# Can the Crowd Bridge the Cleantech Financing Gap?

A comparative analysis of Equity Crowdfunding and Venture Capital returns in the US

**Harvard Extension School**
**ALM in Extension Studies, Field: Sustainability**
**Student Name: Seif Belhani**
**HUID: 91171260**

**May 2019**

**Abstract**

Sustainability has become one of the most discussed topics on the social, economic and political stages. While many experts and policymakers acknowledge the need for funneling more capital towards clean technologies (Cleantech) in order to achieve a genuine transition to a more sustainable economy, there is growing evidence that the current efforts are not only insufficient but that investments in the green sector are, in fact, decreasing. This is particularly true for the early stages of Cleantech innovation. This paper explores new private capital models which can help bridge some of that financing gap. Specifically, the central question asked in this project is whether Equity Crowdfunding can be a viable alternative, as an investment vehicle, for investors interested in Cleantech as well as a source of reliable funding for entrepreneurs.

The United States provides the geographic focus of this research. From 2012, the US JOBS Act opened the privilege previously reserved to professional investors, such as venture capitalists, by allowing "non-accredited" investors to acquire equity shares in startups through licensed crowdfunding platforms. In terms of methodology, this capstone is based on a comparative analysis of the financial returns of three financial protagonists; Equity Crowdfunding, Cleantech-focused Venture Capital (VC) and diversified VC. Drawing on the pioneering work of Signori (2017) and Gaddy (2016), the results of this analysis show that, although Cleantech Equity Crowdfunding lags behind diversified VC, it has performed significantly better than Cleantech VC over the same investment horizon. The results are mainly expressed as Internal Rates of Return (IRR), the most commonly used metric for financial performance in the private investment community.

Given the novelty of Equity Crowdfunding (ECF) as a financial practice, these results remain encouraging regarding ECF's potential to become a valuable complement to professional investment, especially at the early stages of green startups' funding. The findings also support the idea that "the crowd" does not present a structural irrationality (i.e. incapacity to make meaningful decisions) compared to experts when selecting private investments. That said, due to the lack of track record in terms of Equity Crowdfunding investments and exits, the author recommends creating a central repository documenting Cleantech-focused Equity Crowdfunding and Venture Capital activity. Another recommendation of the capstone is undertaking further research on how ECF can integrate more comprehensive monitoring and support mechanisms to help entrepreneurs grow their companies efficiently.

**Keywords:** Clean technology; financing gap; Equity Crowdfunding; private capital

**Table of Contents**

## List of Figures



## List of Tables

**List of Abbreviations and Acronyms**

| | |
|---|---|
| ARPA-E | Advanced Research Projects Agency - Energy |
| BP | British Petroleum |
| CIGS | Copper Indium Gallium Selenide |
| COP | Conference of the Parties |
| DARPA | Defense Advanced Research Projects Agency |
| ECF | Equity Crowdfunding |
| IRENA | International Renewable Energy Agency |
| IRR | Internal Rate of Return |
| JOBS | Jumpstart Our Business Startups |
| LACI | Los Angeles Cleantech Incubator |
| M&A | Mergers and Acquisitions |
| MIT | Massachusetts Institute of Technology |
| NCA | National Climate Assessment |
| PMV | Pre Money Valuation |
| R&D | Research and Development |
| ROI | Return On Investment |
| SEO | Seasoned Equity Offer |
| US | United States |
| VC | Venture Capital |

## 1. Introduction

### 1.1. The Tumultuous 'Divorce' Between Cleantech and Venture Capital Investment

Following the 21st Conference of the Parties (COP 21) in December 2015 which culminated with the ratification of the Paris Agreement, numerous major financial and governmental institutions have made substantial investment pledges related to sustainability. For instance, the World Bank committed $200 billion to help developing countries tackle climate change (Freeman & Zhang, Scientific American, 2018). Five of the largest European banks, managing in aggregate around $3 trillion, also committed to reassessing their lending policies while reducing the carbon impact of their investments. In a similar fashion, Freeman et al. (2018) wrote that the funding for the Green Climate Fund, which supports renewable energy and climate response projects in developing countries, was raised to almost $7 billion. Generally speaking, these announcements are part of a global trend in favor of sustainable investing. However, and despite these pledges, the efficiency and magnitude of clean energy investment for tackling climate change are increasingly in question.

Recently, researchers from the Global Carbon Project demonstrated that global emissions of carbon dioxide have reached the highest levels ever recorded (Freeman et al., 2018). Additionally, the National Climate Assessment (NCA) released by the US Administration in December 2018 revealed that climate change could cost American taxpayers as much as $500 billion by the end of this century. Reaching the COP 21 objectives – chiefly limiting global warming to 2 degrees Celsius – will, therefore, require a radical overhaul of the energy sector. This implies reforming its financing mechanisms at the same time. In a report titled "Perspectives For The Energy Transition: Investment Needs For A Low-Carbon Energy System" (IRENA, 2017), the International Renewable Energy Agency assessed that an additional $25 trillion of clean technologies investment would be necessary by 2050 (i.e., ~$700 billion p.a.) to limit an average rise in global temperatures to 2 degrees C. This corresponds to more than double the current investment level. Further analysis from climate and economy experts suggests that significant improvements in curbing emissions are fundamentally tied to greater investment, especially for renewable energy projects (Freeman 2018). Beyond mere pledges, alternative financial channels for attracting more capital towards both utility-scale renewable projects and development of innovative green technologies are needed. This paper's analysis stems from this growing rift between the public rhetoric surrounding sustainability and the effective capital injection needed for it to happen. While such a “financing gap” has evolved into a global issue, this study has for geographic scope of analysis the United States (US) as presently the most significant area in private funding.

In terms of private financing, venture capital (VC) has become the largest channel of investment in innovation across a variety of technologies. VC investment - i.e., private capital provided by funds to small, early-stage, and startups with strong growth potential - has played a critical role in bringing groundbreaking technologies to a commercial stage. It has significantly contributed, therefore, to enhance the attractiveness of the US within the global economy. This funding has been historically essential to the success of well-known clean technology firms, such as Nest, Boston Power, Silver Spring Networks, and Solar City (now part of Tesla) in fields as diverse as energy storage, smart grids, and the solar industries (Saha et al., 2017). It must be noted that while commonly used, there is no “canonic” definition of “clean technology,” also known as Cleantech. Luis Humpert (2016) suggests the following characterization: “Cleantech is a set of technologies, products, and services able to conserve resources while increasing productivity and profitability at the same time.” In this capstone, Cleantech refers specifically to the following segments: clean energy generation and storage, energy efficiency, sustainable transportation, and smart agriculture and food (See Methods 2.2. below for more details).

Despite the successes enumerated above, there is currently a growing crisis in Cleantech innovation (Saha et al., 2017). Over the recent years, not only the number of Cleantech patents has been slowing down, but there are signals that its early-stage financing, which is crucial to the growth of innovative Cleantech startups, is running out of steam. A close look at VC capital data suggests that Cleantech entrepreneurs are facing increasing challenges in accessing early-stage funding, especially from professional investors (Saha et al., 2017). In the start-up community, this lack of financing during the precarious intermediate period in organizational development between Research and Development (R&D) and product commercialization is referred to as the “Valley of Death.” This financing gap is especially pronounced within the Cleantech sector, which requires higher R&D investment but is also heavily reliant on government support mechanisms in order to launch products and services.

Focusing on this issue, Saha and Muro published in 2017 an analysis which considers the evolution of VC investment across 15 Cleantech subsectors from 2001, with an emphasis on the years since 2011. Their conclusions show that, along with a significant drop in capital allocation to Cleantech, VC investments have been concentrated in just a few technology segments and in the more mature companies, which themselves are based in the largest metropolitan areas, hence highlighting a narrow and inequal focus of this type of financing. Concretely, VC investment in Cleantech declined by nearly 30% between 2011 and 2016 (from $7.5 billion to $5.24 billion). This analysis also demonstrates that the share of Cleantech in total VC investment in the US plummeted from 16.8 % in 2011 to 7.6 % in 2016 (see Figure 1). In comparison, investments in software significantly increased their allocation of VC money, from 31.8 % to 47.7 %, while the pharmaceutical and biotech sector registered modest gains, from 9.5 % to 11.3 % over the same period (Saha et al., 2017).

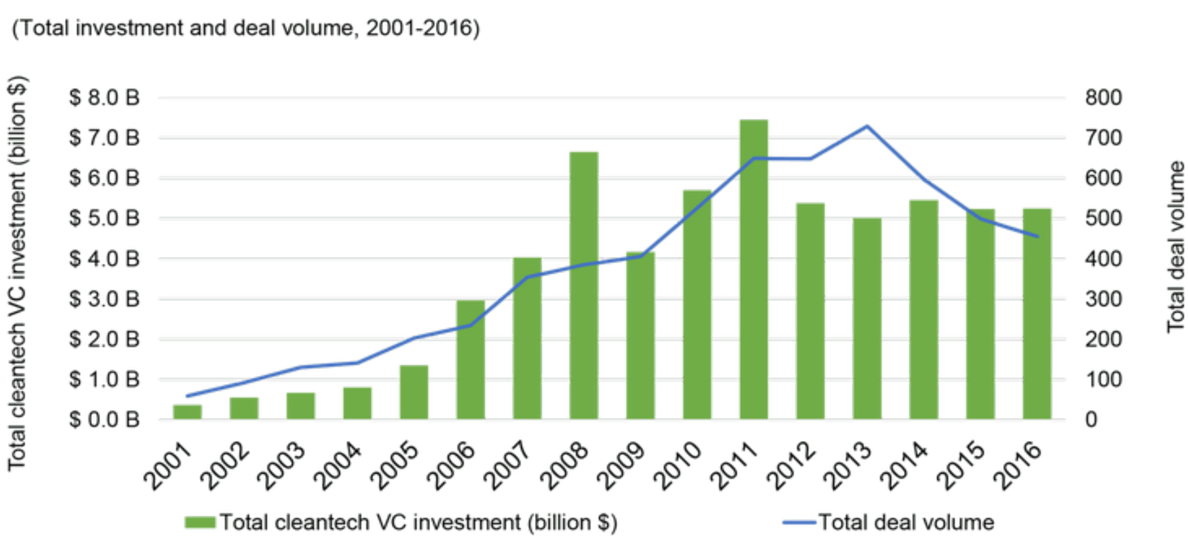



**Figure 1: US Venture Capital Cleantech Investment from 2001 to 2016**
*Source: Saha et al., Brookings Institute, based on Cleantech Group's data, 2017*

Since the turn of the current century, the relationship between Cleantech and early-stage private investment has witnessed a radical twist of fortune. In a first phase, VC investment in Cleantech soared from $365 million in 2001 to $6.7 billion in 2008 – i.e., an average annual growth rate of 51% over this period (Saha et al., 2017). In a 2007 TED talk, John Doerr, a partner at the leading VC firm Kleiner Perkins, announced that "Green technologies, going green, is bigger than the Internet. It could be the biggest economic opportunity of the 21st century." The same forecast was reiterated by former US Vice-President Al Gore in a Financial Times article, as recently as April 2018[1].

However, the financial turmoil in 2008 erased much of the gain made by the green sector, and VC investments in Cleantech dwindled to $4.2 billion in 2009. The sector rebounded again from 2010 with funding for VC-backed Cleantech companies reaching another peak in 2011 at $7.5 billion distributed across 650 deals (Saha et al., 2017). Thereafter, several factors — mainly the struggles and failures of some mediatized companies backed by VC funders (e.g. Solyndra and Evergreen Solar), the onset of cheap and abundant natural gas making renewable projects less competitive, and the commoditization of solar modules in Asia have caused investors to structurally curtail their investments as they lost confidence in the sector.

Throughout this chaotic cycle, VC investors had poured $25 billion into the Cleantech sector only to lose more than half of it. As shown by Gaddy, Sivaram, and O'Sullivan in a working paper for the MIT Energy Initiative (2016), VC Cleantech investments in early-stage startups had eventually dropped to $2 billion in 2013 with only 24 Cleantech companies funded that year, compared with 75 companies in 2007. The level of investment has remained roughly constant since.

### 1.2. What Went Wrong between Cleantech and VC Investors?

It is reasonable to assume that if Cleantech investments had, in fact, fit the VC risk and return profiles, such aversion towards green innovation would not be so deep. To determine whether this was the case, Gaddy et al. (2016) adopted the perspective of traditional VC investors in Cleantech and judged their portfolio's performance from 2006 to 2011. The results were compared against those of two other technology sectors attracting significant VC investment: healthcare and software technology. Cleantech start-ups clearly showed the weakest performance among the three categories. When looking from 2008, the Cleantech sector had the lowest proportion of companies to at least achieve financial break-even. In fact, more than 90 % of Cleantech companies funded after 2007 ultimately failed to return just the initial capital invested (Gaddy et al., 2016). Also, Cleantech investments have yielded substantially lower returns compared to medical or software technologies (see Figure 2).

[1] Read full article at: https://www.ft.com/content/1757dc40-486f-11e8-8ee8-cae73aab7ccb

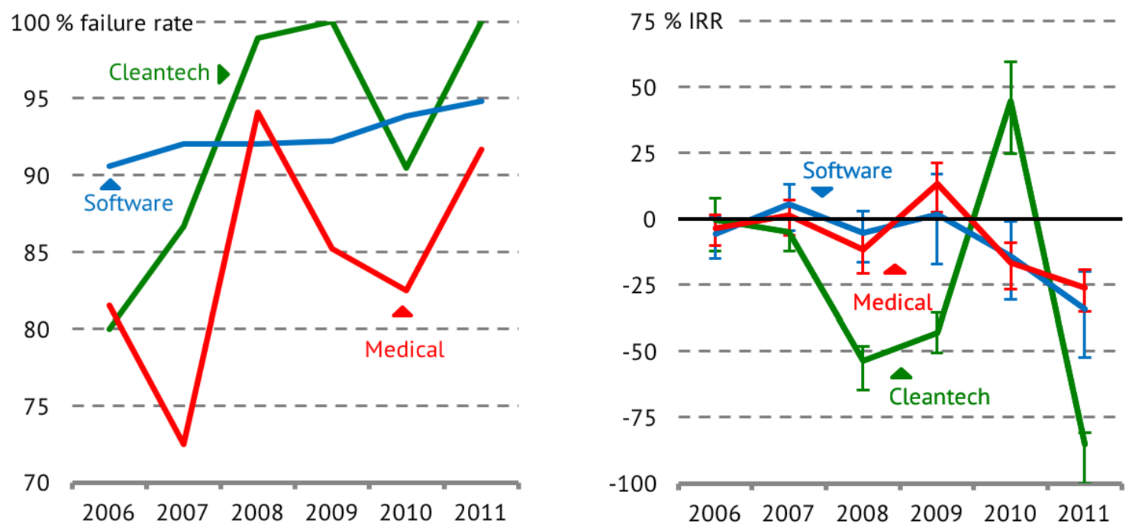



**Figure 2: Cleantech Early-Stage Startups Failure and Return Rates (2006-2011)**
*Source: Gaddy et al., MIT Energy Initiative, 2016*

There are many possible explanations for why most Cleantech startups failed consequently leading VC investors to pull out from the sector. As already mentioned, part of the explanation comes from adverse economic conditions including the "financial crisis" and subsequent credit crunch in 2008, the subsequent decline in oil and natural gas prices, and a glut in manufacturing capacity in China that drove solar panels prices down. Looking deeper into the types of Cleantech companies which benefited from VC funding, and how each type performed, it appears that many companies also failed for intrinsic reasons which are independent of external economic trends.

At a sub-sectoral level, the weakest performer was the segment of Cleantech companies commercializing novel hardware (materials and processes), which lost early-stage investors (Seed and Series A) over $600 million. For example, companies like Solyndra, which was aiming at commercializing an alternative to silicon modules or "CIGS" (a thin film composed of Copper Indium Gallium Selenide meant to bring flexibility and cost reductions to the manufacturing processing) but struggled to match the industrial scale of production of conventional silicon solar panels.

Gaddy et al. identified four main reasons for which Cleantech companies commercializing innovative engineering processes were, especially unsuited to the VC investment model. First, their lack of short-term liquidity meant that capital was tied up for much longer than the standard 5-year time horizon favored by VC investors. Second, they were relatively expensive to scale compared to software and biotech innovation. Third, the thin and sensitive margins in commodities translated in little room for error, which is highly unpractical at the R&D stage where mistakes are common. Finally, the potential acquirers among utilities and industrial conglomerates were unlikely to bet on risky start-ups and consequently averse to paying a premium for future growth prospects. For a majority of Cleantech start-ups, this meant that the exit options could not offer the typical returns investors expected.

These four factors led to a loss of hundreds of millions of dollars for VC investors before even learning whether their Cleantech bets had a chance of success. After 2010, the structural difficulties facing early Cleantech investments steered private investors to reduce their average Series A funding sharply. The peculiarities of the successive funding rounds at different maturity stages of a startup's lifecycle are detailed in Appendix 5. Moreover, investors transitioned to focus heavily on software and financial startups offering loans to green infrastructure at the expense of hardware and physical sciences. Consequently, some engineering companies that managed to raise money ahead of the decline also shifted focus from hardware to software.

That said, medical technologies involving groundbreaking innovation, are also capital-intensive, and require production at scale which means that some other factor is needed to explain the gap between medical technology and Cleantech performance, for instance. Such a factor could be the lack of large corporations willing to acquire Cleantech start-ups with promising technologies once they failed to match the capital and time horizon constraints of VC firms. Over the last ten years, some major energy companies have divested much of their clean energy portfolios. For instance, BP left the solar industry in 2011. Without viable acquisition perspectives and facing a long grind to achieve the bottom-line performance necessary to either enter public markets or be bought by larger competitors, Cleantech companies eventually outlived the patience of VC investors who were not willing to immobilize their funds' capital for a decade or tolerate massive capital inflation in order to scale up production (Gaddy et al., 2016).

The poor financial performance – according to VC standards – of Cleantech innovation has generated consequently two worrisome trends (Saha et al., 2017). Across all Cleantech sub-sectors, early-stage startups started getting less funding, and VC capital for startups with cutting-edge green technologies has been declining. In 2016 for instance, 87 % of total VC investment in Cleantech went to more mature companies which were at or close to profitability (Saha et al., 2017). This type of company is known as late-stage investment, corresponding to Series B and growth equity rounds in financing terms. In contrast, the capital invested into seed and Series A – another appellation of early-stage financing – had dropped sharply from over 32 % in 2001 to 13 % of total investment as of 2016. The shift away from early-stage Cleantech VC financing is most visible from 2011 onwards (see Figure 3). Since then, more than 80 % of Cleantech VC money was diverted to companies in their later stage. This phenomenon has aggravated an already fragile situation for early-stage startups as they have to struggle harder to garner funding, consequently fewer novel and potentially game-changing technologies are getting past their early stage to commercialization. If this trend continues, some breakthrough technologies will be severely underfunded, diminishing the ability of not only the US, but also the global economy to transition away from fossil fuel domination in the next decades.

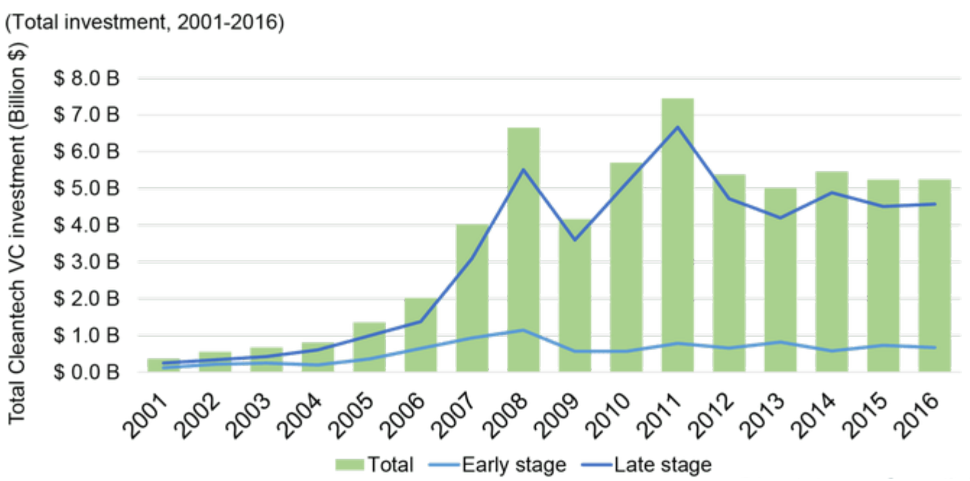



**Figure 3: Venture Capital Cleantech Investment per Stage (2001-2016)**
*Source: Saha et al., Brookings Institute, based on Cleantech Group's data, 2017*

Also, Cleantech VC capital is increasingly being concentrated in just a few technological areas. As illustrated by Saha et al., smart grids and energy efficiency technologies have made up nearly 25% of VC investments since 2011. These sub-sectors were closely followed by transportation and solar power, which accounted for 21 % and 16 %, respectively. Taking into account bioenergy (10 %) and energy storage (8 %), the top five investment recipients represented nearly 80 % of total Cleantech VC funding and 62 % of deals made (Saha et al., 2017).

This "tragic" unfolding has led to the sentiment among many entrepreneurs that Cleantech companies are not yet fit for the constraints of VC capital. Therefore, more and more Cleantech companies are rebranding themselves as software startups in disguise, while companies focusing on new materials and processes are increasingly desperate for capital. On the long run, this trend can turn into a disastrous hinderance for the steady development of clean technologies required to modernize the current energy systems – a transformation that software alone cannot accomplish. An equally valuable lesson is that the peculiarities of the Cleantech sector imply the need for a more diverse set of actors and innovation models.

### 1.3. Who Else Can Fund the Cleantech Transition?

In response, some high-profile billionaires in the US have already pledged to provide more "patient capital" for Cleantech ventures pursuing fundamental science breakthroughs. Most notably, Bill Gates and other prominent investors have launched a $1 billion Breakthrough Energy Ventures fund with the objective of patiently seeding money into Cleantech companies over the next two decades. Yet, demonstrating first-of-a-kind concepts and reaching commercial scale will require even further infusions of capital. Institutional investors, i.e., pension funds, sovereign wealth funds, and family offices, which are traditionally more patient investors looking for returns over the long horizon could fill this gap partially. The issue is that most of these players are often inexperienced technology investors. That said, some of these investors are already venturing into Cleantech investing. The White House announced in 2015 that a network of multiple institutional investors around the world had collectively pledged $4 billion dedicated to innovative Cleantech companies and technologies (Saha et al., 2017). The current administration has, so far, upheld that decision. Even more of this category of investors might follow suit if there is a building perception that it is possible for a Cleantech company to at least return its initial invested capital. Such perception would foster strategic investments and acquisitions by established companies, hence offering start-ups a path to scale-up and market access.

Public policymakers also have an essential role to play by lowering the risk of Cleantech investments through fiscal incentives, as indicated by Gaddy et al. (2016). Beyond increasing funding for the Small Business Innovation Research and Small Business Investment Company programs, US Congress could, for instance, increase funding to ARPA-E, the energy equivalent to the Defense Advanced Research Projects Agency (DARPA; famously responsible for funding early work on the Internet and autonomous vehicles) which enjoys bipartisan support. Federal and local government can also incentivize partnerships between large corporations, startups, and incubators by facilitating favorable technology transfer terms including from national laboratories (Saha et al. 2017). Gaddy and his peers recommend that the Department of Energy should support entrepreneurship at the national laboratories by further replicating ongoing programs at Lawrence Berkeley and Argonne National Laboratories that provide innovators access to shared lab resources. Such an approach could lessen the burden of the VC countdown to exit while minimizing the risks of a new Cleantech VC boom and bust.

On top of public incentivization, Cleantech proponents need to explore innovative financing avenues specifically meant to bridge the current capital gap. In that regard, corporate investment can play a more prominent role, not only as eventual acquirer, but also as early-stage investor. A growing number of corporations like Shell, Schneider Electric, BMW, and Google are now investing in the early steps of startup lifecycle, with an eye toward potential acquisition. One can assume that, through their corporate VC funds, corporations are going to play a more significant role in financing start-ups.

As noted by Saha and Muro (2017), industrial companies have access to substantial cash liquidity but have become deficient at generating internal R&D results. Given the innovative nature of start-ups, further collaboration between them and large industrial corporations seems like a natural fit. A good illustration of such a trend is that BMWi Ventures (the venture capital arm of BMW) recently moved its offices from New York to Palo Alto, in order to be closer to startups working on the future of transportation. To be realistic, the role of corporations in uprooting VC as the primary source of early-stage investment should not be overestimated. Industrial corporations remain driven by ultimate profits further down the road, and a series of missteps in this growing collaboration can only lead to the same deadlock as observed in the VC community. That said, some oil majors such as Shell and Total have recently reentered the clean energy space and even display more patience regarding their investment in green startups. It remains, however, too early to conclude whether this strategic turnaround is mainly due to growing stakeholders' pressure or a genuine belief in the commercial potential of the sector[2].

[2] https://www.bloomberg.com/opinion/articles/2019-02-12/oil-companies-and-renewable-energy-cautious-for-now

It is worth noting, finally, that a growing number of state incubators like Boston-based Greentown Labs and Los Angeles-based LACI, which are funded and supported by local entities, represent a new type of organization designed to foster an adequate ecosystem for helping startups access strategic partners and investors on their way to commercial growth.

Despite these glimpses of optimism, new finance models more aligned with the specificities of the Cleantech sector are still urgently required. In fact, there is still enormous room for investment vehicles willing to deploy patient risk capital over longer periods of time (Saha et al., 2017).

### 1.4. Which Role for the Crowd?

Besides the mechanisms previously cited, this paper explores another channel that could funnel more capital into early-stage Cleantech innovation. Specifically, this paper's analysis considers Equity Crowdfunding as a substitute - or rather a complement - to the current incumbent early-stage investors.

Essentially, Equity Crowdfunding consists of raising capital from the general public through the sale of securities (e.g., shares, convertible notes, debt) in a private company that is not listed on stock exchanges. Until 2015, Equity Crowdfunding in the US was limited to high net worth individuals meeting certain net worth and income levels (known as "accredited investors"[3]), and this funding had to be overseen by licensed broker-dealers. By signing the JOBS Act into law on April 5, 2012, the Obama administration opened access. Following a series of talks and amendments with the SEC, Titles IV and III of the JOBS Act (also referred to as "Regulation A" and "Regulation CF" respectively) came into effect, between mid-2015 and mid-2016, allowing Equity Crowdfunding for up to $50 million, regardless of the net worth or income of the investors. Since then, the expansion of Equity Crowdfunding in the US has been a phenomenal success. According to data compiled by Crowdfund Capital Advisors, the leading Equity Crowdfunding platforms in the US have cumulatively raised more than $2 billion as per the end of 2017 (Crowdfund Capital Advisors, 2018). This figure is estimated to grow close to $30 billion by 2030. Unfortunately, Cleantech startups have been virtually excluded from such

[3] An individual with a net worth of at least $1,000,000 (excluding the value of one's primary residence) or an income of at least $200,000 each year for the last two years as defined in Rule 501 of Regulation D of the U.S. Securities and Exchange Commission (SEC)

successes, most likely because of the lack of expertise from the generalist platforms but also due to the bad reputation that has clouded the sector since the last boom-bust cycle.

Accordingly, this paper focuses on analyzing whether the ongoing success of Equity Crowdfunding could be extended to Cleantech startups, and, if so, under what conditions. Fundamentally, the project assesses the mechanisms, composition and financial returns of a model Cleantech portfolio constituted through an Equity Crowdfunding platform in the US.

Eventually, the aim of this project is to explore the extent that Equity Crowdfunding might serve as a viable instrument for building a sustainable "green portfolio" and, hence, a complementary alternative to the incumbents in early-stage innovation financing (mainly venture capital). Besides, this paper is an attempt to draw meaningful conclusions and recommendations for different players in the sector. Specifically, three main audiences could be interested in such findings. First, Cleantech entrepreneurs seeking alternative channels for accessing capital, second, traditional private investors - typically VC investors - interested in understanding how Equity Crowdfunding could complement their activities while enabling new investment opportunities, and finally, financial entrepreneurs looking to implement a similar concept such as existing crowdfunding platforms willing to add "green startups" to their offer.

## 2. Research Design & Methods

The fundamental hypothesis assessed in this paper is that non-professional investors, regardless of their level of financial savviness, can derive returns comparable to seasoned investment experts by acquiring direct shares in Cleantech startups.

The hypothesis was tested through the following methodology. First, the financing and regulatory mechanisms underpinning Equity Crowdfunding in the US are briefly analyzed. Second, the study defines a representative Cleantech portfolio to be assessed (as a base case model). Third, overall returns yielded from an investment in such a portfolio are computed. For robustness, these results are iterated under three scenarios: a) portfolio performs as per the benchmark reported in related literature, b) portfolio underperforms the benchmark, b) portfolio overperforms the benchmark. Eventually, the capstone's analysis compares the outcomes to the typical returns obtained by traditional VC investors whether investing in a pure Cleantech portfolio or across a large spectrum of sectors (i.e. diversified portfolio).

### 2.1. A Brief Introduction to US Equity Crowdfunding

Equity Crowdfunding (ECF) refers to the process of raising funds for startups, typically via internet-based platforms, whereby investors receive equity shares in exchange for capital injection (SEC, 2015). ECF is growingly attractive for entrepreneurs as the overall global crowdfunding volume is estimated to increase to $35 billion by 2020 (Blohm et al., 2014), with equity-based and lending-based crowdfunding representing the lion's share globally. According to an industry report issued by Mass Solutions (2015), ECF raised $11 billion globally in 2014 and is expected to overtake venture capital as the largest source of start-up funding by 2020 at $36 billion (Emmerson, 2015).

In the US, the federal JOBS Act ("the Act") was signed into law on April 15th, 2012, effectively superseding Rule 501 of Regulation D of the Securities Act of 1933, allowing the general public participation in private investment offerings. One of the primary objectives of the JOBS Act has been to streamline regulations on small business equity funding and private placement activities by legalizing ECF for non-accredited investors[4]. The JOBS Act allows for the creation of a 'crowdfunding exemption,' thereby allowing small investors to participate at any funding stage. Also, entrepreneurs can raise capital by direct solicitation of funds including online advertising. Title II of the Act became effective in 2013, and it relaxed the rules concerning public investment solicitation from accredited investors (SEC, 2015b). Titles III and IV Equity Crowdfunding are, however, open to both accredited and non-accredited investors. The guidelines for Titles III and IV are summarized in Box 1 below.

**BOX 1: JOBS Act Regulations Summary**

The new guidelines for Titles III and IV of the JOBS Act - which are the focus of this capstone - are expected to ensure that its new rules achieve positive effects on private capital formation while still protecting investors from eventual fraud (McDermontt Will & Emory, 2013).
As per Fowler (2015) the SEC guidelines in Title IV – also known as Regulation A+ - state that:

1. Entrepreneurs can directly solicit and publicize their pursuit of equity funding.

[4] Accredited investors must possess a minimum liquid net worth of at least $1 million, excluding the value of a primary residence, or an annual income of $200,000, or $300,000 with a spouse (Vina et al., 2018).

2. Companies may offer and sell securities through a crowdfunding portal, so long as they are US-based, are not subject to the reporting and registration requirements of the Exchange Act and are not considered to be investment companies.
3. Title IV has two ceilings, or Tiers, for fundraising limits. Crowdfunding transactions in Tier 1 may raise up to $20 million in any 12 months. Tier 2 consists of up to $50 million in any 12 months.
4. This title does not require investors to be accredited. For Tier 1 investments, which have a lower cap, there is no investment limit on investors. However, additional Tier 2 requirements include a limitation on the number of securities that non-accredited investors can purchase: an investor may acquire no more than (a) 10% of the greater of their annual income or net worth; or (b) 10% of the greater of annual revenue or new assets within the same fiscal year (SEC Regulation A, 2012).
5. Tier 2 also requires additional financial disclosures and ongoing reporting requirements.

While Title IV came into force on October 30th 2015, Title III of the Act did not officially become effective until January 29th 2016 (SEC, 2015). Title III creates and requires a new legal entity called a funding portal to allow internet-based platforms (i.e., intermediaries) to facilitate the offer and sale of securities without having to register with the SEC as brokers (SEC Rule 300(c)(2)(17)). In summary, Title III SEC guidelines stipulate that:

1. Companies are limited to raising $1 million per year.
2. The offering is available to the general public with no limit as to the number of investors.
3. Startups do not need to comply with their local state's filing and disclosure requirements.
4. All solicitation of investors must be done through a portal or a broker-dealer intermediary registered with the SEC and the Financial Industry Regulatory Authority (FINRA).
5. Investors with income or net worth above $100,000 can invest the greater of 10% of their net worth or $10,000 of their annual income. Investors with income or net worth below $100,000 may invest the minimum between $2,000 and 5% of their annual income or net worth.
6. Equity issuers require some financial disclosure on General Accepted Accounting Principles financial statements for the past two years (crowdexpert.com, 2015).

For a detailed comparison of the JOBS Act regulations, please refer to Appendices 1 and 2.

### 2.2. Cleantech Portfolio Definition

Since Cleantech has become a vast economic space, it is assumed in this paper that investors select startups from its most promising subsectors. The leading subsectors, hence susceptible to attract most investors interested in the field, are currently transportation, energy efficiency, solar power, and smart agriculture and food, according to a study compiled by the Cleantech Group in 2017. The San-Francisco based think tank explains the attractiveness of these segments as follows[5]:

a. **Transportation**

The impressive increase in sustainable transportation investment has largely been driven by mobility services (e.g., Uber), with over $13 billion investment dedicated to this type of deals as of 2016. But even with ridesharing platforms excluded, VC investment in transportation has increased by threefold in value from $1.3 billion in 2015 to $3.9 billion in 2016 making it the largest Cleantech sub-sector in that regard.

While IoT (Internet of Things) technology in cars has been the focus of headlines and investments, there is in fact diversity within the transportation investment ecosystem. Other popular activities include innovative solutions for last-mile logistics, software-based coordination of freight shipping and integrated logistics services, especially in Asia.

b. **Energy Efficiency**

Smart buildings have been the engine of growth in energy efficiency, with the smart home and commercial markets receiving the bulk of early-stage investments. Progress in IoT technology has enabled significant growth in smart buildings investment, even though an innovative variation on existing business models can be equally attractive to investors. Total investments in energy efficiency in 2016 reached $1.4 billion, making it the second largest Cleantech segment globally for VC investors.

c. **Solar**

With around $1.3 billion in investment in 2016, i.e., solar energy received its highest level of private capital allocation since 2011. With hardware production costs falling

[5] "Cleantech's Four $1,000,000,000 Sectors | Cleantech Group. N.p., n.d. Web. 25 Mar. 2019 https://www.Cleantech.com/Cleantechs-four-1000000000-sectors/ .

drastically, this sector remains an attractive proposition for VC investors. On a macro-level, the positive sectorial prospects have materialized in the form of record low bids seen at auction for solar power contracts[6]. Despite the domination of large later-stage investment in this sector, investment in related innovative technologies remains robust.

d. **Smart Agriculture and Food**

VC investment in agriculture and food has witnessed rapid growth since 2014. Between that year and 2017, the total amount of capital invested in this domain has been consistently doubling. In agriculture, growth has been driven by technological advancements in automation, data analytics, IoT, and agricultural biotech. In the food sub-sector, sustainable proteins production has received the largest chunk of investment. In aggregate, the sector reached a market size of $1.1 billion in 2016. The vibrancy of agriculture and food innovation and investment is notably visible at early stages (i.e., Seed and Series A) where investments were over 20% higher than in later stages, with 83 investments made against 69, respectively in 2016 (The Cleantech Group, 2017).

Figure 4 provides a detailed sectorial breakdown of VC investment in Cleantech in 2016.

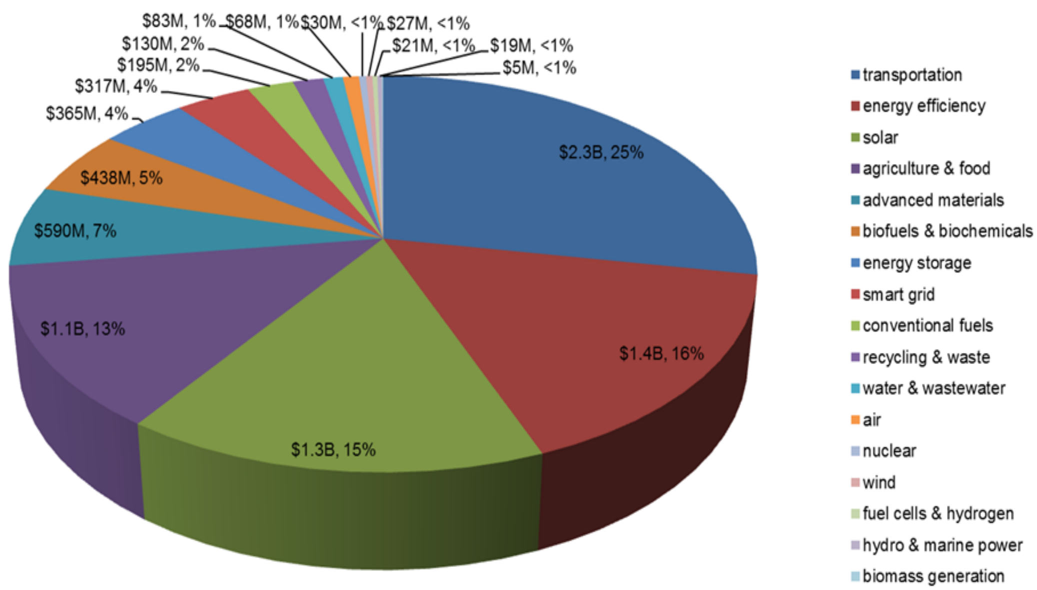



**Figure 4: Sectorial Split of Cleantech VC Investments (2016)**
*Source: Adapted from Cleantech Group's data, 2017*

[6] In June 2018, the Central Arizona Project (CAP) secured the lowest confirmed solar price in the US at $24.99/MWh. Retrieved from https://www.greentechmedia.com/articles/read/nevada-beat-arizona-record-low-solar-ppa-price#gs.2ggoii

The current study assumes that a syndicate of non-professional investors aims to inject $10 million in 100 startups equally distributed across the four sub-sectors. This equal distribution is meant to avoid any bias resulting from overweighting one sub-sector against the others. Such investments would be made through a registered online platform offering opportunities in vetted Cleantech startups. In terms of an investment horizon, the investors' primary intention is to exit with a positive return after 5 to 6 years of holding their assets. It is important to note that the capstone's model also assumes that these investments are "costless" on the investors' side as transaction fees in ECF are usually exclusively borne by entrepreneurs. The research willingly ignores any due-diligence or legal costs which are deemed marginal in this type of operations.

### 2.3. Base Case Analysis

After defining the Cleantech portfolio to be assessed and the legal framework underpinning ECF in the US, the model proceeds with the analysis of the returns that can be yielded from a portfolio built via an online platform. A first stage in doing so is to determine the valuation of each selected startup and even more importantly the returns of such an aggregate portfolio.

To resort to an imperfect metaphor, an early-stage startup is like an opaque box for which an investor tries to determine the value of its contents. The box has an uncertain value because of the lack of revenues, track record, and operational history. The more additions are brought into the box (patents, products, management), the more its value varies. In a "traditional deal," what entrepreneurs offer to their investors at an early stage can be summarized like this: "In exchange of $1 million needed to build the company, you get X% of any proceeds." The challenge is to know how much "X" is to be acceptable for both sides of the transaction.

In the VC world, this measure is referred to as pre-money valuation (PMV), i.e., the value of the startup at the moment of the intial investment. Calculating the PMV, especially before a company starts generating revenues, can be a sticking point in the investment transaction. One additional layer of complexity is that there are nine widely recognized valuation methods to determine pre-money valuation (see Table 1).

**Table 1: Venture Capital Pre-Money Valuation Methods**

| | Valuation Method | Principle |
|---|---|---|
| 1 | Berkus | Valuation based on the assessement of 5 key success factors |
| 2 | Risk Factor Summation | Valuation based on a base value adjusted for 12 standard risk factors |
| 3 | Scorecard | Valuation based on a weighted average value adjusted for a similar company |
| 4 | Comparable Transactions | Valuation based on a rule of three with a KPI from a similar company |
| 5 | Book Value | Valuation based on the tangible assets of the company |
| 6 | Liquidation Value | Valuation based on the scrap value of the tangible assets |
| 7 | Discounted Cash Flow | Valuation based on the sum of all future cash flows generated |
| 8 | First Chicago | Valuation based on the weighted average of 3 valuation scenarios |
| 9 | Venture Capital | Valuation based on the ROI exepected by the investor |

*Source: Nasser et al., 'Valuation for Startups—9 Methods Explained', Medium, 2016*

Given the current lack of research and literature associated with the valuation of Cleantech portfolios built through ECF, this study relies on the methods which do not require cash-flow profiles or comparable transactions to calculate a PMV. In other words, this paper's model primarily depends on the Venture Capital and First Chicago methods which are defined below:

**a. Venture Capital Method**

As its name indicates, the Venture Capital method (VC Method) assesses from the viewpoint of a private investor. Professor Bill Sahlman first described this method at Harvard Business School in 1987 (Sahlman, 1988)[7]. The VC method is especially useful for establishing the PMV of pre-revenue startup ventures. Besides, its general concept is quite simple to formulate, once a few assumptions are made:

- Return on Investment (ROI) = Terminal (or Exit) Value / Post-money Valuation

(assuming no further dilution for initial investors and that those have a target ROI in mind)

- Then, Post-money Valuation = Terminal Value / Anticipated ROI
- Eventually, Pre-money Valuation = Post-money Valuation – Initial Investment

[7] For further details, see http://blog.gust.com/startup-valuations-101-the-venture-capital-method/

### b. First Chicago Method

The First Chicago Method strives to answer some legitimate questions an investor may ask: What if there is a chance of overperforming my expectations? And what if there is an even bigger chance of underperforming those?

This method (named after the late First Chicago Bank) deals with this issue by suggesting three valuations: a worst-case scenario (underperformance), a normal case scenario (base case), a best-case scenario (overperformance).

Each valuation can be made using the VC method explained above. Then a weight reflecting the probability of each scenario to occur is applied. The aggregate valuation according to the First Chicago Method is the weighted average of each case.

In terms of investment outcome, the project distinguishes three types of possible results: (1) startup fails, (2) startup remains active but without exit options within the investment term, and (3) startup proceeds with a Seasoned Equity Offer (SEO). By SEO, it is meant that subsequent private financings either from venture capital or private equity firms, or a complete acquisition by a larger competitor (M&A).

From an investor perspective, when a company undertakes a successful exit or a subsequent round of fundraising (i.e., SEO) its valuation becomes observable, thereby allowing an investor to assess the performance of the investment to date. At such point, investors can compute their annualized Internal Rate of Return (IRR), a common metric in translating performance for private investments (Kaplan and Schoar, 2005; Harris et al., 2015).

If the company fails, investors lose their entire initial capital, hence realizing a -100% return. Second, if the company is still active but has not been involved in any monetization deal, investors are unable to compute the returns from their investment because the valuation of the company has not yet been calculated. In this case, returns are set to zero. Last, if the company has completed an SEO, the return on investment can be quantified by comparing the PMV with that implied by the subsequent transaction. In these cases, an IRR is calculated.

Let's consider an example: a startup launched an ECF offering in January 2014 raising $1 million in exchange for 10% of its equity, and then it issues another 5% of the equity in a new offering (e.g., a public SEO) for the same amount of capital in June 2018. The equity position of the investors in the initial offering gets diluted due to the new equity issued by the company in the second crowdfunding offering. Collectively, their stake decreases from 10% to 10%/1.05 = 9.5%. The new valuation of the company as of June 2018 can be inferred from the terms of the latest SEO ($1 million for 5% of equity gives a $20 million total valuation), which would allow initial investors to monetize 9.5% of $20 million, i.e., $1.9 million by selling their shares should they wish. Given the initial investment of $1 million, this result translates in an annualized IRR of around 13%. All calculations are handled through an MS Excel model following this methodology and specifically built for the needs of this paper.

Supporting data for this model are mostly derived from the research of Signori and Vismara (2017) who published seminal work on returns in Equity Crowdfunding investments. Their empirical setting was based on a sample of 212 firms that successfully raised equity capital on the leading crowdfunding platform CrowdCube between 2011 and 2015.

### 2.4. Sensitivity Scenarios

To test the robustness of this base case and give a higher level of confidence for its results, this paper includes an analysis of sensitivities based on the following parameters: return multiples, and the number of successful investments (i.e., SEO). Besides the base case, defined in 2.2., two other scenarios were envisaged:

a) Worst-case Scenario: The number of startups reaching a positive exit was capped at 20%, and ROI is 25% lower than the benchmark. This scenario was given a 30% probability of occurrence.
b) Best-case Scenario: 50% of startups undertake some kind of SEO, and ROI are 25% better than the benchmark. This scenario was given a 10% probability of occurrence.

Finally, a weighted average result, as defined in the First Chicago Method (see 2.2. above) and expressed in IRR, was computed in order to be compared to the base case as well as traditional VC benchmarks.

### 2.5. Comparative Analysis vs. Traditional Early-Stage Investors

The base case results and their sensitivities were contrasted with the historical performance recorded for expert investors - essentially VC - under two portfolio configurations. The main variable to be compared is the “realized IRR” after exit.

- First, results were likened to the performance of a VC solely investing in the Cleantech space to eliminate, as much as possible, sectorial bias. This part of the analysis drew on the work done by Gaddy et al. around Cleantech VC returns based on datasets compiled by the Cleantech Group (Gaddy et al. 2016).

Second, this paper's results were compared to the average performance of diversified VC firms (often referred to as "agnostic" investment) over the last five years. This comparison acknowledges the fact that most early-stage investors constantly arbitrate between a range of asset categories and would simply opt out from Cleantech if the sector does not match their risk/return profile. Corresponding data for this benchmark were derived from data reported by the investment firm Cambridge Associates based on proprietary information (Cambridge Associates, 2018).

## 3. Results

This report is based on a central premise that Equity Crowdfunding (ECF) could be a financially attractive investment channel for early-stage investors, primarily for those interested in Cleantech. In summary, the paper's model results show that, while lagging diversified venture capital (VC) portfolios, as far as IRRs are concerned, equity ECF outperforms pure Cleantech VC's results in a significant manner (see Table 2). The investment horizon for the three financial protagonists included in this analysis is set to six years in order to minimize bias for this parameter. These results are encouraging as they show the disruptive potential of ECF in relation to capital formation in Cleantech. Such potential is heightened by the fact that ECF in the US has only been in effect for a short period of time (6 years) which means that it still presents a steep learning curve ahead for investors resorting to this type of investment.

**Table 2: Summary Financial Results (%)**

| | Equity Crowdfunding | Diversified VC | Cleantech VC |
|---|---|---|---|
| **Annualized IRR** | 9% | 15% | -17% |

*Source : Cambridge Associates, 2018; Gaddy et al., 2016; Signori et al., 2017; author's calculations*

### 3.1. Base Case Results

There are two main challenges for researchers aiming at analyzing returns for Equity Crowdfunding portfolios. First, the novelty of this financing mechanism - effectively introduced in the US in 2012 - means that there is a lack of a long-enough track record of investment cycles (from inception to exit) to serve as a benchmark. And there is also very limited published literature exploring the subject. The only notable exception to the latter challenge is the pioneering work from Signori and Vismara (2017) who recently issued their results concerning investments returns for the first generation of portfolios constituted via ECF platforms.

This paper essentially relies on these findings in order to build assumptions in terms of investment outcomes and financial performance. It is worth noting that the firms within the sample used by Signori and Vismara are spread across a variety of sectors beyond just Cleantech. That said, it is assumed in the paper's base case that ECF investments are only made in the most attractive Cleantech subsectors in order to maximize investors' financial returns. Therefore, this research considers that the assumption under which such portfolio yields would be at least similar to the average portfolio performance reported by Signori is a reasonable one.

As laid out by Signori et al. (2017), the research is centered around the calculation of the average annualized return to Equity Crowdfunding investors, considering three different outcomes: failure, activity without exit and successful exit (i.e., SEO and/or M&A). Out of their sample, Signori et al. show that 10% of early-stage investments failed, with investors losing their initial capital hence realizing a return of -100%. Second, around 60% of companies neither failed nor pursued further financial transactions. Since returns for this category of companies are unobservable, they should be set to zero. Eventually, 30% of firms within the sample were involved in subsequent equity deals after their initial crowdfunding offerings. As per Signori et al. (2017), the average return earned for companies that have raised further capital in SEO is 63% (See Figure 1 in Appendix 3 for further details).

As a final step, the returns associated with each category of outcome were weighted by their corresponding distribution. This analysis finds that the expected annualized IRR for an investor participating in an initial Equity Crowdfunding offering equals 9%. The detailed statistics of Signori's representative portfolio are reported in Appendix 4.

### 3.2. Sensitivity Scenarios Results

As described in the Methods section above, the robustness of the base case results was tested through two extreme scenarios. In the first scenario, labeled as Best Case, the number of successful exits was raised to 50% of the total portfolio with an average IRR set at 70% (vs. 63% in the base case). Secondly, a Low Case scenario assumes only 30% of firms achieve successful subsequent financing with an average IRR lowered to 53%.

It is worth keeping in mind that, in reality, these two scenarios would be much more unlikely than the base case. The unlikely occurrence of these outcomes is captured in the probability of success (PoS) assigned to them; i.e., 10% for the best case and 30% for the low case. Through the same methodology used to compute the base case returns, the best case and low case yield annualized IRR of 25% and -4% respectively (see Table 3).

**Table 3: Sensitivity Scenarios Financial Performance and Weighted Average**

| | Portfolio outcome (5-yr) | | | Annualized IRR | PoS |
|---|---|---|---|---|---|
| **Base case** | 30% success | 60% no exit | 10% failure | 9% | 10% |
| **Best case** | 50% success | 40% no exit | 10% failure | 25% | 60% |
| **Low case** | 20% success | 65% no exit | 15% failure | -4% | 30% |
| **Weighted avg** | | | | 8% | 100% |

*Source: Signori et al., 2017; author's calculations*

As recommended by the First Chicago method (see Methods above), the analysis then provided the weighted average return for these three scenarios based on their own PoS. The resulting annualized IRR is 8% which is coincidentally similar to the base case's result.

### 3.3. Comparing ECF to Cleantech VC

According to the research of Gaddy et al. (2016), $2 billion of early-stage money was invested by VC investors in Cleantech between 2006 and 2011 (see Figure 5). These investments yielded returns of $816 million which corresponds to an aggregate IRR of -17% over the investment term.

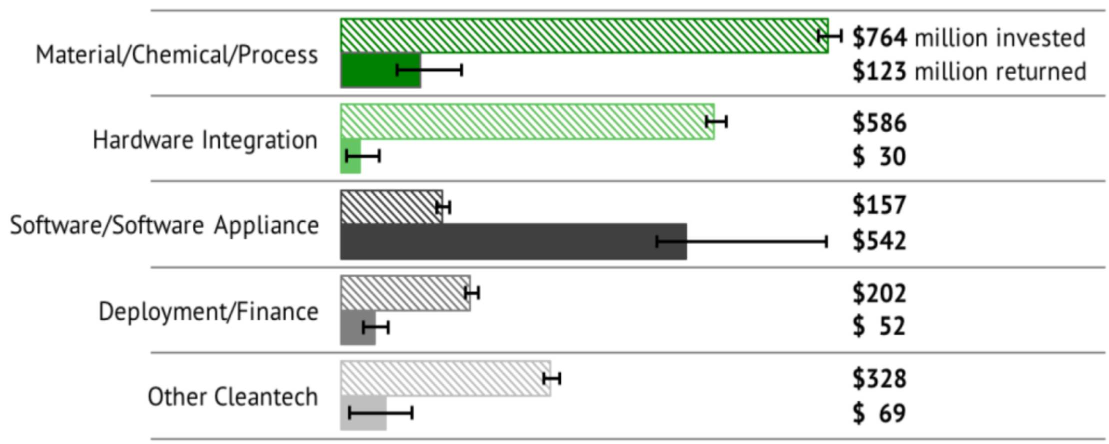



**Figure 5: Early-Stage VC Investment & Returns in Cleantech by Segment (2006-2011)**
*Source: Gaddy et al., MIT Energy Initiative, 2016*

As detailed in Introduction, the poor results for Cleantech VC investment are mainly explained by an unfavorable risk/return ratio over the considered period. Essentially, most firms turned out to be difficult to sell, tying up capital for longer than the 5-year time horizon preferred by VC operators (Gaddy et al., 2016). Also, they were overly capital-intensive to scale while the underlying technologies were still being developed. Third, these companies were also competing in very tense commodity markets, where margins for silicon solar panels and abundant oil and gas became slim making it challenging to invest in R&D processes while also operating. Finally, the likely acquirers among utilities and larger industrial competitors were reluctant to acquire risky start-ups at a premium given the growth prospects at that time. For most Cleantech start-ups, this meant that the resale price couldn't offer the hurdle returns investors expected. These factors conspired to destroy hundreds of millions of VC dollars and led to the sub-par reported returns (Gaddy et al., 2016).

Based on these results, current investors with interest in Cleantech would be better off participating in equity offerings via crowdfunding platforms than pooling their money in VC partnerships with an exclusive focus on Cleantech. To nuance these findings, it is fair to highlight the fact that since that first wave of early-stage investments analyzed by Gaddy, professional investors internalized the lessons of the early failures and most unit costs in Cleantech industries have been going down drastically. It would be, therefore, enlightening to compare - once available - the most recent financial returns from VC investors in Cleantech to their ECF equivalents. Furthermore, this point implies the need for more systematic and readily available monitoring of private capital performance in Cleantech whether through crowdfunding or expert investment.

### 3.4. Comparing ECF to Diversified VC

While relevant data for venture capital performance are also scarce, it remains less of a challenge for researchers to gather information related to diversified portfolios. Specifically, the Boston-based investment firm Cambridge Associates (CA) reports, on a quarterly base, the private capital performance in the US through its Cambridge Associates LLC US Venture Capital Index [8]. In its latest report, CA indicates that venture capital in the US realized an annualized IRR of 16% between 2012 and 2017 (see Table 4 below).

This performance was mainly driven by three buoyant sectors; healthcare, consumer products and IT which have recently dominated the venture capital space. In aggregate, they accounted for almost 87% of the sector's value as of end of 2017. They also attracted most of the investments with around 90% of capital invested in 2017 going into companies in these sectors. This is in line with long-term trends. For instance, healthcare and IT garnered more than $1 billion each in investments during the fourth quarter of 2017.

**Table 4: US Private Equity and Venture Capital Returns (as of mid-2018)**

| Index | 6 Mo | 1 Yr | 3 Yr | 5 Yr | 10 Yr | 15 Yr | 20 Yr | 25 Yr |
|---|---|---|---|---|---|---|---|---|
| CA US Private Equity* | 9.1 | 20.4 | 14.0 | 16.1 | 11.7 | 14.6 | 12.2 | 13.9 |
| Russell 2000® mPME | 7.6 | 17.6 | 10.5 | 12.7 | 11.0 | 10.5 | 8.9 | 9.4 |
| S&P 500 mPME | 2.6 | 14.5 | 11.7 | 13.8 | 10.6 | 9.4 | 7.5 | 8.7 |
| CA US Venture Capital | 10.2 | 17.2 | 7.4 | 16.0 | 10.2 | 10.3 | 21.7 | 29.8 |
| Nasdaq Constructed** mPME | 9.3 | 23.6 | 15.6 | 18.9 | 14.0 | 12.0 | 9.6 | 11.2 |
| Russell 2000® mPME | 7.6 | 17.5 | 10.7 | 12.7 | 10.9 | 10.7 | 8.9 | 9.8 |
| S&P 500 mPME | 2.6 | 14.5 | 11.8 | 13.7 | 10.6 | 9.6 | 7.5 | 9.3 |
| Nasdaq Composite*** AACR | 9.4 | 23.6 | 16.0 | 18.5 | 13.9 | 11.8 | 7.9 | 10.6 |
| Russell 2000® AACR | 7.7 | 17.6 | 11.0 | 12.5 | 10.6 | 10.5 | 8.0 | 9.6 |
| S&P 500 AACR | 2.6 | 14.4 | 11.9 | 13.4 | 10.2 | 9.3 | 6.5 | 9.6 |

*Source: Cambridge Associates LLC, Frank Russell Company, FTSE International Limited, Nasdaq, Standard & Poor's, and Thomson Reuters Datastream.*

[8] More on https://www.cambridgeassociates.com/private-investment-benchmarks/commentaries/

Unlike Cleantech-focused venture capital, the diversification of risk through the distribution of capital across a wide range of sectors provides “agnostic” VC with a significant edge over Cleantech ECF. Only the paper’s best case fares better than the average results boasted by diversified venture capital in the US, but the comparison is somewhat distorted by the low chance of occurrence of such scenario. A more meaningful comparison would be to juxtapose the results above to the base case.

This comparison must be nuanced in two ways. First, in an environmentally-constrained world with a growing focus on the transition towards sustainability, it is unrealistic to envisage that private investors would durably part ways with Cleantech as part of their portfolios despite profitability concerns. In fact, it could be argued that the weight of Cleantech in such portfolios would increase either through strategic conviction or government incentivization on the long run. Second, ECF investing remains in its infancy, and a 9% IRR appears to be a good start on which investors could build to reap higher returns as the activity matures.

## 4. Discussion

### 4.1. The Impact of ECF on Early-stage Capital Formation

As stated by De La Viña and Black (2018), the seminal research in this domain seems to indicate that the new Equity Crowdfunding regulations provide a structural change for start-up funding rather than vindicating the dependency on private capital markets. For now, ECF funding is primarily active during the pre-seed and seed stages of a startup’s lifecycle (i.e., after business plan finalization, but before or during operational start). However, it is anticipated that the latter series of equity funding may include an ECF component which will more likely coexist with more traditional investment agents. ECF, as a new entrant, disrupts the financing life cycle by being predominately active in projects at their early stages of development (Mollick, 2014). Consequently, it is anticipated that such disintermediation will compress the funding processes in terms of execution timeline (Miller, 2013). It is also expected to put downward pressure on the typical transaction capital costs incurred by start-up ventures.

In a further analysis, De La Viña et al. (2018) contend that the main difference between a traditional venture capital firm and an online crowdfunding platform is that investors –whether accredited or not– get a larger access to pre-vetted opportunities than they did in the past, where such opportunities were restricted to a select group of wealthy or professional investors. Also, the quality of available start-ups and the size of offerings in dollars is expected to improve progressively as platforms scale up by iterating an increasing number of offerings (De La Viña et al., 2018).

### 4.2. Can ECF Become a Major Financing Source for Startups?

That said, some fundamental challenges lie ahead of ECF before it gains more ground on traditional early-stage investment. Focusing on Equity Crowdfunding in the US, Agrawal et al. (2014) highlight the potential for crowdfunding platforms to amplify information asymmetries which commonly exist in early-stage ventures. Entrepreneurs are typically more privy to the details of a business venture than their potential investors, and this information asymmetry presents a risk in the evaluation of investment opportunities. This risk is increased by the lack of expertise of most investors using ECF. However, such risk is mitigated by the fact that, in many instances, non-accredited investors pool their resources and form syndicates, wherein a seasoned investor usually takes the lead role in performing the due diligence on potential investments, thus providing some solution to the information asymmetry challenge (Agrawal et al., 2014).

A sticking issue in responding to these challenges is that scholars have produced limited work about the dynamics of ECF. In particular, there is a question regarding the impact of Equity Crowdfunding on the long-term success of ventures electing to raise their initial capital through that channel (Mollick, 2013). However, the literature reports that there is a significant correlation between the ability of a company to access the necessary capital at the early stages of its formation and the ultimate success of its business (Gompers & Lerner, 2004; Gorman & Sahlman, 1989; Kortum & Lerner, 2000), and ECF is emerging as a nontraditional means to secure such funding (Mollick, 2013). While it remains unsure as to whether crowdfunding eventually supplants venture capital as the primary source of early-stage financing, it may be used to attract larger traditional capital. A relevant example of such is Pebble's campaign for its smartwatch which used Kickstarter – the largest crowdfunding platform in the world – for its initial funding, before attracting venture capital funding in later offerings (Dingman, 2013).

Also, there has been a significant retraction over the last ten years in Cleantech markets with startups not gaining access to enough capital needed to start and operate their businesses.

Therefore, crowdfunding can support entrepreneurs by offering them larger access to capital, particularly when traditional financing is not readily available (Bruton et al., 2015). As such, crowdfunding platforms can supplement other aspects of private investment and increase the flow of entrepreneurial innovation (Financial Conduct Authority, 2014).

According to Mollick and Nanda (2015), ECF investment can also serve as an influential signal to other players in the market, suggesting that a company presents attractive perspectives (Baum and Silverman 2004, Hellmann and Puri 2002). To substantiate this point, Mollick et al. (2015) argue that projects which were adequately funded by the crowd received consistently higher interest from experts and were subsequently much more likely to secure further funding from that category of investors.

### 4.3. On the Wisdom of the Crowd

#### 4.3.1. Wise or Mad? The Crowd vs. the Experts

Assuming that the crowd will play a growing part in the financing of early-stage entrepreneurship, comparing the judgment of crowds with that of experts becomes a fundamental question. For instance, crowdfunding where non-professional investors decide without intermediaries or compulsory professional advice heightens the risk that the crowd could act with a herd mentality leading to irrational behavior ("madness of the crowd"), among other collective decision-making pitfalls.

Even granted that crowds are not systematically irrational, they still have a tendency to express idiosyncratic tastes that can radically contradict recommendations emanating from experts. One of the key contributions of Mollick et al. in their 2015 research is to document strong congruence in the judgment of crowds and experts by demonstrating broad similarities between their investment selections and that crowds are generally consistent in their choices of which projects to back, hence rejecting a structural "madness of the crowd." An important nuance to this finding is that their research was primarily conducted in the highly subjective environment of arts financing. However, the authors state that their results were robust for a series of measurement variables that can apply to other sectors.

Even when decisions made by the crowd and experts diverge, Mollick et al. (2015) write that there is a lack of evidence that decisions supported by the crowd alone are bound to perform worse than those of the experts. In their representative sample, the projects selected by the crowd succeeded 93% of the time, when those selected in conjunction between crowds and experts succeeded 100% of the time (Mollick & Nanda, 2015).

### 4.3.2. Crowds as a Complement to Experts?

One main difference, though, between the two types of investors relates to the presentation style of the offering, rather than the fundamental quality of the actual project itself. The crowd is particularly sensitive to "crowdfunding friendly" proposals which rely, for instance, on videos and catchy graphics. Similarly, professional investors are attentive to specific signals for consideration such as the degree of formality of a proposal or the presence of sophisticated financials (Mollick et al., 2015).

In this sense, Mollick's research – in support of this paper's results – provides evidence of the critical role that crowdfunding could have in providing an alternative route for the success of meaningful projects which would not garner enough interest among professional investors. Building on this evidence, the transition from a financing system exclusively led by professionals to another where the crowd and experts work in conjunction may positively impact the variety of innovations produced (Sah and Stiglitz 1986), hence allowing more ideas to come to fruition and an increased quality of innovation (Kornish & Ulrich 2011, Terwiesch & Ulrich 2009).

However, saying that the crowd holds a positive value in financial decision making does not render the role of experts obsolete. For example, experts tend to be less swayed by the salesmanship of a business pitch, as evidenced earlier by the lower importance they appear to grant to stylistic dimensions. These findings support the notion that, in a financing environment where crowdfunding plays a growing role, there is still a critical contribution to be brought by financial experts. As such, this paper hints at the need for more collaboration between the crowd and professional investors in order to cover their mutual blind spots, but also to act as complementary financing channels for innovation, chiefly in Cleantech.

A valid criticism, at this stage, may point again at the fact that the analysis referred to was mainly conducted for artistic projects. Mollick and his co-authors allude to this limitation by asserting their belief that their key conclusion is likely to be generalized to other settings where the crowd is an end user for the product being financed and therefore might be well positioned to judge the project adequately. Although this has been shown to be true for many artistic segments (Mollick et al., 2015), the belief formed throughout this paper is that there are also aspects of technological innovation – including Cleantech – where crowds can play a crucial role in complementing experts as sources of capital. For instance, Kickstarter has proven instrumental in fostering innovation in areas as diverse as gaming, consumer-based Internet technologies, 3D printing, and smart wearables. From a financing standpoint, several start-ups that have raised their initial funding on Kickstarter were later reported to have raised traditional venture capital, further confirming the growing role that crowdfunding can play in reinforcing validation of "commercial traction" for professional investors (Mollick et al., 2015). Beyond hope, the conviction stemming from this study is that the nascent synergy in other fields can be reproduced in the Cleantech space.

## 5. Conclusion & Recommendations:

This paper builds on the ground-breaking research related to Equity Crowdfunding and its returns. Furthermore, it expands its scope of work by being the first to compare the financial performance of ECF to venture capital professionals whether investing solely in the Cleantech space or across a large spectrum of sectors.

The results of the analysis show that ECF ranks between diversified VC and Cleantech pure players in terms of IRR. While ECF, at this early stage of its existence, still lags diversified private investment, it seems to hold promising perspectives for investors with a focus on Cleantech. As concluded by Mollick et al. (2015) and confirmed by Signori et al. (2017), a significant fraction of companies that raised funds through crowdfunding has gone on to raise further funds with higher valuations. While this is not a guarantee of a favorable monetary return to initial crowdfunding investors, it is an important market signal indicating that there is a tangible prospect for investors. In practical terms, the aforementioned conclusions suggest that ECF may be a viable source of entrepreneurial financing for start-ups with a positive environmental impact. Given the current scarcity of data and the novelty of the subject, this study's author also suggests the need for a more systematic reporting of ECF investments and exit performances. An even more compelling measure would be to create a central repository for such information with ECF platforms themselves upgrading their levels of disclosure.

The implications of this paper, as stated above, are of primary significance for private investors. However, the findings also generate interesting implications for Cleantech entrepreneurs considering crowdfunding as a financing source. It shows that ECF is not only a "last resort" for startups unable to garner validation from experts – a digital "market for lemons"[9] of sorts – but can also provide satisfactory financial returns as well as momentum for future capital offerings.

Furthermore, the results confirm that the crowd, as a complement to professional financiers, has the potential to foster innovation, lower barriers to early-stage capital, and further democratize the entrepreneurial experience by helping bring more ideas to compete in the marketplace. Adding to the conclusions of Mollick et al. (2015), it is important to reiterate that much more than mutually exclusive investment vehicles, ECF and traditional VC are complementary chiefly by validating each other's judgment in terms of investment selection. Besides, a successful ECF campaign sends a positive signal to professional investors as for the market potential of a startup they might be considering for further funding. Hence, ECF funding can be a "bridge" between the early-stage phase of a startup's life and its later stages of financing.

That said, the growing role of crowdfunding in private investment raises the question of what is forsaken when bypassing traditional venture capital. Two main aspects can be presented as an answer. First, VC operatives play an important role in building businesses beyond investment. Through maintaining close and direct relations to entrepreneurs, they identify operational and managerial gaps obstructing a company's establishment and expansion. By tapping into their network of legal advisors, strategic partners and potential financial backers, professional investors can greatly contribute to filling such gaps. Second, VC firms put an important emphasis on ensuring that the interests of financial investors remain aligned with those of the funded entrepreneurs. With regular and organized monitoring, they contribute to minimize the risk of exuberant behavior or even capital dilapidation. As of today, the diffuse and impersonal ownership through ECF does not allow for such types of supervision and support to entrepreneurs.

[9] "The Market for Lemons: Quality Uncertainty and the Market Mechanism" is a 1970 economics paper by Nobel Prize winner George Akerlof which examines how the quality of goods traded in a market can degrade in the presence of information asymmetry between buyers and sellers. Retrieved on https://en.wikipedia.org/wiki/The_Market_for_Lemons

Thus, another key recommendation is to undertake further research on how crowdfunding platforms could integrate more exhaustive monitoring mechanisms – besides the streamlined stipulations of the Jobs Act – to minimize investors' risk and bring more operational support to entrepreneurs. This issue is crucial to the continuity of their growth as frauds and investment failures would lead to substantial harm to their reputation and attractiveness. A first step would involve more joint investments between VC firms and syndicates of ECF investors during the same funding round. The British startup Revolut constitutes an encouraging example as it recently secured $66 million in funding from Index Ventures - one of the most reputable VC funds in the world - while raising in parallel $5 million on the crowdfunding platform Seedrs in order to gain further market traction (M. Gajewski, 2018).

**References**

Agrawal, A., Catalini, C., & Goldfarb, A. (2014). Some Simple Economics of Crowdfunding. Innovation Policy and the Economy,14(1), 63-97.

Baum, J. & Silverman, B. (2004). Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups. J. Bus. Venturing 19(3):411–436.

Blohm, I., Sieber, E., Schulz, M., Haas, P., Leimeister, J. M., & Wenzlaff, K. (2014). Delphi-Studie Crowdfunding 2020.—Komplement oder Substitut für die Finanzindustrie. Norderstedt.

Bruton, G., Khavul, S., Siegel, D., & Wright, M. (2015). New financial alternatives in seeing entrepreneurship: Microfinance, crowdfunding, and peer-to-peer innovations. Entrepreneurship Theory and Practice, 39(1), 9–26.

Cambridge Associates. "Commentaries." Accessed January 02, 2019. https://www.cambridgeassociates.com/private-investment-benchmarks/commentaries/.

Crowdfund Capital Advisors. "Data - CCLEAR Crowdfunding Data." Accessed November 30, 2018. http://crowdfundcapitaladvisors.com/data/.

De La Viña, L., & Black, S. (2018). US Equity Crowdfunding: A Review of Current Legislation and A Conceptual Model of the Implications for Equity Funding. The Journal of Entrepreneurship, 27(1), 83-110.

Dingman, S. (2013). Canadian smartwatch startup VC funding. The Globe. Retrieved 3 November 2018, from https://www.theglobeandmail.com/technology/business-technology/canadians-smartwatch-startup-matchesrecord-15-million-in-vc-funding/article11965214/

Emmerson, L. (2015). Crowdfunding industry overtakes venture capital and angel investing. Crowdfunding trends. Retrieved 22 April 2018, from http://blog.symbid.com/2015/trends/crowdfunding-industry-overtakesventure-capital-and-angel-investing/

Fowler, B. (2015). New Equity Crowdfunding rules. Legal I0. Retrieved 15 April 2018, from http://www.lawgives.net/blog/equity-crowdfundingwhat-does-regulation-a-mean-

Freeman, M. & and Zhang, C. (2018). "Major Funding Pledges Won't Close the Clean Energy Investment Gap." Scientific American Blog Network. Accessed April 24, 2019. https://blogs.scientificamerican.com/observations/major-funding-pledges-wont-close-the-clean-energy-investment-gap/.

Gaddy, B., Sivaram, V. & O'Sullivan, F. (2016). "Venture Capital and Cleantech: The wrong model for energy innovationn." Energy Policy, 102, 385-395.

Gajewski, M. (2018). "Crowdfunding – Is It worth It?" MIT Enterprise Forum CEE. Accessed March 02, 2019. https://mitefcee.org/10-surprising-technologies-that-can-make-a-difference-2-2/.

Gilbert, J. Cleantech Group. Retrieved May 02, 2019. https://www.Cleantech.com/Cleantechs-four-1000000000-sectors/.

Gompers, P. A., & Lerner, J. (2004). The venture capital cycle. Cambridge, MA: MIT Press.

Gorman, M., & Sahlman, W. A. (1989). What do venture capitalists do? Journal of Business Venturing, 4(4), 231–248.

Harris, R.S., Jenkinson, T., & Kaplan, S.N. (2015). How Do Private Equity Investments Perform Compared to Public Equity? SSRN Working Paper.

Hellmann, T., Puri, M. (2002) Venture capital and the professionalization of start-up firms: Empirical evidence. J. Finance 57(1):169–197.

Humpert, L. "Bremen." Techstars. March 17, 2017. Accessed April 28, 2019. http://communities.techstars.com/germany/bremen/blog/content/community/whats-Cleantech.

IRENA. "Perspectives for the Energy Transition: Investment Needs for a Low-carbon Energy System." International Renewable Energy Agency. March/April 2017. Accessed April 28, 2019. https://www.irena.org/publications/2017/Mar/Perspectives-for-the-energy-transition-Investment-needs-for-a-low-carbon-energy-system.

Kaplan, S., & Schoar, A. (2005). Private Equity Performance: Returns, Persistence and Capital Flows. Journal of Finance, 60, 1791-1823.

Kortum, S., & Lerner, J. (2000). Assessing the contribution of venture capital to innovation. RAND Journal of Economics, 31(4), 674–692.

Mass Solutions. (2015). Crowdfunding industry report. Retrieved 10 April 2019, from http://www.crowdsourcing.org/editorial/global-crowdfundingmarket- to-reach-344b-in-2015-predicts-massolutions-2015cf-industryreport/45376

McDermontt Will & Emery. (2013). SEC's new crowdfunding explained. Retrieved 5 April 2019, from https://www.mwe.com/en/pressroom/2013/10/secs-new-crowdfunding-rules-explained

Miller, B. (2013). Crowdfunding will transform finance forever. The Fundrise Blog. Retrieved 12 November 2018, from http://blog.fundrise.com/post/51571350796/crowdfunding-will transform-finance-forever

Mollick, E. (2013). Swept Away by the Crowd? Crowdfunding, Venture Capital, and the Selection of Entrepreneurs. Available at SSRN: https://ssrn.com/abstract=2239204 or http://dx.doi.org/10.2139/ssrn.2239204

Mollick, E. (2014). The dynamics of crowdfunding: An exploratory study. Journal of Business Venturing, 29(1), 1–16.

Mollick, E., Nanda, R., & Harvard Business School. (2015). Wisdom or Madness? : Comparing Crowds with Expert Evaluation in Funding the Arts.

National Climate Assessment. "NCA2014." Accessed November 04, 2018. https://nca2014.globalchange.gov/report

Saha, D. & Muro, M. (2017) "Cleantech Venture Capital: Continued Declines and Narrow Geography Limit Prospects." Brookings.edu, The Brookings Institution. www.brookings.edu/research/Cleantech-venture-capital-continued-declines-and-narrow-geography-limit-prospects/.

Sahlman, W. (1988). Aspects of Financial Contracting in Venture Capital. Journal of Applied Corporate Finance, 1(2), 23-36.

SEC. (2015). Proposed rule amendments to facilitate intrastate and regional securities offerings. Retrieved 25 April 2019, from http://ftp.sec.gov/rules/ proposed/2015/33-9973.pdf

Signori, S., & Vismara, S. (2018). Does success bring success? The post-offering lives of equity-crowdfunded firms. Journal of Corporate Finance, 50, 575-591.

## Appendix 1 _ US JOBS Act Details (1/2)

| | The JOBS Act | | | | |
|---|---|---|---|---|---|
| | Title II | | Title IV (Reg A+) | | |
| | 506(b) | 506(c) | Tier 1 Reg A+ | Tier 2 Reg A+ | Title III |
| Maximum Raise | No restriction | No restriction | US$20M per 12 months | US$50M per 12 months | US$1M per 12 months |
| State Registration ('Blue Sky Laws') | Yes | Depends | Yes | No | No |
| General Solicitation Allowed | No | Yes | Yes | Yes | Yes |
| Online Crowdfunding sites allowed | No | Yes | Yes | Yes | Yes |
| SEC Registration | Only Form D | Only Form D | Yes with possible exemptions | Yes with possible exemptions | Only Form C with possible exemptions |
| Audited Financials Required | No | No | Reviewed Financials (not audited) | Two years of audited financial statements | <US$100,000 then not required; US$100,000–US$500,000 then reviewed; >US$500,000 then audited |
| Limit for Accredited Investor | None | None | None | None | None |

Source : De la De La Viña, L., & Black, S. (2018). Adapted from SEC (2015).

## Appendix 2 _ US JOBS Act Details (2/2)

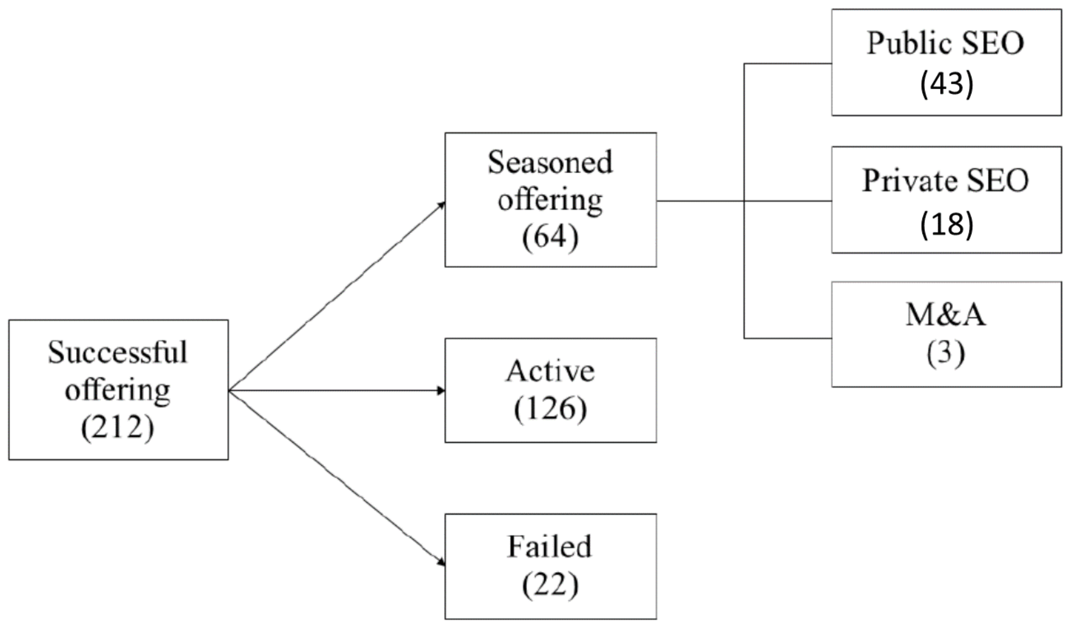
| | The JOBS Act | | | | |
|---|---|---|---|---|---|
| | Title II | | Title IV (Reg A+) | | |
| | 506(b) | 506(c) | Tier 1 Reg A+ | Tier 2 Reg A+ | Title III |
| Shareholder Limits | 35 non-accredited and unlimited accredited | 2000 accredited only | None with conditions | None with conditions | Unlimited |
| Unrestricted Securities | No | No | Yes | Yes | Yes |
| Transfer Restriction | 1 year | 1 year | None | None | 1 year, except to issuer or accredited investor |
| Intermediary | None Required | None Required | None Required | None Required | Funding portal or broker dealer; Internet portal required |
| Limit for Non-accredited | Requires disclosure documents that are the registered offerings | Non-accredited investors excluded | No Limit | 10% of annual income or net worth whichever is greater | If net worth or annual income <US\$100,000, limit = greater of 5% or US\$2,000; if net worth or annual income >US\$100,000, limit = 10% not to exceed US\$100,000 |

**Source:** Adapted from information provided by SEC (2015).

Source : De la De La Viña, L., & Black, S. (2018). Adapted from SEC (2015).

## Appendix 3

**Post-offering Outcomes of Equity Crowdfunding Projects**
Post-offering scenarios of 212 funded offerings on ECF platform Crowdcube from 2011 to 2015. The observation date is end of March 2016.




*Source: Signori et al., Journal of Corporate Finance, 2017*

# Appendix 4

**Descriptive Statistics of an ECF Representative Portfolio**

| | All sample (212 obs) | Post-offering scenarios SEOs (64 obs) | Active (126 obs) | Failed (22 obs) | SEOs Public (47 obs) | Private (22 obs) | M&A (3 obs) |
|---|---|---|---|---|---|---|---|
| Return (%) | 8.8 | 63.5*** | 0.0** | -100.0*** | 69.1 | 61.2 | 48.8 |
| Age (months) | 67.3 | 52.3* | 79.3*** | 41.4* | 49.7 | 62.3 | 30.8 |
| Diversification (no.) | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.2 | 1.3 |
| Positive sales (%) | 53.3 | 62.5* | 54.8 | 18.2*** | 53.2*** | 81.2** | 100.0 |
| Non-executive directors (%) | 9.0 | 18.8*** | 4.8*** | 4.5 | 12.8** | 36.4*** | 66.6** |
| Patents (%) | 8.0 | 12.5 | 6.3 | 4.5 | 8.5 | 13.6 | 33.3 |
| Target capital (£k) | 197.9 | 207.9 | 206.1 | 122.3 | 180.2 | 194.2 | 553.3** |
| Equity offered (%) | 14.8 | 13.1* | 15.5 | 15.4 | 13.4 | 12.2 | 9.3 |
| Voting rights (%) | 75.5 | 62.5*** | 80.2* | 86.4 | 57.4 | 72.7 | 100.0 |
| SEIS (%) | 46.7 | 56.3* | 42.1 | 45.5 | 59.6 | 59.1 | 0.0** |
| No. investors (no.) | 144.9 | 174.5 | 141.7 | 77.2* | 137.1* | 179.6 | 778.0*** |
| Quick success (%) | 10.4 | 12.5 | 9.5 | 9.1 | 14.9 | 18.2 | 0.0 |
| Professional investor (%) | 6.6 | 12.5** | 4.8 | 0.0 | 4.3*** | 31.8*** | 33.3 |
| SEOs (no.) | - | 1.6 | - | - | 1.7 | 2.1*** | 1.7 |
| Time to first SEO (months) | - | 24.7 | - | - | 26.2 | 19.8* | 16.4 |
| Total capital raised (£k) | - | 2,309.3 | - | - | 697.8** | 1,975.8 | 29,082.5*** |
| SEO size (£k) | - | 1,955.7 | - | - | 455.9* | 1,113.8 | 28,590.3*** |
| SEOs within 1 year (no.) | - | 1.0 | - | - | 1.0 | 1.5*** | 1.3 |

*Source: Signori et al., Journal of Corporate Finance, 2017*

## Appendix 5 - Startups Funding Rounds by Stage

Source: Law R., “The SAAS Growth Blog”, 2017 (Adapted from)

### 1. PRE-SEED

Before reaching out to professional investors, a typical pre-seed round sees a founding team (often pre commercial launch) raise a small investment in order to be ready for a formal seed investment from seasoned investors. This startup phase covers from hiring a founding team member to developing a prototype. Pre-seed financing is often used to bridge the capital gap to the next funding round.

- Average Funding Amount: <$1 million
- Typical Company Valuation: $1–3 million
- Common Investors: Friends and family, early-stage angel investors, startup accelerators

### 2. SEED/Early-Stage

Seed round capital is usually meant to fund product development and facilitate early revenue generation.

At this stage, investors expect early signs of Product/Market Fit and some level of market traction (e.g. order backlog, or month-on-month revenue growth), paving the way for later fundraising.

Until recently, seed rounds were the dominion of angel investors, but the proliferation of well-funded VC funds and a huge range of startups to invest in has attracted more VC firms into seed round investment.

There is actually a significant variance in seed sizes: the median angel-funded seed size, as reported by Law (2017), is around $150,000, but the median VC-led seed size is closer to $1.5 million. The involvement of VCs leads to seed rounds 10x larger than those led by angel investors —with the largest seed round in 2015 reaching $10 million.

- Average Funding Amount: $1.7 million
- Typical Company Valuation: $3–6 million
- Common Investors: Angel investors, early-stage VCs, startup accelerators

**3. SERIES A**

The Series A stage is centered around revenue growth. At such a point, a startup is expected by investors to have clear and growing evidence of Product/Market Fit, translating into significant revenue growth from new customers and increasing Average Revenue per Account (ARPA).To maintain a high growth rate, founders are required to adopt new sales and marketing processes and identify new commercial channels. Venture Capital firms usually dominate this stage.

- Average Funding Amount: $10.5 million
- Typical Company Valuation: $10–15 million
- Common Investors: VC funds, large angel investors' syndicates

**4. SERIES B**

In Series B, investors are focused on reaching the next stage of growth: i.e. the ability to scale your product and customer base up. In fact, a successful Series B investment might permit a startup to make more expensive hires across an array of key departments, expand into different market segments or experiment with different revenue streams. Seldomly, Series B money will be used to buy-out other companies offering a competitive advantage.

- Average Funding Amount: $24.9 million
- Typical Company Valuation: $30–60 million
- Common Investors: VCs, late-stage VCs

**5. SERIES C+**

Series C rounds are raised to fuel large-scale expansion, like moving into a new market (e.g. international expansion), or to fuel acquisitions of other businesses.

From Series C onwards, there is, in principle, no limit to the number of investment rounds a startup can raise: some companies will go on to raise investment through Series D, E and even beyond. Given the relatively low number of startups that make it to this point, there is a significant variance in the amounts raised, with investment determined on a case-by-case basis.

- Average Funding Amount: $50 million
- Typical Company Valuation: $100–120 million
- Common Investors: Late-stage VC funds, private equity firms, hedge funds, banks.