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Bechtel–U.S. Council for International Business Submission to the United Nations Sustainable Development Goals

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The purpose of this discussion paper is to contribute to the thematic development of **infrastructure** currently under consideration in the post 2015 United Nations sustainable development goals (SDGs) deliberations. This paper was prepared by Bechtel Corporation[1] on behalf of the U.S. Council for International Business (USCIB).

1 Executive Summary

There are two underlying premises of the paper. First, infrastructure is not just about physical assets (e.g., roads and bridges), but also about sustainable solutions for the delivery of reliable energy, clean water, communications, logistics and mobility. Second, infrastructure advances the poverty reduction outcomes envisioned in the post 2015 SDGs, and business, including the engineering, procurement and construction (EPC) industry, is an essential partner in this global effort.

In many respects, the growing recognition of infrastructure as a fundamental forcing agent for development is connected to key global trends and their impacts and implications on shared prosperity. With an expected population of almost nine billion by 2030, purposeful, smartly-designed and properly maintained infrastructure will become critical to expanding society's access to public goods, as well as productive assets and innovations that progress individual and community capacity, wellbeing, and national economic growth. Conversely, failing to address global infrastructure needs will not only weaken economic growth but also potentially reverse some of the positive gains from the 2000 United Nations Millennium Development Goals (MDGs), and compromise future SDG targets.

We offer four recommendations, to help develop infrastructure as one of the critical anchors to achieving the post 2015 SDGs. These recommendations are not exhaustive.

- **Promote governance frameworks involving multi-stakeholder inputs from civil society, government and business to strike the right balance between top-down and bottom-up decision-making processes**. This approach also helps to organize policies and prioritize projects at a systems level, rather than create single-purpose projects, thereby promoting benefits for multiple sectors.
- **Promote strategic infrastructure planning alongside the wider development agenda through technical and contracting frameworks which rank and prioritize investments according to need, return on investment, and affordability.** This approach helps governments to prioritize within infrastructure sectors and to assess benefits with costs and budget accordingly.
- **Develop a fuller range of alternative financing schemes to address the constraints on public funding and commercial debt.** This includes continuing to support multilateral financing institutions and export credit agencies, improving public-private partnerships, promoting project bonds and non-bank lending instruments, and optimizing existing infrastructures for productivity gains.
- **Leverage technology and data analytics to improve project quality and greater certainty of outcome.** Information technologies and data analytics should not only be used to operate cities more efficiently and sustainably, but also to help advance master planning, conceptual design and engineering, and construction. Designs for climate resilience, for example, can take into account projections for rainfall, tides, temperature and population in order to prepare for changing needs, vulnerabilities and opportunities.

[1] Bechtel is one of the most respected engineering, procurement, construction, and project management companies in the world. We deliver complex—often first-of-a kind—projects through unequaled know-how and experience. Bechtel is a member of the USCIB and concurrently serves as vice chair of the corporate responsibility committee and task force on the SDGs. For more information, please visit www.bechtel.com. The paper was prepared by Dr. Tam Nguyen and Dr. Lis Culbard, Bechtel Global Head of Sustainability and Bechtel Global Infrastructure Head of Sustainability, respectively.

2 Global Trends, Impacts and Implications

Infrastructure issues confronting developed and developing nations are much discussed. Mature economies face the challenge of maintaining and modernizing critical infrastructures, such as transport, power, water, and telecommunications. Developing and emerging economies continue to grapple with planning infrastructure to deliver basic human needs, including water, sanitation, and electricity. Underlying these issues is the challenge of smarter decisions, better design and construction, innovative financing, and positioning the private sector as part of the solution.

While infrastructure has traditionally been viewed as primarily a public sector activity, the business and global development case for infrastructure has evolved and converged overtime around enhancing access to limited resources and opportunities.[2] This evolution has been shaped by a confluence of global issues:

- **Resource Constraints**: The global population may reach nine billion people by 2030. The implications of this on urbanization, energy and water security, and transportation – to name a few – can be profound. An estimated $57 trillion[3] in infrastructure investment may be required by 2030 to keep pace with projected global GDP growth of around 3.8%.[4] Core infrastructure (e.g., utilities, energy, and transport) may grow at an average of three percent per year through 2017, while social infrastructure (e.g., water, healthcare, and education) may grow at an annual average of four percent.[5]
- **Climate Resiliency**: Over the past decade there has been a growing concern for building "resilience" into construction projects to withstand extreme weather conditions and address public safety and economic issues. The C40 Cities Climate Leadership Group, a network of the world's megacities working to address climate change, reports that 98 percent of urban leaders surveyed, identified extreme weather as a major risk to their city. Weather-related losses and damage have risen from an annual average of about $50 billion in the 1980s to close to $200 billion over the last decade.[6] These weather events have precipitated a rethink of the intersection between communities, governments, and the private sector in promoting resiliency in large-scale construction projects. By 2030, there may be 325 million people vulnerable to extreme weather in Africa and Asia and trapped in poverty.[7] Large coastal cities, many of them in middle-income nations, could face combined annual losses of US$1 trillion from such events by mid-century.[8]
- **Data Analytics**: Innovative technologies and data analytics are increasingly being integrated into the planning and design aspects of sustainable urban development. Large information and technology companies are exploring the applicability of their products and services to solve persistent problems related to urbanization. So-called smart technologies can also foster collaborative frameworks between citizens, municipal governments, and businesses by making data and information more accessible, which promote collective decision-making processes to develop more durable, sustainable cities.

3 Advancing Infrastructure in the SDGs

Common among the macro trends discussed above is how infrastructure is closely linked to achieving SDG targets. However, every economy is different, and by extension, societal needs and political decisions vary with regard to infrastructure priorities. In many respects, we are entering a new era of industrial development where a rethinking of infrastructure, as it relates to achieving the SDGs, is critical. Enhanced collaboration between civil society, government, and business in the planning, design and implementation of core and social infrastructures should (i) grow economies, (ii) build resiliency; and (iii) help to solve societal problems. Infrastructure development, similar to any development initiative, is more successful and sustainable when it involves all key stakeholders in decision-making and, where possible, the planning and execution of projects.

Alternative means of financing large-scale infrastructure projects must also be addressed if we are to advance infrastructure as a SDG. It is beyond the scope of this paper to identify financing solutions, but we recognize it as a complicating factor given the fiscal austerity and budget constraints among many governments. While public

[2] "Resilience in a Hotter World" (Harvard Business Review, April 2014).
[3] McKinsey Global Institute report: http://www.mckinsey.com/insights/engineering_construction/infrastructure_productivity.
[4] Centre for European Policy Studies: http://europa.eu/espas/pdf/espas-report-economy.pdf.
[5] Bain & Company research on the infrastructure investment market: http://www.bain.com/about/press/press-releases/global-infrastructure-investment-to-reach-four-trillion-dollars-by-2017.aspx.
[6] The World Bank: http://www.worldbank.org/en/news/feature/2013/11/18/disaster-climate-resilience-in-a-changing-world.
[7] The World Bank: http://www.worldbank.org/content/dam/Worldbank/document/SDN/Full_Report_Building_Resilience_Integrating_Climate_Disaster_Risk_Development.pdf.
[8] Ibid.

sector institutions, such as export credit agencies, will continue to be important sources of funding, private investment, pension funds and sovereign wealth funds may increasingly supplement the market. Public-private partnerships for new infrastructure projects may also complement the market overtime.[9]

Against this backdrop, advancing infrastructure as a SDG requires enhanced cooperation and partnerships at the local, national and global levels around stakeholder governance, flexible financing, appropriate policies, access to knowledge and innovations, and capacity building.

Bechtel Corporation is currently working through a more collaborative model to deliver a number of pioneering civil projects[10] that are helping to put national economies – both in the developed and developing world – on a critical path towards achieving their sustainable development outcomes.

Crossrail (see Box 1), the largest infrastructure project in Europe, is expected to inject nearly $70 billion into the UK economy. Among its many development outcomes, Crossrail will help improve mobility in and around London by reducing crowding on its existing transport network. It is estimated to bring an extra 1.5 million people within a 45 minute commute of London. Bechtel is also helping to raise the bar on "sustainable railway" design and development by using data, techniques, and technologies to reduce carbon emissions during construction and beyond.

Gabon's approach to its national infrastructure development is a promising new model for public-private partnerships (see Box 2). Bechtel helped establish and continues to support l'Agence Nationale des Grands Travaux (ANGT) – the government's executing agency of the $25 billion National Infrastructure Master Plan (NIMP). Bechtel will eventually transition ANGT activities to the Gabonese staff that Bechtel recruited and trained.

Box 1

Project: Crossrail | Customer: Crossrail Ltd. | Our role: Project management

London's Crossrail includes more than 26 miles (42 kilometers) of new rail tunnels and nine new London rail stations. When completed, it is expected to eliminate more than 300 million vehicle miles (nearly 485 million kilometers) each year, significantly easing congestion in and around the city.

Crossrail's comprehensive carbon management plan is aggressive. After estimating that 15 percent of the project's lifecycle carbon emissions would be attributable to construction, Bechtel set out to reduce the carbon footprint by 5 percent—all without increasing costs. To date, we have exceeded these goals—cutting emissions by nearly 10 percent.

Working closely with our project partners, we introduced several innovative plant and equipment technologies in select areas of the project to further reduce carbon impact. For example, our team has used diesel-electric hybrid excavators that consume 25 percent less fuel and produce 30 percent less carbon emissions than conventional excavators. We also substituted nonpetroleum biodiesel fuel in generators used to operate cranes, selected LED site lighting that consumes 47 percent less energy, and relied on zero emission hydrogen fuel cells as portable power sources.

By monitoring digital dimming, movement detection, and photocell light equipment, the team was able to provide a continuous real-time picture of consumption that helped to promote operational efficiencies. The energy needed to run services for the full design life of Crossrail—120 years —is expected to account for 85 percent of overall carbon emissions, most of which will come from the trains. The team is reducing emissions by focusing on design features to improve energy efficiency, including:

- Reducing the weight of passenger cars
- Establishing targets to reduce energy consumption

Box 2

Project: Gabon infrastructure | Customer: Government of Gabon | Our role: Management and technical support

Bechtel and the Government of Gabon developed and are delivering a groundbreaking $25 billion NIMP that will enable the country to modernize the national workforce, expand access to social development, and advance connectivity within the country, across Africa, and with the rest of the world. This unique project is drawing attention from other African governments as an example of how public-private partnerships can develop, design, and execute national development plans.

The success of the infrastructure initiative rests in large measure on project management and accountability. Bechtel helped organize and currently manages ANGT, a government agency that oversees the execution and delivery of NIMP. ANGT coordinates work with various ministries and government agencies, monitors progress, incorporates new execution tools and processes, and engages local communities about NIMP's progress. The agency translated NIMP's vision into a detailed implementation plan sequenced over 15 years. It also helps local businesses participate in the tendering process and has created and introduced minimum requirements for contracting Gabonese businesses. In 2013, the government invested nearly $400 million in NIMP's execution, with two thirds of the work undertaken by Gabonese companies.

To prepare the local construction environment for the 21st century, we are advancing the competencies of all workers to implement and maintain international standards for quality, ethics, and safety. To date, 38 contractors have completed 210 courses, including site setup, site plant and vehicle maintenance, proper use of personal protective equipment, and how to conduct environmental risk assessments. We will deliver more than 50 additional courses in 2014 to teach contractors our core environmental, safety, and health processes, helping to create a local construction workforce capable of performing to international standards.

One of the biggest challenges we faced was striking the right

[9] Price Waterhouse Coopers: http://www.pwc.com/gx/en/capital-projects-infrastructure/publications/cpi-outlook/assets/cpi-outlook-to-2025.pdf.
[10] See Bechtel Sustainability Report for more information: http://bechtel.com/Sustainability.

▪ Using regenerative braking ▪ Placing smart controls in passenger cars for lighting, heating, and air conditioning	balance between prioritizing long-term plans and current needs. By conducting comprehensive feasibility studies across the country, we provided the government a wealth of detailed technical, social, and financial data that enables government authorities to make informed decisions about project plans, designs, and priorities. This approach has not only generated critical information for future developments, but it also put in place a benchmark for how to plan future projects.

4 Ways to Measure Progress

Monitoring, evaluation, and reporting of impacts are well discussed within the international development community. This should be no different for infrastructure, which can be a direct contributor to, or indirect enabler of, achieving the proposed SDGs.

While it may not be possible to list all the possible ways to measure how infrastructure will deliver SDG outcomes, there are several key themes to progress the development of global performance indicators and supporting measurement tools. Among them are (i) public access to core and social infrastructures; (ii) resiliency of infrastructure in relation to atmospheric changes; and (iii) infrastructure sustainability in relation to reducing carbon emissions, improving energy efficiency and savings.

There are also several tools currently available in the market to assess and rate the sustainability benefits of infrastructure projects, such as the Australian Green Infrastructure Council (AGIC)'s IS tool, the Institution of Civil Engineers' CEEQUAL tool, and the Institute of Sustainable Infrastructure's ENVISION tool.[11] These rating tools not only provide a way to determine an infrastructure's sustainability, but also enable comparison of the sustainability between different assets, or of different design solutions for a single asset.

While the methodologies for measuring infrastructure sustainability continue to evolve, a "return on investment" approach should more fully capture the environmental, economic, and social impacts in an objective and quantifiable manner. Moreover, the methodologies should assess multiple development outcomes, including indirect ones, in order to improve decision processes regarding future infrastructure needs and requirements.

[11] Highlighting of these tools does not represent Bechtel's endorsement of these tools.