

2015

EMnet Working Group Meeting:
5 October 2015

THEMATIC POLICY NOTE

GREEN INVESTMENT IN EMERGING MARKETS



INVESTMENT
ENERGY RISK MANAGEMENT
INFRASTRUCTURE INNOVATION
POPULATION GROWTH MIDDLE CLASS
GREEN GROWTH COMMODITIES
REGULATIONS
PRODUCTIVITY **SKILLS**
INDUSTRIALISATION
CREDIT

Policy Note

Green Investment in Emerging Markets

Abstract

The first edition of the EMnet “Greening of the Economy” Working Group Policy Note (2015) provides insights and policy recommendations from the private sector on renewable energy and energy efficiency investment in emerging markets. The analysis is partly based on discussions at the EMnet Working Group meeting held on 5 October 2015 at the OECD headquarters in Paris.

Key messages include:

- With the increasing cost competitiveness of renewables, clean-energy infrastructure projects are becoming more attractive to private investors.
- Green growth generates opportunities for investment across a range of areas including clean energy, energy efficiency and pollution reduction. Although the SDGs and the recently adopted COP 21 Paris Agreement showcase country commitments to greener growth, countries still need more stable and ambitious policies to promote it.
- The risk of policy changes remains the key challenge for scaling up investment, and companies continue to stress the importance of a predictable and stable policy environment for investment.
- Access to finance for small- and medium-sized projects remains a challenge. Creating new tools to pool investments or improve access to capital markets is essential to further expand investment.
- Further development of new technologies will deeply influence the pace of the transition to a greener economy. Companies are closely following technological developments and increasing investments in research and development.

OECD DEVELOPMENT CENTRE

The Development Centre of the Organisation for Economic Co-operation and Development (OECD) was established in 1962 and comprises 26 member countries of the OECD and 24 non-OECD countries. The European Union also takes part in the work of the Centre.

The Development Centre occupies a unique place within the OECD and in the international community. It provides a platform where developing and emerging economies interact on an equal footing with OECD members to promote knowledge sharing and peer learning on sustainable and inclusive development. The Centre combines multidisciplinary analysis with policy dialogue activities to help governments formulate innovative policy solutions to the global challenges of development. Hence, the Centre plays a key role in the OECD's engagement efforts with non-member countries.

To increase the impact and legitimacy of its work, the Centre adopts an inclusive approach and engages with a variety of governmental and non-governmental stakeholders. It works closely with experts and institutions from its member countries, has established partnerships with key international and regional organisations and hosts networks of private-sector enterprises, think tanks and foundations working for development. The results of its work are discussed in experts' meetings as well as in policy dialogues and high-level meetings, and are published in a range of high-quality publications and papers for the research and policy communities.

For an overview of the Centre's activities, please see www.oecd.org/dev.

OECD EMERGING MARKETS NETWORK

Emerging Markets Network (EMnet) is an OECD-sponsored initiative dedicated to the private sector. Managed by the OECD Development Centre, the Network fosters dialogue and analysis on emerging economies and their impact on global economic, social and environmental issues.

EMnet gathers top executives (chief executive officers, vice presidents, managing directors, chief financial officers, heads of strategy, chief economists) of multinational companies from diverse sectors, willing to engage in debates with high-level policy makers, including heads of state and ministers, and OECD experts.

EMnet events are closed to the public and media and operate under Chatham House rule to encourage open and dynamic discussions on doing business in Africa, Asia and Latin America.

To learn more about EMnet, please see www.oecd.org/dev/oecdemnet.htm.

ACKNOWLEDGEMENTS

This Policy Note was written under the guidance of Bathylle Missika, Head of the Partnerships and Network Unit and Lorenzo Pavone, EMnet Co-ordinator (OECD Development Centre). The report was prepared by the EMnet team. The lead author was Kate Eklin with contributions from Josep Casas, Rafael Duque Figueira and Young Sun Lee.

The EMnet “Greening of the Economy” Working Group is a product of collaboration between the OECD Development Centre, Directorate for Financial and Enterprise Affairs and Environment Directorate. Particular thanks go to Géraldine Ang, Ryan Parmenter and Robert Youngman (OECD) for their contributions to the inaugural Working Group meeting held on 5 October 2015.

The report also benefitted from comments from Christopher Kaminker, Takayoshi Kato, Ryan Parmenter, Nelly Petkova, Hideki Takada and Jaco Tavenier (OECD), Carlos Gascó and Marta Martinez (Iberdrola) and Gavin Maxwell (Coolfin Partnerships). The authors thank Myriam Gregoire-Zawilski and Sonja Marki (OECD) for their valuable assistance.

The team is grateful to Marina Urquidi for editing assistance and the OECD Development Centre’s Communications and Publications Unit, especially Delphine Grandrieux, Aida Buendia and Vanda Legrandgérard for their support in producing the report.

The opinions expressed and arguments employed here are the sole responsibility of the authors and do not necessarily reflect those of the OECD or of the governments of its member countries or of EMnet members.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

Table of contents

Challenges and opportunities of green growth in emerging markets	5
Developing countries will be the hardest hit by climate change	5
Rapid increase in energy demand	5
Green growth is essential.....	6
Rapid investment must be scaled up further.....	7
Green growth can be an opportunity to accelerate development.....	9
Public policies for the transition to a low-carbon economy	10
Managing policy risk.....	11
Private sector insights and recommendations	12
Financing the transition to a greener economy	12
Overcoming barriers to green investment	14
Investing in China	15
The role of energy efficiency and new technologies	16
Conclusions	16
Annex 1.1.....	17
Notes.....	18
References	18

CHALLENGES AND OPPORTUNITIES OF GREEN GROWTH IN EMERGING MARKETS

Developing countries and emerging economies are faced with rising resource requirements and escalating impacts from climate change. Promoting green growth through investments in areas such as renewable energy and energy efficiency will be essential. Given the importance of decarbonising the electricity sector, this Policy Note will focus primarily on promoting investment in renewable electricity generation. This was also the main area of discussion at the October 2015 Working Group on the Greening of the Economy.

Developing countries and emerging economies are appearing as key international markets for green investment. The adoption of the United Nations Sustainable Development Goals (SDGs) in September 2015 and the Paris Agreement reached at the 21st United Nations Conference of Parties (COP 21) in December 2015 add further momentum and international commitment to advancing global green growth.

Developing countries will be the hardest hit by climate change

Resource scarcity, pollution impacts and their particular exposure to the consequences of climate change amplify the importance and urgency of investing in green infrastructure in developing countries and emerging economies. Local air pollution, for example, is having an escalating impact on South and Southeast Asia. By reducing air pollution, the region could save up to USD 280 billion in associated health costs and nearly 200 000 early deaths (OECD, 2014b).

According to OECD estimates, climate-change impacts on the global economy will increase exponentially with rising temperatures. The highest impacts are expected in developing countries, particularly in Africa and South and Southeast Asia, with an ensuing decrease of up to 10% of expected world GDP by the end of the century.¹ Agricultural activities, particularly in the Middle East, Africa, and South and Southeast Asia, will be the hardest hit (OECD, 2015a). See Annex 1.1 for a detailed figure of expected losses by country and region through to 2060.

Rapid increase in energy demand

Rapid industrialisation, population growth and urbanisation are also increasing energy needs significantly (OECD, 2014a). The dynamics of international energy demand will be transformed in the next 25 years. The International Energy Agency (IEA) predicts that energy demand out to 2040 will slow and flatten in Europe, Japan, Korea and North America, while demand in the rest of Asia, Africa, the Middle East and Latin America will experience strong growth (IEA, 2015a). By the early 2030s, China is likely to overtake the United States as the largest oil-consuming country and India, Southeast Asia, the Middle East and sub-Saharan Africa will lead global energy-demand growth (IEA, 2015a). Facilitating cost-effective access to energy in rural and remote areas will be crucial for Africa, where by 2050 a two-thirds increase is expected in the rural population of sub-Saharan Africa (AfDB/OECD/UNDP, 2015). These increases in demand correspond with increasing attention to energy access as a key area for sustainable development. For example, Sustainable Development Goal (SDG) 7 seeks to provide universal access to modern energy services.

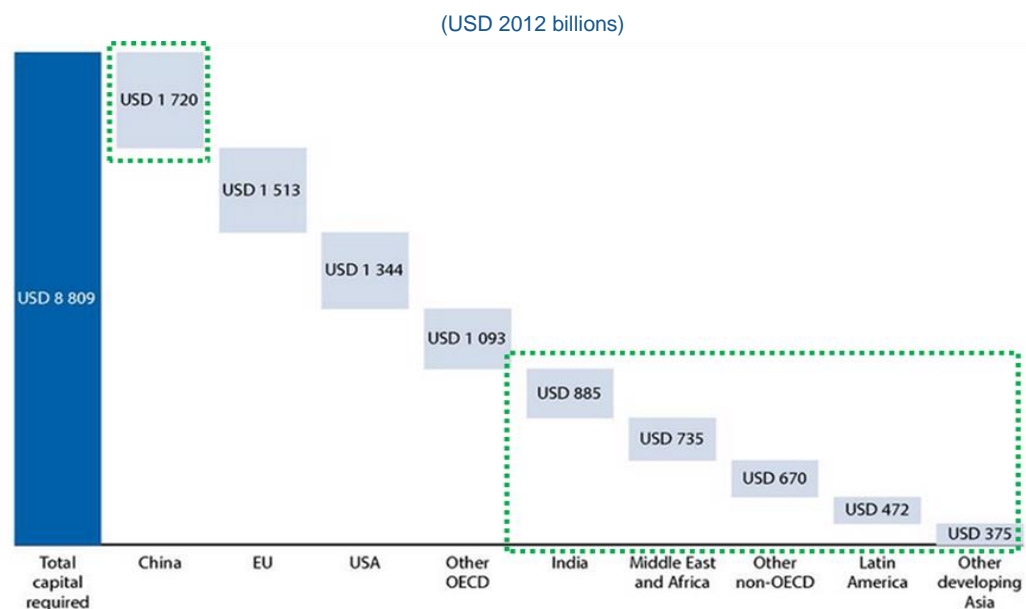
Green growth is essential

Fostering “green growth” in emerging economies and developing countries is essential to combat the impacts of climate change while responding to greater demand for resources.ⁱⁱ Economic growth must catalyse investment and innovation in new technologies, services and infrastructure that will help mitigate and adapt to climate change, reduce pollution and promote conservation.

Green growth, however, presents a particular set of challenges and opportunities for developing countries and emerging economies. Although the SDGs and the recently adopted COP21 Paris Agreement showcase country commitments to greener growth, countries still lack stable and ambitious policies to promote green growth. Businesses investing in these markets may face difficulties in hiring highly skilled local staff. In addition, weak institutional capacity and limited resources can constrain investment (OECD, 2015b). Incomplete technical and financial data can discourage new investments. Weak banking sectors and underdeveloped or inexistent capital markets limit green finance further. Finally, developing countries and emerging economies often face strong domestic pressure for rapid development, economic growth and welfare improvement, which could be viewed as conflicting with environmental objectives (OECD, 2013).

Achieving green growth will require increasing green investment at scale and pace (OECD, 2015c). There exists a range of investment estimates for the transition to low-carbon economy. According to the Global Commission on the Economy and Climate, for example, to transition to a low-carbon economy around USD 93 trillion will need to be invested globally in cities, land-use and energy sectors alone between 2015 and 2030 (GCEC, 2014). For sustainable-energy infrastructure, the OECD estimates that nearly USD 9 trillion in capital will be needed, with China, India, Africa and the Middle East requiring significant investment (Figure 1.1).

Figure 1.1. Sustainable-energy investment requirements 2014-35 (450 Scenario)ⁱⁱⁱ

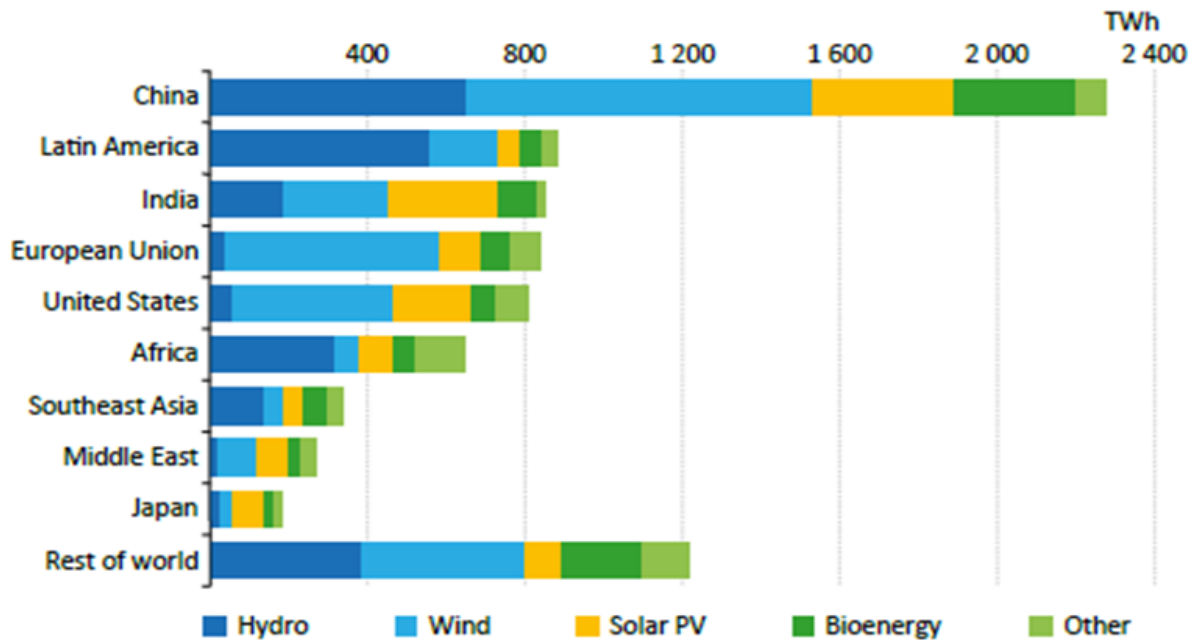


Note: Figures are for power-plant investments in biomass, hydro, onshore and offshore wind, solar PV and “other renewables”. Figures do not add up to rounding and are based on IEA data.

Source: OECD (2015h), *Mapping Channels to Mobilise Institutional Investment in Sustainable Energy, Green Finance and Investment*, <http://dx.doi.org/10.1787/9789264224582-en>.

In terms of additional capacity expansion to 2040, Figure 1.2 shows the growth in renewable-electricity generation using the IEA's New Policies Scenario.^{iv}

Figure 1.2. Growth in renewable-electricity generation by region and type in the New Policies Scenario, 2013-40



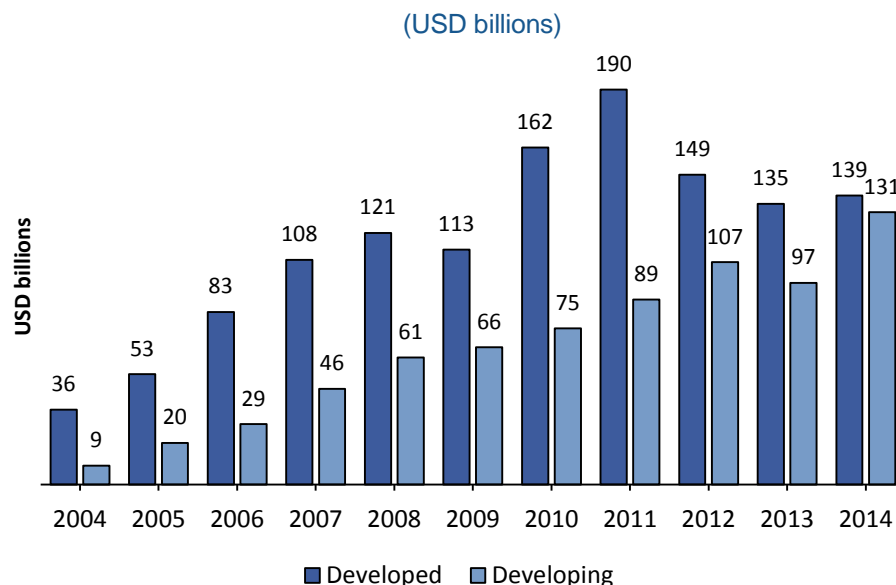
Note: "Other" includes geothermal, concentrated solar power and marine.

Source: IEA (2015a), *World Energy Outlook 2015*, <http://dx.doi.org/10.1787/weo-2015-en>.

Rapid investment must be scaled up further

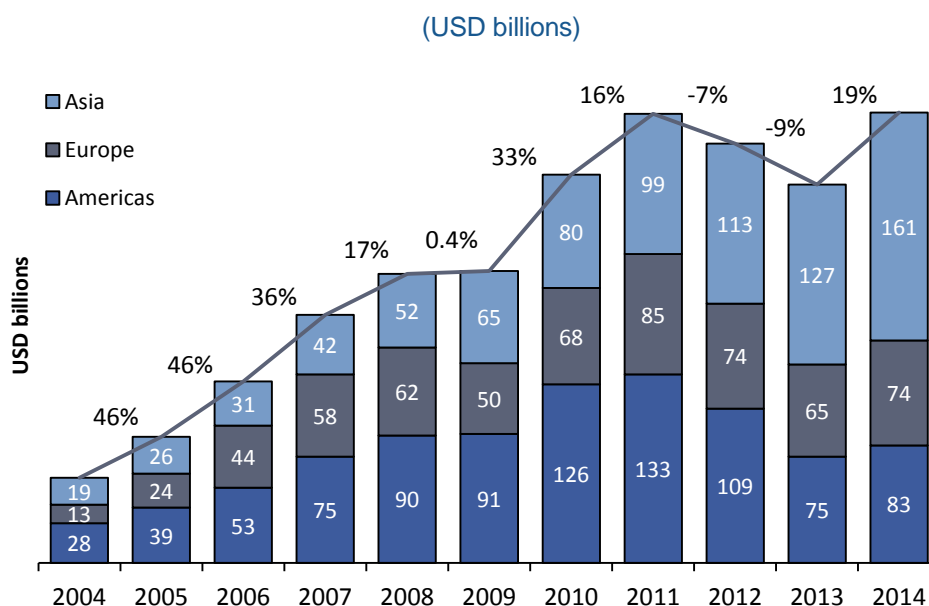
Developing and emerging countries are becoming key players in the renewable-energy sector (Figure 1.3). Renewable energies, particularly solar and wind, are becoming a natural part of the energy mix in developing and emerging countries thanks to their price competitiveness, ability to hedge against future fossil-fuel price increases and the relative speed of building up capacity compared to traditional fuel sources (BNEF, 2016). In 2014, investments in renewable energy in developing countries amounted to USD 131.3 billion, up 36% from 2013 and nearly surpassing the total amount invested by developed countries (USD 138.9 billion) (FS-UNEP, UNEP and BNEF, 2015). Recent clean-energy investment trends from Bloomberg New Energy Finance (BNEF) for the Americas, Asia and Europe are shown in Figure 1.4. Indonesia, Chile, Mexico, Kenya, South Africa and Turkey are investing significant capital and have individually invested more than USD 1 billion in renewables, while Jordan, Uruguay, Panama, the Philippines and Myanmar each spent between USD 500 million and USD 1 billion (FS-UNEP, UNEP and BNEF, 2015). These are encouraging figures, but given the scale of the needs, mobilising investments in green infrastructure requires leveraging even more domestic and international private capital (OECD, 2015c). See Box 1.1 for a discussion of recent private investment in the Indonesian geothermal sector.

Figure 1.3. Global new investment in renewable energy: developed versus developing countries, 2004-14



Note: New investment volume adjusts for reinvested equity. Total values include estimates for undisclosed deals. Developed volumes are based on OECD countries excluding Mexico, Chile and Turkey.
 Source: FS-UNEP, UNEP and BNEF (2015), *Global Trends in Renewable Energy Investment 2015*, <http://fs-uneep-centre.org/publications/global-trends-renewable-energy-investment-2015>.

Figure 1.4. New investment in clean energy by region, 2004-14



Source: FS-UNEP, UNEP and BNEF (2015), *Global Trends in Renewable Energy Investment 2015*, <http://fs-uneep-centre.org/publications/global-trends-renewable-energy-investment-2015>.

Mobilising private investment in China is particularly critical given the scale of the environmental challenges as well as the urgency of transitioning to a cleaner and lower-carbon economy. Ahead of the COP 21 climate-change conference, China made ambitious pledges to reduce carbon emissions per unit of GDP by 60-65% from 2005 levels by 2030 (Department of Climate Change, National Development and Reform Commission, 2015). During COP 21, China announced it would cut annual coal consumption by 100 million tonnes and reduce power-sector emissions of major pollutants by 60% by 2020 (COP 21, 2015). The Chinese government recognises, however, that it cannot transition to a low-carbon economy alone. Recent calculations from the People's Bank of China and the United Nations Environment Programme (UNEP) show that USD 320 billion in green investment are needed annually over the next five years to achieve 2020 environmental targets (PBC and UNEP, 2015).^v The Chinese government, however, can only supply 10-15% of this capital; the remaining investment will need to come from the private sector (PBC and UNEP, 2015).

Box 1.1. Attracting private investment in the Indonesian geothermal sector: Sarulla Geothermal Power Plant

The Sarulla Geothermal Power Plant in Indonesia highlights how supportive public policies can help attract private investment into renewable energy. Indonesia has the world's largest geothermal resource with a potential capacity of 29 GW. Less than 5% of the potential resource has been utilised to date, however. Barriers to private-sector investment include a lack of financing, inadequate feed-in tariffs and regulatory challenges. For the case of the Sarulla Geothermal Plant, public-sector support improved the bankability of the project for the private consortium Sarulla Operations Limited. Government backing in the form of guarantees and long-term feed-in tariffs helped to attract long-term financing and improved the expected return rates of the project.

The Sarulla project has the greatest amount of private-sector involvement in the Indonesian geothermal sector. The Sarulla Plant is already delivering power at a comparable cost to other local and international geothermal projects, but in Indonesia, it remains more expensive than coal. When completed, it will be the largest single contract geothermal power-plant project in the world with a projected total capacity of 330 MW in 2018.

Source: Rakhmadi and Sutyono (2015), Using Private Finance to Accelerate Geothermal Deployment, <http://climatepolicyinitiative.org/publication/using-private-finance-to-accelerate-geothermal-deployment-sarulla-geothermal-power-plant-indonesia/>.

Green growth can be an opportunity to accelerate development

The green transition is also an opportunity for countries to “leapfrog” older technologies, scale down investments in resource-intensive industries and promote the development of cleaner, more efficient infrastructure (OECD, 2014c). In developing countries and emerging economies, a major part of the infrastructure stock required to meet development goals is yet to be built. The massive unmet infrastructure needs therefore offer a window of opportunity to develop low-carbon alternatives directly. Choices made today about types, features and location of new and renovated infrastructure will “lock-in” commitments^{ll} to future levels of climate change and to vulnerability or climate-resilience (Corfee-Morlot et al., 2012). Hence, there is an opportunity to advance forward-looking infrastructure development strategies that integrate climate change considerations to achieve low-carbon and climate-resilient development. Other benefits of adopting green growth include creating domestic jobs, and fostering technology transfers and innovation across value chains.

PUBLIC POLICIES FOR THE TRANSITION TO A LOW-CARBON ECONOMY

Climate change is not the only factor pushing countries towards a greener economy. Decreasing pollution and health costs and leapfrogging older technologies are a few rationales for governments to pursue a more sustainable economy. Commitments to implement the SDGs and the Paris Agreement on climate change give further support and weight to sustainable green investment. According to a recent OECD publication (2015f), *Aligning Policies for a Low-Carbon Economy*, in order to achieve this transition, policy makers should co-ordinate green policies by using a three-pillar approach, which comprises:

- putting an effective price on greenhouse-gas (GHG) emissions, which will provide an incentive to reduce emissions, and invest and innovate in low-GHG technologies;
- developing regulations and technical standards when price signals may be less effective due to market barriers or transaction costs; this can be particularly effective in the household sectors and include measures such as emissions-performance standards or energy-efficiency rules;
- and promoting the competitiveness of low-carbon technologies by providing targeted technology support to help develop and lower the cost of risky, but potentially promising low-GHG technologies.

In addition to promoting core climate policies, governments must also tackle policy misalignments that can hinder green investment. Conflicting incentives in competition, trade, tax and innovation policies can inadvertently discourage cleaner and more efficient investment (OECD, 2015f). For example, it is not only necessary to reduce subsidies for fossil fuels but also to revise existing taxation beyond the energy sector as these may be indirectly encouraging carbon-intensive choices. Similar misalignments are found in trade policy, where import tariffs still penalise trade in some of the technologies needed for the low-carbon transition (OECD, 2015e).

In addition, local-content requirements are frequently used by governments to promote domestic renewable-energy industries but can have harmful unintended consequences. For example, in the case of India's solar photovoltaic (PV) market, the local-content requirement increased costs by up to USD 0.08 per watt for Indian solar energy (OECD, 2015e). In Brazil, local-content requirements to source wind-turbine towers locally increased overall project costs due to Brazil's high steel prices (OECD, 2015e). Recent empirical analysis by the OECD confirms that these requirements can in fact hamper international investments in solar PV and wind energy. Furthermore, when the full value chain is considered, local-content requirements have negative or mixed impacts on job creation, value added and technology transfer (OECD, 2015e). To avoid negative outcomes, policy makers should design domestic incentive measures that do not differentiate between domestic and international investors. For example, well-targeted research and development (R&D) support can stimulate innovation across segments of the value chain, build local manufacturing capability and encourage technology transfer from imports and foreign direct investment (FDI). Training programmes can also be used to improve the technological skills of manufacturers, build local capability of downstream firms and encourage innovation (OECD, 2015e).

Policy makers must also reduce barriers that inhibit private investment in green infrastructure. Governments should recognise that in the realm of infrastructure investment, whether it is low-carbon or not, the private sector faces many challenges. Political and regulatory uncertainty, the

absence of a clear pipeline of projects and critical mass and the need for projects at an appropriate scale (e.g. projects may be too small or too large) can all reduce the attractiveness of investments for the private sector (OECD, 2015h). In some countries, companies may simply lack information regarding available green technologies. For developing countries and emerging economies, there are additional challenges such as weak enabling conditions, limited technical and institutional capacity, a shortage of political will or awareness and a potential path dependency towards traditional infrastructure development (e.g. building fossil-fuel fired plants to supply energy for rapidly growing needs rather than pursuing cleaner alternatives) (Corfee-Morlot et al., 2012).

To overcome these financing barriers, governments can help to mitigate risks by using targeted interventions to reduce or reassign different risks. These mechanisms include guarantees and insurance products, public stakes and other forms of credit enhancement. By providing coverage for risks which are new and are not currently covered by financial actors, or are simply too costly for investors, risk-mitigating tools increase the attractiveness and acceptability of green investments for risk-averse investors (OECD, 2015h).

Managing policy risk

While political risks such as expropriations or security issues remain relevant in some regions, investors identified the risk of policy changes (“policy risk”) as the key barrier to investment. A stable policy environment is crucial for any project and is particularly important for green investments (OECD, 2015g).

The retroactive changes to renewable support policies in Spain are a particularly well-known instance of policy risk. Beginning in the mid-2000s, the Spanish government granted generous subsidies to renewable electricity producers, such as solar and wind, to increase the share of renewables in the energy mix. Rapid cost reductions in renewable technologies and the support for renewables stimulated investment on a much wider scale than the government expected. The costs of renewable energy support increased from EUR 1.2 billion in 2005 to EUR 8.4 billion in 2012 (European Commission, 2014). Meanwhile, the Spanish electricity system had a revenue deficit related to its regulated activities, known as the tariff deficit. The significant rise in electricity prices also contributed to the tariff deficit as Spain’s electricity bills increase 60% between 2006 and 2012 (Andreu, 2014). By 2013, Spain’s total tariff deficit reached EUR 30 billion (Oxford Institute for Energy Studies, 2013). Economic recession combined with a poorly-designed and expensive renewable energy support policy turned the support into a political and economic issue (Oxford Institute for Energy Studies, 2013). In this situation, Spain decided to cut back on subsidies retroactively. Although Spain did increase the role of renewables in the energy mix, the retroactive changes are ultimately harmful for future renewable-energy development and generate uncertainty regarding future policy stability. In addition, these changes also set a poor example to other countries that could consider implementing similar policies.

Box 1.2. Public policies to encourage energy efficiency

Governments at all levels in both developed countries and emerging economies are becoming increasingly active promoters and investors in energy efficiency. In a scenario with no changes in current green policies, world energy demand will increase more than 45% by 2040. A transition to a green economy cannot occur without improvement in energy efficiency. Despite low oil prices, energy efficiency remains at the top of the policy agenda. Yet encouraging improvements in energy efficiency faces a range of complex barriers and will require policy co-ordination amongst all stakeholders involved including governments, ministries, agencies, contractors, etc.

Governments promote domestic energy efficiency in several ways. By adopting regulations and technical standards, public policies can shape the way energy-efficiency markets operate. Governments can actively encourage energy-efficiency technologies by directly investing in a public-private partnership or by offering incentives such as tax benefits for efficiency. Governments can also further develop their human capital in the engineering and technical fields relevant for energy efficiency by promoting the related education.

Sources: IEA (2014a), *World Energy Investment Outlook 2014*, www.iea.org/publications/freepublications/publication/WEIO2014.pdf; IEA (2015b), *Energy Efficiency Market Report 2015*, www.iea.org/publications/freepublications/publication/MediumTermEnergyefficiencyMarketReport2015.pdf; Petrick and Sinha (2015), *Energy Efficiency: Opportunities in Emerging Markets*, www.bain.com/Images/BAIN_BRIEF_Energy_efficiency_in_emerging_markets.pdf.

PRIVATE SECTOR INSIGHTS AND RECOMMENDATIONS

The private sector is becoming increasingly engaged in green projects. With the increasing cost competitiveness of renewables, clean-energy infrastructure projects are becoming more attractive to private investors. Key areas of discussion at the 2015 EMnet Working Group on Greening the Economy included scaling up green finance, overcoming public-policy barriers and the importance of technology in improving resource efficiency.

Financing the transition to a greener economy

Financing green infrastructure projects in emerging markets requires mechanisms that are adapted to the project and the local context. In the case of renewable energy, Working Group participants noted that solar developers can be particularly affected as financing is not well adapted to most solar projects where the project size can smaller than other energy sectors.

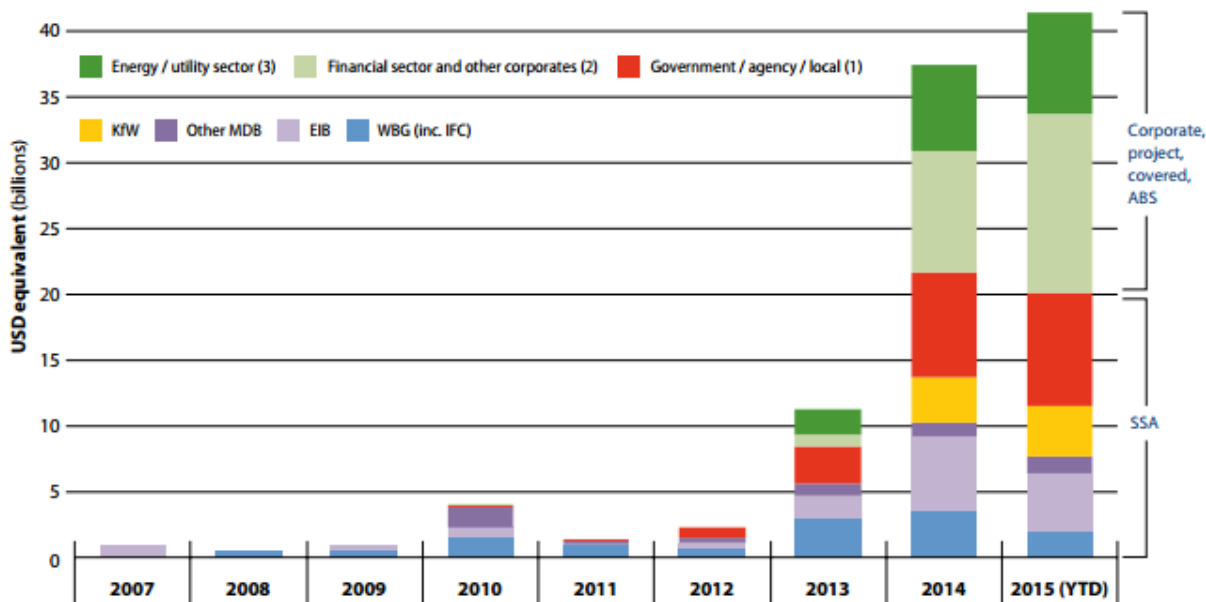
New banking regulations motivated by the 2008-09 global financial crisis present an additional challenge. Participating banks noted that they were spending more capital to comply with heterogeneous rules, entailing higher financing costs. In their efforts to promote financial stability, regulations such as Basel III and Solvency II may inadvertently limit the ability of regulated institutions such as banks and insurance companies to finance long-term infrastructure investments. Participating multinational banks estimated that projects under USD 100 million might not be financially viable unless financing rules and procedures were standardised across countries.

Even for private equity and development finance-backed funds there are barriers in the medium-scale energy projects. Participants noted particular difficulties for projects under USD 5 million. While these small projects face financing barriers, their small size can also deter project developers that cannot support the long process of technical assistance and diligence. In addition, the current volatility in emerging-economy exchange rates also poses an additional challenge. To overcome these barriers, investors are pooling together different projects in a same country or

combining investments in developing and developed markets in order to lower financial costs and make them attractive to institutional investors.

Green bonds are recognised as an important development. Since 2013, green bond issuance has increased significantly, yet total green-labelled issuance remains a small fraction of the bond market. By November 2015, more than USD 40 billion in “labelled” green bonds had been issued globally (Figure 1.5). Green bonds raise capital that can be used for a variety of financing purposes. To date, the majority of green bonds have been used to refinance existing lending at preferable interest rates. They can also finance new and anticipated lending indirectly (via corporate bonds and “use of proceeds” bonds) or directly (via project bonds) (OECD and Bloomberg Philanthropies, 2015). Participants also recalled that it was difficult to define what made a financial product “green” since there were no universally accepted definitions or standards for green projects or activities. Here, progress is being made by the Green Bond Principles and Climate Bond Standards. In addition, many investments that are not “labelled green” may actively contribute to sustainable development. Financial institutions participating in the Working Group expressed concerns that the “labelling” of a bond as “green” would imply additional upfront and ongoing transaction costs for certification, verification and monitoring. In practice, many issuers have accepted these costs in return for benefits such as diversification of their investor base, enhanced credibility regarding sustainability strategies and reputational benefits (OECD and Bloomberg Philanthropies, 2015).

Figure 1.5. Composition of the green bond market
(as of November 2015, USD, gross issuance)



Note: SSA = Sub-sovereign, Supranational and Agency; Muni = Municipal; ABS = Asset Backed Securities. (1) Includes national development banks, sub-sovereign jurisdictions including municipalities, agencies, and local funding authorities. (2) Includes financial-sector bonds and all other corporates that are not energy/utility sector, as well as covered, project and ABS that are not energy/utility related. (3) Includes corporate bonds issued by energy/utility companies as well as covered, project and ABS related to energy/utility companies.

Source: OECD and Bloomberg Philanthropies (2015), “Green bonds: Mobilising the debt capital markets for the low-carbon transition”, <http://issuu.com/oezd publishing/docs/green-bonds-policy-perspectives-lr>.

Overcoming barriers to green investment

In addition to financing, private green investments depend on the public sector to develop a business-friendly environment. Governments need stable, predictable and long-term policies for companies to develop projects successfully (OECD, 2015h). Recent retroactive regulatory changes for renewable energies in OECD countries such as those in Spain in 2012 are harmful institutional setbacks. Investors fear that these changes can set a dangerous precedent for emerging economies and developing countries.

Renewable-energy companies and financial-service providers attending the Working Group expressed concerns about fossil-fuel subsidies. Not only do fossil-fuel subsidies hurt the development of renewable energies, they also undermine governments' own efforts to promote cleaner and more efficient options. Moreover, fossil-fuel subsidies will either increase public expenditure or reduce tax revenue, and this can overcommit public budgets or misallocate funds that could be used in other key sectors, such as education or health (OECD, 2015d).

Requirements to use local content are an additional barrier to investment. Since 2008, local-content requirements have grown in both developed countries and emerging economies in order to favour domestic manufacturers of solar-PV and wind-energy products (OECD, 2015e). These requirements have led to many World Trade Organization disputes. Investors stressed the importance of removing these local-content requirements, which are detrimental to international investment and have a limited, if not negative impact on job creation and technology transfer (OECD, 2015e).

In general, companies at the Working Group meeting did not perceive the lack of adequate skills within local labour forces as a constraint for investing in emerging markets. Some companies have developed in-house training centres for local employees while other enterprises have opted to hire foreign professionals with the adequate technical capacity. In this sense, governments should ensure that highly qualified foreign workers can work in local labour markets.

Investing in China

The private sector recognises the importance of, and opportunity for scaling up investment in clean energy and resource-efficient technologies in China (Box 1.3).

Box 1.3. Key messages from the private sector on green investment in China

The Chinese market is active in environmental and efficiency technologies. At the 2015 EMnet meeting in Beijing on Doing Green Business in an Evolving Economic Landscape, participants shared diverse experiences with green innovation. For example, industrial facilities are recycling and recovering water and solid wastes. Sustainable aviation fuels are being developed with blended biofuels. Decreasing the weight of manufactured components, such as those in the automobile industry, is improving engine efficiency. Non-traditional areas, such as improving air-traffic control, can reduce fuel use and delays. Key outcomes from the discussion include those following.

Compared to other sectors, green-technology industry is relatively open to foreign business.

While some industries have shown signs of opening, not all markets are fully open to foreign business. For example, participants noted that for foreign investors, real estate or IT industries are more challenging than the environmental-technology sector. However, there are still limits on renewable electricity asset ownership, operation and market participation. Protecting the intellectual property of green-technology developments and further opening markets are key issues moving forward.

Strong momentum from government and new legislation is opening up opportunities.

Participants agreed that the Chinese government is prioritising environmental protection and green industrial development. For example, new legislation related to the management of water and land treatment was highlighted as a key area for opportunity.

Green technologies are there; affordability remains a challenge.

Participants highlighted diverse technological solutions that are available for greener and cleaner business practices. While affordability remains a challenge for smaller companies, large companies can help to lead trends. Clusters can be developed to support green technologies. For example, the city of Tianjin has developed the Tianjin Green Supply Chain Center, which helps companies source green technologies in a specially zoned area that benefits from favourable government support. Overall, China has had a positive experience with the development of Special Economic Zones (SEZs), and these have been particularly effective to attract foreign direct investment without crowding out domestic investment (Wang, 2013). However, further study of green-focused SEZs is needed to fully assess their effectiveness (Mohiuddin et al., 2014).

Urbanisation will be a key driver of business opportunities.

Urbanisation is contributing to pollution impacts, notably with vehicle emissions, but is also opening many opportunities for green development. Air treatment, in particular, is expected to generate trillions in investment opportunities. Public-private partnerships remain the model of choice for urban-infrastructure projects.

Source: Key outcomes of the discussion at the EMnet meeting in China, jointly organised by the China International Council for the Promotion of Multinational Corporations (CICPMC) on 7 November 2015 in Beijing; Wang, J. (2013), "The Economic Impact of Special Economic Zones"; Mohiuddin, M. et al. (2014), "The Special Economic Zone as a Locomotive for Green Development in China", <http://dx.doi.org/10.5539/ass.v10n18p109>.

The role of energy efficiency and new technologies

In order to limit global warming to 2° Celsius, energy efficiency must play a key role in reducing GHG emissions. According to IEA estimates, by 2030, energy-efficiency gains should be responsible for 49% of total energy savings, ahead of investment in renewables (17%) and upstream methane reductions (15%) (IEA, 2015b). Country data shows that energy efficiency will be responsible for approximately 80% of total savings in China and 70% in the European Union. This increased efficiency will come mostly from the industrial, construction and transport sectors (IEA, 2015b).

Improved energy efficiency will not only affect the final outcome of emission targets, it will likewise have an effect on other sectors such as industrial productivity and air quality, hence a positive effect on countries' overall economic performance (IEA, 2014b). Further development of new technologies will deeply influence the pace of the transition to a greener economy. Companies are following technological developments closely and increasing investments in research and development (R&D). In 2014, corporate R&D investments in renewable energies alone amounted to USD 7 billion (FS-UNEP, UNEP and BNEF, 2015). Smart-grid technology will increase energy efficiency, and provide reliability to the transmission system and grid stability. The implementation of micro-grids and distributed generation have great potential in both developed and emerging markets, particularly in Africa, where power blackouts are frequent, and isolated rural areas can benefit from small local projects.

CONCLUSIONS

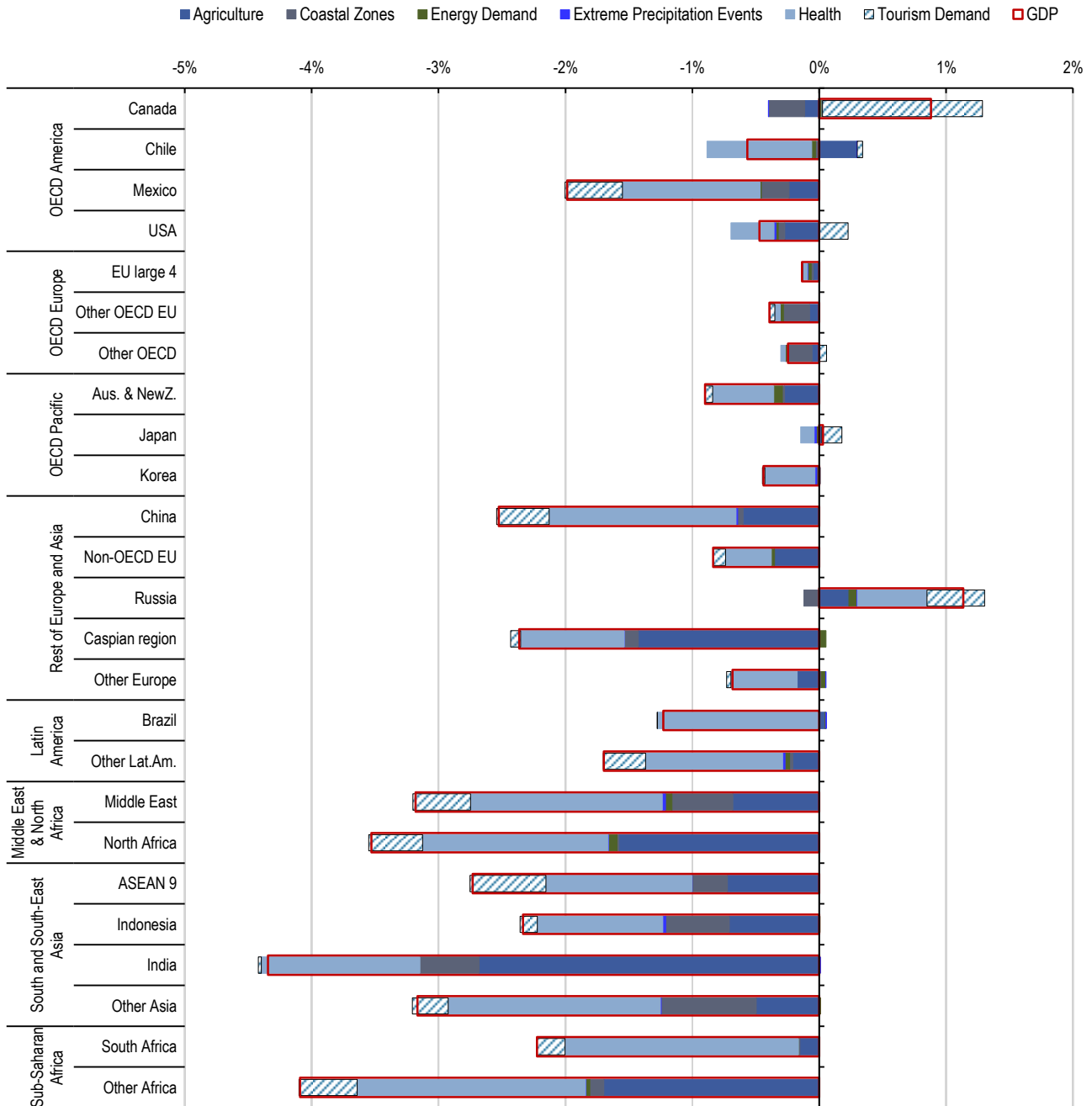
Governments and the private sector are making strong commitments to reduce emissions and improve environmental protection. It is now essential to continue to translate these goals into additional action and investment. Moreover, it is necessary to divert high-carbon investments to lower-carbon alternatives.

Despite progress, governments still struggle to fully incorporate the economic benefits of green growth and consider the potential negative feedbacks of environmental damage on GDP. Without these considerations, it is difficult to align economic and environmental priorities to prioritise green growth objectives. Greener growth can be viewed as an opportunity for businesses as markets for green technologies and services expand, innovation is incentivised, and efficiency improvements are rewarded. However, some Working Group participants still view the low-carbon transition in terms of “winners” and “losers” where new technology developers will gain and fossil-fuel developers will suffer. High-carbon incumbents, however, will continue to play a role in many developing countries as essential energy providers. Scaling up new technologies and managing the transition for existing firms will be essential to moving forward.

In emerging economies and particularly in China, significant new investment opportunities are being generated for clean-energy, energy-efficiency and pollution-reduction projects. Overcoming financing barriers for small- and medium-sized projects remains a challenge. Creating new tools to pool investments or improve access to capital markets through bond financing is essential to further expand investment. Energy companies around the world are monitoring renewable tariffs closely for expansion. Policy risk, however, remains the key challenge for scaling up investment, and companies continue to stress the importance of a predictable and stable policy environment for investment.

ANNEX 1.1.

Annex Figure 1.1. Damages from selected climate-change impacts, central projection
Percentage change in GDP in 2060



Source: OECD (2015a), *The Economic Consequences of Climate Change*, <http://dx.doi.org/10.1787/9789264235410-en>.

Notes

- i The category “South and Southeast Asia” includes ASEAN countries (Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei Darussalam, Viet Nam, Lao PDR, Myanmar and Cambodia) plus India and other developing Asian countries (OECD, 2015a).
- ii “Green growth” is defined by the OECD as “economic growth and development that ensures that natural assets continue to provide the resources and environmental services on which our well-being relies” (OECD, 2011).
- iii The 450 Scenario sets out an energy pathway consistent with the goal of limiting the global increase in temperature to 2° Celsius by limiting concentration of greenhouse gases in the atmosphere to around 450 parts per million of carbon dioxide (CO₂) (IEA, n.d.).
- iv The New Policies Scenario of the World Energy Outlook serves as the IEA baseline scenario. It takes into account broad policy commitments and plans that have been announced by countries, including national pledges to reduce greenhouse-gas emissions and plans to phase out fossil-energy subsidies, even if the measures to implement these commitments have yet to be identified or announced (IEA, n.d.).
- v Calculations from the People’s Bank of China and the United Nations Environment Programme show that USD 320 billion in green investment are needed annually over the next five years to achieve 2020 environmental targets in China. This estimate is based on a range of inputs including: (1) The 12th Five-Year Environmental Protection Plan and the Ministry of Environmental Protection (environmental protection related investment during the 12th Five Year totalled 3.4 trillion yuan, 1.5 trillion of this amount will be allocated to eight key projects; total final investment is expected to exceed 5 trillion yuan), (2) the Plan on Water Pollution Prevention and Control (issued in 2014, total investment planned at 2 trillion yuan), (3) the Plan on Air Pollution Prevention and Control (issued in 2014, total investment planned at 1.7 trillion yuan), (4) China Railway Annual Report (a fixed investment of 800 billion yuan is planned for 2014; realised investment in 2013 was 663.8 billion yuan), (5) the Renewable Energy Policy Network (in 2013, China’s investment in wind, solar, and other renewable energy projects (excluding natural gas) was USD 56.3 billion, or approximately 350 billion yuan), (6) Bloomberg (China’s investment in renewable energies (excluding natural gas) was US USD 67.7 billion in 2012, or 420 billion yuan) (PBC and UNEP, 2015).

References

- AfDB (African Development Bank)/OECD/UNDP (United Nations Development Programme) (2015), *African Economic Outlook 2015: Regional Development and Spatial Inclusion*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/aeo-2015-en>.
- Andreu, J. (2014), “The Shocking Price of Spanish Electricity”, *El País*, January 1, http://elpais.com/elpais/2014/01/01/inenglish/1388590410_230748.html.
- BNEF (2016), “Clean Energy Defies Fossil Fuel Price Crash to Attract Record \$329BN Global Investment in 2015”, Press Release, Bloomberg New Energy Finance, 14 January, <http://about.bnef.com/content/uploads/sites/4/2016/01/BNEF-2015-Annual-Investment-Numbers-FINAL.pdf>.
- BNEF (2015), Future of Energy Summit, Presentation, Shanghai, 4 November, <http://about.newenergyfinance.com/content/uploads/sites/4/2015/11/Shanghai-Summit-ML-keynote.pdf>.
- COP 21 (2015), China Has Promised to Cut Emissions From its Coal Power Plants by 60% by 2020, Press release with AFP, United Nations Conference on Climate Change, COP 21, www.cop21.gouv.fr/en/china-has-promised-to-cut-emissions-from-its-coal-power-plants-by-60-by-2020/.
- Corfee-Morlot, J. et al. (2012), “Towards a Green Investment Policy Framework: The Case of Low-Carbon, Climate-Resilient Infrastructure”, *OECD Environment Working Papers*, No. 48, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5k8zth7s6s6d-en>.
- Department of Climate Change, National Development and Reform Commission (2015), *Enhanced Actions on Climate Change: China’s Intended Nationally Determined Contributions*, submitted to the United Nations Framework Convention on Climate Change, www4.unfccc.int/submissions/INDC/Published%20Documents/China/1/China's%20INDC%20-%20on%2030%20June%202015.pdf.

- European Commission (2014), Electricity Tariff Deficit: Temporary or Permanent Problem in the EU?, Publications Office of the European Union, Luxembourg, http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf.
- FS-UNEP (Frankfurt School-UNEP Collaborating Centre for Climate and Sustainable Energy Finance), UNEP (United Nations Environment Programme) and BNEF (2015), *Global Trends in Renewable Energy Investment 2015*, Frankfurt School-UNEP Collaborating Centre for Climate and Sustainable Energy Finance, Frankfurt, <http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2015>.
- GCEC (2014), *Better Growth, Better Climate: The New Climate Economy Report*, The Global Commission on the Economy and Climate, <http://newclimateeconomy.report/>.
- IEA (2015a), *World Energy Outlook 2015*, IEA/OECD Publishing, Paris, <http://dx.doi.org/10.1787/weo-2015-en>.
- IEA (2015b), *Energy Efficiency Market Report 2015*, IEA/OECD Publishing, www.iea.org/publications/freepublications/publication/MediumTermEnergyEfficiencyMarketReport2015.pdf.
- IEA (2014a), *World Energy Investment Outlook 2014*, IEA/OECD Publishing, Paris, www.iea.org/publications/freepublications/publication/WEIO2014.pdf.
- IEA (2014b), *Capturing the Multiple Benefits of Energy Efficiency: A Guide to Quantifying the Value Added*, IEA, Paris, <http://dx.doi.org/10.1787/9789264220720-en>.
- IEA (n.d.), "Scenarios and Projections", www.iea.org/publications/scenariosandprojections/ (accessed 15 January 2016).
- Mohiuddin, M. et al. (2014), "The Special Economic Zone as a Locomotive for Green Development in China", *Asian Social Science*, Vol. 10/18, Canadian Center of Science and Education, <http://dx.doi.org/10.5539/ass.v10n18p109>.
- Nelsen, A. (2015), "Morocco poised to become a solar superpower with launch of desert mega-project", *The Guardian*, October 26, www.theguardian.com/environment/2015/oct/26/morocco-poised-to-become-a-solar-superpower-with-launch-of-desert-mega-project.
- OECD (2015a), *The Economic Consequences of Climate Change*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264235410-en>.
- OECD (2015b), *Towards Green Growth?: Tracking Progress*, OECD Green Growth Studies, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264234437-en>.
- OECD (2015c), *Policy Guidance for Investment in Clean Energy Infrastructure: Expanding Access to Clean Energy for Green Growth and Development*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264212664-en>.
- OECD (2015d), *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264239616-en>.
- OECD (2015e), *Overcoming Barriers to International Investment in Clean Energy*, Green Finance and Investment, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264227064-en>.
- OECD (2015f), *Aligning Policies for a Low-Carbon Economy*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264233294-en>.
- OECD (2015h), *Mapping Channels to Mobilise Institutional Investment in Sustainable Energy*, Green Finance and Investment, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264224582-en>.
- OECD (2014a), *Urban Green Growth in Dynamic Asia: A Conceptual Framework*, OECD Publishing, Paris, www.oecd.org/regional/regional-policy/Urban-GG-Dynamic-Asia-report.pdf.
- OECD (2014b), *Towards Green Growth in Southeast Asia*, OECD Green Growth Studies, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264224100-en>.
- OECD (2014c), *Enabling Investment in Sustainable Energy Infrastructure*, OECD and Post-2015 Reflections Paper Series, Element 4, Paper 2, OECD Publishing, Paris, www.oecd.org/dac/POST-2015%20sustainable%20energy.pdf.
- OECD (2013), *Putting Green Growth at the Heart of Development*, OECD Green Growth Studies, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264181144-en>.
- OECD (2011), *Towards Green Growth*, OECD Green Growth Studies, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264111318-en>.
- OECD and Bloomberg Philanthropies (2015), "Green bonds: Mobilising the debt capital markets for the low-carbon transition", *Policy Perspectives*, <http://issuu.com/oecd.publishing/docs/green-bonds-policy-perspectives-lr>.
- Oxford Institute for Energy Studies (2013), *Pulling the Plug on Renewable Power in Spain*, University of Oxford, Oxford, www.oxfordenergy.org/wpcms/wp-content/uploads/2013/12/Pulling-the-Plug-on-Renewable-Power-in-Spain.pdf.

- Petrick, K. and A. Sinha (2015), *Energy Efficiency: Opportunities in Emerging Markets*, Bain Brief, Bain & Company, Dubai, www.bain.com/Images/BAIN_BRIEF_Energy_efficiency_in_emerging_markets.pdf.
- PBC (People's Bank of China) and UNEP (2015), *Establishing China's Green Financial System*, Report of the Green Finance Task Force, www.unep.org/newscentre/default.aspx?DocumentID=26802&ArticleID=34981.
- Rakhmadi, R. and Sutyono, G. (2015), Using Private Finance to Accelerate Geothermal Deployment: Sarulla Geothermal Power Plant, Indonesia, Climate Policy Initiative, <http://climatepolicyinitiative.org/wp-content/uploads/2015/06/Using-Private-Finance-to-Accelerate-Geothermal-Deployment-Sarulla-Geothermal-Power-Plant-in-Indonesia.pdf>.
- Wang, J. (2013), "The Economic Impact of Special Economic Zones: Evidence from Chinese Municipalities", *Journal of Development Economics*, Vol. 101/1, pp. 133–147.

For more information about the OECD Emerging Markets Network,
contact the Secretariat:

dev.emnet@oecd.org

www.oecd.org/dev/oecdemnet.htm

EM»net
OECD EMERGING MARKETS NETWORK

