 Meanwhile, calls for climate justice at the urban level have also been raised by high-

94 profile strategies, such as Sustainable Development Goals (SDGs) (UN, 2015). For

95 example, Goal 11 of SDGs (Sustainable cities and communities) specifies:

96 *"11.2. By 2030, provide access to safe, affordable, accessible*

97 *and sustainable transport systems for all, improving road*

98 *safety, notably by expanding public transport, with special*

99 *attention to the needs of those in vulnerable situations,*

100 *women, children, persons with disabilities and older persons"*

101 (UN, 2015).

102 Indeed, both academics and practitioners have started to recognise the importance of

103 citizens in co-creation of "smart cities" (Saunders and Baeck, 2015). However, there

104 is little clarity, guidelines and evidence on what people-centred "smart cities" could

105 mean in practice (Cowley *et al*., 2017). Without the explicit reference to the justice

106 discourse, "smart cities" might become a buzzword, a term characterised by a high

107 frequency of usage but a low potential for accountability (Rist, 2013; Finger and

108 Razaghi, 2016).

109 **2. Theory**

110 **2.1. Smart cities**

111 The literature on smart cities characterises its agenda as 1) Improving economic and

112 administrative decision making through technological innovation; 2) Improving social

113 inclusion in the development and adaptation of the emerging technologies; 3) Raising

114 the profile of high-tech industries in contributing to the economic growth 4) Effective

115 embedding of technology in wider physical and social systems (Caragliu *et al*., 2011;

116 Allwinkle and Cruickshank, 2011).

117 However, an academic critique arising from the closer examination of the smart city

118 goals questions the assumptions coming from the paradigm. For example, Shelton *et*

119 *al.* (2015) challenge the notion of "objectivity" as a result of the integration of

120 technology into policymaking. They argue that all datasets are socially constructed

121 and can, therefore, result in competing representations of the world (*Ibid*.).

122 Furthermore, upon completing a large scale bibliographic analysis of peer-reviewed

123 urban development literature, De Jong *et al*. (2015), argues that "smart cities" are only

124 weakly related to the environmental agenda (e.g. "sustainable" or "low carbon" cities).

125 Instead, they suggested that the idea of "smart city" builds on the other

126 conceptualisations of urban modernisation, e.g. "information city", "digital city" or

127 "intelligent city" (*Ibid*.). The database analysed by de Jong *et al.* (2015) spanned the

128 period 1996 to 2013. Their analysis revealed that in the final year of the analysis,

129 "smart city" was the most commonly used urbanisation concept in the academic

130 discourse (de Jong *et al*., 2015). Nevertheless, without a detailed analysis of the

131 "actually existing" smart initiatives, it is difficult to assess whether this correlates to the

132 popularity of the term in practice and how the decision makers bring academic

133 concepts to life.

134 To explore whether the real-life applications of smart city conceptualisations stands

135 up to scrutiny, Caprotti *et al*. (2016) examined 398 UK initiatives labelled as "smart" by

136 their organisers. Here, the researchers highlighted the issues of the longevity of the

137 projects, long-term adaptation of the technology from the bottom-up and, finally,

138 upscaling pilot initiatives. As a result, UK-based smart initiatives could potentially

139 become unaffordable and unengaged with the majority of citizens. Caprotti *et al*. (ibid.)

140 highlighted that the impact of smart technologies on social equality remains

141 underexplored.

142

143

144

145 **2.2. Urban Climate Justice**

146 Urban climate justice is conceptualised at a more academically mature level

147 comparing to the emergent "smart cities" discourse. Numerous definitions of climate

148 justice have burgeoned over the past few years (Bulkeley *et al*., 2014; Steele *et al*.,

149 2015; Shi *et al*., 2016). What they all have in common is the emphasis on 1) equitable

150 access to resources 2) responsibility for emissions 3) right to emit GHG gases and

151 benefit from policies 4) inclusion and diversity in policy procedures 5) recognising the

152 pre-existing injustices in the first place (Fig.1).
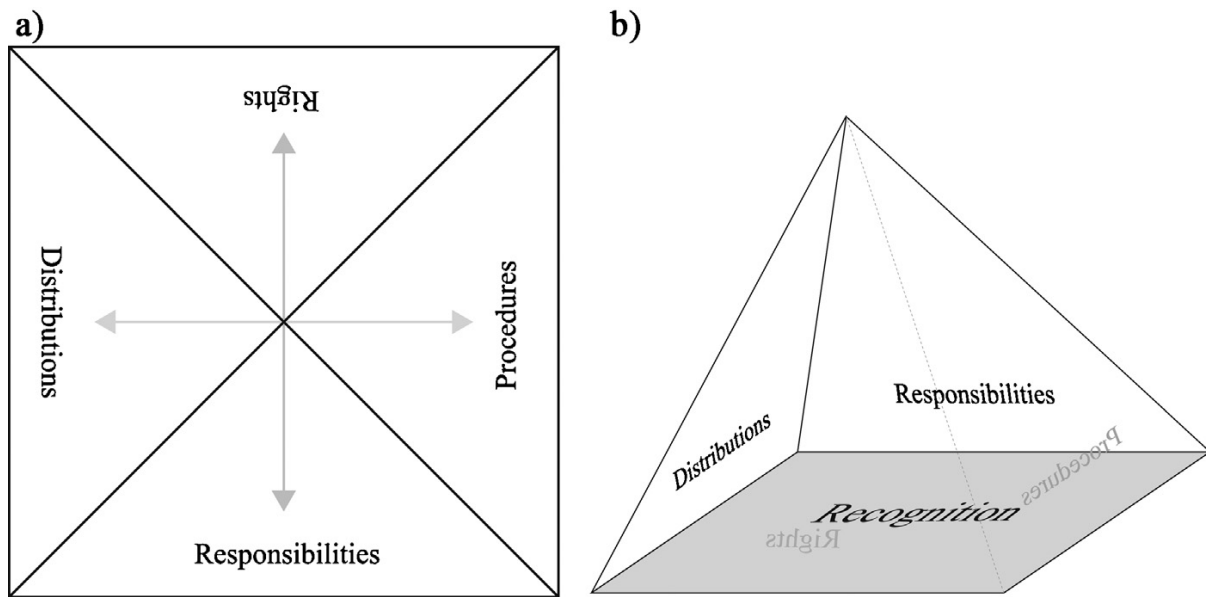
Figure 1. A conceptualisation of climate justice based on recognition of injustice as a necessary basis for assessment of responsibilities, rights, distributions and procedures. (Bulkeley et al., 2014; licensed under CC BY 3.0)

Climate justice is explicitly recognised at the international level by the major frameworks like Sustainable Development Goals (UN, 2015) or Paris Agreement (UNFCC; 2015). However, similarly to the smart cities agenda, there is not enough empirical evidence suggesting whether the international frameworks set from the top-down are applied in cities with the same ethical principles in mind (Shi *et al.,* 2016). Policymakers still lack practical and mixed method tools (e.g. applying both "smart" data and qualitative reviews) to assess the contribution to climate justice both before and after the implementation of the policy.

Furthermore, the application of climate justice to the political sphere is not fully understood yet. Terms like "social justice", "social sustainability", equality", "equity" and "inclusion" carry varying degrees of ambiguity (Michalec *et al*., 2019). They can be either explicitly politically charged or appropriated to suit the current hegemony (Fuchs, 2017).

170 Finally, urban climate justice is most commonly researched in terms of climate

171 adaptation policies in the Global South (Shi *et al*. 2016). However, climate mitigation

172 policies are also subjected to possible injustices which exist across all scales of

173 governance and dimensions of the justice pyramid (Bulkeley *et al.,* 2014). This

174 argument furthered the climate justice agenda into exploring the possibility of

175 "intersectional" analysis and policymaking. Intersectionality research calls for the

176 recognition of the multiple co-existing forms of disadvantage and vulnerability, e.g.

177 income, gender, ethnicity, age and health. Despite a growing body of research on

178 intersectionality and climate justice, these ideas are yet to be encountered in policy

179 practice (Kaijser and Kronsell, 2014; Agyeman *et al.,* 2016).

180 **2.3. The potential for cross-fertilisation of "smart" and "just" agenda**

181 The potential for co-creating "smart" **and** "just" cities has not been fully realised so far

182 (De Jong *et al*., 2015). This raises the questions:

183 - Do "smart city" initiatives take into account social justice issues?

184 - Do climate justice policies make the most of the available opportunities
185   provided by technology and open data?

186 The point of departure of this article is building on the promises of "smart city" and

187 "urban climate justice" agenda. Whereas both theories propose improvements in

188 sustainable policymaking, "smart cities" tend to be most commonly driven by

189 "objective" data, and depoliticised decision-making (Cowley *et al*., 2017). On the other

190 hand, the "urban climate justice" paradigm is explicitly value-laden (Agyeman *et al.,*

191 2016). Therefore, the article examines whether "smart cities" can be deliberately

192 politicised so they openly include urban climate justice aims. The paper also considers

193 the potential for improvements in urban climate justice methodologies – whether the

194 recent advancements in data science and technology can offer new insights beyond

195 the traditional evaluation methods.

2.4. Research aims

197 The aim of this paper is to enrich the agendas of smart cities and urban climate justice

198 as well as contribute to their development in practice. By critically reviewing existing

199 projects in Bristol, UK, this article investigates how justice is understood and applied

200 to "smart city" initiatives. Finally, the paper presents a heuristic for evaluating urban

201 initiatives through the lens of climate justice. This methodology could be readily

202 applied by practitioners, policymakers and researchers. Finally, the paper concludes

203 with suggestions on communicating the results of the analysis as well as the

204 methodology to the decision makers.

3. Research design

206 This paper presents a critical in-depth review of two qualitative case studies. Both

207 projects are focused on climate mitigation initiatives labelled as "smart". The work

208 builds upon the previous conceptualisations of "smart cities" (Caprotti *et al.,* 2016; de

209 Jong *et al*., 2015) and "urban climate justice" (Bulkeley *et al*., 2014).

3.1. Study area

212 The research is concerned with climate change mitigation initiatives implemented in

213 the city of Bristol, UK. The city is located in the South-West of the UK, with a population

214 of 442 000 residents. It is a signatory of the UN-wide climate change mitigation

215 commitment; Compact of Mayors (2014). In 2015, the city adopted its own Climate

216 Change Framework (BCC, 2015a), building upon the national legally binding Climate

217 Change Act (HM Government, 2008). The document sets ambitious targets of

218 reducing urban CO_2 emissions by 40% by 2020 (based on 2005 baseline). Recently,

219   Bristol City Council declared an ambition to become carbon neutral by 2030 (BBC,
220   2018).

221   In terms of technological improvement, Bristol has already been embracing the "smart
222   city" agenda at the project-scale in recent years (Cowley *et al*., 2017). This led to city
223   scoring first position in the Huawei UK Smart Cities Index (Huawei, 2017). The city
224   topped the ranking thanks to the implementation of the innovative initiatives, such as:

225   • Data Dome: data visualisation facility

226   • Bristol is Open: data sharing platform

227   • Citizen Sensor: a project involving citizens in prioritising policy issues which
228   can be then tackled using technology

229   • Bristol Energy: a municipally-owned energy company, responsible for the
230   smart meters rollout

231   • Electric vehicles charging points (*Woods.,* 2016)

232   • Cold Homes Energy Efficiency Surveying (BEN, 2017).

233   Out of the above projects, three have encompassed climate change mitigation
234   explicitly in their agenda. Smart meters rollout, cold homes energy efficiency surveying
235   (CHEESE) and electric vehicles (EV) initiatives are concerned with reducing CO_2
236   emissions with the help of state-of-the-art technology.

237   Despite its recent technological innovations, as the city struggles with social inequality.
238   It is estimated that 69 000 (or 16%) people are amongst the poorest 10% of English
239   residents. Over 13% live in fuel poverty, comparing to 10.6% of the national average.
240   One in four children lives in poverty – which is the highest figure in the south west of
241   England (BCC, 2015b). As tackling social inequalities is one of Bristol's strategic

242 priorities, the emerging "smart city" projects ought to consider their impact on the most

243 vulnerable residents (BCC, 2019).

244

245 **3.2. Selection process**

246 CHEESE project and Electric Vehicles rollout were selected as case studies for the

247 research. These initiatives were selected as currently little is known about the inclusion

248 of justice agenda in them. So far, the theoretical literature on "smart cities" and "urban

249 justice" warned against technologies and policies impacting the residents unevenly,

250 as a result, deepening social inequalities (Shelton *et al*., 2015; Preston *et al*.; 2014).

251 The issues of metering implementation in Bristol are described elsewhere (Michalec,

252 2019).

253 In order to select suitable case studies, the researchers undertook a detailed database

254 search using specialist literature on smart cities (Woods *et al.* 2016; Caprotti *et al,*

255 2015), the local council website (https://democracy.bristol.gov.uk/) and websites of the

256 sustainability sector organisations (http://bristolenergynetwork.org/;

257 http://bristolgreencapital.org/). The initial literature review led to the selection of two

258 case studies based on the variety of information and diversity of the projects (Tab. 2).

259 Selected case studies reflect various types of climate mitigation initiatives present in

260 the city:

261 • EV: A major national government-led initiative. It aims to disseminate the

262 electric transport infrastructure, so EV become more accessible and

263 affordable.

264 • CHEESE: A community-led small size project. CHEESE project offers low-cost

265 and free thermal imaging surveys and advice on affordable insulation. The

266   project aims to tackle fuel poverty by giving the residents the capability to

267   improve the efficiency of their households.

268 *Table 2*. Case studies selected for the discourse analysis

Name of the project	Short description	Number of sources	References used for the analysis
Electric Vehicles (EV)	Infrastructure features (e.g. charging stations) and financial incentives (e.g. reduction in parking fees) aimed at EV owners, car clubs and council fleet vehicles.	2	BBC, 2016; WoE, 2016;
Cold Homes Energy Efficiency Surveying (CHEESE)	A community-led project using thermal imaging surveys indicating the best ways to improve energy efficiency in the local households.	1	BEN, 2017

269

270

271

272

273 **3.3. Discourse Analysis**

274 The case studies were investigated qualitatively, using desk-based analysis. Following

275 the selection of the relevant initiatives, the initiatives were assessed using discourse

276 analysis (DA), in particular:

277   • Bulkeley *et al.* (2014) framework for climate justice (Fig. 1) asking not only

278   about the impact on stakeholders but also on issues of recognition, inclusion,

279   exclusion and omission of potential stakeholders (Tab. 3)

- Bax (2010) heuristic for aims and impact of the project at the explicit, implied and obscured levels (Tab. 3).

This stands in contrast to the evaluation criteria commonly applied in policy studies: logic model and stakeholder analysis (Smith, 2010). A departure from the traditional methods of policy analysis is justified with a need for self-reflexivity and caution of the analyst when it comes to assessing the application of emerging, complex and contested terms. Methods like logic model do not question the assumptions behind the theory-laden terms, potentially contributing to further misuse of the aforementioned "buzzwords" (House and Howe, 1999). Similarly, although stakeholder analyses often ask about impacts and involvement of the stakeholders, they do not question who is *not* considered a stakeholder; neither who is *not* impacted by a policy at all and whether this is a positive thing. The paper argues for practicing self-reflexivity and caution both by academics conceptualising the urban development theories as well as policymakers, whose framing often contributes to the prevailing discourse in practice.

The researchers chose DA as a vehicle of policy and project analysis. The method employs a critical level of text analysis as it goes beyond that which is presented explicitly (Wodak and Meyer, 2009). Questioning the issues of power, inclusion, foregrounding and backgrounding, typical for DA, fits well with the objectives of the paper. By examining the understanding and application of "smart" and "just" projects in Bristol, the paper aims to improve the clarity of the urban climate change mitigation policies.

Table 3 outlines the detailed heuristic for the application of the method both within and outside of the academia. The purpose of the heuristic is not to present an exact protocol to follow, but rather to provide an exhaustive set of potential questions that could be asked about the smart initiative analysed. When reproducing the results, it is

305 critical to identify both the explicit, implied and obscured aims. The analysts ought to

306 pay attention to the definitions, language and tone present in the. A set of detailed

307 questions referring to rhetorical tools contributes to the rigour of the analysis. They ask

308 to draw the conclusions directly from the text, as opposed to the analyst's prejudices

309 and positionality.

310 **Table 3**. *A heuristic for the analysis of justice in sustainable and smart projects*

Questions for discourse analysis

---

1. What does the text achieve or aim to achieve?

1. A What is the intended function of the text?

1. B What is the impact on the individual reader and wider society?

1. C Who is the target audience?

---

2. How does the text achieve their impact or function?

2. A What specific genre(s) does the text draw on?

2. B What aspects of the structure does the text apply?

2. C What layout, auditory or visual resources does the text draw on?

---

3. How is justice understood?

3. A How does the text conceptualise justice/inequality/fairness/equity –
which words are used?

3. B Are references to climate justice explicit or implied?

3. C References to justice by recognition?

3. D References to distributive justice?

3. E References to retributive justice?

3. F References to procedural justice?

3. G References to Intersectionality?

3. H Who is included /excluded/omitted in policy/consultations/decision
making? How are these people characterised?

---

4. What are the methods of achieving justice?

4. A At what stages of policy/project cycle is justice considered?

4. B Do these methods draw from local/ expert/ citizen/ community/ research knowledge?

4. C Do these methods draw from quantitative data?

4. D Methodological assumptions and limitations?

4. E Methodological innovations?

4. F Are these methods "smart"? (As defined by the authors OR by the researchers?)

5. Why does the text seek to achieve its aim and function?

5. A what are the socio-political and ideological underpinnings of the text?

5. B What does the text seek to foreground or background and why?

311

3.4. Limitations to the methodology

313 There are several limitations related to the application of DA and the design of the

314 research. As the analysis is concerned with the ambiguity and complexity of language,

315 the results will be most relevant to the organisations and countries using English as

316 their first language. Moreover, as this study focuses on secondary sources, it does not

317 give a chance for the authors of the selected documents to defend their application of

318 the ambiguous terms present. A degree of the researcher's own interpretation of the

319 complex data is a necessary feature of DA. However, sometimes it is poised as an

320 overall criticism of qualitative methods positioned in the social constructivist paradigm

321 (House and Howe, 1999). An appropriate way to respond to such criticism is to

322 emphasise the analyst's transparency and rigour. This could be achieved by providing

323 a detailed account of the methodology and a self-reflection on the researcher's agenda

324 (Yanow, 2000). The requirements for rigour, a critical level of analysis and self-

325 reflection make this methodology labour-intensive and challenging to disseminate

326 across academic disciplines, let alone across the urban practitioners. Nevertheless,

327 the researchers anticipate that publicising a detailed heuristic will increase the

328 likelihood of its successful dissemination.

329 The study is concerned with the emerging policies and projects, which hinders access

330 to the policy-relevant information. At the time of writing, the available data were

331 incomplete. Moreover, acquiring the data via direct contact or a Freedom of

332 Information Request proved to be complicated and lengthy. However, limited

333 availability of information could be a point of reflection for the analysis as it sheds light

334 on the existing procedures of communication with the public. The questions arising

335 are: what is communicated to the public and at which point in the policy cycle?

336 Finally, the small sample size could be considered as a drawback of the research. As

337 mentioned previously, the depth and rigour of the research are expected to

338 compensate for the small sample size. Since DA is seen here as a pilot method for

339 project design evaluation, there is a potential for other organisations and cities to adopt

340 and apply this heuristic.

341

342 **4. Results and Discussion**

343 **4.1. Electric vehicles (EV)**

344 The rollout of the Electric Vehicles is a part of the national government decarbonisation

345 strategy. In 2016, the UK government awarded the city of Bristol £2.2 millions of direct

346 funding for promotion and uptake of EV. The policy package includes a set of

347 infrastructure features (e.g. charging stations, car club bays, rapid charging hubs,

348 priority lanes, preferential parking spaces) and financial incentives (e.g. reduction in

349 parking fees, discounts for taxi licensing, business engagement) aimed at EV owners,

car clubs and council fleet vehicles (BBC, 2016). This case study analyses two documents submitted to the Bristol City Council as a part of EV policy design:

- A detailed funding bid drafted by "Business West", a partnership between the private and public sector (WoE, 2016).
- An internal cabinet report with recommendations for the Mayor's approval (BCC, 2016).

4.1.1. Funding bid

The first document relevant to the EV policy is a funding bid authored by "Business West" a partnership between local authorities and private sector representatives. The aim of the bid is to present a business case for the large-scale uptake of EV, providing a vision for Bristol as a city leading the trend. The text is written in a formal, yet promotional language, bringing attention to the opportunities and plans. It includes numerous figures (infographics, bar charts, maps), many of them illustrating potential for the growth of the project. Photographs present in the bid are symbolic of innovative technologies (e.g. photographs of EV charging points; WoE, 2016, pp. 1, 11, 12), Bristol's prosperity (a photograph of fireworks over Harbourside; WoE, 2016, p II) and people leading the initiative (photographs of senior professionals at meetings; out of 48 identifiable people, 48 are white, 41 are male and 7 are female; WoE, 2016, p. 16).

The bid does not explicitly refer to the "smart" or "just" agenda. However, the consideration for "smart" and just" city is implied in the text as the bid frames its aims as follows: 1) commitment to low carbon objectives 2) improving air quality for all 3) raising the city profile as a "*laboratory for change*" - place for creativity, new technologies, innovation (WoE, 2016, p.3). The document explicitly targets the proposed policies (e.g. locations of charging stations and discounts for parking) at people most likely to purchase EV. In the document, they are described as "*male, aged*

375 *40-69, likely to be educated to degree level, affluent, have access to two or more cars"*

376 (WoE, 2016, p.17*).* The bid recognises the need to "*help those residents without the*

377 *means to purchase an ultra-low-emission vehicle (ULEV) to join a car club"* by

378 releasing a *"community package"* with support for car club initiatives (WoE, 2016,

379 p.17). However, the bid does not specify the level of support in comparison to the

380 owners of EVs; neither does it provide a plan of engagement with the disadvantaged

381 communities. This poses a risk of the already wealthy target demographics

382 disproportionately benefitting from the discounts for EV charging or parking.

383 The lack of engagement with the idea of distributive justice might stem from the fact

384 that the EV technology is still in a development phase, therefore requiring so-called

385 "*early adopters*" to help with dissemination (WoE, 2016, p. 8). However, in the age of

386 austerity and council budget cuts (BCC, 2017) any policy benefitting a privileged few

387 becomes problematic. The EV bid is keen to portray Bristol as a leader in innovation

388 (WoE, 2016, p.4). However, more needs to be done in order to make sure no one will

389 be left behind as a result of modernisation.

390 Two other potentially socially just EV policy options were outlined in the bid. Namely,

391 the development of EV council fleet and freight consolidation scheme (WoE, 2016,

392 p.12). However, none of them was justified with a social justice agenda. This leaves

393 the policy proposals open to an interpretation for the council officers on the ground.

394 The bid does not acknowledge the need for procedural justice – including diverse

395 demographic of citizens as both precursors and beneficiaries of the policy.

396 Photographs presented throughout the document show a very narrow demographic of

397 sector leaders (WoE, 2016, p. 16). The policy explicitly targets people who are already

398 in financial advantage as they *"(represent) socio-economic segments with*

399 *characteristics which increase the likelihood of ULEV purchase"* (WoE, 2016, p.7).

4.1.2. Cabinet report

The aim of the cabinet report was to analyse the impacts of the proposed bid and provide comprehensive evidence for policymaking. The text uses formal language, passive voice and includes figures and references to interconnected assessments in order to create an impression of legitimacy and neutrality. The report states the objectives of the policy as: reducing carbon emissions, supporting economic growth and improving air quality.

The report mentions justice-related terms numerous times (e.g. *"burden not distributed equally", "living in more deprived areas",* BCC, 2016, p. 4*).* However, this is mostly in the context of indirect anticipated policy outcomes, such as reduction in air pollution. In terms of the just participation in policy design and the uptake of the initiative itself, the council frames it as the case of having *"no negative impact on equalities communities" (BCC, 2016, p. 9).* The document doesn't refer to a risk of a low take up of EVs by the disadvantaged people. This understanding of climate justice makes EVs a solution potentially benefiting all citizens indirectly in the long term. However, in short timescales it is likely to directly benefit merely a privileged few.

Although the notion of "equality" is considered at the early stage of policy design, the cabinet report concluded that a brief impact assessment is satisfactory and there is no need for a full analysis. This might be due to the fact that the council frames "equality analysis" as a question of the potential negative impact rather than a risk of low participation. Finally, the UK Government defines "*equality groups*" as those with the following protected characteristics: "*age, disability, gender, marriage, civil partnership, pregnancy, maternity, race, religion, belief, sex, sexual orientation*" (BCC, 2016, p. 8). Absent from the formal consideration is any identification of income deprivation as a consideration. This is particularly surprising in the context of the common criticism

425   about EV present in media, e.g. "Electric cars - the ultimate subsidy for the rich" (The

426   Spectator, 2013) or "Minorities Are Being Left out of the Electric Vehicle Revolution"

427   (Schwarz, 2011).

428   **4.1.3. Suggestions for improvement**

429   This paper suggests methodological improvements in assessing the success of the

430   urban "smart" policy in terms of climate justice. Firstly, the policy proposals ought to

431   link to climate justice in an explicit way, taking into account income deprivation as one

432   of the factors affecting pre-existing inequalities. Secondly, forming partnerships

433   between the public and private sector creates new opportunities for data collection on

434   the popularity of the technology and uptake of policy. Increased awareness of the

435   customer base could improve the allocation of funding in future policy cycles, e.g. by

436   helping to determine whether to spend it on purchased cars, car clubs, fleet vehicles

437   or public transport. Moreover, since the policy is explicitly linked with the air quality

438   objectives, the data from pollution monitoring could be further utilised for prioritising

439   EV in air pollution hotspots, e.g. using community transport or council fleet cars on

440   routes with the highest air pollution. Finally, opening up the datasets and referring to

441   urban climate justice agenda in press releases will improve the communication

442   between the local authorities and the citizens.

443   **4.2. Cold Homes Energy Efficiency Surveying (CHEESE project)**

444   CHEESE project is a small-scale initiative led by a community energy organisation,

445   Bristol Energy Network. The project was designed in 2014 and started its official

446   development phase in 2016, after receiving nearly £20 000 of funding from the UK

447   Government and The Big Lottery. This case study analyses the report entitled

448   "Progress of the CHEESE Project" (BEN, 2017).

449 The aim of the progress report was to inform the BEN stakeholders on the
450 development phase of CHEESE project. The idea behind CHEESE project is to
451 provide local householders with low cost (or free for the residents on low income)
452 energy efficiency surveys using thermal imaging technology. The developers of the
453 projects argue that gaining knowledge about gaps in building efficiency will incentivise
454 Bristol residents to invest in home improvements (e.g. insulation, stopping of draughts)
455 and behavioural change measures (BEN, 2017, p. 5). The report tells the story of
456 project development from the managerial point of view, praises achievements of the
457 team, shares best practice, justifies delays and set outs plans for the future. The report
458 is written in a semi-formal language using first person to convey a narrative about
459 project development. The paragraphs are brief and the author avoids specialist jargon.
460 The document provides quantitative data on issues like the length of staff training,
461 funding received, number of images and surveys taken. Although the report avoids
462 technical details, it includes comprehensive references to the academic literature,
463 videos with staff training and hyperlinks to the software used in the project.

464 The report explicitly includes urban climate justice, both by recognising that "*poor and*
465 *black neighbourhoods*" suffer disproportionately from inefficient housing and targeting
466 "*fuel-poor areas*"[1] (BEN, 2017, p. 2). The procedure of targeting disadvantaged areas
467 is undertaken using "smart" technology as, *"(the) technical manager has developed*
468 *energy mapping by ward in Bristol which allows us easily to select fuel-poor target*
469 *areas"* (BEN, 2017, p.2). Nevertheless, the report does not outline whether the
470 targeting strategy was successful and who benefitted from the initiative in the first few
471 months of operation. The report to some extent recognises the complexity and

---

[1] A household is considered to be fuel poor if they have required fuel costs that are above average (the national median level), were they to spend that amount, they would be left with a residual income below the official poverty line (DBEIS, 2017)

472   intersectionality of climate justice, referring to poverty, tenure (e.g. owning or renting

473   property) and race. However, it does not mention the age, health or digital literacy as

474   factors potentially contributing to fuel poverty and the uptake of the initiative.

475   The text emphasizes the community-oriented nature of the project, e.g. partnerships

476   with neighbourhood-level low carbon energy groups, work of volunteers and managing

477   the initiative on a low budget. However, it obscures the demographics of the

478   beneficiaries of the project. For example, whether the residents living in fuel poverty

479   benefitted from the CHEESE survey and made subsequent improvements to energy

480   efficiency in their homes. This might be due to the fact that the document reports on

481   the early phase of the project, e.g. *"We have so far done 13 (surveys) and are just*

482   *gearing up, but we think 120 surveys may be more realistic target before it gets too*

483   *warm after Easter. However, the time has been well spent on perfecting equipment*

484   *and all the ancillary management tools needed to record and interpret the results. This*

485   *is still the second development phase"* (BEN, 2017, p.4; emphasis added by the report

486   author).

487   The notion of urban climate justice is embedded in every stage of the project

488   development: from the recruitment of the target area, the design of advertising (*"we*

489   *are putting up flyers in libraries, community centres, shops, local notice boards (…)*

490   *We are using the contacts of other community organisations to seek out fuel-poor"*,

491   BEN, 2017; p. 5) to finally – the design of survey tools (*"In the event of a lack of Wi-Fi,*

492   *we have printed forms for householders",* BEN, 2017, p. 4). Methods of improving

493   urban climate justice through the project are both qualitative (e.g. multiple channels of

494   advertising, adjustments done for the residents without access to the Internet) and

495   quantitative (interactive energy mapping). The project developed a number of

496 technical innovations, e.g. *"own sophisticated, unique software"* (BEN, 2017, p. 3) and

497 an app compatible with smartphone cameras.

498 **4.2.1. Suggestions for improvement**

499 Discourse analysis reveals that in the CHEESE project "smart" and "just" agenda are

500 understood in line with the academic literature. The progress report analysed provided

501 an explicit justification of the climate justice agenda. It also set out a detailed protocol

502 for the project, involving both qualitative local knowledge and quantitative "smart"

503 equipment. The researchers, however, recommend placing more emphasis on

504 consistently updating on the uptake of the project. The project stakeholders would also

505 benefit from finding out about the successes and limitations related to the recruitment

506 of fuel poor households. The second recommendation is to consider analysing data

507 on health and age while conducting surveys. Health and age are significant

508 dimensions of intersectionality in climate justice; they also might potentially be

509 significant barriers for benefiting from the project. The above practices are expected

510 to improve the accountability of the project and facilitate the replicability of the protocol.

511 **4.3 Synthesis**

512 Bristol City Council's cabinet report on EVs frames "justice" as a potential for negative

513 impact on equality groups enshrined in law (which include e.g. gender, race but not

514 income deprivation), without referring to the risk of a low uptake of a policy by the

515 disadvantaged residents. The West of England EV bid does not recognise income

516 deprivation as a dimension of inequality either - it actively targets financially privileged

517 residents as the potential beneficiaries. Although the policy includes a "community

518 package" aimed at those without the means to purchase EVs, it does not specify the

519 level of support in the budget outline.

520 In contrast, the CHEESE project progress report embeds justice explicitly in its aims.
521 The project's targeting strategy refers to the ideas of justice by recognition,
522 redistribution and – to a certain extent – intersectionality (of income deprivation, tenure
523 type and race). Although CHEESE aims to target fuel-poor households, it does not
524 report on whether it achieved the expected outcomes at the time of writing.

525 Although both projects display a potential to contribute to the ideas of smart and just
526 Bristol, they require further detailed analyses in terms of policy impact on climate
527 justice. Bristol City Council ought to report how EVs could benefit the most deprived
528 residents. An analysis of impacts on income deprivation could complement the current
529 equality assessments. CHEESE project would benefit from a thorough account of the
530 survey uptake and following home improvements in order to improve the accountability
531 of the project. Table 4 summarises how these two case studies contributed towards
532 tackling climate injustices.

533 **Table 4**. A summary of the research results

EV	CHEESE
Understanding of justice	
• Avoiding negative impacts on "equality groups",	• Recognising that income, race and tenure are relevant to the project design
Potential benefits	
• Improving air quality for all, • Widespread dissemination of an emerging technology,	• Tackling fuel poverty, • Improving home efficiency, • Improving the awareness of low-cost efficiency measures

Suggestions for improvements	
• Adding "income deprivation" dimension to equality assessments, • Considering benefits of the policy to the most deprived residents.	• Adding dimensions of health and age when targeting vulnerable participants, • Regularly publishing information on the project uptake.

(continued from previous)

• Community package for those without means to purchase own EVs

534

535 **5. Conclusions**

536 This paper outlined a new heuristic for DA as a tool for project evaluation of "smart"

537 and "just" initiatives and presented a critical review of two urban development

538 initiatives in Bristol, UK. DA was applied in the study, as it is suitable for contested and

539 politically charged terms, which are often applied differently by the theorising

540 academics comparing to the practitioners working on the ground. The review of two

541 case studies of urban level projects reveals differing conceptualisations and

542 applications of urban climate justice in the local policies and community projects.

543 Although both initiatives acknowledged justice as an overarching goal for urban

544 development, each case study defined justice differently and embedded it at different

545 stages of project development.

546 This article suggests methodological improvements in policy design, which would

547 ensure rigorous implementation of "smart" and "just agendas. The researchers

548 recommend benefitting from the "smart" data collected about the residents (data on

549 air quality, fuel poverty, tenure, car ownership, income deprivation, uptake of

550 environmental policies and voluntary initiatives) in order to target policies with social

551 justice in mind.

552 Furthermore, the paper suggests taking into account multiple dimensions of justice

553 (e.g. recognition, rights, distributions, intersectionality) at every stage of project

554 development. Finally, the article suggests that the techniques drawn from DA could be

555 introduced into policy analysis. DA has the potential to clear the conceptual

556 ambiguities, improve transparency and encourage critical self-reflection of urban

557 development practitioners.

558

559 **Acknowledgements**

562

563 **References**

564 • Agyeman, J., Schlosberg D., Craven L. and Matthews C. (2016) 'Trends and Directions in

565 Environmental Justice: From Inequity to Everyday Life, Community, and Just Sustainabilities.

566 *Annual Review of Environment and Resources.* vol. 41, pp. 321-340

567 • Allwinkle, S., Allwinkle, S. & Cruickshank, P. (2011) "Creating Smart-er Cities: An Overview",

568 *The Journal of urban technology*, vol. 18, no. 2, pp. 1-16;

569 • Bax, S. (2011) *Discourse and genre: analysing language in context*. Palgrave Macmillan,

570 Basingstoke. Pp. 98-99

571 • Bristol City Council (2015a*) Our Resilient Future: A framework for climate and energy

572 security,* pp. 120- 198. [online]

573 https://www2.bristol.gov.uk/committee/2015/ua/ua000/1103_binder.pdf

574 • Bristol City Council (2015b*) State of Bristol: Key facts* [available online]

575 https://www.bristol.gov.uk/documents/20182/32947/State%2520of%2520the%2520City%252

576 02013-%2520Ma%20yoral%2520vision%2520v8.pdf/cd19638b-9a4d-4b40-833f-

577 c5866896db17 [last accessed 04/07/2017]

- Bristol City Council (2016) *Ultra-Low West 2016/17 – 2020/21.* Cabinet Report [available online] https://democracy.bristol.gov.uk/Data/Cabinet/201604051800/Agenda/0405_5.pdf [last accessed 04/07/2017]

- Bristol City Council (2017) *Corporate Strategy 2017–2022* [available online] https://www.bristol.gov.uk/documents/20182/1188753/Corporate+Strategy+2017-2022+D5/c545c93f-e8c4-4122-86b8-6f0e054bb12d [last accessed 04/07/2017]

- Bristol City Council (2017) Meetings, agendas and minutes [available online] https://democracy.bristol.gov.uk/ [last accessed 04/07/2017]

- Bristol City Council (2019) One City Plan. [available online] https://www.bristolonecity.com/one-city-plan/ [last accessed 14/3/2019]

- Bristol Energy Network (2017) *Progress of the CHEESE Project* [available online] https://cheeseproject.co.uk/static/files/CHEESE-progress-Jan17.pdf [last accessed 04/07/2017]

- Bristol Energy Network (2017) [available online] http://bristolenergynetwork.org/ [last accessed 04/07/2017]

- Bristol Green Capital (2017) [available online] http://bristolgreencapital.org/ [last accessed 04/07/2017]

- BBC – British Broadcasting Corporation (2018) Bristol's 2030 carbon neutral plan 'ambitious' [available online] https://www.bbc.co.uk/news/uk-england-bristol-46343383 [last accessed 14/03/2019]

- Bulkeley, H., Edwards, G.A.S. & Fuller, S. (2014) "Contesting climate justice in the city: Examining politics and practice in urban climate change experiments", *Global Environmental Change*, vol. 25, pp. 31-40;

- Caprotti, F., Cowley, R., Flynn, A., Joss, S., & Yu, L. (2016) *Smart-Eco Cities in the UK: Trends and City Profiles.* Exeter: University of Exeter (SMART-ECO Project).

- Caragliu, A., Del Bo, C. & Nijkamp, P. (2011) "Smart Cities in Europe*", Journal of Urban Technology,* vol. 18, no. 2, pp. 65-82.

- Compact of Mayors (2014) [available online] https://www.compactofmayors.org/history/ [last accessed 04/07/2017]

- Cowley, R., Joss, S. & Dayot, Y. (2017), "The smart city and its publics: insights from across six UK cities", *Urban research & practice*, pp. 1-25;

- de Jong, M., Joss, S., Schraven, D., Zhan, C. & Weijnen, M. (2015) Sustainable–smart–resilient–low carbon–eco–knowledge cities; making sense of a multitude of concepts promoting sustainable urbanization. *Journal of Cleaner Production*, vol. 109, pp. 25-38

- Department for Business, Energy & Industrial Strategy (2017) Fuel Poverty Statistics [available online] https://www.gov.uk/government/collections/fuel-poverty-statistics [last accessed 04/07/2017]

- Eden Strategy Institute (2018) Top 50 smart city governments [available online] https://static1.squarespace.com/static/5b3c517fec4eb767a04e73ff/t/5b513c57aa4a99f62d16 8e60/1532050650562/Eden-OXD_Top+50+Smart+City+Governments.pdf [last accessed 14/03/2019]

- European Commission (2019) The Marketplace of the European Innovation Partnership on Smart Cities and Communities [available online] https://eu-smartcities.eu/ [last accessed: 14/03/2019]

- Finger, M., Razaghi, M. (2016) "Conceptualizing "Smart Cities", *Informatik-Spektrum*, vol. 40, no. 1, pp. 6-13;

- Fuchs, C. (2017) "Critical Social Theory and Sustainable Development: The Role of Class, Capitalism and Domination in a Dialectical Analysis of Un/Sustainability", *Sustainable development,*

- HM Government (2008) *Climate Change Act* [online]. http://www.legislation.gov.uk/ukpga/2008/27/contents [last accessed 04/07/2017]

- House, E.R. & Howe, K.R. (1999) *Values in evaluation and social research*, Sage, London.

- Huawei (2017) UK Smart Cities Index [available online] https://e.huawei.com/uk/special_topic/solution/smart_cities_index_2017 [last accessed: 14/03/2019]

- ISESE (2018) Cities in Motion Index [available online] http://citiesinmotion.iese.edu/indicecim/?lang=en [last accessed 14/03/2019]

- Kaijser, A. & Kronsell, A. (2014) "Climate change through the lens of intersectionality", *Environmental politics,* vol. 23, no. 3, pp. 417-433;

Michalec, A.; Hayes, E.; Longhurst, J. and Tudgey, D. (2019) Enhancing the communication potential of smart metering for energy and water, *Utilities Policy*, 56, pp. 33-40, [available online] https://doi.org/10.1016/j.jup.2018.11.002 [last accessed 14/03/2019]

Preston, I., Banks, N., Hargreaves, K., Kazmierczak, A., Lucas, K., Mayne, R., Downing, C. and Street, R. (2014) Climate change and social justice: an evidence review. John Rowntree Foundation: York

Rist, G. (2013) Development as a Buzzword Development. *Development in Practice*. vol. 17, pp. 485–491.

Saunders, T., Baeck, P. (2015) *Rethinking smart cities from the ground up*. Nesta: London

Schwarz, A. (2011) Minorities are being left out of electric vehicle revolution. Fast Company. [available online] https://www.fastcompany.com/1769539/minorities-are-being-left-out-electric-vehicle-revolution [last accessed 04/07/2017]

Shelton, T., Shelton, T., Zook, M. & Wiig, A. (2015), "The 'actually existing smart city'", *Cambridge journal of regions, economy and society*, vol. 8, no. 1, pp. 13-25;

Shi, L., Chu, E., Anguelovski, I. & Aylett, A. (2016) "Roadmap towards justice in urban climate adaptation research", *Nature climate change*, vol. 6, pp. 131-137;

Smith, C. F. (2010) *Writing Public Policy.* Oxford University Press: Oxford

Steele, W., Mata, L. & Fünfgeld, H. (2015) "Urban climate justice: creating sustainable pathways for humans and other species", *Current opinion in environmental sustainability,* vol. 14, pp. 121-126;

Stilgoe, 2017…

United Nations (2015) *Transforming our world: the 2030 Agenda for Sustainable Development*. Report [online] https://sustainabledevelopment.un.org/post2015/transformingourworld [last accessed 04/07/2017]

United Nations Framework Convention on Climate Change (2015) *The Paris Agreement* [online]

665 http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreeme

666 nt.pdf [last accessed 04/07/2017]

667 • Ware, M. (2013) Electric cars - the ultimate subsidy for the rich. The Spectator [available

668 online] https://www.spectator.co.uk/2013/09/electric-daydreams/ [last available 04/07/2017]

669 • West of England (2016) GoUltraLowWest: The West of England Go Ultra Low Cities Bid

670 [available online]

671 https://democracy.bristol.gov.uk/Data/Cabinet/201604051800/Agenda/0405_5.pdf [last

672 accessed 04/07/2017]

673 • Wodak, R. & Meyer, M. (2009) *Methods of critical discourse analysis*, 2nd edn, SAGE,

674 London

675 • Woods, E., Alexander, D. Rodriguez Labastida, R., Watson, R. (2016) *UK Smart Cities Index:*

676 *Assessment of Strategy and Execution of the UK's Leading Smart Cities*. Commissioned by

677 Huawei. Navigant Consulting, Inc: Boulder

678 • World Economic Forum (2019) WEF, 2019

679 • Yanow, D. (2000) *Conducting interpretive policy analysis,* Sage, Thousand Oaks, Calif;

680 London.

681
682

683

684

685

686

687

688

689

690

691

692

693