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Green New Deal Leadership Determinants of the 21st Century: Teaching Economics of the Environment

Julia M. Puaschunder[1, 2]

[1]*The New School, Department of Economics, School of Public Engagement, New York, NY 10003, USA, Julia.Puaschunder@newschool.edu, www.juliampuaschunder.com*
[2]*Columbia University, Graduate School of Arts and Sciences, Julia.Puaschunder@columbia.edu, http://blogs.cuit.columbia.edu/jmp2265*

ABSTRACT: The future leadership on the Green New Deal (GND) will depend on teaching core concepts of the economics of the environment and evaluating the success of the transition implementation by monitoring and evaluation. The GND operates within the framework of the United Nations Environment Programme (UNEP) since 2008 to create jobs in green industries, thus boosting the world economy and curbing climate change at the same time. In 2019 over 600 organizations submitted a letter to the U.S. Congress declaring support for policies to reduce greenhouse gas emissions. This includes ending fossil fuel extraction and subsidies, transitioning to 100% clean renewable energy by 2035, expanding public transportation, and strict emission reductions rather than reliance on carbon emission trading. This paper describes the implementation of the GND but also underlying efforts to teach GND components for building a cadre of future environmental economists.

KEYWORDS: Climate Bonds, Climate Change, Economics of the Environment, Ecotax, Environmental Justice, Environmental Governance, Fiscal Policy, Green New Deal, Monetary Policy, Multiplier, Sustainability, Teaching

Historical emergence

Since 2019 Senator Edward Markey and Representative Alexandria Ocasio-Cortez push for transitioning the United States to use 100% renewable, zero-emission energy sources, including investment into electric cars and high-speed rail systems, and implementing the social cost of carbon that has been part of Obama administration's plans for addressing climate change within 10 years. Besides increasing state-sponsored jobs, this GND is also aimed to improve vulnerable communities via universal health care, increased minimum wages and preventing monopolies. A 10-year national mobilization targets at work security and working conditions by high-quality health care, affordable housing, economic security, access to clean water, air, healthy food and nature, education, clean, renewable, zero-emission energy, repairing of infrastructure, energy efficient smart power grids, upgraded living conditions, pollution elimination, clean manufacturing and positive work collaborations.

In January 2019, a letter signed by 626 organizations in support of a GND was sent to all members of Congress. It called for measures such as an expansion of the Clean Air Act, a ban on crude oil exports and fossil fuel subsidies and leasing and a phase-out of all gasoline-powered vehicles by 2040. The letter also opposed market-based mechanisms and technology options such as carbon and emissions trading and offsets. Various proposals for a GND have been made internationally, for instance in Australia, Canada and Europe.

Economic foundations

Economic theories that back the GND include John Maynard Keynes' spending multiplier effect (1936), which captures the ratio of a change in national income to any autonomous change in spending – such as private investment spending, consumer spending, government spending, or spending by foreigners on the country's exports that causes it.

Joseph Stiglitz famously advocated for the GND by saying "it is better to leave a legacy of financial debts than to hand down possibly unmanageable environmental disasters." Also, Jeffrey Sachs supports the idea of financial overspending for the sake of avoiding irreversible tipping points and environmental lock-ins. Money will always be there and is fungible, whereas environmental resources are depletable and irreplaceably destroyable.

Implementation

Governance

Global Environmental Governance features different means ranging from formal institutions (major global conferences and treaties), legal regimes, informal arrangements, intergovernmental relationships, nongovernmental organizations, global capital markets and multinational corporations. Obstacles in the past 20 years of Global Environmental negotiations is non-compliance as weak treaties may not go far enough due to lack of commitments on part of emission producing nations. Environmental Treaties addressing climate change are based on various sources and enforceability of international environmental law with unilateral, bilateral and multilateral actions. "Hard law", such as treaties (or agreements, protocols, covenants, conventions) are coupled with "Soft law" (such as policy declarations), of which both are not legally binding. No need for ratification is stressed so that the treaties are easier to adopt by a wider range of actors (e.g., also NGOs), yet the credibility of actor pledges and implementation are often lacking. Therefore, alternative governance means are recommended to be phased in concurrently to support and back environmental justice and climate change mitigation and adaptation efforts.

Governance

Fiscal policies: The public sector and governing institutions play a central role in overcoming free-rider problems and initiated market opportunities associated with externalities like climate change. Mitigation and adaptation policies and disaster risk prevention and recoveries may be supported by fiscal policy. Proposed financing tools include (long) maturity bonds – such as discussed in Sachs (2014), Orlov, Rovenskaya, Puaschunder and Semmler (2018) and Braga, Fischermann and Semmler (2020). Bond (credit) financing allows for better control and scaling of climate policies allowing capitalization of infrastructure, mitigation and adaptation policies as well as financing recoveries after disasters. Issuing bonds can be funded and supported by public and private sector institutions, including governments, municipalities, market institutions, grants from donors and development aid. The raised funds are allocated for climate related infrastructure and for mitigation and adaptation policies. Constraints are imposed through borrowing and bond issuing and a policy trade-off between the use of funds allocated to climate related infrastructure, for mitigation of greenhouse gas emissions and against extreme events to ameliorate local damages from such events. Harmful events might occur in spite of mitigation, but the probability of an extreme and harmful event is reduced with greater mitigation efforts.

Carbon Tax: To peg emissions to tax payments appears simple and fair. Around the globe, about 14% of CO_2 emissions are subject to taxation. But most of these taxation efforts are only a few cents or dollars per CO_2 ton of emissions. Climate effects are only predicted for around 40 USD and increasingly doubling the taxation after an introductory phase successively. So far, Sweden has been quite successful with this: Since 1991 the CO_2 tax has been raised to 130 USD and carbon emissions dropped for about 1/4th while the economy could still grow.

The advantages of taxing carbon emissions are that the costs and revenues are quite predictable. The disadvantages include that CO_2 taxes can be rolled over onto the consumer. Weaker societal income segments then share an unequal burden and the political attention to climate inequality is to this day limited. Economically this could be alleviated by having a

progressive taxation scheme. For instance, the Canadian Province British Columbia designed their CO_2 tax to be neutral by pegging it to the income tax. The more CO_2 an individual pays, the lower the income tax gets adjusted. In the US, a direct refund to citizens was discussed.

An ecotax (short for ecological taxation) is a tax levied on activities which are considered to be harmful to the environment and is intended to promote environmentally friendly activities via economic incentives. Such a policy can complement or avert the need for regulatory (command and control) approaches. Often, an ecotax policy proposal may attempt to maintain overall tax revenue by proportionately reducing other taxes (e.g. taxes on human labor and renewable resources). Such proposals are known as a green tax shift towards ecological taxation. Ecotaxes address the failure of free markets to consider environmental impacts. Ecotaxes are examples of Pigovian taxes, which are taxes that attempt to make the private parties involved feel the social burden of their actions Thomas Pogge's proposed Global Resources Dividend (Pogge 1998).

A Pigovian tax is a tax on any market activity that generates negative externalities intended to correct an undesirable or inefficient market outcome and does so by being set equal to the social cost of the negative externalities. Social cost includes private cost and external cost. However, in the presence of negative externalities, the social cost of a market activity is not covered by the private cost of the activity. In such a case, the market outcome is not efficient.

Overall, there is hardly any cooperation on tax regimes in the international arena. International financial streams are still risky and volatile. International taxation would require international tax cooperation and the risk remains of international tax havens, which we all witnessed recently with the Panama papers. Without international agreements and treaties, international trade disputes and tax evasion appear as potential weaknesses of the approach as a CO_2 tax could also be deducted together with import taxes.

Monetary and credit policies: The importance of monetary policy in support of climate policy is visible in inflation targeting as a proper policy. Yet, adaptation, the provision of climate disasters, and the recovery are often producing bottleneck causing higher inflation rates. So targeting the inflation rate to move down inflation rates do not seem to be the appropriate policy if one has negative shocks on the supply side.

Some of the literature also includes discussions on the role of the financial sector at large, including banks and central banks. After climate disasters have occurred there are not only bottlenecks on the supply side, but also severe credit constraints. Usually, collateral value for loans have declined, due to value losses from housing and real estate. So it is hard to obtain credit, or one obtains credit at large risk premia. To overcome those constraint should be a major task of central banks. Monetary policies could also be more supportive with respect to climate bonds. For example, if central banks accept green bonds as collateral, they could stimulate climate finance. There is some virtuous cycle: Central banks prefer investment grade bonds as collateral and rating firms try to rate climate bonds and they rate those bonds higher if they are accepted by central banks as collateral. Beside financial instruments such a credit and climate bonds, policies such as monetary policy can be considered, particularly the effect of the latter on credit constraints and risk premia. On the other hand, there exists a carbon foot print index of equity which may not only help issuing green bonds, but aid in preventing a fire sale of fossil fuel assets. Central banks could also ease credit flows after disasters, in particular to overcome bottlenecks in the supply of goods and services, in infrastructure, transport and other private and public sectors.

Insurance policies: Some researchers stress the importance of preventive actions and of policy buffers, designed to enhance resilience to shocks. Furthermore, the ease of borrowing constraints, greater reserves, and reserve fund accumulation is suggested. Low income countries and regions

have limited access to issuing climate bonds and exercise little borrowing power. Besides tax increases, risk pooling through self-insurance or some collective insurance schemes, grants from donors, and buildup of financial buffers and disaster funds for contingencies are recommended.

The issue of debt sustainability needs to be addressed as well. Indeed a broader concept of risk pooling could also aim at mechanisms of private or public insurance schemes, multilateral safety nets, regional catastrophic insurance schemes, and so on. Others have suggested that, beside donor grants, fiscal and financial policies and risk pooling and insurance funds, monetary policy should step in to provide for disaster affected regions and countries with low interest rate loans and sufficient credit flows to allow for reconstruction and recovery to avoid hysteresis effects on productive capacity to avoid trapping probabilities (Kovacevic & Semmler 2020).

Central banks: Departing from their central focus on monetary and economic stability (e.g., legal tender & setting the interest rate to achieve market stabilization), central banks have recently gained interest in aiding on the financialization of climate change mitigation and adaptation. The recent interest stems from the realization of the major risks imbued in irreversible environmental lock-ins and climate change tipping points that may impose large-scale irreversible market risks that weaken economies forever. Rising global population prospects and therefore rising economic consumption outlooks could naturally lead to a financial crash. Storms, floods, wildfires and other environmental catastrophes, such as droughts, hurricanes and heatwaves, can create large unpredictable risks that rise the costs exponentially for economies to recover – as visible in the Japan Fukushima disaster or Hurricane Katerina. Large insurance companies have already stepped away from insuring climate change risk havens, such as Long Island coastline property. Central banks now prospect that in the future they will become more and more the institutional backing of high environmental stakes insurance entities. Therefore, the scientific community, have broken ground to get central bankers on board to aid on finding the funds for climate change mitigation and adaptation and serve their purpose of long-term economic stabilizers. Central banks have recently started to invest governmental funds as collateral on environmental endeavors and issue governmental bonds as securities for large-scale environmental foresight, planning, catastrophe contingency planning and resiliency options.

The advantage lies in future economic stability through foresighted financial vigilance. Downsides include that the core focus of central banks is financial and losing ground on too many endeavors could weaken targeted aid. Central bank – to this day – have some doubt about the financial payoffs of the long-term precautionary principle argument of environmental conscientiousness as preventive market stabilizing mean. When it comes to climate change, the risks are simply too unpredictable and sometimes appear too temporally far away for politicians to be factored into historically purely monetary models with short-term attention. Climate stabilization financialization could be promoted as economic market stabilizer and inflation targeting mechanism in the wake of climate disaster-induced price spikes.

The cooperative element appears to be there as central banks are – by now – discussing the idea of climate stabilizing openly and together. For instance, ECB President Christine Lagarde has recently declared climate change financialization as one of the major goals for the European Central Bank. The Banque de France established a network of European Central Banks that coordinates common climate change mitigation and adaptation monetary means. In the US, the Federal Reserve and the Federal Reserves within the States have started concurrent action and a common goals dialogue to make climate stabilization financialization happening. Practical applications are found as well in Bangladesh, India, Brazil and China.

As to climate disasters, climate science is pointing now to similar challenges and urgency to develop and apply similar policy measures. Science has now sufficiently demonstrated that CO_2 emissions lead to rising average temperatures and localized damages

through extreme weather events. The private sector needs to move forward to mobilize real and financial resources to develop and green technology and to move beyond a carbon based energy system, supported by the public sector and public policies. As to public policy there appears to be a policy trade-off between the use of funds allocated to infrastructure for production, for mitigation of greenhouse gas emissions and infrastructure against extreme events to ameliorate damages from such events. Harmful events, as in the case of financial disasters, might occur in spite of mitigation, but the probability of an extreme and harmful event is reduced with greater mitigation efforts. The optimal mix and the relative timing for those two types of challenges is important for policymakers. For the interaction of the private and public sector an important mix of policies are needed – innovation policy, financial, fiscal, monetary, and insurance policies (Puaschunder 2020).

Emissions-Trading: Around the globe, emissions trading covered around 20% of the global CO_2 emissions in about 40 countries of the world and over 20 cities, municipals and provinces of the world ranging from China to the EU.

Advantageous appears that CO_2 can be measured and regulated quite precisely via certificates. However, the disadvantage is that the systems are quite complex and prices highly volatile. Within the EU many high-emission industries got exempt from emissions trading schemes – for instance coal and steel as well as the automotive sector – potentially due to lobbying, which is unfavorable for societal goals accomplishment and the credibility of the cap & trade system.

The international cooperation is hard as there are multiple attempts in different parts of the world that are to be connected. Theoretically, this system could be used by all and the market would expand and prices would become more stable. But developing nations would have a price disadvantage if global prices for a ton of CO_2 emissions are found in the international equilibrium price and worldwide natural price adjustment mechanisms.

Green Bonds: Solar power and wind turbines, eco-friendly infrastructure and more research and development in clean energy and green technology are all investments for climate change. Addressing market changes and the financialization of climate justice are estimated to comprise of 5-7% of the contemporary world GDP, accounting for 5-6 billion USD. Green bonds could fund all these endeavors.

Green bonds are currently planned and enacted by governments, regions, cities and the IMF but also Development Banks and Central Banks. All these entities are currently issuing bonds to invest in climate change mitigation and adaptation. These powerful institutions with long-term and global governance viewpoint serve as liabilities for bonds from the corporate clean technology and socially responsible investment sectors. For the future, green bonds have to be made more attractive for institutional investors and pension funds. In 2019 the worldwide green bonds market comprised of 257 billion USD with main markets residing in the USA and Europe but also growingly China. The potential of green bonds is estimated to reach around 1.5 billion USD.

Advantages of green bonds are a risk-free and easy capital for all those who implement clean energy and/or green environmental projects thanks to the governmental aid that backs the industry on green endeavors. Governments are on board as serving with liabilities and the issuance of green bonds as they appear to meet global common goals and climate stabilization endeavors whilst boosting innovation. Corporations are incentivized to compete over clean energy and green market solutions as for being remunerated with subsidies and tax breaks funded via the bonds. This turns the traditionally unfavorable race-to-the-bottom for dirty cheap energy production in a general market price-cutting behavior to an environmentally-favorable race-to-the-top in the competition over clean energy governmental aid. However,

regular financial market mechanisms lead to high costs due to high risk premia on future-oriented market options with relatively high uncertainty.

Export-oriented countries could use this approach, especially if capital is available for the market. An excellently educated population and traditional green solution-oriented market and clean energy-dominated technology sector aid in the implementation. Disadvantageous appears that green bonds could lead or propel already existing budget deficits – e.g., such as in the USA, Italy, Spain etc. The international cooperation in this approach appears most excellent in setting large-scale incentives potential for institutional investors.

Environmental pricing reform is the process of adjusting market prices to include environmental costs and benefits. A negative externality exists where a market price omits environmental costs. Then rational (self-interested) economic decisions can lead to environmental harm, as well as to economic distortions and inefficiencies. Environmental pricing reform can is a market-based or economic instrument for environmental protection. Examples include green tax-shifting (ecotaxation), tradeable pollution permits, or the creation of markets for ecological services. "Ecological fiscal reform" differs in more narrowly dealing with fiscal (i.e. tax) policies as opposed to using non-fiscal regulations to achieve the government's environmental goals.

An Eco-tariff, also known as an environmental tariff, is a trade barrier erected for the purpose of reducing pollution and improving the environment. These trade barriers may take the form of import or export taxes on products that have a large carbon footprint or are imported from countries with lax environmental regulations.

Net metering (or net energy metering, NEM) is an electricity billing mechanism that allows consumers who generate some or all of their own electricity to use that electricity anytime, instead of when it is generated. This is particularly important with renewable energy sources like wind and solar, which are non-dispatchable when not coupled to storage. Monthly net metering allows consumers to use solar power generated during the day at night, or wind from a windy day later in the month. Annual net metering rolls over a net kilowatt-hour (kWh) credit to the following month, which varies significantly by country and by state or province.

Absorbing CO_2 and forestation: As carbon-negative market solution CO_2 can be absorbed from the atmosphere. Examples of this are carbon-absorbing forests, green rooftops in cities, carbon-negative clothing through fungus-wear but also the absorption of CO_2 from the atmosphere by machinery and windmills as well as premia to stop deforestation. Another ground-breaking innovation could be decentralized energy grids that are run on blockchain approaches. Thereby single households could generate energy, for instance via solar panels on the rooftop or isolated heating devices. Immediately as the energy is generated, the individual household could either use the energy or distribute energy to close neighbors in a grid. This point-to-point solution between closer distributors and decentralized energy sharing could revolutionize the dependency on a few energy providers – e.g., two major pipelines for Europe that come from politically-instable regions outside the EU, US dependency on the gulf region that has led to political action previously, see Nell and Semmler's (2007) work on the gulf war and Iraq foreign policy approach. These decentralized energy grids would also make clean energy cheaper and more sustainable as currently the storage of sustainable energy appears to be driving up the price and making clean energy access unstable. For instance, just imagine that the sun does not always shine on solar panels, wind does not constantly turn windmills and rain does not always fall and spin water turbines in rivers. But a large grid with different power-generating options would diversify the opportunities – energy could be generated during sunshine and rain. Storage would not be expensive as the energy that is generated gets used up in the more locally-connected energy sharing net that has become independent of fluctuating oil prices and large central planner energy

storage and distribution facilities. Large scale investments for this innovative market approach are currently starting and appear to have future potential as prospective market changing opportunities.

All these market innovations can help in the standard predicament between economic growth versus climate stabilization in light of the connection between GDP growth and Greenhouse Gas emissions. These innovative market alternatives do not necessarily pit either economic innovative growth versus environmental protection. Yet to become successful and large-scale mainstream market options, innovations require time and financial means, which could – for instance – be secured via the previously-discussed climate change green bonds market solution.

The clear advantages are the innovative potential that rises hope to change markets forever. The International Climate Council estimates that forestation efforts could revert or compensate for CO2 emissions of all China if done properly. Disadvantages are that investors are often hard to get on board to invest in risky market options with unclear outcome. The cooperative approach seems to be good and many countries find a common ground in forestation, especially those countries with large land space but low income productive capacity. A coalition of countries, multilateral organizations, foundations and commercial certificates could aid fostering international collaboration efforts for reaching mutually-beneficial multi-party agreements.

Behavioral changes: In most recent decades, affluent people in high-income countries have defined environmental conscientiousness as luxury good. High-end consumers around the world then have proven interest in goods that do not cause CO_2 emissions. They travel and shop environmentally-conscientious with respect for the wider community and are investing to fund social and environmental causes in their local communities. Behavioral insight – hence the behavioral economics application onto global governance – proves in many powerful laboratory and field experiments the power of behavioral nudges and winks on consumer choices with less money incentives. Nudges, the behavioral means to change people's choices based on their emotions, status and other environmental and social conditions, have proven to be powerful and easily-implementable sources to educate and change people's behavior without direct enforcement (Puaschunder forthcoming a, b). What is more, these behavioral changes appear to hold strong as the often are based on basic ground emotions and natural behavioral laws (Puaschunder 2018). They become a stable emotional compass and beacon of light on what is right, just and fair that holds strong for very many different domains throughout different life periods and economic market fluctuations. For instance, green bonds and socially responsible investment (SRI) and corporate social responsibility (CSR) actions are based on social and environmental ideals that become quasi-religious value choices that people stick to sustainably and price-independently throughout all phases of market movements (Puaschunder 2019a, b). In creative advertisement, marketers have tapped into these alternative extra-premiums in order to raise prices, create images around the luxury of sustainability and local community investments. SRI funds have benefited significantly from being market-independent and extraordinarily robust during market fluctuations. Socially-conscientious investors stick to their choices as they were interested in these options for their values that they want to stand for and express to others. Not for seeking financial gains to begin with in socially-conscientious options, they stay with them even during times of economic upheaval. Socially-responsible market options thereby have leveraged into a luxury and status symbol.

Advantageous is that in Europe and the US consumers appear to be susceptible to behavioral nudges and have established environmentalism as CSR pledge that moves people's behavior large scale and long-term (Puaschunder forthcoming a, b). Environmental choices have leveraged into a prestige. Nudges are effective and easily-implementable cheap ways to steer markets. The fields of behavioral economics and especially behavioral insights are

fairly new and we are still learning more and more about this growing policy tool and novel market option. Disadvantages are that the direct impact is often hard to quantify and measure and the tools are sometimes vague and also contested if considering the potential to manipulate given the subliminal content of nudges.

The international cooperation on these endeavors is really questionable. Consumer behavior is highly dependent on culture and place. While the US and Europe is good in setting trends that get picked up in many different parts of the world, the historic predominance of these parts of the world appears to be slowly shifting to Asia. In addition, the application of these European and North American tools appears questionable in communities that are not as affluent and a power divide has become noticed in two groups: Those who nudge (the educated nudgers) and those who are being nudged (the uninformed target of nudging strategies). Especially with exporting these tools to other context, one has to warn of a hegemony of the Western nudging attempts trying to impose first-world goals onto uninformed communities in the developing world that are tricked into choices that may only be favorable in certain parts of the world (e.g., the Nairobi behavioral insights lab testing in slum areas what Western nudges are successful there…) (Puaschunder forthcoming a, b).

Sustainable tourism is the concept of visiting somewhere as a tourist and trying to make a positive impact on the environment, society, and economy. Tourism can involve primary transportation to the general location, local transportation, accommodations, entertainment, recreation, nourishment and shopping. It can be related to travel for leisure, business and visiting friends and relatives. There is now broad consensus that tourism development should be sustainable.

Innovation efforts financialization: Technological innovations are usually a result of a mix of private and public activities. The public sector can set frameworks and incentives, to support inventions through R&D and de-risk of innovation through public support and subsidies and setting incentives. Public actions – such as tax and subsidies – could enable the transition to a low carbon economy, and contributing to a faster transformation of the energy system toward a less carbon based energy provisions. As to the existing literature on innovation dynamics, it has been shown that this can be expected to display nonlinearities, thresholds and complex dynamics. Many sources of finance of new energy forms are available – such as self-financing, equity finance, bank loans, bond issuing on the capital markets, venture capital, crowd finance, tax breaks and subsidies etc. As to the real side, those new types of firms, the renewable energy firms, S&M firms, also face challenges. Recent studies on climate policy modeling have studied what challenges new entrants, with new technologies, in the energy sector face, when supports the phasing in of renewable energy firms when there are at the same time carbon-based oligopolies as incumbents, establishing and defending entry barriers against new innovators regarding renewable energy supply.

Major issues as to the real as well as the financial aspects of new inventions and innovations concerning the greening of the energy sector are the entry barriers and long-term costs for renewable energy varying fossil fuel energy prices and the need for financing sources of the new energy sources (self-financing, equity finance, credit from banks, bond issuing, venture capital crowd finance, tax breaks and subsidies).

There are also perils over over-expansions of innovating firms, and lock-ins of innovation firms. Moreover, there are dangers of disruptive effects of outdated fossil fuel technology and stranded assets which may have effects on the banking system and the financial market at large. One needs to pay more attention to portfolio models of two type of assets, either fossil fuel assets or a risk free asset, and alternatively a portfolio of renewable assets and risk free assets, and explore the performance of those portfolios. Additional studies of the dynamics of the entrants

and the incumbents and the possible destabilizing effects on innovation that might be triggered in the financial sector by the carbon-based energy sector are needed.

Intergenerational conscientiousness: In order to stabilize the climate, the current generations face high taxes and expenses. Future generations benefit from these investments for the future. With the right financialization strategy, these costs can be borne by future generations after the climate has been stabilized and is favorable for the humankind to come. Green bonds would be able to enact this intergenerationally-harmonious solution. These financialization strategies are common in the public sector, for instance the New York water distribution is built on this bonds principle. With financial means that raised money via bonds, lakes could be built in mountains near New York. Now when water is consumed, the consumers pay off previous expenses.

Advantageous appears that today's generations are not curbing economic growth potential by raising funds via debts. Future generations benefit from the long-term investment and enjoy an at least as favorable climate as is enjoyed today. Bonds are only successful finance strategies when there is a common faith in bonds and the governmental general debt appears somewhat feasible or the issuing entity somewhat credible to not default on debtors.

The cooperation between different generations appears as Pareto-optimal solution over time. Successful bonds could become a strategy that gets picked up by many countries paving the way for future international trade on green bonds.

Engaging Portfolio Managers: In an integrated economy, oil price fluctuations are causing disturbance in many industries. Portfolio and hedge fund managers strive for reducing risks to the overall portfolio, in the short and the long run. Renewable energy appears as crisis-stable market option as for being chosen in a quasi-religious act based on values and not on profit motives. Investment options based on renewable energy can reduce the risks and political dependencies on commodities associated with non-renewables.

This solution is market conform to attributing standard economic theories. However, until now green market options are usually market-underperforming with lower payoffs than conventional assets, which lowers their use in portfolios. Yet there is a certain trend into renewable energy. The larger this market will get, the more it may become a leader signaling change. The more the demand for green energy will grow signaling change, the more these green assets will become a standard expected part of the industry and the market options become more liquid and profitable due to economies of scale.

Critique on the GND include a too optimistic goals in terms of time and complexity, which should be alleviated by cutting of multiple parts of their plan and aspirational goals of 100% renewable energy that could undermine the credibility of the effort against climate change (Leibovitch, Stremitzer & Versteeg 2019). Left-wing commentators have also argued that the GND fails to tackle the real cause of the climate emergency, namely the concept of unending growth and consumption inherent in capitalism, and is instead an attempt to greenwash capitalism. In their view, not the monetization of Green policies and practices within capitalism are necessary, but an anti-capitalist adoption of policies for de-growth.

Future leadership in teaching

Future leaders in the implementation of the GND will depend on a cadre of upcoming students, scientists and policy experts understanding the interaction and interdependence of economics and the environment. An upcoming group of young minds will drive innovation in the field of ecological economics, who may also be trained with an openness to capture the larger scale of related sciences, such as environmental economics, climate economics and political economies. All these fields cover basic approaches to the relationships between ecological and economic systems, both traditional and alternative economic theories and worldviews.

Overall, future curricular may examine the role of economics in understanding and valuing environmental concern. Current environmental issues, such as climate change, biodiversity loss, land degradation, ocean acidification and freshwater use should become introduced through the framework of marrying environmentalism with an economics lens. Students should be guided to learn through multiple approaches and understand analytical frameworks developed historically and by unconventional economists to frame and interpret these issues. The application of ecological economic principles to environmental problem-solving should be taught by presenting a set of policies targeting areas such as pollution and natural resources management around the globe.

As for building a future cadre of environmental economist, students should learn how to think about the relationship between the economy and the environment, the role of economic analysis in understanding and valuing the environment, and examine problems of social and economic development, environmental and related policies.

Starting with providing an overview of economics with an application in the public domain; concrete teachings should also dare to provide a critical approach to the contemporary micro-, meso- and macro-economic analysis techniques of public choices in environmental decision making. By drawing from the historical foundations of political economy, innovative teachings should to advance the field of environmental economics through a critical stance on behavioral, economic and social sciences' use for guiding on public concerns. Teachers should be encouraged to take a heterodox economics stance in order to search for interdisciplinary improvement recommendations of the use of economics for global governance.

Student presentations of research projects featuring a multi-methodological approach will help gain invaluable information about the interaction of economic markets with the real-world economy with direct implications for policy makers alongside teaching upcoming scholars a broad variety of research methods and tools to conduct independent research projects. Throughout tangible learning approaches online and remotely, students from around the world could be guided to investigate and scientifically propose analysis strategies how to innovatively use and teach economics for the greater societal good. For instance, when it comes to the Green New Deal, students in the United States could outline their experience in reflection with students in Europe that brief on the European Green Deal coupled with experts in Asia who could highlight the most recent developments on the Copenhagen Green Climate Fund. Especially the online character higher education is shifting towards these days can become a forum for open debate around the world on global concerns. Teaching and learning consortia could embrace and engage like-minded specialists, who teach cases of their own environment that can be widely distanced from each other. Innovatively, theses efforts will be enhanced by a self-imposed leadership component, in which leadership aspects of the discussed contents will be highlighted and honed in practical experience and learning-by-doing on the ground. Leadership facets of the research findings should be debriefed during in-class experiences and final project presentations, in which participants may come together in in-person retreats.

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