People's Republic of China
Developing an Innovative Energy Efficiency Financing Mechanism in China

June 2016

GEE02
EAST ASIA AND PACIFIC

The financial and technical support by the Energy Sector Management Assistance Program (ESMAP) is gratefully acknowledged. ESMAP - a global knowledge and technical assistance program administered by the World Bank - assists low- and middle-income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Denmark, the European Commission, Finland, France, Germany, Iceland, Japan, Lithuania, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the World Bank Group.
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China: Developing a Green Energy and Emission Reduction Fund

This report is commissioned by the World Bank and funded by ESMAP. The expressions and conclusions reached in this report are of authors. In any way, the report does not reflect the position, views and reflections of the institutions where authors work or of the sponsors of this report.
# Table of Contents

Acknowledgements ........................................................................................................... 1
Executive Summary ........................................................................................................ 4
1. Review of Green Energy and Financial Sector Policies and the 13\textsuperscript{th} Five-Year Plan ........................................................................... 0
   1.1. Energy and Environment Policies and the 13\textsuperscript{th} FYP ........................................... 0
   1.2. Fiscal Policy Reform ................................................................................................... 1
   1.3 Financial Sector Policies and Regulations: ................................................................... 4
2. Green Energy Market Analysis in China ................................................................... 11
   2.1 Market Demand for Green Energy .............................................................................. 11
   2.2 Current Financing Sources ......................................................................................... 16
   2.3 Barriers to Green Financing ....................................................................................... 19
3. International experience on green energy financing ............................................... 24
   3.1 Overview of Green Energy Financing Mechanisms .................................................... 25
   3.2 International Experiences on Green Energy Funds .................................................... 34
4. Chinese experience on green energy financing ..................................................... 44
   4.1 Government green funds ............................................................................................ 44
   4.2 Green private equity funds and venture capital funds ................................................ 48
5. Rationale for Establishing a Green Fund .................................................................. 50
   6.1. Strategic focus and targeted market ........................................................................... 52
   6.2 Financing sources ....................................................................................................... 53
   6.3 Fund Structure, scale and leveraging .......................................................................... 54
   6.4 Financial Products of the Fund ................................................................................... 63
   6.6. Roadmap for Establishing a Green Energy Fund ..................................................... 73
Appendix I: Cases studies of government funds in China .............................................. 75
   Case 1: Emerging Industries Venture Capital Plan .......................................................... 75
   Case 2: China Clean Development Mechanism (CDM) Fund .......................................... 77
   Case 3: China Railway Development Fund ..................................................................... 79
Figures

Figure 1. Targets for 13th FYP Development ................................................................. 0
Figure 2. Investment Demand by Sectors during the 13th FYP ..................................... 13
Figure 3. EE Investment Demand during the 13th FYP ............................................. 13
Figure 4. Investment Demand for Distributed RE and Clean Energy 13th FYP .......... 15
Figure 5. Central Government's Inputs for EE Improvement during the 11th FYP ....... 17
Figure 6. EE Investment Ratio during the 11th FYP and year of 2013 ......................... 17
Figure 7. Barriers to Green Energy Financing ............................................................... 21
Figure 8. Government/Donors vs. Market Roles in Scaling Up EE Investments .......... 24
Figure 9. Green Energy Financing Ladder .................................................................... 25
Figure 10. Structure of Budget Financing with Capital Recovery Error! Bookmark not defined.
Figure 11. Typical Structure of a Green Energy Fund .................................................. 27
Figure 12. GEEREF Portfolio of Funds .......................................................................... 31
Figure 13. Typical Structure of a Super ESCO ............................................................... Error! Bookmark not defined.
Figure 14. Illustrative Structure of EE Credit Line ......................................................... Error! Bookmark not defined.
Figure 15. Typical Structure of Risk-Sharing Facility .................................................... Error! Bookmark not defined.
Figure 16. Vendor Finance Program .............................................................................. Error! Bookmark not defined.
Figure 17. Typical Structure of a Green Energy Fund .................................................. 34
Figure 18. Framework of nationwide single fund .......................................................... 55
Figure 19. Framework of single fund at local level ....................................................... 57
Figure 20. Framework of the FOF ................................................................................. 59
Figure 21. Design function diagram of fund products .................................................... 65
Figure 22. Road Map for Establishing a Revolving EE Fund ....................................... 74

Table

Table 1. China’s Policies and Regulations Related to PE and VC Funds ................. 6
Table 2. Energy Conservation Targets and its Achievement since 2006 .................... 11
Table 3. Illustrative Oversight Arrangements of Selected Green Energy Funds........ 35
Table 4. Illustrative Examples of Fund Management .................................................... 36
Table 5. Comparison of Characteristics of Selected Green Energy Funds .............. 42
Table 6. List of Government Funds Supported by Central Government Error! Bookmark not defined.
Table 7. Comparison of Pros and Cons of Three Fund Options ............................. 62
Table 8. Leverage ratio calculation of three EE funds ................................................. 66
Boxes

Box 1. Interim Management Measures for Subsidies to Energy Conservation and Emission Reduction.................................................................................................................................................. 2
Box 2. Key Energy Saving Projects of The 13th FYP ................................................................. 12
Box 3. Example of Budget Financing: Macedonia ................................Error! Bookmark not defined.
Box 4. Armenia Renewable Resources and Energy Efficiency Fund (R2E2 Fund) ........... Error!
   Bookmark not defined.
Box 5. Energy Efficiency Services Limited: India’s Super ESCO Error! Bookmark not defined.
Box 7. Risk Sharing Facility Example – Commercializing EE Finance (CEEF) .......... Error!
   Bookmark not defined.
Box 8. Performance Indicators - Romanian Energy Efficiency Fund.......................... 37

III
Acknowledgements

The World Bank team was led by Xiaodong Wang (Task Team Leader). The China Energy Conservation and Environmental Protection (CECEP) Consulting Co. Ltd., composed of Xiaozhen Li, Hongyan Liu, Baorong Yuan, Zhibin Tian, and Jiayan Feng, as well as James Wang (Chinese energy efficiency consultant) and Miao Hong (Chinese clean energy consultant), undertook the study and wrote the main report, supervised by the World Bank team. Dilip Limaye (international energy efficiency financing consultant) and John MacLean (international energy efficiency financing consultant) provided international experience on green energy financing. Xiaodong Wang and Xiaozhen Li wrote the Executive Summary, based on the inputs from the CECEP team. Changyi Shao (Senior Financial Sector Specialist) also provided inputs. The study benefited from comments and suggestions from the Ministry of Finance, NDRC Foreign Capital Utilization Department, NDRC Environmental Protection and Resource Conservation Department, and National Energy Administration during consultation workshops.

The team wishes to acknowledge the generous funding from the Energy Sector Management Assistance Program (ESMAP).
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<td>AGF</td>
<td>Advisory Group on Climate Change Financing</td>
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<td>BEE</td>
<td>Bureau of Energy Efficiency</td>
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<td>BEEF</td>
<td>Bulgaria Energy Efficiency Fund</td>
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<td>CalCEF</td>
<td>California Clean Energy Fund</td>
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<tr>
<td>CBRC</td>
<td>China Banking Regulatory Commission</td>
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<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
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<tr>
<td>CECEP</td>
<td>China Energy Conservation and Environmental Protection Group</td>
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<tr>
<td>CHEEF</td>
<td>China Energy Efficiency Financing Project</td>
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<tr>
<td>CPC</td>
<td>Communist Party of China</td>
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<td>CRESP</td>
<td>China Renewable Energy Scale-Up program</td>
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<td>CSRC</td>
<td>China Securities Regulatory Commission</td>
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<tr>
<td>DECC</td>
<td>Department of Energy and Climate Change</td>
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<tr>
<td>DSM</td>
<td>Demand Side Management</td>
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<td>EE</td>
<td>Energy Efficiency</td>
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<td>EE&amp;ER</td>
<td>Energy Conservation and Emission Reduction</td>
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<td>EMCA</td>
<td>Energy Conservation Association</td>
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<tr>
<td>ENCON</td>
<td>Energy Conservation</td>
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<td>ESA</td>
<td>Energy Service Agreements</td>
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<td>ESPC</td>
<td>Energy Saving Performance Contracting</td>
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<td>ETS</td>
<td>Emissions Trading System</td>
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<tr>
<td>FOF</td>
<td>Fund of Funds</td>
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<td>FREE</td>
<td>Romania Energy Efficiency Fund</td>
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<td>FYP</td>
<td>Five-Year Plan</td>
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<td>GEF</td>
<td>Global Environment Facility</td>
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<td>GHG</td>
<td>Global Greenhouse Gas</td>
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<td>GoC</td>
<td>Government of China</td>
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<td>GP</td>
<td>General Partner</td>
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<tr>
<td>IFI</td>
<td>International Financial Institutions</td>
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<tr>
<td>INDC</td>
<td>Intended Nationally Determined Contributions</td>
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<tr>
<td>IPO</td>
<td>Initial Public Offerings</td>
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<tr>
<td>IREDA</td>
<td>Indian Renewable Energy Development Agency</td>
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<tr>
<td>IRR</td>
<td>Interest Rate Risk</td>
</tr>
<tr>
<td>JREEEF</td>
<td>Jordan Renewable Energy and Energy Efficiency Fund</td>
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<tr>
<td>KEMCO</td>
<td>Korea Energy Management Corporation</td>
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<tr>
<td>KSECF</td>
<td>Kerala State Energy Conservation Fund</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>---------</td>
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<tr>
<td>M&amp;V</td>
<td>Measurement and Verification</td>
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<tr>
<td>MEP</td>
<td>Ministry of Environmental Protection</td>
</tr>
<tr>
<td>MOF</td>
<td>Ministry of Finance</td>
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<tr>
<td>MOST)</td>
<td>Ministry of Science and Technology</td>
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<tr>
<td>NDRC</td>
<td>National Development and Reform Commission</td>
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<tr>
<td>NEA</td>
<td>National Energy Administration</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NMEEEEE</td>
<td>National Mission for Enhanced Energy Efficiency</td>
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<tr>
<td>OM</td>
<td>Operations Manual</td>
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<tr>
<td>PBC</td>
<td>Public Benefit Charge</td>
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<td>PBOC</td>
<td>People's Bank of China</td>
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<tr>
<td>PE</td>
<td>Private Equity</td>
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<tr>
<td>PE</td>
<td>Private Equity</td>
</tr>
<tr>
<td>PG &amp; E</td>
<td>Pacific Gas and Electric</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Private Partnership</td>
</tr>
<tr>
<td>R2E2</td>
<td>Renewable Resources and Energy Efficiency</td>
</tr>
<tr>
<td>SASAC</td>
<td>State-owned Assets Supervision and Administration Commission of the State Council</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprises</td>
</tr>
<tr>
<td>TA</td>
<td>Technical Assistant</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>VC</td>
<td>Venture Capital</td>
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<tr>
<td>VCFEE</td>
<td>Venture Capital Fund for Energy Efficiency</td>
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The policy environment in China is conducive to green energy financing. The Government of China (GoC) is undertaking one of the most aggressive energy efficiency (EE) and renewable energy (RE) campaigns in the world. The GoC set mandatory energy intensity (energy consumption per unit of gross domestic product (GDP)) reduction targets of 20 percent for the 11th Five-Year Plan (FYP) (2006–2010) and 16 percent for the 12th FYP (2011–2015), and achieved 19.1 and 18.2 percent during the 11th FYP and 12th FYP respectively. For the 13th FYP (2016–2020), the GoC plans to adopt a total energy consumption cap and a coal consumption cap, in addition to 15 percent energy intensity reduction target. China currently has the world’s largest installed RE capacity, with 130 gigawatts (GW) of wind and 43 GW of solar photovoltaic (PV) by the end of 2015. RE currently accounts for 11 percent of total primary energy; and the GoC plans for non-fossil fuel to reach 15 percent by 2020 and 20 percent by 2030.

EE and clean energy are “win-win” options to mitigate both air pollution and climate change simultaneously. The GoC has announced at the Paris COP 21 meeting that it expects China’s carbon emissions to peak by 2030, and is committed to reducing carbon intensity (carbon emissions per unit of GDP) by 40–45 percent from 2005 to 2020 and by 60–65 percent from 2005 to 2030. Furthermore, to tackle the severe air pollution, the GoC has declared a “war on air pollution” and issued the Air Pollution Prevention and Control Action Plan (APPCAP) that set mandatory targets to reduce PM$_{2.5}$ concentration and coal consumption in heavy polluted regions of Beijing-Tianjin-Hebei (also called Jing-Jin-Ji), Yangtze River Delta (around Shanghai) and Pearl River Delta (around Guangdong) regions.

Last but not the least, the People’s Bank of China (PBOC) has proposed a green financing framework that recommends to set up Green Funds, greening the banking sector, risk sharing mechanisms, green bonds, lenders liability, etc. The regulatory authorities have also started to build a basic institutional framework for green financing. The China Banking Regulatory Commission’s (CBRC) Green Credit Guidelines require banks to establish credit policies, processes, and systems for due diligence on environmental and social risks.

This study aims to provide inputs to the Chinese government’s envisioned Green Fund. Since the closure of the energy efficiency rewards funds in early 2015, the National Development and Reform Commission (NDRC) Environmental Protection and Resource Conservation Department is interested in setting up an energy efficiency fund with government budget to maximize its leverage of commercial financing for energy efficiency investments. In the meantime, the National Energy Administration (NEA) is also exploring ways to establish financing platform for distributed renewable energy investments. This study targets at these relevant government agencies, and conducted preliminary design of a potential Green Energy and Emission Reduction Fund. During consultation of the study, these government agencies—the Ministry of Finance, NDRC Foreign Capital Utilization Department, NDRC Environmental Protection and Resource Conservation Department, and National Energy Administration—all expressed interests and support to a Green Energy and
Emission Reduction Fund in China. Given the recent interests in establishing a Green Fund in China requested by PBOC, this study also provides timely input to the design of such a Green Fund.

The market demand for green energy financing is huge for the 13th FYP. This study estimated that the investment need to achieve the 13th FYP EE targets would amount to approximately Chinese Yuan Renminbi (CNY) 2.46 trillion (US$380 billion) from 2016-2020, about 1.5 times of the EE investments during the 12th FYP. These investments are expected to save energy of 380 million tons of coal equivalent (tce). A more in-depth analysis showed that the investment needs for Energy Service Companies (ESCOs) who have difficulties in access to financing are estimated to be around CNY 750 billion (US$115 billion) in energy performance contracting (EPC) during the 13th FYP period.

In addition, this study also estimated that the investment needs to achieve the 13th FYP RE targets would amount to CNY 2.6 trillion (US$400 billion) from 2016-2020. In the area of RE, distributed generation is facing difficulties in access to financing, and their investment needs are estimated to be approximately CNY 1.2 trillion (US$185 billion) during the 13th FYP period.

Achieving the APPCAP targets requires CNY 1.8 trillion (US$ 280 billion) nationwide and CNY 250 billion (US$ 40 billion) in the Jing-Jin-Ji Region from 2012-2017, according to estimates by the Chinese Academy of Environmental Planning (CAEP), Tsinghua University, and the Innovation Center for Clean Air Solutions (ICCAS). Looking ahead, a recent joint study by the People’s Bank of China (PBOC) and the United Nations Environment Programme estimates that the investment needs for achieving the 13th FYP’s targets for air, water, and soil pollution control nationwide would be at least CNY 2 trillion (or US$325 billion) per year, which amounts to 3 percent of GDP.

The lion’s share of the green energy investments needs will come from commercial financing. The government funds provide about 10-15 percent of these investment needs. During the 11th FYP, fiscal budget from the central government accounted for about 12 percent of the total EE investments. During the 12th FYP, taking the year of 2013 as an example, central government funding for EE reached CNY 77.8 billion (US$12 billion), accounting for 15 percent of the total EE investments. These government funds played a demonstration and leading role with significant leveraging effect. For the 13th FYP, based on the new government policies to reduce government functions, deepen the fiscal and taxation reforms, and abolish a number of special subsidy funds, the GoC plans to change the use of public funds from heavily relying on fiscal subsidies to increased use of market mechanisms and higher leverage of commercial financing.

Commercial financing, including financial institutions (e.g. debt and guarantee), non-financial institutions (e.g. leasing) and equity financing, makes the bulk of the financing sources. Taking 2013 as an example, about CNY 390 billion (US$60 billion) investment in EE came from commercial financing sources, accounting for 77 percent of the total EE investment, and 5 times the public funds. Debt and guarantee investments accounted for 93.8 percent and 3.8 percent of financial institutions’ EE investment respectively. Non-financial institutions are becoming an
important supplementary financing source for EE investment, accounting for 1.3 percent of the total EE investment.

However, the banking sector’s uptake of green financing remains low relative to the huge investment needs, and many EE/RE enterprises continue to face difficulties in access to financing. Many EE and RE developers, particularly SMEs, such as ESCOs, face difficulties in accessing financing. As a result, despite the fast growth of the ESCO industry in China, only 20 percent of the ESCOs are financed through external financing sources, while the majority relies on self-financing. The major financing barriers include the following:

(a) Most local banks usually rely on balance sheet financing, which requires that borrowers have either good credit ratings or high levels of collateral, which in turn, favors large-scale borrowers. The concept of project-based financing that focuses on the cash flows from energy savings has not yet been widely accepted by financial institutions. The result is that the most creditworthy potential clients do not necessarily need financing for EE, while the customers most in need of financing are typically not creditworthy from the lenders’ perspectives.

(b) Lenders also perceive EE investments to be highly risky, because they are not convinced that the expected future savings will be realized or captured by the investors.

(c) Most financial institutions still lack the required technical expertise and interest in financing EE and RE distributed generation.

(d) EE and RE distributed generation investments tend to be small, with high transaction costs, and most banks’ short-term tenures do not match the long-term payback of the RE technologies.

International and domestic experiences offer a wealth of experience and lessons learned. This study reviewed a wide range of green energy financing mechanisms from international experience, including credit lines, risk guarantees, green funds, green banks, utility demand side management (DSM) funds, utility on-bill financing, ESCO financing and leasing, etc. The study found that a Green Energy Fund, with a dedicated team and mandate to invest in the green energy market, has a higher chance to overcome the above mentioned barriers to increase financing flow to the targeted market and underserved clients, and also has a high leverage of public funds. The study also found that generating sufficient deal flows is a major challenge to green energy financing mechanisms. Technical assistance, aggressive marketing, and special financing criteria and financial products that are tailored to the targeted market segments who most in need of financing are important for deal origination. This study also examined in details on international experience of setting up a green energy fund.

This study also reviewed Chinese experience in government funds, with the intent to learn the structure, financing instruments, and lessons from existing government funds in China. Most of the existing government funds aim to promote new technologies, and very few are targeted at green energy market to date. This study also reviewed relevant laws, policies and
regulations issued by central government agencies including China Security Regulatory Commission (CSRC), NDRC, MOF, CBRC, and China Insurance Regulatory Commissions (CIRC) as well as local governments, for guidance and regulations of establishment and operation of government funds and PE funds. In most cases, the central government puts down 20 percent of the fund capital, requires local governments to provide matching funds, and commissions professional fund management companies to manage the funds, who are responsible for raising the remaining 60 percent of the fund capital from commercial financing sources. Most of these funds have a fund of funds (FOF) structure and provide equity investments, and few such as the CDM Fund provides debt. One important lesson learned is that selecting professional and competent fund managers and maximizing fund managers’ independent decision-making authority are key success factors, while the government provides strategic guidance.

**A Green Energy Fund could overcome the financing barriers, increase financing flow to the green energy market and underserved clients, and have a high leverage of public funds.** The World Bank Group has a long-term engagement in financing EE and RE in China, through credit lines, risk sharing, and now Program for Results instrument, with the objective to mainstream green energy financing in participating banks. While these efforts are making good progress, and commercial banks will remain as the main financing source, given the barriers outlined above, only relying on commercial banks to meet the huge green energy investment needs is not sufficient. In addition, a lack of equity financing presents a gap in the current financial market and a major barrier to get debt financing from commercial banks, particularly for ESCOs and SMEs. Furthermore, the government plans to change the use of public funds from give-away subsidies to maximizing leverage of commercial financing, and is keen to set up green energy funds with government budget, particularly under the context of the “war to air pollution” in heavily polluted regions. We believe a green energy fund can be an effective solution to increase access to financing for the green energy market to complement commercial bank financing, and to better leverage public funds to unlock commercial financing. Furthermore, a Green Energy Fund with a dedicated team of required technical expertise, dedicated mandates, and special financial products tailored to the green energy market, it can also overcome the deal origination challenge. It should also be noted that a Green Fund is not a panacea, for example, reconciling different interests and expected returns from various investors can be a challenge.

**This study conducted preliminary design of a potential Green Energy and Emission Reduction Fund:** The preliminary design includes strategic focus, targeted market, financing sources, fund structure, fund scale and leveraging ratio, financial products, eligibility criteria, and exit strategy.

**Strategic focus:** This proposed Fund will focus on green energy and emission reduction markets, including EE, distributed RE, natural gas, and emission reduction of air pollutants. To ensure sufficient investment flow to the underserved market, the proposed Fund will set a minimum of 50 percent of its investments to the EE market. The recipients include energy users; ESCOs; and EE, RE, low-carbon, and air pollutants emission reduction developers etc. This will contribute to the government’s EE, RE, and carbon emission reduction targets under the 13th FYP, APPCAP, and the green finance agenda. It aims to increase investment flow to the
green energy market, particularly increasing access to financing for SMEs. Setting up such a Fund with the government budget and potentially multi-lateral development banks (MDBs) is an innovative use of public funds. Public funding is warranted to remove market failures and barriers and unlock project financing by lowering risks and closing finance gaps.

**Financing sources:** It is expected that the government and potentially MDBs would put down around 20 percent each of the Fund capital, which will leverage the remaining 60 percent from commercial financing sources from investors, financial institutions, insurance, enterprises, etc.

**Fund structure:** This study proposed three alternative options to structure the Fund:

1. **A national-level fund:** Such a fund will have greater impacts, a bigger market pool to choose projects, but without regional or provincial branches, it may be difficult to reach out and identify projects. A national Fund could have a size of roughly $2.5 billion, of which $500 million from the national government, $500 million from MDBs, and $1.5 billion from commercial sources. Assuming that the Fund could finance about half of the total investments for each deal, this would leverage about a total of $5 billion investments. As a result, the government funds (or the MDB funds) would have a leverage ratio of 9.

2. **A provincial fund:** Such a fund will be closer to the ground for deal origination, and can attract counterpart funds from local governments. But such a provincial fund will have smaller impacts and market size. A provincial Fund could have a size of roughly $1 billion, of which $200 million from the local government, $200 million from MDBs, and $600 million from commercial sources. Assuming that the Fund could finance about half of the total investments for each deal, this would leverage about a total of $2 billion investments. As a result, the government funds (or the MDB funds) would have a leverage ratio of 9.

(iii) **A regional Fund of Funds structure:** Such a FOF can be set up in one of the heavily polluted regions: Jing-Jin-Ji, Yangtze River delta, or Pearl River delta regions. Under this structure, the regional parent Fund will primarily be capitalized by the government and MDBs, and will directly invest in large-scale regional projects, inject equity contribution to subsidiary funds at provincial level, provide risk sharing and technical assistance, and develop innovative financial products such as green bond and securitization of project assets. The subsidiary funds will be set up at provincial level, with additional contributions from local governments and commercial financing sources, and invest in projects primarily within the province. Most of the existing government funds in China are set up as a FOF structure, and such a structure can overcome the disadvantages of a single national fund or provincial fund outlined above. A regional FOF structure could have a total size of roughly $3.8 billion, of which $500 million from the central government and $500 million from MDBs as the capital for the parent Fund, and $0.7 billion from local governments and $2.1 billion from commercial sources for the subsidiary funds. Assuming that the FOF could finance about half of the total investments for each deal, this would leverage about a total of $7.6 billion investments. As a result, the central government funds (or the MDB funds) would have a leverage ratio of 14.
Financial products: This study recommends that the Fund will primarily adopt two categories of financial products: (1) equity financing; and (2) debt financing (in the form of equity\(^1\) or quasi-preferred shares, mezzanine financing\(^2\), or entrusted loans\(^3\)). In addition, the Fund of Funds can also offer risk sharing, technical assistance, and innovative financial products such as green bonds and securitization of project assets. Meanwhile, the Fund can also mobilize donors’ grant for TA services for both the Fund management team and the recipients as well as risk sharing mechanism. After initial investments of the Fund, adopting refinancing products and issuing green bond and securitization of project assets can also be considered subsequently.

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\(^1\) This is commonly used in Chinese investment funds. When a Fund makes an equity investment, the return requirement for this investment is de facto equivalent to a debt investment.

\(^2\) A mezzanine loan is unsecured debt, requiring no collateral; instead, lenders have the right to convert their stakes to an equity position or ownership in the event of default on the loan. This is particularly appealing to private companies because mezzanine financiers do not retain an interest in the company except in the event of default. Subordinated debt is a type of mezzanine financing structure, and may be the most versatile of all public finance instruments. It provides liquidity directly, but at a higher cost. By reducing the risk to senior lenders, it makes commercial bank finance accessible that otherwise would not have been available. Subordinated debt can be used to extend the effective term of loans, thus helping project cash flows and project viability.

\(^3\) As required by law in China, non-bank entities cannot directly lend funds to potential borrowers and thus shall, acting as the principal, entrust a financial institution to extend loans using the principal’s own funds to borrowers designated by the principal. Under this model, the principal makes the lending decisions, and the bank is the intermediary mainly providing loan transfer, repayment collection and accounting service etc., and the principal bears all credit risks for the entrusted loan.

1.1. Energy and Environment Policies and the 13th FYP

In response to climate change, the GoC makes great efforts to advance ecological civilization construction, and proposed the targets and priorities in energy conservation and low-carbon development during the 13th FYP period. The details are as follows:

In 2014, the Chinese government issued the Strategic Action Plans for Energy Development (2014-2020) and the National Planning in Response to Climatic Change (2014-2020), and set the goal that carbon dioxide emission per unit of GDP will be reduced by 40%-45% by 2020 compared with that in 2005.

In 2015, The Government of China (GoC) China formally submitted INDC to United Nations. The pledge commits China to a peak in emissions by 2030, an increase in the share of non-fossil fuels in its energy mix by about 20% by 2030, and a reduction in carbon dioxide emissions per unit of GDP by 60-65% by 2030 from 2005 levels.

In March 2016, the Outline of the 13th FYP for National Economic and Social Development of the People’s Republic of China (hereinafter to be referred to as the Outline of the 13th FYP) was officially released, by requiring to establish and implement the key development concepts in the 13th FYP of innovation, coordination, green, openness and sharing. It is also stated that China’s GDP will grow at an average annual rate of more than 6.5% during the “13th FYP”, the energy consumption per unit of GDP will be reduced by 15%, carbon dioxide emission per unit of GDP will be reduced by 18%, and total energy consumption will be controlled within 5 billion tons of standard coals.

<table>
<thead>
<tr>
<th>Figure 1 Targets for 13th FYP Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2020</strong></td>
</tr>
<tr>
<td>GDP</td>
</tr>
<tr>
<td>Growth rate higher than 6.5%</td>
</tr>
<tr>
<td><strong>2030</strong></td>
</tr>
<tr>
<td>GDP</td>
</tr>
<tr>
<td>Within 5 billion tons of standard coals</td>
</tr>
<tr>
<td><strong>2020</strong></td>
</tr>
<tr>
<td>Total energy consumption</td>
</tr>
<tr>
<td>Decreasing by 15%</td>
</tr>
<tr>
<td><strong>2030</strong></td>
</tr>
<tr>
<td>Total energy consumption</td>
</tr>
<tr>
<td>Decreasing by 40%-45% compared with 2005</td>
</tr>
<tr>
<td>Decr easeing by 60%-65% compared with 2005</td>
</tr>
<tr>
<td><strong>2020</strong></td>
</tr>
<tr>
<td>CO2 emission per unit of GDP</td>
</tr>
<tr>
<td>Accounting for 15% of total energy consumption</td>
</tr>
<tr>
<td><strong>2030</strong></td>
</tr>
<tr>
<td>CO2 emission per unit of GDP</td>
</tr>
<tr>
<td>Accounting for 20% of total energy consumption</td>
</tr>
</tbody>
</table>
Also, to address increased pollutants emissions and worsened air quality, the GoC issued Action Plans on Air Pollution Prevention in 2013 for purpose of striving to gradually eliminate heavy pollution weather and significantly improve air quality across the country by covering 10 key areas with 35 measures including strengthening comprehensive control of air pollution in industrial enterprises, controlling the total consumption of coals, accelerating use of alternative clean energy etc. At the end of 2015, NDRC and Ministry of Environmental Protection (the MEP) issued the Ecological Environmental Protection Planning for Collaborative Development in Beijing-Tianjin-Hebei Region (2016-2020)\(^4\). The new Law on Prevention of Air Pollution has also come into effect since January 1, 2016. It shows that GoC attaches much more attention to air pollution control during the 13\(^{th}\) FYP.

1.2. Fiscal Policy Reform

China’s energy conservation and low-carbon development is mainly funded by government financial input and commercial capital. Although GoC continues to intensify green credit and financial support, wide gap exists for government funds with less efficiency, while commercial capitals pursue high returns, and it is a prevalent and long-term problem in energy green financing. Over the recent years, the Chinese government has strengthened mechanism innovations in financial and fiscal sectors by optimizing utilization of special financial funds, encouraging the PPP (public-private partnership) model, and making an effort to perfect the taxation system.

1.2.1 Optimization of the use of public funds

Since the 11\(^{th}\) FYP of 2006, the Chinese central government funds began to play a crucial role in driving EE investments. Take EE investment as an example, during the 11\(^{th}\) FYP, the central government input was 101.653 billion CNY, accounting for 12% of the total input by the whole society, and 0.34% of the total public finance expenditure of the central government. The amount of central financial investment is unprecedented, and it has provided a solid support and significant contribution to the achievement of fulfilling the targets for energy conservation and emission reduction.

In 2015, to implement the detailed requirements for deepening reform of the fiscal system and improve the utilization efficiency of public funds, the Ministry of Finance (the MOF) successively rolled out the Interim Management Measures for Subsidy Funds for Energy Conservation and Emission Reduction and the Interim Management Measures for Special Funds for Renewable Energy Development, annulled a number of interim management measures for relevant special financial funds issued during the period of 2006-2012, identified the key support scope for special funds for energy conservation and renewable

\(^4\) By 2020, in Beijing-Tianjin-Hebei Region, the total emission of major pollutants will be reduced sharply, the carbon dioxide emission per unit of GDP will be decreased significantly, the quality of regional ecological environment will be improved substantially and PM2.5 concentration will be decreased by about 40% compared with that in 2013.
energy development and specified monitoring inspection and performance assessment for the use of special funds. During the “13th FYP”, relevant competent authorities will explore new modes for the use of financial funds, and introduce the fund management mode which integrates government guidance and market-oriented operation, so as to improve the efficiency of utilizing public funds.

**Box 1. Interim Management Measures for Subsidies to Energy Conservation and Emission Reduction**

1. **Key support areas:** Innovations in systems and mechanisms for energy conservation and emission reduction, capacity building and public platform for energy conservation and emission reduction, comprehensive demonstration for fiscal policy for energy conservation and emission reduction, energy conservation and emission reduction for key sectors, industries and regions, demonstrative promotion and transformation and upgrading of key energy-saving and emission-reducing technologies.

2. **Utilization of public fund:** mainly include subsidies, substitution of awards for subsidies, discounts and settlement as per actual disbursement. Substitution of awards for subsidies means distributing in accordance with actual performance of energy conservation and emission reduction; settlement as per actual disbursement refers to the mode of allocating funds, in which a certain amount is first allocated and then settlement will be made according to actual conditions.


**1.2.2 Environmental and carbon tax**

The environmental tax system includes not only carbon tax, consumption tax and resource tax, but also sulfur tax, nitrogen tax, waste water tax. International experience indicates that the carbon tax is considered as an important economic means to reduce carbon emission among various policy tools for alleviating climate change. At present, the carbon tax collection has already been started in some countries, such as Finland, Sweden, Denmark, Holland and Norway and achieved good results. All or part of environmental tax revenues have been applied in many developed countries in setting up general fund, environmental fund or other social public funds in support of public projects or projects related to environment and resources.

As a major country in energy consumption and CO₂ emission, China faces increasingly huge pressure on energy consumption and emission reduction. Except for necessary legal and administrative measures, other economic policies and measures have to be considered including environmental tax (carbon tax) as an important means for promoting energy
conservation and emission reduction.

In 2009, the Institute of Finance and Economics of the MOF made research into the issues of China levying carbon tax\(^5\), proposing their basic design ideas for China’s basic taxation system as well as the “roadmap” for levying carbon tax; in June 2015, the Environmental Protection Tax Law of the People's Republic of China (Draft for comment) drafted by the MOF, General Administration of Taxation and Ministry of Environmental Protection was published by the Legislative Affairs Office of the State Council, clearly stating that key monitoring (pollutant discharge) taxpayers include thermal power, iron and steel, nonferrous metals, coal, building materials, mining, chemical engineering, petrochemical, light industry, textile and other taxpayers in heavy-polluting industries as well as key monitoring enterprises in other pollutant discharge industries. Taxable pollutants include atmospheric pollutants, water pollutants, solid waste, construction noise and industrial noise and other pollutants; in March 2016, the 13\(^{th}\) FYP expressly states that “Environmental protection tax will be collected”.

Environmental protection tax is an important move in China’s ecological civilization system construction and environmental policy innovation. By collecting environmental tax, a stable public funding source can be secured for environmental protection and pollution control. In the future, it is hoped that the polluting product tax, ecological protection tax and carbon tax will be collected at appropriate time, so as to create an all-round environmental taxation policy system.

1.2.3 Carbon market and CDM Fund

The Chinese government pays high attention to the climate change and actively gets involved in international cooperation on combating climate change. In August 2006, the establishment of China Clean Development Mechanism (CDM) fund and its management center (hereinafter to be referred to as CDM fund) was approved by the State Council. In November 2007, the Fund started its operation, and the main funding source is from the revenues of the registered China CDM projects. As of December 31, 2013, the CDM Fund has accumulatively collected 2,486 sums of national revenue, with a total of 13.39 billion CNY\(^6\). The Fund is mainly used for entrusted loans and grant programs.

Besides, China is making active efforts to advance the establishment of a national carbon market. It is announced that the China emissions trading system (China ETS) will be launched in 2017, and it is expected to play an important role in China greenhouse gas (GHG) emissions by market-based mechanism. The national carbon market will in its first phase cover such key emission industries as petrochemical, chemical engineering, building materials, iron and steel, nonferrous metals, paper making, electric power and aviation. The

\(^6\) Annual Report of China CDM Fund 2013
participants will from the key industries, in particular, the enterprises whose annual total comprehensive energy consumption between the years of 2013 to 2015 reached above 10,000 tce\(^7\), and their total emissions approximately accounted for around 45-50% of total national emissions.

It is noted that the income from the compensable use of quota distribution of carbon in China ETS, like the CDM Fund, will become one of the potential funding sources for the public funds in support of low carbon development.

**1.3 Financial Sector Policies and Regulations:**

In September 2015, the CPC central committee and the State Council issued the Overall Plans for Reform of Ecological Civilization System, explicitly stated “to establish a green financing system, to support the establishment of green development funds by various types in a market-oriented manner”. In March 2016, the Outline of 13\(^{th}\) FYPs for National Economic and Social Development of the People’s Republic of China was officially released, once again making it explicit to “establish a green financing system and establish green development funds”.

**1.3.1 Fund categories**

A. Market-oriented investment funds

Investment funds can be divided into many different types according to different standards.

According to the financing sources, they can be classified into public funds and private funds:

- Public funds refer to funds raised through publicly issuing beneficiary certificates to non-specific investors, which shall be subject to strict regulation by laws and regulators, and also need to fully comply with information disclosure, profit distribution, investment restrictions and other industry norms.
- Private funds refer to funds raised from specific investors through non-public ways, which usually have certain requirements on the investing capacity of investors, and which also have low regulatory requirements in information disclosure and investment restrictions, and are comparatively flexible.

Based on different investment objects, they can be classified into securities investment funds, private equity funds, venture capital funds, hedge funds, and alternative investment funds:

- Securities Investment Funds refer to funds which are invested in securities that are publicly traded on stock exchanges or interbank market, including stocks, bonds, currencies and financial derivatives. Such funds can be further divided into public securities investment funds and private securities investment funds.
- Private Equity (PE) Funds refer to funds which are raised through private placement. Fund managers make equity investment in non-publicly traded equities of unlisted or

\(^7\) NDRC document -NDRC Climate [2016]
listed companies, provide corresponding management and other value-adding services, and exit the funds through listing, acquisition or other ways, so as to increase the added value of the capital.

- **Venture Capital (VC) Funds** refer to funds which are normally raised through private offering. Fund managers invest the funds in innovative enterprises in their start-up or early and medium stages, and exit the funds through listing, acquisition or other ways, so as to increase the added value of the capital.

- **Hedge Funds** are normally raised through private offering. Fund managers invest the funds extensively in financial derivative products, assuming high risks while pursuing high returns.

- **Alternative investment funds** are also normally raised through private offering. Fund managers invest the funds in financial and physical assets other than traditional stocks and bonds, such as real estate, securitized assets, commodities, gold and artwork.

B. **Government funds**

Government funds refer to funds that are established by governments at all levels through budgetary arrangements in the form of individual contribution or joint venture contribution with market-oriented investors. Such funds aim to guide various commercial capitals to be invested in key sectors and weak links in economic and social development and support the development of relevant industries and sectors through equity investment and other market-oriented ways.

Government funds are established in non-public ways and invested mainly in the form of equity. In terms of fund raising and investment mode, such funds are similar to private equity funds and venture capital funds.

Government funds have government fiscal funds as their chief funding sources, while ordinary private equity funds and venture capital funds have market-oriented investors as their chief funding sources. Meanwhile, eligible private equity funds and venture capital funds may apply for contributions from government funds. Government funds are one of the funding sources of private equity funds and venture capital funds.

Government guided funds are invested with the purpose of guiding commercial capitals to be invested in key sectors and weak links in economic and social development, and support the development of related industry and sector. Ordinary private equity funds and venture capital funds are invested with the purpose of realizing capital gain and maximization of profits.

1.3.2. **Regulatory Authorities**

China Securities Regulatory Commission is the main government agency in charge of regulating market-oriented investment funds.

Regulatory authorities for government funds vary according to their levels and support and
guidance directions. For instance, for government funds at the central government level, NDRC and MOF are in charge of the Emerging Industries Venture Investment Plan, the Ministry of Science and Technology and MOF are in charge of the High-tech SME Venture Investment Guidance Fund, and NDRC, MOF and the Ministry of Transport are in charge of the Railroad Development Fund; for government funds at local level, Hubei Provincial Finance Office and NDRC are in charge of the Hubei Yangtze River Economic Belt Industry Fund, Chongqing Municipal Bureau of Finance and Finance Office are in charge of Chongqing Industry Guidance Equity Investment Fund, and Tangshan Municipal NDRC and State-owned Assets Supervision and Administration Commission are in charge of Tangshan Industry Investment Guidance Fund.

1.3.3. Financial Sector Policy and Legal Environment

Government funds, private equity funds and venture capital funds have become key fund categories of interest to the research team. Under the background of the country building multi-tiered capital market, promoting entrepreneurship and innovation and optimizing use of government fiscal funds, as innovative policy tools and investment and financing tools, these funds are in the booming process. The relevant system of policy and laws and regulations are also in the process of gradual establishment and perfection.

A. Policies and regulations related to private equity funds and venture capital funds
Except for basic laws such as the Company Law, the Securities Law, and the Partnership Enterprise Law, since 2005 onward, the Chinese government has issued a series of polices and laws and regulations to guide and regulate the establishment, operation and development of private equity funds and venture capital funds. The relevant policies and laws and regulations are as shown in Table 1.

**Table 1. China’s Policies and Regulations Related to PE and VC Funds**

<table>
<thead>
<tr>
<th>Name of Policies &amp; Laws and Regulations</th>
<th>Issued by and at</th>
<th>Main Provisions and Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interim Management Measures for Venture Capital Enterprises</td>
<td>Ten ministries and commissions including NDRC, Ministry of Science and Technology, MOF, in 2005</td>
<td>Regulating the establishment, investment and operation and supervision of venture capital funds; specifying policy supports to venture capital funds</td>
</tr>
<tr>
<td>National Long-and-Medium Term Planning Outlines for Development of Science and Technology (2006-2020)</td>
<td>State Council, in 2006</td>
<td>Encouraging relevant departments and local governments to establish venture capital guidance funds, guide funding sources in society to flow to venture capital enterprises, and guide venture capital enterprises to retain their investments in start-up enterprises at their seed stage and initial stage</td>
</tr>
<tr>
<td>Notice on Issues Concerning Exemption of Transfer Obligations of State-owned Shares by State-owned Venture Capital Institutions and State-owned Venture Capital Guidance Funds</td>
<td>MOF, SASAC, and CSRC, Social Security Fund, in 2010</td>
<td>Eligible state-owned venture capital institutions and state-owned guidance funds can apply for exemption of transfer obligations of state-owned shares when SMEs they invested go publicly-listed in stock exchanges</td>
</tr>
<tr>
<td>Notice on Issues Concerning Insurance Institutions’ Investment in Equity and Real Estate</td>
<td>CIRC in 2012</td>
<td>Specifying eligible requirements for private equity funds to secure investment from insurance institutions</td>
</tr>
<tr>
<td>Notice on Division of Management Responsibility of Private Equity Funds</td>
<td>State Commission Office of Public Sectors Reform in 2013</td>
<td>Specifying CSRC is responsible for the supervision and management of private equity funds, conducting moderate supervision and protecting investors’ rights and interests; NDRC is responsible for drawing up policy measures for promoting private equity industry, and jointly with other departments working out criteria and specifications for governments’ contributions to private equity funds</td>
</tr>
<tr>
<td>Measures for Registration of PE Fund Managers and Filing of Fund (Trial Version)</td>
<td>The Asset Management Association of China(AMAC) in 2014</td>
<td>Specifying that PE fund managers and PE funds need to file with AMAC, and raising requirements for industry self-discipline and information disclosure</td>
</tr>
<tr>
<td>Interim Measures for Supervision and Management of PE Fund</td>
<td>CSRC, in 2014</td>
<td>Regulating PE fund from a range of aspects including registration, filing, qualified investors, fund raising, investment and operation, industry self-discipline, supervision and management, legal liability</td>
</tr>
<tr>
<td>Some Opinions on Further Promoting Healthy Development of Capital Market (new state nine articles)</td>
<td>State Council, in 2014</td>
<td>Suggesting to “cultivate private offering market, establish and perfect private offering system, and developing private investment funds”</td>
</tr>
<tr>
<td>Notice on Issues Concerning Insurance Fund Venture Capital Funds</td>
<td>CIRC, in 2014</td>
<td>Allowing insurance funds to be invested in venture capital funds, and broadening funding sources for venture capital funds; specifying eligible requirements for venture capital funds to secure investment from insurance institutions</td>
</tr>
</tbody>
</table>
Various policies and laws and regulations that have been rolled out to mainly regulate private equity funds and venture capital funds from the following aspects:

- **Raising capital of funds**: private equity funds and venture capital funds shall not raise funds from any units and individuals other than the qualified investors, and shall not publicly raise or promote funds to non-specific objects via newspapers, radio, television, the Internet and other public communications media or lecture, seminar, analysis meeting, and bulletins, leaflets, mobile phone messages, WeChat, blog or email.

- **Qualifying fund investors**: private equity funds and venture capital funds shall raise funds from qualified investors. The number of investors for a single fund shall not exceed the particular number stipulated by relevant laws including the Company Law, the Partnership Enterprise Law. For qualified investors, the minimum requirements have been set out in Measures for Supervision and Management of Private Investment Funds: units whose net assets are not less than 10 million CNY, individuals whose financial assets are not less than 3 million or whose personal average annual income is not less than 500,000 CNY, the amount invested in a single fund not less than 1 million CNY, and also including public welfare fund and investment plan. For private equity funds and venture capital funds applying for contribution from government funds, there are higher requirements, such as the Emerging Industries Venture Capital Plan requires that a single investor in a fund shall contribute no less than 10 million CNY.

- **Registration and filing**: fund managers shall apply for registration with AMAC, and file with AMAC upon completion of fund-raising. Except for meeting criteria for registration and filing, some regulators also have higher requirements on fund managers. For instance, to be eligible for investment from insurance institutions, fund managers have to meet definite performance requirements set by the CIRC.

- **Investment and operation**: such activities shall be conducted in accordance with agreements in the fund contracts (articles of association, partnership agreements), including investment directions, modes, and investment ban. For example, venture capital funds can only be invested in unlisted enterprises in the form of equity and quasi-equity such as preferred shares, convertible bonds, and cannot be engaged in guarantee and real estate businesses. Idle funds can only be deposited in banks or used to purchase treasury bonds and other fixed income securities.

B. **Policies and laws and regulations related to government funds**

Most of government funds have their own corresponding management measures, which shall make detailed provisions as for the funding source, operating mode and management mode for each government guidance fund. For instance, in 2007, the Interim Management Measures for high-tech SME Venture Capital Guidance Funds was jointly prepared and issued by the MOF and Ministry of Science and Technology, and China’s first state-level high-tech SME venture capital guidance fund be launched; the Emerging Industries Venture Capital Plan shall be operated in accordance with the Interim Management Measures for the Emerging Industries Venture Capital Plan to Invest in Venture Capital Funds issued by MOF and NDRC in 2011; the Railroad Development Fund shall be established and operated for fundraising and investment in accordance with the Management Measures for the Railroad...
Development Fund; operations for the Clean Development Mechanism Fund shall be conducted in accordance with the Management Measures for China’s CDM Fund jointly issued by seven ministries and commissions including MOF and NDRC; chiefly in compliance with the Guideline on Standardized Establishment and Operation of Venture Capital Guidance Funds jointly issued by NDRC, MOF and Ministry of Commerce in 2008, and with reference to local conditions, local governments have also formulated their management measures when setting up guidance funds on local levels.

On November 12, 2015, the Interim Management Measures for Government Investment Funds was issued by MOF, which are intended to regulate the establishment, operation and risk control, termination and exit, budget management, asset management and supervisory management and further improve the legal basis for the establishment and operation of government funds.

Government funds at local levels are mainly established and operated in accordance with the Guideline on Standardized Establishment and Operation of Venture Capital Guidance Funds and the Interim Management Measures for Government Investment Funds, which include the following:

- **Establishment of fund:** governments at all levels establish guidance funds through budgetary arrangements in the form of individual contribution or joint venture contribution with commercial capitals.
- **Sectors supported:** supporting innovation and entrepreneurship, the development of SME, industrial transformation and upgrading as well as infrastructure and public services.
- **Fund management:** managing and operating in the principle of “government guidance, market operation, scientific decision-making and guarding against risks”, government financial departments direct investment funds in establishing scientific decision-making mechanisms to ensure the realization of the policy-oriented objectives of investment funds, they normally do not get involved into daily management affairs of funds; they can either set up management institutions, or entrust qualified management institutions to take charge of the daily management and operation of the funds.
- **Investment and operation:** focusing on equity investment; shall not engage in any business of guarantee, mortgage, entrusted loans other than financing guarantee; or invest in secondary market shares, futures, real estate, securities investment funds, enterprise bonds with a rating of below AAA, trust products, non-guaranteed financial products, insurance schemes and other financial derivatives; shall not provide sponsorship or donations for any third party (other than public welfare donations with approval); shall not accept or accept in a disguised form deposits, or grant loans and lend money to any third party; shall not make investments subject to unlimited liabilities; shall not raise fund by issuing trust or collective financial products.

Based on their objectives, characteristics of guidance and support direction, state-level government funds with funding from central government may have some special provisions in terms of investment and operation. For instance, the Clean Development Mechanism Fund can be used for issuing entrusted loans and granting donations, High-tech SME Venture
Capital Guidance Fund can be used to provide risk allowance and investment guarantee for high-tech SME, and the Railroad Development Fund can have a certain proportion of funds to be invested in comprehensive land development.
2. Green Energy Market Analysis in China

2.1 Market Demand for Green Energy

China's economy has entered the new normal, with increasingly three obvious features of speed change, organization optimization, and energy transformation. During the 13th FYP period, China will actively push the air pollution control, and implement "double-control" of total energy consumption and energy intensity. According to the targets raised by Chinese government, such as, the carbon dioxide emissions per unit of GDP and total energy demand control by 2020 as well as the peak target of carbon dioxide emission by 2030, the team made preliminary analysis on market potential of energy efficiency, distributed renewable energy and clean energy during the 13th FYP.

2.1.1 Market demand and size for energy efficiency

The 13th FYP (2016-2020) is not only the critical period to fully build the well-off society, but also an important period with strategic opportunities for energy development and transformation. In this period, on one hand, as China's industrialization and new urbanization are accelerated, residents' consumption structure upgrades, energy demand and consumption are growing continuously; on the other hand, as China's energy saving and low carbon work is constantly promoted during the past 10 years, energy efficiency in key industry has been significantly improved, marginal benefits of energy saving and low carbon inputs have been reduced, marginal cost has accordingly increased, and the demand of energy saving and low carbon input are still increasing.

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<tbody>
<tr>
<td>Target achievement</td>
<td>19.1%</td>
<td>18.2%</td>
<td>-/-</td>
</tr>
<tr>
<td>Energy saving amount/Market potential</td>
<td>About 20% less than that in 2005</td>
<td>About 16% less than that in 2010</td>
<td>15% less than that in 2015</td>
</tr>
<tr>
<td>Investment Scale/Demand</td>
<td>844.6 billion CNY directly invested in EE improvement</td>
<td>Total investment demand for key EE&amp; ER projects is 982 billion CNY, achieved 927 billion CNY during the 2011-2013</td>
<td>Total investment demand for key energy saving projects is 2460 billion CNY.</td>
</tr>
</tbody>
</table>
According to the study of Energy Research Institute of NDRC, during the 13th FYP, about 937.45 million tce will be saved in the whole society of China, including 520.77 million tce saved by structural adjustment, accounting for 55.6% of the total energy saving potential; 380.08 million tce saved by technological improvement, accounting for 40.5% of the total energy saving potential; about 2.6 million tce saved by capacity building, and about 34 million tce saved by so-called “behavior energy-saving”\(^8\), and in which, EE technology improvement will become the main target area to be supported.

**Box 2. Key Energy Saving Projects of The 13th FYP\(^9\)**

During the 13th FYP, fully promote energy conservation and boost the revolution of energy consumption.

- Implement the nationwide energy saving action plan, and fully promote the energy conservation in industry, building, transportation, and public institution;
- Upgrade boiler (kiln), lighting, and motor system, and implement “waste heat for heating” project, and other key projects;
- Vigorously develop and promote energy saving technologies and products, and develop major technology demonstration;
- Carry out energy-saving actions and voluntary activities of key energy-use units, push construction of energy management system, measuring system, and online monitoring system of energy consumption, and conduct energy audit and performance appraisal;
- Implement the building EE promotion and green building chain development plan; carry out energy-saving and low-carbon power dispatching; conduct the cascade utilization of energy.

If analyze by sectors it will be found that 251.59 million tons of tce will be saved by industry sector (including 74.77 million tons saved by EE improvement of newly increased capacity, 70.1 million tons saved by energy intensive industry, 61 million tons saved by other energy-consuming industry, 45.72 million tons saved by eliminating the inefficient capacity), and its investment demand is 771.5 billion CNY; for building sector, 91 million tons of tce will be saved (including 69 million tons saved by the existing buildings, and 22 million tons saved by the new buildings), and 1367 billion CNY needs to be invested for energy conservation in building sector; regarding transport sector, it is expected that 37.49 million tce will be saved, and 275 billion CNY needs to be invested.

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\(^8\)It is Chinese-style word, means demand-orientated energy-saving activities for power, heat & cool supply.

\(^9\)Source: Outline of the 13th Five-year Plan
Based on the above analysis, the potential for energy efficiency market during the 13\textsuperscript{th} FYP is about 940 million tons of standard coal, including 380 million tons saved by key energy saving projects (including industry, building, traffic and capacity building) with investment demand of about 2,460 billion CNY, which is nearly 1.5 times of that during the 12\textsuperscript{th} FYP. In which, the direct project investment is 2,413.5 billion CNY, and about 380.08 million tce will be saved.

Moreover, ESCO industry, as an important market mechanism to promote China's energy conservation and emission reduction, maintains increasing growth during the 12\textsuperscript{th} FYP. By 2015\textsuperscript{10}, the total output of ESCO industry increased from 83.629 billion CNY in 2010 to

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\textsuperscript{10}Sourced from EMCA (China ESCO Industrial Association)
312.734 billion CNY, with an average annual growth rate of 30.19%; the ESCO project investment increased from 28.751 billion CNY in 2010 to 103.956 billion CNY, with an average annual growth rate of 29.31%. It is found that accumulated 371.072 billion CNY have been invested for ESCO industry during the 12th FYP, with the annual energy saving capacity of 124 million tce and 310 million tons of CO₂ emission reduction. It is anticipated that by the end of 2020, the investment for ESCO projects will reach 750 billion CNY. The investment demand of ESCO industry accounts for 1/3 of the total investment demands of energy conservation, its financing demand is quite huge.

2.1.2 Market demand and size for distributed renewable energy and clean energy

According to the study conducted by UNEP¹¹, since the 12th FYP, China's annual investment in renewable energy has exceeded 300 billion CNY, and the accumulated investment from 2011-2014 is above 250 billion CNY, of which, the investment in 2014 achieved the highest record by reaching 83.3 billion USD with an increase of 32% over the last year.

China's 13th FYP (2016-2020) states that the installed capacity of wind power will reach 250 million kW, and solar PV power generation will reach 150 million kW, and utilization of geothermal energy will reach 50 million tce by 2020.

As for solar energy, according to the latest research results of the 13th FYP renewable energy development plan, the installed capacity of solar PV power generation is predicted to reach 150 million kW by 2020, in which 70 million kW of distributed PV generation project. During the 13th FYP, about 64 million kW will be newly added, which needs the investment of about 576 billion CNY¹².

The biomass energy will realize scaled and diversified development during the 13th FYP, of which, the installed capacity of biomass power generation will reach 15 million kW, biomass briquette will reach 50 million tons, biomass gas will reach 21 billion m³, biomass liquid fuel will reach 6 million tons, and total utilization of newly added biomass energy will reach about 40 million tce. The investment demand of about 300 billion CNY is needed for the newly added distributed renewable energy, such as biomass energy, solar water heater, and geothermal energy during the 13th FYP.

In addition, in terms of distributed natural gas, according to prediction of China Gas Association Distributed Energy Committee, new installed capacity of distributed natural gas energy reaches 40 million kW, about 68-80 billion m³ gas will be consumed, and total investment of 280 billion CNY¹³ is needed during the 13th FYP.

Based on the above analysis, the investment demand for China market on distributed renewable energy is quite huge.

¹²Calculated by the distributed solar PV power station's investment as 9000 CNY/kW
¹³Calculated by gas distributed energy station's investment as 7000 CNY/kW
renewable energy and clean energy is predicted to reach about 1,200 billion CNY by 2020.

**Figure 4. Investment Demand for Distributed RE and Clean Energy 13th FYP**

2.1.3 Market demand and size in key strategic regions

In October 2015, in the CPC Central Committee’s Proposals for the 13th FYP of National Economy and Social Development, the "three strategies" of longitudinal and horizontal economic belts along coast, river, and line are proposed to be formed, based on total strategy of regional development, and guided by construction of "One Belt and One Road", synergetic development of Beijing-Tianjin-Hebei, and construction of Yangtze River Economic Zone.

According to the national arrangement of energy conservation and air pollution control, Beijing-Tianjin-Hebei and its surroundings, Yangtze River Delta, and Pearl River Delta are the three key areas for energy consumption and air pollution control. The three key areas have tremendous demands and market potential of energy conservation and emission reduction.

——Air Pollution Control Action Plan: To implement the specific indicator that the inhalable particle concentration in Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta reduces respectively by 25%, 25%, and 15%, the three areas are required to strive for negative growth of total consumption of coal by 2017.

——Implementation rules of air pollution control action plan in key areas and provinces (cities): To implement the national Air Pollution Control Action Plan, corresponding implementation rules or schemes for the air pollution control action plan have also been formulated in each key area and province, for example, in the Implementation Rules for Beijing-Tianjin-Hebei and Its Surroundings to Implement the Air Pollution Control
Action Plan, the goal\textsuperscript{14} is raised that total consumption of coal will be reduced by 83 million tons in Beijing, Tianjin, Hebei Province, and Shandong Province by 2017, of which, consumption of 13 million tons of raw coal will be reduced in Beijing, 10 million tons in Tianjin, 40 million tons in Hebei Province, and 20 million tons in Shandong Province.

—— In the Energy Development Strategy Action Plan (2014-2020), consumption of coal in Beijing-Tianjin-Hebei-Shandong will be reduced by 0.1 billion tons in 2020 than that in 2012, and the total consumption of coal in Yangtze River Delta and Pearl River Delta will achieve negative growth.

As EE level has been improved continuously in China's key industries and there is less space for eliminating the inefficient capacity during the 13\textsuperscript{th} FYP, it will become an inevitable choice to improve EE and develop the renewable energy, to release huge investment demand and market potential in the three key areas.

2.2 Current Financing Sources

The funding sources for EE and green investment diversified along with the development of green financing system. The main funding sources include public funds, commercial banks, PE, capital market and securitization etc.

2.2.1. Public funds

During the 11\textsuperscript{th} FYP, China's energy consumption per unit GDP reduced by 19.1%, and supported the annual average 11.2% increase of national economy with an annual average 6.6% increase of energy consumption. The input from central government was 101.653 billion CNY, including the central government direct investment, incentive funds for EE technology retrofit, special funds for energy conservation in building and transport sectors, special fund for energy-saving capacity building and new mechanism promotion, subsidy funds for R&D of energy saving technologies and promotion of energy saving products, and transfer payment for eliminating inefficient capacity, as shown in the figure below. During the 11\textsuperscript{th} FYP, the public fund accounted for 12.01\%\textsuperscript{15} of total EE social investment (846.625 billion CNY), and initially paved the way for the EE investment pattern, that is, guided by government and actively participated by the whole society.

\textsuperscript{14}Notice on issuing the Implementation Rules for Beijing-Tianjin-Hebei and Its Surroundings to Implement the Air Pollution Control Action Plan (HF [2013] No.104), September 2013

During the 12th FYP, central government continued to support the key energy saving projects and project investment by means of incentive funds for EE technology retrofit and ESCO projects, (Demand Side Management) DSM pilot cities, as well as pilot cities for comprehensive utilization of fiscal policies for energy conservation and emission reduction. Take 2013 as an example, according to research of China Energy Efficiency Investment and Assessment Committee, the total social investment in China’s EE field reached 504.67 billion CNY, 3 times for that of the annual average investment during the 11th FYP. Of which, central government funding reached 77.87 billion CNY in 2013, accounting for 15.43% of the total social investment in EE field, still playing an active and leading role with good leverage effect.

During the 13th FYP, under the situation of transforming government functions and deepening the reform of the fiscal and taxation systems, with promulgation of Interim Measures for the

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Administration of Subsidy Funds for Energy Conservation and Emission Reduction (CJ [2015] No.161), abolishment of multiple special financial funds, and continuous improvement of environmental tax policy systems, Chinese government will gradually change the existing way of large-scaled fiscal subsidy, and will make more efforts for combination of government guidance and market operation, the demand for commercial capital will become bigger.

2.2.2. Commercial financing

Driven by central government funding, the scale of external commercial financing in EE field has expanded by exploring innovative mechanism and became an important funding source of EE improvement during the 12th FYP. External commercial financing includes banking financial institutions (credit, guarantee, and factoring), non-banking financial institutions (leasing and trust) and equity financing (stock market and private equity).

Taking the year of 2013 as an example, about 390 billion CNY was from market-oriented investors, accounting for 77.3% of the total social investment, and the leverage rate between public fund and commercial investment is 1: 3.4. As the main force of investment in EE field, the investment of the banking financial institutions is 278.2 billion CNY, accounting for 71.3% of the total social investment in EE field. Of which, 260.92 billion CNY for credit investment, 10.56 billion CNY for guarantee investment, 6.72 billion CNY for factoring investment, and respectively accounting for 93.8%, 3.8% and 2.4% of banking financial institutions' EE investment. The investment were mainly used for EE improvement in industry, building, transport and capacity building fields, including 259.43 billion CNY for industry, 8.22 billion CNY for building, and 9.98 billion CNY in transport.

In addition, non-banking financial institutions become an important supplementary source for EE investment, and the total investment in EE field was 6.78 billion CNY, accounting for 1.3% of the total social investment, including 4.5 billion CNY of financing leasing investment, and 2.28 billion CNY of credit trust investment. Moreover, in 2013, the equity investment in EE field was 160 million CNY, mainly including stock market and private equity, although it accounted for less than 0.01% of the total social investment, the equity investment further enriched investment and financing mechanisms in EE field.

2.2.3. Green financing

According to the study of China Green Finance Committee of China Society for Finance and Banking, China will need above 2 trillion CNY of green investment each year in the coming years, while only 250-300 billion CNY can be provided by the government's annual budget for energy conservation, environmental protection, clean energy, and other green fields, which only meet 10%-15% of green investment demands, and the rest 85%-90% needs commercial investment.

In September 2015, the Integrated Reform Plan for Promoting Ecological Progress was
officially issued by The CPC Central Committee and State Council, and for the first time mentioned to “make design and strategy for constructing green financing system”, by clarifying to support establishment of various market-based green development funds, to support green credit with government fund, to issue green bonds, to improve guarantee mechanisms for energy conservation and low carbon projects, to increase risk compensation, and to promote international cooperation in green financing.

In 2015, the Announcement on Green Finance Bonds, and the List of Green Bond-Supported Projects were released by People's Bank of China (PBOC), which is the first time for China to release the guiding opinions on green bonds, and will greatly push the development of green bond market, and promote the financing the projects with regard to energy conservation, pollution control, resource conservation and recycling, clean traffic, clean energy, ecological protection and adapting to climatic change. Also, some green funds, led by local governments or large enterprises have also appeared one after another to attract and drive the investment of commercial capitals.

2.3 Barriers to Green Financing

2.3.1. Barriers to green energy implementation in developing countries

A number of recent studies have identified the various barriers to large-scale implementation of green energy in developing countries\(^7\) in five broad categories:

- Policy and regulatory barriers;
- Barriers related to energy end users (both public and private sectors);
- Barriers related to providers of energy equipment and energy services;
- Institutional barriers; and
- Financing barriers.

Policy and regulatory barriers include low or subsidized energy prices, distorted fiscal and regulatory policies, lack of transparency, rigid procurement and budgeting policies in the public sector, limitations on public financing, ad hoc planning, and limited data availability and quality. A key policy and regulatory issue is the lack of internalizing of the impacts of energy use in the pricing of energy. In particular, the “price” of carbon emissions has not been reflected in energy prices. The Report of the UN Secretary-General’s High-level Advisory Group on Climate Change Financing (AGF) concluded that unless the carbon price is set at US$25 per ton level, it will be difficult to raise the funds needed to mitigate the

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increasing impacts of carbon emissions to the target levels of 450 ppm.\textsuperscript{18}

Barriers related to the public sector end users include limited incentives to save energy, lack of discretionary budgets for special projects or upgrades, unclear ownership of cost and energy savings, limited availability of financing, lack of awareness and technical expertise, and behavioral biases. Barriers related to private sector energy users include higher yields on alternative capital investments, low management priority on energy efficiency relative to other corporate needs, limitations on internal capital for investing in energy efficiency, and lack of knowledge and awareness of new and innovative technologies for energy efficiency. Other major barriers in both the public and private sectors include the high cost of energy-efficient equipment, consumer preferences for other attributes of a product than energy efficiency, and the “split-incentive” issue,\textsuperscript{19} wherein the beneficiary of the savings from energy efficiency is different from the investor in the energy efficiency measures.

With respect to energy efficiency equipment and service providers, the barriers include the limited development of the energy efficiency services delivery infrastructure, high project development and transaction costs for energy efficiency projects, limited technical, business and risk management skills, limited availability of equity financing, and lack of credibility with both large energy users and financial institutions. Further, the formal measurement and verification (M&V) procedures and protocols on which energy savings performance contracts crucially depend, are neither sufficiently developed nor widely accepted in most developing countries.

Institutional barriers in developing countries include: (i) the lack of a formal institutional framework for developing and implementing energy efficiency strategies, policies and programs; (ii) the emphasis on increasing energy supplies rather than reduce energy consumption; (iii) the lack of confidence in the ability of EE improvements to offset the need for new capacity; (iv) the lack of “champions” who will promote energy efficiency; and (v) limited knowledge and understanding of EE by the general public.

The financing barriers to green energy projects arise from the unique characteristics of such projects, such as relatively small project size, high project development and transaction costs, limited availability of commercial financing, and inadequate knowledge and implementation capacity of energy users. The Figure\textsuperscript{20} below illustrates the major financing barriers to green energy deployment.

\begin{footnotesize}


\end{footnotesize}
2.3.2. Barriers to green energy financing in China

Based on the above analysis of market demand and possible funding resources, it is observed that among China's EE or green investment, government fiscal funds can only meet about 15% of investment demands, and the rest 85% needs the inputs of commercial capitals. At present, banking financial institutions are the major source of commercial investment, accounting for about 70% of the total social EE investment\textsuperscript{21}. In recent years, China domestic banks have increased its supports to green economy. According to the data published by China Banking Association, by the end of 2014, credit balance of banking financial institutions had reached 7.95 trillion CNY, of which, 6.01 trillion CNY was from 21 main banking financial institutions, accounting for 9.33% of the total loans.

It is noted that as an efficient market-oriented mechanism, ESCO industry has developed rapidly with strong demands for market financing, but most ESCOs are small and medium-sized enterprises (SMEs), financing difficulty is always the main bottleneck that restricts the China's ESCO development. According to the data published by Science & Technology and Industry Development Working Committee of Chinese Society for Environmental Sciences in 2012, the self-raised funds of ESCOs accounted for 65.2% of the total investment; bank credit accounts for 28.1% of the total investment. According to the incomplete statistics of Committee of China Energy Conservation Association (EMCA), among the ESCO projects invested by EMCA members\textsuperscript{22}, 50% of the projects investment still came from the owned and self-raised funds. In recent years, private capital and leasing business began to enter China’s ESCO market, respectively

\textsuperscript{21}China Energy Efficiency Investment Progress Report (2013), Science and Technology of China Press
\textsuperscript{22}According to statistics, by the end of 12th Five-Year Plan, there were total 5426 ESCOs in China, of which, more than 1200 ESCOs are EMCA members.
accounting for 4.2% and 3.5% of the total ESCO investment with quite small proportions. Although China has released some documents, such as Green Credit Guidelines and Green Credit Statistical System, to encourage financial institutions to actively carry out green credit, and some commercial banks have launched innovative financial products mortgaged for future profits; however, as the main forces of EE financing, domestic financial institutions still need further innovation in carrying out green finance and mitigating barriers.

Currently, main barriers faced by the domestic financial institutions for green financing, these barriers result in the sectors most in need for financing their green energy projects, small and medium enterprises (SMEs), and energy service companies (ESCOs) not having access to financing. These are discussed as below.

A. Lack of collateral guarantee and limited equity funds

Lots of practical experiences show that guarantee is the key factor for SMEs getting access to EE financing, and the financial risks for banks also rely on guarantee. Although some guarantee companies are also exploring guarantee products and business models to meet EE financing, the guarantee link is still weak in current financing mechanism for EE financing.

Since most ESCOs are SMEs with small fixed asset, they are lack of credit records in bank, lack of fixed asset that can be mortgaged but only having the project's future energy-saving benefits and cash flow, which result in ESCOs’ financing difficulties.

For some large and middle-sized ESCOs subordinated to large group companies, even if they have strong fund strength and credit, still face the problem of insufficient internal funds when implementing new EE projects; when they purse to loan from the domestic banks, they are usually required to provide the mother company’s guarantee. Since the parent company can't provide guarantee without limit for its subsidiary ESCOs, which eventually restricts the financing access to these large and middle-sized ESCOs.

There is another option to find potential financing channel for ESCOs to obtain bank loan through commercial guarantee companies. But commercial guarantee companies generally require ESCOs to provide counter guarantees, however it is difficult for most ESCOs to meet the requirements.

B. Limited technical skills at commercial banks

The EE projects of SMEs are characterized by "small, so many, and scattered", that is, small in scale, so many projects, related to various technologies and industries. For the ESCO projects, calculation of energy savings directly relates to project revenue and borrowers' repay ability, however, it is a complicated task and needs professional experiences. Most domestic commercial banks are lack of understanding of relevant technologies and ability for project appraisal. Only those with support of international financial institutions (IFIs) have some cooperation with the third-party professional consulting agencies in terms of in project
technical assessment and cost-benefit analysis. For these reasons, domestic commercial banks have conservative attitude towards EE green projects, especially for the SMEs.

C. Higher perceived risks and transaction cost

ESCO projects involve various types of technologies and have high requirements of risk control. It is common for the domestic banks that these projects are small-scaled, and only accounts for less than 5% of its total credit balance. Compared with traditional loans for large scaled projects, the loan amounts for these small and medium-sized ESCO projects loan are small with low duplicability, while the transaction cost are almost as same as those big ones. It is no doubt that both project management risks and transaction costs are high for ESCOs and SMEs.

Therefore, considering their own management cost and risk, most banking financial institutions haven't implemented the green credit to the whole credit process, they are not willing to change the existing credit approval procedures and standards for ESCOs and SMEs’ EE projects.

D. Mismatch between the short loan maturity and the long payback period

Currently domestic commercial banks generally provide 1-3 years of short-term loans for ESCOs, which are far from meeting the financing demands of some large and medium-sized green projects with medium and long-term operation term. Besides, green financing needs not only debt financing but also equity financing, especially project equity financing. Since it has become a trend for well-developed ESCOs to enter the capital market for equity financing, it is an urgent need for innovation of green financing mechanisms, such as, establishing green industrial funds and green guarantee funds with government background, and providing medium and long-term financing for large and medium-sized green projects.
3. International experience on green energy financing

The international experiences focus on financing mechanisms implemented by governments, international financial institutions (IFIs or “donors”), and private sector organizations to facilitate and promote green energy investments in developing countries, particularly in sectors that are underserved by conventional commercial financing sources.

In developing countries, governments have adopted a wide range of initiatives to overcome the barriers to large scale implementation of energy efficiency. Many reports have provided extensive compilations and discussions of policy instruments for facilitating green energy. The role of the public sector, represented by government agencies and supported by technical assistance from the international donors, has broadly focused on the following approaches to promote green energy:

- Developing policies and programs;
- Providing incentives and/or subsidies;
- Promoting the development of the market for the deployment of green energy and stimulating the financial market for green energy financing.

While such initiatives can facilitate the creation of an enabling environment in the short term to promote and facilitate financing of energy efficiency projects, the scaling up of green energy investments to meet the needs of developing countries requires the facilitation of sustainable project development and commercial financing approaches. Regardless of the resources provided by governments and donors, the long-term growth and development of the market for green energy financing and implementation requires the active participation of commercial banks and financial institutions as illustrated in Figure 8.

Figure 8. Government/Donors vs. Market Roles in Scaling Up EE Investments

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26 Ibid.
3.1 Overview of Green Energy Financing Mechanisms

Many countries, with the assistance and participation of donors, have developed and implemented a range of financing mechanisms, either to enhance the financial leverage of public funds or to gain access to commercial funding for green energy projects, which can be illustrated in the form of a green energy financing “ladder” as shown in Figure 9.

Figure 9. Green Energy Financing Ladder

As shown in Figure 9, the ladder shows a transition from purely public financing (such as grants) to public-private partnerships (such as credit lines or risk-sharing programs) and eventually to predominantly private financing (such as commercial project financing or private equity financing). The specific mechanisms on this ladder depend on the maturity of the financial markets, with the lower tier options being consistent with low market maturity, and the higher tier with advanced market maturity.

3.1.1 National Funds for Green Energy Financing

Overview: A number of countries have established national funds for financing green energy projects. While some of these funds have partial grant components, they are generally established as revolving funds to assure sustainability. Such green energy revolving funds are special purpose funds established by governments, regulators, and/or donor agencies for financing green energy projects. The experience with such funds indicates that a wide range

of financing approaches have been used to deploy the funds. Some funds have been established by donor agencies such as the World Bank. Others have been created by national governments such as in Thailand. In the U.S. electricity regulators have established Public Benefit Funds using the public benefit charge (PBC) mechanism.

A revolving fund has been demonstrated to be an attractive option for scaling up green energy financing projects. Under a typical fund, created using public funds and IFI loans, financing is provided to energy users (project hosts) or ESCOs to cover the initial investment costs of the green energy projects; some of the resulting savings are then used to repay the fund until the original investment is recovered, plus interest and service charges. The repayments can then be used to finance additional projects, thereby allowing the capital to revolve and creating a sustainable financing mechanism.

Such funds may be able to offer better financing terms (grace periods, longer repayment periods, and less-stringent collateral requirements) than typical commercial loans. Because green energy projects have positive financial rates of return, capturing these cost savings and reusing them for new investments creates a more-efficient use of public funds than typical budget- or grant-funded approaches. This can help demonstrate the commercial viability of green energy investments, paving the way for future commercial financing.

**Illustrative Structure:** The typical structure of a green energy fund is shown in Figure 3.4. Such funds have been successfully deployed in Bulgaria, Romania, Armenia, and other countries. Box 4 provides an illustration of the Armenian R2E2 fund.

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27 For example, the World Bank helped establish the Bulgarian Energy Efficiency Fund.

28 Thailand established the ENCON Fund to finance energy efficiency projects.

29 A public benefit charge (also known as a system benefit charge) is a regulatory mechanism that imposes a levy on electricity sales and uses the funds from such a levy to finance energy efficiency programs.


**Figure 11. Typical Structure of a Green Energy Fund**

Source: Adapted by authors from World Bank Clean Energy Financing Book.

**List of Green Energy Funds:** There are many examples of green energy funds. Some of the salient funds are listed below. Section 4 provides a detailed description of the process involved in establishment and operation of a green energy fund as well as a detailed comparative assessment of some of the funds.

- **Bulgaria Energy Efficiency Fund (BEEF)** – Established in Bulgaria in 2005 by the World Bank, GEF and governments of Austria and Bulgaria, BEEF is one of the most successful green energy funds. Its projects included EE improvements in public buildings, industrial processes, street lighting, and heat distribution systems, and off-grid renewable energy. BEEF also successfully supported a number of ESCO projects.

- **Armenia Renewable resources and Energy Efficiency (R2E2) Fund** – Originally established in 2006 (by the World Bank) and modified in 2012 to offer energy service agreements (see Section 4 for details), the R2E2 fund has completed many projects in the public sector, which is generally unserved by other financing mechanisms. Its projects include heat metering and regulation, EE improvement in public and multifamily buildings, and rehabilitation of heating systems.

- **Romania Energy Efficiency Fund** – Established by the World Bank and GEF in 2003, this fund was established to help energy users adopt modern technologies for efficient use of energy. Its projects have included replacement of inefficient energy using equipment (such as boilers, motors, pumps, etc.) with energy-efficient equipment, and modernization of process industry equipment and street lighting.

- **Moldova Energy Efficiency Fund** – This Fund was established by the Government of Moldova in 2012 under a new Law as an independent and financially autonomous legal entity. The main objective of the Fund is to attract and manage financial resources to

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finance and implement EE and RE projects. Its projects include thermal insulation, energy management systems, efficient natural gas and biomass boilers, improvement of heating systems efficiency, and solar systems.

• Thailand Energy Conservation (ENCON) Fund – The Government of Thailand established the Energy Conservation (ENCON) Fund in 1992, using revenues from a levy on petroleum sales, to foster the expansion of EE and RE projects by mobilizing and leveraging additional investments in mitigation projects. The ENCON Fund was initially available to large-scale industrial and commercial facilities and later opened up to ESCOs and small-to-medium sized enterprises.

• Salix Finance – This organization was established by the U.K. Department of Energy and Climate Change (DECC) as an independent, publicly funded corporation to provide interest-free capital to public institutions. Its projects have included Insulation, LED lighting, building energy management systems, cogeneration; and heat recovery systems.

• Indian Renewable Energy Development Agency (IREDA) – IREDA was established by the Government of India in 1987 to promote, develop and extend financial assistance for Renewable Energy and Energy Efficiency projects. It provides project financing, equipment financing, financing for efficient equipment manufacturers, and has financed projects for EE boilers, control systems and lighting, absorption chillers, variable speed drives, cogeneration and industrial process efficiency improvement.

• Kerala State Energy Conservation Fund (KSECF) – This Fund was established by the Government of the State of Kerala in India. The funding was from the State budget and the financing schemes included energy audit subsidies, interest buy-down for commercial and industrial energy users, EE appliance financing, grants for public sector projects, and a Partial Credit Guarantee Scheme.

• Korea Energy Management Corporation (KEMCO) - KEMCO is a public organization responsible for the implementation of energy efficiency, new and renewable energy deployment, and climate change mitigation policies and measures. It was established in 1980 by the Ministry of Commerce, Industry and Energy under the “Rational Energy Utilization Act,” and manages the Rational Energy Utilization Fund, which provides long-term and low-interest rate loans along with tax incentives for energy efficiency and conservation investments. KEMCO also offers rebate and incentive programs for high-efficiency products.

36 Center for Clean Air Policy, Revolving and ESCO Funds for Renewable Energy and Energy Efficiency, Thailand, undated.
37 Salix Finance: http://salixfinance.co.uk.
38 Indian Renewable Energy development Ah0gencyIREDA
• U.S. Public Benefit Funds – Many states in the U.S. have established funds for EE and end-use RE implementation using the public benefit charge which is collected as a surcharge on electricity sales. These funds are managed by the utilities, state agencies or independent third parties to implement a wide range of green energy programs.41

Box 4. Armenia Renewable Resources and Energy Efficiency Fund (R2E2 Fund)

The Fund was established in 2005 and capitalized with an US$8 million IDA credit. The Fund is overseen by a Board of Directors, which includes government, private sector and academia and operates on a fully commercial basis. The Fund currently implements a World Bank/GEF project that provides EE services in public sector facilities—such as municipal street lighting, schools, hospitals, and administration buildings (average size about US$100,000). It is expected to finance projects worth US$8.7 million between 2012 and 2015 and provide technical assistance for project preparation and capacity building.

The Fund provides loans to municipalities and public entities with revenue streams independent of the state budget, and energy service agreements (ESAs) to schools and other public facilities, which are not legally independent:

• Loans will be provided under an ESA, whereby the Fund will also provide additional services against a service fee (conduct a preliminary screening; carry out the procurement of design and works; oversee construction and commissioning; pay the contractors for services provided; and monitor the sub-projects). The loans will be treated as municipal debt, with fixed repayment obligations to be made within their budget provisions in future years. The amount of the repayments will be designed to allow fund clients to repay the investment costs and service fee from the accrued energy cost savings.

• Energy Service Agreements: The Fund will first determine the average baseline energy use,
• Identify the general scope of a sub-project, develop bidding documents, conduct the
• Procure, finance the project, oversee construction and commissioning, and monitor the sub-project. The ESA will obligate the facility to pay the baseline energy costs (with adjustments for energy prices, usage, etc.) over the life of the agreement. In such cases, there is no loan or debt incurred by the client entity. With these payments, the Fund will pay the energy bills on the facility’s behalf and retain the balance to cover its investment cost and service fee of up to 10 years. The agreement will also be designed so that the duration can be adjusted if the Fund recovers its full investment earlier or later.

To support the build-up of an ESCO industry in Armenia, the Fund uses simplified ESCO contracts to shift some performance risks to private construction firms/contractors.

Source: World Bank42

Energy Management Corporation


3.1.2 Fund of Funds

A "fund of funds" (FOF) is an investment strategy of holding a portfolio of other investment funds rather than investing directly in stocks, bonds or projects. A fund of funds may be "fettered", meaning that it invests only in funds managed by the same investment company, or "unfettered", meaning that it can invest in external funds run by other managers. There are different types of FOF, many of which invest in other funds (such as mutual funds) as a diversification strategy. The best example of a FOF in the green energy field is GEEREFF.

Global Energy Efficiency and Renewable Energy Fund (GEEREFF): GEEREFF is a public private partnership (PPP) set up by the European Commission, Germany and Norway in 2008 to maximise the leverage of public funds. Structured as a ‘Fund-of-Funds’, GEEREFF invests in private equity funds that provide equity finance to small and medium-sized project developers and enterprises. The USD169.5 million pledged to the GEEREFF is administered by the European Investment Bank.

GEEREFF invests exclusively in emerging markets outside the EU and particularly focuses on serving the needs of the ACP, which is a group of 79 African, Caribbean and Pacific developing countries. It also invests in Latin America, Asia and neighbouring states of the EU (except for Candidate Countries). Priority is given to investment in countries with policies and regulatory frameworks on energy efficiency and renewable energy. GEEREFF’s focus is on:

- Renewable energy, including but not limited to small hydro, solar, wind, biomass and geothermal
- Energy efficiency, including but not limited to waste heat recovery, energy management in buildings, cogeneration (CHP), energy storage and smart grids.

GEEREFF does not directly provide funding to renewable energy and energy efficiency projects or enterprises, but rather invests in private equity funds that specialise in providing equity finance to small and medium-sized project developers and enterprises (SMEs). These private funds must have a pipeline of environmentally and financially sustainable projects and must meet strict investment criteria in order to qualify for GEEREFF funding.

Some of the funds that have received GEEREFF financing and the associated amounts are illustrated in Figure 12.


Figure 12. GEEREF Portfolio of Funds

<table>
<thead>
<tr>
<th>Fund</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa Renewable Energy Fund (USD 19.6 M)</td>
<td></td>
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<tr>
<td>Armstrong SE Asia Clean Energy Fund (€ 10.0 M)</td>
<td></td>
</tr>
<tr>
<td>Caucasus Clean Energy Fund (USD 13.0 M)</td>
<td></td>
</tr>
<tr>
<td>Frontier Market Energy &amp; Carbon Fund (€ 10.0 M)</td>
<td></td>
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<tr>
<td>Emerging Energy Latin America Fund (€ 12.5 M)</td>
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<tr>
<td>Evolution One Fund (€ 10.0 M)</td>
<td></td>
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<tr>
<td>MGM Sustainable Energy Fund (€ 10.0 M)</td>
<td></td>
</tr>
<tr>
<td>Renewable Energy Asia Funds I and II (USD 28.4 M)</td>
<td></td>
</tr>
<tr>
<td>SolarArise India Fund (€ 12.0 M)</td>
<td></td>
</tr>
</tbody>
</table>

Source: http://geeref.com/portfolio/

3.1.3 Public Venture Capital Funds

**India - Venture Capital Fund for Energy Efficiency**: The Venture Capital Fund for Energy Efficiency (VCFEE), established by the Bureau of Energy Efficiency (BEE) in India, is one of the financial instruments under the Framework for Energy Efficient Economic Development of the National Mission for Enhanced Energy Efficiency (NMEEEE). The VCFEE provides risk capital support to green energy investments in new technologies, goods and services.\(^{45}\)

The availability of this risk capital through the VCFEE will help overcome some of the risks perceived by private players preventing them from investing in this sector. Among others, less returns on investment and often high transaction costs in case of small green energy projects prevent private investments. The VCFEE, being a unique Fund, would potentially assist in addressing these.

The fund helps to create the volume in project deal flow by the fund manager of VCFEE through advertising and soliciting opportunities in energy efficiency area. Energy Service Companies (ESCOs) and companies that plan to undertake green energy projects using the energy saving performance contracting (ESPC) mode are the key potential beneficiaries of the VCFEE.

BEE is selecting a public financial institution as a “Fund Manager” for management of the

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\(^{45}\) Emergent Ventures India, Operationalization of Venture Capital Fund for Energy Efficiency (VCFEE) in India, Report submitted to BEE, February 2011.
funds under VCFEE and the “Fund Manager” will be primarily responsible for making investment on behalf of VCFEE. The manager will also present the quarterly progress reports to the Board of Trustees. VCFEE will provide equity capital for energy efficiency projects in Government buildings and Municipalities in the first phase. Key Features of VCFEE:  

• The fund will invest in the form of equity.
• A single investment by the fund shall not exceed INR 2 crores (about US$300,000).
• The fund shall provide “last mile equity support” to specific energy efficiency projects, limited to a maximum of 15% of total equity required, through Special Purpose Vehicles (SPV) or INR 2 crores (about US$ 30,000), whichever is less.
• The total life of the fund will be 10 years from the date of commencement.

Thailand ESCO Fund: Thailand established the ESCO Fund in 2008 because the financing from the ENCON Fund was not being provided to developers of small energy efficiency and renewable energy projects and to ESCOs. The ESCO Fund provides a variety of financial mechanisms including:

• Equity investment – The ESCO Fund can invest between 10-50 percent of a project, up to a maximum of USD 1.6 million for a period of five to seven years. Investors can exit by selling back shares to the entrepreneur, find new strategic partners, or list in Thailand’s stock market.
• ESCO venture capital – The ESCO fund can invest up to 30 percent of registered capital, with a maximum of USD 1.6 million. The investment period matures in 5 to 7 years.
• Equipment leasing – provides eligible businesses for equipment leasing up to 100 percent of the equipment cost, up to a maximum of USD 0.3 million per project, with a payback of less than 5 years. The associated interest rate is 4 percent per year.
• Carbon credit trading - The ESCO Fund supports project owners in developing Clean Development Mechanism documents, and in accessing the carbon credit market through bundling small projects.
• Technical assistance – up to approximately USD 3,250 per project.
• Credit guarantee facility – Co-financed with other financial institutions, the guarantee of commercial bank loans to project owners up to USD 0.3 million and for no more than five years; owners pay a fee to the guarantor at 1.75 percent per annum of the guarantee amount.

The ESCO Fund provides capital and technical assistance for clean energy, renewable energy, energy efficiency and building retrofit projects. It was organized into two phases (2008-2010 and 2011-2012), each funded by an ENCON grant at a value of USD 16.3 million. The Fund is managed by the government-appointed non-profit Energy Conservation Foundation of Thailand and Energy for Environment Foundation.

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The primary beneficiaries are: small and medium enterprises, including the energy intensive service and industrial sectors; energy service companies, project developers, or technical partners; and domestic and international investors in energy efficiency and renewable energy sectors.

By the end of Phase 1 in 2010, a total of THB 330 million (USD 10.8 million) had been deployed by the ESCO Fund, and resulted in a total investment of THB 3,334 million (USD 109 million). During Phase 1, the majority of investments were equity investments (76%), while equipment leasing projects received (24%), and venture capital (.2%). By the end of Phase 2 (2012) the EE and RE projects were projected to create energy savings of 23.97 ktoe/year and financial savings of THB 932.3 million (USD 29 million) per year. The projects financed were primarily in biomass power, followed by solar power, EE projects, biogas projects, biomass thermal energy projects, and solar water heater projects.  

The ESCO Fund has proved to be a successful mechanism in providing venture capital to promote the implementation of EE/RE projects. The Fund was designed to be a government run institution in order to mitigate the credit and project risks associated with projects. The benefit of this structure has resulted in a lower required rate of return for these projects. The ESCO Fund has experienced a very low default rate since projects are held to extremely stringent eligibility criteria and undergo a thorough approval process.

**California Clean Energy Fund (CalCEF):** California Clean Energy Fund is a private equity and venture capital firm specializing in direct and fund of funds investments. The firm invests in early stage and seed/startup companies. It seeks to invest in private clean energy and transformational clean technology companies focused on low carbon transportation, green building, cleaner fossil fuel, solar, energy efficiency, lighting sector, energy storage, products and services including software, renewable generation, power and communication transmission lines, electric power distribution, demand-side management, and all forms of power including demand and supply side options. It seeks to invest in California and prefers to invest a maximum amount of equity investment of $0.5 million.

The fund was formed in 2004 to accelerate investment for demonstration and commercialization of energy efficiency and renewable energy products in California. The fund has invested in biodiesel, transportation, renewable energy, and other technologies.

CalCEF is structured as a non-profit organization that invests in “for profit” ventures and re-invests the profits earned in other deserving companies. Both early and late stage projects are eligible for investment. CalCEF has hired private equity firms as investment managers.

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49 Center for Clean Air Policy, Revolving and ESCO Funds for Renewable Energy and Energy Efficiency, Thailand, undated.

50 Center for Clean Air Policy, Case Study: Thailand’s Energy Conservation Fund, October 2012.

51 https://calcef.org/
CalCEF has two investment vehicles:
- CalCEF Fund I – Invests and reinvests profits in companies and
- CalCEF Clean Energy Angel Fund I – Supports seed or start up stages of a company dealing in solar, energy efficiency, and transportation and lighting sectors.

The fund’s initial endowment came from utility bankruptcy settlement with Pacific Gas and Electric (PG & E) utility. CalCEF received fund of USD 30 Million over a period of 5 years (2004 - 2008). CalCEF’s profits are reinvested in the USD 30 Million fund.

In 2010, CalCEF initiated the Clean Energy Angel Fund which closed at USD 11 Million.

### 3.2 International Experiences on Green Energy Funds

#### 3.2.1 Characteristics of Green Energy Funds

**Typical Structure of a Green Energy Fund:** The typical structure of a green energy fund is shown in Figure 17. Such funds have been successfully deployed in Bulgaria, Romania, Armenia, and other countries.

![Typical Structure of a Green Energy Fund](image)

**Figure 17. Typical Structure of a Green Energy Fund**

Source: Adapted by authors from World Bank Clean Energy Financing Book

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Fund Management and Governance: The key elements of fund management and governance include the following:

- Oversight arrangements
- Choosing the fund manager
- Monitoring and evaluation
- Reporting

A. Oversight Arrangement: The main functions of the oversight bodies include: (i) setting the investment strategy and policy of the fund; (ii) hiring the fund management team; (iii) establishing the overall criteria for selecting projects; (iv) approving the annual business plans and budgets formulated by the management team; (v) preparing and submitting an annual financial report to the government; and (vi) assuring that the fund is operating in compliance with national EE strategy and plans. Table 3 summarizes the oversight arrangements for selected funds.

<table>
<thead>
<tr>
<th>Fund</th>
<th>Oversight Body</th>
<th>Composition of Oversight Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria Energy Efficiency Fund</td>
<td>Management Board</td>
<td>9 members appointed by Government (4 from public sector and 5 from private sector)</td>
</tr>
<tr>
<td>Armenia R2E2 Fund</td>
<td>Board of Trustees</td>
<td>Appointed by government and includes members from government, private sector, NGOs and academia</td>
</tr>
<tr>
<td>Romania Energy Efficiency Fund (FREE)</td>
<td>Board of Administration</td>
<td>Seven members appointed by government (2 public sector and 5 private sector)</td>
</tr>
<tr>
<td>Moldova Energy Efficiency Fund</td>
<td>Administrative Board</td>
<td>Nine members appointed by government (4 public sector and 5 private sector)</td>
</tr>
<tr>
<td>Salix Finance (U.K.)</td>
<td>Board of Directors</td>
<td>Appointed by government (includes one public sector and two private sector)</td>
</tr>
<tr>
<td>Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)</td>
<td>Management Committee</td>
<td>Seven members appointed by government (Chaired by Minister of Energy; includes 3 other public sector and 3 private sector members)</td>
</tr>
<tr>
<td>Thailand ENCON Fund</td>
<td>Management of DEDE</td>
<td>Existing management of the Department of Alternative Energy Development and Efficiency</td>
</tr>
<tr>
<td>State Energy Conservation Fund (Kerala, India)</td>
<td>Executive Committee</td>
<td>Appointed by Government (with 7 public sector and 5 private sector members)</td>
</tr>
<tr>
<td>U.S. Public Benefit Funds</td>
<td>Management of Utilities</td>
<td>Existing Management of Demand-Side Management (DSM) Departments within utilities</td>
</tr>
</tbody>
</table>

B. Choosing the Fund Manager: Reviews of international experience with EE funds have identified a number of options for fund management. The fund management team needs to have expertise in a number of areas including knowledge and understanding of

55 Limaye 2010
EE technologies and options; skills in market assessment and pipeline development; capabilities in credit analysis, financial analysis and project appraisal; and understanding of EE and energy services markets.

Many options are available for the choice of a fund manager. In the U.S. where many states have established funds to support implementation of EE and end-use RE using what are referred to as public benefit charges (usually created by assessing a levy or surcharge on electricity sales), three fund management models have been used: (i) management by a utility, such as in California; (ii) management by an existing government agency such as in New York; or (iii) management by an independent third-party agency such as in Vermont or Delaware. Examples of these fund management options are shown in Table 4.

<table>
<thead>
<tr>
<th>Fund</th>
<th>Type of Management Entity</th>
<th>Location</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Benefit Funds in U.S. States</td>
<td>Utility</td>
<td>California</td>
<td>Utilities (PG&amp;E, Southern California Edison and SDG&amp;E)</td>
</tr>
<tr>
<td></td>
<td>Existing State Agency</td>
<td>New York</td>
<td>New York State Energy Research and Development Agency</td>
</tr>
<tr>
<td></td>
<td>Independent Third Party</td>
<td>Vermont</td>
<td>Vermont Energy Authority Sustainable Energy Agency of Delaware</td>
</tr>
<tr>
<td>India – State of Kerala</td>
<td>Existing State Agency</td>
<td>Kerala</td>
<td>Kerala Energy Management Center</td>
</tr>
<tr>
<td>National Energy Funds</td>
<td>New Statutory Authority</td>
<td>Ireland</td>
<td>Sustainable Energy Authority Sustainable Energy Agency</td>
</tr>
<tr>
<td></td>
<td>New Government-owned Corporation</td>
<td>South Korea</td>
<td>Korea Energy Management Company (now Korea Energy Efficiency Agency)</td>
</tr>
<tr>
<td></td>
<td>New Fund Management Team</td>
<td>Bulgaria</td>
<td>Competitively selected consortium consisting of three firms</td>
</tr>
<tr>
<td></td>
<td>Permanent staff plus consultants</td>
<td>Romania</td>
<td>Staff appointed by the Board of Admin. plus a fund management consultant</td>
</tr>
<tr>
<td></td>
<td>Permanent Staff</td>
<td>Armenia</td>
<td>Executive Director and senior staff appointed from government</td>
</tr>
<tr>
<td></td>
<td>Existing Government Agency</td>
<td>Thailand</td>
<td>DEDE – Department of Alternative Energy Development and Efficiency</td>
</tr>
</tbody>
</table>

C. **Monitoring and Evaluation**: Monitoring is the process of routinely gathering of information on all aspects of the green energy fund implementation. Monitoring measures the quality and effect of the implementation process and procedures. The funding sources (governments and/or donor agencies) need to obtain from the Board and management team periodic reports on the fund's performance. These funding sources may define specific performance indicators and reporting periods. The Board will then
have to report the fund’s performance annually as required in accordance with these indicators. The fund management team therefore needs to establish a monitoring system that will collect and report the data needed to assess these indicators. Box 8 presents the performance indicators established by FREE, which were required to be reported to the World Bank on a quarterly basis.

<table>
<thead>
<tr>
<th>Box 8. Performance Indicators - Romanian Energy Efficiency Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Output Indicators</td>
</tr>
<tr>
<td>2. Number of projects received</td>
</tr>
<tr>
<td>3. by the Fund Manager (by size, type, categories of clients)</td>
</tr>
<tr>
<td>4. Number of projects appraised by the Fund Manager (by size, type, categories of clients)</td>
</tr>
<tr>
<td>5. Number of the loans approved (by size, categories of clients, sectors)</td>
</tr>
<tr>
<td>6. Deals under preparation/under appraisal/submitted to the Investment Committee (IC)</td>
</tr>
<tr>
<td>7. Total principal, interests and fees received during the quarter</td>
</tr>
<tr>
<td>8. Number of projects with first disbursement, if in trenches</td>
</tr>
<tr>
<td>9. Number of projects with second disbursement, in trenches</td>
</tr>
<tr>
<td>10. Total operating expenses incurred during that quarter</td>
</tr>
<tr>
<td>11. Non-performing loans, comprising of number, size, repayment schedules, type and reasons for non-compliance with the terms of contract</td>
</tr>
<tr>
<td>12. Co-financing including actual contributions made to the investment projects</td>
</tr>
<tr>
<td>13. Technical assistance delivered in terms of amount of time spent and nature of activities</td>
</tr>
<tr>
<td>14. TA provided per development phases of deals;</td>
</tr>
<tr>
<td>15. Relevant news indicating factors that could affect energy prices and thus attractiveness of energy savings instruments, and any changes in the business environment that could impact project demand.</td>
</tr>
<tr>
<td>16. Process Indicators:</td>
</tr>
<tr>
<td>17. Average time for deals preparation (by type of investment, categories, sectors)</td>
</tr>
<tr>
<td>18. Average time elapsed from the submission (preparation) to approval, by IC</td>
</tr>
<tr>
<td>19. Average time elapsed from the submission (preparation) to final approval by Board</td>
</tr>
<tr>
<td>20. Average time elapsed from the approval to concluding of the loan contract;</td>
</tr>
<tr>
<td>21. Average time elapsed from the approval to the first payment, if disbursement by trenches</td>
</tr>
<tr>
<td>22. Number of projects rejected by the Board, by reason of rejection?</td>
</tr>
<tr>
<td>23. Number of projects with delays more than 30-60 days in the repayment of the installments/interest rate/commission by, with reason for delay/clarified with the client by the Fund Manager.</td>
</tr>
</tbody>
</table>

3.2.2 Operationalizing a Green Energy Fund

The major steps in the operationalization of a green energy fund are summarized below.

- Establish the legal framework for the fund - The legal framework may exist in prior legislation. If not, new legislation may need to be enacted. A key decision is to agree on whether to use an existing entity or establish a new one. The options include creating the
fund within an existing Ministry, energy agency, or development bank, creating a new legal entity (independent corporation, NGO or new statutory agency), or establishing a PPP. Most important is the governance structure to incentivize the Fund management to perform well while still providing the needed services to the target markets.

- Develop reliable and sustainable funding sources - It is important that the green energy fund be capitalized with sufficient funds from the government, donor agencies, and/or other sources to initiate operations and fund a number of projects. The government may also need to assure additional funding resources once the initial funds are deployed to ensure that the Fund can continue its operation over the long-term.

- Define the fund objectives and target markets – A green energy fund may not be expected to serve all the energy consuming sectors. The government needs to focus the initial activities on a few targeted markets. The public sector, particularly schools and hospitals, represents a good target market for the initial deployment of such a fund, because these markets offer high EE potential, lack internal financial resources and access to commercial financing, and have very limited capacity to implement EE projects. Also, the SME sector and ESCOs are generally poorly served by commercial financing sources and represent a good target market for a green energy fund.

- Develop the governance structure - The governing body is generally a Board of Directors or Trustees (or Administering Board) appointed by the government. The preferred approach is to include both government and non-government representatives in the Board because the private sector representatives provide knowledge and experience while helping to prevent undue political influence, which helps develop a clear strategy and policy of the Fund.

- Select and recruit the fund management team - The governing board will define the fund management options (existing ministry staff, an independent fund management organization, government agency with a fund management consultant, etc.). The preferred option is to engage a professional fund management team (“Fund Manager”) using a competitive bidding process, because such a team can: (i) bring financial structuring experience that may be very difficult to get from government officials; (ii) be engaged using a performance based contract that rewards success and penalizes failure; (iii) provide incentives for performance that can be a great motivator; and (iv) be terminated and replaced if performance falls substantially short of expectations. However, a private sector fund manager is likely to result in a higher fee structure.

- Hire the staff - The Fund Manager will recruit qualified staff to the management team. It is important that the staff have relevant experience in areas such as green energy project financing, energy services, investment management, credit and risk assessment, loan disbursement and recovery, etc. Some of the staff will therefore need to be recruited from the private sector. However, the management and staff must also be responsive to the public sector needs and perspectives and the public benefit role of the fund. For example, the management team needs to avoid “cream skimming” (picking only the most economically attractive projects), and cater to the needs of a wide range of eligible borrowers and protect the public interest when selecting EE projects for implementation.

- Define the major financing products - A major focus of the fund will be on debt financing
(loans). However, in order to serve the needs of different types of borrowers, the Fund should consider offering other financing options (ESAs, risk-sharing, forfaiting, equity financing, etc.) as one of the major components.

- **Develop the operational procedures** - The Fund needs to develop detailed operational procedures. For example, the fund management team needs to define the application procedures for the different financing windows and prepare related forms based on the eligibility requirements and the major program components. There is also a need to prepare an Operations Manual (OM) that documents the principles and implementation rules governing the Fund’s operations. The OM provides guidance to all the key participants involved in fund management, project implementation, and results monitoring, thereby providing a common understanding of all operational principles and practice for all stakeholders.

- **Define the TA offerings** - Another very important project component is TA, which is often critical to ensuring high quality deal flow and strong portfolios. For example, the fund may develop standard contract terms and procurement procedures and conduct centralized procurement of equipment and services to obtain better pricing for equipment and services and reduce administration and transaction costs.

- **Develop and document eligibility criteria** - As discussed above, the Fund should develop and document the eligibility criteria for the various financing windows and products offered.

- **Define the application procedures and prepare related forms** - Based on the eligibility requirements and the major components, appropriate procedures and forms should be prepared. The Fund should also have an operations manual that lays out the principles and implementation rules governing the fund’s operations. It provides guidance to all the key participants involved in fund management, project implementation, and results monitoring, thereby providing a common understanding of all operational principles and practice for all stakeholders.

- **Develop a marketing strategy and approach** - This step involves identifying the public agencies for each of the fund components, along with eligibility criteria. Then a marketing strategy and approach should be developed for each target market. This may include collecting energy consumption data and assessing the creditworthiness and borrowing capacity of specific agencies, conducting walk-through audits, and so forth.

- **Develop the project pipeline** - Using the marketing strategy and approach, specific projects shall be identified and a project pipeline established.

- **Subcontract to private ESCOs to build their capacity** - The fund manager should develop simple performance-based business models for engaging ESCOs in the implementation process. Such models may include equipment leasing, supplier credits, one-year ESCO contracts, and so forth. The fund should develop a plan to engage private sector energy service providers in the implementation process of the ESAs. In this effort, the fund should try to develop standardized audit templates, agreements, contracts, and M&V

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56These ESP models are described in the *Guidance Note on Energy Services Market Development* (World Bank 2014c).
procedures; and also introduce performance-based contracts for energy services. Participation by the CO in project implementation will build their capacity for undertaking future energy services projects and contribute to the development of an energy services industry.

- Develop and document the monitoring, reporting, and evaluation procedures and approaches - As discussed earlier, these are important functions, and the fund management team must develop the monitoring system, define the data sources and databases to be developed, and specify the evaluation procedures and protocols.

3.2.3 Lessons Learned

The major lessons from the international experiences of green energy funds are summarized as below:

**Pre-requisite market conditions:** The pre-requisite market conditions for successful operation of a green energy fund are: (i) government commitment to implementation of green energy projects; (ii) potential opportunities for green energy implementation; (iii) existing demand for financing green energy projects; (iv) lack of adequate financing for the target market sectors; and (v) creation of a mechanism to repay the Fund from the achieved savings.

**Fund organization structure and governance**

- A green energy fund is best established as an independent organization.
- The Fund governance is usually by a government-appointed Board of Governors or Board of Trustees with representation from the major stakeholders from both the public and private sectors.
- The governing board and the management team need to provide a balance between public interest and as well as private sector perspectives regarding financial structuring of projects, risks, and market development.

**Sustainability:** In order for the Fund to be sustainable, it needs a reliable and continuing funding source(s). Once the Fund deploys its initial capital, the replenishment of that capital through loan repayments will take a number of years (sometimes as long as 5 to 7 years or more). Therefore, the Fund needs to have access to financing sources to enable it to continue operations and finance additional projects.

In Bulgaria, the government initially demonstrated its strong commitment at the project’s outset by contributing significant budget funds for setting up BEEF. However, the government’s involvement was reduced gradually so that by the end of the project there was a lack of ownership and it did not assist BEEF in its efforts to increase its capital base. Sustaining political commitment across administrations can be a big challenge, and therefore public campaigns, involving local politicians in building commissioning, satisfaction surveys,

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57 (World Bank 2010a).
etc. can help build broad support.

**Selection of fund manager** (and related compensation structure and incentives)

- There are many options for selecting a fund management organization. These include an independent, newly created organization; an existing non-independent public agency; a national development bank, a utility, or other public enterprise.

- If the fund manager is a public official (such as in Romania), it is likely that the Fund will be responsive to the public interest need, but there will be limited incentives to take risks and be innovative. The World Bank review of the performance of FREE concluded that the Fund Manager contract structure should have been weighted more towards performance instead of retainer.\(^58\)

- If the fund manager is a private organization or private consortium (such as in Bulgaria), the management team is likely to be more expensive but also more innovative and responsive to market needs. However, in smaller countries and markets, it may be difficult to recruit the talent needed for effective management and administration of the Fund.

- The fund manager may be a competitively selected professional organization or consortium, an individual financial consultant, or a public sector employee dedicated or seconded to the fund. The selection of a professional organization or individual, with performance-based incentive compensation is likely lead to successful performance of the fund.\(^59\)

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\(^{58}\)(World Bank 2009)  
\(^{59}\)WB GN
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Bulgaria EE Fund</th>
<th>Armenia R2E2 Fund</th>
<th>Romanian EE Fund</th>
<th>Salix Finance (U.K.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Established</td>
<td>2005</td>
<td>2006</td>
<td>2003</td>
<td>2004</td>
</tr>
<tr>
<td>Funding Sources</td>
<td>World Bank, GEF, and governments of Austria and Bulgaria</td>
<td>World Bank</td>
<td>GEF</td>
<td>U.K. Department of Energy and Climate Change (DECC)</td>
</tr>
<tr>
<td>Fund Objectives</td>
<td>Support the identification, development and financing of viable EE projects, resulting in substantial reduction of GHGs</td>
<td>Decrease GHG emissions by removing barriers to the implementation of EE investments in the public sector</td>
<td>Help energy users adopt modern technologies for the efficient use of energy</td>
<td>Improve public sector EE and reduce GHG emissions</td>
</tr>
<tr>
<td>Legal Organization</td>
<td>Independent organization</td>
<td>Independent NGO</td>
<td>Independent organization</td>
<td>Independent, publicly funded company</td>
</tr>
<tr>
<td>Governance</td>
<td>Management Board with 9 members (4 government, 5 non-government)</td>
<td>Board of Trustees - members include government, private sector, NGOs and academia</td>
<td>Board of Administration with 7 members (2 government, 5 non-government)</td>
<td>Board of Trustees</td>
</tr>
<tr>
<td>Fund Management</td>
<td>Private sector fund management team selected competitively</td>
<td>Fund Director, Financial Manager, Investment Coordinator, and TA Coordinator</td>
<td>Executive Director (ED) appointed by Board; Fund Manager manages investment portfolio to</td>
<td>CEO appointed by the Board</td>
</tr>
<tr>
<td>Financing Windows</td>
<td>Debt Financing Facility; Partial Credit Guarantees; and TA</td>
<td>Loans, ESAs, and TA</td>
<td>Debt financing and TA</td>
<td>Provide interest-free capital through Recycling Fund and Energy Efficient Loan Scheme</td>
</tr>
</tbody>
</table>
### Typical Projects

<table>
<thead>
<tr>
<th>Rehabilitation of public buildings</th>
<th>Improvements in individual heating systems</th>
<th>Replacing old energy generation equipment (boilers, CHP, hydro, geothermal)</th>
<th>Insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE in industrial processes</td>
<td>Rehabilitation of public buildings</td>
<td>Modernizing process industry equipment and public lighting</td>
<td>LED lighting and controls</td>
</tr>
<tr>
<td>EE Streetlighting</td>
<td>EE improvement in homes and buildings</td>
<td>Heat recovery systems</td>
<td></td>
</tr>
<tr>
<td>Improvements in heat distribution systems</td>
<td>Heat metering and regulating equipment</td>
<td>Cogeneration</td>
<td></td>
</tr>
<tr>
<td>Off-grid renewable energy</td>
<td>Cogeneration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Projects</th>
<th>Loan/ESA Volume</th>
<th>Lifetime Energy Savings</th>
<th>Lifetime GHG Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>81 loans</td>
<td>$16 million</td>
<td>90,000 toe</td>
<td>900,000 tCO2e</td>
</tr>
<tr>
<td>14 ESAs</td>
<td>$2.4 million</td>
<td>32.3 GWh</td>
<td>7,906 tCO2e</td>
</tr>
<tr>
<td>20 loans</td>
<td>$11.4 million</td>
<td>36,533 toe</td>
<td>183,237 tCO2e</td>
</tr>
<tr>
<td>7,400 loans</td>
<td>£115 million</td>
<td>N/A</td>
<td>2.5 million tCO2e</td>
</tr>
</tbody>
</table>

Source: Adapted by authors from World Bank, Guidance Note: Establishing and Operationalizing an Energy Efficiency Revolving Fund
4. Chinese experience on green energy financing

This study reviewed Chinese experience in government funds as well as the relevant laws, policies and regulations issued by central government agencies, with the intent to learn the structure, financing instruments, and lessons from existing government funds in China.

There is no unified definition on green funds, so the research team defined it as government funds and PE funds focus on investment in energy conservation, carbon emission reduction and eco-environment protection.

4.1 Government green funds

The first attempt of Chinese government fund can be traced back to 1999, when Shanghai Venture Capital Co., Ltd. was approved by Shanghai Government for establishment. In 2002, China's first government fund- Zhongguancun Venture Capital Guidance Fund was set up. In 2005, ten Central Ministries and Commissions jointly issued the Interim Measures on the Administration of Venture Capital Firms, to specify that national and local governments can establish the venture capital guidance fund. Later, encouraged by National Outline for Medium and Long Term S&T Development (2006-2020), and other relevant policies, Suzhou Industrial Park, Beijing Haidian District, Shanghai Pudong New District, and Wuxi New District have established the guidance fund. In 2007, Ministry of Finance (MOF) and Ministry of Science and Technology (MOST) jointly formulated the Interim Measures on Management of Venture Capital Guidance Fund for High-tech Small and Medium-sized Enterprises, to specify the source, operation mode and governance structure of such guidance fund, and launched China's first national Venture Capital Guidance Fund for high-tech small and medium-sized enterprises (SME).

In 2008, NDRC, MOF, and Ministry of Commerce jointly issued the Guideline on Standardized Establishment and Operation of Venture Capital Guidance Fund, to define the concept of guidance fund for the first time, and require the nature, purpose, establishment and sources, operation principle and method, management, supervision, and risk control of fund, and establish legal base for organization and establishment of government fund, to bring Chinese government guidance fund into the track of standard establishment and operation. Later, the establishment of venture guidance fund has reached the boiling point everywhere.

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On May 21, 2014, Premier Li Keqiang of the State Council chaired the Executive Meeting of the State Council and pointed out to "Multiply the scale of central government venture capital guidance funds for emerging industries, speed up to establish the National Emerging
Industries Venture Capital Guidance Fund, and improve the long-term market operation mechanism, to realize the effective recovery and rolling use of guidance fund, and solve the financing problem of innovative small and medium-sized enterprises”. On January 14, 2015, Premier Li Keqiang of the State Council chaired the Executive Meeting of the State Council again, and decided to set up the National Emerging Industries Venture Capital Guidance Fund with the scale of 40 billion CNY, to promote entrepreneurship and innovation, and industrial upgrading, which is the highest attitude of the state on development of guidance fund.

Green funds funded by central government are mainly represented by the China Clean Development Mechanism Fund (CDM fund), while the Emerging Industries Venture Capital Plan also supported environmental protection and new energy, as well as the soon-to-be-established Emerging Industries Venture Capital Guidance Fund.

<table>
<thead>
<tr>
<th>Table 6. List of Government Funds Supported by Central Government</th>
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<tbody>
<tr>
<td>Name of the Fund</td>
</tr>
<tr>
<td>High-tech SME Venture Investment Guidance Fund</td>
</tr>
<tr>
<td>China Clean Development Mechanism Fund</td>
</tr>
<tr>
<td>Emerging Industries Venture Capital Plan</td>
</tr>
<tr>
<td>China Culture Industry Investment Fund</td>
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<tr>
<td>China Agriculture Industry Development Fund</td>
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<tr>
<td>Modern Seed Industry Development Fund</td>
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</table>
Box 9. Case 1: Emerging Industries Venture Capital Plan

- **Objective:** through direct investment in entrepreneurial enterprises or investment in venture capital funds with central government funding, cultivate and promote the development of emerging industries.

- **Funding source and method of establishment:** use the central government funding for industrial technology research and development and other dedicated funding to set up the "Emerging Industries Venture Capital Plan", jointly initiate to set up the venture investment funds with local governments and market-oriented investors or participate in existing venture capital funds through capital increase.

- **Investment mode:** central government funding mainly make equity investment in venture capital funds, while these venture capital funds make equity investment in entrepreneurial enterprises.

- **Investment area:** each venture capital fund supported by the Plan concentrates its investment in a specific strategic emerging industry; venture capital funds supported by the Plan mainly invest in innovative enterprises which are start-ups or in early and medium stage.

- **Fund management:** through bidding, NDRC/MOF jointly select professional investment institutions to serve as management institutions of central government funding, assess and supervise performance of these entrusted management institutions; NDRC/MOF determine the regions and industries of venture capital funds the Plan supports, entrust the management institutions of the Plan to conduct due diligence, review and approve establishment plans of venture capital funds as well as the amount of central government funding to these funds; management institutions of venture capital funds supported by the Plan are responsible for daily management of these funds.

- **Rights and interests of central government funding:** liability of central government to a venture capital fund the Plan supported is limited to its contribution amount. When loss occurs to settlement of a venture capital fund, management institution of this venture capital fund is the first to bear the loss, and rest of the loss are borne by central government, local governments and other investors, according to their proportion of contribution.

**Lessons learned:**

- **Design of a FOF and subsidiary funds:** using central government funding to establish the Plan, which is actually a FOF, and cooperate with local governments and commercial capital in venture capital funds supported by the Plan, which are actually subsidiary funds.

- **Managed by professionals:** subsidiary funds are managed by professional fund management institutions in market-oriented way.

- **Structured design:** structured design is made in subsidiary funds in order to safeguard the rights and interests of central government funding. When losses occur to settlement of subsidiary funds, such losses should be first borne by the management institutions of subsidiary funds.
**Box 10. Case 2: China Clean Development Mechanism (CDM) Fund**

- Objective of the fund: support the state to tackle climate changes and promote the sustainable development.
- Funding sources: the state-owned revenue obtained from greenhouse gas emission reduction by CDM project assignments, operating revenue of the fund, and donations of domestic and foreign institutions, organizations, as well as individuals.
- Fund management: governed by the Board of China CDM Fund and managed by China CDM Fund Management Centre. The Board is an inter-ministerial deliberative organ, which is comprised of NDRC, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Science and Technology, Ministry of Environmental Protection, Ministry of Agriculture and China Meteorological Administration. CDM Fund Management Centre is responsible for collection, management and use of the funds and is affiliated to Ministry of Finance.
- Investment strategy: grant; investment, including equity investment, entrust loan, financial guarantee, and other methods approved by the stated.
- Decision-making process: (1) Grant. The relevant departments of the State Council or provincial Development and Reform agencies transmit or submit the Grant Project Application to NDRC; NDRC organizes a review and submits the review results to the Board for verification, application will be approved by NDRC and MOF. (2) Investment: applicants submit application materials to the Fund Management Center, which is responsible for organizing selection and review of projects; major project (amount applied above RMB70mn) will be approved by NDRC and MOF after being submitted to the Board for verification; non-major project will be verified and approved by the Fund Manager Center and submitted to NDRC and MOF for filing.

**Lessons learned:**

- Establishment of the Board: fund is governed by the Board and managed by the Fund Management Center, the Board, being an inter-ministerial deliberative organ, is responsible to verify major business matters; the Center, being affiliated to MOF, is responsible for daily management.
- Diversified investment methods: include grant, equity investment, entrust loan, and financial guarantee etc.
- Decision-making process and authority are set by category: grant is approved by NDRC and MOF; while approval procedure and authority for investment are determined based on amount applied.

With changes in using method of government fiscal funds, local governments have initiated to establish the environmental protection fund since 2015, to promote local environmental protection industry. Examples of green funds initiated and established by local government are as follows:

- **Guangdong Province:** In December 2015, Technology Financial Group represented Department of Finance of Guangdong Province to contribute 2 billion CNY, signed Cooperation Memorandum of Guangdong environment fund with Ping An Bank Guangzhou Branch and Guangdong Construction Engineering Group, and the three parties jointly initiated the 6.3 billion CNY FOF of Guangdong environment fund, planning to pay up the investment of 20 billion CNY of commercial capital in control of
domestic waste and sewage in East, West, and North Guangdong.

- **Chongqing Municipality:** In June 2015, Chongqing Municipal People's Government contributed 1 billion CNY to set up PE funds for Chongqing environmental industry, planning to pry up the investment of 4-5 billion CNY in eco-environment protection.

- **Guangxi Province:** In December 2015, Guangxi Province set up the government investment guidance fund, with intended investment scale of 100 billion CNY, mainly focusing on investment in development of key industries in Guangxi Province, such as strategic emerging industry and eco-environment protection industry.

- **Hunan Province:** Provincial Department of Finance is intended to contribute and guide the commercial capital to jointly establish the industry fund with the total scale of 5 billion CNY, to support the manufacturing of advanced equipment, biology, new energy, information, environmental protection, and other strategic emerging industries.

- **Inner Mongolia:** On January 29, 2016, Establishment Scheme for Inner Mongolia Autonomous Region Environment Fund was officially issued to specify the establishment of Inner Mongolia Autonomous Region Environment Fund. The environment FOF of 2016 has initial scale of 4 billion CNY, including 1 billion CNY of autonomous region government fund, 0.9 billion CNY contributed by Baoshang Bank, 0.9 billion CNY contributed by Inner Mongolia Communications Investment Co., Ltd., 0.9 billion CNY contributed by China Building Group, and 0.3 billion CNY contributed by Shuangliang Eco-Energy Listed Company. The investment is mainly used to solve the public environment problems within the scope of government responsibility, support enterprises to solve problems on insufficient funding for construction and operation of pollution treatment facilities, and comprehensive utilization of pollutants, fully exert fund's leverage effect, introduce and absorb the advanced foreign and domestic technology and team for environmental control, and push the R&D and application of environmental control technologies, and the formation and development of the third-party control service market.

It is noticed that the most of the existing government funds aim to promote new technologies development, and very few are targeted at green energy market to date. Also, almost none of them are specifically targeted at the green market.

### 4.2 Green private equity funds and venture capital funds

Although Energy conservation, carbon emission reduction, and eco-environment protection have now become the popular investment fields concerned by many private equity funds and venture capital funds, before 2014, there were not many private equity funds and venture capital funds focusing on investment in these areas. Tsing Capital is an active green fund manager, and manages funds including 4 offshore dollar environment funds with total amount of 0.6 billion US dollars, and two domestic RMB clean technology funds with total amount of 1 billion CNY, and all the funds are invested in new energy, energy conservation, environmental protection, new material, sustainable transportation, ecological agriculture, clean production, and other fields, the fund investors include Asian Development Bank, Swiss Re-insurance Company, Hong Kong British Petroleum, BASF Venture Capital
Company, International Finance Corporation, Commodity City etc.. Some large-scale enterprises take an active part in the establishment and operation of green fund, for example, since 2010, together with banks, insurance companies and enterprises, China Energy Conservation and Environmental Protection Group has established green funds amounted to over RMB 5 billion CNY; in 2010, in association with Shanghai Urban Investment and Development Corporation, CCB International established the CCB Environment Fund; in 2013, Export-Import Bank of China, Hangzhou Industry Development and Investment FOF, Hangzhou Shangcheng Investment Group Co., Ltd., Mizuho Bank, Ltd., JGC Corporation, Japan Bank for International Cooperation, and other China-Japan institutions established China-Japan Environmental Protection Fund, with the scale of 1 billion CNY in the first phase, mainly invested in the cooperation projects of China and Japan in environmental protection. Since 2014, environmental listed companies have become the main forces to initiate and establish the green funds, in 2015, total 35 listed companies have announced to establish environment buyout funds, with total scale of 7.662 billion CNY. Some green funds, initiated and established by listed companies, are as follows:

- **Zhongzhi-GEM Environmental Industry Buyout Fund:** Jointly established by GEM, Shenzhen Huifengyuan Investment Co., Ltd., and Zhongzhi Capital Management Co., Ltd. on September 15, 2014. The scale in the first phase limits within 1 billion CNY, and the fund is invested in solid waste disposal, water recycling and treatment, atmospheric control, industrial energy conservation, and other fields, to seek excellent growing-type enterprises.

- **Safbon Water Service Industry Investment Fund:** established on October 8, 2014, by Safbon Water Service combined and Jiao Xiang Yue (Shanghai) Investment Co., Ltd., the scale is temporarily predicted as 1 billion CNY, with investment in industrial water treatment, municipal water treatment, solid waste treatment, and other environmental protection fields.

- **Zhihui Environmental Protection Industry Buyout Fund:** On April 22, 2015, South Huiton contributed 3 million CNY in cash to jointly invest 10 million CNY with Beijing Zhidesheng Investment Co., Ltd. to establish Beijing Zhihui Capital Management Co., Ltd., and would jointly set up “Zhihui Environmental Protection Industry Buyout Fund” with the scale no more than 1 billion CNY.

- **Shanghai Sailhero Environmental Protection Industry Fund:** On April 24, 2015, Sailhero Environmental Protection and Shanghai Kangcheng Investment Management Co., Ltd. established Shanghai Sailhero Environmental Protection Industry Fund Partnership Enterprise (limited partnership), with the scale of 0.5 billion CNY, as the limited partner (LP) of the Fund, Sailhero subscribed the capital contribution of no more than 50 million CNY, as the general partner (GP) of the Fund, Kangcheng Investment subscribed the capital contribution of 5 million CNY, and was responsible to raise the rest funds.

- **Green Silk Road Fund:** on March 2015, Elion Resources Group, China Oceanwide, Chint Group, Huiyuan Group, and China Ping An Bank co-launched and established the Green Silk Road Fund, devoting to the ecological improvement of silk road economic belt and development of PV energy.
5. Rationale for Establishing a Green Fund

A green energy fund could overcome the financing barriers, increase financing flow to the green energy market and underserved clients, and have a high leverage of public funds. The World Bank Group has a long-term engagement in financing EE and RE in China, through credit lines, risk sharing, and now Program for Results instrument, with the objective to mainstream green energy financing in participating banks. While these efforts are making good progress, and commercial banks will remain as the main financing source, given the barriers Chapter 2, only relying on commercial banks to meet the huge green energy investment needs is not sufficient.

In addition, a lack of equity financing presents a gap in the current financial market and a major barrier to get debt financing from commercial banks, particularly for ESCOs and SMEs. Furthermore, the government plans to change the use of public funds from giveaway subsidies to maximizing leverage of commercial financing, and is keen to set up green energy funds with government budget, particularly under the context of the “war to air pollution” in heavily polluted regions. We believe a green energy fund can be an effective solution to increase access to financing for the green energy market to complement commercial bank financing, and to better leverage public funds to unlock commercial financing.

Green fund is an effective financial instrument for facilitating investment in green energy. Comparing with other financial instruments, a green fund has the following advantages: (i) Green funds are capable of providing equity finance and debt financing for work capital; (ii) Green funds can also provide credit guarantee, and can leverage loans from banks at a multiplier of 3-5. (iii) While providing debt financing and credit guarantee, green funds are indirect means of intervention, where market plays a more dominant role in investment decision making. And (iv) Green funds could be a model for PPP (public and private partnership), an instrument promoted by the Chinese government and donors, with public fund leveraging private investment for socially beneficial investment, whereas the private investors help to ensure the efficiency in fund investment.

The key for the green energy fund to attract commercial capital and withstand risk is to absorb low-cost IFIs sovereign loans and special funding from domestic governments into the fund, which can significantly decrease fund’s overall capital cost. Application of these low-cost funds also sets aside adequate profit margin for the commercial capital which will be part of Green Energy and Emission Reduction Fund, so that the fund can raise enough market-oriented investors to realize above-mentioned designs regarding providing all necessary investment of green energy project except for owner’s equity.

60 With interest rate risk and Exchange risk taken into consideration, it is estimated that the overall cost of capital of the Fund ranges from 4.7-7.6% depending on which structure (FOF, national single fund or provincial single fund) is adopted.
funding. Low capital cost of the fund builds up certain buffers to absorb the risk of project failure and reserve sufficient investment return for real equity investors, which can be set as achievable key performance indicator to motivate the fund manager.

During consultation of the study, the relevant government agencies—the Ministry of Finance, NDRC Foreign Capital Utilization Department, NDRC Environmental Protection and Resource Conservation Department, and National Energy Administration—all expressed interests and support to a Green Energy and Emission Reduction Fund in China.
6. Preliminary Design of a Green Energy and Emission Reduction Fund in China

6.1 Strategic focus and targeted market

This proposed Fund will focus on green energy and emission reduction markets, including EE, distributed RE, natural gas, and emission reduction of air pollutants. The recipients include energy users; ESCOs; and EE, RE, low-carbon, and air pollutants emission reduction developers etc. This will contribute to the government’s EE, RE, and carbon emission reduction targets under the 13th FYP, APPCAP, and the green finance agenda. It aims to increase investment flow to the green energy market, particularly increasing access to financing for SMEs. Setting up such a Fund with the government budget and potentially multi-lateral development banks (MDBs) is an innovative use of public funds. Public funding is warranted to remove market failures and barriers and unlock project financing by lowering risks and closing finance gaps.

Design of the Green Energy and Emission Reduction Fund requires comprehensive consideration of multiple factors such as strategic orientation, funding sources, investment strategy and feasibility of set-up and sustainable operation of the fund. In the process of designing preliminary schemes of the Green Energy and Emission Reduction Fund, the research group mainly takes the following factors into consideration:

**Strategic positioning:** The major objective of the Green Energy and Emission Reduction Fund is to reduce emissions of air pollutants and GHGs through increasing financing for EE, RE, and emission reduction investments. While the Fund contributes to the government energy and environment targets, sufficient returns and sustainable revolving and operation of the Fund should be ensured.

**Major funding sources:** Different fund investors have different risk return preferences. According to the research conducted by the research team on possible funding sources, the central government funding generally has features including guidance and a low requirement for investment return, but requires that the Fund invests in sectors with certain public welfare and those supported by the government; banks and insurance companies tend to require a high security on principal and constant returns; investment institutions and industrial and commercial enterprises however pursue a higher return and can bear a high risk at the same time. In the process of designing the schemes for the Green Energy and Emission Reduction Fund, full consideration has been given to the requirements and preferences of different investors.

**Investment strategy:** In order to boost energy conservation, emission reduction and financing innovation in more effectively, in addition to products and services generally provided by most funds, including equity, debt, mezzanine, etc., the Green Energy and Emission Reduction Fund will also consider providing other products and services such as guarantee, financing leasing, capacity building and innovative financial products research.
and design so as to expand financing and exit channels for energy conservation and low carbon in more diversified ways and scale up support to energy conservation and low carbon development.

**Feasibility of establishment and operation:** Establishment of the Green Energy and Emission Reduction Fund requires innovation in policy and other aspects as well as support from the Central Government and local governments; successful operation of the Fund also has a high requirement for the fund management team. The difficulty of innovation in policy, the support from the governments, the difficulty of fund management and other factors will impact the feasibility of establishing and operating the Fund. As to the schemes of the Fund, innovation should be done in terms of investment and financing for energy conservation and low carbon, while the feasibility of actual operation should be fully considered.

**Geographical focus:** For single provincial fund, it needs to consider taking certain proportion funding to invest in projects outside the province in order to keep enough flexibility and enhance project influence. For example, if a single fund is located in Beijing or other developed provinces and cities, more than 70% should invest outside and mainly in great Beijing-Tianjin-Hebei region. If it is located in the other provinces, 60% shall be within the province and 40% outside of the province.

**6.2 Financing sources**

Based on precedent document researches and field researches, the research team considers the following potential investors of the Green Energy and Emission Reduction Fund:

**6.2.1 Central government funding**
The central government has arranged and will arrange a large amount of funding to support energy conservation and emission reduction. In recent years, innovative use of the central government funding has been explored. The central government funding has a low requirement for returns but has a requirement for support areas which should reflect government policy and guidance. Funding from domestic governments that may become source of the Green Energy and Emission Reduction Fund includes a special fund for energy conservation and low carbon, carbon tax and carbon trading revenue, etc. in the future.

**6.2.2 Local governments funding**
Accordingly, local governments have arranged and will arrange a large amount of funding to support energy conservation and emission reduction. In recent years, by the means of government funds etc., local governments have been exploring innovative use of these funding and mobilization of social funding. Local governments understand the state of business of local enterprises and can easily grasp specific project selection and operation. Local government funding has a low requirement for returns, generally requiring a certain proportion of funding to support the local enterprises.
6.2.3 Sovereign Loan from IFIs
Energy conservation and low carbon are among key areas supported by sovereign loan from IFIs. Sovereign loan needs government credit guarantee and has a long term, a low requirement for returns but requires funding security.

6.2.4 Grants from international institutions
Grants from Global Environment Facility (GEF) and other donors are mainly used for providing technical assistance services including capacity building and potentially risk sharing.

6.2.5 Commercial sources
The commercial capital mainly includes capital from commercial banks, insurance companies, PE/VC funds, industrial and commercial enterprises, etc. All kinds of commercial capital are not identical in risk return preference, the capital from commercial banks and the insurance companies generally requires a guarantee on returns, but the capital from PE/VC funds and industrial and commercial enterprises requires a high return and is strong in risk bearing capacity. Commercial capital requires a mature project pipeline.

6.3 Fund Structure, scale and leveraging
In accordance with researches on relevant experiences both at home and abroad, through interviews and idea exchanges with relevant government authorities, potential investors, etc., and by giving overall consideration to multiple factors such as strategic orientation, funding sources, investment strategy and feasibility of establishing and operating the Fund, the research team has proposed the following three alternative fund options, namely nationwide single fund, provincial single fund and regional funds.

6.3.1 A single nation-level fund – Option I
By utilizing special funding from the central government and the sovereign loan from IFIs in alliance with the commercial capital, set up a single fund at the state level to invest in green energy and EE projects on a nationwide. The basic framework of the Fund is shown as below:
**Fund establishment:** The Fund is set up jointly by contributions of the central government (special funding from the central government for energy conservation and emission reduction), the sovereign loan from IFIs and commercial capital (capital from commercial banks, insurance companies, industrial and commercial enterprises, PE/VC funds, fund management institution, etc.). The central government on-lends the sovereign loan from IFIs to a leading EE enterprise (or domestic financial institution), and the leading EE enterprise (or domestic financial institution) serves as the borrower of the sovereign loan from IFIs.

**Fund scale and leverage ratio:** The fund scale is proposed to be 2.5 billion US dollars. The ratio of investors’ contribution is: central government funding/sovereign loan from IFIs/commercial capital = 20%/20%/60%. Assuming that the Fund will finance about half of the total investments for each deal, the leverage ratio of funding from IFIs (or central government) is 1:9.

**Structure design:** Funding from different sources has different requirements for risks and returns, thus a structured design of the fund is necessary. The sovereign loan from IFIs has a requirement for break even and payment of interest; a commercial bank (and/or insurance company) participating in the fund generally has a requirement for break even and constant returns, and its requirement for returns is higher than the requirement of the sovereign loan from IFIs. Therefore, sovereign loan from IFIs and funding from commercial bank (and/or insurance company) are superior to contributions by the central government, fund management institution and other commercial capital.

**Fund governance and management:**
- **Management team:** The NDRC, MOF, IFIs and the leading EE enterprise (or large
financial institution) constitute the board of directors in charge of deciding fields to be supported by the Fund, formulating and supervising of all policies concerning use of the Fund, and approving expense budget of the Fund, while not getting involved in daily operation and management of the Fund or making decisions on specific investment. An investment advisory committee with industrial experts involved is established subordinate to the board of directors, taking charge of supplying policy-based suggestions to the board of directors. The fund management institution is recommended by the leading EE enterprise (or large financial institution) serving as the borrower of the sovereign loan or through bidding and determined by the board of directors.

The fund management institution must have experiences in investment and management of RE and EE projects, make contributions to and participate in the Green Energy and Emission Reduction Fund and take charge of raising commercial capital; a management contract must be signed between the Fund and the fund management institution which is responsible for daily operation of the Fund, including set-up, investment, post-investment management, exit from investment, etc. of the Fund; the leading EE enterprise provides technical support for project development, investment decision making, post-investment management, etc. of the Fund with its professional and technical abilities to ensure that the Fund invests and operates in a professional way.

- **Capital contribution management:** The central government and IFIs must make capital contributions after contribution by commercial capital is in place.

- **Investment management:** The board of directors formulates basic requirements for fund investment (e.g. investment area, size and stage); the fund management institution explores potential projects and conducts due diligence and investment negotiation; before making investment, the fund management institution submits the project to the board of directors, which organizes experts for a compliance review without making a judgment on fund investment price and other commercial terms, and the fund management institution should make a decision on the commercial terms by itself.

- **Evaluation and supervision:** The board of directors conducts performance evaluation and supervision on the fund management institution. The NDRC, MOF and IFIs conduct a general evaluation on overall operation of the Fund.

**Fund investment strategy:** The Fund invests mainly in the forms of equity, debt and mezzanine and provides guarantee support, technical assistance (e.g. capacity building and research of innovative financial products) and other services.

**Fund life and exit strategy:** The lifetime of the fund is 20 years (tentative, determined according to the requirements of IFIs and MOF). Equity investment exits in the way of
IPO, trade sale, asset securitization, etc.; debt, mezzanine investment and guarantee are retrieved upon expiration.

6.3.2. A single provincial fund – Option II

A provincial (in Jing-Jin-Ji, Yangtze river and pearl river regions) local government utilizes the sovereign loan from IFIs matched with self-owned funding in alliance with commercial capital to establish a single fund locally, covering the said province and perimeter areas. The basic framework of the fund is shown as below.

**Figure 19. Framework of single provincial fund**

- **Fund establishment**: The Central Government on-lends the sovereign loan from IFIs to a provincial government. The provincial government uses the sovereign loan from IFIs and makes corresponding contributions in alliance with commercial capital to jointly set up the Green Energy and Emission Reduction Fund.

- **Fund scale and leverage ratio**: Since the market size and project sources for a provincial fund are limited, the fund scale is proposed to be 1 billion US dollars. The ratio of contributions is: funding from local government / sovereign loan from IFIs / commercial capital = 20%/20%/60%. Assuming that the Fund will finance about half of the total investments for each deal, the leverage of funding from IFIs is 1:9.

- **Structure design**: The sovereign loan from IFIs and funding from commercial bank (and/or insurance company) are superior to the local finance, fund management institution and other commercial capital.

- **Fund governance and management**:  
  - **Management team**: The NDRC, MOF, IFIs and the local government constitute the
board of directors in charge of deciding fields to be supported by the Fund, formulating and supervising of all policies concerning use of the Fund, and approving expense budget of the Fund, while not getting involved in daily operation and management of the Fund or making decisions on specific investment.; an investment advisory committee with industrial experts involved is established subordinate to the board of directors, taking charge of supplying policy-based suggestions to the board of directors; the fund management institution is recommended by the local government serving as the borrower of the sovereign loan or through bidding and determined by the board of directors.

The fund management institution must have experience in investment and management of EE projects, make contributions to and participate in the Fund and take charge of raising commercial capital; a management contract must be signed between the fund and the fund management institution which is responsible for daily operation of the fund, including set-up, investment, post-investment management, exit from investment, etc. of the Fund; the local government provides support for operation of the fund with respect to policy, project development, investment, etc.

- **Capital contribution management**: Funding from IFIs should make contributions after the funding from the local government and commercial capital in place.

- **Investment management**: The board of directors formulates basic requirements for fund investment (e.g. investment area, size and stage); generally, the local government will require that the Fund invests locally by a certain proportion; the fund management institution explores potential projects and conducts due diligence and investment negotiation; the local government provides support for project development and investment of the Fund; before investment, the fund management institution submits the project to the board of directors, which organizes experts for a compliance review without making a judgment on fund investment price and other commercial terms, and the fund management institution should make a decision on the commercial terms by itself.

- **Evaluation and supervision**: The board of directors conducts performance evaluation and supervision on the fund management institution. The NDRC, MOF and IFIs conduct a general evaluation on overall operation of the Fund.

**Fund investment strategy**: Same as Option I.

**Fund life and exit strategy**: Same as Option I.

**6.3.3 Regional fund of funds – Option III.**

Utilizing the central government funding for energy conservation and emission reduction in heavy polluting regions (such as Jing-Jin-Ji, Yangtze river and pearl river regions) and
the sovereign loan from IFIs to set up a Green FOF at regional level in one of the above three regions, and set up several subsidiary funds at the local level by the FOF in alliance with the local governments in the region and commercial capital. The FOF and subsidiary funds are invested in green energy projects in the region. The basic framework of the FOF and subsidiary funds is shown as below:

**Figure 20. Framework of the regional FOF**

**Funding sources and establishment**

**FOF:** The FOF is set up jointly by contributions of the central government (central government funding for energy conservation and emission reduction) in heavy polluting regions and the sovereign loan from IFIs, wherein the central government on-lends the sovereign loan from IFIs to a leading EE enterprise (or large financial institution), and the leading EE enterprise (or financial institution) serves as the borrower of the sovereign loan from IFIs. The FOF is a regional fund, the region will be chosen from one of the three heavy polluting regions, Jing-Jin-Ji, Yangtze River, and Pearl River.

**Subsidiary funds:** There are two ways of setting-up the subsidiary funds, one is that the FOF in alliance with the local governments in the region and commercial capital sets up several subsidiary funds at local level or in certain sectors; while the other is that the FOF participates in existing funds with RE and EE as investment focus by means of increasing capital.

**Fund scale and leverage ratio:** The size of the FOF is proposed to be 1 billion US dollars, and the ratio of contributions is: funding from central government and the FOF management institution / sovereign loan from IFIs = 50%/50%. It is proposed that 30% of the FOF is used to invest in large-scale regional projects directly, 70% of the FOF is used to set up subsidiary funds, the ratio of contributions of the subsidiary funds is: FOF / local government / commercial capital = 20%/20%/60%, and the size of each underlying fund is proposed to be no less than US$300 million. By setting up the subsidiary funds, the
total fund size could be multiplied to US$3.8 billion. Assuming that the Funds will finance about half of the total investments for each deal, the leverage of funding from IFIs (or central government) is about 1:14.

**Structure design: Structure design of FOF:** It is required to ensure the principal and interest of the sovereign loan from IFIs, and the sovereign loan from IFIs is superior to funding from central government and the FOF management institution.

**Structured design of subsidiary funds:** Funding from commercial banks (and/or insurance companies) and the FOF with different requirements for constant returns are superior to contributions by the management institution of subsidiary funds and other commercial capital.

**Fund governance and management**

- **Management team of FOF:** The NDRC, MOF, IFIs and the leading EE enterprise (or large financial institution) constitute the board of directors in charge of deciding fields to be supported by the FOF, formulating and supervising of all policies concerning use of the FOF, and approving expense budget of the FOF, while not getting involved in daily operation and management of the FOF or making a decision on specific investment; an investment advisory committee with industrial experts involved is established subordinate to the board of directors, taking charge of supplying policy-based suggestions to the board of directors; the FOF management institution is recommended by the leading EE enterprise (or financial institution) serving as the borrower of the sovereign loan or through bidding and determined by the board of directors.

The FOF management institution must have experience in investment and management of RE and EE projects and make contributions to the FOF; a management agreement must be signed between the FOF and the FOF management institution which is responsible for daily operation of the FOF, including set-up, investment, post-investment management, exit from investment, etc. of the FOF; the leading EE enterprise provides technical support for project development, investment decision making, post-investment management, etc. of both the FOF and subsidiary funds with its professional and technical abilities to ensure that they invest and operate in a professional way.

- **Management team of subsidiary funds:** The management institution of subsidiary funds are recommended by the local governments and commercial capital participated in establishing the subsidiary funds and determined by the FOF management institution which conducts due diligence on the management institutions of subsidiary funds and reports to the board of directors of the FOF; management institutions of subsidiary funds must make contributions to their corresponding subsidiary funds; a management agreement must be signed between each underlying fund and its management institution which is responsible for daily operation of the underlying fund; the board of directors and the FOF management institution do not
interfere with daily operation and management of the subsidiary funds.

- **Capital contribution management:** The FOF must make contributions to the subsidiary funds after contributions by the local government and commercial capital are in place.

- **Investment management:** The board of directors formulates basic requirements for fund investment (e.g. investment area, size and stage).

**Investment of the FOF:** in the case the FOF making investment in the subsidiary funds, management institutions of subsidiary funds should submit their fund establishment and operation options to the board of directors for a review, and the FOF management institution conducts due diligence and investment negotiation and represents the FOF to invest in the subsidiary funds; in the case the FOF making direct investment in projects, the FOF management institution explores potential projects and conducts due diligence and investment negotiation, decisions of direct investment in projects are generally made by the FOF management institution on its own, and should be reported to the board of directors for approval if exceeding a certain investment size.

**Investment of the subsidiary funds:** the management institutions of subsidiary funds explore potential projects and conduct due diligence and investment negotiation, and before investment, the management institutions of subsidiary funds should submit their projects to the FOF management institution, which conducts a compliance review without making judgments on investment price and other commercial terms, and the subsidiary funds should make decisions on the commercial terms by themselves.

- **Evaluation and supervision:** The board of directors conducts performance evaluation and supervision on the FOF management institution; the FOF management institution conducts performance evaluation and supervision on management institutions of the subsidiary funds; the NDRC, MOF and IFIs conduct a general evaluation on overall operation of the FOF and the subsidiary funds.

**Fund investment strategy: FOF:** the FOF invests in the subsidiary funds in the form of equity and debt, invests in large regional projects in the form of equity, debt and mezzanine, provides guarantee support, technical assistance (e.g. capacity building and innovation research of financial products) etc. **Subsidiary funds:** the subsidiary funds invest in sub-projects in the form of equity, debt and mezzanine.

**Fund lifetime and exit strategy:** Fund life: The life of the FOF is 20 years (tentative, determined according to requirements of IFIs and MOF); life of the subsidiary funds is no more than 7 years (generally shorter than the duration of the FOF so that the FOF can retrieve investments in the subsidiary funds).

Exit strategy of the FOF: investments in the subsidiary funds exit in the ways of
liquidation upon expiration, buy-back by commercial stockholders, trade sale, etc.; direct equity investments in projects exit in the way of trade sale, asset securitization, etc.; direct debt and mezzanine investments in project are retrieved at due time.

Exit strategy of subsidiary funds from project investments: Equity investments exit through IPO, trade sale, asset securitization, etc.; debt, mezzanine investment and guarantee are retrieved upon expiration.

6.3.4. Comparison of the three options
The three options regarding the single nationwide fund, the single provincial fund and the regional fund of funds have respective pros and cons in terms of achievement of government's strategic intent, influencing power and ability of mobilizing commercial capital, feasibility of establishing and operating the Green Energy and Emission Reduction Fund as well as exploring and managing projects, etc., which are specifically shown in the following table:

<table>
<thead>
<tr>
<th>Table 1. Comparison of Pros and Cons of Three Fund Structure Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option I</strong> Single National fund</td>
</tr>
<tr>
<td>Operating nationwide, the Fund would have a big market with more project sources, and would have greater influence.</td>
</tr>
<tr>
<td>Advantages:</td>
</tr>
<tr>
<td>Disadvantages:</td>
</tr>
<tr>
<td>Without regional or provincial branches, it would be difficult to reach out and identify projects.</td>
</tr>
<tr>
<td>With a large fund scale, great amount of projects need to be explored, invested and managed, the fund management institution would face great challenges and need to have rich experiences in fund operation and project management.</td>
</tr>
<tr>
<td>Since goal of the central government and IFIs in establishing the Fund is to promote EE financing, while commercial investors pursue maximum profit, it will be difficult for the Fund to balance the risk/return preferences of different parties, and to attract and mobilize commercial capital.</td>
</tr>
<tr>
<td><strong>Option II</strong> Single Provincial fund</td>
</tr>
<tr>
<td>Local governments have better understanding of local enterprises and projects, a provincial fund is closer to the ground and finding projects would be easier. With the Fund being a good help to local development, local governments would be likely to put counterpart funding and policy support.</td>
</tr>
<tr>
<td>Advantages:</td>
</tr>
<tr>
<td>Disadvantages:</td>
</tr>
<tr>
<td>Since provincial governments usually require the Fund to invest a certain proportion in its local area, the market and the scale of the Fund would be small, influence of the Fund will be limited in the provincial level.</td>
</tr>
<tr>
<td>With risk/return preferences of IFIs, local government and commercial capital being different, it is difficult to coordinate the appeals of these parties in a single fund.</td>
</tr>
<tr>
<td><strong>Option III</strong> A regional</td>
</tr>
<tr>
<td>With the FOF being a regional</td>
</tr>
<tr>
<td>Advantages:</td>
</tr>
<tr>
<td>Disadvantages:</td>
</tr>
<tr>
<td>Two-layers of fund management institutions (FOF and subsidiary funds)</td>
</tr>
<tr>
<td>Advantages</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FOF level fund, and local governments and commercial capital participating</td>
</tr>
<tr>
<td>in subsidiary funds, regional funds would have greater influences, would</td>
</tr>
<tr>
<td>be able to balance risk/return preferences of different investors, would</td>
</tr>
<tr>
<td>mobilize more capital and have a greater size.</td>
</tr>
<tr>
<td>With local governments participating in subsidiary funds and providing</td>
</tr>
<tr>
<td>support in policy and projects exploration, there would be less challenge</td>
</tr>
<tr>
<td>in fund management.</td>
</tr>
</tbody>
</table>

6.4 Financial Products of the Fund

According to international experience, a green energy fund should be designed to serve the needs of a wide range of eligible borrowers. Some of these may not be creditworthy, or have no borrowing history; others may not have available borrowing capacity; and others may not have the internal capacity to identify, design and manage the implementation of green energy projects. To address some of these issues, the proposed Fund may offer several financing products or “windows.” These may include:

- Equity financing
- Debt financing in the form of equity
- Mezzanine financing
- Entrusted loans
- Risk Guarantees
- Technical assistance
- Innovative financing products such as green bond and securitization of project assets

6.4.1. Considerations of selection of financial products

The following factors enable the financial products by Green Energy and Emission Reduction Fund to effectively meet the demands for equity capital when implementing large sized green energy and emission reduction (GEER) projects and promoting the advanced GEER technologies in the key region, and also enable the Fund’s products to solve the financing difficulty encountered by the small medium enterprise (SME) when

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61 At the time of the research, the investment project pipeline has not been prepared the fund investors have not been clear, so the financial products are talked broadly and aimed at the major categories only. The specific financial products can be further detailed after the investor and investment project are explicit.
they implement GEER projects.

- Depending on the enhanced credit of the Fund by obtaining support from the Central Government and/or the local government, various types of debt funding can be introduced into the fund. Consequently the fund scale can be expanded to a level sufficient to provide all financing, if necessary, for eligible projects except the project developer’s equity capital. By this way, the Fund can reduce, to the maximum extent, the burden of the project developers for raising funds.  

- Strive to invest in the qualified projects in form of genuine project financing (rather than the balance sheet-based bank financing). The project is not required to provide collaterals that it cannot provide, thus solving the SME financing barriers practically. 

- The fund can strive for the funding support from international donation and the special appropriation of the government, and utilize some of government portion of residual investment returns after repaying the related capital cost to set up the financing guarantee product on the basis of risk sharing, so as to provide the credit enhancing service to the projects invested by the fund for obtaining 3rd party financing. 

- The fund can consider setting up asset securitization product at the later stage of implementation to meet the needs of carrying out the GEER projects cyclically. 

As previously mentioned, the typical barriers confronted by the GEER projects in the process of debt financing include: (1) the SME fails to obtain the bank loan due to such barriers as light assets and guarantee ability shortage; (2) the large enterprise lacks the necessary capital fund while investing the large-scale GEER projects or revolving implementation of GEER projects. Especially under the situation of the decelerated economic growth and declined energy price at present, the market inducement is insufficient for the enterprises to use their own funding and mortgage assets for GEER projects. 

Through adopting integrated investment methods to be launched by the fund, financing barriers in relation to GEER are expected to be relieved, as shown in the following Figure.

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62 Generally, the fund can provide financing of 70% of total project investment for the small and medium-sized projects by the means of similar preferred stock, entrusted loan, convertible stock, risk debt, finance leasing and/or guarantee, and provide financing of less than 90% of total project investment for qualified large projects by the means of mezzanine investment and guarantee support. 

63 See the section of Barrier Analysis in this paper for details.
Normal operation of project financing-based financial products as designed by the research is possible because the fund, as supported by governments and IFIs, is able to provide critical technical assistance services such as project identification and assessment, exit channel expansion, and post-investment risk control.

- To adopt project financing methods when making investments, the fund will and is able to rely on national expert network and local governments to build up powerful project identification ability, technical assessment ability as well as technology’s market value evaluation ability;
- Offer additional exit mechanism and channels such as M&A with public listed companies and large state-owned enterprises, and asset securitization (asset backed securities, SPV acquisition);
- Because the fund’s investment involves equity investment features, unlike normal debt financing, the fund can fully supervise the entire implementation process of investment project, so as to effectively eliminate the barrier of information asymmetry between the project invested and investors, mitigate business credit deficiency risk, and reduce project financing risk.

6.4.2. Meeting requirements and expected returns from shareholders

**Meeting the needs of local government:** Investment strategy of the fund is able to be in compliance with industry development policy formulated by the related local government.
Each local level fund (under the structure of a single fund, it refers to a single provincial fund; under structure of a FOF and subsidiary funds, it refers to subsidiary funds) must select appropriate industries within the region for investment, based on three factors: energy consumption by industry, energy saving potential by industry and financing demand by industry. And it shall invest projects and green energy technologies belonging to the selected industries and key technical fields. Capital allocation between project investment and technology investment will differs according to actual condition of each place. Generally speaking, funds invested to GEER projects can account for 60%–80%. Investment fields determined on the basis of this principle can meet governments’ requirements to further realize energy saving and emission reduction through guiding commercial capital to participate in investment, as well as government’s requirements to support specific energy-saving technology industries.

As for leverage ratio, no matter whether FOF or single fund structure is adopted, the leverage ratio of central and local governmental fiscal funding motivating GEER investments will be about 9-14 times\(^{64}\), far more than the average leverage ratio of using governmental fiscal funding traditionally in form of subsidy and reward, which was about 7.33 during the 11\(^{th}\) FYP, and 5.67 during the 12\(^{th}\) FYP, and is estimated as 4.56\(^{65}\) during the 13\(^{th}\) FYP if the traditional way of using public funds would continue. Effects and influences generated hereby are expected to greatly exceed those of original financial incentive mode. Furthermore, the usage of public funds as investment fund can be revoked, thus making the influence more sustainable, while previously government fiscal funds were given away as subsidy and reward, and thus produced effects only for one round. Please see below table for leverage ratio of different EE funds.

### Table 8. Leverage ratio calculation of three EE funds

<table>
<thead>
<tr>
<th>Leverage ratio</th>
<th>Central government</th>
<th>Local government</th>
<th>IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional FOF</td>
<td>14.35</td>
<td>9.00</td>
<td>14.35</td>
</tr>
<tr>
<td>Single National Fund</td>
<td>9.00</td>
<td>/</td>
<td>9.00</td>
</tr>
<tr>
<td>Single Provincial Fund</td>
<td>/</td>
<td>9.00</td>
<td>9.00</td>
</tr>
</tbody>
</table>

\(^{64}\) Assuming 1) FOF direct investment accounts for 30%, and investment on sub-fund accounts for the rest 70%; 2) The fund’s investment accounts for 50% of total investment of projects invested.

In addition, flexible industry selection and capital allocation will enable the fund to find enough economically feasible energy saving and emission reduction projects, with consideration to financial demands and in line with the basic principle of matching risks.

\(^{65}\) The leverage ratios of using government funds in traditional ways in 11 FYP, 12 FYP and 13 FYP are calculated as: 7.33 = (100% -12%)/12%, 5.67 = (100% - 15%)/15%, and 4.56 = (100%-18%)/18%.
and returns.

**Meeting the needs of debt investors:** Basic requirements of debt funding are short investment term, and extremely low risk; on the other hand, its return requirement is moderate. As to large-amount debt investment institutions including commercial banks, their debt funding is safer in the fund structure designed by this research than it is independently invested now, because it will exit before the funding from investors of high credit. Cornerstone investor, governments and IFIs, accumulatively contributing 40% of capital in the fund, will function as subordinated investors. The failure probability of investment portfolio on energy saving and emission reduction project is almost impossible to reach 40%, under the condition that the fund is capable as reasonably expected to keep tight control over and mitigate technical risks, operational risks, obligor’s credit risks and other major risks of the project. This brings maximum guarantee to debt investors. Besides, among Green Energy and Emission Reduction Fund, there are a large amount of government funding and IFI funding, of which the cost is lower and investment term is longer (reasonably assumed to be low at about 3%, and can be recovered in the last three years of each fund’s investment term), as a result, the investment project portfolio can produce adequate cash flow for prioritized exit of debt funding and make sure debt investors can obtain their expected return. Supposing the principal of debt funding will be repaid averagely year by year in the first three years of investment term, fund financial model calculated on this assumption is still feasible.

With earnings ensured, debt investment institutions will have good social reputation and fulfill their social responsibilities, if they take the lead in taking part in the special national and provincial green financing platform.

**Attracting the participation of professional fund manager:** It is estimated by the research team that the Green Energy and Emission Reduction Fund has quite large profit space, mainly due to the involvement of large amount low-cost public funds, to recruit professional fund manager at affordable and acceptable price level to manage the fund.

Green Energy and Emission Reduction Fund can also grant fund managers with more operational flexibility on the condition of following established investment strategy, and enable them to make investment decisions on their own and undertake final investment risk. And in that case, they are allowed to adopt risk investment in GEER technology enterprises, and are allowed to choose appropriate financial products according to risk-return characteristics of investment projects. If the owner fails to raise funding from the bank to carry out GEER project due to its lack of guarantee ability, the fund can adopt the following forms of investment respectively, based on comprehensive assessment of the

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66 According to the preliminary estimation, when investment risk is under proper control (e.g. assuming 10% of failure risk), investment return rate of the fund manager as the real equity investor who bears the final investment risk and takes the residual investment returns will be larger than 60% (excess earnings accrued from successful exit of investment on technology companies are not included), which is a satisfying return rate for the fund management business.
project and the owner (in terms of market, technology, industry and owner’s credit etc.), with risk level from low to high: entrusted loan, guarantee, mezzanine investment, debt financing in form of equity and equity investment. Mezzanine investment with convertible option and equity investment with buy-back condition are particularly suitable for investment on enterprises owing proprietary technologies and with high growth potential. The pre-condition for the fund to make such investment is that the investee should have advanced proprietary technologies in the GEER technical categories encouraged by the government, and the portion of investment on technology companies should be limited to no more than certain percentage accepted by the governments and IFIs. Finally, fund manager, as the party taking final risks, can also share all the residual return including above-mentioned indefinite return. In short, if this part of risk investment is well managed by the fund manager, its return may have no ceiling.

6.4.3. Financial products and related exit strategy
Mainly to promote SME’s access to financing for GEER project implementation and address the financing difficulty of large sized projects in capital shortage, the fund is recommended to provide seven differentiated and coordinated products: Equity, Debt Financing in form of Equity, Mezzanine, Entrusted loan, Guarantee, Innovative financing such as green bond and securitization, and technical assistance in aspects of capacity building for financial institutes, project developers, and M&A partners etc.

All of the FOF and subsidiary funds in case of FOF structure and the single national and provincial funds can provide the following six products, which one or a mix of which are selected shall be up to the decision of the fund manager on case by case basis:

6.4.3.1 Equity Investment
It mainly refers to project equity investment: an equity investment to the especially founded GEER project company. This type of investment is suitable for medium and large projects. The fund investment will rely on the project cash flows to get returns. Usually the fund will attach an early-exit condition to the project equity investment: the project company or its controlling shareholder, as expected capable, shall be made obliged to buy back the fund’s equity in designed time usually at pre-set price. During the period when the fund holds project equity, it will share the project net cash flow in form of distributed dividend with other equity shareholders on a pari passu basis, which means it also takes project risk and enjoy the project return before its investment successfully exits. The fund will not hold controlling shares of the invested project company, will not be its biggest shareholder and will not be responsible for its operation. In some cases if the fund’s equity investment adds the equity up to 60% of project investment cost, the project company’s credit position may be substantially enhanced and thus banks may be motivated provide loan for the rest amount of the project under an eased collateral condition. In a few cases, simply increasing the project equity cannot enable the project to obtain bank loans but the project is very suitable for the fund investment strategy, the fund can provide all of the remaining funds of the project outside the owner’s equity capital. Furthermore, if allowed by the fund investors, the fund can make equity investment to
eligible GEER technology companies to support their fast growth. This is actually a kind of corporate equity investment. Allocating some minority portion of the fund to make equity investment on the technology companies is particularly demanded by governments and commercial capitals. IFIs may accept such type of investment as long as it contributes directly to energy savings or emission reduction. Therefore, it is preferred by the fund if the target technology company applies energy performance contracting model to sell its EE&ER equipment and products. Both project equity and corporate equity investments will generally require monitoring the investee’s financial standing and track its operation status on a regular basis.

**EXIT**

The main return source of project equity is the cash flows of the project. The fund will share the project cash flows according to the proportion of capital contribution or agreed percentage and will have priority to exit compared with the owner. The forecast cash flow distribution plan should be sufficient to ensure the return of fund investment in relatively high level. Buy-back by controlling shareholder condition is a double guarantee for the exit of project equity.

Main exit channels for corporate equity include IPO, M&A and the dividend distribution from operation profits. IPO and M&A are deemed quite uncertain. In view of the higher risk of equity investment, the fund needs to set necessary risk mitigation measures. For example, when the actual corporate profit is significantly worse than expected, the owner of invested technology company is required to repurchase the fund’s investment in fixed price to ensure that the fund can realize a minimum yield to cover the its cost of capital.

**6.4.3.2 Debt financing in form of Equity.**

Through additional constraint conditions including designated usage of fund investment for a specific GEER project, agreed dividend amount and time, mandatory buy-back price and time, the equity investment of the fund into a company will be effectively converted into a debt finance with fixed implied rate of return. Legally speaking it is an equity investment with liquidation priority after debt, but looking from cash flows, it has no difference from a debt. This product is especially suitable for investing in the energy saving service companies and equipment suppliers with proprietary GEER technology to support them to implement small energy saving projects in batches and thus support them to develop rapidly. On the one hand, the fund’s investment constitutes an equity and thus it can help the investee to enhance credit position and further leverage bank loan; on the other hand, the investment only requires a fixed rate of return at acceptable level, so as to leave more profit space for equity shareholders. Different from the above mentioned equity investment, whose return are affected by the investee’s cash flow fluctuation, the Debt Financing in form of Equity has fixed return pattern unaffected by the investee’s actual operation status.

**EXIT**

The investment of Debt Financing in form of Equity mainly exit through the pre-set cash
flows paid from the investee through the designated project or its controlling shareholder. The key of risk control is to ensure that the fixed cash flow enjoyed by fund investment should be significantly lower than the forecast cash flow so that it has enough risk buffers.

6.4.3.3 Mezzanine.
In case the project owner has no mortgage collaterals, the fund can provide mezzanine investment for qualified GEER projects developed by credible owners. Under China’s regulation environment where there are no laws and regulations on preferred shares, mezzanine investment is often structured as equity investment with designated purpose and repurchase requirement, or an inter-company borrowing (unsecured loan) for designated purpose and attached with an option to convert to common share upon triggering certain conditions such as IPO, M&A or serious financial crisis. Mezzanine investment’s implied rate of return is fixed except for the option, through pre-set dividend and repurchase arrangement. Overall, mezzanine investment intends to achieve the necessary fixed returns so that the fund will have the ability to repay its investors even after considering the risk of loss. Meanwhile, it retains the invested company’s equity growth value, and make the returns of the investment match with its associated risks. Mezzanine investment is suitable for financing large GEER projects because it can provide long-term funds to credible investees necessary to close the designated project’s funding gap. For risk control purpose, application of this investment needs a qualified credit appraisal of the investee.

EXIT
The mezzanine investment can realize exit from revenues from dividends and investee share repurchase, funding source of which is mainly the project cash flows. Other sources of exit include sales of investment after the investee’s IPO or M&A.

6.4.3.4 Entrusted Loan
As regulated by China’s law, investment funds, as non-bank FI, cannot directly extend loans to borrower. The fund’s investment has to be channeled to a specified project through a trustee bank in form of entrusted loan. Under the entrusted loan, trustee bank will collect the capital and interest for the fund but the fund will undertake the total investment risks. This product will set the invested project assets and future income right as pledge. In addition, the borrowing enterprises generally should provide third party guarantee. The subsidiary funds provide up to 70% total investment and the remaining is the equity funding of borrowing enterprises. If the 3rd party guarantee is provided, the required rate of return can be set to reach above 8%, slightly higher than bank lending rate.

6.4.3.5 TA.
The TA will be used to provide capacity building services to the related stakeholders on the condition that the fund successfully obtains grant funding support from IFIs or governments. It aims to reinforce the insufficient capacities of stakeholders in relation to the fund’s investment. The TA service mainly consists of three parts: 1) capacity building
for financial institutes for GEER project technical assessment and measurement and verification on energy savings and emission reduction effect. 2) capacity building for project owners, including investment pitch, deal flow arrangement, investment match and measurement and verification; and 3) capacity building for the fund, including advertisement of the fund, project solicitation, project assessment, measurement and verification, FI partner identification and expansion of exit channels for the fund.

The quality of technical assessment on GEER projects is critical for the fund’s investment security. The fund will select national senior technician and industry experts to establish an authoritative expert network so that it can provide technology assessment services required for the projects. And the experts should be held accountable for the assessment results. In addition, the fund will strive to build the innovative exit mechanism for widening the exit channel of the fund invested projects. Because the main investment target of the fund is GEER projects, the exit channel construction will be focused on enhancing mergers and acquisitions. Hence, the fund will develop intimate business relations with the relevant state-owned enterprises, public listed companies and large industry investors for establishing a relatively stable acquisition partner network.

6.4.3.6 **Innovative Financial Products.**

This mainly refers to issuance of green bond for GEER projects to be implemented and issuance of Asset Based Security for refinancing of already implemented GEER projects. The green bond and ABS can be launched in cooperation with banks or security companies. The fund needs to configure about 10% funding for packing the project pool in order to do standardized screening, packing and credit enhancement. Before doing so, the fund needs to improve its credibility and financing standing through sustainable and profitable operation. From the accumulated extra investment return, it can allocate an appropriate portion as the risk cushion for external investors of the green bond and ABS.

**Product to be launched in the next round:** Financial leasing is a good candidate to add in the product line for next round of investment. It is an ordinary but important financing tool for relatively large GEER projects as well as SMEs with cashflow pattern similar to energy performance contracting, and the energy saving and emission reduction under a lease contract is relatively easy to estimate and verify. To meet the demand of that segment, if any, the fund can launch specialized financial lease product, after the first round of investment has been collected back, by injecting capital into a qualified financial leasing company or purchasing their leased assets. This product can be set up on the premise that the management of leasing company is capable of assessing good technologies, identifying high-quality assets and managing the associated leasing risks.

**EXIT**

Both green bond and ABS can realize exit from obtaining the cash flows of underlying project pipelines as per the related financing agreement.

Same as subsidiary funds and the single fund scenarios, FOF can apply the above
mentioned 6 products through its built-in direct investment window. A certain percentage of the FOF (preliminarily assumed as 30%) can be directly invested by FOF in national large-scale projects and large equipment manufacturers, who are preferably expected to implement GEER projects nationwide other than the subsidiary fund’s region in form of Energy Performance Contracting. Since unit investment return of large-scale GEER projects decreases as the scale increases, the expected return rate of FOF direct investment shall be set, in line with actual risk-return characteristic, 1-3% lower than that of corresponding investment products of subsidiary funds. The rest 70% of the FOF will be invested on subsidiary funds in form of equity (including Debt Financing in form of Equity and limited partner investment etc.). The required rate of return from FOF to subsidiary funds will be intentionally set low and fixed so as to reduce the financial burden of subsidiary funds and guide their financing to desired directions.

On the other hand, the Guarantee product is not universally applicable. It can be a part of the FOF, but had better not be built in the single fund. This parallel requirement of guarantee for single fund structure is because guarantee business is perceived by commercial investors as high risk but limited return activity and thus is not attractive to commercial capitals. Since the single fund involves large amount of commercial capital, it is better to segregate the guarantee product from other investment-dominated activities so as to enable commercial capital to flow in the fund for investment.

6.4.3.7 Risk Guarantee
This product is provided by FOF or a separately established guarantee fund in parallel with the single fund on the condition of obtaining international donations or government special allocations. It can be launched through cooperation with financial institutes on risk-sharing basis. The fund will determine the guarantee product’s support direction, screening criteria of qualified projects, decision making process and claim procedure as well as loss allocation scheme, in consultation with the partnering financial institutes. Operation window of the guarantee product will be placed in the financial institutes who issue credit line products to GEER projects and businesses. In comparison with ordinary mortgage and pledge requirement of the bank, fund guarantee products will ease requirements of real security from borrowers, accept a wider range of mortgage and pledge (for instance: accept intellectual property right mortgage, pledge of future charging right, etc.), and increase asset mortgage rate on a reasonably prudent basis. Main funding sources of initial reserve fund of the guarantee product is mostly composed of IFI donations and government allocations, while the possible funding sources of subsequent reserve fund is mainly replenished As long as there is market demand available, the fund can also choose to provide energy saving insurance service as a modified form of the

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67 This is because the leverage ratio of guarantee is usually high, with 10 times of legal ceiling, the guarantee fee is just a small percentage of the guaranteed amount and the associated risk management is quite different from a project investment activity.
Provision of energy saving insurance can help to enhance cash flow reliability of the project and facilitate qualified enterprise to get bank loans with more favorable terms.

6.5. Eligibility Criteria

The proposed fund will give priority to support the following areas, mainly include energy efficiency (EE) improvement, utilization of distributed renewable energies and clean energy to address climate change and promote air pollution control in key areas of China.

**Geographic Areas:** include Greater Jing-Jin-Ji, Yangtze River and Pearl River regions.

**Eligible Investments:**

a. **Energy conservation and EE improvement:** (i) industrial sector--EE improvement of key energy-consuming facilities and equipment like motors and boilers, utilization of excess heat and pressure in industrial enterprises, low temperature and low pressure resources development and utilization; (ii) building sector--the existing buildings reformation and distributed heat supply; (iii) transport sector-- clean-energy vehicle application and promotion, construction charging/filling infrastructure etc.

b. **Distributed renewable energy and clean energy utilization:** Distributed solar PV, geothermal-based heat supply, biomass combined heat and power generation (CHP), and bio-methane, and distributed utilization of natural gas etc.

Given the GoC’s plan and target to control air pollution and mitigate climate change, clean energy on the supply side also play an important role. Our study shows that distributed RE is also facing similar financing barriers as EE, and distributed RE could not meet the government’s target. Therefore, both EE and distributed generation of RE and gas are included in eligible investments of the Fund, and of which, a minimum of 50% of the financing of the green fund would finance EE market, to ensure sufficient investment flows to EE.

**Eligible recipients:** energy users; ESCOs; and EE, RE, low-carbon, and air pollutants emission reduction developers etc.

**Investment stage:** Focuses on the growth stage and mature stage of the enterprises.

6.6. Roadmap for Establishing a Green Energy Fund

The major steps in establishing an EE revolving fund are shown in Figure below:

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68 Energy-saving insurance is in effect a technical guarantee, ensuring the project can produce expected energy saving benefit.
Figure 22. Road Map for Establishing a Revolving EE Fund

1. Obtain government commitment, adopt legislative initiative, and establish legal framework for the Green Energy Fund
2. Develop a reliable and sustainable funding source
3. Define Fund objectives and target markets
4. Establish the governance structure for the Fund
5. Select the Fund Manager (or Management Team) and appoint key staff
6. Define the financing windows to be deployed, including TA and other services
7. Identify and document eligibility criteria
8. Define the operating rules and procedures and the application forms; prepare the Operations Manual
9. Develop marketing strategy and approach; develop a project pipeline
10. Develop simple performance-based business models and engage private ESCOs to provide a range of implementation services
11. Develop approaches for project aggregation to reduce transaction costs
12. Define the monitoring, reporting, and evaluation procedures
Appendix I: Cases studies of government funds in China

Case 1: Emerging Industries Venture Capital Plan

- **Purpose:** through direct investment in entrepreneurial enterprises or investment in venture capital funds with central government funding, cultivate and promote the development of emerging industries.
- **Fund scale:** 57.4 billion CNY, central government invests 10.65 billion CNY, mobilizing commercial capital nearly 300 billion CNY.
- **Funding sources and establishment process:** similar to a FOF and subsidiary funds, special government funding such as central finance industrial technology research and development fund contributes to establish “emerging industries venture capital plan” which is a FOF; then the FOF, uniting with local governments and commercial capital, initiates venture capital funds or invests in existing venture capital funds by means of capital increase, these funds participated are subsidiary funds. In principle, the central government funding will not exceed 20% of the registered capital or committed amount of contribution of subsidiary funds, and synchronize with the capital of local government. The total amount of placement of every underlying fund participated is not lower than 250 million CNY, the registered capital or net asset is not lower than 50 million CNY; the contribution of local government is not lower than 50 million CNY. Besides central and local government, the sum of contribution of other investors is not lower than 150 million CNY, among which the contribution of a single investor except that from underlying fund management institutions is not lower than 10 million CNY. There should be at least three and no more than 15 (including 15) investors except the central and local government.
- **Fund governance and management:** (1) central government funding. It is organized and implemented by Ministry of Finance and National Development and Reform Commission. Through bidding, NDRC and MOF select the management institutions of central government funding. NDRC and MOF will sign the mandatory administration agreement with the selected management institutions, appropriate central government funding, and review and supervise performance of the selected management institutions, which are State Development & Investment Corporation and Infotech Ventures Co., Ltd.
- **Subsidiary funds:** These funds are managed by professional teams in market-oriented methods. Government and the commissioned management organization of central financing capital will not interfere with the daily operation and management of the funds participated. The FOF management institution will sent a representative to the fund participated, supervising the invest direction of the fund. Management institutions of the subsidiary funds should invest in the fund which they serve as manager.
- **Forms of investment:** the capital contributed by central finance can directly invest in entrepreneurial enterprises and venture capital funds; during the operation, the main form is equity investment in venture capital funds (subsidiary funds), and the subsidiary funds will invest the entrepreneurial enterprises in form of equity.
• Fields of investment: investment of subsidiary funds should accord to the industrial policy of the country, development plan for high technology industry and the development plan for state strategic emerging industry; each underlying fund will invest in following fields: strategy emerging industries including environmental protection, information, biology and new pharmaceuticals, new energy, new material, aviation and aerospace, ocean, advanced equipment manufacturing, new energy automobile and high-tech service and fields of transforming and upgrading conventional industries by advanced technology; subsidiary funds focus their investment in innovative enterprises which are in its start-up stage or early, middle stage, and the proportion of investment in this kind of enterprise should not be lower than 60% of the register capital or the committed contribution of capital of the fund.

• Investment prohibitions: subsidiary funds cannot engage in investing in public companies, expect for subsidiary funds’ holding stock which is not transferred and its ration part after the unlisted company which is invested is listed; doing businesses such as guarantee, pledge, entrusted loan, real estate (including purchasing self-use real estate); invest in other venture capital funds or investment enterprises; investing in stock, futures, corporate bond, trust products, finance products, insurance plan and other financial derivatives; providing sponsor or donation to any third party; absorbing or disguisedly absorbing deposits, or serving a loan and capital inter-bank lending to any third party; investing outward undertaking infinite joint liability; issuing placement in forms of trust or collective investment products; in duration, recovered capital used for outward investment again; other businesses forbidden by law or regulations.

• Process of investing in subsidiary funds: when applying for investment from the FOF, firstly local Development and Reform Commission/Bureau (Office) of Finance should submit the material to National Development and Reform Commission/Ministry of Finance for review. After passing the review, the FOF management institutions will conduct due diligence investigation and investment negotiation with subsidiary funds. After approval of National Development and Reform Commission/Ministry of Finance’s, the FOF management institutions will represent National Development and Reform Commission/ Ministry of Finance to contribute the capital.

• Structured design: Contributed capital by central government funding will undertake liability to the subsidiary funds with the amount of contribution as the limit. Except for that agreed in subsidiary funds’ constitution, extra preference clause which is superior to other sponsor is not required. Commissioned management organization should reach an agreement in subsidiary funds’ constitution with other sponsors, if there is loss in the subsidiary funds liquidation, firstly the contributed capital of the subsidiary funds will undertake the loss by commissioned management organization, and the remaining part will be undertaken by central government, local governments and other sponsors according to the ratio of investments.

• Exit Strategy: In principle, the duration of subsidiary funds should not be more than 10 years. Normally, FOF’s investment in subsidiary funds exits by means of
liquidation on expiration, buy-back by commercial shareholders and stock right transfer; subsidiary funds’ investment in entrepreneurial enterprises exits through IPO, trade sale and liquidation etc.

- Supervision and administration: (1) Funds participated. National Development and Reform Commission and Ministry of Finance will be responsible for the supervision for the operating status of the subsidiary funds and entrust professional organizations to conduct audit judging by the need of work and regularly evaluate the performance of the policy target, policy effects and the operating status of the investment for the funds participated. (2) FOF management institutions. National Development and Reform Commission and Ministry of Finance will be responsible for the review of performance and evaluation of the FOF management institutions. The FOF management institutions should report annually the operation of subsidiary funds and the FOF to National Development and Reform Commission and Ministry of Finance.

- Operating status: invested 213 venture capital funds in emerging industry, covering 33 provinces, autonomous regions, municipalities and cities nationwide with a total quantity of 739 innovative enterprises being invested, of which more than 80% are start-up and early stage of innovative enterprises.

**Case 2: China Clean Development Mechanism (CDM) Fund**

- Purpose of the fund: support the state to tackle climate changes and promote the sustainable development.

- Funding sources: state owned part in the income of CDM project transferring greenhouse gas emission reduction, fund operating income, domestic and foreign institutions, organization and individual donations. Among them, the national income in CDM project is the main funding source. Up to December 31, 2013, the clean fund has gathered national income about 13.39 billion CNY from CDM projects in accumulation.

- Governance structure: governed by the Board of CDM Fund and managed by the Fund Management Center. The Board is constituted by the representatives from National Development and Reform Commission, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Science and Technology, Ministry of Environmental Protection, Ministry of Agriculture and China Meteorological Administration. A chairman and a vice-chairman will be appointed from representatives of National Development and Reform Commission and Ministry of Finance respectively who will perform the duties. The Board will be responsible for significant business items such as reviewing the basic fund management regulation, fund grant projects, application of significant investment projects, strategy plans of fund development, budget and final accounting of annual fund financial revenues. Above items will be reviewed by the Board and reached an agreement, then submitted to National Development and Reform Commission and Ministry of Finance for approval; fund management center is the regular management organization for the fund, it is affiliated with Ministry of Finance and will be responsible for the fund raising, management and investment. Also it will report significant business items to the Board; in order to strengthen the strategy guidance a Fund Management Center Strategic Development Committee is
established.

- **Investment strategy:** there are mainly three ways. (1) **Grant.** The funds will support in grant way relative activities that are beneficial to reinforce the construction of the ability to tackle climate change and improve the public awareness to climate change. (2) **Investment.** Mainly by means of equity investment, entrust loans, financing guarantee and other ways approved by the nation, supporting the industrial activities that is good for generating climate change benefit. Among them, for those in ways of equity investment, entrust loans to support the project, the annually cumulative balance should not exceed certain proportion of the net asset value at the end of last year; in ways of equity investment to support the project, the Fund will not hold controlling interest of the project; in ways of financing guarantee to support the project, the guaranteed amount should not exceed the limit determined by yearly budget of the Fund. (3) **Money management.** The Fund also invests in forms of deposit in bank, treasury bond, financial bond and enterprise bond.

- **Decision process:** (1) **Grant.** Relative departments in the State Council or provincial development and reform departments will transfer submit or submit grant project application to National Development and Reform Commission; National Development and Reform Commission will be responsible for organizing the review of grant project; after the review result is submitted to the Board for review and reached an agreement, it will be approved by National Development and Reform Commission and Ministry of Finance. (2) **Investment:** applicants for investment (China-invested enterprises and Chinese holding enterprises which engage in the business of slowing down or acclimatization to the climate in Chinese territory) submits application documents to the Fund Management Center; which will organize the selection and review of investment projects; major project (applied amount is more than 70 million CNY in single project) will be submitted to Board for reviewing and reaching to an agreement, then approved by National Development and Reform Commission and Ministry of Finance; non-major projects will be reviewed by Fund Management Center according to established procedure and submitted to National Development and Reform Commission and Ministry of Finance for the record.

- **Exit strategy:** the exit of stock rights formed by fund investment will be based on the principle of open, equity and marketization to determine the exit way and exit price. Entrust loan, guarantee and so on will be withdrawn on expiration.

- **Supervision and evaluation:** (1) **Grant.** National Development and Reform Commission and the Fund Management Center will be responsible for the supervision, inspection and evaluation of grant projects with project organization and declaration unit. (2) **Investment.** All kinds of capital and rights and interests formed by the investment of fund should be managed according to relevant national financial regulations, and fund management center will be responsible for the organization and implement, supervision and inspection and evaluation and acceptance.

- **Operating status:** by the end of 2013 an accumulated 710 million CNY of grant has been arranged by the fund, being used to support 364 grant projects; totally 110 entrusted loan projects have been reviewed and approved, covering 20 provinces.
(municipalities and autonomous regions) nationwide, with the arrangement of loan capital totaling 6.336 billion CNY, leveraging commercial capital 34.52 billion CNY.

Case 3: China Railway Development Fund

- **Positioning of the Fund:** A diversified and market-oriented railway investment and financing entity with support from central government and funding from central government as guidance contribution.
- **Funding sources:** Central government funding (railway construction fund, investment within the central budget, vehicle purchase tax), commercial funding such as commercial banks (ICBC Credit Suisse Investment Management Co., Ltd., CCB Trust Co., Ltd., Guangde Agricultural Bank Railway Development Partnership, CIB Fund Management Co., Ltd.).
- **Establishment process:** China Railway Corporation, as the representative of central government, cooperates with commercial investors sponsor and to initiate China Railway Development Fund Co., Ltd. The central government funding invested in the Fund will be regarded as equity of China Railway Corporation.
- **Structured design:** China Railway Corporation is the fund's common stock shareholder, who ensures commercial investors to obtain stable and reasonable return as agreed, provides the commitment that the commercial investor’s investment will be bought back at the expiration of the duration of the fund, and buys back according to the provisions. Social investors are the stockholders of preferred stocks, will obtain a stable and reasonable return according to the agreement and no longer participate in the distribution of the remaining profits.
- **Fund management:** China Railway Corporation will be the investment manager of the fund, and commercial investors are not directly involved in the fund management.
- **Investment strategy:** 70% of the fund is required to be invested as equity for the railway projects approved by the state, and rest of the fund is allowed to be invested in projects such as integrated land development, to improve the overall return of the fund. It shall not be used in guarantee, futures trading, financial derivatives and other high risk areas.
- **Governance and management:** China Railway Corporation will submit annual fund investment report to the National Development and Reform Commission, Ministry of Finance and the Ministry of Transport; National Development and Reform Commission jointly with the Ministry of Finance and the Ministry of Transport will supervise and investment direction and annual arrangement of the fund.