

Sno-Caps: The People's Cap-and-Trade

James G. D'Angelo

Using a collection of new technologies we can create a fully transparent, zero-cost, cap-and-trade solution without hierarchies or conscription that incentivizes every person on earth and requires no approval from Congress. Better still, we can launch this year.

Applying the power of free markets to counteract climate change has long been considered a compelling idea. As a result, in the last decade, a number of market-based cap-and-trade programs have been launched by forward

Current cap-and-trade proposals often feel like they are happening on a trapeze.

looking governments. These programs work as follows: governments create

the 'cap' and, in turn, hand freshly minted shares of carbon directly to the corporate polluters, who, can 'trade' these now scarce assets. Increasing demand (as populations and economies grow), leads to an increase in price of these shares, which in theory, should incentivize the corporations to innovate and improve upon efficiency.

Unfortunately, though, as shares are bandied about by corporations and governments, this process often feels as it is happening on a trapeze, high above the heads of the nation's voters. As a result, cap-and-trade programs have done little to stimulate the public's imagination, and proposals languish in Congress. Clearly, sidestepping the masses has the seeming advantage of expediency, but it is fundamentally wrong. It not only results in disinterest and disenfranchisement, but it also makes a mockery of the very power these proposals are trying to capture - a free market. If a government imposes and regulates, particularly the membership of a market, the result is anything but free.

Further, such hierarchical schemes show little knowledge of history. To many, the most powerful social force ever achieved comes through incentivized masses (industrial revolution, modern medicine, the internet boom). And, it is this force that we propose to harness with our cap-and-trade. By giving equal shares of carbon directly to everyone on earth, we

J.G. D'Angelo is an ex-NASA scientist, researcher and environmentalist who occasionally speaks publicly about Bitcoin. He introduces Sno-Caps in this 40-minute [blackboard video](#). email: worldbitcoinnetwork@gmail.com.

can remove hierarchy and confusion while improving trust, participation and incentive.

But first, as our concept relies on a subtle understanding of Bitcoin's technology, it is worth taking a second to understand exactly what this entails.

Bitcoin ≠ Currency

To many, Bitcoin is simply a digital currency, but that's not entirely true, and in our case it provides an unfortunate misunderstanding. To be clear, Bitcoin offers a system of exchange via a global public ledger, and the most obvious first application for such a technology is a currency.

Still, the central innovation of Bitcoin is not the currency, but the ledger itself. And, while Bitcoin's ledger has a handful of important advantages over traditional ledgers, there is one that stands out - Bitcoin's ledger is not controlled by anyone or anything. Instead, it is a new form of public good that, for the first time in history, is truly public. Further, this novel absence of a third party offers the potential to vastly improve the layers of trust in any type of transaction.

Because of this, Bitcoin can be called upon to handle a number of traditionally thorny, non-currency based transactions as well. These include deeds, contracts, stocks, etc. - all of which customarily involve brokers¹. In fact, the transition to a Bitcoin-type infrastructure can provide most of Wall Street's core functions in such a way that is significantly cheaper, more global, more dynamic and infinitely easier to audit. It is almost ridiculous to consider the potential scale of improvement - billions of users could be accommodated with the processing power of a single laptop.

¹ In the Bitcoin literature, assets issued on top of the blockchain are referred to as 'colored coins'

In comparison, the only real service an investment bank provides a company during an IPO is an expensive and sluggish form of third-party accounting, something Bitcoin can do for free. So it is important to separate bitcoin the currency (spelled with a little 'b' and suffering from high volatility) with Bitcoin the ledger (which acts as an accountant and suffers no volatility). If the two were in competition, the ledger, so far, would be the clear winner. In the five years of its existence, the Bitcoin ledger has functioned flawlessly, involving no bankers, brokers, thefts or court cases (not so true of the currency).

And this distinction is important, because for something like shares of carbon, Bitcoin not only appears ideally suited but marvellously capable.

The Big Picture

So, let's begin. Our concept is to build a market on top of a Bitcoin-style ledger where we will provide (on launch day) a

1-ton share of carbon emissions to every person on Earth. Using simplified math, this works out to 8 billion shares or 8 gigatons of carbon, which is convenient, because it approximates the amount of carbon humans are releasing into the at-

mosphere each year.

Before we even get to the issues particular to carbon, we can see that there are myriad problems with launching such an all-inclusive, finance-based market. Establishing individual identity is perhaps the biggest, and it is an issue we don't have a perfect answer for. But ironically, as I type this article, the first such global system to tackle this problem in the cryptocurrency space is being announced. The well-funded company (which I have many personal contacts with) is called [Circle](#). And unlike [Coinbase](#) or other Bitcoin gateways, Circle is offering to negotiate accounts for buying and selling bitcoins for everyone in the world, legally and for free. This is not child's play. Indeed, like our system, it seems too big entirely - all global payouts will require international background checks, IDs, phone verification, etc. Still, Circle's announcement is opportune for us. They are leading the charge into this some-



Bitcoin's ledger has revolutionized the concept of money, but it is better suited to negotiate contracts.

what terrifying abyss of linking the world's billions into one global financial system.

So, one possible route for us is to build right on top of Circle. But there are other options as well, such as allowing people to register with a Facebook account, and then, later when they might receive a payout, establishing a more legal, banking relationship, not dissimilar to that of Coinbase. Both systems face challenges, but, in recent years, it is amazing how reasonable something like this can begin to sound.

Moving forward, though, we quickly run into other problems. And anyone familiar with stock markets will see that if we're not careful, our carbon market could quickly descend into a nightmare of manipulation. On launch day, in particular, the shares themselves will be valueless, so a crafty corporation could quickly buy up enormous quantities and suddenly be in a position to crash the system.

As a result we have decided to step outside of tradition, and redefine the terms of ownership. In our system, each person will retain rights to their share for life. And indeed, 'life' is the key term here – all newborns will receive a share at birth and ownership is forfeited at death. Thus at any point, individual owners can move their share at will (for example, retracting their carbon credit from Burger King and moving it over to Whole Foods).

That said, the typical contract will likely resemble a lease where large polluters pay to rent shares from individuals, and individuals receive monthly (incentivizing) payouts from the polluters. While this *lifetime* ownership works great for eliminating market manipulation it has the added benefit of keeping the shareholder (all world citizens) invested in the idea of capping carbon. Because of this change in the way ownership works, we have decided to call our system a cap-and-lease (CAL).

But here we run into a new problem. Unlike Circle, we are not just buying and selling bitcoins, we are administering billions of rent/lease contracts. Just a couple years ago this would have been a trillion dollar bureaucratic nightmare. But, yet again we have some good news. The infrastructure for *non*-currency use of a Bitcoin ledger is exploding – particularly around this idea of [smart contracts](#).

One of these contract-based compa-

nies is called [Ethereum](#). They have not yet launched their product (expected Q4 of this year), but their sole focus is the negotiation of smart contracts. And looking at their code, it seems reasonable to expect that 8 billion P2P lease contracts would be a straightforward implementation. But that's not just speculation. Ethereum is but one of many offerings in this burgeoning field, and some companies like [Counterparty](#) and [Mastercoin](#) are already established and working well. Better still, like Bitcoin, all three of these companies offer unlimited contract services for free (they have tiny, per-transaction charges in line with Bitcoin's low fees).



MLK faced similar problems attempting to cap civil rights abuses. We modeled our delayed enforcement approach on his work.

The Problem of Enforcement

Now comes the hard part. If all the software comes together (always a big if), there's still one major obstacle – enforcement. With nothing built into our code for social coercion and without massive government support, the shares of our cap-and-lease program (no matter how well we write code) may never correlate to

actual carbon emissions. This correlation can only happen if there is a massive infrastructure dedicated to enforcement, without which, our idea is worthless. While this pitfall is a realistic possibility for our system, there are a number of reasons to suggest that we stand a chance of succeeding. We will discuss each of these 12 reasons individually and then, bring them together to address this make-or-break issue of enforcement.

1. Inexpensive

Instead of a government program (that would likely cost billions to implement), our project will run autonomously, requiring no employees to support it, and can be launched and maintained for zero cost. This seems absurd, but there are precedents. Bitcoin (and every other cryptocurrency) was launched for free, it has no server costs, domain costs, or hosting fees (the code is stored for free on GitHub much like uploading a video to YouTube). Clearly, the users who download the client pay their own internet fees, electricity and buy their own computers, but this would likely be true of any modern capping system. Finally, by using available open-source code (from Ethereum, Bitcoin and others), it is

safe to expect that a handful of part-time programmers could cobble our system together in a couple months.

2. Incentivized Masses

Outside of the potential to slow the effects of global warming, individual voters have little incentive to implement current cap-and-trade schemes. Indeed, they are left out of current schemes entirely as carbon shares are bandied about between governments and corporations. With our system, individuals have skin in the game (lifetime ownership), and by leasing their shares to polluters they stand a chance at earning income (lifetime incentive). Most importantly, there is a powerful potential **feedback loop** here: the more individuals police the system, the more polluters will need to buy shares, which, in turn, yields more income to the individuals. Further, if individuals actually start earning money in our system, we are likely to see massive adoption, which in turn will incentivize more policing, and perhaps one day, build enough of a groundswell to push congress to join the enforcement efforts. This feedback loop is central in our aim toward achieving enforcement.

3. Regulation by Reputation (Congress can wait)

Other cap-and-trade schemes require government support which not only slows them down, but limits their efficacy as their programs are watered down by political compromise and bureaucratic complexity. With our system, we can set very clear rules, launch when we're ready, and the people can choose to adopt or not. Early regulation will resemble that of eBay, Amazon, Uber or airBnB, harnessing the proven power of online reputation as both carrot and stick.

4. Voluntary

There's no need to belabor the benefits of a system that is voluntary vs. coerced. But it's safe to say that coerced cap-and-trade schemes will likely suffer greater slings and arrows via the press and public perception. Further, it is important to note that laws arising in the wake of a successful voluntary grassroots campaign could have greater scope and power.

5. Full Transparency = Trust

All movements suffer from lack of trust. Ours might not. Again, Bitcoin's ledger is public, and this has never existed before. This novelty allows for anyone to be able audit any transaction from any cellphone or computer, creating 100% transparency. But inside this transparency we see the potential for yet another powerful positive **feedback loop**. As we know, individu-

als and companies like to compete. With publicly accessible data, they will be able to advertise and brag about how involved (and green) they are compared to their competitors. And for once, we'll be able to instantly check to see if their claims are true. The more they compete, the more companies will likely adopt, looking to improve their numbers in the system as well. This process can also help expose bad apples.

Further, we believe that counting something (in a way that is credible) changes everything. Indeed, it can be argued that the sole reason for YouTube's success is the value of counting views. People love numbers and data. From an early age, kids count everything, and few play games of any kind without keeping score. As adults, we find ourselves attracted to the dynamism of numbers inside of markets, sports and economies. Our cap-and-lease will surely satisfy this urge. Streams of data will pour through our system, and users will follow prices of contracts, numbers of leases, shares, trades, and new members joining the system. Everything is updated continuously. Carbon emissions estimates will be available (on a forum) for every business. Leader boards will invite people to compete, with tallies broken down by country, city and even individual houses.

6. An Option

Because there are so few capping systems available, simply launching ours has a host of benefits. But our system is massively more inclusive than any other proposal (even kids can join and earn). This will give the once powerless billions something positive that they can finally do (sign on and trade during lunch hour). Further, by releasing a product today, we have suddenly changed the global

discussion from something that is binary (will a country or individual support a

cap and trade, or not?) to something that has a variety of options – one can suddenly choose to embrace our system, a competing system (our code is open-source, so forking/cloning is easy), or anything else. It should be noted, that even governments might be interested in adopting/supporting an already functioning system.

7. Starting Price is Zero

Traditional cap-and-trade schemes concern themselves with how to ramp up the system. But that is because an impatient government is playing watchdog. Instead, free markets ramp up rather well, with greater trust. With a starting price of zero, early adoption is a snap – companies can make token gestures to support the idea for no cost at all. If the price rises to one cent, well then things get

interesting, but its likely a company won't start to flinch until we see a share worth more than a few dollars. But if that happens, watch out for the feedback loops, it could get exciting.

8. Petition on Steroids

Because our system is transparent, it will work as a powerful petition. Listed companies will be declaring to the world what they believe in, but their inclusion on our list will have added *oompf* because users can verify that these listed companies are also paying for their required shares.

9. Interactive

Many advantages of interaction are covered above, but, to underline, there is always benefit to allowing individuals to interact. Via exchanges, lease contracts, enforcement, leader boards and carbon-pricing forums, users will have multiple layers of potential engagement. Better still most of their engagement will be incentivized.

10. Decentralized

A truly decentralized system breaks down borders and biases. It is amoral (a good thing), so it is likely to have wider adoption and suffer less critique. It also eliminates central points of failure.

11. Fairness

Between governments, cap-and-trade systems often bog down around the idea of fairness (the first world pollutes more, etc.) Fortunately we aim to sidestep government, so we can provide the simplest and cleanest of all solutions to equity – each person on earth gets one share. Period. No more, no less. It is hard to argue with that.

12. Removal of Hierarchies

By giving all the power to incentivized individuals we have removed the distaste of corporate control and hierarchies.

Finally, Putting it All Together

Clearly our system is an attempt to solve the tragedy of the commons, and we don't take the task lightly. A successful system will surely need more than just the ability to mathematically cap shares. It will need real incentives, powerful tools and require some massive exponential adoption to achieve a reasonable chance of providing emissions cuts. That said, our secret sauce is 'ownership.' We believe that individual ownership (property or IP) has been the single greatest social force in history. Incentivized masses fueled the industrial revolution, modern medicine and the internet boom. By giving lifetime shares to everyone on earth, we are hoping to do the same with carbon.

Once established, however, the real power of our system is accomplished by a pair

of potentially explosive feedback loops (see bold text in reasons 2 & 5) that will work in our favor. If they kick in, both would greatly increase adoption, vigilance, enforcement and eventually (if interest peaks) push governments to enforce. Still, massive adoption is not something that happens over night – Facebook, Google, Twitter and Bitcoin required a gestation time of about five years before their networks gained substantial value, and they are unusually successful cases.

That said, it is important to have a set of incentives for a company to join the system even at an early stage. And we believe that we offer this. We will not only provide many companies their first option to embrace a capping system, but their involvement will be globally verifiable, showing their levels of commitment publicly. Further, because we expect to have remarkably cheap shares at the beginning, corporate commitment is easy.

So, it is important to realize that we are not shirking the issue of regulation. As we talk about in our paper "[Ignore the Hard Part](#)," we see great benefit in starting without initial regulations in place, and then letting the enforcement build slowly and voluntarily, from the bottom up. This is how Martin Luther King, Jr. built his movement. And while civil rights abuses still occur, his grass roots system resulted in massive legislation, which together provided the needed *cap*² on brutality.

Further, we are wary of the hubris of governments who believe they can do an effective job at policing. Using Wikipedia as an example, we see the power of recruiting the masses for a task that seems too great for any single entity. Dumping carbon, or gaming the system is too easy in a centralized cap-and-trade. And, while it is unlikely that this unsavory behavior will be eradicated entirely, it will be more difficult to sustain if billions of people are incentivized to suss it out.

Finally, we hope that our system might eventually give fickle governments something to get behind. As we know, government decisions are complex and politicized. With our system we can provide a simplicity, openness and inclusion that defies even the best intentioned institutions. Fortunately, most governments realize that it is sometimes better to follow the lead of the people, putting the horse in its rightful place before the cart. This might be one of those situations. ■

The Sno-Caps proposal also appears on the [MIT Climate CoLab site](#) with excellent comments and critiques.

2 In our paper "[Ignore the Hard Part](#)" we look at the eerie similarities between civil rights abuses and carbon emissions. Emissions may be the easier problem to fix strictly because carbon is countable.

One tragedy of climate change is an individual's sense of powerlessness.