

This is the first report in the new *State of the World* series and is launched in unprecedented times. The Covid pandemic and its economic effects, combined with the continued lack of investment to meet our current infrastructure needs let alone the SDGs, has created the challenge of all challenges.

Never has the infrastructure sector faced such an extreme set of challenges concurrently. There is no longer just a gap of trillions of dollars in investment for current needs, but trillions more to meet the SDGs and trillions to repair and stimulate the economy following the impact of Covid.

The scale of the challenge

The challenge is significant, complex and larger than ever. To pick a few headlines we discuss in this report, we now have not just one but multi-trillion-dollar challenges.

- This report has explored that the global infrastructure investment needs to be \$94 trillion between 2016 and 2040, which is 19% higher than the current trend (\$3.2 trillion per year) and would need to average \$3.7 trillion per year.
- Then there is the additional pressure of not only meeting the investment need of the current situation but ensuring we meet the commitments of the SDGs. This is estimated to be between \$5 trillion and \$7 trillion a year, significantly higher than the \$3.7 trillion above.
- Then as discussed previously, 2020 saw a new risk to the global economy with the slowdown caused by Covid-19 likely to cost at least \$1 trillion, however, the doomsday scenario in which the world economy grew at only 0.5%, would involve a \$2 trillion hit to GDP.

As noted in the Foreword, there are two broad approaches to closing the infrastructure investment gap – improving financial and reducing the overall financial need. This report focuses on the former while future reports will include strategies to address the latter.

It is therefore Time To Take The Trillion Task more seriously, yes one T for every trillion that is estimated to be needed as a minimum to meet the SDG requirements. It is Time to \$Tn-vest!

To highlight the scale of the challenge, below this report provides a number of statistics as to what \$5tn dollars could purchase. As can be seen the numbers are significant:

- **2,370** single unit coal 1 megawatt coal power stations.
- **8,794** 1 megawatt combined cycle gas power stations.
- **405** 1 megawatt nuclear power stations.
- Enough four lane motorways to **circle the earth over 28 times** or enough road to **get us to the moon and back and then to the moon again.**

These are all big numbers, but if Covid, climate change and recent events have taught the infrastructure community anything, it is that it needs to be bold and not necessarily in ways that would have been anticipated five years ago.

The skills and expertise that go into providing such assets should not be underestimated, these vary from the visionary that has the concept or idea, through the engineers who envision innovative solutions to challenges and then design and actualise such visions to the constructors that make such designs tangible and ultimately the users and customers that derive benefit from the provision of such assets and infrastructure.

The trillion-dollar challenge is not only on the horizon, it has arrived and in this report we set the scene for a new series of *State of the World* that will put issues at the forefront of discussion on their own accord across an ongoing series of reports.

The industrial progress made over the last three centuries could not have happened without engineering expertise, but the global environmental problems that have resulted can now only be solved by engineers and engineering bringing the full range of their skills to bear with the ambition of the SDGs as their primary driver and properly constituted assessment mechanisms that take account of climate change, social equity, environmental protection, and human development.



The infrastructure industry must therefore work with governments across the globe to act and FIDIC is here to provide that platform for debate to secure progressive movement on this goal.

Recommendation 1: Given the evidence in this report, FIDIC recommends that there be a renewed global effort to improve infrastructure spending to meet the investment challenge facing the world.

Covid has certainly not made this easier but it has shown how expertise such as science and engineering in developing drugs, building hospitals etc, are vital to meeting the infrastructure challenge. Engineers will be vital in ensuring we deliver the infrastructure required in a way that is sustainable for the future.

Prudently moving from Covid, the burning of fossil fuels and towards sustainable infrastructure

Infrastructure plays a vital role in everyone's lives. It provides us with the water we drink and use to grow food, the health care we all need, the electricity that powers our technology, the heat to keep our homes warm, the transportation systems we need to allow trade and the tools we need to be able to effectively communicate and the list goes on.

This report therefore not only explores the investment challenge post-Covid but also considers how such investment adjusts to competitiveness, risks and threats including items such as Covid and how this will change investment preferences.

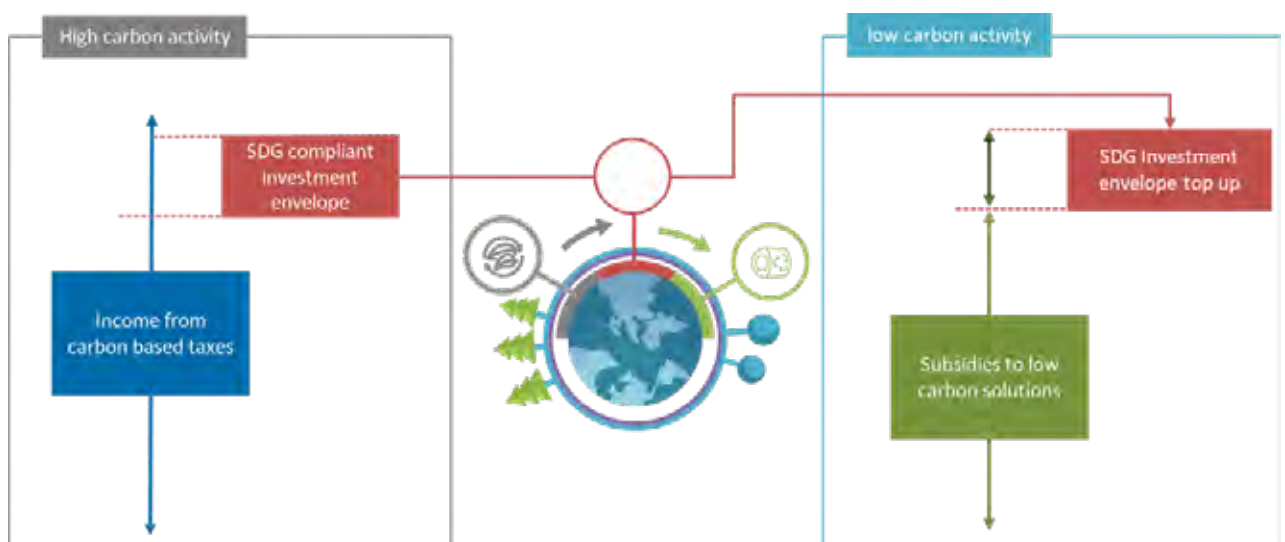
This preference to date has shifted towards one where the environmental benefits of lower activity and improved healthcare are high on the agenda and new ways of working are now inevitable in a shift that would not have occurred at such a significant pace towards remote working if it were not for Covid-19.


So, considering the above and the current situation of usages, resources and pricing in the burning of fossil fuels, do we need to support this monumental shift?

We discuss how, working with the wider infrastructure sector, a number of automatic investment mechanisms or principles could be agreed to transfer increased revenues when they occur through activities that involve the burning of fossil fuels into low-carbon technologies.

Such mechanisms could be set within a capital envelope to provide certainty and automatic stabilisers within hypothecated budgets based on the collection of wider revenues from activities that are related to the burning of fossil fuels. This could provide a significant boost and transfer towards meeting the SDGs.

Figure: 1 – SDG compliant capital envelope mechanism





Recommendation 2: FIDIC has suggested as part of this paper that governments learn from the concept of automatic stabilisers and hypothecation of funds that occur as part of economic conditions and general public expenditure to construct a mechanism to support sustainable investment and prudently shift away from carbon intensive investments and the burning of fossil fuels.

This mechanism would provide a capital envelope to support or enhance spending based on economic conditions, thus providing certainty and a clear commitment towards meeting the SDGs.

FIDIC would also like to see such mechanisms form a core part of policy and built into future commitments as we approach the negotiation of what replaces the SDGs in five to ten years' time.

Challenging perception so we invest holistically

There is much talk of whole life costs, holistic investment, skills retention, resilience, flexible and multi-use infrastructure. All these concepts are important and are essential for a well-operating infrastructure industry and more importantly for embedding sustainability into day-to-day living.

The challenge, however, is not only building new infrastructure but maintaining and upgrading existing infrastructure in a sustainable way. If there was a lesson to be learnt from the last 200 years of growth, it is not just that investment helps to facilitate growth but that if done in an unsustainable way it can result in consequences in the medium to long term.

This report analyses investment across several comparable countries considering their investment and maintenance infrastructure spending and finds some worrying conclusions given the need to move towards a more sustainable footing for infrastructure development and replacement.


The analysis in this report shows that over time the investment/maintenance ratio has fallen from investment being approximately three times the level of maintenance to it being just over two times the level.

Even more important is when you consider the trend going forward. By 2030, the time at which the SDGs and 'sustainable development' is due to be a priority, the ratio would only be 1.7 and if that is pushed out to 2050 the ratio would be 1.

This has two potential implications. The first is that, despite all the emphasis on using investment to grow out of the economic downturns, investment profiles appear to be going in the wrong direction when considered alongside maintenance spending. This suggests we have not seen progress towards the earlier discussed infrastructure needs gap.

The second is that when you consider 'whole life costs' and the aim of making infrastructure more sustainable, there does not appear to be evidence that maintenance costs are reducing because of infrastructure expenditure - in fact they appear to be increasing.

Whilst this may not seem positive, it can explain the issue the globe is facing, in that a lack of infrastructure investment in a sustainable manner is resulting in maintenance costs being higher as a ratio between the two than otherwise would be the case and the globe is not meeting its infrastructure investment need. So, we are still prioritising short-term solutions and fixes over long-term sustainable decisions.



Recommendation 3: Given the evidence in this report on the investment / maintenance ratio FIDIC recommends that there be a global effort to monitor such a ratio not only in the countries that could be analysed as part of this report but across all countries. The goal for example could be that maintenance spending remain stable, but investment spending rises to meet the investment gap thus improving the ratio and truly pushing towards whole life and sustainable investment.

It is also important to recognise the role of engineering in the conceptualisation of cost-effective solutions to challenges followed by the design of infrastructure in meeting such a target, it is only by improving our approach to infrastructure design and procurement can such a goal be truly met.

