Transparency of the "Net-Zero by 2050 Club"

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As governments around the world reaffirm their commitments to reduce carbon emissions at the national level, numerous global corporations have recently issued their own carbon reduction pledges. Such corporate "Net-Zero by 20xx" commitments doubled in 2020 and show no sign of letting up in 2021.

It is readily seen why many firms perceive the decision to join the "Net-Zero Club" to be clear in terms of costs and benefits. With pressure from institutional investors, customers and other corporate stakeholders building, firms can claim the "green mantle" by publicly setting the goal of complete decarbonization by 20xx, say 2050. Management is effectively communicating to the public that the firm assumes the social responsibility of doing its part to address the global climate crisis. Yet, a mere pledge that comes due in the year 2050 is generally beyond the accountability horizon of current executives. The announcements made thus far also exhibit considerable variation in what exactly is being pledged because of latitude in measuring corporate carbon footprints and reporting progress towards the ultimate goal of full decarbonization. Unlike mandatory corporate disclosures, voluntary future-oriented disclosures are not subject to binding measurement and reporting standards. Membership in the "Net-Zero by 2050 Club" is thus virtually free, but lacks transparency as the public seeks to differentiate between firms in terms of their ambition to reduce emissions and the credibility of the stated ambitions.[1] Here, we outline a measurement and reporting framework that would enhance the comparability and transparency of these corporate disclosures.

In calculating carbon footprints, firms apply widely different rules in terms of which emissions are included in gross emissions and offsetting credits. The U.S. utility Xcel, for instance, follows the International Greenhouse Gas Protocol,[2] distinguishing between direct (Scope 1) and indirect (Scope 2 and 3) emissions. A significant share of Xcel's direct emissions result from burning fossil fuels to generate electricity. In general, Scope 2 covers carbon emissions that arise in connection with the production of electricity and heat that companies buy from their suppliers. Since a utility like Xcel need not purchase electricity and heat from third parties, those emissions are not an issue. The indirect emissions in the Scope 3 bucket principally pertain to a firm's entire upstream supply chain as well as all emissions associated with the use of the firm's products. In Xcel's case, a significant block of its Scope 3 emissions arise from natural gas sold to, and subsequently combusted by, the firm's customers. In its recent pledge for the year 2050, the utility envisions the sale of "100% carbon free electricity" from its own power plants and electricity purchased from third parties. Importantly, this pledge does not extend to the Scope 3 emissions associated with the sale of natural gas.[3]

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For a technology firm like Google, direct emissions are negligible in comparison to the carbon content of the electricity needed to power the firm's data centers and buildings. As a major investor in renewable power generation, Google claims to completely offset its significant Scope 2 emissions. Among its Scope 3 emissions, the firm identifies only employee commuting and travel as applicable categories.[4]

The boundaries of Scope 3 emissions are inherently fuzzy. Should Google include employee commuting, but not the carbon content of other inputs, for example, the electronic equipment used to write computer code? The daunting complexity of identifying Scope 3 emissions is well illustrated in the context of an automotive company. On the upstream side, the company should account for the carbon emissions associated with the manufacture of the tens of thousands of different components that go into the automobiles. On the downstream product use side, an estimate of the tailpipe emissions generated by the automobiles sold in any given year should be included.[5] According to its recent disclosures, the consumer products conglomerate Unilever addresses the thorny Scope 3 issue rather simplistically by leveling a flat 46g of CO_2 charge "per use" on all its products, be they food items or skin care products.[6]

The inevitable discretion that firms have in drawing the boundaries of their Scope 3 emissions, and the measurement approach they take, makes an apples-to apples comparison across firms -- even within the same industry - nearly impossible for the interested public. From an economy-wide perspective, there is the undesirable effect of double-counting for Scope 2 and 3 emissions.[7] By construction, Scope 3 emissions compound along the supply chain with every link in the chain including all the emissions reported by its predecessors. The major argument for including indirect emissions in corporate carbon footprints is that firms have some control over the products they sell and the suppliers they work with. Yet, the flipside of this shared responsibility argument is that firms will report significant reductions in their carbon footprints without making any operational changes so long as the firm's suppliers manage to reduce their emissions.

Returning to the example of Google, the firm claims to be already carbon neutral despite its relatively significant Scope 2 emissions. The basis for this claim is a carbon accounting construct that effectively swaps the "clean electrons" delivered to the grid by Google's renewable energy plants for the carbon-intensive electrons that Google actually consumes at its operational centers. In calculating its net carbon footprint, the firm thus subtracts so-called avoidance offsets from its gross Scope 2 emissions. The basis for claiming these avoidance offsets is that because Google supplied clean energy to the grid in some location, other energy consumers purchased less of the carbon-intensive energy generated in those locations. Clearly, this reasoning is based on a counter-factual claim.

The general construct of avoidance offsets is that firms deduct as many tons of carbon-dioxide equivalents from their gross emissions count as were supposedly not emitted by third parties due to the firm's intervention. Aside from carbon-free energy supplied to the market, such offsets can be generated, for example, from a forest that would have been logged, but instead was conserved. Immediate questions then arise regarding the duration of the offset, that is, for

how long that forest will be preserved, and the additionality of the intervention, that is, would the forest indeed have been logged, had it not been for the claimant's intervention. The trade with avoidance offsets has been booming in recent years through voluntary carbon markets. Just like indulgences sold by the Catholic Church over the course of centuries allowed the faithful to "whitewash" their sin registries, offsets traded in voluntary carbon markets allow buyers to claim a lower net-carbon footprint. Though many currently traded offsets are certified by NGOs, their average transaction price has recently been a mere $3 per ton.[8] Thus, offset buyers are currently in a position to reduce their self-reported emissions at a unit cost less than one-tenth of the cost of acquiring mandatory emission allowances in jurisdictions like the EU or California.

Purchasing offsets allows firms not only to reduce their current aggregate carbon footprint measure, but also to showcase select product lines as "carbon neutral" today. For retail products like gasoline, consumers' growing worries about climate change make them favorably disposed towards brands that have a carbon-neutral or net-zero label. Firms can justify this claim today by allocating a suitable share of their gross emissions to the product line in question, and then compensating these emissions with credits through offset purchases.[9]

Voluntary carbon markets also offer so-called removal offsets that emerge when a third party removes CO_2 from the atmosphere and sequesters it for a sufficiently long period of time, say 150 years. One technology for generating high-quality removal offsets is direct air capture, where a facility located anywhere in the world removes CO_2 from the ambient air and then sequesters it in an appropriate geological site, where the gas will stay removed from the atmosphere for 1,000+ years. Nature-based carbon sinks, like forests, soils, or oceans can generate other removal offsets, though generally with a shorter duration (150+ years). In comparison to avoidance offsets, removal offsets currently trade in the $23 – 800/ton range, reflecting the perception of a more tangible climate impact. Removal offsets effectively constitute direct carbon reductions, in contrast to the indirect reductions recognized with avoidance offsets.

Transparency of corporate carbon reduction pledges would be enhanced considerably by common standards for i) measuring corporate carbon footprints and ii) reporting updates at interim points in time. From a climate change perspective, the core variable regarding a firm's carbon emissions arguably is its annual *Direct Net Emissions (DNE).* This metric takes the direct Scope 1 emissions and subtracts the carbon removed from the atmosphere by the firm, or intermediaries, and sequestered for a sufficiently long (150+ years) duration. When added up across all economic entities (including firms and households) and across all years from today up to a particular horizon date, the aggregate DNE figure effectively determines the change in CO_2 concentration in the atmosphere at the horizon date.

Annual reporting of DNEs will allow for an apples-to-apples comparison of firms' carbon footprints and improvement thereof. Firms will enhance the credibility of their annual reports by disclosing any certification received for their removal offsets. In addition to new ratings agencies emerging in this domain, the Taskforce on Scaling Voluntary Carbon Markets seeks to

formulate minimum quality standards for carbon offsets, particularly with regard to the lingering issue of duration.[10] Along similar lines, the currently pending Growing Climate Solutions Act tasks the US Department of Agriculture with establishing protocols that govern the issuance of credits that farmers, ranchers and private forestry owners could sell in the voluntary carbon markets.[11]

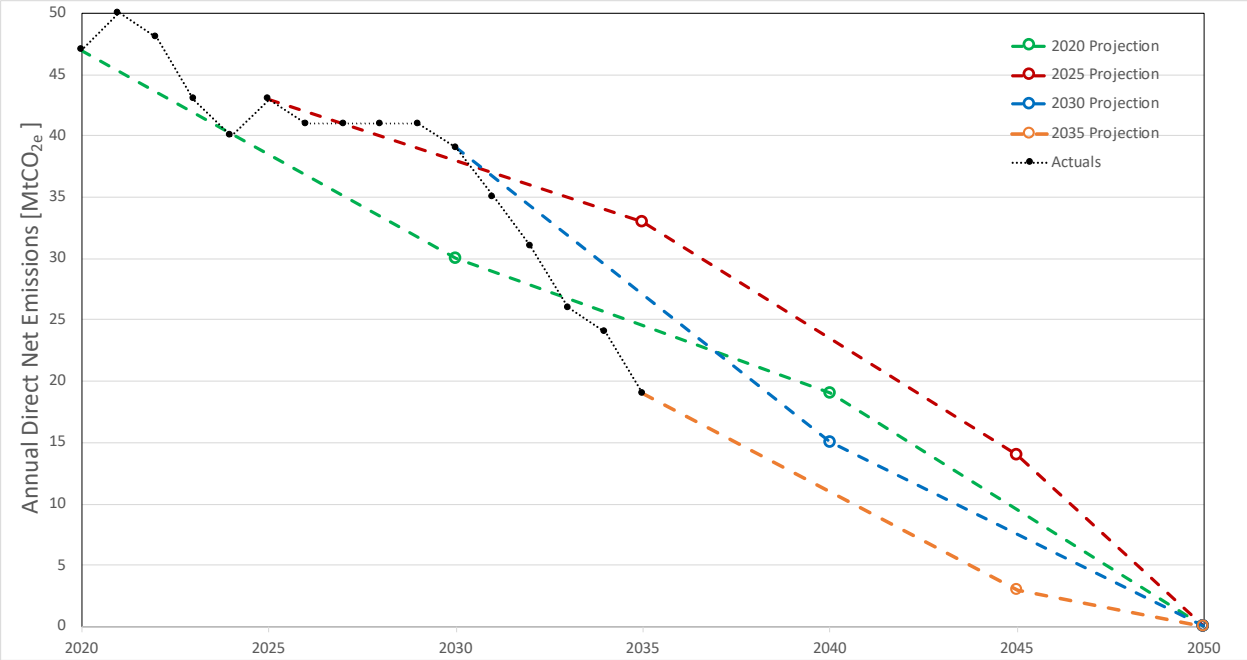

Figure 1: Hypothetical carbon reduction trajectories reported and updated over time

Carbon reduction milestones can effectively mitigate the issue of today's management being no longer accountable in 2050 for potentially missing the stated net-zero goal. Firms may want to set these milestone targets in terms of a carbon intensity metric, such as DNE relative to sales, to account for growth in operations. The targets could be set in accordance with the guidelines formulated by the Science-based Targets initiative.[12] Firms would naturally seek to periodically update the projection of their future DNE trajectory, say every five years. When these updated future trajectories are "spliced" together with actual past DNE results, they enable an integrated assessment of target setting and subsequent achievement, similar to the management control processes firms adopt internally for financial performance measurement.[13] Figure 1 provides an illustration of what a firm adopting this time-consistent reporting format might disclose in the year 2035.

We envision the target setting and reporting framework described here to be voluntary. Adherence to this framework should allow those firms that project meaningful carbon emission reductions, and expect to deliver on their pledges, to distinguish themselves from others that simply seek the green label. Thus, the "Net-zero by 2050 Club" would already become more transparent if only a subset of the club members were to adopt this reporting format. Further transparency would emerge if select elements, such as timely reporting on past DNE results,

became mandatory on a global basis. To date, Britain is one of the few countries that have mandated the reporting of Scope1 and Scope 2 emissions by publicly listed firms in their annual reports. Recent empirical studies argue that even this modest reporting mandate had a tangible real effect in terms of the regulated British firms reducing their CO_2 emissions by significantly more than a group of comparable European firms not subject to the mandate.[14]

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