**Demand for Long-Term Financing of Infrastructure**

Issues Note (No. 7) for Consideration by G20

Coordinated by the World Bank
Infrastructure Policy Unit, Sustainable Development Network

*Based on detailed inputs received from the United Nations Department of Economics and Social Affairs, OECD Environment Directorate, International Energy Agency and Monetary Authority of Singapore (MAS)*

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## 1. Introduction

The developments in global financial markets over the last 3-4 years are fundamentally reshaping how capital is transmitted around the world and invested. Policy-driven rebalancing of appetite for risk and acceptable returns in the interest of safeguarding the global financial system is leading to sweeping regulatory changes, only some of which are as yet manifest. These are forcing banks and traditional sources of capital to have a lower appetite for risk, bringing in new, unconventional players to fill the market segment for risky investments.

Global growth poles are centered in the developing world, and widely seen as the way out of global slowdown and financial gloom. But the high growth rates in emerging markets are being constrained by the lack of infrastructure quality and quantity. For developing countries to grow the world out of recession, they need long-term, reliable capital to overcome the infrastructure deficit, as opposed to the short-term excess capital pouring in now against a macroeconomic backdrop of poor returns in mature economies that is "pushing money out" and higher growth rates in emerging markets "pulling money in"[1]. Developing countries must invest an estimated additional US$1 trillion per annum through 2020 just to keep pace with the demands of rapid urbanization, growth, and the push for greater global integration and connectivity. And the additional financing requirements to orient economies towards a green trajectory are considerable. Assuring that infrastructure investments are low emitting and climate resilient will require an additional US$200 to $300 billion per year.

Already overstretched public finances mean that governments must consider alternative financing models to leverage private capital into infrastructure, along with strategic use of Official Development Assistance (ODA) to crowd in private investments. But the rapidly growing stock of both debt and equity in the developing world suffers from "all dressed and nowhere to go" – large pools of monies with limited financial interlocutors to deploy into infrastructure.

The yawning infrastructure gap – that must be closed to unleash the growth potential of the developing world – juxtaposed with the shifting landscape of global capital transmission – that must be recast to help finance infrastructure – calls for urgent and coherent action by the G-20 to set priorities for global development financing. This note summarizes the recent changes in demand for infrastructure and shifting landscape of long-term infrastructure financing with a view to assess emerging options to finance viable and sustainable infrastructure in the developing world.

[1] Institute of International Finance, January 2013. "Capital Flows to Emerging Market Economies". IIF Research Note.

## 2. Drivers for change in demand for infrastructure

The links between infrastructure and development are well established. Infrastructure can drive growth through higher employment: $100 million investment can generate up to 50,000 annualized direct and indirect jobs; higher trade: transport and logistics costs now account for higher cost of trade than trade policies (e.g., tariffs, duties, quotas); better health: lack of rural roads correlates with maternal mortality, lack of comprehensive road safety policies kills 1.2 million people and injure 50 million per year, 90% in the developing world; and poverty alleviation. What is new is the mainstreaming of sustainable development thought – a growing realization that benefits of infrastructure investments made today could get more than neutralized if deliberate policy efforts are not made to mitigate and manage the associated negative externalities. Today's infrastructure stock will raise global temperatures by 1.3°C to 1.7°C unless it is retrofitted or retired before the end of its useful life. According to the World Bank, a 4-degree increase in average global temperatures would be likely to trigger widespread crop failures and malnutrition and dislocate large numbers of people from land inundated by rising seas. Importantly, the avoidance of a $4^0$ world doubles the additional annual financing needs. Adaption cost estimates range from $37 to $205 billion in short and medium term. Without adaptation, global warming will undo improvements in access to infrastructure over the medium-term. On a related note, rapid and chaotic urbanization, poor managed land use and deforestation are exacerbating the impact of rising sea levels, natural disasters and floods. Here too, the emphasis is increasingly on disaster prevention – a key element of which is infrastructure design – over post-disaster recovery.

The emerging shift towards green infrastructure is a key driver for changing infrastructure demand. But against a backdrop of fiscal tightening, the capacity to meet these requirements from public sources of finance is very limited. However, well-designed policy frameworks can play an important role in leveraging private investment to meet public policy objectives. For instance, the OECD has developed a "green investment policy framework" to help governments create and improve domestic enabling conditions to shift and scale-up private sector investments in green infrastructure, to finance a transition to a low carbon and climate resilient economy and greener growth (See Box 1 for related analysis). Indeed, empirical analysis points to the significant impact of public policy on outcomes. For example, according to OECD a 10% increase in the level of the feed-in-tariff results in a 2% increase in the value of solar, wind and other renewable energy projects[2]. There has also been a "mainstreaming" of sources of finance for renewable energy projects in recent years, consistent with the perception that risks associated with such projects have become easier to assess by capital markets.

The UN estimates that the demand for incremental financing for low-carbon energy investments through 2050 is around $1 trillion per year with projections for energy end-use (e.g. appliances) at $800 billion, and for adaptation at around $105 billion. In addition, projections for a 'business-as-usual' baseline scenario (which includes both high and low-carbon energy investments) are around $1.4 trillion, along with projections for energy end-use at 1 trillion per year. In addition, investment requirements for achieving the objective of maintaining calorie intake to counteract the potential decline in yields due to climate change is estimated to be about $7 billion per year[3].

[2] Hascic, I., et al. (2013 forthcoming), "*Finance for Renewable Energy Projects: Trends and Determinants*" OECD Environment Working Paper, OECD Publishing, Paris.
[3] The United Nations World Economic and Social Survey: The Great Green Technological Transformation, 2011.

**Box 1. Demand for Long Term Finance for a Low Carbon Energy Sector**

The IEA's *Energy Technology Perspectives 2012* has estimated that the investments costs for electricity supply and energy demand technologies in a low carbon or 2°C Scenario (2DS) will reach USD 140 trillion between 2010 and 2050, USD 36 trillion more than under a business as usual or 6°C Scenario (6DS). The 6DS assumes that current energy and climate policies remain unchanged in the future, while the 2DS aims to reduce energy-related carbon dioxide ($CO_2$) emissions by 50%, compared to 2005 levels. In addition, another USD 50 trillion to USD 70 trillion will be required for transport infrastructure between 2010 and 2050.

Although high capital investments will be needed, the transition to a low-carbon energy sector produces significant benefits. Not only will it reduce environmental damage, but it will improve energy security globally as dependence on fossil fuels decreases. Spending on fuel will decline sharply with the switch from fossil fuels to renewable energy sources. For countries that import oil and gas, their current account balances will improve, freeing up foreign reserves for other uses. Reductions in fuel costs will more than offset higher investments in low-carbon technologies. Total fuel savings are estimated at USD 100 trillion between 2010 and 2050, with undiscounted net savings of USD 60 trillion, or an average of USD 1.5 trillion annually.

**Table 1. Investment requirements by sector in the 6DS and 2DS, 2010-20, 2020-30 and 2030-50**

| | **6DS** (in USD trillions) | | | **2DS** (in USD trillions) | | |
|---|---|---|---|---|---|---|
| **Sector** | ***2010 to 2020*** | ***2020 to 2030*** | ***2030 to 2050*** | ***2010 to 2020*** | ***2020 to 2030*** | ***2030 to 2050*** |
| Power | 5.9 | 6.5 | 15.9 | 6.5 | 8.7 | 20.7 |
| Buildings | 3.2 | 3.9 | 9.1 | 6.2 | 6.9 | 14.7 |
| Industry | 2.8 | 2.3 | 4.4 | 3.1 | 2.7 | 5.4 |
| Transport | (30.0) 7.0 | (44.8) 9.9 | (137.3) 32.4 | (33.7) 8.1 | (47.3) 12.5 | (149.9) 44.4 |
| *Total investment* | *19.0* | *22.7* | *61.9* | *23.9* | *30.9* | *85.2* |
| Transport infrastructure | 20.0 | 18.7 | 30.1 | 13.9 | 12.1 | 25.6 |

*Source*: IEA, *Energy Technology Perspectives 2012*.

These huge financing estimates notwithstanding, very limited investments have been made in low-carbon investments to date. For example, the proportion of power generated by renewable energy excluding large hydro remains small, at only 6% in 2011[4]. Although global investment in renewable power and fuels increased by 17%, to reach $257.5 billion in 2011, it is still significantly below pre-financial crisis levels of between 38 and 59% annually. Importantly, while the overall investment in renewable energy continues to increase, the share of developing countries fell from 37% in 2010 to 35% in 2011. China and most other developing economies showed a sharp slowdown in renewable energy investment in 2011, though India remained a notable exception with a growth rate of 62%. Although developed economies have continuously strengthened their share of investment in renewable energy, their strong performance in recent years appears to be caused by a jump in US asset finance and a boom in small-scale solar PV in Italy and Germany. However these developments may be short-lived, as they both depend on temporary subsidy programs.

While the issue of a long investment horizon arises with traditional infrastructure investment, it is particularly relevant for low-carbon infrastructure projects, due to higher risks and lower expected returns

[4] United Nations, January 2013. *National Development Banks for Long Term Financing Note for G20*

over the life of the project. Financing for projects is raised on the basis of the future income stream. Yet, to date, renewable energy investments have not yet yielded high returns. Capital costs on low-carbon infrastructure projects are often higher than for alternative investment opportunities, while future cash flows are more uncertain due to the technology – as output depends on natural resources, which can be unpredictable – as well as to uncertainty surrounding market formation and the regulatory environment. Financing is also difficult to raise for new technologies, which carry high risks that are often difficult to measure and price, have high operating expenses and are often less reliable in the early stages of development. This is true of most green technologies, even those like wind and solar PV. Furthermore, price distortions, e.g., fossil fuels subsidies impact the competitiveness of renewable energy investments.

## 3. Infrastructure financing: The emerging story

### *3.1 Project viability: The role of public finance*

Despite having high socio-economic rates of return, infrastructure projects across the developing world are typically not financially viable, as expected revenues are unable to cover project costs based on existing tariffs. To interest private investors to finance these projects requires closing the financial viability gap (i.e., gap between costs and expected revenues), using public resources through Viability Gap Financing (VGF) mechanisms. These take on particular significance as tools to attract private capital in green infrastructure projects where the size of the viability gap tends to be larger than given higher costs, and difficulties to monetize and return the co-benefits from green investments (such as improved public health or reduced greenhouse gas emissions) to revenue streams. In fact, there is evidence that the very presence of public finance in a renewable energy project reduces the gearing ratio (debt/(debt + equity)) by almost 10%[5].

VGF programs should be designed to strategically complement existing legislative and institutional provisions supporting private financing of infrastructure in countries, and channel VGF support to only those projects that are economically worthy but financially not viable. More broadly, governments should ensure that incentives, pricing and regulations are aligned to attract financing. Subsidies financed by donor agencies for green investments – through, for example, concessionary finance windows of infrastructure funds, budget transfers, government-backed guarantees and output-based aid – should be designed and scaled to cover the additional risks and costs of green technologies and investments.

But constrained public budgets call for raising and channeling private capital into infrastructure provision. The sections below examine the shifting landscape of private financing and how countries can access it.

### *3.2 The changing reality of bank financing*

In most countries, bank lending has been the dominant form of financing long term investments in infrastructure, despite the asset-liability mismatch of short term bank deposits vis-à-vis infrastructure's long-term capital requirements. This is particularly so in emerging markets, where corporate bond and securitization markets are relatively undeveloped[6], and unlikely to be able to generate the type and volume of long term financing that infrastructure financing requires. But the financial crisis and the wave of regulation that ensued has fundamentally changed the banking system and the role it may play in infrastructure financing in the foreseeable future. Banks are now

[5] OECD Environment Directorate Input to G20 World Bank Paper on Long Term Investment Financing for Growth and Development.

[6] Mapping Global Capital Markets 2011, McKinsey Global Institute, August 2011.

responding to higher safety margins vis-à-vis higher capital and liquidity requirements by increasing their lending rates[7], trimming risk assets[8], and being more selective.

Not surprisingly, the resulting deleveraging and retrenchment of banks from the global financial markets has left a huge gap to finance infrastructure. The general retrenchment by European banks in particular is constraining infrastructure and long-term investments not just in Europe but around the world. For instance, French and Spanish banks provided 40% of trade credit to Latin America and Asia in 2010; but according to Morgan Stanley, since June 2011 foreign lending by French banks has shrunk by as much as 20%, i.e., by more than $650 billion[9]. With banks retreating, non-bank financing for infrastructure is now emerging as the new imperative.

In the developing world, bank deposits constitute an asset class with enormous growth potential because large swaths of the population have no bank accounts. Indeed, of the worldwide bank deposits that increased by $2.9 trillion in 2010, China accounted for $1.1 trillion reflecting the high savings rates of households and corporations and limited range of savings vehicles available to them[10]. Banks in emerging markets can therefore offer access to domestic financing through large pools of capital for investment in infrastructure, housing etc. But the asset-liability mismatch challenge remains for bank capital to be suitable for financing infrastructure. Emerging markets therefore need to relook at this asset class and develop refinancing models to credibly lengthen the tenor of debt available for infrastructure, and suitable risk-mitigating instruments to hedge against refinancing risk. These measures notwithstanding, developing countries too will need to explore non-bank financing channels given their huge infrastructure gaps. The section below presents a few emerging options for non-bank financing of infrastructure.

### *3.3 Non-bank financing options for infrastructure*

Bond markets

International capital markets present a largely untapped pool of capital to boost the debt capacity available for infrastructure development. Infrastructure project bonds can help access financing for construction and refinancing short term bridge loans by banks for infrastructure projects. The key pre-requisite for accessing capital through bond markets is securing a credit rating at or above investment grade from an internationally recognized rating agency. Importantly, sovereign rating of the host country does not necessarily operate as a ceiling and it has been possible for well-structured projects to obtain a higher credit rating than that assigned to the country in which the project is located[11]. Credit enhancements, guarantees and International Financial Institution (IFI) lending can be used to support bond issuances through higher credit ratings. This can take many forms, but rating agencies have indicated that lines of credit issued during the construction phase of a project can increase the rating to a level that is safe for institutional investors. One such initiative is the Europe 2020 Bond Initiative. In this case, the project bond credit enhancement (PBCE) instrument by the EIB is given in the form of a loan or a line of credit, which may be used during the construction phase. According to Fitch Ratings, this could move a project from BB to A, allowing for the participation of institutional investors[12]. Other aspects that could be explored is for developing

[7] Santos, A. O. and D. Elliot. September 2012. *Estimating the Costs of Financial Regulation*. IMF Staff Discussion Note.

[8] Institute of International Finance, September 2012. *The Cumulative Impact on the Global Economy of Changes in the Financial Regulatory Framework*.

[9] The Economist. Non-bank finance: Filling the bank-shaped hole, December 15, 2012.

[10] , McKinsey Global Institute, August 2011. Mapping Global Capital Markets.

[11] FinanceAsia, September 18, 2012. Is the bond market the way forward for project finance?

[12] http://www.eib.org/attachments/fitch_eib_project_bond_credit_enhancement_proposal.pdf

countries to create credit enhancement structures that credit enhance project risk in a similar way in which monoliners used to function.

Similarly, municipal bond markets can serve as market-based tools to leverage private capital into municipal infrastructure. Municipal bonds are associated with financial independence, accountability and transparency of financial performance of local governments. In the context of decentralization spreading across the globe, the development of municipal bond market is critical for economies to unleash the potential of cities as engines of growth. Overall, developing countries should institute financial and regulatory systems to utilize municipal bonds and revenue bonds – in addition to commercial bank lending and PPPs – for financing infrastructure projects. Tax regimes can be created or modified to incentivize such structures.

Pension funds and institutional investors

Pension and insurance funds offer pools of non-bank capital to flow into infrastructure, without the asset-liability mismatch problem that plagues bank financing. According to OECD, private pension funds have accumulated some $30tr[13], which could be deployed for infrastructure development. Pension funds are increasingly being set up – countries like Mexico and Peru have developed national pension funds over the past 10 years– and as they grow, will look to diversify their assets from government instruments (typically governments Treasury bonds) to other sources of investment. Infrastructure presents an opportunity for this investor class. However, there is a need to ensure that funds invested generate suitable rates for future pensioners. Indeed, regulators in mature markets do not like defined-contribution schemes holding long-dated, seldom-traded assets, like infrastructure debt, because they are not liquid enough[14]. Moreover, the disappearance of monoline insurers has complicated channeling institutional finances into infrastructure. The monoline was important for institutional investors who did not have the expertise required to appraise and monitor projects themselves. Their exit has reduced the appetite of institutional investors who previously invested in monoline-insured projects. As bank lending becomes increasingly limited, new instruments need to be found, particularly in developing countries, to engage institutional investors in infrastructure.

National Development Banks[15]

In the absence of sufficient long-term private sector financing, many countries have used public funding through National Development Banks (NDBs) to support long-term investment, complementing the financial sector by intervening in the market segments that commercial banks do not engage, or do so only partially. Similar to Multilateral Development Banks (MDBs), NDBs also play a countercyclical role, especially during crises when private investors become highly risk-averse[16]. Thirteen countries of the G20 have some form of national development bank, with combined assets amounting to more than US$3 trillion (Table 1).

**Table 1: Financial indicators for NDBs in G20 countries**

[13] OECD Pension Markets in Focus, September 2012.
[14] The Economist. *Non-bank finance: Filling the bank-shaped hole*, December 15, 2012.
[15] United Nations, January 2013. *National Development Banks for Long Term Financing Note for G20*.
[16] Brei, Michael and Alfredo Schclarek (2013), *Public Lending in Crisis Times*, Journal of Financial Stability, Available at http://dx.doi.org/10.1016/j.jfs.2013.01.002.

| Country | Institution | Total assets | Total loans | Credit rating (Foreign, Long-term) | | |
|---|---|---|---|---|---|---|
| | | USD billions circa 2011 | | MOODY'S | STANDARD & POOR'S | Fitch |
| Brazil | BNDES | 336.1 | | Baa1 | BBB | |
| Canada | BDC | 16.8 | 14.4 | Aaa | AAA | |
| China | CDB | 992.3 | 877.0 | Aa3 | AA- | A+ |
| Germany | KfW | 640.3 | 472.4 | Aaa | AAA | AAA |
| India | IDBI | 546.1 | 340.1 | Baa3 | BBB- | |
| Italy | Cassa depositi e prestiti | 354.0 | 127.6 | Baa2 | BBB+ | A- |
| Japan | DBJ | 189.6 | 166.0 | Aa3 | AA- | |
| Mexico | BANOBRAS | 23.2 | 12.2 | Baa1 | BBB | BBB |
| Russia | Vnesheconombank | 71.3 | | Baa1 | BBB | BBB |
| South Africa | IDC of South Africa | 13.8 | 2.0 | Baa1 | | |
| South Korea | KDB Financial Group | 149.3 | 74.5 | Aa3 | A | AA- |
| Turkey | Kalkinma | 1.5 | 981.9 | | | BBB- |
| United States | Ex-Im Bank of the US | 13.7 | 11.8 | AAA | AA+ | AAA |

*Source*: UN DESA calculations based on Annual Reports.

For instance, Germany's public national bank and second largest commercial bank, KfW, has assets of US$ 640 billion and occupies a wide spectrum of productive project financing, complementing private and cooperative banking on a large scale. KfW deals mainly with those business areas that are considered less profitable in the short term, such as renewable energy, environmental and climate protection. Brazil's 55 year-old entity, BNDES, provides domestic long-term industrial credit, with a high participation of credit to large enterprises, and is using equity structures for investments in innovation so that taxpayers can profit from the upside.

There are two key considerations vis-à-vis establishing NDBs for infrastructure development (i) there are fiscal costs associated with setting up NDBs, as most NDBs were created through public funds. To the extent that public funds are available to set up NDBs and channel into infrastructure, NDBs offer an alternative for the efficient use of public resources to leverage private capital through co-financing and other structures; (ii) efficient institutional design, administrative procedures and good governance should be in place to ensure that NDBs discharge their role as complements to the private sector.

Debt and equity funds

More recently, large asset and fund managers are entering the global infrastructure debt market as they seek to fill the void left by banks that are no longer able and willing to invest in infrastructure[17]. Private debt funds lock their investors in for a long period, which reduces the risk of a run. Sovereign Wealth Funds (SWFs) now manage some $5 trillion in assets worldwide[18], and could potentially be mobilized for infrastructure investment. Overall, the fund structure may be used to channel institutional and sovereign non-bank capital to meet long-term financing needs. Investment funds could also form partnerships with banks to gain exposure to assets (e.g. SME) they would otherwise have no access to[19]. The large insurers and asset managers are also partnering with banks and transferring it on to institutional investors[20].

[17] Financial Times, November 25, 2012. *BlackRock eyes infrastructure debt market.*
[18] Sovereign Wealth Fund Institute, 2012.
[19] Monetary Authority of Singapore (MAS), January 2013.
[20] The Economist, December 15, 2012. Banks are changing.

## 4. Financing for sustainable development[21]

Governments in many countries have taken steps to incentivize investment in low-carbon investments. There are three categories of support, which target both price and quantity. The first group attempts to effectively price high-carbon technologies through cap and trade schemes and carbon taxes. The second lowers the cost and/or risk associated with low-carbon technologies through subsidies or guaranteed premium payments for energy inputs, such as feed-in tariffs (FITs) or other risk-sharing mechanisms such as PPPs. The third helps to build market demand by setting quantity targets through regulations, or creating demand through government procurement or other programs.

### *4.1 Carbon pricing*

Carbon pricing policies such as cap-and-trade schemes and carbon taxes can play two functions in fostering sustainable development. First, they are designed to incorporate environmental externalities into carbon technologies to "get prices right", thereby altering incentives and make sustainable technologies more competitive with existing technologies. Second, they can be designed to raise resources, often to be used for low-carbon investments. Overall, however, the size of the carbon market remains relatively small when compared to mitigation and adaptation needs, and carbon prices remain depressed. One of the main causes behind low prices is the oversupply, as allowances were pre-determined before the crisis based on more optimistic macroeconomic scenarios. In addition to cap and trade schemes, several countries have initiated some form of national or sub-national carbon taxes, but most of these are still substantially below the levels that would be required to cover all the externalities and compensate for fossil fuel subsidies (Box 2).

**Box 2. Carbon Pricing**

The total value of the carbon market reached US$176 billion in 2011, as compared to US$159 billion in 2010. The Kyoto Protocol created the basis for international emissions trading. Under the Clean Development Mechanism (CDM) around 1.47 billion certified emission reduction (CER) units have been issued and 7510 project activities have been initiated since 2005. Under the Joint Implementation mechanism, sixteen countries issued around 39 billion emissions reduction Units (ERU) in 2011. Besides units related to the Protocol, the allowances market (US$148 billion) includes regional and national cap and trade schemes such as the European Union Emissions Trading System (EU ETS), New Zealand ETS and the Regional Greenhouse Gas Initiative (RGGI), among others. Australia created an emissions trading mechanism in 2011 that initially will fix a price on emissions, becoming a flexible price cap and trade system in 2015. Similarly, in 2012 South Korea passed an emission trading scheme (ETS) that will be implemented in 2015. There are also sub-national ETS in several countries including Japan, the United States, Canada, and Brazil. China has approved ETS pilot plans in seven cities and provinces. These mechanisms can also be used to raise new resources, for example, as part of the EU ETS, Governments auction permits for emission allowances. Some countries have agreed to allocate a percentage of the revenues to international climate finance (e.g. Germany has agreed to allocate 15 %).

Overall, however, the size of the carbon market remains relatively small when compared to mitigation and adaptation needs and carbon prices remain depressed. One of the main causes behind low prices is the oversupply, as allowances were pre-determined before the crisis based on more optimistic macroeconomic scenarios. Market prices, which range from less than US$7 per ton in the voluntary market and other schemes to US$18.8 per ton for EU ETS allowances, have not yet reached the levels required to make sustainable technologies more competitive with existing technologies. The High-Level Advisory Group on Climate Change

[21] United Nations, January 2013. *National Development Banks for Long Term Financing Note for G20*.

Financing (AGF), established by the UN Secretary General, has stated that a price of US$20 to US$25 per ton of CO2 is necessary to generate an estimated US$100 billion to US$200 billion of gross private capital flows for low-carbon investments.

In addition to cap and trade schemes, seventeen countries have initiated some form of national or sub-national carbon taxes. This includes carbon taxes initiated in eleven countries in Europe. Carbon taxes have been implemented at local levels in two cities and one county in the US, and three provinces in Canada. South Africa introduced a tax on vehicular emissions in 2010 and India introduced the clean energy tax on coal and peat. Japan is taxing fossil fuels to fund low-emission technologies. China has a resource tax on domestic sales of crude oil and natural gas and is also currently considering a carbon tax on big energy consumers by 2015.

Carbon taxes can be structured to raise new resources or to be revenue neutral. European countries that have had carbon taxes in place for over a decade have seen neutral or slightly positive effects on GDP – suggesting that it has not adversely affected the economy. Nonetheless, most taxes are still substantially below the levels that would be required to cover all the externalities and compensate for fossil fuel subsidies. For example, the carbon tax in Quebec, Canada is US$3.5 per ton, while the rate is around US$19 per ton in Ireland.

*4.2 Other mechanisms to encourage low carbon investments*

Other mechanisms may be used as alternatives to, or in conjunction with, pricing mechanisms to encourage low carbon investments. As of 2012, targets in renewable energy exist in at least 188 countries, up from 109 countries reported in 2010. At least 109 countries had some type of renewable power policy, as of early 2012, up from 96 countries in 2011. Quotas or Renewable Portfolio Standards were in use in 18 countries and at least 53 other jurisdictions in 2012. Quota policies are often combined with mandates for utilities to meet their obligations through the trading of certificates. For example, in 2011, India launched a new Renewable Energy Certificate Scheme (REC) that is linked to its existing quota policies. In addition, a number of countries have instituted competitive bidding for fixed quantities of renewable electricity capacity.

FITs were in place in at least 65 countries and 27 states, as of early 2012. In addition, green investment tax credits are currently used in 18 developing countries. However, the rate of adoption of new renewable energy targets and policies in place to support investments in renewable energy has fallen in recent years, partly due to fiscal pressures in developed countries, as well as to measures to improve existing instruments and achieve more targeted results. For example, a number of governments in Europe have recently decreased financial support for renewable energy, including Spain, UK, Italy and Switzerland.

In Brazil, BNDES has participated with commercial banks on a number of large wind projects. Because the transactions are too large for any single local financial institution to fund them, BNDES has provided additional capacity through direct Tier 1 loans. Similarly, in Chile, CORFO (Corporación de Fomento de la Producción) has established a program aimed at supporting SMEs to optimize energy consumption and reduce the costs associated with its use. It also introduced in 2009 a capital guarantee and risk capital fund in support of clean energy and energy efficiency projects.

More broadly, governments have begun to look to financial mechanisms aimed at risk sharing, including guarantees and PPPs. Such guarantees have been structured to cover specific risks, such as country or convertibility risk, or as a first loss guarantees in equity or debt funds. As an alternative to charging a fee for first loss guarantees, governments are also considering structures used in capital markets, whereby they participate in the 'equity tranche' of a product in return for

taking the first loss risk. In doing so they provide a first loss guarantee to private investors, while allow taxpayers to share in potential upside returns associated with the investment.

Some developing countries have used other types of structures, such as country funds. For example, rural energy funds have been set up in countries such as Bangladesh, Mali, Senegal and Sri Lanka. These funds have the triple advantage of reducing poverty, improving infrastructure (including access to electricity) and stimulating investment in green technological adaptation and diffusion. To stimulate market demand, many countries have also initiated public procurement policies. Overall, a variety of measures are increasingly being employed by both developed and developing countries to attract investments for sustainable development. This trend appears likely to expand over the longer term, despite the recent fall in the rate of adoption of new targets and supporting policies.

### *4.3 International Efforts*

The UN General Assembly, in its resolution 66/288 of 27 July 2012, endorsed the outcome document of the United Nations Conference on Sustainable Development (Rio de Janeiro, Brazil, 20-22 June 2012), entitled "The future we want". The document recognized the need for significant mobilization of resources to promote sustainable development. For this purpose, Governments agreed to establish an "intergovernmental committee, comprising thirty experts nominated by regional groups, with equitable geographical representation, with a view to preparing a report proposing options on an effective sustainable development financing strategy to facilitate the mobilization of resources and their effective use in achieving sustainable development objectives" (para 255). As the Rio+20 document mandates, the analysis should cover three distinct elements: (i) the financing needs identified in the short, medium and long term; (ii) existing mechanisms and instruments and their coherence and effectiveness and (iii) new ideas and proposals regarding instruments, mechanisms, allocation and delivery, among others. Building on the Rio outcome, the General Assembly has emphasized the need to reinforce coherence and coordination and to avoid a duplication of efforts with regard to the financing for development process.

Two major objectives have to be fulfilled in order to achieve effective financing of sustainable development. First and foremost, ensure coherence and coordination between different policy processes, institutions and stakeholders at the systemic level. Increased cooperation and coordination would promote a more coherent international financial architecture that supports sustainable development. Second, increase the mobilization and improve the allocation of resources for sustainable development across all relevant areas, stakeholders and processes of the post-2015 development agenda while at the same time providing a framework for development cooperation.

## 5. The new world of financing infrastructure

**Expanding the use of guarantees, risk insurance and innovative finance to crowd in institutional investors and develop local capital markets:** As debt markets contract—institutional investors, such as pension funds and insurance companies, need market instruments and regulatory support in order to invest in infrastructure. Credit enhancements can help to release this long-term capital. These enhancements would build local capital markets, and mitigate currency risk and specific regulatory risks that are both exogenous and endogenous to projects. Furthermore, pension funds in emerging economies have a larger role to play than in developed economies, as their financial system is mostly bank-based and their financial markets are still small in relation to the size of their economies.

**Creation of on-lending facilities for sub-sovereign entities,** facilitated and/or guaranteed by national governments, could aid municipal, non-sovereign and sub-national governments in developing large scale infrastructure.

**Incorporating green finance into investment policies and financing mechanisms**. Governments need to assure that incentives, pricing and regulations are aligned to attract financing. Subsidies financed by donor agencies--through, for example, concessionary finance windows of infrastructure funds, viability gap funds, budget transfers, government-backed guarantees and output-based aid--should be designed and scaled to cover the additional risks and costs of green technologies and investments.