What did infrastructure ever do for us?

Katy Roelich

Taking wellbeing into account when transforming infrastructure systems for a People's Green Recovery from Covid-19

WHAT IS INFRASTRUCTURE AND WHY TRANSFORM IT?

Infrastructure is not something we talk about much. It tends to be invisible and go unnoticed, unless something goes wrong. In fact, we should be talking about it, a lot. The way we design and use infrastructure is at the root of many pressing environmental and social issues, such as the climate crisis, air pollution, biodiversity loss, unemployment and poverty.[1] The Covid-19 recovery presents an opportunity to transition to a sustainable society (and protect ourselves from damage already set in motion), but to do this we will have to make dramatic changes to how we prioritise, design and use infrastructure. Depending on how we go about doing this, we could exacerbate existing inequalities or create new ones, or we could significantly improve the wellbeing of people and the environment. We urgently need to start thinking about what those changes might be and how to manage any negative consequences.

> **"The way we design and use infrastructure is at the root of many pressing environmental and social issues"**

It's hard to think about the consequences of infrastructure transformation on our daily lives because it's hard to define what infrastructure is – it's a term used frequently but rarely means the same thing to different people. I

1 For good examples of this, see Creutzig F, Agoston P, Minx JC, Canadell JG, Andrew RM, Le Quéré C, Peters GP, Sharifi A, Yamagata Y and Dhakal S (2016) 'Urban infrastructure choices structure climate solutions', *Nature Climate Change*, 6(12): 1054–1056, https://doi.org/10.1038/nclimate3169; and Bayliss K and Mattioli G (2018) 'Privatisation, inequality and poverty in the UK: briefing prepared for UN rapporteur on extreme poverty and human rights', SRI working paper 116, SRI Papers, ISSN 1753-1330

define infrastructure as more than a collection of structures and networks. These structures and networks interact with each other, with the policy and regulation that shape investment and operational regimes, and with the practices and wellbeing of infrastructure's users. In this article, I focus on what the National Infrastructure Commission calls 'economic' infrastructure systems (that is, transport, energy, water and sewerage, flood risk, digital and waste), because it is these that have the most significant impact on environmental breakdown and are affected most extensively by proposals for a green recovery from Covid-19.

It's also hard to think about the consequences of infrastructure transformations because infrastructure is very complex. We are developing a better understanding of how infrastructure interacts with environmental and economic systems, but there is far less discussion about how it contributes to society and the wellbeing of citizens. Without a better understanding of infrastructure's relationship with society, changes to infrastructure, motivated to address environmental breakdown, might have negative consequences for wellbeing.

There has been a rush of proposals for a green recovery from Covid-19, which aim to reinvigorate the economy, while at the same time addressing the climate crisis. Almost universally, proposals for a green recovery imply significant and urgent changes to infrastructure. In this article, I argue that an explicit focus is needed on the impacts of these proposals on wellbeing to ensure that they are fair and to avoid negative social consequences.

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INFRASTRUCTURE'S CONTRIBUTION TO SOCIETAL WELLBEING

Wellbeing, quality of life and human needs are all used, often interchangeably, to describe our state of physical, mental and emotional health and our ability to flourish. Important dimensions of wellbeing include:

- being safe, dry and warm
- having enough to eat and drink

- connecting with others
- engaging in society and decisions
- having meaningful work
- having autonomy and control over one's environment
- developing knowledge and awareness
- being able to enjoy recreational activities
- having protection from discrimination.[2]

Using these outcomes of wellbeing provides a more structured way of analysing how changes to infrastructure may affect wellbeing.[3] Different infrastructure sectors affect wellbeing directly and indirectly; positively and negatively; and in the short and long term.

Direct impacts on wellbeing from some infrastructure sectors are perhaps easier to identify; for example, the access to work, education and social networks that the digital and transport systems provide, or the cleanliness and health that the water and waste systems provide. However, infrastructure can also affect our wellbeing indirectly; for example, the current configuration of the energy system creates carbon emissions contributing to the climate crisis and increases the chances of flooding, which affects our security and health.

The same infrastructure system can affect wellbeing both positively and negatively. For example, transport can provide access to work, education and social networks but can also damage physical health because of air pollution and sedentary lifestyles. These positive and negative effects also happen over different timescales; for example, the positive effect of fossil fuel powered heat on health in the short term compared with the negative effect of carbon emissions or poor indoor air quality on health in the long term.

Importantly, it's not just what is built that can affect wellbeing but also how it is built: engaging individuals and communities in decision-making processes can meet needs directly (for example, the need to engage in

2 Based on several different ways of defining the needs we must satisfy, or the capabilities we must achieve, including: Doyal L and Gough I (1991) *A Theory of Human Need*, Macmillan; Max-Neef M (1991) *Human Scale Development: Conception, application and further reflections*, Zed Books; and Nussbaum MC (2001) *Women and Human Development: The capabilities approach*, Cambridge University Press

3 See Brand-Correa LI and Steinberger JK (2017) 'A framework for decoupling human need satisfaction from energy use', *Ecological Economics*, 141: 43–52. https://doi.org/10.1016/j.ecolecon.2017.05.019

society and decisions). Excluding people from decision-making can mean their needs are overlooked and solutions fail to support their wellbeing or meet with resistance.

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THE BRIGHT SIDE OF GREEN RECOVERY FOR INFRASTRUCTURE AND WELLBEING?

There are clear positive outcomes for wellbeing that could be maximised through a green recovery from Covid-19. Infrastructure-relevant green recovery proposals predominantly relate to energy and transport, which I will focus on here, in the interest of brevity. In a wellbeing-oriented Covid-19 recovery, these proposals would all be implemented using transparent processes that provide opportunities for all to engage with the design and delivery of strategies in their locale.

One of the most effective recovery strategies from a climate perspective is to invest in renewable electricity production. This would increase people's safety and security by reducing risks to property and livelihoods from climate impacts and reduce the negative effects on physical and mental health. If participation and investment in renewable energy were made viable for communities and individuals, through a supportive planning and investment policy, this would increase people's wellbeing as they would be able to engage in society and decisions and have autonomy over their environment.

The electrification of heat and removing fossil fuelled heating infrastructure from homes would reduce negative wellbeing outcomes from climate change and improve indoor air quality and the health of individuals. To distribute these wellbeing benefits equally, the deployment of electrified heat technologies must be universal, and not limited to only those with sufficient financial capital to pay for them outright. Deployment must also be supported by an enhancement in knowledge regarding the operation of a new technology, which differs substantially from existing technologies.

Reducing the demand for heat and electricity, through accelerating investment in home energy efficiency, would have a strong, positive effect on health, reducing the incidence of respiratory disease and mental health

problems. Energy efficiency retrofit is very employment intensive so if implemented rapidly, would result in an increase in local skilled jobs, increasing knowledge and meaningful employment.

The dominant transport strategy is to expand electric vehicle charging networks and subsidise electric vehicle uptake. This has benefits for climate change in the long term, but on its own, fails to address many of the wellbeing impacts of the current transport system; for example, road accidents caused by competition for road space with pedestrians and cyclists. Rather than simply encouraging a move from one type of car to another, a wellbeing-oriented transport recovery would cut private car travel and make it easier and safer to travel on foot and by bike.[4]

Covid-19 has shown that there was a previously suppressed demand for walking and cycling and that when these forms of transport have more priority they become more attractive. They are also more effective from a carbon perspective, particularly because two out of five car journeys are below three miles and could be substituted for walking and cycling.[5] This could happen immediately, rather than waiting for car drivers to adopt low emissions vehicles.

Measures to improve road surfaces and reallocate public road space from cars to bikes and pedestrians are needed to enable safe active travel over shorter distances. This should be supplemented with:

- inter-urban and regional cycle networks infrastructure
- incentives to support e-bike travel and displace longer car journeys
- schemes to improve knowledge of bike maintenance.

From a wellbeing perspective, this would reduce the negative impacts created by car travel, increase the physical and mental health benefits associated with active travel and increase the knowledge and capacity of cyclists.

Many infrastructure-specific strategies would result in changes to workers' conditions and jobs. This includes job losses from the fossil fuel extraction and electricity generation sectors and job creation in renewable energy,

4 See Marsden G, Anable J and Docherty I (2020) 'A new green shovel? Options for the transport stimulus package', CREDS blog, 9 June 2020. https://www.creds.ac.uk/a-new-green-shovel-options-for-the-transport-stimulus-package

5 Neves A and Brand C (2019) 'Assessing the potential for carbon emissions savings from replacing short car trips with walking and cycling using a mixed GPS-travel diary approach', *Transport Research Part A*, 123: 130–146

energy efficiency and active travel. For this reason, infrastructure-related green recovery proposals are frequently supported by strategies to retrain workers and redeploy them in 'green' sectors, and research and development (R&D) funding to support UK manufacture of renewable technologies. If delivered with proper attention to equality of opportunity, economic (worker-led) democracy and job guarantees, this would improve wellbeing in several ways. Retraining supports the need for education and knowledge and provides longer-term security of income – jobs in the fossil fuel sector will only last as long as reserves are viable. Retraining and deployment also provide greater freedom of opportunity, reducing the dependence of workers on a sector that is environmentally damaging and which undermines democracy.

The examples described above show the extensive benefits that could accrue if Covid-19 recovery proposals are wellbeing- as well as climate-oriented. This requires a conscious choice to pay attention to wellbeing and good process, and to put wellbeing front and centre of green Covid-19 recovery plans. If this does not happen, many of the benefits described above will not transpire. Furthermore, wellbeing that is created will be distributed very unevenly, exacerbating existing inequalities.

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PUTTING WELLBEING AT THE HEART OF TRANSFORMATION

A wellbeing-oriented Covid-19 recovery implies significant changes to how we appraise, deliver and use infrastructure, so a vision alone is insufficient. In this section, I outline five issues that must be tackled to deliver this vision: new metrics and criteria, empowered decision-makers, public participation, new forms of finance and public ownership.

New metrics and criteria

Evidence is required about how infrastructure shapes lives, which will be very different from quantitative measures of economic success and carbon emissions reduction. Integrating these diverse forms of evidence into

decision-making processes will be challenging, particularly in the predominantly quantitative approaches to cost–benefit analysis that dominate infrastructure decision-making and the analysis of green recovery proposals. New Zealand, Iceland, Scotland and Wales are already developing wellbeing budgets and decision-making frameworks, so much could be learnt from this experience. The fair distribution of costs and benefits to wellbeing, not just the aggregate costs and benefits, must be considered explicitly to avoid exacerbating existing inequalities or creating new ones.

Empowered decision-makers

New processes will be needed to identify desirable outcomes for local wellbeing and the means through which these outcomes are achieved. This requires a properly resourced and empowered civil service at both a national and a local level. One of the many challenges of transforming infrastructure is the fragmented nature of its governance; infrastructure is the responsibility of a number of different organisations and regulators and is split across the public and private sectors and across geographic scales. Therefore, civil servants must be empowered to engage with and address this fragmentation.

Public participation

The public must have a stronger say in defining both outcomes and means of infrastructure transformation. Improving representation is more likely to improve fair distribution of benefits and opportunities. This means that deliberative democracy, through citizens' juries, participatory budgeting and people's assemblies, will need to become as important as representative democracy. In France and the UK, citizens' assemblies have been created to involve the public in climate policymaking. These assemblies have allowed publics to debate and discuss their preferences for the transformation of key infrastructure, and the act of participation has a demonstrably positive effect on wellbeing. Improving citizens' capabilities to engage is essential to overcome structural inequalities and provide a level playing field to articulate knowledge over infrastructure.

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New forms of finance

This includes mechanisms that allow a long-term and stable return on capitally intensive infrastructure projects that specifically include wellbeing outcomes. Democratising finance, by encouraging options like crowdfunding and community municipal bonds, can refocus on wellbeing outcomes but also improve the autonomy of investors and their engagement in society and decision-making, further enhancing their wellbeing.[6] This has been demonstrated by a surge in crowdfunding of community energy projects and the recent announcement of a community municipal bond to fund local climate emergency strategies.

Public ownership

Because infrastructure is so closely tied to wellbeing, many argue that its operation should be brought back into public ownership and that universal basic services should be provided to ensure that a minimum level of service is available to all. We have seen during the Covid-19 crisis that public transport infrastructure, such as bus and rail franchises, which are essential to the mobility of many key workers, have been brought back under public control to ensure basic service provision. The crisis has highlighted the importance of paying attention to essential goods and services, which require collective provision that cannot be managed by markets.

Infrastructure is closely coupled with our wellbeing and this coupling must be considered as we develop strategies for green recovery from Covid-19. Failing to do this could have severe negative consequences both directly for wellbeing and indirectly by widening inequalities in access to services that improve our wellbeing. A wellbeing-oriented green recovery for infrastructure needs new evidence, processes, funding and governance. It represents a seismic shift from our current view of infrastructure delivery. The payback for that shift is a population that is able to flourish in a natural environment that is not at risk of breakdown. Surely, a decent return from a People's Green Recovery, or perhaps a Green Recovery for the People?

Dr Katy Roelich is an associate professor in participatory and adaptive decision-making at the University of Leeds.

6 Davis M and Cartwright L (2019) *Financing for Society: Assessing the suitability of crowdfunding for the public sector*, University of Leeds. http://eprints.whiterose.ac.uk/145481