

# Cities lead on climate change

Richard D. Pancost

The need to mitigate climate change opens up a key role for cities. Bristol's year as a Green Capital led to great strides forward, but it also revealed that a creative and determined partnership across cultural divides will be necessary.

In October 2013, Bristol was chosen to be the 2015 European Green Capital — the sixth such city after Stockholm, Hamburg, Vitoria-Gasteiz, Nantes and Copenhagen. The honour reflected the city's leadership in ensuring positive change in twelve sustainability criteria, involving waste reduction and renewable energy provision; its thriving green economy, following the employment of tens of thousands of people; and its grass-roots activism, represented by the Bristol Green Capital Partnership. That activism, especially when combined with Bristol's particular brand of creativity, exemplified by balloons, Brunel and Banksy, is the reason why the honour was announced for the “city with a sense of fun.”

Bristol is fun: it was the winner in the *Sunday Times* newspaper's list of Best Places to Live in Britain in 2014. But it is an edgy and radical fun, brought into sharp relief during a year in which we scrutinized the barriers to our aspirations. Bristol 2015 happened during a UK general election, the Syrian refugee crisis and the agreement of the Sustainable Development Goals, all of which highlighted that cities' ambitions are irrevocably linked to those of the nation and the world. The city was a Green Capital during the vital United Nations Climate Change Conference in Paris in December 2015 (COP21), which forced us to focus on the profound transformations that must happen to limit global warming to 2 °C. But Bristol 2015 also happened as rises in food bank use and homelessness reminded us that our city, like all cities, faces a range of challenges.

In that context, the city hosted over 1,000 events — tech expos, art installations, lectures, workshops, hackathons and conferences — that collectively reached hundreds of thousands of people. It procured funding from central government and sponsors (the Green Capital honour comes with no European Union funding) that was used, in part, to support 204 community-led projects, from educational schemes to community gardens to new

cycling initiatives. The award-winning Sustainable Shaun game<sup>1</sup> was created in partnership with Bristol-born Aardman Animations and contributed to a wider educational programme that reached 15,000 school children.

It is too soon to assess the long-term impact of that activity, but lessons are emerging. We learned that being a Green Capital for a year can initiate action that will translate into long-term transformation. But we also learned that a green agenda cannot be pursued in isolation. It must, instead, be tackled in conjunction with issues like poverty and health, and it is key to forge trust and collaborations across the diverse cultures that make up a city.

## Catalysing action

Perhaps the most profound lesson was that status as a European Green Capital is a catalyst for action, education and change. Among the participants were, importantly, the earth and environmental academic communities. We facilitated action by contributing evidence to discussions about climate change, urban pollinators, flood risks, sea-level rise, fracking and nuclear waste storage. Bristol leaders are acutely familiar with reports from the Intergovernmental Panel on Climate Change (IPCC) and Environment Agency, but even in a well-informed context, many earth scientists were still able to develop the local evidence base and contextualize it.

More fundamentally, geoscientists helped create new forms of discourse and shared new narratives, embedding alternative perspectives into the collective surge to action. Scientists at the University of Bristol Cabot Institute provided a palaeoclimatic context for a new show in At-Bristol's 3D planetarium. Earth system and climate scientists partnered with a range of artists, from local street artists (Fig. 1) to internationally recognized names such as Fujiko Nakaya, Luke Jerrams and Fourthland, to explore our uncertain

climate past and future. Co-curated arts projects like Fog Bridge<sup>2</sup> and Withdrawn<sup>3</sup> not only attracted national attention but they helped circumvent ‘climate fatigue’ by telling old stories in new ways, opening up new conversations with new groups.

The long-term gains from this collective catalysis are becoming clear. Arts projects have been donated to schools. Funding has been procured to ensure that many of the community projects can continue. Over 1,200 Bristol businesses joined the Go Green initiative, committing to more sustainable policies. Renewable energy capacity in the city has increased by a factor of five over the past five years. Students from the University of Bristol and the University of the West of England volunteered over 100,000 hours to launch or support sustainability initiatives across the city, and both universities and their associated student unions have committed to maintaining that activity. The Green Capital Partnership (<http://bristolgreencapital.org/>), an independent leadership organization with an aim to make Bristol “a low carbon city with a high quality of life for all”, grew from a coalition of about 150 organizations to a community interest company comprising over 850 organizations, making it the largest of its kind in the world, securing long-term financial commitment and ensuring an ongoing role in civic leadership.

Bristol's year as a Green Capital also accelerated the implementation of new policies. For example, the University of Bristol Cabot Institute committed funds to conduct a mini-Stern review of energy efficiency measures<sup>4</sup>, showing that Bristol could reduce domestic carbon emissions by 40% while creating jobs and saving money. This, in turn, contributed to Bristol City Council's Framework for Climate and Energy Security<sup>5</sup> that will integrate a new council-owned energy company, new and existing council-owned renewable energy provision and a proposed urban retrofit for 40,000 homes to decrease energy consumption and fight fuel poverty.

This catalysis is not limited to the boundaries of the city. Bristol initiatives were shared and escalated through national and international partnerships. Plans drafted in Bristol for energy efficiency and smart city management were shared with the world and critiqued at COP21 as Transformative Actions Programs presented at the Cities and Regions Pavilion. The Bristol 2015 educational programme is being rolled out nationally in 2016 and 2017, dramatically expanding its reach, and the associated game Sustainable Shawn has been played in 150 countries.

Concerted effort, energy and focus have led to a proliferation of actions. In aggregate, these do have the potential to transform our city.

### Resilient and sustainable

Another lesson learned from the Green Capital year is that cities must wed their sustainability and resiliency policies — to each other and to wider issues of health, the economy and inequality. Bristol was chosen in 2014 as an inaugural member of the Rockefeller Foundation's 100 Resilient Cities initiative<sup>6</sup>, and we appointed our Chief Resilience Officer in 2015. The timing, coinciding with the Green Capital year and COP21, encouraged a focus on climate change. It quickly became evident that it could not be the exclusive focus. Resilient cities must be prepared for natural, economic and social shocks while addressing chronic issues of health, poverty and security. Bristol's citywide resilience scoping revealed a complex matrix of potential concerns, ranging from environmental issues such as sea-level rise and flooding to issues regarding an ageing population, food poverty and health inequality.

Nonetheless, climate change did provide a useful lens through which to explore wider resiliency issues. The Paris Agreement aspires to limit global warming to well below 2 °C, and consequently, cities must strive for a sustainable transformation that simultaneously builds resilience to this 'acceptable' climate change risk. However, the climate change forecasts that our city requires — concerning rainfall, extreme weather events, impacts on food production and supply chains — are among the most uncertain.

Wider climate lessons from the Earth's history underscore this pervasive issue of uncertainty. Palaeoclimate research provides confidence in climate forecasts, especially those related to Earth system sensitivity and therefore global warming, but the geological record also reveals how unprecedented our current CO<sub>2</sub> trajectory



RICH PANCOST

**Figure 1** | Bristol 2015 — European Green Capital. As part of Bristol's year as a Green Capital, a number of pieces of art were commissioned to engage local communities around the city. One example is *The Uncertain World*, a mural by Alex Lucas on one of the city's busiest streets.

is. It now seems very likely that the 400 ppm of CO<sub>2</sub> in the atmosphere today is the highest our planet has experienced for 3 million years<sup>7</sup>, and that the rapid rate of change has few, if any, precedents throughout Earth's history<sup>8</sup>.

Of course, uncertainty is not limited to climate change, and collectively, the resilience work provided stark confirmation that we must radically reimagine the concept of resiliency in order to thrive in an uncertain world — a world in which not only is the environment becoming less predictable but our cities and their global interactions are becoming more complex. Classical risk management approaches remain vital but will have to be supplemented by new stakeholder-led models and new financial, legal and governance structures. Food, energy and even manufacturing provision must become not simply more local but redistributed and better networked.

Throughout the year, the resiliency conversation has evolved in unexpected directions, starting with discussions of robust infrastructure but quickly progressing to solutions based on social cohesion, grass-roots movements and the role of smart city technology. The process is incomplete but the central message is clear: resilient cities will be collectives of resilient citizens and communities characterized by their flexibility, creativity and freedom to act.

### Sharp changes

We also learned how great the challenge will be to fundamentally transform our society, infrastructure and individual behaviour to achieve more sustainable and carbon-neutral cities. Bristol's Framework for Climate and Energy Security<sup>5</sup> is ambitious but would be cost neutral within only three to five years; however, depending on its scope, it will require 1 to 2 billion euros. Identifying and liberating creative new forms of finance will be crucial.

Embedded in the mini-Stern report is a more trenchant message — achieving our short-term emissions reductions is relatively easy due to the global economic slowdown, delivery of projects in the pipeline and exploitation of win-win opportunities. But to achieve carbon neutrality, the more difficult, structural challenges cannot be ignored. In the UK, national and local governments must start building an electricity grid that can underpin a renewable energy economy, initiate a near-universal household refitting for a post-gas society and invest in energy storage and other technological innovations.

Bristol is thinking about these longer-term challenges, and for us that requires the critical examination of our congested city — to achieve carbon neutrality, we will have to markedly reduce our transport by automobile. Use of public transport has increased, and one bus route is powered by human and household waste — the so-called

poo bus<sup>9</sup>. And yet, even the impositions of a 20 mph speed limit and residential parking schemes have proved deeply divisive. Bristol also acutely experienced the tension that occurs when multiple green initiatives compete for limited funding, resources or space.

The gap between ambitions and on-the-ground change were mirrored at COP21, where 196 nations agreed to an ambition to limit global warming to 1.5 °C but brought Intended Nationally Determined Contributions (INDCs) projected to limit global warming by only 2.5 to 2.7 °C; the policies that are currently in place will allow even greater warming<sup>10</sup>. Moreover, that 1.5 °C target will require relatively rapid decarbonization of all of our society, not just of electricity provision but also of heavy manufacturing, global supply chains and our agriculture, for which the policy and technology journey remains unclear. Changes in investment and behaviour are required now if we are to have deployable technologies in twenty years.

### In it for all

Perhaps the sharpest lesson from our year as the Green Capital is that environmental challenges remain the priority of only a subset of the population. It has been claimed that the Green Capital programme, like some wider climate change and environmental movements, reached only the usual suspects or, even more contentiously, was a white middle class issue. This perception must be challenged but also demands deep reflection. Reports ranging from that of the IPCC Working Group II on Impacts, Adaptation and Vulnerability<sup>11</sup> to the Pope's encyclical on climate change<sup>12</sup> emphasize that climate change is an issue intrinsically related to issues of inequality — between generations, nations, ethnic groups and classes. This is similarly true in Bristol, a very diverse city, with more than 91 languages spoken, at least 45 religions practised and a black and minority ethnic population<sup>13</sup> nearing 20%. It is a City of Sanctuary welcoming refugees from across the world and has one of the UK's strongest economies but also some of the nation's worst economic, health and educational inequality<sup>14</sup>.

This inequality is a further impetus to strong action on climate change. Moreover, the bold social and economic transformations required to, for example, limit global warming to 2 °C (let alone the ambition to limit warming to well below 2 °C) will require an all-inclusive movement that spans all of society, regardless of class, religion or colour. Many of the Green Capital events, including some of those

organized by me and despite the best of intentions, were perceived as entraining the usual suspects and failing to engage the wider society.

There is a great deal to explore and we must avoid problematic language when doing so. Cultural norms and ingrained anxieties, especially in a city that once thrived through the slave trade, can passively exclude. No groups were actively excluded: all events were public and widely advertised and some of the most exciting projects focused explicitly on inclusion, including 91 Ways, which was inspired by those more than 91 languages spoken in our city. It was an exciting year across Bristol.

### Environmental challenges remain the priority of only a subset of the population.

And yet when the year ended, there was a sense that the inequality issues that plague our city also coloured the Green Capital year. Events and projects happened in all of our communities and neighbourhoods but we could have done more to connect those neighbourhoods. Events were open but agendas were already decided. Many of us talked more than we listened. We are only starting the deep and difficult conversations required to understand this issue. In some of our end-of-year explorations, an emerging theme has been a perceived failure to invite new groups into the conversation as equal contributors, either to the framing of the dialogue or the nature of solutions. As was said at one workshop, “We are invited to the events but only after the agenda has been set.” Substantive change in a multicultural and economically diverse society will require fundamentally new dialogue that inspires grass-roots ideas, nurtures them and values all of them. Those of us who have been invested in acting on environmental challenges for much of our lives will have to rediscover the patience to hear others' ideas.

Social or economic transformations are always challenging. However, collectively, these lessons also reveal an exciting opportunity for a city that has always been innovative and radical.

### A space for ingenuity

Just as the Green Capital has catalysed action with respect to community initiatives and energy policy, it can catalyse vital conversations about resilience, inequality and social justice. In fact, some of the most exciting community initiatives inverted the classical challenge of wicked problems; rather than despairing at the apparent

intractability of complex food, water, health and environmental challenges, people in Bristol showed that clever interventions can have positive ripple effects throughout multiple sectors. A flood resilience community group can plant food, build social cohesion, connect isolated residents and encourage mental and physical health. An upcycling initiative can decrease waste, carbon and litter while building a stronger neighbourhood. Such insights are not unique to Bristol. Elsewhere, local food programmes yield similar cross-sectoral benefits<sup>15</sup>. Alignment of sustainability and inclusion agendas is also central to the Sustainable Development Goals.

For nearly 20 years, cities have been self-proclaimed vanguards of climate change action (and adaptation). Bristol's Mayor, George Ferguson, has repeatedly argued that cities have the evidence base, capacity and local knowledge to make real change. COP21 confirmed that this is a genuine and pervasive movement. Industries recognize cities as potentially more adroit partners than national governments, and global leaders consider cities to be key players in pushing emissions reductions faster than the INDCs. We learned in the Green Capital year that all of this is true. We also learned that unleashing this potential is fundamentally about the ingenuity, capacity and creativity of all of a city's citizens, united with common purpose and empowered by trust in and from their leaders. □

Richard D. Pancost is at the University of Bristol Cabot Institute and School of Chemistry, University of Bristol, Bristol BS8 1UJ, UK. e-mail: R.D.Pancost@bristol.ac.uk

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