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Methodology to Assess and Evaluate Sovereign Green Bonds

Final Report

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MX\$ 1 = US\$ XX

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Background

Green Bonds are technically defined as thematic capital-raising instruments in which the proceeds will be exclusively applied (either by specifying Use of Proceeds, Direct Project Exposure, or Securitization) towards new and existing Green Projects – defined here as projects and activities with positive benefits for climate and environment. However, since we are essentially in a self-labeling phase of the market, the denomination “green bond” is often loosely applied to a bond whose proceeds are claimed to be directed at funding environment-friendly projects. More distinctively, green bonds can be defined as financial instruments that combine the fiduciary element of fixed income products with climate mitigation and adaptation awareness, giving mainstream investors access to environment enhancing and climate-related investment opportunities. As such, they present themselves as potentially valuable tools to encourage government and industry investments in sustainable projects, processes and technologies with a transparency that allows investors to understand the challenges and thus diversify risk.

From a broader point of view, green bonds are ethical products, in the sense that they provide investors with a way to earn income and gain the satisfaction of knowing that the proceeds of their investment will be used in a manner that improves the environment. Issuers also benefit, since the green angle can help attract a new subset of investors – and higher demand, in turn, equates to lower borrowing costs. By providing access for project developers to a deep pool of capital from the institutional investors and world debt markets, green bond financing can thus reduce the cost of capital and ease the transition to a low carbon economy. The Green Bond concept was developed in 2007/2008 by SEB (the Swedish Environmental Bank) and the World Bank as a response to increased investor demand for engagement in climate-related opportunities. The first entity to issue such bonds was the World Bank, which began the practice in 2008 and has since issued over \$3.5 billion in debt designated for issues related to climate change. Ginnie Mae and Fannie Mae have also issued mortgage-backed securities with the “green” label, as has the European Investment Bank. U.S. municipalities have been issuing bonds for the specific purpose of funding environmental projects for several years, although usually not with an easily-identifiable green designation. Still, \$1.7 billion worth of bonds were issued within this category during the first half of 2013.

As for the investors, Sweden’s public-sector pension fund was one of the earliest institutional entity to purchase a large amount of green bonds for its diversified portfolio. More recently, private asset managers have shown increasing interest for this type of investment. Last November Zurich Insurance said it would buy \$1 billion of green bonds, with the portfolio run by BlackRock, an asset manager. Christopher Flensburg of SEB, a Swedish bank that is the largest underwriter of green bonds, reckons more than 250 institutional investors have bought at least one green bond, up from a handful two years ago. The largest bonds—such as

a \$3.4 billion issue from GDF Suez, a utility—are now big enough to appear in general bond indices. On July 1st Barclays, a bank, and MSCI, an information firm, said they would launch the first green-bond index.

Green bonds also attract new investors. When Unilever, a consumer-goods company, issued a £250m (\$416m) green bond in March, 40% of the issue was snapped up by people outside Britain—an uncommon response to a sterling bond. Central banks and other official bodies usually buy 75% of the African Development Bank's (AfDB) benchmark bonds. But when the AfDB issued a green bond last October, asset managers, insurers and pension funds took over 70%. Having more investors ought to make it easier for a company to sell bonds in future. There is also evidence green bonds can sometimes outperform less colorful ones. Last year the yield on almost all South Korean bonds rose 0.6 percentage points in response to an outbreak of sabre-rattling by North Korea. But that of a green bond issued by South Korea's Exim bank rose only 0.1 points.

The green bond concept is a market innovation that allows differentiating a specific category of bonds, thereby enhancing efficient capital intermediation between investors and green or climate-related projects. The potential innovation carried by this new type of bonds is the targeting of the bond proceedings to the intended green impact by identifying and labeling the bond on the basis of transparent and independently verifiable qualifying criteria.

From a market originally dominated by the World Bank, the European Investment Bank (EIB) and the International Finance Corporation (IFC) and a few sovereign issuers, the labeled green bond market has attracted a variety of new issuers, aiming to promote a low carbon economy, and now includes corporate bonds, asset-backed securities (ABS), project and infrastructure assets, and subnational and municipal issuers (regional and city governments). The labeled green bond market still predominantly consists of investment-grade bonds, mostly issued by sovereigns and supranationals. The EIB has been the largest issuer of green bonds, followed by the World Bank and the IFC, with over 75% of the issuance 'AAA' rated since 2007, and with over 75% of all issues with maturities between 2 and 10 years. However, only 47% of CBI's current, broad USD 503 billion, climate themed bond market (7% labeled and 93% unlabeled) is investment grade.

When is a bond considered green? At the moment the answer is, "If someone says it is." At first, that someone was the World Bank's environmental department, which made sense when the Bank issued most of the bonds. But the need for some form of verification was evident as soon corporate green bonds were issued. Independent groups have already emerged to provide second opinions, such as the Centre for International Climate and Environmental Research in Oslo (CICERO), a group of Norwegian academics. The market has grown so fast that CICERO has just announced a partnership with four other academic institutions, including Tsinghua University, to increase capacity (not coincidentally the first yuan-denominated green bond

has just been issued). But sometimes the opinion is that of the issuer itself: Toyota this year sold a \$1.75 billion bond (to finance sales of zero-emission cars) on its own say-so.

Table 1. Green Bond Market Segmentation by Issuer, Green Label and Credit Quality Type

Type	Green Attributes	Credit Quality	Definition
Sovereigns, quasi-sovereigns	Labeled	High investment grade	Bonds issued by country governments or entities that are fully owned by governments, e.g., KEXIM, EDC, KfW
Supranationals	Labeled	High Investment Grade	Bonds issued by multilateral development banks and other international organizations, e.g., IFC, EIB, IBRD, Africa Development Bank
Subnationals including regional, state, municipalities and city governments	Labeled	Investment Grade	Bonds issued by regional, local or cities, e.g., Johannesburg, Massachusetts, Gothenburg
Corporates	Labeled	Sub-investment grade	Bonds issued by corporates, including banks, e.g., Bank of America, GdF Suez, Arise, Unibail Radamco, EdF
Asset-backed securities (ABS)	Unlabeled	Low Investment Grade	Asset-backed securities whose cashflows come from a portfolio of loans, receivables leases or PPAs, which are indirectly associated with renewable energy and energy efficiency projects e.g., Toyota ABS
ABS	Unlabeled	Low Investment Grade	Asset-backed securities whose cashflows come from a portfolio of loans, receivables leases or PPAs, which are associated with renewable energy and energy efficiency projects, e.g., Hannon Armstrong, SolarCity

Project Bonds /Loans	Unlabeled	Low Investment Grade/ Subinvestmentgrade	Cash flows to repay come from specific assets created by the green bond proceeds, e.g., Topaz Solar Farms, Breeze, CSolar
Corporate – pure play green or renewable	Unlabeled	Low Investment Grade/ Subinvestmentgrade	Corporates with portfolio of renewable energy and energy efficiency, assets issuing debt at the corporate level, e.g., Terraform

Source: InfraCredit and S&P Dow Jones Indices LLC. Data as of July 31, 2014.

Sovereign Green Bonds

At the moment, issues of green bonds from government bodies have been limited to AAA national, State governments (e.g. Massachusetts) and municipalities. In addition to states, provincial and regional governments, however, sovereign green bonds from central governments from all countries, with various degrees of credit quality, appear both a likely and a desirable development for several reasons. First, green bonds appear to bridge the gap between the two equally radical alternatives of free market capitalism and environmental activism. Thus, at national level, they may have a valuable role as instruments of policies that reconcile the interest of the state and the market. In this respect, the relationship with the World Bank policies is crucial because of its effort to integrate ecological considerations into the mainstream of its lending activities (Bridgeman 2001: 1037; Nielson and Tierney 2003: 253-71)¹. Second, green bonds may provide access to a deeper pool of capital and thus offer debt relief and opportunities for expanding investment to countries that are financially constrained. Third, by targeting effective policies and projects to mitigate climate change, green bonds may offer a premium to projects that yield global external benefits (such as reduction of CO2 emissions in hydro projects), thus providing incentive to countries that are more preoccupied of the local negative externalities generated by these projects. Fourth, green bonds may provide incentives at country level to move toward more sustainable practices for a wide range of policy choices and investment decisions, including energy, agriculture, waste disposal, infrastructure, water provision and

¹ The introduction of an environmental impact assessment requirement on all of the Bank's loans was a central tenet of this policy and was soon followed by all major regional development banks. Article 1 of The Bank's Policy on Environmental Assessment¹⁰ provides that 'The Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making'. This requirement was consolidated as Operational Directive 4.01 in 1989 and was converted in 1999 into a new format: Operational Policy ('OP') 4.01 and Bank Procedures ('BP') 4.01. Both documents are available at: lnweb18.worldbank.org/ESSD/ envext.nsf/47ByDocName/Policy (visited 12 June 2006). A commitment to environmental assessment is also included in the World Bank, Pollution Prevention and Abatement Handbook ('PPAH') (1998), pp. 22-26 (the Environmental Assessment Process). The PPAH is also used by the International Finance Corporation (see: <http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines>).

mitigation and adaptation projects. Fifth, green bonds may be one of the critical links of a virtuous circle among the various functions of the government, such as financing, investing, regulating and managing public savings (e.g. pension² and investment funds).

While the whole sector of green financing is undergoing a progressive change toward a greater degree of both self-regulation and outside scrutiny (Perez , 2007), the normative needs of an effective capacity for sovereign financing in the green area requires an altogether novel approach. In order to be able to benefit from sizable amounts of green financing, national governments, in fact, will have to convince subscribers and market investors that their creditworthiness is enhanced by the greening program in terms of commitments and delivery capacity. For this, they will need a more rigorous and more general type of assessment of their greening policies and programs, with the provision of credible guarantees at aggregate and project level on the use of the proceeds and the impact of the projects.

While not immediately effective from the operational point of view, the concept of sustainable development appears to be one of the drivers of green financing , with a growing influence on public awareness of a broad accountability set of criteria to judge governments and corporations on ethical grounds. The Dow Jones Sustainability World Index ('DJSI World') is a good example of the increasing attention that investors pay to the ethics of the corporate sector. The index covers the top 10 per cent of the biggest 2,500 companies in the Dow Jones World Index in terms of economic, environmental and social criteria and was first published on 8 September, 1999. It is constructed by following an analytical multi-criterion methodology, based on the so called “Corporate Sustainability Assessment”, with the criteria divided into three dimensions: Economic, Environment, and Social, each including a list of criteria, sub-criteria and weighting. For the environmental dimension the criteria are specified as follows:

Table 2. Dow Jones Sustainability World Index

Dimension	Criteria	Weighting (%)	Sub-criteria
Environment	Environmental performance (Eco-efficiency)	7	• Key Performance Indicators (KPI) - Energy • KPI- GHG • KPI- Waste • KPI- Water Coverage
	Environmental Reporting	3	Content – Environmental Reporting Coverage
	Industry Specific Criteria	Depends on Industry	• Environmental Management Systems,

² In the U.K., for example , since July 1st, 2000, pension fund trustees are required to declare their policy on social, environmental and ethical issues in their Statement of Investment Principles and these new rules have already induced several pension funds to earmark some or even all their funds to investment that have a positive social or environmental impact.

			<ul style="list-style-type: none"> • Climate Strategy, Biodiversity Impacts, Product Stewardship, etc. • Media and Stakeholder Analysis (MSA): Selected Industry Specific Criteria
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The reporting guidelines issued by the Global Reporting Initiative ('GRI')³ is the major example of the emergence of social and environmental standards at global level . The latest (2015) GRI Sustainability Reporting Guidelines (<https://www.globalreporting.org/reporting/g4/Pages/default.aspx>) are said “ to offer Reporting Principles, Standard Disclosures and an Implementation Manual for the preparation of sustainability reports by organizations, regardless of their size, sector or location. The Guidelines also offer an international reference for all those interested in the disclosure of governance approach and of the environmental, social and economic performance and impacts of organizations. The Guidelines are useful in the preparation of any type of document which requires such disclosure.”

The concept of sustainable development, in spite of some of its ambiguities, appears a good venue to a new ethos of socially responsible financing. The Guidelines provide detailed prescriptions for reporting on three main aspects of the activities of organizations: economic, environmental, and social, with the view that ‘achieving sustainability requires balancing the complex relationships between current economic, environmental, and social needs in a manner that does not compromise future needs’ . As Table 2 shows, while the Environmental dimensions loom large in the aspects identified by the Guidelines, the economic and social aspects appear equally important, and, for many variables, highly interdependent within a nexus including the environmental variables.

Table 3. Categories And Aspects In The Guidelines Of The Global Reporting Initiative

Category Aspects	Economic	Environmental
	<ul style="list-style-type: none"> Economic Performance Market Presence Indirect Economic Impacts Procurement Practices 	<ul style="list-style-type: none"> Materials Energy Water Biodiversity Emissions Effluents and Waste Products and Services Compliance Transport Overall Supplier Environmental Assessment Environmental Grievance
		Mechanisms

³ The GRI was founded in 1997 by the Coalition for Environmentally Responsible Economies in partnership with the United Nations Environment Programme.

Category Sub- Categories Aspects ⁱⁱⁱ	Labor Practices and Decent Work	Social Human Rights	Society	Product Responsibility
	Employment Labor/Management Relations Occupational Health and Safety Training and Education Diversity and Equal Opportunity Equal Remuneration for Women and Men Supplier Assessment for Labor Practices Labor Practices Grievance Mechanisms	Investment Non-discrimination Freedom of Association and Collective Bargaining Child Labor Forced or Compulsory Labor Security Practices Indigenous Rights Supplier Assessment Human Rights Assessment Human Rights Grievance Mechanisms	Local Communities Anti-corruption Public Policy Anti-competitive Behavior Compliance Supplier Assessment for Impacts on Society Grievance Mechanisms for Impacts on Society	Customer Health and Safety Product and Service Labeling Marketing Communications Customer Privacy Compliance

At national policy level, governments⁴ appear increasingly involved on extending and refining environmental regulation along the financing front. Securities regulation, in particular, is evolving towards wider disclosure requirements of environmental data. While for the time being the rationale for this disclosure appears to be the concern about the impact of environmental changes on the firm's future revenues, expanding reports and analysis of this issue would certainly serve also the need to monitor individual and collective impact of financing on the environment. A broader interest for transparency on environmental impact seems to be at the basis of the steps taken by the U.S. Environmental Protection Agency ('EPA') in cooperation with the U.S. Securities and Exchange Commission ('SEC'), to improve compliance with SEC disclosure requirements. Government regulators are also developing mandatory

⁴ In addition to direct issuance, and following the example of the international Development Banks, governments are also engaging or contemplating actions to develop the market for green bonds by supporting deal flow and aggregation, and creating the enabling policy and risk environment. Some of these actions are the operations of Credit Enhancement/Guarantees/De-Risking, whereby the credit rating of the bond is improved by a partial or total guarantee provided by the government (E.g. US Department of Energy Loan Guarantee program). Public entities can insure Power Purchase Agreements (PPAs) on renewable energy generation projects as well as provide credit enhancement wraps for Collateralized Debt Obligations (CDOs) of project loans to address political and other market risks and first-loss (default) risk. Backstopping operations are also being used, whereby governments purchase sub-tranches of subordinated debt from early bond issuances to improve the risk profile of bonds by temporarily taking some first-loss layers from early issuances which would serve to lower their price and help the market gain familiarity. The government could also insure the credit or debt of the bond issuer. (E.g. European Investment Bank offers credit enhancement product targeted for clean energy). Governments also can, as demonstrated in the case of the state of Pennsylvania, purchase and securitize energy efficiency loans to recycle capital for further lending. As already experimented in the US, tax preferencing, in the form of total or partial tax exemption, can also be an effective way of developing a green bond market.

reporting schemes for companies which may impact the environment within a broad area of public concern. Examples of these schemes are those required by the U.S. Toxic Release Inventory program ('TRI'), the European Pollution Emissions Register ('EPER') and the Canadian National Pollutant Release Inventory Scheme ('NPRI').

Even though transparency and full information on security issuance has been one of the prime concerns of governments regulating financial markets, so far no special attention has been given to the quality and extent of security issuers as to their sustainability conditions and the environmental impacts of the investment financed. This is not only true for general corporate financing, but also for the case of "green" financing, where the governments so far have stayed away from trying to regulate issuance documentation, reporting and monitoring of the use of proceeds and the impact of the projects financed. The legal landscape for these types of securities is rapidly changing, going from self-labeling to self-regulation to various types of verification and ratings. The basis for the standards for green bonds have been established in a set of "green bonds principles" by a plurality of diverse stakeholders.

Green bonds are especially important components of the new type of financing for several reasons. First, as private debt financing instruments, bonds are a favorite form of fund allocation for institutional investors and have traditionally been used by the public sector to finance major infrastructure projects. Second, projects financed with bonds issued by central or regional governments and municipalities were often revolving around environmentally impacting projects such as railways, roads, sewage systems, energy grids and hospitals, toll roads, bridges and water ways, electric and gas systems and utilities. Third, most of these bonds were targeted in the sense that their proceeds were earmarked to the financing of one particular project or sets of projects. Finally, these bonds were typically attractive for investors because they were exempt from federal income taxes and often also from local taxes. They had also a much lower default rate than corporate bonds (0.04% against 9.83%, between 1970 and 2002), even though they had lower yields than corporate bonds.

Targeting bond proceeds to green uses imply a series of safeguards that were only sparingly used for targeted bonds. A simple measure is the so called ring fencing, which consists in moving the proceeds to a sub-portfolio, from which they can be removed only for the use for which they are targeted. Alternatively, they may be subject to a formal internal process that can be tracked by the investors and will be linked to the issuer's lending and investment operations for projects. Also, while such investment are pending, the issuer may commit to specific classes of eligible investments for the balance of unallocated proceeds. These may include, in particular, (i) Green Project Bonds, i.e. a project bond for a single or multiple Green Project(s) for which the investor has direct exposure to the risk of the project(s) with or without potential recourse to the issuer; (ii) Green Securitized Bonds, i.e. a bond collateralized by one or more specific projects, including but not limited to covered bonds, ABS, and other structures; (iii) Green Securitized Revenue Bonds. I-e- a bond

that is backed by an asset both as a collateral and as a source of revenue; (iv) Green use of the proceedings) bonds, i.e. bonds whose proceeds are segregated in a way that allow their use only for a specific project or set of projects. Other types of green bonds are possible and they are coming or will come to existence as the market for green financing widens and differentiation evolves to satisfy different types of investors and related concerns. For example, while the first source of repayment is generally the cash flows of the assets financed, other assets, government and private guarantees may be used to back the project. This type of bond covers, for example, asset-backed securitizations of rooftop solar PV and/or energy efficiency assets. Convertible green bonds are also a promising new instrument to provide leverage and risk sharing to the issuers and the investors. They appear to be especially interesting for government projects that can be implemented through public private partnership agreements.

The green bond principles (GBP) were put together by a group of interested parties including NGOs, investors, and banks in February 2004⁵. They suggest disclosure and reporting procedures aimed at achieving transparency for the process of issuing the bonds, and directing their proceeds to the green targets chosen, before, during and after project implementation. However, because GBPs are conceived as a guide for voluntary commitments on the part of the issuers, they do not imply or recommend any form of impact evaluation and do not link disclosure or reporting to any standard except those that may be freely chosen by the issuers at the time of issuance.

Nevertheless, in spite of being perhaps too general, somewhat vague and somewhat under-ambitious in their purported undertaking, GBPs represent an important landmark in the recent history of green financing. The reason for this is that they clearly define an important difference from the traditional sustainable development approach and the rationale for a whole set of new financial instruments in support of the environment. Whilst sustainability reporting relates to the behavior of an organization with respect to the environment both in terms of its procedures and of the consequences of its acts, reporting on green bond issuance is seen as mainly focusing on specific projects, their structure and performance. The organization procedures and other actions are still likely to be important, but only to the extent that they may or may not yield credibility to its commitments and claims. In this respect, a sustainability report that identifies a negative condition and the need to change may be the point of departure and even a promising support for green projects that signal a step in a totally new and virtuous direction. Thus, in some sense, GBPs can be the basis to report on increasing sustainability of an economic agent, and the instrument to turn around a negative assessment of black or gray corporate subject⁶.

⁵ A consortium of investment banks - Bank of America Merrill Lynch, Citi, Crédit Agricole Corporate and Investment Bank, JPMorgan Chase, BNP Paribas, Daiwa, Deutsche Bank, Goldman Sachs, HSBC, Mizuho Securities, Morgan Stanley, Rabobank and SEB announced support for the initiative after it was made public through the website of CERES, a leading NGO in the field of collective action for policies toward climate change.

⁶ In this sense, there may be an important element of additionality incorporated in green bonds, in the sense that their impact may be more valuable if it is considered with respect to a counterfactual, e.g. the possibly harmful projects that would be pursued by the same issuers in an alternative scenario.

From the World Bank to Other Potential Issuers

The World Bank (WB) has been the initiator and the main issuer and has thus already established some of the basic rules that identify green bonds. Because of the overriding importance of its mission to support sustainable development, poverty reduction and inclusive growth, the WB also claims that all its bonds, in a sense, have a green quality⁷. Within this general characterization, however, green bonds are seen by the WB as a “smart” financial product capable of concentrating investors’ interest in sustainable investment opportunities focused specifically on climate change mitigation and adaptation⁸. To some extent, this dual approach based on the idea that all WB bonds are green, but green bonds are more specifically so, reflects on the selection and monitoring process that is offered to investors as a form of assurance of the effectiveness of the targeting that GB pursue.

The due diligence/ assurance⁹ process proposed by the WB is thus threefold. First, eligible projects are selected through a rigorous review and approval process. This process is the same that the Bank follows for all projects, but in the case of GB is more focused on questions concerning climate change and natural resource issues and includes, in addition to the usual technical, economic, and institutional analysis of projects’ scopes and opportunities: (i) an early screening to design concrete mitigation actions and to identify environmental and social impacts, and (ii) a further selection by environmental specialists of approved projects that meet the green bond eligibility criteria. These criteria are not specified in detail, however, and appear to delegate the selection to the staff on the basis of a mix of subjective judgments on intrinsic projects’ characteristics (e.g. renewable energy production), and their expected impacts, in terms of mitigation or adaptation to climate change.

A second component of the WB process aims to guarantee the targeting of the GBs from a financial point of view. For this “Ring Fencing” is used, by crediting GB proceedings to a separate Green Cash Account from which they are invested in accordance with IBRD’s conservative liquidity policy until allocated for eligible green project disbursements.

A final component is constituted by the Monitoring & Reporting phase, concerning project implementation both in the construction and operational phase, through investigation and disclosure of projects’ progress,

⁷ See, for example: *Green Bond, Sixth Annual Investors’ Update, 2014, The World Bank- Treasury*: “All World Bank bonds support sustainable development, poverty reduction and inclusive growth. They fit well with investment strategies that incorporate Environmental, Social and Governance factors into the decision-making process”.

⁸ For more information on WB sustainable development projects see <http://treasury.worldbank.org/documents/IBRDInvestorPresentation.pdf>.

⁹ Due diligence concerns all activities of information collecting and analysis on the structure and performance of an object of purchase on behalf of the purchaser. In the case of an investment, due diligence aims to enable the potential investor to make informed decisions concerning the risks and the opportunities that the transaction offers. Due diligence assignment is generally combined with assurance, a process aimed to focus on the credibility of the information reviewed during the due diligence assignment, whose lack may result in the abandonment of the potential investment.

outputs and outcomes, and the evaluation of the objectives achieved. This information is projected to be made available on the main World Bank website and summaries and key impact indicators to be provided on the World Bank's Green Bond website.

The WB due diligence process appears simple and straightforward, and , so far seems to have satisfied investors. Several factors, however, render this process insufficient for other institutions and especially so for sovereign issuers. First, most institutions, governments or corporate entities, cannot claim, as the WB does, that a rigorous process of selection and implementation of all projects is already in place for them. Thus, some basic questions will have to be addressed on the capabilities to select and effectively carry out the projects put forward for financing. Second, project eligibility and impact evaluation in the case of the WB is predicated upon already existing "green assessment" procedures at both country and sector levels, while for most issuers no such processes are already in place. Public sector issuers, in particular, would have to provide investors of evidence that both their general strategies and the specific projects selected would contribute to the achievement of the objectives to which the GBs issued are aimed. Third, again in contrast with the WB situation, we could think of a large category of GB issuers, with a "black" rather than a green record in their environmental policies and investment history. While these issuers could provide an even more valuable contribution to green objectives, such as mitigation or adaptation measures, they would have the burden to demonstrate that the program/project proposed is likely to achieve its targets, despite the handicap of previous choices and the consequent unfavorable industrial and institutional framework. They would also have to show that a significant green impact is likely to be achieved by the individual project, either because of its size and qualities, or as part of a broader strategy.

More generally, and with reference to all potential GB issuers, one can ask what would have to be the key components of disclosure and reporting that investors would need, in order to make an informed decision on the matter. In theory, investors should be first guaranteed of effectiveness of bond targeting (ring fencing and timely disbursement against the stated goals). But in addition to these basic requirements, they should also be interested in two main dimensions: (i) returns , and (ii) impact . The first dimension includes expectations and uncertainty of returns and of repayments, with risks possibly looming large in many cases of corporate and sovereign bonds. In this respect, disclosing and reporting needs may be very different for issuers that do not have a high credit rating, as instead was the case of the World Bank and the other institutions that followed its lead in the first wave of bond issuance, The second dimension concerns the evaluation of the outcomes and impact of the project, including direct and indirect , and intended and unintended consequences. For this task, while WB reports generally do make a brave attempt at describing and, less often, at providing some quantification of the intended effects of the GB supported program or project, an accepted set of best practices simply does not exist at the moment. In the case of sovereign debt, in particular, a methodology of impact analysis would have to integrate the environmental impact

assessment with program evaluation , tying the principles of government green strategy with the characteristics of the program or project that the green bond issuance aims to finance.

Other Green Bond Due Diligence Practices

Practices for due diligence for other public and private issuers are still in a state of flux, with no well established standards and many alternative approaches depending on context, stakeholders and third parties concerned. One line of thought, which is more popular with NGOs and environmental groups, tends to assimilate green bonds to one form of ethical financial product of the greater family of impact investment. Under this approach, GB can be considered a trust good (Weisbrod,1988) , so that issuers should demonstrate first that they are trustworthy both in their socially responsible behavior and in their concern for the environment, and , once this is ascertained, that they will choose the projects according to a series of criteria that ensure some likelihood that the projects will improve environmental conditions. For example, in its “second opinion “ on the GB issuance from GDF SUEZ, Vigeo¹⁰ states that the first step in the analysis of a Green Bond consists in analyzing the issuer performance in terms of social responsibility. For this reason, Vigeo has evaluated GDF SUEZ, on the basis of publicly available information, by assigning a rating on its social responsibility performance, based on a framework aligned with public international standards, in compliance with the ISO 26000 norm, and organized in 6 domains: Environment, Human Resources, Human Rights, Community Involvement, Business Behavior and Corporate Governance. In addition to this rating, however, Vigeo also reports to have established criteria for project eligibility , on the basis of ISO26000 guidelines, of a review of GDF SUEZ Policies and Guidelines on Sustainability and practices in place, and of internal interviews with business lines managers. These criteria focus on responsible project management and on project’s contribution to the energy transition and to the fight against climate change as well as to responsible business.

According to the above approach, the due diligence procedure is resolved in terms of trust, in the sense that the eligibility of the company is established on the basis of past records (i.e. the company is trustworthy). The eligibility of the projects is defined by a trustworthy company’s commitment to follow a set of criteria on project characteristics (i.e. the green “credibility” of GB financed projects) . No attention is paid to objective implementation issues, concerning the issuer’s capability to implement an eligible project and to deliver the “green” result promised (outcome evaluation). No consideration is equally taken of project impact, except for it’s a priori characteristic as an environmentally benevolent operation.

¹⁰ Vigeo (founded in 2002) , describes itself as “...the leading European expert in the assessment of companies and organizations with regard to their practices and performance on environmental, social and governance (“ESG”) issues” <http://www.vigeo.com/csr-rating-agency/en/1-2-qui-somme-nous-2>.

A completely different approach is suggested by the Climate Bond Initiative¹¹, an assembly of operators ranging from banks to no profit institutions aiming at financing climate related projects (a subcategory of green projects) . This approach focuses on delivering rather than trust and commitments and on carbon emissions. It proposes an international screening standard , based on a tool (named itself Climate Bond Standard). This in turn is described as allowing investors and governments to easily prioritize climate and green bonds with confidence that the funds are being used to deliver climate change solutions. The Standard is structured according to 3 components: (i) a General Requirements part that sets out Clauses designed to ensure uniformity and consistency across the Climate Bonds asset class and include requirements around use of proceeds; ESG disclosure and non-contamination; (ii) a Low-Carbon Contribution component, which sets out the eligible projects and physical assets that can be regarded as contributing to the delivery of a Low-Carbon Economy; (iii) a part concerning Bond Structures setting out Clauses specific to certain bond-types.

In spite of its insistence on delivery, however, as the description itself suggests, the Standard tool appears more as a series of contractual clauses than as a test to ascertain the green nature of the investment proposed. Rather than on trustworthiness, which presumably remains important, therefore, the tool focuses on commitment and likely compliance: two things that in themselves are useful to circumscribe the class of financial and extra-financial agreements that can be involved in a GB issue, but are not , per se, a guarantee either of commitment or of delivery.

An independent, not-for-profit research institute “ CICERO (Center for International Climate and Environmental Research - Oslo)” takes yet another approach to due diligence from a second opinion point of view. CICERO’s approach concerns more the impact side of the investment by providing expert led ad hoc environmental reviews. CICERO’s researchers are said¹² to “ review the issuing institutions' frameworks for eligible project selection and assess the framework’s robustness in meeting the green bond’s environmental objectives”. While the resulting evaluation tends to be very general, and essentially based on scant, ex ante public information, focus on project’s expected effects appears appropriate and so does the emphasis on the need for transparent and regular reporting on impacts of green bond projects to investors.

A somewhat more substantial type of a due diligence example is provided by a recent (2011) Green Bond operation by IDB: The operation’s architecture is somewhat complex, with long-term project financing through an onshore Special Purpose Vehicle in the form of senior secured loan, and partial credit guarantee (PCG) for capital markets. The Green Bond is issued with IDB participation for approximately US\$50 million to promote Energy Efficiency (EE) investments from end-users (in particular small and medium size companies) in Mexico . These investments are planned to be complemented by a senior secured loan and a PCG from IFC for up to US\$50 million, and additional resources from the Clean Technology Fund (“CTF”), in the form of a credit guarantee in an amount of approximately US\$10 million, and by non-reimbursable technical cooperation to foster the capacity and knowledge for the assessment and identification of opportunities in EE investments that will include guidelines for energy efficiency projects. It is expected that the Green Bond will be executed with Water Capital (“WCAP”) , a large international company, specialized in targeted financing, with headquarters in Mexico City.

Given this framework, the environmental and social due diligence outlined for the Green Bond is mostly aimed to verify operation’s compliance with the IDB’s Environment and Safeguards Compliance Policy (ESCP)

¹¹ See: <http://www.climatebonds.net/>: “The Climate Bonds Initiative is an international, investor-focused not-for-profit. It’s the only organization in the world focusing on mobilizing the \$100 trillion bond market for climate change solutions”.

¹² See: http://sebgroupp.com/siteassets/corporations_and_institutions/ . CICERO has been the leading market provider of green bond second opinions since the market’s inception in 2007, and has recently established the Expert Network on Second Opinions (ENSO), a global network of trustworthy research institutions which can claim know how and reputation on climate change and other environmental issues.

and guidelines and WCAP trustworthiness, capability and commitment to comply. A partial checklist in this regard includes: (i) an assessment of WCAP's capacity to manage satisfactorily the proposed operation and to design and implement an environmental and social management system for the EE projects to be supported by the Green Bonds by ensuring their proper assessment and management by the EE project proponents; (ii) an assessment of WCAP's ability to evaluate the capacity of the EE project proponents, local regulations and the capacity of local service providers, especially with respect to the management and final disposal of solid and hazardous waste; (iii) an assessment of WCAP compliance status with the applicable environmental, social, health and safety, and labor regulatory requirements; (c) an assessment of potential reputational risks associated with WCAP involvement in projects, companies or activities considered unacceptable to the IDB; (iv) an evaluation of WCAP status and compliance with other multilateral development facilities and programs; (v) an evaluation to ensure an appropriate inventory of any present environmental, social, labor and health and safety liabilities in WCAP portfolio, and facilities, (vi) an assessment of the adequacy of the action plans to properly resolve them; (vi) an evaluation of WCAP compliance with the Fundamental Principles and Rights at Work and of their fair and unbiased labor practices related to sex, age, ethnicity, cultural heritage, and collective bargaining.

Quantifying the financing gap

Financial risk and credit rationing

Financial markets are dominated by the consideration of risk, that in many ways has proven to be a beast very difficult to tame, in spite of the considerable panoply of products and devices developed to tackle it. Credit risk can be defined as the option to default, which in any credit contract is contemplated, explicitly or implicitly as a contingent asset for the debtor and as an equally contingent liability for the creditor. In dealing with private debtors, financial intermediaries use credit rationing and a variety of complementary conditions, such as collaterals, covenants and relationship banking, to attenuate the risks arising from asymmetric information and the disalignment of objectives characteristic of the principal agent relationship of the credit contract. The bond market, which has developed alongside with relationship banking in the attempt to reduce the risk borne by the individual banks, suffers itself from the same asymmetric information problem and a whole industry has developed to provide credit ratings to help investors to discriminate from good and bad creditors. Even though financial intermediaries still provide some rationing services in the selection of bond issuers, it is a combination of their subscription services, together with the credit ratings of the specialize agencies that eventually allows the bonds to be issued, purchased and traded on the secondary markets.

The degree of risk created by a loan depends on the characteristics of both the creditor and the debtor. In addition to traditional instruments (debt covenants, maturity, building a relationship with the borrower), financial and technological innovations have in fact made available to credit institutions new instruments that allow a partial or total coverage for risk (e.g. securitizing the loan, swapping, etc.) or greater control (data banks, sophisticated surveillance systems). On the side of the debtor, risk depends on the structure of the balance sheet of the firm, the owner's wealth, the capacity of the enterprise to generate cash flow, thereby insuring that the loan will be repaid and the supply of collateral and guarantees. For sovereign debtors, risk is a function of the

fundamentals of the country economy, the efficiency of its government and other institutions, and the status and sustainability of its public policies.

Strictly connected with project risk is the interest rate, which plays a many-fold function:

- a) it is a charge for the risk of default of the borrower;
- b) is an instrument for risk sharing;
- c) is a premium for loss of liquidity;
- d) is a compensation to defer consumption.

Interest rates applied by credit institutions include all the charges corresponding to the functions above plus the coverage of implicit costs (loss of money purchasing power, credit risk), and the production costs (costs of provision, operational and administration expenses). Interest rates are inversely correlated to the price of debt and, as a price-like variable, they summarize market information, in a way, which at least for a given range of rates, contributes to market efficiency. In particular, all other things being equal, the greater the risk of financing, the greater the interest charged by the credit institutions.

There is, however, a threshold of maximum acceptability for project risk (which is a function of the degree of the lenders' risk aversion and of innovation capacity) beyond which credit institutions and perspective investors will switch to straight out rationing. In this respect, two types of rationing may be distinguished:

type one rationing, when all borrowers receive a quantity of credit lower than the one desired. In this case the borrower is considered creditworthy, but her demand is greater than the amount granted;

a) *type two rationing*, when some potential borrowers are denied credit altogether. In this case the borrower does not pass the creditworthiness test.

The literature on credit rationing is rather extensive. Initially its interest was focused almost exclusively on the effects of the adjustment lags of the interest rates. Credit rationing was explained through hypotheses of price rigidities determined by exogenous factors, such as market imperfections, upper limits on interest rates, etc. In a second moment, Hodgman [37], Freimer and Gordon [38] claimed that the causes for rationing were to be found in factors internal to the credit institutions and linked to the objective of profit maximization. These contributors identified the real cause for rationing in the fact that beyond a certain size of the loan, no increment in the interest rate would be capable to compensate the expected losses from the corresponding increment in default risk.

More recent theories have tried to explain rationing from the existence of asymmetric information [35] and the hypothesis of multi-period contracts. The asymmetric information thesis¹³ demonstrates that the fact that a

¹³ Two classes of models refer to asymmetric information to justify credit rationing. They can be represented by the model, respectively, of Jaffee and Russel and of Stiglitz and Weiss.

perspective borrower possesses more information with respect to the creditor on the probability of success of a project determines a situation where the perspective lenders, in order to avoid adverse selection and lack of incentives, do not finance investment projects that would be willing to pay high interest rates. New projects seeking finance for innovative enterprises in relatively unknown areas, such as climate change mitigation, or other “green ventures” may be most difficult to assess and, as a consequence, most likely targets of credit rationing exclusion.

The second line of thought, based on multi-period credit contracts¹⁴, identifies in the stipulation of one period contracts between the bank and the borrower, a way to provide an incentive to the borrower to be repay her debt. If this does not happen, rationing occurs as a sanction. In other words, the possibility of exclusion from credit, combined with the existence of one period contracts, is used as a disincentive to default.

As indicated before, the relationship between the bank and the borrower may be framed by the principal-agent model, which has received much attention in the economic literature [39; 40; 41]. On one hand, in fact, we find the credit institution attempting to maximize the returns to the loan, while, on the other hand, its customers try to exploit as much as possible financial leverage, to maximize the enterprise net worth. Furthermore, the productive firm sends signals on its creditworthiness and credit capacity to the bank to obtain as high a rating as possible. The bank, on its part, tries to perform an effective selection, by denying credit to the unworthy and limit the size of the loans to expected capacity for the worthy ones.

Both the signals sent by the firm and the activities of the banks to assess credit risks are such that, small firms with little track record, involved in high tech products or markets are at comparative disadvantage in obtaining credit. This is particularly true if their projects appear to revolve on untested ideas, require technical expertise and are associated with risks that are difficult to diversify. Furthermore, while adverse selection via interest rate may be limited by rationing, the cost of appraising innovation may itself be correlated with project complexity and success chances. Thus, in a different form, adverse selection may re-enter the scene, since more complex projects may be discriminated against simply because they are more costly to assess. Moral hazard, in the form of the over-investment incentive, may also discourage the banks from getting involved with firms and projects that propose to invest in innovation and technology.

In a hypothetical market without informational asymmetries, where both subjects (bank and client) would be able to obtain the same returns from the investments financed, there would be no reason for conflict. The two subjects are put on opposite positions, however, by the uncertainty of the business plans of the perspective borrowers and by their potential use of financial leverage as an instrument to gain value at the expense of the bank. A special form of conflict, in particular, arises for *start ups* and *high tech* projects, where enterprises naturally aim at postponing the production of cash flow favoring long term growth, against the banks’ attempt

¹⁴ See Kletzer; Stiglitz and Weiss.

to anticipate as much as possible debt repayment to minimize risk. Possible solutions to this conflict rely on two basic techniques: *monitoring* and *commitment*. *Monitoring* activities on the part of the bank may be performed on an *ex ante* or an *ex post* base. *Ex ante* activities aim at improving the portfolio of bank investments, by granting credit on the basis of systematic evaluation of both projects and enterprises. These techniques, which may be rather costly to set up, are not particularly biased for projects involving high or new technology, if they develop methodologies and procedures (such as feasibility studies and expert evaluations) that deal with project merits rather than with the evaluation of corporate capacity for credit.

Ex ante activities thus consist in the more traditional screening and evaluation types and concern the fundamentals of the subjects that are interested or potentially interested by financing, as well as project appraisal. As in all cases where it is necessary to undertake acceptance-rejection decisions, the possibility of error is two-fold. On one hand, it is possible to err by granting loans that should be refused (error of type one). On the other hand, one can incur in the opposite mistake of denying loans that should have been granted (error of type two). The proportion of loans of good and bad quality depends on both error types and not, as it could appear on first sight, only on the error of type one. An excess of type two error, which is particularly likely for high tech, start ups and innovative projects, may have particularly nefarious consequences on economic growth and competition, and result in high social costs.

A recent literature [42] has studied the effect on the two errors of the architecture of the economic systems, identifying two extreme typologies of organization: the hierarchy and the poliarchy. In a hierarchical organization, which we may assimilate to a traditional bank, loan proposals are examined at each of the successive levels of a pyramid of decision makers. Credit is eventually granted if and only if the proposal has been considered acceptable at all levels of scrutiny. Type one error is clearly minimized in this decisional structure, while the probability of error of type two is comparatively higher, *coeteris paribus*.

In a poliarchic structure, on the other hand, we are closer to the case of specialized credit institutions, such as the investment banks and the venture capitalists, since projects proposed for financing are examined by a limited number (some times only one) of decision levels. The project is thus promptly accepted or rejected and does not have to go through a vertical line of positive evaluations to be financed. If it is rejected by one possible financing institution according with this procedure, the project does not receive the stigma that is inevitably associated to a candidate that is solemnly dismissed after a ponderous examination

This system clearly increases the probability of error of type one, while error of type two is minimized. Specialized institutions should be able, at the cost of a higher risk of being wrong, to capture a greater percentage of the best and most innovative projects.

The upshot of this discussion is thus that *ex ante* monitoring activities present a clear comparative advantage for projects based on innovation and for specialized institutions. These are called, one could say, to perform a social function, by discriminating among projects, with the objective of not letting the best opportunities escape for lack of sufficient attention to the error of type two. The same activity, on the other hand, is exposed to two different risks, which tend to attenuate its benefits, at least from the point of view of financial agents.

The first risk is the consequence of the fact that financial intermediaries, and specially the larger banks, deprived of the information and of the decision structure adequate to capture the best projects, are tempted to behave as free riders. They can do so by exploiting the monitoring activities of specialized operators, to select part of the projects, thereby avoiding to incur in direct monitoring costs. This risk may imply higher social costs, even though the optimal combination of hierarchy and poliarchy is decided by the interaction of the intermediaries and the market. Specialized operators, in fact, may see their competitive advantage severely compromised by the opportunistic behavior of larger and un-specialized banks, and, as a consequence, scouting and other monitoring activities aimed at finding new project ideas may be hampered.

The second risk concerns the so called “winner’s curse”, associated with the winner of a competitive auction, who discovers to have bid a higher price than what he should be willing to pay. The financial equivalent of this curse is the fact that the specialized operator, investment bank or venture capitalist, may be financing prevalently those projects which everybody else has rejected because of the excessive risks involved. This financing is apparently the fruit of competition, but at the same time it may be a poisonous fruit, since in the long run it may both do damage to the specialized operators, which will be affected by a higher degree of failures, and the high tech firms, which will find fewer financing opportunities.

Ex post activities aim at improving the performance of firms who have already been granted financing, through supervision and control. Because of the general uncertainty characterizing innovative projects, the often long gestation lags, the tenuous property rights and the prevalence of intangibles in the assets owned by the high tech enterprise, monitoring may be costly and only partially effective. The fact that the bank may try to audit the firm’s accounts and to prescribe actions of some sort does not generally help on the front of moral hazard. When it is tied to the possibility of renegotiating loan terms, it may hamper project success by either unduly restricting the firm’s impulse to grow (under-investment incentive), or by inciting it to take excessive risks (over-investment incentives) at the expenses of senior lenders who may not be able to renegotiate.

Ex post monitoring activities may be divided in two groups: (a) surveillance and control actions, to collect information on the firm that may be relevant for the bank; (b) supervision actions. These include assistance, advice and provision of services, thereby involving prevalently information that may be useful to the firm financed. In a regime of *financial deepening*, with both banks and specialized operators competing to promote the success of the projects financed, both activities of type (a) and (b) should be growing. This would be specially

true for start ups and projects that require technical expertise and innovative or at least state of the art technology to be successful. Both activities, however, are linked to a relationship between intermediary and enterprise that may go much beyond unilateral monitoring. Specialized operators may develop a competitive advantage in type (b) activities, but they may not be sufficiently numerous to satisfy the demand for know how and technical capability where innovation and technology is at stake.

The relationship between the intermediary and the enterprise has been recently evolving towards forms of delegated monitoring, where the incentives provided to the two parties constitute the essential elements of the financing relationship. Monitoring activities of type (a) and (b), in fact, tend to eliminate the problems of *moral hazard* deriving from the fact that the firm and the intermediary may both have an interest to hide information to one another and to operate under conflict of interest. The contract of delegated monitoring with incentives, instead, aims at creating a unity of behavior of the two parties, which may be particularly beneficial for long term performance.

Can we say that the specialized intermediaries hold a competitive advantage, at least a potential one, as agents for monitoring financing in behalf of banks and enterprises. While many activities may be conceivable as part of this type of a relation, it is evident that a contract of delegated monitoring may of great interest for small firms, local banks and operators, such as closed funds, that are also often operating on a local basis. This activity is very difficult to organize, because in most cases both banks and specialized operators are unprepared to go beyond traditional monitoring and control. On the other hand, the experience of *capital deepening* in the areas of concentration of technological progress, such as many industrial districts and science parks indicate that this may be a most productive area of business.

Commitment activities aim at reducing adverse selection and moral hazard by incorporating incentives in the structure of contracts or of its implementation procedures. They include a panoply of instruments, the most important being collateral, loan agreements, debt covenants and what is generally referred to as “building a relationship” [14].

Collateral may take the form of a pledge of inside assets, i.e. assets owned by the firm, or outside assets, owned by the shareholders, sponsors or other stakeholders. Because it attenuates the implications of limited responsibility (the value of a failed project is negative rather than zero), collateral reduces both adverse selection and moral hazard. On the other hand, the fact that the bank has required an independent pledge to back the project, significantly reduces the value of the loan as a signal of approval and trust to the enterprise. Nevertheless, collateral is the main instrument to overcome the conflict of interest between the bank and the firm, specially in the case of SMEs, *start ups* and *high techs*. In the United States, about 40% of loans [43] and 60% of their value [44] to small business are backed by outside pledges.

Loan commitments are forward contracts committing lenders to provide loans over a given period, at fixed rates. Lines of credit are “generally pure revolving credits that allow the firm to borrow as much of the line as needed at any given time over the interval time specified” [13, 41]. Even though these instruments appear to be conceived to provide working capital, they may be used to finance machinery and innovation. It is also typically utilized to open a credit door to the firm by allowing her to slowly upgrade her credit capacity over time. In general, however, the short term and conditional nature of this type of credit, allows the banks to hold an option *not to finance* the enterprise, and limits its commitment to any longer term venture. While it may mitigate the effects of rationing for small enterprises, it makes them dependent on the credit institutions to the extent that they may not be able to implement a new project without prior consent from the main bank that finances their current operations. Loan commitments and lines of credit, furthermore, are not generally sensitive to positive news, including the favorable characteristics of good innovation projects. They tend to be, in fact, rather dependent on bad news, to deny credit when the firm enters the gray zone of financial difficulties, low cash flow and, depending on the circumstances, temporary low returns due to high growth prospects.

Debt covenants can stipulate that the borrower has to obtain the consensus of the lender before engaging in a new project or in a change of corporate policies. They are specifically designed to reduce the information problem and agency costs and may be rather effective for sufficiently large enterprises. Small firms, however, are more rarely disciplined by this type of instruments, because of the generally low quality of their auditing. In the case of innovative projects, furthermore, restricting the firm’s ability to change its financial position may severely hamper management flexibility in the face of uncertainty, including its ability to take advantage of market and technological opportunities. More frequently, small firms are controlled through contracts of short maturity. These contracts enable the banks to monitor changes in the borrower and to renegotiate the terms of the loan if risk conditions have been modified by the evolution of its fundamentals, or by the adoption of riskier expansion policies. In the case of high tech SMEs this adds a further reason to their inability to obtain long term credit on the basis of projects’ merits rather than on systemic risks.

The activities that lead to the development of a long term relationship between the lender and the borrower provide more efficient *commitment* than contractual instruments that restrict in any way the flexibility of one or both parties. Long term relations are particularly desirable because they may drastically reduce *agency costs*. These costs are due to the fact that the credit contract generally does not satisfy the requisite of time consistency. Efficient *ex ante* contracts may thus become *ex post* inefficient, if circumstances occur that determine a divergence in the interest of the two parties as to abiding by the contract terms, renegotiating, defaulting.

Under these conditions, developing a long term relationship between the bank and the firm may allow the bank to build up a credit history for the SME, by accompanying her through her life cycle and providing financing at the appropriate time with sufficient information. In the United States, for example, small business that define a

commercial bank as their main financial partner have been receiving financing from the same bank for more than 9 years¹⁵. Bornheim and Herbeck [45, 328] illustrate the situation by contrasting gross marginal benefits from the relationship, shown as a curve decreasing with time, to costs, which are instead increasing with the length of the relationship. Costs are mainly due to what has been called the phenomenon of *information capture*. Marginal gross benefits are mainly due to the reduction of capital costs in response to the private information about borrower quality provided by the relationship. As a consequence the price of the loans falls [46], loan size rises over time and collateral demand also tend to fall [47].

Information capture shows up as a progressive loss of options for the firm. Once caught in a long term relationship, a small firm may find difficult to turn elsewhere for funding. The broader effect may be lowering competition among banks and higher costs to the firm. On the other hand, a long term relationship does not necessarily imply an exclusive one, both in the sense that the firm may try to build up long term financial ties with several intermediaries and because after a certain number of years it may be advisable to sever one's ties with the main lender.

Relational financing has been defined by Aoki and Dinc [48] in a way directly dependent on the intermediary expected benefits, as the type of financing that is provided in the expectation of both further financing over time and the exaction of rents. In contrast, ordinary financing is referred to as *arm's length*. Relational financing is thus particularly important for start ups, high tech projects and SMEs because the prospect of the gain proposed is often sufficiently vague and long term that only the expectation of extracting a rent may provide the incentive to offer financing on a likely repeated basis. Relational financing thus includes commercial banks, investment banks and venture capitalists, but clearly favors specialized intermediaries which can fulfill the needs of growing firms through their more closeness to the firm territory, their expertise in the firm operations, and their know how on the relevant markets.

The risk borne by an investor buying a security can be decomposed, according to the Capital Asset Pricing Model (CAPM) developed by Sharpe [4], Lintner [3] and others, into diversifiable (or unsystematic) and nondiversifiable (or systematic) risk. In this model, the unsystematic risk can be neutralized ("washed out") by diversification, while the systematic risk is not affected by the portfolio composition. While the CAPM presents several limitations and is no longer considered a good basis for financial analysis, the distinction between diversifiable and non diversifiable risk is still helpful to understand the behaviour and the plight of investors in financial markets. On one hand, in fact, risk managers tend to diversify their portfolios by purchasing the large variety of financial products now available on the market, in an effort to eliminate non systematic risk. On the other hand, however, financial innovation essentially makes the same products

¹⁵ Berger and Udell, from SBIC data.

accessible to all investors, so that there is a tendency, especially on the part of large institutional investors, to hold different shares of an essentially similar portfolio. This increases systemic risk, as shown by the recent financial crisis (Dicembrino and Scandizzo, 2011). Risk managers are thus more aware of the fact that diversification is only a partial shield for credit risk and that the systematic component linked to the specificity of one asset cannot be eliminated without creating a more insidious source of risk. As a consequence, risk premia have become relatively larger and many projects may find financing lacking, especially in the relatively unknown areas of climate change and green innovation.

Specialized securities such as green bonds are financial innovations that may help reduce the widening gap between potential investors and worthy green projects. As an instrument of management of project specific risks, they can be combined with due diligence practices that attenuate information asymmetry in a market segment, and thus tend to re-align principal agents incentives. As we have already remarked, green bonds are goal oriented financial products, and can be considered trust goods in that their value depends on the trust that investors grant to the borrowing party as to the use of the proceeds to finance sound and effective green projects. In addition to the additional flow of information that building such a trust will generate, green bonds may thus develop a form of relationship lending, based on the commonality of interests and goals of investors and borrowers. Relationship lending is indeed a classic instrument to overcome the moral hazard threat of traditional bank loans, but it usually has negative side effects, such as the capturing of the borrower, who becomes dependent on the bank and forced to forego any alternative market option for future financing. A relationship in the bond market based on trust, on the other hand, while may reach the same reduction of moral hazard risks, reposes entirely on the sharing of common interests and the interest of the borrower to keep an immaculate reputation as a basis for sustainable finance.

The Financial side of environmental uncertainty

Issuing sovereign green bonds implies a careful quantification of their contribution to the financial structure of the issuing country and the financial gap developing under the environmental pressures to increase energy efficiency, reduce carbon emissions and provide other environmental benefits under increasing capital scarcity. This scarcity is the consequence of specific country financial conditions as well as of the fact that many countries (tendentally “most” or “all” countries) need further access to capital supplies to invest in their own green growth and to contribute to climate change mitigation international policies. In this respect, taking into account the fact that climate change is the consequence of a global externality, the International Energy Agency (IEA), estimates that halving global emissions by 2050, using existing or emerging technologies, would require an investment of USD \$46 Trillion. HSBC parallel estimates suggest that USD \$10 Trillion is required by 2020. Assuming a low debt equity ratio, about USD \$6 Trillion could be expected to come from the debt market (including both bank loans and bonds) and the rest directly from unlevered private and public funds. On the supply side, large amounts of loanable funds (estimated globally at 38 trillion

USD) are available from institutional investors, i.e. primarily insurance companies, pension funds and investment funds. These institutional actors manage these resources in a variety of ways, but the share of long term investments appear to be limited and with great potential for expansion. Because of their nature of institutional investors with a broad mandate to favour positive economic and social development, avoid speculation and exercise social and environmental responsibility, the managers of these funds are potentially sensitive to project impacts beyond and even in partial substitution for short term profits.

Sovereign issuances are important also in fostering financial innovation and so in general a more active government role in green bond regulation, insurance, tax treatment and cofinancing. In order to tap the deep pools of capital of institutional investors, green bonds at present have to achieve investment grade (at least BBB rating and competitive rates of return). However, both credit rating and rates of return largely depend on the characteristics of the financial products and the price of risk in the financial markets. Many green projects may thus fail to be financed because they are considered too risky, insufficiently remunerative or both, this being the consequence of imperfections in the capital markets, that are dominated by information asymmetries and agency costs. Part of the financial gap is thus caused by the failure to tackle with these imperfections and to match the demand for funds emanating from projects that are priced out of the market, because they are too innovative to be considered safe and because they do not appear sufficiently remunerative for the private investors, despite their positive economic impact for the collectivity. In many cases, green projects lack an articulated financial structure that allows them to be competitive in attracting financial resources: they may be too small, too specialized, dependent on very specific and risky sources of income, or, due to their public or quasi public nature, not capable to generate appropriable cash flows that may permit risk sharing through concessions or similar private public partnerships. The role of the government in improving this situation is thus expandable on a number of fronts and may prove to be decisive. In addition to the issuance of sovereign green bonds, that can be sold to the public to complement the usual debentures to finance the budget, the government can reduce the market price of risk by judicious management of a number of financial instruments. For example, Sustainable Prosperity ¹⁶(2012) lists the following possible financial interventions:

- 1. Credit Enhancement/Guarantees/De-Risking:** The government could use its own assets to provide a guarantee for some portion of the underlying liabilities to enhance the credit rating of the bond. This helps to reduce the bond's risk level ("de-risk"). (E.g. US Department of Energy Loan Guarantee program). Public entities can insure Power Purchase Agreements (PPAs) on renewable energy generation projects

¹⁶ Sustainable Prosperity is a national research and policy network, based at the University of Ottawa. SP describes itself as focusing on market-based approaches to build a stronger, greener, more competitive economy and in bringing together business, policy and academic leaders to help innovative ideas inform policy development.

as well as provide credit enhancement wraps for Collateralized Debt Obligations (CDOs) of project loans to address political and other market risks and first-loss (default) risk.

2. Backstopping: The government could purchase sub-tranches of subordinated debt from early bond issuances to improve the risk profile of bonds by temporarily taking some first-loss layers from early issuances which would serve to lower their price and help the market gain familiarity. The government could also insure the credit or debt of the bond issuer. (E.g. European Investment Bank offers credit enhancement product targeted for clean energy). Governments can, as demonstrated in the case of the state of Pennsylvania, purchase and securitize energy efficiency loans to recycle capital for further lending.

3. Tax Preferencing: Using internationally standard qualifying criteria, governments could make the income from green bonds either tax-free or taxed at a lower rate than typical investments. For example, the United States provides tax credits for clean energy bonds.

4. Bond Issuance/Marketing: Governments at all levels could issue retail green bonds, similar to Canada Savings Bonds, but to fund renewable energy or other projects. According to a poll conducted by Nanos, 81.8% of Canadians support the green bonds idea, and 62.2% stated that they would purchase them if they had an interest rate similar to that of Canada Savings Bonds.

In addition to these financial interventions, the reduction of financial risk from issuing green bonds may come from the capacity on the part of the government and government sponsored institutions at engineering financial packages to fund projects. In these packages, the presence of sovereign bond financing would be symbolic of the government commitment to support investment, guarantee a proper use of the funding to improve the environment, and avoid default. Furthermore, because green investors are motivated by the expected impact of the investment on the environment, and not only by the expected return – risk combination, they will be more likely to favour a strategy of long term holding for green bonds, thus reducing the pressure on the secondary markets, with beneficial consequences also on the perceived risk of sovereign debt.

The Importance of the Secondary Market

In spite of their exceptional growth in the recent past, green bonds (GB) still look as a tiny niche in the gigantic international bond market, for several related reasons. First, many potential issuers do not see a concrete benefits in the GB prospects, since price advantages so far have been slight, despite the undersupply conditions demonstrated by the large rates of oversubscription for most large issues. Second, it is not clear what is properly required from GB issuers in terms of commitment, monitoring and assurances to ensure target effectiveness of financing, project implementation and impact evaluation. Third, issuances so far have been large and limited to highly credit rated concerns, with very limited diffusion to medium size and lower

credit rated institutions and companies. Fourth, although slowly expanding their holdings of GBs, institutional investors have been committing only small portions of their portfolios (around 2%) to these types of financial instruments. Finally, a secondary market for GBs has been materializing only slowly, both for the still small amount of holdings and for the “buy and hold” intrinsic attitude of investors who see GBs as ethical, non speculative, long term investment products.

Activity on the secondary market is essential to fuel further GB expansion and improve their prospects as instruments of financing beyond narrowly defined project or program areas of investment. In general, the market of thematic bonds is not a well defined section of the secondary market because of the heterogeneity and the lower liquidity of the products. While the heterogeneity is due to the still tentative nature of much of the instruments of impact or “ethical” finance, the lack of liquidity is due on one hand on the already noted “buy and hold” attitude of the buyers and, on the other hand, on their yet untested market performance.

Expansion of a secondary market is also essential to reduce the financing gap for the achievement of a low carbon economy. Estimates of the International Energy Agency (IEA), HSBC and other international financial sources put investment requirements for green energy infrastructure for the pursuit of significant reductions in global emissions in the 10-15 trillion \$ area by 2020 and in the neighborhood of 50 trillion by 2050 . Similar large requirements exist in water and other low carbon infrastructure with fixed debt accounting for more than 60% of the financing needs. In this context bond financing can achieve a desirable target only if it can make a successful bid for the institutional investment sector (pension, mutual and insurance funds) which has presently global assets under management in excess of 80 Trillion\$.

However, something classified as a green bond portfolio, with 100% of capital invested in the asset, may have directly contributed 0% cash to green projects or re-financing, if the green bonds in the portfolio are bought on the secondary market. But buying of green bonds in the secondary market could have an indirect impact on green financing in the real economy, if the seller of the green bond re-invests the money from the trade into green bonds from the primary market. In this sense, bond investment in the secondary markets can be seen as "refinancing one-step removed". That's good.

For investors aiming to maximise their direct impact on green financing then, they should aim to maximise their investment in green bonds in the primary markets, To do that, they must roll over their green bond portfolio at a faster rate. As an example, there is a tenfold difference between the direct environmental impact of a portfolio which rolls (reinvests in primary market) its holdings twice a year versus one that rolls them every five years. End investors should be aware of this feature in their investment, if they want to have a more tangible impact on the real economy. If this is the case, green bonds should be more, not less, liquid than traditional bonds due to higher turnover than traditional bond funds. However, this process of rolling

over the portfolio does require that there are investors willing to buy the bonds in secondary markets, i.e. that they are satisfied with having indirect impacts on green investment in the real economy.

See more at: <http://www.climatebonds.net/2015/01/ruminations-harnessing-power-bond-market-green-mainstreaming-vs-niche-funds-benefits#sthash.ctJxY5x.dpuf>

Establishing the Policy – Program/Project Link : Capital budgeting and Government Accounts

Let's look in more detail to the question of targeting in the case of government issuance of green bonds. Linking any form of targeted financing to government accounts (GAs) encounters two sorts of difficulties: on one hand, GAs lack time perspective, since budgets are generally for one year, with only limited perspective on a three year horizon. On the other hand, accounts are mostly designed for liquidity management and do not address either the question of income nor the question of wealth accounting in any significant manner. As tools of management, government accounts have been mostly used to expand parliamentary control over the budget by trying to incorporate a crucial phase of financial and economic management within the legislative process. This has been used both to control spending of the executive branch and to transfer a significant part of the economic power of the state into the political process, mainly through its "pork and barrel" mode.

Technically speaking, in most advanced countries, the public budget is still a so called "authorization" budget, formulated on a cash basis, almost entirely devoted to a registration of outlays by expenditure class (typically called budget chapter). This type of budget is only vaguely related to investment design and scope since it is completely non recognizant of the inter-temporal nature of capital expenditure, which is assimilated to current expenditure by either instantaneous amortization or by conversion into debt. Wealth and capital accounting are often limited to financial assets and liabilities and are a consequence of current accounting of issuance of paper on the part of the government in form of bonds or money. No comprehensive balance sheet is maintained on accrual basis and the consequence of instant amortization of capital expenditure is the fact that the government does not know, in practice, what it owns in terms of real assets and productive capital, nor what obligations arise from their maintenance and the servicing.

While in most countries, in order to be financed, investment projects are required to pass a cost benefit test, the process of authorizing the budget and managing the ensuing expenditure flows is thus, in practice, completely independent from the estimate and the evaluation of the project cash flows, and, more generally of project impact. This independence extends on several dimensions and generates a number of conflicts. For example, in rolling over the authorizations from one year to the other, the budget financial figures are typically inconsistent with the cash flows approved for the projects financed. Also, in spite of the theoretical multiyear nature of the authorizations for capital expenditure, government liquidity

management in practice interferes with the planned flow of funds and impresses its own rhythm to project implementation. Finally, in many cases, authorizations without projects are matched by projects without authorizations generating a standstill or, even worse, the artificial creation of non economic projects out of perceived availability of resources and political will.

In spite of the historical experience with bonds used to finance various types of infrastructure, therefore, the present system of government accounts appears ill suited to be used to report and monitor on the impact of a project or a program funded through some form of targeted financing. Its design and current practices can be faulted in several respects, both as a basis for truthful disclosure and for more substantial economic and financial management. As an accounting tool, the present GA system fails to represent in any meaningful way the fair value of the underlying financial and economic magnitudes. By relying on a cash flow accounts of government outlays, it emphasizes the less significant element of government planning and performance, thereby neglecting much more important dimensions of government expenditures and revenues. By minimizing accounting differences between current and capital expenditure, it encourages the expansion of the first at the expenses of the second, neglects the need to service government assets and ultimately causes an almost total lack of knowledge and understanding of the management of the public patrimony.

As a management tool, on the other hand, the present GA system is especially unfit to provide information to a due diligence process on the effectiveness of the targeting, since it centralizes in a particularly rigid way economic and financial management in selected bureaucracies (typically, the Ministry of Treasury or Finance). In these bureaucracies, targeting has low priority, as the mission of managing the budget tends to be perceived as one of expenditure containment and control, rather than one of enhancing the performance of programs and projects. True enough, decentralization of management has been widely experimented in the recent and not so recent past through the creation of specialized government agencies, government owned corporations and, ultimately, special partnerships with the private sector through various forms of project financing. Yet, in most, if not all countries, all these experiments have failed to introduce a universally recognized system of best practices capable to link the government budget process to project accounting and evaluation, both to “tie the knots” of the project cycle and produce meaningful feedbacks, and to provide a reliable account to assess performance both on ex ante and ex post basis.

While ring fencing and other financial controls may be useful to provide an accounting link between the broad strategy pursued by the government and the specific project, only capital budgeting can offer systematic disclosure and reporting on the effectiveness of this link. Establishing an effective form of capital budgeting for public investment, however, encounters many obstacles especially because of the concern for fiscal profligacy and the possibility to classify as investment other forms of current expenditure. Budgeting is necessary in the case of targeted investment since traditional public accounts serve the logic of

macroeconomic monitoring, while targeted financing demands that they be connected with project management and implementation. The lack of autonomy of the individual management units within the government structure complicates this problem, as the effectiveness of the project cycle is hindered by the failure to coordinate authority and executive decisions. Because at the project level funding is de facto targeted, while it is not at program level, public managers, in practice, are forced to use a double system of accounts. They use a formal set of accounts, that ensures that the budget chapters to which their expenditures are assigned are coherent with the allocations provided by the financial bill. They often also develop a second set of accounts, of more substantial, if “shadowy” nature, that can be utilized to monitor project expenditure on the basis of principles of effectiveness and economic efficiency. This second set of accounts tends to mirror the accounts of a private enterprise, it is based on itemized costs grouped by functional categories, and contains balance sheets, income statements and cash flow accounting, which are totally unavailable within the context of the traditional budget system. In addition to ensure flexibility and effectiveness to monitor resource allocation during project implementation, this accessory system of accounts gives some practical autonomy to management from legislators and bureaucratic hierarchies. Unless it is connected to macro-monitoring level by a well recognized and formal process, however, it is no guarantee that the targeting will be effective, since the macro-micro connection is ultimately vulnerable to the vagaries of the often intricate and unpredictable outcomes of the budgetary process, its delays, formalities and multiple controls.

Modern practices to monitor program targeting and management fall under the general heading of Project Management Evaluation (PME). While their evolution has proceeded from several sources of theoretical approaches and best practices, they appear to converge to the input-output representation of economic activities, extended to take into account of various stakeholders in the form of a Social Accounting Matrix (SAM). They are based on the idea of constructing an information system on the basis of analytical input accounts, including, in particular, labor of various skill categories and functions, capital, financial resources of various kind, and intermediate inputs. At aggregate level, the information may be derived from national accounts and government budgets, while at micro-level, relevant data can be obtained from specific surveys and record maintaining practices. For example, time sheets can be used to record labor deployments in different functions and for different tasks, while some other types of records such as bills of loading and registration cards can be used for intermediate inputs. Financial sources can also be recorded on the basis of the characteristics of the investors, and the nature and duration of the securities (debentures or equity). In project management, building up a similar information system corresponds also to the idea that managers and supervisors should be empowered by a reading of the project “performance accounts” in real time, thus acquiring the possibility of effective implementation, correcting maneuvers and other interventions to improve project performance.

Table 4 shows how the PME idea can be applied in principle to a Green Bond program. The first row of the table lists the actions to be taken in the first phase of structuring the GBs and the projects that they support. In this phase, rather than by technical means, the projects and the funds that are earmarked for their financing are given a structure in terms of goals, relevant stakeholders, the social and economic change they are expected to promote, and a clear set of criteria for reporting, monitoring and recording success or failure. The structure of financing is also determined in this stage with reference to different types of investors and corresponding stakeholders.

Table 4. Key Components of a PME based Methodology to Assess and Evaluate Green Bonds Issuance

	<i>Setting strategic goals</i>	<i>Specifying expected results, strategic alignment</i>	<i>Determining the source of funds and the need for target financing</i>	<i>Ongoing monitoring and assessment</i>	<i>Improved accountability</i>
Structuring	Meta-evaluation of viable interventions and goals (e.g. mitigation and adaptation)	Developing theory of change with reference to the economy, the environment and the relevant stakeholders	Designing the financing instruments (government funds, green equity, green bonds)	Ensuring appropriate M&E systems in place, including side effects	Ensuring clearly articulated criteria and standards for success at all levels of program /project organization
Observing	Identifying relevant measures for impact	Identifying relevant measures for inputs, output, outcome	Identify relevant disclosure and reporting data for stakeholders	Assuring quality data collected	Assuring quality data collected
Analyzing	Ensuring objectives can be evaluated	Ensuring objectives can be evaluated	Performing assurance procedures for target effectiveness	Identifying weak links in implementation of ToC or errors in theory	Inducing balanced analysis of performance
Judging	Setting clearly articulated standards for success	Setting clearly articulated standards for success	Setting clear measures of segregation and additionality for targeted financing	Reporting results in accessible format. Accompanying performance data with contextual evidence	Ensuring balanced analysis and use of performance data
Utilizing	Ensuring timely feedback of data to strategic and budget cycle	Ensuring timely feedback of data to tactical decision making	Ensuring timely disclosure and reporting of data on ring fenced accounts and targeted disbursement	Distributing results in appropriate breakdowns. Contingency planning to test the attribution question	Ensuring balanced analysis and use of performance data. Detect illegitimate or unintended consequences of measurement

Source : Adapted from Scandizzo and Napodano (2011)

Investment Impact Assessment

A survey of the practices followed by most countries (Scandizzo and Napodano, 2011) shows that the most common forms of appraisal and impact analysis for infrastructure are based on cost-benefit and multi criteria analysis. However, the impacts included in the analysis and the way they are treated differ between countries. In the case of EU countries, for example, as Table 5 shows, appraisals include widely varying impacts across the countries studied, and the degree of inclusion, the precision of measurement and the overall coverage also vary widely from country to country.

Table 5. Impacts included (partly or all) in infrastructure appraisal in different EU countries

Direct impacts	Environmental impacts	Socio-economic impacts
<ul style="list-style-type: none"> Capital • Construction costs • Disruption costs • Land and property costs Recurring costs • Maintenance costs • Operating costs • Vehicle operating costs • Revenues • Passenger cost savings • Time savings • Safety • Service Level • Information • Enforcement • Financing/Taxation 	<ul style="list-style-type: none"> • Noise • Vibration • Air-pollution – local • Air-pollution – global • Severance • Visual Intrusion • Loss of important sites • Resource Consumption • Landscape • Ground/water pollution 	<ul style="list-style-type: none"> • Land use • Economic Development • Employment • Economic & Social Cohesion • International Traffic • Interoperability • Regional Policy • Conformity to Sector Plans • Peripherality/Distribution

Source: Bristow et al, 2000

While economic impacts are generally quantified with cost benefit techniques, environmental impacts are more difficult to value, and the range and scope for their assessment varies considerably across countries. Noise and local air pollution are generally included, but monetary valuation is seen as more problematic and is often considered impractical. Assessment of socio-economic or indirect impacts also vary considerably from country to country, and even from institution to institution within the same country. Best practices in this respect include social accounting matrices and input output methods and, at times, computable general equilibrium models.

An additional dimension of evaluation is given by the combination of consensus building and environmental impact assessment (EIA). Because of its public nature and its important relationship with every day activity, decision making about infrastructure and environment impacting projects increasingly enters the deliberative aspect of democracy. This implies an increasing attention to integrate the evaluation part into the whole decision process that surrounds investment. The interaction with the general public and the local residents during the whole process of infrastructure investments is thus becoming part of a strategic planning process which is of growing importance in the modern economies.

Strategic environmental assessment (SEA) is yet another method to incorporate the environmental aspects of management evaluation in a process of planning for sustainable development. SEA's practices extends

EIA's from projects to policies, programs and plans (Figure 1). Because of its concern with different levels of environmental governance and evaluation, SEA uses a continuum of approaches, rather than a single approach, stretching from integrating biophysical environmental considerations into higher level of decision making to downstream capability assessment and risk management (Ahmed and Sanchez Triana, 2008).

SEA may include a large variety of specific methodologies to assess the environmental impact and, as in the case of EIA, can also be an instrument of empowerment and rent seeking for regulatory agencies, their stakeholders and political constituencies (Sanchez Triana and Scandizzo, 2015). Regulatory norms and prescriptions that have tried to circumscribe EIA's and SEA's ranges of concern and action, however, appear to have been only partly successful. For example, an EU directive (ec.europa.eu/environment/eia/sea-legalcontext.htm) states that: "...The SEA procedure can be summarized as follows: an environmental report is prepared in which the likely significant effects on the environment and the reasonable alternatives of the proposed plan or program are identified. The public and the environmental authorities are informed and consulted on the draft plan or program and the environmental report prepared. As regards plans and program which are likely to have significant effects on the environment in another Member State, the Member State in whose territory the plan or program is being prepared must consult the other Member State(s)".

BOX: Summary of SEA Directive requirements

Preparing an environmental report in which the likely significant effects on the environment of implementing the plan, and reasonable alternatives taking into account the objectives and geographical scope of the plan, are identified, described and evaluated. The information to be given is (Article 5 and Annex I):

- a) An outline of the contents, main objectives of the plan, and relationship with other relevant plans and programmes;
- b) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan;
- c) The environmental characteristics of areas likely to be significantly affected;
- d) Any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;
- e) The environmental protection objectives, established at international, Community or national level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation;
- f) The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors. (These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects);
- g) The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan;
- h) An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;
- i) a description of measures envisaged concerning monitoring in accordance with Article 10;
- j) a non-technical summary of the information provided under the above headings

The report must include the information that may reasonably be required taking into account current knowledge and methods of assessment, the contents and level of detail in the plan, its stage in the decision-making process and the extent to which certain matters are more appropriately assessed at different levels in that process to avoid duplication of the assessment (Article 5.2)

Consulting:

- authorities with environmental responsibilities, when deciding on the scope and level of detail of the information which must be included in the environmental report (Article 5.4)
- authorities with environmental responsibilities and the public, to give them an early and effective opportunity within appropriate time frames to express their opinion on the draft plan and the accompanying environmental report before the adoption of the plan (Article 6.1, 6.2)
- other EU Member States, where the implementation of the plan is likely to have significant effects on the environment in these countries (Article 7).

Taking the environmental report and the results of the consultations into account in decision-making (Article 8)

Providing information on the decision:

When the plan is adopted, the public and any countries consulted under Article 7 must be informed and the following made available to those so informed:

- the plan as adopted
- a statement summarising how environmental considerations have been integrated into the plan and how the environmental report of Article 5, the opinions expressed pursuant to Article 6 and the results of consultations entered into pursuant to Article 7 have been taken into account in accordance

with Article 8, and the reasons for choosing the plan as adopted, in the light of the other reasonable alternatives dealt with; and

- the measures decided concerning monitoring (Article 9)

Monitoring the significant environmental effects of the plan's implementation (Article 10)

While opinions on its implementations differ, SEA may be a good, albeit insufficient, input for a proactive green assessment for two different reasons. First, as a defensive measure to reduce environmental impact, SEA is necessarily and broadly oriented towards actions such as prevention, remediation and repair. It thus inevitably tends to be reactive (even in the preventive case) rather than proactive, and to act as a restraint to investment policies rather than as a stimulus. Second, because of these restraining characteristics, SEA's effectiveness ranges from paying lip service to environmental protection to modifying or suppressing potentially damaging projects or programs or their components. While its "scoping" could be extended, SEA also does not appear to be designed to appraise, evaluate or valorize environmentally beneficial "green" projects or components, such as, for example, mitigation or adaptation to climate change.

Figure 1. The Relationship between SEA and EIA

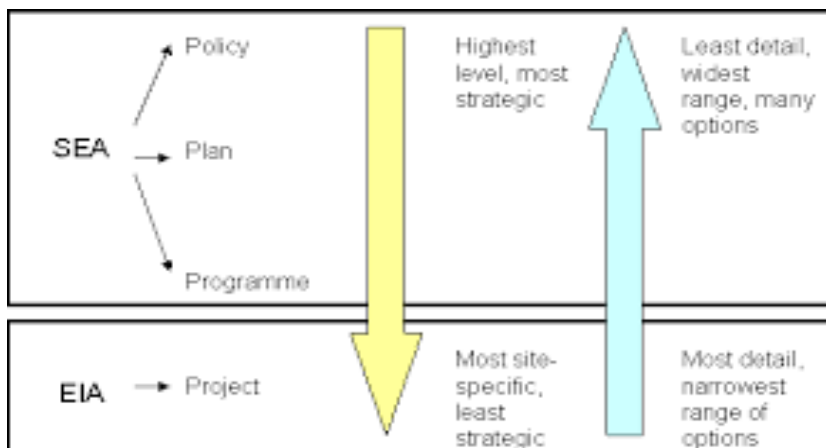
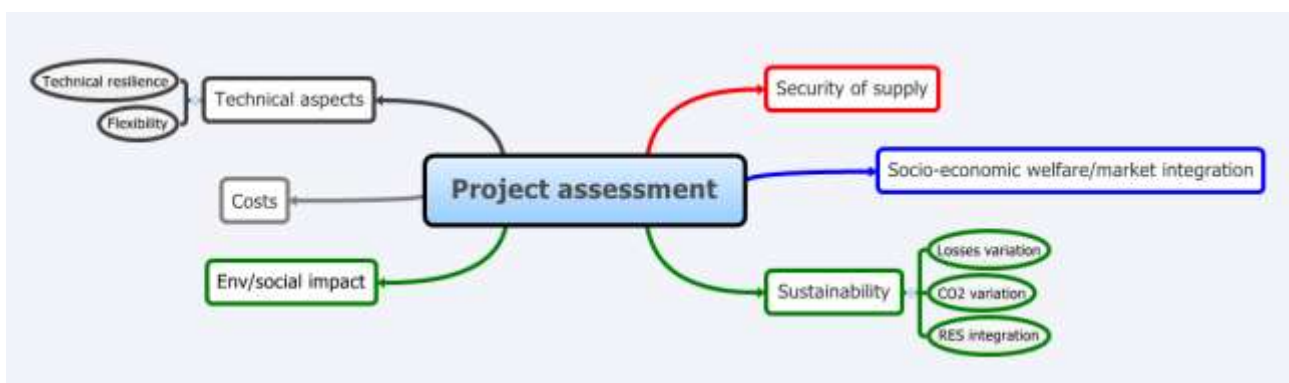


Figure 2. Main categories of the project assessment methodology



A Green Investment Policy Framework

In a recent OECD working paper (2012) Corfee Morlot et al. propose an approach towards a green investment policy framework consisting of five elements, which can also be considered the basis for the evaluation of the significance and coherence of government commitment to the establishment of a low carbon , resilient green economy. These elements are:

(1) Goal setting and aligning policies across and within levels of government. This is the component most difficult to assess. Criteria such as clarity of long term vision and specificity of targets for climate change and green investment are suggestive, but do not necessarily determine effectiveness and economic efficiency. The overall consistency of different goals , their potential contradictions and the coherence between instruments and targets are cogent objective criteria. Other characteristics of the policies undertaken are also important. They include the consensus of the general population and selected influence groups, possible conflicts of interest and trade offs among major goals (e.g. income distribution and emission reduction), stakeholder engagement and unintended effects.

(2) Establishing specific financial policies, regulations, tools and instruments that provide transitional support for new green technologies; including financial reforms to support long-term investment and insurance markets; innovative financial mechanisms to reduce risk or increase market liquidity; transitional direct support for LCR investment.

(3) Reforming policies to enable investment and strengthen market incentives for low carbon infrastructure. Measures under (2) and (3) are the key economic components of green policies, but also the most difficult to evaluate. The basic argument in favor of “green” interventions, in fact, is based on the existence of multiple externalities , linked in various ways with environmental problems, and first of all on the severe underpricing of carbon. Other “market failures”, however, may be important as well, including the mispricing of risk, asymmetric information and adverse selection in the capital markets. The policy measures comprised in this category, therefore, may include the creation or the improvement of markets for carbon through various means, including negotiable permits and cap and trade systems the introduction of a carbon tax and other synergic measures, such as the elimination or reduction of fuel subsidies. According to Rodrik (2013), “embedness” and a process of discovery should be the modus operandi of green policies, since no clear order of principal and agents nor of targets and instruments exist in such a delicate matter. The optimum equilibrium between the actors from the private and the public sector thus lies in a suitable compromise between “arms length” and “capture”.

(4) Harnessing resources and building capacity.

If a process of discovery, rather than a list of specific policy instruments is the right way to proceed both for the government and the private sector, harnessing resources and building capacity should focus on learning by doing. This involves a set of policy rules that allow and encourage cooperation, and set the stage to

experiment and evaluate alternative instruments such as tax breaks, R&D subsidies, credit incentives, loan guarantees, and so on. However, the more important question is whether the policies provide adequate attention to the human and institutional capacity building needed to implement the specific green policy measures, support LCR innovation; monitoring and enforcement; and climate risk and vulnerability assessment.

(5) **Promoting green business and consumer behavior.** This includes information policies; corporate reporting and consumer awareness programs; and public outreach.

A New Methodology for Green Assessment and Green Labeling

Present methodologies to provide systematic information and assessment methods for due diligence of Green Labeling are loosely based on the attempt to evaluate five aspects of the Green Bond considered: (i) the credibility of the environmental concern and activities of its issuer, (ii) the commitment of the issuer to the use of the funds obtained and to the purpose of the loan, (iii) the issuer's capability to implement the program or project proposed, (iv) the project's capacity to deliver the output and the outcome promised, and (v) the likely impact of the project on the economy and the environment. Of these, evaluating aspect (i) has the objective of testing the issuer's trustworthiness and corresponds to the idea that the aim of this type of loan is to finance a trust good (Weisbrod, 1988), and as such its first assurance is provided by the nature and the record of the enterprise providing it. Evaluating aspect (ii) is similarly linked to the "trust" idea, but also aims to assess the degree to which the issuer is committed to the intended path of action in terms of dynamic credibility (Buhlman and Gisler, 2005). Assessing this aspect may thus include contractual clauses such as, for example the establishment of ring fencing and other internal accounting and disbursing procedures that might reinforce the claim that proceedings will be used only for the project or program financed. It may also include monitoring and control on the part of the lenders or subscribers and/or reporting or disclosure on the part of the borrower. Evaluation of aspects (iii) and (iv) aims to assess the probability that the financing will achieve the intended goal. It thus relates in both cases to the past record of the issuer, and the appraisal of its present capacities, including the state and quality of project preparation exhibited for the object of the loan. Finally, evaluation of aspect (v) aims to assess the project outcomes and concerns the characteristics of the project, including its design, its intended and likely effects and the context where it is supposed to display its impact. Of course, creditworthiness of the borrower and the project capacity to deliver payments that permit the repayment of the loan are also important features to consider in a more general evaluation, but this analysis focuses on the evaluation of the green characteristics and assume that the more general issue of investment grading is separately assessed through the ordinary credit rating procedures.

In many circumstances, however, it may not be possible to analyze in detail the characteristics of plans and programs, because they may consist of general policies designed to facilitate and expand investment in green projects by both the public and the private sector and because no previous experience in similar types of ventures may exist. Therefore, outcome evaluation will have to be postponed to a later stage of the project cycle and process evaluation would have to be developed as a first step to analyze and describe how the policy has been planned to reach the desired goals. While process evaluation may be qualitative and informal, it is essential that it be based on a theory of change, that is, on a model (formal or informal) linking in a cause-effect relationship goals and policy instruments (Griggs et al, 2008). The theory may be captured by a verbal description, or by a model capable to simulate the policy linkages and the pathways that are hypothesized/estimated to be at the base of the cause effect relationship that have guided the design of the policies in question.

VIGEO Ratings

Vigeo rating system is based on universally opposable social responsibility criteria. Vigeo selected criteria approved by the international community including: the Millennium Development Goals¹¹, Agenda 21¹², the International Labour Organization (ILO) conventions, the United Nations Charters and Treaties, and the OECD Guiding Principles.

For transparency reasons, Vigeo gathers only official data from international institutions and non-governmental organizations: the World Bank, the United Nations Development Program, the United Nations Environment Program, the United Nations Office on Drugs and Crime, the United Nations Children's Emergency Fund, the Food and Agriculture Organization, the United Nations Conference on Trade and Development, the United Nations Department for Disarmament Affairs, the International Labour Institute, the Organization for Economic Co-operation and Development, the Office of the High Commissioner for Human Rights, Coface, Amnesty International, Transparency International, Freedom House and Reporters Without Borders. Three separate ratings are available as well as a composite index. The specific indexes are the Environmental Responsibility Rating (ERR), Social Responsibility and Solidarity Rating (SRSR), and the Institutional Responsibility Rating (IRR). They correspond to the three classical SRI dimensions (see Table 5 of the Appendix for a comprehensive list). For each rating, Vigeo has selected several criteria representing either commitments or quantitative realizations. For each criterion, the countries are rated on a scale ranging from 0 to 100 (the best grade).

For the commitment criteria, i.e. the signature and ratification of treaties and conventions, the grade is: 0 if the country did not sign, 50 if the country signed but did not ratify, and 100 if the country signed and ratified. For the quantitative criteria, a score is computed following the decile method: the 10 percent of worst-performing countries obtain a score of 10, and so on. Vigeo ranks not only levels but also trends computed

as variation rates between the first and the last available values. More precisely, if a country's trend lies in the top 20 percent, then it benefits from a premium of ten points for the criterion at stake; if the country exhibits a negative trend, it gets a ten-point penalty. The three specific ratings (ERR, SRSR, IRR) are weighted averages of scores. The SCR global index is an equally-weighted average of these three ratings. The advantage of using these Vigeo ratings comes from the wide spectrum of criteria taken into account. The main drawback is that, contrary to credit ratings, no historical data are available, which makes it impossible to run a dynamic analysis.

A Multi-criteria Analysis

Multi-criteria analysis (MCA) is the methodology of choice when the evaluation is driven by several objectives that cannot be monetized and reduced to a single indicator, as in the ordinary cost – benefit analysis (CBA). The main idea behind MCA, however, is the same of CBA analysis, that is: (i) a rigorous process of identification and quantification of the effects and the characteristics of a project along the several dimensions defined by its different objectives and, (ii) the aggregation of the measures derived in a single indicator of project worthiness¹⁷.

The following are the steps suggested for this methodology:

Establish the decision context

In general, MCA is used to choose among different options, and is thus a way to compare these option along several dimensions and then take an informed decision based on their scoring. In our case, instead, the objective is to assess the Green Bond along the several dimensions of its objectives, scope, and anticipated outcomes, without necessarily considering competing alternatives. While an implicit or even explicit comparison with other green bonds or other financial operations may be indeed called for, the immediate objective of the analysis is to prove to the perspective investors that the bond is “green” and that its main outputs and outcomes are going to be delivered with an acceptable degree of likelihood. Rather than a comparison with other specific alternatives, therefore, the MCA evaluation of a Green Bond aims at comparing it with an acceptable standard. This standard will be considered the only other option and the benchmark of comparison.

1. Identify objectives and criteria

1.1. Identify criteria for assessing the consequences for each characteristic/dimension of possible performance.

¹⁷ A general reference for a detailed treatment of MCA is : *Multicriterion Analysis*, Department for Communities and Local Government, London, 2009.

1.1.1. Credibility of the environmental concern and activities of the issuer.

Criteria: Issuer's record of activities , practices and achievements. Sustainability reporting and assurance. Rating on Environmental policies and social practices. EIA and SEA reports and records. Green Assessment. Third party rating for transparency and accountability.

1.1.2. Commitment of the issuer to the use of the funds obtained and to the purpose of the loan.

Ring Fencing establishment and likely effectiveness. Use and control of funds. Public Investment Management practices. Public accounting practices (Green accounting?).

1.1.3. Issuer's capability to implement the program or project proposed.

Planning and implementation practices. Record of achievements and failures. Third party assessment and rating (e.g. Transparency International) for institutional capacity

1.1.4. Project capacity to deliver the output and the outcome promised.

Public investment planning capacity. Existing studies , master plans, feasibility studies etc.

1.1.5. Likely impact of the project on the economy and the environment

Expected effects of the project. Impact evaluation through Social Accounting Matrix (see next section).

1.2. Organize the criteria by clustering them under high-level and lower-level objectives in a hierarchy.

2. 'Scoring'. Assess the expected performance for each dimension against the standard and the criteria. Then assess the value associated with the consequences for each dimension and each related criterion.

2.1. Describe the consequences of a different performance (weaker or stronger) for each dimension.

2.2. Score the dimensions on the criteria.

2.3. Check the consistency of the scores on each criterion.

3. 'Weighting'. Assign weights for each of the criterion to reflect their relative importance to the decision.

4. Combine the weights and scores for each option to derive an overall value.

4.1. Calculate overall weighted scores at each level in the hierarchy.

4.2. Calculate overall weighted scores.

5. Examine the results. Are the individual scores and the overall weighted scores at the acceptable standard?

5.1. If not , which are the dimensions along which the project fails to reach the standard?

5.2. Which actions may the issuer undertake to improve its scores?

6. Sensitivity Analysis

- 6.1. Conduct a sensitivity analysis: do other preferences or weights affect the overall rating and position against the standard?
- 6.2. Assuming that the issuer takes actions to modify its scores, how likely is that its position with respect to the standard will significantly improve?
- 6.3. How much would the scores have to change to allow the issuer to level with the standard?

Impact Analysis: The SAM as a Tool for Green Assessment and Risk Management

One of the key criteria for assessing the likely performance of the project or program financed is its expected socioeconomic and environmental impact, on the basis of process evaluation. Even though a variety of indicators and scores are suggested for the various dimensions of the multi-criteria analysis, estimating the project impact on the basis of a credible theory of change is the single most important criterion of assessment of a green project. For this purpose, we propose to use an extended Social Accounting Matrix, estimated with a comprehensive new statistical methodology (Scandizzo and Ferrarese, 2015) and already applied in several World Bank studies in Mexico, Brazil, Peru, and Tanzania. Tables 6 and 7 show the structure of the accounts at the base of this economic model, constructed according to the UN methodology (the so called SEEA03 for the SAMEA or System Environmental and Economic Accounting), and accounting for both the physical flows linked to the environmental sphere, the monetary flows associated with production activity and consumption and their connections. From an economic point of view, the SAMEA contains a Social Accounting Matrix (SAM), where the flows are expressed in monetary units, associated to the economic flow, that means, these are related to production activity and consumption, as well as those that refer to a subsequent distribution and redistribution of these flows. From an environment point of view, the SAMEA rows account for the flows of natural resources that the productive system uses as inputs (for example, water resources) or the reabsorbed residuals that are picked up and processed. The SAMEA columns account instead for the emissions, i.e. how recycled water is picked up by nature once it has been used by the production process, household consumption and the emission of greenhouse effect gasses.

Table 6. Structure of a Social, Environmental and Economic Accounting Matrix (SAMEA)

SAMEA	National Economy	Rest of the world economy	National Environment	Rest of the world environment
National Economy	SAM: production, income, consumption and capital formation	Net exports	Residuals by residents	Residuals by residents to rest of the world
National environment	Natural resources inputs	Natural resources exports	Residuals by non residents	

Rest of the world environment	Natural resources from rest of the world			
National residuals	Residuals reabsorbed			
Rest of the world residuals	Residuals reabsorbed		Cross-boundary residual inflows	Cross-boundary residual outflows

Table 7. Exogenous and Endogenous Accounts in SAMEA

SAMEA		SAM			EA
		Endogenous accounts(m)	Exogenous accounts (k)	Totals	Environmental endogenous accounts (v)
SAM	Endogenous accounts(m)	Y_{mm}	X_{mk}	Y_m	E_{mv}
	Exogenous accounts (k)	X_{km}	X_{kk}	X_k	-
	Totals	Y_m	X_k	-	E_v
EA	Environmental endogenous accounts	R_{rm}	-	R_r	-

The matrix detailed in Tables 5 and 6 can serve as a basis for an assessment of the green policies followed by the country and, at the same time, to estimate the impact of the program or project put forward for green financing. More specifically, in a first instance, the matrix in Tables 5 and 6 can be used to develop a theory of policy response to climate change. This implies that each element of the table may be considered as a potential source of mitigation or adaptation effects. Thus, for example, key sectors, such as water and energy production of the main SAM (first set of accounts in both tables), can be changed to improve efficiency and reduce emissions, but emissions can also be reduced by better managing natural resources or by changes in the way residuals are treated or disposed (environmental accounts). All these cause-effect sequences can be first described qualitatively as narrative components of a theory of change, and subsequently appropriately quantified using the data available.

In addition to the environmental relations, the SAM can also incorporate information on uncertainties and risk, in the estimate of its coefficients, which span interdependencies and can be used to calculate multipliers, that is, characteristic, direct, indirect and induced effects of investment policies. It can also be used to simulate alternative scenarios for climate change and their effects on sector production, income distribution, and resource impact. More specifically, given estimates or hypotheses on primary losses, SAM multipliers can be used to estimate loss impact and to assess the effect of alternative risk management policies. Depending on the design and the statistical detail of the matrix, alternative meteo and hydrological scenarios and correspondent policies of mitigation, hedging and insurance actions can be analyzed, in terms of direct, indirect and induced risks as well as distributional impacts.

An example of the extended SAM is provided by the model developed for the State of Quintana Roo in Mexico. In this model, the economy was divided into 28 sectors, with the following environmental specification:

- ⊙ The biodiversity sectors are related to the other sectors as inputs (ecoservices, user and non user values) along two rows of the SAM (recipient sectors are: Agriculture, Food, Manufacture, Construction, Tourism, Hotels), and as sectors renewing their natural capital by using inputs along two corresponding columns: (inputs for maintenance and re-newal are from: Agriculture, Food, Manufacture, Construction, Tourism, Hotels, Government).
- ⊙ A positive difference between uses and maintenance –renewal totals from each biodiversity sector is an estimate of biodiversity loss. This loss is represented by Loss of Natural Capital as the balance between the total of the column, which captures the annual biodiversity rehabilitation, and of the row, which shows the use of Biodiversity.
- ⊙ CO2 emissions are estimated by economic activity and stakeholders’ consumption profiles.

This SAM is being used to evaluate the environmental impact of three alternative investment programs , corresponding to three different scenarios: (i) Focused growth, with a maximum of negative effects on the environment, (ii) Business as Usual with intermediate effects, and (ii) National Expansion, with minimum effects on biodiversity and considerable reductions of CO2 emissions (Table 8). The economic and environmental impact of the three investment scenarios, based on the direct and indirect effects estimated with the SAM is shown in Figures 3-6, which suggests that the National Expansion scenario dominates the other options both in terms of its economic and “green” impact.

Table 8. Direct Effects of Different Programs of Public Investment on the Environment

Scenario	Focused growth		Business as usual		National expansion	
	Qualitative	Quantitative	Qualitative	Quantitative	Qualitative	Quantitative
<i>Environment and Biodiversity</i>						
Wetland	Decrease	-50%	Decrease	-50%	Slight increase	10%
Forest	Decrease	-50%	Decrease	-50%	Slight increase	10%
Corals	Decrease	-30%	Decrease	-30%	Slight increase	10%
Carbon stored	Decrease	-30%	Decrease/stable	-10%	Increase	30%

Figure 3. Impact Multipliers for the Three Scenarios

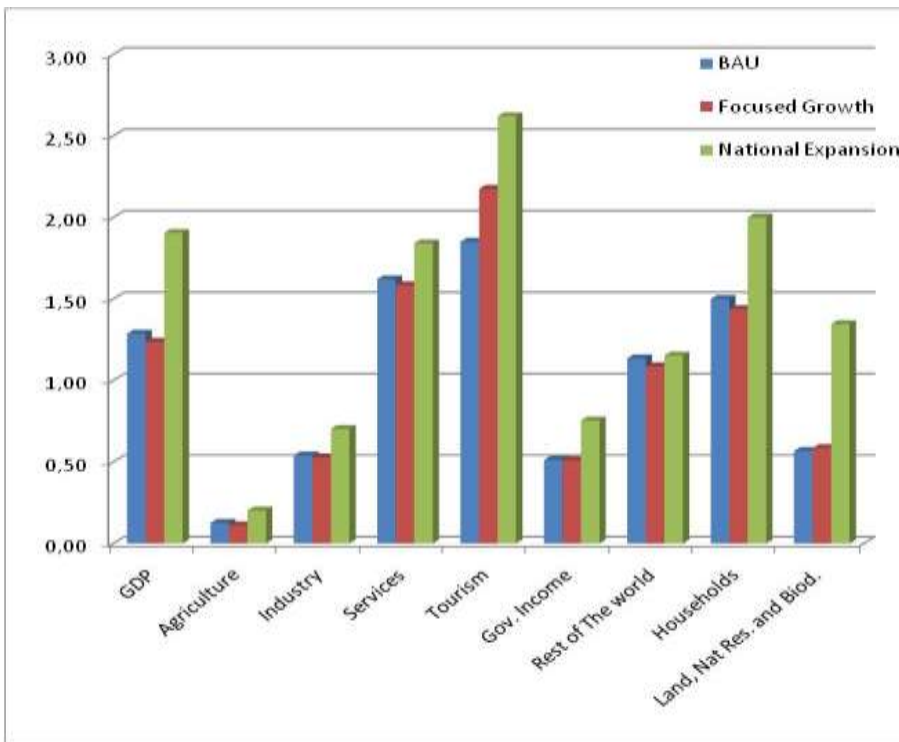


Figure 4. Program Impact on Wetland for the Three Scenarios

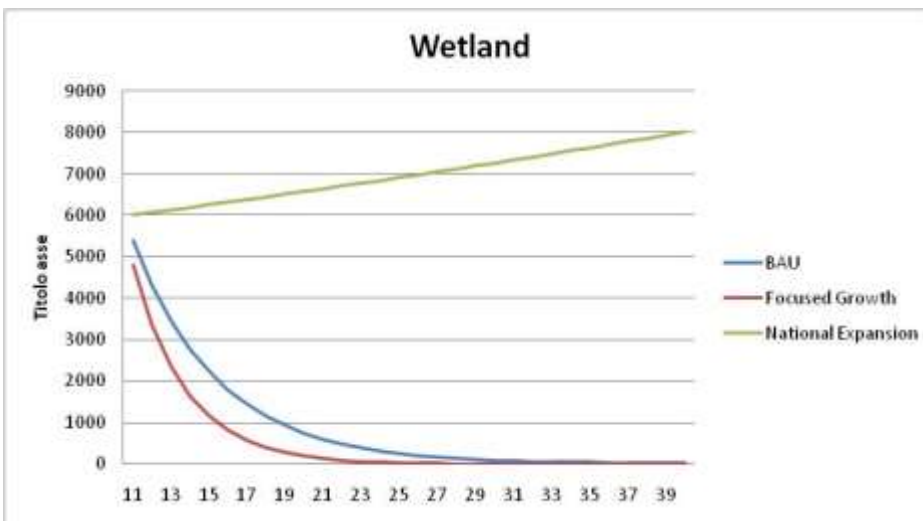


Figure 5. Program Impact on Forest for the Three Scenarios

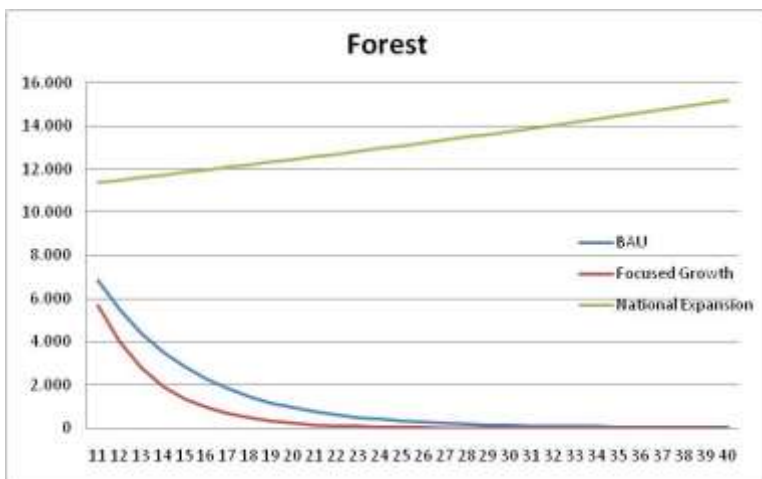
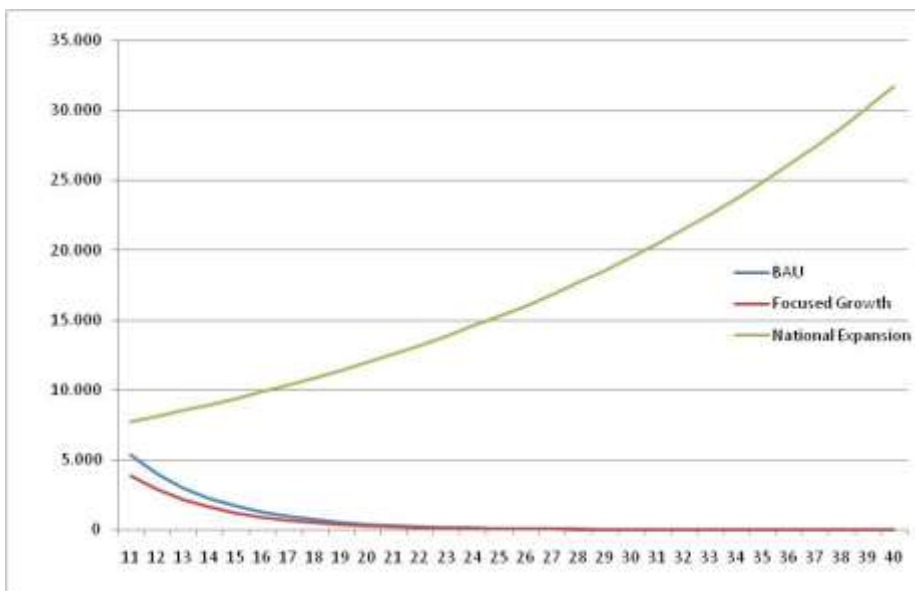


Figure 6. Program Impact on Carbon Storage for the Three Scenarios



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Chapter 2. A Case Study: An analysis of green policies in Mexico

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An analysis of green policies in Mexico

Summary and conclusions

In this analysis we have considered Mexico as a case study for the due diligence process that could be used to back up the issuance of sovereign green bonds on the part of the Government or, alternatively, on the part of local authorities backed by Government guarantees. The process proposed aims to achieve a transparent assessment of the Government revealed capacity to pursue consistently a green and inclusive growth strategy, and, at the same time, to demonstrate commitment and trustworthiness for this purpose on the use of funds and on investment planning.

The Mexican government formulation of the ***National Program of the Environment and Natural Resources*** provides the starting point to test the evaluation methodology proposed, looking at the main areas of interest of the program, which include all the important issues of environmental policies, including integrated ecosystem and environmental management, the provision of environmental services, the enforcement of environmental legislation and public participation and transparency. The recent introduction of a carbon tax and of a voluntary platform for a cap and trade emission system provides the further opportunity to evaluate the effects of specific policy measures, with an intrinsic potential for expansion and a widespread impact on the environment.

Using only publicly available information and a simple multi-criteria rating tool, the case study has sought to evaluate the credibility of the commitment and the implementation capacity of the Mexican government with respect to a hypothetical issuance of green bonds. A rating analysis has thus been developed with respect to several qualitative dimensions of Mexico's green policies. More generally, in addition to the green financing reference, this rating can be considered an indication of the "green stance" of Mexico as an agent to improve the environment and of its commitment to a low carbon economy and a healthier environment. A social accounting matrix (SAM) has also been estimated and applied to the problem on hand to evaluate the impact of a plausible package of green investment public projects coherent with the policy measures undertaken by the Mexican Government, including the carbon tax recently introduced. This evaluation adds a quantitative dimension to the green rating and shows that sizable gains could be obtained by implementing a green investment program. These gains, which would accrue to all income groups, would be synergic with the gains obtained from the emission reductions from the carbon tax and from the investment directly financed by the private sector, in response to the government incentives for cleaner technologies.

While the exercise developed has to be considered only a preliminary test of the methodology, a summary assessment of the results suggests that Mexico could receive a good rating for a possible green lending program both in terms of its records and the potential benefits of a green growth program. The analysis leading to this conclusion, however, need to be strengthened by a deeper probing in some of the

performance aspects that cannot be appraised without a more in depth examination of the historical record, and from the interaction with knowledgeable government officials and other interested stakeholders.

Mexico green policies

Using a Multicriteria evaluation model ,we divided the Mexican green policy into 8 different class of information.

(1) **Goal setting and aligning policies across and within levels of government.** The General Climate Change Law (GCCL) aims to regulate, encourage, and facilitate the implementation of the national climate change policy. It pursues these goals through a comprehensive approach, aimed at incorporating adaptation and mitigation actions within a long-term, systematic, decentralized, participatory and integrated framework. Aside from defining the faculties and the responsibilities of the different government orders, the GCCL establishes the institutional mechanisms needed to face this challenge. Broadly speaking, the approach is based on the principle of voluntary action on the part of the stakeholders, including state and local governments, supported by the framework of legislation and appropriate incentives and facilities, provided by the Federal Government. Mexico's climate change law sets voluntary national targets to reduce Mexico's total emissions to half of 2000 levels by 2050 and aims to restructure industry supply so that a third of electricity will be produced from renewable sources by 2024. At present, Energy production is responsible for roughly 65 percent of Mexico's national greenhouse gas emissions, with a very low percentage of electricity coming from renewable sources.

BOX : Mexico environmental policy goals

The National Program of the Environment and Natural Resources promotes six main goals:

Integrated ecosystem management - focus on watershed rather than political boundaries in the management of water, land, air quality, forests and biodiversity;

Policy integration - sustainable development should be the shared responsibility of Federal secretariats and agencies;

Environmental management - halt and reverse environmental contamination and degradation of ecosystems;

Provision of environmental services - improve management of natural ecosystems and ensure that those who benefit pay for these services;

Enforcement of environmental legislation - strengthen inspection and compliance; and

Public participation and transparency - publish environmental information and respond to public demand for environmental protection.

A number of strategic programs are explicitly identified, including:

- *Halting and reverting pollution of the systems supporting life (water, air and soil);*
- *Halting and reverting the loss of natural resources;*
- *Conserving ecosystems and biodiversity; and*

- *Promoting sustainable development*

The General Climate Change identifies the following goals and instruments

- *Accelerating the transition to low-carbon energy sources, with a goal to produce 35% of electricity from “clean” sources by 2024.*
- *Development of new economic instruments to finance mitigation, including the potential development of an emissions trading system.*
- *Reducing subsidies that favor inefficient use of resources, and redirection of current subsidies from fossil fuels.*
- *Reducing energy intensity through conservation and efficiency measures.*
- *Integrating national emissions reductions targets into the federal, state and sectoral programs.*
- *Improving forest management and reducing deforestation through REDD+ (Reducing Emissions from Deforestation and forest Degradation) policies and other measures.*
- *Reducing emissions of short-term climate forcers and other greenhouse gases.*

Source: (SEMARNAT 2001, p. 72-73). See also: <http://blogs.edf.org/climatetalks/2013/06/19/mexicos-new-president-releases-promising-strategy-for-national-climate-action/>

(2) **Establishing specific financial policies, regulations, tools and instruments that provide transitional support for new green technologies.** The GCCL foresees a series of financial, regulatory, technical, planning, evaluation, and surveillance instruments within the national climate change policy. Amongst the planning instruments that the GCCL dictates, the National Climate Change Strategy stands out. Other planning instruments are the Special Climate Change Program and the State Climate Change Programs. The GCCL also foresees different instruments, such as the National GHG Emissions Inventory, the National Emissions Registry, the Climate Change Information System, the Climate Change Fund, economic instruments, Mexican official standards, and national, state, and municipal risk atlases.

(3) **Reforming policies to enable investment and strengthen market incentives for low carbon infrastructure.**

3.1. Emission targets: Mexico has committed to reducing its emissions 30 percent below business-as-usual levels by 2020 and 50 percent below 2000 levels by 2050. While voluntary, the targets were set at the U.N. climate negotiations in 2009 and reiterated in the climate law as a serious commitment.

3.2 National emissions registry and green light on emissions trading

The national emissions registry has been created by Mexico’s GCCL as a part of its National Climate Change System. Reporting by polluting industries’ is mandatory, standardized and public . It pursues the objective of achieving a reliable level of measurement, accurate reporting, systematic accounting and total transparency, as a first step toward an emission trading system. This was explicitly authorized, but not required by the same Law. Reporting will start in 2015 for 2014 emissions and will include: (i) SOURCES: Stationary and Mobile TYPE: Direct and Indirect emissions; (ii) GREENHOUSE COMPOUNDS: CO₂, CH₄, N₂O, SF₆, HFCs, PFCs, HCFCs, NF₃, and Black Carbon ; (iii) THRESHOLDS: > to 25,000 ton CO₂e/year, (more than

95% of emitters covered) MRV: Verification every 3 years ; (iv) SECTORS: Industry, Energy, Transportation, Waste, Agriculture and Services

3.3 Price on carbon in fossil fuels. A carbon tax was proposed by the government and approved by the parliament in 2014. The tax is levied on carbon in fossil fuel products, and aims to reduce Mexico's emissions by seven million tons annually. It applies to all fuel except natural gas and is levied at a rate based on the carbon content and linked to global market prices for carbon tons . The tax legislation also provides that companies may pay the carbon tax through carbon offsets projects of an equivalent number of tons.

3.4. Pilot trading of carbon credits. In conjunction with the approval of CCGL, a new offset trading platform was created on the Mexican stock exchange where credits for carbon emissions reductions (in tons) can be purchased either for the voluntary market, or in lieu of paying the carbon tax . This appears to be a start for a first mini-emission trading system linked to the carbon tax, which may gradually develop capacity for transaction and credit tracking, and evolve over time into a full scale emission market.

The Mexican Government has finished the six year Climate Change Program (PECC) for this Administration. PECC has the following features:

- It defines targets and specific actions the public administration will carry out to achieve the 30% GHG reduction goal
- Allocates responsible agencies for the fulfillment of each goal;
- It contains budget estimates for each action line
- Has an MRV system;
- It will be reviewed every two years by INECC ;
- It has been elaborated with gender perspective to ensure gender equity.

PECC pursues 5 main objectives:

1. To minimize vulnerability of society and productive sectors, increasing their resilience and the resistance of strategic infrastructure.
2. To conserve, restore and manage ecosystems in a sustainable way to ensure their environmental services for climate change mitigation and adaptation.
3. To reduce GHG emissions to transition to a competitive and sustainable low carbon emissions economy.
4. To reduce short lived climate pollutants emissions, promoting health and welfare related benefits.
5. To strengthen a national climate change policy through effective instruments and coordination with state and city governments, the Congress and society.

New opportunities for capital, technology, and transparency

Most of Mexico's energy infrastructure to meet demand beyond 2020 is yet to be built and it is widely acknowledged that the potential for renewable energy in Mexico vastly outweighs the current development. Opening Mexico's major energy producing sectors to private investment provides capital, pressure to reduce waste and increase transparency to attract investment, and — particularly in the electricity sector — opens the field to a wide array of clean energy players who previously could not break in to Mexico.

Key pieces of the policy outlined have been driven by different goals and approaches, and of course, spanned a presidential election. But they do provide essential ingredients for a cohesive climate and energy policy and an effective mechanism to get to Mexico's climate and development goals, and the time is ripe to put them together.

The multicriteria tool

Our analysis is performed using a multi-criteria rating tool that is completed by the evaluation of the impact of green investment in terms of GDP growth and CHG reduction of policy implementation and using a synthetic indicator of Green Climate obtained by applying the Environmental Performance Index proposed by Yale University (<http://epi.yale.edu/epi/country-profile/mexico>).

Preliminary results are summarized in following table.

Table 9. Multicriteria Analysis results

Category	Implementation	Phaseless
Credibility of the environmental concern and activities	BBB	BB
Reputational, Local and Environmental Risks	BB	B
Borrowers Capacity to Carry out Programs	A	BBB
Program Definition and Execution	B	CCC
Commitment of the issuer to the use of the funds obtained	AA	A
Reporting Evaluation and Assurance	BB	B
Economic Evaluation	B	B
Overall phaseless score	BB	
Overall Stage score	B	

An explanation of the rating criteria is detailed in the next figure.

Figure 7: Rating

Rating symbol	Explanation		Expected distribution
AAA	The risk of the policy not generating green benefits is very low and there is a high expectation that the programs and timings will be achieved. Borrower also has strong internal procedures and capacity to carry out the policy.	highest quality	5%
AA		very high quality	5%
A		high quality	10%
BBB	There is a low risk of the policy not delivering green benefits, however there remains a certain risk that either specified programs and timing cannot be achieved. Borrower also has weakness in internal checks and balances and environmental due diligence.	good quality	15%
BB		speculative	15%
B		highly speculative	15%
CCC	There is a risk that the policy does not deliver any green benefits. Significant doubts exist on the Borrowers' capacity to carry out the programs, regulate the use of proceeds, and carry out other aspects of the Green Bond or other environmental principals.	high risk	10%
CC		very high risk	10%
C		highest risk	5%
D	Default – the policy cannot deliver green program benefits.	default	10%

The questions

The Multicriteria analysis addresses several aspects of green policy implementation of a Country.

Regarding the Credibility of the environmental concern and activities, we reviewed the procedures for: Account and Internal Tracking, Selection Project and Investment, Readiness For Implementation, Internal Mechanisms for Environmental Review, Quality of Social Responsibility, Legal aspects and strengths in terms of activities started in a country or by a national institutions.

In terms of Reputational, Local and Environmental Risks, we analyzed the country performance for Political risks (Government stability), State financial risks (foreign debt), State economic risks, Site specific political risks, Business climate risks (international ranking), Infrastructure development, Natural hazards (tornado earthquake).

The section related to Borrowers Capacity to Carry out Programs refers to results in term of competencies and experience, soft and hard resources and financial assets and liabilities.

To evaluate the Program Definition and Execution of projects and policies, we consider: *selection concept, business planning, design, construction and O&M, work planning, cost management, risk management, organization, health, safety and environment (HSE), reporting, audit & quality assurance.*

An important section concerns the *commitment* of the issuer to the use of the funds obtained measured by two main indicator levels of *Use and Control of Funds* and *Size and Program Complexity*.

The level of *reporting evaluation* and *assurance* is estimated by a measure of quality for: *report transparence, quantitative evaluation, qualitative evaluation, stakeholder consultation, publicly available information, third party independent verification.*

The last section links the multi-criteria analysis with the quantitative evaluation impact of the program using the *indicator of economic integration and the SAM impact.*

The results reported below are based on a summary review of the most recent publicly available documents and should be considered only an example to be developed further. Given this caveat, however, as shown in Table 2, the evaluation of this case study suggests high quality results for green policy in terms of program complexity, and a good to average quality for the capacity to carry out the program.

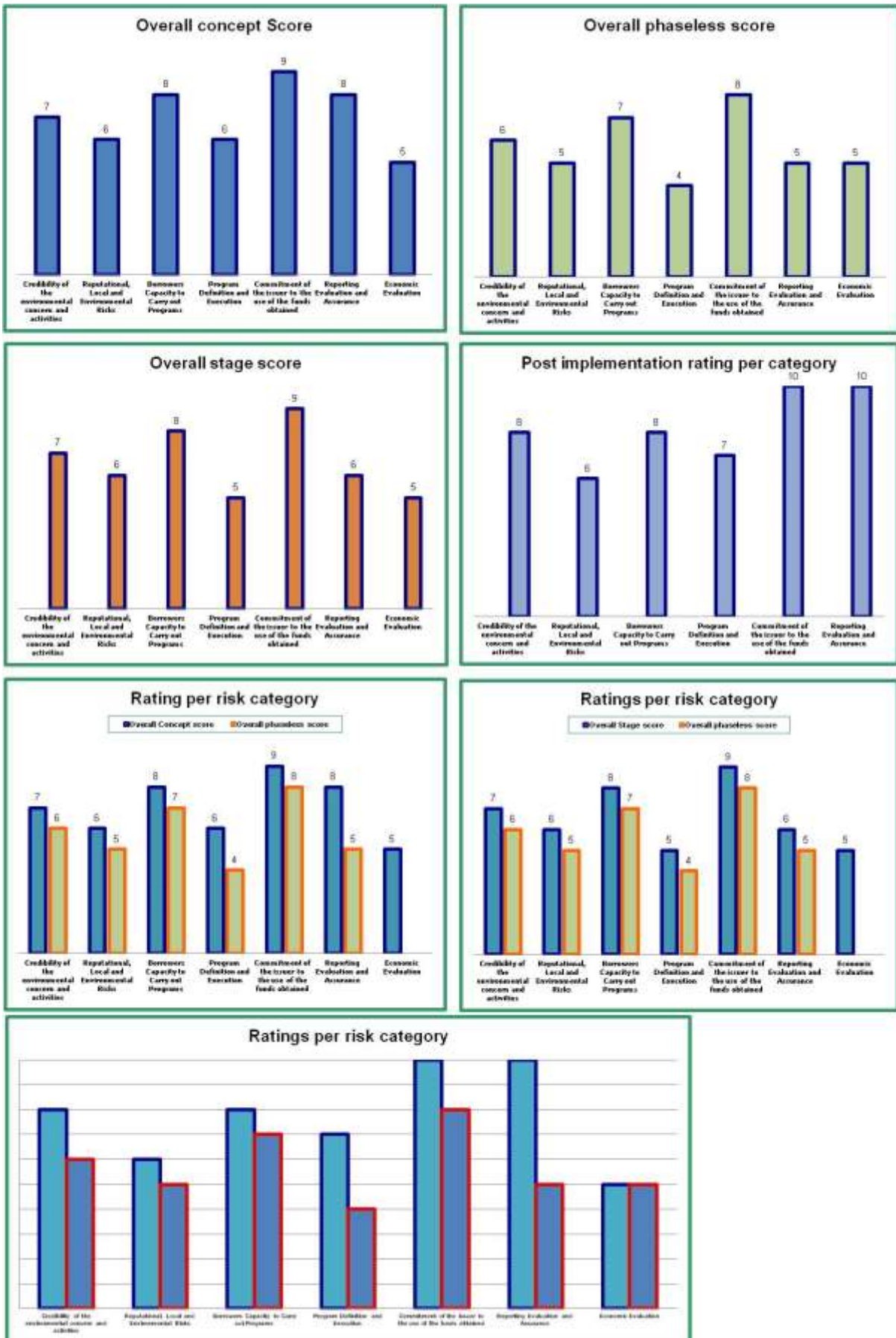
Table 10. Results for the Multi-criteria analysis

Category	Subcategory	Rating
Credibility of the environmental concern and activities	Account and Internal Tracking	A
	Selection Project and Investment	BBB
	Readiness For Implementation	A
	Internal Mechanisms for Environmental Review	A
	Quality of Social Responsibility	BBB
	Legal aspects and strengths	AA
Reputational, Local and Environmental Risks	Political risks	BB
	State financial risks	BB
	State economic risks	BB
	Site specific political risks	BB
	Business climate risks	BB
	Infrastructure development	B
	Natural hazards	BB
Borrowers Capacity to Carry out Programs	Competencies and experience	A
	Soft and hard resources	AAA
	Financial resources and liabilities	BB
Program Definition and Execution	Concept selection	BB
	Business planning	BB
	Design	BBB
	Construction	BB
	O&M	AAA
	Work planning	BBB
	Cost Management	BB
	Risk Management	B
	Organisation	AA
	Health, Safety and Environment (HSE)	B
	Reporting	AAA
Audit & quality assurance	BB	
Commitment of the issuer to the use of the funds obtained	Use and Control Funds	AAA
	Size and complexity	AA
Reporting Evaluation and Assurance	Report Transparencies	BB
	Quantitative Evaluation	AAA
	Qualitative Evaluation	BBB
	Stakeholder Consultation	AAA
	Publicly Available	AAA
	Thirty party independent verification	AAA
Economic evaluation	Integration	BB
	SAM impact	BB

The next figure shows the results for each category for *Green Policy* in Mexico. Using this approach you can define as a benchmark for comparison.

Further details of the multicriteria analysis are presented in the Annex.

Figure 8: Results of multicriteria analysis



SAM impact

In order to complete the analysis by looking in greater depth on the economic structural consequences of Mexico's growing orientation toward green growth, we evaluate the impact of a package of green investments in Mexico using a Social Accounting Matrix estimated for this purpose. The SAM includes the *carbon tax* recently approved, as a structural policy measure, and the estimates of sector interdependencies (through direct trading and externalities) for the CHG, and the low atmosphere emissions (Air Pollution).

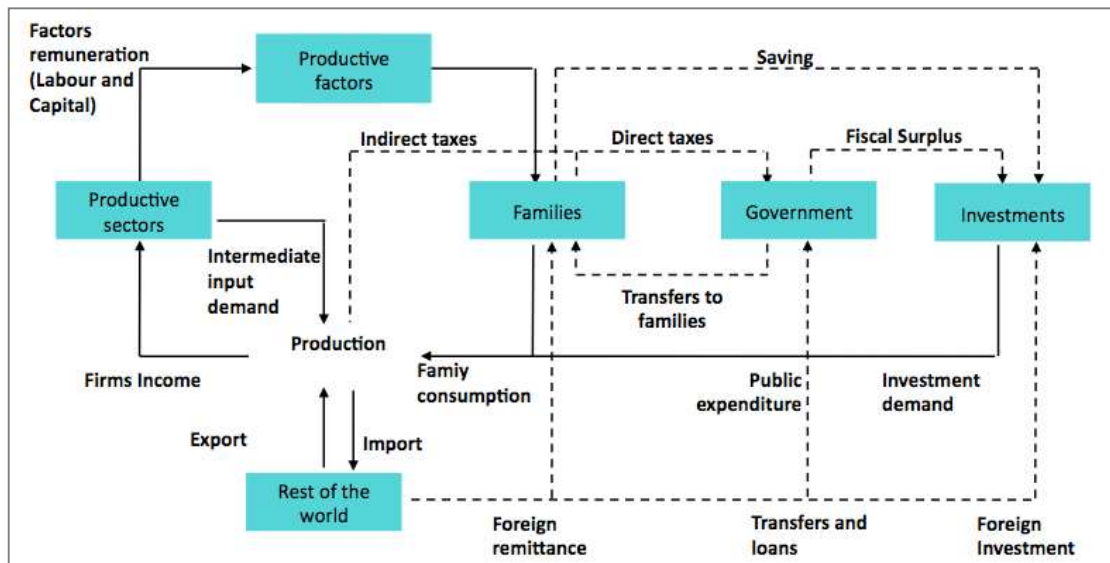
The Social Accounting Matrix (SAM) is a system of national / regional / sub-regional accounts represented in a matrix format. It includes the inter-industry linkages through transactions typically found in the I-O accounts and the transactions and transfers of income between different types of economic agents, such as households, government, firms and external institutional sectors. The SAM consists of a set of interrelated subsystems that, on the one hand, give an analytical picture of the studied economy in a particular accounting period and, on the other hand, serve as an instrument for assessing the effects of changes on the particular flows represented by it (injections and leakages in the system), which might be the result of policy measures. The Matrix is a double-entry table, describing the structure of the economic system through its disaggregation in key blocks, thought as origin and destination of transaction flows. Thanks to its theoretical and methodological characteristics, it can represent the distributive and redistributive income process by including the accounts headed to the institutional sectors (households, firms and government). Following this approach, the economic system is typically disaggregated into the following blocks:

- i. Primary production factors (Labour and Capital);
- ii. Production sectors (Agriculture, Industry, Services and their disaggregations);
- iii. Households;
- iv. Firms;
- v. Government (Public Administration);
- vi. Capital Formation (Public and Private gross fixed investments);
- vii. Rest of the Country (ROC) and Rest of the World (ROW)

Both the expenditures (columns) and revenues (rows) are defined for any productive and institutional sector. If data are available, any of the above blocks can be further disaggregated depending on the objective of the analysis. The SAM is considered an extension of the traditional Input-Output (I/O) model proposed by Leontief, which also consists of a transaction matrix and records, in quantitative terms, the exchange flows of an economic system in a specific place, for a specific period of time. In its usual configuration, the SAM includes the Input-Output matrix of the intermediate exchanges between production sectors, the accounts related to institutional sectors (households, firms and government), production factors (labor and capital), capital formation and rest of the economy. The Matrix allows considering the entire structure of relations

characterizing an economic system through the different phases of the production, distribution, utilization and income accumulation process as shown in Figure 1.

Figure 9: The income circuit



In a typical SAM structure, columns represent the outflows of the different economic agents that is, the expenditure of any aggregate with respect to the others, while rows represent the inflows, namely the income formation; Since total incomes equal total expenditures, including savings and capital formation, the SAM is a square and balanced matrix. A simplified scheme of the SAM is presented in Figure 4.

Figure 10: A Simplified SAM Scheme

	Production Factors	Institutions	Production sectors	Capital formation	Rest of the economy	Total inflows
Production Factors						
Institutions						
Production sectors			Matrix of the sectors interdependences			
Capital formation						
Rest of the economy						
Total outflows						

Given its ability to coherently represent all the relations characterizing an economic system and the national account structure, the SAM is both a powerful descriptive tool and a valid starting point for economic modeling.

We have estimated a SAM for Mexico – 2013, using data from national accounts, labor market statistics and from two recent SAM estimates for Mexico, both referring to the 2008 as a base year (IFPRI, 2012 and Chapa and Ortega 2013), to obtain a disaggregated picture of the industry, the personal income distribution and the emissions. The matrix also incorporates the carbon tax recently introduced by Mexican legislation, with coefficients estimated on the basis of emission data from SEMARNAT, according to sector consumption of fossil fuel (Table 3).

Table 11. Fossil fuel consumption for Mexican Economy

	1990	2010	Percentage change
Coal	7,050.0	29,921.5	324.4
Coal coke	1,154.4	3,165.0	174.2
Petroleum coke	-	11,524.8	-
LPG	20,638.3	28,317.0	37.2
Gasoline	62,460.4	102,754.8	64.5
Kerosene	6,504.7	4,857.6	-25.3
Diesel	35,623.5	59,381.9	66.7
Fuel oil	84,019.8	39,639.2	-52.8
Natural gas	52,004.2	125,568.3	141.5
Total	269,455.30	405,130.2	50.35

Source: Chapa and Ortega, 2013, based on SEMARNAT data (2012).

The result of our estimates is a SAM for Mexico divided into 77 sectors, where households are divided according to four groups: *urban poor*, *urban non-poor*, *rural poor* and *rural non-poor*. The total economic value for Carbon is estimated using an International price per equivalent ton of CO₂ and equal to 7,45 €/ton. To estimate the value of air pollution we use the last five year price mean in US market (100 USD per ton) and use this figure as a lower bound estimate of the real opportunity cost for health losses (mainly increased child mortality and increase in respiratory diseases) paid by households as a consequence of the greater concentration of low atmospheric pollutants.

Simulation

In order to estimate the structural effects of the policies embedded in the different scenarios, we base our simulation on the following differential reformulation of the open (Leontief) Input - Output model, according to the equation:

$$(1) \Delta X = (I - A^*)^{-1}[(\Delta A)X + \Delta Y]$$

Where A and A* are the SAM matrices, respectively, with and without the scenarios' hypotheses, and ΔY is the vector of exogenous changes in receipts or expenditure of the capital account (Project intervention or exogenous investment).

To simulate the effect in term of CHG reduction and low emission reduction, we design a pattern of investment coherent with the national green policy and we simulate a structural change in the economy, based on the achievement of a new level of green efficiency for industrial production and household

/government consumption, as a consequence of the incentives provided by the carbon tax and through the financing of new green investment.

In order to appraise the quality of Mexico's green policy, we thus imagine a stylized public investment and policy program, mainly centered on the power sectors and nenergy saving measures, designed over ten years, centered on green technologies, consistent with the main tenets of Mexico green policy plan and aimed at reducing oil and gas consumption as well as pollutant emissions. The parameter estimates of the program are obtained from the ENEA- University of Rome Tor Vergata study and other sources , such as the International Energy Agency.

In order to estimate the investment cost components for the construction of the energy production plants, we need to identify which sectors (or technologies) are typical of the project class considered. Generally data on the investment costs derive from project feasibility studies. A rich source of data is represented by the database of the International Economic Institutions, first of all the World Bank, that provides project data from the preliminary investigation to the ex-post evaluations.

We considered the following types of investment in energy plants :

- Photovoltaic;
- Biomass;
- Wind;
- CSP;
- GeOthermal ;

To identify investment costs, we utilized data from a series of recent feasibility studies¹⁸. The results, presented in Tables 8-10, can be considered orders of magnitude of typical projects. Even though they generally do not derive from Mexican data, they represent state of the art technologies and are used to calibrate the model and to derive first indications on the indirect effects of the different project-typologies.

¹⁸ GSE - Electric System Operator regarding the pattern of production of a photovoltaic system updated to 2012, the feasibility study for the Construction of an electricity generation plant biomass by University of Rome Tor Vergata made in 2007. In this case, the expense ratios were updated from Biomass Energy Development for Sub - Saharan Africa, the World Bank Group (2011). The source for the estimation of the expenditure vector for the wind farms is study of feasibility of the Rialto farm realized in 2006. Data on CSP technologies and power plants to fossil fuel source are from the World Bank project Database for the Middle East and North Africa Region and the Asia Regio (latest projects in 2012). The expenditure structure for the geOthermal power plants was estimated from a feasibility study conducted by the Region Friuli Venezia Giulia in 2012. Finally, the data are from projects of Hydropower stations included in the African Hydroelectric program - The World Bank .

Tables 4-5 below present the estimates of typical investment cost estimates by type of plant and by sector of input purchases.

Table 12: Investment cost structure for power plants

Sector	Photovoltaic		Biomass	
	% cost	Cost main category	% cost	Cost main category
Textile	3%	Glass		
Chemical product	2%	Tedlar		
Metal	5%	Other structure	5%	Other structure
Metal product	5%	Panels	3%	Other product
Computer, electronic and optical products	2%	Control system	2%	Control System
Electrical equipment	50%	Cells		
Equipment			55%	turbine system and generator
Repair and installation of machinery and equipment	8%	Installation	5%	Installation
Construction	15%	Civil Work and support structure	20%	Civil Work and support structure
Transport	2%	Transport	2%	Transport
Financial Services	1%	Bank costs	1%	Bank costs
Insurance	1%	Insurance	1%	insurance
Legal and Other professional services	1%		1%	
architecture and engineering	5%		5%	
	100%		100%	
Investment timing (year)	0.5		1	
Source	GSE - Italian Authority - and panel of PMI corporation feasibility study		electricity generation plant biomass by Biomass Energy Development for Sub - Saharan Africa, the World Bank Group	

Table 13: Investment cost for power plants

	CSP	
	% cost	Cost main category
Textile	20%	Looking glass
Chemical product	5%	elements for collector and tower
Metals		
Computer, electronic and optical products		
Equipment	30%	Collector and system
Repair and installation of machinery and equipment		
Construction	35%	Tower and Other works
TRansport	2%	
Financial Services	1%	
Insurance	1%	
Legal and Other professional services	1%	
architecture and engineering	5%	
	100%	
Investment timing (year)	2	
Source	The World Bank project Database Middle East and North Africa Region	

To estimate the program components concerning *Households and Public Administration* energy efficiency, we use parameter estimates from European data, and estimate the differential in expense to change the set of appliances and the equivalent investment cost to reduce the environmental impact of energy consumption in private houses and public administration building.

In terms of absolute values of the program, we use the reference figure of 1.000 billion pesos, assuming that such an expenditure would crowd out alternative domestic investment for 500 billion Pesos, and thus equivalent to a counterfactual scenario equal to 50% of the investment considered and distributed across sectors according with historical shares, for a 10 year time horizon. Proportionally to investment costs, we simulate a reduction of emission in CHG and air pollution to achieve the national goals of 2030 (-35% CHG, -15% air pollution)¹⁹.

Summary results of this evaluation are reported in the tables below. Detailed results are in the Annex. In term of direct investment impact, and without considering the structural gains from pollutant reduction, the program is estimated to generate value added for a present value (at 6% discount) of 683 billion pesos, while present values of carbon and air pollution reduction is, respectively 453 and 881 million.

Table 14. Impact in the Investment Period

	1	2	3	4	5	6	7	8	9	10	PV
Households	90.680	68.164	68.164	68.342	69.410	70.584	72.178	73.794	75.589	77.563	541.558
Non Poor Urban	74.696	56.172	56.172	56.290	57.146	58.086	59.361	60.651	62.083	63.656	445.685
Poor Urban	8.391	6.294	6.294	6.318	6.421	6.535	6.690	6.848	7.023	7.216	50.143
Non Poor Rural	5.588	4.186	4.186	4.214	4.295	4.386	4.509	4.636	4.778	4.935	33.643
Poor Rural	2.005	1.513	1.513	1.520	1.547	1.577	1.618	1.659	1.705	1.756	12.086
FIRMS	73.884	56.592	56.592	56.603	57.454	58.370	59.601	60.831	62.187	63.668	446.666
GOVERNMENT	16.105	11.305	11.305	11.489	11.632	11.781	12.001	12.209	12.437	12.685	90.930
Value Added	115.251	86.150	86.150	86.423	87.677	89.040	90.903	92.769	94.834	97.097	683.487
CAPITAL	73.884	56.592	56.592	56.603	57.454	58.370	59.601	60.831	62.187	63.668	446.666
LABOR	32.707	23.896	23.896	23.982	24.328	24.720	25.261	25.817	26.441	27.131	190.587
Tax	8.660	5.662	5.662	5.839	5.894	5.950	6.041	6.121	6.206	6.298	46.235
Production	186.854	161.646	161.646	161.894	163.769	165.855	168.771	171.719	175.012	178.641	1.246.719
Agriculture	4.920	2.380	2.380	2.430	2.477	2.519	2.571	2.615	2.658	2.702	20.742
Industry	60.012	84.311	84.311	83.994	84.640	85.349	86.384	87.399	88.523	89.749	607.185
Construction	34.742	20.854	20.854	20.902	21.347	21.981	22.865	23.911	25.149	26.581	176.785
Services	87.180	54.101	54.101	54.567	55.305	56.006	56.950	57.795	58.681	59.609	442.007
Carbon tax	92	59	59	56	55	54	57	58	58	59	453

¹⁹ Mexico's Climate Change Law and Policies, SEMARNAT 2014.

Air Pollution	164	123	123	120	119	118	106	102	98	95	881
Import/export	33.150	39.283	39.293	38.817	38.597	38.227	38.025	37.776	37.506	37.205	277.728
Savings	26.256	20.354	20.368	20.424	20.720	21.036	21.466	21.893	22.366	22.885	160.505

Table 15. investment multipliers

Households	1,472
Non Poor Urban	1,211
Poor Urban	0,136
Non Poor Rural	0,091
Poor Rural	0,033
FIRMS	1,214
GOVERNMENT	0,247
Value Added	1,857
CAPITAL	1,214
LABOR	0,518
Tax	0,126
Agriculture	0,056
Industry	1,650
Construction	0,480
Services	1,201
Carbon tax	0,001
Air Pollution	0,002
Import/export	0,755
Savings	0,436

Figure 11. Investment multipliers

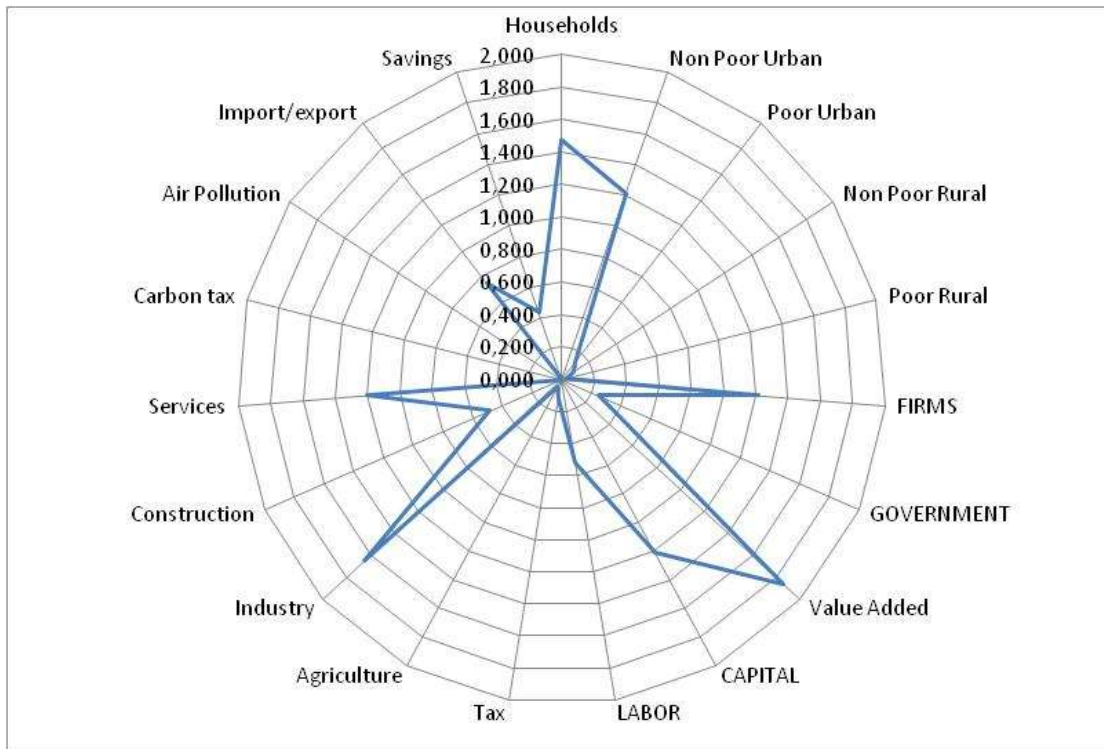


Table 16. Yearly effects of the structural changes induced by the investment program

	1	2	3	4	5	6	7	8	9	10	PV
Households	0	0	0	118.824	93.204	80.561	101.171	83.301	82.519	82.365	434.943
Non Poor Urban	0	0	0	95.117	73.395	62.364	78.002	62.925	61.565	60.731	335.858
Poor Urban	0	0	0	11.615	9.382	8.351	10.560	8.989	9.080	9.229	45.290
Non Poor Rural	0	0	0	9.054	7.863	7.471	9.582	8.704	9.106	9.541	40.866
Poor Rural	0	0	0	3.038	2.564	2.375	3.027	2.683	2.768	2.864	12.930
FIRMS	0	0	0	93.140	71.450	60.241	74.969	59.668	57.628	55.964	322.290
GOVERNMENT	0	0	0	29.178	26.452	26.145	34.101	32.299	34.796	37.531	145.805
Value Added	0	0	0	151.216	118.707	102.783	129.358	106.925	106.396	106.782	556.658
CAPITAL	0	0	0	93.140	71.450	60.241	74.969	59.668	57.628	55.964	322.290
LABOR	0	0	0	38.541	28.332	22.867	28.406	21.590	20.503	19.763	123.429
Tax	0	0	0	19.534	18.926	19.674	25.983	25.667	28.264	31.054	110.939
Production	0	0	0	204.389	157.661	137.667	192.250	159.655	165.351	172.439	798.946
Agriculture	0	0	0	8.489	7.523	7.236	9.212	8.382	8.674	8.937	38.956
Industry	0	0	0	85.166	84.266	91.882	138.900	137.138	155.400	173.999	562.761
Construction	0	0	0	-8.951	-31.067	-48.008	-66.057	-79.413	-92.885	-105.523	-271.807
Services	0	0	0	119.685	96.938	86.558	110.196	93.548	94.162	95.026	469.035
Carbon tax	0	0	0	-1.611	-1.558	-1.497	-1.440	-1.383	-1.329	-1.319	-6.844
Air Pollution	0	0	0	-465	-507	-526	-523	-523	-520	-555	-2.412
Investment	0	0	0	45.767	37.539	38.688	35.395	35.009	35.087	35.484	177.663

RoW	0	0	0	-15.643	-15.673	-29.398	-20.213	-20.151	-20.065	-19.884	-93.891
Saving	0	0	0	32.879	25.968	22.174	28.583	23.749	23.758	23.946	122.423

In terms of the structural changes induced by both the carbon tax and the investment, the results show a net effect in terms of value added equal to a present value of 556 billion of pesos. The effects in terms of pollution values is equal to a 6,8 billion pesos reduction for carbon (evaluated at the carbon tax level, but potentially much more if evaluated at the opportunity cost of carbon) for Carbon CHG and 2,4 billion pesos for the reduction of Air Pollution.

Details of total impact, i.e. the sum of the investment and the structural effects are presented in Tables 9-10. They include a permanent reduction in the propensity to use fuel and electricity for households, an increase in the use efficiency of energy by the production sectors, and, as a consequence, a reduction of CHG and low atmospheric pollutant emissions. The results show a total present value effect on GDP equal to 1240 billion of pesos.

Table 17. Total Annual values impact

	1	2	3	4	5	6	7	8	9	10	PV
Households	90.680	68.164	68.164	187.166	162.614	151.146	173.349	157.094	158.108	159.928	976.501
Non Poor Urban	74.696	56.172	56.172	151.406	130.541	120.450	137.363	123.576	123.648	124.387	781.543
Poor Urban	8.391	6.294	6.294	17.933	15.803	14.886	17.251	15.836	16.103	16.445	95.433
Non Poor Rural	5.588	4.186	4.186	13.268	12.159	11.857	14.091	13.340	13.884	14.476	74.509
Poor Rural	2.005	1.513	1.513	4.558	4.111	3.952	4.645	4.342	4.473	4.620	25.016
FIRMS	73.884	56.592	56.592	149.743	128.904	118.612	134.570	120.500	119.815	119.632	768.956
GOVERNMENT	16.105	11.305	11.305	40.667	38.084	37.926	46.101	44.507	47.233	50.216	236.735
Value Added	115.251	86.150	86.150	237.639	206.384	191.823	220.261	199.694	201.230	203.879	1.240.145
CAPITAL	73.884	56.592	56.592	149.743	128.904	118.612	134.570	120.500	119.815	119.632	768.956
LABOR	32.707	23.896	23.896	62.523	52.660	47.588	53.667	47.407	46.944	46.894	314.016
Tax	8.660	5.662	5.662	25.373	24.820	25.624	32.024	31.787	34.471	37.352	157.173
Production	186.854	161.646	161.646	366.283	321.430	303.522	361.021	331.375	340.363	351.081	2.045.665
Agriculture	4.920	2.380	2.380	10.919	10.000	9.754	11.783	10.996	11.333	11.639	59.698
Industry	60.012	84.311	84.311	169.160	168.907	177.231	225.284	224.537	243.923	263.749	1.169.946
Construction	34.742	20.854	20.854	11.951	-9.720	-26.027	-43.192	-55.502	-67.735	-78.942	-95.022
Services	87.180	54.101	54.101	174.252	152.243	142.564	167.146	151.343	152.843	154.635	911.042
Carbon tax	92	59	59	-1.555	-1.503	-1.443	-1.383	-1.325	-1.271	-1.260	-6.391
Air Pollution	164	123	123	-345	-388	-408	-417	-421	-422	-460	-1.531
RoW	33.150	39.283	39.293	23.174	22.924	8.829	17.812	17.625	17.441	17.321	183.837
Saving	26.256	20.354	20.368	53.303	46.688	43.210	50.049	45.642	46.124	46.831	282.929

Table 18. Total annual value changes

	1	2	3	4	5	6	7	8	9	10	Total 1-10
Households	0,74%	0,55%	0,55%	1,50%	1,29%	1,19%	1,35%	1,21%	1,21%	1,22%	10,81%
Non Poor Urban	0,75%	0,56%	0,56%	1,49%	1,27%	1,17%	1,32%	1,18%	1,17%	1,17%	10,63%
Poor Urban	0,72%	0,54%	0,54%	1,51%	1,32%	1,23%	1,41%	1,28%	1,29%	1,31%	11,15%
Non Poor Rural	0,66%	0,50%	0,50%	1,55%	1,40%	1,35%	1,59%	1,49%	1,53%	1,58%	12,15%
Poor Rural	0,69%	0,52%	0,52%	1,54%	1,37%	1,30%	1,52%	1,40%	1,43%	1,46%	11,74%
FIRMS	0,75%	0,57%	0,57%	1,50%	1,28%	1,17%	1,31%	1,17%	1,15%	1,14%	10,62%
GOVERNMENT	0,62%	0,43%	0,43%	1,54%	1,43%	1,40%	1,68%	1,60%	1,68%	1,76%	12,58%
Value Added	0,74%	0,55%	0,55%	1,50%	1,29%	1,18%	1,35%	1,21%	1,21%	1,22%	10,79%
CAPITAL	0,75%	0,57%	0,57%	1,50%	1,28%	1,17%	1,31%	1,17%	1,15%	1,14%	10,62%
LABOR	0,77%	0,56%	0,56%	1,46%	1,22%	1,09%	1,22%	1,07%	1,05%	1,04%	10,04%
Tax	0,55%	0,36%	0,36%	1,57%	1,51%	1,54%	1,89%	1,85%	1,97%	2,09%	13,68%
Production	0,71%	0,61%	0,61%	1,37%	1,19%	1,12%	1,32%	1,20%	1,22%	1,25%	10,60%
Agriculture	0,64%	0,31%	0,31%	1,40%	1,27%	1,22%	1,46%	1,34%	1,37%	1,39%	10,71%
Industry	0,53%	0,74%	0,75%	1,48%	1,47%	1,52%	1,91%	1,88%	2,01%	2,14%	14,44%
Construction	1,66%	0,99%	0,99%	0,57%	-0,47%	-1,29%	-2,20%	-2,95%	-3,77%	-4,66%	-11,14%
Services	0,71%	0,44%	0,44%	1,40%	1,21%	1,12%	1,30%	1,17%	1,17%	1,17%	10,12%
Carbon tax	0,30%	0,19%	0,21%	-5,81%	-5,95%	-5,61%	-5,56%	-5,49%	-5,43%	-5,53%	-38,67%
Air Pollution	0,74%	0,55%	0,57%	-1,61%	-1,84%	-2,18%	-2,35%	-2,50%	-2,64%	-3,05%	-14,32%
RoW	0,65%	0,77%	0,78%	0,46%	0,46%	0,18%	0,36%	0,36%	0,36%	0,36%	4,75%

Figure 12. Total annual value changes

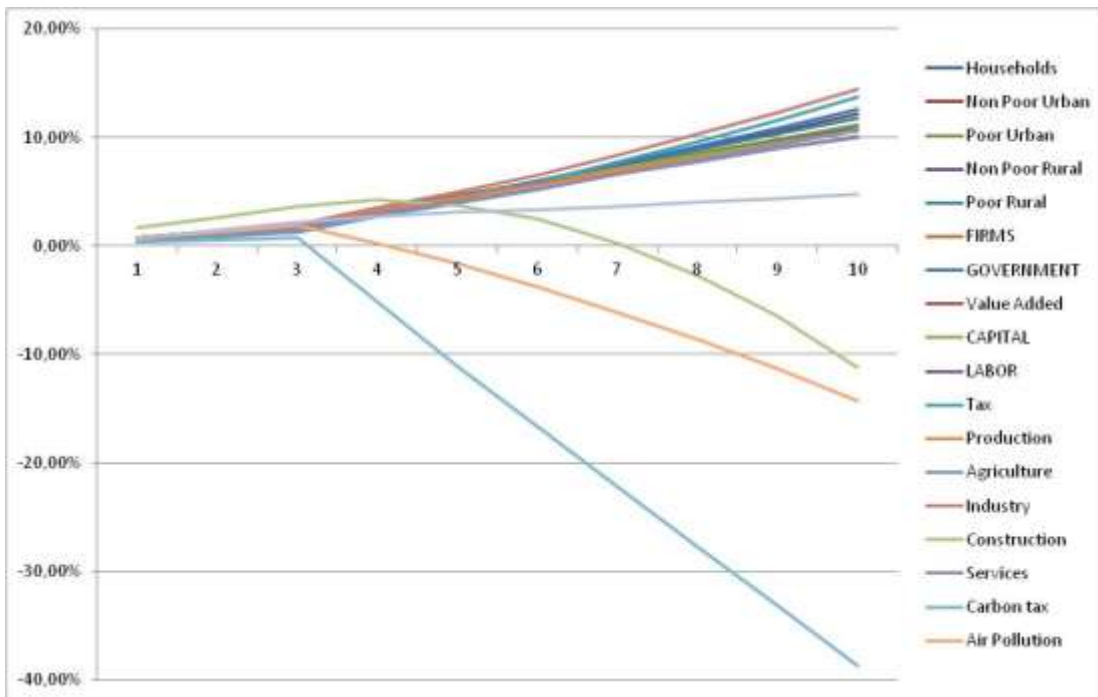


Figure 13. Annual values for pollution

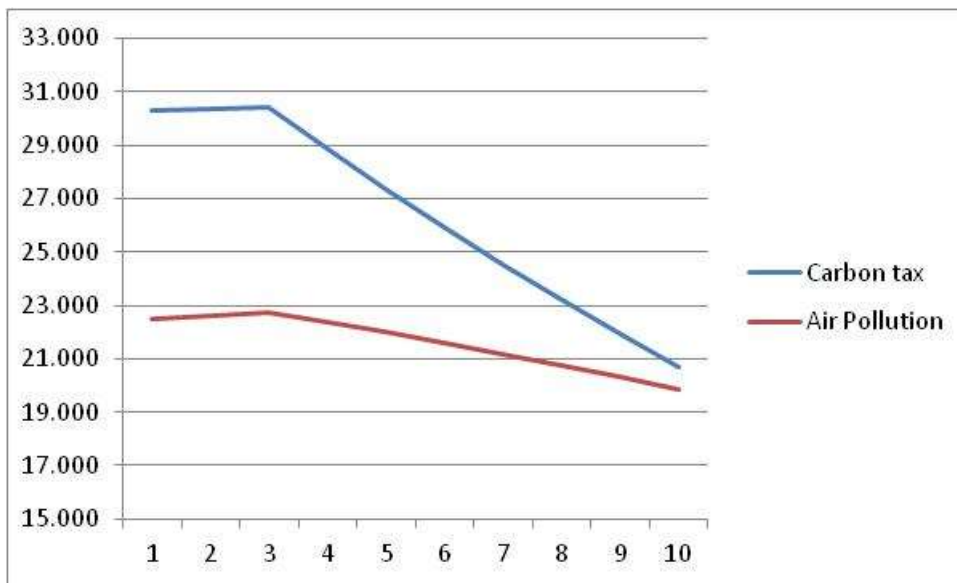
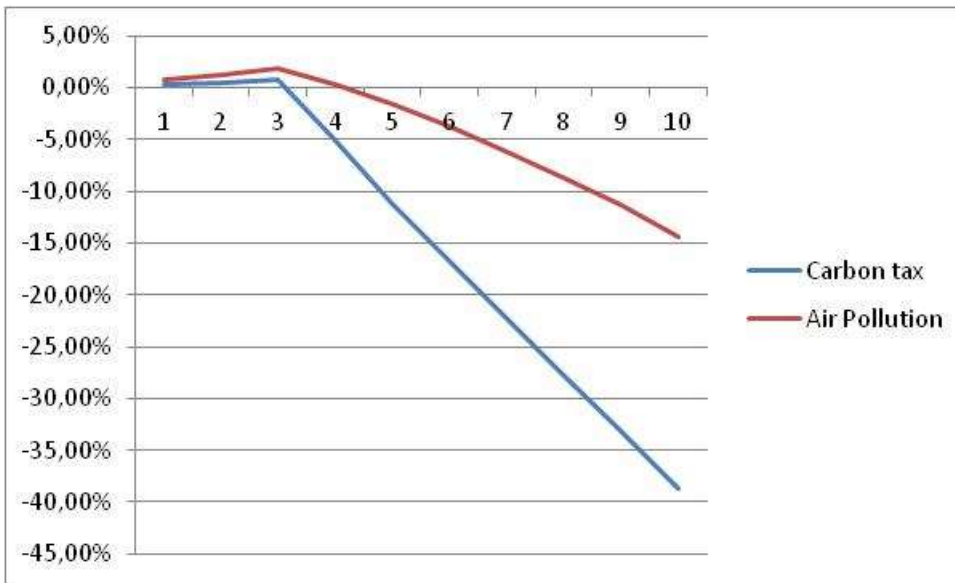


Figure 14. Annual value changes for pollution



In terms of income distribution with this policy there is not a variation for the 4 typology of households considered.

Figure 15. total factor, tax and institution growth

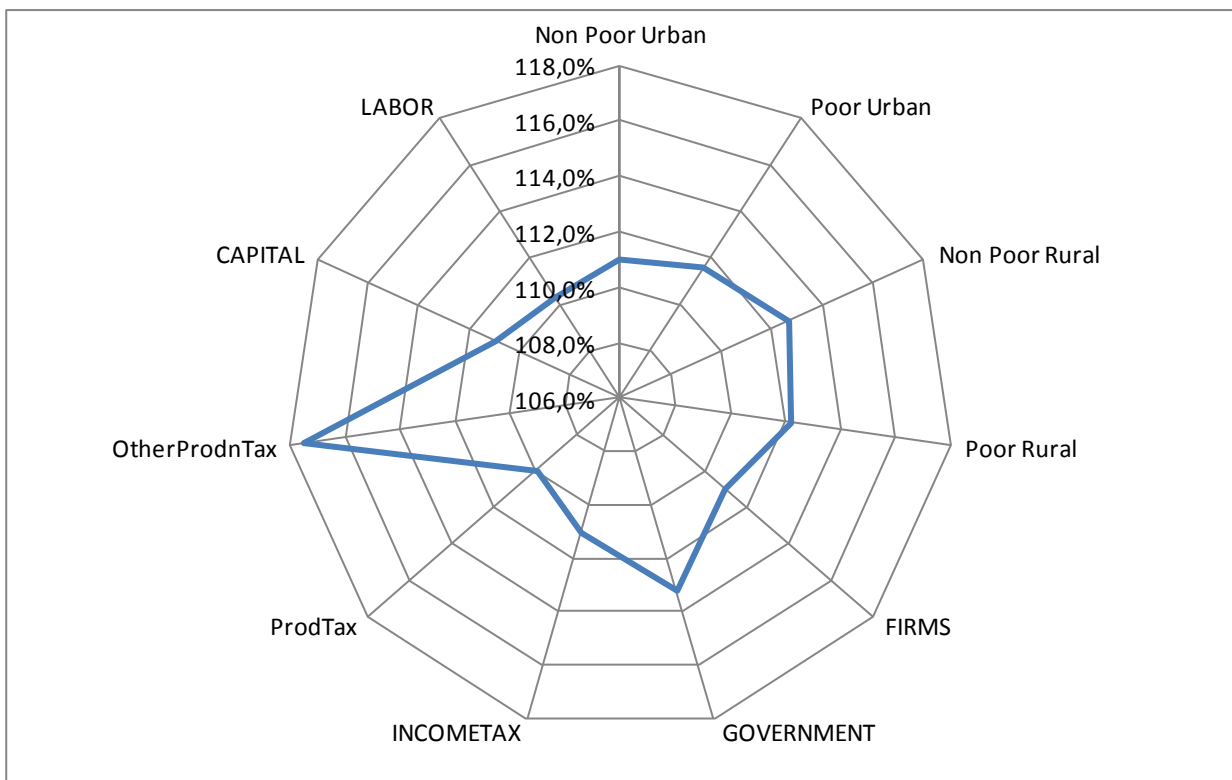


Figure 16. total industry sectors growth

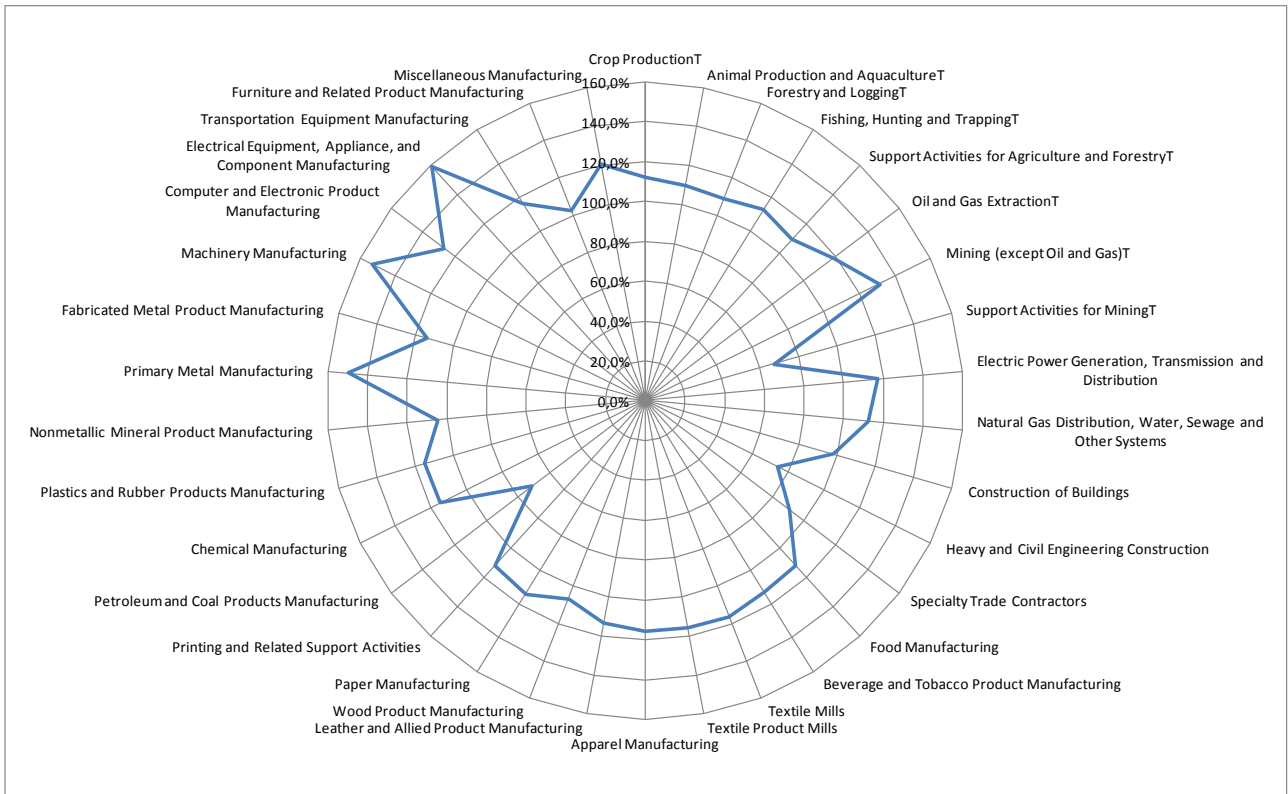
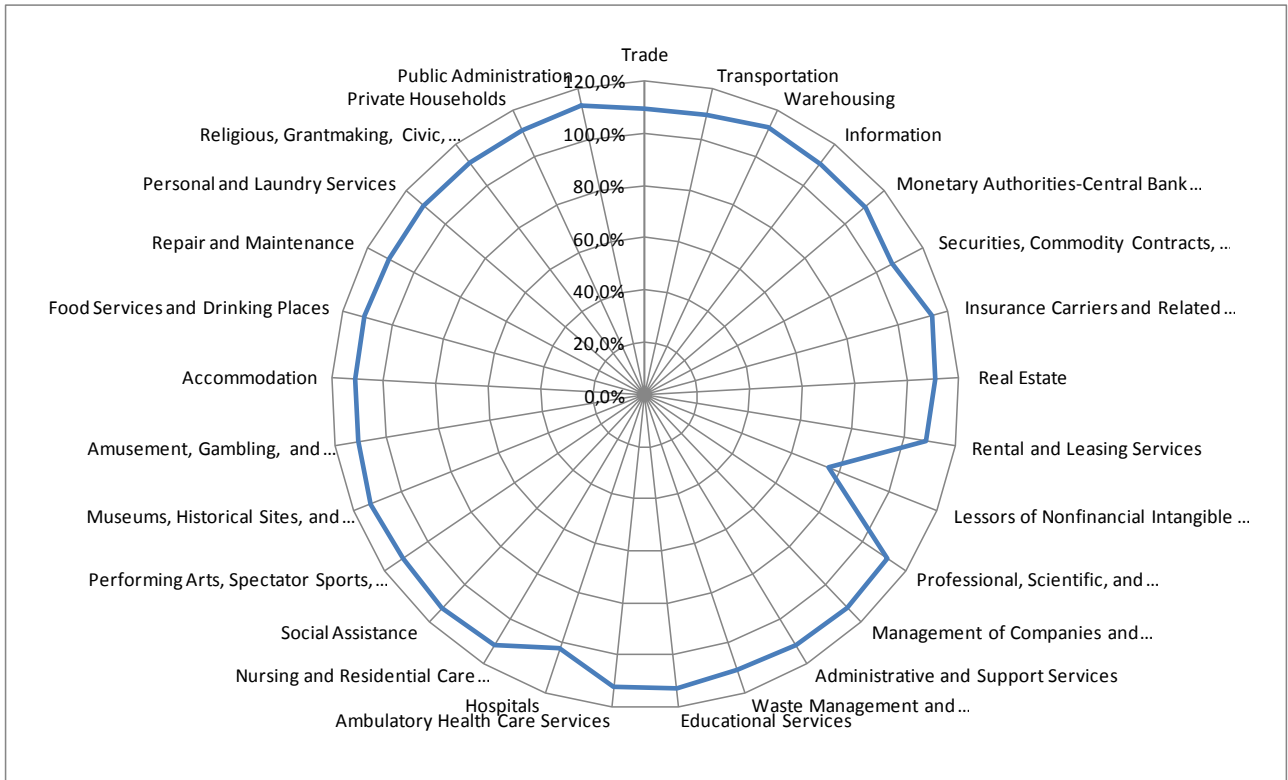


Figure 17. total services sectors growth



Conclusions

In this analysis we have considered Mexico as a case study for the due diligence process that could be used to back up the issuance of sovereign green bonds on the part of the Government or, alternatively, on the part of local authorities backed by Government guarantees. Using only publicly available information and a simple multi-criteria rating tool, the credibility of the Mexican government has been evaluated with respect to several qualitative dimensions of its green policies. More generally, in addition to the green financing reference, this rating can be considered an indication of the “green stance” of Mexico as an agent to improve the environment and of its commitment to a low carbon economy and a healthier environment.

A social accounting matrix (SAM) has also been estimated and applied to the problem on hand to evaluate the impact of a plausible package of green investment public projects coherent with the policy measures undertaken by the Mexican Government, including the carbon tax recently introduced. This evaluation adds a quantitative dimension to the green rating and shows that sizable gains could be obtained by implementing a green investment program. These gains, which would accrue to all income groups, would be synergic with the gains obtained from the emission reductions from the carbon tax and from the investment directly financed by the private sector, in response to the government incentives for cleaner technologies.

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ANNEX 1: Multicriteria questions

Economic Evaluation

- Goal setting and aligning policies across and within levels of government.
- Specific financial policies, regulations, tools and instruments that provide transitional support for new green technologies
- Policy measures designed to enable investment and strengthen market incentives for low carbon infrastructure.
- Policy measures to promote green business and consumer behavior
- Number of International protocols signed by country
- Number of Environmental Taxes
- CHG reduction (%)
- 10 years EPI trend

SAM impact

- Growth
- Structural change
- Income distribution
- lower emissions

Credibility of the environmental concern and activities

Account and Internal Tracking

- Has the borrower established internal accounts for the proceeds of the bond?
- Has the borrower put in place internal audit procedures for the use of the proceeds of the account?
- Does the borrower have detailed procedures for disbursement of funds from the bond proceed accounts?
- Does the borrower have adequate procedures in place of tracing the disbursement of the proceeds of the bonds?
- Is the accounts for the proceeds differentiated by the Programs?
- Are all procedures and auditing of accounts of the bonds proceeds been or will be made public?

Selection Project and Investment

- Is there a rigorous process of selection of green investment?
- Is the selection of underlying Programs consistent with the Green Principles?
- Is there a track record of implementation of these type of Programs in the project areas?
- Has the Programs been subject to financial and economic analysis?
- Are the financial viability of these Programs dependent on subsidies?
- Is the project compliant with legal and regulatory requirements of the state, including possibly rights for the emission reductions or other green benefits?

Readiness For Implementation

- Have the project components of the program been identified?

- Have some of the projects been designed including engineering specifications?
- Has stakeholder consultations been completed?
- Have the Programs risks been sufficiently mitigated?

Internal Mechanisms for Environmental Review

- Does the borrower have in place procedures for environmental review?
- Is the environmental review independent of the project team or implementors?
- Are the standards for the environmental review comparable to international standards?
- In the event of environmental adverse consequences, does the borrower have procedures in place for mitigating the impact?

Quality of Social Responsibility

- Does the borrower have procedures or standards for social impact review of eligible Programs?
- Is the team doing the social review independent of the project team?
- Does the borrower have internal standards for social impact assessment eg resettlement procedures and standards?
- Will the borrower have stakeholder consultations on project investments with parties impacted by the project(s)?

Legal aspects and strengths

- Has the borrower entered into contracts for some or all the eligible Programs?
- Has the borrower organized a specific capacity for review of legal documentation?
- Is the determination of who has the entitlement to the revenue from the Programs clearly established legally?
- Are the legal partners experienced in the eligible countries?
- Does the Implementation contain appropriate warranties and indemnities?
- Has specific legislation been issued or being implemented for the legal agreements concerning the program?

Reputational, Local and Environmental Risks

Political risks

- Does the Program categories have popular support among NGOs?
- Are socioeconomic conditions stable in the areas of the program/project planned? (unemployment, consumer confidence, poverty)
- Are local bodies and governments generally favorable to this type of project?
- Is corruption a threat to program implementation?
- Are there no pending or active environmental legal actions which may affect the program?

State financial risks

- Are the financial situations with state and or local governments stable?

State economic risks

- Is state GDP growth healthy compared to average?

Site specific political risks

- Is local government in the region where the project is to be implemented stable?
- Is the region where the project is to be implemented socially stable (unemployment, strike risk, consumer confidence, poverty)?
- Is the region where the project is to be implemented criminal inactive?
- Is local government keen on environmentally and socially friendly Programs?

Business climate risks

- Is the region of the project economically stable?
- Are legislation and regulations that could affect the project's success known and stable?

Infrastructure development

- Is there sufficient reliable transport and highways leading to the project to carry out activities?
- Is there power supply available suited for the type of project being undertaken?
- Is there sufficient local capability - local workforce, consultants, contractors etc?
- Is the market for the contractors that are going to be needed well established and robust?

Natural hazards

- Is expected risk and impact of flooding mitigated?
- Is expected risk and impact of extreme weather mitigated?
- Is expected risk and impact of hurricanes/ tornadoes low or mitigated?

Borrowers Capacity to Carry out Programs

Competencies and experience

- Does the government have a track record of carrying out successfully Programs of similar or larger complexity?
- Does the technical team have experience in the program area?

Soft and hard resources

- Does the Government have the required staff or consultants of sufficient caliber to carry out the technology and activities of the program/project?
- Does the Government have facilities that will allow in situ supervision of the program and its different projects?

Financial resources and liabilities

- Has the Program Financing been authorized by the Country different authorities (Government, Parliament)?
- If a Government agency has been chosen as program developer, does it have pending legal cases that may affect its ability to carry out the program?
- Does the implementing agency have a strong statewide or national reputation?

Program Definition and Execution

Concept selection

- Are there Preparatory studies such as a Program Master Plan and Feasibility Reports of adequate quality?
- Has a sufficiently wide range of alternatives been considered during the phase of preparatory studies?
- Did the criteria for selection of the preferred alternative consider economic, commercial, environmental as well as social impacts?
- Are operations and maintenance requirements incorporated in the selected development concept and plan?
- Are the key stakeholders aligned with the concept selection?

Business planning

- Is there a Business Plan of an appropriate quality?
- Have critical project milestones and checkpoints (including future decisions and commitments) been identified?
- Is there an appropriate project/venture execution strategy (i.e. outsourcing strategy)?
- Are the economics, timelines and needed resources modeled to an appropriate level and do they justify continuation?
- Has a preliminary environmental and social impact assessment been completed?
- Is the legal framework (including corporate vehicle) in place to move to the next phase of the project?
- Are all permits needed identified and is the plan to acquire these realistic?
- Is there a detailed plan for financing of the project in place?

Design

- Is there a Project Execution Plan of adequate quality (does it include all business aspects; IT, HR, Finance, etc.)?
- Is the General manager of the project appointed?
- Is the outsourcing structure of the project manageable and does it cover the range of project risks?
- Is there a detailed plan for procurement, with realistic assumptions for the stages in procurement?
- Have bids for the most important contracts been received.
- Have the required construction permits been secured?

Construction

- Is the contractor at the construction stage well established and does it have a reliable track record?
- Is there a crisis management plan, considering escalation scenarios during execution?
- Has the project operations staff been adequately trained ?
- Are the critical spare parts available?

O&M

- Are the operations resources, systems, processes and procedures performing in accordance with the requirements?

- is there an operations economic model updated with realistic costs?
- Are all permits for operations in place?

Work planning

- Does the project have a clearly defined Work Breakdown Structure of all stages of the project?
- Are there clear estimates of costs, time and resources for all activities?
- Is the project plan realistic and achievable?

Cost Management

- Does the project have a detailed capex cost estimate for the next stage of the project, based on work-level activities
- Is there a contingency plan to cover budget overruns?
- Is the project budget estimate realistic and achievable?

Risk Management

- Is there an issues (risks + opportunities) management system and is this implemented?
- Are all project issues and problems identified, documented and acted upon?
- Is there a list of stakeholders that will be impacted during design, construction and operations?
- Is there an appropriate stakeholder engagement plan and is this being implemented?
- Has the project been pro-active in their engagement with key stakeholders?
- Is there evidence of strong positive stakeholder support for the project?

Organization

- Is the chosen organization structure fit for purpose for the current stage of the project?
- Does the form of leadership match the organization structure and type of business?
- Does upper management fully support the project efforts?
- Are there regular project team meetings to discuss project status and identify any issues likely to occur?

Health, Safety and Environment (HSE)

- Does the project have an adequate Health, Safety and Environmental (HSE) Management System (policies, guidelines, procedures)?
- Does the project comply with environmental and zoning regulatory requirements?
- Has the project adequately addressed its health risks associated with its activities?

Reporting

- Is there a clear project reporting system in place?
- Is there evidence that the project has an adequate data management and filing system?

Audit & quality assurance

- Does the project have a formal quality management system implemented?
- Does the project have an Audit and Review plan for the duration of the project?

Commitment of the issuer to the use of the funds obtained

Use and Control Funds

- Are program activities reliant on proven technologies?
- Have the policies promoted by the Program been successfully applied previously within the operating environment?
- Are there reliable Public Investment Management practices to implement?
- Are there sufficient supplies of skills available to operate the technologies involved by the Program?

Size and complexity

- Has a program of this size been executed before ?
- Has a program of this size been previously successfully executed within the operating environment?
- Are there sufficient skills available to execute a program of this size ?
- Is the complexity of this program appropriate to the operating environment?
- Are there skills available to operate a program of this complexity?

Reporting Evaluation and Assurance

Report Transparencies

- Is there in place a reporting mechanism for each project in the eligible portfolio?
- Is the reporting mechanism frequency adequate ?
- Does the government have a policy and mechanism for reporting the results of environmental and social assessments?
- Will the Projects be reviewed or have been reviewed by a credible independent certifier?
- Has the government developed the capabilities to report on quantitative and qualitative outcomes?
- Does the borrower have sufficiently robust procedures for monitoring and evaluation?

Quantitative Evaluation

- Are the environmental benefits quantifiable?
- Has a baseline been established for measuring the quantifiable benefits?
- Does the government or its advisors have the experience and capability to quantify the environmental benefits?
- Has the government agreed on specified performance indicators to track program/ project(s) benefits?

Qualitative Evaluation

- Is there a satisfactory and clear description of both quantifiable and non quantifiable green benefits?
- Are the qualitative benefits mainly directly attributable to the project(s)?
- Are there health benefits to the project(s)?
- Are there poverty reduction benefits to the Programs?

Stakeholder Consultation

- Are there procedures and plans for stakeholder consultation on investments?
- Are any of the Programs located in indigenous peoples areas where specialized consultation and rights will need to be observed?

- Has the borrower budgeted for these consultations?
- Will the results of these consultations be publically reported?

Publicly Available

- Does the government have plans or available reviews and audits of past project performance?
- In measuring impact, will the borrower use credible third parties or independent borrower teams?
- Will the government establish baseline scenarios that can be publicly made available?

Thirdly party independent verification

- Will the government or its implementing agencies hire independent certifiers for measuring and reporting quantitative results such as carbon emission reductions?
- Is the possible third party verifier experienced in the type of Programs funded by the proceeds of the loan?
- Has a sufficient budget been designated for third party auditors?
- Are there plans to have independent reviews during implementation?

ANNEX 2: Initial SAM

	Non Poor Urban	Poor Urban	Non Poor Rural	Poor Rural	FIRMS	GOVERNMENT
Non Poor Urban	0	0	0	0	6.153.693	221.029
Poor Urban	0	0	0	0	656.345	64.888
Non Poor Rural	0	0	0	0	413.439	41.067
Poor Rural	0	0	0	0	191.514	17.421
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	456.581	21.164	30.681	6.960	476.085	0
ProdTax	493.105	22.857	33.136	7.516	0	0
OtherProdnTax	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
LABOR	0	0	0	0	0	0
Crop ProductionT	63.598	23.506	11.379	7.521	0	0
Animal Production and AquacultureT	22.929	8.475	4.103	2.712	0	0
Forestry and LoggingT	1.464	541	262	173	0	0
Fishing, Hunting and TrappingT	6.301	2.329	1.127	745	0	0
Support Activities for Agriculture and ForestryT	111	41	20	13	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	0	0	0	0	0	0
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	103.710	23.781	10.370	4.062	0	0
Natural Gas Distribution, Water, Sewage and Other Systems	14.969	3.432	1.497	586	0	0
Construction of Buildings	0	0	0	0	0	37
Heavy and Civil Engineering Construction	0	0	0	0	0	0
Specialty Trade Contractors	0	0	0	0	0	0
Food Manufacturing	927.523	177.387	114.521	48.232	0	0
Beverage and Tobacco Product Manufacturing	171.901	32.876	21.225	8.939	0	0
Textile Mills	11.052	2.114	1.365	575	0	0
Textile Product Mills	10.505	2.009	1.297	546	0	0
Apparel Manufacturing	59.809	11.438	7.385	3.110	0	0
Leather and Allied Product Manufacturing	25.693	4.914	3.172	1.336	0	0
Wood Product Manufacturing	4.743	907	586	247	0	0
Paper Manufacturing	27.607	5.280	3.409	1.436	0	0
Printing and Related Support Activities	4.408	843	544	229	0	2.535
Petroleum and Coal Products Manufacturing	211.971	40.539	26.172	11.023	0	0
Chemical Manufacturing	195.150	37.322	24.095	10.148	0	0
Plastics and Rubber Products Manufacturing	45.390	8.681	5.604	2.360	0	0
Nonmetallic Mineral Product Manufacturing	40.979	7.837	5.060	2.131	0	0
Primary Metal Manufacturing	664	127	82	35	0	0
Fabricated Metal Product Manufacturing	35.139	6.720	4.339	1.827	0	0

Machinery Manufacturing	1.793	343	221	93	0	0
Computer and Electronic Product Manufacturing	2.825	540	349	147	0	0
Electrical Equipment, Appliance, and Component Manufacturing	27.468	5.253	3.391	1.428	0	0
Transportation Equipment Manufacturing	229.264	43.846	28.307	11.922	0	0
Furniture and Related Product Manufacturing	21.878	4.184	2.701	1.138	0	0
Miscellaneous Manufacturing	32.762	6.266	4.045	1.704	0	0
Trade	1.133.952	216.866	140.008	58.966	0	0
Transportation	696.237	177.104	104.127	44.455	0	0
Warehousing	7.986	2.031	1.194	510	0	0
Information	306.062	33.235	19.875	4.187	0	103
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	349.407	4.550	8.570	130	0	2.353
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	11.464	149	281	4	0	0
Insurance Carriers and Related Activities	123.821	1.612	3.037	46	0	0
Real Estate	1.559.885	20.312	38.259	581	0	23
Rental and Leasing Services	6.869	89	168	3	0	0
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	0	0	0
Professional, Scientific, and Technical Services	51.752	674	1.269	19	0	19.965
Management of Companies and Enterprises	0	0	0	0	0	0
Administrative and Support Services	26.660	2.182	2.422	472	0	0
Waste Management and Remediation Services	4.378	457	480	129	0	0
Educational Services	128.155	17.420	6.562	2.673	0	557.470
Ambulatory Health Care Services	63.936	6.670	7.006	1.878	0	125.639
Hospitals	30.534	1.050	3.764	900	0	206.017
Nursing and Residential Care Facilities	1.486	155	163	44	0	716
Social Assistance	5.334	556	585	157	0	11.835
Performing Arts, Spectator Sports, and Related Industries	22.253	1.821	2.021	394	0	2.015
Museums, Historical Sites, and Similar Institutions	837	68	76	15	0	6.768
Amusement, Gambling, and Recreation Industries	43.041	3.522	3.910	762	0	748
Accommodation	138.424	11.328	12.574	2.452	0	0
Food Services and Drinking Places	188.874	15.457	17.157	3.346	0	0
Repair and Maintenance	54.636	4.471	4.963	968	0	0
Personal and Laundry Services	131.516	10.763	11.947	2.330	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	41.556	3.401	3.775	736	0	0
Private Households	59.796	4.894	5.432	1.059	0	0
Public Administration	2.261	185	205	40	0	927.762
Carbon tax	0	0	0	0	0	551
Air Pollution	16.531	3.864	1.392	482	0	0
SAVINV	1.021.753	102.235	88.419	24.555	1.795.367	377.249
RoW	497.903	13.448	120	0	126.356	1.644
TOTAL	9.978.592	1.166.124	840.205	291.187	9.812.801	2.587.834

	INCOMETAX	ProdTax	OtherProdnTax	CAPITAL	LABOR	Crop ProductionT
Non Poor Urban	0	0	0	0	3.487.572	0
Poor Urban	0	0	0	0	393.581	0
Non Poor Rural	0	0	0	0	286.883	0
Poor Rural	0	0	0	0	58.711	0
FIRMS	0	0	0	9.812.801	0	0
GOVERNMENT	991.471	616.897	967.143	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	0	0	0	0	0	0
OtherProdnTax	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	265.056
LABOR	0	0	0	0	0	57.333
Crop ProductionT	0	0	0	0	0	6.817
Animal Production and AquacultureT	0	0	0	0	0	1.118
Forestry and LoggingT	0	0	0	0	0	0
Fishing, Hunting and TrappingT	0	0	0	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	5.544
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	0	0	0	0	0	371
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	0	0	0	0	0	4.576
Natural Gas Distribution, Water, Sewage and Other Systems	0	0	0	0	0	4.284
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0	0
Specialty Trade Contractors	0	0	0	0	0	2
Food Manufacturing	0	0	0	0	0	9
Beverage and Tobacco Product Manufacturing	0	0	0	0	0	0
Textile Mills	0	0	0	0	0	0
Textile Product Mills	0	0	0	0	0	883
Apparel Manufacturing	0	0	0	0	0	0
Leather and Allied Product Manufacturing	0	0	0	0	0	0
Wood Product Manufacturing	0	0	0	0	0	563
Paper Manufacturing	0	0	0	0	0	691
Printing and Related Support Activities	0	0	0	0	0	0
Petroleum and Coal Products Manufacturing	0	0	0	0	0	10.592
Chemical Manufacturing	0	0	0	0	0	21.324
Plastics and Rubber Products Manufacturing	0	0	0	0	0	1.511
Nonmetallic Mineral Product Manufacturing	0	0	0	0	0	1
Primary Metal Manufacturing	0	0	0	0	0	448
Fabricated Metal Product Manufacturing	0	0	0	0	0	12
Machinery Manufacturing	0	0	0	0	0	1.073

Computer and Electronic Product Manufacturing	0	0	0	0	0	2
Electrical Equipment, Appliance, and Component Manufacturing	0	0	0	0	0	8
Transportation Equipment Manufacturing	0	0	0	0	0	146
Furniture and Related Product Manufacturing	0	0	0	0	0	0
Miscellaneous Manufacturing	0	0	0	0	0	26
Trade	0	0	0	0	0	10.394
Transportation	0	0	0	0	0	2.671
Warehousing	0	0	0	0	0	11
Information	0	0	0	0	0	1
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	0	0	0	0	0	2.016
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	0	0	0	0	0
Insurance Carriers and Related Activities	0	0	0	0	0	627
Real Estate	0	0	0	0	0	4
Rental and Leasing Services	0	0	0	0	0	2.457
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	0	0	0
Professional, Scientific, and Technical Services	0	0	0	0	0	523
Management of Companies and Enterprises	0	0	0	0	0	0
Administrative and Support Services	0	0	0	0	0	301
Waste Management and Remediation Services	0	0	0	0	0	0
Educational Services	0	0	0	0	0	1
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	0	0	0	0	0	0
Food Services and Drinking Places	0	0	0	0	0	2
Repair and Maintenance	0	0	0	0	0	150
Personal and Laundry Services	0	0	0	0	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	0	0	0	0	0	29
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	0	0	0	0	0	189
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	0	0	0	0	0	35.413
TOTAL	991.471	616.897	967.143	9.812.801	4.226.748	437.180

	Animal Production and AquacultureT	Forestry and LoggingT	Fishing, Hunting and TrappingT	Support Activities for Agriculture and ForestryT	Oil and Gas ExtractionT	Mining (except Oil and Gas)T
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	378	19	0	0	0	0
OtherProdnTax	27	0	171	10	850.095	704
CAPITAL	105.348	13.617	5.559	5.958	116.606	200.043
LABOR	20.335	1.080	1.554	1.134	23.636	15.367
Crop ProductionT	51.274	36	7	686	0	0
Animal Production and AquacultureT	242	0	0	0	0	0
Forestry and LoggingT	0	482	0	0	0	0
Fishing, Hunting and TrappingT	0	0	157	0	0	0
Support Activities for Agriculture and ForestryT	143	1.118	7	24	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	254	29	147	0	136	32.091
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	370	47	50	132	2.127	5.514
Natural Gas Distribution, Water, Sewage and Other Systems	1.630	1	256	9	0	839
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0	0
Specialty Trade Contractors	0	0	0	0	0	6
Food Manufacturing	63.705	5	20	0	0	1
Beverage and Tobacco Product Manufacturing	19	0	490	0	0	1
Textile Mills	0	0	0	0	0	0
Textile Product Mills	0	17	0	0	0	37
Apparel Manufacturing	15	0	0	0	0	1
Leather and Allied Product Manufacturing	0	101	0	0	0	8
Wood Product Manufacturing	1	0	0	0	0	13
Paper Manufacturing	759	16	0	11	0	15
Printing and Related Support Activities	0	0	0	0	11	13
Petroleum and Coal Products Manufacturing	1.450	13	3.136	148	12.590	8.721
Chemical Manufacturing	262	81	77	302	27.776	1.650

Plastics and Rubber Products Manufacturing	15	35	0	22	0	45
Nonmetallic Mineral Product Manufacturing	50	0	0	0	498	183
Primary Metal Manufacturing	0	5	1	0	0	227
Fabricated Metal Product Manufacturing	3	6	0	0	2.690	131
Machinery Manufacturing	80	0	139	0	22	350
Computer and Electronic Product Manufacturing	0	14	1	185	49	7
Electrical Equipment, Appliance, and Component Manufacturing	0	0	0	0	62	75
Transportation Equipment Manufacturing	65	0	219	0	0	1.124
Furniture and Related Product Manufacturing	0	0	0	0	0	0
Miscellaneous Manufacturing	0	0	0	0	7	2
Trade	16.826	158	448	268	11.859	4.236
Transportation	2.715	26	521	57	3.410	1.106
Warehousing	0	0	0	0	0	18
Information	33	38	24	27	1.014	216
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	979	29	66	0	5.026	1.176
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	0	0	0	0	274
Insurance Carriers and Related Activities	40	103	27	0	459	426
Real Estate	2	0	22	42	0	268
Rental and Leasing Services	12	0	219	3	44	2.106
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	0	134	1.007
Professional, Scientific, and Technical Services	258	45	4	45	4.095	2.991
Management of Companies and Enterprises	0	0	1	58	12.933	199
Administrative and Support Services	144	0	233	45	3.336	3.640
Waste Management and Remediation Services	0	0	0	0	152	0
Educational Services	0	0	0	0	0	0
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	0	0	0	0	1.179	38
Food Services and Drinking Places	0	7	193	0	406	90

Repair and Maintenance	345	117	2	15	97	791
Personal and Laundry Services	0	0	0	0	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	9	9	9	19	18	118
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	26	0	56	3	224	155
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	16.794	1.440	391	1.257	11.941	11.707
TOTAL	284.608	18.696	14.209	10.458	1.092.629	297.733

	Support Activities for MiningT	Electric Power Generation, Transmission and Distribution	Natural Gas Distribution, Water, Sewage and Other Systems	Construction of Buildings	Heavy and Civil Engineering Construction	Specialty Trade Contractors
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	0	0	690	0	0	0
OtherProdnTax	1.364	1.937	1.105	1.752	1.333	205
CAPITAL	73.837	153.764	37.772	465.894	196.312	85.469
LABOR	30.922	30.720	17.110	367.135	100.234	44.025
Crop ProductionT	0	21	0	109	106	288
Animal Production and AquacultureT	0	0	0	0	0	0
Forestry and LoggingT	0	0	0	4	0	0
Fishing, Hunting and TrappingT	0	0	0	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	760	5.741	261	14.905	7.163	1.082
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	1.667	2.367	499	3.686	1.077	756
Natural Gas Distribution, Water, Sewage and Other Systems	94	360	1	532	542	321
Construction of Buildings	0	0	0	11.799	0	0
Heavy and Civil Engineering Construction	0	0	0	0	22.921	0

Specialty Trade Contractors	6.053	1.509	0	81.865	47.823	552
Food Manufacturing	0	12	1	67	0	0
Beverage and Tobacco Product Manufacturing	0	16	0	74	46	0
Textile Mills	0	1	0	3	0	0
Textile Product Mills	0	0	0	517	14	17
Apparel Manufacturing	38	139	0	95	155	0
Leather and Allied Product Manufacturing	0	362	0	254	197	68
Wood Product Manufacturing	1.948	0	0	9.448	2.798	738
Paper Manufacturing	27	212	126	608	231	115
Printing and Related Support Activities	21	38	0	162	187	603
Petroleum and Coal Products Manufacturing	1.538	68.134	1.910	15.773	16.877	7.333
Chemical Manufacturing	2.016	40.983	5.909	12.350	7.122	1.613
Plastics and Rubber Products Manufacturing	108	9	3	16.793	2.686	407
Nonmetallic Mineral Product Manufacturing	3.759	30	0	83.689	25.967	2.239
Primary Metal Manufacturing	9.611	5	164	46.931	25.864	4.264
Fabricated Metal Product Manufacturing	1.414	368	1	23.926	8.694	3.698
Machinery Manufacturing	798	5	0	4.013	1.653	3.386
Computer and Electronic Product Manufacturing	148	1.204	38	529	397	1.925
Electrical Equipment, Appliance, and Component Manufacturing	9	9	0	9.042	6.202	4.669
Transportation Equipment Manufacturing	103	115	0	329	501	38
Furniture and Related Product Manufacturing	3	0	0	3.010	331	0
Miscellaneous Manufacturing	94	85	5	369	413	521
Trade	7.052	24.919	2.437	58.653	28.498	6.112
Transportation	1.695	8.469	711	11.825	7.363	1.385
Warehousing	2	42	0	35	0	0
Information	229	676	206	6.747	1.862	1.345
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	812	692	1	12.929	11.389	2.724
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	0	0	3.242	2.625	20
Insurance Carriers and Related Activities	264	382	60	635	1.845	46
Real Estate	134	102	186	2.203	140	1.069
Rental and Leasing Services	3.992	212	33	3.783	4.034	716
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	32	0	0	7	41	211
Professional, Scientific, and Technical Services	10.383	3.653	816	11.228	8.423	687

Management of Companies and Enterprises	591	703	200	114	16	0
Administrative and Support Services	4.936	694	1.042	14.265	8.754	1.115
Waste Management and Remediation Services	171	98	0	0	0	0
Educational Services	0	147	0	3	0	0
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	179	522	197	1.921	2.469	209
Food Services and Drinking Places	268	78	0	12	0	0
Repair and Maintenance	254	303	400	3.332	3.938	866
Personal and Laundry Services	0	0	0	7	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	152	8	0	127	177	22
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	27	1.214	34	281	301	131
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	18.910	45.926	3.957	152.145	74.846	14.426
TOTAL	186.417	396.989	75.876	1.459.156	634.569	195.415

	Food Manufacturing	Beverage and Tobacco Product Manufacturing	Textile Mills	Textile Product Mills	Apparel Manufacturing	Leather and Allied Product Manufacturing
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	3.248	656	0	13	301	62
OtherProdTax	1.850	1.263	414	144	884	191
CAPITAL	534.702	98.021	12.489	12.171	46.896	14.535

LABOR	88.141	21.240	7.935	4.020	19.033	8.945
Crop ProductionT	133.111	7.519	4.445	132	122	0
Animal Production and AquacultureT	221.567	6	584	0	4	101
Forestry and LoggingT	487	0	121	0	0	237
Fishing, Hunting and TrappingT	2.083	0	0	0	19	0
Support Activities for Agriculture and ForestryT	0	0	2.201	0	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	756	0	3	0	0	0
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	16.140	3.683	2.529	449	830	540
Natural Gas Distribution, Water, Sewage and Other Systems	5.810	5.755	331	44	151	160
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0	0
Specialty Trade Contractors	655	16	21	33	213	15
Food Manufacturing	153.297	38.441	26	13	12	4.929
Beverage and Tobacco Product Manufacturing	116	882	8	14	5	0
Textile Mills	7	0	3.114	2.138	14.596	796
Textile Product Mills	865	4	137	342	594	56
Apparel Manufacturing	240	7	3	219	8.487	2
Leather and Allied Product Manufacturing	811	67	0	2	397	5.598
Wood Product Manufacturing	1.207	823	37	25	15	22
Paper Manufacturing	6.835	1.052	477	70	397	290
Printing and Related Support Activities	420	45	13	9	70	54
Petroleum and Coal Products Manufacturing	26.539	5.072	1.035	221	1.044	433
Chemical Manufacturing	17.610	1.619	4.616	1.476	685	990
Plastics and Rubber Products Manufacturing	17.256	10.550	176	44	157	2.275
Nonmetallic Mineral Product Manufacturing	3.474	13.133	4	1	0	0
Primary Metal Manufacturing	7	0	14	12	11	73
Fabricated Metal Product Manufacturing	3.400	5.856	3	37	52	89
Machinery Manufacturing	1.933	4	6	3	6	1
Computer and Electronic Product Manufacturing	254	195	1	1	16	2
Electrical Equipment, Appliance, and Component Manufacturing	10	0	0	2	1	0
Transportation Equipment Manufacturing	515	788	8	13	3	7
Furniture and Related Product Manufacturing	0	0	0	0	0	0
Miscellaneous Manufacturing	415	9	16	14	636	68
Trade	136.606	14.968	4.678	1.470	8.610	4.091

Transportation	28.109	3.197	996	353	2.850	552
Warehousing	898	346	95	32	190	21
Information	3.891	611	105	52	229	112
Monetary Authorities- Central Bank and Credit Intermediation and Related Activities	4.253	1.099	413	52	271	133
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	1.869	123	2	5	45	0
Insurance Carriers and Related Activities	524	57	23	30	85	16
Real Estate	7.092	558	146	152	1.277	321
Rental and Leasing Services	1.967	301	115	55	359	76
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	106	24	2	5	2
Professional, Scientific, and Technical Services	12.858	4.123	559	379	1.636	324
Management of Companies and Enterprises	4.079	968	88	60	315	152
Administrative and Support Services	32.812	6.485	2.052	671	2.958	1.650
Waste Management and Remediation Services	0	0	0	0	3	0
Educational Services	6	0	0	0	3	0
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	488	83	20	3	22	14
Food Services and Drinking Places	583	82	31	20	122	38
Repair and Maintenance	2.649	292	145	158	127	95
Personal and Laundry Services	9	18	0	0	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	309	15	18	7	9	15
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	473	90	18	4	19	8
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	194.798	36.184	16.771	13.513	40.949	14.775
TOTAL	1.678.031	286.411	67.066	38.680	155.719	62.868

	Wood Product Manufacturing	Paper Manufacturing	Printing and Related Support Activities	Petroleum and Coal Products Manufacturing	Chemical Manufacturing	Plastics and Rubber Products Manufacturing
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	0	0	0	10.613	0	222
OtherProdnTax	68	404	234	342	6.011	872
CAPITAL	17.009	37.341	11.361	87.781	242.788	50.593
LABOR	9.872	11.441	7.351	22.640	52.139	21.855
Crop ProductionT	445	1	0	0	1.039	57
Animal Production and AquacultureT	0	0	0	0	287	0
Forestry and LoggingT	9.935	12	0	0	466	3.410
Fishing, Hunting and TrappingT	0	3	1	0	10	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	0	516.578	73.601	0
Mining (except Oil and Gas)T	0	314	0	490	10.943	22
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	1.296	5.059	698	304	5.680	5.260
Natural Gas Distribution, Water, Sewage and Other Systems	56	618	83	87	1.329	507
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0	0
Specialty Trade Contractors	23	66	32	0	41	278
Food Manufacturing	2	563	2	0	1.493	50
Beverage and Tobacco Product Manufacturing	0	9	0	0	172	10
Textile Mills	65	3.643	1	0	28	418
Textile Product Mills	0	0	4	0	2	455
Apparel Manufacturing	0	40	19	87	59	8
Leather and Allied Product Manufacturing	1	1	1	169	85	163
Wood Product Manufacturing	5.396	707	20	265	396	265
Paper Manufacturing	28	27.250	6.982	111	5.131	1.424
Printing and Related Support Activities	31	63	1.306	6	528	110
Petroleum and Coal Products Manufacturing	3.620	4.319	690	9.738	8.852	1.874
Chemical Manufacturing	1.097	4.128	2.879	2.135	82.540	35.406

Plastics and Rubber Products Manufacturing	480	964	828	345	5.955	4.086
Nonmetallic Mineral Product Manufacturing	11	2	23	164	605	103
Primary Metal Manufacturing	5	29	6	5	66	728
Fabricated Metal Product Manufacturing	73	51	5	6.657	1.863	996
Machinery Manufacturing	52	74	6	4	85	32
Computer and Electronic Product Manufacturing	4	7	64	37	23	29
Electrical Equipment, Appliance, and Component Manufacturing	2	1	1	0	12	11
Transportation Equipment Manufacturing	10	102	11	2	25	33
Furniture and Related Product Manufacturing	2	0	0	0	5	0
Miscellaneous Manufacturing	13	39	83	23	57	65
Trade	6.651	16.809	4.328	8.358	47.999	16.626
Transportation	1.685	3.018	735	4.111	13.438	4.509
Warehousing	27	190	137	132	775	801
Information	70	299	288	181	1.399	519
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	170	514	109	570	1.627	1.150
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	2	86	0	49	511	113
Insurance Carriers and Related Activities	19	218	17	16	649	354
Real Estate	180	892	509	89	1.690	1.241
Rental and Leasing Services	72	562	391	14	1.236	948
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	219	4	88	263	6
Professional, Scientific, and Technical Services	340	1.288	1.436	439	6.195	1.652
Management of Companies and Enterprises	33	225	278	3.343	3.570	449
Administrative and Support Services	551	4.133	1.996	930	18.231	9.557
Waste Management and Remediation Services	0	0	0	1	14	1
Educational Services	0	1	3	1	1	3
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0

Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	10	115	127	12	539	87
Food Services and Drinking Places	8	147	40	90	638	205
Repair and Maintenance	87	678	88	40	1.034	207
Personal and Laundry Services	0	0	3	0	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	7	109	5	6	120	51
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	64	77	12	174	158	33
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	5.908	37.509	8.541	369.787	195.098	100.524
TOTAL	65.482	164.341	51.740	1.047.015	797.500	268.379

	Nonmetallic Mineral Product Manufacturing	Primary Metal Manufacturing	Fabricated Metal Product Manufacturing	Machinery Manufacturing	Computer and Electronic Product Manufacturing	Electrical Equipment, Appliance, and Component Manufacturing
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	0	664	0	434	394	620
OtherProdnTax	591	470	719	1.016	1.276	776
CAPITAL	105.510	151.603	54.892	80.481	60.889	55.115
LABOR	24.154	13.670	24.910	28.429	49.115	26.342
Crop ProductionT	0	0	8	10	2	3
Animal Production and AquacultureT	0	0	0	0	0	0
Forestry and LoggingT	0	0	0	2	0	0
Fishing, Hunting and TrappingT	0	0	0	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	13.814	108.918	11	88	28	1.441
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	7.457	11.449	3.564	2.162	715	2.018

Natural Gas Distribution, Water, Sewage and Other Systems	503	556	581	333	66	133
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	12	0	0	0
Specialty Trade Contractors	19	128	156	145	843	682
Food Manufacturing	106	2	14	30	20	29
Beverage and Tobacco Product Manufacturing	3	0	0	3	2	3
Textile Mills	42	1	10	29	22	24
Textile Product Mills	1	0	3	9	4	3
Apparel Manufacturing	33	16	51	149	71	67
Leather and Allied Product Manufacturing	29	269	114	64	48	59
Wood Product Manufacturing	521	193	549	727	491	369
Paper Manufacturing	1.636	81	1.088	1.189	1.054	729
Printing and Related Support Activities	71	18	85	38	9	15
Petroleum and Coal Products Manufacturing	17.023	3.435	3.057	2.793	692	683
Chemical Manufacturing	8.449	2.830	3.013	1.126	1.149	1.603
Plastics and Rubber Products Manufacturing	325	99	1.797	2.078	2.521	6.209
Nonmetallic Mineral Product Manufacturing	15.120	56	697	490	704	1.301
Primary Metal Manufacturing	1.394	69.191	47.293	42.305	5.264	30.469
Fabricated Metal Product Manufacturing	202	4.186	10.830	6.111	1.109	2.236
Machinery Manufacturing	178	339	357	10.216	505	760
Computer and Electronic Product Manufacturing	11	15	174	465	7.067	1.249
Electrical Equipment, Appliance, and Component Manufacturing	9	263	131	640	956	4.191
Transportation Equipment Manufacturing	178	89	113	638	50	212
Furniture and Related Product Manufacturing	0	0	4	0	0	0
Miscellaneous Manufacturing	138	18	146	404	711	626
Trade	12.939	29.658	20.336	30.788	6.342	12.365
Transportation	3.068	6.832	5.096	9.938	5.423	5.270
Warehousing	192	513	406	363	1.248	371
Information	716	175	491	445	97	272
Monetary Authorities-Central	1.577	1.459	1.427	1.048	108	537

Bank and Credit Intermediation and Related Activities						
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	323	86	34	160	7	11
Insurance Carriers and Related Activities	290	128	264	480	1.986	820
Real Estate	1.306	646	1.695	1.044	1.800	1.035
Rental and Leasing Services	746	490	765	1.694	1.868	1.140
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	35	993	250	62	40	92
Professional, Scientific, and Technical Services	2.588	1.746	2.385	7.267	9.029	4.305
Management of Companies and Enterprises	683	154	413	1.003	190	397
Administrative and Support Services	8.717	4.409	8.230	10.472	5.208	5.364
Waste Management and Remediation Services	1	11	11	14	17	2
Educational Services	5	5	16	21	6	8
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	115	138	132	199	28	95
Food Services and Drinking Places	166	167	237	420	940	727
Repair and Maintenance	1.011	688	476	573	734	464
Personal and Laundry Services	0	0	0	0	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	99	73	57	57	12	39
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	303	61	54	50	12	12
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	27.797	109.179	85.890	134.447	627.434	182.636
TOTAL	260.190	526.169	283.044	383.150	798.308	353.931

	Transportation Equipment Manufacturing	Furniture and Related Product Manufacturing	Miscellaneous Manufacturing	Trade	Transportation	Warehousing
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	2.030	0	219	3.314	0	0
OtherProdnTax	1.452	360	401	23.010	0	423
CAPITAL	317.121	20.758	39.500	1.968.822	617.719	16.788
LABOR	77.998	9.830	19.252	412.873	263.333	12.652
Crop ProductionT	4	0	620	0	0	0
Animal Production and AquacultureT	0	0	0	0	0	0
Forestry and LoggingT	17	3	1	0	0	0
Fishing, Hunting and TrappingT	0	0	23	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	1.317	0	0	0
Mining (except Oil and Gas)T	245	4	87	36	143	0
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	8.644	545	1.451	45.188	5.901	1.628
Natural Gas Distribution, Water, Sewage and Other Systems	715	77	546	1.729	1.322	77
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	8	0
Specialty Trade Contractors	153	32	419	4.490	2.423	573
Food Manufacturing	169	16	39	18.545	99	22
Beverage and Tobacco Product Manufacturing	1	0	1	1.659	0	6
Textile Mills	6.214	1.138	885	2.157	0	0
Textile Product Mills	30	151	180	1.709	72	0

Apparel Manufacturing	382	12	97	1.340	211	119
Leather and Allied Product Manufacturing	4.255	181	93	23	4	0
Wood Product Manufacturing	1.157	8.155	2.380	14.346	0	0
Paper Manufacturing	2.680	169	2.079	16.289	394	250
Printing and Related Support Activities	120	14	28	2.137	547	389
Petroleum and Coal Products Manufacturing	2.273	1.179	1.210	16.192	299.613	5.151
Chemical Manufacturing	7.094	926	5.609	10.391	2.390	953
Plastics and Rubber Products Manufacturing	35.433	2.736	1.899	19.569	730	305
Nonmetallic Mineral Product Manufacturing	3.939	474	1.404	4.523	93	0
Primary Metal Manufacturing	52.052	2.681	10.747	2.691	34	0
Fabricated Metal Product Manufacturing	17.928	839	491	8.149	24	93
Machinery Manufacturing	8.579	9	18	2.697	2.500	3
Computer and Electronic Product Manufacturing	2.011	3	291	5.774	1.035	88
Electrical Equipment, Appliance, and Component Manufacturing	2.742	78	116	1.630	1.203	34
Transportation Equipment Manufacturing	77.063	5	32	14.149	18.690	73
Furniture and Related Product Manufacturing	0	220	1	2.101	0	0
Miscellaneous Manufacturing	566	102	6.342	7.715	148	144
Trade	112.511	4.107	7.579	37.922	46.392	1.574
Transportation	32.350	921	3.442	9.294	33.875	578
Warehousing	658	70	741	15.572	3.974	162
Information	1.556	209	395	14.850	5.914	691
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	3.892	225	419	14.919	5.344	604
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	592	6	2	80	17	0
Insurance Carriers and Related Activities	1.158	50	502	62	3.247	537
Real Estate	3.314	735	1.678	78.684	7.759	2.767
Rental and Leasing Services	3.442	196	800	3.338	4.261	477

Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	2.375	99	93	79	955	0
Professional, Scientific, and Technical Services	9.663	737	4.934	33.952	27.796	3.032
Management of Companies and Enterprises	1.043	193	267	14.461	7.523	1.208
Administrative and Support Services	26.137	1.589	4.253	146.431	19.039	5.798
Waste Management and Remediation Services	20	0	32	13	0	0
Educational Services	50	0	14	83	1.028	2
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	2	7	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	633	49	109	2.080	1.862	161
Food Services and Drinking Places	1.886	68	418	4.157	4.146	158
Repair and Maintenance	2.256	164	659	9.442	8.852	261
Personal and Laundry Services	0	0	0	244	19	24
Religious, Grantmaking, Civic, Professional, and Similar Organizations	452	15	38	379	546	44
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	324	0	0
Carbon tax	40	21	22	288	5.338	92
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	639.814	14.161	68.544	105.488	139.212	3.761
TOTAL	1.476.908	74.314	192.715	3.105.394	1.545.742	61.703

	Information	Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	Securities, Commodity Contracts, and Other Financial Investments and Related Activities	Insurance Carriers and Related Activities	Real Estate	Rental and Leasing Services
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Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	1.340	12.775	186	2.382	0	0
OtherProdnTax	2.753	12.117	199	2.823	18.800	126
CAPITAL	267.420	257.722	10.864	51.019	1.662.563	31.621
LABOR	68.198	93.949	5.898	22.083	22.976	2.197
Crop ProductionT	0	0	0	0	0	0
Animal Production and AquacultureT	0	0	0	0	0	0
Forestry and LoggingT	0	0	0	0	0	0
Fishing, Hunting and TrappingT	0	0	0	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	0	0	0	0	1	0
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	4.130	3.901	131	98	15.871	322
Natural Gas Distribution, Water, Sewage and Other Systems	1.081	113	0	9	1.959	105
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0	21
Specialty Trade Contractors	4	0	0	0	533	22
Food Manufacturing	0	0	0	0	778	0
Beverage and Tobacco Product Manufacturing	0	1.412	50	61	10	26
Textile Mills	0	0	0	0	3	15
Textile Product Mills	0	0	0	0	35	12
Apparel Manufacturing	3	0	0	0	41	16
Leather and Allied Product Manufacturing	0	0	0	0	108	1
Wood Product Manufacturing	568	0	0	0	20	13
Paper Manufacturing	293	4.298	285	233	593	106
Printing and Related Support Activities	326	7.165	253	218	4.173	770
Petroleum and Coal Products Manufacturing	4.138	444	30	156	20.409	3.288
Chemical Manufacturing	2.335	314	16	14	4.366	189

Plastics and Rubber Products Manufacturing	8	95	0	0	29	7
Nonmetallic Mineral Product Manufacturing	0	0	0	0	717	216
Primary Metal Manufacturing	58	0	0	0	45	178
Fabricated Metal Product Manufacturing	725	0	0	0	341	618
Machinery Manufacturing	131	0	0	0	103	458
Computer and Electronic Product Manufacturing	3.789	174	5	13	363	63
Electrical Equipment, Appliance, and Component Manufacturing	4.750	0	0	0	35	37
Transportation Equipment Manufacturing	4.710	84	9	6	6.902	981
Furniture and Related Product Manufacturing	1	0	0	0	77	3
Miscellaneous Manufacturing	119	638	6	6	549	125
Trade	14.538	5.427	266	245	4.735	1.554
Transportation	3.893	6.722	683	111	1.249	1.156
Warehousing	4.143	4.683	20	456	644	51
Information	22.540	10.178	765	48.445	5.643	483
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	7.517	28.661	294	17.255	10.650	307
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	2.455	115	260	242	288	21
Insurance Carriers and Related Activities	1.572	407	7	23.425	192	131
Real Estate	13.110	10.857	638	2.221	23.048	926
Rental and Leasing Services	121	712	92	293	651	483
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	168	684	0	0	77	27
Professional, Scientific, and Technical Services	15.252	21.706	958	8.913	19.598	1.353
Management of Companies and Enterprises	7.679	13.727	1.364	5.840	976	74
Administrative and Support Services	22.148	15.561	1.963	7.809	5.999	1.490
Waste Management and Remediation Services	0	0	0	0	0	0
Educational Services	40	483	74	208	19	3
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	683	0	0	0	0	0

Museums, Historical Sites, and Similar Institutions	0	29	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	1.910	2.356	110	250	460	45
Food Services and Drinking Places	366	653	34	15	98	92
Repair and Maintenance	748	2.749	270	135	2.093	576
Personal and Laundry Services	3	286	16	760	16	107
Religious, Grantmaking, Civic, Professional, and Similar Organizations	145	3.119	158	133	174	45
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	74	8	0	3	364	59
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	68.365	28.312	843	7.030	10.312	5.477
TOTAL	554.349	552.637	26.747	202.913	1.849.688	55.996

	Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	Professional, Scientific, and Technical Services	Management of Companies and Enterprises	Administrative and Support Services	Waste Management and Remediation Services	Educational Services
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	0	0	43	2.329	29	933
OtherProdnTax	0	1.296	15.732	1.902	35	1.153
CAPITAL	44.579	249.795	52.113	175.836	2.597	61.168
LABOR	982	91.864	11.733	300.765	1.451	566.430
Crop ProductionT	0	0	0	0	0	0
Animal Production and AquacultureT	0	0	0	0	0	0
Forestry and LoggingT	0	0	0	0	0	0
Fishing, Hunting and TrappingT	0	0	0	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	0	0	0	0	0	0

Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	104	3.117	158	3.562	27	11.242
Natural Gas Distribution, Water, Sewage and Other Systems	60	2.204	14	2.847	223	2.899
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0	0
Specialty Trade Contractors	2	26	9	38	0	6.393
Food Manufacturing	3	55	0	0	0	27
Beverage and Tobacco Product Manufacturing	0	2	0	0	0	44
Textile Mills	0	31	0	0	0	7
Textile Product Mills	0	33	0	3	48	179
Apparel Manufacturing	48	283	0	549	0	325
Leather and Allied Product Manufacturing	0	44	0	0	0	0
Wood Product Manufacturing	2	7	0	0	0	0
Paper Manufacturing	34	2.367	81	1.052	9	1.274
Printing and Related Support Activities	772	1.546	76	7.820	6	1.631
Petroleum and Coal Products Manufacturing	396	4.805	1.192	1.896	321	1.810
Chemical Manufacturing	72	517	2	2.959	73	1.638
Plastics and Rubber Products Manufacturing	5	46	0	948	22	97
Nonmetallic Mineral Product Manufacturing	73	6	0	1	0	0
Primary Metal Manufacturing	3	14	0	39	0	1
Fabricated Metal Product Manufacturing	40	84	0	44	1	114
Machinery Manufacturing	3	13	0	17	3	0
Computer and Electronic Product Manufacturing	4	835	3	32	0	170
Electrical Equipment, Appliance, and Component Manufacturing	2	5	0	34	0	83
Transportation Equipment Manufacturing	11	22	1	13	11	41
Furniture and Related Product Manufacturing	0	0	0	17	0	59

Miscellaneous Manufacturing	140	512	18	239	0	782
Trade	394	3.541	181	4.201	133	2.850
Transportation	126	3.191	223	2.926	34	1.920
Warehousing	17	690	22	418	56	873
Information	531	6.049	498	4.786	48	7.715
Monetary Authorities- Central Bank and Credit Intermediation and Related Activities	184	7.215	635	3.325	24	2.146
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	1	11	0	0	0	78
Insurance Carriers and Related Activities	17	680	47	1.774	6	585
Real Estate	1.024	9.896	754	4.903	85	6.806
Rental and Leasing Services	41	480	108	556	161	389
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	889	79	1.004	30	0	46
Professional, Scientific, and Technical Services	1.109	28.702	5.120	15.259	99	10.427
Management of Companies and Enterprises	1.020	695	6.636	1.728	0	749
Administrative and Support Services	1.490	24.266	2.960	16.517	365	7.817
Waste Management and Remediation Services	0	0	0	0	193	0
Educational Services	0	378	0	0	0	263
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	18	0	0	3	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	67	632	165	2.872	9	2.375

Food Services and Drinking Places	48	284	149	608	21	859
Repair and Maintenance	22	1.322	63	788	157	1.051
Personal and Laundry Services	0	115	1	2	0	839
Religious, Grantmaking, Civic, Professional, and Similar Organizations	7	842	17	161	1	88
Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	7	86	21	34	6	32
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	276	10.117	523	9.441	630	8.933
TOTAL	54.624	458.802	100.304	573.272	6.883	715.338

	Ambulatory Health Care Services	Hospitals	Nursing and Residential Care Facilities	Social Assistance	Performing Arts, Spectator Sports, and Related Industries	Museums, Historical Sites, and Similar Institutions
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	0	4	18	0	0	32
OtherProdnTax	225	931	16	41	83	73
CAPITAL	52.475	21.890	328	2.046	23.766	325
LABOR	97.351	151.082	1.245	6.118	2.786	4.509
Crop ProductionT	0	32	0	6	0	0
Animal Production and AquacultureT	0	0	0	0	0	0
Forestry and LoggingT	0	0	0	0	0	0
Fishing, Hunting and TrappingT	0	0	0	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	0	0	0	0	0	0
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	2.797	6.035	65	1.118	68	162

Natural Gas Distribution, Water, Sewage and Other Systems	677	1.429	36	442	29	110
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0	0
Specialty Trade Contractors	3.900	5.898	3	941	0	0
Food Manufacturing	53	2.280	4	12	0	58
Beverage and Tobacco Product Manufacturing	39	53	0	14	1	0
Textile Mills	932	1.181	0	0	0	0
Textile Product Mills	44	78	0	16	0	12
Apparel Manufacturing	779	1.565	4	47	93	72
Leather and Allied Product Manufacturing	18	32	0	1	6	30
Wood Product Manufacturing	0	0	0	0	0	0
Paper Manufacturing	753	1.099	7	145	103	49
Printing and Related Support Activities	692	811	2	194	136	1
Petroleum and Coal Products Manufacturing	2.653	4.024	35	228	235	91
Chemical Manufacturing	1.653	3.026	34	195	138	67
Plastics and Rubber Products Manufacturing	649	1.164	0	24	1	6
Nonmetallic Mineral Product Manufacturing	0	0	0	0	3	0
Primary Metal Manufacturing	12	0	0	0	0	0
Fabricated Metal Product Manufacturing	3	205	0	28	32	18
Machinery Manufacturing	27	32	1	0	2	0
Computer and Electronic Product Manufacturing	182	743	1	19	2	2
Electrical Equipment, Appliance, and Component Manufacturing	25	296	1	42	0	1
Transportation Equipment Manufacturing	62	73	0	2	0	0
Furniture and Related Product Manufacturing	1	259	1	38	0	0
Miscellaneous Manufacturing	800	1.080	319	28	215	0
Trade	6.547	11.363	55	472	261	122
Transportation	2.101	3.483	12	164	89	87
Warehousing	114	222	1	62	35	210

Information	1.452	1.279	30	816	210	54
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	259	279	1	154	28	25
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	115	104	0	0	0	0
Insurance Carriers and Related Activities	28	127	1	86	6	1
Real Estate	2.685	1.074	48	638	287	153
Rental and Leasing Services	182	207	2	8	67	6
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	0	18	0
Professional, Scientific, and Technical Services	7.199	13.064	70	879	232	220
Management of Companies and Enterprises	254	328	1	41	32	171
Administrative and Support Services	3.277	6.216	32	307	657	544
Waste Management and Remediation Services	0	459	0	0	0	0
Educational Services	0	0	0	7	0	0
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	66	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	457	618	2	385	32	41
Food Services and Drinking Places	439	813	40	268	32	5
Repair and Maintenance	1.720	3.444	21	390	34	158
Personal and Laundry Services	416	331	4	192	0	209
Religious, Grantmaking, Civic, Professional, and Similar Organizations	95	61	0	0	2	2

Private Households	0	0	0	0	0	0
Public Administration	0	0	0	0	0	0
Carbon tax	47	72	0	4	4	2
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	10.938	15.687	122	1.851	420	163
TOTAL	205.129	264.535	2.563	18.467	30.212	7.794

	Amusement, Gambling, and Recreation Industries	Accommodation	Food Services and Drinking Places	Repair and Maintenance	Personal and Laundry Services	Religious, Grantmaking, Civic, Professional, and Similar Organizations
Non Poor Urban	0	0	0	0	0	0
Poor Urban	0	0	0	0	0	0
Non Poor Rural	0	0	0	0	0	0
Poor Rural	0	0	0	0	0	0
FIRMS	0	0	0	0	0	0
GOVERNMENT	0	0	0	0	0	0
INCOMETAX	0	0	0	0	0	0
ProdTax	113	130	298	0	0	0
OtherProdnTax	706	1.252	797	355	259	136
CAPITAL	25.784	130.841	112.394	50.988	116.955	22.058
LABOR	8.195	15.316	53.983	22.360	6.511	14.923
Crop ProductionT	0	0	5	0	6	0
Animal Production and AquacultureT	0	0	0	0	0	0
Forestry and LoggingT	0	0	0	0	0	0
Fishing, Hunting and TrappingT	0	0	0	0	0	0
Support Activities for Agriculture and ForestryT	0	0	0	0	0	0
Oil and Gas ExtractionT	0	0	0	0	0	0
Mining (except Oil and Gas)T	0	0	0	0	0	0
Support Activities for MiningT	0	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	1.799	9.635	7.654	1.375	4.315	824
Natural Gas Distribution, Water, Sewage and Other Systems	950	2.206	1.619	883	780	306
Construction of Buildings	0	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	1	0	0

Specialty Trade Contractors	148	0	502	231	296	0
Food Manufacturing	34	0	21.625	0	0	0
Beverage and Tobacco Product Manufacturing	0	0	4.416	0	2	0
Textile Mills	0	0	0	29	17	0
Textile Product Mills	1	3.032	143	5	26	0
Apparel Manufacturing	11	0	77	0	1.031	25
Leather and Allied Product Manufacturing	4	0	10	0	0	0
Wood Product Manufacturing	130	0	0	2	0	0
Paper Manufacturing	34	396	1.193	232	393	305
Printing and Related Support Activities	128	0	160	242	55	806
Petroleum and Coal Products Manufacturing	661	3.395	3.142	4.556	1.057	2.032
Chemical Manufacturing	1.370	5.748	1.517	1.680	6.465	221
Plastics and Rubber Products Manufacturing	11	0	1.860	279	4	238
Nonmetallic Mineral Product Manufacturing	0	229	418	294	0	0
Primary Metal Manufacturing	0	0	0	1.454	0	0
Fabricated Metal Product Manufacturing	1	74	24	547	130	0
Machinery Manufacturing	0	7	2	284	64	1
Computer and Electronic Product Manufacturing	54	7	30	63	10	37
Electrical Equipment, Appliance, and Component Manufacturing	2	258	71	651	22	0
Transportation Equipment Manufacturing	120	0	18	2.216	20	13
Furniture and Related Product Manufacturing	1	543	0	0	0	0
Miscellaneous Manufacturing	1.309	1.837	80	53	863	629
Trade	586	3.561	6.904	5.134	2.805	746
Transportation	191	1.004	878	1.147	540	1.118
Warehousing	36	0	56	111	48	22
Information	694	1.148	870	1.192	1.242	933
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	498	791	1.473	300	130	30

Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	0	436	0	1	0
Insurance Carriers and Related Activities	241	237	213	29	129	7
Real Estate	977	1.535	2.064	3.765	12.811	540
Rental and Leasing Services	101	0	139	211	98	28
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	23	1	40	0
Professional, Scientific, and Technical Services	1.497	4.218	1.916	2.185	2.149	3.591
Management of Companies and Enterprises	46	1.246	593	65	51	582
Administrative and Support Services	2.704	15.468	12.789	3.069	1.846	6.327
Waste Management and Remediation Services	0	0	0	10	0	0
Educational Services	103	0	0	0	0	0
Ambulatory Health Care Services	0	0	0	0	0	0
Hospitals	0	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0	0
Social Assistance	0	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	1	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0
Accommodation	177	288	52	86	3	340
Food Services and Drinking Places	3	0	65	314	12	303
Repair and Maintenance	300	131	753	1.828	325	230
Personal and Laundry Services	25	1.673	765	287	2.593	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	418	25	474	73	16	33
Private Households	0	0	0	0	0	0

Public Administration	0	0	0	0	0	0
Carbon tax	12	60	56	81	19	36
Air Pollution	0	0	0	0	0	0
SAVINV	0	0	0	0	0	0
RoW	1.809	5.392	11.127	24.139	2.679	1.320
TOTAL	51.983	211.686	253.685	132.808	166.821	58.737

	Private Households	Public Administration	Carbon Tax	Air Pollution	SAVINV	RoW	TOTAL
Non Poor Urban	0	0	0	0	0	116.298	9.978.592
Poor Urban	0	0	0	0	0	51.309	1.166.124
Non Poor Rural	0	0	0	0	0	98.815	840.205
Poor Rural	0	0	0	0	0	23.542	291.187
FIRMS	0	0	0	0	0	0	9.812.801
GOVERNMENT	0	0	12.322	0	0	0	2.587.834
INCOMETAX	0	0	0	0	0	0	991.471
ProdTax	0	0	0	0	15.795	0	616.897
OtherProdTax	0	3.456	0	0	0	0	967.143
CAPITAL	3.210	2.326	0	0	0	0	9.812.801
LABOR	67.970	625.884	0	0	0	12.230	4.226.748
Crop ProductionT	0	0	0	0	23.886	100.379	437.180
Animal Production and AquacultureT	0	0	0	0	14.290	8.191	284.608
Forestry and LoggingT	0	0	0	0	461	618	18.696
Fishing, Hunting and TrappingT	0	0	0	0	0	1.411	14.209
Support Activities for Agriculture and ForestryT	0	0	0	0	793	443	10.458
Oil and Gas ExtractionT	0	0	0	0	1.941	499.192	1.092.629
Mining (except Oil and Gas)T	0	0	0	0	1.241	96.210	297.733
Support Activities for MiningT	0	0	0	0	186.417	0	186.417
Electric Power Generation, Transmission and Distribution	0	15.547	0	0	0	4.955	396.989
Natural Gas Distribution, Water, Sewage and Other Systems	0	3.968	0	0	0	0	75.876
Construction of Buildings	0	0	0	0	1.447.321	0	1.459.156
Heavy and Civil Engineering Construction	0	0	0	0	611.606	0	634.569
Specialty Trade Contractors	0	5.162	0	0	22.042	0	195.415
Food Manufacturing	0	5.356	0	0	0	98.346	1.678.031
Beverage and Tobacco Product Manufacturing	0	126	0	0	924	40.748	286.411
Textile Mills	0	6	0	0	0	14.407	67.066
Textile Product Mills	0	549	0	0	571	13.429	38.680

Apparel Manufacturing	0	1.042	0	0	2.706	53.096	155.719
Leather and Allied Product Manufacturing	0	1.274	0	0	1.589	11.212	62.868
Wood Product Manufacturing	0	0	0	0	264	4.415	65.482
Paper Manufacturing	0	8.226	0	0	1.324	21.228	164.341
Printing and Related Support Activities	0	1.886	0	0	57	6.096	51.740
Petroleum and Coal Products Manufacturing	0	34.786	0	0	11.295	85.286	1.047.015
Chemical Manufacturing	0	4.995	0	0	5.637	163.365	797.500
Plastics and Rubber Products Manufacturing	0	1.234	0	0	3.423	57.744	268.379
Nonmetallic Mineral Product Manufacturing	0	0	0	0	1.582	37.908	260.190
Primary Metal Manufacturing	0	0	0	0	7.946	162.917	526.169
Fabricated Metal Product Manufacturing	0	1.054	0	0	14.279	104.429	283.044
Machinery Manufacturing	0	0	0	0	43.914	295.753	383.150
Computer and Electronic Product Manufacturing	0	416	0	0	8.475	755.639	798.308
Electrical Equipment, Appliance, and Component Manufacturing	0	469	0	0	11.414	266.082	353.931
Transportation Equipment Manufacturing	0	492	0	0	125.144	907.166	1.476.908
Furniture and Related Product Manufacturing	0	61	0	0	17.643	20.031	74.314
Miscellaneous Manufacturing	0	1.183	0	0	1.340	115.045	192.715
Trade	0	22.818	0	0	269.566	421.030	3.105.394
Transportation	0	13.415	0	0	108.328	147.429	1.545.742
Warehousing	0	8.971	0	0	0	0	61.703
Information	0	18.073	0	0	5.150	4.078	554.349
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	0	24.754	0	0	0	933	552.637
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	440	0	0	0	0	26.747
Insurance Carriers and Related Activities	0	0	0	0	0	28.000	202.913
Real Estate	0	8.998	0	0	0	0	1.849.688
Rental and Leasing Services	0	802	0	0	0	5	55.996
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	0	44.312	0	54.624
Professional, Scientific, and Technical Services	0	27.357	0	0	478	9.758	458.802
Management of Companies and Enterprises	0	498	0	0	0	0	100.304
Administrative and Support Services	0	13.734	0	0	0	0	573.272
Waste Management and Remediation Services	0	218	0	0	0	0	6.883
Educational Services	0	70	0	0	0	0	715.338
Ambulatory Health Care Services	0	0	0	0	0	0	205.129
Hospitals	0	0	0	22.269	0	0	264.535
Nursing and Residential Care Facilities	0	0	0	0	0	0	2.563

Social Assistance	0	0	0	0	0	0	18.467
Performing Arts, Spectator Sports, and Related Industries	0	926	0	0	0	0	30.212
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0	0	7.794
Amusement, Gambling, and Recreation Industries	0	0	0	0	0	0	51.983
Accommodation	0	19.341	0	0	0	0	211.686
Food Services and Drinking Places	0	6.778	0	0	0	0	253.685
Repair and Maintenance	0	6.671	0	0	0	0	132.808
Personal and Laundry Services	0	1.301	0	0	0	0	166.821
Religious, Grantmaking, Civic, Professional, and Similar Organizations	0	0	0	0	0	0	58.737
Private Households	0	0	0	0	0	0	71.180
Public Administration	0	0	0	0	0	0	930.777
Carbon tax	0	620	0	0	0	17.823	30.145
Air Pollution	0	0	0	0	0	0	22.269
SAVINV	0	0	0	0	0	190.955	3.600.533
RoW	0	35.493	17.823	0	587.380	0	5.067.942
TOTAL	71.180	930.777	30.145	22.269	3.600.533	5.067.942	76.419.355

ANNEX 3: Investment Impact

	1	2	3	4	5
Non Poor Urban	74.696	56.172	56.172	56.290	57.146
Poor Urban	8.391	6.294	6.294	6.318	6.421
Non Poor Rural	5.588	4.186	4.186	4.214	4.295
Poor Rural	2.005	1.513	1.513	1.520	1.547
FIRMS	73.884	56.592	56.592	56.603	57.454
GOVERNMENT	16.105	11.305	11.305	11.489	11.632
INCOMETAX	7.407	5.619	5.619	5.626	5.712
ProdTax	4.690	3.106	3.106	3.113	3.154
OtherProdnTax	3.971	2.556	2.556	2.725	2.740
CAPITAL	73.884	56.592	56.592	56.603	57.454
LABOR	32.707	23.896	23.896	23.982	24.328
Crop ProductionT	2.578	1.129	1.129	1.162	1.188
Animal Production and AquacultureT	2.040	1.095	1.095	1.110	1.127
Forestry and LoggingT	142	74	74	75	77
Fishing, Hunting and TrappingT	92	69	69	70	71
Support Activities for Agriculture and ForestryT	67	13	13	14	15
Oil and Gas ExtractionT	4.034	2.521	2.521	2.740	2.747
Mining (except Oil and Gas)T	1.385	5.442	5.442	5.551	5.693
Support Activities for MiningT	3.093	-3.093	-3.093	-3.090	-3.048
Electric Power Generation, Transmission and Distribution	2.744	2.503	2.503	1.927	1.979
Natural Gas Distribution, Water, Sewage and Other Systems	528	407	407	409	416
Construction of Buildings	24.213	26.195	26.195	26.229	26.539
Heavy and Civil Engineering Construction	10.530	-5.342	-5.342	-5.327	-5.192
Specialty Trade Contractors	2.862	800	800	811	828
Food Manufacturing	11.448	8.447	8.447	8.506	8.666
Beverage and Tobacco Product Manufacturing	1.812	1.331	1.331	1.346	1.375
Textile Mills	298	185	185	190	196
Textile Product Mills	188	120	120	124	128
Apparel Manufacturing	752	481	481	493	508
Leather and Allied Product Manufacturing	368	224	224	228	233
Wood Product Manufacturing	567	298	298	302	307
Paper Manufacturing	956	689	689	700	715
Printing and Related Support Activities	338	217	217	220	225
Petroleum and Coal Products Manufacturing	7.271	4.577	4.577	4.103	3.938
Chemical Manufacturing	4.443	3.169	3.169	3.171	3.260
Plastics and Rubber Products Manufacturing	1.502	1.235	1.235	1.255	1.283
Nonmetallic Mineral Product Manufacturing	2.703	1.813	1.813	1.836	1.884
Primary Metal Manufacturing	2.668	21.363	21.363	21.484	21.622
Fabricated Metal Product Manufacturing	1.611	1.067	1.067	1.096	1.124
Machinery Manufacturing	1.039	14.833	14.833	14.833	14.810
Computer and Electronic Product Manufacturing	345	37	37	41	41
Electrical Equipment, Appliance, and Component Manufacturing	882	15.412	15.412	15.432	15.453
Transportation Equipment Manufacturing	5.033	-81	-81	-45	-84

Furniture and Related Product Manufacturing	592	-64	-64	-60	-66
Miscellaneous Manufacturing	548	376	376	392	409
Trade	21.934	10.313	10.313	10.482	10.591
Transportation	11.072	5.670	5.670	5.740	5.804
Warehousing	414	311	311	313	317
Information	4.098	2.869	2.869	2.882	2.926
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	4.236	3.019	3.019	3.029	3.077
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	246	158	158	158	161
Insurance Carriers and Related Activities	1.264	958	958	968	990
Real Estate	13.712	10.183	10.183	10.209	10.362
Rental and Leasing Services	463	288	288	289	295
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	802	-662	-662	-656	-653
Professional, Scientific, and Technical Services	3.255	2.335	2.335	2.344	2.382
Management of Companies and Enterprises	665	452	452	454	461
Administrative and Support Services	4.052	3.113	3.113	3.126	3.168
Waste Management and Remediation Services	51	34	34	34	34
Educational Services	4.637	3.312	3.312	3.355	3.400
Ambulatory Health Care Services	1.368	989	989	1.000	1.014
Hospitals	1.714	1.224	1.224	1.222	1.220
Nursing and Residential Care Facilities	18	13	13	13	14
Social Assistance	123	88	88	89	91
Performing Arts, Spectator Sports, and Related Industries	220	164	164	164	167
Museums, Historical Sites, and Similar Institutions	50	35	35	36	36
Amusement, Gambling, and Recreation Industries	383	288	288	289	293
Accommodation	1.570	1.129	1.129	1.133	1.150
Food Services and Drinking Places	1.840	1.402	1.402	1.406	1.427
Repair and Maintenance	1.009	707	707	710	721
Personal and Laundry Services	1.229	922	922	924	939
Religious, Grantmaking, Civic, Professional, and Similar Organizations	435	323	323	324	329
Private Households	526	396	396	397	403
Public Administration	5.796	4.069	4.069	4.135	4.187
Carbon tax	92	59	59	56	55
Air Pollution	164	123	123	120	119
Investment	50.000	50.000	50.000	50.000	50.000
Import/export	33.150	39.283	39.293	38.817	38.597
Savings	26.256	20.354	20.368	20.424	20.720

	6	7	8	9	10
Non Poor Urban	58.086	59.361	60.651	62.083	63.656
Poor Urban	6.535	6.690	6.848	7.023	7.216
Non Poor Rural	4.386	4.509	4.636	4.778	4.935
Poor Rural	1.577	1.618	1.659	1.705	1.756
FIRMS	58.370	59.601	60.831	62.187	63.668
GOVERNMENT	11.781	12.001	12.209	12.437	12.685

INCOMETAX	5.805	5.931	6.057	6.198	6.352
ProdTax	3.194	3.247	3.295	3.346	3.399
OtherProdnTax	2.755	2.794	2.825	2.861	2.900
CAPITAL	58.370	59.601	60.831	62.187	63.668
LABOR	24.720	25.261	25.817	26.441	27.131
Crop ProductionT	1.210	1.239	1.262	1.284	1.305
Animal Production and AquacultureT	1.142	1.162	1.179	1.196	1.213
Forestry and LoggingT	78	80	82	85	87
Fishing, Hunting and TrappingT	73	75	77	80	83
Support Activities for Agriculture and ForestryT	15	15	14	14	14
Oil and Gas ExtractionT	2.754	2.787	2.810	2.837	2.867
Mining (except Oil and Gas)T	5.857	6.077	6.311	6.576	6.874
Support Activities for MiningT	-2.989	-2.906	-2.809	-2.695	-2.563
Electric Power Generation, Transmission and Distribution	2.036	2.114	2.194	2.283	2.382
Natural Gas Distribution, Water, Sewage and Other Systems	423	433	443	453	465
Construction of Buildings	26.981	27.597	28.327	29.190	30.189
Heavy and Civil Engineering Construction	-5.000	-4.732	-4.416	-4.041	-3.607
Specialty Trade Contractors	849	879	911	947	988
Food Manufacturing	8.843	9.081	9.323	9.593	9.890
Beverage and Tobacco Product Manufacturing	1.409	1.453	1.499	1.550	1.607
Textile Mills	202	209	217	226	236
Textile Product Mills	132	138	144	150	157
Apparel Manufacturing	524	546	568	593	620
Leather and Allied Product Manufacturing	237	243	249	255	261
Wood Product Manufacturing	314	323	332	343	355
Paper Manufacturing	731	752	772	795	819
Printing and Related Support Activities	230	238	245	253	262
Petroleum and Coal Products Manufacturing	3.771	3.623	3.464	3.305	3.144
Chemical Manufacturing	3.358	3.492	3.630	3.785	3.958
Plastics and Rubber Products Manufacturing	1.313	1.352	1.391	1.434	1.480
Nonmetallic Mineral Product Manufacturing	1.946	2.032	2.129	2.245	2.381
Primary Metal Manufacturing	21.778	21.982	22.193	22.426	22.679
Fabricated Metal Product Manufacturing	1.154	1.194	1.233	1.276	1.321
Machinery Manufacturing	14.772	14.715	14.643	14.550	14.436
Computer and Electronic Product Manufacturing	39	35	29	18	3
Electrical Equipment, Appliance, and Component Manufacturing	15.475	15.506	15.537	15.573	15.614
Transportation Equipment Manufacturing	-161	-278	-437	-642	-897
Furniture and Related Product Manufacturing	-76	-90	-106	-126	-147
Miscellaneous Manufacturing	429	456	485	519	557
Trade	10.639	10.687	10.667	10.607	10.511
Transportation	5.844	5.891	5.909	5.913	5.904
Warehousing	320	325	330	335	339
Information	2.974	3.037	3.101	3.170	3.246
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	3.132	3.207	3.284	3.370	3.466
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	165	170	176	183	190

Insurance Carriers and Related Activities	1.015	1.048	1.083	1.122	1.165
Real Estate	10.528	10.753	10.978	11.227	11.499
Rental and Leasing Services	302	312	323	334	347
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	-650	-644	-636	-625	-611
Professional, Scientific, and Technical Services	2.424	2.482	2.539	2.603	2.673
Management of Companies and Enterprises	468	478	487	496	507
Administrative and Support Services	3.212	3.271	3.328	3.389	3.455
Waste Management and Remediation Services	35	36	37	38	39
Educational Services	3.448	3.517	3.584	3.657	3.738
Ambulatory Health Care Services	1.029	1.051	1.072	1.095	1.121
Hospitals	1.218	1.222	1.227	1.233	1.242
Nursing and Residential Care Facilities	14	14	14	15	15
Social Assistance	92	94	96	98	100
Performing Arts, Spectator Sports, and Related Industries	170	173	177	182	186
Museums, Historical Sites, and Similar Institutions	37	37	38	39	40
Amusement, Gambling, and Recreation Industries	298	305	312	319	328
Accommodation	1.170	1.196	1.224	1.254	1.287
Food Services and Drinking Places	1.450	1.481	1.512	1.546	1.584
Repair and Maintenance	733	749	766	785	806
Personal and Laundry Services	955	976	998	1.022	1.049
Religious, Grantmaking, Civic, Professional, and Similar Organizations	334	342	350	358	368
Private Households	410	419	428	439	450
Public Administration	4.241	4.320	4.395	4.477	4.567
Carbon tax	54	57	58	58	59
Air Pollution	118	106	102	98	95
Investment	50.000	50.000	50.000	50.000	50.000
Import/export	38.227	38.025	37.776	37.506	37.205
Savings	21.036	21.466	21.893	22.366	22.885

Savings

	Non Poor Urban	Poor Urban	Non Poor Rural	Poor Rural	FIRMS	GOVERNMENT
1	7.648	736	588	169	13.518	2.348
2	5.752	552	440	128	10.354	1.648
3	5.815	559	446	129	10.318	1.655
4	5.873	565	452	131	10.309	1.688
5	6.009	578	463	134	10.446	1.716
6	6.172	594	477	137	10.587	1.741
7	6.370	613	494	142	10.780	1.778
8	6.578	633	513	147	10.966	1.814
9	6.810	656	533	153	11.167	1.852
10	7.067	681	557	159	11.384	1.894

Import

	1	2	3	4	5
Non Poor Urban	3.727	2.803	2.891	2.828	2.799
Poor Urban	97	73	75	73	73
Non Poor Rural	1	1	1	1	1
Poor Rural	0	0	0	0	0
FIRMS	951	729	741	717	703
GOVERNMENT	10	7	7	7	7
Crop ProductionT	209	91	96	97	97
Animal Production and AquacultureT	120	65	67	66	66
Forestry and LoggingT	11	6	6	6	6
Fishing, Hunting and TrappingT	3	2	2	2	2
Support Activities for Agriculture and ForestryT	8	2	2	2	2
Oil and Gas ExtractionT	44	28	29	31	30
Mining (except Oil and Gas)T	54	214	224	225	226
Support Activities for MiningT	314	-314	-326	-320	-310
Electric Power Generation, Transmission and Distribution	317	290	143	109	110
Natural Gas Distribution, Water, Sewage and Other Systems	28	21	22	22	22
Construction of Buildings	2.525	2.731	2.833	2.786	2.767
Heavy and Civil Engineering Construction	1.242	-630	-653	-641	-615
Specialty Trade Contractors	211	59	62	61	61
Food Manufacturing	1.329	981	1.017	1.005	1.004
Beverage and Tobacco Product Manufacturing	229	168	175	173	174
Textile Mills	75	46	48	49	49
Textile Product Mills	66	42	43	44	45
Apparel Manufacturing	198	126	130	131	133
Leather and Allied Product Manufacturing	87	53	54	54	54
Wood Product Manufacturing	51	27	28	28	28
Paper Manufacturing	218	157	163	163	164
Printing and Related Support Activities	56	36	37	37	37
Petroleum and Coal Products Manufacturing	2.568	1.617	830	698	624
Chemical Manufacturing	1.087	775	808	791	793
Plastics and Rubber Products Manufacturing	563	462	476	477	481
Nonmetallic Mineral Product Manufacturing	289	194	203	203	204
Primary Metal Manufacturing	554	4.433	4.567	4.498	4.427
Fabricated Metal Product Manufacturing	489	324	332	336	338
Machinery Manufacturing	364	5.205	5.324	5.242	5.147
Computer and Electronic Product Manufacturing	271	29	29	32	32
Electrical Equipment, Appliance, and Component Manufacturing	455	7.953	8.091	8.007	7.916
Transportation Equipment Manufacturing	2.180	-35	-36	-19	-36
Furniture and Related Product Manufacturing	113	-12	-13	-12	-13
Miscellaneous Manufacturing	195	134	137	141	145
Trade	745	350	367	366	363
Transportation	997	511	540	543	544
Warehousing	25	19	20	20	20

Information	505	354	368	363	362
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	217	155	161	159	158
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	8	5	5	5	5
Insurance Carriers and Related Activities	44	33	34	34	34
Real Estate	76	57	60	59	58
Rental and Leasing Services	45	28	29	29	29
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	4	-3	-4	-3	-3
Professional, Scientific, and Technical Services	72	51	54	53	53
Management of Companies and Enterprises	3	2	2	2	2
Administrative and Support Services	67	51	54	53	53
Waste Management and Remediation Services	5	3	3	3	3
Educational Services	58	41	43	43	43
Ambulatory Health Care Services	73	53	55	55	55
Hospitals	102	73	76	74	73
Nursing and Residential Care Facilities	1	1	1	1	1
Social Assistance	12	9	9	9	9
Performing Arts, Spectator Sports, and Related Industries	3	2	2	2	2
Museums, Historical Sites, and Similar Institutions	1	1	1	1	1
Amusement, Gambling, and Recreation Industries	13	10	11	10	10
Accommodation	40	29	30	30	30
Food Services and Drinking Places	81	61	65	64	63
Repair and Maintenance	183	128	134	132	132
Personal and Laundry Services	20	15	16	15	15
Religious, Grantmaking, Civic, Professional, and Similar Organizations	10	7	8	7	7
Private Households	0	0	0	0	0
Public Administration	221	155	163	163	162
Carbon tax	54	35	33	30	27
Investment	8.157	8.157	8.288	8.345	8.491

	6	7	8	9	10
Non Poor Urban	2.747	2.714	2.671	2.626	2.580
Poor Urban	71	71	69	68	67
Non Poor Rural	1	1	1	1	1
Poor Rural	0	0	0	0	0
FIRMS	681	663	643	622	600
GOVERNMENT	7	7	7	6	6
Crop ProductionT	96	96	95	94	93
Animal Production and AquacultureT	65	64	63	61	60
Forestry and LoggingT	6	6	6	6	6
Fishing, Hunting and TrappingT	2	2	2	2	2
Support Activities for Agriculture and ForestryT	2	2	2	2	1
Oil and Gas ExtractionT	30	29	29	28	27
Mining (except Oil and Gas)T	226	228	230	231	233
Support Activities for MiningT	-296	-280	-263	-245	-225
Electric Power Generation, Transmission and Distribution	111	113	115	117	118

Natural Gas Distribution, Water, Sewage and Other Systems	22	22	21	21	21
Construction of Buildings	2.741	2.733	2.728	2.726	2.728
Heavy and Civil Engineering Construction	-578	-535	-487	-434	-376
Specialty Trade Contractors	61	61	62	62	62
Food Manufacturing	998	998	996	994	992
Beverage and Tobacco Product Manufacturing	173	174	174	174	174
Textile Mills	49	50	51	51	52
Textile Product Mills	45	46	47	48	49
Apparel Manufacturing	134	136	138	140	142
Leather and Allied Product Manufacturing	54	54	54	54	53
Wood Product Manufacturing	28	28	28	28	28
Paper Manufacturing	164	164	165	165	165
Printing and Related Support Activities	37	37	37	37	37
Petroleum and Coal Products Manufacturing	547	478	412	351	295
Chemical Manufacturing	790	794	794	793	789
Plastics and Rubber Products Manufacturing	482	486	489	492	494
Nonmetallic Mineral Product Manufacturing	206	210	214	219	224
Primary Metal Manufacturing	4.325	4.234	4.133	4.026	3.913
Fabricated Metal Product Manufacturing	339	342	344	346	347
Machinery Manufacturing	5.016	4.884	4.738	4.579	4.409
Computer and Electronic Product Manufacturing	30	27	22	14	2
Electrical Equipment, Appliance, and Component Manufacturing	7.790	7.668	7.534	7.388	7.232
Transportation Equipment Manufacturing	-68	-114	-176	-252	-342
Furniture and Related Product Manufacturing	-14	-16	-19	-22	-24
Miscellaneous Manufacturing	148	154	160	166	173
Trade	354	347	336	323	309
Transportation	539	535	527	517	504
Warehousing	20	19	19	19	19
Information	358	357	354	351	347
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	157	157	156	155	154
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	5	5	5	5	5
Insurance Carriers and Related Activities	34	34	34	34	34
Real Estate	58	57	57	57	56
Rental and Leasing Services	29	29	30	30	30
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	-3	-3	-3	-3	-3
Professional, Scientific, and Technical Services	52	52	52	52	51
Management of Companies and Enterprises	2	2	2	2	2
Administrative and Support Services	52	51	51	50	49
Waste Management and Remediation Services	3	3	3	3	3
Educational Services	42	42	42	41	41
Ambulatory Health Care Services	54	54	53	53	52
Hospitals	71	69	68	66	64
Nursing and Residential Care Facilities	1	1	1	1	1
Social Assistance	9	9	9	9	9
Performing Arts, Spectator Sports, and Related Industries	2	2	2	2	2

Museums, Historical Sites, and Similar Institutions	1	1	1	1	1
Amusement, Gambling, and Recreation Industries	10	10	10	10	10
Accommodation	29	29	29	29	28
Food Services and Drinking Places	62	62	62	61	60
Repair and Maintenance	131	131	131	130	130
Personal and Laundry Services	15	15	15	15	15
Religious, Grantmaking, Civic, Professional, and Similar Organizations	7	7	7	7	7
Private Households	0	0	0	0	0
Public Administration	160	159	157	155	153
Carbon tax	26	27	25	23	22
Investment	8.678	8.930	9.215	9.522	9.839

Export

	1	2	3	4	5
Non Poor Urban	761	901	884	862	843
Poor Urban	336	398	390	381	373
Non Poor Rural	646	766	754	738	725
Poor Rural	154	182	179	175	172
LABOR	80	95	90	87	83
Crop ProductionT	657	778	760	737	718
Animal Production and AquacultureT	54	63	61	59	57
Forestry and LoggingT	4	5	5	4	4
Fishing, Hunting and TrappingT	9	11	11	10	10
Support Activities for Agriculture and ForestryT	3	3	3	3	3
Oil and Gas ExtractionT	3.265	3.869	3.334	3.464	3.632
Mining (except Oil and Gas)T	629	746	729	712	699
Support Activities for MiningT	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	32	38	760	740	724
Natural Gas Distribution, Water, Sewage and Other Systems	0	0	0	0	0
Construction of Buildings	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0
Specialty Trade Contractors	0	0	0	0	0
Food Manufacturing	643	762	738	713	692
Beverage and Tobacco Product Manufacturing	267	316	307	298	291
Textile Mills	94	112	109	106	103
Textile Product Mills	88	104	102	100	98
Apparel Manufacturing	347	412	405	396	390
Leather and Allied Product Manufacturing	73	87	85	82	80
Wood Product Manufacturing	29	34	33	32	31
Paper Manufacturing	139	165	159	154	149
Printing and Related Support Activities	40	47	46	44	43
Petroleum and Coal Products Manufacturing	558	661	769	697	632
Chemical Manufacturing	1.069	1.266	1.225	1.190	1.161
Plastics and Rubber Products Manufacturing	378	448	437	424	413

Nonmetallic Mineral Product Manufacturing	248	294	285	276	268
Primary Metal Manufacturing	1.066	1.263	1.244	1.211	1.184
Fabricated Metal Product Manufacturing	683	809	792	776	764
Machinery Manufacturing	1.935	2.292	2.314	2.303	2.306
Computer and Electronic Product Manufacturing	4.943	5.857	5.963	6.022	6.142
Electrical Equipment, Appliance, and Component Manufacturing	1.740	2.062	2.077	2.073	2.086
Transportation Equipment Manufacturing	5.934	7.032	7.032	6.955	6.916
Furniture and Related Product Manufacturing	131	155	152	147	142
Miscellaneous Manufacturing	753	892	889	881	880
Trade	2.754	3.264	3.169	3.061	2.963
Transportation	964	1.143	1.107	1.069	1.035
Warehousing	0	0	0	0	0
Information	27	32	30	29	28
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	6	7	7	7	6
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	0	0	0	0
Insurance Carriers and Related Activities	183	217	211	205	199
Real Estate	0	0	0	0	0
Rental and Leasing Services	0	0	0	0	0
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	0	0
Professional, Scientific, and Technical Services	64	76	72	70	67
Management of Companies and Enterprises	0	0	0	0	0
Administrative and Support Services	0	0	0	0	0
Waste Management and Remediation Services	0	0	0	0	0
Educational Services	0	0	0	0	0
Ambulatory Health Care Services	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0
Social Assistance	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0
Accommodation	0	0	0	0	0
Food Services and Drinking Places	0	0	0	0	0
Repair and Maintenance	0	0	0	0	0
Personal and Laundry Services	0	0	0	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	0	0	0	0	0
Private Households	0	0	0	0	0
Public Administration	0	0	0	0	0
Carbon tax	117	138	127	116	107
Investment	1.249	1.480	1.446	1.406	1.373

	6	7	8	9	10
Non Poor Urban	819	797	773	747	719
Poor Urban	363	354	344	333	321
Non Poor Rural	708	694	677	660	640

Poor Rural	168	164	159	155	150
LABOR	79	75	71	67	63
Crop ProductionT	692	669	642	614	583
Animal Production and AquacultureT	54	51	48	45	42
Forestry and LoggingT	4	4	4	3	3
Fishing, Hunting and TrappingT	10	9	9	9	8
Support Activities for Agriculture and ForestryT	3	3	3	2	2
Oil and Gas ExtractionT	3.806	4.017	4.246	4.496	4.768
Mining (except Oil and Gas)T	681	666	648	629	609
Support Activities for MiningT	0	0	0	0	0
Electric Power Generation, Transmission and Distribution	702	683	662	639	614
Natural Gas Distribution, Water, Sewage and Other Systems	0	0	0	0	0
Construction of Buildings	0	0	0	0	0
Heavy and Civil Engineering Construction	0	0	0	0	0
Specialty Trade Contractors	0	0	0	0	0
Food Manufacturing	665	640	613	585	555
Beverage and Tobacco Product Manufacturing	281	273	263	253	242
Textile Mills	100	96	93	89	85
Textile Product Mills	96	94	92	89	86
Apparel Manufacturing	381	374	365	355	345
Leather and Allied Product Manufacturing	77	75	72	69	66
Wood Product Manufacturing	29	28	27	25	24
Paper Manufacturing	143	138	132	125	119
Printing and Related Support Activities	41	39	38	36	34
Petroleum and Coal Products Manufacturing	566	506	448	393	342
Chemical Manufacturing	1.122	1.087	1.049	1.008	965
Plastics and Rubber Products Manufacturing	399	386	371	356	339
Nonmetallic Mineral Product Manufacturing	257	248	238	227	217
Primary Metal Manufacturing	1.147	1.115	1.078	1.039	997
Fabricated Metal Product Manufacturing	745	729	710	688	665
Machinery Manufacturing	2.301	2.302	2.296	2.282	2.260
Computer and Electronic Product Manufacturing	6.290	6.478	6.684	6.910	7.155
Electrical Equipment, Appliance, and Component Manufacturing	2.098	2.118	2.137	2.156	2.173
Transportation Equipment Manufacturing	6.843	6.787	6.707	6.606	6.480
Furniture and Related Product Manufacturing	136	129	122	114	105
Miscellaneous Manufacturing	877	876	875	872	867
Trade	2.832	2.711	2.578	2.438	2.291
Transportation	989	947	901	852	801
Warehousing	0	0	0	0	0
Information	27	26	25	23	22
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	6	6	6	5	5
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	0	0	0	0
Insurance Carriers and Related Activities	192	186	179	171	164
Real Estate	0	0	0	0	0
Rental and Leasing Services	0	0	0	0	0

Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	0	0
Professional, Scientific, and Technical Services	64	61	58	55	51
Management of Companies and Enterprises	0	0	0	0	0
Administrative and Support Services	0	0	0	0	0
Waste Management and Remediation Services	0	0	0	0	0
Educational Services	0	0	0	0	0
Ambulatory Health Care Services	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing and Residential Care Facilities	0	0	0	0	0
Social Assistance	0	0	0	0	0
Performing Arts, Spectator Sports, and Related Industries	0	0	0	0	0
Museums, Historical Sites, and Similar Institutions	0	0	0	0	0
Amusement, Gambling, and Recreation Industries	0	0	0	0	0
Accommodation	0	0	0	0	0
Food Services and Drinking Places	0	0	0	0	0
Repair and Maintenance	0	0	0	0	0
Personal and Laundry Services	0	0	0	0	0
Religious, Grantmaking, Civic, Professional, and Similar Organizations	0	0	0	0	0
Private Households	0	0	0	0	0
Public Administration	0	0	0	0	0
Carbon tax	106	99	93	87	81
Air Pollution	0	0	0	0	0
Investment	1.328	1.287	1.243	1.195	1.144

ANNEX 4: Structural Impact

	1	2	3	4	5
Non Poor Urban	0	0	0	95.117	73.395
Poor Urban	0	0	0	11.615	9.382
Non Poor Rural	0	0	0	9.054	7.863
Poor Rural	0	0	0	3.038	2.564
FIRMS	0	0	0	93.140	71.450
GOVERNMENT	0	0	0	29.178	26.452
INCOMETAX	0	0	0	9.486	7.345
ProdTax	0	0	0	5.781	4.370
OtherProdnTax	0	0	0	13.753	14.556
CAPITAL	0	0	0	93.140	71.450
LABOR	0	0	0	38.541	28.332
Crop ProductionT	0	0	0	5.197	4.853
Animal Production and AquacultureT	0	0	0	2.845	2.298
Forestry and LoggingT	0	0	0	173	129
Fishing, Hunting and TrappingT	0	0	0	157	139
Support Activities for Agriculture and ForestryT	0	0	0	117	104
Oil and Gas ExtractionT	0	0	0	16.155	17.460
Mining (except Oil and Gas)T	0	0	0	4.102	4.222
Support Activities for MiningT	0	0	0	-797	-2.766
Electric Power Generation, Transmission and Distribution	0	0	0	5.117	5.062
Natural Gas Distribution, Water, Sewage and Other Systems	0	0	0	782	653
Construction of Buildings	0	0	0	-6.238	-21.651
Heavy and Civil Engineering Construction	0	0	0	-2.713	-9.415
Specialty Trade Contractors	0	0	0	-252	-1.962
Food Manufacturing	0	0	0	17.642	14.981
Beverage and Tobacco Product Manufacturing	0	0	0	3.222	2.896
Textile Mills	0	0	0	945	985
Textile Product Mills	0	0	0	520	527
Apparel Manufacturing	0	0	0	2.103	2.140
Leather and Allied Product Manufacturing	0	0	0	752	708
Wood Product Manufacturing	0	0	0	504	285
Paper Manufacturing	0	0	0	1.973	1.860
Printing and Related Support Activities	0	0	0	564	494
Petroleum and Coal Products Manufacturing	0	0	0	-48.921	-50.196
Chemical Manufacturing	0	0	0	9.966	9.666
Plastics and Rubber Products Manufacturing	0	0	0	3.308	3.178
Nonmetallic Mineral Product Manufacturing	0	0	0	1.308	15
Primary Metal Manufacturing	0	0	0	6.896	6.893
Fabricated Metal Product Manufacturing	0	0	0	3.442	3.269
Machinery Manufacturing	0	0	0	6.442	7.315
Computer and Electronic Product Manufacturing	0	0	0	16.289	20.028
Electrical Equipment, Appliance, and Component Manufacturing	0	0	0	6.061	6.955
Transportation Equipment Manufacturing	0	0	0	23.202	25.547

Furniture and Related Product Manufacturing	0	0	0	650	443
Miscellaneous Manufacturing	0	0	0	3.191	3.610
Trade	0	0	0	31.546	25.821
Transportation	0	0	0	15.477	12.508
Warehousing	0	0	0	659	567
Information	0	0	0	5.356	4.191
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	0	0	0	5.109	3.810
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	0	0	0	185	84
Insurance Carriers and Related Activities	0	0	0	2.312	2.100
Real Estate	0	0	0	17.828	13.920
Rental and Leasing Services	0	0	0	467	304
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	0	0	0	-72	-555
Professional, Scientific, and Technical Services	0	0	0	4.631	3.793
Management of Companies and Enterprises	0	0	0	1.081	940
Administrative and Support Services	0	0	0	5.809	4.767
Waste Management and Remediation Services	0	0	0	67	53
Educational Services	0	0	0	7.818	6.899
Ambulatory Health Care Services	0	0	0	2.189	1.891
Hospitals	0	0	0	-1.051	-1.372
Nursing and Residential Care Facilities	0	0	0	26	21
Social Assistance	0	0	0	198	172
Performing Arts, Spectator Sports, and Related Industries	0	0	0	297	236
Museums, Historical Sites, and Similar Institutions	0	0	0	86	77
Amusement, Gambling, and Recreation Industries	0	0	0	504	396
Accommodation	0	0	0	2.037	1.590
Food Services and Drinking Places	0	0	0	2.506	2.008
Repair and Maintenance	0	0	0	1.241	938
Personal and Laundry Services	0	0	0	1.619	1.274
Religious, Grantmaking, Civic, Professional, and Similar Organizations	0	0	0	567	443
Private Households	0	0	0	688	539
Public Administration	0	0	0	10.505	9.522
Carbon tax	0	0	0	-1.609	-1.554
Air Pollution	0	0	0	-386	-429
Investment	0	0	0	45.767	37.539
Import/export	0	0	0	-15.643	-15.673
Savings	0	0	0	32.879	25.968

	6	7	8	9	10
Non Poor Urban	62.364	78.002	62.925	61.565	60.731
Poor Urban	8.351	10.560	8.989	9.080	9.229
Non Poor Rural	7.471	9.582	8.704	9.106	9.541
Poor Rural	2.375	3.027	2.683	2.768	2.864
FIRMS	60.241	74.969	59.668	57.628	55.964
GOVERNMENT	26.145	34.101	32.299	34.796	37.531
INCOMETAX	6.259	7.824	6.324	6.183	6.088

ProdTax	3.623	4.483	3.482	3.300	3.137
OtherProdnTax	16.051	21.500	22.185	24.964	27.918
CAPITAL	60.241	74.969	59.668	57.628	55.964
LABOR	22.867	28.406	21.590	20.503	19.763
Crop ProductionT	4.862	6.239	5.881	6.198	6.486
Animal Production and AquacultureT	2.036	2.547	2.133	2.108	2.081
Forestry and LoggingT	105	128	95	87	78
Fishing, Hunting and TrappingT	134	171	158	165	174
Support Activities for Agriculture and ForestryT	100	127	114	117	119
Oil and Gas ExtractionT	19.503	26.205	27.281	30.834	34.604
Mining (except Oil and Gas)T	4.536	5.950	5.966	6.536	7.105
Support Activities for MiningT	-4.275	-5.882	-7.071	-8.270	-9.396
Electric Power Generation, Transmission and Distribution	5.300	6.913	6.796	7.372	7.945
Natural Gas Distribution, Water, Sewage and Other Systems	599	762	669	687	708
Construction of Buildings	-33.458	-46.037	-55.345	-64.734	-73.542
Heavy and Civil Engineering Construction	-14.550	-20.020	-24.068	-28.151	-31.981
Specialty Trade Contractors	-3.251	-4.511	-5.558	-6.561	-7.504
Food Manufacturing	13.948	17.774	15.810	16.322	16.887
Beverage and Tobacco Product Manufacturing	2.826	3.634	3.374	3.560	3.751
Textile Mills	1.067	1.402	1.413	1.550	1.686
Textile Product Mills	561	733	729	794	859
Apparel Manufacturing	2.283	2.990	2.979	3.251	3.520
Leather and Allied Product Manufacturing	715	923	880	938	994
Wood Product Manufacturing	147	150	-1	-79	-155
Paper Manufacturing	1.883	2.437	2.331	2.493	2.654
Printing and Related Support Activities	473	606	552	577	604
Petroleum and Coal Products Manufacturing	-50.571	-48.413	-49.338	-49.030	-48.740
Chemical Manufacturing	9.985	12.997	12.652	13.667	14.685
Plastics and Rubber Products Manufacturing	3.258	4.228	4.086	4.389	4.688
Nonmetallic Mineral Product Manufacturing	-888	-1.395	-2.240	-2.868	-3.461
Primary Metal Manufacturing	7.268	9.497	9.386	10.207	11.019
Fabricated Metal Product Manufacturing	3.317	4.276	4.082	4.338	4.578
Machinery Manufacturing	8.323	11.022	11.451	12.696	13.877
Computer and Electronic Product Manufacturing	23.908	32.448	35.122	40.258	45.593
Electrical Equipment, Appliance, and Component Manufacturing	7.985	10.668	11.217	12.604	14.001
Transportation Equipment Manufacturing	28.557	37.658	38.666	42.635	46.410
Furniture and Related Product Manufacturing	313	343	170	70	-41
Miscellaneous Manufacturing	4.111	5.482	5.734	6.428	7.129
Trade	23.100	28.771	24.166	23.694	23.063
Transportation	11.072	13.802	11.499	11.268	10.993
Warehousing	535	685	617	641	668
Information	3.611	4.524	3.705	3.650	3.620
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	3.121	3.873	2.985	2.843	2.736
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	19	8	-57	-94	-127
Insurance Carriers and Related Activities	2.067	2.666	2.497	2.650	2.807

Real Estate	11.971	15.008	12.275	12.100	12.015
Rental and Leasing Services	210	250	144	109	80
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	-922	-1.289	-1.596	-1.897	-2.185
Professional, Scientific, and Technical Services	3.425	4.353	3.770	3.854	3.964
Management of Companies and Enterprises	895	1.150	1.048	1.100	1.155
Administrative and Support Services	4.302	5.443	4.685	4.744	4.818
Waste Management and Remediation Services	46	59	49	49	50
Educational Services	6.667	8.639	8.017	8.538	9.117
Ambulatory Health Care Services	1.795	2.314	2.110	2.225	2.355
Hospitals	-1.445	-731	-945	-756	-549
Nursing and Residential Care Facilities	19	25	22	22	23
Social Assistance	163	211	193	204	216
Performing Arts, Spectator Sports, and Related Industries	208	262	220	221	224
Museums, Historical Sites, and Similar Institutions	75	98	91	98	105
Amusement, Gambling, and Recreation Industries	343	431	355	353	352
Accommodation	1.368	1.720	1.412	1.399	1.400
Food Services and Drinking Places	1.774	2.241	1.892	1.903	1.927
Repair and Maintenance	779	969	760	731	709
Personal and Laundry Services	1.104	1.388	1.147	1.139	1.140
Religious, Grantmaking, Civic, Professional, and Similar Organizations	381	478	392	387	385
Private Households	466	585	481	476	475
Public Administration	9.408	12.265	11.615	12.510	13.490
Carbon tax	-1.491	566	-822	-748	-677
Air Pollution	-448	-2.420	-937	-936	-934
Investment	38.688	35.395	35.009	35.087	35.484
Import/export	-29.398	-20.213	-20.151	-20.065	-19.884
Savings	22.174	28.583	23.749	23.758	23.946

Savings

	Non Poor Urban	Poor Urban	Non Poor Rural	Poor Rural	FIRMS	GOVERNMENT
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	9.923	1.039	971	261	16.963	4.288
5	7.718	845	848	222	12.991	3.901
6	6.626	759	813	207	10.926	3.863
7	8.370	968	1.051	266	13.559	5.053
8	6.825	831	963	238	10.756	4.799
9	6.753	848	1.017	248	10.349	5.183
10	6.742	871	1.076	259	10.006	5.603

ANNEX 5: Total Impact

	1	2	3	4	5
Non Poor Urban	74.696	56.172	56.172	151.406	130.541
Poor Urban	8.391	6.294	6.294	17.933	15.803
Non Poor Rural	5.588	4.186	4.186	13.268	12.159
Poor Rural	2.005	1.513	1.513	4.558	4.111
FIRMS	73.884	56.592	56.592	149.743	128.904
GOVERNMENT	16.105	11.305	11.305	40.667	38.084
INCOMETAX	7.407	5.619	5.619	15.112	13.056
ProdTax	4.690	3.106	3.106	8.894	7.525
OtherProdnTax	3.971	2.556	2.556	16.478	17.296
CAPITAL	73.884	56.592	56.592	149.743	128.904
LABOR	32.707	23.896	23.896	62.523	52.660
Crop ProductionT	2.578	1.129	1.129	6.358	6.041
Animal Production and AquacultureT	2.040	1.095	1.095	3.954	3.425
Forestry and LoggingT	142	74	74	249	206
Fishing, Hunting and TrappingT	92	69	69	226	210
Support Activities for Agriculture and ForestryT	67	13	13	131	119
Oil and Gas ExtractionT	4.034	2.521	2.521	18.894	20.207
Mining (except Oil and Gas)T	1.385	5.442	5.442	9.653	9.915
Support Activities for MiningT	3.093	-3.093	-3.093	-3.887	-5.815
Electric Power Generation, Transmission and Distribution	2.744	2.503	2.503	7.044	7.041
Natural Gas Distribution, Water, Sewage and Other Systems	528	407	407	1.192	1.069
Construction of Buildings	24.213	26.195	26.195	19.991	4.887
Heavy and Civil Engineering Construction	10.530	-5.342	-5.342	-8.040	-14.608
Specialty Trade Contractors	2.862	800	800	559	-1.134
Food Manufacturing	11.448	8.447	8.447	26.148	23.647
Beverage and Tobacco Product Manufacturing	1.812	1.331	1.331	4.568	4.271
Textile Mills	298	185	185	1.135	1.180
Textile Product Mills	188	120	120	643	655
Apparel Manufacturing	752	481	481	2.596	2.648
Leather and Allied Product Manufacturing	368	224	224	980	940
Wood Product Manufacturing	567	298	298	805	593
Paper Manufacturing	956	689	689	2.672	2.575
Printing and Related Support Activities	338	217	217	785	720
Petroleum and Coal Products Manufacturing	7.271	4.577	4.577	-44.817	-46.258
Chemical Manufacturing	4.443	3.169	3.169	13.137	12.925
Plastics and Rubber Products Manufacturing	1.502	1.235	1.235	4.564	4.461
Nonmetallic Mineral Product Manufacturing	2.703	1.813	1.813	3.144	1.899
Primary Metal Manufacturing	2.668	21.363	21.363	28.380	28.515
Fabricated Metal Product Manufacturing	1.611	1.067	1.067	4.538	4.393
Machinery Manufacturing	1.039	14.833	14.833	21.275	22.125
Computer and Electronic Product Manufacturing	345	37	37	16.329	20.069
Electrical Equipment, Appliance, and Component Manufacturing	882	15.412	15.412	21.493	22.408
Transportation Equipment Manufacturing	5.033	-81	-81	23.158	25.463

Furniture and Related Product Manufacturing	592	-64	-64	589	376
Miscellaneous Manufacturing	548	376	376	3.583	4.019
Trade	21.934	10.313	10.313	42.028	36.411
Transportation	11.072	5.670	5.670	21.217	18.312
Warehousing	414	311	311	971	884
Information	4.098	2.869	2.869	8.238	7.117
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	4.236	3.019	3.019	8.138	6.888
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	246	158	158	343	245
Insurance Carriers and Related Activities	1.264	958	958	3.280	3.090
Real Estate	13.712	10.183	10.183	28.037	24.282
Rental and Leasing Services	463	288	288	756	600
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	802	-662	-662	-729	-1.208
Professional, Scientific, and Technical Services	3.255	2.335	2.335	6.975	6.175
Management of Companies and Enterprises	665	452	452	1.536	1.402
Administrative and Support Services	4.052	3.113	3.113	8.935	7.936
Waste Management and Remediation Services	51	34	34	101	87
Educational Services	4.637	3.312	3.312	11.174	10.299
Ambulatory Health Care Services	1.368	989	989	3.189	2.905
Hospitals	1.714	1.224	1.224	171	-152
Nursing and Residential Care Facilities	18	13	13	39	35
Social Assistance	123	88	88	287	262
Performing Arts, Spectator Sports, and Related Industries	220	164	164	461	403
Museums, Historical Sites, and Similar Institutions	50	35	35	122	113
Amusement, Gambling, and Recreation Industries	383	288	288	793	689
Accommodation	1.570	1.129	1.129	3.170	2.740
Food Services and Drinking Places	1.840	1.402	1.402	3.912	3.435
Repair and Maintenance	1.009	707	707	1.951	1.658
Personal and Laundry Services	1.229	922	922	2.543	2.212
Religious, Grantmaking, Civic, Professional, and Similar Organizations	435	323	323	890	771
Private Households	526	396	396	1.085	942
Public Administration	5.796	4.069	4.069	14.640	13.708
Carbon tax	92	59	59	-1.553	-1.499
Air Pollution	164	123	123	-266	-310
Investment	50.000	50.000	50.000	95.767	87.539
Import/export	33.150	39.283	39.293	23.174	22.924
Savings	26.256	20.354	20.368	53.303	46.688

	6	7	8	9	10
Non Poor Urban	120.450	137.363	123.576	123.648	124.387
Poor Urban	14.886	17.251	15.836	16.103	16.445
Non Poor Rural	11.857	14.091	13.340	13.884	14.476
Poor Rural	3.952	4.645	4.342	4.473	4.620
FIRMS	118.612	134.570	120.500	119.815	119.632
GOVERNMENT	37.926	46.101	44.507	47.233	50.216
INCOMETAX	12.064	13.754	12.381	12.381	12.439

ProdTax	6.818	7.730	6.777	6.646	6.535
OtherProdnTax	18.806	24.294	25.010	27.825	30.817
CAPITAL	118.612	134.570	120.500	119.815	119.632
LABOR	47.588	53.667	47.407	46.944	46.894
Crop ProductionT	6.072	7.478	7.143	7.481	7.791
Animal Production and AquacultureT	3.178	3.709	3.312	3.304	3.294
Forestry and LoggingT	183	208	178	171	165
Fishing, Hunting and TrappingT	206	246	235	245	256
Support Activities for Agriculture and ForestryT	115	141	129	131	132
Oil and Gas ExtractionT	22.257	28.992	30.092	33.671	37.471
Mining (except Oil and Gas)T	10.394	12.027	12.277	13.113	13.979
Support Activities for MiningT	-7.264	-8.788	-9.880	-10.965	-11.959
Electric Power Generation, Transmission and Distribution	7.336	9.027	8.990	9.655	10.328
Natural Gas Distribution, Water, Sewage and Other Systems	1.022	1.195	1.112	1.140	1.173
Construction of Buildings	-6.477	-18.439	-27.018	-35.544	-43.354
Heavy and Civil Engineering Construction	-19.550	-24.752	-28.484	-32.192	-35.589
Specialty Trade Contractors	-2.402	-3.632	-4.648	-5.613	-6.516
Food Manufacturing	22.791	26.855	25.133	25.915	26.777
Beverage and Tobacco Product Manufacturing	4.234	5.087	4.873	5.110	5.358
Textile Mills	1.269	1.611	1.630	1.776	1.921
Textile Product Mills	693	871	872	944	1.016
Apparel Manufacturing	2.807	3.535	3.547	3.844	4.140
Leather and Allied Product Manufacturing	952	1.167	1.129	1.192	1.254
Wood Product Manufacturing	461	473	331	264	200
Paper Manufacturing	2.613	3.189	3.104	3.288	3.473
Printing and Related Support Activities	703	843	797	831	866
Petroleum and Coal Products Manufacturing	-46.800	-44.790	-45.874	-45.726	-45.596
Chemical Manufacturing	13.344	16.488	16.281	17.452	18.643
Plastics and Rubber Products Manufacturing	4.571	5.581	5.477	5.823	6.168
Nonmetallic Mineral Product Manufacturing	1.058	637	-111	-622	-1.081
Primary Metal Manufacturing	29.046	31.479	31.579	32.633	33.698
Fabricated Metal Product Manufacturing	4.472	5.470	5.315	5.613	5.899
Machinery Manufacturing	23.094	25.738	26.094	27.246	28.313
Computer and Electronic Product Manufacturing	23.947	32.484	35.151	40.276	45.596
Electrical Equipment, Appliance, and Component Manufacturing	23.460	26.174	26.754	28.177	29.615
Transportation Equipment Manufacturing	28.395	37.380	38.229	41.993	45.513
Furniture and Related Product Manufacturing	236	253	63	-55	-188
Miscellaneous Manufacturing	4.540	5.938	6.219	6.947	7.686
Trade	33.740	39.458	34.833	34.302	33.574
Transportation	16.916	19.693	17.408	17.181	16.897
Warehousing	855	1.010	947	976	1.007
Information	6.584	7.562	6.805	6.821	6.867
Monetary Authorities-Central Bank and Credit Intermediation and Related Activities	6.253	7.079	6.269	6.213	6.202
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	184	179	119	89	63
Insurance Carriers and Related Activities	3.082	3.715	3.580	3.771	3.972

Real Estate	22.499	25.760	23.253	23.327	23.514
Rental and Leasing Services	512	562	467	443	427
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	-1.572	-1.933	-2.232	-2.522	-2.796
Professional, Scientific, and Technical Services	5.849	6.835	6.309	6.457	6.638
Management of Companies and Enterprises	1.363	1.628	1.535	1.596	1.662
Administrative and Support Services	7.514	8.714	8.013	8.133	8.272
Waste Management and Remediation Services	81	94	86	87	89
Educational Services	10.115	12.156	11.600	12.196	12.855
Ambulatory Health Care Services	2.824	3.364	3.182	3.320	3.476
Hospitals	-226	491	282	477	692
Nursing and Residential Care Facilities	33	39	36	37	38
Social Assistance	255	305	289	302	316
Performing Arts, Spectator Sports, and Related Industries	377	436	398	403	410
Museums, Historical Sites, and Similar Institutions	112	135	130	137	145
Amusement, Gambling, and Recreation Industries	641	736	667	672	680
Accommodation	2.538	2.916	2.635	2.653	2.687
Food Services and Drinking Places	3.224	3.721	3.404	3.449	3.510
Repair and Maintenance	1.511	1.718	1.526	1.516	1.515
Personal and Laundry Services	2.059	2.364	2.145	2.161	2.189
Religious, Grantmaking, Civic, Professional, and Similar Organizations	715	820	741	745	753
Private Households	875	1.004	909	915	925
Public Administration	13.649	16.585	16.010	16.987	18.057
Carbon tax	-1.438	623	-764	-689	-618
Air Pollution	-331	-2.315	-835	-837	-839
Investment	88.688	85.395	85.009	85.087	85.484
Import/export	8.829	17.812	17.625	17.441	17.321
Savings	43.210	50.049	45.642	46.124	46.831