

# Recycling our Infrastructure for Future Generations

Prepared in collaboration with Atkins Acuity



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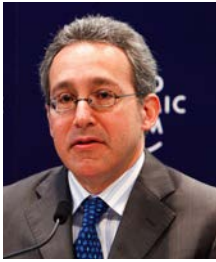
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# Preface



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Short political cycles, short-term investment horizons, a lack of viable financing structures, inappropriate risk assessment frameworks and a lack of long-term vision mean that much-needed investment does not flow to infrastructure and development. This results in a US\$1 trillion annual shortfall in infrastructure alone.

As part of the System Initiative on Shaping Long-term Investing, Infrastructure and Development<sup>1</sup>, this report – Recycling our Infrastructure for Future Generations – builds on earlier work completed under the Forum’s Strategic Infrastructure Initiative<sup>2</sup> and takes a closer look at an emerging approach to financing new infrastructure, which is known as “asset recycling”.

Insight presented in this report demonstrates that asset recycling in infrastructure has the potential to significantly increase levels of investment. This is the result of creating alignment with long-term institutional investors that have a preference for built assets, notably pension funds. Asset recycling unlocks and directs capital from these investors towards governments’ most critical greenfield infrastructure needs.

This approach can be particularly valuable in jurisdictions that face difficulties in raising finance for infrastructure projects due to existing high levels of public debt or the perceived levels of risk of building new infrastructure.

If successfully implemented, asset recycling can provide governments with a viable route towards closing the infrastructure investment gap and accelerating national infrastructure programmes to stay on a path to inclusive economic growth and recovery. It can also allow citizens to invest in mature local infrastructure through their pension funds, meaningfully diversifying retirement savings portfolios.

We would like to thank the many World Economic Forum partner companies and other expert stakeholders that have contributed their expertise and leadership. In particular, we wish to express our appreciation to Atkins Acuity, a member of the SNC Lavalin Group, for their support and collaboration in this project and to this report.

# Forewords



**Michael Sabia**  
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Chief Executive  
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et placement du  
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Shaping Long-  
term Investing,  
Infrastructure and  
Development

The case has been made: the world needs massive investment in infrastructure, for many important reasons, such as maintaining existing infrastructure or building new projects to keep pace with growth and increase productivity. But governments almost everywhere are facing significant fiscal constraints, prompting them to look for ways to manage their balance sheets prudently while meeting basic, critical needs in infrastructure. At the same time, especially in a low-interest rate environment, long term investors are looking for opportunities to invest in infrastructure assets that meet their risk-return objectives.

The question is: How do you bring together infrastructure needs and long-term investor capabilities? Asset recycling is an important part of the answer. It is a solution that connects needs and capabilities in an efficient way. It is a way for governments to tap into the value they have built into existing assets over the years to free up the capital they need to launch new greenfield projects. And it is a way for long-term investors to invest in a tried-and-true asset class that generates stable and predictable returns over the long term for their clients.

The idea merits the attention of government leaders and investors worldwide with good reason. Through asset recycling programmes, governments gain the financial flexibility to take on new and innovative infrastructure projects. Investors can access previously unavailable investment opportunities. Citizens benefit twice, as users from better mobility and additional services and as investors through their retirement savings portfolio. Cities and countries will gain from increased productivity and more sustainable economic development.

Clearly, the global economy could use a boost from infrastructure. Asset recycling gives governments and investors an opportunity to do just that.



**Neil Bruce**  
Chief Executive  
Officer  
SNC-Lavalin  
Group Inc.

Our longstanding equity participation in infrastructure assets has allowed us to play a significant role in shaping the Canadian infrastructure sector into one of the most efficiently regulated and attractive markets of its kind. This approach has been proven to consistently provide the best value for money that creates solutions to important public needs.

We are aware that the need for new infrastructure goes beyond the current model's capability, not only in Canada, but also throughout the world, stimulating the need to explore new avenues to deliver more projects. One of the key elements is how to finance new infrastructure projects in a cost of capital efficient way. Infrastructure Asset recycling is one of the solutions that can unlock capital investment using existing assets, thus providing a substantial and potentially sustainable source of financing for upgrades, maintenance and new project launches.

However, success will rely on the approach and inclusion of all stakeholders, ensuring that the social and economic objectives are met. It will also hinge on creating new types of partnerships, expanding the reach for capital to new players such as local pension funds.

As a leading player in the development, financing, engineering and construction, operation and maintenance, and asset management of large-scale, complex infrastructure projects, SNC Lavalin is always at the forefront of the industry. Our goal is to become a trailblazer on this journey, helping to propel the successful Canadian version of the public-private partnership model globally, just as we have successfully done in Canada over the last 15 years.

# Executive summary

## Obstacles to private investment in infrastructure: Private sector–government expectations mismatch and distrust from populations

Infrastructure has long been recognized as a key enabler of economic and social development. Even so, persisting wealth differences exist between regions, and new challenges such as climate change, ageing of the existing asset base, population growth and urbanization, all require increasing levels of investments in infrastructure.

The slow growth in developed economies in the aftermath of the global financial crisis has significantly reduced the share of governments' budget allocated to building, maintaining and operating new infrastructure. High debt levels have also restricted government's ability to borrow, and governments are increasingly looking at ways to create space on their balance sheet rather than considering simple on or off the balance sheet approaches. Furthermore, demographic patterns such as ageing populations can increase pressure on government budgets, notably through the impact on providing healthcare or the increasing retirement savings gap (see **Box 1**). These factors reduce governments' flexibility or 'fiscal space' to address the infrastructure investment shortfall.

Lack of transparency has also been a major challenge, with governments diluting any proceeds from the sale of assets to the overall budget or using them to pay off debt, thus failing to show the value of the infrastructure sale. This lack of transparency also relates to the lack of standardization in financial market documentation and reporting. Infrastructure debt is still far from being a tradable asset class. Further efforts are needed to standardize and ensure the hurdles for investing are minimised.

In parallel, private sector offerings in infrastructure have significantly developed and governments are learning more about how to regulate and structure public-private partnerships. Multiple reports, articles and analyses are now available to explore the risk sharing, governance, models and types of assets that have had the best results, as well as the pitfalls to avoid.

Private engagement in building and operating assets has not always delivered the innovation and higher levels of service expected, although there equally are many cases where it has. The history of this journey also contributes to a negative public perception of private sector participation. In parallel, the private sector has often increased prices to cover real costs where governments previously subsidized these services. Today, people expect higher levels of services from private operators of infrastructure.

People also fear a loss of control, but the fact that many investors are pension funds managing constituents' funds for retirement has often not been well understood. There has often been a lack of engagement and communication both from the government and private operators with affected communities.

Private investors' appetite for infrastructure assets has been growing, driven in part by the slow growth environment characterized by the low returns of sovereign debt instruments. In particular, the growth in number of assets under management in pension and sovereign funds has been encouraging. However investors' interest for infrastructure exceeds the supply of investable projects and assets. There is often a mismatch between what governments want in terms of new or social infrastructure, and private investors' preference for existing and proven economic infrastructure, especially long-term investors such as pension funds.

## An asset recycling strategy can meet the challenges

An asset recycling strategy can help solve the challenges outlined above by:

- Building trust with communities through budget transparency, prioritized planning and improved safeguards;
- Divesting government assets that private investors want, to reinvest the proceeds into the assets that communities want;
- Building new infrastructure without increasing debt levels and taxes, nor reallocating funds from other much needed public services;
- Targeting opportunities for efficiency gains in existing infrastructure and more private-public knowledge transfer;
- Promoting infrastructure as a more accessible and tradable asset class for institutional sources of capital, notably pension funds;
- Providing more opportunities for citizens to invest in local mature infrastructure through their pension funds, meaningfully diversifying retirement savings portfolios.

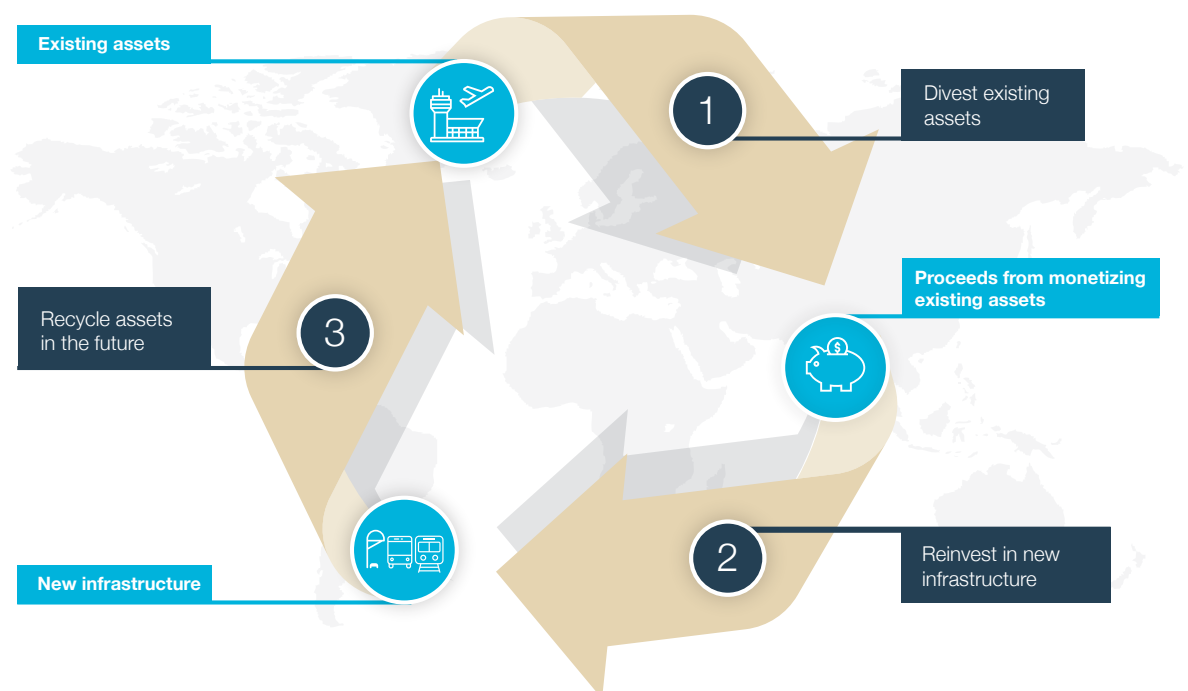
## What is the infrastructure asset recycling mechanism?

An asset recycling strategy involves two well-known activities – divesting existing assets to a private consortium and investing in a new infrastructure asset. However, it innovates by taking a long-term, comprehensive view of these two activities, which involves a strategic assessment of:

- The capital value tied up in existing infrastructure assets on the public balance sheet.
- The potential benefits to be obtained by monetizing these assets and directly reinvesting the capital proceeds to create additional or improve existing infrastructure.
- The possibility for governments to meet the challenges of political, construction and user risks of new assets and reap the benefits by divesting these new assets to private investors in the future and repeat the cycle;

This process recycles previous taxpayer's funds that have been locked up in older assets to pay for new or renewed assets to meet the demand of future generations. This avoids the need to continually raise taxes or increase borrowing and debt levels. The population retains access to the public services and benefits provided by the older assets, but now also gains from additional or improved services and benefits provided from re-investment in new and/or improved infrastructure (see **Figure 1**).

**Figure 1: The infrastructure asset recycling process**



Source: Authors



An asset recycling strategy is typically implemented at the country level in partnership with local governments and includes all types of urban and infrastructure services. This strategy supersedes the silo approach to infrastructure planning.

Depending on the assets owned by governments, the institutional and political situation, and the needs of the population, asset recycling can be implemented at a smaller scale, for example in one region, or selling a category of assets to reinvest in a targeted category of assets.

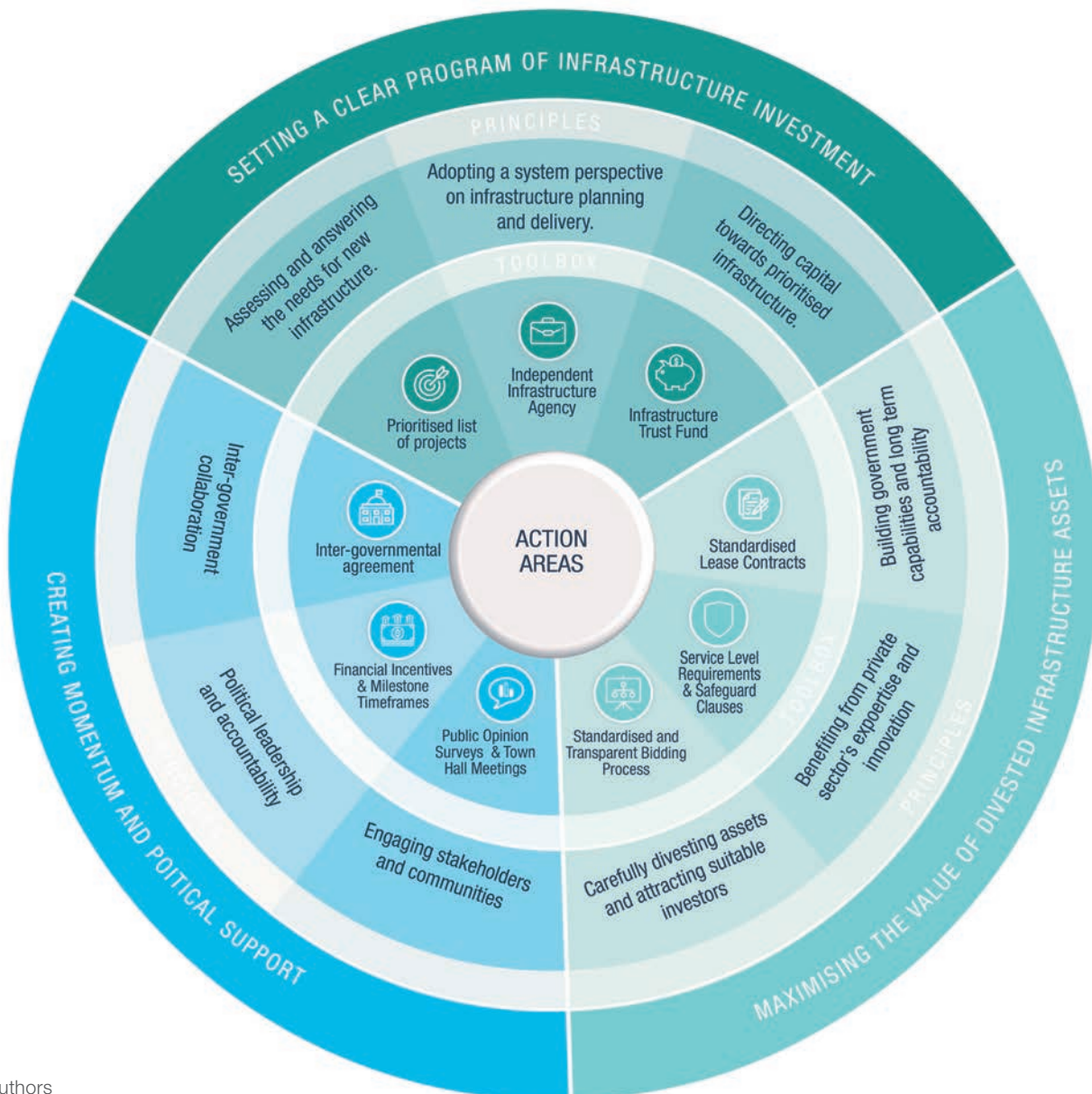
Experimenting at a smaller scale before scaling-up into a larger strategy can be valuable to test investors' appetite and improve the government's processes and knowledge. However, the best way to meet the needs of the stakeholders should always come first. Stakeholders' and community engagement should be an integral part of the strategy from the outset.

## Implementing an infrastructure asset recycling programme

Asset recycling must be adapted to each jurisdiction's institutional, cultural and physical situation. However, a set of principles and tools inspired by best practices and experts' consultation can support the process of designing and implementing an infrastructure asset recycling strategy. (See **Figure 2**.)

These nine principles are organized in three action themes. They correspond to how to organize, plan and optimize asset recycling, divesting and reinvesting, as well as how to create momentum and support through the whole lifecycle of the programme.

Figure 2: A framework for implementing infrastructure asset recycling



Source: Authors



Beyond these principles, some governance and operational tools have proved particularly useful in best practice examples.



### Establish an independent infrastructure agency

Independent infrastructure agencies in charge of advising the government on the long-term infrastructure plan can offer a system-wide vision of infrastructure, crossing the usual silos of sectoral bureaucracy. They can also be the repositories of learnings from research, divestment and reinvestment. By representing several public, private and academic views through their board of directors, these agencies can contribute their innovation and expertise. They can also contribute to better communication and transparency by conducting and publishing reviews of projects and publishing lists of prioritized projects based on diligent cost-benefit analysis.



### Publish lists and business cases

For an asset recycling programme not to fall into the traps of previous privatizations, the government needs to clearly plan for each step of the initiative. This means using internal or external expertise to divest assets according to best practices in public-private partnerships, but to also develop a strong plan for reinvestment. The reinvestment phase involves most of the innovation of asset recycling.

Designating an agency or a team to build methods to assess the value and priority of assets justify how they will answer present and future needs, but also communicate the list and the choices made. These are key elements to guarantee the good use of the funds and to build the communities' trust. This stage also determines if the new assets will be good candidates for future private investors, and will bring equivalent economic value to the divested assets.



### Using a trust fund to store the proceeds from divesting assets

Much of the distrust of divesting public assets comes from the perception that unlocked capital seems to not benefit the population. By allocating the capital proceeds to a fund separate from the government's balance sheet, and clearly specifying what the capital from the fund will be used for, is a strong message to the public, as well as a guarantee of long-term value creation. Key performance indicators, a strong and transparent investment planning, and transparent governance are all important elements to this fund structure.



### Protecting the public interest by enforcing the service level and safeguarding clauses in concessions

The ability of governments and regulatory bodies to ensure the divested asset continues to provide a service to the population as good or better will be a critical factor to the success of an asset recycling strategy. A regulatory framework is essential. This should include robust and

transparent operational and financial performance reporting requirements of the assets and companies in question. Concession agreements can then be crafted with clauses that protect the levels of service for users through key performance indicators (KPIs) and safeguards, enforcing issues such as operations and maintenance standards, asset capacity upgrades and agreement on pricing levels and indices.



### Engaging the public through opinion surveys and community meetings

Better understanding communities' and stakeholders' concerns by engaging them directly to identify their key fears and threats, and how they might be addressed, can help tailor an asset recycling programme to the needs and values of local communities. Mechanisms should be created that encourage the public community to engage throughout the whole process. These mechanisms include public opinion surveys and town hall meetings that can help identify people's concerns as well as the public's reaction to the rationale set forth by the government, and to proposed solutions to address concerns. Adopting a more collaborative process with the local community during the planning and implementation stages can considerably reduce opposition and build support.

This report details the elements and describes international examples according to the following contents.

- **Part 1:** Context, takes a closer look at the current trends and barriers preventing governments from closing the infrastructure investment gap.
- **Part 2:** Introducing infrastructure asset recycling, details the three key parts of an asset recycling strategy in infrastructure, addresses some of the misconceptions of asset recycling, and provides a checklist for governments to consider when assessing the suitability of an asset recycling strategy.
- **Part 3:** Implementing an infrastructure asset recycling programme, details action areas and principles important to a good implementation strategy and provides examples of the tools used by governments to successfully recycle assets and reinvest in new and needed infrastructure.
- **Part 4:** The way forward, reviews how this strategy might be helpful in different regions and proposes ideas of adaptation to different situations, notably in developed versus developing regions.

# Context

## Infrastructure outlook

By 2040, the global population will increase by almost 2 billion people, which is 25% more than today's total population. Continued rural to urban migration will also increase the number of people living in cities by 46%, pushing global population density up to 61 people per square kilometre from 49 today.

These demographic patterns will result in a surge in demand on existing infrastructure, resulting in the following effects:<sup>3</sup>

- Higher resource consumption and need for improved services, such as power, telecommunications, clean water and sanitation
- Heavier traffic and congestion on roads
- Increased number of passengers using public transport networks, for example bus, metro and rail
- More trade and delivery of goods and services through shipping, air, road and rail freight transport
- Increased demand and increased cost of housing if supply cannot match demand
- More solid waste and pollution.

There will also be an increasing need for ageing infrastructure<sup>4</sup> to be more resilient and able to cope with the effects of climate change.<sup>5</sup>

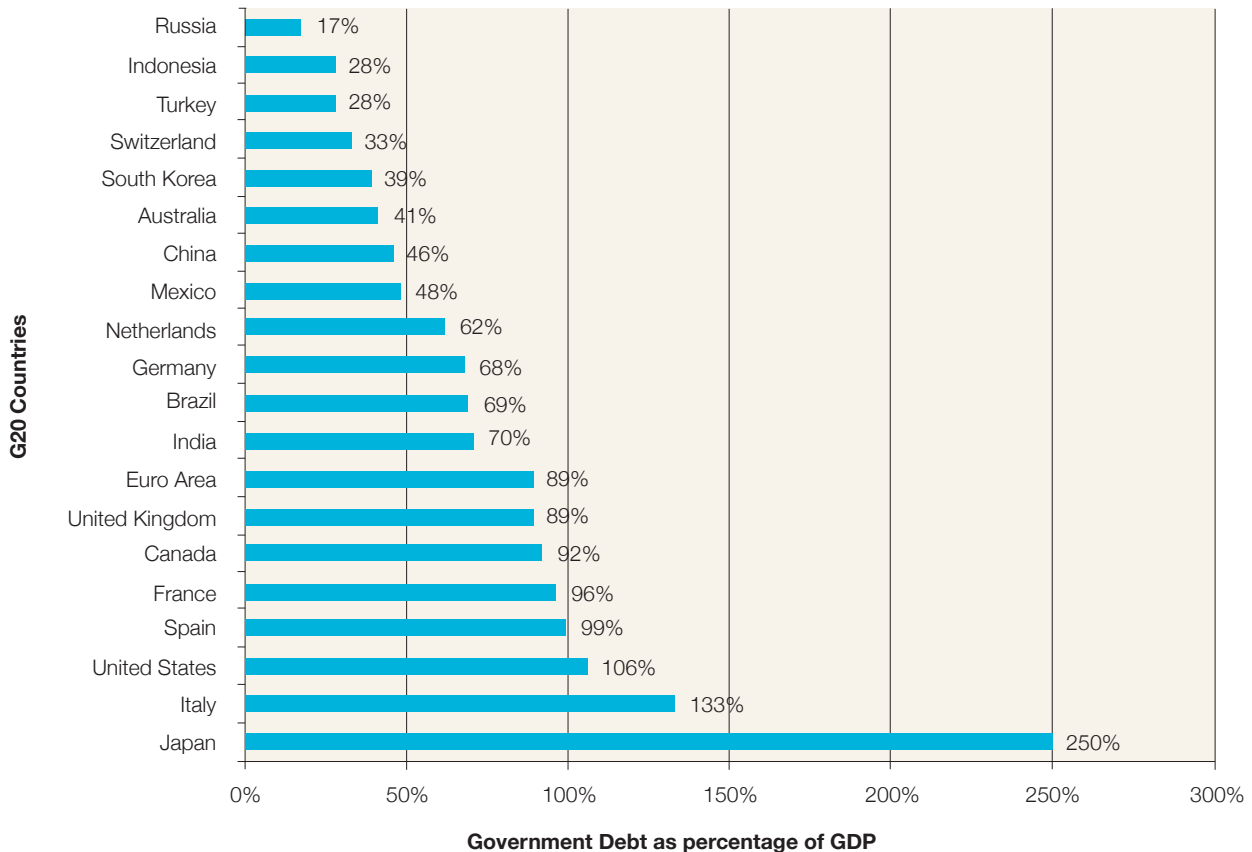
Over the next 25 years, global infrastructure needs are estimated to reach \$100 trillion.<sup>6</sup> On current investment trends, there will be a projected investment gap of \$20 trillion over the same period.

To sustain global economic growth and also meet the UN's Sustainable Development Goals,<sup>7</sup> global investment in infrastructure needs to be increased by 23%, to 3.7% of annual global GDP.<sup>8</sup>

## Government budget constraints

Today, governments continue to tackle record levels of public debt a decade after the global financial crisis, which now stands above the critical level of 90% of GDP in Japan, Italy, the United States, Spain, France, and Canada, and at 89% of GDP in the United Kingdom and the Euro area, as illustrated in Figure 3.

Figure 3: Government debt levels as percentage of GDP among G20 countries



Source: Trading Economics<sup>9</sup>



To improve operational budgets and “fiscal space”,<sup>10</sup> governments in many countries are taking steps to reduce public spending levels, making it difficult to simultaneously increase investment in infrastructure, especially through further borrowing.<sup>11</sup> With existing high levels of government debt, increasing further levels of borrowing is not always a viable solution, as this can trigger downgrades to sovereign credit ratings and increase the governments’ cost of borrowing.

In 2016, investment in infrastructure among G7 countries remained low, for example as little as 1.6% of GDP in the

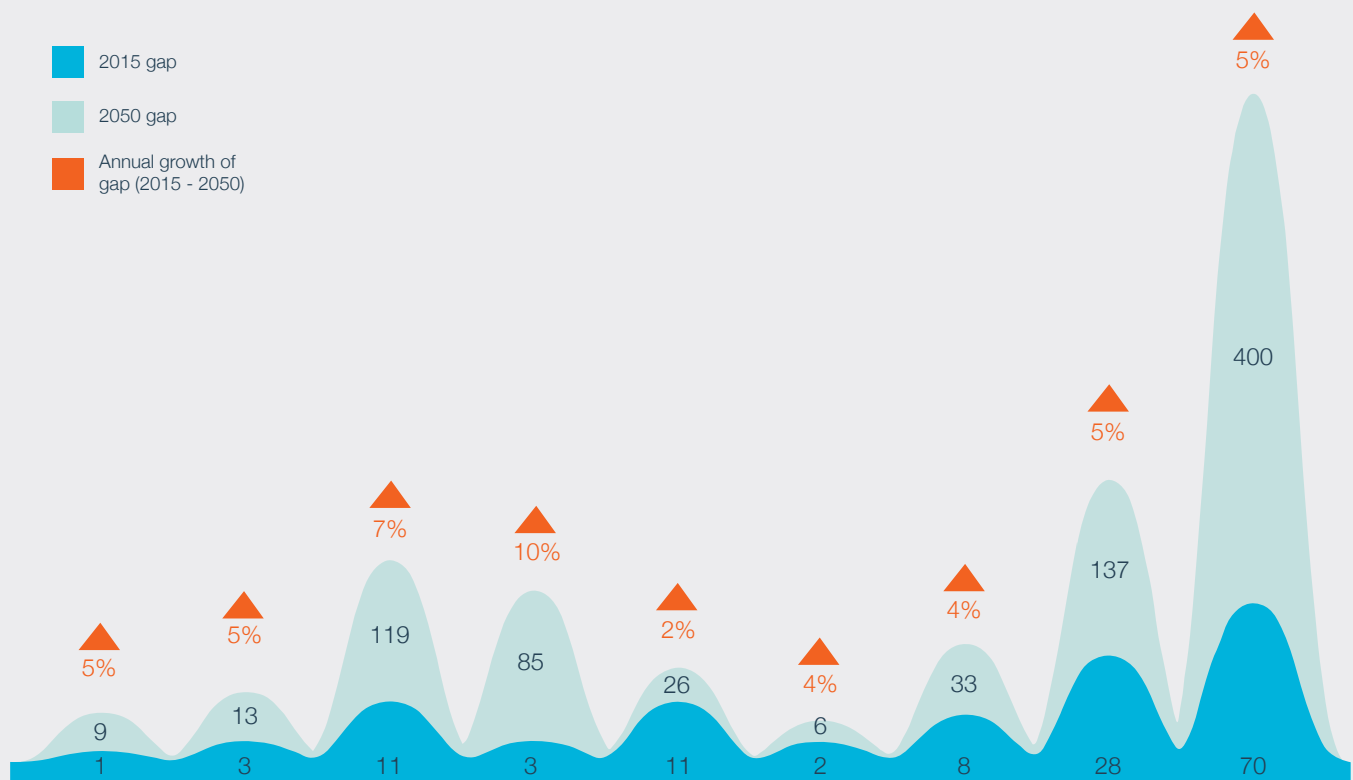
United States.<sup>12</sup> At current investment levels this will result in the largest infrastructure investment shortfall of any country, with a national deficit projection of \$3.8 trillion by 2040, which is 31% of the national investment need in infrastructure.

Other demographic patterns, notably the trend of ageing populations, are creating further pressure on government budgets. Examples include the impact on healthcare costs and the cost of providing national/state pensions, which poses a significant challenge with a projected retirement savings gap of \$400 trillion by 2050 (Box 1).

### Box 1: Fiscal space and the retirement savings gap

The global dependency ratio, which is the ratio of those in the workforce to those in retirement, will plummet from 8:1 today to 4:1 by 2050. As a result, the global retirement savings gap, currently estimated at \$70 trillion today, will grow to \$400 trillion by 2050, as shown in Figure 4.

Figure 4: The size of the retirement savings gap (\$trillions, 2015)



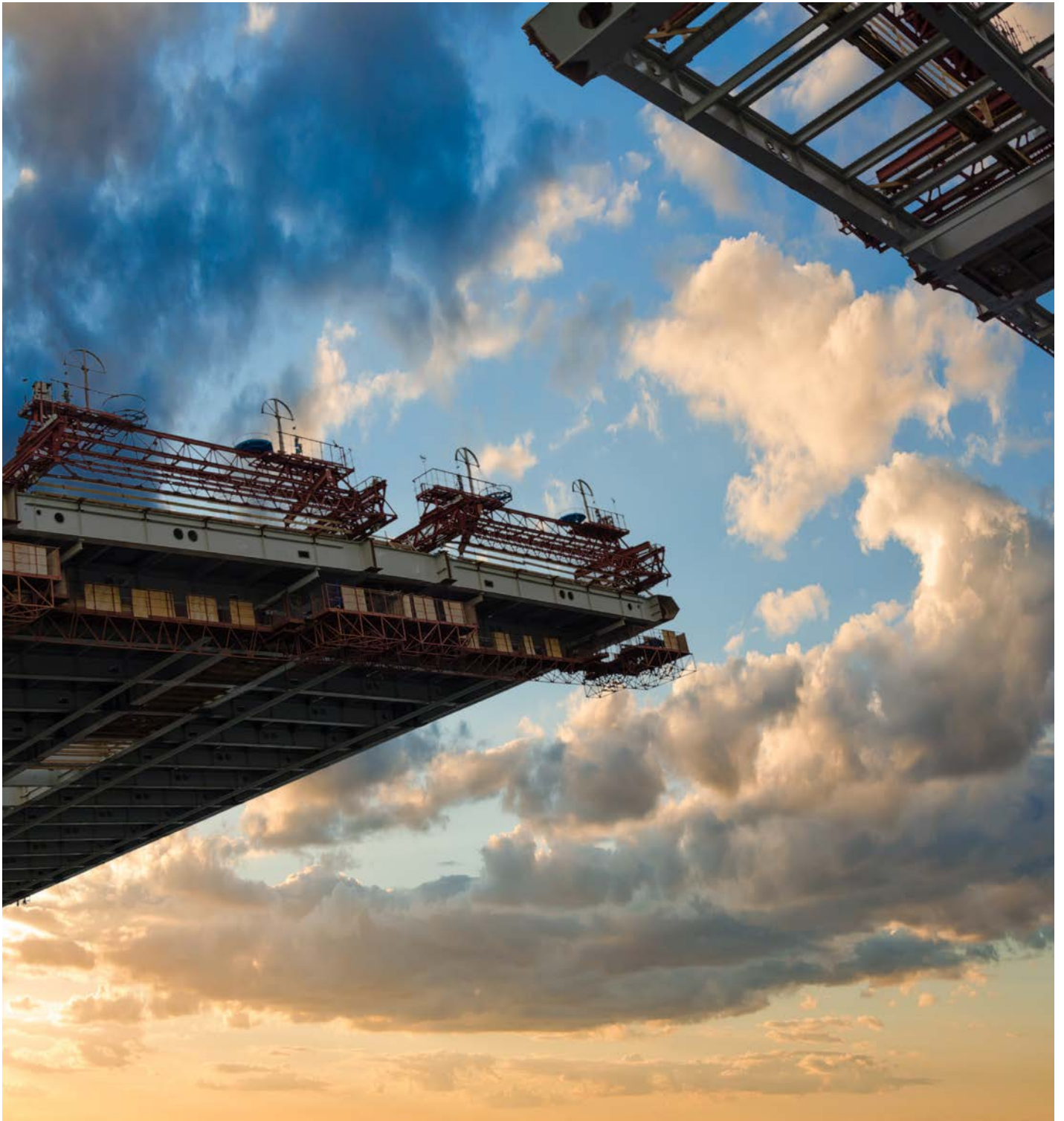
Source: Mercer/World Economic Forum<sup>13</sup>

Of the \$70 trillion gap for 2015, more than 75% is associated with unfunded government-provided pillar one pensions and pensions promised to public employees. Closing the gap will require a number of interventions and reform, such as increasing the retirement age. It will also likely add further pressure to the fiscal position of governments. This will reduce flexibility in their operational budgets going forward and the ability to increase allocation to more investment in infrastructure.

In addition to challenges stemming from ageing populations, the past decade has also seen increased levels of volatility in the stock market, impacting the returns from equity and debt investments. Low interest rates and bond yields<sup>14</sup> have also contributed to the problem. The result is that pension fund assets have not grown as fast as their liabilities, so their deficits – the gaps between the money they have and the money it will take to pay their pensioners – have widened.

In an attempt to offset these growing unfunded liabilities, national and state pension funds have been increasing their investment levels in infrastructure over recent years.<sup>15</sup> Fund managers are looking for new sources of return and better diversification of investment risk, searching beyond the traditional asset classes of equities, bonds, cash and real estate.<sup>16</sup> These investors need low-risk, long-term and inflation-hedged investments to better position themselves to pay the benefits promised to current and future retirees. This investment profile explains the increased level of interest in mature operating infrastructure assets.

Pension and sovereign funds that invest in infrastructure can also help communities benefit twice from infrastructure, both as users and as investors. The long-term horizon of pension funds can also create alignment between investors looking to hold the asset for a long time and governments looking to optimize infrastructure assets' planning, delivery and operations over their entire lifecycle.



## The mismatch between investor appetite and government needs

Private actors have increasingly participated in the financing, building and operating of infrastructure through public-private partnerships. The aggregate value of global infrastructure investments reached its highest level in 2016, with \$413 billion invested.<sup>17</sup>

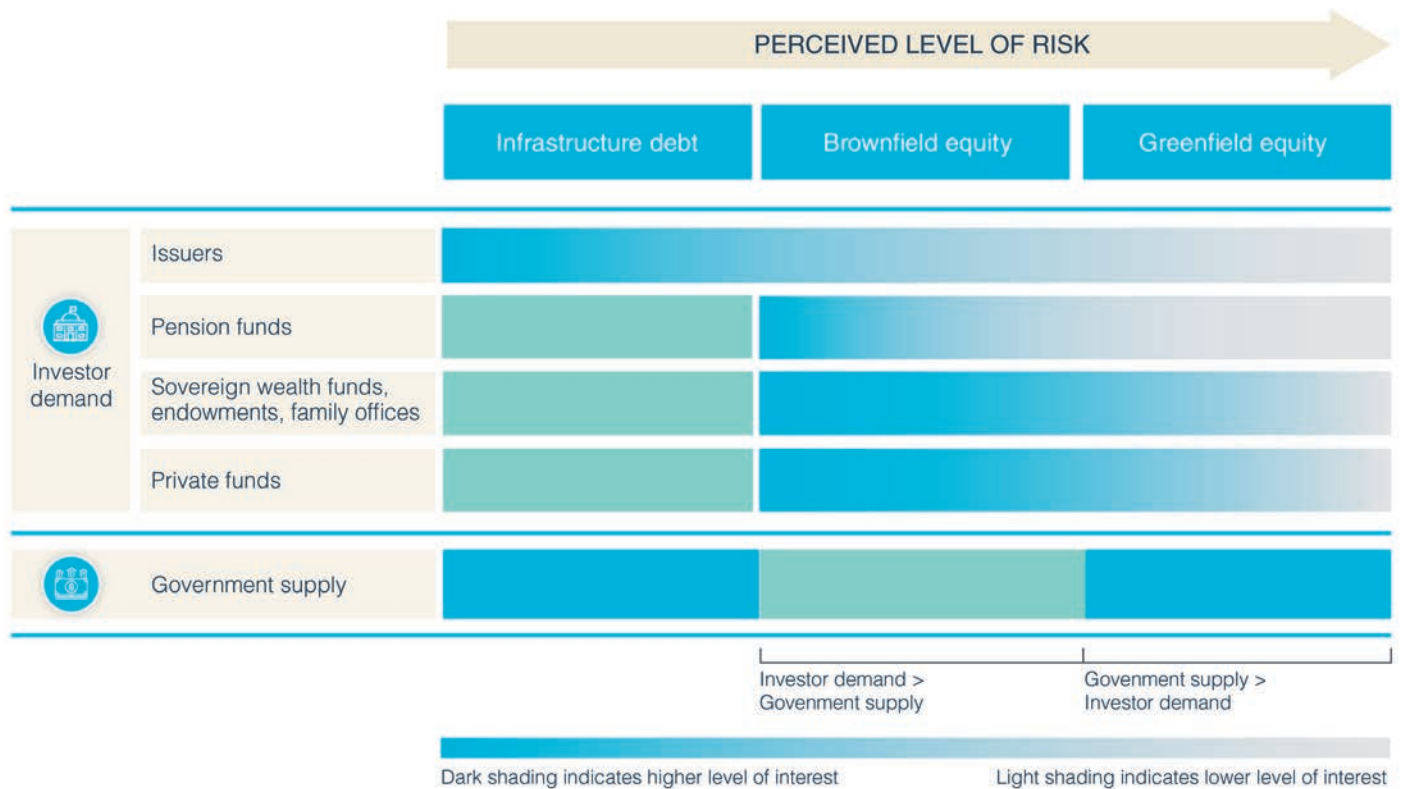
Investor appetite for infrastructure has grown steadily since the global financial crisis. Investing in infrastructure assets, characterized by long-term contractual arrangements and regulation, was a means to reduce portfolio risks through diversification, and to access higher risk-adjusted returns when sovereign bond returns were extremely low. A recent survey<sup>18</sup> among investors reveals that these two objectives have been met.

However, infrastructure was also expected to provide additional benefits, such as inflation-linked returns and long-term stable cash flows, all particularly interesting for investors with long term horizons such as pension funds. If these benefits do not seem as clearly met, they explain investors' declared preference for:

- Privately-held infrastructure debt or equity as opposed to public stocks or bonds; and
- "Brownfield" (existing) and "contracted" infrastructure, as well as brownfield regulated utilities rather than "greenfield"<sup>19</sup> (new) projects.

As a result, demand from private investors is high, but concentrated on some types of assets that do not necessarily match governments' priorities, as illustrated in Figure 5.

Figure 5: Indicative investor preferences and government supply



Source: World Economic Forum<sup>20</sup>

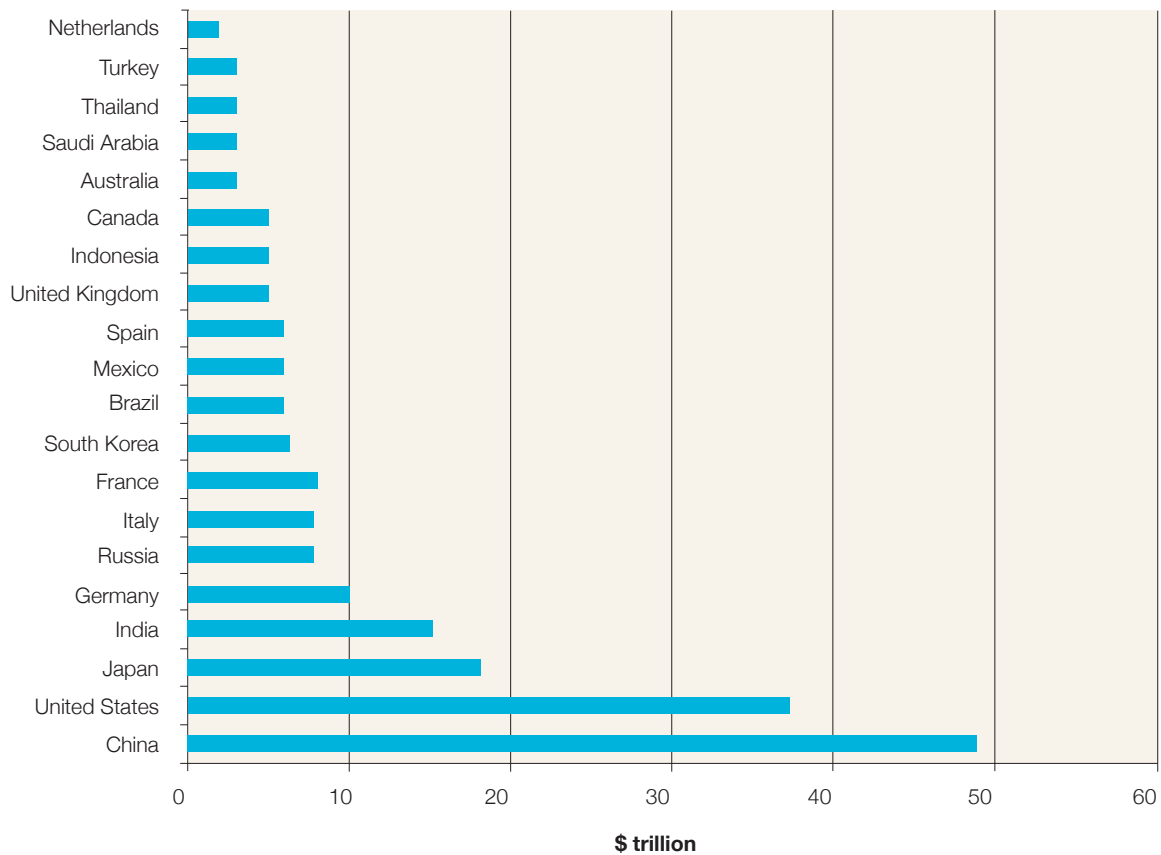
Efforts to increase private participation in infrastructure therefore continue to face challenges, due to the mismatched expectations between private investors and governments. As a result, infrastructure investment funds have had trouble investing the private capital they have raised, with a surplus of “dry powder”<sup>21</sup> reaching \$151 billion as of June 2017.<sup>22</sup>

## Brownfield infrastructure stock

Governments struggle to reflect the true value of public assets on their balance sheets, which means there is very little data on how effective governments are at managing their generally large portfolios of property, infrastructure and natural resources. This also makes it unclear whether taxpayers receive a good return on the investment in those assets, either financially or in terms of effective public service delivery.<sup>23</sup>

According to a recent report,<sup>24</sup> the total built asset wealth now stands at an estimated US\$218 trillion. The report provides an index (see Figure 6) and calculates the value of all the buildings and infrastructure that contribute to economic productivity in 32 countries, which collectively makes up 87% of global GDP, representing on average per country analysed a built asset stock worth 2.9 times their GDP.

**Figure 6: Top 20 countries ranked by wealth of built assets (\$trillion)**



Source: CEBR/Arcadis



Many G7 economies have seen a net de-investment through lack of additional investments and the depreciation of their existing built assets since 2012. The largest of these was Japan, which experienced depreciation in its built asset stock of \$4.6 trillion. However, as a proportion of its stock, Germany's net loss exceeds that of Japan – at 21% compared to 20%.

When budget allocation, debt and public-private partnerships for greenfield projects fail to provide sufficient capital for new infrastructure projects, governments can consider unlocking capital from their existing infrastructure stock by using investor interest in mature operating assets.

## Public perception of private participation in infrastructure

Since widespread policies of privatizing public services began in the 1980s, there have been recurring concerns and debates about allowing the private sector to own and manage public services, notably infrastructure.

Worldwide studies<sup>25</sup> have provided examples of the benefits of involving the private sector in infrastructure development and management. Benefits include innovation, increased efficiency and effectiveness of services, increased investments throughout the project's lifecycle, reduced time of construction and overall cost of the project when risks are well allocated. However, these benefits do not systematically and consistently occur

and expectations might have been disproportionate and sometimes contradictory, notably in the water sector.<sup>26</sup> Failures have gradually helped governments establish legal frameworks and advance contracts, dispute resolution mechanisms and rules to support more successful private sector participation.<sup>27</sup>

Communication with communities to inform but also to understand their needs and concerns is still key to the success of private-sector engagement. This is an area that needs to improve in practice.<sup>28</sup> Practitioners interviewed agreed that the private sector needs to focus on improving the customer experience and service, and communicate about key achievements. Voter concerns also include the fear of losing "ownership" of infrastructure assets, particularly where the buyer is foreign and profits go to shareholders far from home.

Privatization is also perceived as resulting in job loss, higher prices and quick profits instead of sustainably providing services.<sup>29</sup> In some cases, there has been a discrepancy between what private operators and sector departments report in their official key performance indicators and the daily experience of users.<sup>30</sup>





In addition, privatization has often been used to alleviate a government's debt, or the money has disappeared into the government's budget, with the population not having a clear sense of the use of this capital. Using privatizations to pay off debt could be viewed as a short-term strategy, foregoing the future to make up for the governments' financial mismanagement.

An infrastructure asset recycling strategy can provide a mechanism for governments to address most of these public perception issues. An asset recycling strategy can also regain the trust of communities by clearly laying out a plan for new infrastructure, and transparently showing the value of divesting existing assets to reinvest in the most needed projects. Asset recycling can both communicate the transparency of the government's budget and long-term planning based on user needs. It can also help engage new types of investors such as local pension funds, which significantly increase community support levels for private engagement in infrastructure. (See Box 4.)

# Introducing infrastructure asset recycling

## The asset recycling process

Asset recycling, also known as capital recycling, is a widely used business practice<sup>31</sup> that consists of disposing non-strategic or underperforming assets to unlock “idle” capital and reinvest it in other assets or projects that deliver improved or additional benefits.

Governments and public-sector organizations, which own and operate infrastructure assets and also hold the responsibility of delivering improved or new public services, can adopt this practice to meet the growing needs of the population.

Infrastructure asset recycling involves two activities:

- Divesting existing assets; and
- Reinvesting in new infrastructure.

Separately, the activities could be regarded as standard practices often used by governments and public-sector organizations. For example, governments have historically leased or sold public assets. However, the proceeds from these divestments have often been used to pay off debts and improve their operational budgets. Governments also invest in new infrastructure assets, however, they often use national budgets, subject to bureaucratic rules of allocation that often lack a whole lifecycle and system-wide perspective on infrastructure.

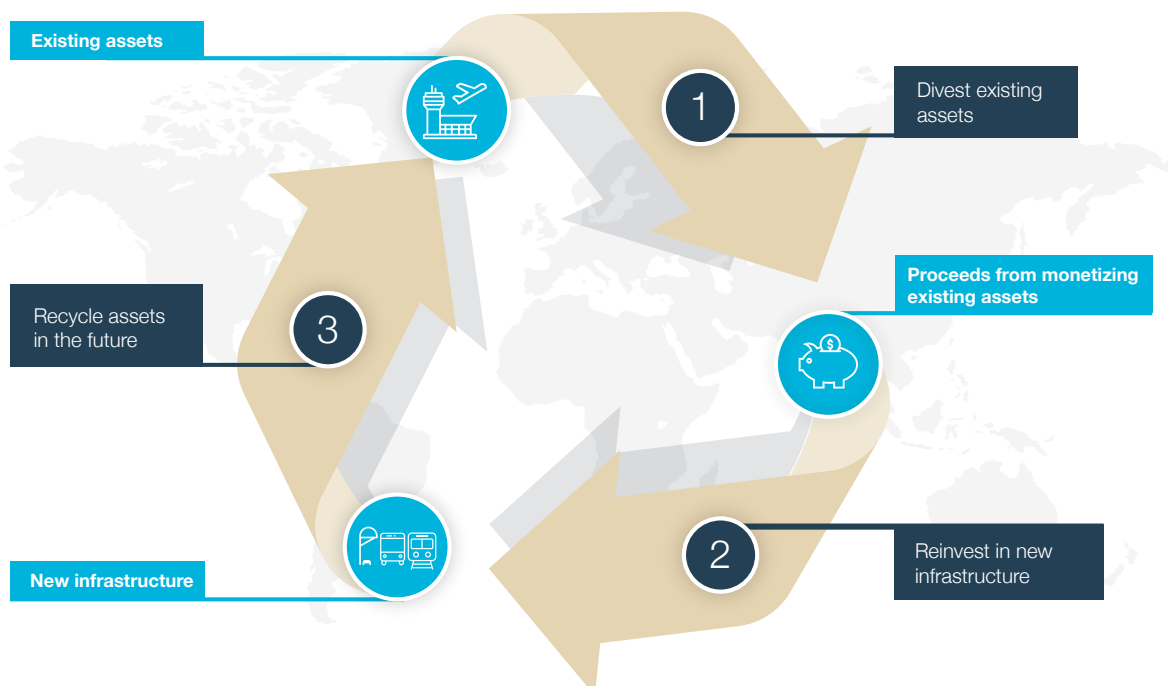
An infrastructure asset recycling strategy described here goes beyond current practices, and combines these two activities together into a long-term view and strategic assessment of:

- The capital value tied up in existing infrastructure assets on the public balance sheet; and
- The potential benefits to be obtained by monetizing these assets and directly reinvesting the capital proceeds to create additional or improve existing infrastructure

This process recycles previous taxpayer’s funds that have been locked up in older assets to pay for new or renewed assets to meet the demand of future generations. This avoids the need to continually raise taxes or increase borrowing and debt levels. The population retains access to the public services and benefits provided by the older assets, but now also gains from additional or improved services and benefits provided from re-investment in new and/or improved infrastructure, as illustrated in Figure 7.



Figure 7: The infrastructure asset recycling process



Source: Authors

## Step 1 – Divest existing assets

There are different degrees of divestment possible and each government should follow a process to choose which one best suits their objectives for their jurisdiction and assets. The four main options to divest existing assets are:

- **Temporary ownership**  
Full ownership of the asset can be divested temporarily through a lease/concession agreement with a defined period, for example of 30, 50 or 100 years.
- **Partial ownership**  
A partial equity stake in a public asset is divested on a permanent basis, for example 49% of ownership.
- **Temporary-partial ownership**  
A temporary-partial ownership is a combination of the above, for example under a shared ownership structure but on a temporary basis.
- **Full ownership**  
Full ownership is transferred to the private sector on a permanent basis, which is also known as privatization.

In asset recycling, the most popular options for divesting assets are temporary and partial ownerships through a lease and concession agreement. This allows governments or public sector organizations to maintain a direct stake in the asset as a major equity shareholder, draft an agreement with safeguard clauses to protect service levels, and allow governments to get the full ownership of the asset back in the future.

Meanwhile, the private party takes full responsibility for operating the asset, assuming all or most commercial risks, and guaranteeing a level of service for the right to collect user fees. See Box 2.

### Box 2: The Poles and Wires Divestment Programme – New South Wales and Australia

The state of New South Wales' (NSW) Poles and Wires Divestment Programme was completed in 2017 with the successful leasing of electricity network assets Ausgrid, Endeavour Energy and Transgrid to private consortiums. The consortiums include, and often were led by, local pension funds, also known as superannuation or “super”, such as:

- AustralianSuper: The largest pension fund in Australia.
- IFM Investors: A fund management company owned by 29 Australian pension funds that invests in infrastructure on their behalf.
- Hastings: A portfolio manager for the Utilities Trust of Australia.
- AMP Capital: An investment manager on behalf of REST Industry Super (Retail Employees Superannuation Trust).

The programme also attracted more than A\$34 billion<sup>32</sup> in private capital investment and raised A\$23 billion<sup>33</sup> in net capital proceeds (after clearing debt attached to the assets) to directly finance new infrastructure in NSW, under its Rebuilding NSW' infrastructure plan. Some highlights from the infrastructure plan include urban projects such as the Sydney Metro project, Westconnex Highways project, Parramatta Light Rail, and also social infrastructure projects including A\$1 billion in school upgrades, A\$1 billion in healthcare and A\$1.5 billion in culture and sport.<sup>34</sup>

The NSW government divested these assets through a mixture of partial and temporary ownership agreements, for example the 99-year lease and concession agreement for 50.4% equity stake in Ausgrid. Under these agreements the NSW government will:

- Have an ongoing role as the lessor of the business and as an investor;
- Continue its role as licensor; and
- Continue its role as safety and reliability regulator<sup>35</sup>.

The NSW government also retained its majority ownership through 51% of the overall state's electricity network, with equity holdings in Essential Energy (100 %), Ausgrid (49.6 %) and Endeavour Energy (49.6 %).

The networks will continue to be regulated by the Australian Energy Regulator, which determines the network charges. As part of the concession agreements, the total network charges from the private consortium will need be lower in 2019 than they were in 2014, as per the Electricity Prices Guarantee that was included in the transaction as a result of the Australian Energy Regulators decision to cut power prices by 5% to 12%. Some additional safeguards implemented in the agreements include:

- Operation and control is to be undertaken solely from Australia and foreign consortium members will retain an interest of no more than 50%;
- Half of the board, including an independent chair and director, must be Australian citizens and residents;
- Five-year job guarantees for workers, including leave entitlements and superannuation accrued while working for the state-run networks, a condition of the electricity privatization legislation passing the NSW Parliament <sup>36</sup>, and;
- All transactions need to receive regulatory clearances from the Foreign Investment Review Board, the Australian Competition and Consumer Commission, the Australian Taxation Office and the Federal Treasurer.



## Step 2 – Reinvest in new infrastructure

The second phase of asset recycling is to reinvest the capital proceeds from divesting existing assets into other strategic and valuable projects. This should aim to distribute the maximum amount of benefits possible to the broader community and taxpayers, to whom the divested assets belonged to.

Two strategies are possible. One is to reinvest in assets that have the same economic value as the assets divested, while the other gives more weight to the needs of the population even if new infrastructure does not generate cash flows.

### Strategy 1 – Maintain the monetary value of the governments' infrastructure capital

This strategy will promote investing in economic infrastructure: infrastructure systems and assets that enable and promote economic activity, productivity and connectivity at national and regional levels. Examples of economic infrastructure include highways, rail, airports, seaports, electricity, telecommunications, and water.

Economic infrastructure typically involves assets with user charges. Because it directly generates cash flows, this infrastructure is more likely to reach the same or higher value as the assets divested. These assets allow governments to replace older sources of revenues from divested assets with new sources of revenues, and provide financial returns to the governments' operational budget and public balance sheet.

They are also of greater interest to the market, and offer more opportunities for future monetization, providing a sustainable asset recycling cycle for governments. A reinvestment strategy that allocates a large and majority portion of the capital proceeds into these types of assets has the potential to create a new valuable capital stock of infrastructure that could be recycled in the future. This strategy presumes that the private sector overprices the political, demand and construction risks, and is also ready to pay more for operating assets than the government's book value.

### Strategy 2 – Reinvest to maximize both social and economic value based on populations' needs

The second strategy is to reinvest in infrastructure most needed from a social, environmental and economic value. This means the proceeds from divestment will also go to social infrastructure, which includes assets that fund social services. These social services include schools, hospitals, elderly care homes, sports facilities, prisons, courthouses, and community housing.

Social infrastructure projects sit high on the political agenda and will attract high levels of support, which is important for implementing an asset recycling programme in infrastructure. These projects often find it difficult to be earmarked for funding by government budgets and it is recommended that they be allocated a fair portion of the proceeds. When redirecting proceeds to these types of projects, it is important for governments to identify and secure their long-term funding, usually from tax proceeds.



It is also important to consider geographic areas outside of the major cities and trade corridors within a country or at a regional level. This rural infrastructure supports smaller towns and communities that can face difficulty competing for budget allocations due to the increased pressures of urbanization. The development of a rural infrastructure programme, which bundles prioritized projects to address both economic and social infrastructure in these areas, can facilitate sharing benefits with the wider community and attracting further levels of support.

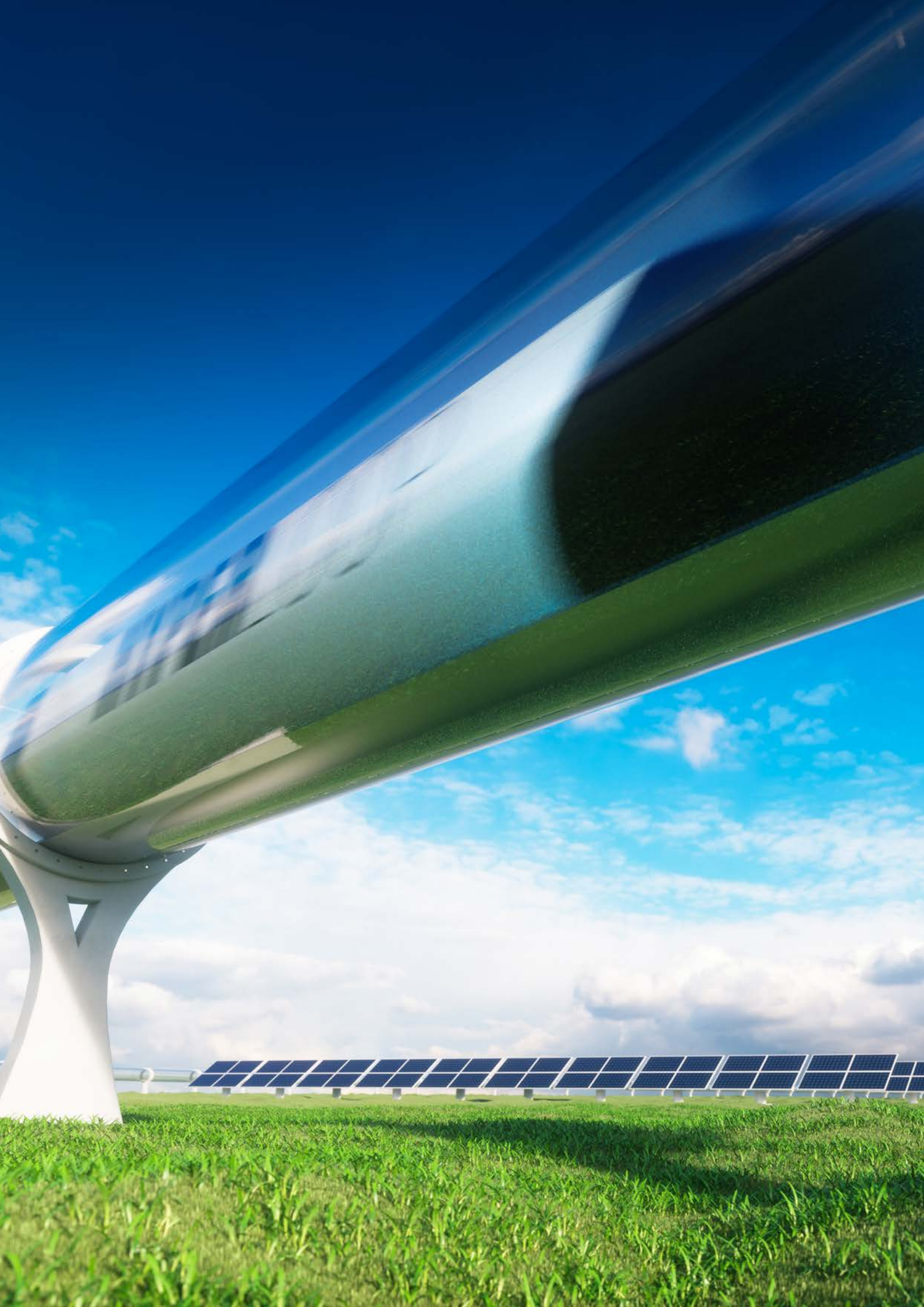
To attract private investment to support the delivery of social and rural infrastructure projects, governments need to pass legislation guaranteeing the long-term funding through availability payments, which might run the risk of not being sustainably funded. Using the capital proceeds to deliver this infrastructure overcomes this issue. The downside, however, is that these assets typically do not provide future opportunities to recycle capital and deliver more infrastructure.<sup>37</sup>

### Reinvestment methods

Once the reinvestment strategy is agreed upon there are several routes for governments to procure the projects and deliver the proposed benefits. The procurement method will depend heavily on the type, scale and complexity of the project, as well as the ability of the public sector to handle civil works contracts efficiently. These options include:

- **Traditional procurement.** An example is design and build contracts. The government provides direct public finance using the capital proceeds and also bears the risk associated with managing the delivery of greenfield projects, such as construction delays and patronage forecasts. This is an appropriate choice for mature governments with an in-house capability to plan and procure engineering and construction projects.

- **Joint venture.** Governments may choose to continue a partnership with specialist long-term investors and enter directly into a joint venture for a number of similar greenfield infrastructure projects from the infrastructure pipeline. The government uses the capital proceeds from divested assets to cover their equity stake in special purpose vehicle (SPV) alongside the private partner. This is an appropriate choice where successful and well-established public-private partnerships exist, such as those between local government and private consortiums led by local pension funds and supported by specialist infrastructure investors.
- **Greenfield Public Private Partnership (PPP) Concession.** Asset recycling can also help to enhance greenfield PPPs by using the capital proceeds to provide guarantees to investors in the form of a standby line of credit, also known as a “liquidity pool”. This will only be made available if agreed upon risks materialized in the greenfield stages, such as insufficient patronage in the early years of operation. This allows the project to achieve a higher investment grade rating category than is possible from the project on a standalone basis.<sup>38</sup> This can be particularly useful in emerging markets where there can be perceived higher political risks by investors.



## Step 3 – Recycle assets in the future

Governments might want to recycle newly built assets in the future. This will more likely happen if some of the proceeds are reinvested into economic infrastructure that are attractive to the market once built and in operation.

In this case governments can consider the strategy of Build Now, Divest Later, whereby governments look to use public capital to seed greenfield infrastructure project development by initiating and funding project development to a point where they are either no longer comfortable with the management of risk or alternatively they may choose to divest (temporally or partially) from the project and reinvest the proceeds towards developing further projects in the pipeline. An example is provided in Box 3.

This strategy is mainly built on the traditional public procurement routes, such as design and build contracts, and can be profitable only if the government has the capabilities to manage early project lifecycle stages better than the private sector. By divesting later on in the project lifecycle, such as in the early years of operations, the government can attract better valuations from investors

that are seeking low-risk and long-term inflation-hedged investments, such as pension funds, thus generating better returns for their infrastructure funds to finance future projects.

Alternatively, governments may choose to recycle assets once they have been transferred to public ownership from greenfield public-private partnership concessions or in joint ventures the government has the option to divest its equity stake. In all cases, an asset recycling strategy focuses on reusing the capital proceeds from divested assets to provide new infrastructure for future population needs.

Ultimately, each jurisdiction will need to strike its own balance to determine how to maximize value and distribute the benefits to the population as efficiently and effectively as possible.

### Box 3: A build now divest later example from the Sydney Motorway Corporation and the WestConnex Motorway Project

The A\$16.8 billion, 33km WestConnex Motorway Project is an example of the New South Wales (NSW) government using a build now divest later approach. The NSW government planned to retain 100% ownership until construction is complete to maximize the sale price for future sell-down of their equity stake. The initial finance was raised from a mixture of loans from the private sector, state and federal governments, as well as capital proceeds from asset recycling collected in the Restart NSW, which is a state infrastructure fund. The project was split into three sections and the plan is to divest each section of the motorway as construction is completed.

The key elements of this approach include:

- Reinvestment of capital proceeds from asset recycling;
- A state entity holding equity in the special purpose vehicles (SPV) created to deliver the project;
- The state acting as a “contract aggregator” and taking the lead role on structuring and procurement;
- Limited-recourse private sector debt finance against future toll revenues to fund construction costs, making it self-supporting and therefore without government guarantee; and
- Retaining flexibility for the state to progressively sell down equity in the project at appropriate points in time to optimize value.<sup>39</sup>

To facilitate this approach, separate project entities are being established for the delivery of each section of the WestConnex. These are wholly owned subsidiaries of the SPV and will be responsible for holding the long-term toll concession for their respective stage during the project.

In May 2017, the NSW government announced its intention to divest 51% to 100% of the SPV to investors.<sup>40</sup> It is believed that the move was to boost the sale price because of the high level of interest from large investors at current low interest rates. The money raised from the sale will then be used to fund the final stage of the motorway, which is due for completion in 2023 and will cost more than \$7 billion to construct.<sup>41</sup>

## Misunderstandings about asset recycling

Asset recycling in infrastructure has received more attention in recent years, but a number of misunderstandings have been observed, impeding its development as an effective, alternate option to finance infrastructure. The asset recycling concept, beyond its apparent simplicity, requires a very careful communication strategy and systematic plan, and execution on the part of government to ensure its success.

Asset recycling engages a large variety of stakeholders, who typically want to know the answers to the questions below.

### Is asset recycling the same as privatization?

Privatization means selling an asset to a private owner. Contrary to privatization, asset recycling has two steps: (1) Monetizing an existing asset or assets and (2) Reinvesting the proceeds into new infrastructure.

The two steps allow for another vision than simply selling one asset (a transaction), and have a different impact on government balance sheets because there is reinvestment into new assets. In addition, the first step does not have to be the full sale of an asset to the private sector. In fact, most of the time, it will be the lease of the operation side of an asset for a limited period of time, with additional safeguards in the contract regarding the value of user fees/ payments by the government and their evolution through time, as well as the level of service expected from the operator.

### Does asset recycling mean only profits will count?

Asset recycling aims to maximize the overall value. The value does not have to be based on money alone, and the government can also consider social and environmental priorities when deciding on the terms of the contract for assets it will lease to private actors, and when choosing which new projects to build with the proceeds from the lease. In the NSW example (see Box 5), the proceeds from divesting existing assets were enough to build both comparable revenue-generating assets and social infrastructure.

Assets leased to the private sector usually include regulation or a contract clause limiting the user fees or profits of the private actors, as well as requirements in terms of levels of service or investment in maintenance.

### Does asset recycling mean losing control over key assets?

Divesting existing assets can be done in many different ways, of which complete privatization, without any regulation or control from the government is rare. The concession model lets the government define by contract what the operator of the asset can do, thus retaining control of aspects key for the public. Selling shares in a public company can also leave control to the government if it stays a majority shareholder.

Because infrastructure assets attract pension funds, especially local ones, they keep a partial control of the assets through the local pension fund board. Also, with them as investors in infrastructure, citizens benefit from the

asset twice, as users and investors through their pension plans.

### Are you selling off the public silverware? Are assets sold better than the ones being built?

A worry is that the private sector is only interested in the infrastructure that is most profitable and that the government will lose by leaving these assets to the private sector. However, when these assets are leased through a bidding process, the government will get the equivalent of the future cash flows from these assets. The government might even make a profit because investors are willing to pay a premium for an investment that better matches their risk-return target compared to other assets on the market.

This question also refers to whether the assets in which the capital would be redirected are of less value than the ones leased. If value refers only to the sum of future cash flows, the government can choose to prioritize commercial assets with similar cash flows or value to private investors. However, value for the public is larger than the stream of cash flows. If the source of funding for new assets is secure in the government's budget, investing in social infrastructure could be as valuable to the population.

### Is asset recycling funding or financing?

Asset recycling is often considered funding instead of financing because the capital for new projects does not increase the sovereign debt and comes with none of the conditions attached to a loan. It also instantly brings more capital to the government's balance sheet.

However, when divesting an asset, the government gets the equivalent now of the value of future streams of revenue from this asset. Unless this capital is used for the whole lifecycle of a new asset (construction, maintenance and operations), the government will still need to secure future funding for new assets, ideally through inclusive user fees.

### Is asset recycling a gift to the private sector? How does it benefit the public?

If the divesting process is well handled and assets are attractive to private investors because of their risk-return preferences, the government can get a premium on the divestiture of its assets. When this money is invested in new infrastructure that could not have been financed otherwise, the population can benefit from a higher level of service.





## Will asset recycling decrease government revenues?

The government does forego full future revenues from the asset (or commit to make future payments), but it gets the equivalent of these future payments now. Therefore, the government should reinvest this capital, considering it might need to make up for fewer revenues in the future.

It is important to note that the government will lease or sell at a high premium, which should cover new investments in both economic and social infrastructure projects. In the case of investments in assets paid by user fees, the

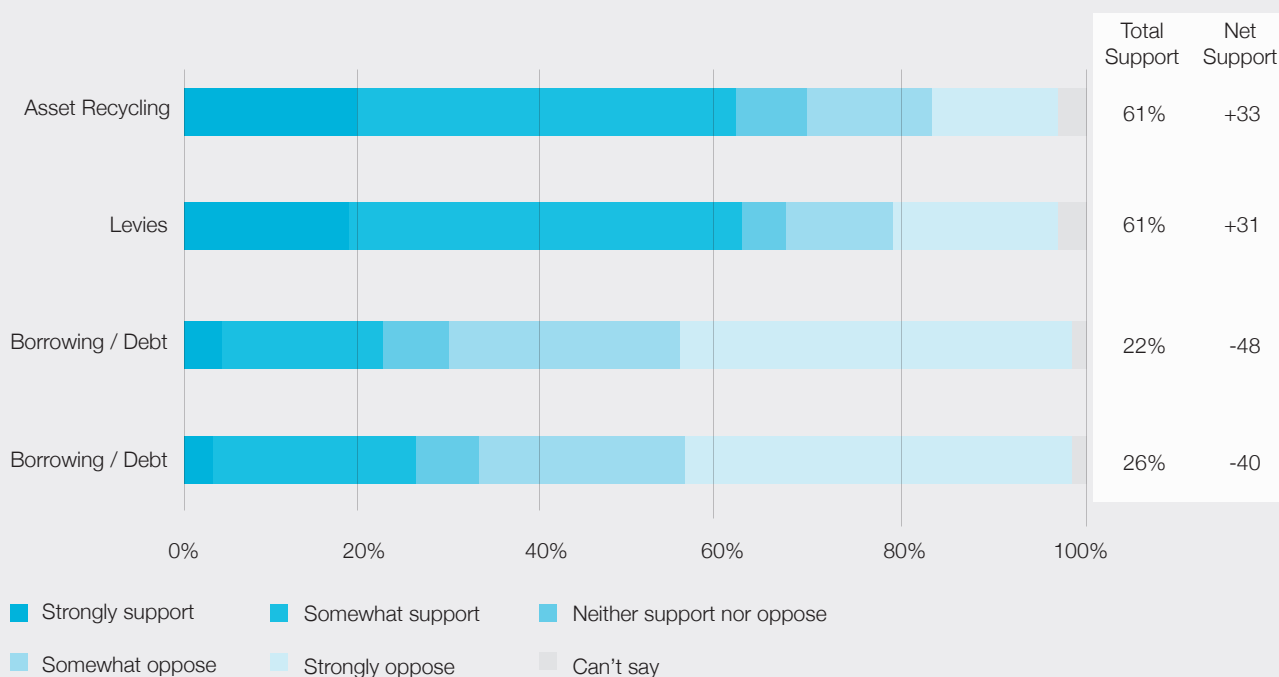
government might end up receiving more revenues in the future. But even if the government invests in some social infrastructure, the tax flow generated by the creation of such infrastructure and the cash flow generated through ancillary services might create a virtuous circle for the asset recycling concept.

Once asset recycling is explained to community members, research suggests that it can receive the highest levels of support among other options for financing infrastructure, as demonstrated in Box 4.

### Box 4: Public awareness and opinion research on asset recycling

The awareness of asset recycling to finance infrastructure projects is quite low among the public community. Once asset recycling was explained, it received a very strong level of support. Whereas, there were strong levels of opposition to more traditional forms of financing infrastructure such as increasing tax and borrowing/public debt. This finding, illustrated in Figure 8, is from research carried out in February 2017 in the State of Queensland, Australia.

Figure 8: Public opinion research on awareness of and attitudes towards asset recycling



Source: Infrastructure Partnerships Australia

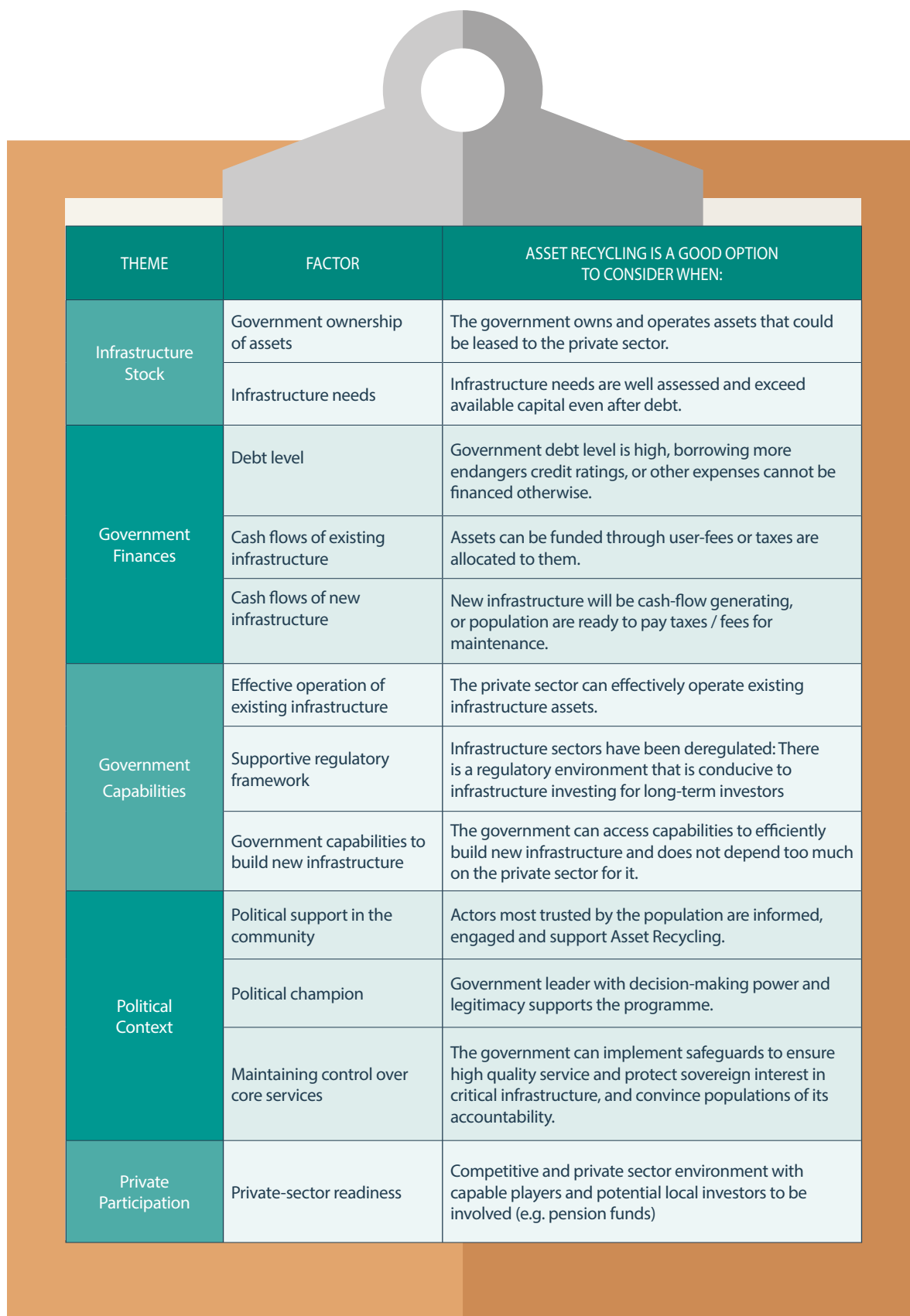
This research shows that the political argument and public support for asset recycling is there to be won. The respondents also strongly agreed with the following statements with regards to asset recycling in infrastructure:

- More people can be employed by reinvesting the proceeds of asset recycling into new infrastructure development.
- Asset recycling allows the development of new infrastructure without having to borrow more money, increase state debt or introduce new taxes, levies or tolls.
- Protections can ensure funds raised from asset recycling are only spent on new infrastructure projects
- Asset recycling can enable investment in new income-generating assets, ensuring continued revenue for Queensland.
- Protections can ensure limits on foreign ownership of essential infrastructure.
- Through long-term leasing, tight controls can be maintained by government over the cost and delivery of services.
- Through their super funds, Australians can collectively invest in former state assets, enabling ownership of these assets to continue.
- The lease or sale of state assets could make money, particularly on older, mature assets, which would otherwise cost more money and lose value over time.

## Checklist for considering an asset recycling strategy

Before embarking on an asset recycling strategy, governments should assess the appropriateness and feasibility of the programme for a specific jurisdiction. The checklist in Figure 9 identifies some important points to consider.

Figure 9: A checklist for governments considering asset recycling



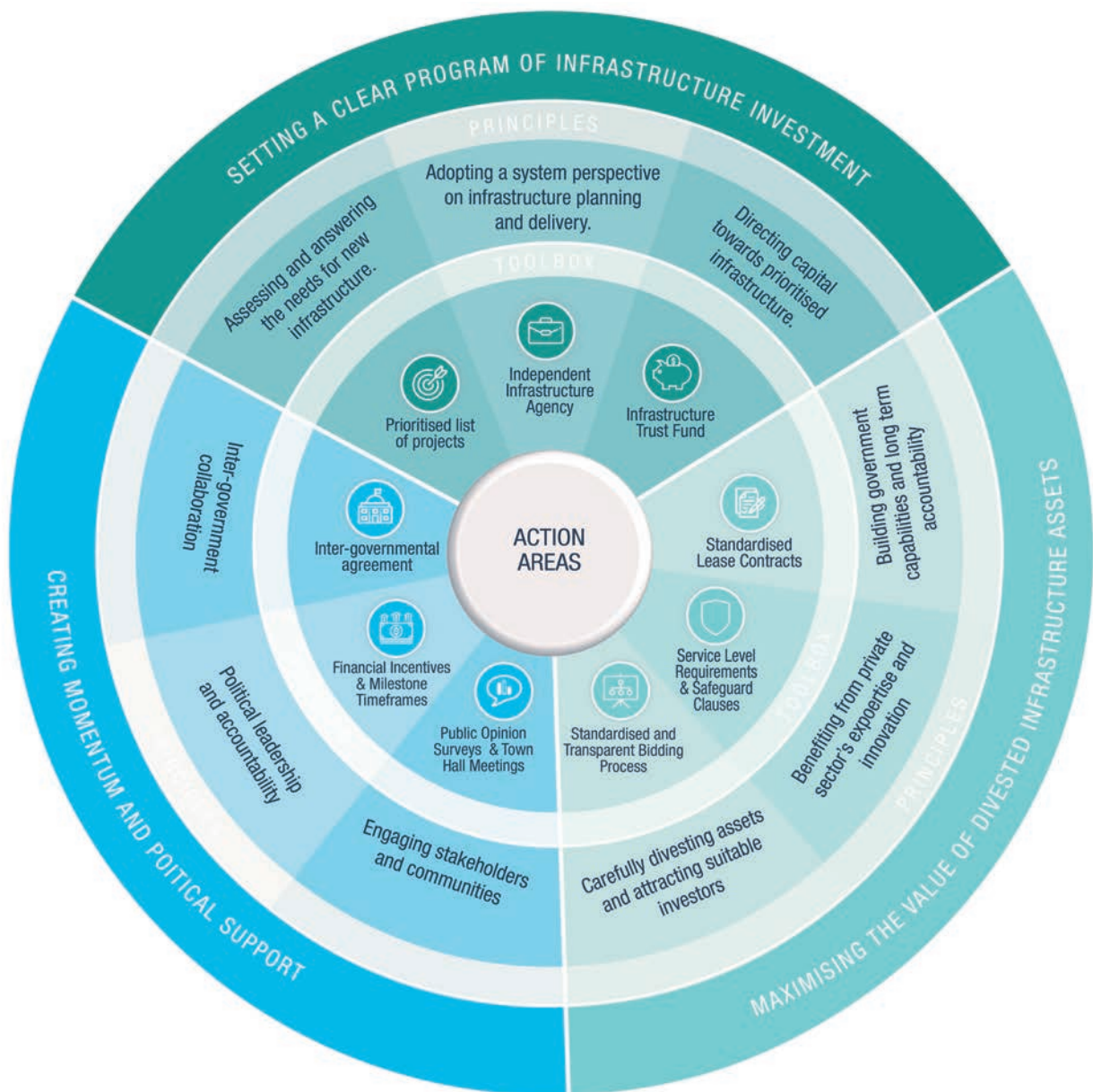
THEME	FACTOR	ASSET RECYCLING IS A GOOD OPTION TO CONSIDER WHEN:
Infrastructure Stock	Government ownership of assets	The government owns and operates assets that could be leased to the private sector.
	Infrastructure needs	Infrastructure needs are well assessed and exceed available capital even after debt.
Government Finances	Debt level	Government debt level is high, borrowing more endangers credit ratings, or other expenses cannot be financed otherwise.
	Cash flows of existing infrastructure	Assets can be funded through user-fees or taxes are allocated to them.
	Cash flows of new infrastructure	New infrastructure will be cash-flow generating, or population are ready to pay taxes / fees for maintenance.
Government Capabilities	Effective operation of existing infrastructure	The private sector can effectively operate existing infrastructure assets.
	Supportive regulatory framework	Infrastructure sectors have been deregulated: There is a regulatory environment that is conducive to infrastructure investing for long-term investors
	Government capabilities to build new infrastructure	The government can access capabilities to efficiently build new infrastructure and does not depend too much on the private sector for it.
Political Context	Political support in the community	Actors most trusted by the population are informed, engaged and support Asset Recycling.
	Political champion	Government leader with decision-making power and legitimacy supports the programme.
	Maintaining control over core services	The government can implement safeguards to ensure high quality service and protect sovereign interest in critical infrastructure, and convince populations of its accountability.
Private Participation	Private-sector readiness	Competitive and private sector environment with capable players and potential local investors to be involved (e.g. pension funds)

Source: Authors

# Implementing an infrastructure asset recycling programme

Inspired by best practice examples, this report has identified nine principles organized in three key action areas (see Figure 10) that have been successfully employed by governments to make the most of an infrastructure asset recycling strategy. The tools that support these principles and provide examples of how they have been used are also highlighted.

Figure 10: A framework for implementing infrastructure asset recycling



Source: Authors

## Setting a clear programme of infrastructure investment

### Principle one: Assessing and answering the needs for new infrastructure

The main goal of asset recycling is to provide better infrastructure services to the population. Therefore, the first step should be to undertake an assessment of the current capacity, condition and performance of existing infrastructure sectors as well as the drivers of future infrastructure demand. These drivers include population growth and urbanization. This will identify current and future stress points and enable a jurisdiction to prepare and prioritize an investment programme to address them.

The investment programme should explore innovative solutions, both in terms of the type of infrastructure to be renovated or built and ways to deliver it efficiently and effectively. The programme should also include a funding and financing strategy, evaluating the options for financing the cost of building new infrastructure, as well as the sources of funding for its operation and maintenance phase.

Having this clear investment picture in place prior to divesting assets will enable the government to effectively demonstrate the value and benefits of an asset recycling programme to the community and taxpayers.

### Principle two: Adopting a system-wide perspective on infrastructure planning and delivery

Asset recycling is a strategy of value maximization based on a systematic evaluation of both a territory's assets and its needs. Therefore, it is likely to require a shift in how governments have managed their infrastructure planning and operation, especially if infrastructure planning responsibilities are shared by different departments.

Governments can benefit from a system-wide perspective to infrastructure to focus on the needs and services

instead of assets per se. This new perspective should transcend the traditional regional and functional boundaries set by the bureaucracy of the organization to envision innovative solutions to problems and provide more value for the capital invested, rather than thinking in terms of infrastructure assets.

### Principle three: Directing capital towards prioritized infrastructure

The aim of an asset recycling programme is to guarantee the use of the capital proceeds from divested infrastructure assets for new and needed infrastructure. A structure should be created to provide the population with a guarantee that this capital will be used to finance the construction of new infrastructure and deliver them the benefits. This structure should be able to withstand any political or economic changes.

#### Toolbox



**Prioritized list of projects.** Building and sharing a pipeline of projects and engaging stakeholders and communities around this list and the criteria used to build it is an important part of creating the population's support.<sup>42</sup>



**Independent infrastructure agency.** Using a dedicated infrastructure agency or team that can cross the boundaries of government bureaucracy and can help support the process of rethinking infrastructure needs and planning is important. Using business cases for projects to demonstrate value for money can support such a new vision and can enable long-term and integrated planning for infrastructure.



**Infrastructure trust fund.** Creating a trust fund is an effective way to earmark funds and allow the gradual drawdown of cash over several years depending on the new project's implementation stage. This type of fund clearly demonstrates commitment, accountability and transparency to the public, and is an effective way to establish trust and build support. The infrastructure trust fund should have strong governance, independent reporting, and well-defined key performance indicators validated by an independent audit to ensure good performance.


The same independent infrastructure agency in charge of establishing the list of prioritized projects could oversee the management of the fund. This would protect projects from the risk that a political change in government takes the capital away. An example of this is provided in Box 5.

### Box 5: New South Wales (NSW) Infrastructure Agency and Infrastructure Fund, Australia

In 2011 the NSW government established an independent infrastructure agency, known as Infrastructure NSW (see Figure 11), which has the mandate to advise the NSW government on:

- Priorities for investment in major state infrastructure over A\$100 million.
- Improving capital use to get better performance of existing state assets.
- Ensuring value for money by assuring the planning and delivery of future state assets.
- Ensuring that decisions about state infrastructure projects are informed by expert professional analysis and advice.<sup>43</sup>

**Figure 11: Core functions and activities of the NSW Infrastructure Agency and Infrastructure Fund**

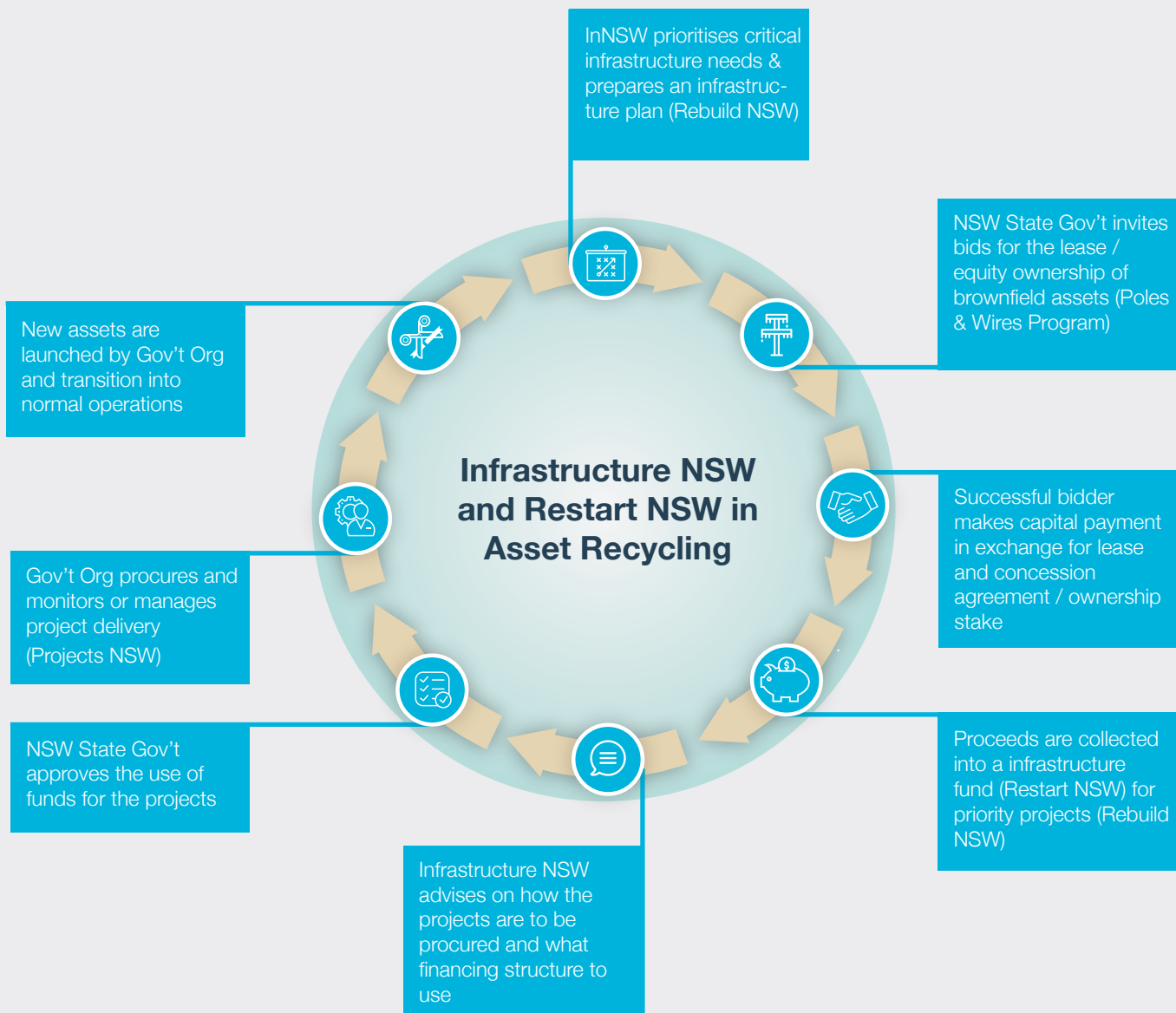
 <p>EXPERT ADVICE</p>	<ul style="list-style-type: none"> <li>• Independent and strategic advice to the NSW Government</li> <li>• Preparing the 20-year infrastructure investment plan every five years</li> <li>• Compiling the annual five year Prioritised Infrastructure Plan</li> </ul>
 <p>INFRASTRUCTURE FUND</p>	<ul style="list-style-type: none"> <li>• Independent assessment and recommendations for priority projects to receive immediate funding and delivery through the NSW Government's dedicated infrastructure fund (RestartNSW)</li> </ul>
 <p>PROJECT ASSURANCE</p>	<ul style="list-style-type: none"> <li>• Monitoring NSW's overall infrastructure program</li> <li>• Carrying out independent reviews of projects ensuring the State's infrastructure projects are being effectively developed and delivered on time and on budget, and in accordance with the NSW Government's objectives</li> </ul>
 <p>PROJECT MANAGEMENT</p>	<ul style="list-style-type: none"> <li>• A specialist project management unit (ProjectsNSW) who manages the procurement and delivery of nominated priority projects.</li> </ul>

Source: Infrastructure NSW<sup>44</sup>

The NSW government set up a new infrastructure fund, Restart NSW, to earmark capital for its prioritized infrastructure programme, Rebuilding NSW. This programme was based on Infrastructure NSW's list of priority projects that was created to address critical infrastructure needs aimed to reduce congestion, support population growth and increase productivity across Sydney and regional NSW.

The bulk of the programme was to be funded by capital proceeds from its asset recycling programme, which mainly involved the long-term, 99-year lease of 49% of the state's existing electricity network assets, known as Poles and Wires. The fund was established to guarantee that the capital was to be used for new infrastructure projects only, protecting it from use for other purposes, as illustrated in Figure 12.

Figure 12: Overview of Infrastructure NSW and Restart NSW in asset recycling



Source: Authors

Complete transparency and traceability is provided to the public about the amount of capital proceeds raised and spent in the fund by the NSW treasurer in the regular state budget updates, which also provide full details on all individual projects that are earmarked to receive funding.

Since its creation, cash inflows deposited into the fund have totalled A\$ 29.8 billion.<sup>45</sup> From this, A\$ 20.2 billion has been allocated to the Rebuilding NSW infrastructure programme and a surplus of A\$ 9.8 billion has been reserved and committed to other priority infrastructure projects.

## Maximizing the value of divested infrastructure assets

A key pillar of asset recycling is divesting assets that may be worth more to the private sector than to the government. This can be true because the private sector can operate the asset more efficiently than the government, bring a better level of service, or because the investment in the asset is more attractive than other comparable investments on the market.

First, a regulatory framework allowing the engagement of private actors in infrastructure is essential. This should

include robust and transparent operational and financial performance reporting requirements of the assets and companies involved. The ability of governments and regulatory bodies to ensure the divested asset continues to provide a service to the population as good or better is a critical factor to the success of an asset recycling strategy. It also enables communication of benefits drawn from evidence-based reporting.

Second, governments need to define which assets could be leased and operated by the private sector. In general, engaging private actors can be considered if:

- The asset is not considered a core public service where the presence of the private sector could endanger the safety or values of the community and/or country.
- There is evidence of improved service delivery under private sector ownership and operations, using asset performance data and comparisons with leading industry benchmarks. (See Box 6.)
- There is a positive net economic benefit from divesting the asset to reinvest the capital proceeds towards delivering additional critical infrastructure. This analysis should also consider the costs of not proactively addressing critical infrastructure needs of the population.

To find assets that could be leased and operated by the private sector, the government could focus on commercial assets with track records of good operation by the private sector, such as airports or transmission lines. However, there is space for innovation based on private investors'

interest, for example, the redevelopment of public property or the lease of land as part of an infrastructure asset recycling programme.

In the United Kingdom, the government is selling ageing and ineffective inner city prison infrastructure to private developers, and using the capital proceeds to pay for the costs to build nine new and modern correctional facilities. The urban regeneration of the existing prison precincts is providing 3,000 new and much-needed homes, improving streetscapes and creating opportunity for people to own a home that is well serviced by amenities.<sup>46</sup>

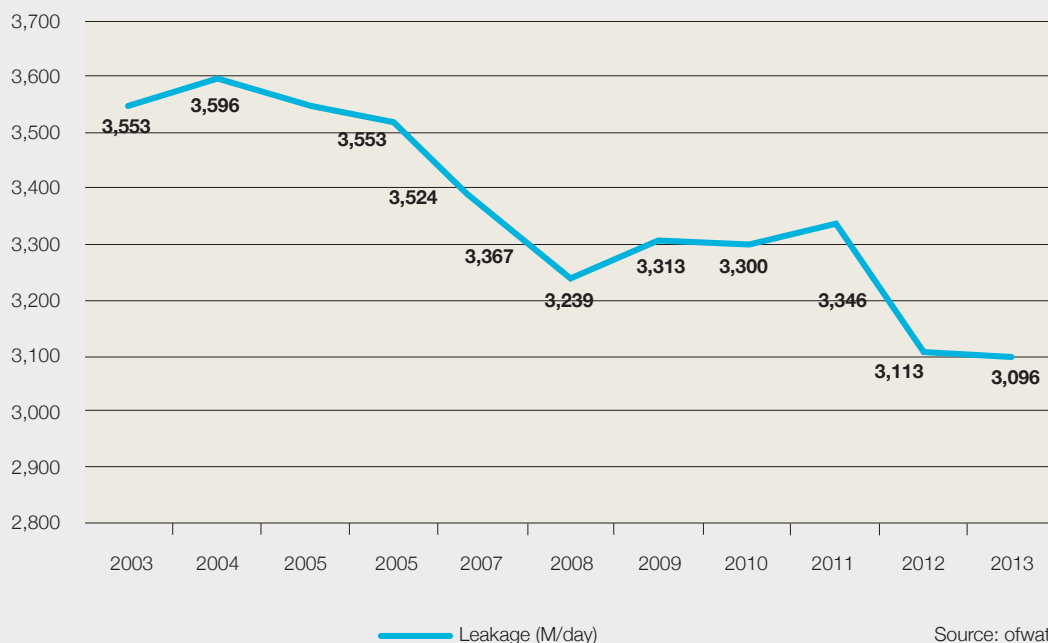
Governments also must determine the preferred type and mix of private actors deemed suitable for engagement over these assets. For example, what are the capital sources? Are they local and/or foreign ownership, specialist operators, pension funds or other private capital sources? Consortiums led by local pension funds combined with specialist infrastructure investors and operators would make the proposal attractive to the community.

### Box 6: The impact of private infrastructure investors on service delivery levels in the United Kingdom's infrastructure sectors

There is limited direct analysis of the impact of investors on infrastructure as a sector. However, it is possible to look at specific sectors where private investment is most developed. The UK's airports, energy distributors, and water and sewage companies have undergone a pronounced shift in ownership to specialist private investors over the past decade. An analysis<sup>47</sup> of these sectors reveals:

- A reduction in annual water leakage by 13% annually – equivalent to the entire consumption of Wales (see Figure 13);
- Reductions in electricity supply interruptions by 29% and length of average outage by 39%; and
- High investment levels. Every year between 2004 and 2014, water companies and electricity distribution network operators invested more per customer than was generated in profits.

Figure 13: Total water leakage across England and Wales (million litres per day - M/day)



These improvements were attributed to the following factors created by the change in ownership:

- A long-term perspective on the asset, with focus on performance and value creation;
- A focus on the underlying infrastructure, rather than ancillary commercial businesses;
- The desire to work with regulators for the long-term benefit of consumers; and
- An alignment of management incentives with long-term performance.

The analysis<sup>48</sup> concluded that there has been a notable improvement in performance across all major asset classes, which is largely due to the expertise and large capital investment of private investors.





## Principle five: Benefiting from private-sector expertise and innovation

Leasing an existing asset to private partners over long periods will allow them time to invest in operational improvements as well as research and development, which should improve the level of service and overall performance of the asset. To ensure this level of quality is reached at a reasonable price for the user and taxpayers, the government should have processes in place to:

- Attract enough private consortiums with the right experience and track record to benefit from competition in the bidding process;
- Have the right incentives in the contract for the private sector to provide the best value for money; and
- Ensure service level requirements and safeguards are in place and match populations' expectations and daily experiences.

Recent improvements in regulatory frameworks have introduced mechanisms to motivate adopting innovation and sharing cost savings with customers, which allows for reducing fees once privately owned companies have realized significant savings.

This has proven successful in some western European utilities, such as in the United Kingdom.<sup>49</sup> Ofwat, the national water industry regulator, focused on outcomes and implemented a balanced package of risk and reward, allocating risks to the party best able to manage them. Ofwat provided meaningful outcome delivery incentives, both financial and reputational, to deliver the agreed performance commitments. This approach creates an environment where companies are incentivized to provide the best service to customers. By using additional mechanisms such as “efficiency sharing”,<sup>50</sup> it can share future savings from investments with final users, which mitigates the impact on prices.

## Principle six: Building government capabilities and long-term accountability

Asset recycling encourages governments to focus on strengthening capabilities in planning infrastructure, developing the most effective solutions, planning and procuring infrastructure projects, and regulating infrastructure operations and maintenance activities. It also encourages proactive data capture and management of assets on the public balance sheet to maximize value for money to taxpayers.

Asset recycling will also encourage diligent management of the bidding process for divesting public assets. The process is quite complex and benefits from being systematically set up and learning from past and other experiences. As a result, having an agency or authority in charge of managing the process and continuously learning over the long term is the most effective form of governance. Having this entity separate from the government's bureaucracy can help insulate its recommendations from political influence. Staffing it with people with a wide range of public and private experience in infrastructure can also

help to develop in-house capability with diverse areas of expertise, for example legal, financial, engineering, project management, and public relations specialists. This will also create opportunities for innovation.<sup>51</sup>

## Toolbox



**A standardized and transparent bidding process.** A benchmark study of the process and results of comparable sales and concessions can help the design of an effective bidding process and impact the outcome. Managing a standardized, transparent and easily accessible bidding process will attract bidders by reducing uncertainty, giving them confidence to invest time and effort into developing a competitive and quality proposal.



**Service-level requirements and safeguard clauses.** Picking the most effective type of private participation model and crafting a concession agreement with clauses that protect the levels of service for users through key performance indicators and safeguard clauses will be important to the process of successfully divesting assets. Some examples of the clauses that can be enforced in the concession agreements to protect public interests include:<sup>52</sup>

- Operations and Maintenance performance and environmental standards;
- Price guarantees and selection of growth indices;
- Private party excess revenue sharing provisions;
- Post transaction requirements, such as employment guarantees;
- Support for asset capacity expansion and upgrades; and
- Risk of default and/or renegotiation.



**Standardized lease contracts.** Building standardized contract models and processes at the regional or country level could limit the preparation costs for private partners, while allowing the government to preserve the learning from previous or shared experiences by reflecting it in model contracts. This is also an opportunity to accelerate standardization in financial documentation and reporting practices by applying a best-practice framework shared by both the public and private sectors.

## Creating momentum and political support

Having the right processes in place to maximize the value of the programme might not be sufficient to successfully lead asset recycling. There also needs to be momentum to launch, lead and support the programme.

### Principle seven: National programme and incentive to local governments

In cases where most of the infrastructure stock is owned by local governments, the national or federal government can support local efforts by creating national momentum. A national programme should aim to commit local government leaders and provide them with an incentive to exercise the political will to implement an asset recycling programme in their jurisdictions. A national programme should also support the principles, processes and tools described above, notably technical assistance to local governments. It will also incentivize local politicians to act. An example is provided in Box 7.

#### Box 7: The National Partnership Agreement on asset recycling in Australia

Asset recycling was encouraged by the federal government, which in 2014 implemented an intergovernmental agreement – the National Partnership Agreement on asset recycling.<sup>53</sup> The agreement was implemented to assist in addressing state and territory funding constraints that limit their ability to invest in additional economic infrastructure. The aim of the agreement was to contribute to increased investment in productivity-enhancing infrastructure by encouraging the sale or lease of state-owned assets to unlock funds and recycle the capital into additional infrastructure.

Included in the agreement was a financial incentive to state and territory governments seeking to divest assets and use the proceeds for new infrastructure. For any state and/or territory asset that was monetized, the state and/or territory government would receive an additional payment, provided by the Australian Treasury, equivalent to 15% of the proceeds from the sale that were reinvested in new infrastructure projects.

To be eligible for a payment from the A\$5 billion asset recycling Initiative fund, the projects proposed must meet the following criteria:

- They must demonstrate a clear net positive benefit;
- They must enhance long-term productive capacity of the economy; and
- Where possible, they should provide for enhanced private sector involvement in both the funding and financing of the infrastructure

To demonstrate that the project has a net positive benefit, the State or Territory must provide a cost-benefit analysis. For infrastructure projects where the State or Territory is seeking a Commonwealth contribution of A\$100 million or more, Infrastructure Australia (an independent central infrastructure agency) is required to review the cost-benefit analysis for the State or Territory to qualify for payment. Infrastructure Australia provides technical assistance as well as a national perspective, thus improving the linkages between state jurisdictions, and shifting decisions about infrastructure from the traditional ‘bottom-up’ project-by-project and jurisdiction-by-jurisdiction approach to a much broader ‘top-down’ focus linked to national objectives and priorities<sup>54</sup>.

Once qualified the payment was made in two stages, based on the following milestones:

- Fifty per cent when the asset sale process starts and infrastructure planning commences; and
- The remainder on the sale of the asset and start of the infrastructure project.

These milestones were also set against a timeframe, which was 2 years from commencement of the agreement. During 2015 to 2019 this initiative provided A\$ 3.34 billion<sup>55</sup> in payments to States and Territories for infrastructure projects.



### Principle eight: Political leadership and accountability

An asset recycling programme can necessitate changes in existing processes with government and with external stakeholders. Given the complexity of designing and implementing such changes, strong political will to mobilize stakeholders to design and implement such a programme is paramount. Once convinced of the programme's fit with the territory's need, national and local political leaders should campaign for it and be willing to communicate and engage stakeholders and communities.

Public accountability is key. Political leaders should create momentum and demonstrate that they will not interfere with the processes set in place for political reasons. This reduces uncertainty and the risk of using the capital for another cause. The use of the infrastructure fund and independent agency can help build this accountability.

### Principle 9: Engaging stakeholders and communities

Private participation in infrastructure continues to be at the centre of much political and public debate. There are many good and bad examples of private capital investment in infrastructure. These examples are frequently used by various groups to defend each side of the debate, but they do not bring proponents and opponents closer together.

Moving away from ideologies and understanding communities' and stakeholders' concerns by engaging them directly to identify the key fears and threats and how they might be addressed can help tailor the programme to the needs and values of local communities. Mechanisms should be created that encourage the public to engage throughout the whole process. Engaging stakeholders can take several forms.

#### – Understanding

Town hall meetings and surveys help to clarify the main concerns of the population in terms of infrastructure needs and values that should guide the decisions to lease an asset or not. A public survey in NSW prior to Poles and Wires helped the government understand public concerns. (See Box 8.)

#### – Informing

Communicating to the public about the processes and steps taken to make informed decisions and protect the public's interest is paramount. A public opinion survey in Queensland, Australia, showed wide support for the asset recycling programme once its mechanism of divesting to reinvest in new infrastructure was explained. (See Box 8.)

#### – Garnering support

Beyond informing and understanding, the programme should be tailored to the needs and concerns of stakeholders and communities to garner support.

### Toolbox



#### Intergovernmental agreements

An intergovernmental agreement sets out the governance model for central and local governments and enables a collaborative approach to identify infrastructure funding options by using existing state-owned assets. The agreement should clearly define the objectives and expected outcomes, the roles and responsibilities of each party, reporting arrangements, and any financial matters.



#### Financial incentive and milestone timeframes

To motivate and reward the political goodwill and efforts of the local governments and relevant agencies, the central government can propose to contribute additional funding to the state infrastructure plan. This mechanism demonstrates a collaborative commitment to support the intergovernmental agreement and provides further funding to priority infrastructure. The incentives can also be adjustable depending on asset type and their attractiveness, as well as meeting population needs.

Introducing a limited time period can provide focus and improve the likelihood of an immediate and successful outcome. The timeframes need to be mutually agreed by all parties, as some jurisdictions might be more advanced than others, and therefore have an unfair advantage to benefit most from the agreement.



#### Public opinion surveys and town hall meetings

Using mechanisms such as public opinion surveys and town hall meetings can help to identify the public's concerns, as well as their reaction to the rationale set forth by the government and to proposed solutions to their concerns. Adopting a more consultative and collaborative process with the local community at the planning and implementation stages considerably reduces opposition and builds support.

## Box 8: Public engagement in New South Wales, Australia

A public opinion survey<sup>56</sup> was conducted in New South Wales (NSW) in 2014 to collect the views and opinions of the local community prior to the NSW Poles and Wires divestment programme, a plan that initially sought to sell the NSW electricity networks to pay for new infrastructure.

A questionnaire was designed to capture the public's concerns ahead of the divestment process, to identify the drivers opposing the sale of the assets. This was also an opportunity to collect opinions on some alternative options to a full sale, for example asset recycling, leasing or partial equity sell-down. The survey revealed that the major concerns among the population on the sale of the Poles and Wires were the following:

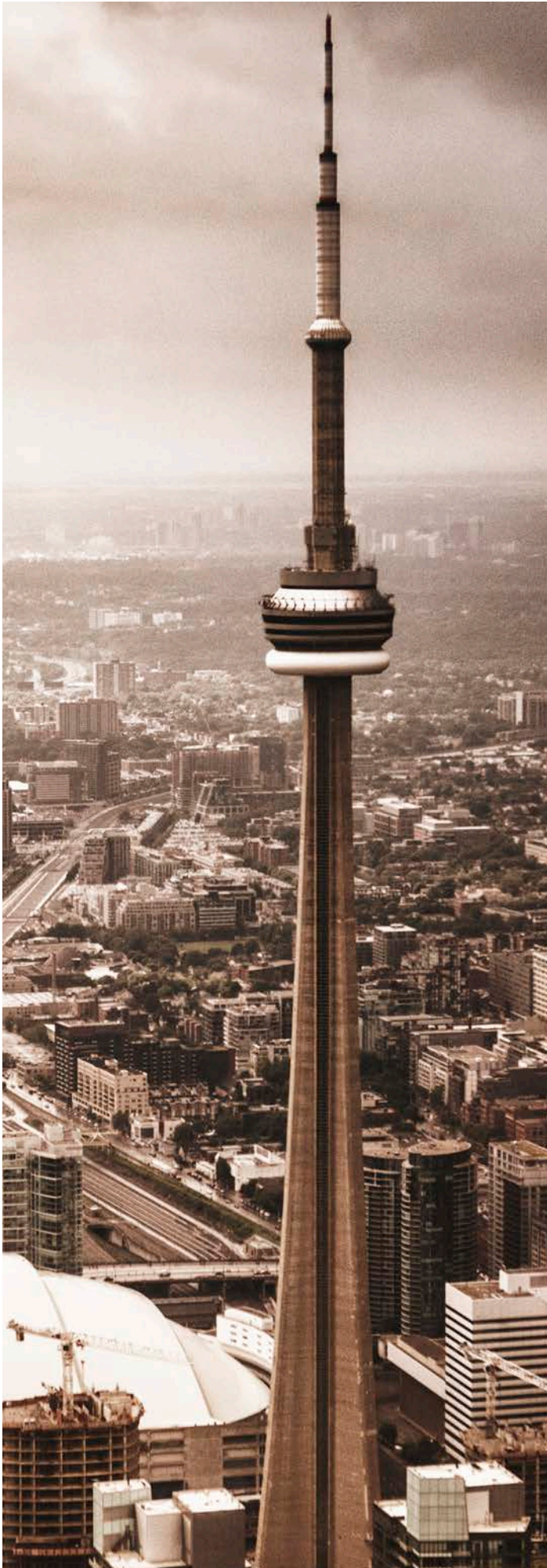
- The impact on prices under private ownership;
- The government needs to maintain control over essential services;
- Private companies only care about profits and shareholders;
- Money (proceeds) will be squandered by government; they cannot be trusted;
- There is a risk of job losses as private companies look for savings;
- Queries about the idea of foreign ownership of state assets; and
- Considering the full asset sales (privatizations), too many and fewer assets will exist for future generations.

In addition to these concerns, the survey also revealed the government would gain significantly increased levels of support from the public if:

- There were concrete benefits to provide a clear trade-off, for example additional infrastructure, which demonstrates value to the community of divesting public assets.
- The government considered alternative options to full asset sales such as temporary and/or partial sales, so that government control and future ownership is still retained.

This understanding of the public's concerns helped the NSW government to tailor a divestment programme, which is highlighted in Box 2.





## The way forward

This report has demonstrated that infrastructure asset recycling has the potential to mobilize increased amounts of private capital through better alignment with pension funds and other long-term investors, which is the most immediate solution to closing the global infrastructure investment gap. Even without facing fiscal constraints, asset recycling can provide benefits to governments, such as more prudent public balance sheet management.<sup>57</sup>

Asset recycling enables governments to redirect capital towards their most critical infrastructure needs, using several innovative mechanisms including temporary-partial ownership to make it more attractive, incentives to align different levels of government and setting up infrastructure funds to protect the transfer of capital and make the process more transparent.

So far, the state of New South Wales has most successfully implemented a complete asset recycling strategy. Some of the concurring factors in New South Wales include:

- Political leadership;
- Infrastructure sectors with supportive regulation for privatization;
- An attractive asset base on public balance sheet for divesting;
- An independent and capable infrastructure agency;
- A dedicated infrastructure fund;
- A well-developed infrastructure plan; and
- Sufficient awareness and support from the population due to existing infrastructure challenges and bottlenecks.

In nearby jurisdictions, notably in the State of Queensland, asset divesting served only to repay government debt, which incurred adverse effects such as downgrades to credit ratings. This did not address the infrastructure needs of the population, which still remain.<sup>58</sup>

Asset recycling will need to adapt to each jurisdiction. Following are some considerations for developed and emerging markets.

## Developed markets

There is potential to replicate the asset recycling recycling success from Australia/NSW into developed and mature markets such as in the Americas, notably in the United States, where infrastructure shortfalls are the largest of any country. The ownership of assets is more often at the municipal level than at state or federal level, with the same principles and recommendations applied. The introduction to asset recycling might be more effective starting at city level.

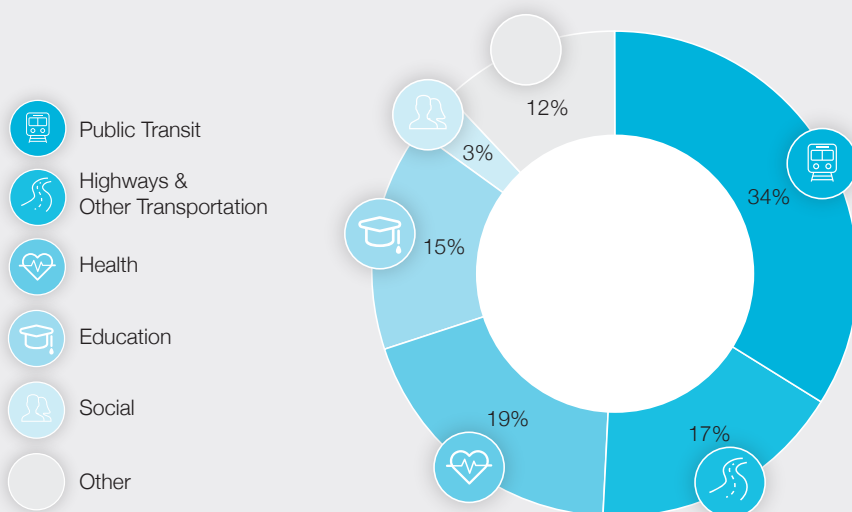
Other markets that might be suitable for implementing asset recycling include the United Kingdom, Italy, Japan or Canada. (See Box 9.) These countries face high levels of public debt, a shortfall in infrastructure investment, and possess a wealth of built and mature operating infrastructure assets.

### Box 9: Assessing the infrastructure stock and planning for infrastructure needs: The example of Infrastructure Ontario, Canada

The Canadian province of Ontario has developed a robust plan to build and renew its infrastructure over the next 10 years. The projects in the plan have been selected based on an infrastructure assessment and evidence linked to factors such as improved service needs, economic impact, relationship to climate change, and benefits to the local community's quality of life.

The priority infrastructure projects are distributed across the province, allowing for the wider community to benefit from the proposed investments in infrastructure. The province plans to invest more than **CDN\$160 billion**, (from 2014) as outlined in Figure 14.

Figure 14: The province of Ontario's 10-year infrastructure plan by sector

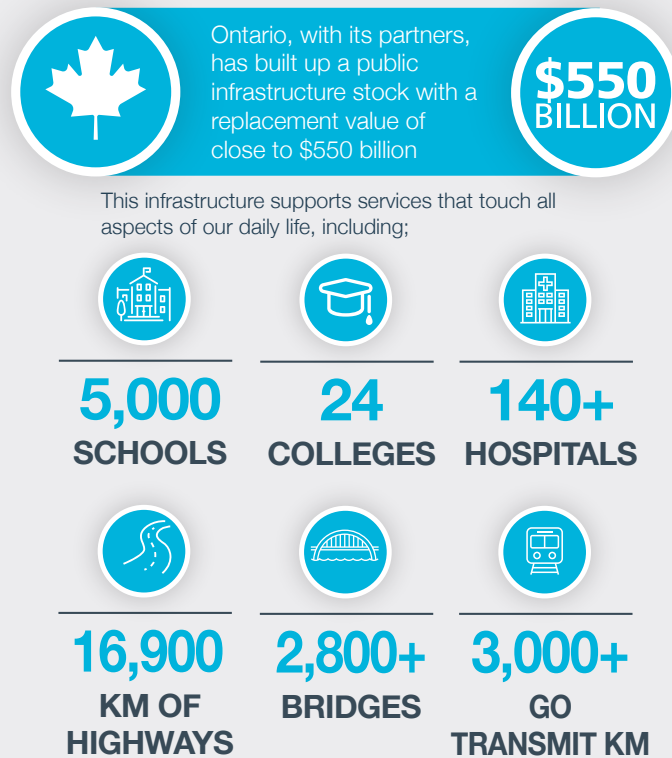


Source: Infrastructure Ontario<sup>59</sup>

The province of Ontario is also served by a large and diverse portfolio of public infrastructure, with a replacement value of close to CDN\$550 billion, more than half the amount of the estimated US\$1 trillion global infrastructure investment gap.

Assets include those that are directly owned by the province by consolidated agencies and broader public sector assets, as summarized in **Figure 15**.

**Figure 15: Estimated public infrastructure stock value in Ontario, Canada**



Source: Infrastructure Ontario

As part of its funding and financing strategy, the government can work with the public sector agencies to explore options such as asset recycling to identify assets on their balance sheets suitable to be divested,<sup>60</sup> and to use the capital proceeds to support the financing and delivery of its 10-year infrastructure plan. This would avoid the need to increase taxes or debt, which is currently at 92% of GDP, as illustrated in Figure 3.

## Emerging markets

In emerging markets, particularly in Asia, public finance with Multilateral Development Banks (MDBs) support can account for more than 70%<sup>61</sup> of all infrastructure investment. Progress in PPP's for Greenfield projects has been slow and the Asia region is facing an estimated shortfall of \$6.1 trillion by 2040 (including SDG's). Governments need to consider all possible financing options to close this financing gap, including an asset recycling strategy programme.

Regulatory and institutional reforms are still needed to make infrastructure more attractive to private investors. A deepening of capital markets<sup>62</sup> will also help channel the region's substantial savings into productive infrastructure investments<sup>63</sup>. For example, local pension funds can take an equity stake in mature operating assets.

Governments in emerging markets may lack the capability to procure and deliver greenfield infrastructure projects. In this case they may look to use the capital proceeds to encourage private investment into greenfield projects by providing guarantees to private investors in the form of a standby line of credit, also known as a "liquidity pool". This will be made available to meet any project overruns in the construction phases as well as cash flow shortfalls in the ramp-up period into operations, thereby mitigating the project default risks. The mitigation of the default risks allows for the project to achieve a higher investment grade rating category than is possible from the fundamentals of the project on a standalone basis.

MDBs can also play an important role by sharing expertise and knowledge to support governments and local investors, for example pension funds, to work together with specialist infrastructure investors to identify and prepare assets for divesting. They could explore ways to support an incentive mechanism, similar to Australia's federal

support programme, through their guarantee programmes. MDBs might also consider supporting the management of a transparent bidding process, and help governments to redirect the capital proceeds into a protected infrastructure trust or fund, thereby avoiding the threat of corruption, and being available to finance only the most critical and beneficial projects that address the population's rapidly growing needs.

In some emerging or frontier markets there could also be a lack of attractive assets on the public balance sheet. In many cases there are still challenges for governments to implement inclusive user charges to fund their infrastructure operations and maintenance.<sup>64</sup> Until this fundamental challenge is addressed, asset recycling will not be a serious option to consider. In these circumstances, asset recycling might be included as part of future strategic infrastructure planning, identifying those assets that are currently being built or undergoing deregulation to be recycled in future and supporting the financing of future infrastructure projects. There might also be more creative options to consider. For example, Australia's Northern Territory sold part of a government-owned insurance company, the Territory Insurance Office,<sup>65</sup> as part of its infrastructure asset recycling programme.





## Smaller scales of asset recycling

Another way forward is to promote asset recycling at a smaller level at the outset. A sectorial approach, for example divesting airports, is currently being considered in both India and Indonesia, to reinvest the capital into another series of airports. An example of a sectorial approach in the roads sector is provided in Box 10.

These smaller steps will build confidence among key stakeholders such as the public and investors that the asset recycling process is different and can be mutually

successful. As the process matures, it can then be scaled up and introduced into other sectors and the resulting benefit will be the knowledge and capabilities developed. It is important to point out that infrastructure systems are integrated and an asset approach for investment should not replace a system-wide planning from the government.

Ultimately there is no one-size-fits-all approach. Various institutional maturity levels exist across regions over a number of key factors, such as political, legal and regulatory frameworks. However, the principles and goals of asset recycling could be applied in most circumstances, whether at a national, regional, local or sectorial level.

### Box 10: The National Highways Authority of India (NHA)

Today, 6,500 kilometres of highways are being maintained by the NHA using public funds. This number is expected to more than double over the next five years. Previous maintenance models, such as the operate-maintain-transfer (OMT) approach, did not succeed because there was a fixed annual increase in payments to the authority irrespective of traffic volumes. In addition, contract tenures were shorter, which resulted in poor maintenance. As a result, only 2,500 kilometres of highways have been awarded on OMT, with just six to seven firms participating in these projects.<sup>66</sup>

In 2017, the NHA announced plans to divest and monetize 75 publicly funded operational highways to private investors using a 30-year lease to operate and maintain the highways, and for the private investors to collect revenues through user charges via toll stations in exchange for an upfront payment.<sup>67</sup> The estimated proceeds may fetch the government about Rs 40,000 billion Indian rupees (\$6 billion) and will be used to invest in developing more highways to meet the rapid population growth in the country.

This form of asset recycling is referred to as the new Toll Operate Transfer (TOT) model. The bidding process for the first segment began in September 2017 with 10 to 15 operational highways, and will remain open until early 2018. The bidders will include domestic road companies, as well as international infrastructure investors and funds.



# Acknowledgements

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# Endnotes

- 1 “Shaping the Future of Long-term Investing, Infrastructure and Development”, *World Economic Forum*, [online] Available at: <https://www.weforum.org/system-initiatives/shaping-the-future-of-long-term-investing-infrastructure-and-development> [Accessed July 2017.]
- 2 “Overview of the Strategic Infrastructure Initiative”, *World Economic Forum*, 2011-2015 [online] Available at: <http://reports.weforum.org/strategic-infrastructure-2014/overview-of-the-strategic-infrastructure-initiative/> [Accessed July 2017.]
- 3 “Migration and Its Impact on Cities”, *World Economic Forum*, October 2017, [online] Available at: [http://www3.weforum.org/docs/Migration\\_Impact\\_Cities\\_report\\_2017\\_low.pdf](http://www3.weforum.org/docs/Migration_Impact_Cities_report_2017_low.pdf) [Accessed October 2017.]
- 4 “New Report Finds Aging Infrastructure Comes at a High Cost to Economy”, *American Society of Civil Engineers*, 10 May 2016, [online] Available at: <https://www.asce.org/templates/press-release-detail.aspx?id=20935> [Accessed October 2017.]
- 5 Vallejo, L., Mullan, M., “Climate-Resilient Infrastructure: Getting the Policies Right – Environment”, *OECD Working Paper*, 21 April 2017, [online]. Available at: [http://www.oecd.org/official-documents/publicdisplaydocumentpdf/?cote=ENV/WKP\(2017\)8&docLanguage=En](http://www.oecd.org/official-documents/publicdisplaydocumentpdf/?cote=ENV/WKP(2017)8&docLanguage=En) [Accessed October 2017]
- 6 Authors analyses using “Global Infrastructure Outlook: Forecasting 0069nrastructure investment needs and gaps”, A G20 Initiative, [online]. Available at: <https://outlook.gihub.org/> [Accessed October 2017.]
- 7 “Sustainable Development Goals: 17 Goals To Transform Our World”, *United Nations*, [online] Available at: [www.un.org/sustainabledevelopment/sustainable-development-goals/](http://www.un.org/sustainabledevelopment/sustainable-development-goals/) [Accessed July 2017.]
- 8 “Global Infrastructure Outlook: Infrastructure investment needs; 50 countries, 7 sectors to 2040”, *Oxford Economics / Global Infrastructure Hub*, 24 July 2017, [online]. Available at: <http://www.oxfordeconomics.com/Global-Infrastructure-Outlook> [Accessed August 2017.]
- 9 “Country List Government Debt to GDP - G20” [Data Table], *Trading Economics*, [online] Available at: <https://tradingeconomics.com/country-list/government-debt-to-gdp?continent=g20> [Accessed October 2017.]
- 10 Botev, J., Fournier, J.M., Mourougane A., “A Re-Assessment of Fiscal Space in OECD Countries: Economics Department Working Papers No. 1352”, *OECD*, 23 November 2016, [online]. Available at: <https://www.oecd.org/eco/A-re-assessment-of-fiscal-space-in-OECD-countries.pdf> [Accessed October 2017.]
- 11 “Increasing Infrastructure Investment Must Be Paid For”, *Committee for a Responsible Federal Budget*, 18 April 2017, [online] Available at: <http://www.crfb.org/blogs/increasing-infrastructure-investment-must-be-paid> [Accessed October 2017.]
- 12 Stupak, Jeffrey M., “Economic Impact of Infrastructure Investment”, *Congressional Research Service*, 18 July 2017, [online] Available at: <https://fas.org/sgp/crs/misc/R44896.pdf> [Accessed October 2017.]
- 13 “We’ll Live to 100 – How can we afford it?”, *World Economic Forum*, May 2017, [online] Available at: [http://www3.weforum.org/docs/WEF\\_White\\_Paper\\_We\\_Will\\_Live\\_to\\_100.pdf](http://www3.weforum.org/docs/WEF_White_Paper_We_Will_Live_to_100.pdf) [Accessed July 2017.]
- 14 Kao, J.S., Authers, J., “Pensions and bonds: the problem explained”, *Financial Times*, 23 August 2016, [online] Available at: <https://ig.ft.com/sites/pensions-interest-rates-explainer/> [Accessed October 2017.]
- 15 “Annual Survey of Large Pension Funds and Public Pension Reserve Funds: Report on Pension Funds’ Long-term Investments”, *OECD*, 2015, [online] Available at: <http://www.oecd.org/daf/fin/private-pensions/2015-Large-Pension-Funds-Survey.pdf> [Accessed October 2017.]
- 16 Inderst, G. (2009), “Pension Fund Investment in Infrastructure”, *OECD Working Papers on Insurance and Private Pensions*, January 2009, [online]. Available at: <http://www.oecd.org/finance/private-pensions/42052208.pdf> [Accessed: October 2017]

- 17 “Infrastructure Deals 2016” [Data pack], *Preqin*, [online] Available at: <https://www.preqin.com/docs/reports/Infrastructure-Deals-2016.pdf> [Accessed August 2017.]
- 18 “Towards Better Infrastructure Investment Products: A survey of investor’s perceptions and expectations from investing in infrastructure”, *EDHEC Infrastructure Institute Singapore*, July 2016, [online]. Available at: [http://edhec.infrastructure.institute/wp-content/uploads/publications/blanc-brude\\_2016e.pdf](http://edhec.infrastructure.institute/wp-content/uploads/publications/blanc-brude_2016e.pdf) [Accessed August 2017.]
- 19 Greenfield is a new-build infrastructure project delivering a new asset. This covers all of the early project lifecycle phases and activities in the pre-construction, construction, and ramp-up period into the operations phase, known as the brownfield secondary stage.
- 20 “Infrastructure Investment Policy Blueprint”, *World Economic Forum*, February 2014, [online]. Available at: [http://www3.weforum.org/docs/WEF\\_II\\_InfrastructureInvestmentPolicyBlueprint\\_Report\\_2014.pdf](http://www3.weforum.org/docs/WEF_II_InfrastructureInvestmentPolicyBlueprint_Report_2014.pdf) [Accessed August 2017.]
- 21 Dry powder: An informal term that refers to highly liquid securities, cash reserves and any other security that can be converted to cash right away.
- 22 “Preqin Quarterly Update: Infrastructure Q2 2017”, *Preqin*, June 2017, [online]. Available at: <https://www.preqin.com/docs/quarterly/inf/Preqin-Quarterly-Infrastructure-Update-Q2-2017.pdf> [Accessed October 2017.]
- 23 “Better Government Series: Managing the Public Balance Sheet, Policy Insight”, *Institute of Chartered Accountants in England and Wales (ICAEW)*, 2017, [online]. Available at: <https://www.icaew.com/-/media/corporate/files/about-icaew/what-we-do/policy/public-finances/policy-insight-managing-the-public-balance-sheet.ashx> [Accessed August 2017]
- 24 “Global Built Asset Wealth Index 2015”, *Centre for Economic and Business Research Arcadis*, October 2015, [online]. Available at: [https://www.arcadis.com/media/5/E/6/%7B5E69E0DE-1B61-4608-A2E9-9FE45A405D95%7D9385\\_Global%20Built%20Asset%20Wealth%20Index%202015%20WEB%2032pp.pdf](https://www.arcadis.com/media/5/E/6/%7B5E69E0DE-1B61-4608-A2E9-9FE45A405D95%7D9385_Global%20Built%20Asset%20Wealth%20Index%202015%20WEB%2032pp.pdf) [Accessed July 2017.]
- 25 “Infrastructure How the Private Sector Helps”, *International Finance Corporation/World Bank Group*, Vol 6 / Issue 1 2012, [online]. Available at: [http://www.ifc.org/wps/wcm/connect/3c4a9e004af21a4bbcaefe888d4159f8/IFC\\_TOS\\_Infrastructure.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/3c4a9e004af21a4bbcaefe888d4159f8/IFC_TOS_Infrastructure.pdf?MOD=AJPERES) [Accessed October 2017.]
- 26 “Private Sector Participation in Water and Sanitation Infrastructure”, OECD Directorate for Financial and Enterprise Affairs Investment Division, 27 November 2007, [online]. Available at: <https://www.oecd.org/investment/investmentfordevelopment/39663326.pdf> [Accessed October 2017.]
- 27 “PPP Knowledge Lab”, *World Bank Group*, [online]. Available at: <https://pppknowledgelab.org/external-resources> [Accessed October 2017.]
- 28 Calabrese, Daniele, “Strategic Communication for Privatization, Public-Private Partnerships, and Private Participation in Infrastructure Projects”, *The International Bank for Reconstruction and Development and The World Bank, March 2008*, [online]. Available at: <http://siteresources.worldbank.org/EXTDEVCOM-MENG/Resources/StrategicCommunicationfor-PrivatizationPublicPrivatePartnershipsandPrivate-ParticipationinInfrastructureProjects.pdf> [Accessed October 2017.]
- 29 Jericho, Greg, “Privatisation: benefits are not assured and public are sceptical, history shows”, *The Guardian*, 10 January 2014, [online] Available at: <https://www.theguardian.com/business/grogonomics/2014/jan/10/privatisation-benefits-are-not-assured-and-public-are-sceptical-history-shows> [Accessed October 2017.]
- 30 “The future of rail: Improving the rail passenger experience”, *House of Commons Transport Committee*, 10 October 2016, [online]. Available at: <https://publications.parliament.uk/pa/cm201617/cmselect/cmtrans/64/64.pdf> [Accessed October 2017.]
- 31 Private Real Estate Portfolio Management: Portfolio managers are responsible to both plan and manage the investment and divestment strategy for real estate assets in order to meet the required financial performance and according to their risk management strategy.
- 32 “That’s a wrap for poles and wires”, *NSW Government Treasury*, 15 May 2017, [online]. Available at: <https://www.treasury.nsw.gov.au/news/thats-wrap-poles-and-wires> [Accessed August 2017.]
- 33 Robertson, J., “NSW closes its poles and wires sale with \$3 billion deal”, *The Sydney Morning Herald*, 11 May 2017, [online]. Available at: <http://www.smh.com.au/nsw/nsw-closes-its-poles-and-wires-sale-with-3-billion-deal-20170511-gw2dqp.html> [Accessed October 2017.]
- 34 “Rebuilding NSW: Delivering on our \$20 billion infrastructure program”, *NSW Government Treasury Website*, [online]. Available at: <https://www.treasury.nsw.gov.au/sites/default/files/2017-05/20170511%20-%20Rebuilding%20NSW%20-%20Delivering%20on%20our%20%2420%20billion%20infrastructure%20program.pdf> [Accessed October 2017.]

- 35 “\$16 billion partial lease of Ausgrid”, NSW Government (25 October 2017). Available at: <https://www.nsw.gov.au/news-and-events/news/16-billion-partial-lease-of-ausgrid/>
- 36 Nicholls, Sean, “NSW reaps \$8 billion infrastructure bonanza from Transgrid privatisation”, *The Sydney Morning Herald*, 26 November 2015, [online]. Available at: <http://www.smh.com.au/nsw/nsw-reaps-8-billion-infrastructure-bonanza-from-transgrid-privatisation-20151125-gl7vv5.html> [Accessed July 2017.]
- 37 Quiggin, J., “Asset Recycling: A Spurious Justification for Privatisation”, *Submission to: Senate Standing Committees on Economic*, [online]. Available at: <http://www.aph.gov.au/DocumentStore.ashx?id=6c33d95e-0376-4731-8161-6b6de7cf01cf&subId=303245> [Accessed October 2017.]
- 38 “Unique financing model as EBRD backs Elazig hospital PPP project in Turkey”, *European Bank for Reconstruction and Development (EBRD)*, 30 November 2016, [online]. Available at: <http://www.ebrd.com/cs/Satellite?c=Content&cid=1395253880065&d=Mobile&pagename=EBRD%2FContent%2FContentLayout> [Accessed October 2017.]
- 39 “Westconnex – Updated Strategic Business Case”, *Westconnex*, November 2015, [online]. Available at: <https://www.westconnex.com.au/sites/default/files/WestConnex%20Updated%20Strategic%20Business%20Case%20-%20November%202015.pdf> [Accessed September 2017.]
- 40 Stewart, Robb M., “New South Wales Seeks Buyer for WestConnex Toll Road”, *Fox News*, 12 May 2017, [online]. Available at: <http://www.foxbusiness.com/features/2017/05/12/new-south-wales-seeks-buyer-for-westconnex-toll-road.html> [Accessed September 2017.]
- 41 “Sale of entire WestConnex motorway project on table for government”, *The Sydney Morning Herald*, May 24 2017, [online]. Available at: <http://www.smh.com.au/nsw/sale-of-entire-westconnex-motorway-project-on-table-for-government-20170524-gwc2n2.html> [Accessed September 2017.]
- 42 “Strategic Infrastructure Steps to Prioritize and Deliver Infrastructure Effectively and Efficiently”, *World Economic Forum*, 18 October 2012, [online]. Available at: <https://www.weforum.org/reports/strategic-infrastructure-steps-prioritize-and-deliver-infrastructure-effectively-and-efficiently/> [Accessed July 2017.]
- 43 “Infrastructure NSW Act 2011”, *NSW Government*, 26 May 2011, [online]. Available at: <https://www.legislation.nsw.gov.au/acts/2011-23.pdf> [Accessed July 2017.]
- 44 Infrastructure NSW Website, [online]. Available at: [http://www.infrastructure.nsw.gov.au/media/62346/insw\\_corporateprofile\\_v10.pdf](http://www.infrastructure.nsw.gov.au/media/62346/insw_corporateprofile_v10.pdf) [Accessed July 2017.]
- 45 “Infrastructure Statement 2017-18 NSW Budget”, *NSW Government treasury*, June 2017, [online]. Available at: <https://www.budget.nsw.gov.au/sites/default/files/budget-2017-06/2.%20Restart%20NSW.pdf> [Accessed August 2017.]
- 46 Travis, Alan, “City centre Victorian prisons may close under £1bn prison reform plans”, *The Guardian*, 9 November 2015, [online]. Available at: <https://www.theguardian.com/society/2015/nov/09/city-centre-victorian-prisons-may-close-1bn-prison-reform-plans> [Accessed October 2017.]
- 47 “Global Infrastructure Investment: The role of private capital in the delivery of essential assets and services”, *Global Infrastructure Investors Association / PricewaterhouseCoopers*, 2017, [online]. Available at: <http://www.pwc.com/gx/en/industries/assets/pwc-giia-global-infrastructure-investment-2017-web.pdf> [Accessed July 2017.]
- 48 “The role and impact of specialist investors in UK infrastructure”, *PricewaterhouseCoopers*, October 2015, [online]. Available at: <http://www.pwc.co.uk/assets/pdf/the-role-and-impact-of-specialist-investors-in-uk-infrastructure-oct-15.pdf> [Accessed July 2017.]
- 49 “Towards Water 2020 – meeting the challenges for water and wastewater services in England and Wales”, *Ofwat*, July 2015, [online] Available at: [https://www.ofwat.gov.uk/wp-content/uploads/2015/10/pap\\_tec201507challenges.pdf](https://www.ofwat.gov.uk/wp-content/uploads/2015/10/pap_tec201507challenges.pdf) [Accessed October 2017.]
- 50 “The economic regulation of the water sector”, *Ofwat / UK National Audit Office*, 14 October 2015, [online]. Available at: <https://www.nao.org.uk/wp-content/uploads/2014/07/The-economic-regulation-of-the-water-sector.pdf> [Accessed October 2017.]
- 51 Nowacki, C., Levitt, R., Monk, A., “The Financier State as an Alternative to The Developmental State: A Case Study of Infrastructure Asset Recycling in New South Wales, Australia”, *Engineering Project Organization Conference Cle Elum, Washington, USA June 28-30*, October 27 2016, [online]. Available at: <https://ssrn.com/abstract=2860264> [Accessed October 2017.]
- 52 Buxbaum, Jeffrey N., Ortiz, Iris N., “Protecting the Public Interest: The Role of Long-Term Concession Agreements for Providing Transportation Infrastructure”, *USC Keston Institute for Public Finance and Infrastructure Policy*, June 2007, [online]. Available at: [https://www.inthepublicinterest.org/wp-content/uploads/Protecting\\_Public\\_Interest\\_Long\\_Term\\_Concessions.pdf](https://www.inthepublicinterest.org/wp-content/uploads/Protecting_Public_Interest_Long_Term_Concessions.pdf) [Accessed July 2017.]

- 53 “National Partnerships Agreement on Asset Recycling”, *Council of Australian Governments*, 2 May 2014, [online] Available at: [http://www.federalfinancial-relations.gov.au/content/npa/infrastructure/national-partnership/Asset\\_Recycling\\_Initiative\\_NP.pdf](http://www.federalfinancial-relations.gov.au/content/npa/infrastructure/national-partnership/Asset_Recycling_Initiative_NP.pdf) [Accessed July 2017.]
- 54 Infrastructure Australia Website, [online]. Available at: <http://infrastructureaustralia.gov.au/about/role.aspx> [Accessed October 2017.]
- 55 “Commonwealth Budget 2016-17, Part 2 Infrastructure”, *Australian Commonwealth Treasury*, 3 May 2016, [online]. Available at: [http://www.budget.gov.au/2016-17/content/bp3/html/bp3\\_03\\_part\\_2g.htm](http://www.budget.gov.au/2016-17/content/bp3/html/bp3_03_part_2g.htm) [Accessed August 2017.]
- 56 Provided by *Infrastructure Partnerships Australia* to the project team for this report.
- 57 “Asset Recycling a smarter way for Australia?”, SMART Infrastructure Group – Sydney Business School – University of Wollongong, March 2015, [online]. Available at: <https://smart.uow.edu.au/content/groups/public/@web/@qa/documents/doc/uow189689.pdf> [Accessed October 2017.]
- 58 Elks, Sarah, “Queensland warned that using rail and port profit to pay down debt will hike up interest”, *The Australian*, 10 March 2017, [online] Available at: <http://www.theaustralian.com.au/national-affairs/state-politics/queensland-warned-that-using-rail-and-port-profit-to-pay-down-debt-will-hike-up-interest/news-story/0943559cd35e3831aa2c91afc3c26693> [Accessed October 2017.]
- 59 “BUILDON 2017 Infrastructure Update”, *Government of Ontario / Ministry of Infrastructure*, July 2017, [online] Available at: <https://www.ontario.ca/page/buildon-2017-infrastructure-update> [Accessed October 2017.]
- 60 Fenn, Michael, “Recycling Ontario’s Assets: A New Framework for Managing Public Finances”, Mowat Centre, 11 April 2014, [online]. Available at <https://mowatcentre.ca/recycling-ontarios-assets/> [Accessed July 2017.]
- 61 Inderst, George, “Infrastructure Investment, Private Finance, and Institutional Investors: Asia from a Global Perspective”, *Asian Development Bank Institute*, January 2016, [online]. Available at: <https://www.adb.org/sites/default/files/publication/179166/adbi-wp555.pdf> [Accessed October 2017.]
- 62 “How Global Can Power Local Harnessing International Investment to Develop Sustainable Local Capital Markets”, *World Economic Forum*, May 2017, [online]. Available at: [http://www3.weforum.org/docs/WEF\\_How\\_Global\\_Can\\_Power\\_Local\\_WP\\_report\\_2017.pdf](http://www3.weforum.org/docs/WEF_How_Global_Can_Power_Local_WP_report_2017.pdf) [Accessed October 2017.]
- 63 “Asia Infrastructure Needs [to] Exceed \$1.7 Trillion Per Year, Double Previous Estimates”, *Asian Development Bank*, 28 February 2017, [online]. Available at: <https://www.adb.org/news/asia-infrastructure-needs-exceed-17-trillion-year-double-previous-estimates> [Accessed October 2017.]
- 64 “Steps to Operate and Maintain Infrastructure Efficiently and Effectively”, *World Economic Forum*, April 2014, [online]. Available at: [http://www3.weforum.org/docs/WEF\\_IU\\_StrategicInfrastructureSteps\\_Report\\_2014.pdf](http://www3.weforum.org/docs/WEF_IU_StrategicInfrastructureSteps_Report_2014.pdf) [Accessed July 2017.]
- 65 Shanahan, Leo, “NT looks to pocket billions as it mulls insurance sell-off”, *The Australian*, 6 October 2014, [online]. Available at: <http://www.theaustralian.com.au/business/nt-looks-to-pocket-billions-as-it-mulls-insurance-selloff/news-story/3a97ec07c4b44e0752d4b622f2acf745> [Accessed October 2017.]
- 66 “Toll-operate-transfer scheme may net Rs 40,000 crore” [Press Release], *Crisil*, 22 March 2017, [online]. Available at: <https://www.crisil.com/Ratings/Brochureware/News/toll-operate-transfer-scheme-may-net-Rs%2040-thousand-crore.pdf> [Accessed October 2017.]
- 67 Arora, Rajat, “Auction to lease out 11 NHs under toll-operate-transfer in mid-September”, *The Economic Times*, 17 August 2017, [online] Available at: <https://economictimes.indiatimes.com/news/economy/infrastructure/auction-to-lease-out-11-nhs-under-toll-operate-transfer-in-mid-september/articleshow/60092707.cms> [Accessed October 2017.]



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