FINANCING ENERGY EFFICIENCY ON A GLOBAL SCALE

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Prepared for Goldsworthy Capital

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Executive Summary

Goldsworthy Capital can play an important role in the global effort to reduce greenhouse gas (GHG) emissions and profit in the process. With our policy recommendations, we believe Goldsworthy Capital will obtain the support of national governments and the international business community in its effort to abate climate change. Our recommendations refer to the funding mechanisms that are most likely to incentivize investment in energy intensity reduction around the world.

RECOMMENDATIONS

1. **Finance Energy Efficiency in Buildings.** Exploit the huge potential for energy savings in commercial and residential real estate by creating international standards for assessing building retrofit opportunities and linking loans to buildings rather than their owners. Once these conditions are met, investment banks can securitize these loans and market them to investors looking for stable income.

2. **Incentivize Private Finance.** In order to stimulate private investment, we recommend advocating for the creation of a tax-supported clean mutual fund, a mechanism to invest in companies advancing climate change mitigation such as renewable and alternative energy. Investors would receive a number of tax benefits such as tax credits and deductions for contributions to these funds, and income from any profit generated would be tax-free.

3. **Clean Investment Bonds.** Goldsworthy Capital should pursue investments through the World Bank’s Green Bonds program. Participating in this program provides one of the best opportunities for tackling climate change in developing countries, where traditional private capital is difficult to raise, and the necessity of the World Bank’s creditworthiness is most important to investors. Green Bond cooperation can lead to tremendous success and it will require relatively few resources from Goldsworthy.

4. **International Climate Trust.** Goldsworthy Capital should advocate for the creation of an International Climate Trust to complement the efforts of private capital. The World Bank managed fund would focus investments on GHG abatement opportunities that do not produce a positive ROI. Even with relatively low participation rates, this fund has the opportunity to raise over $100 billion in annual investment and has the potential to abate 12 GtCO₂e/year.

Due to the magnitude of the problem at hand, no single strategy will suffice in the effort to mitigate climate change. Therefore we suggest Goldsworthy Capital look to advocate as many of these recommendations as possible to the B20 to maximize augmentations in energy efficiency investment.
1. Introduction

1.1
To date, financing energy intensity investments on a global scale has been difficult to accomplish. Private investors eschew energy efficiency investments, which are perceived as having low returns over longer periods of time. Thus even successful investments would tend to result in negative net present values. This is especially true for projects with potentially large greenhouse gas (GHG) reductions because they require years before yielding positive returns. Public investments, while placing less emphasis on the monetary returns, are inefficient, costly, and have frequently been unsuccessful. Improving the feasibility of energy efficiency investments requires a global infrastructure that accentuates the strengths of each sector and mitigates their weaknesses.

Most analyses agree that investments in the environmental infrastructure of developing countries hold the highest potential for abating greenhouse gas (GHG) emissions since are typically cheaper than in developed countries (World Development Report 2010: Development and Climate Change, 2010). While investment in green growth has increased in the past few years, it still falls far short of what is needed. In order to prevent global temperature increases beyond 2 degrees Celsius, developing countries need to invest $275 billion\(^1\) annually by 2030 (IFC, 2010). At least 80 percent of the investment required to stabilize the climate will have to come from the private sector (IFC, 2013). Mobilizing private capital is essential to climate change mitigation, and this paper elucidates a few scenarios that are most likely to attract additional private capital to green energy growth.

In its World Energy Outlook for 2013, International Energy Agency (IEA) estimates that the world needs to invest $1.5 trillion by 2020. Delaying the investment would require an additional $5 trillion to get back on track (Word Bank, 2013). Similarly, McKinsey & Co. found that delaying action until 2020 would make it virtually impossible to keep global warming to the 2 degree Celsius threshold. We therefore recommend spending contributions as soon as they become available.

\(^1\) 2014 US$
1.2 DEMAND FOR GREEN INVESTMENT PRODUCTS

Much of the success in environmental investments has originated from multilateral investment banks’ efforts, such as the World Bank’s Green Bonds program. While these initiatives may continue to flourish, private support for socially responsible investing is beginning to gain traction and acceptance. On January 13th, 2014, a coalition of 13 investment banks have endorsed and committed to the “Green Bond Principles” (GBP) (CERES 2014). Notable supporters include Crédit Agricole, Deutsche Bank, HSBC, JPMorgan Chase, and Morgan Stanley.

Further evidence of potential growth can be seen in the recent success of the French utility company EDF. They bonded €1.4 billion with an annual coupon of 2.25% and 7.5 years to maturity, the first Euro-denominated Green Bond ever. Most importantly, the bond was twice oversubscribed (EDF, 2013).

And while these recent developments reveal the potential success of private green investment, younger generations of investors are even more interested in contributing to
climate change abatement through their investments preferences. Anecdotally, fund managers are hesitant to follow those socially responsible investing patterns. Often they turn a deaf ear to the willingness of those who trade greater return on investment for corporate responsibility, but the investment trends are substantial.

Among Millennials with at least $1 million net worth, 49% said they consider social responsibility as a factor when evaluating investment opportunities. That is 5%, 15% and 22% higher than Generation X, Baby Boomers, and WWII generations, respectively. For those with less than $1 million net worth, 53% said they apply socially responsible principles when investing, which is roughly 11-14% more than other generations. Instead of being ignored, public policy needs to capitalize on the preferences of Millennials. Private investment firms have begun to mobilize by establishing their own socially responsible mutual funds such as Calvert’s social index fund, TIAA-CREF’s Social Choice Equity Fund, Green Century’s Balance Fund, and Vanguard’s Social Index Fund.

According to The Forum for Sustainable and Responsible Investment (USSIF), an industry association, socially responsible investing has grown from $639 billion in 1995 to roughly $3.07 trillion in 2012, representing about 11.3% of all professionally managed US wealth (Reflections on Sustainable and Responsible Investment, 2012).

### 1.3 Market Failures

Despite the Millennial generation’s intent to invest in socially responsible projects, governments must incentivize investments in energy efficiency. In a perfect, efficient market, little government action is necessary to stimulate investment in clean technology. However, substantial barriers to consumers’ investment behavior attenuate the ability to attain an optimal outcome. Health consequences, such as particle induced pulmonary disease among children (Grigg, 2002), stem from reliance on fossil fuels, whose negative externalities do not reflect the social costs inherent in consumer choices (Helm, 2005). Moreover, the persistence of the energy conservation paradox means consumers to place abnormally high discount rates on energy efficiency investments leading to underinvestment (Nichols, 2014). Current policy mechanisms do not effectively take into account the social costs of fossil fuel use. The recommendations we provide build on and adjust for policy errors that have thus far failed to produce enough investments in GHG reduction projects.

### 1.4 Clean Development Mechanism

Currently the Clean Development Mechanism (CDM) functions as a global carbon market that allocates Certified Emissions Reduction units (CERs) to industrialized countries investing in emission reduction projects in other countries. This allows industrialized countries to emit...
excess carbon past their limit stated in the Kyoto Protocol provided they can prove investments abroad result in emissions reductions that would not have occurred otherwise.

Despite some marginal success in reducing emissions compared to the baseline (Schneider, 2007), the CDM suffers from two structural deficiencies that limit its ability to increase efficiency investments. The first problem with the CDM is that over allocation of emission reduction units have reduced the price of CERs considerably. Prices have fallen from $20 a ton in August 2008 to a low of 31 cents as of December 12, 2012 (Allan, 2012). The lack of demand is due in large part to recession in Europe, the largest market for credits, which has led to few investments in carbon reduction projects.

Demand for CERs will likely recede further due to impending restrictions on their use in the European Emissions Trading System (ETS), the world’s largest trading system.

1.5 ADDITIONALITY
The second deficiency of the CDM pertains to the concept of additionality. For a project to qualify for CERs, its investors must convince the CDM executive board that the carbon reductions resulting from the project are additional - i.e., that they would not have occurred in the absence of the CDM. Without additionality, the CDM amounts to an income transfer from developed to developing countries (Burniaux, 2009). Additionality is difficult to prove, as it requires comparison with a counterfactual in which the CDM does not exist and thus requires relying on uncertain, hypothetical forecasts. Moreover, the current method for establishing additionality poses extraordinarily high transaction costs for emission reduction projects and therefore decreases the likelihood of their manifestation (Burniaux, 2009).

While it is important to establish additionality, the current method is inefficient and subjective. Suggestions have been made to streamline its process, reduce subjectivity, and reduce transaction costs. One such method is to shift from a project-by-project review process to a more standardized approach that would use pre-approved metrics to determine additionality (United Nations, 2012). That method would, of course, require periodic evaluation and updates to improve its functionality.

2 See Appendix A
1.6
What follows is an analysis of four funding mechanisms that will significantly increase green investments beyond current baseline levels. They are by no means mutually exclusive. We believe the best approach to mitigate the negative effects of climate change require a mixture of some or all of our investment models.

A Note on Carbon Pricing
Because of existing political realities, we find it most useful to consider all of these models in the absence of a carbon tax. If our recommendations effectively reduce emissions without a price on carbon, then they will also work if a carbon tax is ultimately implemented. We expect the ability of each financial mechanism to attract capital to increase in the presence of an international carbon market.
2. Financing Energy Efficiency in Buildings

KEY POINTS
• Huge potential exists for energy efficiency improvements in residential and commercial real estate.
• Energy efficiency improvements will lead to significant energy savings, which can pay off initial capital investments and provide an attractive return for financing institutions.

RECOMMENDATIONS
• Create international standards for assessing building retrofit opportunities.
• Encourage governments to streamline loan procedures for building retrofits.
• Market these new securitized bonds as a safe investment with consistent income.

2.1
The IEA estimates that buildings represent 25% of potential worldwide energy efficiency improvements. Achieving the full potential of these improvements would mean savings of 7.6 GtCO₂/year by 2030 (IEA, 2011). Because these investments result in lower energy bills, many of them would provide positive returns on investment. In the US, almost 50% of these investments produce a positive ROI (USDOE, 2013).

Historically, the challenge in capturing these savings has been the large amount of upfront capital required to pay for the improvements. For residential homeowners or commercial small building owners, often this kind of capital is simply unavailable. Even if occupants have the required capital, there is a large opportunity cost to justify the investment, and achieving positive returns would require long periods of occupancy.

Given these challenges, the solution is to introduce private capital to finance improvements. However, investor interest in financing small building retrofits is challenging since they require the same level of due diligence as on larger projects (Rocky Mountain Institute, 2013). The solution requires two conditions:

1. Create internationally recognized guidelines to measure potential energy savings.
2. Tie the loan to the building rather than the owner.

Once these conditions are met, investment banks such as Goldsworthy can bundle these loans into securitized bonds marketable to investors looking for stable income.
In the US, the Home Energy Rating System (HERS) is an example of the kind of common standards needed to bundle these loans into investor-friendly financial products. A HERS report is similar to a vehicle’s miles-per-gallon (MPG) rating. It’s prepared by a certified “energy rater,” and it calculates the building’s current energy efficiency, potential cost-effective improvements, and potential energy savings. Once improvements are made, the energy rater calculates the building’s new energy efficiency rating. While HERS is currently designed for residential properties, this type of report could easily be expanded to small commercial properties. The report can help determine the loan amount and the payback period. Expanding the use of HERS reports would allow financial institutions to bundle a diverse array of energy efficiency loans into one product.

For these energy efficiency securitized bonds to work, payments must keep accruing even after properties are sold in order to provide certainty and instill investor confidence. The loans must therefore be tied to the property. While the exact mechanism will depend on each country’s property laws, there are two good examples in the US of how this can be accomplished. A public financing option called Property Assessed Clean Energy (PACE) exists in some municipalities. In that program, the local municipality finances the improvement instead of a bank, but these loans could still be bundled and securitized. The second US example is the Energy Efficient Mortgage (EEM). This is a federally recognized program that allows borrowers to couple energy efficiency investments with their home loan. Typically, the increased mortgage payment is more than offset by reduced energy costs. While usually created upon purchase, EEMs can also be created through refinancing. For investors, the important aspect again is that the energy efficiency investment is tied to the home and not the homeowner. While designed for residential customers, EEMs could easily be adapted to the commercial real estate market, creating even more opportunity for investment and energy efficiency improvements.

2.2 IMPLICATIONS

In the last decade, solar installations in many areas of the US have gone from being a major expense to an easy way to save money on monthly utility bills. In California, for example, solar leases represent 75% of new installations. This example demonstrates that ease of financing is a major factor in whether or not building owners will decide to make cost-effective improvements. With better standards on how to measure energy efficiency improvements and mechanisms to link loans to the property we argue that financial institutions will be able to create attractive investment products that will bring scale to the building retrofit market. This has the opportunity to make significant reductions in worldwide carbon emissions.
3. Incentivize Private Finance

RECOMMENDATIONS:
• Advocate the creation of tax-supported “clean mutual funds.”
• Use existing regulated investment companies as models.
• Promote tax expenditures to incentivize investment into climate change mitigation.

3.1
To correct consumer behavior and mobilize private investment in renewable and energy efficiency projects, we recommend a new tax-supported clean mutual fund. Capital invested by individuals or corporations will fund clean projects, such as solar or wind energy installations, that simultaneously produce economic returns and reduce GHG emissions. This approach is beneficial for a number of reasons. First, it encourages private sector investment, albeit with government support. In exchange for preferential tax treatment, profit-seeking entities will handle these investments. The result is financing of existing efficiency improvements or renewable energy projects on a scale much larger than is currently happening. Additionally, these mutual funds could give preference to companies that invest profits into research and development.

Second, the US has vast experience with administering and monitoring tax expenditures. Congress allocates tax expenditures for things such as oil and natural gas exploration, deductions for health insurance premiums, mortgage interest payments, and individual retirement accounts. The Congressional Budget Office estimated that tax expenditures cost $800 billion in 2012 – roughly 5.8% of annual GDP – and are expected to cost nearly $12.7 trillion over the decade. A proposed tax preferred clean mutual fund is therefore achievable.

Using the United States tax code as an example, we demonstrate that countries can use their tax laws to incentivize private investment. While our proposed clean mutual funds might invest in companies with global investments, other countries should also stimulate climate change mitigation efforts by adopting similar tax preferred investment funds. Such funds would have to fit within each country’s specific tax framework. We are proposing tax

3 These funds will mirror the Green Bonds that the World Bank issues to support its greenhouse reduction goals.
4 Although beyond the scope of this paper, a tax-supported funding mechanism might also have a research and development component that would allocate capital specifically for R&D. Ideally that would alleviate the R&D gap because, whereas venture capital requires a “lemon” premium, a tax-supported fund could be statutorily prevented from commanding large equity in new technology in exchange for R&D capital.
treatment that we believe will drive investment, and, where applicable, other countries should follow this model.

3.2 - CLEAN MUTUAL FUND

Through the tax code, US tax law has created certain investment mechanisms, such as mutual funds, that satisfy certain policy objectives. These so-called regulated investment companies (RICs) are mandated to invest client funds in certain ways but are also limited in their discretion. A clean mutual fund would be subject to similar RIC requirements with restrictions concentrating investments into renewable and energy efficiency.

Creating clean mutual funds requires congressional action because they would be a new type of RIC. By having such a narrow investment approach, current RIC statutory limitations require at least 90 percent of income derived from securities, which might impede the goal of climate change mitigation. A clean mutual fund, therefore, must also have the flexibility to invest funds in the bond market to finance GHG-reducing projects. Such investments could be in municipal bonds or in the Clean Investment Bonds that we propose in this Paper.

3.2.1 - Proposed Tax Treatment

The proposed preferential tax treatments for clean mutual funds are common elements of current tax law familiar to investors. To stimulate maximum growth in these clean mutual funds, we recommend three tax expenditure strategies:

- **Tax Credits.** Taxpayers’ investments in clean mutual funds qualify for a refundable tax credit on annual contributions up to $2,000 (or some other appropriate amount). The policy behind this approach benefits lower income taxpayers who usually value the dollar-for-dollar reductions in tax liability of tax credits, rather than deductions, which depend on individual gross income.

- **Tax Deductions.** Taxpayers can elect to take a deduction for contributions exceeding $2,000. This policy recognizes that a portion of clean mutual fund investment will support research and development, which could result in a financial loss. Investors could choose...
to receive the tax benefit upfront via deduction. Or, if they plan to sell it, they could maintain the basis in the asset at a level equal to their contribution.

- **Interest Free Income.** To encourage high-wealth individuals to contribute to a clean mutual fund, any income derived from those investments would be tax-free.

Combining all three of these approaches would cause a substantial increase in tax expenditures, but the goal to mobilize private capital to invest in climate mitigation at an accelerated rate provides strong justification for government intervention. If we consider the costs of adapting to climate change such as seawall construction, which are predicted to range from $70-100 billion annually (World Bank, 2010), then an increase in tax expenditures of 1%, from 5.8 to 6.8%, is likely the optimal thing to do from a benefit-cost perspective. Moreover, the federal government already spends roughly 5.8% of annual GDP⁹ through the tax code on specific policy priorities, and finding compromise to support these sorts of clean investments, while difficult, is certainly not insurmountable.

### 3.2.2 - Where Money Will Be Invested

As we discuss later, the World Bank issues so-called Green Bonds in order to support its strategic objectives. The goal is “to develop and promote innovative financial products that attract greater investments to climate-related projects” (IFC, 2013)¹⁰. Green Bonds are allocated to projects based on a number of criteria including: Solar and wind installations; funding for new technologies producing significant GHG reductions; carbon reduction through reforestation and avoided deforestation. Clean mutual funds would require projects to meet similar criteria. In order to promulgate appropriate benchmarks, the Treasury Department could work with the Department of Energy to research which metrics most effectively reduce GHG.

Instead of investing through a government entity, this model would target private companies active in alternative energy or energy efficiency markets. The tax expenditures we propose will increase the amount of capital available for such clean projects, and the statutory regulations would focus money into appropriate climate change mitigation investments. Fortunately, such investments already exist.

For example, Select Environment and Alternative Energy Portfolio (FSLEX) targets investments “in business activities related to alternative and renewable energy, energy efficiency, ...

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¹⁰ See section 4 for more on Green Bonds.
pollution control, water infrastructure, waste and recycling technologies, or other environmental support services” (Fidelity). The fund has grown 17.36% in five years and has exceeded the S&P 500 by growing nearly 30% in the past year. To date, the fund has net assets of over $100 million.

Various indices exist to track companies invested in clean technology energy or alternative energy ventures. Therefore, managers interested in managing a tax-supported clean mutual fund would have at their disposal the information needed to seek investment opportunities.

3.3 - IMPLICATIONS AND OBSTACLES

3.3.1 - Experience With RICs and Size of Potential Clean Mutual Fund Investments

One of the primary benefits of using tax policy to stimulate private money is that investments can occur relatively quickly and on an increasing scale. Investors and government regulators are familiar with the process of operating RICs. For the most part, RICs govern their own investment decisions and report to the Securities and Exchange Commission. Regulators only become involved when the fund runs afoul of statutory requirements.

Using traditional mutual fund data as a proxy to calculate the lower bound of potential investments, clean mutual funds would expect to grow more than 15 percent annually. In 2012, approximately $13 trillion was invested in mutual funds compared to less than $0.5 billion in 1940, the first year that mutual funds were available to investors. In 2014 dollars, that would be roughly $7.5 billion invested in the first year. If a similar amount of money was invested during the first year of clean mutual funds availability, this model would predict roughly $168 billion invested over ten years.

A separate approximation on the growth of clean mutual funds is based on Sustainable and Responsible Investments (SRI), which comes from The Forum for Sustainable and Responsible Investment (US SIF). According to its website “USSIF and its members advance investment practices that consider environmental, social and corporate governance criteria to generate long-term competitive financial returns and positive societal impact.” Data from its 2012 report *Reflections on Sustainable and Responsible Investment* demonstrate that institutions applying “environmental, social and governance (ESG) criteria in their investment analysis and portfolio selection” had roughly $3.3 trillion in investments.

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12 The Investment Company Act of 1940 governs mutual fund structure.
3.3.2 - Investor Behavior and Tax Salience

It is difficult to predict how much money would be initially invested in these proposed clean mutual funds. First, though financial advisors have experience with existing RICs, they would have to learn about the new, clean mutual fund products and their growth potential. Second, some might be skeptical advising their clients to invest in funds that could generate smaller returns, despite the necessary social good that would result. Regardless, as the growth estimates above indicate, clean funds could increase reasonably well once the public’s familiarity and confidence solidifies.

Moreover, evidence suggests that clean mutual fund investment would grow faster than either traditional mutual funds or Sustainable and Responsible Investments. Consumer behavior often responds to changes in the tax code, a principle known as market salience of taxes (Faulhaber 2012). With the proposed income tax-reducing policies, investors will likely contribute to clean mutual funds in order to reduce their taxable income, despite the potential for higher returns through other investments. Therefore, because taxpayers sometimes also make investment decisions with preferential tax treatment in mind (e.g., charitable donation deductions), these tax preferred clean mutual funds would be one additional consideration.
4. Clean Investment Bonds

RECOMMENDATIONS:
• Join other institutional investors that incorporate World Bank Green Bonds into their portfolios.
• Become a Lead/Syndicate Manager for Green Bonds.
• Participate in privately managed and underwritten Green Bonds.

4.1 GREEN BONDS
Goldsworthy has an opportunity to join a global movement of investing through Green Bond initiatives. The best and most widely recognized example of a AAA Clean Investment Bond operates through the World Bank’s Green Bonds program. Since its inception in 2008, the Green Bond program has continued to increase in popularity, participation, and funding, with average bonding exceeding $600 million per year (Figure 2).

FIGURE 3: WORLD BANK’S ANNUAL GREEN BOND ISSUES

Green Bonds Issued Per Year ($mil)

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>523</td>
<td>480</td>
<td>1438.8</td>
<td>722.1</td>
<td>246.5</td>
<td>590.2</td>
<td>550</td>
</tr>
</tbody>
</table>

As a World Bank-backed investment, the Green Bonds program has a meticulously monitored six-stage lifecycle. Given the first stage of a country partnership, the second stage identifies
potential carbon-mitigation or climate-adaptation projects that meet select criteria reviewed by World Bank environment specialists. These criteria are reviewed by the Center for International Climate and Environmental Research at the University of Oslo (CICERO). This is followed by careful preparation, appraisal, and approval. Implementation occurs in the next two steps, while evaluation is the final step of the process.

The Green Bonds represent diverse geographic, industry, and scale investments. In its roughly 6-year history (Table 1), a total 59 loans have been made worth $4.55 billion, with 13 different lead investment bank managers and 31 participating institutions (World Bank 2013a, 2013b). Goldsworthy has the opportunity to both invest in as well as lead and manage Green Bonds on the World Bank’s behalf.

**TABLE 1: COMPOSITION OF WORLD BANK’S GREEN BOND INITIATIVE**

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount Invested ($millions)</th>
<th>Number of bonds</th>
<th>Coupon*</th>
<th>Average Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>523</td>
<td>1</td>
<td>3.5%</td>
<td>6</td>
</tr>
<tr>
<td>2009</td>
<td>480</td>
<td>2</td>
<td>2%</td>
<td>4</td>
</tr>
<tr>
<td>2010</td>
<td>1438.8</td>
<td>24</td>
<td>4.98%</td>
<td>6.8</td>
</tr>
<tr>
<td>2011</td>
<td>722.1</td>
<td>17</td>
<td>2.46%</td>
<td>5.9</td>
</tr>
<tr>
<td>2012</td>
<td>246.5</td>
<td>9</td>
<td>2.17%</td>
<td>7.1</td>
</tr>
<tr>
<td>2013</td>
<td>590.2</td>
<td>5</td>
<td>3.03%</td>
<td>5.8</td>
</tr>
<tr>
<td>2014</td>
<td>550</td>
<td>1</td>
<td>2.5%</td>
<td>10</td>
</tr>
<tr>
<td>Avg.</td>
<td>650.1</td>
<td>8.4</td>
<td>2.95%</td>
<td>6.5</td>
</tr>
</tbody>
</table>

*Based on 55 of 59 bonds with fixed coupons. Four utilized the 90-day LIBOR.

In 2013, the leading project areas pursued by the Green Bonds program were Energy Efficiency (32%), Renewable Energy (26%), Multi-Sector (19%) and Green Transport (11%). Historically, many projects occurred in underdeveloped Southeast Asia, and this continued in 2013. Investments occur all around the world with Latin America (Colombia, Dominican Republic and Mexico), East Asia/Pacific (China), South Asia (India), and Europe/Central Asia (Belarus, Montenegro, Turkey and Ukraine) receiving 33%, 22%, 20%, and 20% of bonding (World Bank, 2013b).

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13 For additional examples of Green Bond projects, go to http://treasury.worldbank.org/cmd/htm/MoreGreenProjects.html

14 See Appendix C
Some examples include:

- $3 million to JK Paper Ltd. in India to save an estimated 15.6 GW-hours per year
- $2 million to Ameriabank in Armenia to finance a small hydroelectric power plant
- $150 million to Shangdong Province in China for energy efficiency programs focusing on leasing and performance contracting for the industrial sector, financing for biomass electricity (from corn and wheat stalk), and building a heat power plant
- $10 million to Optima Energia in Mexico for energy-efficient upgrades in the hotel industry.
- $150 million to develop capacity and infrastructure to improve river basin and irrigation management in Indonesia. The project will benefit 500,000 farmer households from more reliable and efficient irrigation water, and yield 15% more crops.

4.2 IMPLICATIONS

Bonds backed by development banks will likely continue to succeed and represent an important strategy to Goldsworthy. Participation by Goldsworthy aligns with the globe’s largest institutional investors while presenting minimal risk by working with the World Bank. While the historical rates provided above may mean reduced private returns, they pose some of the largest opportunities for gains in global energy efficiency and production since the gains occur in countries often ignored in traditional capital markets.

Because of the private growth for green bonds, climate bonds and other forms of SRI investing, the necessity to use MIBs such as the World Bank to leverage additional private green investment may be unwarranted. Instead, privately sourced capital and underwriters should utilize and strengthen the mechanisms of the World Bank, such as its partnership with CICERO, to identify opportunities that qualify for Green Bonds and that need its additional creditworthiness. These projects in underdeveloped countries ought to take place from the perspective of climate change mitigation, and thanks to World Bank supervision, also means minimal required resources for Goldsworthy’s participation.
5. International Climate Trust

KEY POINTS

- On its own, the International Climate Trust (ICT) has the potential to limit global warming to 2 degrees Celsius by 2030, but the investments required are politically infeasible.
- Compared with private financing, the ICT is an inefficient tool for investing in energy efficiency.

RECOMMENDATIONS

- Lobby for the creation of the ICT.
- Promote the ICT as a means to complement (not replace) the efforts of private capital.
- Focus the trust’s investments towards non-market GHG abatement opportunities.

5.1

The previous sections demonstrate that markets are effective at channeling money into energy efficiency projects that will achieve financial returns. What if the goal, however, is simply to achieve the greatest improvements in global carbon intensity in the shortest amount of time? In a world with no mechanism to price the externalities of GHG emissions, the International Carbon Trust could be a simple and effective way to invest in projects that will achieve the greatest amount of GHG reductions.

With all countries contributing an equal portion of their GDP, the ICT is an equitable solution to a global problem. In our Perfect World scenario (Table 3), we estimate that an agreement to contribute 1% of global GDP to the ICT could finance enough greenhouse gas abatement efforts to limit global warming to 2 degrees Celsius by 2030. While possible, we find that this scenario is highly unlikely for the following two reasons:

1. While everyone benefits from preventing climate change, this system essentially requires the resources and goodwill of nations to invest in nations that have less means. In the end, a trust like this can only be as effective as it is large.
2. The other challenge is that no project is perfect, and many are subject to leakages. How do you ensure that the projects are effective at reducing GHG emissions?

5.2 HOW IT WORKS

The ICT would be modeled on, and would supersede the Green Climate Fund. The GCF was created as the financial mechanism for the United Nations Framework Convention on Climate
Change (UNFCCC). It was designed to finance climate change mitigation in developing countries, but its funding remains uncertain. Unlike the GFC, the ICT would begin with an international agreement in which nations would agree to contribute a certain percentage of their GDPs to the trust. The exact percentage would be of much debate. In the Modeling Outcomes section, we discuss the likelihood of various contribution levels. Counties that fall into the UN's classification of Least Developed Countries (LDCs) would be exempted from the requirement, as their opportunity cost for this type of spending would be too high.

To achieve the full potential of the ICT, investments with the highest abatement potential would be made first. These investments can be divided into four categories: energy efficiency, new energy sources, terrestrial carbon,\(^{15}\) and behavioral change.\(^{16}\) Because many investments in energy efficiency and new energy sources produce positive returns on investment, they would compete with other public and private financing efforts, and it would therefore be difficult to prove additionality.

The fund would be operated within the framework of the World Bank. The multilateral investment bank’s existing institutions and knowledge of available investment opportunities would lower transaction cost and provide a major head start for the ICT. All contributions would go through the trust, and the trust would be responsible for choosing projects and monitoring their effectiveness. It is likely that most funding will be distributed in grants to smaller NGOs that have in-country networks and the local knowledge necessary to carry out the projects. This distribution method would be similar in nature to the way food aid is distributed by USAID and the UN. It is estimated that the largest portion of abatement potential, and therefore the destination of most of the investments, is in the developing world (World Bank, 2010).

Unlike an institutional endowment in which a large principal is accumulated and investments are made off of the interest, the ICT will be most effective by making investments as quickly as the finance becomes available. While thorough research and vetting of investment options is important, the obligation to guard against any potentially wasted funds must be balanced against the need to invest immediately or risk losing abatement potential through inaction.\(^{17}\)

\(^{15}\) Terrestrial carbon emissions refer to carbon emissions cause by land use changes. Common sources include deforestations, intensive field agriculture, and livestock.

\(^{16}\) McKinsey & Company first outlined these four categories in their report, *Pathways to a Low Carbon Economy*.

\(^{17}\) See section 1.1 for more information.
5.3 MODELING OUTCOMES

Because nothing on this scale has ever been implemented before, it is difficult to predict potential outcomes. In an often-cited report from 2009, McKinsey & Company developed a GHG cost abatement curve (Nauclér & Enkvist, 2009). In their report, they estimate that reducing worldwide emissions by 2030 to achieve the Kyoto Protocol’s goal of stopping global warming at two degrees Celsius is possible with today’s technologies and they estimate that such a reduction would require annual financing $788 billion (2014 US$) above current business as usual investments (Nauclér & Enkvist, 2009). This number represents about 1% of worldwide GDP, a number that has coincidentally been discussed as a possible contribution (Carr, 2014). While it is believed that current financing could achieve this additional investment load, political feasibility is another matter.

**TABLE 2 - PARTICIPATION SCENARIOS**

<table>
<thead>
<tr>
<th></th>
<th>Perfect World Scenario</th>
<th>Targeted Efforts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide participation</td>
<td>100%</td>
<td>50-85%</td>
</tr>
<tr>
<td>Level of Investment</td>
<td>1% of GDP</td>
<td>0.3% of GDP</td>
</tr>
<tr>
<td>Total Investment</td>
<td>$717 billion</td>
<td>$108-$186</td>
</tr>
<tr>
<td>Investment Focus</td>
<td>All GHG emissions</td>
<td>Non-market emissions</td>
</tr>
<tr>
<td>Potential abatement/ year</td>
<td>38 GtCO₂e</td>
<td>12 GtCO₂e</td>
</tr>
</tbody>
</table>

The size of the ICT is highly dependent on the number of countries that participate as well as the level of their contribution (Appendix D). Additionally, the types of investments that are made and the effectiveness of those investments will also have a large impact on the success of the ICT. Table 2 outlines two possible scenarios for the ICT: The Perfect World Scenario and the Targeted Efforts Scenario. In The Perfect World Scenario, investments would need to be almost 100% effective to reach its abatement goal outlined in the McKinsey report. While possible, capturing all of the abatement potential would mean productivity would have to quadruple (Nauclér & Enkvist, 2009). As an example, in the transportation sector, hybrid
vehicles would have to make up 40% of the worldwide fleet by 2030. In forestry, 330 million hectares of marginal land (roughly the size of India) would need to be reforested (Nauclér & Enkvist, 2009). These types of changes are not impossible, but it is highly unlikely to assume that every sector of abatement investment could reach its full potential.

Not only would the full abatement potential be difficult to realize, achieving such a high level of international participation would be virtually unprecedented. While it is beyond the scope of this analysis to assign probabilities to every outcome, the second scenario in table 2, Target Efforts, is designed to be a more feasible option. In this scenario, all or most of the G20 nations would agree to participate in the ICT at a level that is similar to their current level of foreign aid (OECD, 2014). Instead of dispersing this smaller fund across all four sectors of investment, we will argue that a focused effort on non-market improvements is a more effective complement to other forms of GHG abatement financing.

5.4 WHERE TO INVEST
As described above, the size of the ICT will be limited. It is our recommendation that ICT investments then be focused on abatement opportunities that have no financial return because these are the investments that would not occur without government action. Terrestrial carbon emissions, for example, would fall into this category. Terrestrial carbon emissions come from changes in land use patterns, most notably through agriculture (livestock and fertilizer) and deforestation. Achieving reductions of this type of GHG emissions will not be easy. These emissions come from billions of small sources, mostly in hard to reach, rural areas (Nauclér & Enkvist, 2009). Previous investments in these areas have been prone to fraud and other leakages. Even tracking the effectiveness of these measures is difficult as emissions estimates are often highly uncertain. Nevertheless, the ICT is the only effective financing mechanism to incentivize the necessary actions.

5.5 CONCERNS
Along with a great potential, there are reasons to be concerned about the effectiveness of the ICT. One problem with a focus on terrestrial carbon, for example, is that there is a finite potential of carbon abatement (Nauclér & Enkvist, 2009). In other words, there is a limit on the earth’s ability to absorb CO₂. Additionally, terrestrial carbon emissions are difficult to measure, and there is a great deal of uncertainty in the abatement efforts. This uncertainty is only amplified by the rates of population change and agricultural innovation.

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OECD nations annually contribute an average of 0.29% of their GDP to direct foreign aide.
Additional concerns lie within the structure of the fund. The sheer scope of this project makes it susceptible to fraud. In a recent publication, Transparency International recently reported that many of the existing climate change funds are prone to such problems and need to take aggressive action to improve transparency and governance (2014). Additionally, the fund will challenge the notion of country ownership, which has repeatedly been affirmed in international climate negotiations (Carvalho, 2013).

5.6
We recommend lobbying for the creation of an International Climate Trust that is designed to be a complement to private financing. This financial mechanism will involve governments in the solution to GHG abatement without requiring impossible contribution levels.
6. Concluding Remarks

Given the enormous challenge of combating climate change, every country is compelled to contribute to this effort. As the IEA calculated, the world needs to invest $1.5 trillion in climate mitigation efforts by 2020. Moreover, McKinsey & Co. estimated that delaying action until 2020 would make it seemingly impossible to stymie global warming from exceeding the 2 degree Celsius threshold. Investments approaching that scale have so far been impossible to achieve.

International institutions such as the World Bank have offered various financial mechanisms to funds climate mitigation. These so-called Green Bonds support various climate change mitigation projects particularly in developing countries. So far those efforts have fallen short.

Attitudes among investors are changing. For example, the majority of Millennials consider social responsibility a factor when evaluating investment opportunities. Among other reasons, the younger generations recognize they must deal with the destructive effects of climate change. Public policy should capitalize on this growing sentiment by incentivizing investment in climate change mitigation.

We propose four different mechanisms to support such investments: finance energy efficiency in buildings, incentivize private finance, clean investment bonds, and an international climate trust. Each proposal has benefits that mobilize different segments of the population. Private sector strategies will incentivize existing profit-generating investments while public sector strategies will specifically target GHG reductions. Moreover, by agreeing to climate mitigation efforts, an international climate trust avoids the always-contentious issue of carbon emissions caps.
• Carvalho, Annaka Peterson. (2013). 3 ways country ownership is being put to the test with climate change funding. The Politics of Poverty. politicosofpoverty.oxfamamerica.org/2013/07/3-ways-country-ownership-is-being-put-to-test-with-climate-change-funding/
• IFC. (2013). Climate Business at IFC. From www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/CB_Home/
• I.R.C. §§ 851-855, 860, 4982.


CERTIFIED EMISSIONS REDUCTION SPOT PRICE AND NUMBER OF CREDITS ISSUED

Based on daily average BlueNext CER spot price. Source: Vivid Economics; BlueNext, Institute for Global Environmental Strategies, 2012
APPENDIX B

Mobilize Private Capital

Tax expenditures are creatures of congressional grace,[i] and thus establishing a clean mutual fund would require congressional action. But the Internal Revenue Service (IRS) already has experience with similar investment funds known as regulated investment companies (or RICs).[ii] To be a RIC, like a mutual fund, tax law places some restrictions that are broadly characterized as: administrative, an income-and-assets limitation, and forced distribution to investors.[iii] The administrative component is mostly procedural, requiring the company to register under the Investment Company Act of 1940 and to file with the IRS.[iv]

To satisfy the income limitation, the particular investment company must ensure that ninety percent of its income comes from dividends, interest, foreign currency, and gains and investments related to the sale of securities.[v] Tax law also restricts what types of assets mutual funds may own, restrictions that broadly mirror income limitations.[vi] One benefit of investing in mutual funds as opposed to securities is to avoid corporate double taxation since RICs are able to deduct from their taxable income any dividends they pay investors.[vii]

Mutual funds were initially conceptualized to offer middle-income Americans an affordable means to access professional investment advice.[viii] Whereas hedge funds and other similar high-wealth investments require upwards of $1 million minimum contributions, mutual funds typically only require a $1,000 initial investment.[ix] Moreover, by utilizing the expertise of professional financial manager, which removes the need for average, lay investors to research individual stocks and by pooling financial resources, mutual funds allow investors of moderate wealth to diversify their investments.[x] As a result, the middle class has been the primary beneficiary of mutual funds and would presumably be a targeted investor group for these proposed clean mutual funds.[xi]

[iv] Brunson, supra, note 11.
[v] See Id.
[vi] See Id.
[vii] See id. at 146.
[viii] See id. at 148.
[ix] Id.
[x] See id. at 148-49.
[xi] See id. at 149 (“[Mutual funds’] benefits largely accrue to the middle class; the majority of mutual fund shareholders have household incomes of less than $100,000, and a quarter have household incomes of less than $50,000. . . . Congress intended for mutual funds to have this middle class focus.”)
APPENDIX C

Participating Investors for Green Bonds:
## APPENDIX D

<table>
<thead>
<tr>
<th>Number of Participating Countries</th>
<th>Level of Investment</th>
<th>Investment in real US$ (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Participation</td>
<td>1% GDP</td>
<td>$717.36</td>
</tr>
<tr>
<td></td>
<td>.7% GDP</td>
<td>$502.15</td>
</tr>
<tr>
<td></td>
<td>.3% GDP</td>
<td>$215.21</td>
</tr>
<tr>
<td></td>
<td>.1% GDP</td>
<td>$71.74</td>
</tr>
<tr>
<td>G20</td>
<td>1% GDP</td>
<td>$621.28</td>
</tr>
<tr>
<td></td>
<td>.7% GDP</td>
<td>$434.89</td>
</tr>
<tr>
<td></td>
<td>.3% GDP</td>
<td>$186.38</td>
</tr>
<tr>
<td></td>
<td>.1% GDP</td>
<td>$62.13</td>
</tr>
<tr>
<td>The Noble Few</td>
<td>1% GDP</td>
<td>$156.03</td>
</tr>
<tr>
<td></td>
<td>.7% GDP</td>
<td>$109.22</td>
</tr>
<tr>
<td></td>
<td>.3% GDP</td>
<td>$46.81</td>
</tr>
</tbody>
</table>