

Clean Tax Cuts for Green Bonds

Charrette Report

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Note: This document compiles policy ideas from many sources for further discussion and consideration. Inclusion here does not imply that any CTC working group participant endorses any specific proposal as public policy.



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1. Executive Summary

On March 6, 2017, the Grace Richardson Fund, the Energy and Environment Concentration at the School for International Public Affairs, and the Sabin Center for Climate Change Law co-convened a one-day charrette workshop at Columbia University. The primary purpose of the charrette was to design policy proposals that incent capital flow to clean projects by applying the concept of Clean Tax Cuts (CTC) to the burgeoning green bond market. This report describes the resulting proposals arising from the charrette process, the technical background for the green bonds charrette, the conclusions and recommendations, and the foreseen sectoral challenges identified during the event.

Clean Tax Cuts (CTC) for qualified green bonds is a proposal to create a new class of bonds that are designed to stimulate investment in clean technologies by reducing taxes on fixed income securities that fund qualified technologies. By reducing the taxes on the fixed income securities, the cost of capital for the qualified companies should decline and, consequently, the profitability of these businesses should increase. CTC has the potential to encourage a significant increase in the amount of investment devoted toward clean technologies. It provides a framework to align conservative and progressive interests on energy, environmental protection, and economic growth.

Green bonds are an emerging class of financial tools that have already proven to be an effective instrument for channeling investor funds into clean technologies. They represent a burgeoning market that has seen dramatic growth since their debut in 2007. The global value of green bonds issued last year rose to a record \$93.4 billion, up from 2012's \$2.6 billion. Moody's Investor Services suggests that green bond issues could more than double again in 2017, to \$206 billion. Although the standards and definitions for green bonds are still being established, this designation helps reduce the costs of matching interested buyer and sellers. Green bonds are used for projects in a variety of sectors and are therefore an effective focal point for CTC. Applying CTC to green bonds promises accelerated, broad-scale impact with targeted simplicity.

The established market of municipal bonds represents a successful experiment in mobilizing large amounts of low-cost capital for public benefit. Adopting strategies similar to the municipal bond tax abatement model is the simplest, most impactful solution: by cutting taxes paid on interest earned from green bonds, CTC will lower the cost of capital for investors, thus making qualified projects more attractive. Because the target technologies and initiatives are typically capital intensive, lowering the cost of capital significantly lowers the levelized cost of production. Cheaper solutions will open larger potential investor and consumer markets in tandem, and translate into accelerated deployment of clean technologies.

Thus, tax-free corporate green bonds create a new security class, which simultaneously increase both supply and demand for clean solutions. Blending characteristics of tax free municipal bonds (\$3.7 trillion market) and higher yield taxable corporate bonds (\$35 trillion market) makes the potential appeal to investors and issuers - even those with no interest in sustainability - straightforward. These bonds offer low cost of debt for issuers, and higher tax-free return for investors.

There are many potential ways to design CTC mechanisms, but using them to accelerate the supply of capital through the green bond market holds significant potential impact across a broad swath of sectors. All the sectors financed by the green bond market are supplying clean solutions, but they all stand on the demand side of capital. Only the green bond market stands on the supply side of capital. So here we have a root inflection point for the application of CTC to capital markets, with perhaps the greatest potential for capital acceleration. Like CTC, green bonds are a similarly broad and flexible vehicle for the same purpose, and marrying the CTC tax benefits to the concept of green bonds represents a powerful tool for mobilizing cheaper capital where it is needed.

***NOTE:** Post-charrette commentary led to important insights that several of the proposals produced by the charrette would likely not be acceptable to green bond market participants, while two (Clean Asset Bonds and Emission Reduction Bonds) might be well accepted. These and other insights are detailed in Annex III attached below.*

2. Overview of Charrette Goals, Background, and Insights

A successful charrette integrates a diverse range of expertise and perspectives to promote joint ownership of solutions. The CTC for Green Bonds charrette brought together 21 experts in tax law, finance, climate policy, economics, and environmental science. The group concluded with eight draft policy proposals, detailed in this report.

The charrette laid out the following goals:

- Build a baseline understanding of Clean Tax Cuts
- Define what qualifies as “clean” for the sector, including details on metrics and methods used for measurement, reporting, and evaluation
- Identify the target tax regulations and mechanisms that present the most effective low hanging fruit
- Identify barriers, opportunities, or knowledge gaps; propose solutions or next steps
- Design simple practical and effective CTC proposals for green bonds
- Compile conclusions, proposals and next steps into a sector charrette report.

Key observations included the following:

- Applying CTC to green bonds promotes the supply of capital to clean projects – regardless of the specific use of the capital for different sector needs, green bonds can be flexibly used across many sectors in a consistent way.
- Defining the metrics that determine what is clean is difficult and better done within each sector. Establishing a common definition of “clean” across all sectors is very difficult to do in a rigorous and satisfying way, and should probably be tailored to individual sectoral goals.
- Adopting the municipal tax exemption approach is the simplest, most impactful solution: cutting interest rates on taxes will both increase the supply of capital and simultaneously increase the demand for it as the observed cost of capital for projects

comes down. Lower cost of capital lowers the levelized cost of services that capital provides, improving project economics and competitiveness.

2.1. Clean Tax Cuts Charrette Background

In September 2016, 35 non-partisan experts in economics, public policy, climate, and finance convened at the invitation of Grace Richardson Fund (GRF), Rocky Mountain Institute, and the Sabin Center for Climate Change Law at Columbia University. The group explored the general feasibility and potential impact of clean tax cuts (CTC), and identified target sectors for follow-up charrettes. Details can be found in the [GRF Clean Tax Cuts Charrette Report](#).

The CTC Green Bond Charrette at Columbia on March 6, 2017, was one of seven sector-specific charrettes held across the country leading up to Earth Day 2017. Twelve organizations in the CTC working group stepped forward to co-convene seven new sector-specific CTC charrettes in March and April 2017. The goal of each sector charrette was to identify the simplest and best opportunities to apply CTC for the most impact in each sector, and design practical implementation plans accordingly. The results were presented at Earth Day Texas and the Smithsonian simultaneously in April 2017, in discussion with federal legislators and policymakers.

The sectors selected are as follows: green bonds, power, transportation, clean tech, real estate, oil & gas, and agriculture/forestry/land-use. Dates, locations and sponsors are listed below.

- **Green bonds.** Columbia University CTC Working Group: Energy & Environment, SIPA; Sabin Center for Climate Change Law, *New York - March 6*.
- **Commercial real estate.** The American Council for an Energy Efficient Economy, *Washington, DC - March 23*
- **Power Sector.** American Renewable Energy Institute, *Aspen, CO - March 27*
- **Agriculture, forestry and other land use.** The Nature Conservancy, Rodale Institute, *Washington, DC - April 3*
- **Clean technology.** Arizona State University, LightWorks, Center for Negative Carbon Emissions - *Arizona, April 4*
- **Oil & gas.** One Step In Foundation, Getches-Wilkinson Center for Natural Resources, Energy, and the Environment at the University of Colorado School of Law, *Boulder, CO - April 9 - 10*
- **Transportation.** R Street Institute, Panel on Capitol Hill, *Washington, DC - April 14*

2.2. Focusing on Green Bonds

Green bonds are used for projects in a variety of sectors and are therefore an effective focal point for CTC. Applying CTC to green bonds promises broad scale impact with low-level, targeted effort.

Why Green Bonds. Green bonds have already proven to be an effective investment instrument for channeling investor funds into clean technologies. They represent a burgeoning market that has seen dramatic growth in since their debut in 2007. Climate Bonds Initiative reported a total issuance of \$2-3 billion in 2012.¹ By contrast, the global value of green bonds issued last year rose to a record \$93 billion, up over 120 percent from 2015's \$41.8 Billion. Moody's Investor Services suggests that green bond issues could more than double again in 2017, to \$206 billion.²

Applying CTC to Green Bonds will have three interrelated impacts:

1. it will lower the cost of capital for green bonds, thereby increasing ROI, and increasing issuance and flow of capital;
2. by lowering weighted average cost of capital (WACC) by a modest amount, the levelized cost of delivering the output of that asset falls. This means that the investors are not only getting tax abatement, but they are creating the conditions that drive down the cost of clean solutions directly.
3. Therefore, CTC increases the supply of clean solution investment opportunities and the demand for them simultaneously. The increased flow of capital to green bonds will translate into accelerated deployment of clean technologies and lower overall emissions.

Using strategies similar to municipal bond tax abatement for interest and dividend income from approved investments, CTC for green bonds will lower the cost of capital for investors. Because the target technologies and initiatives are typically capital intensive, lowering the cost of capital significantly lowers the levelized cost of production, be it electricity, lumber, water, or fish. Lowering cost of capital for renewable energy is important because an estimated 50-70% of costs of electricity generation are in the financial cost of capital.³ Cheaper solutions will open up larger potential investor markets, and hasten progress towards emissions reductions commitments and environmental impact. Simultaneously, lower taxes and energy prices will stimulate overall economic growth.

How Green Bonds work. Green bonds are like regular bonds with an added commitment to funding products, assets, or business activities that are considered good for society and/or the environment. They are fixed income financial instruments used to raise capital from the debt capital market that emerged as a self-labeled voluntary market in 2007. By 2015, the "climate bond market" was valued at USD \$600 billion and an ecosystem of standards, assurance providers, and 3rd party verifiers emerged.

In 2014, a group of financial institutions called the International Capital Market Association wrote the "Green Bond Principles" (GBP) to provide a basic framework and taxonomy for the emerging market. The GBP require that projects fall into one of the following 9 categories:

- **renewable energy**, including production, transmission, appliances, and products;

¹ Clean Technica, [Labeled Green Bonds Issuance Doubled To \\$81 Billion In 2016](#)

² ImpactAlpha, [Global green bonds more than doubled in 2016, led by China](#)

³ OECD/Bloomberg Philanthropies, Green Bonds: Mobilizing the Debt Capital Markets for a Low-Carbon Transition

- **energy efficiency**, including new and refurbished buildings, energy storage, district heating, smart grids, appliances, and products
- **pollution prevention and control**, including waste water treatment, greenhouse gas control, soil remediation, recycling and waste-to-energy, value added products from waste and remanufacturing, and associated environmental monitoring analysis;
- **sustainable management of living natural resources**, including sustainable agriculture, fisheries, aquaculture, forestry and climate smart farm inputs such as biological crop protection or drip-irrigation
- **terrestrial and aquatic biodiversity conservation**, including the protection of coastal, marine, and watershed environments;
- **clean transportation**, including electric, hybrid, public, rail, non-motorized, multimodal transportation, infrastructure for clean energy vehicles and reduction of harmful emissions;
- **sustainable water management**, including sustainable infrastructure for clean and/or drinking water, sustainable urban drainage systems and river training, and other forms of flooding mitigation;
- **climate change adaptation**, including information support systems, such as climate observation and early warning systems;
- **eco-efficient products**, production technologies and processes, such as development and introduction of environmentally friendlier, eco-labelled or certified products, resource efficient packaging and distribution.

In 2015, Ceres issued a Statement of Investor Expectations for Green Bonds to provide additional clarity around project eligibility, transparency and disclosure from an investor perspective. Also in 2015, the Center for International Climate Research (CICERO) induced a grading scale for green bond frameworks, called Shades of Green. The grading scale was designed to give investors a clear impact signal: long-term climate solutions that contribute to a low-carbon future are marked dark green; light green represents short-term improvement.

The green bond market is still a voluntary one that does not require application of or adherence to these or any standards or certifications. The lack of standards is a concern for market stakeholders because it potentially threatens the integrity of the market and invites green washing. However, stakeholders fear that requiring – and enforcing – compliance with standards may slow the rapid pace of growth of the market. Many existing bonds could potentially qualify as “green” but have not been voluntarily labeled; HSCB estimates that of \$30.3 billion in municipal bonds issued between 2014 and 2016 that met its green standard, only \$10.9 billion-worth were labeled green.⁴ CTC application to Green Bonds would encourage issuers of the other two thirds to label qualifying bonds as green.

⁴ S&P [What's Next for U.S. Municipal Green Bonds?](#)

3. Defining Clean Tax Cuts for Green Bonds

As originally formulated, clean tax cuts have four guiding principles:

- (1) The objective is to reduce waste, inefficiency, and negative externalities impacting public health and the environment, whether arising from government policy or business practice, by accelerating clean solutions in the most efficient, profitable way possible.
- (2) The core concept is rooted in supply-side economics. The proposed mechanism is adoption of simple tax cuts on capital returns from investment in clean solutions, in lieu of current tax credit price support mechanisms and other policies rooted in the assumption that clean solutions must be unprofitable. Other taxes may be considered if they offer a point of leverage.
- (3) The approach emphasizes positive feedback loops, rewarding environmentally or socially conscious behavior from investors and companies instead of punishing bad behavior.
- (4) CTC picks metrics, not winners and losers. Selection criteria and reporting formats should rely on simple metrics that are broadly applicable, and translate to maximum impact.

Designing effective sector-specific CTC interventions or policy programs requires additional precision on each of the components, including:

- CLEAN: what defines cleanliness for the purpose of qualification in each sector?
- TAX: which taxes will be specifically targeted in that sector?
- CUTS: how the targeted taxes will be cut, by how much, using what yardstick(s) to reward impact?

The CTC Green Bonds charrette was structured to reflect these three elements of CTC. Each of the resulting discussions is described below.

3.1. What is Clean?

Charrette participants reviewed the current state of the green bond market, including existing standards and metrics, reporting requirements, authorities, and enforcement. Participants then developed a general approach for CTC application to green bonds that drew from the parameters and considerations discussed. The results of both discussions are outlined below.

3.1.1. Current state

Following a general overview of the GBP categories, SASB's sector-specific metrics, and CICERO's Shades of Green, and discussions about market place strengths and weaknesses, there was broad consensus among participants that CTC ought to use existing frameworks developed by the market instead of developing bespoke metrics or standards to avoid confusion, streamline implementation, and maximize participation. There were, however, several concerns that the group indulged.

Standards. Currently, the GBP excludes any projects that fall within the purview of the fossil fuels industry. Representatives voiced concerns about non-inclusion of technologies that hold dramatic potential for reducing emissions from existing fossil fuel-based infrastructure, for example green well heads, distribution pipeline maintenance that would reduce rates of fugitive methane, or hydrogen fuel cells that could transition the market from natural gas to solar power. The discussion was inconclusive, but transition technologies deserve further attention and may be addressed in sector-specific charrettes.

Metrics. Because green bonds can fund a broad array of projects in at least 9 different categories ranging from forests and fisheries to batteries and smart cities, pinpointing one ubiquitous metric that is material to all sectors' progress is difficult. Metrics are perhaps the biggest ongoing challenge for the green bond market. An issuer present noted that the lack of a common metric made it difficult to require reporting formats from projects, assess impact of portfolios, or report progress to investors. On the flip side, requiring high levels of complex measurement, calculation, and reporting could chill the market. The trick would be to find the balance between transparency, accountability, and competitiveness.

While greenhouse gas emissions (GHGs) have been offered and commonly used as a solution, GHGs do not apply to or accurately reflect "clean" progress in all sectors: take fisheries or water distribution systems, for example. Water quality, quantity, and biodiversity are all core elements for sectoral definitions of "clean" that are not captured with GHG. It was also noted that, in some sectors, projects could go carbon negative, i.e. absorb more carbon than emitted. This raised the question of whether, in the case of a progressive tax cut approach, projects like these would then qualify for subsidies in addition to the cuts.

The group lightly explored some alternatives, such as the new development of carbon productivity metrics or ratios. However, because of these sector-specific caveats, participants agreed to defer to SASB's sector standards and the sector-specific charrettes, which would be better able to ground discussions with more tangible metrics and targets.

Reporting. Reporting requirements are still undefined and voluntary for green bonds. Several issuers present noted that, without standards for metrics, issuers that did present reports used different key performance indicators (KPIs) that didn't align with one another, making it difficult to assess relative or total market performance. Banks are beginning to develop internal frameworks and standards for reporting, but there isn't a market consensus. This is a key area of interest for investors who want to use the reported data to align investments with their constraints.

Enforcement. Currently, there are scant if any procedures in place for enforcing green bond standards or impact, and no credible penalties. Noncompliance could feasibly result in exclusion from green bond indices, like Barclays', but this is a not a substantial threat because the lack of required data-based reporting makes it difficult to conduct audits. Another potential penalty could be exclusion from future participation in the program in subsequent years. This introduces a new element of project risk; project managers would have to account for annual compliance-based cost uncertainty.

The group noted that because the CTC would involve use of tax payer dollars, some quality assurance measures would be preferable. This raised the difficult question of compliance premiums. Requiring 3rd party verification introduces costs and a time lag that discourages market participation and investor interest.

The other question is on enforcement authorities. Because of the voluntary nature of the green bonds market to date, there is no established ownership of standards or compliance. The group discussed potential public sector owners that included the Internal Revenue Service, the Environmental Protection Agency, and the Securities Exchange Commission. While the EPA would be the natural authority on setting definitions for 'clean,' the IRS or the SEC would be better able to enforce compliance and integrate impact data with financial performance.

Cross-subsidies. Finally, the risk of cross subsidies with other sectors was noted. Projects that receive tax cuts on invested capital could also feasibly qualify for sector-specific tax cuts under the same program. This could be seen as gaming the system or as an added incentive.

3.1.2. Shifting the paradigm

Using the foundation laid by the discussion outlined above, charrette participants suggested a three-tiered approach to defining 'clean' in implementation of CTC. The three tiers would define temporal stages of introduction for different project types that would, essentially, buy experts time to develop appropriate metrics and standards for the more complex and difficult sectors.

Tier 1 would span year 1 through year 5, and include industries with established GHG standards and metrics. This would be the 'low hanging fruit' tier, used to prove the CTC model and generate evidence of impact. The tier would include renewable energy, energy efficiency, and clean transportation projects, in accordance with the GBP. Participants would use SASB-sanctioned metrics and report impact to SASB. The impact data would be made publicly available so that ratings agencies could incorporate it into their analysis. Qualified projects would be awarded a performance-based progressive tax cut: projects that performance in the top quartile would get 100% tax cut; 75% for the next quartile down, and so on.

Tier 2 would launch in year 3 and include sustainable water management, eco-efficient products, pollution prevention and control, and biodiversity conservation. The tier would build on lessons learned from the GHG-based Tier 1 to effectively manage a broader range of indicators (i.e. acres of forest conserved for biodiversity, or water treated).

Tier 3 would introduce the categories that rely on natural capital accounting and ecosystem service valuation strategies that require refinement and broader acceptance. Sustainable management of living and natural resources and climate change adaptation projects would be included at this stage.

3.2. Which taxes should be targeted?

The range of taxes that CTCs can target with respect to green bonds is limited to the taxes incurred in their use. These are largely, though perhaps not exclusively, taxes related to the investment income of green bonds. Such taxes are most likely those that accrue to the gains on investments in the form of interest payments, dividends, or possibly capital gains.

Some key questions that emerged from the charrette discussions included the following:

- Should CTC aim to encourage more capital in the green bond market, or more green technologies in the investment market? Each introduces subtle differences.
- Should corporate issuer or the purchaser collect on tax benefits?
- Should 'green bonds' be expanded to include 'green loans,' allowing state-level green banks or emerging technologies to benefit from the policy?

There are several established models that can be referenced, including low income housing tax credits and ITC for renewables. Based on discussion, charrette participants developed four models: municipal bonds, build America bonds, taxes on equity, and green bank loans.

3.2.1. Option 1: Municipal bonds – project level investments

In this approach that is based on tax benefits for municipal bonds, taxes on interest income and dividends would be cut. As with current municipal bonds, capital gains would not be included. The assumption is that if you make the interest tax exempt, the issuer will issue the bond at a lower rate, so the benefit will accrue to both issuer and holder.

Advantages

- This approach doesn't require changes to ratings systems
- Applicants would need a corporate entity sponsor
- Could be recourse or non-recourse, depending on the amount of additional security required by the sponsor

Disadvantages

- Doesn't give benefit to those already tax exempt – pension funds, non-profits, foundations etc. – so this set of investors wouldn't get the advantage. One solution might be to end general tax-exemption with respect to bond income for these investors, so they would respond to CTC incentives like all investors, and "earn" tax-exemption by buying clean bonds.
- Would disqualify applicants from collecting benefits from the ITC and/or PTC at same time.

3.2.2. Option 2: Build America Bonds (project level investments)

This approach would introduce a narrower structure (debt only) for all investors with Build America Bonds framework. Unlike option 1 that could potentially accommodate debt and equity, this would focus exclusively on debt.

- Taxable bond with cash payments
- Targets supply of capital
- Also has possibility of some of the muni bond features

3.2.3. Option 3: Tax Exempt Equity (project level OR corp. level investments)

If additional or different investment capital tax reduction was required beyond those obtained on interest income or dividends in the above models, structures that allowed for reduction in taxes on capital gains can be developed. This could be used to reduce capital gains taxes on either the increase in the value of a green bond if sold before maturity for a gain or for the equity portion of investment supporting green bonds.

Advantages

- Including equity would allow for the additional benefit to accrue to project economics
- Exempting capital gains would reduce the penalty for transferring the debt and equity assets during the life of the project and increase market liquidity.

Disadvantages

- Creating a class of securities that would qualify for this type of tax treatment and certifying them may be complicated and subject to dispute.

3.2.4. Option 4: Green bank loan

In order to broaden the market to a wider range of participants such as homeowners and smaller investors, the green bank loan was suggested. It would still have a corporate sponsor, but the lender would be the bank. In this example, the benefits would need to accrue to both the bank and to the customer.

3.3. How should the taxes be cut?

Finally, how the targeted taxes should be cut is a key operational consideration and will play a role in the effectiveness of any program. This includes the mechanism by which the tax benefits accrue to the people or entities involved in the clean technology deployment decision, as well as the specific mechanism for determining when the tax reduction is due and the verification that the threshold has been met. CTC developers must also consider how CTC proposals will be paid for; at what level – city, state, or federal — would it take effect; and how to handle potential barriers.

There was general consensus among charrette participants that the mechanism needed to be as simple but broadly applicable as possible, using existing structures and standards instead of reinventing the wheel. Participants kept the focus clearly on tax abatement (instead of tax credit), and leaned towards binary qualification instead of progressive (as with QECBs or CREVs), although some consideration was given to performance-based gradations and blanket periods of benefits (15 to 30 years to reduce operational risk).

Participants settled on the following six key suggestions to keep things simple, streamlined and high impact:

- **Use metrics-based clusters or categories:** in order to sidestep the lack of a universal metric, the group suggested clustering projects around key target metrics, such as GHGs, water quality, and biodiversity.

- **Limit complexity to 2-3 levels of tax abatement.** This limited approach to progressive tax cuts or gradations would allow broad participation, but still reward the strongest performers. These levels can be based on performance against established standards such as LEED, PACE, etc, and have differing requirements. For example, the lowest level of tax abatement may only require internal verification of results, while full tax exemption requires 3rd party verification.
- **Consider expansion to green loans.** Tax exemption for green bank loans would broaden the spectrum of players to include smaller businesses and even individuals, and allow potential securitization. Bank loans used for home insulation or purchase of Energy Star products, for example, would qualify and encourage positive consumer behavior. There was also a suggestion to consider blanket tax exemptions for state-level green banks.
- **City/State level tax exemption is important too.** The general conversation deals with federal level tax bonds, but making this a state-level discussion would encourage local action, which would involve more small and medium businesses and could potentially be nimbler. For states and municipalities, granting tax exemption for local green bond financed private projects would not take away from existing tax revenue sources, like property taxes, but would instead stimulate new capital flows to local projects with environmental and health benefits, simultaneously expanding local economic opportunity and jobs, and tax revenues from an expanded local economy. These new local capital flows might not occur without such local tax reduction.
- **Avoid penalties for green failure.** Penalties would introduce bureaucratic complications and risk elements for all players.
- **Phasing out the current approach.** Finally, the market would need to be given a set time period to transition from the current system of tax credits to tax cuts. Eligible bonds would be allowed to keep both benefits for a period of three years, after which – assuming public sector approval and adoption went smoothly – credits would be wholly phased out.

Many charrette participants liked the simplicity of using muni bond tax exemption as a precedent for projects that deliver a significant public benefit, such as a high environmental and health impact. This treatment might have surprisingly strong dynamic growth and revenue effects not normally associated with a 0% tax rate, because in this case, leverage is being used on top of leverage. In the context of applying tax exemption to privately issued bonds, it should be noted that debt-side tax-exemption does not mean that all profits from such projects would be tax exempt, only interest on debt. Since low, fixed-interest debt is used to leverage equity investments and thus increase profits for equity holders, governments can forgo lower tax revenues on the smaller debt side profits, and still participate in the major portion of the profits on the leveraged equity side. The government would in fact be leveraging the leverage, accelerating capitalization and profiting from that increased leverage alongside the stockholders. Thus, green bond tax-exemption might have surprisingly strong dynamic growth and equity-side tax revenue effects, even with a 0% tax rate on interest.

The above observation also explains why muni bond treatment for green bonds may have particular appeal to legislators. Providing such debt-side tax exemption might have little negative effect on overall tax revenue, because (a) the level of capital investment in such green infrastructure could be much higher than it would have been otherwise, so the “lost

revenue” from all that new investment would not otherwise have existed without the tax exemption anyway; (b) whatever realistic level of debt side revenue is lost from the currently expected green bond market may be offset by increased equity-side profits from new investment; (c) all the new investment will create tax revenue when it is spent paying third parties for the manufacture, installation, and ongoing operation of clean solutions. However, these potential factors will require careful study to fully understand net revenue effects.

Many participants also felt there was some logic and appeal to the proposal that zero emissions energy sources should be taxed at zero percent. Other participants expressed concerns that in cases where the known benefit is less than that of a zero emission power source, zero percent tax rate might be seen as overambitious, and not tied to relative impact. Sliding scale tax rates related to quantifiable impact were considered, but bracketed as too complex to qualify now as low-hanging fruit, but worthy of future consideration in a later phase of CTC development.

Some charrette participants suggested the “clean” tax rate be half that of ordinary tax rates, but not zero, and in line with the framework of the “Better Way” tax plan, where capital gains is taxed at half the rate of ordinary income because of the public benefit conferred by capital investment. They suggest “clean” capital investment confers a greater public benefit than ordinary capital investment, so clean capital returns should be taxed less, half of all ordinary taxes, what might be called a “clean half-tax rate”. They also noted that a clean half-tax rate would also have a better dynamic revenue effect than a zero-tax rate, at least with respect to revenue from the actual tax being cut.

Note that several other CTC charrettes have adopted the Better Way inspired clean half-tax concept: Oil & Gas, Farming & Forestry, Real Estate, with all charrettes including it among attractive variations to consider.

3.4. Pay-fors and Scoring for CTC for Green Bonds

Charrette participants did not undertake a detailed analysis of payfors and scoring for CTC applied to green bonds, but did take note of factors that should be considered in future analysis.

- In many cases, the most direct pay-for possible would be tax credit price support subsidies and regulations, which can be reduced or eliminated as CTC is introduced, either immediately or over a phase in period. For example, several charrettes have suggested the elimination of the ITC and PTC for wind and solar as CTC phases in. R Street Institute has proposed the phase out of costly CAFE (and other) regulations and phase in of reward system using CAFE-metric-based clean tax cuts. Since CTC has dynamic growth effects, and price support subsidies and regulations have dynamic loss effects, it is recommended that dynamic scoring be applied to model how much more CTC can be afforded by eliminating subsidies and regulations. It is recommended that future charrettes or economic studies carefully consider the value of all subsidies and regulations that can be

eliminated by the introduction of CTC in each relevant sector, and that data be applied to scoring and modeling.

- Since it is likely that the inclusion of clean tax cuts will make tax reform more palatable and bipartisan, clean tax cuts could reasonably be scored against the savings achieved by overall tax reform. The savings from elimination of all tax expenditures, terminated by tax reform, could be scored against CTC as part of an overall package. In general, ordinary tax rates and CTC rates should balance each other and be targeted to bring in revenue required for a balanced budget.
- Clean tax cuts should also be scored against the harm and future costs averted as a result of pollution and emissions avoided. This includes cost reductions deriving from future impacts on health, environment, natural capital preserved, and cost of adaptation, including reductions to flooding and severe weather damage, etc.
- Dynamic growth effects should be taken into account in scoring, including increased profitability from transformation of waste into profitable product.
- With respect to CTC applied to green bonds, dynamic growth effects should consider: (a) the increased profits and tax revenue from those profits on the equity side resulting from the new use of tax-exempt debt as leverage; (b) the likely level of new investment that would not otherwise have existed; (c) tax revenue from spending the increased capital raised on green investments as planned.

4. Charrette Workshop Proposals

Towards the end of the charrette, after carefully considering all the above parameters discussed for each of the Clean Tax Cuts components, the participants formed four breakout groups. Groups were challenged to come up with proposals that were simple, practical, and effective; would generate bipartisan support and appeal to the broadest audience; and were hard to game but easy to administer. The collaborative result was eight draft policy proposals that ranged in stringency, relative simplicity, sector focus, intended impact, and levels of tax cuts.

Of the eight proposals, five adopt the municipal bond model of cutting federal taxes on interest income; four use the ICMA's Green Bonds Principles as a basis for qualification; two rely rather on the proven impact of underlying assets; two offered a flat 100% tax cut for compliance with baseline criteria; four suggested two levels of tax reduction: 50% and 100%; one suggested quartiles; two required waiting periods of 2 years or more; one used GBP categories to qualify R&D investments for capital gains elimination.

Each proposal is broken down into qualification criteria, targeted taxes, and mechanisms, with notes on the advantages and opportunities, as well as disadvantages and challenges implied. These draft proposals require further refinement and are meant as a starting point for future conversations and analysis.

4.1. Proposal 1 (Group 1): Clean Asset Bonds (CABs)

Qualifying as Clean: “Clean Asset Bonds” CABs are corporate or bank issued green bonds, where the underlying assets deliver or support a known, quantifiable benefit, or are impact-certified by an external standard such as ENERGY STAR or CAFE. These qualify as “clean” without further external assessment, by virtue of proven ability of underlying assets to reduce waste, inefficiency and negative externalities. CABs could finance:

- Renewable and other low or zero emission energy projects
- Factories to build wind turbines, solar panels, geothermal systems, etc.
- Advanced nuclear power projects
- Factories to build electric or PEH vehicles, efficient busses or trucks
- Factories to build energy storage devices, batteries, fuel cells, pumped storage, etc.
- Bonds or securities backed by ENERGY STAR certified buildings and plants
- Bundled car loans for efficient vehicles meeting high CAFE standards
- Mass transportation projects
- Transmission and grid expansion and upgrades
- CCS, CCUS, carbon negative Air Capture systems
- Downstream industrial manufacture of captured carbon products
- EPA recommended oil & gas waste & emission reduction and monitoring systems
- Other waste reduction and recycling systems

Taxes targeted:

- Taxes on interest received from loans, loans bundled into securities and bonds

Tax cut mechanism: Projects resulting in near zero or negative emissions would receive municipal bond treatment, 100% tax exemption. Projects resulting in significant but not near 100% emission or waste reduction would receive municipal bond treatment, with 50% tax exemption.

Once approved, qualified bond issuers would voluntarily transition from the existing system of tax credits to clean tax cuts. Qualified bond projects would be allowed to claim both credits and cuts for a three year transition period, after which they would be required to pick one or the other.

Advantages and opportunities

- The proposal is immediately feasible for many kinds of assets in many sectors, guaranteeing reasonably high impact.
- Using expert consensus on impact of underlying technology or assets, OR where possible, using established, external verification like Energy Star or CAFE, provides a sound base for qualifying criteria, ensures adoption, and keeps transaction costs low.
- Qualification method can be used across a wide variety of sectors and products
- Avoids some complexity involved in attempting to set a single, universal criteria for all green bonds
- It is expected that expert consensus will evolve into broad certification systems over time in sectors like old & gas and farming. A tax cut reward should hasten that evolution.

- Lowest possible cost of debt for most private issuers and borrowers
- Potentially highest tax free or tax reduced yield for most investors
- Increases taxable income and tax revenues on the equity side of profitable projects
- Attracts capital to both debt and equity sides by making both more attractive
- After transition, avoids worst risks of price support subsidies: bubbles supporting failing business models

Disadvantages and challenges

- The proposed transition period assumes that tax credits and tax cut programs will be offered in parallel to each other, and that projects could qualify for both for three year periods. This may create confusion and cost tax payers.
- Transition period should be short. Combination of subsidies plus CTC could be dangerous, too powerful, leading perhaps to economic bubbles if not transitioned quickly
- Legislatures will need to decide what constitutes expert consensus on technology impact, so political considerations may distort impact
- Needs to be modeled for economic, fiscal, environmental and health impacts

4.2. Proposal 2 (Group 1): Rated or Assessed Bonds (RABs)

Qualifying as Clean: “Rated or Assessed Bonds” (RABs) are corporate or bank issued green bonds, which qualify as “clean” by virtue of being granted a top or second rank assessment or rating from either Moody’s or S&P/Trucost.

Taxes targeted: Taxes on interest received from loans bundled into securities and bonds

Tax cut mechanism: The bonds associated with the highest ratings would qualify for full 100% tax exemption like municipal bonds. Second highest ratings would earn 50% tax exemption. Once approved, qualified bond projects would voluntarily transition from the existing system of tax credits to tax cuts. Qualified bond projects would be allowed to claim both credits and cuts for a three year transition period, after which they would be required to pick one or the other.

Advantages and opportunities

- The proposal is immediately feasible.
- The proposal to base qualification on rating agency’s scoring insures mostly that issuers are genuinely following Green Bond Principles (GBP). That means they are transparently reporting impact and use of proceeds, which makes it easier for market participants to judge actual impact for themselves.
- Green Bond Principles offer a broad qualification gate to encourage participation, and allow market participants to decide what is “green.” Aligning CTC with GBP embraces the broad participation by self-definition model of GBP, so should expand the green bond market more than CABs, albeit with multiple broad but harder to quantify impacts.

- Aligning with a standards system developed entirely by leading market participants has obvious potential appeal to free market conservatives, who prefer such naturally arising self-regulation.
- Green bond ratings, assessments, standards and principles are all very new and evolving fast. It is likely that these verification systems will all get better at measuring and comparing actual impact fairly soon. Indeed the pressure for these rating systems to become more rigorous will increase if they become the basis of tax reduction.
- An opportunity exists for an NGO to establish a “Consumer Reports” for green bonds, reviewing for impact and green-washing.
- Offers lowest possible cost of debt for most private issuers and borrowers and potentially highest tax free or tax reduced yield for most investors
- Increases taxable income and tax revenues on the equity side of profitable projects
- Attracts capital to both debt and equity sides by making both more attractive
- After transition, avoids worst risks of price support subsidies: bubbles supporting failing business models

Disadvantages and challenges

- The proposal to base qualification on rating agency’s scoring assumes that the score assigned will include positive performance on pollution and waste averted, energy and resource efficiency, etc. Although this broad qualification gate may encourage participation, it makes verification and reporting of impact almost impossible.
- Top ratings do not guarantee equality of high impact from one green bond to another.
- Since Proposal 3 below (ERBs) delivers guaranteed high impact (zero emissions from energy produced) rewarded by 100% tax exemption, it may be difficult to justify 100% tax exemption for RABs when the impact varies from one such bond to another. It may be the 50% tax exemption (the clean half-tax approach) makes more sense for all RABs. At least until such time as ratings systems improve and more precisely compare impacts.
- The RAB qualification method is hard to apply to loans.
- The proposed transition period assumes that tax credits and tax cut programs will be offered in parallel to each other, and that projects could qualify for both for three year periods. This may create confusion and cost tax payers.

4.3. Proposal 3 (Group 2): Emission Reduction Bonds (ERBs)

Emission Reduction Bonds (ERBs)

(or if the test is only carbon based, could be Carbon Emission Reduction Bonds, CERBs)

Similar to favorable tax treatment given to municipal bonds for large-scale assets deemed to be in the public interest, ERBs would eliminate federal taxes on interest income from bonds or loans invested in projects that meet the test of being an emissions-free energy generator, thus rewarding investments in clean energy infrastructure like wind, solar, nuclear and geothermal projects.

Qualifying as Clean: The main focus of this policy proposal is to reward emission-free electricity generation. Approved and verified technologies installed and put into service would qualify for the tax cut treatment.

Taxes targeted: For debt investments in assets qualifying as clean – including both dedicated bond investment pools or by individuals for qualified loan products - the tax treatment of these bonds/ loans would be based on the tax treatment currently offered to investors in municipal bonds – i.e., the interest income should be exempted from federal income taxes. Since the activities financed by the bonds are not necessarily confined to a single state, the bonds should be subject to state and local income taxes depending upon the investor’s state of residence. Furthermore, like municipal bonds, all capital gains on the bonds would be taxable. (An option exists to expand this proposal to cover equity distributions, or even capital gains, but that would introduce substantial additional complexity.)

Tax cut mechanism: approved investments would receive 100% exemption from taxes on interest income of qualified bonds. (Again, options exist to create a graduated scale, based on degree of cleanliness, but that will require a more complex qualifying mechanism.)

Payment options: The current ITC/ PTC could be eliminated or reduced to help fund this tax cut. At a minimum, projects should not be allowed to take advantage of both, which should assist in the scoring as projects migrate from one regime to another.

Advantages and opportunities

- This approach avoids setting artificial thresholds and negotiating good behavior which can be contentious and chill market participation.
- The proposal is immediately feasible for many projects that would qualify without question
- Potential to rapidly expand the production of zero emission energy
- Lowest possible cost of debt for most private issuers and borrowers
- Potentially highest tax free or tax reduced yield for most investors
- Increases taxable income and tax revenues on the equity side of profitable projects,
- Attracts capital to both debt and equity sides by making both more attractive
- Avoids worst risks of price support subsidies: bubbles supporting failing business models

Disadvantages and challenges

- The proposal limits participation to clean technology within the power market.
- Disputes may arise over some emerging technologies’ claims to be emission neutral or negative.

4.4. Proposal 4 (Group 2): Capital gains exemptions for R&D

Qualifying as Clean: This policy proposal focuses on promoting investment in R&D for clean solutions. In order to qualify for tax exemption, applicants will need to comply with the following three conditions:

- Represent a research and development (R&D) initiative that is directly linked to sustainability impact, e.g. a solar company would like to conduct R&D that would help them reduce their to \$X/KWH, but need this specific data set developed and stress tested to invest in next steps.
- Conduct two years of R&D to demonstrate link between initiative and impact.
- Secure a certification of impact from an established rating agency such as S&P or Moodys, informed by a third party verification.

Taxes targeted: once approved, taxes on capital gains of equity investments in a corporation would be eligible for exemption.

Tax cut mechanism: approved investments would receive 100% tax exemption after 2 years of proven impact.

Advantages and opportunities

- Addresses a serious capital constraint in clean tech, linking underfunded R&D programs with clean impact and necessary funding.

Disadvantages and challenges

- Requires some subjectivity when establishing link between R&D and impact over time lags.

4.5. Proposal 5 (Group 3): Simple GBP enhancement (GBP+)

Qualifying as Clean: The greatest difficulty creating tax-preferred status for bond investors who invest in clean projects is defining what qualifies as “clean”. The group did not adequately resolve this issue within the timeframe provided.

As a placeholder for this issue, the Green Bond Principles, which provides broad guidelines that frame the intent of these proposals, were used. The concept is that tax-preferred status should be extended to commercial projects/investments that reduce greenhouse gas emissions as broadly as possible.

Taxes targeted: The tax treatment of these bonds would be based on the tax treatment currently offered to investors in municipal bonds – the interest income should be exempted from federal income taxes. Since the activities financed by the bonds are not necessarily confined to a single state, the bonds should be subject to state and local income taxes depending upon the investor’s state of residence. Furthermore, like municipal bonds, all capital gains on the bonds would be taxable.

Tax cut mechanism: approved green bonds would receive a 100% tax cut on interests.

Advantages and opportunities

- Straightforward qualification criteria – complying with existing and established Green Bonds Principles – keeps bar of entry low which encourages participation.
- The proposal is immediately feasible
- Lowest possible cost of debt for most private issuers and borrowers

- Potentially highest tax free or tax reduced yield for most investors
- Increases taxable income on the equity side of profitable projects, tax revenues too
- Attracts capital to both debt and equity sides by making both more attractive
- Avoids worst risks of price support subsidies: bubbles supporting failing business models

Disadvantages and challenges

- Lack of reporting or verification requirements or standards leaves the program susceptible to green washing and may compromise the integrity of the market.

4.6. Proposal 6 (Group 3): GBP + Best in Class

Qualifying as Clean: The greatest difficulty creating tax-preferred status for bond investors who invest in clean projects is defining what qualifies as “clean”. The group did not adequately resolve this issue within the timeframe provided.

As a placeholder for this issue, the Green Bond Principles, which provides broad guidelines that frame the intent of these proposals, were used. The concept is that tax-preferred status should be extended to commercial projects/investments that reduce greenhouse gas emissions as broadly as possible.

Taxes targeted: The tax treatment of these bonds should be based on the tax treatment currently offered to investors in municipal bonds – the interest income should be exempted from federal income taxes. Since the activities financed by the bonds are not necessarily confined to a single state, the bonds should be subject to state and local income taxes depending upon the investor’s state of residence. Furthermore, like municipal bonds, all capital gains on the bonds would be taxable.

Tax cut mechanism: a company/venture that only meets the Green Bond Principles would receive a 50 percent income tax exemption. In order for the interest income to be completely tax-exempt, a higher standard would need to be met. This higher standard would demand that the technology/investments were certified to be best in class. While this second scenario provides a higher incentive to invest in lower GHG projects, it raises difficulties with respect to measuring and documenting these benchmarks.

Advantages and opportunities

- Inclusion of third party verification and ramifications for failure to meet standards will protect the integrity of the market.

Disadvantages and challenges

- More stringent standards may discourage participation.
- The proposed certification method is not defined so this proposal needs more work
- Not clear that the proposal is immediately feasible

4.7. Proposal 7 (Group 4): Science-based Targets and SEC disclosure

Qualifying for the CTC: To be considered for Clean Tax Cuts, applicants will have to consider three related qualifications:

1. Comply with the ICMA's Green Bond Principles
2. Identify and set a performance target for the investment that aligns with a 2 degree economy. Note that projects with a focus on water or biodiversity conservation under the GBP may not consider GHG a primarily material metric; they will be asked to submit relevant targets such as water quality or quantity preserved alongside a GHG reduction target to comply both with the GBP and science-based targets.
3. Report sustainability performance alongside financial performance to the Securities Exchange Commission, alongside performance against their set targets.

[Science Based Targets](#) offers approaches, tools, and methods to guide companies and investors seeking to set such a target, including the Sectoral Decarbonization Approach, the 3% Solution and the Mars Method. These tools are free and open for public use.

Because applicants will be required to present one year of performance against science-based targets before qualifying for the tax cut, CTC will not lend itself to early stage venture projects.

These layers of 'clean' requirement will ensure that qualifying green bonds are contributing positively to system level targets for decarbonization, neatly addressing the current question of assurance and 'additionality.' It uses existing, trusted frameworks – the GBP – as a foundation and draws from industry thought leaders – CDP, The UN Global Compact, WRI and WWF – to ensure continual improvement.

Taxes targeted: once the applicant is approved, taxes on green bond interest will be cut. This will lower the cost of capital for investments that qualify as green bonds, encouraging investors and companies to develop projects that adhere to the GBP, to measure the environmental impact associated with their project (in terms of GHG and/or water), and report the results for continued tax benefits.

Logistics of the cut: tax cuts would happen in proportion to performance against science-based metrics. Performance in the 25th percentile would be rewarded with a 25% tax cut, 50th percentile with a 50% tax cut, etc.

Starting in year 2, applicants would not need to comply with steps 1 (GBP) or 2 (setting science-based targets); in order to continue to receive the tax cut benefits, applications would merely need to continue annual integrated sustainability and financial reporting to the SEC. The performance data would be subsumed into company or bond ratings by agencies such as Moody's and S&P, which could then be used by the IRS as a proxy for GBP and science-based targets alignment.

Advantages and opportunities

- Uses existing, established frameworks and organizations.
- Minimizes the costs of verification through the use of industry-developed tools and ratings agencies.
- Directs performance along decarbonization paths necessary for impact on the real economy
- Rigorous measurement requirements will build awareness and understanding of industry sustainability standards and capacity for measuring sustainability performance.
- Performance-based quartile tax cuts will allow all players to qualify for the tax benefit equally, not at one another's expenses as on a curve.
- Reporting requirements will build a comprehensive inventory of reliable, accurate sustainability data for all sectors. The influx of data will inform credit ratings, allow investors to make more informed decisions, build consumer preference profiles, and encourage friendly competition between industry players.
- The risk of losing the tax advantage year-by-year keeps performance up.
- Reporting to both the SEC and IRS would strongly guarantee truthfulness, as penalties for deception could be severe, especially if rising to the level of tax fraud

Disadvantages and challenges

- Stringent requirements for measurement, target setting, and reporting may trigger reporting fatigue and chill the market.
- If reporting becomes expensive, it may increase the cost of capital, which is the opposite of our goal
- The risk of losing tax advantage introduces a level of complexity that may present difficulties and limit political appeal
- Not clear that the proposal is immediately feasible because the supply of experts with knowledge of sustainability accounting is currently very limited.

4.8. Proposal 8 (Group 4): Beating the Bell-curve

Qualifying for the CTC: In order to qualify for CTC, applicants must do the following:

1. Comply with the ICMA's Green Bond Principles
2. Report performance against industry sustainability averages, as established by SASB

Taxes targeted: once the applicant is approved, taxes on green bond interest will be cut. This will lower the cost of capital for investments that qualify as green bonds, encouraging investors and companies to develop projects that adhere to the GBP, to measure the environmental impact associated with their project (in terms of GHG and/or water), and report the results for continued tax benefits.

Logistics of the cut: In year 1, applicants that outperform industry averages are awarded a flat rate 50% tax cut. The industry standards and averages must be defined by industry experts and/or trade associations, and verified by SASB. In subsequent years, applicants can be awarded the 50% flat rate tax cut for outperforming the industry average, and can qualify for an additional 50% tax cut for providing 3rd party verification of their performance.

Advantages and opportunities

- Uses existing, established frameworks and organizations.
- Simple and easy to understand
- Limiting qualification to the 50th percentile encourages friendly competition between industry players which will drive up the industry average over time, and preserves tax flow from under-performers.
- Encourages the use of material sustainability standards and reporting

Disadvantages and challenges

- Limiting qualification to the 50th percentile disqualifies the companies that fall under the industry average.
- Industry averages may be dramatically below performance levels needed to effect needed impact on the real economy.
- It is not clear that SASB provides industry average performance data on the project level, or would be willing to verify any data provided by another source.
- Numbering roughly 80 in the entire world, there may not exist enough SASB certified FSAs currently credentialed to make this proposal immediately workable. For this reason, the proposal might not be immediately feasible.
- It might make some sense to adapt the performance-based quartile cuts from Proposal 7 to this industry baseline proposal. Industry ranking, if such can be established at the project level, could correlate with tax rate, with the lowest rate for the top quartile.

5. Conclusions and next steps

When applying CTC to anything, it is important to distinguish between what can be done right now, with impact, and what can be done in the near future with better impact, and more precise measurement.

The immediately feasible proposals listed above (CABs, RABs, ERBs, and GBP+) should be further refined at the gathering of the CTC Working Group at EDTX and then modeled for economic, environmental, and health impact. These proposals need only a few more prudent design choices and they could be ready for in depth analysis and scoring.

Without a doubt, ERBs offer the simplest, most feasible method of qualification, with the highest consistent impact. These could be turned into law in short order. CABs extend the concept of qualification based on the impact of underlying assets, but the extension is likely to lead to some areas where impact is less certain and subject to disagreements. This is by no means a fatal flaw, but it would need a good solution, such as a clean half-tax rate for probable but hard to quantify impacts. CABs and ERBs both offer a partial work around to the problem of green bond certification by relying on expert consensus about the impact of technology and external certification. RABs and GBP+ are both very feasible, but impact is likely to range the gamut, varying widely from one bond to the next.

Since GBP and green bond rating systems do not currently guarantee consistency or level of impact, proposals 6, 7 and 8 attempt to deliver that result by other means. But that attempt

to construct an overarching qualification system amounts to an attempt to create an impact certification system for the overall green bond market. Very valuable and ambitious — and no doubt where CTC and the green bond market will soon go — but also difficult for both theoretical and practical reasons, given the young, understaffed, underfunded, and rapidly changing state of the standards and certification profession. It is very likely that improved certification systems for each sector, along the lines on ENERGY STAR, will be the key to a satisfying method of green bond certification.

The three tier proposal found in section 3.2.2 of this report is commendable in recognizing the need to introduce CTC in phases. Further thought should be given at the EDTX gathering about the precise tiered strategy we should employ going forward, in light of the importance of developing robust sectoral certification systems as a necessary building block for satisfying green bond certification.

Most participants felt that the application of CTC to green bonds had great potential to accelerate cheap capital to clean solutions. ERBs, CABs and RABs present some immediately feasible options that could be put in place with very good effect. Perfect effect, however, will take time, development of the standards profession, and a few more charrettes.

6. Annex I: Facilitator's Agenda

Green Bonds Charrette	
9:00	<i>Registration and coffee</i>
9:15	Welcome notes and introductions <ul style="list-style-type: none">• Overview CTC, agenda, and objectives• Round table introductions of stakeholders
10:00	What is “CLEAN”: <ul style="list-style-type: none">• How do we define “clean”?• How is “clean” measured in the green bond market?• Who measures “clean” for green bonds and how reliable and useful is their work to CTC?• What are the best practices?• Who are the leaders in the sector and how are they performing?• How might we qualify green bonds so they impact-fully earn CTC rate reduction, using existing market participant analysis and verification?
10:30	What TAXES do we target? <ul style="list-style-type: none">• We target capital taxes lenders and bondholders pay on intent and capital gains.• What is the potential impact of doing so?• What is the current state of the green bonds market and what would a CTC do to it (growth, expansion, reduction etc.)?• How much tax cut gives you what impact? What would the big picture impact be of CTCs for green bonds? (on reducing GHGs, making the tax code more efficient, growing the existing market, etc.) What are the economics of this moving forward?• What economic and environmental impact can we expect from cutting these taxes for green bonds? How can we model this?
11:00	Where and how do we CUT? <ul style="list-style-type: none">• What straw proposals seem like the best opportunities to develop?• What is the mechanism for awarding tax rate reduction?• How do we pay for any cut?• What are the tax credits that might be eliminated, and what is their value?• If you say you’re eliminating other tax cuts/subsidies to pay for this, what does that mean for the big picture?• How do we make the switch? Voluntary phase-in?• Sector differences? Barriers & opportunities & unintended consequences
11:30	<i>Coffee break and discussion</i>

11:40	Form breakout groups around “clean,” “tax” and “cuts”
11:50	Review breakout group mission and questions <ul style="list-style-type: none"> • Pull together questions from Christina and White Paper
<i>12:00</i>	<i>Working lunch for break out groups, more coffee</i>
12:40	Break out groups prepare reports <ul style="list-style-type: none"> • Focus group facilitator sets objectives • Conversations should identify key barriers and opportunities, potential sector champions, areas for further study, and next steps.
1:00	Focus group report out and Q&A <ul style="list-style-type: none"> • Breakout leaders report findings. Facilitator reviews and solidifies conclusions, lessons learned, potential sector champions, opportunities for further study, and next steps from each group, integrating group consensus • Objective to identify most promising straw proposals to develop further
<i>2:00</i>	<i>Coffee break and networking</i>
2:10	Form breakout groups around straw proposals chosen by plenary
2:15	Breakout groups refine straw proposals, via “clean” “tax” “cuts” frame <ul style="list-style-type: none"> • Develop actionable plan that can be modeled • Answer key questions for each proposal
3:00	Focus group report out and Q&A <ul style="list-style-type: none"> • Breakout leaders report findings. Facilitator reviews and solidifies conclusions, lessons learned, potential sector champions, opportunities for further study, and next steps from each group, integrating group consensus • Plenary identifies most promising refined proposals to report and study further • Who could be a champion/pioneer (both accept the pros and the cons of this) this policy or policy ideas? Senators nonprofits? Who houses this going forward? • Who writes what parts of charrette report? • Next steps?
3:40	Summary and wrap up <ul style="list-style-type: none"> • Closing remarks from hosts • Refreshments at Le Monde

7. Annex II: Participants

1. Alexander Peters, Amagansett – Springs Aquifer Protection
2. Laura Segafredo, Blackrock
3. Tanya Khotin, Clean Energy Advisors
4. Arnaud Brohe, CEO - CO2Logic
5. Travis Bradford, Director – Energy and Environment, Columbia University
6. Jeffrey Potent, Columbia University
7. Ava Song, Columbia University
8. Rosalind Louise Venables, Columbia University
9. Sophie Dejonckheere, Columbia University
10. Shlomit Azgad-Tromer, Columbia University
11. Bert Hunter, CT Green Bank
12. Satyajit Bose, Earth Institute – Columbia University
13. Dakota Gangi, EDF
14. Carolyn Kim Allwin, Elysian Advisers
15. Rod Richardson, Grace Richardson Fund
16. Phillip Henderson, NRDC
17. Roger Baneman, NRDC
18. Michael Gerrard, Sabin Center for Climate Change Law, Columbia University
19. Stephen Scofield, South Pole Group
20. Christina Wong, SustainAbility
21. Lorraine Smith, SustainAbility
22. Stephen Freedman, UBS
23. Nathan Walworth, University of Southern California
24. Todd Cort, Yale Center for Business and Environment
25. Wayne Winegarden, Capital Economic Advisors
26. Dillon Lanius, Restituo Advisors

8. Annex III: Post-Charrette Commentary

Post-charrette commentary led to important insights that several of the proposals produced by the charrette would likely not be acceptable to green bond market participants, while two (Clean Asset Bonds and Emission Reduction Bonds) might be well accepted. Any proposal making tax exemption conditional on future impact performance would likely not be attractive to issuers or investors. By contrast, tax exemption based on historical performance of asset classes would better meet the needs and expectations of the bond market. These and other insights are explained in more detail in the following excerpt from the GRF white paper “Clean Tax Cuts: A Year of Policy Design” released September 2017, attached hereto.

OVERVIEW of CLEAN TAX CUTS MECHANISMS: Equity vs. Debt

Equity-Side: Clean-Product-Based CTC vs. Debt-Side: Clean-Asset-Based CTC

Two leading categories of CTC mechanisms have emerged for accelerating profitable clean investments (one appropriate for debt, the other for equity), each offering a broadly applicable, metrics-based method on which to reward beneficial environmental impact performance:

Equity-Side: Clean-Product-Based CTC:

Rewards equity investors (owners, partners and shareholders) with tax reduction tied to annual share of income derived from sales of (or rents from) property, plant and equipment, commodities and consumer goods with known waste and pollution reducing environmental benefits.

Debt-Side: Clean-Asset-Based CTC: Rewards debt investors with tax exempt interest on loans and bonds financing deployment of pre-qualified “clean” assets with known waste-reducing environmental benefits;

Before describing specific CTC mechanisms, we should first understand a key big-picture distinction here: for Equity-Side Clean-Product-Based CTC tax reduction is tied to firm performance, as defined by how much clean product is sold as a percentage of total sales, and how quantifiably clean the product may be – both of which could vary annually.¹¹

For Debt-Side Clean-Asset-Based CTC, tax reduction is tied to historical asset class performance for the pre-qualified clean assets being deployed. But on the debt side, firm or future project performance is *irrelevant* (short of fraud or bankruptcy) to future tax rates on debt that finances clean assets.

Why this difference?

Since returns in equity markets are based on actual market performance of securities, Clean-Product-Based CTC, rewarding actual firm performance with respect to clean product sales, is a good fit there. It conforms to equity market expectations that rewards relate to performance.

But in debt markets, CTC based on actual firm or project environmental performance would NOT work well at all. Debt markets explicitly seek to decouple market performance from returns as much as possible. Loan and bond payments are usually guaranteed, predictable and secured by assets. Risk-averse debt markets will likely not accept performance-based CTC mechanisms where tax-exemption could be lost based on future impact assessments. Such a mechanism would introduce not only unacceptable risks for investors, who demand predictable returns, but would complicate issuance, and introduce a level of unaccustomed government interference that would chill the market. A non-starter for debt markets.

Clean-asset-based CTC, however would likely work extremely well for debt markets, since it avoids the above problems. By basing tax reduction on historical environmental performance of a given asset class, it decouples tax rewards from future environmental performance of any specific project. That matches the needs, expectations, and existing practices of debt markets (decoupling investment profits from project performance to make returns predictable). It creates a sound basis for an environmental impact incentive¹², reduces the possibility of “green washing” (which worries some

¹¹ It is possible to imagine other equity-side performance-based CTC mechanisms, determined, for example, by a corporate sustainability accounting score, reflecting overall corporate practices. But such sustainability accounting standards are not sufficiently developed at present, nor are there enough certified sustainable accountants in the workforce today, to physically do all the accounting and reporting work that might make such proposals workable. However, if that changes, this could be one possible evolution of the CTC concept.

¹² CABs qualify projects for tax reduction in a manner similar to that used for most solar and wind tax credits (based on the emission-free nature of assets deployed). By contrast, CABs are much broader-based (incorporating more kinds of waste-reducing clean assets) and more technology and sector neutral.

green bond market observers) but also keeps financial regulators out of impact assessment.

This is important.

CTC works differently for debt vs. equity. These two capital markets work powerfully together, precisely because they meet different needs. CTC debt and equity mechanisms can also work powerfully together. But such mechanisms must fit the varying needs and expectations of each capital market and sector – which could be the difference between working very well, and not working at all.

One shared characteristic of all thriving capital markets, debt or equity: issuance and investment must be easy, and effective regulators must do their job with finesse, to avoid any unnecessary interference, risks and costs that might chill the market. CTC mechanisms must not introduce any heavy-handed regulations, and should keep financial regulators (IRS, SEC,

US Treasury) out of the business of impact assessment, about which they know little or nothing.

Any impact certification or pre-qualification of lists of clean assets and products should stay squarely with legislatures and non-financial agencies (EPA, NHTSA, etc., or NGOs) who usefully already play a critical role in this area through certification and standards programs like CAFE, LEED and ENERGY STAR. With respect to possible CTC implementation, determinations by any such chosen standard-setting organizations should be accepted without second guessing by all financial agencies. That would keep issuance and tax reporting cheap, easy and uncomplicated. For bonds, that would also keep returns predictable, and financial regulation of issuance pretty much as it is now.

Here is an example of a clean-asset-based CTC mechanism:

Debt-Side: Tax-Exempt Clean Asset Bonds (CABs)¹³

One of the most intriguing, broadly applicable CTC proposals comes out of the Columbia University working group led by SIPA Energy & Environment, and the Sabin Center, which focussed on the application of CTC to green bonds. [Columbia's tax-exempt Clean Asset Bond \(CAB\) proposal](#) would allow corporations and banks to issue tax-exempt debt financing (green bank loans and green bonds) for manufacture, deployment and operation of assets and technologies with proven environmental impact. For example: zero emission power sources, electric car factories, or equipment reducing waste and emissions from oil and gas produc-

tion.¹⁴

Privately issued tax-exempt green bonds would form a new class of security, “blending characteristics of tax free munis (\$3.7 trillion market) and higher yield taxable corporate bonds (\$35 trillion market)” – but potentially more attractive than either trillion dollar security class. These new bonds would offer the lowest cost of debt for issuers, and the highest tax-free return for investors – a better deal for both issuers and investors than anything else they can get.¹⁵ The market potential appears significant, according to [some leaders in clean infrastructure deployment](#).

¹³ The first proposed clean-asset-based bond mechanism appears to be the Emission Reduction Bond (ERB) suggested by Travis Bradford during the March 6 charrette. ERB's narrowly define what qualifies as clean assets worthy of tax-exemption: zero emission power sources. Clean Asset Bonds expands that to all waste-reducing assets as described herein.

¹⁴ May 2017 saw [the first issuance of a green bond by a major fossil fuel company](#), to finance equipment intended to increase the energy efficiency and reduce the emissions of their oil processing facilities.

¹⁵ A tax-exempt US corporate green bond market could eventually become significantly larger than the low yield muni-bond market, which relies on a smaller market of HNW individuals and does not attract many institutional investors looking for higher yields. But [82% of the US holders of the much larger US corporate bond market are taxable individuals or entities](#), and would likely invest in a high-yield tax-exempt corporate bond. Pension funds are tax exempt, but only account for 11% of the US corporate bond market. Right now, pensioners are taxed on pension distributions. Tax-exempt green bonds could be made attractive to pension funds if the tax-exemption on that income flowed through to pensioners by law.

Every sector studied has expert-compiled lists of such high-impact technology. CABs and tax-exempt loans can help finance a wide variety of clean infrastructure in a simple, uniform manner that is metrics-based, and technology/sector neutral. They offer a potential CTC mechanism for sectors not yet studied – perhaps, say, to finance PP&E and operations that collect and recycle waste plastic, or operations that retire and recycle used vehicles, or high-emission power generation and manufacturing plants; or maybe for ecotourism or other operations benefitting rainforest, coral reef and other wild ecosystem conservation.

CABs could become policy in a variety of ways: as part of either federal tax reform or infrastructure legislation, or as a state level policy (for California or other high-income-tax states). Or perhaps they might offer a promising basis for an international treaty or UN agreement on global tax exemption for green bonds.

The Columbia tax-exempt Clean Asset Bond proposal would work well for debt markets because it meshes with needs and expectations. CABs are targeted, like most corporate bonds,

at asset-backed project finance. They keep returns predictable and issuance easy, because use of lists of pre-qualified high-impact assets make qualification automatic for such projects, without involving financial regulators in impact assessment. Tax-exemption for municipal bonds is also the most well known precedent for tax reduction in debt markets, so tax-exemption for CABs makes sense as a familiar mechanism.

Tax-exemption also makes sense because debt is used as leverage to drive profits to the equity side. Tax-exempt CABs allows governments to ride this leverage. They can offer a very strong incentive for clean infrastructure financing, but still recoup significant tax revenue on higher equity side profits – without giving up too much on the debt-side because rates of return, and share of overall profits, are lower there. That would argue that CTC tax rate reductions on the equity side should be more modest, to capture much of that increased profit as tax revenue, to be as fiscally sound as possible. Such a combination would likely score well fiscally, and deliver a high impact.