

Transport Action Network

Stop the Silvertown Tunnel coalition

Speak Out Woolwich

Extinction Rebellion Greenwich

Briefing: Stop the climate-wrecking Silvertown Tunnel



This Briefing updates the arguments made in our *Stop Digging* report (June 2020)¹ for cancellation of the Silvertown Tunnel project. We comment here on issues that have arisen in public discussion of the tunnel project since then, with a particular focus on the climate policy issues under discussion prior to the COP 26 climate talks in Glasgow.

Summary

- London's greenhouse gas emissions policies lag far behind targets climate scientists recommend. These policies have not been updated in line with the government's legally binding carbon budgets. Nor have they been independently assessed as compatible with the Paris climate agreement, as City Hall claims.
- The transport sector has made the least progress in reducing emissions in the last 20 years, future targets are insufficiently ambitious – and Transport for London's estimates of emissions from the road network, whether or not the £2 billion + Silvertown tunnel is built, do not even meet these inadequate targets. In planning the tunnel, TfL has ignored the induced traffic effect. Claims that the tunnel will alleviate air pollution are exaggerated.
- The tunnel project is part of a London transport policy which, despite expressing support for alternative modes, remains car- and road-focused. Such a policy will exacerbate social inequality in London. In this respect, and in its reckless reliance on future growth of electric vehicles, it is aligned with government transport policy.
- The proposed tunnel has not been re-assessed in the light of increased flood risk.
- Climate scientists have established that all new fossil-fuel-centred infrastructure, including road projects, damage humanity's chances of limiting global heating to 1.5 degrees, or even 2 degrees. There has been no life-cycle analysis of the tunnel's impact. In the run-up to the COP 26 climate talks, the project should be reviewed with a view to cancellation.

1. London and UK climate policy and carbon budgets

The Silvertown Tunnel project is incompatible with London making a fair contribution to keeping global heating to 1.5°C above pre-industrial temperatures. The project needs to be reviewed in the light of the climate emergency, declared in 2018 by the Greater London Authority (GLA) along with the UK Parliament and other local authorities. The main reason given by the GLA for pressing ahead with the project – that it will ease traffic congestion at the Blackwall tunnel and improve road network resilience – is inadequate to justify doing such damage to the aim of tackling dangerous global heating. The case for reconsidering the project in the run-up to the COP 26 climate talks has been made by climate, energy, transport and urban planning researchers in an Open Letter to Grant Shapps, the transport secretary, and Sadiq Khan, Mayor of London (see Appendix).

In response to residents concerned about the tunnel's climate impact, the Deputy Mayor for Transport, Heidi Alexander, has stated that the Mayor is making efforts to address the climate emergency, and “would not be pressing ahead” with the project “if he thought it would jeopardise these efforts”.² But it is jeopardising such efforts. In this section, we show that: GLA greenhouse gas emissions policies lag far behind targets that climate scientists recommend; actual emissions reductions may be lagging still further behind; and the GLA's

¹ S. Pirani, *The Silvertown Tunnel is in a hole, so Stop Digging* (Transport Action Network and others, June 2020) <https://transportactionnetwork.org.uk/wp-content/uploads/2020/07/Stop-Digging-Report.pdf>

² Heidi Alexander letter to Gareth Thomas MP, 24 August 2021; the same, or similar, wording has been used in numerous other letters

claim that its emissions reduction policies have been “independently assessed” as aligned with the goals of the 2015 Paris climate agreement lacks credibility (see section 1.c below).

1.a. The gap between climate scientists’ recommendations and GLA policies

Researchers at the Tyndall Centre for Climate Change Research and the University of Manchester have developed a set of carbon budgets (estimates of the amount of carbon dioxide emissions allowable over set time periods) for all UK local authorities, that enable them to contribute to meeting the 1.5°C target. For London, the Tyndall researchers recommend a cumulative carbon budget of 203.5 million tonnes of CO₂ (Mt CO₂) for 2020-2100; this compares to a cumulative budget of 453.04 Mt CO₂ that the GLA allows itself in its Zero Carbon Pathway.³ The GLA’s budget is more than twice as large as the Tyndall researchers’ budget. This translates into two very different approaches to cutting carbon emissions. The GLA has targeted reducing CO₂ emissions to 27.7 Mt/year by 2020 and 23.4 Mt/year by 2025; the Tyndall approach implies reducing CO₂ emissions to 25.3 Mt/year by 2020 and 13.1 Mt/year by 2025.⁴ London’s 2019 emissions were 28.5 Mt CO₂, as measured in BEIS statistics (see section 1.b below).

The reason for the gulf between the two carbon budgets lies in the methodology used to work them out. The Tyndall Centre’s budgets for all local authorities are derived from international carbon budgets in the Intergovernmental Panel on Climate Change (IPCC) reports.

Essentially, the researchers took a global carbon budget that aligns with the 1.5°C target; adjusted it to exclude cement production (assuming it is essential for developing countries), and aviation and shipping (that can not be dealt with by local authorities); allotted budgets to developing countries that assumes their emissions will peak in 2025; divided the remaining budget between developed countries; and divided the UK budget between local authorities using a “grandfathering” approach (i.e. sharing it out on the basis of recent emissions data). The budget covers carbon dioxide only (and not other greenhouse gases), and assumes no reliance on carbon removal technologies.⁵

By contrast, the GLA declares an “ambition for London to become zero carbon by 2050”,⁶ without taking any account of the way carbon budgets may be apportioned between developing and developed countries. The GLA’s approach is similar to that of the UK government and the UK Climate Change Committee (CCC), who set carbon budgets according not to fair sharing-out of global budgets, but to what they consider are “feasible limits” for the UK economy, and “ambitious but credible reductions” in emissions.⁷

Furthermore, the GLA’s emissions trajectories *do not reach zero at all*. The *London Environment Strategy* presents three scenarios labelled “London’s GHG emissions trajectory to zero carbon”. The most ambitious of these assumes additional action at both national and local level, and projects annual CO₂ emissions of 4.72 Mt in 2050.⁸ In *Zero Carbon London*, the GLA presents five scenarios, reflecting a range of energy technology policy choices.

³ J. Kuriakose et al, *Setting Climate Commitments for London* (Manchester University/ Tyndall Centre, November 2019), at <https://carbonbudget.manchester.ac.uk/reports/LN/>; <https://tyndall.ac.uk/news/mayor-manchester-launches-low-carbon-city-toolkit-tyndall-manchester>; GLA Zero Carbon Pathway

⁴ Author’s estimates, using BEIS statistics for 2015 emissions (34.43 mt), Tyndall centre recommendations of reductions in annual emissions, and GLA Zero Carbon Pathway

⁵ See Kuriakose et al, *Setting Climate Commitments for London*, section 2 on “Method”

⁶ *London Environment Strategy*, p. 202; *Zero Carbon London: a 1.5deg compatible plan* (December 2018), p. 5

⁷ These are the words used in the Sixth Carbon Budget to describe how it was set. See CCC, *The Sixth Carbon Budget: the UK’s path to net zero* (December 2020), pp. 319-325 <https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf>

⁸ *London Environment Strategy*, Figure 34, p. 208, and in Appendix 2, Figure 48 on page 76. The most ambitious scenario is based on the numbers generated by the London Zero Carbon Pathways tool at <https://data.london.gov.uk/dataset/london-s-zero-carbon-pathways-tool>

Excluding the “baseline” scenario, which projects no change in policy, the four other scenarios project annual greenhouse gas emissions in 2050 of 6.9 Mt (“decentralised” scenario), 3.4 Mt (“high electrification”), 3.5 Mt (“decarbonised gas”) and 4.4 Mt (“patchwork”).⁹ In the *London Environment Strategy*, it is claimed that these residual emissions “can be addressed through offsetting schemes”, a largely discredited method by which governments and corporations mainly in the global north pay for supposed “avoided emissions” elsewhere to allow themselves to continue emitting greenhouse gases.

The GLA carbon budgets, set in 2018, not only lag far behind the Tyndall Centre’s proposed budgets. They also project emissions being reduced more slowly than the rate implied by the UK Nationally Determined Contribution (NDC) under the Paris agreement, and more slowly than the rate implied by the UK’s target written into legislation this year, in association with the UK Sixth Carbon Budget. The UK NDC commits to emissions 68% lower than the 1990 level in 2030; the GLA’s Zero Carbon Pathway projects emissions 59.6% lower than London’s 1990 levels in 2030. The legislation adopted this year commits to emissions 78% lower than the 1990 level in 2035; the Zero Carbon Pathway projects emissions 71% lower than London’s 1990 level in 2035.¹⁰

1.b. London’s actual emissions reductions, compared to scientists’ recommendations and GLA policies

London’s greenhouse gas emissions have been falling over the last two decades, mainly due to the decline of industry in the city, lower gas consumption and decarbonisation of the electricity grid. London’s emissions have also fallen more quickly than those in other local authorities, due to the predominance of residential areas.¹¹ But serious dangers remain that the emissions reductions from here onwards will be insufficient. There are three particular reasons for concern.

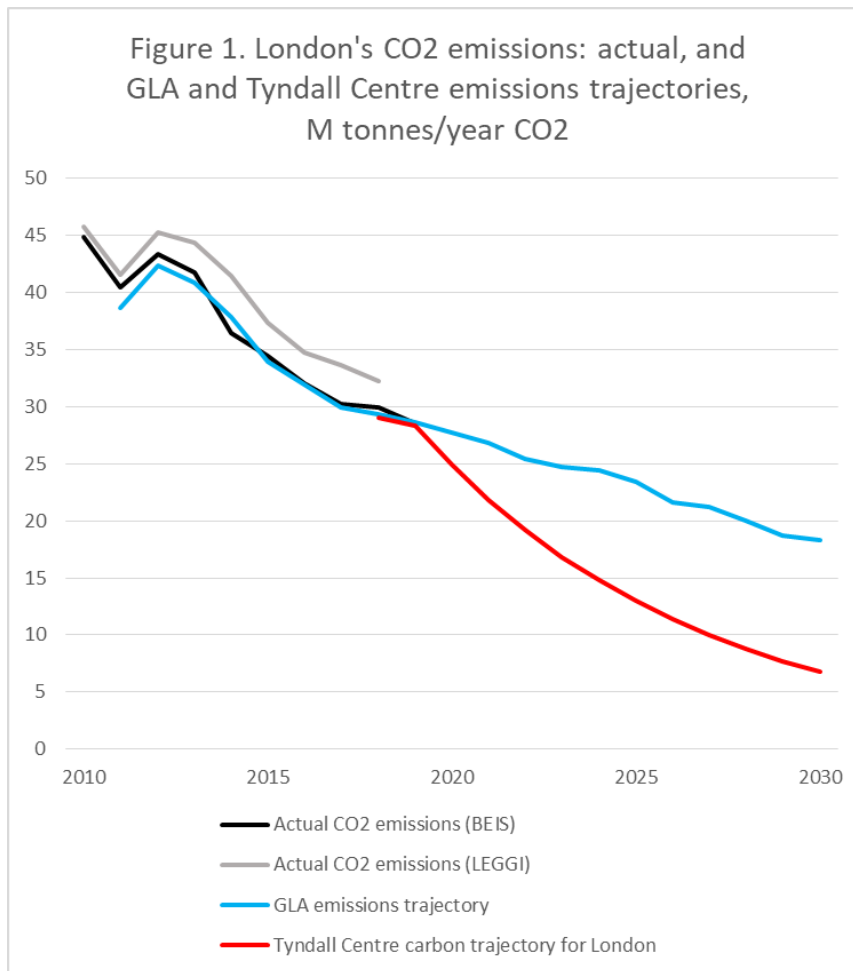
First, *the rate at which emissions are falling are far short of the pace implied by the Tyndall trajectory*. Figure 1 shows actual emissions as measured by two different statistical sets, and the trajectories for future emissions reductions mapped by the GLA and the Tyndall Centre, discussed above. CO₂ emissions as measured by one statistical set (the London Energy and Greenhouse Gas Inventory (LEGGI)) are already higher than both GLA and Tyndall trajectories. Emissions as measured by the second statistical set (BEIS local authority statistics) was close to the trajectories in the last year available, 2019.¹² But the rate of change, as reflected by both statistical sets, is far slower than needed.

⁹ *Zero Carbon London*, p. 9. See also Element Energy, *London’s Climate Action Plan: Zero Carbon Energy Systems*, p.9 https://www.london.gov.uk/sites/default/files/element_zero_carbon_energy_systems_report.pdf

¹⁰ Calculated by the author. London’s CO₂ emissions were 45.36 Mt CO₂ in 1990 (from LEGGI statistics); this is compared to the amounts in the row “emissions trajectory” in the Zero Carbon Pathway budgets

¹¹ *London Environment Strategy*, p. 205; BEIS, UK local authority carbon dioxide emissions estimates 2019, p. 7

¹² The BEIS statistics are published on the government web site at <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019>. The LEGGI statistics are at <https://data.london.gov.uk/dataset/leggi>; I have used the “net CO₂ emissions” line from the “summary” tab. The statistics are calculated using different methodology, including different assumptions on some indirect emissions (freight, imported energy, waste disposal, etc). The LEGGI statistics were updated in 2018 to cover five major sectors, as recommended by the IPCC (author’s correspondence with Environment Team at the GLA), but the Zero Carbon Pathway has not been updated.



Second, the GLA's own recent progress report on its environment strategy does not mention the level of greenhouse gas emissions. With regard to transport, it does not comment directly on traffic levels, focusing instead on its long-term plan to electrify the bus fleet.¹³ From this it appears that the GLA is doubling down on its road-focused approach to transport policy.

Third, the sectoral breakdown of CO2 emissions shows that, while emissions from London's industrial and residential sectors have declined gradually for the last 20 years, domestic transport emissions¹⁴ have hardly declined, in keeping with the national trend. This is shown in the table.

London's emissions from the three big sectors	1990	2010	2018	2018, as a % of 1990	2018, as a % of 2010
Domestic energy use	15.84	15.88	10.57	66.7%	66.6%
Industry energy use	19.74	18.22	10.42	52.8%	57.2%
Transport energy use	9.47	8.52	8.11	85.6%	95.2%

¹³ *London Environment Strategy: second progress report (2019-2021)*. There is a passing remark about traffic reduction in respect of ambient noise levels, page 13. The GLA has commissioned an update of its Net Zero modelling from Element Energy (decision DD2538, June 2021, on the GLA web site)

¹⁴ Statistics from the LEGGI. Transport includes road, rail, domestic aviation and river transport

Given that emissions have declined least of all in the transport sector, and that action there is the most urgent, it is reckless to press ahead with the Silvertown Tunnel project, which at huge cost expands a road network that, whichever path is taken to tackle climate change, should not be expanded any further.

1.c. The GLA's claim that C40 Cities has assessed its climate strategy independently is false

In dealing with the climate emergency, caution is paramount, given the gulf on a global level between current policies and what needs to be done. Faced with the Tyndall scientists' recommendations, that emissions reductions need to accelerate, senior GLA politicians might be expected to consider these issues soberly. Instead, they have repeatedly declined to comment on the Tyndall Centre research – while falsely claiming that an “independent assessment” of the *London Environment Strategy* has found it to be compliant with the 2015 Paris climate agreement. Deputy Mayor Heidi Alexander has written to opponents of the Silvertown Tunnel project that the GLA's emissions trajectory:

has been independently assessed by [the C40 Cities group] to be in line with the advice of the Intergovernmental Panel on Climate Change on the level of carbon emission reduction required to put us on track to staying within 1.5°C global warming.¹⁵

The assessment to which this refers was completed in July 2018. It makes no reference to *Zero Carbon London*, which had not yet been published. It only compares the emissions trajectories in the *London Environment Strategy* with those in the *C40 Deadline 2020* report, which outlined climate policy measures that city administrations could take in the five year period 2016-2020. The C40 assessment states that the trajectories in the *London Environment Strategy* “align with C40's *Deadline 2020* analysis, which sets out the requirements to meet the aims of the Paris Agreement”.¹⁶

First, for this assessment to be presented as “independent” is, at best, misleading. The *Deadline 2020* report was drafted by C40 in collaboration with Arup;¹⁷ Arup was simultaneously working for the GLA on its emissions strategy; finally, the C40 assessment of the *London Environment Strategy* was drawn up by Arup. Arup's staff confirming that a strategy on which they were working aligned with policy guidelines and (unpublished) trajectories and proposals that they themselves drew up is not “independent”.¹⁸

Second, and more important, the period covered by *Deadline 2020* has now passed, and the urgent climate policy question is: have the aims it set been achieved? The report, published in 2016, declared that “the next four years will determine whether or not the world's megacities can deliver their part of the ambition of the Paris agreement”, and that “without action by cities the Paris agreement cannot realistically be delivered”. And yet neither C40 Cities nor the GLA appear to have any monitoring procedures in place by which to measure progress towards the actions recommended.¹⁹

Nevertheless, the report raised important questions for London. Its Headline Finding no. 5 was that “wealthier, high carbon cities must deliver the largest savings between 2017 and 2020”. Although London is not bracketed as “high carbon”, according to the report's methodology, it is clearly “wealthier”. What did this imply for its emissions reduction

¹⁵ Heidi Alexander letter to Gareth Thomas, op cit

¹⁶ C40 Cities Climate Leadership Group, London 'Paris-compatible' Climate Action Plan: Final Climate Action Plan Assessment (18 July 2018), paragraph 2.4.2.

https://www.london.gov.uk/sites/default/files/london_wp1_arup_final_assessment_report_2018_publish.pdf. C40 Cities, *Deadline 2020: how cities will meet the Paris agreement*. https://www.c40.org/other/deadline_2020

¹⁷ Arup is a UK-based multinational professional services firm that works closely with the GLA and TfL

¹⁸ For Arup's work on London climate strategy, see Element Energy, *London's Climate Action Plan*, pages 7, 15 and 17.

¹⁹ There is no mention of monitoring on either organisation's web sites, or in either of the GLA's two progress reports on its *Environment Strategy*. The C40 Cities media team did not respond to a request for comment

trajectory? In its summary of Process to Pathways, the report estimated a carbon budget of 22 billion tonnes of CO₂ equivalent (Gt CO₂e) for its 40 member cities, for 2016-2100. On what basis was this calculated, and what was London's share? The report said that 14,000 actions had been identified that should be initiated by 2020; it also suggested that 5800 were underway by the time of publication. How many of these were in London? What were they? Have they now been implemented?²⁰

Without answers to these questions, justifying construction of a major tunnel project on the grounds that it aligns with *Deadline 2020* is no more than greenwash.

Moreover, the Silvertown Tunnel project runs counter to the recommendations of the *Keeping Cities Green* report,²¹ commissioned by the C40 Cities group and published shortly before *Deadline 2020*. This report estimates that, of a global carbon budget for 2015-2200 of 1000 billion tonnes of carbon dioxide (Gt CO₂), up to 800 Gt CO₂ is "committed" by existing infrastructure. It warned that, in a reference scenario in which approaches to urban infrastructure are unchanged, new urban buildings and transport infrastructure could in 2015-2030 effectively commit society to 220 Gt CO₂ of additional emissions. In support of the report, C40 Cities stated that "urban policy decisions before 2020 could determine up to a third of the remaining global carbon budget not already 'locked in' by past decisions".²²

The report outlines an "urban action" scenario, in which urban development "takes on a more compact form, with less vehicle travel, a reduced demand for new vehicles, and substantially more efficient new buildings". In this case, emissions commitments could fall from 14 Gt CO₂ per year in 2015 to 8.5 Gt CO₂ by 2030. The "urban action" scenario assumed an extra 20% reduction in private passenger vehicle travel, compared to the reference scenario. In conclusion, the report warns that infrastructure locks in higher emissions, and says that, "in particular, construction of new urban buildings and transport systems brings an important opportunity to avoid locking in [carbon-] inefficient pathways".

The decision to press ahead with the Silvertown Tunnel is a rejection of the conclusions of this report, and is incompatible with the "urban action" scenario. The GLA's repeated suggestions that the tunnel project aligns with the climate policies to which C40 Cities aspires are false.

2. Flood risk

Increased flooding and flood risk is one of the most significant effects of global heating. The cumulative effect of excessive fossil fuel burning, and greenhouse gas emissions, is increasing flood damage and flood risk everywhere. It is impossible to attribute any particular flood or flood risk to any particular fossil-intensive project. But opponents of the Silvertown Tunnel project have pointed out that flood risk is relevant in two ways: 1. All carbon-intensive projects and carbon-heavy transport policies contribute to greater flood risk globally, with devastating consequences for people in the global south. 2. Flood risk is increasing in the Thames Estuary area (in particular urban rainwater flooding, rather than sea level rise). The adverse effect should be a key consideration in building new transport infrastructure.

²⁰ C40 Cities, *Deadline 2020*, pp. 8-11 and p. 46

²¹ Peter Erickson and Kevin Tempest, *Keeping Cities Green: avoiding carbon lock-in due to urban development* (Stockholm Environment Institute WP no. 2015-11)

²² https://www.c40.org/blog_posts/one-third-of-the-world-s-remaining-safe-carbon-budget-could-be-determined-by-urban-policy-decisions-in-the-next-five-years

The first of these points was explained by Suga Thekkeppurayil, a Newham councillor, at a public meeting in August 2020, held by the Stop the Silvertown Tunnel coalition outside the Transport for London headquarters at Stratford. Thekkeppurayil spoke about the effect of climate change, aggravated by infrastructure projects such as the Silvertown Tunnel, on the Indian sub-continent. He referred to rising sea levels in Bangladesh, the way that Bangladeshi people are responding by migrating to India, the anti-Muslim citizenship laws passed by the Indian government to intimidate them, and the interconnected manifestations of injustice and hardship caused by this chain of ecological and social disasters.²³ This chain is very large. In 2020, the Internal Displacement Monitoring Centre estimated there were 4.4 million temporary displacements in Bangladesh due to disasters, mostly pre-emptive evacuations prior to Cyclone Amphan, with 345,000 people still displaced at the end of the year.²⁴

The second point, about heightened flood risk in the Thames Estuary, was drawn to the attention of the Mayor and the GLA by Phil Goodwin, emeritus professor of transport policy at University College London and one of the UK's most prominent transport researchers.²⁵ He wrote in July this year, pointing out two plausible future scenarios that had not been accounted for in modelling for the tunnel project:

□ In the first scenario, international action on climate change is insufficient, and flood risks intensify in a time period “much shorter than the assumed life span of the Silvertown Tunnel (and other projects) in normal appraisal methods”. The consequences in the area where the tunnel is planned would be “much more severe than has accounted for in established emergency planning”. In this case, much more attention would need to be given to “flexible transport arrangements whose geography can be swiftly altered, with less emphasis on geographically fixed links, especially close to sea level”.

□ In the second scenario, international action on climate change will take effect and flood risks will not intensify. This would imply the implementation of a decarbonisation strategy that includes reduction in car use.

Goodwin called for the tunnel project to be reassessed, taking these prospects into account. At the time of writing, he has not received a response.

3. Transport sector decarbonisation in London

The Silvertown Tunnel project is incompatible not only with any meaningful climate policy for London overall, but also with any meaningful climate policy for the transport sector in London. The most recent data available indicates that transport sector carbon emissions reductions are not only behind those implied by climate science, but also behind those set by the GLA itself. While the GLA *Zero Carbon London* trajectory aims for transport sector emissions to be down at 7.3 Mt/year in 2018-22, in 2018 (the latest year for which data is available) they were 8.1 Mt.²⁶ It is certain that the emissions levels will have fallen substantially in 2020, due to the Covid 19 pandemic, but what happens subsequently is a

²³ Simon Pirani, "The Mayor won't change his mind", *The Ecologist*, 1 July 2021

<https://theecologist.org/2021/jul/01/mayor-wont-change-his-mind>

²⁴ “Bangladesh” page on Internal Displacement Monitoring Centre web site <https://www.internal-displacement.org/countries/bangladesh>. See also: World Meteorological Organisation, *State of the World Climate 2020*, p. 28, p. 35 and p. 37

²⁵ https://twitter.com/Phil_Goodwin99/status/1418642303221121029. The argument is set out in more detail in: Phil Goodwin and Jillian Anable, “We are now facing two alternative futures (plus an untenable one)”, *TransportXtra*, 10 August 2021 <https://www.transportxtra.com/publications/evolution/news/69570/we-are-now-facing-two-alternative-futures-plus-an-untenable-one->

²⁶ LEGGI 2018; *Zero Carbon Pathway; London Environment Strategy*, p. 207

matter of policy: either the trend towards home working can be strengthened, public transport use restored, and car use reduced permanently, or a car-centred policy can increase traffic volumes, and greenhouse gas emissions, still further. If the Silvertown Tunnel goes ahead, it will eat up resources (not only more than £2 billion, but also TfL's human resources) that should be focused on public transport and alternative transport modes.

In this section we show that: the Silvertown Tunnel project is incompatible with the GLA's declared aims for decarbonising the transport sector; the GLA continues to ignore the induced traffic effect that is essential to understand transport's carbon impact; and the GLA ignores the possible negative effects of the tunnel project on air quality. Underlying these problems is a car-centred transport policy, similar to the UK government's, incompatible with tackling climate change.

3.a. The Silvertown Tunnel is incompatible even with the GLA's aims for decarbonising transport

In response to residents who are concerned about the tunnel project, the Deputy Mayor for Transport, Heidi Alexander, has sent out letters that include the claim that:

Our 1.5°C carbon reduction trajectory was developed using detailed modelling of carbon emissions from transport, buildings and other sectors and takes into account planned developments such as the Silvertown Tunnel.²⁷

A comparison of the carbon reduction trajectory with TfL's documentation for the tunnel project shows that this statement is false.

The TfL *Environmental Statement* for the Silvertown Tunnel project included estimates of CO₂ emissions from the modelled road network of which the tunnel would be part.²⁸ The network had produced 5.628 Mt of CO₂ in 2012; TfL assumed that this would fall to 5.31 Mt in 2021, and then fall to 5.164 Mt in 2036 if the tunnel is not built, and to 5.187 Mt in 2036 if the tunnel is built.

The TfL modelling for the tunnel did not provide for the possibility of induced traffic (see section 3.b below), and so there are reasons to believe that, if the tunnel is built, the volume of emissions in 2036 would be much higher. However, even TfL's projections as they stand can not be reconciled with the GLA's own Zero Carbon London pathway, still less with the Tyndall Centre's trajectories for London linked to the 1.5°C target. The Zero Carbon London pathway projects that the entire transport sector will produce 3.97 Mt of CO₂ emissions in 2036²⁹ – about three-quarters of the amount that TfL's models project for the modelled road network alone. How can a quart be put into a pint pot? Requests to the GLA to explain have fallen on deaf ears.

Figure 2 shows (i) TfL's projections of emissions from the modelled road network, (ii) a projection of emissions based on the GLA Zero Carbon Pathway, and (iii) a projection of emissions based on the Tyndall Centre's 1.5°C trajectory for London. The assumptions used are detailed in a footnote.³⁰

²⁷ Letter from Heidi Alexander to Gareth Thomas MP, op cit. Identical wording appears in other letters from Ms Alexander

²⁸ *Silvertown Tunnel Environmental Statement* (2016), p. 6-131

²⁹ Zero Carbon Pathways tool, "carbon budgets results" tab

³⁰ The assumptions used for the graph are as follows. To estimate a trajectory for the modelled road network based on the GLA Zero Carbon London trajectory (grey line), we have assumed (i) that the transport sector's carbon budget is 98.6% of its total greenhouse gas budget (as it was in 2018, the only year for which a breakdown by gases is available); and (ii) that, of the transport sector carbon budget, 67% will be used by the modelled road network. If anything, this is a generous allowance: in 2012, the only year for which comparable data are available, the modelled road network accounted for 65.6% of the transport sector carbon budget – so we assume that at no point will aviation, the main non-road transport sector in London, take any greater share. To estimate a trajectory for the modelled road network based on the Tyndall Centre trajectory (red line), we have allowed a transport sector carbon budget of 25% of London's total (roughly its share

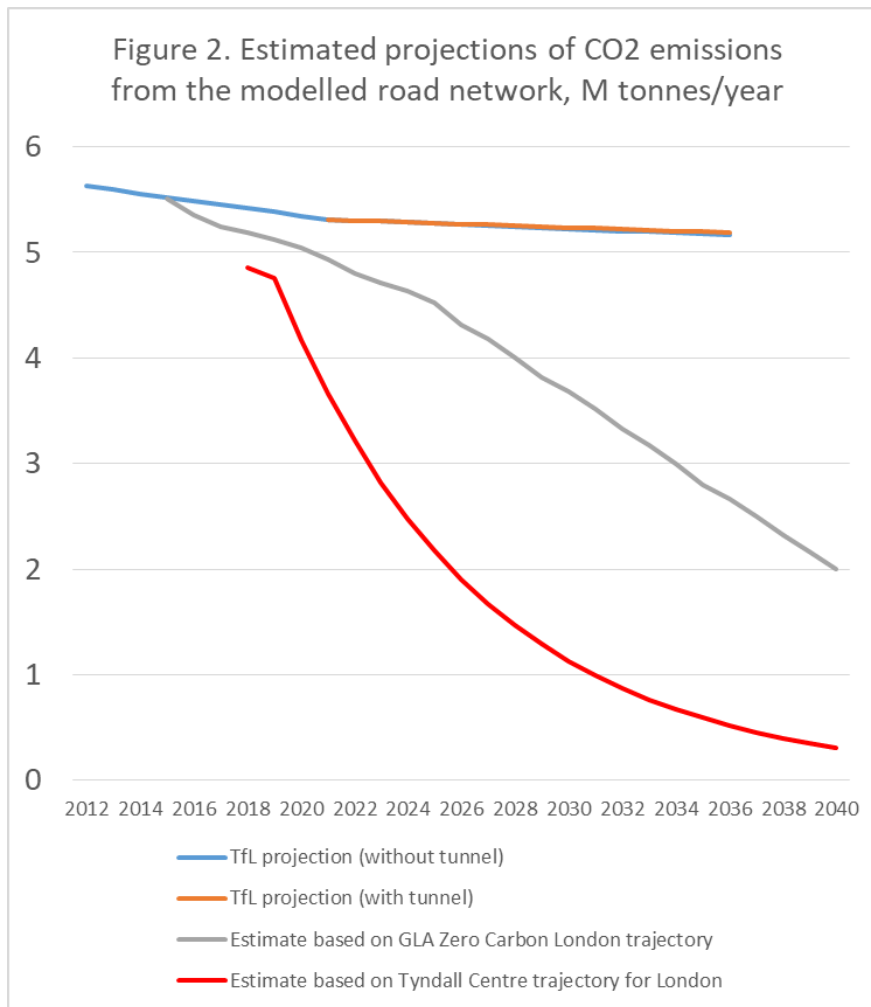


Figure 2 shows clearly that there is no plausible way in which the GLA’s carbon reduction trajectory – let alone the Tyndall centre trajectory – can be based on TfL’s modelling for the tunnel project.

The assertion that the Zero Carbon London pathway is based on modelling that takes account of the tunnel project is false.

3.b. The induced traffic effect

TfL’s projections allow for a far greater volume of carbon emissions from the modelled road network than would be possible, were the climate emergency to be seriously addressed. But, if the Silvertown Tunnel was built, the level of emissions could be still higher than the projections allow, because they ignore the induced traffic effect (i.e. that more roads produce more traffic).

The induced traffic phenomenon was explained in research commissioned by the UK government in the 1990s, and again in 2018. But modelling of future traffic flows by TfL, included in the documentation for the tunnel project, is based on an a priori assumption that, if the tunnel is built, the total number of vehicle trips across the Thames will not change. The *Stop Digging* report examined the flaws in this modelling in detail,³¹ but there has been no response from the GLA or from TfL.

in 2018, but higher than its share in the early 2010s). We again assume that, of the transport sector carbon budget, 67% will be used by the modelled road network.

³¹ See *Stop Digging*, pages 9-14

The GLA claims that the volume of traffic going through the Silvertown Tunnel, and the Blackwall tunnel, will be regulated by a user charge on both tunnels. As the Stop the Silvertown Tunnel Coalition has argued repeatedly in correspondence with City Hall, this raises the question: why not experiment with the user charge first, on the Blackwall Tunnel, before committing to a £2 billion-plus project to build another tunnel next door to it?³²

3.c. Air quality

The main justifications given publicly for the tunnel project are that it will ease traffic congestion, and that it will improve the air quality situation. As the Stop the Silvertown Tunnel coalition has pointed out in correspondence with the Mayor, (i) the projected improvements in air quality are “vanishingly small”, and the projections depend on TfL’s modelling, which was based on an a priori denial of the induced traffic effect (see section 3.b above); and (ii) the plans to monitor pollution from the tunnel are inadequate, and depend on political decisions by future Mayors.³³

Given the marginal impact of the projected improvements, and the way they are endangered by factors over which the GLA has little or no control, the response by Heidi Alexander, the Deputy Mayor for Transport – that “the resulting overall improvement to air quality will be experienced by some of London’s most disadvantaged neighbourhoods” – is, at best, founded on wishful thinking rather than evidence.³⁴

The GLA has made long-standing efforts to tackle air pollution, which have nevertheless left the boroughs affected by the tunnel with levels above the World Health Organisation (WHO) recommended minima. In September, the WHO issued new recommendations, for lower minima, presenting a still bigger challenge in reducing pollution in those boroughs. This is an additional reason for reviewing the tunnel project.³⁵

3.d. The GLA’s car-centred transport policy is one of the roots of the problem

The Silvertown Tunnel project is part of a car-centred transport policy, that aims only at a minimal reduction in traffic volumes over the next two decades, is at odds with tackling the climate emergency, and will exacerbate social inequality by favouring car and lorry drivers over the population as a whole.³⁶ For members of the public, this is easily overlooked, because of the impressive public relations offensive by City Hall, highlighting its support for cycling and walking, and its commitment to address air pollution e.g. through the Ultra Low Emission Zone. But in reality, the *Mayor’s Transport Strategy* provides for very little overall reduction in road traffic.

The strategy includes a briefly-mentioned target of a 10-15% reduction in traffic volume by 2041,³⁷ and no target at all for 2030 – in contrast to the *Keeping Cities Green* report (see above, section 1.c), which projects an extra 20% reduction in private passenger vehicle travel in cities by 2030, if dangerous climate change is to be avoided. The *Mayor’s Transport Strategy* also projects that the total number of car journeys will fall from 9.88 million in 2015 to 6.6 million in 2041, presumably to be achieved by discouraging shorter journeys – but in

³² Letters from Victoria Rance (SSTC) to the Mayor, 16 February 2021, and Kate Middleton (SSTC) to the Mayor and others, 13 July 2021

³³ Letters from Victoria Rance (SSTC) to the Mayor, 18 December 2020 and 16 February 2021

³⁴ Letter from Heidi Alexander to Gareth Thomas MP, op cit

³⁵ WHO, “New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution”, 22 September 2021 <https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution>

³⁶ On social inequality, see *Stop Digging*, pp. 25-27

³⁷ The 10-15% target for 2041 is mentioned in the *Mayor’s Transport Strategy*, pp. 21-22; in *Element Energy, London’s Climate Action Plan*, p. 31, it is stated as a “more than 10% reduction”. See also *Stop Digging*, p. 21.

terms of emissions reduction, what matters is the total traffic volume (measured as the total number of vehicle-km), and this is projected to fall by an inadequate 10-15% by 2041.

The GLA's main policy for reducing carbon emissions from road transport – on which all the emphasis is placed in Element Energy's *London's Climate Action Plan*, on which climate policy implementation is based – is the introduction of electric and/or hydrogen-fuelled cars. Here its approach is similar to that of the UK government (see section 4 below). While the *Mayor's Transport Strategy* says a great deal about non-car modes of transport, the Element Energy report describes electrification and hydrogen as “the two primary methods consistent with deep decarbonisation of the transport sector”,³⁸ and does not mention the road network or its role in the transition to low- or zero-carbon transport.

The blinkered nature of the GLA's car-centred policy is underlined by the fact that the changes in urban traffic flows during 2020, as a result of the coronavirus pandemic and the trend towards home working, throws doubt on all long-term traffic projections. In respect of the A2, which runs into the Blackwall Tunnel, there is the additional impact of reduced cross-channel freight due to Brexit.³⁹ A rational post-pandemic traffic policy would consider the effect of these changes to reassess a problematic road expansion project such as the Silvertown Tunnel.

4. The national transport policy context

The GLA shares its focus on vehicle technology, as opposed to reducing the volume of road traffic, with the UK government. A series of government transport policies, up to and including the *Transport Decarbonisation Plan* published in July, have been criticised by transport, energy and climate researchers, for ignoring the need to reduce dependence on cars, while betting recklessly on vehicle technologies that have limited decarbonisation potential.

The *Transport Decarbonisation Plan*⁴⁰ focuses mainly on measures to switch to electric vehicles, and includes no specific targets for reducing the overall volume of traffic. It refers to a “bold vision for cycling and walking” and “action to increase average vehicle occupancy”. There is even a claim in the Foreword that “we want to reduce urban road traffic overall”. But, while £2 billion for cycling and walking infrastructure, promised last year, is recycled, it is dwarfed by the £27 billion being spent on the strategic road network. While the strategy includes a commitment to review the 2014 National Networks Policy Statement, neither the £27 billion scheme, nor any other road building, is to be reviewed.

The UK's leading transport policy researchers have denounced the strategy's smoke-and-mirrors approach. Jillian Anable, senior researcher at the Institute for Transport Studies at the University of Leeds, said: “You simply cannot achieve any emissions reductions from the transport sector by 2030 if traffic growth is allowed to continue, and you need significant absolute reductions from today's levels to make any real cuts in carbon.” Of the focus on electric vehicles (EVs), she said: “It's been the only egg in the transport decarbonisation basket for some time ... but the focus is delusional.”⁴¹

Christian Brand, associate professor at the Transport Studies Unit at the University of Oxford, wrote in response to the Strategy that “focusing solely on EVs is slowing down the race to zero emissions”; even if all new cars were fully electric, it would still take 15-20 years

³⁸ Element Energy, *London's Climate Action Plan*, p. 30

³⁹ See also *Stop Digging*, pp. 4-5

⁴⁰ <https://www.gov.uk/government/publications/transport-decarbonisation-plan>

⁴¹ “In depth Q & A: what is the UK's ‘net zero’ plan for transport?”, Carbon Brief, 15 July 2021
<https://www.carbonbrief.org/in-depth-qa-what-is-the-uks-net-zero-plan-for-transport>

to replace the world's fossil fuel car fleet; emissions from cycling and e-biking can be ten times lower than those from an electric car; and active travel "can contribute to tackling the climate emergency earlier than EVs".⁴² Such arguments reflect the mainstream consensus among energy and transport policy researchers.⁴³

The government's approach to road building has been shown to be incompatible with action on climate change, and likely to cause substantial increases in carbon emissions. A report on the strategic road network, published last year by Transport for Quality of Life, included estimates that the government's second Road Investment Strategy (RIS2) would produce an extra 20 Mt CO₂ from the strategic road network in 2020-2032, a period during which emissions should be 167 Mt CO₂ lower than projected. Even in the most optimistic scenario for introduction of EVs, 80% of the potential carbon savings on the strategic road network would be wiped out.⁴⁴ In addition, more than 100 smaller schemes are being promoted by local authorities, and these, too, need to be reviewed in the light of the climate emergency.⁴⁵

Transport⁴⁶ is the UK's largest source of emissions, responsible for 27% of greenhouse gases in 2019. Of this, 55% comes from cars and most of the rest from vans and lorries. The level of transport emissions has remained roughly the same for a decade; greater fuel efficiency has been offset by an increase in distances driven. The policy approach of both the government and the GLA allows for these emissions to keep growing; the Silvertown Tunnel project aligns with this policy.

5. Infrastructure projects and the climate emergency

Research by climate scientists has shown that: infrastructure is a major factor determining the level of greenhouse gas emissions; the "lock in effect" – the way that infrastructure facilitates and supports higher levels of carbon-intensive activities such as driving cars – is insufficiently reckoned with in climate policies; and future infrastructure projects could contribute to forcing global heating beyond the 1.5°C limit, and even 2°C. In this section we summarise this research, and look at the implications for the Silvertown Tunnel project.

5.a. Research on infrastructure and climate change

A summary of this research published in 2019⁴⁷ concluded that:

⁴² Christian Brand, "Obsessing over EVs is impeding the race to net zero: more active travel is essential", Oxford University comment, 14 July 2021. <https://www.ox.ac.uk/news/2021-06-14-obsessing-over-electric-cars-impeding-race-net-zero-more-active-travel-essential>

⁴³ See, for example, Nick Eyre, "The UK Government's ten point plan for a green industrial revolution", Centre for Research into Energy Demand Solutions, 26 November 2020 <https://www.creds.ac.uk/the-uk-governments-ten-point-plan-for-a-green-industrial-revolution/>; J. Allwood et al, *Absolute Zero* <https://www.repository.cam.ac.uk/handle/1810/299414A>. C. Serrenho et al, "The impact of reducing car weight on global emissions: the future fleet in Great Britain", *Philosophical Transactions of the Royal Society A*, May 2017 <https://royalsocietypublishing.org/doi/10.1098/rsta.2016.0364>

⁴⁴ Lynn Sloman and Lisa Hopkinson, *The Carbon Impact of the National Roads Programme* (Transport for Quality of Life, July 2020) <http://www.transportforqualityoflife.com/u/files/The%20carbon%20impact%20of%20the%20national%20roads%20programme%20FINAL.pdf>

⁴⁵ <https://integratedtransport.co.uk/are-councils-plans-for-local-road-schemes-compatible-with-the-declaration-of-a-climate-emergency>

⁴⁶ As measured by government statistics, i.e. including road, rail, water transport and domestic aviation. See BEIS, Greenhouse Gas Emissions Statistical Release https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957887/2019_Final_greenhouse_gas_emissions_statistical_release.pdf

⁴⁷ Dan Tong et al, "Committed emissions from existing energy infrastructure jeopardize 1.5degC climate target", *Nature* vol. 572 (15 August 2019), pp. 373-377

[L]ittle or no new CO₂-emitting infrastructure can be commissioned, and [...] existing infrastructure may need to be retired early (or retrofitted with carbon capture and storage technology) in order to meet the Paris Agreement climate goals.

This paper, by an international team of researchers, headed by Dan Tong of the University of California, presented estimates that existing energy, transport and built infrastructure will cumulatively emit about 658 Gt CO₂, compared to a total global budget of 420-580 Gt CO₂ to achieve the 1.5°C target, and 1170-1500 Gt CO₂ to achieve the 2°C target.

This paper built on work first published in 2010, which warned that “sources of the most threatening emissions have yet to be built”, and that CO₂-emitting infrastructure would expand “unless extraordinary efforts are undertaken to develop alternatives.” That paper showed that the transport sector represented the second largest source of emissions globally after the energy sector; and that the rapid expansion of the transport sector, principally road transport, globally was a source of climate danger.⁴⁸ Another paper, published in 2016 with a specific focus on urban infrastructure, warned that new infrastructure in cities “could consume a considerable share of the remaining carbon budget as it is a carbon-intensive process”.⁴⁹ *The Keeping Cities Green* report, published by C40 Cities (see section 1.c above) made similar warnings.

5.b. Silvertown Tunnel emissions projections

This research suggests that a precautionary approach should be adopted to each and every infrastructure project. This has not been the case with the Silvertown Tunnel. No life-cycle analysis, using transparent methodology, has been conducted on its carbon impact. The limited information provided by TfL on the carbon cost of the tunnel has been criticised as an understatement.

The *Energy and Carbon Statement* for the tunnel project projects that emissions embodied in construction and materials would be 153,279 tonnes CO₂eq.⁵⁰ This number was calculated using the Highways England Carbon Calculation for Major Projects (CCMP) model.⁵¹ However there are a range of methods to estimate embodied emissions, and no uniform, transparent method.

A research team at the University of Leeds, on the basis of many years of study of infrastructure, recommended using either bottom-up life-cycle assessment (which requires a large amount of input data), or top-down environmentally-extended input-output analysis, which they consider more suited for capturing all emissions related to a particular project. Using this latter methodology, John Whitelegg, research fellow at the Foundation for Integrated Transport, concluded that the carbon cost of building the Silvertown Tunnel would be 754,600 tonnes CO₂eq. This does not include the operation and maintenance of the tunnel, or the much larger impact of vehicles using the tunnel over the course of its lifetime.⁵² The ways in which infrastructure projects’ emissions are assessed continues to develop. In June,

⁴⁸ Steven Davis et al, “Future CO₂ emissions and climate change from existing energy infrastructure”, *Science* vol. 329 (10 September 2010), pp. 1330-1332

⁴⁹ Felix Creutzig et al, “Urban infrastructure chices structure climate solutions”, *Nature Climate Change* vol. 6 (December 2016), pp. 1054-1056

⁵⁰ *Silvertown Tunnel Energy and Carbon Statement* (document 6.7), pp. 29-40. This figure includes the 82,077 tonnes CO₂eq of embodied emissions mentioned in the Environmental Impact Statement, pp. 13-44 and 13-45. We mentioned the latter figure in the *Stop Digging* report, p. 7, but the one in the Energy and Carbon statement is more complete

⁵¹ The CCMP is not available on the Highways England web site or from the government internet archive

⁵² John Whitelegg, “Scrap Silvertown Tunnel project and divert resources to mobility solutions”, *TransportXtra*, 27 July 2021 <https://www.transportxtra.com/publications/local-transport-today/comment/69402/scrap-silvertown-tunnel-project--and-divert-resources-to-mobility-solutions-that-tackle-climate-change>. Kate Scott et al, “Embodied greenhouse gas emissions of the UK National Infrastructure Pipeline (NIP) (University of Leeds, 2015). See also Jannik Gieseckam, “Capital carbon of transportation infrastructure”, Centre for Research into Energy Demand Solutions, 25 November 2020

Highways England (now National Highways) and other state transport agencies published a wide-ranging set of guidelines, with reference to climate change.⁵³

In the light of these changes, and the doubt cast on TfL's original assessment, a precautionary approach that took account of the global heating danger would review the project, with these factors in mind. Instead of this, the GLA has claimed that the embodied emissions for construction are negligible, e.g. by comparing the 153,279 tonnes to 500,000 tonnes of projected future avoided emissions annually from electrification of the London bus fleet (in correspondence from Deputy Mayor Heidi Alexander), or by presenting it as 0.006% of the UK's 2018-22 carbon budget.

Obviously, these are not comparisons of like for like, and are no more analytical than the claim that Brexit would free up £350 million per week for the National Health Service.⁵⁴ Moreover, these claims ignore (i) John Whitelegg's much higher estimate of embodied emissions, and (ii) the complex way in which transport policy decisions feed through to greenhouse gas emissions levels, including the rejection of alternative urban development paths, the induced traffic effect, and so on.

6. Conclusions

The Silvertown Tunnel project has no social licence. It is opposed by dozens of residents' groups and trade unions; by local groups of doctors and teachers; by numerous transport, energy, climate and urban planning researchers;⁵⁵ by the borough councils of Newham, Southwark, Lewisham and Hackney; by several local Members of Parliament; and by the Labour Party in London (a decision re-affirmed at the regional Labour conference in July 2021⁵⁶), as well as the Greens and Liberal Democrats.

We therefore repeat the recommendations of the Stop Digging report, all of which remain relevant.

We recommend to the GLA and the Mayor of London:

- The Silvertown Tunnel project should be cancelled, and the financial, management and other resources freed up directed primarily to projects that support reducing the number of trips required, and modal shift;
- Review and amend the modelling used for the *London Environment Strategy*, using a range of alternative tools, including the SCATTER tool developed by the Tyndall Centre for Climate Research;
- Review the *London Environment Strategy* in the light of these models;
- Review the *Mayor's Transport Strategy* with a view to redirecting resources towards reducing the number of trips and modal shift, rather than reliance on electric, hydrogen and hybrid vehicles to achieve decarbonisation.

To local communities, campaign groups and political parties:

⁵³ Highways England et al, *Design Manual for Roads and Bridges* LA 114 (climate) (June 2021)

⁵⁴ See H. Alexander letter to Gareth Thomas, op cit, and *Silvertown Tunnel Energy and Carbon statement*, p. 40. A statement e.g. that the embodied emissions from tunnel construction are 10.3% of London's projected annual emissions from transport in 2018-2022 would be more relevant. But it would not carry the subliminal message "negligible", as anyone who works in advertising could tell you

⁵⁵ For an indicative list, see *Stop Digging*, pp. 31-34

⁵⁶ <https://www.independent.co.uk/news/uk/politics/silvertown-tunnel-sadiq-khan-labour-conference-vote-london-b1890150.html>

- Continue to campaign for the cancellation of the tunnel project, and for the re-direction of resources to policies that will effectively tackle global warming.

□ This Briefing was written by Simon Pirani, author of *Burning Up: a global history of fossil fuel consumption* and Senior Research Fellow, Oxford Institute for Energy Studies

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Appendix. Open letter to Grant Shapps and Sadiq Khan

This open letter from 72 scientists and other researchers was sent to Grant Shapps, transport secretary, and Sadiq Khan, Mayor of London, in April. Neither has responded

28 April 2021

We, the undersigned, urge Grant Shapps, Secretary of State for Transport, and Sadiq Khan, Mayor of London, to take emergency action to put in place a review of the Silvertown Tunnel project. This could take the form of a cancellation of the Development Consent Order, or a decision to freeze work on the project while an inquiry is conducted.

Since the DCO was issued, the UK parliament and the Greater London Authority are among the many bodies internationally to have declared that we are in a climate emergency. As a result of the Covid 19 pandemic, long-term transport projections have changed. In these circumstances, it would be foolhardy to press ahead with an infrastructure project that can only contribute to the UK's excessive greenhouse gas emissions – as well as skewing London's transport system further towards roads, and exacerbating local air pollution problems.

With the COP 26 talks coming up in Glasgow in November, the government has decided to review the licencing of a new deep coal mine in Cumbria. This was a correct decision in view of the climate emergency, which requires both that total emissions be reduced swiftly in this decade, and that infrastructure projects that could underpin higher emissions in future be avoided.

The Climate Change Committee has warned the government that it is on course to miss its own emissions targets for the fourth and fifth carbon budgets – targets that some researchers believe are anyway too generous to reflect adequately the UK's fair share of the emissions cuts required to limit global warming to 1.5°C above pre-industrial levels.

Transport emissions are a major part of the problem: they are rising while emissions from other sectors are falling. This can not be addressed mainly by electrification. Transport strategy in London, and the UK as a whole, needs to prioritise modal shift and public transport, not further expansion of the unsustainable road network.

Under these circumstances, the DCO issued in 2017 is not an adequate basis on which to press ahead with the Silvertown project. It risks, like the Cumbrian coal mine, undermining the UK's efforts to address climate change.

Yours faithfully,

Professor Joanna Haigh, Distinguished Research Fellow, Imperial College London; former co-director of the Grantham Institute for Climate Change and Environment

Kevin Anderson, Professor of Energy and Climate Change, Tyndall Centre, School of Engineering, University of Manchester

Dr Jaise Kuriakose, Lecturer in Energy and Climate Change, University of Manchester

Julia Steinberger, Professor of Social Ecology and Ecological Economics, University of Leeds

Dr Rachel Aldred, Professor in Transport, Director of the Active Travel Academy, Westminster University

Professor John Whitelegg, Fellow in Transport and Climate Change, Foundation for Integrated Transport

Professor Tim Jackson, Director, Centre for the Understanding of Sustainable Prosperity, University of Surrey

Professor Matthew Paterson, Research Director, Sustainable Consumption Institute, University of Manchester

Dr Ian Mudway, Senior Lecturer in Respiratory Toxicology, Environmental Research Group, Imperial College London

Dr Jake Ainscough, Senior Research Associate, Lancaster University

David Andrews, Chair of Bath Trams; Chair of Claverton Energy Group

Dr Keith Baker, Researcher, Built Environment Asset Management (BEAM) Centre, Glasgow Caledonian University

Dr Lucy Baker, Senior Research Fellow, University of Sussex

Dr Andrew Baldwin, Associate Professor in Human Geography, Department of Geography, University of Durham

Terence Bendixson, President Emeritus, Living Streets

Dr Joe Blakey, Lecturer in Human Geography, University of Manchester

Dr Andrew Boswell, Independent Scientist, Activist and Consultant, Climate Emergency Planning and Policy

Professor Stefan Bouzarovski, Professor of Human Geography, University of Manchester

Dr Juliette Brown, Consultant Psychiatrist, Newham

Dr Lesley Catchpole, critical and social researcher of accounting and organisations, University of Greenwich

Dr Nicolas Collignon, data scientist and researcher in urban mobility

Gareth Dale, Senior Lecturer in politics, Brunel University

Dick Daniel, transport campaigner and committee member of Bath & Bristol Area Trams Association (BBATA)

Dr Adrian Davis, Professor of Transport and Health and Fellow of the Faculty of Public Health, Edinburgh Napier University

Dr Robert Davis, Chair of Road Danger Reduction Forum

Patrick Devine, Honorary Research Fellow (Social Science), University of Manchester

James Evans, Professor of Geography, University of Manchester

Jay Ginn, researcher of sociology (retired), University of Surrey

Dr Luna Glucksberg, Research Fellow, International Inequalities Institute, London School of Economics

David Hall, Visiting Professor, Public Services International Research Unit, University of Greenwich

Alastair Hanton, Honorary Secretary, Foundation for Integrated Transport, and former Chair, Living Streets

Owen Hatherley, culture editor, *Tribune*; and author, *Red Metropolis: socialism and the government of London* (Repeater Books, 2020)

Fumi Hayashi, MsC, researcher in atmospheric physics, Imperial College London

Dr Jane Hindley, Lecturer, Interdisciplinary Studies Centre, School of Philosophy and Art History, University of Essex

Lisa Hopkinson, Environmental Researcher of Sustainable Transport and Trustee, Foundation for Integrated Transport

Dr Marc Hudson, researcher of social movements

Dr Neil Jennings, Partnership Development Manager, Grantham Institute, Imperial College London

Clemens Kaupa, Assistant Professor, Vrije Universiteit Amsterdam

Dario Kenner, author of *Carbon Inequality: the role of the richest in climate change* (Routledge, 2019)

Peter Knapp, Air Quality PhD student, Imperial College, London

Rebecca Lush, Trustee, Foundation for Integrated Transport

Professor Graeme Macdonald, University of Warwick; Researcher, Climaginaires project and Low Carbon Scotland

Dr Martin Mahony, School of Environmental Sciences, University of East Anglia

James Marriott, artist and activist at Platform; associate researcher, University of Durham; co-author of *The Oil Road* (Verso)

Books, 2012) and *Crude Britannia* (Pluto Press, 2021)

Bill McGuire, Professor Emeritus of Geophysical & Climate Hazards, UCL

Duncan McLaren, Professor in Practice, Lancaster Environment Centre

Lucie Middlemiss, Associate Professor in Sustainability, Sustainability Research Institute, University of Leeds

Greg Muttitt, Senior Policy Advisor, International Institute for Sustainable Development

Dr Audrey de Nazelle, Senior Lecturer and co-Deputy Head, Centre for Environmental Policy, Imperial College London

Michael Norton, Trustee, Foundation for Integrated Transport; social entrepreneur

David Olivier, BSc, principal, Energy Advisory Associates

Dr Kerstin Oloff, Director, Centre for Culture and Ecology, University of Durham

Dr Douglas Parr, Policy Director, Greenpeace UK

Kate Pickett, Professor of Epidemiology, University of York

Simon Pirani, Senior Research Fellow, Oxford Institute for Energy Studies; Honorary Professor, University of Durham

Professor Clive A Potter, Professor of Environmental Policy, Imperial College London

Rupert Read, Associate Professor of Philosophy at the University of East Anglia

Eric Schoenrock, MSc, postgraduate researcher of atmospheric physics, Imperial College London

Tom Sinclair, Associate Professor of Philosophy, University of Oxford

Dr Pritam Singh, Professor Emeritus (Economics), Oxford Brookes University

Peter Somerville, Emeritus Professor of Social Policy, University of Lincoln

Kate Soper, Emerita Professor of Philosophy, London Metropolitan University

Chris Todd, Director, Transport Action Network

Dr Scott Urban, Lecturer in Economics, Hertford College, University of Oxford

Dr Ans Vercammen, Research Fellow, Centre for Environmental Policy, Imperial College London

Dr Caroline Vincent, Biologist, member of Extinction Rebellion Scientists

Dr Judith Watson (retired), Brighton University

Chris Wells, MSc, postgraduate researcher of atmospheric physics, Imperial College London

Christian Wolmar, writer and broadcaster on transport; shortlisted to be Labour's candidate for London mayor 2016 election

Andrew Wood, Co-ordinator of Network for Clean Air

Tristram Wyatt, Senior Research Fellow, Zoology, University of Oxford

Dr Yuliya Yurchenko, Senior Lecturer in Political Economy, University of Greenwich

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